CRREL Report 12

BIBLIOGRAPHY ON SNOW ICE AND FROZEN GROUND WITH ABSTRACTS

Volume XXII

JUNE 1968

U.S. ARMY MATERIEL COMMAND
COLD REGIONS RESEARCH & ENGINEERING LABORATORY
HANOVER, NEW HAMPSHIRE

CRREL Report 12

BIBLIOGRAPHY ON SNOW ICE AND FROZEN GROUND
WITH ABSTRACTS

Volume XXII

JUNE 1968

U.S. ARMY MATERIEL COMMAND
COLD REGIONS RESEARCH & ENGINEERING LABORATORY
HANOVER, NEW HAMPSHIRE

CONTENTS

INTRODUCTION

The Bibliography on Snow, Ice and Frozen Ground with Abstracts, CRREL Report 12, was first published in 1951 and is the annual publication of a continuing project of the Cold Regions Bibliography Section in the Science and Technology Division of the Library of Congress. It is prepared for the Cold Regions Research and Engineering Laboratory (CRREL) of the U. S. Army Materiel Command, formerly U. S. Army Snow, Ice and Permafrost Research Establishment (SIPRE) of the Corps of Engineers. Volumes 1-15 were issued as the Bibliography on Snow, Ice and Permafrost, SIPRE Report 12. Beginning with Volume 16, the designation was changed to CRREL Report 12, and with Volume 20, the title was further changed to the present form. The current Volume 22 contains abstracts SIP 25201-26000.

The Bibliography provides USA CRREL with a current and comprehensive coverage of basic and applied scientific research on snow, ice, and frozen ground, as well as living and working in polar regions and other cold areas.

Each entry includes a bibliographic citation, code designating the library holding of the abstracted item (see p. vi), assigned call number, Universal Decimal Classification number, and the abstract. The abstracts were written by Jane E. Boerner, Benjamin L. Evans, Wan-Wan Li, Frank M. Marson, Diana M. Niskern, Vladimir D. Pastuhov, Arthur G. Renstrom, Dorine A. Smith, Geza T. Thuronyi, and Natalie S. Voshinin.

Requests for materials abstracted should not be addressed to USA CRREL. Where copyright regulations permit, photocopies of materials in the collection of the Library of Congress may be purchased from the Photoduplication Service, Library of Congress, Washington, D. C. 20540. U. S. Government technical reports, including those designated as located in the Defense Documentation Center may, in most cases, be obtained from the Clearinghouse for Federal Scientific and Technical Information, Springfield, Va. Other materials should be ordered from the publisher or consulted at the designated library.

The volume was prepared by Frank M. Marson, Supervising Editor, Calvin L. Clark and Odessa Swann.

Geza T. Thuronyi, Head
Cold Regions Bibliography Section
Science and Technology Division
Library of Congress

LIBRARY SYMBOLS

DDC	--	Defense Documentation Center Cameron Station, Alexandria, Va.
CRREL	--	Cold Regions Research and Engineering Laboratory Hanover, N.H.
DGS	--	Department of the Interior Geological Survey Library Washington, D.C.
DNAL	--	National Agricultural Library Washington, D.C.
DLC	--	Library of Congress Washington, D.C.
CFSTI	--	Department of Commerce Clearinghouse for Federal Scientific and Technical Information Springfield, Va.

ABSTRACTS

SIP 25201 551.461:550.312

Debenham, Frank
WHEN THE ICE MELTS. Geogr. Mag., 34(11):630-638 incl. illus., diagr., map, March 1962.
DLC, G1.G343

About 10% of the world's land area is covered with ice. If all this ice were to melt and be distributed only over present ocean areas, sea level would rise by about 200 ft. However, the spreading of the water over land, increasing the area of the sea, would have the effect of reducing the rise to 180 ft. The fact that much of Antarctica's ice is already below present sea level further reduces the figure, bringing the rise down to about 150 ft. According to the principle of isostasy, the addition of the extra weight of water would lower the sea floor, and thus the sea level, by about 50 ft. The effective rise in sea level would then be 100 ft over the present level. The current state of knowledge of geophysics is such that it is impossible to do more than make a reasonable assumption about these changes in sea level. -- DMN

SIP 25202 551.574.42

Buchinskiĭ, V. E.
ALBUM OF ICING FORMS ON WIRES. (Atlas obledeneniĭa provodov; Text in Russian). Leningrad, Gidrometeorologicheskoe Izdatel'stvo, 115p. incl. illus., table, diagrs, 1966. 4 refs.
DLC, TK3231.B62

The enlarged edition of the Album, initially published in 1955 (see SIP 13432), contains a detailed classification and description of the forms and diversities of icing on transmission and communication lines. The meteorological phenomena determining the formations are described. New data shows icing effects on network wires. Selected photographs show typical icing deposits including cross-section views and details of the microstructure. -- VDP

SIP 25203 581.5:551.34:528.715(*49)

Johnson, Philip L. and Theodore C. Vogel
VEGETATION OF THE YUKON FLATS REGION, ALASKA. Res. Rept. 209, U.S. Army Cold Regions Research and Engineering Laboratory, 53p. incl. illus., tables, graphs, diagr., maps, appendixes A-B, Nov. 1966. 30 refs.
CRREL files

This paper describes the characteristic vegetation types and their ecology in the Yukon Flats Region, Alaska, and associates aerial photographic patterns with these types. The discussion includes the physiographic setting, vegetation patterns, forest fires, bog succession, the selection of sample sites, vegetation sampling, photographic interpretation, composition and structure of vegetation, and radar and thermal imagery. Appendix A lists the scientific and common names of plants, while Appendix B tabulates selected soil samples from vegetation stands. Ground and air reconnaissance were used to select 43 stands representative of the common plant communities. Ten individual trees were harvested by meter increments, and stem, branch, and leaf components were weighed. Three kinds of vegetation type maps were constructed from an examination of aerial photography by application of the ground data to photo interpretation. -- BLE

SIP 25204 551.578.482:167.7

de Quervain, M. R.
PROBLEMS OF AVALANCHE RESEARCH. p. 15-22 incl. diagrs. (In: International Symposium on Scientific Aspects of Snow and Ice Avalanches, April 5-10, 1965, Davos, Switz., Publ. No. 69, Int. Assoc. Sci. Hydrol., 1966). 18 refs.
DLC, GB651.I63

The questions to be answered about avalanches may be classified under: (1) types, location, and frequency of occurrence, (2) reason and manner of formation, and (3) movement process and effects. Two branches of genetic studies must be distinguished; (1) the problem of the genesis of certain types of snow or certain strata, and (2) the pure mechanics of avalanche formation. The most complex problem in avalanche genesis is probably the influence of temperature, be it conductive or radiant heat. Other basic factors are fresh snow deposits, stratification of the old snow cover, and wind action. A definition of avalanche velocity is given and different types of friction involved in moving snow are described. -- BLE

SIP-25205 551.578.482(*531.9)

Akkouratov, V. N.
METEOROLOGICAL CONDITIONS OF AVALANCHE FORMATION IN THE KHIBINY. p. 35-42 incl. graphs, diagrs. (In: International Symposium on Scientific Aspects of Snow and Ice Avalanches, April 5-10, 1965, Davos, Switz., Publ. No. 69, Int. Assoc. Sci. Hydrol., 1966). 3 refs.
DLC, GB651.I63

Information is presented about the number of avalanches and their distribution on slopes with different exposure, numerical characteristics of the possibility of avalanche formation of different volume in avalanche deposits, and relationships between avalanches and transfer and wastage of snow. A diagram is given for estimating the onset of snow drift avalanches. The role of solid precipitation and air temperature in the formation of avalanches are discussed, and a brief classification is given. (Author's abstract)

SIP 25206 551.578.46:531.74:551.578.48

Martinec, Jaroslav
SNOW COVER DENSITY CHANGES IN AN EXPERIMENTAL WATERSHED. p. 43-52 incl. tables, graphs, map. (In: International Symposium on Scientific Aspects of Snow and Ice Avalanches, April 5-10, 1965, Davos, Switz., Publ. No. 69, Int. Assoc. Sci. Hydrol., 1966). 5 refs.
DLC, GB651.I63

Factors influencing the accumulation and properties of snow are investigated in an experimental mountain water shed. As the area comprises a slope with a frequent occurrence of avalanches, the obtained results may also be applied to the problem of avalanches. Although a grent variability in the total snow deposit was observed, there is a consistent occurrence of the deepest snowpacks in one place with avalanche danger. The gradual increase in the snow density during the winter season was measured and a method of calculating it derived. As the density differences between the layers of a snowpack diminish with time, special apparatus must be used to determine layers of different structure to indicate avalanche conditions. On the basis of measurements of the effect of air temperature and wind velocity on changes in the water content, the weight of a snowpack was determined by a radioactive snow gage and by weighing snow samples. (Author's abstract)

SIP 25207 551.578.482:551.578.466:551.43(*234.9)

Kotlyakov, V. M. and M. Ya. Plam
THE INFLUENCE OF DRIFTING ON SNOW DISTRIBUTION IN THE MOUNTAINS AND ITS ROLE IN THE FORMATION OF AVALANCHES. p. 53-60 incl. tables, graphs. (In: International Symposium on Scientific Aspects of Snow and Ice Avalanches, April 5-10, 1965, Davos, Switz., Publ. No. 69, Int. Assoc. Sci. Hydrol., 1966). 5 refs.
DLC, GB651.I63

The paper discusses two indirect methods of determining precipitation, determines the relationship between the solid precipitation and its transport during the snow storms, touches on the problem of snow concentration in the wind shadow, and draws some general conclusions as to the role of snow storms in the formation of glaciers and avalanches and to the possibilities of preventing avalanches. The experimental studies from which the conclusions are drawn were carried out in the Elbrus area. (Authors' abstract)

SIP 25208 551.578.482:551.584.3

Zingg, Th.
RELATION BETWEEN WEATHER SITUATION, SNOW METAMORPHISM AND AVALANCHE ACTIVITY. p. 61-64 incl. table. (In: International Symposium on Scientific Aspects of Snow and Ice Avalanches, April 5-10, 1965, Davos, Switz., Publ. No. 69, Int. Assoc. Sci. Hydrol., 1966).
DLC, GB651.I63

The weather acts especially on the surface layer of a snow cover. The poor heat conductivity of snow is responsible for the thermal instability of a snow cover. This instability produces moisture transport in the upper levels and at the same time a metamorphism of the snow crystals into new shaped grains. This changes also the mechanical and physical properties of the snow cover. The phenomenon depends very much on the depth of the new fallen snow and the whole snow cover. The temperature gradient and the effective temperature of the snow determine the structure and grain shape of the snow. Avalanche activity depends on the stratigraphy and on the current weather. Important are: amount and kind of snowfall, wind action, (separately or in connection with snowfall), temperature, radiation, and rain (especially early in the winter and in spring. (Author's abstract, modified)

SIP 25209 551.578.482:551.579.2(494)

Ambach, W. and F. Howorka
AVALANCHE ACTIVITY AND FREE WATER CONTENT OF SNOW AT OBERGURGL (1980 m a.s.l., SPRING 1962). p. 65-72 incl. illus., graphs., diagr. (In: International Symposium on Scientific Aspects of Snow and Ice Avalanches, April 5-10, 1965, Davos, Switz., Publ. No. 69, Int. Assoc. Sci. Hydrol., 1966).
DLC, GB651.I63

The free water content of snow was determined daily by measuring the dielectric constant of the snow at different depths. Other climatological data were also taken. Free water content was measured with a new instrument, a plate capacitor, which is rammed into the snow. The capacitor consists of 7 plates (13 x 13 cm) spaced 2 cm apart, so that its average volume is about 1500 cm^3. The capacitance depends on the dielectric constant of the snow. A small amount of free water causes a significant rise in the capacitance due to the high value of the dielectric constant of water and the low value of snow. The evaluation of the measurements is facilitated by means of a nomograph which also includes the dependence of the readings of snow density. Accuracy is ± 0.5 vol. per cent of free water. High avalanche activity was found to be correlated with a high value of the free water content, caused by large positive values of the heat budget. -- BLE

SIP 25210 551.578.482:551.482.4

Iveronova, M. I.
THE HYDROLOGICAL ROLE OF AVALANCHES. (Le rôle hydrologique des avalanches; Text in English with French title). p. 73-77. (In: International Symposium on Scientific Aspects of Snow and Ice Avalanches, April 5-10, 1965, Davos, Switz., Publ. No. 69, Int. Assoc. Sci. Hydrol., 1966). 15 refs.
DLC, GB651.I63

The necessity for studying the avalanche factor in the hydrological investigations of highland regions is advanced in this report. The role of the avalanches in the nourishment of glaciers, the disturbance of the winter regime of river run-off, and the formation of floods by mudflows is pointed out. The main hydrological role of avalanches is their creation of avalanche snow deposits, the hydrological processes (melting, evaporation, infiltration) which differ sharply from the same processes inherent in snow cover. Some specific examples show that even in regions with weak avalanche activity, about 10-30% of the snow cover is carried away by avalanches, whereas in regions with abundant avalanches, meltwater from avalanche deposits can produce about 50% of the average annual runoff of the catchment area. (Author's abstract)

SIP 25211 551.578.482:551.482.4(235.21)

Sosedov, I. S. and I. V. Seversky
ON HYDROLOGICAL ROLE OF SNOW AVALANCHES IN THE NORTHERN SLOPE OF THE ZAILIYSKY ALATAU. p. 78-85 incl. tables, graphs. (In: International Symposium on Scientific Aspects of Snow and Ice Avalanches, April 5-10, 1965, Davos, Switz. Publ. No. 69, Int. Assoc. Sci. Hydrol., 1966). 10 refs.
DLC, GB651.I63

The paper is based on quantitative field observations. On the northern slopes of the Zailiisky Alatau range, snow deposits are extensive and well developed. In the zone of rugged topography (1600-3000 m) they are formed by snow avalanches and fill the lateral valleys and ravines in ribbonlike form. Avalanches are formed mainly in the spring on the northfacing slopes. They scour considerable areas and transport up to 20% of the total. On the avalanche slopes the infiltration properties of the ground is changed. Avalanches increase the runoff to such a degree that the coefficient of thaw water runoff is less than one. This increase appears to be small, as it is only a few per cent of the annual runoff and flood flow. The controlling effects of the redeposited snow is also insignificant. It is concluded that the use of artificial avalanching under these conditions is inexpedient. (Authors' abstract)

SIP 25212 551.578.46:539.4

Roch, André
VARIATIONS OF THE STRENGTH OF SNOW. (Les variations de la résistance de la neige; Text in French with English summary). p. 86-99 incl. tables, graphs, diagrs. (In: International Symposium on Scientific Aspects of Snow and Ice Avalanches, April 5-10, 1965, Davos, Switz., Publ. No. 69, Int. Assoc. Sci. Hydrol., 1966). 4 refs.
DLC, GB651.I63

A general relation is given to determine the influence of a change of temperature (below freezing) on the tensile strength of snow. From a series of shear tests in which the snow was subjected to different pressures, perpendicular to the shear plane, the intrinsic strength curves of various types of snow have been established. Successive measurements of the shear strength of different layers with-

in the snow cover show how it varies with time. It increases under pressure of new snowfall and is reduced by metamorphism and/or a rise in temperature. The relation between the shear strength parallel to the stratification and the tensile strength (measured in the same direction) varies greatly between strong and weak layers. This stems from the anisotropic qualities of snow which change with time and prevailing natural conditions. (Author's abstract)

SIP 25213 551.578.46:539.3

Kartashov, S. N.
MECHANICAL PROPERTIES OF SNOW AND FIRN. p. 114-118 incl. graphs. (In: International Symposium on Scientific Aspects of Snow and Ice Avalanches, April 5-10, 1965, Davos, Switz., Publ. No. 69, Int. Assoc. Sci. Hydrol., 1966).
DLC, GB651.I63

General methods are given of studying the physico-mechanical properties of snow and firn. Emphasis is placed on principles of densification and peculiarities of the deformation of snow and firn, concepts of hardness and bearing capacity, methods of determination of these characteristics, and the dependence of the strength of snow and firn on its hardness, temperature, and structure. The results can be used for the analysis of the processes of formation of the snow-firn cover and its stability on mountain slopes. (Author's abstract, modified)

SIP 25214 551.578.4:539.61:621.762

Ramseier, René O. and Gary W. Sander
SINTERING OF SNOW AS A FUNCTION OF TEMPERATURE. p. 119-127 incl. table, graphs. (In: International Symposium on Scientific Aspects of Snow and Ice Avalanches, April 5-10, 1965, Davos, Switz., Publ. No. 69, Int. Assoc. Sci. Hydrol., 1966). 19 refs.
DLC, GB651.I63

This paper shows that both the sintering of snow and the rate constant as a function of temperature can be represented satisfactorily by an exponential equation. The findings will probably apply over the entire density range from freshly fallen snow to about 0.55 gm/cm^3. The sintering process will also be affected strongly by densification. From the apparent activation energy obtained, it appears that the most probable mechanism is the one of evaporation, diffusion through the ambient atmosphere, and condensation. There is no indication that another mechanism takes over at any particular temperature. -- BLE

SIP 25215 551.578.46:539.3:551.578.482

Haefeli, R.
CONSIDERATION OF THE CRITICAL SLOPE AND THE PRESSURE COEFFICIENT OF A SNOW COVER. (Considérations sur la pente critique et la coefficient de pression au repos de la couverture de neige; Text in French with English abstract). p. 141-153 incl. table, graphs, diagrs. (In: International Symposium on Scientific Aspects of Snow and Ice Avalanches, April 5-10, 1965, Davos, Switz., Publ. No. 69, Int. Assoc. Sci. Hydrol., 1966). 10 refs.
DLC, GB651.I63

For the critical slope, the second primary stress becomes 0 by definition. Its main value is a function of the so-called parameter of creep, which can be measured and expressed by the relative density of the snow layer. Furthermore, it is shown that there exist simple but only approximate relations between the critical slope and the pressure at rest of the horizontal snow cover on one hand and the pressure at rest of the inclined snow and ice layer on the other hand. The values of the latter are calculated and it appears that they are always smaller than those of the pressure at rest of the horizontal snow and ice-layer. Finally, the application of these theoretical relations to the problems of the state of stresses of the neutral zone of the snow cover and the formation of loose snow avalanches are discussed. (Author's abstract)

SIP 25216 551.578.46:531.75

de Quervain, M. R.
MEASUREMENTS ON THE PRESSURE AT REST IN A HORIZONTAL SNOW COVER. p. 154-159 incl. illus., tables, graphs, diagrs. (In: International Symposium on Scientific Aspects of Snow and Ice Avalanches, April 5-10, 1965, Davos, Switz., Publ. No. 69, Int. Assoc. Sci. Hydrol., 1966).
DLC, GB651.I63

An attempt was made to measure the snow pressure at rest in a horizontal snow field by means of free floating electrical pressure plates of 200 cm^2 pressure surface. The measured coefficients for the pressure at rest were found in the order of magnitude predicted by the theory, but, probably due to edge effects, no consistent connection was established with the density of the snow. (Author's abstract)

SIP 25217 551.578.46:539.3

Jaccard, C.
THE STABILITY OF SNOW LAYERS. (Stabilité des plaques de neige; Text in French with English abstract). p. 170-181 incl. graphs, diagr. (In: International Symposium on Scientific Aspects of Snow and Ice Avalanches, April 5-10, 1965, Davos, Switz., Publ. No. 69, Int. Assoc. Sci. Hydrol., 1966). 2 refs.
DLC, GB651.I63

The comparison of the stresses in the weakest layer of snow with the corresponding critical curve in the Mohr plane allows one to define a primary stability. Primary stability is investigated as a function of the slope angle and of the distributed load, and it is shown that it is absolute in certain cases (independent of the load). Secondary stability characterizes the absence of sensitivity to perturbations, especially to a localized rupture of the critical layer. Different shapes of the broken zone are considered, and also the influence of a vertical concentrated force applied to the surface. (Author's abstract)

SIP 25218 551.578.482:539.3

Roch, Andre
THE RELEASE OF AVALANCHES. (Les Déclenchements d'avalanches; Text in French with English abstract). p. 182-195 incl. tables, graphs, diagrs., map. (In: International Symposium on Scientific Aspects of Snow and Ice Avalanches, April 5-10, 1965, Davos, Switz., Publ. No. 69, Int. Assoc. Sci. Hydrol., 1966). 8 refs.
DLC, GB651.I63

An approximate indication of the stability of a snow cover on a slope can be established by the stability index. This is the strength parallel to the slope of the weakest stratum, divided by the shear stress within the stratum. The angles of static and of kinetic friction are measured in disaggregated crystals of different kinds of snow. It gives an idea of the amount of resistance left in a layer after its structure has been broken and once the crystals are in movement. Measurements at the rupture line of slab avalanches show that avalanches can start when the stability index is as high as 4. An attempt is made to show that a rupture due to tension stresses in the convex part of a slope is the most likely cause of a slab avalanche release when the stability index is higher than 1. It is found that the higher the stability index, the more compact and resistant the slab must be for an avalanche to be released. Several examples are given. (Author's abstract)

SIP 25219 551.578.482:551.579.2

Moskalev, Yu. D.
ON THE MECHANISM OF THE FORMATION OF WET SNOW AVALANCHES. p. 196-198. (In: International Symposium on Scientific Aspects of Snow and Ice Avalanches, April 5-10, 1965, Davos, Switz., Publ. No. 69, Int. Assoc. Sci. Hydrol., 1966).
DLC, GB651.I63

This paper considers the equilibrium equation of a snow layer subjected to water seepage. Among the factors considered in the calculations are the apparent friction angle, free water in the snow layer, porosity of the snow, and shearing strength. In all of the equations presented, the water equivalent includes the full amount of water in the snow sample after its free water has flowed down in the snow gage. The latter must be thrust vertically into the snow cover for its full depth. For quick estimation of possible wet avalanche hazards it is sufficient to know the average density of the snow cover and the ratio of the thicknesses of the aquifer to the whole snow cover. -- BLE

SIP 25220 551.578.482

Salm, Bruno
CONTRIBUTION TO AVALANCHE DYNAMICS. p. 199-214 incl. table, graph, diagrs. (In: International Symposium on Scientific Aspects of Snow and Ice Avalanches, April 5-10, 1965, Davos, Switz., Publ. No. 69, Int. Assoc. Sci. Hydrol., 1966). 8 refs.
DLC, GB651.I63

Snow in motion is considered to consist of clods of snow. Among the clods appear friction forces. The three components of these friction forces are: a force not depending on velocity, a force proportional to the velocity, and a force proportional to the square of the velocity. It is shown that surface waves cannot propagate in a flowing avalanche. The avalanche velocities are calculated for arbitrary cross section and for all three components of the friction forces. The phenomena of moving snow depend on the Froude's and Reynolds' numbers. The runout distance for flowing avalanches is calculated, and it is shown that under a certain condition, it is impossible to stop an avalanche by means of artificial obstacles. (Author's abstract)

SIP 25221 551.578.482

Shōda, M.
AN EXPERIMENTAL STUDY ON DYNAMICS OF AVALANCHES SNOW /sic/. p. 215-229d incl. illus., tables, graphs, diagr., appendix. (In: International Symposium on Scientific Aspects of Snow and Ice Avalanches, April 5-10, 1965, Davos, Switz., Publ. No. 69, Int. Assoc. Sci. Hydrol., 1966). 9 refs.
DLC, GB651.I63

Experimental studies on the dynamics of avalanching snow were carried out during the winters of 1959-1962 on a test slope, some 500 m long and 35° in mean gradient, using artificially released avalanches which made it possible to obtain positive and confirmable data on moving avalanches for the first time in Japan. To understand the mechanism of avalanches which is affected by many factors it is most necessary to first observe and record the motion accurately and then to attempt a qualitative classification. Therefore, this paper presents such a classification and points the way to more quantitative approaches. (Author's abstract)

SIP 25222 551.578.482:539.3

in der Gand, H. R. and M. Zupančič
SNOW GLIDING AND AVALANCHES. p. 230-242 incl. illus., graphs, diagrs. (In: International Symposium on Scientific Aspects of Snow and Ice Avalanches, April 5-10, 1965, Davos, Switz., Publ. No. 69, Int. Assoc. Sci. Hydrol., 1966). 12 refs.
DLC, GB651.I63

The slow, downhill gliding of the entire snow cover along the ground leads on uneven slopes to the formation of cracks and sluffs. While the cracks form as a result of the gliding, such a relationship for the sluff release is not clear. As a result of field investigations over several years, the influence of ground surface roughness, terrain shape and snow characteristics has been determined. The snow cover always glides on a wet snow boundary layer several millimeters thick and in all cases reaches a steady glide velocity. A method for measuring the glide velocity is described. A glide velocity equation is derived for these relations, assuming a free-gliding snow block and a simplified friction model. Field observation of the spatial and temporal coincidence of sluffs running on the ground with rapid glide motion lead to the influence that snow gliding participates in the release of the sluffs. (Authors' abstract)

SIP 25223 551.578.482:624.182

Frutiger, Hans
BEHAVIOUR OF AVALANCHES IN AREAS CONTROLLED BY SUPPORTING STRUCTURES. p. 243-250 incl. illus., tables, graph, diagrs., map. (In: International Symposium on Scientific Aspects of Snow and Ice Avalanches, April 5-10, 1965, Davos, Switz., Publ. No. 69, Int. Assoc. Sci. Hydrol., 1966). 4 refs.
DLC, GB651.I63

Observations suggest that avalanches occur more often in areas controlled by supporting structures than is commonly believed. Two problems which arise regarding avalanche prevention are (1) the structure has to stabilize the snowpack and prevent avalanches from starting, and (2) the structures must resist the quasistatic snow pressure and the impact of the sluffs. A large number of case studies show that under unfavorable conditions structures cannot completely stabilize the snow cover nor can they catch all the sliding snow once movement has started. -- BLE

SIP 25224 551.578.482:551.321.7

Bradley, Charles C.
THE SNOW RESISTOGRAPH AND SLAB AVALANCHE INVESTIGATIONS. p. 251-260 incl. graphs, diagrs., appendix. (In: International Symposium on Scientific Aspects of Snow and Ice Avalanches, April 5-10, 1965, Davos, Switz., Publ. No. 69, Int. Assoc. Sci. Hydrol., 1966).
DLC, GB651.I63

Certain types of snow avalanches, notably deep slab avalanches, appear to be initiated by the catastrophic disruption or collapse of the snowpack under its own load. Hence, field measurements of snow strength and snow load are fundamental to the prediction of such avalanches. Snow loads are easily measured with a standard snow coring tube. For the measurement of snow strength, the Earth Sciences Department at Montana State College has developed a new field instrument called a Snow Resistograph which gives a vertical strength profile of the snowpack. Highly consistent results may be obtained. Weekly resistograms taken in the Bridger Range of Montana during the winter of 1963-1964 illustrate the methodology and potential usefulness of the resistograph in avalanche and other snow research. (Author's abstract, modified)

SIP 25225 624.182:551.574.42

LaChapelle, E. and R. M. Stillman
THE CONTROL OF SNOW METAMORPHISM BY CHEMICAL AGENTS. p. 261-266 incl. illus., tables, graphs. (In: International Symposium on Scientific Aspects of Snow and Ice Avalanches, April 5-10, 1965, Davos, Switz., Publ. No. 69, Int. Assoc. Sci. Hydrol., 1966). 6 refs.
DLC, GB651.I63

Laboratory tests have identified chemicals, principally aldehydes, which inhibit snow recrystallization and the formation of depth hoar. This inhibition is accompanied by gains in strength of bulk snow samples. Several investigators have noted this phenomenon of crystal poisoning of ice. Comparison of these observations and those of the authors indicates that the effect of a given chemical depends on experimental conditions, prevailing temperatures, and possible other unidentified factors. Practical application of this phenomenon to avalanches has been tested in the field. Test plots at Berthoud Pass, Colorado, where natural depth hoar formation is common, were sprayed with selected chemicals. Later, pit excavations showed strong depth hoar suppression and snow cover strengthening next to the ground on those plots sprayed with benzaldehyde and N-heptaldehyde. Chemical hardening extended 15 cm above the ground, while above this level depth hoar developed with some crystal alteration. Depth hoar suppression by ethylene glycol was tested on a small avalanche path. No avalanche fell, although others did nearby, but enough depth hoar formed to make the snow dangerously unstable. (Authors' abstract)

SIP 25226 551.578.482(*38)

Nobles, Laurence H.
SLUSH AVALANCHES IN NORTHERN GREENLAND AND THE CLASSIFICATION OF RAPID MASS MOVEMENTS. p. 267-272 incl. illus., diagrs. (In: International Symposium on Scientific Aspects of Snow and Ice Avalanches, April 5-10, 1965, Davos, Switz., Publ. No. 69, Int. Assoc. Sci. Hydrol., 1966). 8 refs.
DLC, GB651.I63

Slush avalanches are rapid mass movements of water-saturated snow that are most prevalent in regions where negative temperatures below the surface inhibit infiltration of rain and melt waters. Along stream courses they may comprise an important part of the process of stream break-up. On open slopes in the melt zones of sub-polar glaciers and ice caps, they may be a kilometer or more in length, up to several hundred meters wide, and may move on slopes as low as 2°. In some cases they entrain significant volumes of rock material into the moving mass, and thus become important geomorphic agents. The interrelationships between all types of rapid mass movements may be effectively visualized by plotting the approximate bulk composition of the moving mass on a triangular diagram utilizing end-members of water, snow, and rock fragments. This approach results in consideration of dry snow avalanches, land slides, and streamflow as being extremes in a continuum, with such features as slush avalanches and mudflows as intermediate types. (Author's abstract)

SIP 25227 551.578.482(79)

Cottman, B.
A WET SNOW AVALANCHE ON A SLOPE OF 12 DEGREES. p. 273-275. (In: International Symposium on Scientific Aspects of Snow and Ice Avalanches, April 5-10, 1965, Davos, Switz., Publ. No. 69, Int. Assoc. Sci. Hydrol., 1966).
DLC, GB651.I63

Spring wet snow avalanche activity is not an uncommon occurrence in the Cascade Mountain Range, but due to the unusual combinations of weather that prevailed during the winter of 1963-64, the snowpack on south slopes, when exposed to the spring warming trend, reached a higher degree of instability than is normal. Wet snow avalanche activity is not necessarily confined to the spring season and can occur at any time during winter when a cold, unconsolidated snow pack is exposed to a sudden warming trend. (Author's abstract)

SIP 25228 551.578.46+.48(45:234.3)

Capello, Carlo F.
CONTRIBUTIONS OF THE ITALIAN INSTITUTE OF ALPINE GEOGRAPHY TO THE STUDY OF SEASONAL SNOW AND AVALANCHES. (Contributions de l'Institut Italien de Géographie Alpine á l'étude des neiges saisonnieres et des avalanches; Text in French with English abstract). p. 276-282 incl. graphs. (In: International Symposium on Scientific Aspects of Snow and Ice Avalanches, April 5-10, 1965, Davos, Switz., Publ. No. 69, Int. Assoc. Sci. Hydrol., 1966).
DLC, GB651.I63

This paper discusses the results of studies on the height variations of temporary snow lines in the Italian Western Alps. The results indicate that the snow line moves downward at a speed of 170 m per week in autumn, and moves upward 115 m per week in spring. The variations in height depend on anomalies due both to the quantity of snowfall at the various levels and to the orographic conditions. (Author's abstract, modified)

SIP 25229 551.578.48:624.182(*50)

Toushinsky, G. K.
MAJOR TRENDS IN THE STUDY OF AVALANCHE DANGER IN THE USSR. p. 283-285. (In: International Symposium on Scientific Aspects of Snow and Ice Avalanches, April 5-10, 1965, Davos, Switz., Publ. No. 69, Int. Assoc. Sci. Hydrol., 1966). 1 ref.
DLC, GB651.I63

The paper describes the four major trends in the study of avalanches in the Soviet Union: evaluation of avalanche danger in various regions, prediction and determination of time criteria of avalanching, standardization of types of anti-avalanche constructions and their distribution under different geographical conditions, and elaboration of special control and measurement equipment. (Author's abstract)

SIP 25230 551.578.461:551.578.48(437)

Kozlík, Vladimír
SNOW COVER AND ITS MEASUREMENT ABOVE THE TREE LINE (IN AVALANCHE REGIONS). (La couche de neige et sa mesure au-dessus de la zone forestière (dans la région des avalanches); Text in French with English abstract). p. 286-293 incl. illus., table, graphs. (In: International Symposium on Scientific Aspects of Snow and Ice Avalanches, April 5-10, 1965, Davos, Switz., Publ. No. 69, Int. Assoc. Sci. Hydrol., 1966).
DLC, GB651.I63

The tree line in the climatic zone of Czechoslovakia is situated about 1500 m above sea level. Above this line snow cover conditions are favorable for the formation of avalanches. Research in the area suggests that it is advantageous to determine snow cover conditions in mountain ranges by the genetic snow measuring method. Its features are: (1) snow parameters are measured by snow measuring pictures with contour lines; (2) a snow measuring line has equal morphometric parameters, i.e., slope orientation, absolute elevation, and vegetative cover; (3) the length of the snow measuring line is given by the number of measuring points and their spacing and by terrain configuration; and (4) minimal point spacing is given so the values of the snow cover parameters will not be interdependent. (Author's abstract, modified)

SIP 25231 551.578.482:551.321.7(437)

Chomicz, Kazimierz
AVALANCHES IN THE TATRA MOUNTAINS. MEASUREMENT METHODS. (Les avalanches dans les montagnes de Tatra. Méthodes de mesures; Text in French with English abstract). p. 294-303 incl. illus., tables, graphs, diagrs., map. (In: International Symposium on Scientific Aspects of Snow and Ice Avalanches, April 5-10, 1965, Davos, Switz., Publ. No. 69, Int. Assoc. Sci. Hydrol., 1966).
DLC, GB651.I63

This paper reviews the methods and instruments used to measure the physical properties of snow in the Tatra Mountains, discusses the formation of avalanches in the area, and presents a map indicating avalanche occurrences based on observations from 1959 to 1964. Information is also given on the hydrological characteristics of avalanche snow. -- BLE

SIP 25232 551.578.48(85)

Morales, Benjamin
THE HUASCARAN AVALANCHE IN THE SANTA VALLEY, PERU. p. 304-315 incl. illus., graph, map. (In: International Symposium on Scientific Aspects of Snow and Ice Avalanches, April 5-10, 1965, Davos, Switz., Publ. No. 69, Int. Assoc. Sci. Hydrol., 1966). 7 refs.
DLC, GB651.I63

The avalanche, the first one known in the country, occurred on Jan. 10, 1962, and fell from one of the country's highest and most beautiful peaks. It was caused by the breaking off of the west front of the hanging glacier on the summit of North Huascarán at the approximate altitude of 6300 m. The amount of ice involved is estimated at 2.5 to 3 million m^3, and the avalanche included a great volume of granodiorite blocks from the cliff. It travelled 16 km, descended 4000 m in elevation, and destroyed and demolished everything in its path. The average speed was 60 km/hr. More than 4000 human lives were lost and nine small towns were destroyed. Cultivated fields were devastated, thousands of animals were killed, and great destruction was caused in an area famous for its fertility and beauty. (Author's abstract, modified)

SIP 25233 551.578.481:551.324.65

Haefeli, R.
NOTE ON THE CLASSIFICATION, THE MECHANISM, AND THE CONTROL OF ICE AVALANCHES, AND EXTRAORDINARY GLACIER GROWTH. (Note sur la classification, le mécanisme et le contrôle des avalanches de glace et des crues glaciaires extraordinaires; Text in French). p. 316-325 incl. illus., table, graph, diagrs. (In: International Symposium on Scientific Aspects of Snow and Ice Avalanches, April 5-10, 1965, Davos, Switz., Publ. No. 69, Int. Assoc. Sci. Hydrol., 1966). 20 refs.
DLC, GB651.I63

Descriptions are given of ice avalanches and cases of unusual glacier growth which occurred between 1892 and 1962. It is pointed out that it is not always easy to distinguish ice or glacier avalanches from unusual glacier growth which can take on the characteristics of an avalanche. A classification of ice avalanches is proposed which considers the type of rupture, the condition of the sliding surface, the nature of the avalanche trail (ice or terrain), type of movement, and the type of deposited material. National organizations are encouraged to intensify the defense against the danger of ice avalanches by serious control and international collaboration.
-- BLE

SIP 25234 551.578.48:551.324.05(*49)

Field, William O.
AVALANCHES CAUSED BY THE ALASKA EARTHQUAKE OF MARCH 1964. p. 326-331. (In: International Symposium on Scientific Aspects of Snow and Ice Avalanches, April 5-10, 1965, Davos, Switz., Publ. No. 69, Int. Assoc. Sci. Hydrol., 1966). 16 refs.
DLC, GB651.I63

The 27 March 1964 earthquake in south central Alaska caused less snow avalanching in the upper glacier basins than might be expected and does not appear sufficient to have a significant effect on glacier regimen. The validity of the Tarr and Martin earthquake advance theory is therefore being questioned. However, avalanches induced by rock falls occurred on a number of glaciers and are expected to modify their regimen by insulating the underlying ice from normal ablation. One of the largest avalanches of this kind was on Sherman Glacier near Cordova and measures 7.7 km in length and about 13 km^2 in area. Its average thickness has been estimated to be 3 m. At the end of the 1964 ablation season the lower end of this avalanche was already on a pedestal some 7 m above the surrounding exposed surface of the glacier. Detailed observations of this avalanche and its effect on glacier regimen are being planned in 1965 and succeeding years. (Author's abstract)

SIP 25235 551.578.482(44:234.3)

Kahn, Marcel
PRELIMINARY CONSIDERATIONS ON THE CHRONOLOGICAL DISTRIBUTION OF SNOW AVALANCHES. (Considérations préliminaires sur la répartition chronologique des avalanches de neige; Text in French with English abstract). p. 332-340 incl. tables, graphs. (In: International Symposium on Scientific Aspects of Snow and Ice Avalanches, April 5-10, 1965, Davos, Switz., Publ. No. 69, Int. Assoc. Sci. Hydrol., 1966). 16 refs.
DLC, GB651.I63

Preliminary results are presented of an analysis of the chronology of avalanches in the French mountains. It is stressed that such chronologies should be in relation to the climatic fluctuations of the region. , Using the Labrouste-Vercilli method, the meteorological factors which are important in the evolution of snow cover avalanches seem to have an "invisible rhythm" obeying a geometric progression of the square root of 2. (Author's abstract, modified)

SIP 25236 551.508.77:551.578.48

Beaumont, R. T.
EVALUATION OF THE MT. HOOD PRESSURE PILLOW SNOW GAGE AND APPLICATION TO FORECASTING AVALANCHE HAZARD. p. 341-349 incl. illus., tables, graphs, diagr. (In: International Symposium on Scientific Aspects of Snow and Ice Avalanches, April 5-10, 1965, Davos, Switz., Publ. No. 69, Int. Assoc. Sci. Hydrol., 1966). 2 refs.
DLC, GB651.I63

At Mt. Hood, Oregon, the Soil Conservation Service has conducted evaluation tests of the pressure pillow approach to measuring the water content of snow. This evaluation has indicated that the method is practical and accurate for measuring the equivalent water content of snow. Inasmuch as the pressure pillow can measure snowfall rates as low as 0.8 mm/hr, it has application to avalanche prediction and control. (Author's abstract, modified)

SIP 25237 551.578.483(73)

LaChapelle, E.
AVALANCHE FORECASTING - A MODERN SYNTHESIS. p. 350-356 incl. map. (In: International Symposium on Scientific Aspects of Snow and Ice Avalanches, April 5-10, 1965, Davos, Switz., Publ. No. 69, Int. Assoc. Sci. Hydrol., 1966). 8 refs.
DLC, GB651.I63

Avalanches are generated by structural weaknesses

in the snow cover. Some of these weaknesses can be observed and measured by investigating snow stratigraphy in pits or with instruments. This method offers reliable data from direct observation, but it is time consuming. It is most effective when forecasting climax avalanches caused by snow metamorphism or a consequence of snowfalls. Many avalanches fall during or immediately after a storm. Time usually does not permit stratigraphic investigation, which is difficult in fresh snow. These direct action avalanches can be forecast by an analysis of meteorological factors prevailing during the period of snow deposition. This indirect evidence is less reliable, but can be more easily obtained and is often the only forecasting guide available. The accuracy of such forecasts is checked by practical field tests. This determination is illustrated by examples from different climate zones in the western U. S. (Author's abstract, modified)

SIP 25238 551.578.48:551.3.053(497.2)

Peev, Khristo D.
GEOMORPHIC ACTIVITY OF SNOW AVALANCHES. p. 357-368 incl. illus. (In: International Symposium on Scientific Aspects of Snow and Ice Avalanches, April 5-10, 1965, Davos, Switz., Publ. No. 69, Int. Assoc. Sci. Hydrol., 1966). 17 refs.
DLC, GB651.I63

Previous investigations are summarized and information is given on observations in the mountains of Bulgaria including a table of the activity of avalanches as a factor in contemporary denudation. The following aspects are discussed: snow accumulation in the catchment areas of avalanches and the nivation action of snow; investigation related to the tracks of avalanches; the appearance of accumulative forms in the valleys; and the nivation action of snow avalanche cones. An explanation is given for the significance of the study of the geomorphic activity of avalanches. It is found that avalanches are a great and active agent of contemporary denudation. (Author's abstract, modified)

SIP 25239 551.578.483(44:234.3)

de Crecy, L.
STATISTICS AND THE FORECASTING OF AVALANCHES. (Statistique prévision d'avalanches; Text in French with English abstract). p. 369-374 incl. illus. (In: International Symposium on Scientific Aspects of Snow and Ice Avalanches, April 5-10, 1965, Davos, Switz., Publ. No. 69, Int. Assoc. Sci. Hydrol., 1966). 2 refs.
DLC, GB651.I63

Since 1899, many avalanche tracks have been located in the French Alps. Now 3500 tracks are being constantly observed. The paper suggests that it is possible to use this statistical data to increase knowledge of meteorological and topographical factors in relation to avalanche formation. -- BLE

SIP 25240 551.578.481(52)

Fukui, Atsushi
THE CLASSIFICATION OF SNOW AVALANCHES IN JAPAN. p. 377-381 incl. tables. (In: International Symposium on Scientific Aspects of Snow and Ice Avalanches, April 5-10, 1965, Davos, Switz., Publ. No. 69, Int. Assoc. Sci. Hydrol., 1966). 2 refs.
DLC, GB651.I63

Various methods and terms have been used for the classification and nomenclature of snow avalanches in Japan. Since the study of snow avalanches has recently become more active in Japan and more attention is being paid to the design of avalanche countermeasures, the need for a standardized classification was evident. This paper presents the official classification and nomenclature of avalanches which was developed by the Japanese Society of Snow and Ice Research. The classification is based on (1) the geometrical form of avalanche rupture, (2) snow quality of the avalanche layer, and (3) position of the slide-plane. -- BLE

SIP 25241 551.578.481:551.324.63(*3)

Toushinsky, G. K.
AVALANCHE CLASSIFICATION, AND RHYTHMS IN SNOW COVER AND GLACIATION OF THE NORTHERN HEMISPHERE IN HISTORICAL TIMES. p. 382-393 incl. tables, graphs. (In: International Symposium on Scientific Aspects of Snow and Ice Avalanches, April 5-10, 1965, Davos, Switz., Publ. No. 69, Int. Assoc. Sci. Hydrol., 1966). 6 refs.
DLC, GB651.I63

An avalanche classification is presented which is based on the morphology of the avalanche track, the avalanche accumulation, and the type and condition of the snow. Stratigraphical, geomorphological, and archeological evidence are discussed which demonstrate the existence of a break in glaciation and a sudden decrease in snow cover, humidity, and avalanching in different regions in historical times. (Author's abstract, modified)

SIP 25242 551.578.481

Lossev, K. S.
GENETIC CLASSIFICATION OF AVALANCHES. p. 394-396 incl. table. (In: International Symposium on Scientific Aspects of Snow and Ice Avalanches, April 5-10, 1965, Davos, Switz., Publ. No. 69, Int. Assoc. Sci. Hydrol., 1966). 4 refs.
DLC, GB651.I63

A scheme for genetic classification of avalanches is suggested which takes into account the effects of meteorological factors and the processes within the snow cover on their formation. Avalanche types may be distinguished as those associated with snowfalls, snow drifts, rapid fall of temperature, rainfall, advection thaw, radiation thaws, spring warming, depth hoar formation, and snow cover strength reduction caused by the continuous action of load. These avalanche types are simple, but in nature complex types occur. Further development of the classification should be directed towards quantitative characteristics of avalanches and definition of those complex types that occur most often in nature. -- BLE

SIP 25243 551.578.481:551.43(234.3)

Vanni, M.
A GEOGRAPHICAL CLASSIFICATION OF AVALANCHES. (Pour une classification géographique des avalanches; Text in French). p. 397-407 incl. illus., table. (In: International Symposium on Scientific Aspects of Snow and Ice Avalanches, April 5-10, 1965, Davos, Switz., Publ. No. 69, Int. Assoc. Sci. Hydrol., 1966). 1 ref.
DLC, GB651.I63

An avalanche classification is presented based on the physical properties of snow and on the mechanical laws which cause them, as well as a geographical classification based on the distribution of avalanches in different mountain areas. Therefore, one may distinguish (1) avalanches in the high mountains which form below the perennial snow line; (2) avalanches in the medium range mountains which form at an altitude between 2000 and 2700 m, where much vegetation is present; and (3) avalanches in the bottom of the valley which form in the glacial trough. The characteristics of the avalanches formed in each of these areas are discussed. -- BLE

SIP 25244 551.578.481

de Quervain, M. R.
ON AVALANCHE CLASSIFICATION, A FURTHER CONTRIBUTION. p. 410-417 incl. tables. (In: International Symposium on Scientific Aspects on Snow and Ice Avalanches, April 5-10, 1965, Davos, Switz., Publ. No. 69, Int. Assoc. Sci. Hydrol., 1966). 9 refs.
DLC, GB651.I63

Examples of existing avalanche classifications are presented and discussed and suggestions are submitted for possible refinements. Additional criteria which are not a part of the classifications are the type of sliding horizon (crust, surface, hoar, etc.); exposure, steepness and altitude of avalanche area; avalanche size and mass involved; and the starting effect (spontaneous or triggered). -- BLE

SIP 25245 551.322:53

Lavrov, V. V.
PROBLEMS IN PHYSICS AND MECHANICS OF ICE. (Voprosy fiziki i mekhaniki l'da; Text in Russian). Trudy Arkticheskogo i Antarkticheskogo N.-I. Inst. (Leningrad), Vol. 247, 118p. incl. illus., tables, graphs, diagrs., 1962. 152 refs.
DLC, G600.L4

An account is given of studies made by the Arctic and Antarctic Scientific Research Institute of the Northern Sea Route Main Administration since 1946. The structure of liquids, the formation and growth of ice crystals, elemental forms of ice, and cohesiveness of ice particles are discussed. Ice behavior under stress and rupture phenomena are described. The elastic properties of ice, shear strength under load, ultimate limit under bending, compression and tension are reviewed. Preparation of ice models similar in structure and strength to natural ice is discussed. Techniques used in the laboratory of the Institute are presented including numerous tests made with models of icebreakers and ice-resisting ships. -- VDP

SIP 25246 551.345.3(*57)

Hillefors, Åke
ICE-WEDGES IN NORTHERN HALLAND, SOUTHWESTERN SWEDEN. (Iskilar i norra Halland; Text in Swedish with English summary). Svensk Geogr. Årsbok, 42:134-144 incl. illus., map, 1966. 12 refs.
DLC, G25.S8

Ice wedges lie at levels partly just a few meters under the highest limit of the late-glacial sea and partly 30-40 m above this limit. The glacifluvial deltas in which the ice wedges were observed are part of the so called Gothenburg-moraine or lie a few kilometers to the west of this ice recession line. The ice wedges occur only in the northeastern part of the deltas and are so wide and deep in the glacifluvial sands that they must have taken considerable time to develop. The ice-wedge areas in West Sweden are not in age relation to each other. They may have developed just as the ground was exposed to the cold arctic climate in connection with the regression of the land ice and/or have arisen during several periods in gothiglacial and finiglacial times. (From author's summary)

SIP 25247 551.322:548.51:551.51

Fukuta, N.
ACTIVATION OF ATMOSPHERIC PARTICLES AS ICE NUCLEI IN COLD AND DRY AIR. J. Atmos. Sci., 23(6):741-750 incl. graphs, diagrs., Nov. 1966. 24 refs.
DLC, QC851.A283

Ice nucleation and subsequent phase equilibrium in water held in the micro-capillaries of atmospheric particles are examined. It is found that ice formed in the micro-capillaries of certain particles may exist in equilibrium with a dry atmosphere, where particles preactivated by Fournier's effect are expected to lose their activity. A possible mechanism of activation of the particles as ice nuclei in a cold dry atmosphere is suggested. (Author's abstract)

SIP 25248 551.322:548.51:547.466

Evans, L. F.
ICE NUCLEATION BY AMINO ACIDS. J. Atmos. Sci., 23(6):751-752, Nov. 1966. 7 refs.
DLC, QC851.A283

The ice-nucleating properties of l-leucine, d-valine, and l-aspartic acid have been studied in detail in order to check a report that certain amino acids including d-valine behaved anomalously, being more effective in a cloud chamber than when immersed in supercooled droplets of water. On the contrary, the results show d-valine to be exceptionally active when immersed in water. (Author's abstract)

SIP 25249 551.322:548.51:551.576

Wexler, Raymond and Ralph J. Donaldson, Jr.
THE SPREAD OF ICE IN CUMULUS CLOUDS. J. Atmos. Sci., 23(6):753-756 incl. table, graphs, Nov. 1966. 10 refs.
DLC, QC851.A283

An analysis of growth of a distribution of cloud drop sizes is made for different models of cumulus clouds. The temperatures at which the growing drops freeze are determined by applying Bigg's criterion. It is found that the initiation of ice occurs over a considerable depth of cloud at about the same time. At any rate, the spread of ice throughout the cloud by heterogeneous freezing is much more rapid than could be accomplished by the initiation of ice at one level and the transport of splinters by the updraft to higher levels. (Author's abstract)

SIP 25250 551.322:537.24:551.576

Hobbs, P. V. and D. A. Burrows
THE ELECTRIFICATION OF AN ICE SPHERE MOVING THROUGH NATURAL CLOUDS. J. Atmos. Sci., 23(6):757-763 incl. illus., tables, graph, Nov. 1966. 7 refs.
DLC, QC851.A283

Measurements have been made of the electric charge acquired by an ice sphere as the result of whirling it through various types of natural cloud and snowfall. The sphere received an appreciable charge only if ice were present in the air. In the case of an ice crystal cloud or a fall of snow crystals, the charge on the sphere was generally negative provided that the air temperature was -4°C or less. Simultaneous measurements of the charge on the ice sphere and the number of ice crystals colliding with a sphere of similar size yielded a value for the charge on the sphere of -2×10^{-3} esu per ice crystal collision. When the air temperature was above -4°C, the charge on the sphere was erratic but was found to have the same sign as the charge on the particles in the air. If graupel particles were present the ice sphere always received a large positive charge. The presence of supercooled drop lets in the air caused a considerable reduction in the charge accumulated on the ice sphere. When the sphere was whirled through a cloud consisting entirely of supercooled droplets, negligible charge was separated. This result is in disagreement with the laboratory measurements of Latham and Mason, and casts doubt on the mechanism of thunderstorm electrification proposed by these workers. (Authors' abstract)

SIP 25251 536.2:551.525.5:551.34

Pavlov, A. V.
HEAT EXCHANGE OF FREEZING AND THAWING GROUND AND THE ATMOSPHERE. (Teploobmen promerzaîshchikh i protaivaîshchikh gruntov s atmosferoî; Text in Russian). Moscow, Izd-vo "Nauka", 254p. incl. map, tables, diagrs., graphs, 1965. 309 refs.
DLC, TA713.P3

Results of long research on the heat balance in regions with seasonally freezing and thawing ground are summarized. Components of heat balance of the ground during the year, characteristics of heat exchange of ground and atmosphere, processes of heat exchange in ground and snow cover, and the heat regime during seasonal freezing and thawing are studied. On the basis of theoretical research checked by field observations, recommendations are made regarding methods of calculating freezing depth, moisture migration and ground heaving. A mathematical formula for the determination of subsoil freezing is set up. Mathematical derivation for the depth of ground thawing takes into account the heat influence in the processes occurring between the active layer and the atmosphere. It is recommended that limiting values be established in engineering computations of freezing and thawing depths and also of temperature fields of the ground on the basis of the thermal regime of the ground, the snow cover, and the atmosphere. -- VDP

SIP 25252 551.322:548.51:66.067.1

Mossop, S. C. and N. S. C. Thorndike
THE USE OF MEMBRANE FILTERS IN MEASUREMENTS OF ICE NUCLEUS CONCENTRATION. I. EFFECT OF SAMPLED AIR VOLUME. J. Appl. Meteorol., 5(4):474-480 incl. graphs, Aug. 1966. 16 refs.
DLC, QC851.A66

The membrane filter technique for detecting ice nuclei in atmospheric air has the disadvantage that the measured concentration decreases with the volume of air sampled. Various possible causes are investigated. The effect is found to be due to the presence of small numbers of ice nuclei on the filters prior to use, which give a spurious "background count," and to the presence of other particles, sampled simultaneously with the ice nuclei, which prevent the latter from being detected. (Authors' abstract)

SIP 25253 551.578.7:543.064

Rosinski, J.
SOLID WATER-INSOLUBLE PARTICLES IN HAILSTONES AND THEIR GEOPHYSICAL SIGNIFICANCE. J. Appl. Meteorol., 5(4):481-492 incl. tables, graphs, diagrs., Aug. 1966. 7 refs.
DLC, QC851.A66

By melting concentric layers of ice, the size distribution, and concentration of solid water-insoluble particles accumulated in hailstones were determine for three hailstorms in Colorado. It was found that in approximately 50% of the hailstones analyzed, particle concentration increased with radial distanc Following an equation derived for this category of hailstones, a relationship is shown among liquid water content of a cloud, concentration of solid particles in cloud droplets, speed of the hailstone, and its residence time in the atmosphere. Spatial distribution of solid particles in hailstones was also determined by slicing hailstones and subsequently separating particles from the ice by sublimation under low pressure. It was found that some of the hailstones analyzed were oriented during their growth. (Author's abstract)

SIP 25254 551.321.1:66.067.1:551.508.76

Mossop, S. C. and others
THE USE OF MEMBRANE FILTERS IN MEASUREMENTS OF ICE NUCLEUS CONCENTRATION: II. COMPARISONS WITH CLOUD CHAMBERS. J. Appl. Meteorol., 5(5):703-709 incl. tables, graphs Oct. 1966. 23 refs.
DLC, QC851.A66

Comparisons between ice nucleus concentrations as measured by membrane filters and cloud chambers show good agreement when natural ice nuclei are being sampled. Wide discrepancies in the case of other test aerosols, particularly silver iodide, bring to light differences in the mechanisms by which various substances nucleate. The experimental technique is described. Comparisons were made in atmospheric air, using silver iodide aerosols, organic ice nuclei, and clay minerals. -- BLE

SIP 25255 551.321.13:551.578.7

Knight, Charles A.
FORMATION OF CRYSTALLOGRAPHIC ETCH PITS ON ICE, AND ITS APPLICATION TO THE STUDY OF HAILSTONES. J. Appl. Meteorol., 5(5):710-714 incl. illus., diagrs., Oct. 1966. 8 refs.
DLC, QC851.A66

The principle of formation of etch pits with crystal faces on ice crystals is explained as a natural consequence of evaporation (or any sort of dissolution) at concave surfaces of crystals. A new technique of ice etching using perforated metal foil is described, which is useful for determining grain orientations in hailstones. In etching hailstones, a funnel is used as a vacuum chamber. The hailstone is cut and a flat surface is frozen onto the center of a four inch square glass plate. The other side of the glass plate is placed on a thick metal plate (a heat sink), and an ice layer is built up to the desired thickness by dropping cold water onto the glass around the hailstone with a medicine dropper. The entire section of the stone is covered with the perforated foil, and the funnel is sealed to the surrounding, built-up ice. In the application of crystallographic etch pits for crystal orientation measurement of hailstones, one plots the difference between c-axis orientation and the growth direction as a function of frequency and looks for preferred growth orientations. -- BLE

SIP 25256 551.578.71:536.62

Gitlin, Sonia N., H. Scott Fogler, and Guy G. Goyer
A CALORIMETRIC METHOD FOR MEASURING WATER CONTENT OF HAILSTONES. J. Appl. Meteorol., 5(5):715-721 incl. illus., graphs, diagr., Oct. 1966. 5 refs.
DLC, QC851.A66

A calorimetric method for measuring the liquid water content of hailstones has been developed. When parameters such as the radiative losses of the system and the changes in heat capacity of the apparatus are eliminated by performing all measurements under identical conditions, the temperature drop is linearly related to the mass of ice melted. For equal masses the temperature drop is smaller if water is present, and there is a linear relationship between the changes in temperature drop and the amount of water present. The water content of hailstones can then be determined from a calibration of plot of the changes in temperature drop as a function of the water content of ice. (Authors' abstract)

SIP 25257 551.578.7:551.508.77

Changnon, Stanley A., Jr.
NOTE ON RECORDING HAIL INCIDENCES. J. Appl. Meteorol., 5(6):899-901 incl. graph, map, Dec. 1966. 5 refs.
DLC, QC851.A66

A means of recording hail occurrences with existing field facilities has been found. Standard weighing-bucket raingages without evaporation funnels will record the incidence of hail, and dense networks of such gages can provide data for portraying the areal extent, movement, and the time of hailstorms and their cells. Likewise, useful climatological data on hail could be obtained through the dense hydroclimatic network of recording raingages operated by the U. S. Weather Bureau through out the nation. In Illinois, unusual vertical marks, or 'spikes,' which occurred on the rainfall traces at several raingages, were determined to be a record of the time and incidence of hail. -- BLE

SIP 25258 551.324.51

Weertman, J.
SLIDING OF NON-TEMPERATE GLACIERS. Res. Rept. 216, U.S. Army Cold Regions Research and Engineering Laboratory, 4p. incl. diagrs., Dec. 1966. 5 refs. (Also: J. Geophys. Res., 72(2): 521-523, Jan. 15, 1967)
CRREL files; DLC, QC811.J6

It is shown that the temperature gradient normal to the bed is an important parameter in determining whether sliding can or cannot occur in a glacier whose bottom surface is at the melting point. Only if a large temperature gradient exists will sliding be prevented. Since the temperature gradient of a glacier whose bottom surface is at the melting point is expected to be small, it is concluded that sliding usually will occur in such a glacier even if obstacles in the bed may protrude into cold ice. (Author's abstract)

SIP 25259 551.593:551.506.61

Hicks, J. R.
IMPROVING VISIBILITY DURING PERIODS OF SUPERCOOLED FOG. Tech. Rept. 181, U. S. Army Cold Regions Research and Engineering Laboratory, 35p. incl. illus., tables, graphs, diagrs., appendixes A-B, Dec. 1966. 7 refs.
CRREL files

Six tests of dispersal systems using propane were conducted in Hanover, New Hampshire during winter 1964-65 and a like number in Greenland during summer 1965 mainly on supercooled fogs and in a few instances when air temperatures were within the lower 2 meters at or slightly above freezing. Propane was introduced into the fog as a liquid aerosol, fully exploiting its evaporative cooling properties, to set in motion the clathrate reaction which may be important in fog modification. The tests show that

liquid propane will improve visibility in fogs, is safe to use, and no standby time is needed. The system may be permanently installed with either telemetered or manually controlled valve units and is inexpensive. Details of the individual tests conducted are given. The dispensing apparatus, propane flammability tests, and the theory of formation, growth, and precipitation of ice crystals, thermal reaction, and the clathrate concept are discussed. (Author's abstract)

SIP 25260 551.579.2:551.321.7

Thomson, A. B.
WATER YIELD FROM SNOW. Meteorol. Mag., 92(1096):332-335 incl. illus., table, graphs, Nov. 1963. 4 refs.
DLC, QC851.M18

This paper presents the relationship between snow depth and water yield which has been found from snow samples taken in Scotland. Each morning rain gage stations measured snow accumulation on a flat board laid on the ground or on top of previously fallen snow near the rain gage. Using the inverted funnel of the rain-gage, a cylindrical snow sample was cut from the full depth of measured snow on the board. The sample was melted and measured in the glass rain measure to obtain the water yield. A total of 381 snow-depth observations were made at 7 stations. The equivalent snow depth was calculated and tabulated against the mean daily temperature. The large standard deviation of the equivalent snow depths (nearly 4 inches) shows the imperative need to obtain the actual water equivalent by melting wherever possible. -- BLE

SIP 25261 551.508.77:624.148.7

Rodda, J. C.
A NOTE ON THE OPERATION OF RAIN-RECORDERS DURING COLD WEATHER. Meteorol. Mag., 92(1096):335-338 incl. table, Nov. 1963. 4 refs.
DLC, QC851.M18

Rain recorder operation during cold weather is discussed, and descriptions are given of field trials of an electrical method of heating a rain recorder by means of an accumulator. The system which results is an approach to a recorder which would function at an isolated site for a week under frosty weather conditions without attention or refueling, but it is not designed for snow measurement. -- BLE

SIP 25262 551.574.7:629.13

Great Britain. Meteorological Office
ICE ACCRETION ON AIRCRAFT. Meteorol. Rept. No. 9, 2d ed., 1965, 32p. incl. illus., tables, graphs, diagr., maps. 10 refs.
DLC, QC851.G67

Practically every aspect of ice accretion on aircraft is discussed with emphasis on physical factors associated with ice accretion, forms of ice accretion, the severity of ice accretion, the results of investigations, effects of airframe icing, engine icing, helicopter ice accretion, and flight procedure. -- BLE

SIP 25263 551.326.7:620.179.16(*3)

Mellen, R. H.
UNDERWATER ACOUSTIC SCATTERING FROM ARCTIC ICE. J. Acoust. Soc. Amer., 40(5):1200-1202 incl. graphs, Nov. 1966. 9 refs.
DLC, QC221.A4

Comparison of the roughness-wavenumber spectrum of an underice sonar profile with that of an equivalent rough surface deduced from reverberation measurements shows levels of the latter to be excessively high. This, together with the apparent disparity between experiment and theory in the dependence of reverberation strength on grazing angle, indicates a need for improvement in the scattering model. (Author's abstract)

SIP 25264 528(*3)

Woodworth, Ralph W.
ARCTIC SURVEYING. Tech. Assist. Chief of Nav. Oper. Polar Proj., 1956, 10p. incl. maps. 16 refs.
DLC, Tech. Rept. Collection

Surveys in the Arctic are not difficult to accomplish With careful planning a knowledge of the country, experience with the limitations of the various types of transportation, and the elimination of unnecessary risks, operations may be carried out safely and efficiently although at high cost. Surveys in subarctic regions are conducted in a similar manner as surveys in the temperate zones. Arctic surveys comprise geodetic control surveys for the determination of geographical positions and elevations for use in charting and mapping; topographic surveys from aerial photographs; and hydrographic surveys for the determination of depths of water for navigation. -- BLE

SIP 25265 551.312.2:551.345:551.343(*3)

Schenk, Erwin
ON THE FORMATION OF STRING BOGS AND AAPAMOORS OF THE ARCTIC AND ANTARCTIC. Z. Geomorphol., 10(4):346-368 incl. illus., diagrs., Dec. 1966. 36 refs.
DLC, G1.Z47

Aapamoors and string bogs hitherto explained by solifluction and vegetation, are derived from normal fen and moss with permafrost that is broken when the meltwater in the subsoil drains off. The underflow of moving water and mud turned the still frozen surface layers so that their steep borders are in the direction against the underflow. The occurrence of string bogs is restricted to the border zone of permafrost in all the northern hemisphere. Aapamoors and string bogs are developed by collapse of permafrost. Its structure controls the differentiation of the vegetation cover. (Author's abstract)

SIP 25266 551.58(*430)

Marcus, Melvin G.
ICEFIELD RANGES CLIMATOLOGY PROGRAM, ST. ELIAS MOUNTAINS, 1964. PART I: DATA PRESENTATION. Res. Paper 31-A, Arctic Institute of North America, 109p. incl. tables, map, appendix, Feb. 1965.
DLC, Tech. Rept. Collection

During the summer field seasons of 1961-1964, research was carried out in such interrelated earth sciences as glaciology, glacial geology, photogrammetry, sedimentology, and geophysics. Emphasis was also placed on regional climatology and the operation of a weather station network. This paper presents tabulated data which includes meteorology, shelter air temperature, and duration of sunshine. -- BLE

SIP 25267 551.345:551.579.5:624.131.37

Koopmans, R. W. R. and R. D. Miller
SOIL FREEZING AND SOIL WATER CHARACTERISTIC CURVES. Soil Sci. Soc. Amer. Proc., 30(6): 680-685 incl. graphs, Nov.-Dec. 1966. 16 refs.
DLC, S590.S64A13

An earlier paper (SIP 24852) suggested that the soil water characteristic (SWC) of soil should have an analogue to be called the soil freezing characteristic (SFC) that could be obtained by freezing saturated soil in an apparatus functionally related to the pressure plate apparatus. The analogy for granular soil, free of colloids, is on a different basis (capillary effects) than for soil that is wholly colloidal (absorption effects). Different rules are needed to demonstrate the analogies for the respective types. Apparatus was devised to permit SFC and SWC data to be obtained, in turn, with each material placed in the apparatus. Two silt fractions, a sodium-montmorillonite paste, and a whole soil were used. The results confirm the expected analogies and indicate that, in these experiments, the ratio of the specific surface energy of an air-water interface at 20°C to that of an ice-water interface near 0°C was as 72.7:33.1. The results demonstrate significant mobility for unfrozen water at temperatures as low as -0.15°C even in clean silt fractions. It is concluded that the inherent instability of some of the residual water in soils during drying does not significantly affect the SWC in the range 0 to 4 bars of matric suction. (Authors' abstract)

SIP 25268 629.124.752:624.04

Richardson, C.
SIMILITUDE CONDITIONS FOR MODELING ICE-BREAKER OPERATIONS. Nav. Engr. J., 78(6): 1039-1044 incl. tables, Dec. 1966. 4 refs.
DLC, VM1.A5

Structural and dynamic similitude are considered for modeling icebreaker operations. The icebreaker must perform at least 3 separate functions: it must provide impact forces, provide gravity forces, and disperse the broken segments. Model tests should involve all three functions. The presented analysis is mostly concerned with the impact forces which must precede the gravity forces and will therefore govern as well most of the conditions which follow the impact. Particular emphasis is placed on dimensional analysis and the principles of similitude by which model experiments provide data on full scale performances. -- BLE

SIP 25269 624.144.53(75)

Hassett, John
MARYLAND SNOW SEMINAR PIN-POINTS "BIG STORM" PROBLEMS. Rural & Urban Roads, 4(7): 27, 91, July 1966.
DLC, TE1.R78

The biggest trouble that state, country, and city public works people in Maryland have with snow removal are: (1) the need for a storm warning service which can be used also at the country and city level, (2) a lack of radios in snow maintenance vehicles, (3) the need for a snow-removal and informational "hot line" between State Police headquarters and the State Road Commission snow removal operations center, (4) problems of handling priorities in emergencies, (5) the non-enforceability of snow removal parking bans, and (6) the need for big, powerful snow removal equipment. -- BLE

SIP 25270 624.144.534:625.7(74)

SNOW-FREE TOLL PLAZA. Rural & Urban Roads, 4(7):47 incl. illus., July 1966.
DLC, TE1.R78

A toll plaza area on the Garden State Parkway at Interchange 148 in Bloomfield, New Jersey, is equipped with an experimental automatic snow removal system which covers a panel area of 7000 sq. ft. The grid and serpentine system consists of 1-in. and 3/4-in. wrought iron pipe spaced on 12-in. centers. The system was designed to melt 1 in. of snow per hour with the air at 25°F, wind velocity of 15 mph, snow density of 6 lb./ft^3. Circulating through the system is a mixture of 42% glycol solution and water at an average temperature of 131.5°F. The entire system was embedded in a 9-in. pavement slab and is directly fired in the boiler house with a take-off to heat the toll administration building. The system is controlled by an inter-control in the return water line from panels which automatically reset a three-way valve to maintain return water temperature. The panels are heated all winter and the system automatically adjusts to temperature changes, eliminating thermal shock in the concrete roadway. -- BLE

SIP 25271 624.139.62:621.565:551.579.5

Dewhurst, I. S.
MOISTURE PROBLEMS IN COLD STORAGE CONSTRUCTION. PART 2: FROST HEAVE. Australian Refrig., Air Cond. and Heating, 20(5):22, 25 incl. table, graphs, May 1966. 5 refs.
DLC, TP490.R438

An equation is given with which the depth of freezing beneath a cold store can be calculated and compared with moisture conditions in the ground. Illustrations are given of heaving pressure increase due to ice lensing as a function of time and a ground temperature regime under a cold storage building. Freezing can be prevented by electric cable heating, by the use of ventilated pipes which are exposed to atmosphere, or by the use of heated liquid or air through ducts under the floor. The problem can also be overcome by the use of additional insulation but this in most cases becomes rather expensive. -- BLE

SIP 25272 551.345.1:523.4

Karev, Mikhail
THE PLANETS' ICE SPHERE. APN Newsletter, Sci. & Eng. (Moscow), No. 7:6-8, Feb. 25, 1967.
DLC, Unbound Periodical

The Earth's stone sphere (the lithosphere) is accompanied by the hydrosphere which is increased by the great masses of water vapor from volcanic eruptions. Where the temperature drops below zero, there appear short term, seasonal, and perennial zones of frost. What is known as permafrost has been proved to exist not only in the extreme North but all over the globe, its temperature differing according to geographic latitude and altitude above sea level. Usually temperature increases by 3-4°/100 m of depth to the level of thawed ground. The inclination of the Earth's axis towards the plane of the Earth's rotation about the Sun promotes glaciation but the area of glaciation is always smaller than that of persistently frozen rock. This rock forms earlier and disappears later than does the surface ice. The permafrost sphere on Mars must be very thick all over because Mars is a greater distance from the Sun and half as well heated as the Earth. -- BLE

SIP 25273 551.322:548.51:661.7

Evans, L. F.
TWO-DIMENSIONAL NUCLEATION OF ICE. Nature, 213(5074):384-385 incl. graph, Jan. 28, 1967. 11 refs.
DLC, Q1.N2

This paper shows that the first stage in the nucleation of ice on organic nucleators is the growth of monolayer patches of ice on the nucleator surface. The properties of the monolayer of ice can be investigated by studying the effect of pressure on the nucleation of Ice I by organic nucleators. The described experiments show that once ice has been formed on phloroglucinol dihydrate, a monolayer persists at temperatures up to 0°C. In general, it may be stated that at all pressures the nucleation temperature of bulk ice is the temperature at which the monolayer becomes sufficiently well developed to act as a nucleator for bulk ice at the ambient bulk supercooling. -- BLE

SIP 25274 551.322:548.51:66.067.1

Stewart, J. B., I. Ross, and Catherine M. Stevenson
ICE-FORMING NUCLEI IN THE ATMOSPHERE. Nature, 211(5054):1164, Sept. 10, 1966. 5 refs.
DLC, Q1.N2

Three years of investigations and experiments on the 'Millipore' filter method of measuring ice nuclei concentration have given results better than those obtained by Bigg (SIP 21758). The main differences between the two techniques are in the means of providing the water vapor and in the method used to observe the ice crystals when they have formed. In the present method, before the filter is cooled it is placed on molten petroleum jelly, which partly fills the pores, so that water vapor cannot pass. The filter is then exposed to air which has been saturated with respect to the ice at the bottom of the chamber, and, by cooling the filter further, the air in contact with the filter can be made saturated with respect to water. The filter is kept under these conditions for 30 min. The ice crystals in the central portion of the filter (about 40% of the total area) are observed with a microscope. Preliminary results show that the ice crystal count does not depend on the length of time the filter is exposed to air at water saturation. The count becomes constant after 15 min. -- BLE

SIP 25275 551.322:548.5:552.6

Bigg, E. K. and J. Giutronich
ICE NUCLEATING PROPERTIES OF METEORITIC MATERIAL. J. Atmos. Sci., 24(1):46-49 incl. illus., Jan. 1967. 15 refs.
DLC, QC851.A283

A description is given of an attempt to duplicate the small particles formed by evaporation and recondensation during the flight of meteors in the atmosphere by heating meteors at low pressure. A metallic meteorite produced entirely shiny spherules, almost all of which were in the size range 5 to 25 μ diameter, while a stony meteorite produced only irregular aggregates of tiny particles whose maximum dimensions were 0.1 to 0.2 μ. At water saturation and -10°C, it is estimated that the iron meteorite creates about 10^5-10^6 ice nuclei per gram and the stony meteorite about 10^8-10^9. It is concluded that sufficient ice nuclei active at -15°C are produced to explain observed concentrations in the troposphere. (Authors' abstract)

SIP 25276 551.322:548.51:553.6(94)

Paterson, M. P. and K. T. Spillane
A STUDY OF AUSTRALIAN SOILS AS ICE NUCLEI. J. Atmos. Sci., 24(1):50-53 incl. graphs, Jan. 1967. 9 refs.
DLC, QC851.A283

The ice nucleating properties of some Australian arid zone soils have been studied in the laboratory simulating as closely as possible the conditions pertaining to soil particles in the real atmosphere. Both mixing cold chamber and Millipore filter methods were used. The validity of relating measurements on pure minerals in the laboratory to atmospheric situations is questioned. Soils from Australia's arid regions appear to be too inert by several orders of magnitude to constitute the majority of ice nuclei found in the real atmosphere. (Authors' abstract)

SIP 25277 551.578.7:533.6.07

Young, Ronald G. Eng and Keith A. Browning
WIND TUNNEL TESTS OF SIMULATED SPHERICAL HAILSTONES WITH VARIABLE ROUGHNESS. J. Atmos. Sci., 24(1):58-62 incl. graphs, Jan. 1967. 7 refs.
DLC, QC851.A283

Wind tunnel test data on the relationship between drag coefficient and Reynolds number are presented for solid spherical models with different roughness parameters. Using a wind tunnel with minimal free-stream turbulence, it is found that spheres with spherical roughness elements designed to simulate hailstones with rough rime coats exhibit an unexpectedly sharp drop in drag coefficient at critical Reynolds number. For a spherical hailstone with roughness elements as large as 0.02 in., the transition to the lower drag coefficient could occur when the stone is as small as 1.6 in. in diam. (for a smooth sphere the corresponding transition does not occur unless its diameter exceeds 4 in). (Authors' abstract)

SIP 25278 551.322:536.2

Yen, Yin-Chao
NATURAL CONVECTION IN ICE MELTING FROM BELOW. Res. Rept. 211, U.S. Army Cold Regions Research and Engineering Laboratory, 13p. incl. illus., tables, graphs, diagr., Dec. 1966. 12 refs.
CRREL files

An experimental technique has been successfully developed to study the effect of natural convection (thermal instability) on the melting rate of ice. Reproducible results were obtained by using homogeneous, bubble-free ice samples for the melting process. The problem of volume change due to phase transition or separation of the ice-water interface encountered when melting from below was solved by continuously adding water at the same temperature as the constant temperature bath which supplied the heat for melting. Under certain temperature conditions irregularities in the interface, a result of convective motion, became very apparent and could be observed visually. By periodically measuring the amount of water added and varying the initial temperature of the ice sample and that of the heat source, extensive results were obtained demonstrating the effects of these temperatures on the melting rate which could be expressed in terms of dimensionless parameters. The results from this experimental investigation are compared with those obtained from an analytical solution of the same problem. (Author's abstract)

SIP 25279 624.146.2(44)

Michel, Bernard
THE METAMORPHOSIS OF FRAZIL ICE IN RIVERS. (Les metamorphoses du frasil en riviere; Text in French). Trans. Eng. Inst. Can., Paper No. EIC-65-CIV 13, Vol. 8, No. A-5, 9p. incl. illus., graph, diagrs., July 1965. 17 refs.
DLC, TA1.C22

Frazil ice occurs in flowing bodies of supercooled water. From its origin it begins to change shape and the metamorphosis continues throughout its existence. Different aspects of frazil ice in rivers are examined with emphasis on the evolution of water temperature during frazil ice formation and resulting civil engineering problems. Most important of these problems are the obstruction of water flow through man made conduits etc.; the immobilization of mechanisms situated in rivers; and flooding. -- BLE

SIP 25280 551.322:548.5:539.89

Roedder, Edwin
METASTABLE SUPERHEATED ICE IN LIQUID-WATER INCLUSIONS UNDER HIGH NEGATIVE PRESSURE. Science, 155(3768):1413-1417 incl. illus., table, graph, March 17, 1967. 32 refs.
DLC, Q1.S35

In some microscopic inclusions (consisting of aqueous liquid and vapor) in minerals, freezing eliminates the vapor phase because of greater volume occupied by the resulting ice. When vapor fails to nucleate again on partial melting, the resulting negative pressure (hydrostatic tension) inside the inclusions permits the existence of ice I crystals under reverible, metastable equilibrium, at temperatures as high as +6.5°C and negative pressures possibly exceeding 1000 bars. (Author's abstract)

SIP 25281 551.322:548.5:543.422

Shubin, V. N. and others
PULSE RADIOLYSIS OF CRYSTALLINE ICE AND FROZEN CRYSTALLINE AQUEOUS SOLUTIONS. Nature, 212(5066):1002, 1035 incl. graphs, Dec. 3, 1966. 3 refs.
DLC, Q1.N2

An expression is given which describes quantitatively electronic and orientation polarizations which are involved in the formation of hydrated electrons. To check the agreement between the theoretical predictions and the experimental results, the optical absorption spectra of crystalline ice and frozen crystalline aqueous solutions were investigated using electron pulse radiation. The results do not agree with the solvated electron theory which is being developed at present. The decisive part in the formation of the particle investigated is probably played by processes involving purely electronic rather than electron-dipole interactions. -- BLE

SIP 25282 624.042.42(*429)

Wright, D. T. and B. B. McClorry
THE ANALYSIS OF SNOW LOADS WITH APPLICATIONS TO SNOW LOADS IN BRITISH COLUMBIA. Trans. Eng. Inst. Can., Paper No. EIC-65-CIV 6, Vol. 8, No. A-2, 10p. incl. tables, graphs, map, May 1965. 31 refs.
DLC, TA1.C22

The paper discusses factors influencing snow loads, forms of statistical solutions, choice of distribution for snow loads, selection of a return period for a design load, the present snowfall situation in Canada, mountain snow loads, theoretical load distribution functions, and snow load-elevation relationships. Climatic or meteorological factors influence both ground and roof cover: wind velocities, wind direction and variability, temperature, solar radiation, rain and the seasonal snowfall characteristic. It is uncertain whether the factors to be used to determine roof loads in low lying areas can be directly transferred for use in mountainous districts. This difficulty arises not only because the factors may change when transposed from high to extremely high snow loading conditions, or due to an areal variation of the meteorological influences, but because of certain unique features of snow loads in mountains. -- BLE

SIP 25283 625.7:624.139:22

Hodgins, Peter T.
SWEDISH ROAD RESEARCH: A BRIEF SURVEY FOR CANADIAN ENGINEERS. Trans. Eng. Inst. Can., Paper No. EI-65-CIV 3, Vol. 8, No. A-1, 10p. incl. illus., appendixes I-II, April 1965. 4 refs.
DLC, TA1.C22

The National Swedish Road Research Institute includes research departments for road surfacing, road foundations, geology (frost research, etc.), vehicle mechanics, and traffic. Frost cracks result from differential frost penetration, and hence heave, occurring beneath uninsulated bare road and depths of some feet each winter. Much of the mutual displacement of the road halves disappears in the springtime; however, a residual crack generally remains and requires filling. Granular materials are applied in abundance near the pavement centerline and tapered off toward the road edges to minimize frost penetration. The effects on frost cracks of different snowplowing techniques have also been investigated. Information is given on heavy transportation on weak roads and dynamic load testing. Appendix I presents a list of the Institute's published reports, and Appendix II contains a glossary of key Swedish words for the scanning of road papers. -- BLE

SIP 25284 624.131.436:624.143.8

Low, Philip F., Duwayne M. Anderson, and Pieter Hoekstra
SOME THERMODYNAMIC RELATIONSHIPS FOR SOILS AT OR BELOW THE FREEZING POINT: I. FREEZING POINT DEPRESSION AND HEAT CAPACITY. Res. Rept. 222, U. S. Army Cold Regions Research and Engineering Laboratory, 18p. incl. tables, graphs, appendixes A-B, Dec. 1966. 16 refs.
CRREL files

An extended equation was derived relating the relative partial molar free energy of water in a soil to its freezing point depression and relative partial molar heat content. The equation was used to prepare a table from which each of these 3 quantities can be ascertained if the other 2 are known. The table was used with experimental data to obtain a curve of freezing point depression vs. water content for Na-Wyoming bentonite. Provided the activity of the liquid water in the clay is a single-valued function of the liquid water content and that the ice has the properties of pure bulk ice, this curve also represents the relationship between freezing point depression and unfrozen water in the partially frozen clay. An equation for the heat capacity of a partially frozen soil was also derived. This equation was employed to calculate the heat capacities of the clay at different water contents and sub-zero temperatures. A comparison of the calculated unfrozen water contents and heat capacities of the partially frozen Na-Wyoming bentonite with the available experimental data indicated satisfactory agreement, especially as regards the unfrozen water contents. (Authors' abstract)

SIP 25285 551.324.5

Lliboutry, L.
DISCUSSION OF PAPER BY J. WEERTMAN, 'SLIDING OF NONTEMPERATE GLACIERS.' J. Geophys. Res., 72(2):525-526, Jan. 15, 1967. 5 refs.
DLC, QC811.J6

A refined theory of glacier sliding, worked out during 1965-66, abandons the idea of "controlling obstacle size." In a realistic model of a glacier bed, the biggest bumps are not juxtaposed to smaller ones, but are covered with them. The hillocks, covered with small bumps, protrude into the cold ice, and ice cannot overflow even the minute bumps. This is true because the melting-point isotherm must follow the mean profile of the bedrock, and not the exact profile of the hillocks.
-- DMN

SIP 25286 551.326.62:551.242(*3)

Hunkins, Kenneth
INERTIAL OSCILLATIONS OF FLETCHER'S ICE ISLAND (T-3). J. Geophys. Res., 72(4):1165-1174 incl. graphs, map, Feb. 15, 1967. 10 refs.
DLC, QC811.J6

Observations with improved Roberts current meters, tethered drogues, and fathogram highlights are used to show that Fletcher's Ice Island (T-3) in the Arctic Ocean often moves in clockwise circles with a diameter of about 1 km and a period of about 12 hours. The motions are inertial oscillations which represent the transient response of a floating ice mass to changing wind stress. Since the winds are often fluctuating, T-3 responds often with inertial motion. The following arguments indicate that these motions are inertial oscillations: (1) the period of the motions is closer to the inertial period at this latitude of 12.05 hr than it is to the lunar semidiurnal tidal period of 12.42 hr; (2) the amplitude of the periodic motion and the local wind speed are closely correlated; (3) the phase of the motion changes irregularly with time; and (4) the motion is restricted to the ice and to the uppermost layers of water. (Author's abstract)

SIP 25287 54.06:551.324.84(*38+*7)

Hodge, Paul W., Frances W. Wright and Chester C. Langway, Jr.
STUDIES OF PARTICLES FOR EXTRATERRESTRIAL ORIGIN. 5. COMPOSITIONS OF THE INTERIORS OF SPHERULES FROM ARCTIC AND ANTARCTIC ICE DEPOSITS. J. Geophys. Res., 72(4):1404-1406 incl. illus., table, Feb. 15, 1967. 5 refs.
DLC, QC811.J6

Previous papers in this series have reported results of chemical analyses of the surfaces of microscopic particles of several origins (See SIP 22174, 22175, 22176, and 23402). The present paper reports results of chemical analyses of the sectioned and polished interiors of some of these particles. Among the particles are 2 from the South Pole and one designated only as Antarctic. Contrary to expectations, there are few significant differences in composition between the surface and the interior of a spher[illegible], and the particles are rather homogeneous. [illegible] of the spherules cannot be determine[illegible] data available.
-- DMN

SIP 25288 551.322:539.193.4

Coulson, C. A. and D. Eisenberg
INTERACTIONS OF H_2O MOLECULES IN ICE. I. THE DIPOLE MOMENT OF AN H_2O MOLECULE IN ICE. Proc. Roy. Soc. (London), 291A(1427):445-453 incl. tables, diagrs., April 26, 1966. 15 refs.
DLC, Q41.L7

The dipole moment of an H_2O molecule in ice is greater than the moment of an isolated H_2O molecule, 1.84 D, owing to the electric fields of neighboring molecules. The magnitude and direction of the field arising from the nearest 85 neighbors is computed in this paper by representing each molecule as a series of electric multipoles. It is found that the field has the direction of the dipole moment of the central molecule and is sufficiently strong to increase its total dipole moment to about 2.60 D. (Authors' abstract)

SIP 25289 551.322:539.194

Coulson, C. A. and D. Eisenberg
INTERACTIONS OF H_2O MOLECULES IN ICE. II. INTERACTION ENERGIES OF H_2O MOLECULES IN ICE. Proc. Roy. Soc. (London), 291A(1427): 454-459 incl. table, diagr., April 26, 1966. 7 refs.
DLC, Q41.L7

The energy of interaction of H_2O molecules in ice is calculated by representing each molecule as a series of multipoles. This energy is found to increase when the mutual polarization of the molecules is taken into account. It is also found to depend significantly upon interactions of a molecule with its second and further neighbors. The interaction energy of molecules in the cubic form of ice is found to be essentially the same as that of molecules in the ordinary hexagonal form. (Authors' abstract)

SIP 25290 551.578.486(85)

McDowell, Bart and John E. Fletcher
AVALANCHE. Nat. Geogr. Mag., 121(6):855-880 incl. illus., map, June 1962.
DLC, G1.N27

An account is given of the avalanching of the 22,205-ft Nevado Huascaran glacier down Peru's tallest mountain on Jan. 10, 1962. In seven minutes, eight villages and towns were destroyed killing 3500 Peruvians. Numerous photographs are included. -- BLE

SIP 25291 551.322:539.219.3

Onsager, L. and L. K. Runnels
MECHANISM FOR SELF-DIFFUSION IN ICE. Proc. Nat. Acad. Sci., 50(2):208-210, Aug. 1963. 19 refs.
DLC, Q11.N26

The observation that the coefficients of diffusion of deuterium and oxygen-18 in ice are equal strongly suggests that the diffusion measured is the self-diffusion of intact water molecules. This paper summarizes the considerations which have led to the conclusion that the diffusion occurs by means of the migration of interstitial molecules. A comparison is also made of diffusion and dielectric relaxation. -- BLE

SIP 25292 693.547.3:551.34

Cordon, William A.
FREEZING AND THAWING OF CONCRETE--MECHANISMS AND CONTROL. Detroit, Amer. Concrete Inst., [1966], 99p. incl. illus., tables, graphs, diagrs. 130 refs.
DLC, TA439.C58

Discussion of the behavior of various concrete structures exposed to freezing and thawing is followed by theories regarding mechanisms which cause this behavior, and methods of overcoming the mechanisms and preventing concrete deterioration. The sections of the book are entitled Deterioration of concrete exposed to freezing and thawing; Exposure conditions in structures; Mechanisms of freezing and thawing deterioration; Influence of concrete aggregates; Air entrainment; Laboratory evaluation of freezing and thawing deterioration; and Requirements and recommendations for producing durable concrete. A selected bibliography and an index are included. -- BLE

SIP 25293 551.578.482:551.58(494)

SNOW AND AVALANCHES IN THE SWISS ALPS: WINTER 1963/64. (Schnee und Lawinen in de Schweizeralpen, Winter 1963/64; Text in German). Winterbericht des Eidg. Institutes für Schnee- und Lawinenforschung No. 28, Weissfluhjoch/Davos, 144p. incl. illus., tables, graphs, diagrs., maps, 1965.
DLC, QC929.S7D3

Six papers are presented: Weather and Climate by Th. Zingg; Snow and Avalanche Conditions in the Swiss Alps Area by M. Schild and P. Brauschi; Accidents and Damages Caused by Avalanches by M. Schild; Snow and Avalanche Investigations in the Parsenn Area by Th. Zingg; The Relationship Between Weather and Avalanches by Th. Zingg; and Notes on Further Work Conducted During 1963/64 by M. de Quervain. Extensive data are given. -- BLE

SIP 25294 551.578.46:634.0.904

Seppänen, Maunu
ON THE ACCUMULATION AND THE DECREASING OF SNOW IN PINE DOMINATED FOREST IN FINLAND. Fennia, 86(1), 51p. incl. illus., tables, graphs, diagrs., maps, 1961. 39 refs.
DLC, G23.G4

An investigation has been conducted to determine the effect of forest density and tree distribution on snow accumulation and ablation. The data used are from snow course stations in which a part of the measuring route includes pine dominated forests, and stake stations with fixed measuring stakes established in groups in such forests. Snow accumulation in forests is compared with accumulation in open areas and factors causing the decrease of snow in forests are outlined. -- BLE

SIP 25295 582.26:551.326.7(*881)

Zaneveld, Jacques S.
THE OCCURRENCE OF BENTHIC MARINE ALGAE UNDER SHORE FAST-ICE IN THE WESTERN ROSS SEA, ANTARCTICA. In: International Seaweed Symposium, 5th, Halifax, August 25-28, 1965, Proceedings. Oxford, Pergamon Press [1966], p. 217-231, incl. illus., tables, map. 23 refs.
DLC, QK564.I5

Diving surveys along the western coast of the Ross Sea during Jan. and Feb. 1964 revealed the presence of large algal beds at depths between 6 and 35 m. The dominant species were red algae. Investigations of these same localities in Oct. through Dec. 1964, when the area was covered by up to 6 m of sea ice, again showed a luxuriant growth of the rhodophycean species. Adult and fruiting specimens were found in abundance during both surveys, so it is likely that the algae in this part of the Antarctic are present for at least 8 mo. of the year. If they are present throughout the year, they may be inactive during some of the months when there is no sunshine. In contradiction to previous work, the present study shows that the algae under consideration are capable of photosynthetic production under fast ice with a coverage of 9 to 10 mo. (Author's abstract, modified)

SIP 25296 551.578.45.001.57:551.594

Latham, J. and C. D. Stow
A LABORATORY INVESTIGATION OF THE ELECTRIFICATION OF SNOWSTORMS. Quart. J. Roy. Meteorol. Soc., 93(395):55-68 incl. graphs, diagrs., Jan. 1967. 22 refs.
DLC, QC851.R8

Artificial snowstorms were created inside a large cold room by blowing snow crystals over a snow surface. The charges acquired by the visible blown particles and the residual snow surface and the electric fields and concentrations of positive and negative ions produced in the air above the snow surface were measured as a function of the wind velocity, the relative humidity, the amount of snow introduced into the air jet, and the temperature of the jet and the snow surface. The charging was found to increase with an increase in wind velocity, and was slightly reduced as the relative humidity was raised. The measured electrification at temperatures below 0°C is shown to be entirely explicable, quantitatively and qualitatively, in terms of the temperature-gradient effect. The primary source of the charge carried by air is shown to be point discharge between highly charged particles. The contributions to the measured electrification of the Workman-Reynolds effect, the Dinger-Gunn effect and the evaporation of ice are shown to be minimal. (From authors' abstract)

SIP 25297 551.578.4:551.594.25

Latham, J. and C. D. Stow
THE DISTRIBUTION OF CHARGE WITHIN ICE SPECIMENS SUBJECTED TO LINEAR AND NONLINEAR TEMPERATURE GRADIENTS. Quart. J. Roy. Meteorol. Soc., 93(395):121-125 incl. graphs, Jan. 1967. 5 refs.
DLC, QC851.R8

Numerical solutions are presented of the differential equations derived by Latham and Mason (1961) describing the distribution of charge within ice specimens across which temperature gradients exist. In the case of specimens subjected to nonlinear temperature gradients the computations predict an extremely rapid increase of volume charge density with increasing temperature gradient and therefore provide an explanation for the reported dependence of the thermoelectric effect in ice on the geometry of the specimen under investigation. (Author's abstract)

SIP 25298 69:624.139(*57)

WINTER BUILDING IN SWEDEN. Eng. & Constr. World, 1(9):44-46 incl. illus., Sept. 1965.
DLC, Unbound periodical

Builders in Sweden now work all year round despite months of cold, snow, and darkness. The median temperature of the country is below freezing 27 weeks of the year. New techniques have been developed since the end of World War II. Four measures that have effectively reduced cold-weather costs are careful planning, prefabricated components, choice of building materials, and special working methods. -- BLE

SIP 25299 624.144.4(*56)

Taivainen, O. A.
FINNISH STUDIES ON SNOW FENCES IN 1947-1959. (Kinostintutkimuksia Suomessa vuosina 1947-1959; Text in Finnish with English summary). Tielehti, 34(3):13-17, 97-98 incl. graphs, 1964. 6 refs.
DLC, TE4.T5

Results are presented of snow fence studies in Finland. Snow fences are generally placed in one or two rows with about 100 m between rows. The fences generally come in 7 sections. Snowdrift depth was measured 3 to 6 times in winter depending on snowfall and drift accumulation. On the basis of the measurements, longitudinal sections have been graphed, and the length and maximum height of drifts have been determined. Also, the cross-sectional area of drifts above the actual snow surface was calculated. (From author's summary)

SIP 25300 551.579.5:551.345

Krumbach, A. W., Jr. and D. P. White
MOISTURE, PORE SPACE, AND BULK DENSITY CHANGES IN FROZEN SOIL. Soil Sci. Soc. Amer., Proc., 28(3):422-425 incl. illus., tables, graphs, May-June 1964. 11 refs.
DLC, S590.S64A13

This paper reports a study of the changes in moisture and physical properties which occurred during winter freezing of soil under two cover conditions. The two test plots, forty feet apart, were located 6 mi north of Lansing, Mich. One was on bare soil that had been plowed and packed 7 weeks before continuous freezing began. The second was under a full, mature stand of alfalfa. In the upper 15 in. of the two plots, moisture contents usually exceeded prefreeze field maximum. Total pore space was always above that before freezing; bulk density was predominantly less than the lowest expected prefreeze bulk density. Moisture changes in the frozen soils are attributed solely to internal moisture movement. -- BLE

SIP 25301 551.34:624.13:537.32

Hoekstra, Pieter
THERMO-ELECTRIC COOLING FOR FROST EFFECT TESTS. Soil Sci. Soc. Amer., Proc., 28(5):716 incl. illus., Sept.-Oct. 1964.
DLC, S590.S64A13

In work reported previously, freezing tests of soil were conducted in freezing cabinets. The top of a soil sample was cooled by the air temperature in the cabinet. This apparatus can be considerably simplified by use of thermoelectric cooling, in which a d.c. current is passed through the junction of 2 dissimilar semiconductors. The thermoelectric element can remove up to 40 watts of heat. In a laboratory soil column of 6 in. diam., this would correspond to a frost penetration of about 8 cm/hr. The apparatus was found to be very convenient. The sample did not have to be enclosed in a cabinet and better control of the rate of heat removal was obtained. -- BLE

SIP 25302 551.322:624.147:539.376/.377

Mellor, Malcolm and James H. Smith
CREEP OF SNOW AND ICE. Res. Rept. 220, U.S. Army Cold Regions Research and Engineering Laboratory, 13p. incl. tables, graphs, Dec. 1966. 23 refs.
CRREL files

Constant load creep tests in uniaxial unconfined compression were performed on samples of sintered snow and bubbly polycrystalline ice. Nominal axial stresses were in the range 0.1 to 1.0 kgf/cm^2 for snow, and 0.5 to 20 kgf/cm^2 for ice. The range of temperatures investigated was from -0.5 to -34.5°C. Assuming creep to follow the Arrhenius relation, values of apparent activation energy for secondary creep under a nominal axial stress of 0.5 kgf/cm^2 varied from 10.7 kcal/mole for ice of density 0.83 gm/cm^3 to 17.8 kcal/mole for snow of density 0.44 gm/cm^3. The creep of polycrystalline ice depends on dislocation damping for the process dominant at high stress, and drift of dislocations pinned by stress-induced order for the low stress mechanism. If each mechanism has its own characteristic activation energy, the apparent activation energy measured in creep experiments may well vary with stress level. In snow subjected to a given nominal stress, such an effect should be reflected in variation of apparent activation energy with bulk density, since true stress in the ice matrix will increase as density decreases when the nominal applied stress is fixed. The effect of bulk density on strain rate and the possibility of predicting creep rates for snow from data on creep of polycrystalline ice are discussed. (Authors' abstract)

SIP 25303 624.143:621-427:69.022.56

Minsk, L. D.
PREVENTION OF ACCUMULATION OF SNOW AND ICE ON OPEN MESH METAL PANELS. Tech. Rept. 169, U.S. Army Cold Regions Research and Engineering Laboratory, 62p. incl. illus., tables, graphs, diagrs., appendixes A-C, Nov. 1966. 3 refs.
CRREL files

Investigations have been conducted to (1) determine the extent to which open mesh metal panels will accumulate snow, and (2) to devise methods for controlling or eliminating accumulation and adhesion. Methods investigated include electrical resistance heating, forced air movement, icephobic surface coatings, infrared heating, mechanical vibration, fluid flow, and power broom sweeping. The influence of meteorological parameters on unheated panel tests was also investigated. It is concluded that passive methods alone are incapable of keeping a perforated steel panel free of snow and ice accumulation under all conditions. Forced air moving at a minimum speed of 300 to 500 ft/min through the panels can prevent accumulation of snow. Near the freezing point, however, and with slight precipitation of snow or ice, forced air can result in ice accretion. Mechanical vibration will remove dry snow but not wet snow or ice. Fluid flow over the panel cannot prevent snow accumulation at moderate rates of fall. Resistance heating using the perforated panel as the resistance element is an effective and practical method. (Author's abstract)

SIP 25304 551.578.4:539.61:621.762

Ramseier, René O. and Charles M. Keeler
THE SINTERING PROCESS IN SNOW. Res. Rept. 226, U.S. Army Cold Regions Research and Engineering Laboratory, 4p. incl. graph, Feb. 1967. 12 refs.
CRREL files

The growth of bonds between snow grains or ice spheres has been variously attributed to surface diffusion, volume diffusion, and evaporation-condensation. To distinguish among these possible mechanisms the unconfined compressive strength of 2 groups of snow samples was determined as a function of time. One group was allowed to sinter under atmospheric conditions while the other group was kept immersed in silicone oil. The much lower rate of strengthening of the latter group suggests that evaporation-condensation must be the major mechanism of mass transport in snow under atmospheric conditions. The possible magnitudes of the various mass transfer coefficients are discussed. (Authors' abstract)

SIP 25305 551.324.51

Palmer, Andrew C.
CREEP-VELOCITY BOUNDS AND GLACIER-FLOW PROBLEMS. J. Glaciol., 6(46):479-488 incl. table, graphs, Feb. 1967. 7 refs.
DLC, GB2401.J68

A general result due to Martin can be used to find upper and lower bounds on velocities in steady-creep problems. This method can be applied to glacier flow if ice can be assumed to satisfy a power-law, stress-strain-rate relation. Bounds on the mean velocity over the glacier cross-section and on the mean velocity on the surface are determined for a particular example (a uniform parabolic channel, with power-law exponent 3) and they are shown to bound quite closely the exact solutions due to Nye. Bounds can be found rapidly by hand calculation. The method can be applied to real glacier cross sections measured in the field. (Author's abstract)

SIP 25306 551.324.22:551.324.51

Weertmen, J.
AN EXAMINATION OF THE LLIBOUTRY THEORY OF GLACIER SLIDING. J. Glaciol., 6(46):489-494 incl. illus., Feb. 1967. 8 refs.
DLC, GB2401.J68

A review is presented of Lliboutry's theory of glacier sliding, which assumes a glacier bed that is rough in only one direction. The equation contains 2 unknown parameters--the water pressure, and the thickness of the water layer; their values cannot be determined from the theory in its present state of development. Therefore, it is claimed, the theory is incompletely developed and cannot be used to make meaningful predictions of sliding velocities. -- DMN

SIP 25307 551.578.46:531.754

Alford, Donald
DENSITY VARIATIONS IN ALPINE SNOW. J. Glaciol., 6(46):495-503 incl. graphs, maps, Feb. 1967. 11 refs.
DLC, GB2401.J68

Stratigraphic studies of the annual snow layer in the Beartooth Mountains of southwestern Montana and on Mount Logan in the St. Elias Range have disclosed a similar distribution of at least one physical property of the snow pack in the two areas. The average density of the pack, obtained by integrating a series of measurements taken at 5-10 cm vertical intervals over the total thickness of the annual layer, reaches a maximum value near a mid-point of the total elevation covered by each traverse and decreases linearly toward the elevation extremes. A preliminary hypothesis, relating the distribution of average snow density values along slopes to a semi-stable zonation of near-surface air temperatures, is presented. (Author's abstract)

SIP 25308 551.322:539.6:537.228

Latham, J. and C. P. R. Saunders
THE ADHESION OF ICE SPHERES IN ELECTRIC FIELDS. J. Glaciol., 6(46):505-514 incl. graphs, diagrs., Feb. 1967. 12 refs.
DLC, GB2401.J68

The force F required to separate two ice spheres was measured as a function of environmental temperature T, relative humidity H and the strength E of the external electric field in which the spheres were situated. It was found that over the entire attainable range of T and H, F increased rapidly with increasing E. The increased adhesion was not accompanied by an increase in the rate of growth of the ice bridge between the two spheres and is explicable in terms of Davis's (1964) calculations of the purely electrostatic forces between two spheres situated in an electric field. The experiments indicate that the rate of growth of snowflakes in a cloud by means of ice crystal aggregation will be markedly enhanced if the cloud is highly electrified. (Authors' abstract)

SIP 25309 551.326.7(*881)

Paige, Russell A. and Claude W. Lee
PRELIMINARY STUDIES ON SEA ICE IN McMURDO SOUND, ANTARCTICA, DURING "DEEP FREEZE 65." J. Glaciol., 6(46):515-528 incl. illus., graphs, maps, Feb. 1967. 16 refs.
DLC, GB2401.J68

Studies were made of the bearing strength of the ice at McMurdo Sound, in order to determine the safety of logistics activity on the ice. During the summer of 1964-65, shear strength decreased from 9.8 kg/cm^2 in Oct. to 6.3 kg/cm^2 in late Jan., then it increased to 8.0 kg/cm^2 by Feb. 10. The salinity of collected brine decreased from 125 ppt in Nov. to 43 ppt in Jan. Thickness of the ice increased until mid-Dec., then decreased rapidly by bottom melting until break-out in Feb. In the Cape Armitage shoal area, thickness decreased from 2.5 m in mid-Dec. to 36 cm in late Jan. Snow cover significantly affects the degree of internal deterioration and the amount of strength lost during the summer. Sea ice with more than 6 cm of snow cover is consistently stronger than unprotected ice, and deterioration is less. Bearing strength of the sea ice is sufficient for most ordinary loads throughout the period of greatest use. (Authors' abstract, modified)

SIP 25310 551.324.22(*762)

Dort, Wakefield, Jr.
INTERNAL STRUCTURE OF SANDY GLACIER, SOUTHERN VICTORIA LAND, ANTARCTICA. J. Glaciol., 6(46):529-540 incl. illus., map, Feb. 1967. 10 refs.
DLC, GB2401.J68

Sandy Glacier is a narrow, 600-m-long cirque glacier. It is apparently composed throughout of alternating layers of ice and sand that strike parallel to the edge of the glacier and dip into the glacier at an angle of 82°. The thickness of the sand layers averages 10 cm, and that of the ice layers, 20 cm. The sand layers are generally composed of thin parallel laminations, but micro-crossbedding is present locally. The layers have been broken into angular blocks 0.5 to 3.0 m long, separated by ice columns connecting adjacent ice layers. The ice layers show thinner zones of contrasting bubble content; these bend into the columns separating the sand blocks. The sand was probably blown into the cirque from the floor of Wright Valley 6 km SW and 1100 m below. Each pair of sand and ice layers may record a year's accumulation. The steeply dipping, yet otherwise undeformed layers, clearly prove that rotational movement has occurred. The breaking of the sand layers into blocks is the result of plastic extension within the glacier. (Author's abstract, modified)

SIP 25311 551.324.435(85)

Hastenrath, Stefan L.
OBSERVATIONS ON THE SNOW LINE IN THE PERUVIAN ANDES. J. Glaciol., 6(46):541-550 incl. illus., graphs, diagr., map, Feb. 1967. 28 refs.
DLC, GB2401.J68

Observations on both the present and Pleistocene snow lines were made during a journey through the Peruvian Andes. En route observations were supplemented by an evaluation of air photographs in the Servicio Aerofotografico Nacional in Lima and a survey of the literature. The large scale variation of the Pleistocene snow-line depression is discussed with respect to possible paleoclimatic implications. (Author's abstract)

SIP 25312 551.578.41:532.62

Maeno, Norikazu and Daisuke Kuroiwa
METAMORPHISM OF AIR BUBBLES IN A SNOW CRYSTAL. J. Glaciol., 6(46):561-564 incl. illus., graph, Feb. 1967. 6 refs.
DLC, GB2401.J68

Observations have been made of the modification produced by a temperature gradient in the shape of air bubbles in natural snow crystals, and also of the shrinkage of the bubbles with time. The rate of shrinkage is governed by a constant which is strongly temperature dependent with an activation energy of about 15.1 kcal/mole, a value sufficiently similar to the activation energy for diffusion of tritium and dielectric and mechanical relaxation to suggest that atomic diffusion processes may be responsible for all of these phenomena. To observe air bubble shrinkage rate, a snow crystal was soaked in ice-saturated kerosene to keep it from sublimation. This shrinkage rate was measured at temperatures of -5, -15, and -34°C. The time dependence of the shrinkage could be expressed by a given formula. It is pointed out that the shrinkage can be explained also in the same manner as that of voids in metals. -- BLE

SIP 25313 551.333:551.324.5:001.4

Ragan, Donal M.
PLANAR AND LAYERED STRUCTURES IN GLACIAL ICE. J. Glaciol., 6(46):565-567, Feb. 1967. 22 refs.
DLC, GB2401.J68

On historical and etymological grounds, as well as on the basis of widespread acceptance by petrologists and structural geologists, it is argued that "foliation" should apply to structures in both rocks and glacial ice. The term "foliation" has been applied longest and most consistently in the planar sense which is consistent with the etymology of the term and finds widest acceptance by geologists today. -- BLE

SIP 25314 551.343.72(*3)

Bostrom, R. C.
WATER EXPULSION AND PINGO FORMATION IN A REGION AFFECTED BY SUBSIDENCE. J. Glaciol., 6(46):568-572 incl. diagrs., Feb. 1967. 5 refs.
DLC, GB2401.J68

Geophysical evidence indicates that the delta area of the Mackenzie River, Northwest Territories, is affected by tectonic subsidence. Pingos are of sparse occurrence in the Arctic as a whole but they occur in hundreds in the Mackenzie River delta. In a region of subsidence, as recent sediments pass through the base of permafrost, compaction becomes possible. The resulting water expulsion produces an artesian head responsible for building pingos. (Author's abstract)

SIP 25315 551.578.43(*772)

Brecher, Henry H.
ACCUMULATION BETWEEN MOUNT CHAPMAN AND "BYRD" STATION, ANTARCTICA. J. Glaciol., 6(46):573-577 incl. tables, graph, map, Feb. 1967. 2 refs.
DLC, GB2401.J68

In Nov. and Dec. 1965, accumulation measurements were made at 3-km intervals and at networks of poles at 6 photogrammetric arrays on an oversnow traverse from Mt. Chapman to Byrd Station. The results at the photogrammetric arrays, which yield a mean accumulation of 16.4 g/cm^2/yr for 1963-65, are compared with values determined from stratigraphic investigations in 1958-59 and in 1962-63, which gave 12.2 g/cm^2/yr and 13.2 g/cm^2/yr, respectively. (Author's abstract)

SIP 25316 551.322:548.51:551.576

Isono, Kenji and Toyoaki Tanaka
SUDDEN INCREASE OF ICE NUCLEUS CONCENTRATION ASSOCIATED WITH THUNDERSTORM [sic]. J. Meteorol. Mag. Jap., 44(5):255-259 incl. graphs, diagrs., Oct. 1966. 11 refs.
DLC, Orientalia Div.

Anomalies of atmospheric ice nuclei of short duration were observed under thunderclouds. The result of analysis of meteorological conditions shows that the anomalies were associated with downdrafts of dry air in and under the thunderclouds. Other possible mechanisms are discussed. -- BLE

SIP 25317 551.578.4:551.594

Magono, Choji and Keitaro Orikasa
ON THE DISTURBANCE OF SURFACE ELECTRIC FIELD CAUSED BY SNOWFALL. J. Meteorol. Soc. Jap., 44(5):260-279 incl. tables, graphs, diagrs., maps, Oct. 1966. 27 refs.
DLC, Orientalia Div.

The results of observations on the atmospheric electric field pattern, the electrical charge on falling snow crystals, and the intensity of snowfall indicate that: (1) in the case of light snowfall

from altocumulus clouds, snow crystals are charged negatively by the Wilson induction mechanism, and a steady positive atmospheric surface electric field is increased by the downward transportation of negative charge on the snow crystals; (2) in the case of heavy steady snowfall from stratocumulus or successive nimbocumulus clouds, graupel or rimed snow crystals are charged positively by the friction with non-rimed snow crystals which are charged negatively, and then a negative surface electric field is established by the removal of the positive charge on graupel or rimed snow crystals from the cloud layer where a negative space charge is left due to the negative charge on non-rimed snow crystals with a low fall speed. This negative electric field of the atmospheric surface corresponds to the negative area of the graph pattern; (3) sharp peaks in the surface electric field pattern are produced by the passing of local space charges near an observation point due to falling graupel. -- BLE

SIP 25318 551.578.4:551.594.25.001.57

Magono, Choji and Keitaro Orikasa
MODELS OF CHARGE DISTRIBUTION IN AND UNDER CLOUDS DURING SNOWFALL. J. Meteorol. Soc. Jap., 44(5):280-285 incl. graphs, diagrs., Oct. 1966. 1 ref.
DLC, Orientalia Div.

Several models of charge distribution in and under snowy clouds were proposed, based on the mechanism in which falling rimed snow particles or larger snowflakes are electrified positively by the frictional contact with non-rimed snow crystals or smaller snowflakes in temperatures warmer than -10°C. The models explain the surface electric field patterns very well, particularly the rapid change in the field. In the models, it is assumed that the surface electric field is influenced by the space charge only vertically above the observation point. However, in actuality the rapidly changing surface electric field during snowfall is influenced by the space charge both just above and at the observation point. -- BLE

SIP 25319 551.322:536.42:537.311.5

Latham, J. and C. D. Stow
CHARGE TRANSFER ASSOCIATED WITH THE EVAPORATION OF ICE IN ELECTRIC FIELDS. J. Meteorol. Soc. Jap., 44(5):286-290 incl. graphs, diagrs., Oct. 1966. 11 refs.
DLC, Orientalia Div.

Experiments are described which were designed to investigate the possibility that the electrification which accompanies the evaporation of ice may be drastically modified in the presence of an electric field, and to provide information enabling a reevaluation of the importance of evaporation processes in atmospheric electricity. The mechanism of evaporation and electrification of ice in the absence of an electric field has been discussed earlier by the authors (SIP 24586), who demonstrated theoretically that energetic limitations preclude the possibility that individual charged molecules escape from the ice surface. In the present work the mechanism of charge transfer is obscure. The possibility that the electrification was a consequence of the splintering of microscopic protuberances on the evaporating surface is inconsistent with the observed dependence of the charging on pressure, temperature, and, more conclusively, the sign of the electric field. -- BLE

SIP 25320 629.124.752

Pchelkin, IU. V., (ed.)
THE ATOMIC ICEBREAKER "LENIN." (Atomnyĭ ledokol "Lenin"; Text in Russian). Leningrad, Izd-vo Lenizdat, 171p. incl. illus., diagrs., 1960.
DLC, VM451.A8

Popular articles by various authors describe the building of the "Lenin", its structure and installations: 1. "A brillant victory of Soviet science and technique" by Yu. A. Shimansky. 2. "The atomic giant has been created by the whole nation" by A. I. Bobrov. 3. "The firstling of the atomic fleet" by V.I. Neganov, (See SIP 25321). 4. "The task given by the motherland has been accomplished with honor" by B.E. Klopotov, N.I. Pirogov, N. K. Krylov. 5. "The building of the hull of an atomic powered ship" by A.I. Gorbushin, M.K. Glozman, V.N. Barabanov, Ya.A. Kremer and I.E. Smirnov, deals with cleaning steel plates, handling stainless steel, assembling the prefabricated parts of the hull and superstructure, and successful launching on 5 Dec. 1957. 6. "A difficult assignment has been accomplished" by N.D. Dvornikov, V.M. Luchko, P.S. Artsibasov and V. Ya. Migunov. 7. "Higher learning provided success" by S.A. Chernykh and I.S. Drabkin. 8. "In step with 'collective' cooperation" by K.P. Babushkin, T.L. Polyakov, E.N. Shumsky, S.V. Dunayev. 9. "In close contact with the shipbuilders" by P.A. Ponomarev and A. N. Stefanovich. 10. "The voice of those to whom peace is dear" by P.I. Ukhanov, I.A. Ivanov, and M.L. Kovadlo. -- VDP

SIP 25321 629.124.752

Neganov, V. I.
THE FIRSTLING OF THE ATOMIC FLEET. (Pervenets atomnogo flota; Text in Russian). p. 22-44 incl. table, diagrs. (In: Atomnyĭ ledokol "Lenin" IU. V. Pchelkin, (ed.). Leningrad, Izd-vo Lenizdat, 1960).
DLC, VM451.A8

The development of icebreakers, beginning with the "Yermak" built in 1899 in England for the Russian government is briefly reviewed. To increase 20-40 day cruising capability, the first atomic powered icebreaker, the "Lenin" was designed to navigate one year without refueling and built at the Admiralty yard in Leningrad in 1956-1958. Technical characteristics of this atomic turboelectrical ship are given. The low ratio between length and width ensures high maneuverability in ice, and careful stern design provides reliable protection for propellers and rudder, and ensures a smooth reverse motion across ice. The steam generating plant, mechanical systems, fire prevention system, and the electrical circuits are described. Diagrams of the reactor, the total power system and steam generator and cooling systems are given. -- VDP

SIP 25322 629.124.791

Ignatiev, M. A.
SCREW PROPELLERS OF ICE NAVIGATING VESSELS. (Grebnye vinty sudov ledovogo plavaniîa; Text in Russian). Leningrad, Izd-vo Sudostroenie, 114p. and 6 annexes, incl. illus., tables, diagrs., graphs, 1966. 19 refs.
DLC, VM755.I33

Icebreakers in escort often change speed and direction and hence must have high maneuverability. The icebreaker screws require sufficiently high torque in forward and reverse, the latter being of great importance. Experience acquired in operating icebreakers and transport vessels in arctic ice conditions shows a high percentage of damage to the propulsion machinery, which sharply decreases the ice-cutting capacity. Therefore, in specifications for propellers (diameter, number of blades, profile of the blades, etc.) special attention must be paid to production reliability to ensure the necessary strength of propellers and shafting. Although the use of theoretical methods for the calculation of screw propellers has recently increased in practice, the most reliable method is calculation on the basis of continuing tests made with sm ale models. Numerous mathematical formulas, phs, and diagrams are given to calculate required strength and optimum torque of screw propellers on icebreakers and ice-navigating vessels under various conditions of design, ice distribution, power, load, etc. -- VDP/FMM

SIP 25323 528.516(*7)

Bugaev, IU. G. and G. E. Lazarev
THE UTILIZATION OF TELLUROMETERS UNDER ANTARCTIC CONDITIONS. (Primenenie radiodol'nomerov v usloviîakh Antarktidy; Text in Russian). Antarktika: Dokl. komis., 1965. Moskva, Izd-vo Akad. nauk SSSR, 1966, p. 59-64 incl. tables, graph, diagrs. 4 refs.
DLC, G576.A65

Specifications are given for a new continuous operation phase tellurometer which was used in Antarctica during the 1963-64 summer season with increased speed and accuracy. The measurable distance ranges from 0.15 to 30 km. The carrier frequencies may vary from 2700 to 3000 Mc/s, with a wavelength of ~10 cm. Formulas are given for the calculation of the length of a side, taking into consideration the temperature and atmospheric pressure. The accuracy of the tellurometer was tested on a geodetic quadrangle at the Pole of Inaccessibility, one vertex of which was set on a class-4 astronomical point. The relative error of a side was 1:160,000 without taking possible systematic errors into consideration. It has been proven, however, that tellurometer measurements can achieve great accuracy on the Antarctic ice cap as a result of the extremely low humidity. -- DAS

SIP 25324 551.510.52:551.524.34(*746:*747)

Novikova, N. F. and T. A. Tsitovich
PECULIAR FEATURES OF TEMPERATURE DISTRIBUTION IN THE LOWER LAYER OF THE TROPOSPHERE OVER ANTARCTICA. (Nekotorye osobennosti raspredeleniîa temperatury v nizhnem sloe troposfery nad Antarktidoî; Text in Russian). Antarktika: Dokl. komis., 1965. Moskva, Izd-vo Akad. nauk SSSR, 1966, p. 73-81 incl. tables, graphs. 5 refs.
DLC, G576.A65

The most probable explanation for a high surface inversion (as high as 3-4 km) is the conjunction of a surface radiation inversion with a subsidence inversion in an anticyclone. The results of the present paper confirm this hypothesis, and at the same time it is found that a conjunction of a radiation inversion and a frontal inversion may occur. Tables show the

frequency of various upper boundaries of surface inversions as observed by radiosonde ascents at Mirnyy and Vostok Stations in 1958 and 1959. An analysis of synoptic maps and vertical profiles, constructed for cases of high inversions at these stations in 1958, leads to the conclusion that the specific characteristics of surface inversions on the Antarctic coast and on the ice cap are determined by the conditions under which they are formed. On the coast the greatest activity of synoptic processes takes place in winter; only with these intensive processes are the significant descending movements and thick frontal zones possible which lead to the conjunction of several inversions to form high inversions to 3-4 km. Further inland, where only the peripheries of cyclones and ridges arrive, the height of inversions does not exceed 2 km. -- DAS

SIP 25325 551.551:551.510.52/.53(*746)

Babarykin, B. K. and V. P. Beliñev
INVESTIGATION OF ATMOSPHERIC TURBULENCE IN ANTARCTICA BY THE RADIOSONDE METHOD. (Issledovanie atmosfernoĭ turbulentnosti v Antarktide radiozondovym metodom; Text in Russian). Antarktika: Dokl. komis., 1965. Moskva, Izd-vo Akad. nauk SSSR, 1966, p. 82-86 incl. graphs. 6 refs.
DLC, G576.A65

The turbulence-measurement apparatus consisted of an ordinary radiosonde, suspended by a spring from a sounding balloon and possessing an attachment which converted the overload on the balloon caused by vertical gusts into radiofrequency impulses. Temperature, pressure, and humidity measurements could be made simultaneously. Approximately 100 ascents were made at Mirnyy Station in Sept., Oct., and Dec., 1963, at 1200 and 2400 hr. The frequency of turbulence per kilometer, its mean-monthly variation with height, and the turbulence distribution relative to the tropopause and level of maximum wind speed are calculated. The turbulence shows two maxima: between 6.5 and 11.5 km (63%), related to the tropopause and the maximum wind velocity, and at 21 km (54%), possibly related to a secondary wind maximum. High turbulence is distributed symmetrically to the axis of a stratospheric jet stream, with calmer winds on the axis. Turbulence in the lower troposphere is evidently related to dynamic, rather than thermal, factors. -- DAS

SIP 25326 551.510.3:551.510.52/.53(*7)

Dolgin, I. M. and N. V. Shiposh
THE DISTRIBUTION OF ATMOSPHERIC DENSITY OVER ANTARCTICA. (Raspredelenie plotnosti vozdukha nad Antarktidoĭ; Text in Russian). Antarktika: Dokl. komis., 1965. Moskva, Izd-vo Akad. nauk SSSR, 1966, p. 87-94 incl. tables, graphs. 4 refs.
DLC, G576.A65

The more reliable data on atmospheric density are analyzed for Mirnyy, Vostok, Amundsen-Scott, Ellsworth, Hallett, and McMurdo Stations. The results show that at the isobaric surfaces the maximum mean-monthly values are observed from June to Sept. in the troposphere, and in Aug. and Sept. in the stratosphere. Minimum values are observed in Dec. and Jan. in the troposphere, and from Dec. to Feb. in the stratosphere. A vertical profile above the continent, showing isopycnals and isotherms, permits a comparison of the latitudinal distribution of densities at various altitudes. The monthly density values to an altitude of 26 km above Mirnyy Station are graphed. An evaluation is made of the effect of pressure and temperature factors on the atmospheric densities above Mirnyy. Vertical gradients ($g/m^3/km$) are graphed in the form of isolines. -- DAS

SIP 25327 912(084.3/.4)(47:*7)

Dubovskoĭ, B. V.
CARTOGRAPHIC INVESTIGATIONS OF THE U. S. S. R. IN ANTARCTICA FOR THE PAST 10 YEARS. (Kartograficheskie issledovaniĭ SSSR v Antarktide za 10 let; Text in Russian). Antarktika: Dokl. komis., 1965. Moskva, Izd-vo Akad. nauk SSSR, 1966, 130-167 incl. tables, maps, append.
DLC, G576.A65

The scope of Soviet mapping in Antarctica is indicated by means of the following: (1) a map of the areas covered by surveys; (2) a map of the coverage of geographic and topographic maps; (3) a table of the quantity of aerial negatives obtained in various Antarctic regions from 1956 to 1962; (4) a table of Soviet maps compiled between 1957 and 1965, their scales, and their projections; and (5) a table of maps included in the Antarctic Atlas, with scales, projections, and the sources of data. The accuracy of Soviet mapping in Antarctica is demonstrated by comparisons with other maps covering the same territories. An appended table gives the names, geographical coordinates, dates of discovery, and origins of the names of approximately 500 geographical objectives discovered or photographed by the Soviet Union during the past 10 yr. -- DAS

SIP 25328 551.578.46:551.324.24(*7)

Kotlîakov, V. M.
THE SNOW COVER OF ANTARCTICA AND ITS ROLE IN THE PRESENT GLACIATION OF THE CONTINENT. (Snezhnyĭ pokrov Antarktidy i ego rol' v sovremennom oledenenii materika; Text in Russian with English summary). Akad. nauk SSSR. Mezhduved. geofiz. komt. proved. MGG. IX razdel progr. MGG: Glîatsiologiîa. Sb. statei, No. 7, 246p. incl. illus., tables, graphs, diagrs., maps, 1961. 413 refs. Eng. transl. by Israel Program for Scient. Transl., Jerusalem, 1966, 256p.
DLC, QE575.A45; CFSTI, TT 65-50144

The study is based primarily on Soviet research in the Antarctic in 1957 and 1958 and secondarily on data of other expeditions. The climatic and meteorological factors causing the formation of the snow cover in Antarctica are discussed. The following aspects of snow cover formation are described: precipitation, snow transport, dynamics of the microrelief, snow accumulation during the year, development of the snow surface in warm and cold seasons, and the mass balance of the surface layer. Development of the snow-firn layer is treated. Some properties of Antarctic snow, its classification and characteristics for distinguishing the annual and seasonal layers are presented. A description is given of features of the snow cover in various geographic zones of the continent. The thickness and age of the snow-firn layer and the development of recent Antarctic glaciation are discussed. -- DAS

SIP 25329 551.33:551.79(235.24)

Wang, Ming-ye and Mein-ping Chung
REMNANTS OF QUATERNARY GLACIATION ON THE TIBETAN PLATEAU. (Text in Chinese with English summary). Acta Geographica Sinica, 31(1):63-72, March 1965.
DLC, P/B106.4 T43

On the Tibetan Plateau, remnants of the Quaternary glaciation are of general occurrence. Cirques, U-shape valleys, glacial-scoured lakes, till plains, terminal moraines, and drift boulders are widespread features down to 4200 m in altitude. The authors believe that there was once a fairly continuous ice cover on the Tibetan Plateau in late Pleistocene. Subsequently the snow-line was higher and the glaciers retreated gradually to their present positions. The reasons are two-fold: a general warming of the world climate, and desiccation of Tibet due to further uplift. The latter is evidenced by the obvious shrinkage of many lakes on the plateau. By correlating the moraines of this glaciation with the terrace of Zi-Ling Tsangpo and Yamdrok, it is concluded that this great ice cover was late Pleistocene. Since that time the glacier retreated in three stages forming: 1) Yamdrok Lake (4400 m. 2) terminal moraines in Cano Chu Valley (4650 m.); 3) moraines on Cano-La Col (4950 m.). Recessional moraines are also present in the valley of Drokar Chu on the northern slope of Chumulanma. (Authors' abstract, modified)

SIP 25330 629.13:624.143

Trunov, O. K.
AIRPLANE ICING AND ITS CONTROL. (Obledenenie samoletov i sredstva borby s nim; Text in Russian). Moscow, Izd-vo Mashinostroenie, 247p. incl. illus. tables, maps, diagrs., graphs, 1965. 62 refs.
DLC, TL557.I3T7

The physics and theory of the icing process described includes the meteorological conditions causing this phenomenon during flight, and the present thermal and mechanical methods employed in anti-icing systems for use on passenger airplanes and helicopters. Discussed also are the methods of selecting the basic parameters and of computing the electrical and thermo-pneumatic anti-icing systems; the effect of the amount and type of icing on the flight characteristics of the airplane; the methods of testing the airplanes during flights under icing conditions and the characteristics of the icing on grounded planes. -- VDP

SIP 25331 532.58

Odar, Fuat
FORCES ON A SPHERE MOVING STEADILY ALONG A CIRCULAR PATH IN A VISCOUS FLUID. Res. Rept. 229, U.S. Army Cold Regions Research and Engineering Laboratory, 6p. incl. graphs, diagrs., April 1967. 2 refs.
CRREL files

Forces on a sphere moving steadily along a circular path in a viscous fluid are measured and it is found that within the experimental range both the longitudinal and normal forces are dependent on the Reynolds number and not on the radius of the path. Thus, the conventional drag coefficient can also be obtained from a rotational motion. (Author's abstract)

SIP 25332 624.143.56

Standish, Norman W. and Gordon G. Cross
DEICER COMPOSITION. U.S. Patent 3,185,648, [3]p., May 25, 1965. 2 refs.
CRREL files

A chloride-free chemical deicer is described which, even at subfreezing temperatures, rapidly wets and melts ice, is composed entirely of plant nutrients, and will not cause corrosion or discoloration of surfaces (especially stressed aluminum and aluminum alloy surfaces). The deicer is particularly useful in conjunction with the melting of ice and snow in driveways and walkways adjacent to lawns, shrubs, flowers, and trees. It is also useful in the melting of ice and snow on airport runways, bus and truck loading areas, etc., where most of the equipment is constructed of various metals. Principle components of the composition are urea, ammonium nitrate, trisodium phosphate, and sodium polyphosphates. -- BLE

SIP 25333 624.143.56

Pinckernelle, Werner and Leonore Gentsch
DE-ICING COMPOSITION. Great Britain. Patent Specification 1,037,363, 3p., July 27, 1966.
CRREL files

The invention relates to deicing compositions suitable for winter maintenance of roads and similar icy surfaces. The invention contains sodium chloride with additives of water soluble ferrocyanide, calcium and/or magnesium chloride. It prevents caking and freezing of deicing compositions under all weather conditions, remains spreadable for long periods of time at very low temperatures, eliminates the need for protective measures otherwise required to retain the effectiveness of deicing compositions such as wrapping materials, storage facilities, etc. The preparation of the composition is described. -- BLE

SIP 25334 624.143.8

Barker, G. E.
LOW FREEZING LIQUID. U.S. Patent 2,767,145, 3p. incl. graph, Oct. 16, 1956. 2 refs.
CRREL files

This invention relates to liquid compositions of low freezing point, and particularly to low freezing liquids which are also of low flammability. The described liquid consists of three essential ingredients: ethylene glycol, water, and formamide. Compositions ranging in freezing point downward from -65°F and from -95°F are provided. By the addition of thickening agents and/or viscosity index modifiers the ternary liquids convert into hydraulic fluids which may be further modified by corrosion inhibitors and lubricants. -- BLE

SIP 25335 672.6:551.326

Kintish, I. L. and T. M. Roach
ICE OR FROZEN EARTH ANCHOR. U.S. Patent 3,304,671, [5]p. incl. diagrs., Feb. 21, 1967.
CRREL files

An ice or frozen earth anchor is described which has maximum holding power, is simple, relatively inexpensive to manufacture, has a minimum number of operating parts, is very strong, and has a long operating life despite continued rough use. The tubular anchor is installed into ice or frozen ground by lighting a combustible material such as thermite placed in the lower portion of the anchor after the unit is placed in a hole made specifically for it. The thermite container is insulated from the upper portion of the anchor tube by a circular disk of low-strength refractory material. Above the refractory disk in the central portion of the tube are ground engaging cables, rods, and corner anchors attached to it and to an ignition wire along the outside of the anchor tube. When the thermite is expended, the spring forces the ground gripping elements out of the anchor tube. The ice or frozen earth reforms around the holding components. -- BLE

SIP 25336 551.579.2:551.321.7(438)

Lewińska, Janina
DETERMINATION OF WATER CONTENT IN SNOW. (Określenie zasobów wodnych śniegu; Text in Polish). Przegląd Geofizyczny, 7(4):245-254 incl. tables, maps, 1962. 11 refs. (Engl. transl.: TT 65-50500, Central Institute for Scientific, Technical and Economic Information, Warsaw, 1967)
DLC, QC851.P72; DLC, Tech. Rept. Collection

Investigations of snowfall conditions in the Dunajec Basin are discussed which resulted in a new method enabling day-by-day measurements of the water content in snow and consequently current determination of the decrease in the snow cover and the formation of both water levels and flows. This method is better than previous ones because (1) it produces charts of constant coefficients of water content in the snow cover based on observational data; (2) it requires only measurements of the thickness of the snow cover for current computations; (3) it reduces the up-to-date computations to the basic rule of multiplication (of constants); (4) it is rapid and gives the results within the limits of accuracy adopted for computations of this kind; and (5) it gives the possibility of observing the changes in water content of snow from day to day. -- BLE

SIP 25337 551.32(021)

Lliboutry, Louis
TREATISE ON GLACIOLOGY. VOLUME 2. GLACIERS--CLIMATIC VARIATIONS--FROZEN GROUND. (Traité de glaciologie. Tome 2. Glaciers--Variations du climat--Sols gelés; Text in French). Paris, Masson & Cie, 1965, p. 429-1040 incl. illus., tables, graphs, maps. Refs.

This volume, which completes a comprehensive handbook on glaciology, treats the following topics: general problems of glaciers, data on contemporary glaciers, geophysical techniques in glaciology, the effects of forces on glaciers, glacier sliding, glacial erosion and deposition, fluctuations of temperate glaciers, flow and evolution of ice sheets, climatic variations, ice ages and their origin, and frozen ground. The volume also contains a subject index and a detailed table of contents for volume 1 and 2 (See SIP 23860). -- DMN

SIP 25338 672.6:551.322

Kovacs, Austin
FEASIBILITY STUDY OF BURIED ANCHORS IN POLAR SNOW. Spec. Rept. 107, U. S. Army Cold Regions Research and Engineering Laboratory, 41p. incl. illus., tables, graphs, diagrs., appendix, March 1967. 8 refs.
CRREL files

The load resistance behavior of buried anchors in polar snow was investigated to determine the feasibility of using them as part of a reaction system for containing the forces generated by pile test loading devices. The test program was conducted at Camp Century, Greenland. Ten anchors were load-tested: eight in quick extraction and two under sustained long-term extraction. Ultimate load capacities of the anchors to resist quick extraction forces and their ability to hold sustained loads have not been definitely established, and no mathematical solution has been brought forward to predict the unit load creep rate or the ultimate load vs. embedment depth of an anchor in snow. The results of this exploratory study established the feasibility of using buried anchors in polar snow for the pile test program. (Author's abstract)

SIP 25339 551.578.46:536.2

Yen, Yin-Chao
HEAT CONDUCTION IN MOIST POROUS MEDIA. Res. Rept. 212, U. S. Army Cold Regions Research and Engineering Laboratory, 10p. incl. graphs, Dec. 1966. 3 refs.
CRREL files

An equation has been developed to describe heat conduction in moist porous media. Specific examples are given to demonstrate the effect of dry medium density and water vapor diffusivity through the medium on the rate of temperature propagation in snow. (Author's abstract)

SIP 25340 551.322:548.51:551.464(265.4)

Isono, K. and others
A PHYSICAL STUDY OF SOLID PRECIPITATION FROM CONVECTIVE CLOUDS OVER THE SEA: PART IV. IMPORTANCE OF GIANT SEA SALT NUCLEI IN FORMATION OF SOLID PRECIPITATION. J. Meteorol. Soc. Jap., 44(6):308-319 incl. illus., tables, graphs, Dec. 1966. 16 refs.
DLC, Orientalia Div.

Observations over the Japan Sea revealed that: (a) the amounts of sodium and chlorine in graupel pellets were several times as large as those in snowflakes, and the ratio of sodium to chlorine in the graupel was very close to that in the sea water, (b) a number of supercooled large cloud drops (several tens of microns in diameter) were present in the clouds over the sea near the coast where graupel showers occurred often, (c) there was a positive correlation between the daily amount of snowfall and the concentration of giant chloride particles in the air, (d) the relation between NH_4^+ content and Na^+ content of snow showers from convective clouds over the sea was different from that of snow showers from orographic cells at an inland area. The results suggest that giant sea salt particles play an important part in the formation of snowfall from convective clouds over the sea. The giant salt particles probably enhanced the growth of rimed snow crystals. -- BLE

SIP 25341 551.322:548.51:523.16(519)

Yang, I. K.
ON ICE NUCLEUS CONCENTRATIONS IN SEOUL DURING WINTERS 1962-1965. J. Meteorol. Soc. Jap., 44(46):376-380 incl. tables, graphs, Dec. 1966. 9 refs.
DLC, Orientalia Div.

Ice nucleus concentrations in Seoul were measured using millipore filters for the period of the last four winters. Concurrently, the microscopic dust count and the radioactivity of airborne dust caught on the filter surface were also examined. Taking into consideration the correlation among these factors, the sources of ice nuclei in Korea seem to be distant rather than local. The average value of ice nucleus concentrations in Seoul during the winter seasons was 0.12 per liter of air at -15°C, which is lower than that of Australia and Japan. (Author's abstract)

SIP 25342 624.131.43:620.176

Bernhard, R. K.
STRESS AND WAVE PATTERNS IN SOILS SUBJECTED TO DYNAMIC LOADS. Res. Rept. 120, U. S. Army Cold Regions Research and Engineering Laboratory, 52p. incl. tables, graphs, diagrs., appendixes A-B, March 1967. 44 refs.
CRREL files

The report is divided into four parts: Parts I and II cover investigations of the reliability of shear stress measurements in soils subjected to vibratory loads for biaxial and triaxial systems, respectively. Part I is a summary only (See SIP 21834 for detailed treatment). Part III is a study of three-dimensional "principal" stress patterns produced in soil subjected to vibratory loads. Part IV is a theoretical analysis of some aspects of soil wave propagation in stratified soil. From the measurements of five shear stresses and one normal stress, the stress distribution of a triaxial system can be determined. In noncohesive soils triaxial stress fields due to vibratory loads can be determined by recording six independent stress components. Sinusoidal force excitation and impact excitation yield time-distance graphs which can be used to determine reflection and refraction techniques in stratified soils. (Author's abstract)

SIP 25343 629.124.752:629.12.037.1(*50)

Khaĭkin, A. and V. Ĭagodkin
OPERATION OF THE ELECTRICAL PROPULSION SCREW OF AN ICEBREAKER IN ICE BREAKING BY THE PROPELLER BLADES. (Rabota grebnoĭ elektricheskoĭ ustanovki ledokola pri razrushenii l'da lopastiami vinta; Text in Russian). Morskoĭ flot, 26(8):26-27 incl. diagr., graph, Aug. 1966.
DLC, VM4.M6

The greatest strain on screw propellers and shafting of an icebreaker occurs when the propeller blades are striking the ice and the propulsion unit stalls. This leads to frequent damage of propeller and shaft and often makes the vessel inoperative. The importance of determining the ice forces on propeller blades is emphasized in designing the main propulsion machinery and insuring adequate engine torque to overcome stalling. Mathematical formulas are offered for calculating the necessary moment for propellers to break ice caught in the blades. The formulas are based on specific pressure necessary for breaking ice by crushing and cutting, mean thickness of blade, depth of blade cut into ice, moment of power application, diameter of propeller, speed of vessel, number of blades, angle between fracture planes and propeller blade, mean width of blade, pitch angle of blade section, angle of normal blade section determined by actual vessel speed and propeller revolutions, and rotating speed of propeller. -- VDP/FMM

SIP 25344 551.321.62

Thyssen, F.
THE TEMPERATURE-DEPENDENCE OF THE P-WAVE VELOCITY IN GLACIERS AND ICE CAPS. (Die Temperaturabhängigkeit der P-Wellengeschwindigkeit in Gletschern und Inlandeisen: Text in German with English summary). Zeit. Geophys., 33(2):65-79 incl. table, graphs, April 1967. 23 refs.
DLC, QC801.Z4

The influence of temperature, thickness, and melting on the velocity of P-waves in ice is discussed, and an empirical formula for the dependence of the velocity on these parameters is given. The formula describes the seismic velocity on glaciers and the maximum velocity on ice caps. (Author's abstract)

SIP 25345 656.61.052:551.46.062.7(*3)

[U. S. Coast Guard]
INTERNATIONAL ICE PATROL, 1966. Marine Observer, 37(216):71-74 incl. illus., April 1967.
DLC, QC851.M127

The Ice Patrol operated from March 1, to April 28, 1966, for the primary purpose of guarding the southeastern, southern, and southwestern limits of ice in the vicinity of the Grand Banks. The operations included (1) pre-, in-, and post-season reconnaissance flights, (2) forecasts of ice conditions, (3) weather reports to ships including sea temperatures, (4) the maintenance of position plots of all reporting ships in the Ice Patrol areas, (5) one oceanographic survey for the collection of ice information affecting the drift and deterioration of ice in the Grand Banks area, (6) a special iceberg dyeing program to assist in tracking same, and (7) the monitoring of ice bulletins broadcast by the Canadian Department of Transport, and Ice Central Halifax. -- BLE

SIP 25346 551.576:551.578.7

Haman, Krzysztof
ON THE ACCUMULATION OF LIQUID WATER IN A BUOYANT JET AND ITS RELATION TO HAIL PHENOMENA. Acta Geophys. Polon., 15(1):9-27 incl. graphs, diagr., 1967. 22 refs.
DLC, QC801.A25

A theoretical model of the accumulation of liquid water in cumulonimbus clouds is given, according to which the large droplet fraction circulates up and down around the level of the strongest updraft, due to suitable distribution of horizontal convergence and divergence of velocity. On the basis of this theory, estimates of maximal water content as well as criteria for hail formation are derived. The results are compared with those of the theory of accumulation zone and hail formation, developed in the High Mountains Geophysical Institute (VGI) in Nalchik, USSR. (Author's abstract)

SIP 25347 551.578.7:551.509.54(438)

Haman, Krzysztof and Michal Niewiadomski
A PRELIMINARY ATTEMPT AT HAIL FORECASTING IN CENTRAL POLAND. Acta Geophys. Polon., 15(1):29-38 incl. table, graphs, map, 1967. 6 refs.
DLC, QC801.A25

A practical scheme for hail forecasting is given, based on a forecasting method (proposed by the author, see SIP 25346) which requires a knowledge of the temperature inside the buoyant turbulent jet modelling the cumulonimbus updraft, of the vertical velocity calculated under the assumption of vanishing liquid water content, as well as of the altitude at which the speed of the updraft is maximal. Auxiliary considerations are given, and further improvements of the method are proposed. -- BLE

SIP 25348 551.509.67

Pleszczyńska, Elzbieta
ON A STATISTICAL STUDY OF HAIL SUPRESSION EXPERIMENTS. Acta Geophys. Polon., 15(1):39-47 incl. table, diagr., 1967. 5 refs.
DLC, QC801.A25

The effectiveness of hail suppression methods ought to be verified statistically on the basis of a properly planned experiment. However, special features of hail make most standard methods inapplicable. The paper discusses problems and presents suggestions for planning and interpreting experimental results. The Monte-Carlo method of evaluating required experiment duration time is also described. These problems are illustrated by hail data gathered in Poland. Critical remarks on methods adopted by some experimenters working abroad are presented. (Author's abstract, modified)

SIP 25349 551.345:523.3

Werner, M., T. Gold, and M. Harwit
ON THE DETECTION OF WATER ON THE MOON. Planet. Space Sci., 15(4):771-774 incl. tables, diagr., April 1967. 21 refs.
DLC, QC801.P5

It has been suggested that a permafrost layer may exist beneath the surface of the Moon. If such a layer were present, H_2O molecules would be outgassing from the lunar surface. These molecules could be detected by observations of fluorescent radiation from OH radicals produced from the H_2O by radiative dissociation. It is shown that an outgassing rate from such a lunar permafrost layer as low as 3×10^7 molecules/cm^2-sec could be detected from the surface of the Earth. (Authors' abstract)

SIP 25350 551.345.1:536.53(*440)

Mackay, J. Ross
PERMAFROST DEPTHS, LOWER MACKENZIE VALLEY, NORTHWEST TERRITORIES. Arctic, 20(1):21-26 incl. graphs, map, March 1967. 6 refs.
DLC, G600.A695

Ground temperature records in the Lower Mackenzie Valley have been obtained for seven sites during the 1965-1966 period by installing thermistor cables in seismic shot holes drilled for the purpose. From the initial measurements, permafrost thickness is estimated at about 350 ft for Arctic Red River and 400 ft for a site 14 mi west of Fort McPherson. In the south central part of the Mackenzie Delta, in an area of gradually shifting channels and infilling lakes, the depth is 350 ft, or possibly more. In the distal part of the Delta, where new islands are growing, permafrost is aggrading downwards in the saturated alluvial soils. At four sites within 2 ft of sea level, permafrost may be only 60 to 100 ft deep. The permafrost in this area should continue to aggrade for many centuries. (Author's abstract)

SIP 25351 553.97:551.345:622.23.001.4

Nichols, Harvey
PERMAFROZEN PEAT SAMPLING--DYNAMITE AND CHAIN-SAW. Arctic, 20(1):54, March 1967. 1 ref.
DLC, G600.A95

Experience in Canada has revealed that explosives are effective for obtaining peat samples big enough for radiocarbon dating and plant macrofossil analysis. A sequence of irregularly-shaped peat blocks was thus obtained. Subsequently it was found that a conventional 5-1/2 hp chain-saw was capable, without adaptation, of cutting frozen peat without difficulty and with close control. -- BLE

SIP 25352 551.321.5:528:625.7(*38)

Davis, R. M.
ICE SURFACE MOVEMENT ON THE TUTO RAMP IN NORTH GREENLAND. Tech. Rept. 164, U.S. Army Cold Regions Research and Engineering Laboratory, 28p. incl. tables, graphs, diagrs., maps, appendixes A-B, March 1967. 6 refs.
CRREL files

As part of a study of road construction on glacier ice, a program of measurements of the horizontal and vertical movement of the surface of the ice has been conducted. This report covers measurements from 1956 through the 1963 thaw season. The measurement procedure is described, and the movement data are tabulated. Appendixes A and B present short-term horizontal movement measurements and station elevations, respectively. The rate and direction of both the vertical and horizontal movement on the Tuto ramp are fairly consistent on an annual basis. The upward vertical movement from Station 20+00 to 58+00 on the original Ramp Road is probably caused by the ice upthrust over a stagnant wedge of ice at the edge of the glacier. The existence of this wedge is evidenced by the small amount of horizontal movement at the edge of the glacier and the upward vertical movement of the ice in the area in front of the wedge. -- BLE

SIP 25353 551.345(*3)

Péwé, Troy L.
PERMAFROST AND ITS EFFECT ON LIFE IN THE NORTH. Corvallis, Ore. State Univ., 1966, 40p. incl. illus., tables, diagrs., map. 152 refs.
DLC, GB641.P4

Permafrost is actively forming in the north, and most perennially frozen ground is in equilibrium with the existing climate, although a few occurrences of permafrost are relics of a colder climate. The effect of permafrost in the biological field is perhaps most evident on vegetation. Underlying frozen ground seriously modifies surface drainage, which in turn affects the distribution of vegetation. Ground water distribution in many parts of the north is affected by the distribution of perennially frozen ground. In many places, it may be found only below permafrost; elsewhere, however, it may occur above the frozen ground and also in thawed zones within the permafrost. Engineering structures are seriously influenced by permafrost if the ice content of the ground is greater than the available pore space in the sediments. Intense seasonal frost heaving of the ground is common because of the rigorous climate and great areas of poorly drained fine-grained sediments. -- BLE

SIP 25354 551.322:536.421.4:532.3

Boger, D. V. and J. W. Westwater
EFFECT OF BUOYANCY ON THE MELTING AND FREEZING PROCESS. Trans. Amer. Soc. Mech. Engr., 89(1):81-89 incl. tables, graphs, diagrs., Feb. 1967. 17 refs.
DLC, TJ1.A7

Measurements were made of interfacial velocities and transient and steady-state temperature profiles during the freezing and melting of water in a 0.5 x 0.5 x 2-in. high test chamber. Heat flow was one-dimensional, up and down. Tests both included and excluded the density-inversion temperature of 4°C. Freezing at the top and at the bottom, melting at the top, and at the bottom, all were achieved by selection of cold-end temperatures between -50 and -5°C and hot-end temperatures between 3 and 97°C. Runs included conditions with buoyancy forces in the liquid, with buoyancy forces existing but insufficient to cause convection, and with natural convection occurring at all times. With no natural convection the results agreed with predictions found by use of the numerical technique of Murray and Landis developed originally for cases with no convection. The onset of natural convection was found to be at a Rayleigh number of about 1700. Proper selection of the significant length, the ΔT [temperature], and coefficient of expansion for the Rayleigh number is described. The effective thermal conductivity for Rayleigh numbers up to 10^7 agreed with prior correlations obtained with free convection but with no phase change. The numerical calculation procedure was modified sucessfully by use of the effective k [thermal conductivity]. At the highest Rayleigh number, an unusual case of oscillations in the interface velocity is reported. (Authors' abstract)

SIP 25355 551.575:629.139.1(*49)

Taylor, John H. and James F. Church
THE ICE FOG PROBLEM AT EIELSON AFB, ALASKA. AFCRL-66-230, AFSG No. 176, U.S. Air Force Cambridge Res. Lab., Office of Aerospace Res., Bedford, Mass., 26p. incl. illus., tables, graphs, map, April 1966. 25 refs.
DLC, Tech. Rept. Collection

This report summarizes the findings and conclusions drawn from a survey which was conducted at Alaskan bases. The purpose of the survey was to secure necessary information for making recommendations on the nature and level of effort of research program which could be directed toward minimizing the disruptive effect of ice fog on air operations at Eielson Air Force Base. The ice fog phenomenon, its principal causes at Eielson, and the nature and extent of its effect on air operations to the solution

of ice fog problems and their influence on the apparent trend during the past ten years toward a decreasing frequency of occurrence. A recommendation is made for engineering designed to minimize pollutions from what is considered to be the primary source. Finally, there is a discussion of the feasibility of establishing an applied research program designed to provide operationally useful solutions to the ice fog problem. (Authors' abstract)

SIP 25356 629.124.75.001.2(*50)

Rachkov, A.
APPROXIMATE EVALUATION OF THE STATIC ICEBREAKING POWER OF VESSELS. (Prblizhennaîa ocenka staticheskoî ledokol'noî moshchnosti sudov; Text in Russian). Morskoî Flot, 26(10):32-33 incl. graphs, Oct. 1966.
DLC, VM4.M6

Vessels for ice navigation are designed in terms of static icebreaking power, i.e., capacity to overcome the greatest thickness of ice in steady progress without charging. This phase of design is determined when writing basic specifications and as required by ice conditions in the area of navigation which govern the vessel displacement and installed power. A new simplified method of approximate evaluation of the static icebreaking power enables designers to establish a direct relationship between vessel dimensions, installed power and ice thickness. It is assumed that the width of ice channel made by the icebreaker equals the width of the vessel. Therefore calculations are made in terms of $q = N/B = k\sqrt{\delta^3}$, where q is screw power proportional to 1 m of vessel width, N is screw hp, B is width of vessel, k is an empirical value of 0.55, and δ is the ice thickness in cm. Graphs show that the results obtained agree closely with those obtained in field observations aboardship and those obtained by an elaborate 5-term equation. A nomogram enables the navigator to determine the screw power depending on the ice thickness and width of vessel. -- VDP/FMM

SIP 25357 629.135.4:551.33(*462)

Ives, Jack and Dave Harrison
ROTORCRAFT ON RESEARCH. Can. Geogr. J., 74(5):145-151 incl. illus., diagrs., map, May 1967.
DLC, G1.C3

The use of helicopters by the Geographical Branch in its continuing Baffin Island Research Project is discussed. Mountain top landings are being made to test the Nunatak Hypothesis (which reasons that some Canadian mountain tops have never been ice covered and remained a refuge for certain plant species during the Ice Age). Samples of finely weathered materials were collected for chemical analysis and a particularly careful investigation was made of the many large "foreign" boulders that were found on some of the high mountain tops. Equally valuable was the access afforded by the helicopter to many other landforms and deposits under study at all levels. Information is given on flying time and general rules for operating helicopters in Arctic regions. -- BLE

SIP 25358 551.322:536.421.4:532.77:536.62

Williams, R. J. and H. T. Meryman
A CALORIMETRIC METHOD FOR MEASURING ICE IN FROZEN SOLUTIONS. Cryobiology, 1(5):317-323 incl. illus., graphs, diagr., 1965. 11 refs.
DLC, QH324.C9

A calorimeter was designed and constructed for the specific purpose of determining the amount of ice in biological tissues as a continuous function of subfreezing temperature. Other methods of acquiring this information are discussed. Analysis of the data permits separation of latent heat of fusion from change of specific heat of the specimen with thawing or freezing. Preliminary results of this calorimeter are shown, and compared with a salt solution of known thermal behavior. (Authors' abstract)

SIP 25359 624.131:553.068:388.1(*49)

Mathews, A. C. and others
TRAFFICABILITY STUDIES OF SOME ALASKAN SILTS. Progress Rept., Proj. 320-S, Iowa Eng. Exp. Station, 44p. incl. illus., tables, graphs, maps, July 1, 1955. 21 refs.
DLC, Tech. Rept. Collection

As part of a 1954 project investigation of silts and glacial deposits in Alaska, the trafficability of various silt deposits was estimated by means of a U.S. Corp of Engineers cone penetrometer. This instrument is essentially a cone-tipped rod which is slowly forced into the ground by hand. During the test, the resistance of the ground to penetration by the cone is measured at several depths. These data have been correlated by the Corps of Engineers with the abilities of various soils to support vehicular traffic. Silt deposits were tested in Matanuska Valley, Big

Delta, and Fairbanks. Most of the work was done in the Matanuska Valley, and an approximate trafficability map was made. Strong correlations were found between trafficability and topographic position, and between trafficability and vegetation and/or cultivation. In general, the trafficability is less on hilltops and in uncut areas. Lesser correlations were found between trafficability and various engineering property data, such as median grain size. (Authors' abstract)

SIP 25360 624.138:553.623(*49)

Ward, Ira J. and others
MECHANICAL STABILIZATION OF A GRAVELLY SAND FROM THE BEACH AT POINT BARROW, ALASKA. Progress Rept., Proj. 320-S, Iowa Eng. Exp. Station, 57p. incl. illus., tables, graphs, maps, appendix, July 1, 1955. 22 refs.
DLC, Tech. Rept. Collection

Laboratory experiments indicate that the stability of the gravelly beach sand in the Barrow area may be substantially improved by mechanical stabilization using locally available materials. The stability may be increased approximately tenfold. However, the stability still is not adequate for permanent base or surface course construction, largely because of the highly rounded nature of the beach materials. Because of possible beneficial affects to be realized by the use of other materials or modifications to the mechanical stabilization treatment, further work seems to be justified. -- BLE

SIP 25361 631.47:624.131:553.068(*49)

Stump, R. W. and others
PROPERTY STUDIES OF ALASKAN SILTS IN THE MATANUSKA VALLEY, BIG DELTA, AND FAIRBANKS AREAS. Progress Rept., Proj. 320-S, Iowa Eng. Exp. Station, [57]p. incl. illus., tables, graphs, diagrs., maps, Dec. 1, 1955. 8 refs.
DLC, Tech. Rept. Collection

The silty materials of the Matanuska Valley, Big Delta, and Fairbanks regions are being studied as part of an Office of Naval Research project. This report covers work done during the first year, most of which concerns the Matanuska Valley. The silts overlie a variety of glacial and alluvial deposits in the Matanuska Valley as a surficial deposit. Five and possibly six volcanic ash layers are present in the thick silt, but only remnants are to be found in the thin silt sections. Mechanical analyses and consistency limits of all 91 samples showed 92% classified texturally as silty loam, and 85% had an engineering classification of A-4(8). Only a preliminary survey of the Big Delta region was made. Here the principal silt deposits (which are highly micaceous) lie on what may be terraces. The Fairbanks silts, which are a surficial deposit found on the hills, are also micaceous but are generally finer-grained. Numerous illustrations, graphs, diagrams, and maps are appended. -- BLE

SIP 25362 553.068:624.131(*49)

Stump, R. W. and others
PROPERTIES AND GEOLOGIC OCCURRENCE OF SILT DEPOSITS IN THE MATANUSKA VALLEY, ALASKA. Final Rept. I, Proj. 320-S, Iowa Eng. Exp. Station, 89p. incl. illus., tables, graphs, diagrs., maps, June 1, 1956. 38 refs.
DLC, Tech. Rept. Collection

Petrographic analysis of several samples indicates that the silts have a mineral composition similar to that presently being carried by both the Matanuska and Knik Rivers. The engineering properties of the silts are similar to those of the loess in Iowa. The Matanuska Valley silts are present on a wide variety of glacial and glaciofluvial land forms. In some areas of the Matanuska Valley, the topography has been modified by the interaction of the Matanuska River and the Knik Glacier that was present in the southern part of the valley after the Matanuska Glacier had retreated from the area. Various theories of origin of the silts are described and assessed on the basis of the various silt properties. -- BLE

SIP 25363 624.131:631.47:355.243(*49)

Blank, H. L. and others
MILITARY TRAFFICABILITY OF SOILS IN THE MATANUSKA VALLEY, ALASKA. Progress Rept., Proj. 320-S, Iowa Eng. Exp. Station, 42p. incl. illus., tables, graphs, map, Feb. 1, 1957. 24 refs.
DLC, Tech. Rept. Collection

Most soils in the Matanuska Valley appear to provide good trafficability for most military vehicles. Many areas of swamplands, which are classified as untrafficable in this study, may, if further tests are conducted, prove to be trafficable for many military vehicles. In this area, cultivated soils provide better trafficability then adjacent virgin tracts of the same soil. This increase in trafficability is due both to densification of the top soil and to better surface drainage. All tests conducted in hay fields produced very high trafficability ratings. The report presents a review of the literature and suggests a simplified procedure for tactical trafficability mapping and interpretation by military field units. -- BLE

SIP 25364 553.068:624.131(*49)

Lindholm, G. F. and others
GEOLOGIC AND ENGINEERING PROPERTIES OF SILTS NEAR BIG DELTA AND FAIRBANKS, ALASKA. Final Rept. I, Proj. 320-S, Iowa Eng. Exp. Sta., 112p. incl. illus., tables, graphs, maps, appendixes A-D, Dec. 1, 1957. 37 refs.
DLC, Tech. Rept. Collection

Information is given on geologic and engineering properties of silts near Big Delta and Fairbanks, Alaska, based on a literature review and field studies. The appendixes present data on mechanical analysis, sample preparation for petrographic study, differential thermal analysis, and X-ray analysis.
-- BLE

SIP 25365 551.33:624.138(*49)

O'Sullivan, J. B. and others
GEOLOGY AND BITUMINOUS STABILIZATION OF SOIL MATERIALS AT BARROW, ALASKA. Final Rept. III, Proj. 320-S, Iowa Eng. Exp. Sta., 96p. incl. illus., tables, graphs, maps, June 30, 1958. 56 refs.
DLC, Tech. Rept. Collection

Investigations were made in the southwestern portion of the Matanuska Valley, the area south of Big Delta, Fairbanks and vicinity, and the region near Point Barrow to determine the areal extent, geologic and engineering properties and the trafficability characteristics of the soil materials in these areas. Correlation of this data is to be used to determine the feasibility and most practical method of soil stabilization for use in road and runway construction. This report deals with the Point Barrow area. The results indicate that the stability of the beach materials can be satisfactorily increased by mechanical stabilization. The available crude oil can be used in bituminous stabilization of base and surface courses only after blowing to increase its cohesive properties. The consideration of subgrade behavior on thawing is very important in pavement design when working in an area of continuous permafrost. Prevention of ice saturated silts from thawing is very important. Generally, the beach is the most favorable location for roads and runways.
-- BLE

SIP 25366 551.324.24:551.321.6:621.396.96

Bogorodskiĭ, V. V. and B. A. Fedorov
RADAR MEASUREMENTS OF ICE FORMATIONS. (Radiolokatsiia lednikov; Text in Russian). Zh. Tekh. Fiz., 37(4):781-788 incl. illus., tables, graphs, 1967. 12 refs.
DLC, QC1.Z48

A description is given of the results of systematic measurements of the thickness of the ice cover made along a 100-km sector between the Mirnyy Observatory and the Pionerskaya Station during the 10th Soviet Antarctic Expedition. Measurements were made at 36 points whose geodetic coordinates had been fixed by GDR scientists. The sounding and reflected pulses were recorded on an electron beam tube. On the basis of a two-year cycle of investigations the following conclusions were drawn: (1) The amplitude of the reflected signal is practically constant when measuring the distance from the antenna to the snow surface within a 1 to 500-cm range. Should the active antennas of the vibrators come in contact with the snow, the signal amplitude decreases by 6 to 10 db. Penetration of the entire antenna into snow weakens the amplitude of the recorded signal by 6 to 20 db. (2) No regular amplitude variations of the reflected signal were detected when measuring the temperatures of the snow-cover surface between -2 and -12°C. (3) It was possible to measure the angle of inclination of the base of the glacier relative to the horizontal plane with an error of ±15°. (4) The most probable values of tan δ for f = 213 mc for a glacier with a snow layer is in the range (4.2 to 7) x 10^{-4}. (From ATD abstract)

SIP 25367 551.326.7:548:53(*764)

Paige, R. A.
CRYSTALLOGRAPHIC STUDIES OF SEA ICE IN McMURDO SOUND, ANTARCTICA. U.S. Nav. Civ. Eng. Lab., Proj. Y-F015-11-01-026, Tech. Rept. R-494, 31p. incl. illus., graphs, map, Nov. 1966. 23 refs.
CFSTI, AD642432

Sea ice is a crystalline solid with physical properties that are highly temperature-dependent between -1.8°C and -10°C. This dependence becomes less with decreasing temperatures. A detailed study of the crystal structure and other internal features of sea ice is necessary for an understanding of the relationship of these properties with strength properties. Horizontal banding in the McMurdo Sound ice sheet was studied to determine the effect of temperature fluctuations on band frequency, and various

crystal parameters were measured from photographs of thin sections. Subcrystal platelet width increased with depth from about 0.5 mm at the surface to about 1 mm at 2.8 m. The length-width ratio of single crystals increased from 2 to 1 near the surface to more than 5 to 1 at depths greater than 2 m. The number of crystals per unit area decreased with depth. Strained ice from a pressure ridge showed preferred c-axis orientation and wavy extinction similar to that observed in strained quartz. There is apparently no correlation between strength and crystal structure in a mature isothermal ice sheet. (Author's abstract, modified)

SIP 25368 551.322:550.93(*701)

Crozaz, G. and P. Fabri
MEASUREMENT OF POLONIUM IN THE RANGE OF 10^{-13} CURIES, TRACING BY MEANS OF Po-208, AND APPLICATION TO THE CHRONOLOGY OF ICE. (Mesure du polonium á l'échelle de 10^{-13} Curie, traçage par le ^{208}Po et application á la chronologie des glaces; Text in French with English summary). Earth & Planetary Sci. Let., 1(6):446-448 incl. tables, graphs, Nov. 1966. 7 refs.
DLC, Unbound periodical

A procedure is described for measuring Po-210 in the range of 10^{-13} c. in water and ice samples. Po-208 is used as a tracer in order to check the recovery yield. The procedure is of interest in dating firn cores by the Pb-210 method. It is applied to the measurement of the rate of snow accumulation at the Pole of Inaccessibility. (Authors' abstract, modified)

SIP 25369 551.24:551.326.3(*824:263:22)

Wilson, J. Tuzo
ARE THE STRUCTURES OF THE CARIBBEAN AND SCOTIA ARC REGIONS ANALOGOUS TO ICE RAFTING? Earth & Planetary Sci. Let., 1(5):335-338 incl. illus., diagrs., Sept. 1966. 11 refs.
DLC, Unbound periodical

The structures of the Caribbean and Scotia Ridge regions appear to be geometrically similar to "finger-rafting" of ice. Simple overlapping, such as occurs in ice sheets, is not likely to occur in the mantle. However, the oceanic crust could have been forced down in trenches in front of the arcs, and reabsorbed into the mantle. Conclusions based solely on the general similarity in geometry seem to indicate a possible explanation for the thicker crust, wider range in crustal velocities, more gradual change from crustal to mantle velocity, and greater thickness of derived materials overlying the crust. -- DMN

SIP 25370 551.578.7(6)

Sansom, H.W.
THE OCCURRENCE AND DISTRIBUTION OF HAIL IN AFRICA. Meteorol. Mag., 95(1128):212-218 incl. table, maps, July 1966. 12 refs.
DLC, QC851.M18

Hail is virtually unknown over Africa between 20°N and 30°N, on the Atlantic coast north of 25°S, and on the Indian Ocean coast north of 15°S. However, hail has been reported at Mauritius (20°S), where there is a reliable report of a hailstorm occurring over the sea, and at the Grande Comore Island (12°S) in the Mozambique Channel. There have been occasional reports of hailstorms in West Africa even at fairly low elevations, but on the east coast, where thunderstorms are much less common, hail is extremely rare north of Mozambique. In most areas the peak hail frequency does not necessarily occur in the wettest month, but more often towards the beginning and end of rainy seasons, or at the end of a dry spell in the rainy season. Geographical and topographical features undoubtedly lead to the existence of certain favorable hail "breeding areas." The problem of forecasting hail in tropical Africa is not likely to have a simple solution, but it seems probable that the best results will be obtained by using some form of stability index. -- BLE

SIP 25371 629.124.752(*56)

ICEBREAKERS TO THE FORE. Finnish Trade Review, 134(2):38-39, 56 incl. illus., 1963.
DLC, HF25.F5

The modern shipyard Sandvikens Skeppsdocka of Wärtsilä-koncernen A/B is the world's foremost shipyard for icebreakers. Of the icebreakers delivered to the USSR the 22,000 shp polar icebreakers "Moscow" and "Leningrad" are the largest and most powerful icebreakers in the world with conventional machinery. After extensive modernization during the last few years the yard now fulfills all modern requirements. A fitting out pier over 100 m long with a 25-ton gantry crane was completed some years ago. For repair work there is a floating dock of 2500 tons capacity and a graving dock measuring 465 x 65 x 21 ft. Finland's biggest icebreaker "Voima" (Power) is Wärtsilä-built with shaft hp of 10,500. Orders in hand include a polar icebreaker, a sister ship to the "Moscow" and "Leningrad," and two 12,000 shp sea-going icebreakers for the Swedish and Finnish Governments. -- BLE

SIP 25372 629.124.752(*56)

ICE-BREAKER EXPORTED TO SWEDEN. Finnish Trade Review, 104(2):63 incl. illus., table, 1958.
DLC, HF25.F5

On Nov. 9, 1957, the Sandvikens Shipyards (Finland) delivered the "Oden," a 10,500 shp icebreaker to Sweden. This was the fifth icebreaker built at the shipyard. The first European vessel to be designed especially for ice breaking was the "Eisbrecher I," built in Hamburg in 1871. The Finnish "Sampo," built in 1898, was the first ship built in Europe with a propeller in the bow. The use of diesel-electric propulsion was introduced with the Swedish icebreaker "Ymer." One of the advantages obtained was improved maneuverability. The latest development is the use of 2 bow propellers on the "Voima," the prototype of the class to which the "Oden" belongs. The "Oden" has 2 continuous decks and an extended forecastle. Nine transverse, bulkheads divide the vessel into 10 watertight compartments. Two heeling tanks are situated amidships on each side between the lower and main decks. The hull's ratio between length and breadth is 4.14 and the angle of the stem at the water line, 22°. The propellers are made of cast Ni-steel. Two diesel engine rooms form independent u[illegible], both of which have three 9-cycle single-acting 2 [illegible]oke diesels, each connected to a generator. The [illegible]ding winch is fully automatic. Normal crew size is 63 persons. -- BLE

SIP 25373 551.324.5:551.321.62(*38)

Brockamp, B. and H. Kohnen
A CONTRIBUTION TO THE SEISMIC INVESTIGATIONS ON THE GREENLAND ICE CAP. (Ein Beitrag zu den seismischen Untersuchungen auf dem Grönländischen Inlandeis; Text in German with English abstract). Polarforschung, 6(1/2):2-12 incl. tables, graphs, map, 1965, publ. Jan. 1967. 21 refs.
DLC, G600.P6

The compressional and the shear wave velocities in the Greenland ice sheet are derived from seismic records of the EGIG 1959. Also, the variation of velocities in the firn and the dependence of Poisson's ratio are determined. At Station Centrale, two P-waves are recorded from underground layers. Their velocities show that the ice base consists of crystalline rocks. The P-wave velocities derived from reflections agree well with those obtained by refraction shooting. This indicates that the ice is ± homogenous and ± isotropic for P-waves. The elastic constants for isotropic ice are calculated, and the temperature dependence of the velocities is discussed. (Authors' abstract, modified)

SIP 25374 551.324.51:551.321.62(*32)

Oelsner, Chr.
SEISMOACOUSTICS, A NEW MEASURING TECHNIC FOR GLACIER MECHANICS. (Seismoakustik, eine neue Messmethode für die Gletschermechanik; Text in German). Polarforschung, 6(1/2):19-27 incl. illus., graphs, diagr., map, 1965, publ. Jan. 1967. 17 refs.
DLC, G600.P6

The expedition program of the German Spitsbergen Expedition (1964/65) of the National Committee for Geodesy and Geophysics of the DDR included glaciology, geodesy, hydrological meteorology, periglacial morphology, and geophysics. This paper describes the seismoacoustical measurement technique and equipment used in the Kingsbay area of West Spitsbergen. The seismoacoustic method was originally a geophysical technique used to study vibrations in mines, based on dynamic stress equalization in rock formations which produces elastic waves whose tonal components can be heard as pistol-shot noises or explosions, depending on the intensity. By calculating energy spectra, it was determined that a reverse glacier movement prevails which is caused by a lubricating water layer beneath the ground. -- BLE

SIP 25375 551.4:551.321:528(*7)

Hochstein, M.
MORPHOLOGY OF THE WEST ANTARCTIC ICE CAP BETWEEN MARIE BYRD LAND AND EDITH RONNE LAND. (Morphologie der Westantarktischen Eiskappe zwischen Mary-Byrd- und Edith-Ronne-Land; Text in German). Polarforschung, 6(1/2):27-31 incl. graphs, map, 1965, publ. Jan. 1967).
DLC, G600.P6

During the Antarctic summer of 1963/64, a group from the University of Wisconsin crossed West Antarctica between Byrd Station and the Filchner Ice Shelf. It was found that the ice forms a wide ridge between 80 and 84°S, with a crest at about 100°W. This part of the West Antarctic ice cap can be described as two-dimensional. The paper presents data concerning ice movement and thickness as well as information on snow accumulation, based on triangulation surveys using tellurometers and on mathematical analysis. -- BLE

SIP 25376 551.501.9:5.001.5(*782)

Burdecki, Feliks
A WEATHER STATION TO BE CONSTRUCTED ON BOUVET ISLAND? (Errichtung einer Wetterstation auf Bouvet Øya?; Text in German). Polarforschung, 6(1/2):38-41 incl. map, 1965, publ. Jan. 1967. 9 refs.
DLC, G600.P6

One of the most isolated areas of the Earth is to become accessible to scientific research and at the same time be brought into the large international network of meteorological observation stations. This is the result of the short, but meaningful "South African Bouvet Island Expedition, Feb. - March 1966," which staked off an area of the island on which a manned weather station could be built. Many expeditions have been made to the island, the first being in 1739 by Lozier Bouvet. In 1966, measurements were made on the plateau as well as on the ice free rock ridges of the crater. The scientists present included geologists, geophysicists, meteorologists, geodesists, and biologists. Neither ice thickness nor ice movement could be determined during the 7 days of research, but other glaciological observations were made. Direct radio contact is foreseen between the weather station, South Africa, and Mawson and SANAE Stations in Antarctica. -- BLE

SIP 25377 91(08):550.3(*38)

Brockamp, B.
SOME GEOPHYSICAL RESULTS OF THE INTERNATIONAL GREENLAND EXPEDITION, EGIG 1959. (Über einige geophysikalische Ergebnisse der internationalen Grönland-Expedition EGIG 1959; Text in German with English abstract). Polarforschung, 6(1/2):42-66 incl. tables, graphs, maps, 1965, publ. Jan. 1967. 36 refs.
DLC, G600.P6

Results are presented of investigations made by the Expedition Glaciologique Internationale au Groenland (EGIG) concerning the surface morphology of the ice sheet by barography and barometry, firn temperature, seismic investigations, and magnetic and gravimetric measurements. The last part of the paper is devoted to a correlation of the findings. -- BLE

SIP 25378 551.576.11:551.574.13

Stewart, J. B.
A PRELIMINARY STUDY OF THE OCCURRENCE OF ICE CRYSTALS IN LAYER CLOUDS. Meteorol. Mag. (London), 96(1134):23-27 incl. table, graphs, Jan. 1967. 2 refs.
DLC, QC851.M18

Flights have been made to investigate the occurrence of ice crystals in layer clouds, using an icing rod to collect samples of the cloud particles. Concentrations down to 1 ice crystal per cubic meter can be detected by this method. From a study of 26 layers of cloud, it has been found that ice crystals can occur in stratocumulus cloud, whose lowest temperature is -7°C, and also that some altocumulus clouds with temperatures below -20°C contained only supercooled water drops. (Author's abstract)

SIP 25379 551.578.41:539.155.2(52)

Isono, K., M. Komabayasi, and T. Takahashi
A PHYSICAL STUDY OF SOLID PRECIPITATION FROM CONVECTIVE CLOUDS OVER THE SEA: PART I. DEUTERIUM CONTENT OF SNOW CRYSTALS WITH RESPECT TO CRYSTAL SHAPES AND THEIR RELATION TO ORIGINS OF THE WATER VAPOUR OF SNOWFALL. J. Meteorol. Soc. Jap., 44(3):178-184 incl. tables, map, June 1966. 35 refs.
DLC, Orientalia Div.

On the basis of the isotopic analysis of deuterium content in snow crystals and graupel pellets which fell on the coast of Japan facing the Japan Sea, the following results were obtained. (a) The D/H ratios of snow were large (mean value 150 ± 2 ppm) when the snow flakes consisted of nonrimed crystals having the same shape of crystal habit. (b) The D/H ratios were small (mean value 146 ± 3 ppm) when the precipitation consisted of graupel pellets, rimed crystals, or a mixture of 2 different shapes of snow crystals. (c) It is likely that the difference between (a) and (b) was due to the difference in the vertical development of precipitating clouds. (d) Temperatures of the sea surface from which snowfall water had evaporated were estimated from the D/H ratio of snow samples. As the horizontal water temperature gradient in the Japan Sea was very steep, the geographic location of this vapor source could be specified. (Authors' abstract)

SIP 25380 551.578.4:551.576(52)

Isono, Kenji and others
A PHYSICAL STUDY OF SOLID PRECIPITATION FROM CONVECTIVE CLOUDS OVER THE SEA: PART II. RELATION BETWEEN ICE NUCLEUS CONCENTRATION AND PRECIPITATION. J. Meteorol. Soc. Jap., 44(4):218-226 incl. graphs, diagrs., map, Aug. 1966. 7 refs.
DLC, Orientalia Div.

Ice nucleus concentrations in cold air which came from the continent of Asia to the northwest coast of the main island of Japan in the northwest monsoon season was observed. A close relation has been found between the fallout rate of snow crystals or graupel pellets and the concentration of atmospheric ice nuclei active at the temperature at the top of the clouds. It is concluded that ice nuclei actually play an important role in the formation of snow crystals and graupel pellets and that their concentration controls the rate of precipitation, at least in the case of cold convective clouds. (Authors' abstract)

SIP 25381 551.578.4:551.594.25:551.576(265.4)

Isono, Kenji and others
A PHYSICAL STUDY OF SOLID PRECIPITATION FROM CONVECTIVE CLOUDS OVER THE SEA: PART III. MEASUREMENT OF ELECTRIC CHARGE OF SNOW CRYSTALS. J. Meteorol. Soc. Jap., 44(4):227-233 incl. tables, graphs, Aug. 1966. 7 refs.
DLC, Orientalia Div.

The electric charge of snow particles was measured at several ground stations and by radiosondes with special emphasis on graupel pellets. The results indicate that snow crystals without cloud droplets were negatively electrified, whereas snow flakes composed of rimed snow crystals were positively electrified. Processes of electrification of snow crystals and graupel pellets in convective clouds are discussed based on field and laboratory experiments. (Authors' abstract, modified)

SIP 25382 551.578.4(265.4)

Fukuda, Kiyoshi
A SYNOPTIC STUDY ON THE HEAVY SNOWFALL IN THE JAPAN-SEA COASTAL AREA OF THE HOKURIKU DISTRICT. J. Meteorol. Soc. Jap., 44(4):201-208 incl. tables, graphs, Aug. 1966. 7 refs.
DLC, Orientalia Div.

Heavy snowfall in the Japan Sea coastal area of the Hokuriku district was observed when upper cold air developed anomalously and broke out towards the Japan Sea. The heavy snowfall area was found at the northwest side of the jet stream where positive vorticity prevails. While in the lower layer, some smaller scale lows move to the Hokuriku district and cause heavy snowfall at the coast. A three-dimensional structure of the disturbance which would produce coastal heavy snowfall was studied. From the horizontal distribution at each level and zonal and meridional cross sections of vorticity, divergence and temperature fields, it was noticed in the cases of coastal heavy snowfall that there exist descending currents above the cold dome and ascending currents in the lowest layer and, thus in the middle layer, there is a divergent wind field in which the southerly wind at about the 700 mb level over Wajima seems to be important. (Author's abstract, modified)

SIP 25383 551.326.7(*881)

Johnson, Jimmie D. and Gabriel J. Potocsky
LONG-RANGE ICE OUTLOOK, ANTARCTIC (1966-67). Spec. Publ. 100(66), U.S. Nav. Oceanogr. Off., Mar. Sci. Dept., Wash., D. C., 11p. incl. maps, Nov. 1966.
DLC, Tech. Rept. Collection

Oceanographic and climatic data for the Ross Sea and McMurdo Sound areas were analyzed in terms of sea ice growth during the preceding austral winter. These analyses, combined with observed ice conditions for Oct. 3-8, 1966, and a comprehensive study of historical ice and climatic information, formed the basis for the outlook from mid-Nov. 1966 through mid-Jan. 1967. Evaluation of this information indicates that ice conditions were similar to those observed during the 1964-65 season. Compared to the 1965-66 season, ice conditions are expected to be slightly heavier in the Ross Sea, with less fast ice to be broken in McMurdo Sound. (Authors' abstract, modified)

SIP 25384 551.574.42:551.578.1(420)

Parker, G. and A. A. Harrison
FREEZING DRIZZLE IN SOUTH-EAST ENGLAND ON 20 JANUARY 1966. Meteorol. Mag., 96(1137): 108-112 incl. illus., graphs, April 1967.
DLC, QC851.M18

On Jan. 20, 1966, freezing drizzle coated the greater part of southern England with a thin skin of ice and the opportunity has been taken for investigating its effects in as many fields as possible. The last comparable occurrence was in Jan. 1940. Police records show that the 245 accidents reported were 70% above the daily average for the month and that 205 of these were on roads officially classified as "slippery." General information is given on weather conditions, and the effect of icing on roads, docks, railways, airlines, pedestrians, and trade. -- BLE

SIP 25385 551.574.42:551.578.1:551.509.21(420)

Kirk, T. H.
THE SYNOPTIC CONDITIONS ATTENDING AN OCCURRENCE OF FREEZING DRIZZLE. Meteorol. Mag., 96(1137):112-115 incl. maps, April 1967.
DLC, QC851.M18

The widespread occurrence of freezing drizzle over southern England on Jan. 20, 1966 (see SIP 25384), was accompanied by an easterly stream of cold air from western Europe, while milder Atlantic air was crossing France from the Bay of Biscay. Available evidence suggests that the drizzle was produced at freezing or near-freezing temperature and, falling through a shallow freezing layer, readily froze on contact with the ground or other surfaces. Surface charts indicate that the very weakness of the low pressure area was a main factor in the extent of the icing. -- BLE

SIP 25386 581.325.3:551.326.5(*736)

Iizuka, Hiroshi, Ikunosuke Tanabe and Hiroshi Meguro
MICROORGANISMS IN PLANKTON-ICE OF THE ANTARCTIC OCEAN. J. Gen. Appl. Microbiol., 12(1):101-102 incl. illus., March 1966. 4 refs.
DLC, QR1.J63; DNAL, 448.3 J824

The fifth Japanese Antarctic Research Expedition took samples of plankton-ice, sea water around icebergs, icebergs, and phytoplankton from Lützow-Holm Bay in Jan. 1961. The samples were frozen and stored for about 6 mo., and then thawed for analysis. Microorganisms were isolated on sea water agar plates. Viable bacteria in the plankton-ice consisted of about 70% Brevibacterium minutiferula and about 20% Achromobacter aquamarinus. Algae in this ice consisted mainly of Fragilariopsis curta and Charcotia australis. In the sample of phytoplankton collected by pumping, Corenthron cryophila predominated. Predominant organisms in the surface sea water were Pseudomonas azotogena, Achromobacter aquamarinus, and some flavobacteria. Only a few Brevibacterium minutiferula were isolated from the sea water samples. The brevibacteria and diatoms in the plankton-ice might be ecologically connected. -- DMN

SIP 25387 551.343.2(*725)

Chambers, M. J. G.
INVESTIGATIONS OF PATTERNED GROUND AT SIGNY ISLAND, SOUTH ORKNEY ISLANDS: II. TEMPERATURE REGIMES IN THE ACTIVE LAYER. Brit. Antarctic Surv. Bull., No. 10:71-83 incl. tables, graphs, Dec. 1966. 14 refs.
DLC, Unbound periodical

Soil temperatures were recorded by electric resistance thermometers over a 2-yr period at 2 sites on Signy I. Resistance readings were converted to temperatures by a computer, which also calculated monthly means and standard deviations. Analysis of these records shows rates of freezing and thawing throughout the year, frequency of freeze-thaw cycles at different depths, and the difference in regime between the stones and fines of a sorted pattern. Results suggest that, in this case, there is no uneven descent of a freezing plane in a manner which would induce cryostatic pressure and the consequent movement of fine material. A considerable difference is noted between freeze-thaw cycles inferred from meteorological data and actual freezing and thawing in the soil, suggesting that air temperatures are an inadequate indicator of soil conditions unless information on snow cover, soil moisture, and radiation is available. (See SIP 25127) (Author's abstract, modified)

SIP 25388 551.575:551.574.2:547.213(79)

Hicks, J. R.
FOG DISPERSAL EXPERIMENTS USING PROPANE AT WALLA WALLA, WASHINGTON. Tech. Rept. 198, U.S. Army Cold Regions Research and Engineering Laboratory, 15p. incl. illus., table, graphs, diagrs., April 1967. 2 refs.
CRREL files

Propane is an effective agent causing glaciation of supercooled fog droplets and subsequent improvement of visibility. When wind is less than 5 or 6 knots and steady with respect to direction, two or three dispensers, each emitting 2.5 to 3 lb/min. of liquid propane, could probably keep an airfield open to air traffic at a cost of about 20 dollars per hour. The propane system is easy to use, inexpensive, requires neither preparation nor personnel standby time after the initial installation, and is effective at temperatures higher than the effective temperature of the more commonly used agents. No combustible mixture has been found beyond 8 ft from the discharge nozzle of the propane-air mixture. On airports with short runways, the reduced aircraft braking index caused by snow accumulation might be sufficient to render the system unsuitable unless the dispensers could be positioned far enough from the airport to allow the snow to fall upwind of the runway. -- BLE

SIP 25389 531.42:523.16:551.324.84:551.217.24

Franklin, Fred A. and others
DETERMINATION OF THE DENSITIES OF INDIVIDUAL METEORITIC, GLACIAL, AND VOLCANIC SPHERULES. J. Geophys. Res., 72(10):2543-2546 incl. table, graph, May 15, 1967. 12 refs.
DLC, QC811.J6

Individual densities were determined for 72 small (diameters between 15 and 100 μ) spherules found in polar ice, collected near known volcanoes, or produced in the laboratory from meteoritic samples. The average densities of these 3 types of spherules are 4.54, 2.75, and 4.92 g/cm^3, respectively, lending support to the claim that most polar spherules do not have a volcanic origin. (Authors' abstract, modified)

SIP 25390 548.74:551.578.4(*7)

Brocas, J. and E. Picciotto
NICKEL CONTENT OF ANTARCTIC SNOW: IMPLICATIONS OF THE INFLUX RATE OF EXTRATERRESTRIAL DUST. J. Geophys. Res., 72(8):2229-2236 incl. tables, April 15, 1967. 52 refs.
DLC, QC811.J6

The concentrations of Na, Mg, K, Ca, Cl, and Ni were measured in firn samples collected near Roi Baudouin and Amundsen-Scott Stations. The Ni content at both stations is on the order of several parts per billion. About 35% of the Ni was probably present in the firn as soluble salts. Arguments are presented in support of an extraterrestrial origin for nearly all the Ni found in the South Pole samples. The rate of Ni deposition at the South Pole is of the order of 10^{-8} g/cm^2/yr. Assuming a Ni abundance of 1.3% (chondrite average), the influx rate of extraterrestrial matter over the entire earth's surface should lie between 3 and 10 million tons/yr, depending on the assumption made in the extrapolation. (Authors' abstract, modified)

SIP 25391 551.324.4(*38)

Bauer, Albert
A NEW ESTIMATE OF THE MASS BALANCE OF THE GREENLAND ICE SHEET. (Nouvelle estimation du bilan de masse de l'Indlandsis du Groenland; Text in French with English abstract). Deep Sea Res., 14(1):13-17 incl. tables, Feb. 1967. 20 refs.
DLC, GC1.D25

The Greenland ice sheet mass balance is negative with a water equivalent of -110 km^3/yr. This represents an equivalent water layer of +0.3 mm/yr uniformly spread over the seas of the globe. Recent data on the actual retreat of the Greenland ice sheet are given. (Author's abstract)

SIP 25392 551.326.7:622.214:551.351(*3)

Marlowe, J. I.
A PISTON CORER FOR USE THROUGH SMALL ICE HOLES. Deep Sea Res., 14(1):129-131 incl. illus., diagr., Feb. 1967. 2 refs.
DLC, GC1.D25

The coring device consists of 2 main parts: (1) a short-radius, bottom-sensitive release; and (2) a corer head or weight with a maximum diameter of slightly less than 3 in. The release mechanism consists of a system of 2 levers and a rotatable slotted support lug, all of which are bolted to a mounting plate. It was found that repeated use of the release caused the locknuts on the lever to loosen slightly causing the levers to cross each other and jam. The corer head conforms to conventional patterns in that it consists of a weighted lower part and an upper stabilizing structure. Field tests have shown that the corer and release perform satisfactorily under Arctic conditions. -- BLE

SIP 25393 551.322:536.421.4:532.528

Hickling, R.
NUCLEATION OF FREEZING BY CAVITATION IN SUPERCOOLED LIQUIDS. Nature, 214(5086):379, April 27, 1967. 3 refs.
DLC, Q1.N2

In a recent paper (SIP 23211) the author has proposed that the nucleation of freezing by cavitation is caused, in all supercooled liquids, by the high compression generated near the surfaces of collapsing cavitation bubbles. It was assumed that the compression is isentropic. Hunt and Jackson have suggested that this assumption is erroneous and that Rankine-Hugoniot relations across a shock wave front are a more realistic representation of the thermodynamic behavior of the liquid during cavity collapse. The Rankine-Hugoniot relations are based on the belief that shock waves occur during the collapse of cavitation bubbles. Shock waves, however, cannot occur at this stage of the bubble wall motion, because the conditions for generating shock waves do not arise. There seems to be no reason to believe that the isentropic condition is not a suitable assumption. -- BLE

SIP 25394 551.345.3(*57)

Svensson, Harald
MOISTURE CONDITIONS IN FOSSIL ICE-WEDGE POLYGONS IN THE PLAIN OF LAHOLM, THE SWEDISH WEST COAST. (Fuktighetsegenskaper i fossila iskilspolygoner; Text in Swedish with English summary). Svensk Geogr. Arsbok, 42:145-162 incl. illus., tables, graphs, diagr., 1966. 4 refs.
DLC, G25.S8

As the result of photo interpretation, a relict pattern of ice wedge polygons was identified in a cultivated area on the Swedish west coast. In this paper the moisture conditions have been studied to get an idea of the actual difference in water content causing the crop pattern, and to determine if the polygon lines could be detected on the ground surface itself because of their moisture properties. In vertical sections a fossil ice wedge often stands out very clearly some time after the excavation because of its higher moisture content. However, on the ground surface the polygon lines can be detected very seldom. On early summer mornings a clear moisture contrast was visible on the surface of a thin humus layer on the polygon line. A junction of 2 lines could be mapped in detail. Freezing makes the polygon lines visible on ground surfaces where the humus layer is removed. The photographs that were used were made with panchromatic film. More details could probably be obtained by using infrared film. -- BLE

SIP 25395 551.578.7(680)

Carte, A. E.
HAIL STUDIES IN SOUTH AFRICA 1962 36. Nuusbrief (Newsletter), No. 209:151-155 incl. tables, graphs, Aug. 1966. 6 refs.
DLC, GPRR

Earlier articles are brought up to date describing certain aspects of hail observations in South Africa. Data are given on the monthly distribution of hail days, areal frequency of hail, year-to-year comparisons, reports from Weather Bureau stations, sizes of largest hailstones, and upper air temperature and wind observations for August 1966. -- BLE

SIP 25396 551.324.4:551.58:634.561.24(*428)

Brunger, A. G., J. G. Nelson, and I. Y. Ashwell
RECESSION OF THE HECTOR AND PEYTO GLACIERS: FURTHER STUDIES IN THE DRUMMOND GLACIER, RED DEER VALLEY AREA, ALBERTA. Can. Geogr., 11(1):35-48 incl. illus., table, graphs, maps, 1967. 14 refs.
DLC, G1.C28

The Hector and Peyto Glaciers were studied during 1965 and 1966 as part of a program of glacial and geomorphological studies which began in the Canadian Rockies in 1962. Recession estimates are based on photographs, tree ring data, and recent measurements of ice wastage conducted by the federal Water Resources Branch. Recession is correlated with climate and average annual precipitation and temperature data are given for 1940-1965. -- BLE

SIP 25397 628.1:624.143.5:621.624.3

Branch, John R.
ELEVATED WATER TANK FREEZE-UPS. I. A FREEZE-UP EXPERIENCE. J. Amer. Water Works Assoc., 59(2):163-166 incl. table, Feb. 1967.
DLC, TD201.A12

A freeze-up is related of a well 536 ft deep and constructed with a 20-in. outer casing and a 12-in. liner. Static water level was 137 ft. The pump was a 50-hp submersible, which delivered 500 gpm against a normal head of water. The tank was a 100,000-gal water-sphere. Heat was furnished by a thermostatically controlled electric heater. The events and conditions preceding the freeze-up are discussed. De-icing was accomplished by applying heat from propane torches to the riser pipe at the top of the reservoir. Attempts at de-icing near the reservoir floor level and chopping through 8 ft of ice at top level failed. Water service to the system's consumers was maintained throughout the freeze-up by operating the well pump on a manual basis. -- BLE

SIP 25398 628.1:624.143.5:621.624.3

Toman, George J.
ELEVATED WATER TANK FREEZE-UPS. II. CORRECTION OF FREEZE-UPS. J. Amer. Water Works Assoc., 59(2):166-168, Feb. 1967.
DLC, TD201.A12

Some of the methods in which heat is used in combatting freeze-up of elevated tanks are (1) hot water, and (2) the pump and liquid medium. Several combinations of the heat, pump, and coiled type of energy dissipation are used in one form or another. The types of freeze-up that occur in tanks usually result in an ice wedge forming in the riser pipe at the junction of the riser pipe and the bowl. Ice in tanks forms in layers which form plugs that are dangerous if precautions are not taken to preclude the piston action of a falling ice chunk. Thawing out of all riser pipes and tanks should be done from the top end. One of the most effective methods is to use the steam jenny. Where steam jennies are not available, a method of heating a large tub with butane gas torches to obtain hot water is used. Basically, the concept of movement of water must be kept in mind for the prevention of freezing. -- BLE

SIP 25399 553.61:551.322:548.7:532.613

Anderson, Duwayne M.
THE INTERFACE BETWEEN ICE AND SILICATE SURFACES. Res. Rept. 219, U.S. Army Cold Regions Research and Engineering Laboratory, 31p. incl. illus., tables, graphs, diagrs., March 1967. 42 refs.
CRREL files

Experiments have been conducted with a particular layer lattice silicate, montmorillonite, in order to study the interaction of water and ice with silicate surfaces. The structural features of this class of silicate minerals are described, and other aspects which have a particular bearing on interfacial phenomena are discussed. Emphasis is placed on the nature of water and aqueous solutions, mechanisms of clay-water interaction, physical and thermodynamic properties of clay-adsorbed water, freezing point depression and supercooling, the existence of unfrozen interfacial water, spatial distribution of unfrozen water, the nature of the ice phase, and phase relationships. -- BLE

SIP 25400 551.579.2:551.321.7(43)

Kern, H.
INVESTIGATION OF THE WATER BUDGET OF A SNOW COVER. (Untersuchung des Wasserhaushalts der Schneedecke; Text in German). Umschau, 67(8): 258, April 15, 1967. 1 ref.
DLC, AP30.U5

Snow storage on the ground surface and its melting and evaporation are closely related to the meteorological situation which therefore determines how much of the winter precipitation will actually contribute to the water economy. To determine the quantitative relationships between these components of the water budget of a snow cover, a large surveying apparatus was constructed several decades ago in Obernachtal, south of Walchensee (Oberbayern), at the present Research Establishment for Water Works of the Munich School of Technology. It consists primarily of a platform 2.5 x 2.5 m which operates at ground level and rests on a 3-ton scale. The scale is situated on a topless concrete bunker which can only be entered from the side. Snow and meltwater accumulate naturally on the platform and surrounding area and can be weighed regularly. By observing and evaluating weight changes as a result of melting and evaporation, insight can be obtained into the processes within the snow cover. To determine the general applicability of the results, a similar surveying station was erected under different climatological conditions in 1965. -- BLE

SIP 25401 551.324.4(*38)

Bauer, Albert
THE MASS BALANCE OF THE GREENLAND ICE SHEET IS NOT POSITIVE. (Le bilan de masse de l'indlandsis du Groenland n'est pas positif; Text in French with English abstract). Bull. Intern. Assoc. Sci. Hydrol., 11(4):8-12, Dec. 1966. 20 refs.
DLC, GPRR

An analysis of the glaciological observations of the Greenland ice sheet published by H. Bader in 1961 yields a positive mass budget. However, according to more recent calculations and recent data, the mass budget is negative. (Author's abstract, modified)

SIP 25402 551.324:061(*49)

Miller, Maynard M.
ALASKA'S MIGHTY RIVERS OF ICE. Nat. Geogr., 131(2):194-217 incl. illus., maps, Feb. 1967.
DLC, G1.N27

This paper presents a colorfully illustrated description of Alaska's glaciers and the investigating methods to gain new insights into past and present climate and hints about the future. The survey was part of the National Geographic Society's Alaskan Glacier Commemorative Project, a five-year field study begun in 1964. Much information is given also about the aspects of operating Michigan State University's Summer Institute of Glaciological and Arctic Science with emphasis on transportation and logistics. The results of the investigations back up the solar-climate theory of weather cycles. Glacier fluctuations over the past 200 yr show a correlation to recorded cycles of sunspots. -- BLE

SIP 25403 551.324.2:528.7

Brandenberger, A. J. and C. Bull
GLACIER SURVEYING AND MAPPING PROGRAM OF THE OHIO STATE UNIVERSITY. Can. J. Earth Sci., 3(6):849-861 incl. illus., graph, maps, Nov. 1966. 18 refs.
DLC, QE1.C17

Ohio State University's extensive program of glacier mapping and associated glaciological research has studied glaciers in the western United States, Alaska, the Yukon Territory, Greenland, and Antarctica. Ground surveying and aerial triangulation have been used, and the mapping has been performed stereophotogrammetrically by means of first- and second-order instruments. Surveying and mapping phases of the work are described, and data on glacier structure, volume variations, and surface ice velocity are presented to illustrate the value of photogrammetric techniques in glaciological studies. The Antarctic glaciers considered are Byrd Glacier and the continental ice sheet between Byrd Station and the Whitmore Mts. (Authors' abstract, modified)

SIP 25404 551.324.65(*49)

Wood, Walter A.
GLACIOLOGY: CHAOS IN NATURE. Explorers J., 45(2):79-87 incl. illus., map, June 1967.
DLC, G1.E93

A first-hand report is given of investigations made in the area of Steele Glacier during its unexpected rapid advance during the 1966 field season of the Icefield Ranges Research Project in the St. Elias Mountains. The glacier was moving at 2 ft/hr and seemed likely to maintain its advance for some time to come. As of mid Nov. 1966 the active terminus of the surge has advanced 3400 ft since Aug. 1966. Many aerial photographs were made from which large scale maps are to be plotted, the advance of the active ice measured, and surface patterns of flow and changes of volume analyzed in selected areas of the glacier trunk. -- BLE

SIP 25405 551.578.7(73)

Changnon, Stanley A., Jr.
METHOD OF EVALUATING SUBSTATION RECORDS OF HAIL AND THUNDER. Monthly Weather Review, 95(4):209-212 incl. maps, April 1967. 8 refs.
DLC, QC983.A2

Cooperative substation records of hail and thunder incidences have been used as a source of data to develop more accurate and detailed average patterns of these phenomena. Since the accuracy and completeness of records by volunteer observers are generally considered questionable, a method of determining accurate substation records of thunder and hail was devised. The evaluation method relies strongly on comparisons of substation data with those from nearby first order stations. The number of stations with accurate hail records was found to be greater than the number with accurate thunder records. Reliable records of both events in Illinois and surrounding States have provided very useful information. (Author's abstract)

SIP 25406 551.467.3.03

Kirillov, A. A., V. A. Spichkin
METHOD OF CALCULATING PROBABLE DEPARTURE DATE OF ICEBREAKERS FOR UNINTERRUPTED PASSAGE THROUGH CONTINUOUS ICE. (Metod rascheta srokov vozmozhnogo nachala nepreryvnogo dvizheniia ledokolov v sploshnykh l'dakh; Text in Russian). Prob. Arktiki Antarktiki, No. 22:66-74 incl. graphs, diagrs, 1966. 2 refs.
DLC, G575.L422

Uninterrupted icebreaker passage through continuous ice is determined by the design parameters of the icebreaker and by the ice cover resulting from local physicometeorological conditions. In the basic equation used for the study,

$$F(v) = R_{(v)} = k_2 B\mu\omega h + k_3 B\mu h^2 + k_4 B^x \frac{1}{\eta} h v^y + r(v),$$

$F(v)$ is propeller traction in tons, at speed, v; $R(v)$ is shearing force of ice cover and water in tons during icebreaker motion; B is vessel width in meters; μ, η are dimensionless coefficients of hull configuration at bow waterline; k_2, k_3, k_4, x, y, are empirical coefficients; $r(v)$ is water resistance in

tons during the vessel motion; v is icebreaker speed in m/sec.; h is ice thickness in meters; and σ is the temperary ice resistance to bending in tons/m^2. An example of navigation scheduling is given which shows a gain of 17 days passage time when the icebreaker forces the ice. During the forcing, the speed of the icebreaker increases from 1 to 8 knots in 15 days. Formulas are derived from the basic equation to determine the factors for evaluating departure dates. VDP/FMM

SIP 25407 [551.322:536.4.031][531.73:543.54]

Schufle, J. A. and M. Venugopalan
SPECIFIC VOLUME OF LIQUID WATER TO -40°C. J. Geophys. Res., 72(12):3271-3275 incl. table, graph, diagr., June 15, 1967. 4 refs.
DLC, QC811.J6

The specific volume of water has been measured at temperatures extending down to approximately -40°C by holding the water in fine capillaries, the smallest of which had a diameter of 4 microns. The specific volume of water passes through a minimum at about 4°C. This paper describes the experimental apparatus and procedure and tabulates and graphs the results. -- BLE

SIP 25408 624.146.4:626.1

Zagirov, F. G.
FORMATION OF ANCHOR ICE ON BODIES OF VARIOUS STRUCTURE. Soviet Hydrology: Selected Papers, No. 1:99-101 incl. graph, 1966. 2 refs.
DLC, Unbound periodical

Experiments are described which have been conducted to investigate the formation of ice in canals, the freezing over of grids, floodgates, the crests of weirs, and the underwater parts of hydraulic structures. The study concludes that (1) a concrete surface is subject to significant icing at a water temperature of 0.05°C; (2) materials subject to icing in various degrees may be classified in terms of the time taken for formation of the initial layer of ice on their surface, after which the subsequent icing conditions become the same; (3) only absolutely water-repelling materials can have reliable protective properties against icing, e.g. polyethylene films. Coating the parts of metallic constructions that freeze in winter with polyethylene film may significantly improve their winter performance, and coating the bottom and sides of a canal might prevent the formation of anchor ice. (See SIP 25303) -- BLE

SIP 25409 551.326.71/.85:551.321.6(*40)

Bilello, M. A. and R. E. Bates
ICE THICKNESS OBSERVATIONS, NORTH AMERICAN ARCTIC AND SUBARCTIC, 1962-63, 1963-64. Spec. Rept. 43, Pt. III, U.S. Army Cold Regions Research and Engineering Laboratory, 103p. incl. tables, maps, appendixes A-D, July 1966. 15 refs.
CRREL files

Ice thickness and ice condition reports on lake, river, and fast sea ice observations include (1) such information received from Alaska and Cape Athol, Greenland, for 1962-63 and 1963-64; (2) supplementary ice thickness data for locations in Canada, Alaska, and parts of northeast United States; and (3) isoline maps of northern North America showing maximum ice thicknesses observed during 1962-63 and 1963-64 and the least and greatest ice thickness observed at the time of maximum thickness during the entire period of record. Information is also given on network changes and expansion and possible reasons for site to site differences in ice thickness. -- BLE

SIP 25410 628.1/4:614(*49)

Lauster, K. C.
WATER SUPPLY AND WASTE DISPOSAL IN ALASKA NATIVE COMMUNITIES. Civ. Eng., 37(4):66-68 incl. illus., graph, diagr., map, April 1967. 3 refs.
DLC, TA1.C452

The 43,000 native Alaskans of 3 ethnic groups, Indians, Eskimos, and Aleuts are spread over an area about one fifth the size of the 48 contiguous United States. Beginning in 1961, the U.S. Public Health Service initiated a construction program in cooperation with the Alaskan natives to improve environmental sanitation facilities. In a community which has no electricity, no roads, a site underlain by permafrost, and primitive living conditions, a central watering point is a practical solution. Thus to provide potable water, a well has to be drilled, a heated building must be provided, facilities for treatment are needed, a means to prevent the well water from freezing is necessary, and a system of maintenance and operation must be developed. Under these conditions, batch treatment in wood stave tanks of about 500 gal capacity is used. The cost of a 4-in. well ranges from $10.00 to $100.00 per ft with an average of about $50.00. The distribution system to put running water in homes is described with emphasis on heating costs and sewage disposal. -- BLE

SIP 25411 5.001.5:551.32(*2)

Treshnikov, A. F.
SCIENTIFIC INVESTIGATIONS IN THE ARCTIC AND ANTARCTIC IN 1965. (Nauchne issledovaniâ v Arktike i Antarktike v 1965 g.; Text in Russian). Prob. Arktiki Antarktiki, No. 24:5-10, 1966.
DLC, G575.L422

A review is presented of experiments conducted and of new methods and instruments tested in polar regions in 1965 by the Arctic and Antarctic Scientific Research Institute. Arctic studies included: (1) calculating ice thickness; (2) absorption of solar radiation in an ice sheet; (3) ice-sheet ablation and accumulation; (4) dependence of ice structure on ice formation conditions; (5) calculations of icebreaker velocity in fast ice; (6) prediction of autumn ice phenomena; (7) computerized calculation of the fall-winter hydrologic conditions of Arctic seas; (8) long- and short-range weather prediction; and (9) calculation of level and current fluctuations, tidal drift, and ice thinning and compression, on the basis of hydrodynamic equations and harmonic constants. Antarctic research included: (1) repeated geodetic measurements at Mirnyy Station; (2) study of radio emission and the electromagnetic characteristics of polar snow and ice in a wide range of frequencies and the measurement of electric properties of ice, culminating in the development of a radar method of determining ice sheet thickness; (3) hydrologic investigation of new Antarctic coastal waters; (4) study of ice conditions in Antarctic waters; and (5) new research on the history of Antarctic discovery and exploration. -- DAS

SIP 25412 551.466.3:551.326.2(*3)

Kudrîavtsev, N. F.
EXPERIMENT IN MEASURING UNDULATION OF SEA-LEVEL SURFACE ON DRIFTING ICE OF THE CENTRAL ARCTIC. (Opyt izmereniîa denivelîatsii urovennoĭ poverkhnosti na dreĭfuûshchikh l'dakh Tsentral'noĭ Arktiki; Text in Russian). Prob. Arktiki Antarktiki, No. 24:20-29 incl. illus., graphs, diagr., 1966. 6 refs.
DLC, G575.L422

The primary effect of the wind's tractive action is a simple drift component of currents; the secondary effect, caused by wind inhomogeneity and the influence of coastlines, develops purely gradient currents. A means of separating these components is necessary to determine current development and physical constants. An experiment conducted on drifting Arctic ice from May to Oct. 1964 included measurements of wind speed, currents at various horizons, and tilting of the plane surface. Instruments embedded in an ice floe of 1-km diameter and 220-460-cm thickness measured meridianal and latitudinal components of inclination. The following conclusions were obtained: (1) local sea-level inclinations resulting from inhomogeneous wind fields are the sources of waves with periods ranging from tens of seconds to several minutes; (2) the superposition of waves in an ice-covered open ocean creates deformations in the ice which, under anomalous conditions, lead to fracturing; (3) in the Arctic fast-ice zone the effect of these waves is strengthened by interference phenomena and by wave transformation in shallows; and (4) these fluctuations are a basic factor in fracture formation in ice in which there are no visible signs of deformation. -- DAS

SIP 25413 551.324.414(*2)

Marshunova, M. S. and N. P. Rusin
COMPARATIVE CHARACTERISTICS OF THE RADIATION REGIME OF THE ARCTIC AND ANTARCTIC. (Sravnitel'naîa kharakteristika radiatsionnogo rezhima Arktiki i Antarktiki; Text in Russian). Prob. Arktiki Antarktiki, No. 24:30-34 incl. maps, 1966.
DLC, G575.L422

In the Arctic, scattered radiation accounts for 70-80% of the total radiation, while over the central Antarctic continent direct radiation comprises 80% or more. Total radiation in summer in high Arctic latitudes attains 17-19 kcal/cm^2/mo., and in central Antarctica, 25-30 kcal/cm^2/mo.; total yearly values are 75-80 kcal/cm^2 and 100-120 kcal/cm^2, respectively. The highest values on earth are observed in summer in the elevated region near the Pole of Inaccessibility. The monthly total radiation values decrease rapidly with distance northward from the Antarctic coast as a result of dense cloud conditions. The lowest yearly totals in the Southern Hemisphere are found between 65° and 50°S. On the surface of the Antarctic ice cap, the radiation balance is positive (about 2 kcal/cm^2) only in the 2 months of the year during which the sun is 18-20° below the horizon. The lowest negative balance is observed on the high Antarctic plateau, where strong surface inversions significantly increase counter-radiation in winter. -- DAS

SIP 25414 551.521.3(*7)

Pîâtnenkov, B. A.
RADIATION BALANCE OF THE ANTARCTIC ATMOSPHERE. (O radiafâionnom balanse atmosfery Antarktiki; Text in Russian). Prob. Arktiki Antarktiki, No. 24:35-45 incl. tables, graphs, 1966. 23 refs.
DLC, G575.L422

The intensity of radiational and thermal processes in the atmosphere is partially dependent on the content of absorptive gases, the thermal stratification of the atmosphere, astronomical factors, etc. The vertical trend of water vapor density at varying temperatures at Mirnyy and Argentine I. Stations is calculated, and the zonal distributions of temperature and water vapor intensity and volume in the Antarctic atmosphere are tabulated. Equations are derived for computing the absorption of direct and reflected radiation by water vapor, carbon dioxide, and the permanent gases; the calculated values are tabulated in cal/cm^3/day for each month at 70°S, 80°S, and 90°S. Water vapor accounts for the greater proportion of absorption, in spite of its infinitesimal volume in the Antarctic atmosphere. In summer, the intensity of absorption remains relatively constant with latitude. The annual cycle of the components of the long-wave radiation balance are graphed for various latitudes. Monthly and annual values of the short-wave, long-wave, and total Antarctic radiation balance are tabulated. -- DAS

SIP 25415 629.124.752

Petrov, E. fU.
DETERMINATION OF THE AMOUNT OF HULL RISE OF AN ICEBREAKER FORCING ICE. (Opredelenie velichiny vsplytiîâ korpusa pri rabote ledokola nabegami; Text in Russian). Prob. Arktiki Antarktiki, No. 24:68-72 incl. diagr., 1966. 3 refs.
DLC, G575.L422

Wedging of the midship section of an icebreaker while forcing hummocky ice or during movement through a narrow channel is considered. Equations are derived by which the hull rise and force of wedging can be determined from parameters of ice conditions, hull configuration, and ship velocity before impact with unbroken ice. Using concrete data for illustrative purposes, a graph is presented of the dependence of force of wedging on icebreaker velocity. -- DAS

SIP 25416 69:624.148.7(*41)

HOW TO AVOID THE MORE DIFFICULT WINTER CONSTRUCTION PROBLEMS. Eng. & Contr. Rec., 78(10):48-53 incl. illus., diagr., Oct. 1965.
DLC, TH1.C84

Methods are presented of counteracting frost action in soil, the destructive effects of high humidity in buildings, ice lensing in walls, condensation on exterior walls, differential drying effects, heaving of foundations located on frost susceptible soils, frozen masonry, and ice lenses in mortar. New problems in winter construction are being investigated and information thereon published by the Division of Building Research of the National Research Council of Canada. -- BLE

SIP 25417 551.321.63(*32)

Voigt, U.
ICE THICKNESS DETERMINATION BY SOUNDING IN FRONT OF THE KONGSVEGEN GLACIER (WESTSPITZBERGEN). (Eisdickenbestimmung durch Lotungen vor der Gletscherfront des Kongsvegen (Westspitzbergen); Text in German). Petermanns Geogr. Mitt., 110(4):284-285 incl. graph, map, 1966. 5 refs.
DLC, G1.P43

An ice thickness profile was made gravimetrically in the summer of 1964 by members of the German Spitzbergen Expedition 1964-65 of the National Committee for Geodesy and Geophysics of the GDR. At the end of the Polar night in March 1965, the nearly constant advance of the glacier at 1.5 m/day had caused calving and shattering of the ice cover of the fiord immediately near the front of the Kongsvegen Glacier. Fiord ice and ice from calving were constantly being pushed forward, causing a compression and broken-ice zone whose course reflected the velocity profile. This zone extended within 1 m of the glacier front. Soundings at 31 profile points along the entire front in this complex ice field came within 100 and 450 m of the glacier front. An average ice thickness of 85 m was obtained, which agrees with earlier estimates. -- BLE

SIP 25418 551.322:548.51:551.510.5

Bigg, E. K.
CROSS SECTIONS OF ICE NUCLEUS CONCENTRATIONS AT ALTITUDE OVER LONG PATHS. J. Atmos. Sci., 24(2):226-229 incl. graphs, March 1967. 4 refs.
DLC, QC851.A283

Measurements of ice nucleus concentrations using Millipore filters at altitudes of about 4 and 11 km over lengthy paths are described. Bands of ice nuclei between latitudes 23S and 30S were frequently found at both altitudes, narrower and of higher concentration than those observed at the ground. Broad regions at 10-12 km markedly deficient in ice nuclei were found near the equator on each of two flights. There was no conspicuous difference in ice nucleus concentrations in the two hemispheres and no obvious change was found at the northern boundary of the pall of volcanic dust then present. (Author's abstract)

SIP 25419 629.124.752:[656.61.052:551.326]

Kashtelîan, V. I. and A. ÎA. Ryvlin
CONSIDERATION OF THE NATURAL CHARACTERISTICS OF CONTINUOUS ICE IN THE EVALUATION OF ICEBREAKER PROGRESS. (Uchet prirodnykh kharakteristik sploshnogo l'da pri otsenke ego prokhodimosti ledokolom; Text in Russian). Prob. Arktiki i Antarktiki, No. 22:75-81, 1966.
DLC, G575.L422

The extension of navigation periods in the far north is occurring more often, pointing to the growing importance of icebreaker capability in making progress through continuous ice. Up to recently, this capability was computed by the Arctic and Antarctic Institute formula on the basis of tests with models in experimental water ways: $R = 0{,}004B\sigma Bph\mu + 3.25Bh^2\mu + 0.25B^{1.65}h\nu\, 1/\eta^2 + R_B$[1], where R is total ice resistance in tons; B is vessel width in m; σBp is temporary resistance of ice to bending in tons/m^2; h is ice thickness in m; ν is vessel speed in m/sec.; μ and η are coefficients of hull configuration effects on the resistance of the ice; R_B is the vessel resistance in open water in tons. This formula, however, takes into consideration only thickness and strength of the ice cover (temporary resistance to bending). Closer study points to the fact that continuous ice thickness possessing fracturing and hummocking properties has a substantial effect on the vessel progress, whereas temporary resistance of ice to bending has little effect. For the additional factors of ice thawing and hummocking, five-point scales have been devised by Volkov and Somov and by Gordienko, respectively. Nomograms with the above characteristics are given to improve the A. A. I. formula, showing effects on thrust capability and speed of the icebreaker.
-- VDP/FMM

SIP 25420 551.321.6(*38)

Rinker, J. N. and S. J. Mock
RADAR ICE THICKNESS PROFILES NORTHWEST GREENLAND. Spec. Rept. 103, U.S. Army Cold Regions Research and Engineering Laboratory, 20p. incl. graphs, May 1967. 11 refs.
CRREL files

In June and July of 1964, extensive field trials of radar ice sounding equipment were held on the ice sheet in northwest Greenland. The results, in the form of profiles over 350 km of trail, made from seismic depth measurements along the Tuto-Century trail and Project 42 trails provide a good representation of surface and subsurface topography. A continuous trace of the ice/bedrock interface was obtained for over 97% of the route traveled, through ice up to 1400 meters thick. The film record obtained by the Scott Polar Research Institute, as a result of providing the Scott Polar Research radar set with continuously moving photographic film to record echo traces, shows a richness of detail (internal structure of the ice sheet) not portrayed by the manual plot. A sample of this film is given. References are made to project work of previous seasons. -- BLE

SIP 25421 551.33:551.324(*533)

Cherkasov, P. A.
MAIN FEATURES OF RECENT GLACIATION OF THE EASTERN DZHUNGAR ALATAU. (Osnovnye cherty sovremennogo oledeneniîa vostochnoĭ chasti severnogo sklona Khrebta Dzhungarskiĭ Alatau; Text in Russian). Glîatsiologicheskie issledovaniîa v Kazakhstane, Vyp. 6:5-28, Alma-Ata, 1966.
11 refs.
DLC, QE575.A4

During a survey of the Tentek and Tastau river basins, the features of recent glaciers in the area under general alpine climate characteristics are shown in connection with hypsometry, orography, exposure, and mechanical factors. Morphologic and morphometric characteristics of basin, valley, train, corrie, hanging, and flat-summit glaciers are distinguished. The role of hypsometry in the development of glaciation in the eastern part of the range is revealed, based on the dependence of mean height of upper firn line from the area of glaciers of different types. Peculiarities of firn line distribution on the glaciers of different types are described in connection with bed exposure. Glaciation elements are explained, such as distribution of degree of glaciation according to exposure; structure of glaciers of various types in per cent of their general area; distribution of glaciation in high zones in per cent of the general glaciation area. They are presented separately for all basins as a whole and for every type. (From author's summary)

SIP 25422 551.33:551.324(*533)

Cherkasov, P. A. and [illegible]. V. Erasov
RECENT GLACIATION OF THE RGAĬTY RIVER BASIN IN THE DZHUNGAR ALATAU RANGE. (Sovremennoe oledenenie basseĭna reki Rgaĭty khrebta Dzhungarskiĭ Alatau; Text in Russian). Glîatsiologicheskie issledovaniîa v Kazakhstane, Vyp. 6:29-49, Alma-Ata, 1966. 7 refs.
DLC, QE575.A4

The mean absolute height of mountain ranges bearing glaciers in the area of the Tastau basin is 3657 m. In the eastern part of this ridge, under recent climatic conditions, this height is sufficient for the development of all types of glaciers which may be found in all other areas of the ridge, namely, valley, corrie valley, train, train hanging, corrie, corrie hanging, hanging, and flat-summit glaciers. Valley glaciers are characteristic of higher areas of the ridge, while all other glaciers are distributed in lower areas. In the Tastau basin 49 glaciers have been registered, the total surface of which is 15.53 km^2. Tables illustrate the morphometry of the Tastau river glaciers, their length, width, total area, height of the firn line and tongue end, glacial coefficient, and ratio of glacier area to basin area. A supplement gives glacier areas according to morphologic elements such as firn field, clear surface of the tongue, etc. (From authors' summary)

SIP 25423 551.324.433(*533)

Cherkasov, P. A. and V. A. Zenkova
GLACIER ABLATION IN THE AGANAKTY TENTEK RIVER BASIN OF THE DZHUNGAR ALATAU RANGE. (Ablîatsiîa lednikov basseĭna reki Aganakty Tentekskoĭ v khrebte Dzhungarskiĭ Alatau, Text in Russian). Glîatsiologicheskie issledovaniîa v Kazakhstane, Vyp. 6:50-68, Alma-Ata, 1966. 7 refs.
DLC, QE575.A4

The ablation seasons during 1960 to 1963 ranged from 75 days in 1962 to 50 days in 1963, the mean duration being 61 days, from July 9 to Sep 8. Ice melted near the Krasovskiy Glacier terminus during the ablation seasons as follows: 1961 – 159 cm (water equivalent), 1962 – 263 cm, and 1963 – 134 cm. Compared to a glacier surface free of moraine, the thawing of ice on moraines 5 cm thick was 70% and on moraines 50 cm thick was 6%. Determination of precipitation in the glacial areas by means of calculations and direct observations yielded similar results—for 1960-61, 963 mm; 1961-62, 795 mm; and for 1962-63, 922 mm. The gradient temperature change, dependent on general cloudiness, ranged from May, 0.68; June, 0.72; July, 0.73; Aug, 0.70; to Sep, 0.63. Mean daily temperature was obtained by extrapolation of temperature gradients. The relationship between ice thaw and mean daily air temperature was used as the basis of calculation to obtain ice thaw during periods of no observations.
-- VDP/FMM

SIP 25424 551.324.4(*533)

Dîarova, K. Sh. and L. P. Koneva
WEATHER AND RADIATION CONDITIONS IN THE DZHUNGAR ALATAU RANGE GLACIAL ZONE. (Meteorologicheskie i radiatsionnye usloviîa gliatsial'noĭ zony khrebta Dzhungarskiĭ Alatau; Text in Russian). Glîatsiologicheskie issledovaniîa v Kazakhstane, Vyp. 6:69-81, Alma-Ata, 1966. 2 refs.
DLC, QE575.A4

Weather and actinometric investigations in the altitude of 2940 and 3180 m were carried out during ablation season 1961-1963 on the Krasovskiy Glacier in the Aganakta-Tentek River basin. During the period of observation the glacier surface changed very little. The maximum albedo occurs after snowfall (A = 60 to 90%) and decreases as the snow becomes compact and dirty, down to 30 to 50%. When the solar altitude and the air temperature increases and glacier meltwater appears, the albedo decreases to 12 to 15%. The effective radiation depends on the temperature of the underlying surface, air water content and on cloudiness. Mean magnitudes of effective radiation at cloudless sky at various values of steam pressure and air temperature, and mean values of cloudiness were calculated at different amounts of clouds. When the cloudiness changes from 0 to 10 points, the effective radiation decreases by 0.100 cal/cm^2/min. At night the magnitude of the radiation balance is negative, being in the ranges of -0.2 to -0.1 cal/cm^2/min. Daily amounts of radiation balance from six thirty to eighteen thirty change in wide ranges from 30 to 500 cal/cm^2. Maximum frequency was observed in the ranges from 100 to 250 cal/cm^2/day. Radiation balance during one month (August) in 1962 was 8 kcal/cm^2, in 1961 and 1963, 6 kcal/cm^2. (From authors' summary)

SIP 25425 551.324.4(*533)

Makarevich, K. G.
MASS BALANCE OF SOME SMALL GLACIERS IN THE ZAILĬSKIĬ ALATAU. (Balans massy nekotorykh malykh lednikov v Zailiĭskom Alatau; Text in Russian). Glîatsiologicheskie issledovaniîa v Kazakhstane, Vyp. 6:82-92, Alma-Ata, 1966. 8 refs.
DLC, QE575.A4

Glaciers in the Zailiysky Alatau Range range from 0.1—0.2 to 40 km^2, and from 0.1 to 10—12 km in length. Mass balance observations were made on 6 small (< 2 km^2) glaciers, Igly Tuyuksu (valley type), Molodezhnyy Glacier (trail type), Mametova's Glacier (corrier hanging type), and valley-hanging type, Shokaljskiy's Glacier, and the TEU Northern and the TEU Southern Glaciers. Their unique feature is the high elevation of the tongue termini, 3450-3720 m, or 100 m or more higher than the termini of the larger valley glaciers nearby. Comparative mass balance data is given for the glaciers. (From author's summary)

SIP 25426 551.324.433:551.324.63(*533)

Pal'gov, N. N.
CHARACTERISTICS OF INTERRELATIONSHIPS IN THE HYDROLOGICAL REGIME OF A CENTRAL TUYUKSU GLACIER. (Kharakteristika nekotorykh bzaimosvîazeĭ v gidrologicheskom rezhime Tsentral'nogo Tuĭuksuiskogo lednika; Text in Russian). Glîatsiologicheskie issledovanîîa v Kazakhstane, Vyp. 6:93-111, Alma-Ata, 1966. 8 refs.
DLC, QE575.A4

The interrelationships of the hydrological regime of the glacier are determined by precipitation and air temperature measurements taken at an altitude of 3030 m from 1937 to 1964 and discussed in sections under weather conditions and run-off; run-off and hydrological balance; weather conditions and hydrological balance; and climatic conditions of zero and extreme balance. Formulas are used which relate precipitation, air temperature, and precipitation together with air temperature to height of the névé line. Meltwater run-off is related to precipitation and air temperature. The hydrological balance is divided into tongue balance, névé basin balance, and total glacier balance given in terms of water, cm/km^2 of corresponding area. The most suitable of the above relationships may be used to establish similar relationships in glaciers under other physico-geographical conditions and facilitate solutions to problems involving regularities in nature and in glacier regimes. -- VDP/FMM

SIP 25427 551.578.46(*533)

Filatova, L. N.
ON THE INFLUENCE OF ELEVATION AND SLOPE ORIENTATION ON THE TIME OF SNOW COVER DEPOSITION; FOR EXAMPLE, IN THE MALAYA ALMATINKA RIVER BASIN. (O vliîanii vysoty i orientatsii sklonov na sroki zaleganiîa snezhnogo pokrova; na primere basseĭna r. Maloĭ Almatinki; Text in Russian). Glîatsiologicheskie issledovanîîa v Kazakhstane, Vyp. 6:112-122, Alma-Ata, 1966. 13 refs.
DLC, QE575.A4

The Malaya Almatinka River basin is taken as an example to show the influence of relief forms on the snow cover regime in mountainous areas. Relief indices - altitude, orientation and slope steepness offered by I. S. Sosedov are taken as a basis of analysis. Influence of orientation appears to be very important. On the average, considering the northern and southwestern slopes the time difference in formation and breaking up of the snow cover was about two months at altitude 2000-2500 m. On the southern slopes stable snow cover is absent. In higher altitudes the orientation is less significant. Influence of altitude is significant. With higher altitude, the snow cover on northern slopes sets 0.7 day earlier for each 100 m., while for the southwestern slopes the gradient is several times more, being on the average three days for each 100 m. Influence of orientation change from the southwest to the north according to the time of snow cover deposition is equivalent to the influence of altitude increase from 800 to 3400 meters in accordance with different characteristics. Thus in the areas with lesser altitude ranges the influence of the orientation may be greater than that of the altitude. (From author's summary)

SIP 25428 551.578.48(*533)

Sosedov, I. S. and I. V. Severskiĭ
INFLUENCE OF AVALANCHES ON RUN-OFF FORMATION IN AREAS OF MODERATE ELEVATION IN THE ZAILIĬSKIĬ ALATAU. (Vliîanie shezhnykh lavin na formirovanie stoka v srednegornoĭ zone Zailiĭskogo Alatau; Text in Russian). Glîatsiologicheskie issledovanîîa v Kazakhstane, Vyp. 6:123-132, Alma-Ata, 1966. 13 refs.
DLC, QE575.A4

The report is based on the quantitative indices obtained as a result of special field investigations. Névé basins are widely developed on the northern slopes of the Zailiysky Alatau range. In the zone of the deeply dissected topography (1600-3000 m) they are formed by avalanches and fill talwegs of the side valleys and ravines in a shape of long bands. Avalanches occur mostly in the spring on the northern slopes. They strike considerable areas and carry away up to 20 per cent of snow reserves. Hence ground permeability on the slopes stricken by avalanches, varies greatly. Avalanches increase the run-off to the same degree in which the coefficient of snow run-off on slopes is less than one. This increase appears to be rather small, and is expressed in % units of the annual and flood run-off. The regulating effect of névé basins is also not very great. It is concluded that artificial increase of avalanche activity under the above mentioned conditions would be inexpedient. (From authors' summary)

SIP 25429 551.324.414(*533)

Denisova, T. IA.
ACCUMULATED RADIATION IN THE ZAILIĬSKIĬ ALATAU RANGE ALPINE ZONE. (Summarnaîa radiatsiîa v vysokogornoĭ zone khrebta Zailiĭskogo Alatau; Text in Russian). Glîatsiologicheskie issledovaniîa v Kazakhstane, Vyp. 6:133-139, Alma-Ata, 1966. 5 refs.
DLC, QE575.A4

Accumulated radiation is the most important component of the input of radiation balance. Low latitudinal position as well as great height of the glacier result in considerable flow of short-wave radiation. The daily heat amount in June reaches 943 cal/cm^2. Maximum intensity of the accumulated radiation of 1.98 cal/cm^2/min has been observed frequently. The magnitude of the incoming short-wave radiation changes depend on the condition of the Sun. The medium- and upper-level clouds do not have much influence on the intensity of the accumulated radiation. In the annual heat cycle, the maximum may occur in May - August depending on the annual cycle and transparency of the atmosphere. The minimum accumulated heat radiation, as a rule, occurs in December. (From author's summary)

SIP 25430 549.1:552.52:543.422.8

Anderson, Duwayne M. and Robert C. Reynolds
UMIAT BENTONITE: AN UNUSUAL MONTMORILLONITE FROM UMIAT, ALASKA. Res. Rept. 223, U.S. Army Cold Regions Research and Engineering Laboratory, 15p. incl. illus., table, graphs, March 1967. 12 refs.
CRREL files

Numerous bentonite clays interbedded with shale and coal are exposed in the interfingering, Cretaceous sediments along the Colville River and its tributaries in northern Alaska. Two bentonite beds of high purity, ten to twelve inches thick are conveniently accessible at Umiat Mountain, four miles northeast of Umiat, Alaska. X-ray diffraction, X-ray fluorescene and other diagnostic techniques revealed the bentonite to be nearly pure montmorillonite with certain beidellitic characteristics. It is proposed that this clay be known as Umiat bentonite. (Authors' abstract)

SIP 25431 551.324.431:551.321.2:622.14(*38)

Langway, C. C., Jr.
STRATIGRAPHIC ANALYSIS OF A DEEP ICE CORE FROM GREENLAND. Res. Rept. 77, U.S. Army Cold Regions Research and Engineering Laboratory, 133p. incl. illus., tables, graphs, diagr., maps, appendixes A-D, May 1967. 403 refs.
CRREL files

A deep rotary core drilling project in 1957 at Site 2 on the Greenland ice sheet (76°59'N, 56°04'W) provided ice core to a depth of 411 m. The vertical variation in bulk density, macroscopic structure, oxygen isotope rations, ionic constituents, and extraterrestrial dust (black spherules) were analyzed using both field and laboratory techniques. These data permit the direct estimate of annual accumulation layers in the core. The average total ionic concentration in the ice sheet ranges between 0.65 and 1.35 mg/liter. The annual global mass deposit of black spherules as calculated from these studies varies from 2.10 x 10^5 metric tons in 700 year old ice to 6.57 x 10^5 metric tons in 12 year old firn. The oxygen isotope ratio variation provides the best means of estimating accumulation at depth. Results of the investigations indicate rates of net snow accumulation of 42.3, 34.2, 37.4, 41.1 and 41.6 g/cm^2-yr at the surface, A.D. c. 1773, c. 1513, c. 1233 and c. 934, respectively. Accumulation data and other physical and chemical evidence allow climatological inferences to be made over the 10-century profile. The ice core record shows that snow accumulation and temperature in A.D. 934 were similar to today, followed by a gradual decrease in accumulation to a minimum around the late 13th century and an increase in both accumulation and temperature from A.D. 1773 to 1957 and following.

SIP 25432 629.124.752

Dorokhov, A. P.
THE ICEBREAKER "MOSKVA" (LEDOKOL "MOSKVA"; Text in Russian). Sudostroenie, 26(10):1-5 incl. illus., tables, diagrs., Oct. 1961.
DLC, VM4.S8

A series of icebreakers, ordered by the Soviet Union, are being built in Finland to specifications of the Lloyd Class 100 A 1. The "Moskva" is described and illustrated as a 26,000 hp diesel-electric ship of 13,290 tons displacement designed for escort duty along the Northern Sea Route. It is 122.1 m long, 24.5 wide, height to upper deck 14 m, greatest draft 10.5 m, max speed 18.3 knots, and has a crew of 101 (with accomodations for 162 persons). It has a landing deck and carries 1 helicopter. The hull is all-welded Siemens-Marten steel, with the exception of removable deck plates for repair of the

ship's machinery. At max draft, the ice breaking section rides 1 m above the water-line, and 2.5 below at min draft. In the bow section it extends to the keel, and the between deck areas are reinforced with stringers. Information is provided on the engines, fuel, ventilation and refrigeration systems, crew's quarters, safety measures, deck equipment, communication systems, and navigation devices. (For description of the sister ship, "Leningrad", see SIP 20806). -- VDP

SIP 25433 551.312:551.331.5(*7-11)

Lazarev, G. E., S. A. Ushakov and IU. G. Bugaev
PROCEDURE AND BASIC RESULTS OF GEODETIC AND GRAVIMETRIC INVESTIGATIONS IN THE CENTRAL SECTOR OF EAST ANTARCTICA. (Metodika i osnovnye rezul'taty geodezicheskikh i gravimetricheskikh issledovaniĭ tsentral'nogo sektora Vostochnoĭ Antarktidy; Text in Russian). Antarktika: Dokl. Komis., 1964. Moskva, Izd-vo Akad. nauk SSSR, 1965, p. 53-60 incl. table, maps. 7 refs.
DLC, G576.A65

Knowledge of the Antarctic continent's subglacial structure is obtained from a combination of seismic and gravimetric investigations. Beginning with mean sea level at the Davis Sea, elevations sufficiently accurate for the purposes of gravimetry, were determined by trigonometric leveling for 250 points along the oversnow traverses from Mirnyy to Vostok, Pionerskaya, Komsomol'skaya, and Sovetskaya Stations and to the Pole of Inaccessibility. The Faye (free-air) anomalies were determined by SN-3 and Worden gravimeters at 350 points along this route; these anomalies are mapped and lines are drawn connecting regional maximum and minimum values between adjacent traverses. The subglacial relief, as reflected by the free-air anomalies and indicated by other data, is mapped and isohyposes are drawn at 500-m intervals. The crustal thickness is estimated from the Bouguer anomalies in accordance with known empirical relationships, and is found to increase from 33-35 km at the coast to 40-55 in the area of the subglacial Gamburtsev Range. -- DAS

SIP 25434 551.311.161:551.311.243(*7)

Bardin, V. I. and K. K. Markov
THE PROBLEM OF THE ANTARCTIC PENEPLAIN. (Problema poverkhnosti vyravnivaniĭa Antarktidy; Text in Russian). Antarktika: Dokl. Komis., 1964. Moskva, Izd-vo Akad. nauk SSSR, 1965, p. 61-66 incl. illus. 18 refs.
DLC, G576.A65

Descriptions of various leveled rock surfaces found in Antarctica are compiled, and their geneses are discussed. Peneplained peaks range from 500 to 3700 m in elevation. The peneplain had probably been created through water denudation by the end of the Mesozoic; the present differences in its elevation are due possibly to Neogenic faulting. That Quaternary glacial processes account for part of the peneplanation is indicated by glacial striae and polishing of leveled rock now cropping out far above the icecap. -- DAS

SIP 25435 551.324.24:551.324.4(*7)

Bardin, V. I. and I. A. Suetova
THE PERIMETER OF ANTARCTICA AND THE BUDGET OF THE ANTARCTIC ICE CAP. (Perimetr Antarktidy i biūdzhet Antarkticheskogo lednikovogo pokrova; Text in Russian). Antarktika: Dokl. Komis., 1964. Moskva, Izd-vo Akad. nauk SSSR, 1965, p. 67-75 incl tables. 30 refs.
DLC, G576.A65

A new calculation of the ice budget for the entire continent of Antarctica is made. For the purpose of accurate determination of the discharge through formation of icebergs, a careful measurement of the coastline was made which showed the length to be 30,030 km. The iceberg discharge is calculated for each type of glacial coastline (outlet glaciers, ice shelves, and continental ice barriers), the total of which is 1180 km^3/yr. Other sources of discharge are underwater melting from ice shelves (250 km^3/yr) and bottom melting in the central part of the ice cap (20 km^3/yr). The total rate of ice accumulation, 2420 km^3/yr, is compiled from the value calculated by the present authors for the Antarctic Peninsula and that given by Dolgushin, Evteev, and Kotlīakov (1964) for the remaining part of the continent. A positive ice budget of 370 km^3/yr is obtained from these figures. The problem of establishing the accuracy of ice-budget calculations is discussed. The mean quadratic error for this determination is $\pm$ 170 km^3/yr, or 20%. -- DAS

SIP 25436 551.594.254(*746)

Lobodin, T. V.
CAUSES OF ELECTRIFICATION OF SNOW CRYSTALS DURING SNOWSTORMS. (O prichinakh elektrizatsii snezhnykh kristallov vo vremīa meteleĭ; Text in Russian). Antarktika: Dokl. Komis., 1964. Moskva, Izd-vo Akad. nauk SSSR, 1965, p. 110-115. 12 refs.
DLC, G576.A65

Continuous measurements were made at Mirnyy Station of the atmospheric electric field, space charges, and corona discharge currents. Based on the available information from various sources,

an attempt is made to compare the various charge-generating mechanisms operant during snowstorms, and to evaluate their relative significances. An equation is given for Q_{max} for a spherical snow particle with radius r. Factors in the equation represent: (1) the charge acquired as a result of collision with larger or smaller particles; (2) electrification of the crystal during its disintegration; (3) charge from random capture of atmospheric ions; (4) charge resulting from friction; and (5) charge arising during phase changes. After evaluation of these factors, the equation is represented in a simplified form with the elimination of (3) and (5) because of their relative insignificance. Likewise, charge losses due to atmospheric electric conductivity and corona discharge currents were not considered. -- DAS

SIP 25437 551.324.6(*7)

Zhantuarov, R. S. and K. K. Markov
DYNAMICS OF THE ANTARCTIC ICE SHEET. (O dinamike Antarkticheskogo lednikovogo pokrova; Text in Russian). Antarktika: Dokl. Komis., 1964. Moskva, Izd-vo Akad. nauk SSSR, 1965, p. 138-154 incl. table, graph. 46 refs.
DLC, G576.A65

Criticisms are made regarding the calculations made by P. A. Shumskiĭ and S. A. Evteev (1963), based mainly on evidences from Drygalski I. and Gaussberg, which they believe prove the existence of a general ablation trend for the entire ice sheet. It is felt that various calculations of the total Antarctic ice budget, which have generally indicated that the ice sheet is growing, are more likely to reflect the true situation. Recent investigations have shown that glacial retreat in one area is not necessarily accompanied by retreat elsewhere on the earth, and in particular that warming trends are not uniform over the entire Antarctic. Furthermore, a warming trend beginning only in the 20th century would not be sufficient to warm the Antarctic ice sheet to any significant depth. -- DAS

SIP 25438 551.324.6(*7)

Shumskiĭ, P. A.
CHANGES OF THE ANTARCTIC ICE SHEET. (Ob izmeneniĭakh Antarkticheskogo lednikovogo pokrova; Text in Russian). Antarktika: Dokl. Komis., 1964. Moskva, Izd-vo Akad. nauk SSSR, 1965, p. 155-171. 43 refs.
DLC, G576.A65

The arguments presented by R. S. Zhantuarov and K. K. Markov, attempting to refute the position maintained by P. A. Shumskiĭ and S. A. Evteev (1963) that the Antarctic icecap is receding, are answered. Zhantuarov and Markov express the opinion that the past 50-yr atmospheric warming trend would not have been sufficient for the warming of a glacier to any significant depth; Shumskiĭ feels they have neglected to account for such factors as convection in calculating heat transfer. The method of determining icecap retreat or advance by calculating the total ice budget, which Zhantuarov and Markov feel has correctly indicated growth of the Antarctic icecap, is not considered sufficiently accurate. Further data are presented which may indicate glacial retreat within the 20th century, for instance, Lady Newnes and Amery Ice Shelves have decreased in area by 2500 km^2 and 11,000 km^2, respectively; an 80-km ice tongue has disappeared from the Weddell Sea; and the Astrolabe and Zélée Glaciers have retreated significantly. -- DAS

SIP 25439 627.2:627.8:624.145.3

Balanin, V. V., B. S. Borodkin and G. I. Melkonîan
UTILIZATION OF DEEP WATER HEAT IN RESERVOIRS FOR THE MAINTENANCE OF UNFROZEN WATER AREAS. (Ispol'zovanie tepla glubinnykh vod vodoemov (dlîa podderzhaniîa nezamerzaîushchikh akvatoriĭ); Text in Russian). Moscow, Izd-vo Transport, 1964, 272p. incl. illus., tables, graphs, diagrs. 121 refs.
DLC, TC409.B3

Laboratory and field data are presented on measures for maintaining water areas in reservoirs in an unfrozen state by using the heat of deep waters. The thermal regime of reservoirs and the physical principles of the methods of utilizing water heat are reviewed. Descriptions and diagrams are provided of various installations in use at dam gates, navigable locks and canals, port and ship-building facilities, etc. Laboratory investigations include kinematics of lifting bottom waters by air bubbles, the phenomenon of air outlet freezing, and air movement in a perforated pipe used to keep a water area ice-free by compressed air. Theories and computations are provided for the operation of pneumatic installations and flow generators and maintaining a pool of unfrozen water during transfer of warm deep water from one reservoir to another. Recommendations are made regarding planning of installations and the nature and extent of future research.
-- DAS

SIP 25440 625.731.2:624.131.4/.5:624.138

Kharkhuta, N. ÎA. and îU. M. Vasil'ev
STRENGTH AND COMPACTION OF ROAD EMBANKMENT SOILS. (Ustoĭchivost' i uplotnenie gruntov dorozhnykh nasypeĭ; Text in Russian). Moscow, Avtotransizdat, 1964, 216p. incl. tables, graphs, diagrs. 127 refs.
DLC, TE210.K48

Physical and rheological properties of various soils and factors determining soil behavior in embankments are discussed. Information provided on the strength of soils under the influence of moisture and frost covers deformations from consolidation, increase in moisture, frost heaving, repeated freezing, and thawing. Required soil densities, allowable moisture, and required value of the coefficient of frost resistance are determined, and the following measures for achieving optimum conditions are reviewed: 1) replacement of soil; 2) compaction by bulldozers, graders, and dump trucks; 3) compaction using smooth-wheel, tamping cam, and pneumatic tire rollers; and 4) compaction by impacting and vibrating. -- DAS

SIP 25441 551.321.7(78)

Keeler, C. M. and W. F. Weeks
SOME MECHANICAL PROPERTIES OF ALPINE SNOW, MONTANA 1964-66. Res. Rept. 227, U. S. Army Cold Regions Research and Engineering Laboratory, 56p. incl. illus., tables, graphs, diagrs., appendixes A-F, March 1967. 36 refs.
CRREL files

Data on the physical properties of seasonal alpine snow have been collected from the Beartooth Mountains near Cooke City, Montana, and the Bridger Range near Bozeman, Montana. Systematic measurements of snow density, temperature, structure, ram and Canadian hardness, centrifugal tensile strength and shear strength measured with a shear box and several types of shear vanes are included. Test results were grouped according to gross snow types and whether the snow was wet or dry. Interrelations between the different test parameters were studied. Experiments were also conducted to study the sources of error in making in-situ mechanical tests on snow without utilizing a pit wall. The main factor contributing to the experimental scatter is lateral inhomogeneity in the snow cover. However, the standard deviation of a group of strength tests is shown to be directly proportional to the mean value of the group. The systematic relations between snow properties invariably become obscured when different snow "types" are indiscriminantly grouped together. (Authors' abstract)

SIP 25442 551.321.7(*733 + *746)

Dubrovin, L. I. and V. N. Petrov
ACCURACY OF SNOW MEASUREMENTS IN ANTARCTICA. (O tochnosti snegomernykh nablîudeniĭ v Antarktide; Text in Russian). Sovet. Antarkticheskafâ Eksped., Inform. bîull., No. 43:15-20 incl. tables, graphs, map, 1963. 4 refs. (Eng. transl. in: Soviet Antarctic Expedition, Information Bulletin. Vol. 5, Issue No. 1:6-10, 1965).
DLC, Q115.S686; Q115.S6862

Ten-day measurements at Pionerskaya (Jan. 30, 1957, to Jan. 1, 1958) and Lazarev (March 31, 1959, to Feb. 20, 1961) stations and measurements from snow-measuring cables at Lazarev for the same period are used to determine the accuracy of snow measurements. Both areas are 100 x 100 m and have 41 stakes arranged in checkerboard fashion. The measuring cable consists of legs 40 m long, and measurements are made every meter. The accuracy with which average snow accumulation can be computed increases with the length of the observation period. Accuracy also increases rapidly as the number of stakes in the area is increased to 25; beyond this, the number of stakes has relatively little effect on the percentage of error. The accuracy of stake measurements is taken as 1 cm, and the square error in the computation of the average value from 41 stakes over 2 yr as 3 cm. This error increases by a factor of several tens with a smaller number of stakes and especially when the measurements are made from single stakes. The same applies to single borehole and pit measurements. -- JEB

SIP 25443 551.466.73(*741)

Shamont'ev, V. A.
TIDES IN ALASHEYEV BIGHT. (Prilivy v zalive Alasheeva; Text in Russian). Sovet. Antarkticheskafâ Eksped., Inform. bîull., No. 43:31-32 incl. graph, 1963. (Eng. transl. in: Soviet Antarctic Expedition, Information Bulletin. Vol. 5, Issue No. 1:15-16, 1965).
DLC, Q115.686; Q115.6862

A gage with a tide staff and marigraph were used to observe tidal phenomena in the southern part of Alasheyev Bight in the vicinity of Molodezhnaya Station from Jan. 16 to Feb. 10, 1962. This region has mixed, predominantly diurnal tides. The maximum spring tide of 148 cm was recorded Feb. 4. The neap tide on Jan. 28 was 17 cm. The computed maximum possible tide was about 170 cm. This data is of importance for ships sailing in the coastal part of Alasheyev Bight, which is shallow and has complex bottom topography. -- JEB

SIP 25444 528.3:528.27(*74)

Lazarev, G. E.
PRELIMINARY RESULTS OF GRAVIMETRIC AND GEODETIC WORK ALONG THE KOMSOMOL'SKAYA-SOVETSKAYA-VOSTOK TRAVERSE. (Predvaritel'nye rezul'taty gravi-geodezicheskogo pokhoda po marshrutu Komsomol'skafâ-Sovetskafâ-Vostok; Text in Russian). Sovet. Antarkticheskafâ Eksped., Inform. bîull., No. 43:41-43 incl. table, map, 1963. Ref. (Eng. transl. in: Soviet Antarctic Expedition, Information Bulletin. Vol. 5, Issue No. 1:20-21, 1965).
DLC, Q115.S686; Q115.S6862

Geodetic and gravimetric observations were made along the Komsomol'skaya-Sovetskaya-Vostok-Komsomol'skaya traverse from Nov. 12, 1961, to Jan. 11, 1962. Simultaneous geodetic leveling observations were made from opposite ends of consecutive 5.5-km intervals. A relief map of the glacier surface and a table of the elevation of the stations above sea level are given. To investigate the effect of the refraction coefficient on the results of geodetic leveling, systematic observations were made for 24 hr at one 5.5-km interval. Preliminary values of the gravitational and magnetic anomalies indicate that the interior of the continent is a single, very slightly dissected block. The mean annual snow accumulation between Sovetskaya and Vostok was 11 cm. According to the snow stakes at Sovetskaya, the 3-yr snow accumulation there was 60.3 cm. -- DMN

SIP 25445 538.711:550.382:550.389(*744/*745)

TSukernik, V. B.
MAGNETOMETER SURVEY OF THE WEST ICE SHELF. (Magnitometricheskaya s"emka Zapadnogo shel'fovogo ledника; Text in Russian). Sovet. Antarkticheskaya Eksped., Inform. byull., No. 43:45-47 incl. map, 1963. 2 refs. (Eng. transl. in: Soviet Antarctic Expedition, Information Bulletin. Vol. 5, Issue No. 1:22-23, 1965).
DLC, Q115.S686; Q115.S6862

During the Fifth Continental Expedition, measurements of the vertical component ($\bar{Z}$) of the magnetic field were made at 90 stations on the West Ice Shelf simultaneously with seismic and gravimetric measurements. The values of $\Delta\bar{Z}$ relative to the absolute datum at Mirnyy were obtained from preliminary analysis of the data. The map of these values generally shows a normal field, with intensity increasing gradually from east to west (1500 to 4500 γ). The region of the West Ice Shelf is characterized by a relatively quiet magnetic field with anomalies of 0 to 500 γ. The magnetic field of the ice shelf does not show a clear relationship to the subglacial relief, but individual peculiarities of the bedrock relief may be reflected on the $\underline{Z}_a$ map. -- DMN

SIP 25446 621.396:551.324.24(*772)

Kuperov, L. P.
ABSORPTION OF LONG RADIO WAVES BY THE ANTARCTIC ICE CAP. (Pogloshchenie dlinnykh radiovoln ledyanym massivom Antarktidy; Text in Russian). Sovet. Antarkticheskaya Eksped., Inform. byull., No. 43:49-52 incl. tables, 1963. 2 refs. (Eng. transl. in: Soviet Antarctic Expedition, Information Bulletin. Vol. 5, Issue No. 1:23-25, 1965).
DLC, Q115.S686; Q115.S6862

The field intensity of long-wave radio stations was measured at Byrd Station from March 11-19, 1961, and the results were used to compute the average field for 120°W at noon. The Austin equation was applicable for all radio links except those of the region from the coast to Byrd. Absorption values of 16 to 20 kcs and 1,2 to 2,0 db/100 km were obtained for the Antarctic ice cap. Darkness leads to the greatest increase in field intensity on the Balboa-Byrd line, where the equatorial section comprises a large part of the entire link. Antarctica is south of 65°S and therefore the maximum solar depression angle is 48.5°. Taking into account only the changes in the illumination of radio links, 6 db can be adopted for the index of long waves at night or in winter. -- JEB

SIP 25447 621.436:620.193/.197

Serdyukov, V. I.
CORROSIVE EFFECT OF MELTWATER ON THE COOLING SYSTEM OF TYPE 7D-12 DIESELS DURING OPERATION IN ANTARCTICA. (Korrodiruyushchee vliyanie talov vody na sistemu okhlazhdeniya dizeley tipa 7D-12 pri ekspluatatsii ikh v Antarktide; Text in Russian). Sovet. Antarkticheskaya Eksped., Inform. byull., No. 43:53-54, 1963. (Eng. transl. in: Soviet Antarctic Expedition, Information Bulletin. Vol. 5, Issue No. 1:26, 1965).
DLC, Q115.S686; Q115.S6862

Meltwater in the closed 2-circuit cooling system of 7D-12 diesels causes the block walls to corrode, apparently from the combined action of electrochemical corrosion and cavitational erosion. Typical corrosion control methods, such as the addition to the cooling water of 0.3 to 1% potassium bichromate, 50 to 100% sea water, or soap, drying oils, or paint, are unsuccessful. During the third Soviet expedition, the cast iron blocks were replaced by aluminum blocks, and even after 4000 hr of operation there was no sign of hole formation. -- JEB

SIP 25448 551.322:548.5(*7)

Voronov, P. S.
ICE "PLANTS" OF ANTARCTICA. (Ledyanye "rasteniya" Antarktide; Text in Russian). Sovet. Antarkticheskaya Eksped., Inform. byull., No. 43:58-60 incl. illus., 1963. (Eng. transl. in: Soviet Antarctic Expedition, Information Bulletin. Vol. 5, Issue No. 1:28-30, 1965).
DLC, Q115.S686; Q115.S6862

Congelation ice resembling organic forms of "ice flowers" resulting from water freezing into strips of specific white ice and "ice grass" forming long channels by surfacing air bubbles between developing ice needles in freezing lake water is described. -- JEB/FMM

SIP 25449 551.46(*741)

Mal'tsev, V. N.
HYDROGRAPHIC EXPLORATION OF THE MOLODEZHNAYA STATION REGION. (Gidrograficheskoe obsledovanie raĭona stantsii Molodezhnoĭ; Text in Russian). Sovet. Antarkticheskaia Eksped., Inform. biûll., No. 44:17-21 incl. map, 1963. (Eng. transl. in: Soviet Antarctic Expedition, Information Bulletin. Vol. 5, Issue No. 1:41-43, 1965).
DLC, Q115.S686; Q115.S6862

The sea bottom west of Molodezhnaya Station is a continuation of the structural relief forms of the coastal oasis. Two small islands, 2 to 3 m high, are covered with continental ice that probably was recently continuous with the mainland. A good natural berth 250 m long exists at the edge of the continental ice barrier which rises 3 to 4 m above sea level. Observations of sea level fluctuations in Alasheyev Bight were used to determine the theoretical zero datum of 67 cm in gage readings, established relative to the tidal gage bench mark and the center of the Molodezhnaya astronomical station. The volume of fresh water lakes in the vicinity of the station was also investigated and found adequate to meet any needs of a wintering party. -- JEB

SIP 25450 551.465.7(*7)

Ledenev, V. G.
INFLUENCE OF EVAPORATION ON THE FORMATION OF COLD ANTARCTIC WATER. (Vliianie isparenifa na protsessy obrazovaniia kholodnykh antarkticheskikh vod; Text in Russian). Sovet. Antarkticheskaia Eksped., Inform. biûll., No. 44:35-38 incl. table, 1963. 3 refs. (Eng. transl. in: Soviet Antarctic Expedition, Information Bulletin. Vol. 5, Issue No. 1:50-52, 1965).
DLC, Q115.S686; Q115.S6862

Off the coast of East Antarctica, polynyas persist throughout the year. They occur on the west side of any ice shelf or northward-projecting cape or peninsula. Their formation and existence are determined by the influence of strong drainage winds and prevailing SE winds on the water surface. Intense evaporation of the open water in these areas restores to normal the dry air arriving from the continent and thus is one of the main factors in cooling or supercooling the water in polynyas. The transport of the supercooled water to coastal regions causes the formation of a large amount of ice under the shore ice. Also, evaporation is accompanied by strong salinization of a thin surface layer which inhibits ice formation and promotes the conservation of open water areas. -- JEB

SIP 25451 551.466.7(*733)

Shesterikov, N. P. and L. I. Dubrovin
TIDES IN THE LAZAREV STATION REGION. (Prilivy v raĭone stantsii Lazarev; Test in Russian). Sovet. Antarkticheskaia Eksped., Inform. biûll., No. 44:39-42 incl. tables, graph, 1963. 3 refs. (Eng. transl. in: Soviet Antarctic Expedition, Information Bulletin. Vol. 5, Issue No. 1:52-54, 1965).
DLC, Q115.S686; Q115.S6862

Analysis of a diurnal series of observations yielded the harmonic constants of 4 principal tides. These constants were used to compute the variation in sea level at Lazarev Station Sept. 26 and 27, 1960. The highest spring tide at maximum lunar declination may reach 210 cm. The minimum tide during quadrature and when the moon is located near the equatorial plane decreases to 30 cm. The tides have a mixed, predominantly semidiurnal character. The cotidal hour of the semidiurnal tide is 4.0 hr and that of the diurnal tide, 22.0 hr. The age of the semidiurnal tide is 13.8 days and that of the diurnal tide, 13.4 days. Because the tides in the Lazarev Station region are complex, the harmonic constants obtained from a one-day series of observations are approximate. -- JEB

SIP 25452 551.324.28:551.321.62/63(*733)

Bokanenko, L. I. and Iû. N. Avsiûk
SUBGLACIAL RELIEF AND THICKNESS OF THE LAZAREV ICE SHELF. (Podlednyĭ rel'ef i moshchnost' shel'fovogo lednika Lazareva; Test in Russian). Sovet. Antarkticheskaia Eksped., Inform. biûll., No. 44:43-48 incl. diagr., maps, 1963. 2 refs. (Eng. transl. in: Soviet Antarctic Expedition Information Bulletin. Vol. 5, Issue No. 1:55-58, 1965).
DLC, Q115.S686; Q115.S6862

Fifteen seismic and 150 gravimetric observations were made on the Lazarev ice shelf in 1960-61. The surface relief is generally smooth at 37 m above sea level and slopes gently from southeast to northwest. The ice shelf is 170 to 190 m thick in the western and northern parts. It increases to 375 m in the south and southeast and decreases to 140 m in the marginal area near the station. The ice shelf is located over a relatively deep part of the ocean. Bedrock depth ranges from 90 to 1170 m below sea level. It is suggested that the ice domes on the shelf were formed by icebergs grounded in the shallows, and that the shelf is associated with the development of shore ice which formed and persisted under the protection of the icebergs. -- JEB

SIP 25453 551.324.28(*732)

Kruchinin, IU. A. and IA. P. Koblents
DYNAMICS OF THE TROLLTUNG ICE SHELF. (K voprosu o dinamike shel'fovogo lednika Trolltunga; Text in Russian). Sovet Antarkticheskaia Eksped., Inform. biull., No. 44:49-52 incl. map, 1963. 7 refs. (Eng. transl. in: Soviet Antarctic Expedition, Information Bulletin. Vol. 5, Issue No. 1:56-60, 1965).
DLC, Q115.S686; Q115.S6862

A comparison of surveys of the Princess Martha Coast between 0° and 3°W (the Trolltung Ice Shelf) indicates that the tongue of the shelf has a dynamic front. Instability results from the very ample replenishment of the tongue by ice flowing into the sea along the Penck Trough and from the lack of support for the ice. On the basis of various charts, it is concluded that the shelf advanced at an average rate of about 1.1 mi/yr from 1939 to 1955. Between 1939 and 1959, the shelf was displaced about 10 mi to the west. -- DMN

SIP 25454 551.324.24:551.324.4(*7)

Losev, K. S.
COMPUTATIONS OF THE MASS BALANCE OF THE ANTARCTIC ICE CAP. (O raschetakh balansa massy ledianogo shchita Antarktidy; Text in Russian). Sovet. Antarkticheskaia Eksped., Inform. biull., No. 44:53-58 incl. tables, map, 1963. 14 refs. (Eng. transl. in: Soviet Antarctic Expedition, Information Bulletin. Vol. 5, Issue No. 1:60-63, 1965).
DLC, Q115.S686; Q115.S6862

The computations of the mass balance of the Antarctic ice cap by various authors are compared. It appears reasonable to assume that from 1.70 to 2.30 x 10^{18} g/yr of snow are accumulated, while more than 1.70 x 10^{18} g/yr of ice are lost in the calving of icebergs and about 0.55 x 10^{18} g/yr of ice are lost by the melting of the lower surface of ice shelves. Using the average values, the mass balance of the Antarctic ice cap is less than -0.4 x 10^{18} g/yr. -- JEB

SIP 25455 551.578.4:551.324.431(*746)

Kotliakov, V. M.
SNOW ACCUMULATION IN THE COASTAL BELT OF EAST ANTARCTICA FROM 1957-1961. (Snegonakoplenie v beregovoĭ polose Vostochnoĭ Antarktidy v 1957-1961 gg.; Text in Russian). Sovet. Antarkticheskaia Eksped., Inform. biull., No. 44:59-62 incl. tables, graph, 1963. 6 refs. (Eng. transl. in: Soviet Antarctic Expedition, Information Bulletin. Vol. 5, Issue No. 1:64-66, 1965).
DLC, Q115.S686; Q115.S6862

Data on snow accumulation along the coast of East Antarctica are analyzed from 7 stakes in the Mirnyy region. For the years studied, snow accumulation increased inland from the coast to 15 km, reached a maximum from 15 to 30 km, and decreased farther inland. For this last area, the average annual accumulation was 266 mm, which includes the high value of 484 mm for 1957. Correcting the accumulation for 1957 by a factor of 0.55 and averaging the accumulation along a 50-km profile, a value of 421 mm/yr is obtained. -- JEB

SIP 25456 551.324.24:551.324.412(*747)

Nozdrukhin, V. K.
SPRING-SUMMER TEMPERATURE REGIME OF THE SNOW AND FIRN LAYER AT VOSTOK STATION. (Vesenne-letniĭ temperaturnyĭ rezhim snezhno-firnovoĭ tolshchi na stantsii Vostok; Text in Russian). Sovet. Antarkticheskaia Eksped., Inform. biull., No. 44:63-67 incl. tables, graph, 1963. 2 refs. (Eng. transl. in: Soviet Antarctic Expedition, Information Bulletin. Vol. 5, Issue No. 1:66-68, 1965).
DLC, Q115.S686; Q115.S6862

The temperature regime of the snow and firn layer at Vostok Station was studied from a 40 m hole for 100 days in the spring and summer of 1961. Only the upper 2 m are subject to sharp fluctuations. Annual temperature fluctuations attenuate at a depth of 25 m, where a temperature of -57.2°C was recorded. Below 25 m, the temperature is apparently subject to long-period fluctuations only. The temperature gradients decrease with depth as temperature fluctuations attenuate. They vary greatly with time. The lowest temperatures are recorded in winter near the surface and in summer, at a depth of 5 m. The average annual air temperature for 4 yr (1958-61) were -55.4°, -55.4°, -57.4°, and -54.2°C, respectively. The difference between the mean annual air temperature and the firn temperature at the level of zero annual fluctuations is small and depends mainly on the upward heat flux and the presence of radiational heat exchange at the snow surface. -- JEB

SIP 25457 551.578.42(*746:*701)

Ukhov, S. B.
ENGINEERING INVESTIGATIONS OF SNOW COVER BETWEEN KOMSOMOLSKAYA AND AMUNDSEN-SCOTT STATIONS. (Inzhenernye issledovaniia snezhnogo pokrova mezhdu stantsiiami Komsomol'skaia -- Amundsen-Scott; Text in Russian). Sovet. Antarkticheskaia Eksped., Inform. biull., No. 44: 68-75 incl. illus., table, graph, 1963. (Eng. transl. in: Soviet Antarctic Expedition, Information Bulletin. Vol. 5, Issue No. 1:69-73, 1965).
DLC, Q115.S686; Q115.S6862

The following investigations of the upper snow layers were conducted during the Komsomol'skaya--Amundsen-Scott traverse of the fourth Soviet expedition: 1) determination of the shear strength of snow under various normal loads and temperatures corresponding to natural conditions of deposition, 2) descriptions of snow structure in pits and determinations of its density, and 3) determinations of the average annual snow accumulation. The equipment and methods used in the determinations are described. Snow density varied little along the route, but its strength varied sharply, apparently due to texture. Snow strength is considerably greater in the Mirnyy region than in central Antarctica; it reaches a minimum between Komsomol'skaya and Vostok, and increases beyond Vostok. The average thickness of annual layers decreases toward the interior. Crystal sizes increase sharply with depth. As the intensity of snow accumulation decreases, the enlargment of snow particles occurs at a lesser depth. -- JEB

SIP 25458 551.324.83(*746)

Voronov, P. S.
BLACK ICE IN THE ANTARCTIC. (Chernyĭ led v Antarktike; Text in Russian). Sovet. Antarkticheskafa Eksped., Inform. bfull., No. 44:82-84 incl. illus., 1963. (Eng. transl. in: Soviet Antarctic Expedition, Information Bulletin. Vol. 5, Issue No. 1:78-79, 1965).
DLC, Q115.S686; Q115.S6862

In 1956 a large area of black ice was seen in the wall of the coastal ice barrier at the head of McDonald Bay, about 12 km SW of Mirnyy Station. It is probable that a huge block of continental ice had turned over, exposing the morainic material embedded in its lower surface. In addition to the usual igneous and metamorphic rocks of central East Antarctica, a flat boulder was found which consisted of calcite-diopside-acetinolite rock dissected by a calcite sheet vein up to 0.15 m thick containing radiated aggregates of actinolite crystals in the center. This led to the conclusion that greenstone slate facies of regional metamorphism are widespread south of Mirnyy. -- JEB

SIP 25459 629.124.752

THE SOVIET'S NEWEST ICEBREAKER LENINGRAD. (NL:n uusin polaarijäänmurtaja Leningrad, Sovjets nyaste polarisbrytare Leningrad; Text in Finnish and Swedish). Voima ja Käyttö; Kraft och Drift, 60(1): 8-15 incl. illus., table, Jan. 1962.
DLC, TJ4.S73

The diesel-electric icebreaker "Leningrad," a sister ship to the "Moskva" (launched January 1959 and delivered June 1960) was launched October 1959 and delivered to V/O Sudoimport of Moscow on October 30, 1961. The principal dimensions and characteristics of the "Leningrad" and "Moskva" are presented in a table together with comparative data for the Russian atomic icebreaker "Lenin." The design features, accomodations, and the main and auxiliary equipment and machinery including the three propellers and engines, are described. The 122-m-long "Leningrad" accomodates a crew of 120 men, comprising 40 ship's officers, 24 petty officers, and 56 seamen. The speed of the icebreaker, 18 knots, is the same as that of the "Lenin." The hull is made of high-tensile special steel and is completely welded. It is designed to withstand both the forces suffered during passage through the ice and those caused by the pressure of drifting ice masses. The shell plating has a maximum thickness of 5 cm. The living quarters are heated by warm air radiators to maintain a normal inner temperature at -35°C outer temperature. The mechanical ventilation system permits the maintenance of normal inner temperatures down to -10°C outside temperature. -- AGR

SIP 25460 551.345:536.48

Ivanov, N. S. and R. I. Gavril'ev
THERMOPHYSICAL PROPERTIES OF FROZEN GROUND. (Teplofizicheskie svoĭstva merzlykh gornykh porod; Text in Russian). Moscow, Izd-vo Nauka, 1965, 72p. incl. tables, graphs, diagrs. 65 refs.
DLC, QE431.5.I9

Data on thermal properties of frozen friable rocks (sands, loams, clays, and sandy loams) are compiled and systematized. Basic concepts are reviewed regarding the forms and coefficients of heat transfer in thawed and frozen ground and in that undergoing freezing or thawing. Relationships of volume/heat capacity and temperature and thermal-conductivity coefficients on moisture, density, and temperature are shown analytically and graphically. The thermophysical properties of snow and ice are discussed in terms of their physico-mechanical properties, such as porosity, structural characteristics, and temperature. The effect of lowering the coefficient of thermal conductivity in rock in the first stage of thawing is demonstrated. The influence of cryogenic textures on the thermophysical properties of frozen ground, particularly of laminated and reticulate textures is discussed. The temperature dependence of the coefficients of bound-water transfer in frozen ground is treated, and fundamental methods for determining thermophysical properties of rock in various frost stages are presented. -- DAS

SIP 25461 624.144.55:625.151

Obukhov, L. M. and IU. G. Red'kin
SNOW REMOVAL FROM RAILWAY SWITCHES. (Ochistka strelok ot snega; Text in Russian). Moscow, Transzheldorizdat, 1962, 36p. incl. illus., tables, diagrs. Ref.
DLC, TF542.O2

Specifications and recommendations are given for operation and maintenance of pneumatic devices and electric heaters for snow removal at switch points. A semi-automatic device with electrical startup consist of a control unit, air tank, and electropneumatic valves; compressor; and a 24-v energy source. Intermittent blasts of air not exceeding 400 ml between the switch point and the rail clean a switch in 1 to 3.2 sec or 51 switches in 3 min. A similar device consists of an automatic valve, a switch, and 2 air distribution pipes with outlets. A hand operated blower with 30 mm^3 nozzle area is recommended for use on lines with low traffic. An electric heating device is also described which uses a helical nichrome wire coil stretched in a seamless steel tube packed with magnesium oxide powder. It is used as a straight tube 5800 mm long and 16 mm in diameter, placed between the switch point and the rail, or as a bent tube 9400 mm long, placed around the switch base. A safety device automatically controls short circuits and excessive heater amperage. -- VDP/DAS

SIP 25462 628.155:551.345(*531.41)

Zenger, N. N.
FEATURES OF WATER SUPPLY LINE CONSTRUCTION IN PERMAFROST CONDITIONS (BASED ON EXPERIENCE IN NORIL'SK). (Osobennosti ustroĭstva vodoprovodov v usloviĭakh vechnoĭ merzloty (opyt Noril'ska); Text in Russian). Moscow, Izd-vo lit-ry po stroitel'stvu, 1964, 98p. incl. illus., tables, graphs, diagrs. 29 refs.
DLC, TD491.Z4

The well-organized water supply system of Noril'sk, located beyond the Polar Circle, is used as an example, and supplementary data are included. The geographic, meteorological, and soil characteristics of the Noril'sk region are reviewed. Considerations of the design, layout, and thermal regimes of water conduits and conduit networks include choice of pipe diameters and types, design of open water channels, required equipment, heating of water, and organization of thermal control. Questions of dispatching and automation are discussed. Special problems of planning, construction, testing, repair, and operation of water lines in permafrost regions are covered. -- DAS

SIP 25463 691.1/.3(*3)

Lokshtanov, G.
NEW DEVELOPMENTS IN CONSTRUCTION IN POLAR REGIONS. (Novoe na stroĭkakh Zapolĭar'ĭa; Text in Russian). Murmansk, Murmanskoe knizhnoe izd-vo, 1962, 52p. incl. illus., tables, graphs, diagrs.
DLC, TH86.R9L6

Information is presented regarding thermal insulating construction materials and processes in wide use and those recently developed for use in polar regions, with special reference to the Murmansk region. Characteristics and processing technology of vermiculite and vermiculite concrete are discussed. Technology of vermiculite concrete panel manufacture is detailed. A description is provided for a new thermal insulating material, "vermibite" -- a mechanical blend of expanded vermiculite and molten asphalt, with asbestos insulation material added for strength. The successful addition of potash (K_2CO_3) to concrete and reinforced concrete for prevention of freezing during winter manufacture is described. A description is presented of new temporary stands on which prestressed concrete girders of length 12 to 24 m can be produced. A dispenser for applying asphalt cement water insulation to foundations and walls is shown. Specifications are presented for a high-porosity concrete which can be prepared in winter and used in a structure such as an ore concentration plant, in which a humidity greater than 70% is maintained. -- DAS

SIP 25464 624.139:622.233

Maramzin, A. V.
EXPERIMENT OF DRILLING GEOLOGICAL TEST HOLES IN PERMAFROST. (Opyt bureniĭa geologo-razvedochnykh skvazhin v merzlykh porodakh; Text in Russian). Moscow, Gos. nauch.-tekhn. izd-vo, 1963, 72p. incl. illus., tables, graphs, diagrs., map. 30 refs.
DLC, Slavic Div.

Various aspects of drilling in permafrost with fluid flushing are discussed on the basis of extensive field and laboratory data. Recommendations are made for choice of hole diameter, type of drill and crown, fluid temperature, and parameters of clay and chemical additives to the flushing fluid. Formulas are provided for computing amount of damage done to borehole walls through heat transfer from the drill. Suggestions regarding use of casing pipes and cementing are given and a number of drilling complications are anticipated. Procedures are presented for destroying the borehole after completion of operations, transportation of derricks and other equipment in permafrost regions, organization of drilling operations, and construction of working and living quarters at the drilling site. Safety measures for the prevention of accidents and fires are discussed. -- DAS

SIP 25465 627.8:624.139(*531.3)

Lyskanov, G. A.
EXPERIMENTAL CONSTRUCTION OF A FROZEN-TYPE DAM IN ÎAKUTIÎA. (Opyt stroĭtel'stva plotiny merzlogo tipa v ÎAkutii; Text in Russian). Yakutsk, ÎAkutskoe knizhnoe izd-vo, 1964, 70p. incl. diagrs. 19 refs.
DLC, TC543.L9

An experimental dam was constructed on the Irelîakh River at Mirnyĭ in central Yakutia, using the method of natural winter freezing of the anti-filtration core integral with the permafrost foundation and river valley walls. The lower facing wall was built of loose frozen rock which subsequently compacted and settled after spring thawing; the upper facing wall was constructed in spring of partially and completely thawed rock by mechanical compaction. The operating and temperature regimes of the dam and spillway were observed for over a year, and the following conclusions were drawn: 1) the construction of this type of dam is much more economical in the Far North than the non-frozen or the artificially frozen types; 2) due to its monolithic, permanently frozen core, the dam has fewer weak points than the non-frozen type; 3) the frozen state of the core can be maintained naturally year-round in climates similar to that of Mirnyĭ and artificially in warmer climates; 4) an inlaid stone spillway is the most economical, is sufficiently reliable, and can be used even when a talik has formed in the stream bed. Recommendations are given for organization of construction of frozen dams in permafrost regions. -- DAS

SIP 25466 551.345:620.17

Tîûtîûnnik, P. M.
STRENGTH AND STABILITY OF FROZEN GROUND. (Prochnost' i ustoĭchivost' zamorozhennykh gornykh porod; Text in Russian). Moscow, Izd-vo Nedra, 1965, 78p. incl. illus., tables, graphs, diagrs. 30 refs.
DLC, Slavic Div.

A variety of soil types -- clays and medium, fine and powdered sands -- from various mining regions were subjected to laboratory tests for compressional and shear strength in the frozen state. The strength was found to depend on the temperature of freezing, physico-mechanical properties (i.e., moisture, porosity, and granulometric composition) and on load duration. Creep occurs in all samples and under constant stress reduces strength by several factors. Strength ratings and their parameters are determined for instantaneous and continuous stress. Under a continuous load the decrease in overall value of shear resistance takes place only as a result of a decrease in the cohesive coefficient, with the angle of internal friction remaining constant. Results of field observations on the temperature regime of shaft walls stabilized by freezing are presented. A proposed method for determining the depth and stability of an artificially frozen bare rock wall is based on the plastic, elasto-plastic, and elastic zones in a cylindrical shaft. Depth calculations are related to strength of the frozen rock or to deformation of the frozen rock wall. -- DAS

SIP 25467 551.525:625.84:551.578.468

Gold, L. W.
INFLUENCE OF SURFACE CONDITIONS ON GROUND TEMPERATURE. Can. J. Earth Sci., 4(2):199-208 incl. graphs, April 1967. 8 refs.
DLC, QE1.C17

Ground temperatures were measured under two parking lots, one of which was cleared of snow in winter, and monthly and annual average surface temperatures were estimated by extrapolation. The surface temperatures were compared with monthly and annual surface and air temperatures measured at a nearby grassed site. A dependence of the difference between the monthly average surface and air temperatures on snow cover and convective loss was observed. A correlation was found to exist between the monthly average of the daily global solar radiation and the difference between monthly ayerage air temperature and monthly average parking lot surface temperature. It was demonstrated that, because of a change in surface conditions, there was a change in annual average ground temperature beneath a parking lot. The observations are discussed with reference to the formation of sporadic permafrost. (Author's abstract)

SIP 25468 551.481.1:54(*762)

Boswell, C. R., R. R. Brooks and A. T. Wilson
SOME TRACE ELEMENTS IN LAKES OF McMURDO OASIS, ANTARCTICA. Geochim. Cosmochim. Acta, 31(5):731-736 incl. table, map, May 1967. 24 refs.
DLC, QE351.G425

In order to study the origin of a number of highly saline lakes in the Taylor and Wright Valleys, the concentrations of Zn, Pb, Bi, Fe, Mn, and Mo were determined by a combined spectrochemical and solvent extraction procedure. From the measurement of ionic ratios, it was concluded that there was some evidence for Lake Bonney having had a sea water origin. It was also deduced that Lake Fryxell may have contained sea water in the past. (Authors' abstract, modified)

SIP 25469 624.144.55:656.2

Best, Gerald M.
SNOWPLOW: CLEARING MOUNTAIN RAILS.
Berkeley, Howell-North Books, 1966, 119p. incl. illus., tables, graph, diagrs., map, appendix.
DLC, TF542.B4

This book presents an illustrated history and development of the battle against snow on the railroad which crosses the Sierra Nevada between Sacramento, California and Reno, Nevada. Emphasis is placed on equipment used by the Central Pacific and Southern Pacific railroads, snowshed construction, methods to prevent fires in the sheds and forests, the Bucker snowplow, rotary snowplows, and notable snowstorms and attempts to overcome them. The appendix has rules for operating the rotary snowplow, lists snowplows giving basic information such as builder, date built, dimensions, purchaser, status (in use or out of use), etc. Diagrams are given of snowshed types. -- BLE

SIP 25470 551.32(*2:*50)

Akademiîa Nauk SSSR. Institut Geografii
MATERIALS OF GLACIOLOGICAL INVESTIGATIONS: CHRONICLE AND DISCUSSIONS, ISSUE 12.
(Materialy glîâsiologicheskikh issledovaniî: Khronika [i] obsuzhdeniîâ, Vyp. 12; Text in Russian with English summary). Moscow, 1966. 328p. incl. illus. tables, graphs, map, diagrs. (International Geophysical Year, 1957-1959).
DLC, QE575.A43

The "Chronicle" Section, briefly summarizes papers from the following symposia: 1) 3rd All-Union Glaciological Symposium, held in Kirgizia in 1965; 2) International Symposium on Scientific Aspects of Snow and Ice Avalanches, held in 1965 in Davos, Switzerland; and 3) 3rd Scientific Conference on Study of the Snow Cover, Avalanches, and Glaciers of the Caucasus, held in 1965 in Yerevan. Papers on investigations of a wide variety of glaciated regions in the Ural Mts, Soviet Central Asia, and Soviet Arctic are included. The "Methodology" section contains papers on 1) turbulent exchange in inversions by the Laĭkhtman method, 2) the Bowen equation for calculation of heat- and moisture-exchange on a glacier, and 3) drive hammer drill rigs for use on glaciers. The "Terminology" section includes articles on international glaciological terminology, the classification of snow-surface crusts, and definition of the terms "small glacier forms" and "Antarctic oasis." Translations and criticisms are presented of the theories of ice ages proposed by W. L. Stokes, Ewing and Donn, T. Segota, and A. T. Wilson. -- DAS

SIP 25471 551.578.46:551.33/.34(*746)

Grigor'ev, N. F.
SNOW BEDS OF BUNGER OASIS AND THEIR ROLE IN ALTERATION OF TOPOGRAPHY AND THE DEVELOPMENT OF CRYOGENIC PHENOMENA IN EAST ANTARCTICA. (Snezhniki oazisa Bangera i ikh rol' v izmenenii rel'efa i razvitii kriogennykh îâvleniî v Vostochnoĭ Antarktide; Text in Russian). Akad. nauk SSSR. Inst. geogr., Mater. glîâsiol. issled. Khronika, obsuzhdeniîâ, No. 12:115-121 incl. illus., table, graph, 1966. 3 refs.
DLC, QE575.A43

Most snow-accumulation features are of the drift type. They consist mainly of firn and infiltration ice and can be characterized as seasonal or intraseasonal formations. Those which survive the summer may cover 5 to 7% of the ice-free rock area and attain dimensions of 60 x 200 x 15 m. Seasonal snow strips and ridges are formed in valley bottoms and hollows. The melting of snow deposits causes intensive nivation and in some cases leads to the formation of solifluction terraces and rudimentary cirques in small valleys. Rock deposits are rare at the glacier edge but increase in area toward the north. Nival processes occurring on the moraine surface create moraine-nival deposits--usually represented by viscous loam--and accumulations of eolian aleurite. Melting of snow beds plays an important role in forming cement ice, segregation ice, and vein ice in the layer of friable Quaternary deposits. -- DAS

SIP 25472 551.332.5(210.5)(*7)

Model', îU. M.
THE MEANING OF THE TERM "ANTARCTIC OASIS."
(O soderzhanii ponîâtiîâ "Antarkticheskiĭ oazis"; Text in Russian). Akad. nauk SSSR. Inst. geogr., Mater. glîâsiol. issled. Khronika, obsuzhdeniîâ, No. 12: 255-257, 1966. 7 refs.
DLC, QE575.A43

The term "Antarctic oasis" entered the literature in the works of the British Antarctic Expedition of 1934-37. In view of the confusion which has characterized the use of the term in the Antarctic literature to date, clarification is considered imperative, and the following definition is proposed: those ice-free portions of the marginal zone of the continent that have a comparatively smooth, hummocky topography. The oases are distributed within the limits of the glacial accumulation area and possess a specific complex of landscape elements: 1) local frigid desert climate; 2) a hydrological regime dominated by undrained lakes and temporary streams; 3) irregularly distributed vegetation, consisting mainly of epilithic, scablike, and bushy lichens; and 4) an animal population represented by several species of penguins, petrels, and skuas. -- DAS

SIP 25473 551.324(*7-11)

Barkov, N. I.
SOME RESULTS OF 10 YEARS OF SOVIET GLACIOLOGICAL RESEARCH IN ANTARCTICA. (Nekotorye itogi sovetskikh glîatsiologicheskikh issledovaniĭ v Antarktide za 10 let; Text in Russian). Akad. nauk SSSR. Inst. geogr., Mater. glîatsiol. issled. Khronika, obsuzhdeniîa, No. 12:283, 1966.
DLC, QE575.A43

Results are summarized from papers presented in 1966 at a meeting of the Geographical Society of the USSR and institutes participating in Antarctic research. Snow accumulation studies indicate a rate varying from 50 to 70 g/cm^2/yr in coastal and some shelf areas to 5 to 15 g/cm^2/yr on the plateau. The thickness of the snow-firn layer is 10 to 20 m at the coast, 100 m at Pionerskaya Station, and 150 m in the interior. The time required for snow to transform into ice is calculated. Studies of East Antarctic bedrock relief reveal extensive depressions 1500 m below sea level and a 2500-km-long mountain system which rises in some areas to 3000 m above sea level. From temperatures at the 20 to 25-m level in boreholes, the mean annual temperatures of the surface air layer at Vostok Station, the Pole of Inaccessibility, and the highest point of the plateau are determined to be -57.0°, -57.2°, and -59.2°C, respectively. The rate of movement of the ice sheet edge is 100 to 200 m/yr, while that of large outlet glaciers is 1000 to 1200 m/yr, -- DAS

SIP 25474 551.338:551.324.24(*7)

Grosval'd, M. G.
A NEW GLACIAL HYPOTHESIS. A. T. WILSON: THE GREAT ANTARCTIC ICE SHELF AND ANCIENT GLACIATION OF THE EARTH. (Novaîa lednikovaîa gipoteza. A. T. Uilson: Velikiĭ shel'fovyĭ lednik Antarktidy i drevnie oledeneniîa Zemli; Text in Russian). Akad. nauk SSSR. Inst. geogr., Mater. glîatsiol. issled. Khronika, obsuzhdeniîa, No. 12:315-318 incl. map, 1966, 5 refs.
DLC, QE575.A43

The Antarctic ice shelf theory of Pleistocene glaciations proposed by A. T. Wilson (See SIP 21931) is summarized, and critical comments are added. The strong point of the theory is its use of modern geographical and geophysical data. Very recent mass balance calculations, however, cast doubt on the basic premise, which involves mass increase of the Antarctic ice cap at present and during interglacial periods in general. Recent observations indicate much higher rates of ice movement and iceberg calving in marginal regions than those utilized in earlier mass balance calculations. Wilson's hypothesis still deserves attention because of its emphasis on the interaction of natural processes accompanying glaciation and the possibility of their autoregulation. -- DAS

SIP 25475 551.345:552.52:548.212:536.62

Anderson, Duwayne M.
PHASE COMPOSITION OF FROZEN MONTMORILLONITE-WATER MIXTURES FROM HEAT CAPACITY MEASUREMENTS. Res. Rept. 218, U.S. Army Cold Regions Research and Engineering Laboratory, 14p. incl. tables, graphs, diagr., May 1967. 15 refs.
CRREL files

Equations are presented which form the basis of a method for determining the unfrozen water content of frozen clay-water mixtures from heat capacity measurements. The heat capacity of frozen sodium-montmorillonite water mixtures was determined at -4.7 and -9.6°C with a Calvet Microcalorimeter. The data were then used in conjunction with the method described to obtain the unfrozen water content of these clay water mixtures. The data obtained indicate that the method is applicable at temperatures below about -5°C. The amount of unfrozen water found in the frozen clay-water mixtures at -5 to -10°C is equivalent to an interfacial surface layer of water of from one to two molecular diameters in thickness. Most of this water can be accommodated and is thought to be located in interlamellar regions. (Author's abstract)

SIP 25476 620.179.1.05:666.97

Ashworth, R.
APPARATUS FOR LABORATORY FREEZING-AND-THAWING TESTS ON CONCRETE SPECIMENS. Mag. Concrete Res., 19(58):45-48 incl. illus., graphs, diagrs., March 1967. 7 refs.
DLC, TA680.M27

The article describes an inexpensive and easily operated refrigeration cabinet which may be used in the smaller research laboratory to carry out freezing-and-thawing tests on concrete specimens in accordance with the former ASTM test C 292-63T. The performance of the apparatus is discussed and time-temperature curves for the 48 hr cycle of freezing and thawing are given, together with typical test results after 25 cycles. (Author's abstract)

SIP 25477 629.124.752:621.43(*50)

Ovsiannikov, M. K.
SOME RESULTS OF TESTS OF THE MAIN ENGINES OF THE ICEBREAKER "MOSKVA." (Nekotorye rezultaty ispytaniîa glavnykh dvigateleĭ ledokola "Moskva"; Text in Russian). Sudovstroenie, 28(6): 45-46 incl. graphs, June 1962.
DLC, VM4.S8

The "Moskva" has eight 3250 hp diesel engines, 4

each in separate compartments, turning the GM 434/80-80 generators to produce power for 3 electrical screws. The power is distributed among the shafts in the ratio 1:2:1, and with varying switching arrangements of the diesel generators, necessary power can be obtained in different combinations up to a 100% capacity. The Woodworth constant speed electro-mechanical hydraulic regulators enable engine operation at 3 rates: 330, 300, and 260 rpm. Load tests were carried out at the 3 operating rates. The power of each diesel engine was determined. Fuel consumption was determined at different speeds for 4 loadings at 25, 50, 75 and 100% of nominal load. Graphs show the amount of power and hourly fuel consumption relative to the vessel speed in open water and to various engine speeds. An analysis shows that 330 rpm is the optimum rate to develop main engine power beyond 21,000 hp. When working with less power, 300 rpm is more economical, and reduces piston wear. Operation at 260 rpm is not effective because scavenging and combustion deteriorate which results in increased scale formation. Smooth functioning and control of diesel fuel flow by maintaining constant pressure of the scavenging air is described and related to exhaust gas analysis. -- VDP/FMM

SIP 25478 629.124.752:621.43(*50)

Ovsiannikov, M. K.
ABOUT THE SELECTION OF THE INJECTION PUMPS OF THE MAIN DIESEL-ENGINES FOR ICEBREAKERS WITH ELECTRIC POWER TRANSMISSION TO SCREW PROPELLORS. (O vybore toplivnykh nasosov glavnykh dizeleĭ dlia ledokolov s elektroperedacheĭ na grebnye vinty; Text in Russian). Sudostroenie, 28(11):33-35 incl. table, graphs, Nov. 1962.
DLC, VM4.S8

Icebreaker operation requires that the power generators provide constant engine speed despite frequent and sharply changing shaft torsion moments. The required engine speed reaction to load variations is insured by a constant speed governor which varies fuel injection pump rate. The control of fuel injected into the cylinders is accomplished in 3 ways: by modifying 1) starting or 2) closing time of injection into the cylinder or 3) modifying both. Opinion is that the second way is the best for diesel engines driving electric generators; the third way is possible. The first way is not recommended, but may be desirable in other cases. The main technical characteristics of the diesel engines on the "Moskva" are tabulated. Curves of the engine performance at varying loads and speed are provided. -- VDP/FMM

SIP 25479 629.124.752:629.12.014.6(*50)

Bublĭakin, A. A.
DETERMINATION OF THE DIAMETER OF THE RUDDERSTOCK OF ICEBREAKERS AND OF ICE NAVIGATING VESSELS. (Opredelenie diametra ballera rulia ledokolov i sudov ledovogo plavaniia; Text in Russian). Sudostroenie, 28(12):13-15 incl. tables, graphs, Dec. 1962.
DLC, VM4.S8

The experience of operating icebreakers and ice navigating vessels in Antarctica has proved that the rudder mechanism is often damaged. The most frequent and important kind of damage results from rudderstock torsion caused by ice force compression or stern ramming of the ice channel edge. The rudderstock for Class L ships of the Register of USSR (the Register of USSR lists the standard specifications for sea and river boats of the merchant marine; Class L (Class III of the Register) is the lowest class of ice navigating vessels), are subject to large residual torsion damage. The most successful rudder construction has come from ordinary castings with horizontal ribs. Mathematical formulae are proposed for the computation of the torsion moment for the rudderstock under ice compression. A formula is proposed for determining a conventional value (k) for measuring relative rudderstock strength taking into consideration the material, dimensions, and the Register standards (N). Tables provide the value k for the rudderstock of 1) a series of icebreakers and ice navigating vessels cited by name, and 2) for vessels of Class UL (Class I and II) classified according to value N. A mathematical formula, which includes factors k and N, is proposed for computing the rudderstock diameter. -- VDP

SIP 25480 536.21:624.139:625.7

Kritz, Mark A. and Alfred E. Wechsler
SURFACE CHARACTERISTICS-EFFECT ON THERMAL REGIME, PHASE II. Tech. Rept. 189, U.S. Army Cold Regions Research and Engineering Laboratory, 44p. incl. tables, June 1967.
CRREL files

Various methods were investigated for improvement of the structural stability of roadways, airstrips, and other similar structures through the use of passive thermal control techniques. The principle methods considered were: (1) control of the thermal absorption and radiation properties of construction materials and surface coatings, (2) control of the bulk thermal properties of construction materials, and (3) integration of insulating materials into the designs of structures to minimize the effects of adverse heat flow conditions. A survey and evaluation

of commercially available thermal control materials was made, and the most promising materials were selected for further laboratory and field investigation. Sixteen white paint samples were also obtained for laboratory and field study. Most of the paints tested were alkyd resins. A 2.5 lb/ft^3 extruded polystyrene foam appeared to be the most practical of the present commercially available insulations; others show promise of future usefulness. High-quality alkyd resin white traffic paints were most satisfactory for use as passive thermal control coatings. -- BLE

SIP 25481 625.89:551.324(*38)

Davis, Robert
APPROACH ROADS, GREENLAND 1960-1964. Tech. Rept. 133, U.S. Army Cold Regions Research and Engineering Laboratory, 46p. incl. illus., tables, graphs, diagrs., maps, June 1967. 5 refs.
CRREL files

Project 1, Approach Roads, Greenland R & D Program, was organized in 1954 to develop methods, techniques and criteria for constructing roads on both glacial ice surfaces and adjacent ice-free terrain. This report covers activities for the years 1960 through 1964, which consisted primarily of an annual assessment of the performance of the various roads and other structures on the ice cap. Emphasis is placed on climate; design, construction and performance of new construction; performance of past construction; ice surface movement; subsurface temperature measurements; and the use of snow fences to reduce ablation. -- BLE

SIP 25482 551.321.2:622.234.2:622.14

Aamot, Haldor W. C.
PENDULUM STEERING FOR THERMAL PROBES IN GLACIERS. Spec. Rept. 116, U.S. Army Cold Regions Research and Engineering Laboratory, 8p. incl. diagrs., July 1967.
CRREL files

Pendulum steering, a new concept of attitude stabilization for thermal probes or coring drills in ice, eliminates instability. The center of support is placed above the center of gravity. A lower and upper hot point produce melt penetration. The ratio of their power levels is the basis for stabilization, which is provided by the automatic control of the heater in the upper hot point. This feature makes possible a single thermal probe design that is suitable for all ice cap temperatures and a wide range of penetration rates (i.e., applied power levels). The simplicity of a thermal probe with pendulum steering suggests availability at modest cost and versatility as a widely applicable tool. -- BLE

SIP 25483 551.32:001.4(038)

Armstrong, Terence, Brian Roberts and Charles Swithinbank
ILLUSTRATED GLOSSARY OF SNOW AND ICE. Cambridge, Scott Polar Research Institute, 1966, 60p. + 20 plates, 29 refs. (Scott Polar Res. Inst. Spec. Publ. No. 4)
DLC, GB24405.A67

The body of this glossary consists of definitions of about 150 terms and the equivalents of these terms in Danish, Finnish, French, German, Icelandic, Norwegian, Russian, and Spanish. The section of photographs illustrating the terms is followed by a section of foreign language indexes. -- DMN

SIP 25484 551.324.63(*58)

Ritchie, William
NOTE ON THE RETREAT OF REINTINDBRE GLACIER (FROSTISEN). Norsk Geogr. Tidsskr., 21(2):143-144 incl. diagr., 1967. 1 ref.
DLC, G1.N6

The results are presented of a study of the Reintindbre Glacier in July 1963 by a party of geography students of Glasgow University. The survey revealed that in the 29-yr interval since 1934 the ice front retreated 371.3 m (12.8 m/annum) compared with 450.7 m in the 28-yr interval 1906-1934 (16.1 m/annum). -- BLE

SIP 25485 5.001.5(*7)

Silkin, B. I.
CONTINENT OF RIDDLES. (Kontinent zagadok; Text in Russian). Novoe v zhizni, nauke, tekhnike, Ser. 12: Geologiâ i geografiâ, No. 14, 32p. incl. illus., map, 1963. 22 refs.
DLC, G1.N64

A general review is presented of the history of Antarctic discovery and scientific exploration. Climatic characteristics, nature of the ice sheet, hydrologic features of Antarctic waters, upper atmospheric phenomena, and data on flora and fauna are briefly summarized. -- DAS

SIP 25486 551.324

Ives, J. D.
GLACIERS. Can. Geogr. J., 74(4):110-117 incl. illus., diagr., maps, April 1967.
DLC, G1.C3

This paper is a pictorial introduction to the science of glaciology. General information is given on glacier movement and its effect on topography, mass balance, and physical properties of glaciers, and the Ice Ages. Areas included in the descriptions include Canada, Baffin Island, and the Antarctic and Greenland ice caps. -- BLE

SIP 25487 551.326.1:"1965"(*764)

U.S. Naval Oceanographic Office
REPORT OF THE ANTARCTIC ICE OBSERVING AND FORECASTING PROGRAM- 1965. Spec. Publ. 80(65), 26p. incl. illus., tables, maps, appendix A, Jan. 1967.
DLC, Tech. Rept. Collection

This report describes the ice program conducted by the Naval Oceanographic Office principally in support of Deep Freeze 66 Antarctic operations. Methods of data collection and dissemination, ice forecasting, and various allied ice projects are discussed. A summary of ice conditions in the Ross Sea and McMurdo Sound is given graphically for the period Oct. through Dec. 1965. Ice concentrations were near normal during the Deep Freeze 66 operation, but they were somewhat heavier than those experienced during Deep Freeze 65. Rapid disintegration of the ice during late Nov. resulted in nearly ice-free conditions in the Ross Sea by mid-Dec. Because of persistent northerly winds that prevented the ice from drifting northward into warmer waters, McMurdo Sound remained congested until mid-Jan. (Author's abstract modified)

SIP 25488 551.326.62:551.46.09(*3)

Mathieu, Guy
OCEANOGRAPHY FROM FLETCHER'S ICE ISLAND T-3. Geo-Marine Technology, 3(2):14-18 incl. illus., Feb. 1967. 3 refs.
DLC, GC1.G4

General information is given on the history, management, life and working facilities, and scientific research on Fletcher's Ice Island T-3. The island has been manned since 1952 for various periods of time and continuously since 1962. It is a 4-by-9 mi. kidney-shaped chunk of ice approximately 190 ft thick, which broke off most probably from the Ellesmere Island ice shelf. The island is run by the Arctic Research Laboratory (ARL) operated by the University of Alaska under contract with the Office of Naval Research. Last summer 24 people occupied the island, seven ARL support personnel and 17 from various scientific institutions, as follows: University of Washington (4), U.S. Weather Bureau (4), McGill University (2), U.S. Geological Survey (1), General Motors Defense Research Lab. (2), University of Southern California (1), and Lamont Geological Observatory (3). -- BLE

SIP 25489 693.547.3:624.142

Bonzel, Justus
CONCRETE WITH HIGH RESISTANCE TO FROST AND DE-ICING SALTS. (Beton mit hohem Frost- und Tausalzwiderstand; Text in German). Beton, 15(11):469-474, Nov. 1965 and 15(12):509-515, Dec. 1965 incl. illus., tables, graphs. 38 refs. + 71 refs.
DLC, TA680.B36

The paper discusses the mechanics of damage to concrete roads and sidewalks as a result of frost action and de-icing salts. Particular emphasis is placed on aggregate type and the influence of air pores on frost and salt resistance. The composition of an ideal young concrete with a high resistance to frost is described, and data are given on the results of investigations. Continuation of the paper discusses the manufacture of high frost resistant concretes with emphasis on various types of cement and aggregates. Standard mixtures are given for concrete blocks for streets and sidewalks, and testing processes for determining freeze-thaw durability are described. It is concluded that best resistance will be obtained if the aggregate is free from clayey and micaceous particles, and if the water-cement ratio, air pore content, and particle size are kept within a prescribed range. Very young concrete can be made completely resistant to salt damage by saturating it with diluted linseed oil or with epoxy resin solutions. -- BLE

SIP 25490 551.33:551.324.435(*428+*429)

Østrem, Gunnar
THE HEIGHT OF THE GLACIATION LIMIT IN SOUTHERN BRITISH COLUMBIA AND ALBERTA. Geografiska Annaler, 48A(3):126-138 incl. illus., graph, maps, 1966. 31 refs.
DLC, G25.G4

A number of methods for determining the climatic snowline are described. The firn line on glaciers will normally lie slightly lower than the climatic snowline; however, most previous methods for its determination are connected with observations on glaciers. From a study of the distribution of glaciers and the altitudes of surrounding mountain summits, it is possible to determine a critical height (the "glaciation limit") which has normally to be exceeded if glaciers should form. This height is about 100 m above the climatic snowline. The glaci-

ation limit was determined on a large number of topographic maps, the results plotted on a small-scale map, and contour lines were drawn showing its regional variation in southern British Columbia and Alberta. The source material and possible errors in the determinations are discussed. A comparison is made with different maps showing precipitation, continentality, land surface elevation, and the 1961 firn line altitude on glaciers. It is concluded that the height of the glaciation limit is inversely connected with the precipitation distribution. (Author's abstract)

SIP 25491 551.322:539.171.12

Kim, Dong-Yun and V. Hugo Schmidt
SEMICLASSICAL THEORY OF PROTON TRANSPORT IN ICE. Can. J. Phys., 45(4):1507-1516, April 1967. 15 refs.
DLC, QC1.N332

A method is described for calculating proton or other ion mobility which is applicable if mobility is limited by lattice scattering rather than by barrier jumping. The Boltzmann transport equation is used, with the collision term calculated from the electrostatic interactions between the mobile ion and the vibrating lattice. In particular, the proton mobility in ice is calculated. The lattice vibrations are approximated by a Debye spectrum for translational vibrations of water molecules, plus an Einstein spectrum for modes in which protons vibrate almost as independent particles. Scattering by phonons somewhat below the Debye cutoff frequency is of the greatest importance in determining the mobility, and the proton modes have negligible effect. The calculated mobility agrees reasonably well with the experimental value. (Authors' abstract)

SIP 25492 624.144.53/.55(79)

Dugovich, William
YEAR-ROUND PREPARATION KEEPS WASHINGTON READY WHEN SNOW COMES. Better Roads, 37(7):22-24 incl. illus., July 1967.
DLC, TE1.B27

The Department of Highways in Washington State spends its summer months repairing and cleaning its snow removal equipment. The current statewide inventory lists 37 rotary snowplows, 120 hopper sanders, 14 salt spreaders, 318 tailgate sanders, 570 moldboard plows, 14 V-plows, and 34 wings. Equipment overhaul is the major part of winter preparation during summer months. Sand and salt are ordered, received and hauled to a host of storage depots around the state. Perhaps the most unusual bit of winter preparation is the hauling and storage of 105-mm ammunition for use with recoilless rifles and crew furnished by the Washington National Guard for avalanche control. For the past 2 yr a telephone weather information service has been provided for motorists. -- BLE

SIP 25493 624.144.53:654.16(74)

Lennon, Joseph T.
FIGHTING SNOW IN URBAN AREAS REQUIRES GOOD COMMUNICATIONS. Better Roads, 37(7):25-27 incl. diagr., July 1967.
DLC, TE1.B27

Experience in New York City has shown that a central communications network is indispensable in a snow and ice control organization. The variance of local snow situations demand timely information and progress reports of weather forecasts and direct reports from various scenes of actual operations. Only with such information can personnel, equipment, and material be used efficiently. In the past several years, New York City's communication facilities have been expanded to include a two-way radio system of nearly 140 units installed in vehicles of field supervisors, which give almost instantaneous contact with the heads of the 57 sanitation districts into which the city is divided. Plans are made to expand the radio system by installing two-way sets in some of the operational vehicles. The present system of teletype communications has been in use for more than 25 years. It does not provide over-all two-way communications but it has served well. Telephones will always be a basic component of the system, especially for confidential conversations and unavoidably lengthy exchanges of ideas. The main shortcomings of the radio network lies with the people who use it. -- BLE

SIP 25494 624.144.9

Mueller, Don R.
HOW TO CHOOSE THE RIGHT SPREADER. Better Roads, 37(7):33-35 incl. illus., July 1967.
DLC, TE1.B27

Spreading equipment for ice control work can be divided into two categories: tailgate type and hopper type. Tailgate spreaders are less expensive to maintain and can be mounted on smaller more maneuverable trucks. The most common power sources and control means available for tailgate spreaders are: (1) chain drive from rear wheel of truck, (2) straight hydraulic drive, and (3) variable control hydraulic drive. Most tailgate spreaders are classified as the tailgate-replacement or the under-the-tailgate type. Hopper spreaders usually have a greater capacity than tailgate spreaders and larger trucks can be used. They can be used in low clear-

ance areas and the spreading disc remains about the same height from the pavement throughout the spreading operation. Hopper spreaders are designed with variations in width and slope, variations in conveyors, and variation in drives. Usually the hydraulic pump that drives a spreader is large enough to handle any other hydraulically controlled device which may be mounted on a truck. By planning ahead, one can buy a truck that will receive a power take-off and pump and then buy the other hydraulic accessories, less their pumps. -- BLE

SIP 25495 624.144.55

THE CASE FOR RUBBER SNOWPLOW BLADES. Better Roads, 37(7):35, incl. illus., July 1967.
DLC, TE1.B27

A rubber snowplow blade that underwent two winters of testing in Canada has been introduced by Goodyear Tire and Rubber Co. In one test, the rubber blade was worn only 2 in. along its entire length after removing snow from 3500 miles of highways. The blade can be turned over so that a new plowing edge is available when one side wears. It flexes during plowing and its entire bottom edge is in contact with the surface to be plowed. The blade passes over or bounces off obstacles such as frozen ruts, stones, and manhole covers. Two city street departments have experienced very good results with the blades. Directions are given for mounting the rubber blades. -- BLE

SIP 25496 551.326.7:778.35:621.396.96

Bradie, Richard A.
SLAR IMAGERY FOR SEA ICE STUDIES. Photogramm. Eng., 33(7):763-766 incl. illus., July 1967. 6 refs.
DLC, TA593.A2P5

The process of obtaining aerial photographic coverage of Arctic regions has been hampered by inclement weather, cost, and amounts of imagery necessary for adequate coverage. Recent studies utilizing Side-Looking Airborne Radar (SLAR) imagery have illustrated its value for collecting imagery during day or night, during periods of bad weather, and covering large amounts of land and water masses on relatively small amounts of film. The value of timely and continuous ice observations is evident for military and commercial applications. A brief historical background to the ice-observation program includes a comparison of radar versus conventional imagery acquisition and graphic examples of ice interpretation from radar flights. Key sea ice features commonly associated with the physical process of formation, growth, drift, deformation, and disintegration are readily identified by SLAR. (Author's abstract, modified)

SIP 25497 [551.322:539.13]:536.48

Kamb, Barclay, Anand Prakash, and Carolyn Knobler
STRUCTURE OF ICE V. Acta Crystallogr., 22(Pt. 5):706-715 incl. tables, diagr., May 10, 1967.
DLC, QD801.I523

Ice V, the high pressure ice phase stable at pressures of about 3 to 6 kbar, density 1.23 gm/cm^3, has a structure involving 28 H_2O molecules in a monoclinic cell. The structure is a single tetrahedral framework, rather than a "self clathrate" as occurs in the denser forms ice VI and VII. Each oxygen atom is hydrogen bonded to 4 near neighbors at distances of 2.76-2.87 Å, and the shortest next-nearest neighbor distance is 3.28 Å. Distortion from ideal tetrahedral coordination is rather large, bond angles (at oxygen) ranging from 84 to 128°, with an rms deviation of 18° from 109.5°. There is no indication of bifurcated hydrogen bonds. Proton ordering is not possible in the space group A2/a indicated for the oxygen atoms. A proton-ordered structure is possible in space group Aa, but is considered unlikely on the basis of comparison with X-ray evidence for proton order in ice II. For the ice V structure to remain proton disordered on quenching to 120°K (the experimental conditions), the ordering energy must be less than 0.14 kcal/mole. (Authors' abstract, modified)

SIP 25498 551.543.2(*7)

Schwerdtfeger, W.
ANNUAL AND SEMI-ANNUAL CHANGES OF ATMOSPHERIC MASS OVER ANTARCTICA. J. Geophys. Res., 72(14):3543-3547 incl. table, graphs, July 15, 1967. 12 refs.
DLC, QC811.J6

The annual march of atmospheric pressure at the surface is analyzed for 15 Antarctic stations. For a combined series, weighted so that it represents pressure changes over the whole continent, the first and second harmonics are significant. The most pronounced rise, of almost 13 mb, occurs between the end of Sept. and the middle of Jan., concomitant with the partial filling of the southern circumpolar vortex. This rise corresponds to an increase of about 2×10^{18} g in atmospheric mass over the continent. Variations of such magnitude can affect

meridional mass-exchange in high southern latitudes and sea-level changes in Antarctic waters; they also slightly affect the moment of inertia of the Earth. (Author's abstract, modified)

SIP 25499 551.326.7:551.463.2:534.2(*413)

Payne, F. A.
FURTHER MEASUREMENTS ON THE EFFECT OF ICE COVER ON SHALLOW-WATER AMBIENT SEA NOISE. J. Acoust. Soc. Amer., 41(5):1374-1376 incl. graphs, May 1967. 6 refs.
DLC, QC221.A4

The results are presented of shallow-water ambient-noise measurements made during the 1963-64 winter under open water and ice cover conditions at Prince Edward Island. Through the use of improved equipment, measurements were made that covered a greater range in frequency (3-3200 cps) and noise levels than previously reported for this area. The results have generally corroborated those obtained in 1961-62. The 1963-64 measurements have extended the spectra toward lower frequencies, where both the open-water and under-ice spectra exhibit interesting features. It appears that there may be more than one source of ambient noise contributing to the low-frequency levels. While no data have been gathered to establish the existence of second-order pressure variations in the present investigation, they cannot be ignored as a possible source of low-frequency ambient noise. Some support for the hypothesis that turbulent pressure fluctuations are the source of the low-frequency noise is suggested by the lowest spectrum level curve below 20 cps in the under-ice spectrum. The relationship of wind speed to shallow-water ambient noise has not yet been clarified. -- BLE

SIP 25500 910.4(*76)

Quartermain, L. B.
SOUTH TO THE POLE: THE EARLY HISTORY OF THE ROSS SEA SECTOR, ANTARCTICA. London, Oxford University Press, 1967, 481p. incl. illus., maps. Refs.
DLC, G870.Q33

Extracts from diaries are chosen to show the old explorers approach to tasks and to the environment. Exploration is documented and pioneer work in the sector is reconstructed. The deepest penetration of the sector was made between 1837 and 1917 by British explorers. The first journeys over the Antarctic plateau were made and the South Pole reached. From the close of this era, the course of events to 1930 are very briefly summarized. -- FMM

SIP 25501 551.321.6:537.311(*38+*765)

Hochstein, M.
ELECTRICAL RESISTIVITY MEASUREMENTS ON ICE SHEETS. J. Glaciol., 6(47):623-633 incl. tables, graphs, June 1967. 15 refs.
DLC, GB2401.J68

Several D.C. electrical resistivity measurements have been made on the Greenland Ice Sheet and on Roosevelt I. and the Ross Ice Shelf in Antarctica. These measurements were made in order to study the variation of the specific resistivity with depth and to investigate the existence of low resistivity layers at the bottom of the ice sheet. The results show that the electrical resistivity of firn and ice of ice sheets is a function of the "base" resistivity, the contact resistance between the grains, and the temperature. At greater depths, temperature is the predominant influence, and observed resistivity curves can be explained by temperature variations that agree in part with the theories of heat conduction in ice sheets. (Author's abstract, modified)

SIP 25502 551.321.6:537.311(*464.6)

Vögtli, Kurt
D.C. RESISTIVITY SOUNDINGS ON DEVON ISLAND, N.W.T., CANADA. J. Glaciol., 6(47):635-642 incl. table, graphs, map, June 1967. 3 refs.
DLC, GB2401.J68

Ice thickness and resistivity of an Arctic glacier have been investigated systematically by the geoelectrical method. Further measurements were carried out on the ice cap. Favorable conditions for soundings were encountered, since the ice masses proved to be generally homogeneous, and there was a sufficient difference between the resistivities of ice and bedrock, while the surface layer differed only very little from the ice mass. A higher resistivity was found for bedrock than for the ice. (Author's abstract)

SIP 25503 551.321.6:537.311

Østrem, Gunnar
LABORATORY MEASUREMENTS OF THE RESISTIVITY OF ICE. J. Glaciol., 6(47):643-650 incl. illus., graphs, June 1967. 9 refs.
DLC, GB2401.J68

An attempt has been made to measure the D.C. resistivity of ice directly by placing plane-parallel samples between two electrodes with guard rings. Very strong polarization effects were observed which were most pronounced in ice from an ice-cored moraine, lesser in glacier ice, and least in artificially frozen ice. The electric resistivity of ice varies with time when current is flowing through

the ice. The resistivity drops during the first few minutes, then it rises again and will reach its first observed value within 30 to 60 min. It is possible that free ions in the interstices between ice crystals are responsible for this effect, as the amplitude of the variation is less at lower temperatures. Variations in the electrical resistivity of ice samples seem to depend on the direction of the current. -- BLE

SIP 25504 551.322:548.5:536.4.031

Pruppacher, H. R.
GROWTH MODES OF ICE CRYSTALS IN SUPERCOOLED WATER AND AQUEOUS SOLUTIONS. J. Glaciol., 6(47):651-662 incl. illus., graphs, diagr., June 1967. 17 refs.
DLC, GB2401.J68

The growth modes of ice crystals in supercooled water and various aqueous solutions were studied at different supercoolings by a motion picture technique. In pure water contained in plastic capillary tubes, ice dendrites formed which at supercoolings between 1 and 4°C grew parallel to the tube axis. At supercoolings larger than 4°C, the direction of growth was inclined to the tube axis such that the dendrites hit the tube wall and afterwards proceeded growing in a new direction. As a result it appeared that the ice crystals grew in a zig zag or screw fashion. This growth mode became enhanced when the supercooling was increased or salts were dissolved in the water. In large water drops, ice dendrites formed which at supercoolings smaller than 1°C were co-planar with the seed crystal and between 1° and 5°C split into 2 dendritic segments. At supercoolings larger than 5°C, multiple splitting of the seed crystal was observed and this became strongly enhanced when salts were dissolved in the water. Tentative explanations for these results are given. (Author's abstract)

SIP 25505 551.322:551.463:548.5

Rohatgi, P. K., and C. M. Adams, Jr.
ICE-BRINE DENDRITIC AGGREGATE FORMED ON FREEZING OF AQUEOUS SOLUTIONS. J. Glaciol., 6(47):663-679 incl. illus., graphs, diagrs., June 1967. 13 refs.
DLC, GB2401.J68

Dendritic aggregates of ice and brine formed on freezing of aqueous solutions have been studied. Chlorides of sodium, potassium, lithium, and hydrogen were used as solutes, and the structures produced on freezing of binary, ternary, and quaternary solutions were examined. Effects of freezing rate, solute concentration, solute diffusivity, mixing of solutions, and magnetic fields are reported. The spacing between ice platelets or dendrites was found to be proportional to the square root of the freezing time when the freezing rate was constant from beginning to end of solidification. During unidirectional freezing from a constant temperature chill, the solution at each location is subjected to a spectrum of freezing rates; dendrite spacing increases linearly with distance from the chill surface and it is inversely proportional to the square root of the maximum freezing rate. In binary solutions, dendrite spacing increases linearly with solute concentration; above a critical solute concentration, ice platelets develop side branches. At a given solute concentration, spacing between ice dendrites increases linearly with solute diffusivity. In ternary and quaternary solutions, dendrite spacing is a function of the concentration and diffusivities of each of the constituent solutes. (Authors' abstract)

SIP 25506 551.343.74:624.131

Palmer, Andrew C.
ICE LENSING, THERMAL DIFFUSION AND WATER MIGRATION IN FREEZING SOIL. J. Glaciol., 6(47):681-694 incl. illus., graphs, diagr., June 1967. 18 refs.
DLC, GB2401.J68

When a surface layer of the soil freezes, both heat and water diffuse from the unfrozen soil beneath to the frozen region. Often the soil does not freeze homogeneously but distinct ice lenses form. An analysis of the diffusion and ice nucleation processes suggests conditions under which ice lensing can be expected; in particular, it is shown that multiple ice lenses cannot form unless the soil thermal diffusivity is greater than the water diffusion coefficient. Analysis of a simple one-dimensional case (a semi-infinite mass of homogeneous soil whose surface temperature is suddenly lowered) gives the temperature and water-content fields as functions of time; these agree with those observed in an experimental study of freezing clay. (Author's abstract)

SIP 25507 551.324.51

Nye, J. F.
PLASTICITY SOLUTION FOR A GLACIER SNOUT. J. Glaciol., 6(47):695-713 incl. table, graphs, diagrs., appendixes A-C, June 1967. 9 refs.
DLC, GB2401.J68

The flow near the end of a glacier in a steady state is investigated by using a theoretical model: a plastic rigid material with a constant flow stress resting on a rough horizontal bed. Starting from an appropriately chosen slip-line far from the end, the slip line field is constructed numerically and continued to the end of the glacier. The field rapidly settles down to a form independent of the precise starting conditions. In the region of small surface slope it agrees with the approximate analytical solution reported earlier. To avoid a breakdown in the method it is found necessary to modify the bed by a

trivial amount over the final 3 m. In practice the ice can lose contact with the bed very near the end, and the effect of this on the solution is discussed. The velocity field is computed for a uniform ablation rate. Other distributions of ablation rate could be accomodated, but there appears to be a critical gradient of ablation rate beyond which the slip line field falls. (Author's abstract)

SIP 25508 551.324.63:551.332.56(*38)

Gribbon, P. W. F.
GLACIOLOGICAL NOTES FROM SUKKERTOPPEN, WEST GREENLAND. J. Glaciol., 6(47):752-753 incl. table, June 1967. 3 refs.
DLC, GB2401.J68

The retreat of a glacier front at Sukkertoppen, West Greenland, has been related by lichen size measurements to the lowering of the snow level in the accumulation region of the glacier. The altitudes of two Quaternary marine shell beds near Sukkertoppen have been measured and the shell fauna contained in them has been identified. The behavior of two adjacent ice dammed lakes is also discussed. (Author's abstract)

SIP 25509 551.322:536.421.4:548.54

Krausz, A. S., B. Harron, and G. G. Litvan
TUBULAR ICE CRYSTALS. Nature, 215(5098):271-273 incl. illus., diagr., July 15, 1967. 8 refs.
DLC, Q1.N2

A simple method is described for growing hollow ice tubes or needles of controlled size for physical testing. Some of the crystallographic characteristics are reported, and evidence is presented which supports and extends Dorsey's mechanism. Dorsey assumed that needle growth occurred when, because of an increase in volume during solidification, water in an open container is forced through an opening in the ice surface. He suggested also that a tube formed through which water flowed and which "grew" at the tip. The apparatus used in the present experiment consisted of a cell, a cold trap, and a rotary vacuum pump. Crystallographic orientation was determined in polarized light and with an etch pit technique. Microscope observation showed that the tube wall was clear, but the frozen core occasionally contained small bubbles of air or vapor. Visual observation was made of the formation of the ice cover, water flow through the tube, and growth at the tip. It is pointed out that in practice the process is made feasible only by the high surface tension of water and the apparently low polarity of the ice surface which prevents overflow. It is concluded that tubes from substances other than water could be grown if an experimental technique could be devised to create suitable conditions. -- BLE

SIP 25510 546.21:532.62:551.322

Knight, Charles A.
SPIRAL AIR BUBBLES IN ICE. Nature, 214(95): 1324-1325 incl. illus., diagr., June 24, 1967. 4 refs.
DLC, Q1.N2

Air bubbles and brine inclusions in intercrystal boundaries in ice polycrystals are illustrated and discussed which were grown slowly from a 0.1% solution of NaCl. Direct observation of the formation of the spiral air bubbles is difficult, but from a few observations of the formation of less perfect spirals, their origin appears to be as follows. First, an air bubble nucleates within an integranular brine film. As the bubble grows it tends to become surrounded by ice-ice contact, i.e., the brine film "shrinks" away from it, cutting off its air supply. When the rates of growth of the air bubble and the ice-ice contact have just the right ratio, the spiral bubbles form. After growth, no brine is in contact with the spiral bubbles. The spiral shape can not have any relation to dislocations and, even though they form in thin films rather than on free surfaces, the principles of their formation may apply to the spirals on metals. Many if not all of the patterns expected from pairs of screw dislocations are expected from this mechanism also, though the spiral air bubbles are so infrequent in ice that no interacting spirals have been found. In the etching of crystal surfaces, spirals of this sort may form by precipitation of a new phase at the edge of an adsorbed surface layer which is either forming radially or breaking up radially. -- BLE

SIP 25511 551.322:548.54

Yosida, Zyungo
SURFACE STRUCTURE OF ICE CRYSTALS. I. STRUCTURE OF BASAL SURFACE AND THE EQUILIBRIUM OF ICE CRYSTALS. (Kōri no kesshō no hyōmen kōzō I: Kesshō teimen kōzō, kōri no kesshō heikōkei; Text in Japanese with English summary). Teion-kagaku (Low Temp. Sci.), Ser. A, 24:1-18 incl. graphs, diagrs., 1966. 9 refs.
DLC, Orientalia Div.

A mathematical theory is developed to show that the equilibrium form of an ice crystal is not polyhedral but round, based on the surface-energy theory and related to the numerous widely varying states of the crests and depressions comprising the rough surface structure of ice crystals. -- BLE

SIP 25512 [551.322:548.7]:536.75

Suzuki, Yosio
PAULING ENTROPY OF A FINITE ICE CRYSTAL. (Yūgen no kōri no Pauling entropī; Text in Japanese with English summary). Teion-kagaku (Low Temp. Sci.), Ser. A, 24:19-39 incl. diagrs., 1966. 7 refs.
DLC, Orientalia Div.

The Pauling entropy of a finite ice crystal is defined and computed in order to investigate the effect of the crystal surface. The surface effect must be considered because (1) it may not be neglected for a small crystal, (2) the entropy per molecule would tend to zero for a large crystal if the effect were long range, and (3) of the correctness of the assumption itself. If the effect is short range, an independent concept of surface Pauling entropy may be defined. -- BLE

SIP 25513 551.322:548.54

Suzuki, Yosio
A METHOD OF EVALUATING PAULING ENTROPY OF TWO-DIMENSIONAL ICE. (Seihōkōshi mokei no kōri no Pauling entropī no keisanhō; Text in Japanese with English summary). Teion-kagaku (Low Temp. Sci.), Ser. A, 24:41-56 incl. diagrs., 1966.
DLC, Orientalia Div.

A method of evaluating the number of acceptable arrangements of hydrogen atoms in a two-dimensional finite ice crystal is developed. The essential point of the method is to classify the arrangements into subsets according to the states of a set of appropriately chosen proton positions and to find a recurrence formula for the sizes of the subsets. The method is general in principle, although practical applications are limited to simply structured crystals consisting of a few rectangles. (From author's summary)

SIP 25514 551.322:548.2:551.321.1

Kuroiwa, Daisuke
ON ETCHING OF SNOW CRYSTALS. (Yuki no kesshō no fushoku; Text in Japanese with English summary). Teion-kagaku (Low Temp. Sci.), Ser. A, 24:57-80 incl. illus., diagrs., 1966. 5 refs.
DLC, Orientalia Div.

Chemical etching was applied to natural snow crystals to observe surface structures. When a fresh surface of a snow crystal was etched, typical hexagonal pyramidal etch pits (dislocation etch pits) and etch channels were observed. Surface density of the etch pits was found to be different for every crystal. The results suggest that aerosol particles are captured by a developing snow crystal, producing dislocations. An ice crystal containing PbI_2 particles was etched to demonstrate the etch pit formation by entrapped foreign particles. In the course of etching snow crystals, two interesting etch patterns were observed. Patterns of frozen clouds droplets showed a different orientation (30° in angle) from that of the base crystal. A fine step-like structure, produced on a snow crystal surface placed on the surface of the viscous etchant, was produced by the surface migration of the film of the etchant. The formation of both patterns was caused by the etching processes. (Author's summary, modified)

SIP 25515 551.578.41:548.54

Maeno, Norikazu and Daisuke Kuroiwa
GAS ENCLOSURES IN SNOW CRYSTALS. (Yuki no kesshō no naka no kihō; Text in Japanese with English summary). Teion-kagaku (Low Temp. Sci.), Ser. A, 24:81-89 incl. illus., 1966. 5 refs.
DLC, Orientalia Div.

The existence of gas enclosures in natural snow crystals was proved by (1) replicating their surface structures, (2) allowing them to sublime in an atmosphere almost saturated with water vapor, and (3) melting them in kerosene. Several interesting phenomena were observed. The gas enclosures are usually oriented in <1120> directions. Some of the long and hairlike gas enclosures split into spheres in an isothermal condition and vanished after twenty days or so. When a thermal gradient was applied to a snow crystal by heterogeneous sublimation, the gas enclosures were modified in shape showing crystal faces on their warmer sides and rounded faces on their colder sides. This phenomenon is similar to that of vapor figures produced by internal melting in ice. (Author's summary, modified)

SIP 25516 551.322:536.421.4

Maeno, Norikazu
AIR BUBBLES IN ICE, NUCLEATED AND TRAPPED AT AN ICE-WATER INTERFACE. (Suihyō kaimen ni okeru kihō no hassei to hosoku; Text in Japanese with English summary). Teion-kagaku (Low Temp. Sci.), Ser. A, 24:91-109 incl. illus., graphs, diagrs., 1966. 13 refs.
DLC, Orientalia Div.

The formation of air bubbles at an ice-water interface was observed with a microscope. Air bubbles were nucleated along a scratch made by a fine glass rod on the ice surface and also on surfaces of foreign solid particles placed on the ice-water interface. The nucleation abilities were investigated using various substances such as carborundum particles, glass or metallic beads, and droplets of mercury and water-insoluble organic liquids. While

air bubbles were formed on contaminated solid surfaces no air bubbles were produced on clean ones, on the smooth surfaces of organic liquids or on mercury. The shape of an air bubble trapped in ice is determined by rates of freezing and modes of diffusion of air molecules along the ice-water interface. When an air bubble formed between a carborundum particle and a developing ice surface, it was immediately captured by the ice surface. The carborundum particle, however, migrated upward with the advancing ice-water interface. (From author's summary)

SIP 25517 624.147

Mizuno, Yukiko and Daisuke Kuroiwa
COMPRESSION OF SNOW PARTICLES BY TAPPING. (Sekisetsu ryūshi no tappingu asshuku; Text in Japanese with English summary). Teion-kagaku (Low Temp. Sci.), Ser. A, 24:111-131 incl. illus., tables, graphs, diagrs., 1966. 2 refs.
DLC, Orientalia Div.

Snow particles were compressed by dropping their cylindrical container repeatedly from a height of 4 cm, and a correlation found between "strain of volume" and the number of drops. To apply greater compression, the containers were dropped from heights of 85 and 154 cm. The results indicate that when samples were dropped from 4 cm the final strain of volume was almost independent of the grain size of the snow. However, the velocity of compression of large-grain snow was found to be smaller than that of small-grain snow. Compression velocity increased in the order: granular > compacted > newly fallen snow. The internal structure of compacted snow by tapping was investigated by making a cross section or thin section of each sample and is discussed in connection with tapping processes. (From authors' summary)

SIP 25518 551.321.12:551.578.41

Nakamura, Tsutomu
THIN PLATE OF SNOW THINNED WITH HOT METAL PLATES. (Netsuban ni yoru sekisetsu usuita no sakusei; Text in Japanese with English summary). Teion-kagaku (Low Temp. Sci.), Ser. A, 24:133-137 incl. illus., diagr., 1966. 7 refs.
DLC, Orientalia Div.

The process and equipment are described for making thin sections for the observation of the structure and texture of deposited snow. A sample cut from a snow cover is made into a plate 2 cm thick and is placed on a glass plate which is in turn placed on a metal plate which has been heated on an oil stove or electrically. When the snow plate is thinned to about 1 cm by melting, it is covered with another glass plate and inverted so as to be melted on the other side. Immediately after the inversion, the glass plate on top is taken off. When the snow plate is thinned to about 2 mm, it is sandwiched between two polaroid plates and placed on a wooden table. The snow plate continues to melt because of the light source and, after a while, the single crystals composing the snow plates become distinguished from one another due to different colors which are caused by interference of polarized light. (Author's summary, modified)

SIP 25519 551.578.46:53:551.343

Oura, Hirobumi and Daiji Kobayashi
ON THE METHOD OF SIZE FREQUENCY DISTRIBUTION ANALYSIS OF ICE PARTICLES IN SNOW COVER. (Sekisetsu no ryūdo bumpu no motomekata ni tsuite; Text in Japanese with English summary). Teion-kagaku (Low Temp. Sci.), Ser. A, 24:139-157 incl. illus., tables, graphs, 1966. 2 refs.
DLC, Orientalia Div.

The paper reports how the size frequency distribution of ice particles in snow cover was obtained from microphotographs of a cross section of the snow cover and using an electronic computer to solve the integral equations representing the relation between size frequency distribution of undisturbed perfect grains and that of cross sectional areas of the grains appearing on the section. The snow sample was immersed in aniline at -5°C which contained suspended powders of ferric oxide (rouge), and it was solidified at about -25°C. Then it was cut and planed. The microphotographs of the cross section were obtained by the light reflected at the surface of the section which was illuminated vertically and obliquely. The photograph was magnified 14.6 times. (From authors' summary)

SIP 25520 551.578.46:53:631.47(52)

Kojima, Kenji and others
REPORT OF SNOW COVER OBSERVATIONS, SAPPORO, 1964-65. (Sapporo no heichi sekisetsu dammen sokutei shiryō hōkoku: Shōwa 39~40-nen tōki; Text in Japanese with English summary). Teion-kagaku (Low Temp. Sci.), Ser. A, 24:159-176 incl. illus., tables, graphs, 1966. 2 refs.
DLC, Orientalia Div.

Results are presented of observations of temperature, hardness, density, grain size, free water content, and total water equivalent, of snow cover during the snow season. The observations were made routinely at the same places from Dec. 15, 1964, to April 5, 1965. Data are also given on air temperature, and snow depth. Snow accumulation was much greater than it has been in several seasons. (From authors' summary)

SIP 25521 551.578.46:53:551.578.48(52)

Huzioka, Toshio and others
SNOW COVER OBSERVATION AT TESHIO DISTRICT. I. (1963-1964, 1964-1965). (Hokudai Teshio Chihō Enshūrin sanchi sekisetsu no yukishitsu chōsa hōkoku I: Shōwa 38~39-nen, 39~40-nen fuyu; Text in Japanese with English summary). Teion-kagaku (Low Temp. Sci.), Ser. A, 24:177-200 incl. illus., tables, graphs, diagr., 1966. 14 refs.
DLC, Orientalia Div.

Observations were made at nine sites during the winters of 1963-64 and 1964-65 of the change in the physical properties and accumulation of snow cover in an avalanche hazard area. Data are presented on snow temperature, grain shape and size, density, hardness, water content, and metamorphosis of snow. (From authors's summary)

SIP 25522 551.578.463:539.3(52)

Kinosita, Seiiti
STUDIES OF FIRN ON MT. DAISETSU IN SUMMER. II. (Daisetsuzan no sekkei chōsa; Text in Japanese with English summary). Teion-kagaku (Low Temp. Sci.), Ser. A, 24:201-210 incl. illus., table, graphs, diagr., 1966. 7 refs.
DLC, Orientalia Div.

Firn studies were made from Sept. 2-5, 1965, on the "Yukikabe" snow near the top of "Yanbetappu" valley of Mt. Daisetsu, Hokkaido. Main emphasis was placed on snow metamorphism and melt, and the creep of firn down the slope. These phenomena proceed rapidly in summer because of the high water content of the snow and firn. The firn area observed was 55 x 60 m and 8-m thick in the center. Firn volume was 8658 m^3, eleven times what it was the previous summer. The snow structure was almost homogeneous except for a bottom layer of ice. Density was about 0.7 gm/cm^3. Other observations showed a daily mean snowmelt of 6 cm/day at the end of Aug., and 2.8 cm/day in the middle of Sept. (Authors' summary, modified)

SIP 25523 551.578.482:53.08(52)

Shimizu, Hiromu
THE MAGNITUDE OF AVALANCHE. (Nadare no kaikyū; Text in Japanese with English summary). Teion-kagaku (Low Temp. Sci.), Ser. A, 24:211-220 incl. table, graphs, 1966. 8 refs.
DLC, Orientalia Div.

To assist in the measurement of avalanches, a tentative definition of avalanche magnitudes has been proposed using a simple snow slide model. Energy diagrams for three cases with constant slope are presented with (1) no destruction along the course, (2) destruction at the upper part of the slope, and (3) destruction at the lower part of the slope. The study was conducted under the assumption that resistance to snow movement can be expressed as an increasing function of velocity. Three magnitude scales are proposed for describing an avalanche: (1) mass magnitude (the quantity of avalanched snow), (2) potential magnitude (total work done by an avalanche consuming its potential energy), and (3) destructive magnitude (maximum destructive power for a given mass of snow and slope. Examples of classifying avalanches by mass magnitude and potential magnitude are given. It is pointed out that more research should be conducted on the destructive power of avalanche wind. (From author's summary)

SIP 25524 551.578.486(52)

Shimizu, Hiromu and others
SATSUNAI-GAWA AVALANCHE, 1965. (1965-nen Satsunaigawa nadare chōsa hōkoku; Text in Japanese with English summary). Teion-kagaku (Low Temp. Sci.), Ser. A, 24:221-238 incl. illus., tables, graphs, diagrs., maps, 1966. 8 refs.
DLC, Orientalia Div.

A surface, dry-snow avalanche is described which buried and killed 6 members of the Academic Alpine Club of Hokkaido University on March 14, 1965. Noteworthy features of the avalanche were the extremely wide front and destructive effect of the avalanche wind along the path, and ice shells, composed from newly formed ice sheets, found, in the debris. The major diminution of the debris was solar radiation and wind. Surface melting was accelerated by a thin layer of soil on the debris. But a thick layer of soil acted as a thermal insulator. Bottom melting along the water stream was very active in the summer and resulted in more rapid collapsing and diminution of the debris. (From authors' summary)

SIP 25525 551.326.7:624.145.5:534.2(52)

Ishida, Tamotsu
VIBRATIONS OF A SEA ICE SHEET ON THE OCCASION OF ITS BREAKING. (Kaihyōban no hakai ni tomonau shindō; Text in Japanese with English summary). Teion-kagaku (Low Temp. Sci.), Ser. A, 24:239-248 incl. graphs, 1966. 6 refs.
DLC, Orientalia Div.

Vibrations of a sea-ice sheet on the Okhotsk Sea coast of Hokkaido were observed when a cantilever type of sea-ice beam deflected and broke. Three types of transducers were used to detect the vibrations: an electro-magnetic detector of the moving-coil type of 2 c/s for vertical components; an accelerometer of the U-gage type for lateral vibrations; and a piezoelectric transducer detected internal stress during flexural loading. The results are presented and discussed in relation to tensile stress and flexural loading of the ice beam. (From author's summary)

SIP 25526 551.326.7:536.631

Ono, Nobuo
THERMAL PROPERTIES OF SEA ICE. III. ON THE SPECIFIC HEAT OF SEA ICE. (Kaihyō no netsuteki seishitsu no kenkyū. III. Kaihyō no hinetsu ni tsuite; Text in Japanese with English summary). Teion-kagaku (Low Temp. Sci.), Ser. A, 24:249-258 incl. illus., graphs, 1966. 8 refs.
DLC, Orientalia Div.

This paper presents a practical formula for the specific heat of sea ice calculated as a function of chlorinity and temperature. Another method uses the observed values of the thermal conductivity (K) and density (ρ) for sea ice in situ. The good agreement in specific heats (c) obtained by the different methods proves that a K/cρ-value is useful and the specific heat of sea ice can be measured in situ. (From author's summary)

SIP 25527 55..326.7:620.17

Tabata, Tadashi
STUDIES OF THE MECHANICAL PROPERTIES OF SEA ICE. IX. MEASUREMENT OF FLEXURAL STRENGTH IN SITU (3). (Kaihyō no rikigakuteki seishitsu no kenkyū. IX. Genjō ni okeru mage kyōdo no sokutei (3). Text in Japanese with English summary). Teion-kagaku (Low Temp. Sci.), Ser. A, 24:259-268 incl. table, graphs, 1966. 7 refs.
DLC, Orientalia Div.

Cantilever beam tests were conducted at Monbetsu Harbor on the Okhotsk Sea at Hokkaido from Feb. 18-20, 1965. The ice was about 24 cm thick, 30-40 cm wide, and 1.5 m long. The bending force was applied manually, measured with an electric load cell, and recorded with an oscillograph. The vertical acceleration at the free end of the beam was also measured and recorded. Maximum and minimum values of the temperature profile of the ice were measured with thermocouples. Data are presented on the deflection and flexural strength of a beam, the relation between the obtained flexural strength and maximum tensile stress, the relation between maximum tensile stress and Young's modulus, and the relation between flexural strength and the square root of the relative volume of brine. It is concluded that the flexural strength of a sea ice beam increases with an increasing rate of tensile stress because Young's modulus increases with an increasing rate of tensile stress. Flexural strength decreases with increasing ice temperature, and decreases in proportion to an increasing square root of the relative volume of brine. (From author's summary)

SIP 25528 551.46.06:551.326.62(*60)

Fujino, Kazuo
OCEANOGRAPHIC OBSERVATIONS ON THE DRIFTING STATION ARLIS-II, JUNE- NOVEMBER 1964. (Hyōtō Arisu II ni okeru kaiyō kansoku; Text in Japanese with English summary). Teion-kagaku (Low Temp. Sci.), Ser. A, 24:269-284 incl. tables, graphs, maps, 1966. 11 refs.
DLC, Orientalia Div.

Results are presented of oceanographic observations made in the Arctic Ocean in the area of Greenland. Arlis-II drifted from 86°25'N, 35°31'W to 83°50'N, 14°32'W covering a total of 150 oceanographic stations. Three main water masses are identified as the Arctic Surface Water, Atlantic Water and Arctic Bottom Water. The vertical distribution of temperature, chlorinity, and density in each season are shown. In the dilution processes, there are two different kinds of fresh water in this region, the fresh water transported from other localities and that supplied by melting of sea ice. The processes of concentration take place due to ice formation, the vertical convection being deduced from chlorinity distribution. The amount of sea ice formed is estimated from the deviation of the depth of the vertical convection layer. (From author's summary)

SIP 25529 551.343:624.139.62(52)

Kinosita, Seiiti, Taketoshi Ono, and Mitsugu Oguro
HEAVING FORCE OF FROZEN GROUND. II. ON THE RESULTS OF FIELD RESEARCH. (Tōjōryoku II: Genjō no sokutei kekka ni tsuite; Text in Japanese with English summary). Teion-kagaku (Low Temp. Sci.), Ser. A, 24:285-297 incl. illus., tables, graphs, diagrs., 1966. 5 refs.
DLC, Orientalia Div.

Direct measurements of heaving force have been made since the 1961-62 winter, using a load cell mounted on an iron disc, 12 cm in diameter and attached to a rigid beam, which was placed as a receiver of the force. The beam was supported by 2 iron rods fixed to a large concrete foundation 2 m below the ground. The maximum force measured was 5300 kg. The average pressure applied to the disc was 47 kg/cm^2. A cyclic change of the heaving force was observed frequently, although the heaving and frost penetration were continuous during winter. Heaving force decreased with time when the heave ceased increasing. A vertical section made at the end of winter revealed no ice beneath the disc but many thin layers below the heaved ground surface. Measurements with a 30-cm-diam disc indicate that heaving force is proportional to disc size, suggesting the stress distribution under the disc is similar to that in a semi-infinite elastic medium where its boundary is compressed by a rigid disc. (Authors' summary, modified)

SIP 25530 551.578.4:620.179.4

Kojima, Kenji
ADHESION PROPERTIES OF SNOW. (Yuki no sendan tōchakuryoku; Text in Japanese) Teion-kagaku (Low Temp. Sci.), Ser. A, 24:299-303 incl. illus., table, graphs, diagrs., 1966. 6 refs.
DLC, Orientalia Div.

The adhesive strength of ice was studied by shear experiments. A concentric test-sample of snow with inside diam, 16 cm and outside diam, 26 cm was placed between two plates and revolved against a shearing plate. The relationship between time of adhesion and shearing stress, influence of temperature on the adhesive strength, and variation of adhesive strength for various solids is discussed. -- WWL/FMM

SIP 25531 551.578.466

Oura, Hirobumi and Daiji Kobayashi
PRELIMINARY STUDY ON BLOWING SNOW. EFFECT OF DITCHES ON DRIFTING SNOW. (Chifubuki no kenkyū yohō: Sekisetsu hyōmen o nagareru yuki ni taisuru mizo no eikyō; Text in Japanese). Teion-kagaku (Low Temp. Sci.), Ser. A, 24:305-309 incl. illus., table, graph, diagr., 1966.
DLC, Orientalia Div.

Two parallel ditches perpendicular to the wind direction were used to collect drifting snow. The results obtained from several observations of blowing snow in this experiment agreed with those observed at Showa Station in the Antarctic where more than 90% of the drifts were measured to be less than 20 cm above the snow cover. The ditch method was effective in studying snow drifting which is primarily limited to movements along the snow cover surface. -- WWL/FMM

SIP 25532 551:345:620.186

Kinosita, Seitti
THIN SECTION OF FROZEN SOIL. (Doryūshi o fukumu kōri no hakuhen; Text in Japanese). Teion-kagaku (Low Temp. Sci.), Ser. A, 24:311-314 incl. illus., 1966. 3 refs.
DLC, Orientalia Div.

Wet clay (water content 54%) was packed in a 10 x 10 x 20 cm plastic box which was insulated on the sides. The surface of the soil was exposed to cold air at -10°C and the bottom was kept at +10°C. After a day, the soil had risen some 3 cm and an icy-looking layer appeared on the surface. The layer consists of a great number of very fine, needle-like ice columns containing soil particles. Microscopic observations were made on thin sections of the ice columns and are illustrated in detail. -- WWL/FMM

SIP 25533 551.345:620.178.1

Kinosita, Seiiti
MEASUREMENT OF HARDNESS OF FROZEN SOIL. (Tōdo no kōdo sokutei; Text in Japanese). Teion-kagaku (Low Temp. Sci.), Ser. A, 24:315-317 incl. illus., graph, diagr., 1966. 2 refs.
DLC, Orientalia Div.

A 3 kg drop-weight device to measure frozen ground hardness uses the depth of penetration of the bevel end of a 50 cm brass rod as the basis of measurement. A weight concentrically fitted around the rod strikes an end collar to cause penetration. The hardness value of the soil can be determined by measuring the diameter of the penetration hole at the ground surface level. WWL/FMM

SIP 25534 551.345:661.183.2:536.421.4

Horiguchi, Kaoru
ICE COLUMN GROWN FROM ACTIVE CARBON. (Kasseitan ni arawareta shimobashira; Text in Japanese). Teion-kagaku (Low Temp. Sci.), Ser. A, 24:319-320 incl. illus., diagr., 1966. 2 refs.
DLC, Orientalia Div.

The microgranular property of soil has been known as a major cause of ice column formation. The experiment to test the hypothesis for other microgranular substances used active carbon and aluminum oxide as samples, spread evenly for several mm on a silty loam. The sample box (22 x 22 x 15 cm) was placed in a water bath (30 x 30 x 25 cm) enclosed in a 5 cm thick insulating material and equipped with 4 thermoelectric couples, two (E_1, and E_2) placed 5.0 and 0.5 cm above the sample surface and two (E_3 and E_4) placed below the surface at 0.5 and 3.0 cm. After 7 hr and the following readings, E_1 = -8.7°C, E_2 = -4.6°C, E_3 = 0.8°C, and E_4 = 7.2°C ice columns were observed on the active carbon, 5.0 cm; on the bare soil, 2.5 cm; and on the aluminum oxide, no occurrence. -- WWL/FMM

SIP 25535 551.507.362:551.521.32

Belov, P. N. and Kurilova, ĪU. V.
SOME POSSIBILITIES OF USING RADIATION DATA TRANSMITTED BY SATELLITE IN SYNOPTIC ANALYSIS. (Nekotorye vozmozhnosti ispol'zovaniĭa radiatsionnykh dannykh so sputnika v sinopticheskom analize; Text in Russian). Meteorologiĭa i gidrologiĭa, No. 7:20-28 incl. graphs, maps, Aug. 1967. 11 refs.
DLC, QC851.M27

The results of radiation measurements transmitted by satellites are discussed in relation to determining heat inflow in statistical forecasting and synoptic analyses. The characteristics of the radiation measurements obtained by "Kosmos-122" are tabulated and discussed for three different types of surfaces: 1) the surfaces of the Pacific and Atlantic oceans, land surface of tropical and sub-tropical latitudes (Africa and Australia), land surface of temperate latitudes (Asia), and 2) three states of sky: clear, cloudy with the prevailance of cumulus clouds, and overcast when layered clouds predominate. A graph relating radiation temperature to that of soil and air is presented and the way of calculating the temperature of an underlying surface (soil, ocean surface) is explained. Heights to the upper boundaries of clouds are calculated according to true temperature of the upper cloud boundary, the underlying surface, and the vertical temperature gradient. The relationship between radiation fields and weather fronts, cyclones, and anticyclones is discussed and illustrated by practical examples. -- NSV

SIP 25536 551.482.213(471.4)

Gorfunov, I. V. and Perzhinskiĭ, V. V.
ICE AND THERMAL CONDITIONS OF THE LOWER VOLGA AFTER CONSTRUCTION OF THE VOLGA H.E.P.S., NAMED AFTER XXII-nd CONGRESS OF THE CPSU, AND FORMATION OF THE VOLGOGRAD RESERVOIR. (Ledovo-termicheskii rezhim Nizhnei Volgi posle sooruzheniîa Volzhskoi GES im. XXII s'ezda KPSS i obrazovaniîa Volgogradskogo vodokhranilishcha; Text in Russian). Meteorologiîa i Gidrologiîa, No. 7:96-97 incl. graph, Aug. 1967. 1 ref.
DLC, QC851.M27

Observations have revealed that the impounding of the reservoir waters has affected the conditions of icing and temperature variation in the lower Volga during the fall-winter seasons in the following ways: 1) normal temperature increase from north to south was reversed; 2) ice was formed in the south 15 to 26 days later than under normal conditions and proceeded upstream; 3) water supply inlets located in the tail-water area were affected by bottom ice and slush, regardless of their depth and structure, at temperatures of -8° to -10°C, dependent on the wind direction. Massive bottom ice was formed mainly by slow progress of the ice edge from Astrakhan' to Volgograd and an intensive heat transfer from open water surface. The ice edge was growing in the direction of the dam by holding back the ice brought by the free part of the river. Its position with respect to the dam and the possible intensity of bottom-ice formation were calculated according to formula offered, as well as determined graphically from a curve relating the position of ice edge to the negative temperature of air. -- NSV

SIP 25537 551.578.46:551.42(471.6)

Profšenko, V. F.
ON THE MEASUREMENT OF SNOW COVER DENSITY. (Ob izmerenii plotnosti snezhnogo pokrova; Text in Russian). Meteorologiîa i Gidrologiîa, No. 7:105-107 incl. table, Aug. 1967. 3 refs.
DLC, QC851.M27

The height of snow cover and its density were registered during the five year period 1960-1965 over the European territory of the USSR and the northern Caucasus. The results tabulated show differences between the snow density values obtained near the permanent measuring rods and along the 1-km long survey strips. Repeated control measurements sustained a sufficient accuracy of these data; the results of both kinds of measurements were quite close. It is concluded that the snow density values obtained at the permanent measuring rods are sufficient for the solution of practical problems, such as the estimation of water content in snow for a thawing period, so there is no need of repeating measurements when surveying along 1-km strips. -- NSV

SIP 25538 691.81

Kostrov, A. I.
FOR THE SIXTH CONTINENT. (Dlîa shestogo kontinenta; Text in Russian). Stroitel'stvo i arkhitektura Leningrada, No. 2:32 incl. illus., Feb. 1967.
DLC, NA6.87274

Several models of prefabricated houses designed for arctic and antarctic conditions will be displayed at Expo-67 in Montreal, including separate lodging houses for 10 persons and a diner accommodating 50 persons. All houses are built of Arbolite - a porous building material made of crushed wood and a cementing solution with special admixtures. It is a light-weight material (750 kg/m^3) with good insulating properties (0.16 to 0.19). To reduce air-permeability, the 30-cm thick walls are covered by a 5 mm cement layer on the outside and a 15- to 20-mm layer on the inside. The storm windows consist of four 6-mm glass plates with 3 interlayers of air. A heating cable placed on the floor below the linoleum covering warms the floor surface up to 17-20°C. An electric, hot-water, central heating system is used. The ventilation system is a combination of hot air blower and exhaust fans. The houses are built 2 m above the ground for free passage of snow during storms and preventing accumulation near the house. -- NSV

SIP 25539 551.322:539.219.3

Shreve, R. L.
MIGRATION OF AIR BUBBLES, VAPOR FIGURES, AND BRINE POCKETS IN ICE UNDER A TEMPERATURE GRADIENT. J. Geophys. Res., 72(16):4093-4100 incl. graphs, Aug. 1967. 23 refs.
DLC, QC811.J6

Equations are derived for the speed and direction of migration of air-, vapor-, or brine-filled triaxial ellipsoidal cavities of any orientation, and expected velocities are computed for the spherical, cylindrical, and discoidal cases that have been investigated experimentally. In the case of air bubbles agreement is only fair for approximately spherical bubbles trapped during freezing and is somewhat better for drilled cylindrical holes open to the atmosphere. The lack of agreement and the considerable scatter in the data are probably due to uncontrolled variations in pressure and shape and to the slow accumulation of frost. In the case of discoidal vapor figures the agreement is much poorer and the scatter is much greater, probably because of large uncontrolled variations in shape, air content, and temperature of the figures. Calculation of the effect of small size, for which viscous flow of the vapor is important, shows it to be negligible for the figures used in the experiments. For spherical brine pockets at temperatures a few degrees or more, below freezing agreement is fairly good, considering the uncertainties in the diffusion coefficient, but at the ice point the predicted speed is about 5 times that observed, probably because the brine concentration in the pockets at this temperature was not in fact zero as required by the theory. (Author's abstract)

SIP 25540 551.578.463

Keeler, Charles M.
SOME OBSERVATIONS ON THE DENSIFICATION OF ALPINE SNOW COVERS. Tech. Rept. 197, U.S. Army Cold Regions Research and Engineering Laboratory, 16p.incl. tables, graphs, appendix A, July 1967. 15 refs.
CRREL files

Through pit measurements on selected deep seasonal snow covers, observations have been made on the densification rates of dry snows. The variation between rates has been compared with such physical characteristics of the snow as temperature, grain size, and loading rate. The rate of densification does not appear to be affected by temperature in the -1 to -10°C range but it is inversely proportional to grain size and sensitive to rates of loading during the formative stage of any particular snow layer. Values of compressive viscosity vary from 10^6 to 10^9 gm/cm^2 per second which is an order of magnitude less than the lowest values for polar snow. Plots of specific volume against overburden reveal a sharp discontinuity at a specific volume of about 3.0 cm^3/gm. The persistence of this discontinuity from location to location indicates that it may reflect a real phenomenon. It is suggested that it may be accounted for by extremely high strain rates at low densities. (Author's abstract)

SIP 25541 551.465.7

Kagan, B. A.
A MODEL OF VERTICAL STRUCTURE OF A TIDAL FLOW IN A HOMOGENEOUS ICE-BOUND SEA. (Model' vertikal'nogo stroeniia prilivnogo potoka v odnorodnom more, pokrytom l'dom; Text in Russian). Akademii Nauk SSSR, Doklady, 167(2):338-341 incl. illus., 1967. 10 refs.
DLC, AS262.S3663

Mathematical solution of a problem concerning the effect of ice-cover on the vertical variation of water velocity in a tidal flow below the ice is presented and discussed. It is assumed that the sea is homogeneous and its ice cover can be simulated by an elastic film, which reacts to the vertical movements of water by assuming the form of the wave passing underneath and slowing down its horizontal movement. Two boundary layers are distinguished in the velocity cross-section of a tidal wave during its motion under the ice: one near the sea-bottom and another immediately below the ice. When the sea is shallow the upper and lower layers may close producing a turbulent mixing. Formulas are derived which can be used for the calculation of a vertical velocity profile of a tidal wave. -- NSV

SIP 25542 551.481.1(*527)

Govorukha, L. S. and Simonov, I. M.
A NEW TYPE OF HIGH LATITUDE LAKES. (Novyi tip vysokoshirotnykh ozer; Text in Russian). Akademii Nauk SSSR, Doklady, 167(2):415-417, 1967. 7 refs.
DLC, AS262.S3663

Lakes of a lagoonal origin discovered in Franz Josef Land are described in relation to their proper classification. They were formed by a complete isolation of ancient lagoons by barrier beaches and offshore bars with subsequent uplift to a certain height above the sea-level as a result of glacial isostatic compensation. Existing side by side with glaciers, these lakes represent the near-glacial basins which differ from the glacial lakes by sediment composition, accumulation, and thermal, hydrological, and chemical conditions. Their basic distinction is the

absence of varved clays, the presense of brown flakes in the non-stratified sediment which consist of Fe and Mn compounds mixed with the remains of algae and diatoms, and the reversed yearly course of temperature variation, compared to that of usual high latitude lakes, with the clearly defined phases of vernal heating and aestival cooling of water. The type of lake described was not included in the most complete classifications of I. V. Baranov and G. E. Hutchinson. -- NSV

SIP 25543 624.15(061.6)(*50)

Mysholivskiĭ, ÏA. S.
DESIGN OF PUBLIC BUILDINGS WITH REINFORCED GRADE AND TIE BEAMS BY DEFORMATION OF THE THAWING GROUND. (Raschet po deformatsiiam ottaivaiushchikh osnovaniĭ grazhdanskikh zdaniĭ s armirovannymi poiasami; Text in Russian). Moscow. Nauchno-issledovatel'skiĭ institut osnovaniĭ i podzemnykh sooruzheniĭ. Osnovaniia i Fundamenty. Sbornik trudov, No. 54:34-55 incl. tables, diagrs., 1964. 25 refs.
DLC, TA775.A45

Observations made of the majority of structures in Magadansk Oblast erected on gravelly ground of moisture content ranging from 13 to 20% by weight, indicate that an irregular thawing of the ground during subsequent use of the building results in a relative sag of 0.023 in the foundation and cracking of the walls and basement floor. Three types of cracks are described; the nature of their distribution indicates that a building during ground thawing behaves in very much the same way as a beam resting on two supports or as a cantilever beam subject to bending. The deformation is based on the calculation of beams by ultimate design which accounts for the time factor and for variable settling of the ground dependent on full load of the building and irregular thawing of the basement. Its application is illustrated by the case of a building strengthened by tie beams placed at the floor levels and along the edge and bottom of the basement. -- NSV

SIP 25544 551.343(061.6)(*50)

Tolkachev, N. A.
DETERMINATION OF RELATIVE NORMAL FORCES OF GROUND FROST HEAVING. (Opredelenie otnositel'nykh normal'nykh sil moroznogo pucheniia gruntov; Text in Russian). Moscow. Nauchno-issledovatel'skiĭ institut osnovaniĭ i podzemnykh sooruzheniĭ. Osnovaniia i Fundamenty. Sbornik trudov, No. 54:165-170 incl. tables, illus. diagr., 1964. 2 refs.
DLC, TA775.A45

Determination of normal forces developing during freezing of the bearing ground requires the knowledge of relative normal forces, which are the stresses acting in the zone of intensive frost heaving of grounds. An attempt is made to develop a physically substantiated procedure for the evaluation of relative normal forces and obtaining data for the most common types of soil in the Moscow region. An apparatus for measuring these forces in artificially mixed and undisturbed natural soil samples is described in detail and observational procedures are outlined. It is concluded that the values established were mainly dependent on the degree of preliminary soil compaction and temperature of the freezing process. Maximal heaving forces are revealed when the sample is frozen along its entire depth. For the Moscow region the relative normal forces of frost heaving range from 0.5 to 3 kg/cm^2, reaching their maximum in finegrained moist soil. The data obtained may be used for computing heaving forces acting on any type of supports located within the zone of seasonal freezing. -- NSV

SIP 25545 624.15(061.6)(*50)

Maksimov, G. N.
ARTIFICIAL AIR COOLING FOR BUILDING PILE FOUNDATIONS IN PERMAFROST. (Iskusstvennoe vozdushnoe okhlazhdenie pri ustroĭstve svaĭnykh fundamentov na vechnomerzlykh gruntakh; Text in Russian). Moscow. Nauchno-issledovatel'skiĭ institut osnovaniĭ i podzemnykh sooruzheniĭ. Osnovaniia i Fundamenty. Sbornik trudov, No. 55:103-115 incl. tables, diagrs., 1964. 14 refs.
DLC, TA775.A45

An air-cooling technique is discussed which was developed for accelerating the freezing of piles when building foundations and sinking shafts in frozen ground by using steam jets or drill bits. A mathematical procedure for air cooling is developed and a formula relating the duration of the process to atmospheric temperature is derived. The computations are illustrated by practical examples. According to tabulated data the preliminary cooling of frozen ground in shafts takes little time, especially when the ground is sandy. The theoretical results closely correlated with field testing data obtained in May and December for grounds of different physical properties and moisture contents. This technique permits the erection of pile foundations at zero ground temperature, thus broadening the geographic areas for such construction. In permafrost regions it can be used during six months of the season. -- NSV

SIP 25546 624.143.36

Tiutiunova, F. I.
POTASSIUM CHLORIDE COUNTERACTS HEAVING OF SOILS (LABORATORY INVESTIGATIONS). (Khloristyĭ kaliĭ v bor'be s pucheniem gruntov. (Laboratornye issledovaniia); Text in Russian). Moscow. Nauchno-issledovatel'skiĭ institut osnovaniĭ i podzemnykh sooruzheniĭ. Osnovaniia i Fundamenty. Sbornik No. 56:48-72 incl. tables, diagrs., 1966. 12 refs.
DLC, TA755.A45

The results of preliminary experimental studies of the relationship between the composition of exchange ions, soil heaving intensity and water migration in freezing soils indicated that the last two factors depend on the isobar potential of soils or their free energy, the variation of which is expressed through the change of particle sizes, their mineralogical composition, and the composition of exchange ions in the exchange complex of soils; the possibility of controlling soil heaving by varying the composition of exchange ions was proved. An attempt is made to find such cation pairs which can be used for decreasing soil-heaving intensity by varying their ratios in the exchange complex of the soil. Potassium ion was chosen for the experimental study of this process in different soil samples. Also the aggregation and destruction of soil particles from different fractions was studied to establish the regularities governing moisture redistribution when soil freezing is accompanied by moisture inflow. The introduction of potassium into a soil lowers its heaving because it decreases the surface energy of soil particles by changing the size and quality of their surface. -- NSV

SIP 25547 624.139.55:697

Rabinovich, I. G.
EFFECT OF HEATED BUILDINGS ON DEPTH OF NATURAL FREEZING OF SOIL. (K voprosu o vliianii otaplivaemykh zdanii na glubinu promerzaniia grunta; Text in Russian). Moscow. Nauchno-issledovatel'skiĭ institut osnovaniĭ i podzemnykh sooruzheniĭ. Osnovaniia i Fundamenty. Sbornik No. 56:78-87 incl. illus., graphs, diagrs., 1966. 9 refs.
DLC, TA775.A45

It was established by observation that the depth of ground freezing decreases nearer to a heated building and is mainly determined by temperature inside the building and the structure of the surrounding fence touching the ground. These observation data are used in the analytical discussion of the dynamics of frozen ground near heated buildings, in plotting graphs relating the depth of freezing to the distance from the cellar wall, and in diagrams showing the position of frozen ground boundaries at various periods of the freeze-thaw cycle during the years 1962-63. Formulas are derived for the coefficient of thermal effect (m_t) of a heated building on the frozen ground accounting for seasonal variations in the depths of ground freezing and the time of the year when the heating of the building begins. It is concluded, that actual m_t values may vary within a broad interval depending on the type of the first-story floors, the building dimensions in plan, depth of the cellar, and temperature inside the building. -- NSV

SIP 25548 624.139.62:624.15

TSytovich, N.A., Grigor'eva, V.G. and Zaretskiĭ, IU. K.
STUDY OF CONSOLIDATION OF THAWING ICE-SATURATED GROUNDS. (Issledovaniia konsolidatsii ottaivaiushchikh l'donasyshchennykh gruntov; Text in Russian). Moscow. Nauchno-issledovatel'skiĭ institut osnovaniĭ i podzemnykh sooruzheniĭ. Osnovaniia i Fundamenty. Sbornik No. 56:97-141 incl. tables, illus., graphs, diagrs., 1966. 10 refs.
DLC, TA775.A45

Consolidation of thawing ice-saturated grounds is discussed with relation to the calculation of deformation limits for a foundation erected on permafrost. The discussion is presented in two parts: experimental study of thawing clayey ground and theoretical analysis of primary and secondary consolidation. It is concluded, that at the same moisture content the highly frozen grounds thawing under load are more compressible than thawed grounds; after thawing they become overdense, their porosity changing stepwise in this process and remaining almost constant with depth. Within the limits studied the consolidation process is practically independent of load, its course being determined by rate of thawing. An increasing thawing rate increases soil compressibility and decreases its porosity, moisture content, and strength in a stabilized state. Regardless of thawing rate the ground settling under any load proceeds during the thawing period in proportion to the square root of time and amounts to 92-99% of the full stabilized settling for the soils studied. In the same samples this process occurs at high pore pressure which remains about constant during the whole thawing period, rapidly dropping to zero at the end. -- NSV

SIP 25549 629.12(520:*7)

"FUJI": A JAPANESE ANTARCTIC RESEARCH AND SURVEY VESSEL. Shipbldg. & Shipg. Rec., 106(11):348-350 incl. illus., Sept. 9, 1965.
DLC, VM1.S4

Japan's new diesel-electric vessel, the "Fuji", in Japan's 7th expedition to south polar regions will reopen Showa Station 3 yr after closing in Feb. 1962. The 328-ft "Fuji", built in icebreaker form, displaces 7760 tons, travels at a service speed of 15 kn., and has a range at this speed of 15,000 mi. It has a cargo capacity of 400 tons which, in addition to stores and general expedition equipment, includes hangar space and flight deck for 3 helicopters and a tracked snow vehicle. The well-rounded reinforced double-hull section is designed to assist the "Fuji" in rolling free of ice. The "Fuji" will carry a crew of 182 in addition to its scientific staff. Each heli-

copter holds 24 persons and crew or 4 tons of cargo. Boat-form hulls provide for amphibious operations; the helicopters are instrumented for night-flying. In addition to a launch, 2 lifeboats, and 6 liferafts, the vessel's fleet includes a whaler. Meteorological and many other observational installations are situated throughout the vessel; a large communications room is included. -- FMM

SIP 25550 551.524.4(*732)

Vinje, T. E.
SOME RESULTS OF MICROMETEOROLOGICAL MEASUREMENTS IN ANTARCTICA. Arch. Meteorol., Geophys. Bioklimatol., 16(1):31-43 incl. graph, 1967. 12 refs.
DLC, QC857.A73

Measurements at Norway Station indicate that the exchange of sensible heat between air and snow is effected by aeration. Therefore, the existence of a laminar sub-layer over permeable snow is questionable. The zig-zag profile of the mean vertical distribution of temperature near the surface indicates that turbulence in the area considered is systematized. The vertical displacement of the elements is estimated from the temperature profile, and heat transfer in the air is calculated in relation to measurements of the frequency of temperature variations near the surface. The expression derived for the eddy heat transfer coefficient contains fairly well defined quantities and proportions. (Author's abstract, modified)

SIP 25551 551.326.7:581.5(*2)

Meguro, Hiroshi, Ito, Kuniyuki and Hiroshi Fukushima
ICE FLORA (BOTTOM TYPE): A MECHANISM OF PRIMARY PRODUCTION IN POLAR SEAS AND THE GROWTH OF DIATOMS IN SEA ICE. Arctic, 20(2): 114-133 incl. tables, illus., diagrs., June 1967. 16 refs.
DLC, G600.A95

A field survey off Barrow in the summer of 1964 revealed that sea ice in the Arctic develops a layered structure through the growth of diatoms. The diatoms increase in brine solutions which occur in the microfissures between fine crystals of sea ice and form a brown-coloured layer near the bottom. The chlorophyll content of the layer studied was 120 μg/l., or one hundred times greater than that of the sea water under the ice, leading to the hypothesis that the most important production of the Arctic is in sea ice, especially in spring and in early summer. Studies were also made of the flora of diatoms and of the mechanism of sea-ice degradation as related to its biological effects. In this paper arctic and antarctic conditions are compared. (Authors' abstract)

SIP 25552 629.122.5

Rumynskiĭ, O. A.
A HARBOR ICEBREAKING FERRY-BOAT. (Portovoĭ ledokol'nyĭ parom; Text in Russian). Sudostroenie, 31(8):3-6 incl. illus., diagrs., 1965.
DLC, VM4.S8

The main specifications of the ice navigating ferryboat "Kanonerets" are: total length 39.8 m., length between perpendiculars 36 m., breadth at guards 10.2 m., rated breadth 9.7 m., rated board height 4.2 m., mean draft 2.5 m., loaded displacement 516, lifting capacity 65. The vessel is equipped with bow and stern platforms for loading and unloading of motor cars and similar vehicles. Accomodations are at the bow, the stern and in the deck superstructures for 135 passengers. The strake is made of shipbuilding steel, 09G2 reinforced by intermediate frames. The diesel electric propulsion machinery consists of three DG 200 diesel engines. The 4-blade screw propellers, made of one-piece stainless steel, have the high strength calculated for ice navigation. Speed in clear water attains 7.5 knots with one propeller operating, and 10.5 knots with 2 propellers. In broken ice the speed reached is 3.0 to 3.5 knots. The shape of the vessel and the rational placement of deck machinery and equipment ensures speedy loading and unloading. The building design has provided good maneuvering qualities to the vessel. A photograph of the boat, general layout of the vessel, and diagrams of the midship frame, the strake, and stern structure are given. -- VDP

SIP 25553 629.124.791.2.037.4

Samoĭlov, IU. S.
ICEBREAKER'S SIDE SCREW SHAFT. (Bortovoĭ grebnoĭ val ledokola; Text in Russian). Sudostroenie, 31(9):35 incl. diagr., Sept. 1965.
DLC, VM4.S8

Conical fitting of the screw propeller on the drive shaft is the most frequent type. According to statistics most of the screw failures occur precisely in this section. The side screws of the icebreakers "Moskva" and "Leningrad" have removable blades which together with the hull configuration permits dismantling of the propellers in the direction of the long axis. The shaft and the hub are made from a single forging with a fillet radius larger than is usually recommended. (According to the USSR Register this radius must be not less than 1/8 of the shaft). The shaft is simple to build, and permits, with the same outside diameter of the hub (and the same dimensions of the removable blades) an increase in the strength of the shaft. -- VDP

SIP 25554 551.509.67

Schleusener, Richard A.
EVOLUTION OF USES OF CLOUD-SEEDING TECHNOLOGY. Proc. Amer. Soc. Civ. Engr., J. Irrig. & Drain., 93(IR3):187-197 incl. graphs, diagrs., Sept. 1967. 11 refs.
DLC, TC801.A4

The evolution of uses of cloud-seeding technology is reviewed to determine the factors responsible for introduction of this new technology into operating systems for water resources management. There is a time lag between recognition of the possibility of beneficial use of this technology and its general acceptance. Factors promoting this time lag include not only physical and economic evaluations of the technology, but also the attitudes of management and its willingness to innovate. In contrast to attitudes of the recent years, a consensus now exists on the importance of cloud seeding as a tool in management of water resources. This portends substantial increases in weather modification activity, and attempts to evolve operational systems of weather modification to further exploit the technology as a water resources management tool. Experience to date indicates the importance of providing latitude for innovators in developing the technology. (Author's abstract)

SIP 25555 624.131.436:631.4

Shul'gin, A. M.
THE TEMPERATURE REGIME OF SOILS. Israel Program for Scientific Translations, Jerusalem, 1965, 218p. incl. illus., tables, graphs, diagr., maps. Refs. (Originally published as Temperaturnif rezhim pochvi, Leningrad, 1957)
DLC, S594.5,S5213

Information and data are presented concerning fundamental questions of soil climatology, principal regularities of the soil's temperature regime, soil temperature during the warm season, the influence of soil temperature on plants, the temperature of deep soil layers during the cold season, depth of soil freezing, temperature of surface layers of soil in winter, soil temperature and the wintering of agricultural crops, and the regulation of soil temperature during the warm and cold seasons. -- BLE

SIP 25556 629.12:532.585

Khaĭkin, A. B.
MATHEMATICAL MODEL OF THE INTERACTION BETWEEN THE SCREW PROPELLER AND ICE. (Matematicheskoe modelirovanie rezhima vzaimodeĭstviĭa grebnogo vinta so l'dom; Text in Russian). Sudostroenie, 30(3):32-36 incl. diagr., graphs, March 1964. 3 refs.
DLC, VM4.S8

When planning new icebreaker machinery, the computation of the elements of the interaction between the propeller and ice depends on the solution of a system including numerous non-linear differential equations. An electronic computer study gave the relationship of the electrical screw propulsion system of the "Moskva" and the conditions of stalling the propellers and of optimal working conditions during an ice passage. Computer output based on input derived from the electrical characteristics of the power generators, moments of the screw, flywheel, and drive shaft, and water resistance was used to plot curves showing the transformation of energy. Oscillograms obtained from field tests and model experiments indicate that the mathematical model is reliable for determining screw behavior in ice. -- VDP/FMM

SIP 25557 911.2:551.321.3(*533)

Brichkin, A. V., Mikheev, S. V. and Boev, A. V.
HIGH TEMPERATURE BORING IN GLACIERS UNDER HIGH-MOUNTAIN CONDITIONS. (Ognevoe burenie lednikov v vysokogornykh usloviĭakh; Text in Russian). Izvestiĭa vsesoiuznogo geograficheskogo obshchestva, 99(2):147-148 incl. illus., diagr., Mar.-Apr. 1967. 2 refs.
DLC, Slavic Div.

An assembly for drilling in ice under summer conditions was designed and tested by the A. V. Brichkin Laboratory of the Kazakh Polytechnic Institute. It includes a tripod, a torch-drill of the rocket type, pressure hoses, a light pile-driver, a hand-operated hoist, the oxygen, air, and kerosene tanks, and a water pump. Ice is destroyed by a jet of gasses heated to 3000°C escaping from the burner at a supersonic speed (2000 m/sec.). The rocket-burner, weighing 3-4 kg and suspended from a steel cable, is lowered into the bore-hole together with the fuel and air supplying hoses. During testing, the kerosene pressure in the main line was 12 atm., that of oxygen - 11 atm., drilling speed - 140 meters per hour, remaining the same with depth. The advantage of this device, compared to mechanical drilling, is a higher penetration speed and a considerable saving of working time since it does not require lifting of instruments for removing ice cuttings, which in this case are melted and evacuated by the exhaust gasses. The simplicity and low operation cost make this method especially suitable for deep drilling in difficultly accessible high-mountain regions. -- NSV

SIP 25558 551.345(*50)

Shmelev, L. M.
ORIGIN OF UNDERGROUND ICE LAYERS IN THE LOWER YENISEY VALLEY. (Proiskhozhdenie plastovykh zalezhei podzemnogo l'da v nizov'iakh r. Enisefi; Text in Russian). Izvestifi Akademii Nauk SSSR, Serifi Geograficheskafi, No. 2:108-115 incl. map, illus., Mar.-Apr. 1967. 8 refs.
DLC, Slavic Div.

A discussion is presented on the recent origin of ice layers 1 to 4 meters thick, outcropping in the lower Yenisey Valley at different depths from the surface. The horizontal layering of the ice bodies, their position at the contact between two lithologically different formations, limited extent, and occasional boulder and rock pieces found within the ice, indicate their recent origin through repeated water injections into taliks formed between the underlying water-resistant shales containing boulders and the irregularly frozen water-permeable overlying sands. It is believed that they originated at the end of Middle Pleistocene when ground freezing and the formation of the injection ice occurred at the same time with the emergence of the deposits from the sea. In this case, it was an epigenetic permafrost, the taliks (closed water-bearing pockets) being formed at different depths in proportion to a gradual freezing of water-bearing zones in the ground.
-- NSV

SIP 25559 663.672.006.5

Shchelokov, V. K.
ICE STOREHOUSES. (Ledianye khranilishcha; Text in Russian). Akademifa Nauk SSSR, Sibirskoe Otdelenie, Institut Merzlotovedenifa. Moscow, Izd-vo "Nauka", 118p. incl. tables, diagrs., graphs, 1967. 72 refs.
DLC, Slavic Div.

Problems concerning the erection of different structures built of ice are discussed taking as an example building of ice storehouses. The progress of ice-building technique during the last 12 years is covered and the material is presented in four chapters: 1) Ice as a structural material, its physical properties, and the production of ice for structural purposes. 2) General information on ice storehouses; different types of structures, their advantages and shortcomings are discussed. 3) Deformative and thermal stability of ice storehouses is evaluated from a new standpoint concerning the insignificant role of winter cooling of the whole ice mass in the general thermal balance of the structure. The design of insulating cover is outlined, an optimal procedure for its freezing during construction is recommended, and a new method of calculating thermal stability of seasonal storehouses is explained. 4) Certain peculiarities of the organization and execution of work are analyzed which have to be accounted for when building an ice structure. The monograph gives practical recommendations for building small storehouses which can be followed by the untrained staff of a kolkhoz or a trade center, and at the same time, presents the theoretical justification and the methods of designing large ice structures with an account for their thermal and deformative stability.
-- NSV

SIP 25560 551.525

Dikinov, Kh. Zh.
CALCULATION OF THE FREEZING DEPTH OF SOIL COVERED BY SNOW ACCORDING TO GIVEN AIR TEMPERATURE. (Raschet glubiny promerzanifa pochvy, pokrytoĭ snegom, po zadannoĭ temperature vozdukha; Text in Russian). Izvestifa Akademii Nauk SSSR, Fizika atmosfery i okeana, 3(6):602-610 incl. graphs, 1967. 8 refs.
DLC, Slavic Div.

The depth of soil freezing under a snow cover and temperature distribution in the soil and calculated by numerical solution of a system of equations describing the heating of a multilayered medium on the basis of a model at a given air temperature. The theoretical results, illustrated by practical examples, closely approached the observation data because variation of the following factors in time was considered: snow cover thickness, water vapor in air, albedo of the underlying surface, solar radiation, and heat inflow from lower layers of thawed soil. For these calculations it is desirable to have exact data on thermal and physical characteristics of soil and snow, and the coefficients of air turbulency for the atmospheric boundary layer. The calculation procedure was programmed for electronic digital computers EVM M-20. -- NSV

SIP 25561 629.124.752:621.311:13.43

Khaĭkin, A. B. and V. A. Chirkov
CAPITAL ICEBREAKER'S ELECTRIC GENERATOR PLANT WITH A SELF-EXCITATION SYSTEM. (Sudovafa elektrostantsifa lineĭnogo ledokola s sistemoĭ samovozbuzhdenifa; Text in Russian). Sudostroenie, 29(4):35-39 incl. tables, diagrs., April 1963.
DLC, VM4.S8

Six main 385 kva synchronous generators, one 213 kva generator and one 62.5 kva emergency generator are included in the power plant of the "Moskva" type icebreakers built by the Siemens and Schukert Co. All the generators have a static exciting system with compound phase amplitude. Four hundred volts is the generators' normal voltage, and a stabilization in the 388-395 volts range is ensured by a self-exciting system. The machinery is insulated by a double layer of glasscloth. The main and stationary generators have 2-cycle, 600 rpm diesel engines with the following specifications: K58E, 412 hp, 8 cylinders; K55E, 258 hp, 5 cylinders. The engines have a "Wooldworth UG8" precision regulator with a remote control servodrive, to modify speed within ±5%. The generator feeder, switching, interruptor, and overload systems with 5 kg/cm^2 pneumatic pressure, electromagnetic controls are described. The emergency power plant, the distribution panel, and control instruments are located in a separate location on the lifeboat deck. The generator motor is a RHS548D, 4-cycle, 3-cylinder diesel engine of 87 hp and 1500 rpm. The 62.5 kva synchronous generator differs only slightly from the main generators. -- VDP/FMM

SIP 25562 629.124.752:621.313.001.5

Khaĭkin, A. B.
DYNAMICS OF THE ELECTRICAL PROPULSION SCREW OF AN ICEBREAKER DURING INTERACTION BETWEEN THE SCREW AND ICE. (Dinamika grebnoĭ elektricheskoĭ ustanovki ledokola pri vzaimodeĭstvii grebnogo vinta so l'dom; Text in Russian). Sudostroenie, 29(9):31-35 incl. diagr., graphs, Sept. 1963. 3 refs.
DLC, VM4.S8

Modern recorders enable designers to study the complicated phenomenon of the interaction between the screw propeller and ice and variation in motor torque for propeller thrust or stall. The results of tests carried out on the "Moskva" are discussed and a line diagram of the main electrical power variation on the ship is provided. The dynamic load can at certain times increase to a magnitude which is dangerous not only for the blades of the screw propeller but also for other parts of the screw. The moment of rotation resistance in such cases can exceed the nominal torque of the electrical machinery 2 to 4 times. Results from the study of graphs of variations occurring during the action between the screw and the ice pressure show that for a short time, not exceeding 15 sec, the high-speed control system of the screw must ensure the increase of the nominal value of the screw moment up to 3-4 times. -- VDP

SIP 25563 551.577:551.58

Bilello, Michael A.
SURVEY OF FROZEN PRECIPITATION IN URBAN AREAS AS RELATED TO CLIMATIC CONDITIONS. Tech. Rept. 162, U.S. Army Cold Regions Research and Engineering Laboratory, 33p. incl. tables, graphs, map, appendix, May 1967.
CRREL files

This study investigates relationships between observed frozen precipitation and associated meteorological conditions in large cities, and develops procedures for presenting tabulated data on frozen precipitation in a readable and usable form. An explanation of several interpretations is included with methods of analysis, sample diagrams, advantages and disadvantages, and comparisons of the different interpretations. To avoid excessive bulk, only the diagrams for LaGuardia Airport and Buffalo, New York, are discussed in this paper. Similar figures for 22 other stations are on file at USA CRREL. (Author's abstract)

SIP 25564 551.584:551.32(*50)

Shvetsov, P. F.
ROLE OF TWO- AND THREE-YEAR INCREASES IN SOIL TEMPERATURES ON THE DEVELOPMENT OF PRESENT THERMOKARST AND CRYOGENIC PROCESSES ON SLOPES IN THE EXTREME NORTH. (Rol' dvukh-trekhletnikh povysheniĭ temperatury pochv v razvitii sovremennogo termokarsta i kriogennykh sklonovykh protsessov na kraĭnem severe; Text in Russian). Akademiĭa Nauk SSSR, Sibirskoe otdelenie, Institut merzlotovedeniĭa, Sovremennye voprosy regional'noĭ i inzhenernoĭ geokriologii (merzlotovedeniĭa), Izdatel'stvo "Nauka", p. 39-47 incl. tables, illus., 1964. 7 refs.
DLC, TA713.A439

Short cyclic variations of mean aestival and mean annual soil and atmospheric temperature were registered in sub-arctic regions of the USSR; the temperature variation of 5 to 6 year periods was expressed by a simple near-sinusoidal harmonic curve. Steady temperature increases over the half-periods of 2 to 3 years have increased the depth of soil thawing by 30 to 45 cm or 50 to 60% of the normal depth, sometimes accompanied by a decrease in mean annual air temperature. According to mean annual temperatures, the directions of temperature variation are determined by different types of the snow-cover effect on the mean annual temperatures of soil and the boundary air layer. The law of latitudinal zonality and thermokarst is discussed in terms of total heat received by the soil, depths of soil thawing and annual increments, and the intensity of heat exchange between soil and atmosphere in warm seasons. The short-period increments in the depth of thaw exceed 25 cm, so are believed to be responsible for increased intensity of present thermokarst and soil slides on the slopes. -- NSV

SIP 25565 551.33:551.345(*531.3)

Danilova, N. S.
SUBSURFACE ICE IN THE LOWER COURSE OF THE VILIUI RIVER VALLEY, THE CONDITIONS OF ITS ACCUMULATION AND PALEOGEOGRAPHIC SIGNIFICANCE. (Podzemnye L'dy doliny nizhnego techeniia r. Viliui, usloviia ikh obrazovaniia i paleogeograficheskoe znachenie; Text in Russian). Akademiia Nauk SSSR, Sibirskoe otdelenie, Institut merzlotovedeniia, Sovremennye voprosy regional'noi i inzhenernoi geokriologii (Merzlotovedeniia) Izdatel'stvo "Nauka", p. 48-62 incl. illus., 1964. 18 refs.
DLC, TA713.A439

The lower reaches of the Viliya River are a part of the Central Yakutia lowland -- an alluvial plain consisting of a series of Quaternary terraces characterized by a widely developed thermokarst relief which indicates large masses of subsurface ice filling rock fractures and cavities. In this area ice is found in the flood plain deposits and above them, mostly in peat bogs or peaty silts. Because of great ice thickness, the nature of rock bending near contact with ice, and its cryogenic structure, it is believed that ice is syngenetic to the enclosing rock. It is concluded that it should be referred to the class of vein ice rather than limnetic. In this region the climatic conditions were more frigid during the lower Pleistocene when the forest-tundra landscape prevailed, and the permafrost which appeared at that time is still preserved. -- NSV

SIP 25566 551.525.5(*50)

Efimov, A. I.
PERMAFROST TEMPERATURE IN THE VICINITY OF THE TOWN OF MIRNYI. (Temperatura mnogoletnemerzlykh gornykh porod v okrestnostiakh g. Mirnogo; Text in Russian). Akademiia Nauk SSSR, Sibirskoe otdelenie, Institut merzlotovedeniia, Sovremennye voprosy regional'noi i inzhenernoi geokriologii (merzlotovedeniia), Izdatel'stvo "Nauka", p. 63-83 incl. graphs, tables, diagr., 1964. 24 refs.
DLC, TA713.A439

Temperature of frozen ground was measured in 25 dry wells especially equipped for the use of mercury thermometers. The holes were drilled over an area of 20 km^2 in different topographic elements: river valleys, mountain slopes, and water divides. In this area the climate is sharply continental the mean annual temperature being -8°C and precipitation about 250 mm. An analysis of the maximum and minimum rock temperatures measured at different depths indicated a wide variation of the absolute temperatures, depending on the combinations of natural conditions, and a similarity in their relative changes with respect to time and depth. Down to 15 meters, temperatures ranged from about -1° on the water-divides and populated gentle slopes, to -2° in the forrested areas, and to -3° to -4° on the northern slopes. A mean geothermal gradient of 0.6°/100 m was typical of the depth interval 70-590 m but the variation itself was irregular, increasing from 0.6°/100 m to 1.3°/100 m in the interval 20-400 m and suddenly dropping to 0.5°/100 m below 420 m. In the permafrost zone the rock temperatures ranged from -1.6° to -1.8°, but below it they increased to 0° due to the effect of highly mineralized ground waters. The thickness of the permafrost zone depended on the degree of surface cooling and on water mineralization. -- NSV

SIP 25567 624.139:622:551.525.5(*531.3)

Lukin, G. O.
SHERGIN MINE AND THE GEOTHERMAL CONDITIONS OF THE SURROUNDING SOILS AND ROCKS. (Shakhta Shergina i geotermicheskii rezhim okruzhaiushchikh ee pochv i gornykh porod; Text in Russian) Akademiia Nauk SSSR, Sibirskoe otdelenie, Institut merzlotovedeniia, Sovremennye voprosy regional'noi i inzhenernoi geokriologii (merzlotovedeniia), Izdatel'stvo "Nauka", p. 84-96 incl. tables, graphs, 1964. 10 refs.
DLC, TA713.A439

In 1869 A. F. Middendorf calculated the depth of permafrost for the Yakutsk city territory from the geothermal gradient established by him according to mean temperatures of shaft walls in the Shergin Mine. Similar studies were conducted in the mine by other investigators in 1939, and by the author during the four year period 1958-62 in a well drilled at a 30 meter distance from the mine. The comparison of all data has shown that the mean annual temperatures of permafrost obtained by Middendorf for the first 15 meters of the ground were much lower, compared to the subsequent data and about the same at depths of 30, 45 and 61 m. From there to 116 m they were higher by 0.2 to 0.8°C, and in complete agreement with the subsequent measurements beyond this depth. This temperature increase was explained by disturbance of the thermal regime during shaft sinking and its gradual reestablishment through the subsequent years, while the discrepancy of the upper 15 meters was referred to a convective heat-exchange between air and shaft walls during cold seasons. -- NSV

SIP 25568 551.345.2:551.46(*531.3)

Mel'nikov, P. I.
THE PRESENCE OF PERMAFROST UNDER THE RIVERS AND LAKES OF THE YAKUT ASSR TERRITORY. (O nalichii mnogoletnemerzlykh gornykh porod pod rekami i ozerami na territorii IAkutskoi ASSR; Text in Russian). Akademiîa Nauk SSSR, Sibirskoe otdelenie, Institut merzlotovedeniîa, Sovremennye voprosy regional'noĭ i inzhenernoĭ geokriologii (merzlotovedeniîa), Izdatel'stvo "Nauka", p. 97-104 incl. table, illus., 1964. 7 refs.
DLC, TA713.A439

Drilling of numerous wells near lakes and rivers in different parts of the territory revealed the lithological effect of river-bed deposits on the thawing depth of frozen ground under the channels of major nonfreezing rivers and lakes. In the presence of water resisting formations the depths of thawing zones were restricted to certain limits depending on the degree of conductive heat-exchange, thermal conductivities of rocks, and the geocryological conditions of the region; when the river-bed deposits were permeable the underlying permafrost was not preserved under the river channels. Another cause of increased thawing zones was the presence of interconnected taliks below the river channels which conducted warm water deep into the frozen ground; this was typical for limestone formations and for faulting zones. The relationships described were important for designing dams and large water reservoirs, and calculating the depth of permafrost thawing during different periods of their exploitation. -- NSV

SIP 25569 551.345:536

Ivanov, N. S.
THERMOPHYSICAL PROPERTIES OF FROZEN ROCKS. (Teplofizicheskie svoĭstva merzlykh gornykh porod; Text in Russian). Akademiîa Nauk SSSR, Sibirskoe otdelenie, Institut merzlotovedeniîa, Sovremennye voprosy regional'noĭ i inzhenernoĭ geokriologii (merzlotovedeniîa), Izdatel'stvo "Nauka", p. 114-146 incl. tables, graphs, illus., 1964. 29 refs.
DLC, TA713.A439

Proceeding from a short review of the recent progress in theoretical studies of matter and energy transfer in freezing and thawing ground, new problems concerning thermal properties are formulated and discussed with emphasis on the procedure of determining the effective thermal capacity of frozen ground, its thermal conductivity coefficients, and the relation of these properties to certain parameters. The results indicate that both properties depend on temperature and that this relationship is based on the principle of a dynamic equilibrium of the solution filling the pores of rocks. The established relationship makes it possible to calculate these coefficients for the whole natural range of rock temperatures, water content, and specific weight. -- NSV

SIP 25570 551.584:551.345.2

Balobaev, V. T.
HEAT EXCHANGE BETWEEN ROCKS AND ATMOSPHERE AND THAWING OF FROZEN GROUND. (Teploobmen mezhdu atmosferoĭ i gornymi porodami i protaivanie merzlykh gornykh porod; Text in Russian). Akademiîa Nauk SSSR, Sibirskoe otdelenie, Institut merzlotovedeniîa, Sovremennye voprosy regional'noĭ i inzhenernoĭ geokriologii (merzlotovedeniîa), Izdatel'stvo "Nauka", p. 147-166 incl. tables, 1964. 14 refs.
DLC, TA713.A439

The temperature field of frozen ground and the thawing-freezing processes are usually analyzed separately from the phenomena of heat and moisture transfer in the air, taking the surface temperature as a boundary condition; consequently, all formulas for calculating depths of thawing are based on the surface temperature, which is unstable and difficultly measurable. An attempt is made to determine the temperature field of permafrost and its thawing depths in relation to heat exchange in the air by solving a system of thermal-conductivity equations for a rock layer and the boundary layer of air in the absence of water phase transformation in rocks. The mathematical solution is then used for deriving formulas for thawing depths and for the calculation of time required for a full freezing of a rock layer thawed during the summer season. Rocks with an irregular moisture distribution with depth are separated into layers assuming a constant moisture content in each layer and the thermal coefficients obtained as average values for the whole thawed zone. -- NSV

SIP 25571 551.341:534.64

Akimov, A. T.
EXPERIENCE IN APPLYING ACOUSTICAL AND SEISMIC METHODS OF PERMAFROST EXPLORATION. (Opyt primeneniîa akusticheskikh i seismicheskogo metodov issledovaniîa merzlykh gornykh porod; Text in Russian). Akademiîa Nauk SSSR, Sibirskoe otdelenie, Institut merzlotovedeniîa, Sovremennye voprosy regional'noĭ i inzhenernoĭ geokriologii (merzlotovedeniîa) Izdatel'stvo "Nauka", p. 167-180 incl. illus., graphs, diagrs, 1964. 23 refs.
DLC, TA713.A439

Three methods of permafrost exploration are described with a schematic illustration of instruments and their working principles: the impulse ultrasonic, sonic, and seismic techniques, all designed for shallow sounding. The first is used for determining elastic properties of rocks and the variation of physical and chemical processes in frozen grounds. By measuring acoustic wave attenuation dependent either on the relaxation phenomenon, or Rayleigh scattering, or thermal processes, it is possible to establish the coefficient of thermal conductivity of rocks without disturbing their initial thermal state. The second method is in principle the same as the navigational echo ranging technique; its advantages are the speed of measurement and a detailed presentation of complicated permafrost cross-sections. The seismic method is based on the construction of travel time curves for reflections. Its data are used for an accurate determination of the permafrost depth, dimensions of thawing ground under buildings, lithological subdivisions of a cross-section, and other problems. -- NSV

SIP 25572 551.342(*50)

Pchelintsev, A. M.
STEPWISE NATURE OF PERMAFROST HEAVING. (O skachkoobraznosti pucheniîa promerzaîûshchikh gruntov; Text in Russian). Akademiîa Nauk SSSR, Sibirskoe otdelenie, Institut merzlotovedeniîa, Sovremennye voprosy regional'noî i inzhenernoî geokriologii (merzlotovedeniîa), Izdatel'stvo "Nauka", p.181-185 incl. table, graph, 1964. 5 refs.
DLC, TA713.A439

According to observations permafrost heaving under laboratory and field conditions is an intermittent, incremental and steady, stepwise process. Because freezing of soil may be regarded as water crystallization in pore spaces or in the presence of a large quantity of insoluble particles, the stepwise heaving reflects a discontinuous water crystallization produced by the following factors: intermittent inflow of water to the growing ice crystals, the soil particle effect, and the separation of salts from freezing water resulting in water overcooling. In the second case the regular growth of ice crystals is interrupted by periodical accumulations of close-lying mineral particles on the crystal surface. In the third case, a gradually increasing precipitation of salts near the growing ice crystals lowers the water freezing temperature causing a pause in water crystallization. In some cases the intermittency of the heaving process may be due to a stepwise deformation of an externally loaded permafrost layer under the action of compressive and shear forces. -- NSV

SIP 25573 551.341:624.139:624.15

Orlov, V. O.
CALCULATION OF GROUND HEAVING WHEN DESIGNING PREVENTIVE MEASURES AGAINST FOUNDATION HEAVING. (K raschetu puchinistosti gruntov osnovaniî pri proektirovanii meropriîatiî protiv vypuchivaniîa fundamentov; Text in Russian). Akademiîa Nauk SSSR, Sibirskoe otdelenie, Institut merzlotovedeniîa, Sovremennye voprosy regional'noî i inzhenernoî geokriologii (merzlotovedeniîa), Izdatel'stvo "Nauka", p. 186-193, 1964. 1 ref.
DLC, TA713.A439

The calculations offered are based on the hypothesis of a stationary heat-separation process in the ground, which produces a dynamically balanced relationship between water in the thawed and frozen zones. Ice is formed in a certain boundary layer of the freezing ground limited by a definite temperature gradient the lower limit of which is the temperature of water crystallization and the upper -- a certain extreme temperature at which the water-movement, capable of ground heaving, ceases. Because the forces causing water migration cannot be evaluated, the analytical calculation of specific moisture accumulation in frozen ground can be conducted according to the moisture gradient in the thawed and frozen layer, i.e., the quantity of migrating water in the frozen layer will depend on the temperature of the ground freezing process as well as its initial moisture and other physical and mechanical rock properties. In some cases it is possible to assign the depth of ground freezing by calculating the values of normal heaving forces according to the procedure described. -- NSV

SIP 25574 624.139:622:551.342(*50)

Zil'berbord, A. F.
WEATHERING OF FROZEN BED-ROCK IN UNDERGROUND EXCAVATIONS. (O vyvetrivanii merzlykh korennykh porod v podzemnykh vyrabotkakh; Text in Russian). Akademiîa Nauk SSSR, Sibirskoe otdelenie, Institut merzlotovedeniîa, Sovremennye voprosy regional'noî i inzhenernoî geokriologii (merzlotovedeniîa), Izdatel'stvo "Nauka", p. 194-202 incl. graphs, diagr., illus., 1964. 11 refs.
DLC, TA713.A439

The process of rock failure as the result of temperature increase and repeated freezing-thawing of the ground is discussed and illustrated by practical examples. Maximum deformation of supporting walls in mines was observed in the ventilation shafts, the main causes being moisture condensation near walls in summer and its evaporation during

the cold season. The areas of intensive moisture accumulation moved progressively from their near-surface position at the beginning of a warm season to some 500 meters below it in August, resulting in a periodical successive moistening-drying of the ground within one warm period. This effect combined with repeated heating-cooling and freezing-thawing of rocks leads to their rapid destruction and consequently an increased pressure on supporting walls. It is recommended that the thermal conditions of mines located within the permafrost zone be regulated to reduce to minimum the thawing zone behind the supporting walls and the variations of air temperature in the mine. -- NSV

SIP 25575 624.139:622:693.547.3(*50)

Novikov, F. ÎA.
LOAD ON CONCRETE WALLS SUPPORTING UNSTABLE FROZEN GROUND IN MINES. (O nagruzkakh na krep' shakhtnykh stvolov v merzlykh dispersnykh porodakh; Text in Russian). Akademiîa Nauk SSSR, Sibirskoe otdelenie, Institut merzlotovedeniîa, Sovremennye voprosy regional'noĭ i inzhenernoĭ geokriologii (merzlotovedeniîa), Izdatel'stvo "Nauka", p. 203-209 incl. table, diagr., 1964. 6 refs.
DLC, TA713.A439

Concrete supporting walls in the shafts of the Vorkuta coal-mines were showing signs of deformation after a sufficiently thick layer of thawed rocks was formed around them. Typically for these mines, the failure of concrete was associated with the air-supplying shafts, while the exhaust shafts remained undamaged although a similar thawing zone was formed around them. All these effects were explained by the consequences of blowing hot dry air through the shaft: an increased moisture evaporation, desiccation of thawed ground behind the concrete, and excessive vertical stress exerted on the concrete by the settling ground. This process was studied in a model of an air-supplying shaft, which is described and illustrated schematically; a formula for the minimum radius of rock thawing sufficient for the onset of deformation is derived, and the measures preventing ground desiccation behind the concrete are recommended. -- NSV

SIP 25576 355.49:(*7):91(091)

Euller, John
OUR NAVY EXPLORES ANTARCTICA. London, Abelard-Schuman [1966], 127p. incl. illus., tables, maps, appends. 10 refs.
DLC, G870.E8

This book describes and pictures some of the activities of the U.S. Navy in support of science in Antarctica, including participation in Operations High-jump, Windmill, and Deep Freeze, and the erection of Little America and Byrd Stations. Several chapters discuss the various means of transportation used in polar exploration. Other chapters describe USARP activities, Antarctic animals, and historic sites. -- DMN

SIP 25577 5.001.5:910.4:779(*7)

Clarke, Peter
ON THE ICE. Photogr. by Warren Krupsaw. [Boston] Burdette & Co. Distributed by Rand McNally [c1966] 104p. incl. illus., map.
DLC, G860.C55

U.S. Navy operations in support of USARP are described and pictured. Individual sections discuss McMurdo Station activities, Hercules aircraft, ice breaking, and "Goony-Birds." -- DMN

SIP 25578 551.324/.338

Kotlîakov, V. M.
ARE WE LIVING IN AN ICE AGE? (My zhivem v lednikovyĭ period?; Text in Russian). Leningrad, Gidrometeorol. izd-vo, 1966, 234p. incl. illus., graphs, diagrs., maps, append.
DLC, GB2403.K6

This book, intended for the general reader, emphasizes the importance of the glaciologist's contribution to geographical knowledge. The author's experiences as a glaciologist in Antarctica, on Novaya Zemlya, in the Caucasus, and in the mountains of Tien Shan are related. Methods and results of glaciological observations since the beginning of the IGY are discussed, and tentative conclusions regarding the present state of the Antarctic and Greenland ice caps are reached. The effect of glaciers on climate and vice versa is treated. A chapter is devoted to occurrences of "ice meteorites" and to the possibility of ice caps on Mars. A list of definitions of glaciological terms used in the text is appended. -- DAS

SIP 25579 551.326.8:621.311.4
551.326.8:624.21

Korzhavin, K. N.
DYNAMIC EFFECT OF ICE ON THE INSTALLATIONS OF HYDROELECTRIC POWER PLANTS AND BRIDGE SUPPORTS. (Dinamicheskoe vozdeĭstvie l'da na sooruzheniîa gidrostantsiĭ i opory mostov; Text in Russian). Novosibirsk, Izd-vo Akademii Nauk SSSR, Sibirskoe otdelenie, Sibirskiĭ nauch. issled. institut energetiki. Metody Bor'by s Ledovymi Zatrudneniîami na Gidrostanciîakh Sibiri, p. 3-11 incl. graph, 1965. 17 refs.
DLC, TK1509.A7

Dynamic action of ice on structural supports of bridges and power plant installations during ice drift are discussed. Forces of reaction originating in this process between ice-masses and the supports are analyzed in relation to the size of ice-fields, speed of their movement, physical and mechanical properties of ice, and the material and form of the supports in plan and profile. Various ways of determining ice load on a structural support are reviewed, their results evaluated, and a new method of calculating actual ice-pressure on different types of supporting elements is offered. -- NSV

SIP 25580 627.81:551.326

Butîagin, I. P.
ICE COVER ON A WATER RESERVOIR. (Ledianoĭ pokrov vodokhranilishcha; Text in Russian). Novosibirsk, Izd-vo Akademii Nauk SSSR, Sibirskoe otdelenie, Sibirskiĭ nauch. issled. institut energetiki. Metody Bor'by s Ledovymi Zatrudneniîami na Gidrostanţsiîakh Sibiri, p. 12-22 incl. tables, graphs, illus., 1965. 11 refs.
DLC, TK1509.A7

Thickness, strength, and structure of ice cover on a water reservoir is discussed in relation to use in the winter as a road or an air-field. Specific thermal conditions affect the formation and destruction of the ice-cover, which differs from river ice in homogeneity and regularity of crystalline structure through the whole thickness and lesser stability due to a rapid loss of mechanical strength in the spring. The scale factor is of utmost importance in the experimental strength evaluation, the limit of which is determined from a curve relating strength to the size of ice-sample cross-section and ice sheet thickness. It is recommended that the periodic occurrence of multiple temperature fractures of different width and direction, growing in numbers after sudden drops of temperature, especially in the snow-free ice, be taken into account when calculating the carrying capacity of ice cover. -- NSV

SIP 25581 624.145.8

Liser, I. ÎA.
ICE JAMMING AND PREVENTIVE MEASURES. (Zatory l'da i bor'ba s nimi; Text in Russian). (Novosibirsk, Izd-vo Akademii Nauk SSSR, Sibirskoe otdelenie, Sibirskiĭ nauch. issled. institut energetiki. Metody Bor'by s Ledovymi Zatrudneniîami na Gidrostanţsiîakh Sibiri, p. 23-37 incl. tables, graphs, diagrs., 1965. 13 refs.
DLC, TK1509.A7

General regularities governing the formation of ice stoppage in Siberian rivers are discussed and the degree of channel clogging is analyzed in relation to the conditions of river freezing in the fall, temperature variation during winter, and the intensity of spring season development. The problems concerning river hydraulics, river-channel conditions, and the temperature/ice regime during ice-breaking are analyzed for the Yenisey River in Spring 1958. A method of calculating the degree of obstruction is given. It is stressed that building of hydro developments, particularly power plants, leads to essential changes in the ice regime dealing with ice thickness, and the time and character of ice breaking. Since the elimination of ice jamming is costly and not always effective, the following preventive measures are recommended: the use of ice-breakers and ice cutting machines, weakening of ice by accelerated radiation or chemical methods, and building of dams further upstream. -- NSV

SIP 25582 551.322:539.37(210.5)

Panfilov, D. F.
ICE COVER DEFORMATION NEAR SHORES. (Deformaţsii ledîanogo pokrova vblizi beregov; Text in Russian). Novosibirsk, Izd-vo Akademii Nauk SSSR, Sibirskoe otdelenie, Sibirskiĭ nauch. issled. institut energetiki. Metody Bor'by s Ledovymi Zatrudneniîami na Gidrostanţsiîakh Sibiri, p. 38-56 incl. graphs, diagrs., 1965. 1 ref.
DLC, TK1509.A7

Carrying capacity of ice is analyzed in relation to the arrangement of ice crossovers and different hydrotechnical works during winter. The problem concerning ice deformation near the shore due to a changing water level and the bending of ice under a short-term static load applied near the shore, are analyzed. Formulas are derived to calculate ice sag and bending moments originating in the ice for the case of an inelastic junction between ice and shore when the ice is broken by long cracks parallel to the shore. Graphs are plotted for determining maximum values of bending moments originating in a semi-infinite ice field when the load is located on the ice edge. -- NSV

SIP 25583 624.147:621.311.4
624.147:627.33

Bubyr', A. A.
USING ICE STRUCTURES WHEN BUILDING HYDRO PLANTS AND PORTS. (Ispol'zovanie sooruzheniĭ iz l'da pri stroitel'stve gidrostanţsiĭ i portov; Text in Russian). Novosibirsk, Izd-vo Akademii Nauk SSSR, Sibirskoe otdelenie, Sibirskiĭ nauch. issled. institut energetiki. Metody Bor'by s Ledovymi Zatrudneniîami na Gidrostanţsiîakh Sibiri, p. 57-71 incl. diagrs., illus., 1965. 13 refs.
DLC, TK1509.A7

In Siberia ice was used as a structural material for

building dams and moorage places. Experience obtained in the erection, exploitation, and investigation of such structures is reviewed in relation to building hydro plants on large rivers and a series of landing places on the shores for different heights of water-level during the ice-breaking season. The types and dimensions of such hydro developments are discussed, illustrated by plans and photographs, their stability evaluated, and the ice building technique outlined. The advantages of such structures are the very low cost, and the speed of erection; due to permafrost their stability with respect to shearing forces and buoyancy is greater than that of concrete structures. -- NSV

SIP 25584 551.326:621.311.4

Estifeev, A. M.
A METHOD OF DECREASING SLUSH FORMATION ON THE HYDRO PLANT CASCADE. (Metod umen'sheniîa shugoobrazovaniîa na kaskade GES; Text in Russian). Novosibirsk, Izd-vo Akademii Nauk SSSR, Sibirskoe otdelenie, Sibirskiĭ nauch. issled. institut energetiki. Metody Bor'by s Ledovymi Zatrudneniîami na Gidrostanţsiîakh Sibiri, p. 72-82 incl. table, maps, diagr., 1965. 8 refs.
DLC, TK1509.A7

The mathematical analysis of slush origin and its dynamics indicated the major role of water velocity in determining the direction and development of the ice and slush formation processes. Velocity control by the regulation of cascade flow is discussed. Regarding the improvement of the winter regime conditions the conclusion was reached that building of the plants in downstream succession, or covering the entire stretch of the cascade by the basic stations at once, will diminish ice jamming. When the hydro plant development is gradual it is desirable to decrease the water stream velocities in the lower reaches during the periods of spring and autumn ice-drifts to the limits when the edge of a slush-cover moves rapidly upstream preventing further formation of floating ice and furthering the development of an ice cover. The feasibility of these recommendations is illustrated by practical examples. -- NSV

SIP 25585 551.322:539.6:621.643

Suslov, M. P.
CONTROLLING THE ICING OF THE INTERNAL SURFACE OF WATER LINES. (Control' za oledeneniem vnutrenneĭ poverkhnosti vodovodov; Text in Russian). Novosibirsk, Izd-vo Akademii Nauk SSSR, Sibirskoe otdelenie, Sibirskiĭ nauch. issled. institut energetiki. Metody Bor'by s Ledovymi Zatrudneniîami na Gidrostanţsiîakh Sibiri, p. 83-87 incl. diagrs., 1965. 3 refs.
DLC, TK1509.A7

The results of experimental studies indicated that a slight icing of the internal surface of water pipes is beneficial because it makes the surface smoother, increases transmitting capacity, and serves as an insulation decreasing the heat transfer of water. In view of controlling the growth of the ice layer the All-Union Scientific Research Institute for Water Supply, Sewer Systems, Hydraulic Structures and Hydrogeological Engineering has designed an instrument for measuring the thickness of the ice layer in the pipe, which is based on the measurement of electrical capacitance of water and ice. It consists of a data unit built into a section of the pipe in the water line and an auxiliary measuring device of the "PIMEL" type. The structure and working principle of this instrument is discussed in detail. -- NSV

SIP 25586 551.321

Butîagin, I. P. and V. K. Morgunov
NEW INSTRUMENTS AND THE METHODS OF STUDYING ICE PHENOMENA. (Novye pribory i metody issledovaniĭ ledovykh îavleniĭ; Text in Russian). Novosibirsk, Izd-vo Akademii Nauk SSSR, Sibirskoe otdelenie, Sibirskiĭ nauch. issled. institut energetiki. Metody Bor'by s Ledovymi Zatrudneniîami na Gidrostanţsiîakh Sibiri, p. 88-98 incl. illus., 1965. 4 refs.
DLC, TK1509.A7

New instruments and observation procedures for studying ice regime under natural conditions were developed by the Thermal and Power Engineering Institute of the Siberian Branch of the USSR Academy of Sciences: an ice cutting device for sampling ice; an assembly for studying ice strength during spring season by testing prismatic ice samples for bending and fracturing at constant 0°C temperature; an electrical assembly for measuring thicknesses of snow and ice from the surface; a cross-slit camera for determining the velocity of floating objects, such as hydrometric floats and ice-blocks, by taking successive images of the object over definite periods of time; a photogrammetric camera for determining dimensions of moving ice-blocks, which may also be used for a simultaneous determination of stream velocity by photographing the ice-drifts at successive positions in a time sequence without changing camera position. -- NSV

SIP 25587 548.1:534.222

Maris, H. J.
TEMPERATURE AND FREQUENCY DEPENDENCE OF THE VELOCITY OF SOUND IN DIELECTRIC CRYSTALS. Phil. Mag., 16(140):331-340, Aug. 1967. 9 refs.
DLC, Q1.P5

The temperature and frequency dependence of the velocity of sound in dielectric crystals have been calculated to lowest order in anharmonic terms by using the quasi-harmonic approximation and the phonon Boltzmann equation. It is assumed that the quasi-harmonic approximation for the stress in a deformed crystal in microscopic equilibrium may be generalized to non-equilibrium situations in a simple way. It is found that at very low frequencies the velocity is determined by the adiabatic elastic constants in agreement with classical continuum theory. At high frequencies, however, the classical isothermal result is not obtained, and in contrast to the classical result it is found that there is a change in velocity in going from low frequencies to high frequencies for pure shear waves. A rough estimate is made of the magnitude of this effect and it is decided that it should be observable under suitable conditions. (Author's abstract)

SIP 25588 551.326.7:551.321.62(*62)

Brown, J. R. and A. R. Milne
REVERBERATION UNDER ARCTIC SEA-ICE. J. Acoust. Soc. Amer., 42(1):78-82 incl. diagrs., illus., July 1967. 8 refs.
DLC, QC221.A4

Backscattering strengths were obtained from polar pack ice in the Beaufort Sea during April 1965. The ice surface in the experimental area consisted of 10%-15% of pressure ridges separating random patches of 1 yr ice. The results cover a frequency range of 40 to 10240 Hz and a grazing-angle range of 5°-85°. Comparison with earlier results obtained with the same equipment and methods but limited to frequencies of between 1280 and 10240 Hz indicates a strong relationship between surface roughness and scattering strength. The variation with frequency of scattering strength is small over the 8-oct range examined. However, at grazing angles below 20° and frequencies below the 320-640-Hz band, scattering strength falls with decreasing frequency. (Authors' abstract)

SIP 25589 551.578.46:546.57'151

Morgan, G. M., Jr. and J. Rosinski
A FIELD TECHNIQUE FOR DETECTING SILVER IODIDE IN SNOW. J. Appl. Meteorol., 6(4):656-661 incl. table, graphs, illus., Aug. 1967. 8 refs.
DLC, QC851.A66

A field technique was developed to detect silver iodide seeding agent in snow samples. The technique consists of collecting snow during a snow storm, forming liquid drops by melting pellets made from the snow, and refreezing the drops. A histogram of frequency of drop freezing plotted against temperature indicates the presence or absence of silver iodide in snow. (Authors' abstract)

SIP 25590 551.326.62:550.312(*60)

Heirtzler, J. R.
MEASUREMENTS OF THE VERTICAL GEOMAGNETIC FIELD GRADIENT BENEATH THE SURFACE OF THE ARCTIC OCEAN. Geophys. Prospecting, 15(2):194-203 incl. graphs, June 1967. 4 refs.
DLC, TN269.G4

Simultaneous measurements made on an ice island and about 1000 ft. below show that magnetic anomalies can be detected in the presence of large time variations of the magnetic field. Attenuation and phase lag of time variations at depth are measurable but do not limit the utilization of the vertical gradient of geomagnetic total intensity for defining crustal anomalies. (Author's abstract)

SIP 25591 911.2:551.48(*50)

Sofer, M. G.
CONDITIONS OF BREAKING ICE JAMS ON THE MALAI SEVERNAI DVINA RIVER IN THE REGION OF KOTLAS. (Ob usloviiakh proryva zatorov l'da na r. Maloi Severnoi Dvine v raione g. Kotlasa; Text in Russian). Izvestiia vsesoiuznogo geograficheskogo obshchestva, 99(3):239-240, May-June 1967.
DLC, G23.G16

Ice jams at the river junction were caused by narrowing of the channel at Pustoi I. located in the middle of its course. Decreasing stream velocity and water transmission capacity sharply increased the upper water level, forcing water to escape through the river branches. Expensive ice cutting and blasting produced little effect because the ice jams practically reached the river bottom. A detailed analysis of the morphometric, hydrological and hydraulic conditions at the jamming area has indicated that local broadening of the channel until it is sufficient for an unobstructed ice passage, and increasing the water level to maximum probability of a break-through will eliminate ice jamming. This measure proved very effective during Spring 1966 ice breaking at the river junction. -- NSV

SIP 25592 629.139.85:551.578.46:620.181

Ramseier, René O.
ROLE OF SINTERING IN SNOW CONSTRUCTION. Res. Rept. 214, U.S. Army Cold Regions Research and Engineering Laboratory, 14p. incl. tables, graphs, July 1967. 21 refs.
CRREL files

The mechanism of sintering and the effect of compaction on snow is discussed. Examples of possible snow runway construction using processed snow for

Site II, Greenland, and McMurdo Sound and Amundsen-Scott South Pole Station, Antarctica, are given. From theory and the examples discussed, it is concluded that snow runways capable of handling large aircraft can be constructed in any polar or temperate region with enough snow and temperatures below the melting point for a sustained period. (Author's abstract)

SIP 25593 551.326.2:54.03/.04

Weeks, W. F.
UNDERSTANDING THE VARIATIONS OF THE PHYSICAL PROPERTIES OF SEA ICE. Spec. Rept. 112, U.S. Army Cold Regions Research and Engineering Laboratory, 18p. incl. illus., graphs, diagrs., May 1967. 39 refs.
CRREL files

Information and test results are presented concerning the mechanism of growth, brine content, strength, structure, and dielectric properties of sea ice. Suggestions are given for improving methods of calculating growth conditions and a schematic drawing is given of the solid-liquid interface for sea ice together with photomicrographs of sea ice at low temperatures. (Author's abstract)

SIP 25594 551.467

Kagan, B. A.
ON TIDAL DRIFT OF ICE. (O prilivnom dreĭfe l'da; Text in Russian). Izvestiĭa Akademii Nauk SSSR, Fizika Atmosfery i Okeana. No. 8:881-889 incl. graph, maps, Aug. 1967. 5 refs.
DLC, QC851.A2732

A mathematical analysis is presented of the case when ice cover starts moving under the action of shearing stress originating at the ice-water boundary, acquiring certain finite velocity in accordance with the given external parameters. The velocity and direction of ice drift are obtained as a particular solution of the general problem concerning the structure of a tidal flow in the sea covered by floating ice. Proceeding from the solution of a system of equations describing such a flow, formulas are derived for the velocity and direction of the drifting ice, the oscillations of tidal level, the profile of tidal flow velocity, and the turbulence coefficient in the boundary layers of water adjacent to ice and the sea-bottom. The calculation results are illustrated by a practical example. -- NSV

SIP 25595 624.139.2.001.002(*50)

Bratsev, L. A. and Zhukov, V. F. (ed.)
THEORY AND PRACTICE OF GEOCRYOLOGY FOR THE BUILDING INDUSTRY. ACCORDING TO WORKING EXPERIENCE OBTAINED IN THE EASTERN PART OF THE EUROPEAN NORTH. (Teoriĭa i praktika merzlotovedeniĭa v stroitel'stve. Po opytu raboty v vostochnoĭ chasti Evropeĭskogo Severa; Text in Russian). Akademiĭa Nauk SSSR, Komi filial, Gosstroĭ SSSR Nauchno-issledovatel'skiĭ institut osnovaniĭ i podzemnykh sooruzheniĭ, Severnoe otdelenie, Izd-vo "Nauka", Moskva, 188p. incl. illus., tables, graphs, diagrs., 1965. Refs.
DLC, TA713.A436

This work is a continuation of the monograph "Geocryological Conditions of the Pechora Coal Basin" published by "Nauka" in 1964; it deals with the problems of a practical engineering nature. The characteristics of frozen and thawed ground of the Pechora coal basin are outlined, the methods of special geocryological study of the building objectives are discussed, different building techniques under particular permafrost circumstances and the conditions of their application are analyzed, and practical recommendations following from the experience are offered. Separate chapters deal with the design of coal mines, the analysis of shaft sinking, the ways of supporting shaft walls and the exploitation of coal mines under permafrost conditions. -- NSV

SIP 25596 551.345:622.333(*50)

Shamanova, I. I.
FROZEN GROUND ZONING IN MINE FIELDS OF THE PECHORA COAL BASIN. (Merzlotnoe mikroraĭonirovanie shakhtnykh poleĭ v Pechorskom ugol'nom basseĭne; Text in Russian). Vsesoĭuznoe geograficheskoe obshchestvo, Komi filial, Izvestiĭa, Vyp. 10:40-51 incl. tables, diagrs., map, illus., Syktyvkar 1965. 4 refs.
DLC, G23.G2625

A map was compiled showing a detailed subdivision of mine fields in the Pechora coal basin area into smaller zones according to the characteristic features of their seasonal freezing and thawing layers of soil, serving as a basis for the engineering, geological, and cryogenic evaluation of the terrain. General and particular regularities governing the formation of this layer were established and the division based on certain zonal distinctions reflecting the influence of climate, topography, lithology of ground, its moisture content and cryogenic structure, mean yearly temperature of the ground, mean velocity of its freezing and thawing, and the amplitude of temperature fluctuation at the soil surface. Types and sub-types of seasonally freezing and thawing grounds were distinguished and the areas of their development mapped. This procedure is explained in detail and illustrated by the practical example of the Ĭun'-Iagin coal field. -- NSV

SIP 25597 629.1:624.142(*50)

Popov, K. V.
PROBLEMS OF COLD-RESISTANCE OF TECHNICAL DEVICES IN SIBERIA AND THE EXTREME NORTH. (Problemy khladostoikosti tekhnicheskikh ustroistv v Sibiri i na krainem severe; Text in Russian). Akademiia Nauk SSSR, Gosplan SSSR, Problemy Severa, Ikonomika Izd-vo "Nauka", p. 121-129, Moskva, 1965. 14 refs.
DLC, GB395.P7

Excessive break-down of transportation vehicles under conditions of the extreme north is analyzed. Low temperature is the principal cause of engine malfunction since it affects the performance of the basic units and the mechanical parts, changes the properties of lubricants, makes more difficult the starting of an internal-combustion engine, and increases the brittleness of steel. It is recommended that special types of cold-resistant steels be used in fabricating the engines and vehicles intended for use in the extreme north to diminish the tendency of metal toward brittle failure by taking the cold-factor into consideration when designing separate details, and avoiding technology omissions in the process of fabricating these details. The performance of a vehicle can be improved by good practice, which is based on the knowledge and understanding of the nature of cold-brittleness of metals, and depends on the degree of qualification of the servicing personnel. -- NSV

SIP 25598 621.565.2.006.5(*50)

Mironov, N. G.
CONSTRUCTION AND USE OF UNDERGROUND COLD STORAGE. NORTHERN AND NORTH-EASTERN SOVIET UNION. (Stroitel'stvo i ekspluatatsiia podzemnykh kholodil'nikov. Sever i severo-vostok sovetskogo soiuza; Text in Russian). Akademiia Nauk SSSR, Bibirskoe otdelenie, Trudy Severo-Vostochnogo kompleksnogo nauchno-issledovatel'skogo instituta, Izd-vo "Nauka", Vyp. 15, 69p. incl. illus., tables, graphs, diagrs., Moskva, 1967. 34 refs.
DLC, QE699.A55

This monograph was written to fill gaps in the technical literature, which concerned the economic advantage of building underground coolers, and the solution of problems related to protection from ground-water penetration, to stability of roofs, and to the temperature regime. General information on the types of coolers, structural properties of frozen ground and buried ice, and the regions suitable for such structures are described. The design of underground cold storage chambers, the calculation of dimensions, volume, roof stability, and ground works is discussed and the formulas derived for the radius of cooling zone for single- and multi-chambers. The thermal regime of such structures and their advantages over surface coolers built for use under northern conditions are evaluated. -- NSV

SIP 25599 629.123:621.311

Sitbaev, M., B. Rasskazov, and E. Frik
ELECTRIC PROPELLER DRIVE OF THE ICE-BREAKER "KIEV". (Grebnaia elektricheskaia ustanovka ledokola "Kiev"; Text in Russian). Morskoi flot, p. 29-31 incl. diagrs., July 1967.
DLC, VM4.M6

The ice-breaker "Kiev" is the third ship of the "Moskva" series built in Finnland on the USSR order. Its electric propeller drive includes 8 main, irreversible, two-stroke, trunk diesel-generators of the type 9MN-51/55, their effective power being N_e = 3250 hp and the step control of the diesel rotation speed: 260, 300, 330 revol./min. The ice breaker has 3 aft rotors the middle one activated by two identical propeller drives coupled by a clutch. The scheme of its electronic control generator shows three separate principal circuits, which provide for different ways of connecting the main generators to the electric propeller drives. The activation system for the electronic control generator differs in many points from that in the previously built ice-breakers in this series. -- NSV

SIP 25600 629.11.013:625.04:620.178.7

Garbus, N. A. and others
COLD RESISTANCE STUDY OF COUPLING DEVICES OF BROAD-GAGE ROLLING STOCK. (Issledovanie khladnostoikosti nekotorykh detalei avtostsepnogo ustroistva podvizhnogo sostava zheleznykh dorog shirokoi kolei; Text in Russian). Trudy, Irkutskogo politekhnicheskogo instituta, seriia mekhanicheskaia, Vyp. 26:13-27 incl. graphs, illus., Irkutsk 1966.
DLC, T4.I72

Cold-resistance of cast steel items was studied by testing metal samples for impact bending at temperatures 0, -10, -20, -30, -40, -50, -60, and -70°C. The testing results are discussed separately for each detail and indicate that increased content of phosphorus, sulfur, nitrogen and oxygen in steel as well as non-metallic inclusions and pores lower its strength at minus temperatures. Coarse-grained steels are especially susceptible to cold destruction and their qualities could not be improved by additional normalizing and tempering. Hardening of steel in water followed by tempering at 600-650°C brought the critical temperature down to -50°C and the impact viscosity to 2 kg-m/cm^2. Steels treated this way are recommended for coupling devices of rolling stock. -- NSV

SIP 25601 581.524.32:551.345(57)

Lazukova, G. G.
USE OF VEGETATION AS AN INDICATOR OF PERMAFROST CONDITIONS. (Ispol'zovanie rastitel'nosti v kachestve indikatora merzlotnykh uslovi; Text in Russian). Vestnik Moskovskogo Universiteta, Geografii, 5(4):54-58 incl. table, July-Aug. 1967.
DLC, G1.M68

Plants growing on permafrost ground in the valleys of major Siberian Rivers are studied at the Department of Geocryology of the Geological Faculty, Moscow State University. Because the depth of seasonal thawing and freezing of ground depends on temperature, lithology and moisture content of rocks, thickness and density of snow cover, and on mean yearly amplitude of air temperature, the vegetation cover affects the freezing depth of ground and at the same time is a product of the same factors. General aspect of plant communities in all parts of permafrost regions is similar; it is characterized by thin forest of a low quality and yield index devoid of seedling growth, large numbers of swamp plants, and widely developed peat moss. -- NSV

SIP 25602 631.436(571.5)

Nesmelova, E. I.
PECULIARITIES OF HEAT-EXCHANGE DEVELOPMENT IN ACTIVE SOIL LAYER IN EASTERN SIBERIA. (Osobennosti razvitiya teploobmena deyatel'nogo sloya pochvy v Vostochnoy Sibiri; Text in Russian). Vestnik Moskovskogo Universiteta, Geografii, 5(4):83-90 incl. table, July-Aug. 1967. 9 refs.
DLC, G1.M68

In Eastern Siberia the thickness of the thawing-freezing soil layer is quite often less than that of the layer with seasonal temperature variations; the upper 2-3 meters of soil absorb more heat during warm seasons releasing it during the cold period than the whole underlying layer with the yearly temperature fluctuation. Thermal exchange (B) in soil was calculated according to the variation of heat content in this yearly "active" layer using formula

$$B = \int_0^z C(T_2 - T_1)\,z\,dz,$$

(where C - is thermal capacity by volume), the integral of which is divided into two parts expressing both layers separately:

$$B = \int_0^h c(T_2 - T_1),\,dz + \int_h^H C(T_2 - T_1),\,dz,$$

and the formula is further transformed to account for the quantity of heat used for phase transitions. The advantage of this method is its applicability to multilayered media and the possibility of characterizing seasonal variations in the thermal regime of soils. -- NSV

SIP 25603 551.35.054(268)

Sal'yanov, G. A.
TRANSFORMATION OF THE NEAR-SHORE TEMPERATURE FIELD IN THE PROCESS OF THERMAL ABRASION. (Metamorfizatsiya pol'ya temperatur pribrezhi'ya v protsesse termicheskoy abrazii; Text in Russian). Vestnik Moskovskogo Universiteta, Geografii, 5(4):104-106 incl. graphs, July-Aug. 1967.
DLC, G1.M68

Similarly to a flow of dissolved substances accompanying a chemical abrasion, a thermal abrasion transforms the temperature field near the eroding shore forming a flow of relatively cooler water along the shore. The parameters of this stream were measured by thermistors at the northern shore of Mostakh I., the Laptev Sea, in a direction perpendicular to the shore. Results indicated in all cases a gradual rising water temperature in the direction away from shore behind a cool flow zone 15 to 20 m wide. In this zone temperature gradients were reaching 1 to 2°C/m of water depth, while along the course of the flow they amounted to 0.1 to 0.01°C/m of flow movement along the shore, the temperature being quite stable within the zone. It is believed also that water-salinity in the cool stream may differ from its background values. -- NSV

SIP 25604 551.324.433(235.21)

Dikikh, A. N. and V. A. Blagoobrazov
PROBLEMS OF ARTIFICIAL ACCELERATION OF GLACIER MELTING IN TIEN SHAN. (Voprosy iskusstvennogo usileniya tayaniya lednikov na Tian'-Shane; Text in Russian). Akad. Nauk Kirg. SSR, Frunze. Tyan'shan. Vysoko. Fiziko-geogr. Sta., Roboty, Vyp. 11:14-26 incl. illus., tables, graphs, diagrs. Frunze, Izd-vo "Ilim", 1965. 13 refs.
DLC, GB2401.A55

An investigation into methods of accelerating the melting of ice and snow by artificial dusting was conducted on the Semenov and Kara-Batkak Glaciers with the conclusion that natural polution of glaciers is so strong that an additional recommended 5 g/m^2 of coal dust cannot substantially decrease the reflection factor of ice; even when 400 g/m^2 was used the effect was insignificant and short-lived. Considerable additional melting was obtained by repeated dusting during the entire ablation period which was economically unjustified. The conclusions reached were of a local nature, the justification of glacier dusting in other Tien Shan regions required further study. -- NSV

SIP 25605 551.324.5(235.21)

Tkachekno, V. K.
CONCERNING DAILY VARIATION OF GLACIER MOVEMENT VELOCITY. (K voprosu ob izmenenii poverkhnostnoĭ skorosti dvizheniĭa l'da v techenie sutok; Text in Russian). Akad. Nauk Kirg. SSR, Frunze. Tĭan'shan. Vysoko. Fiziko-geogr. Sta., Roboty, Vyp. 11:27-31 incl. table, graphs. Frunze, Izd-vo "Ilim", 1965. 14 refs.
DLC, GB2401.A55

This report is based on data obtained in 1962-1963 in connection with studying daily regimes of the Semenov Glacier movement using the optical theodolite TB-1 to measure progress every 2 hours. Glacier velocity was changing stepwise its increase beginning at 10-12 AM and lasting to the evening with subsequent gradual decrease toward the next morning. Variations in ice movement were noticed not only between the 2 hour observation intervals but also between successive days. In 1962 the general ice displacement per 24 hours was 10 cm while in 1963 it was 13.5 cm and 16.5 cm during the first and second observation days, respectively. Such variations are explained by changes in meteorological conditions; therefore, an attempt is made to establish a relationship between the variation of surface velocity of ice movement and air temperature. -- NSV

SIP 25606 551.324.412(235.21)

Dikikh, A. N.
THERMAL REGIME OF GLACIERS ON FLAT SUMMITS (FOR EXAMPLE THE GRIGOR'EV GLACIER). (O temperaturnom rezhime lednikov ploskikh vershin (Na primere lednika Grigor'eva); Text in Russian). Akad. Nauk Kirg. SSR, Frunze. Tĭan'shan. Vysoko. Fiziko-geogr. Sta., Roboty, Vyp. 11:32-35 incl. tables. Frunze, Izd-vo "Ilim", 1965. 4 refs.
DLC, GB2401.A55

Temperatures of the Grigor'ev Glacier were measured in several bore-holes 10, 20 and 30 m deep arranged along its longitudinal profile. Five temperature zones were distinguished in the ice but regularities governing temperature distribution with depth could not be established from short-term observations. The first zone 0.5 to 1.0 m in depth showed a sharp temperature variation from -6.8°C on the surface to -4.3°; the second zone of almost stationary temperature was between 1.0 and 2.5 m, temperature changing from -4.3° to -3.5°; in the cold middle zone temperature was constantly dropping from the 2.5-m depth reaching -5.8° at 10°m depth; the fourth zone between 10 to 30 m was characterized by a gradual temperature leveling and increase to -3.1°; in the fifth zone 40 to 50 m temperature was about -1.0° and almost stationary. The conclusion was reached that the upper 40 to 50 m of glaciers located on flat summits are the coldest due to rigid climatic conditions and moderate precipitation. -- NSV

SIP 25607 551.324.433(235.21)

Sumarokova, V. V.
FACTORS AFFECTING GLACIER MELTING IN THE ALA-ARCHA RIVER BASIN. (Faktory tafĭaniĭa lednikov v basseĭne reki Ala-Archa; Text in Russian). Akad. Nauk Kirg. SSR, Frunze. Tĭan'shan. Vysolo. Fiziko-geogr. Sta., Roboty, Vyp. 11:38-45 incl. map, tables, graphs. Frunze, Izd-vo "Ilim", 1965. 8 refs.
DLC, GB2401.A55

Meteorological and actinometric measurements were conducted in the Ala-Archa River basin located on the Frunze meridian in the altitude range 1600-4200 m. Some 20 glaciers were counted in the basin; their melting and movements were measured, the rate of evaporation evaluated, and the rate of ice melting under moraines and the effect of artificial dusting by coal powder on the reflection factor of ice were analyzed. This investigation was carried out to determine the basic and secondary ablation factors, to establish analytically the relationships among them, and to compute accurately the part contributed by the glacier waters to the general amount of run-off. -- NSV

SIP 25608 551.324.433:551.482.4(235.21)

Sumarokova, V. V.
EFFECT OF GLACIER MELTING ON RIVER DRAINAGE IN ALA-ARCHA BASIN. (Vliĭanie tafĭaniĭa lednikov na stok rek Ala-Archinskogo Basseĭna; Text in Russian). Akad. Nauk Kirg. SSR, Frunze. Tĭan'shan. Vysolo. Fizilo-geogr. Sta., Roboty, Vyp. 11:46-56 incl. tables, graphs. Frunze, Izd-vo "Ilim", 1965. 7 refs.
DLC, GB2401.A55

An attempt was made to calculate thicknesses of seasonal ablation layers for each glacier in this basin as well as the intraglacial and subglacial melting produced by heat flow toward the ice body from the bottom, heat generated by ice friction against the rocks, high internal pressures, and heat released by melt water and air penetrating into a glacier along fissures and cavities. Two methods are given for calculating the amount of glacial discharge per season accounting for the above factors. The results obtained are tabulated and the relations among different factors are presented graphically. They indicate that the volume of glacial melt water was not equal to that of the run-off from the glacier surface due to the controlling effect of intraglacial cavities, moraines, trapping of water in pot holes on the surface, its freezing on the ice surface during temperature drops, and partial penetration of melt water into the ground. A general mathematical procedure for computing the components of water-balance in glacial regions is described and illustrated by practical examples. -- NSV

SIP 25609 551.482.4:551.491.818

Tsytsenko, K. V.
EVAPORATION FROM THE SURFACE OF A MOUNTAIN DRAINAGE SYSTEM. (Isparenie s poverkhnosti gornogo vodosbora; Text in Russian). Akad. Nauk Kirg. SSR, Frunze. Tian'shan. Vysoko. Fiziko-geogr. Sta., Roboty, Vyp. 11:57-76 incl. tables, graphs, diagrs. Frunze, Izd-vo "Ilim", 1965. 7 refs.
DLC, GB2401.A55

Evaporation from the surface of the Ala-Archa drainage system was measured to evaluate this component of the total water balance in relation to the problem of artificial irrigation of mountain pastures in northern regions. The total figure represents the sum of moisture evaporation from different exposed surfaces: grassy slopes, hillside waste, snow cover, ice, etc.; values from derived formulas equalled 140, 180 and 166 mm for the years 1960, 1961 and 1962 respectively. The amount of evaporation is dependent on air temperature and on the amount of precipitation during summer seasons; low temperatures were responsible for the evaporation figure in 1960, and increased precipitation combined with high air temperature accounted for its value in 1961. -- NSV

SIP 25610 551.578.483:[551.578.46:53](235.21)

Shcherbakov, M. P.
VARIATION IN THE COHESION OF DIFFERENT SNOW TYPES AND FORECASTING THE FORMATION OF AVALANCHES. (Izmenenie velichiny stsepleniia razlichnykh vidov snega i nekotorye voprosy prognozirovaniia obrazovaniia lavin; Text in Russian). Akad. Nauk Kirg. SSR, Frunze. Tian'shan. Vysoko. Fiziko-geogr. Sta., Roboty, Vyp. 11: 77-81 incl. table, graphs, Frunze, Izd-vo "Ilim", 1965. 4 refs.
DLC, GB2401.A55

According to observations 54% of the total number of avalanches in Tien Shan were produced by recent snow. Relationships among the cohesive properties of such snow, the thickness of its cover, its density, and the resting period were determined empirically for Tien Shan and Altai Mt. The experiments were conducted in the Kokomeren River valley and included the measurement of snow cover temperature every 10 cm of thickness, density, total thickness of snow cover, its stratification, struct and physico-mechanical properties of recent /. The relation of cohesion to snow thickness and of the snow-cover thickness to the steepness of the slope are expressed graphically. A formula is derived for determining the moment of unstable equilibrium and the beginning of an avalanche. -- NSV

SIP 25611 551.33(235.21)

Gorbunov, A. P.
CRYOGENIC FORMATIONS IN THE BASIN OF AK-SHIIRAK RIVER. (Kriogennye obrazovaniia v basseine reki Ak-Shiirak; Text in Russian). Akad. Nauk Kirg. SSR, Frunze. Tian'shan. Vysoko. Fiziko-geogr. Sta., Roboty, Vyp. 11:82-94 incl. illus. Frunze, Izd-vo "Ilim", 1965.
DLC, GB2401.A55

Permafrost manifestation and the resultant cryogenic structures were observed mostly in the river valleys of this area. Descriptions are given for each tributary of the Ak-Shiirak River. The most frequent types were produced by solifluction, frost heaving, and thermokarst phenomena and were associated with definite localities on the northern slopes of steep valleys and altitude exceeding 3,000 m. They were entirely absent in rocky slopes or those facing south. Slight variations in climatic conditions, moisture content, steepness of the slope, and other factors, caused the appearance or disappearance of different cryogenic forms. -- NSV

SIP 25612 551.343.4(235.21)

Lisichek, E. N.
MOVEMENT OF LOOSE MATERIAL ALONG THE SLOPES OF MAI-KOLOT GORGE. (Peredvizhenie rykhlogo materiala po sklonam saia Mai-Kolot; Text in Russian). Trudy Instituta Geografii, 67(5):54-62 incl. tables, graphs, diagrs., 1956.
DLC, 236.A4

The quantity of talus moving along the slopes of the gorge during a dry-weather period was measured in five areas differing by the angle, lithology, and surface of the slope, with simultaneous observation of the temperature regime, air humidity, velocity and direction of winds. The tabulated results indicate that maximum material was accumulating during evening hours due to temperature fluctuation and the winds blowing downwards from the mountains to the river valley. The largest quantity of debris was moving along the precipitous bare slopes of south-eastern exposure, and the smallest, along the grass-covered 15-25° slopes facing north-west. Total quantity of talus moving over the whole area of the gorge in 24 hours varied from 49 to 202 kg, and from 945 to 5249 kg for one month, maximal quantities moving during August due to strongest temperature fluctuation and the largest number of rainless days. -- NSV

SIP 25613 551.345.1/.2(573)

Krîûchkov, V. V.
FORESTLESS TUNDRA IN NORTH-EASTERN SIBERIA AND ITS CAUSES. (Bezlesie tundrovoĭ zony severo-vostochnoĭ Sibiri i ego prichiny; Text in Russian). Izvestiîâ Akademii Nauk SSSR, Seriîâ geograficheskaîâ, No. 4:94-103 incl. illus., July-Aug., 1967. 32 refs.
DLC, G23.A35

Relationships among the type of vegetation, lithology, and thawing depth of soil in tundra were studied to explain the presence of localized arboreal growths in the marsh-tundra of northeastern Siberia in which the northern boundary of vegetation passes through the near-shore plain built of alluvial deposits containing 50-60% buried ice to a depth of 50-100 m. Hummocky marsh tundra was associated with clayey and loamy soil cut by vein ice, its maximum thawing depth ranging from 45 to 80 cm. In the southerly direction it passed into the forest-tundra in which the northern boundary of arboreal vegetation followed the line of 50 cm thawing. Separate islands of trees found in the marsh area were located about 100 km north of this boundary. They were always associated with sandy soils or bed-rock outcrops the thawing depth of which ranged from 60 to 80 cm. -- NSV

SIP 25614 551.324.51

Tîûlina, T. ÎÛ.
WAYS OF SOLVING THE PROBLEMS OF GLACIER MOVEMENT. (Puti resheniîâ problemy dvizheniîâ lednikov; Text in Russian). Izvestiîâ Akademii Nauk SSSR, Seriîâ geograficheskaîâ, No. 4:118-121. July-Aug., 1967. 15 refs.
DLC, G23.A35

A critical review is presented of different methods for solving the problems concerning rheological properties of ice and of their study in various models. Since the main difficulty for a theoretical solution lies in two kinds of ice movement in a glacier: the block movement and the visco-plastic flow, it is believed that the most promising technique is the modeling of this process on the basis of mechanical similarity by choosing the materials rheologically similar to ice and shaping them into a geometric model of a glacier, using the corresponding formulas of the similarity theory for the choice of material. This way, it is possible to study the glacier movement mechanism, verify the existing theories, determine the feasibility of other modeling methods, check the applicability of known numerical solutions of the differential equations for the case of glacier movement, and to verify the hypotheses concerning the origin of some structural features of glaciers. -- NSV

SIP 25615 551.508.2:551.578.46

Schwerdtfeger, Peter and Gunter Weller
THE MEASUREMENT OF RADIATIVE AND CONDUCTIVE HEAT TRANSFER IN ICE AND SNOW. Arch. Meteorol., Geophys. Bioklimatol., Ser. B, 15(1/2):24-38 incl. illus., tables, graphs, 1967. 11 refs.
DLC, QC851.A732

The importance of radiation as a mode of energy transfer in ice and snow is established and instruments are described which enable both radiated and conducted heat to be measured inside a cover. A novel high-sensitivity thermopile of simple construction has been calibrated by both laboratory and field methods. Preliminary measurements with these instruments for snow fields as different as those of the Australian Alps and Antarctica show that in both regions the sub-surface radiation plays an important part in the heat economy of the upper snow layers. (Authors' abstract)

SIP 25616 551.343(*532.6)

Voskresenskiĭ, S. S. and G. S. Anan'ev
STRUCTURE OF SLOPE DEPOSITS IN ZABAIKAL. (O stroenii sklonovykh otlozheniĭ Zabaikal'îâ; Text in Russian). Vestnik Moskovskogo Univ., Ser. 5, Geogr. No. 6:54-61 incl. illus., tables, diagrs., 1961.
DLC, G1.M68

The talus accumulations described differ in thickness but are similar in structure and composition resembling moraines. They consist of sandy loam with large quantities of rounded and striated boulders and gravel, the peculiar feature being linear veins of relatively compacted fine material cutting the main body of the deposit (which is in places disturbed by cryoturbations) in all directions. Such accumulations were formed by slow movement of waste material, its velocity depending on the slope steepness and variable hydrothermal conditions. Four structural layers are distinguished: the surface layer produced by sliding of the seasonally thawing part along the deeper frozen material, and the also active layer beneath whose movement is characterized by successive sliding of separate layers in proportion to the depth of seasonal thawing. One of the causes of this well defined layered structure was frost heaving of separate zones with subsequent melting and sliding down the slope. -- NSV

SIP 25617 551.343.4(*50)

Kostenko, N. P.
OBSERVATION OF GRAVITY DEPOSITS IN THE MOUNTAINOUS TAIGA ZONE (IN REFERENCE TO THE PROCEDURE OF PLOTTING SPECIAL GEOMORPHOLOGICAL MAPS FOR PRACTICAL PURPOSES). (Nablîudeniîa nad gravitafsionnymi otlozheniîami v gorno-taezhnoĭ zone. (K metodik sostavleniîa spefsial'nykh geomorfologicheskikh kart dlîa prakticheskikh fselefĭ); Text in Russian). Vestnik Moskovskogo Univ., Ser. Biol., Pochvovedeniîa, Geol. i Geograf. No. 1:89-99 incl. illus., diagrs., map, 1958. 4 refs.
DLC, QH301.M566

Active rock waste and the deposits closely resembling rock glaciers were studied on the valley slopes of mountainous taiga in relation to development of special morphological maps for engineering purposes. Different types of deposits moving by creep or solifluction are described, classified, and the yearly rate of their advancement evaluated. It is concluded that because rock streams consist of an upper layer of loose material and a dense lower layer their movement is of a complex differentiated nature, the upper layer progressing faster and sometimes in discrete increments, its velocity depending mostly on slope steepness, water saturation, and the intensity of weathering processes. For rock streams the yearly speed of movement does not exceed 1.5 to 2 m for the slope angles of 20 to 30°, while the maximum advancement of rock glaciers developing in permafrost regions on much gentler slopes does not exceed 0.5 m. -- NSV

SIP 25618 551.343(*50)

Iveronova, M. I.
MOVEMENT OF TALUS (EXPERIENCE IN BASE STATION INVESTIGATION OF TALUS MOVEMENT IN THE CHON-KYZYL-SU RIVER VALLEY). (Dvizhenie osypeĭ. (Opyt stafsionarnogo issledovaniîa dvizheniîa osypĭ v doline r. Chon-Kyzyl-Su); Text in Russian). Trudy Instituta Geografii, 60(4): 5-44 incl. illus., tables, graphs, diagrs., 1954. 15 refs.
DLC, GB236.A4

The movement of rock debris along mountain slopes under forces of gravity were studied in several talus cones produced mostly by physical weathering. The results indicated that the degree of mobility at different parts of the same cone-surface differed widely, the maximum movement for large Tien Shan cones being restricted to the upper levels and depending on the degree of material cohesion and on its slope angle. The talus movement was more intensive in the spring, less so in summer and fall, and almost extinct during winter. Depending on the speed of moisture penetration, slope, physical composition of the talus, and other factors, three forms of its movement were distinguished: rolling of separate boulders, general creep of material for short distances down the slope, and rapid band-like movement of debris along the slope for long distances (rock streams). The temperature factor was important only for separate smaller rock pieces oriented in a special way, the basic factors being the impact of falling blocks and the penetration of melt and rain water into the waste material. -- NSV

SIP 25619 551.343.4(234.8)

Matveev, N. P.
DYNAMICS AND AGE OF TALUS AND ROCK GLACIERS IN THE BALD MOUNTAIN ZONE OF NORTHERN URAL, THE DENEZHKIN KAMEN' PEAK TAKEN AS AN EXAMPLE. (Dinamika i vozrast osypeĭ i kamennykh potokov gol'tsovoĭ zony severnogo Urala na primere massiva Denezhkin Kamen'; Text in Russian). Problemy Severa, Vyp. 7:211-216, 1963. 6 refs.
DLC, GB395.P7

An attempt is made to obtain an approximate analytical solution of the problem concerning the movement of hillside waste under the action of the following forces: impact of falling rock-blocks, water freezing and melting of ice, expansion and contraction of rock debris caused by temperature fluctuation, force of moving water, rain impact, variation of the internal friction angle of falling debris due to icing or water absorption, solifluction, and avalanches. Three states are distinguished in this process and the formulas describing them are derived: the state of equilibrium stability; the conditions of equilibrium disruption, and the regularities governing the movement of falling debris. Knowing the velocity of a rock stream movement its age can be calculated from the distance traveled. -- NSV

SIP 25620 551.343.4

Treskinskiĭ, S. A.
ENGINEERING USE OF HILLSIDE WASTE. (Ob inzhenernom ispol'zovanii osypeĭ; Text in Russian). Avtomobil'nye Dorogi, No. 3(173):27-28 incl. illus., diagr., 1957.
DLC, TE4.S73

This comment concerns the P.I. Pushkin article "How to evaluate hillside waste when designing roads", published in No. 4 of "Avtomobil'nye

Dorogi", 1956. The author was studying talus in the Far East, Mongolia, Kirgizia, the Caucasus, the Urals, and other regions, and reached the conclusion that the majority of hillside waste, be it granite, slate, limestone, marl, or sandstone had a characteristic slope suggesting the conditions of its accumulation: an angle of 35° ± 2° was indicative of its formation under dry conditions. The author also observed and photographed crumbling of limestone mylonite during heavy rain: its slope after a few hours was 28°. It is believed, that the 14-18° slopes of the porphyritic debris observed in Safâny indicated crumbling of iced material falling from a great height rather than "dying out" of a formerly steep hillside pile as assumed by P. T. Pushkin. From the engineering standpoint talus is believed to be a good quality dam material with good water-transmission properties, the problem being in shaping it and making it stable. -- NSV

SIP 25621 551.343.4(573)

Glazovskiĭ, N. F., A. A. Lukashov, and fŭ. G. Simonov
CERTAIN PECULIARITIES OF ROCK STREAMS LOCATED IN THE SOUTH-EASTERN CHITA REGION. (Nekotorye osobennosti razmeshcheniâ kurumov na fŭgo-vostoke Chitinskoĭ oblasti; Text in Russian). Geograficheskoe Obshchestvo SSSR. Zabaikal'skiĭ otdel. Zapiski. Vyp. XXI:189-191, 1963.
DLC, Slavic Div.

Different types of rock streams observed in this area are described and the mechanism of their origin discussed. They were found in the form of talus aprons associated with the levels of ancient or recent denudation, the layers of coarse debris covering slopes of varied steepness and exposure, separate bands, or filling the bottom of valley heads Sometimes there was no visible source of their origin, or the bedrock occurred deeply below the debris. Quite often they formed entire landscapes the origin and dynamics of which is explained. Because frost weathering was the principal factor in their origin, their irregular distribution was explained by the peculiarities of water movement through fractured rocks and the conditions of its freezing. Thalweg zones are believed to be especially favorable for their development when the depth of seasonal freezing exceeds that of the loose deposits. -- NSV

SIP 25622 551.343(573)

Parmuzin, fŭ. P. and B. I. Prokopchuk
RECENT RELIEF-FORMING PROCESSES IN THE ORULGAN MOUNTAINS (WESTERN YANA RIVER). (Sovremennye rel'efoobrazuûshchie protsessy v gorakh Orulgana (zapadnoe Verkhoân'e); Text in Russian). Izvestiâ Akademii Nauk SSSR Seriâ Geograficheskaâ, No. 6:58-65 incl. illus., map., 1966. 3 refs.
DLC, G23. A35

Recent talus deposits formed in young mountains are described and the rate of rock destruction processes evaluated for the conditions of a sharply continental climate and the permanently frozen ground of polar and sub-polar regions. The Orulgan mountains are devoid of vegetation and entirely covered with talus from summits to river-beds; it is constantly moving along the steep and gently sloping sides, all over the alluvial fans, and even along the river terraces and their thalwegs with a speed sufficient to prevent the appearance of any vegetation. The typical elevations for physical rock destruction were 1000 to 1200 m., and those for temporary waste accumulations with subsequent reworking by frost-solifluction were 500-1000 m. -- NSV

SIP 25623 551.343.4(573)

Zamorûev, V. V.
ROCK GLACIERS IN KHAMAR DABAN MOUNTAIN RANGE. (Kamennye gletchery v khrebte Khamar-Daban; Text in Russian). Izvestiâ Vsesoiuznogo Geograficheskogo Obshchestva, 97(1):80-81, Jan. - Feb. 1965.
DLC, G23.R6

In the Khamar-Daban range stone glaciers are associated with cirques of north exposure, valley heads, and elevation range from 1700 to 2000 m. They are narrow bodies 700 meters to 1 km long displaying all stages of their development: from talus creep to foothill benches to lobate forms and to spatulate tongues, their micro relief becoming progressively more complicated. By their form and position in the cirque they strongly differ from the crescent-shaped moraines which have no visible relation to the waste movement along the cirque slopes. The rock glacier development depended strongly on the lithology of the source and the degree of rock fracturing in close contact with granitic bare mountains and tectonically weakened zones. -- NSV

SIP 25624 551.467 + 532.59

Kheisin, Dmitriĭ Evgen'evich
DYNAMICS OF ICE COVER. (Dinamika ledīanogo pokrova; Text in Russian). Gidrometeorologicheskoe Izd-vo., Leningrad, 215p. incl. tables, graphs, diagrs., 1967. 109 refs.
DLC, GB2403.K5

A mathematical theory is presented of wave processes developing in a floating ice sheet under the action of gravity and internal elasticity forces, hydrodynamic water pressure, and the disturbance produced by external forces. The scope of the work includes the purely oceanological side of the problem as well as strength problems in which the action of a system of dynamic loads on an ice sheet is analyzed. The previously published information on theoretical solutions and experimental results are considerably supplemented by the author's own investigation data and utilized. It is assumed that the reader is familiar with the fundamentals of hydrodynamics, theory of elasticity, Fourier series and integrals, and the functions of complex variables. -- NSV

SIP 25625 551.343.4(494)

Chaix, André
ROCK-GLACIERS IN THE SWISS NATIONAL PARK OF BASSE-ENGADINE. (Coulées de blocs (Rock-glaciers, Rock-streams) dans le parc national suisse de la Basse-Engadine; Text in French). Compt. Rend. Soc. Phys. et D'Hist. Natur. Genève, 36(1):12-15, Jan.-Mar. 1919.
DLC, Q67.G35

Three rock glaciers at elevations below 2000 m were studied in the National Park; one located in the Sassa Valley is briefly described. A regular glacier occupies almost the whole length of this valley and is bordered by two lateral moraines. In place of the frontal moraine the glacier channel ends in a kind of earthwork which overtops the moraines and represents a most typical part of a rock glacier. Its complicated surface relief appears to be identical to those in the U.S.A. described by Whitman, Cross and Howe. Borings into the glacier to a depth of 1 m 20 cm revealed material gradation from coarse angular stones to smaller gravel and to black-gray earth mixed with gravel. -- NSV

SIP 25626 551.467:551.521.14(268)

Spichkin, V. A.
ACCOUNTING FOR ALBEDO IN CALCULATING ICE THAW. (Uchet al'bedo pri raschetakh tafānifā l'da; Text in Russian). Leningrad. Arkticheskii i Antarkticheskii Nauchno-Issledovatel'skii Institut, Trudy, 269:71-78 incl. table, graph, 1966.
DLC, G600.L4

Starting with the heat balance equation for ice and considering the cited results of the research work of the drift stations "Severnyĭ Polius" 4 and 5 and the changes in albedo with the thickness and surface characteristics of the ice (shown graphically) the following equation is derived for the computation of ice melting: $h_t(n) = D(n) + C(n) + F(n)$, where D(n) is the least melting for a critically large thickness of ice and of snow or of ice crumbs on it; F(n) = additional melting considering the actual thicknesses, and C(n) = additional melting considering the floating snow on the ice. A nomogram is given for the computation of F(n) and C(n). A sample computation of the change in the ice thickness resulting from melting is given in a table. (Meteorol. & Geoastrophys. Abstract)

SIP 25627 551.343.4(494)

Chaix, André
ROCK GLACIERS OF THE SWISS NATIONAL PARK. NEW MEASUREMENTS AND COMPARISON WITH THE "ROCK STREAM" OF THE SIERRA NEVADA IN CALIFORNIA. (Les coulées de blocs du Parc National Suisse Nouvelles mesures et comparison avec les "rock stream" de la Sierra Nevada de Californie; Text in French). Le Globe, 82:121-128 incl. illus., tables, 1943.
DLC, G29.S5

The results of recent observations of two out of three rock glaciers occurring in the following valleys: Sassa, l'Acqua, Val Tantermozza, of the Swiss National Park are tabulated and discussed. The yearly rate of movement measured from 1918 to 1919 and in 1920 was 1 m 35 cm for the central part and correspondingly, 20, 40, 50 cm for the margins. New measurements in 1942 showed that the central mass of the Sassa glacier has been advancing at the rate of 1 m 36 cm per year, the same for l'Acqua being 1 m 58 cm. A more rapid movement of l'Acqua was explained by its greater volume. The yearly movement of the lateral parts ranged from 11 to 15 cm (Sassa) and from 57 to 1 m 24 cm (l'Acqua). The similarity between the structural and the surface-relief features of these rock glaciers and the rock streams of the Sierra Nevada are discussed. -- NSV

SIP 25628 551.343.4(*533)

Pal'gov, N. N.
NEW OBSERVATIONS OVER THE MOVEMENT OF THE NIZKOMORENNYI ROCK GLACIER IN DZHUNGARSKIY ALATAU. (Novye nabliūdeniĭa nad dvizheniem kamennogo gletchera Nizkomorennogo v Dzhungarskom Alatau; Text in Russian). Akad. Nauk Kazakh. SSR, Vyp. 8:200-204 incl. tables, diagrs., 1961.
DLC, G23.A34

The data obtained during the 6 year period 1953-59 and a short review of the measurement technique are presented. According to the results the advancement of this rock glacier during that period was slower compared to the 5 year period of 1948-53, the explanation being the leveling of the slope, a decrease in the amount of talus and moraine material inflowing into the glacier from the cirque sides, and certain changes in the dynamics of the main glacier (Nizkomorennyi) the rock glacier being its lower extension. The double row of measurement points running across the glacier indicated that the upper row was moving faster than the lower, its mean advancement being 120 and 92 cm compared to 89 and 68 cm of the lower row during the 5- and 6-year periods respectively. -- NSV

SIP 25629 551.343.4(*533)

Pal'gov, N. N.
OBSERVING THE MOVEMENT OF ONE ROCK GLACIER IN THE DZHUNGARSKIY ALATAU RANGE. (Nabliudeniĭa nad dvizheniem odnogo iz kamennykh gletcherov khrebta Dzhungarskiĭ Alatau; Text in Russian). Akad. Nauk Kazakh. SSR, Vyp. 2: 195-207 incl. illus., tables, diagrs., 1957. 7 refs.
DLC, G23.A34

The rock glacier observed is the continuation of Nizkomorrennyi Glacier on the northern slope of the Dzhungarskiy Alatau range (Kazakhstan) filling the bottom of a smaller cirque. Continuous talus creep along the cirque walls supplied large amounts of rock material for the glacier which differed somewhat from that of the associated moraines, the deposits of which covered the entire glacier surface in some places. Its movement was studied during one year period (1948-49) from seven observation points; the measurement results are tabulated and the rheological peculiarities of the glacier discussed. It was difficult to determine the actual distance of advancement during a year's period because certain obstacles on the way changed the glacier's course. -- NSV

SIP 25630 551.343.4(235.22)

Zamoruev, V. V.
ROCK STREAMS IN KATUNSKIY RANGE (CENTRAL ALTAI MT.). (Kamennye potoki v Katunskom khrebte (Tsentral'nyĭ Altaĭ); Text in Russian). Vsesoīūz. nauch. -issled. Geologicheskiĭ Institut, 90:126-133 incl. illus., diagrs., 1963. 4 refs.
DLC, QE1.L438

Rock streams widely developed in the Katunskiy range and described and the difference between them and similar developments like "kurumy" and moraines is discussed. Their characteristic feature is occurrence as single streams of rocks representing a separate elongated body resembling moraines. They are quite often mistaken for moraines but differ from them by the ability of independent movement and having a greater content of loose material. The origin of rock glaciers is discussed in relation to a short review of various opinions on this subject, reaching the conclusion that rock glaciers are a special form of debris movement that is a characteristic feature of high-mountain landscape, the origin and mechanism of development being similar in all regions of their origin. -- NSV

SIP 25631 551.322:548.54:536.48

Odencrantz, F. Kirk and Roger W. Buecher
TEMPERATURE-DEPENDENCE OF THE POLARITY OF ELECTRICAL CHANGES ON ICE CRYSTALS. Science, 158(3798):256-257 incl. illus., graph, Oct. 13, 1967. 5 refs.
DLC, Q1.S35

The electrical polarity of ice crystals produced from a supercooled cloud is temperature-dependent. The charge polarity appears to be associated with the crystal habit. This phenomenon may be important in precipitation and cloud electrification processes. (Authors' abstract)

SIP 25632 551.343.4(235.2)

Markov, K. K.
ON THE FORM AND ORIGIN OF MORAINES IN MOUNTAINS. (O forme i proiskhozhdenii moren v gorakh; Text in Russian). Moskovskiĭ Universitet, Uchenye Zapiski, 119(2):59-74, 1946. 10 refs.
DLC, Q60.M868

Two types of morainic deposits were observed in the Pamirs: stationary moraines, and accumulations consisting of similar material but moving under their own weight and increased plasticity acquired by water absorption. The second type occurred in two forms depending on topography: aprons on gently sloping ground and long spatulate tongues moving along river valleys or cirque gorges. Local

to the Pamirs the conclusion was reached that moraines are the product of glacial activity to a very small degree, because in this case the glacial erosion was insignificant compared to that by running water, but glaciers were acting as a transporting agent by transfering rock waste on their surface and saturating the already accumulated bodies with water thus helping them to flow. The mobile "moraines" are compared to the rock glaciers of Zailiiskiy Alatau several types of which are described. -- NSV

SIP 25633 551.343(*50)

Pushkin, P. I.
HOW TO EVALUATE HILLSIDE WASTE WHEN DESIGNING ROADS. (Kak otsenivat' osypi pri proektirovanii dorog; Text in Russian). Avtomobil'nye Dorogi, No. 4(162):21-22 incl. tables, diagr., 1956.
DLC, TE4.S73

Three types of hillside waste are distinguished on the basis of mobility which depends on the surface slope, the intensity of debris inflow, and the degree of compaction within the deposit. A table is given for classifying talus according to these factors. It is believed, from the standpoint of road building, solifluction is a phenomenon which cannot be utilized to advantage and requires countermeasures or must be avoided. Several means of stabilizing mobile hillside wastes are described and illustrated diagrammatically. -- NSV

SIP 25634 911.2:551.324.63(*685)

Govorukha, L. S.
ICE BALANCE AT USHAKOV ISLAND IN PRESENT CLIMATIC CONDITIONS. (O sootnoshenii prikhoda i raskhoda l'da na ostrove Ushakova v sovremennykh klimaticheskikh usloviiakh; Text in Russian). Izvestiia Vsesoiuznogo Geograficheskogo Obshchestva, 98(1):62-64, 1966. 4 refs.
DLC, G23.R6

Present state of ice covering the island and prevailing glaciological processes are discussed in light of new evidence obtained in 1963. Approximate calculations indicate a yearly increment of 0.02 km^3 in the ice-accumulation area and yearly loss of 0,1 and 0.01 km^3 of ice on account of ablation and calving respectively, the total yearly loss of ice amounting to at least 0.09 km^3 since maximum increment and minimum loss figures were used in the computations. The yearly waste of ice on Ushakov I. exceeded that of Franz Josef Land in a ratio of 1/340, the general trend of ice evolution being identical to that of other glacier regions in the Atlantic-European Glaciological Province. -- NSV

SIP 25635 551.343(*50)

Chigir, V. G.
CRYO-GEOLOGICAL PROCESSES IN A POLAR DESERT AS A CONSEQUENCE OF SEASONAL ICING OF ACTIVE LAYER. (Merzlotno-geologicheskie protsessy v poliarnoi pustyne kak sledstvie sezonnogo l'doobrazovaniia v deiatel'nom sloe; Text in Russian). Vestnik Moskovskogo Univ. Ser. Geograf., 5(2):67-71, 1965. 3 refs.
DLC, G1.M68

Regularities governing the movement of hillside waste, solifluction, sorting, and orientation of rock debris in permafrost regions were studied by observing the sinking of metal rods and rock fragments into ice due to their lower light reflection. This process is complicated by the variation of heat absorption within the same rock fragment and by heat inflow from the side of the ice-free ground, and resulting in a much longer horizontal than vertical displacement, which increases with the steepness of the slope and the amount of ice surrounding the rock fragments. This is considered to be most characteristic of talus creep in permafrost regions when the rock debris is devoid of fine-grained material filling spaces between individual stones. -- NSV

SIP 25636 551.345(235.216)

Gorbunov, A. P.
PERMAFROST IN INNER TIEN SHAN. (Vechnaia merzlota vo vnutrennem Tian'-Shane; Text in Russian). Vestnik Moskovskogo Univ. Ser. Geograf., 5(3):75-77 incl. map, 1965.
DLC, G1.M68

Cryogenic features of the high-mountain southern regions are described and the mechanism of their formation explained. The permafrost zone in Tien Shan is developed at altitudes exceeding 3000 meters, its lower boundary fluctuating between 3000 and 3300 m depending on local climatic differences. At lower altitudes there is a thin and unstable snow cover. A number of talliks associated with faults cutting through the permanently frozen ground were evident on land and assumed to be present under larger lakes. Other characteristic features were thermokarst topography formed in moraines by thawing of ice-lenses, seasonal frost heave hummocks up to 30 m. in diameter, and the solifluction processes which in this region are restricted to the permafrost zone. -- NSV

SIP 25637 911.551.467

Kupefskiĭ, V. N.
CONCERNING SEA ICE LUMINESCENCE. (O lîuminisfsentsii morskikh l'dov; Text in Russian). Izvestiîa Vsesoîuznogo Geograficheskogo Obshche-. stva, 99(1):67-70, 1967. 17 refs.
DLC, G23.R6

A critical review is presented of the literature published on this phenomenon with the conclusion that two types of ice luminescence have been established: a lasting green glow appearing in separate spots, and momentary blue flashes. The first is believed to be of a biogenic origin its manifestation depending on the activity and yearly life-cycle of glowing organisms; the second is of an electrical nature depending less on the surrounding medium, goegraphical location, and ice age than on the intensity of ice destruction, its thickness, and the solidity of ice cover. The first type prevails in the primary forms of young sea-ice where water salinity exceeds 10%, the second in all types of ice regardless of water salinity. It is recommended to try applying the well known method of luminescence analysis, used for studying admixtures in minerals, to the investigation of natural ice. -- NSV

SIP 25638 911.2:551.324.22(235.22)

Reviîakin, V. S.
BELUKHA GLACIERS IN 1965. (Ledniki Belukhi v 1965 godu; Text in Russian). Izvestiîa Vsesoîuznogo Geograficheskogo Obshchestva, 99(1):70-75 incl. tables, diagr., 1967. 8 refs.
DLC, G23.R6

Data obtained in periodic surveying of the Belukha Glaciers starting with the year 1895 indicated that the middle of the 19th century was a turning point in the Altai glacial regime manifest in an overall and still active reduction accompanied by deposition of end-moraines. Only the Gebler Glacier moraines could be dated accurately, but the morphological similarity of those associated with other glaciers left no doubt about their simultaneous origin. Against the background of general climatic conditions, the retreat of each Belukha Glacier depended on its size and the mode of occurrence. While the ice-covered area was decreasing the number of glaciers increased with progressive thawing due to the division of major bodies into separate units. -- NSV

SIP 25639 911.2:551.48:551.467(235.22)

Kamalov, B. A. and N. V. Petrov
ON THE GLACIATION OF SARYTAG RIVER BASIN. (Ob oledenenii basseîna reki Sarytag; Text in Russian). Izvestiîa Vsesoîuznogo Geograficheskogo Obshchestva, 99(1):75-76, 1967. 4 refs.
DLC, G23.R6

Widely developed glaciation is the characteristic feature of the Sarytag River basin which affects the drainage in different ways. This basin has the largest glaciation coefficient (relating the ice covered area to that of the whole basin) among the particular basins of the Zeravshan River (Altai Mts.). According to investigations in 1964 the glaciers in this area are separated, consisting predominantly of smaller forms filling cirques, the outcrops around them showing fresh traces of glacial scouring. Recent moraines are associated with some but the ancient end-moraines extend for 4 to 5 km beyond their ice margins indicating the scale of former glaciation. These eroded, smoothed, and forested morains filter and clarify melt waters passing through them, control daily water discharge of the river and even the amount of yearly drainage. -- NSV

SIP 25640 551.515.13:551.324.6:551.336(7)

Malkin, N. R.
RETREATS OF THE AMERICAN ICE SHEET AND THE SHIFTING OF CYCLONE PATHS. (Otstupanie amerikanskogo lednika i smeshchenie putei tsiklonov; Text in Russian). Geograficheskoe Obshchestvo SSSR, Izvestiîa, 98(4):326-332 incl. graph, illus., July-Aug., 1966. 19 refs.
DLC, Slavic Div.

Using the well-known events of the North American late glacial age, the author attempts to verify his hypothesis on the influence of depressions in the relief of the Earth, which serve as the paths of cyclones and marine currents, on the development of continental glaciers. According to this hypothesis the fluctuation (retreat and advance) of glaciers is explained by the interaction of planetary warming and the movement of cyclones over depressions resulting from retreating glaciers. The graphs of R. F. Flint showing 3 fluctuations in the movement of ice 20,000-8000 yrs ago in the Great Lakes region, the Cochrane substage; and the end of glaciation are discussed. (Meteorol. and Geoastrophys. abstracts)

SIP 25641 551.578.468:551.326.2

Koptev, A. P.
ROLE OF SNOW COVER IN HEAT EXCHANGE PROCESSES. (O roli snezhnogo pokrova v protsessakh teploobmena; Text in Russian). Prob. Arktiki Antarktiki, Leningrad, No. 22:82-89 incl. tables, graphs, 1966. 13 refs.
DLC, G575.L422

The ratio of the coefficient of heat insulation by snow cover to the thickness and compactness of ice was tabulated and presented in a graph. The table shows that the total heat exchange from the surface of the snow and ice cover decreases considerably with a thicker snow blanket. The role of snow cover in ice formation and the variation in the thickness of ice and its growing speed was estimated. It was found that the dominant factors are the air temperature and the variations of radiative balance. (Meteorol. and Geoastrophys. abstracts)

SIP 25642 551.345:625.14:537

Maksimenko, N. N., O. I. Uvarov and V. P. Chumakov
CALCULATION OF CONDUCTIVITY OF PERMAFROST GROUND. (K voprosy rascheta provodimosti mnogoletnemerzlykh gruntov; Text in Russian). Elektrosviaz', No. 5:75-77 incl. graphs, May 1967. 1 ref.
DLC, TK5101.A1E5

Apparent electrical conductivity of permanently frozen ground was determined by measuring the inductance between two single-wire lines and the resistivity in one wire-earth loop. The emf induced in a two-wire line was calculated from the data on apparent conductivity of the ground. The computation results were verified by measuring line emf by VK-7 voltmeters. Zones of current flow from single-track rails were studied by introducing current into the rail and measuring its variation and that of electrical potential along the track. The results indicate that due to high specific resistivity of the permafrost surface layers in the Extreme North the coefficient of current potential along rails is considerably lower compared to that of the middle latitudes. -- NSV

SIP 25643 551.578.48(235.21:*533)

Shcherbakov, M. P.
EXPERIENCE IN AVALANCHE ZONING OF KIRGHIZ TERRITORY. (Opyt lavinnogo raĭonirovaniĭa territorii Kirgizii; Text in Russian). Akad. Nauk Kirgizskoĭ SSR. Geogr. Obshch. Izv.,, Vyp. 6: 5-19 incl. illus., tables, maps, 1966. 7 refs.
DLC, AS581.F753

An attempt was made to subdivide the Kirghiz territory according to intensity of snow slides, expressed in terms of volume and frequency of occurrence; into regions of definite degrees of such danger and definite conditions of origin and regime of avalanches. The work is based on the geomorphology of the territory and the conditions of snow-cover occurrence. The results are tabulated and illustrated by four maps showing the observation sites, the dangerous areas, the variation in snow-slide intensity, and the final subdivision of the territory according to the degree of such danger into five regions: Northern Tien Shan occupying an intermediate position, Western and Central Tien Shan being the area of maximum avalanches, and Inner and Southern Tien Shan, the zone of minimal activity. -- NSV

SIP 25644 551.345(235.21)

Atakanov, U. A.
PERMAFROST ON SARY-DZHAZ HIGH ALTITUDE WATERSHEDS. (O mnogoletnemerzlykh gornykh porodakh na Sary-Dzhazskikh syrtakh; Text in Russian). Akad. Nauk Kirgizskoĭ SSR. Geogr. Obshch. Izv., Vyp. 6:77-83 incl. illus., map, 1966.
DLC, AS581.F753

General conditions of occurrence and development of perennially frozen grounds in this region of Tien Shan are described and discussed concluding that the following circumstances favor a state of preservation: peculier geographic position of the region, proximity of large glaciation centers, orographic closure, distant position from seas, surrounding Asiatic deserts, and high elevation above sea level. These factors create unusual heat-exchange between soil and atmosphere resulting in a sharply continental climate, intensive solar radiation, little cloudiness, low average yearly air temperatures with large daily and seasonal fluctuations. Various cryogenic phenomena originate as a result of ground deformation affected by repeated freezing-thawing and irregular cooling in the seasonally frozen layer. These formations depend on the composition, humidity, ice content, temperature, and freezing speed of the frozen layer, the structure of the upper zone of the perennially frozen ground, and the course of thermo-mechanical interaction between the latter. -- NSV

SIP 25645 551.343(*533)

Aristov, I. F.
DATA ON FROST WEATHERING AND SOLIFLUCTION IN THE ZONES OF LOW AND INTERMEDIATE MOUNTAINS IN THE KIRGHIZ ALA-TAU RANGE. (Nekotorye dannye o moroznom vyvetrivanii i solifliuktsii v nizkogornoĭ i srednegornoĭ zonakh khrebta Kirgizskiĭ Ala-Tau; Text in Russian). Akad. Nauk Kirgizskoĭ SSR. Geogr. Obshch. Izv., Vyp. 6: 105-106 incl. table, 1966.
DLC, AS581.F753

A three-year study of this region is presented with a discussion on the speed of ravine growth and terrace retreat. Solifluction was observed on mountain roads, erosion scarps, and animal trails, the frost weathering reducing slopes ranging from 25 to 50° to 3 to 5°. Eroded ground flowed as tongue-shaped bodies forming characteristic triangular ridges in areas of spread. Average speed of ravine growth and that of mountain slope collapse was 12.3 and 12 cm/year respectively. The downhill flow of soil was observed only during the fall-winter-spring seasons indicating the major role of frost weathering in these processes. -- NSV

SIP 25646 551.343(235.21)

Turbin, L. I. and A. G. Konfūkhov
CRYOGENIC FORMATIONS OF INNER TIEN SHAN. (Merzlotnye obrazovaniīa vnutrennego Tīan'Shanīa; Text in Russian). Akad. Nauk Kirgizskoĭ SSR. Geogr. Obshch. Izv., Vyp. 6:107-110, 1966. 3 refs.
DLC, AS581.F753

Cryogenic structures of ancient and recent origin observed during the geological survey (1961-64) are described including the following: cryoturbations appearing in the terrace outcrops of the Chu River as disharmonic almost diapiric sharply slanted and overturned folds ranging in size from 0.1 to 1.2 m; polygonal fractures covering the flat surfaces of terraces at absolute altitude 2050 m; thermokarst developed in glacial plains built of morainic deposits; series of veins 1.8 to 2.0 m long in the ground, formed by melting of vein ice and filling with fine material; hummocky turf developed along the thalwegs of glacial and river valleys, and hummocky ground devoid of any vegetation occurring in the highly elevated intermontane basins. The mechanism of the appearance and disappearance of small islands in local lakes is explained by combined action of permafrost processes and neotectonic movements. -- NSV

SIP 25647 551.343.4

Cailleux, André
DISTINCTIVE FEATURES OF ROCK STREAMS BOUND BY INTENSIVE FREEZE. (Caractères distinctifs des coulées de blocailles liées au gel intense; Text in French). Compt. Rend. Soc. Geol. France, No. 15:323-325 incl. table, 1947.
DGS, G(540) F85

Three new distinguishing features of rock glaciers are added to the previously established ones for a better definition and identification of such bodies: 1) their slope; 2) percentage of the largest fragments oriented with their apparent length parallel to the slope, i.e. those forming an angle smaller than 45° with the maximum slope, and 3) percentage of largest fragments the length of which is more or less oriented in a plane vertical to the largest slope. According to that, rock glaciers will differ from hillside waste by a smaller slope (7 to 24° compared to 27 to 40°) and strong prevalence of fragments oriented in the vertical plane. -- NSV

SIP 25648 551.326.02:551.46:621.396.9(08)

Bogorodskiĭ, V. V., (ed.)
USE OF RADIOPHYSICAL METHODS IN OCEANOGRAPHY AND ICE INVESTIGATIONS. (Primenenie radiofizicheskikh metodov v okeanograficheskikh i ledovykh issledovaniiakh; Text in Russian). Arkt. Antarkt. Nauch.-Issled. Inst. Leningrad, 1965, 106p. incl. diagrs., tables. 8 refs.
DLC, GC57.L4

Reports presented at the First All-Union Conference on the Use of Radiophysical Methods in Oceanography and Ice Observations held in Leningrad, Jan. 23-24, 1964 are: Borisenkov, E.P., First All-Union Conference on the Use of Radiophysical Methods in Oceanographic and Ice Investigations and its problems. Bogorodskiĭ, V.V. and Rudakov, V.N., Use of polarization and interference of electromagnetic waves for determining the thickness of sea ice. Rudakov, V.N., Flaw detection in snow and ice cover with the aid of electromagnetic waves. Borogodskiĭ, V.V. and Rudakov, V.N., Electromagnetic parameters of snow, ice, fresh and sea water. Loshchilov, V.S. and Shil'nikov, V.I., Use and prospects of the radar method in aerial reconnaissance of ice. Mizinov, P.I. and Tsurikov, V.L., Generalization of an experiment in the use of radar in oceanographic observations. Bogorodskiĭ, V.V. et. al., Electrical phenomena which arise during water crystallization. Paka, V.T., Investigation of the temperature field of the upper levels of the sea using a method of continuous temperature recording along a ship's route. Tsvetkov, V.N., Investigation of micro-nonhomogeneities in the water layer just beneath the ice in the Arctic. Kudriavtsev, N.F., Experiment and problems in using radar in sea current investigations. Bogorodskiĭ, V.V. and Dobrotin, D.D., Radiophysical methods of studying mechanical characteristics of submerged ground in the Arctic Basin. Zubkovich, S.G. and Marchenko, Iu. I., Possibilities of determining certain characteristics of sea swell with the aid of electronic instruments, installed in aircraft. Chapurskiĭ, L.I., Detection of clouds against a snow background. Melkov, F.I. and Rublev, P.A., Use of infrared equipment during observations of ice conditions. -- FMM

SIP 25649 551.467:001.4(26)

Tsurikov, V. L.
ON THE PROBLEM OF INTERNATIONAL ICE NOMENCLATURE. (K voprosu o mezhdunarodnoi ledovoi nomenklature; Text in Russian). Okeanologiia, No. 2:372-378 incl. table, 1966. 10 refs.
DLC, GC1A47.A23

Fundamentals of both the WMO International and the Soviet Ice Nomenclatures are discussed in relation to Moira Dunbar's request for review, with emphasis on the terms "slush", "ice rind" and those suggested by M. Dunbar for different stages of ice development. A comparative table is presented showing the Soviet ice classification of 1954, International classification of 1956, recent Canadian proposals and Soviet suggestions. -- NSV

SIP 25650 551.343.4(494)

Chaix, André
ROCK GLACIERS IN THE SWISS NATIONAL PARK OF ENGADINE. (Les coulées de blocs du Parc National Suisse D'Engadine; Text in French). Le Globe, Vol. 62:1-38 incl. illus., maps, 1923.
DLC, G29.S5

The results of successive surveying of rock glaciers in the Sassa and Acqua Valleys during 1918, 1919, and 1920 are described in detail and discussed. Description includes surface forms, material composition, and the rates of movement. In Sassa the middle parts of the glaciers were moving with an average velocity of 1 m 35 cm per year, which movement was believed to be responsible for the surface features of these bodies. The lateral parts were advancing at different speeds averaging approximately 40 cm on the right and 85 cm per year on the left side. These rates were somewhat higher for the Acqua rock glaciers. It is concluded that the rock glaciers described originated on the terrain evacuated by the normal glaciers, by a slow sliding of the material forming the frontal morraine of the glaciers, and that their present movement is a continuation of the former advancement of this material with the difference that no new material is added. -- NSV

SIP 25651 551.324.84:551.321(*2)

Hamilton, Wayne L.
MEASUREMENT OF NATURAL PARTICULATE FALLOUT ONTO HGH POLAR ICE SHEETS. PART II. ANTARCTIC AND GREENLAND CORES. Res. Rept. 139, Part II, U.S. Army Cold Regions Research and Engineering Laboratory, 40p. incl. graphs, diagrs., appendixes A-F, March 1967. 5 refs.
CRREL files

Greenland and Antarctica ice samples were analyzed for size distribution of the particulate content. Samples are from Little America V, age 800 yr; Byrd Station, age 1340 yr; Byrd Station, age 450 yr; and Site 2, Greenland, age 220 yr. Particle concentration is lower in the younger Byrd samples than in the older ones. Concentration was seen to vary cyclically with depth. Annual accumulation determined by peak to peak measurement on the dust concentration profiles compares favorably with that determined by surface stratigraphy. The results indicate that winter snow is dirtier, mean particle size changes as a result of relatively discrete addition of well sorted fallout to the log-normal distribution, and that annual accumulation of dust was about 8 times higher in Greenland than in Antarctica at the times represented by the samples studied. (For Part I See SIP 24286) (Author's abstract)

SIP 25652 532.526:518.5
551.324.51

Odar, Fuat
A NEW SOLUTION OF THE BOUNDARY LAYER EQUATION AND ITS APPLICATIONS. Res. Rept. 217, U.S. Army Cold Regions Research and Engineering Laboratory, 29p. incl. tables, graphs, appendixes A-F, Aug. 1967. 7 refs.
CRREL files

Solutions of the boundary layer equation for an unsteady flow have previously been obtained for only a few boundary conditions such as those which exist in suddenly accelerated or uniformly accelerating flows. In this paper a general solution using the method of successive approximations for an arbitrarily accelerating flow is presented. The solution, which is expressed in an integral form including the acceleration as a chosen function of time, is valid for both two-dimensional and axially symmetrical flows. An example is presented in which the variation of velocity outside of the boundary layer is a fourth degree polynomial in time multiplied by a function depending on shape of object. (Author's abstract)

SIP 25653 551.322:548.5/.54:536.483

Kumai, Motoi
A STUDY OF HEXAGONAL AND CUBIC ICE AT LOW TEMPERATURES. Res. Rept. 231, U.S. Army Cold Regions Research and Engineering Laboratory, 21p. incl. illus., tables, graphs, July 1967. 19 refs.
CRREL files

The formation of hexagonal and cubic forms of ice was studied by the use of a cold stage in an electron microscope within the temperature range of -190 to -170°C. Ice crystal specimens were made on cold substrates, i.e., a collodion film, gold foil, or copper grid on the specimen holder of the cold stage. The structural forms of the ice were detected with the electron microscope using the selected area electron diffraction method. The hexagonal form of ice formed on the cold substrates at temperatures

from -90 to -100°C. At -100 to -130°C, both hexagonal and cubic forms of ice were detected. From -130 to -160°C only cubic ice was found. At temperatures below -170°C, minute crystals of cubic ice were detected. No transformation of the structural form of ice from hexagonal to cubic or from cubic to hexagonal occurred when the temperature of the specimens was varied in the range of -90 to -160°C. The minute crystals of cubic ice formed below -160°C were transformed into larger cubic ice crystals by heating them to a temperature between -130 and -150°C. The lattice constants of hexagonal and cubic ice, and the coefficient of thermal expansion of ice were calculated from the experimental results. (Author's abstract)

SIP 25654 551.322:536.2

Yen, Yin-Chao
AN ANALYTICAL AND EXPERIMENTAL STUDY OF A MELTING PROBLEM WITH NATURAL CONVECTION. Res. Rept. 234, U.S. Army Cold Regions Research and Engineering Laboratory, 13p. incl. table, graphs, July 1967. 4 refs.
CRREL files

The correlation by O'Toole and Silveston (1959) of natural convection heat transfer for fluids confined between two parallel horizontal plates has been extended to the case involving phase change. The new correlation, which is applicable for melting from below in a water-ice system, is described with special focus on theoretical considerations, estimation of heat flux, and the experimental and analytical results. In all experiments, bubble-free, homogeneous ice samples were prepared beforehand to assure reliable and reproducible results. In general, the results from theory and experiment are in close agreement. (Author's abstract)

SIP 25655 551.482.212.3(479)

Ermakov, Ĭu. G.
MORPHOLOGICAL FEATURES OF THE GERKHOZHANSU RIVER VALLEY CHARACTERIZED BY ROCK-STREAM DANGER (CENTRAL CAUCASUS). (Morfologicheskie osobennosti doliny seleopasnoĭ r. Gerkhozhansu (Tsentral'nyi Kavkaz); Text in Russian). Vestnik Moskovskogo Univ., Ser. 5, Geograf. 2:137 incl. illus., 1967.
DLC, QC851.M27

An attempt was made to establish a set of local features characterizing river valleys in which sudden movements of rock trains can be expected, thus avoiding time-consuming detailed investigation of entire basins. The most typical features were rock ridges and rock terraces in such valleys; the first representing a haphazard piling-up of boulders ranging in size from 0.20 to 4 m, devoid of any filling material, and extending along the river channel; the second were flat platforms built of smaller boulders and gravel with sandy filling. Both types of structures were traced upstream almost to the place of the rock-stream origin. They were not observed in the river valleys where rock streams were absent or where there was no danger of sudden movement. -- NSV

SIP 25656 551.482.212.3:551.4(571.56)

Anan'ev, G. S.
TRACES OF ROCK STREAM ACTIVITY IN THE UPPER COURSE OF THE KOLYMA RIVER. (Sledy defâtel'nosti seleĭ v verkhov'îakh r. Kolymy; Text in Russian). Vestnik Moskovskogo Univ., Ser. 5, Geograf. 2:138-140 incl. illus., map, 1967. 5 refs.
DLC, QC851.M27

Rock-streams observed in the Khibiny Mts. and Sub-polar and Polar Urals differed in origin and material composition from those in Central Asia; they were studied in the upper course of the Kolyma River at mean elevation of 1400 m and typed as "water-rock streams". The area of their development was characterized by Alpian topography, bald steep slopes, glacial cirques, smooth almost vertical walls of river valleys, and the end-moraines left by ancient glaciers, which supplied most of the material for rock streams. Their movement was associated with seasonal snow melting when large masses of rock waste activated by streams with velocities reaching 4 m/sec were descending along smooth valleys devoid of any vegetation. Their deposits differed from those of solifluction processes by the coarseness of material and lack of the clay-silt fraction. Morphology and basic parameters of the valleys favorable for the development of water-rock streams are listed. -- NSV

SIP 25657 551.482.213

Lekhatinov, A. M.
DENDROLOGICAL METHOD OF DETERMINING TIME AND PERIODICITY OF ROCK STREAM MOVEMENT. (Dendrologicheskiĭ metod ustanovleniîa vremeni i periodichnosti prokhozhdeniîa selevykh potokov; Text in Russian). Vestnik Moskovskogo Univ., Ser. 5, Geograf. 2:140-142, 1967. 3 refs.
DLC, QC851.M27

This dendrochronological method consists of dating the events of catastrophic rock stream movements and the variations in environment in former periods by comparative study of growth rings in the stumps of sawn-off trees. For this purpose the trees are chosen in the areas of rock stream development and cut down according to a definite pattern after their orientation with respect to the channel of the stream

is established. Observations made of their growth rings indicate the age of the tree; the year of its mechanical injury by passing rock streams; repetition of rock stream movements, and maximum daily amount of precipitation. Such studies in the region north of Baikal indicated that rock stream movements of maximum destructive force originated on certain ridges which had daily precipitation exceeding 40 mm, repeating periodically every 10 to 15 years. -- NSV

SIP 25658 634.928.53:625.164

Fedĭushin, V. T. and N. P. Ivlev
EFFECTIVE SNOW FENCING BY PLANTING. (Effektivnye snegozashchitnye nasazhdeniĭa; Text in Russian). Avtomobil'nye Dorogi, No. 4(294):24-25 incl. graph, diagr., 1967.
DLC, TE4.S73

The method described was used in Central and Western Kazakhstan where snow cover stabilizes in November and continuous strong winds are a constant cause of snow storms and drifts. The fencing procedure consists of planting parallel rows of trees including definite combinations of certain tree types, each row presenting a different degree of resistance to snow passage. The composition, length, and distances between individual tree rows were varied depending on the degree of snow protection required. -- NSV

SIP 25659 551.467.3

Shesterikov, N. P.
ABSORPTION OF SOLAR RADIATION BY THE ICE UNDER A POOL. (O pogloshchenii solnechnoĭ radiatsii l'dom pod snezhnitseĭ; Text in Russian). Prob. Arktiki Antarktiki, Vyp. 25:66-70 incl. tables, graph., diagr., 1967. 3 refs.
DLC, G575.L422

Solar radiation (q) penetrating a pool and absorbed by the ice beneath was mathematically analyzed using the q attenuation coefficients in sea water obtained by N. T. Chernigovskiĭ for clear water and by V. M. Klimovich for river water inflow, and assuming that the attenuation of short-wave radiation with depth follows the Bouguer-Lambert law. A formula is derived for calculating q absorbed by different layers of ice accounting for changes during melting. The results indicate that q depends very little on the pool depth if the water is clear, so that stages of ice destruction are more advanced in this case. In the river-water pools, melting of the ice surface proceeds more rapidly than in clear water, but the internal ice layers absorb less radiation and therefore, are much stronger. -- NSV

SIP 25660 551.326.7(268)

Nazintsev, Iŭ. L.
EQUILIBRIUM CONDITION OF POLAR ICE. (O ravnovesnom sostoianii polĭarnykh l'dov; Text in Russian). Prob. Arktiki Antarktiki, Vyp. 25:77-83 incl. table, graph, diagr., 1967. 16 refs.
DLC, G575.L422

A state of equilibrium is reached by ice when the opposing effects of atmospheric cold and oceanic heat are balanced. This particular case for drifting polar ice can be used for evaluating the thickness that can be reached by growing ice, and the changes when the thickness exceeds or is below the balanced thickness. In problems involving polar ice and climate, the balanced thickness becomes a climatic characteristic of the corresponding geographical region. An attempt is made to calculate the state of polar ice equilibrium on the basis of theoretical postulates, and to evaluate the effect of different thermal factors determining the variation of its thickness in a balanced state. -- NSV

SIP 25661 551.46.062.5(0.98)

Shpaĭkher, A. O., Dĭubkin, I. A. and Konstantinov, Iŭ. B.
CONCERNING THE ACCURACY OF MEAN WATER TEMPERATURE VALUES IN THE ARCTIC BASIN. (O tochnosti srednikh znacheniĭ temperatury vody v Arkticheskom basseĭne; Text in Russian). Prob. Arktiki Antarktiki, Vyp. 26:35-38 incl. table, 1967. 7 refs.
DLC, G575.L422

The accuracy of water temperature variation obtained on the basis of single measurements and by continuous serial observations is evaluated according to a statistical procedure described, concluding that a probability of 0.95 can be assumed in a single measurement of the Arctic basin temperature to give true value with an accuracy of ±0°.08. Thus, the accuracy of isolines on the maps or cross-sections of temperature distribution with water depth is about ±0°.1. Because the mean daily values of water temperature in this basin are stable in time, the observations carried out during 2 to 3 decades may be regarded as synchronous. Mean monthly values of water temperature may be obtained from two measurements per day during the period to be averaged; at that, the degree of approximation of the temperature and its mean quadratic deviation will be the same as in the case of more frequent observations. These conclusions do not extend to micropulsations, which require special observation. -- NSV

SIP 25662 551.465.73(083.57)

Shamont'ev, V. A.
NOMOGRAMS FOR CALCULATING TURBULENT HEAT EXCHANGE AND HEAT LOSS BY EVAPORATION. (Nomogrammy dlîa vychisleniîa turbulentnogo teploobmena i zatrat tepla na isparenie; Text in Russian). Prob. Arktiki Antarktiki, Vyp. 26:39-44 incl diagrs., 1967. 7 refs.
DLC, G575.L422

Two nomograms are offered for direct reading of heat losses by turbulent heat exchange and evaporation. The plotting requires graphic solution of an equation in three unknowns, using the system of Cartesian coordinates and the A. R. Konstantinov formula for turbulent heat exchange curves. The coefficients in this formula were obtained by A. V. Smetannikova for the surfaces of arctic seas. Heat loss for evaporation is obtained from two graphs: for the open and ice-covered sea. The application of the nomograms is explained by a practical example. -- NSV

SIP 25663 551.322.539

Lavrov, V. V.
POISSON'S COEFFICIENT OF ICE UNDER STATIC LOAD. (Koeffitsient Puassona l'da pri staticheskoĭ nagruzke; Text in Russian). Prob. Arktiki Antarktiki, Vyp. 26:49-52 incl. table, diagrs., 1967. 6 refs.
DLC, G575.L422

The Poisson's coefficient of ice subjected to deformation by tension without a preliminary pressure-treatment for strength was determined for three types of ice: granular, fresh-water structurally modified forms, and artificial sea ice with salinity 1‰. Data on sample deformation was transmitted by highly sensitive inductive data units and registered on an oscillograph's tape. Smaller values of the coefficient were obtained for the samples under tension than for those under compression. In the structurally modified ice, near rupture, the coefficient greatly exceeded the maximum value possible in plastic materials. During the initial loading-stage the coefficient for the salt-water samples was similar to that of the fresh-water ice, differing only by the absence of a sudden jump near rupture.
-- NSV

SIP 25664 551.326.14

Khelsin, D. E.
ON THE REYNOLD'S NUMBER FOR BROKEN ICE. (O chisle Reĭnol'dsa dlîa bitykh l'dov; Text in Russian). Prob. Arktiki Antarktiki, Vyp. 26:53-56, 1967. 1 ref.
DLC, G575.L422

Movement of broken ice over water surfaces is mathematically analyzed and a numerical coefficient is introduced for a quantitative evaluation of this motion. It is assumed that the broken ice forms a continuous, locally isotropic cover which can be regarded as a layer of viscous compressible fluid the movement of which is characterized by the Reynolds number. This approach makes it possible to study different aspects of broken-ice movement on the sea surface, to evaluate its resistance to the motion of a vessel, and to model such processes according to the gravitational similarity laws. -- NSV

SIP 25665 551.326.022

Gorbunov, IU. A.
POSSIBILITY OF STUDYING ICE DRIFT BY AERIAL PHOTOGRAPHY. (O vozmozhnosti issledovaniîa osobennosteĭ dreĭfa l'dov s pomoshch'iû aerofotos"emki; Text in Russian). Prob. Arktiki Antarktiki, Vyp. 26:57-60 incl. diagrs., 1967. 5 refs.
DLC, G575.L422

Mean directions and velocity of ice drift in arctic seas were obtained by processing aerial-photography data according to the procedure described by V. G. Zdanovich and IU. D. Sharikov (SIP 24711). In the result, 550 vectors were obtained for drift directions of various size blocks in ice of different degrees of packing, and plotted on schematic maps which also show numerically the drift velocities in meters per second. This method is more informative than the instrument observations at stationary points and gives many simultaneous observations on the shore, in near-shore areas, and a considerable distance into the sea. -- NSV

SIP 25666 551.326.02

Izvekov, M. V.
REMARKS CONCERNING THE USE OF LEAD LINES IN DETERMINING DRIFT OF FLOATING STATIONS. (Nekotorye zamechaniîa po primeneniû lotovogo sposoba opredeleniîa elementov dreĭfa na dreĭfuûshchikh stantsiîakh; Text in Russian). Prob. Arktiki Antarktiki, Vyp. 26:98-103 incl. tables, diagr., 1967. 6 refs.
DLC, G575.L422

Proceeding from a critical review of the existing lead line methods of ice drift measurement, the advantages of a new technique developed and tested by the author are discussed. The procedure of stretching a lead line of definite length along the bottom during a certain time interval is described step by step, and its accuracy evaluated and compared to that of other methods. More accurate readings result because the error associated with lead-line sag is avoided. Problems are solved by simple computations or approximate solutions are obtained graphically with sufficient accuracy.
-- NSV

SIP 25667 551.326.14

Pavlikov, Zh. A. and L. A. Timokhov
OBSERVING ICE DRIFT IN OPEN SEAS THROUGH SHIP'S LOCATOR. (Nablīūdeniīa za dreĭfom l'da v otkrytom more s pomoshch'īū sudovogo lokatora; Text in Russian). Prob. Arktiki Antarktiki, Vyp. 26:104-107 incl. graphs, diagrs., 1967.
DLC, G575.L422

Special observations of ice drift in the open sea were carried out in 1964 to obtain additional information on the small scale variations of ice movement by serial photography of the ship's radar screen. The investigation procedure is described in detail and the results are presented graphically. Drift direction in the areas studied was plotted from the courses of three ice floes traced for 4 1/2 hours, their position being registered every 15 minutes. Distances traveled by the floes during that time varied from 90 to 350 m with the observation error amounting to ±40 m. The Lagrange space-time correlation function was obtained for drift velocity components; it showed periodical maxima in the correlative relation of ice-floe movement, indicating a disturbance shifting from ice floe to ice floe with a velocity about 6 m/sec., which was ascribed to wind since its direction and velocity coincided with those of the disturbance. -- NSV

SIP 25668 629.124.75

Popov, ĪŪ. N. and A. ĪA. Ryvlin
ON THE STREAMLINE FORM OF BOW EXTREMITY IN ICE-BREAKING TRANSPORT SHIPS. (K voprosu o forme obvodov nosovoĭ okonechnosti ledokol'no-transportnykh sudov; Text in Russian). Prob. Arktiki Antarktiki, Vyp. 26:108-109, 1967.
DLC, G575.L422

The "Anguema", a transport ice-breaker designed for carrying 5000 tons of load, which has length, width, and water displacement of 133 m, 18.9 m and 11,640 tons, respectively, was tested in the Arctic Experimental Basin. The vessel is an improved version of the "Lena" type built in Holland in 1954, the main objective of the new design being a streamlined form of the bow permitting a better passage through solid ice. Testing results indicated an increased strength of the main power unit making possible continuous cutting through solid ice, exceeding by 15 cm the ice-thickness limit for "Lena"; better maneuverability; and the capability of continuously following a powerful ice-breaker at any distance and under any ice conditions. -- NSV

SIP 25669 626.861:551.343(*532.6)

ĪAkhtenfel'd, I. P.
SOLIFLUCTION CAUSING DESTRUCTION OF CANAL SLOPES. (Solifliūkt̄siīa kak prichina razrusheniīa otkosov kanalov; Text in Russian). Gidrotekhnika i Meliorat̄siīa, 5:63-66 incl. illus., table, 1967. 5 refs.
DLC, TC1,G53

Solifluction processes caused by frost heaving or excessive moisture absorption during freezing of the ground and the subsequent loss of slope strength at ground thawing were destroying the drainage channel near Ulan-Ude (Buryat SSR). The maximum movement consisted of alternating clay and sand layers that accumulated 45-53% of moisture at the time of mud-flow development, which usually started with liquifaction of clays followed by slumping of the over-lying sand beds. Intensity of this process strongly depended on the rate of temperature increase in warm season. During a protracted spring when the quantity of melting ice in the ground was about equal to that of water evaporation, these phenomena were absent. Different ways of preventing solifluction under the conditions described are mentioned, among them the replacement of frost-heaving ground by gravel or coarse sand along the channel slopes with simultaneous drainage of water which penetrates into the fill. -- NSV

SIP 25670 551.457:551.34(573)

Chechkin, S. A.
SOME INDIRECT MEANS OF EVALUATING THE FREEZING DEPTH OF UNEXPLORED SWAMPS. (Nekotorye sposoby kosvennoĭ ot̄senki promerzaniīa neissledovannykh bolot; Text in Russian). Leningrad Gosudarstvennyĭ Gidrologicheskiĭ Institut, Trudy, Vyp. 145:52-68 incl. tables, graphs, 1967. 6 refs.
DLC, GB651.L38

The relationship between the thickness of a frozen upper layer in swampy and non-swampy, normal ground is analyzed and used as a basis for estimating the freezing depth of an unexplored swamp from combined data on the gradual freezing of non-swampy soil and on meteorological conditions. This method was especially suitable for the West Siberia periods: fall and winter, during which the intensity of freezing varied in each type of ground due to differences in moisture content, thermal capacity, and in addition the thermal conductivity and thickness of the overlying snow cover. Formulas are derived for calculating freezing depth of a swamp during winter of average hydrometeorological conditions and tables are given for the depths of frozen layers in different swamp types. -- NSV

SIP 25671 551.343(479)

Selnova, I. B. and E. A. Rubtsov
CAUSES OF SOLIFLUCTION IN THE GERKHOZHAN-SU RIVER BASIN. (Prichiny selevoĭ aktivnosti v basseĭne r. Gerkhozhan-Su; Text in Russian). Gosudarstvennyi Gidrologicheskii Institut, Trudy, Vyp. 141:121-126 incl. tables, 1967. 4 refs.
DLC, GB651.L38

This basin is characterized by periodic solifluction set off by strong rains or glacier melting. An attempt is made to correlate these two factors and evaluate the possibilities of forecasting such events, reaching the conclusion that by knowing the amount of winter precipitation and the June-July weather it is possible to calculate the probability of rain solifluction in the coming year. In the years of average hydrometeorological conditions solifluction can be started by a strong rain exceeding 50 mm. Solifluction caused by ice melting is expected in less rainy years, the March through August weather being most significant. Both rain and thaw waters saturate the moraines, preparing the later rock stream movement. Only by observing the rate of moraine saturation is it possible to obtain quantitative estimates of the coming events. -- NSV

SIP 25672 551.578.46:531.42

Morozov, G. A.
CALCULATING THE VARIATION OF SNOW COVER DENSITY UNDER THE ACTION OF WATER VAPOR DIFFUSION, CONVECTION, VOLATILIZATION AND SUBLIMATION. (Raschet izmeneniĭa plotnosti snezhnogo pokrova pod deĭstviem diffuzii, konvekt͡sii vodi͡anogo para v nem; Text in Russian). Meteorologiĭa i Gidrologiĭa, No. 6:98-103 incl. tables, graphs, 1967. 8 refs.
DLC, QC851.M27

The All-Union Scientific Research Institute of Hydrotechnical Sciences carried out experimental investigations to determine the water vapor distribution coefficient (D) for the following types of snow: fresh snow, density 0.13-0.15 b/cm^3, settled snow, density 0.23-0.26 g/cm^3, and old medium-grained snow, density 0.32-0.38 g/cm^3. The results indicate a definite relationship between D and snow temperature (or density). D exceeded 3.5 to 4.5 times the coefficient of molecular diffusion in the temperature range of 0 to -1°C; D lowered considerably with drops in snow temperature; definite D value corresponded to every snow density. No essential difference in D was noticed for the snow density range 0.13-0.38 g/cm^3 at temperatures below -12°C. Formulas are derived for describing the mass-transfer process in snow and calculating the variation of its density in time under the action of vapor sublimation. -- NSV

SIP 25673 551.495:551.328.2

Lifshit͡s, F. A. and B. L. Sokolov
ICE CONTROL OF UNDERGROUND DRAINAGE. (Nalednoe regulirovanie podzemnogo stoka; Text in Russian). Gosudarstvennyĭ Gidrologicheskiĭ Institut, Trudy, Vyp. 139:180-205 incl. tables, graphs, diagr., 1967. 22 refs.
DLC, GB651.L38

The term "ice control" applies to the yearly redistribution of underground water drainage during warm seasons, the process consisting of two parts: water accumulation in the ground as ice, and its subsequent release by melting. Several methods of determining the amount of ice-bound water are discussed and an attempt is made to establish the regularities governing this process by theoretical and experimental means. Stationary observations along the Samokit River (Yakutia) provided data on the nature of ice distribution, the places of its maximum concentration, quantitative evaluation of the ice-bound water reserves, and physical regularities governing their growth and melting. A hydrograph of water discharge was plotted for the Samokit River basin in which the genetic components of underground drainage were separated and a preliminary evaluation of the ice control process in time and along the course of the river within the experimental basin was obtained. -- NSV

SIP 25674 629.124.791.2.003.1

Mit͡sevich, A. and L. Muchnik
EVALUATING EXPLOITATION EFFECTIVENESS OF ICEBREAKERS. (Oc̆enka ekspluatat͡sionnoĭ effektivnosti lineĭnykh ledokolov; Text in Russian). Morskoĭ Flot, No. 9:13-14, 1967.
DLC, VM4.M6

Formulas are derived for calculating the exploitation effectiveness of certain types of icebreakers working under especially difficult conditions in clearing the way for vessel convoys in very thick ice. It is believed that the usual formula relating yearly expenses to the conveying capacity of the vessel is inapplicable. The performance of such ice-breakers should be measured by the sum of the gross register holding capacities of all the vessels convoyed, multiplied by the distance sailed by the vessels behind the icebreaker, i.e., by gross ton-miles. -- NSV

SIP 25675 551:624.139:624.19(*49)

Sellmann, Paul V.
GEOLOGY OF THE USA CRREL PERMAFROST TUNNEL, FAIRBANKS, ALASKA. Tech. Rept. 199, U. S. Army Cold Regions Research and Engineering Laboratory, 26p. incl. illus., tables, graphs, diagrs., maps, July 1967. 29 refs.
CRREL files

This study provides the pertinent regional and historical geology of the tunnel site and immediate surroundings as well as data on the index properties of the material through which the tunnel passes. The tunnel is in the center of the zone of discontinuous perennially frozen ground. The tunnel geology is discussed with emphasis on bedrock, gravels, silts, ground ice, and chemical gradient. A study of the stratigraphy of the section reveals a record of the past climatic history of the area, based on the structure and distribution of the ice wedges, chemical gradients, sedimentary structures, radiocarbon dates, and the lithology of the material exposed along the tunnel section and vertical ventilation shaft. Two recognizable unconformities appear in the section. The large size of the wedges suggests that depositional rates were fairly slow during the period of wedge development. It can also be concluded that within the last 30,000 yr a minimum of 30 ft of silt was deposited, most of which is of Wisconsin age. (Author's abstract)

SIP 25676 551.343

Kaplina, T. N.
CRYOGENIC SLOPE PROCESSES. (Kriogennye sklonovye protsessy; Text in Russian). Izd-vo "Nauka", 296p. incl. illus., tables, graphs, diagrs. 1965. Approx. 700 refs.
DLC, GB406.K3

This book deals with the study of slope processes originating and developing under the action of cryogenic conditions in the Arctic and Sub-arctic territories and in the high mountains of any latitude. An attempt is made to generalize all the material published on this subject in the USSR and abroad, to define the approach to its study, and to formulate the trends of future investigations. Recent concepts of the mechanism of cryogenic slope processes are summed up, the deposits and relief features formed by them are described, and the influence of different natural phenomena and their geographical distribution is discussed, with basic emphasis on solifluction as the most important and best studied cryogenic process. -- NSV

SIP 25677 551.343.4(931)

McGregor, V. R.
HOLOCENE MORAINES AND ROCK GLACIERS IN THE CENTRAL BEN OHAU RANGE, SOUTH CANTERBURY, NEW ZEALAND. J. Glaciol., 6(47):737-748 incl. illus., maps, June 1967. 19 refs.
DLC, GB2401.J68

Young moraines and rock glaciers in the central part of the Ben Ohau Range, about 42 km south of the highest peaks of the Southern Alps, are briefly described. A new formation, the Ben Ohau Formation, consisting of the Ferintosh, Jacks Stream and Dun Flunary Members, is proposed for moraines and rock glaciers believed to have been built since the climatic optimum by three minor glacial advances. Moraines, and outwash and fan gravels, deposited during a more extensive pre-climatic optimum advance which was contemporaneous with the Cockburn Glacial Phase (Cochrane) in North America are assigned to the Birch Hill Formation. The sequence of glacial advances recorded in the Ben Ohau Range is compared with that found in western North America. (Author's abstract)

SIP 25678 621.315:551.574(52)

Takagi, Sihei
OBSERVATION FOR SNOW ACCRETION ON OVERHEAD POWER LINE CONDUCTOR. (Ishiuchi ni okeru densen chakusetsu no kansoku; Text in Japanese with English abstract). Seppyō, 28(1):1-7 incl. illus., graphs, Jan. 1966.
DLC, Orientalia Div.

This paper deals with the observational results of snow accretion on the testing line conductor. From the observation, it was found that meteorological conditions, mechanism of growth and properties of snow accretion on the big line conductor were different from those on a small line conductor. (Author's abstract)

SIP 25679 551.321.1:532.529.6

Maeno, Norikazu
AIR BUBBLES IN ICE. (Kōri no naka no kihō; Text in Japanese with English abstract). Seppyō, 28(1): 8-11 incl. illus., diagr., Jan. 1966.
DLC, Orientalia Div.

Microscopic observations were made of the formations and the metamorphoses of air bubbles in ice, which were formed on surfaces of small solid particles on a developing ice-water interface and then captured in the growing ice crystal. The results can explain clearly the regular (sometimes periodic)

distributions and shapes of air bubbles in natural and artificial ice crystals. (Author's abstract)

SIP 25680 551.482.215.7:551.326.83(52)

Kamada, Shin-etu
THE DISCHARGE IN THE CLOSED RIVER WITH THE WHOLE FROZEN SURFACE. (Keppyō kasen no ryūryō; Text in Japanese with English abstract). Seppyō, 28(1):13-18 incl. illus., table, graphs, Jan. 1966.
DLC, Orientalia Div.

In the open channel, the water stage is connected closely to its discharge and the discharge is obtained by the observation of stage. But, almost every river in a cold climate such as Hokkaido freezes at the surface in winter. Therefore, the results of studies about the open channel can not be applied directly to the closed river with the whole frozen surface. The stage-discharge curve of the above mentioned closed river is obtained by the same method in the open channel, if the water stage of the closed ice-covered river is defined as the water level in the hole of ice drilled for measurement. But, it is indicated theoretically that the curve is not invariable and varies with the changes of the accumulated snow weight on the whole frozen surface and the other conditions. The lower limit level of the surface ice of river was introduced as the parameter of the discharge in the closed river with the whole frozen surface. It is the theoretical and suitable parameter and is not affected by the accumulated snow weight and the other conditions. The vertical distribution of the suspended material in the closed river with the whole frozen surface was explained by the constant apparent viscosity all over the depth. The total suspended material corresponds to the lower limit level of the surface ice of river. (Author's abstract)

SIP 25681 551.321.1:551.576

Takahashi, Tsutomu and Yoshiro Kumazawa
SNOW CRYSTAL SONDE BY THE USE OF SHADOW PHOTOGRAPH. (Kage-shashin o mochiita yuki zonde no shisaku; Text in Japanese with English abstract). Seppyō, 28(1):19-22 incl. illus., diagr., Jan. 1966.
DLC, Orientalia Div.

Snow crystal sonde was designed to know snow shapes, especially, snow flakes and graupel pellets, in clouds. One snow crystal sonde among 10 was recovered and this result showed that there were a great number of small size snow particles at about 1000 m cloud height. (Authors' abstract)

SIP 25682 551.578.46:531.58

Miyairi, M., J. Ohkushi, and S. Ozawa
DRAG OF BODIES MOVING THROUGH SNOW WITH HIGH SPEEDS. (Yukichu o kosoku de hashiru buttai no teiko; Text in Japanese with English abstract). Seppyō, 28(1):23-29 incl. graphs, Jan. 1966.
DLC, Orientalia Div.

Drag of bodies moving through snow with high speeds (15 ~ 40 m/sec) was studied. Shells (as high-speed moving bodies) were shot into a snow pile by an air gun, and output in a built-in acceleration meter was recorded on an oscillogram. The impulse acceleration of shells was measured when they hit the snow surface, and the relation between the drag and the speed of the shell was obtained by integrating the curve on the oscillogram. In the speed range studied, the drag of a body can be expressed as a sum of a term proportional to the square of the velocity and a constant term. (Authors' abstract)

SIP 25683 624.182(52)

Kannabe, Kōzō
SNOW PRESSURE ON POLES FOR PREVENTING AVALANCHE ON THE TADAMI-LINE. (Tadami-sen ni okeru nadare bōshikō ni kakaru setsuatsu; Text in Japanese with English abstract). Seppyō, 28(2):41-45 incl. illus., diagrs., graphs, Mar. 1966.
DLC, Orientalia Div.

The maximum depth of snow-cover in the Tadami region averages 3 m to 5 m. Before providing protection, to collect snow data poles 2 m or 3 m long were set up for preventing avalanches at glens and uniform slopes. Four simple snow manometers were fitted on the 2 m poles (B-type), and six simple snow manometers on the 3 m poles (A-type): 1) The total pressure on the poles was greater at glens than on uniform slopes. (about 10 tons). 2) A-type poles were almost deformed at glens. 3) The total pressure on B-type poles was about 10 tons at glen, and 5 tons to 8 tons at uniform slopes in A test section; 5 tons to 6 tons in B test section and 6 tons to 8 tons in C test section. 4) According to the data on B-type poles, bending moment is nearly equal to total pressure, 5 tons to 10 tons. 5) Avalanche poles taller than 2 m are found useless both technically and economically. (Author's abstract)

SIP 25684 624.182(52)

Saeki, Masao and others
TRANSITION OF CONDITION ON HILLSIDES TERRACED AGAINST AVALANCHES. (Nadare bōshi kaidan-kō shikōchi no keinen henka; Text in Japanese with English abstract). Seppyō, 28(3):55-64 incl. illus., tables, diagrs., May 1966.
DLC, Orientalia Div.

The authors have been carrying out a survey about the transition of conditions on hillsides where the terracing works for ground avalanche prevention were executed before. This paper presents the results of investigation conducted during the period of 1963-1965 on the snowy area with maximum snow depth of 2-3 m in winter. The matters deduced from obtained data are as follows: 1) The terracing work shows a gradual decline of its function against avalanches in the course of breaking of executed terracing and soil accumulation on terraced steps. However, the function of terracing lasts effectually for 20-25 years in every place except the area susceptible to erosion such as a sandstone zone. 2) It is estimated that natural trees on the terraced hillsides generally begin to function against ground avalanches about 15 years after execution of the terracing. (Authors' abstract)

SIP 25685 551.578.4:634

Nezu, Seiichi and Shigeo Watanabe
EXPERIMENT ON THE SNOW CROWN OF JAPANESE LARCH (1). (Karamatsu no kansetsu jikken (Dai-1 ho; Text in Japanese with English abstract). Seppyo, 28(3):65-68 incl. illus., table, graphs, May 1966.
DLC, Orientalia Div.

A series of experiments have been continued in order to realize the silvicultural management for the prevention of forest damage caused by the weight of snow crown. This paper deals with the study about the snow crown on the trees of Japanese larch, during the snow season of 1964-1965. The equipment of the experiment is shown in photographs. As a result, the following points were made clear: The process of snow crown on Japanese larch was similar to that on Japanese cedar, but the crowned state did not continue for over a few days. The maximum quantity of snow crown, in the ordinary conditions of snowfall, occurred in the case when the amount of precipitation was about 20 mm. (Authors' abstract)

SIP 25686 551.321:622.234.2:536.2

Aamot, Haldor W. C.
HEAT TRANSFER AND PERFORMANCE ANALYSIS OF A THERMAL PROBE FOR GLACIERS. Tech. Rept. 194, U.S. Army Cold Regions Research and Engineering Laboratory, 15p. incl. tables, graphs, diagrs., appendix A, Sept. 1967. 5 refs.
CRREL files

A thermal probe penetrating a glacier requires heat at the hot point for melting as well as along its entire length to balance the radial heat dissipation in the ice and thus prevent freezing in. The heat transfer problem is solved with a LaPlace transform and the results are developed graphically to simplify the numerical calculations. A performance diagram, developed as a design and operating aid, serves for analysis of the anticipated penetration performance of the probe and the required power levels. (Author's abstract)

SIP 25687 541.182.45:546.22

Dale, John M. and Allen C. Ludwig
PREPARATION OF LOW DENSITY SULFUR FOAM. Tech. Rept. 206, U.S. Army Cold Regions Research and Engineering Laboratory, 18p. incl. illus., tables, graphs, Sept. 1967.
CRREL files

It has been demonstrated that it is possible to lower the density of rigid sulfur foam to as low as 10 lb/ft^3 in continuous pressurized process equipment and as low as 6 lb/ft^3 in laboratory glassware at atmospheric pressure. Based on past experience, each reduction of foam density becomes progressively more difficult to achieve. With further research the densities might be further reduced, lowering the unit volume cost of the material and improving the thermal conductivity of the foam. The attractive features of the foam include stress-strain characteristics which should allow use in a variety of structural applications; low thermal conductivity, making it a good thermal insulation material; low moisture absorption; low water vapor permeation; low cost; insensitivity to ambient temperature conditions but favored by low temperatures; and the capability of being produced at a remote field site. (Authors' abstract)

SIP 25688 551.345:536

Ivanov, N. S.
ON THE MODELING OF THERMAL PROCESSES IN THE PERMAFROST ZONES OF THE EARTH'S CRUST. (O modelirovanii teplovykh protsessov v merzlykh tolshchakh zemnoĭ kory; Text in Russian). Akademiia Nauk SSSR, Sibirskoe Otdelenie, Institut Merzlotovedeniia. Moscow, Izd-vo "Nauka", p. 5-18, 1965. 2 refs.
DLC, TA713.A4385

An example of modeling heat- and mass-exchange processes in the system: boundary layer of air - vegetation cover - thawed soil layer - permafrost, in the UMTP-63 assembly designed by the Institute of Geocryology is analyzed mathematically. This assembly was designed for the study of geocryological problems which cannot be solved by the methods of hydrothermal and electrothermal anal-

ogies. The problems concern three-dimensional non-stationary potential fields of energy and matter transfer in multilayered media at arbitrary initial and boundary conditions under the action of different energy- and mass-transfer mechanisms in the media studied, and the energy- and mass-exchange processes active at their boundaries. Their solution is of practical importance for progress in construction, hydrotechnical developments, utilization of intraterrestrial heat and hot ground waters in northern regions, use of ice and frozen ground as building material, and other similar considerations. -- NSV

SIP 25689 551.343:551.332.56

Zolotar', I. A.
CALCULATING MAGNITUDE OF GROUND FREEZING AND HEAVING ACCOUNTING FOR WATER MIGRATION. (Raschet promerzaniîa i velichiny pucheniîa grunta s uchetom migratsii vlagi; Text in Russian). Akademiîa Nauk SSSR, Sibirskoe Otdelenie, Institut Merzlotovedeniîa. Moscow, Izd-vo "Nauka", p. 19-25 incl. graphs, 1965. 10 refs.
DLC, TA713.A4385

A simple and accurate method is offered for forecasting the degree of ground heaving. Formulas are derived for heat- and mass-exchange in freezing grounds assuming that for fine-grained soil the water migration under the action of temperature gradients and the heat-transfer of moisture moving toward the freezing front may be neglected. It is also assumed that water flow from the thawed zone toward the frost boundary is determined by the freezing of free water and partly of bound water at certain temperature. With these assumptions the variation of moisture content in the ground due to water migration from below does not depend on the position of the front, i.e. does not depend on time but only on the properties and state of the ground and the speed of its freezing. The advantage of this method over the systems of differential equations offered by G. A. Martynov and N. S. Ivanov for the description of the same processes, is that electronic computers are not required. -- NSV

SIP 25690 551.345.2

Fel'dman, G. M. and Shchelokov, V. K.
DETERMINING THE DEPTH OF A FREEZING SOIL LAYER AND THE TIME OF ITS JOINING THE PERMAFROST. (Opredelenie glubiny promerzaiushchego sloîa grunta i vremeni ego smykaniîa s vechnomerzloĭ tolshcheĭ; Text in Russian). Akademiîa Nauk SSSR, Sibirskoe Otdelenie, Institut Merzlotovedeniîa. Moscow, Izd-vo "Nauka", p. 26-35 incl. diagr., graphs, 1965. 9 refs.
DLC, TA713.A4385

A correct determination of freezing depth and the time when a freezing layer unites with the permanently frozen ground is required for calculating the depths of water-lines, foundations, water wells, and other structures. The popular way of obtaining these data is a time consuming operation in which the depth is determined for a series of short time-intervals until the moment of a complete union of the layer with permafrost; besides, the existing formulas account only approximately for the thermal resistivity of a snow cover. A very simple calculation procedure is offered in which the dynamics of snow cover and the variation of air temperature in the winter are accounted for when determining the maximum freezing depth of a layer at any time, including the time of reaching the permafrost level. -- NSV

SIP 25691 621-47:551.345:536

Ivanov, N. S.
METHODS OF DETERMINING THERMAL PROPERTIES OF ROCK IN WELLS. (K metodike opredeleniîa teplovykh svoĭstv gornykh porod v skvazhinakh; Text in Russian). Akademiîa Nauk SSSR, Sibirskoe Otdelenie, Institut Merzlotovedeniîa. Moscow, Izd-vo "Nauka", p. 36-44, 1965. 16 refs.
DLC, TA713.A4385

The method of determining specific thermal capacities and the coefficients of thermal conductivity of rock walls in wells is still in the stage of development. The theoretical postulates and the structural peculiarities of the instruments to be used in wells for such measurements are discussed; they depend on two basic factors: the physical properties of fluid filling the well and those of the surface of the well wall. Analysis of possible combinations of these factors indicated that the methods may be divided into four basic groups: for the dry or fluid-filled wells with or without casing. These can be arranged into two groups: one based on the assumption that the thermal properties are thermo-isotropic and the phase transformations are absent; the other based on accounting for the transition of moisture in the rock pores and the dependence of thermo-physical coefficients on temperature. Only the first group methods are discussed. -- NSV

SIP 25692 551.578.46:531.754(*531.3)

Gavril'ev, R. I.
DEPENDENCE OF DENSITY OF SNOW COVER IN YAKUTIA ON ITS THICKNESS. (Zavisimost' plotnosti snezhnogo pokrova v Îakutii ot ego vysoty; Text in Russian). Akademiîa Nauk SSSR, Sibirskoe Otdelenie, Institut Merzlotovedeniîa. Moscow, Izd-vo "Nauka", p. 45-49 incl. illus., graphs, 1965. 4 refs.
DLC, TA713.A4385

The thickness of snow cover, h after a long snowless interval, expresses to a certain degree the summation of the following factors: snow density, ρ and the structure and texture of the snow, which change in time under the action of snow weight, wind, temperature, and the firnification processes. It is difficult to obtain one empirical relationship $\rho(h)$ for all geographic regions, thus, an attempt is made to calculate $\rho(h)$ for the specific conditions of Yakutia. The formulas derived describe the variation of snow thickness because of surface melting, disregarding its settling as a result of structural changes produced by peripheral melting of snow crystals after moistening. The settling starts at the very beginning of snow melting and lasts a short time. The formulas may be corrected for the structural changes by introducing the empirical corrective formula of P. P. Kuz'min. -- NSV

SIP 25693 536.53(*50)

Mandarov, A. A., Kitaev, V. D., Rudenko, G. M. and Chistotinov, L. V.
USE OF A GALVANOMETRIC AMPLIFIER FOR RECORDING SMALL TEMPERATURE CHANGES. (Primenenie gal'vanometricheskogo usiliteliā dlā zapisi malykh perepadov temperatury; Text in Russian). Akademiā Nauk SSSR, Sibirskoe Otdelenie, Institut Merzlotovedeniā. Moscow, Izd-vo "Nauka", p. 50-52 incl. diagr., 1965. 9 refs.
DLC, TA713.A4385

A galvanometer of the type F-12 with the photoelement F-100/1, designed for magnification of thermo-currents to the level needed for their registration with a potentiometer EPP-09, is described. As an auxiliary automatic part of the semi-automatic potentiometer P-2 its advantage lies in the possibility of use without additional direct-current electronic amplifiers. The F-12 also registers both positive and negative temperature differences and the whole device is assembled from instruments of standard make. The block-diagram of this assembly shows copper-constantan thermo-couples, a galvanometer amplifier F-12, and an automatic self-recording electronic potentiometer EPP-09. -- NSV

SIP 25694 551.579.5:537

Korkina, R. I.
ELECTRICAL POTENTIAL IN FREEZING SOLUTIONS AND EFFECT ON MIGRATION. (Elektricheskie potentsialy v zamerzaīushchikh rastvorakh i ikh vliīanie na migratsiīu; Text in Russian). Akademiā Nauk SSSR, Sibirskoe Otdelenie, Institut Merzlotovedeniā. Moscow, Izd-vo "Nauka", p. 56-65 incl. tables, graphs, 1965. 6 refs.
DLC, TA713.A4385

Electrical potential originating during gradual cooling of doubly distilled water, weak salt solutions, and clay suspensions was studied experimentally in relation to moisture migration in soil during freezing. The experimental procedure consisted in keeping the sample-filled flasks, insulated on all sides but the bottom, under definite minus temperature conditions and observing the variation of the magnitude and sign of potential in time. Curves relating these variations to the distance between the measuring electrode and the cooling surface, and to cooling time were plotted from the readings obtained. Interpretation of the results indicated that a change in water structure preceeding its freezing was the cause of origin of electrical potential and that this effect on water migration in freezing soil is dependent on the concentrations of salts dissolved in the soil moisture, the mineralogical composition of colloidal particles suspended in the solution, and the composition of exchange cations on the surface of these particles. -- NSV

SIP 25695 551.579.5:541.1

Derbeneva, M. M.
CONCERNING THERMAL EFFECTS OF PHYSICAL-CHEMICAL REACTIONS. (K voprosu o teplovykh eifektakh fiziko-khimicheskikh reaktsiĭ; Text in Russian). Akademiā Nauk SSSR, Sibirskoe Otdelenie, Institut Merzlotovedeniā. Moscow, Izd-vo "Nauka", p. 66-72 incl. tables, graphs, 1965. 3 refs.
DLC, TA713.A4385

The magnitude of heat originating in the process of a reaction between natural rocks and solutions at different temperatures was studied experimentally by leaching fine-grained rocks, differing in mineralogical composition and contents of water-soluble salts and exchange bases, with 1N solutions of H_2SO_4 and HCl. The results indicated that thermal effects depend mostly on the properties of the reacting solution and chemical composition of rocks, also on temperature and duration of the reactions. Decrease of thermal effect is determined by the direction of reaction at positive and negative temperatures; temperature decrease increases the solution viscosity, decreases the translation movement of ions in the solution, and decreases the speed of ion removal from the dividing surface. -- NSV

SIP 25696 551.322:536.421.4:536.2

Are, F. E.
THERMAL CONDUCTIVITY OF AIR-ICE COVERS. (Teploprovodnost' vozdushno-ledîanykh pokrytiĭ; Text in Russian). Akademiîa Nauk SSSR, Sibirskoe Otdelenie, Institut Merzlotovedeniîa. Moscow, Izd-vo "Nauka", p. 73-81 incl. tables, graphs, diagrs., 1965. 6 refs.
DLC, TA713.A4385

The term "air-ice" cover is used for a layer of ice, supported above ground by short wooden or concrete pillars, which protects the ground against winter freezing. Such a cover is obtained by flooding the ground with a layer of water of certain thickness and letting it freeze down to 20-30 cm with subsequent evacuation of the remaining water. The air-ice cover is widely used in practice, the demensions usually being estimated intuitively. The author presents a method of calculating thermal conductivity coefficients of ice and air interlayers and a detailed discussion of the optimal dimensions of the cover and their calculation. -- NSV

SIP 25697 551.345:551.322:536.421.4

Are, F. E. and Balobaev, V. T.
PROTECTION OF GROUND AGAINST WINTER FREEZING BY AN AIR-ICE COVER. (Zashchita grunta ot zimnego promerzaniîa pri pomoshchi vozdushno-ledîanogo pokrytiîa; Text in Russian). Akademiîa Nauk SSSR, Sibirskoe Otdelenie, Institut Merzlotovedeniîa. Moscow, Izd-vo "Nauka", p. 82-93 incl. tables, graphs, 1965. 13 refs.
DLC, TA713.A4385

Different types of air-ice covers, consisting of ice layers separated by air are discussed and their thermal conductivities evaluated mathematically. It is recommended that layer thickness be held to a minimum, thus increasing the heat-protection effect of the covers, the depth of the water layer on the ground being the same. The surface ice-layer must be thick enough to withstand the weight of a man with an instrument and of snow cover while the underlying layers must be much thinner. The thickness of air layers is determined by the possibilities of maintaining water level to the least required depth while that of the underlying ice-layers is determined by the capability of withstanding their own wieght. -- NSV

SIP 25698 532.54:551.345

Kamenskiĭ, R. M.
HEAT EXCHANGE DURING FILLING OF A WATER LINE PLACED IN FROZEN GROUND. (Teploobmen pri zapolnenii vodoprovoda, ulozhennogo v merzlyĭ grunt; Text in Russian). Akademiîa Nauk SSSR, Sibirskoe otdelenie, Institut Merzlotovedeniîa. Moscow, Izd-vo "Nauka", p. 94-97, 1965. 2 refs.
DLC, TA713.A4385

It is shown that the heat losses of water and the starting period of a water line occurring in frozen ground cannot be accurately determined by using the well known Newton formula relating the quantity of heat-loss per unit time to the area of the pipe surface, water temperature, and that of the pipe wall, since the conditions of filling the same line at the same water temperature depends on the temperature of the surrounding ground. Formulas are derived for the heat exchange processes at the moment of water line filling when the temperature of pipe walls is minus, and which account for additional factors such as: the inside icing of the pipe and heat separation because of phase transformations of water, variation of heat-exchange conditions due to icing, and the replacement of cooled portions of water by the subsequent portions with a higher temperature. -- NSV

SIP 25699 532.54:551.345

Konstantinov, I. P.
EXPERIMENTAL STUDY OF HEAT EXCHANGE BETWEEN A PARTIALLY FILLED WATER LINE AND FROZEN GROUND. (Eksperimental'nye issledovaniîa teploobmena mezhdu truboprovodom s nepolnym zapolneniem i merzlymi gruntami; Text in Russian). Akademiîa Nauk SSSR, Sibirskoe Otdelenie, Institut Merzlotovedeniîa. Moscow, Izd-vo "Nauka", p. 98-103 incl. tables, graphs, 1965. 4 refs.
DLC, TA713.A4385

The results obtained in experimental investigations of temperature variation along a water line, its heat losses, dynamics of the thermal field around the line, and the distribution of heat inside the pipe: in water and in the air above at different time intervals are discussed. Copper-constantan thermocouples and thermistors were used for measuring the thermal field and the temperature inside the pipe while that of water along the line was measured with usual mercury thermometers. The water quantity, the degree of line filling and its slope were also determined. Formulas are given for thermal calculations of the constantly functioning water lines and reservoirs, but are not recommended for use with the periodically functioning water conduits, pending further study of this case and the development of special procedures for thermal calculations. -- NSV

SIP 25700 622.25:536.24

Budennyĭ, ÎŬ. A.
HEAT EXCHANGE BETWEEN ROCK AND MINE AIR WHEN TEMPERATURE VARIATION FOLLOWS HARMONIC LAW. (Teploobmen mezhdu porodnym massivom i rudnichnym vozdukhom pri garmonicheskom zakone izmeneniĭâ temperatury vozdukha; Text in Russian). Akademiĭâ Nauk SSSR, Sibirskoe Otdelenie, Institut Merzlotovedeniĭâ. Moscow, Izd-vo "Nauka", p. 104-110 incl. table, graphs, 1965. 6 refs.
DLC, TA713.A4385

A critical review is presented of different methods developed for studying the thermal regime of mines in terms of heat exchange between mine air and the walls to choose the most suitable procedure for determining the coefficient of nonstationary heat-exchange in the case of a harmonic variation of air temperature. The theoretical study of this problem included an improved version of the V. S. Luk'ianov model designed for determining the temperature field of a rock-mass from which the magnitude of heat flux may be calculated. Both analytical and experimental data were used in deriving formulas for heat exchange coefficients. -- NSV

SIP 25701 624.012:551.345(*531.3)

Lukin, G. O.
GEOTHERMAL REGIME OF GROUND UNDER THE BUILDINGS OF YAKUTSK. (Geotermicheskiĭ rezhim gruntov pod zdaniĭâmi g. Îakutska; Text in Russian). Akademiĭâ Nauk SSSR, Sibirskoe Otdelenie, Institut Merzlotovedeniĭâ. Moscow, Izd-vo "Nauka", p. 111-121 incl. tables, diagrs., 1965. 1 ref.
DLC, TA713.A4385

Geothermal conditions of permafrost ground under heated buildings were studied in an attempt to develop means of their control, and verify the standing norms of ground loading for structural design. The results indicated continuous lowering of ground temperature under ventilated cellars even when the thermal regime was disturbed by incorrect building techniques. This effect increased the carrying capacity of the ground and became progressively greater with the increase in the cellar space and in the height between the ground and the reinforced-concrete girders. Because of a continuous permafrost spread in this area and its rigid climatic conditions, resulting in increased carrying capacity of the ground under heated buildings, an increased load on the bearing ground was authorized and the erection of 7-and 8-story buildings was permitted. -- NSV

SIP 25702 551.326.62:551.345:551.466.3

Grigor'ev, N. F. and Ivanov, N. S.
ON THE FREEZING OF GROUND IN THE WAVE-BUILT ISLANDS OF ARCTIC SEAS. (K voprosu o formirovanii merzlykh tolshch na namyvnykh ostrovakh arkticheskikh morei; Text in Russian). Akademiĭâ Nauk SSSR, Sibirskoe Otdelenie, Institut Merzlotovedeniĭâ. Moscow, Izd-vo "Nauka", p. 122-129 incl. tables, graphs, illus., 1965. 5 refs.
DLC, TA713.A4385

Recent permafrost processes in wave-built islands were studied in terms of the physical and geographical conditions of their origin and for sites of future emergence. Only the shelf zone of the Arctic Basin within the limits of the Kara, Laptev, and East Siberian Seas is considered. Four stages were distinguished in the formation process: 1) one-year cycle in which, prior to the island emergence, the sea bottom deposits freeze seasonally to the permafrost depth; 2) a three-year period characterized by the appearance and growth of an intermediate non-freezing layer in the bottom deposits due to intensive sediment accumulation; 3) next 2 years of steady rise of the permafrost level ending in a complete freezing of the intermediate layer; 4) steady upbuilding and final emergence of the island during which the freezing processes are intensified by sediment aggradation until the ice cover reaches the sea-bottom, producing constant lowering of temperature in the deposits. -- NSV

SIP 25703 551.331.5:551.52(*531.3)

Are, F. E. and Molochushkin, E. N.
SPEED OF DESTRUCTION OF ARCTIC ESCARPMENTS IN YAKUTIA UNDER THE ACTION OF THERMAL DENUDATION. (Skorost' razrusheniĭâ arkticheskikh obryvov Îakutii pod deĭstviem termodenudatsii; Text in Russian). Akademiĭâ Nauk SSSR, Sibirskoe Otdelenie, Instut Merzlotovedeniĭâ. Moscow, Izd-vo "Nauka", p. 130-138 incl. graphs, diagrs., illus., 1965. 4 refs.
DLC, TA713.A4385

The results obtained in the study of thermal effect of solar radiation and air temperature on the destruction of frozen unconsolidated Quaternary deposits containing ice layers and forming escarpments on Mostakh I. in the Laptev Sea indicate that the speed of erosion by thawing does not depend on slope. Snow drifts may slow down the thawing depth of a cliff surface by 35%, the yearly mean depth of thawing of the exposed surface being 4.3 cm/24 hrs, basically dependent on solar radiation and air temperature. These data may be approximately extended to the whole Yakutia sea-shore and the near-shore islands. Destruction speed of outcropping deposits not containing ice layers was dependent on their mechanical properties and varied in the same climate from none to that of exposed ice. -- NSV

SIP 25704 551.578.46:536.5(*531.3)

Are, A. L.
CERTAIN PECULIARITIES OF TEMPERATURE DISTRIBUTION IN SNOW COVER IN THE VICINITY OF YAKUTSK. (O nekotorykh osobennostiâkh raspredeleniâ temperatury v snezhnom pokrove v okrestiâkh IAkutska; Text in Russian). Akademiiâ Nauk SSSR, Sibirskoe Otdelenie, Institut Merzlotovedeniiâ. Moscow, Izd-vo "Nauka", p. 139-146 incl. table, graphs, diagrs., 1965. 5 refs.
DLC, TA713.A4385

The Institute of Geocryology, Siberian Branch of the Academy of Sciences USSR conducted daily observations of temperature variation in natural snow cover near Yakutsk and generalized on the characteristic features of an undisturbed snow. It was concluded that rimed snow is continuously formed under the action of vapor sublimation at first in the lower, then in the middle layer of the cover, the processes of snow recrystallization being so strong that they are often reflected in temperature distribution producing an anomalously cold layer in the lower part of the snow cover. Climatic peculiarities of Yakutsk create a rapid growth of temperature gradient along the snow profile, especially in spring, so that the upward migration of vapor and its sublimation may be considerable. -- NSV

SIP 25705 551.343.4(573)

Komlev, A. M.
ROCK-STREAM FLOODS IN THE REGIONS BEYOND POLAR CIRCLE. (Selevye pavodki v Zapolâr'e; Text in Russian). Meteorologiiâ i Gidrologiiâ, No. 12:31-32, 1957. 1 ref.
DLC, QC851.M27

The phenomena described were observed in the Central Siberian Plateau where different cryogenic slope processes were widely developed and the channels of local streams contained large amounts of rock debris ranging in diameter up to 1 m. They occurred most frequently in early spring when the upper courses of streams were heavily dammed up by snow. The accumulated melt water broke the snow dams and entire ice-rock-water masses moved downslope at a velocity of 5 m/sec reaching the lower broad part of the valley and spreading over it like a flood. Such events were triggered off by definite meteorological conditions and were typical for slopes devoid of vegetation. -- NSV

SIP 25706 551.324.2(*726.50)

Miller, Hubert
GLACIOLOGICAL OBSERVATIONS IN THE VICINITY OF GENERAL BERNARDO O'HIGGINS BASE, ANTARCTIC PENINSULA. (Observaciones glaciologicas en las cercanias de la Base General Bernardo O'Higgins, Península Antartica; Text in Spanish with summaries in English and German). Chile. Univ., Santiago. Escuela Geol., Comun., No. 8, 29p. incl. illus., table, graphs, diagr., maps, Sept. 1965. 21 refs.
DLC, Unbound periodical

The methods and results of observations on types of glaciers and their rates of movement and on the texture, density, and hardness of snow on the Trinity Peninsula are discussed. The permanent snow line seems to lie between 0 and 100 m above sea level. Ice streams originating in plateau glaciers move at a rate of about 3 m/mo.; those originating in highland glaciers move about 10 to 15 m/mo. The size of the grains of firn (1 to 5 mm) and the density of the firn of the uppermost 2 m of the firn bed (0.48 to 0.56) correspond to values for the oceanic Arctic and indicate a more rapid process of firnification than has been found in other areas of the Antarctic. Rammsonde measurements yielded a maximum hardness at 20 to 25 cm and an average increase of hardness with the square of the depth, down to about 2 m. (Author's abstract, modified)

SIP 25707 551.321:622.234.2

Aamot, Haldor W. C.
THE PHILBERTH PROBE FOR INVESTIGATING POLAR ICE CAPS. Spec. Rept. 119, U.S. Army Cold Regions Research and Engineering Laboratory, 14p. incl. table, graphs, diagrs., appendix A, Sept. 1967. 5 refs.
CRREL files

The Philberth probe is a surface-controlled, non-recoverable instrumented vehicle that penetrates polar ice sheets down to 3600 m by melting. It can be used to measure temperature, stress and ice movement, seismic and acoustic observations, electromagnetic transmission in ice, and other investigations with remote instrumentation. The probe consists of a hot point for melt penetration, instrumentation for control and measurement functions, two supply conductor coils to link the probe with the surface for transmission of power and measurement signals, and a reservoir section. The probe is filled with a dielectric fluid. (Author's abstract)

SIP 25708 551.345.1(*531.3)

Solov'ev, P. A.
ZONALITY OF THE STRENGTH OF THE SEASONALLY THAWING LAYER AND ITS MAPPING IN WESTERN AND SOUTHERN YAKUTIYA. Translation: Siberian Dept. Acad. Sci., USSR, Inst. Frozen Ground Res., Seasonal Thawing and Freezing of the Ground in the Northeast Territory of the USSR. Moscow, Izd-vo "Nauka", p. 14-20 incl. tables, maps, 1966. 5 refs.
CRREL files

The zones of seasonal thawing layers are mapped for Western and Southern Yakutia. In order to separate the territory into zones, data on the depth of thawing at various points are compared, but under conditions that are comparatively homogeneous - according to some limiting complex of criteria. In parts with contrasting conditions it is sufficient to compare data of a standard part to establish boundaries. To establish the practical significance of seasonal thawing it is necessary to combine the regionality of a territory according to geological-geomorphological criteria on special small-scale and medium-scale charts of seasonal thawing and divide it into zones according to the greatest depth of thawing under definite conditions. The first brings out specific types of areas and covering sediments represented in any region and the predominant seasonal thawing layer. The second essentially fixes the gradation of the thawing depth as an aid in economic exploitation of the territory. -- FMM

SIP 25709 631.42(*762)

Campbell, I. B. and G. G. C. Claridge
SITE AND SOIL DIFFERENCES IN THE BROWN HILLS REGION OF THE DARWIN GLACIER, ANTARCTICA. N.Z. J. Sci., 10(2):563-577 incl. illus., tables, map, June 1967. 14 refs.
DLC, Q1.N525

Three soils typical of those formed in small, enclosed, glacially scoured basins in the Brown Hills region were studied. The soil-forming factors, parent material, regional climate, and age were considered to be the same for each of the soils; slope and aspect were the principal site variants, and these gave rise to considerable moisture variations. The soils can be arranged in a sequence, from a dry soil that contains only a little salt and shows little weathering of clay minerals, to a wet, very salty soil that contains clay minerals, which, by Antarctic standards, are considerably weathered and hydrated. (Authors' abstract, modified)

SIP 25710 551.312.2:551.34

Juusela, Taneli
SOME RESULTS OF FIELD OBSERVATIONS ON THE FROST PHENOMENON ON PEAT SOIL. J. Hydrol. (Amsterdam), 5:269-278 incl. diagr., table, 1967. 8 refs.
DLC, GB651.J6

Field observations on ground frost carried out during the winter period 1953-1954 on peat soil revealed e.g. the following: 1) The relative total water quantity in the frozen zone formed during a period of slow cooling (in percent by volume) is higher than that resulting when freezing takes place at a fast rate. 2) With increasing frost depth, the soil immediately under the frozen zone dried out to such extent that the minimum values of its moisture content were lower in the winter than in the summer. 3) The total quantity of water stored in the frozen zone either in frozen or in liquid condition (in percent by volume) increased continuously in the course of the winter with further increase in frost depth. 4) After the increase of frost depth had ceased, the moisture content of the soil layers under the frozen zone once more began to increase, already before the start of the thawing period. 5) The frost penetration was the deeper but the relative total water quantity of the frozen zone (in percent by volume) the lower, the lower the level at which the water was kept dammed in the open ditches surrounding the area. The free-board amounts subjected to comparison in this respect were 20, 35 and 60 cm. The observations show that the frost phenomenon both developed and acted on the moisture conditions in the soil investigated in a manner largely similar to that which it is known to follow on mineral soils. (Author's abstract)

SIP 25711 551.345:551.495

Romanovskiĭ, N. N. and A. B. Chizhov
PROBLEMS OF RELATION AND INTERACTION OF GROUND WATERS AND FROZEN ROCKS. (Voprosy vzaimosvîazi i vzaimodeĭstviîa podzemnykh vod i merzlykh tolshch gornykh porod; Text in Russian). Vestnik Moskovskogo Univ., Geologiîa, No. 4:22-36 incl. map, diagr., 1967. 13 refs.
DLC, G1.M68

Physical interaction between frozen rocks and ground water, expressed in thermal and material exchange, is discussed. Ground waters change thermal conditions of rocks by starting convective heat flows in the process of their movement through the frozen zone. These heat flows combine with conductive heat currents originating in the rock layers characterized by periodical heat-cycles, and with the heat inflow from deeper zones in the crust. This way

ground waters redistribute heat energy in the upper rock layers and determine the cryogenic structure of the epi- and syn-genetic frozen rocks. Perennial freezing of the lithosphere effects ground-water supply, its movement and drainage by creating mobile water-resistant layers which divide single hydrodynamic systems in the frozen rocks, temporarily interrupts the communication between separate localities, and changes the velocity and direction of water movement. All these factors are briefly discussed with an attempt to distinguish definite types of ground water in the perennially frozen regions and plot their areal distribution on a map. -- NSV

SIP 25712 551.343:631.43

Bisal, Frederick and Kenneth F. Nielsen
EFFECT OF FROST ACTION ON THE SIZE OF SOIL AGGREGATES. Soil Science, 104(4):268-271 incl. tables, Oct. 1967. 11 refs.
DLC, S590.S6

It has been suggested that freezing and thawing modify the physical condition of fine textured soils decreasing ultimate particle size and increasing erosiveness; on the other hand, there were indications that frost action causes an increase in the size of aggregates, which results in a decrease in the erosiveness of the surface soil. This paper reports the results of the field study and four laboratory tests undertaken to investigate the influence of frost and soil moisture content at the time of freezing on the size of aggregates in soils. The objects of study were Haverhill loam, Sceptre clay, Hatton fine sandy loam, and Chin loam soil. There was little effect of frost on the aggregate-size distribution in clay or fine sandy loam. However, frost action decreased the percentage of erodible particles in a loam soil. Freezing and thawing decreased the percentage of erodible particles in the clay, loam, and fine sandy loam soil at higher moisture levels. Essentially there was no difference in the water-stable aggregates because of freezing and thawing. -- NSV

SIP 25713 551.343

Sartz, Richard S.
A TEST OF THREE INDIRECT METHODS OF MEASURING DEPTH OF FROST. Soil Science, 104(4): 273-278 incl. illus., tables, graphs, Oct. 1967. 11 refs.
DLC, S590.S6

This paper reports the results of a 2-year test of three different methods or devices for measuring depth of frost: change in resistance of soil-moisture blocks; soil temperature measured by thermistors; and frost-meters. Depth of bonded frost penetration was evaluated by the above three methods plus by a modified frost penetrometer. The direct reading penetrometer, which was found to be fast and accurate, was used as a check on the indirect methods. Moisture-block and thermistor resistances and penetrometer measurements were made at weekly intervals throughout the frost seasons of 1963-64 and 1964-65. It is concluded that of the three indirect methods tested only the resistance blocks gave a reliable estimate of frost depth. Blocks were easily installed in the stone-free soils, and the accuracy of the method was limited only by the vertical spacing of the blocks and the natural variation in ground freezing. The study was made in a moist soil. Whether change in resistance should be as good an indicator of frozen ground in dry soils was not determined. -- NSV

SIP 25714 551.322:539.3(*7)

Savel'ev, B. A. and S. B. Ukhov
PLASTIC PROPERTIES OF ICE (LAKE AND CONTINENTAL ICE OF THE MARGINAL ANTARCTIC ZONE TAKEN AS AN EXAMPLE). (Plasticheskie svoĭstva l'da (na primere ozernykh i materikovykh l'dov kraevoĭ zony Antarktidy); Text in Russian). Merzlotnye Issledovaniĭa, Sbornik Statei, Vyp. 4: 397-419 incl. illus., tables, graphs, diagrs., 1964. 7 refs.
DLC, GB648.55.M44

This paper reports the results of the laboratory study undertaken to determine the viscosity coefficients of different types of ice samples obtained from the marginal zone of Antarctica, and to investigate the stress-deformation relationship for the ice samples, and its variation in time. An attempt was also made to establish quantitatively the effect of temperature of a sample on its plasticity and to determine the relationship between the viscosity coefficient and structure of different ices. Ice was tested according to the method based on bending of a small ice beam, described by B. A. Savel'ev in his book "Study of Mechanical and Physical Properties of Ice" (Izuchenie Mekhanicheskikh i Fizicheskikh Svoĭstv L'da. Izd-vo AN SSSR, M., 1957). Structural features of ice, optic orientation of its crystals, their form and sizes were established microscopically. Formulas are obtained which describe the effect of temperature and deformation speed on ice plasticity, and the effect of ice structure on its viscosity is illustrated by stereograms of ice crystal orientation in the samples studied. -- NSV

SIP 25715 551.465

Mikhailova, E. N., Fel'zenbaum, A. I. and Shapiro, N. B.
CALCULATION OF ICE DRIFT AND CURRENTS IN THE ARCTIC BASIN. (O raschete dreifa l'dov i techenii v Arkticheskom basseine; Text in Russian). Doklady Akademii Nauk SSSR, 175(6):1273-1276, 1967. 11 refs.
DLC, AS262.S3663

A stationary problem is solved which concerns the determination of ice drift and current velocities, and water temperature and salinity in the Arctic basin, imagining the ice cover as a continuous medium behaving as a solid body in the vertical and as a fluid in the horizontal directions, and accounting for possible convergence and divergence of ice. NSV

SIP 25716 551.467

Gudkovich, Z. M.
CORRELATION METHOD OF PROCESSING ICE DRIFT DATA. (Korrelfâcionnyĭ metod obrabotki dannykh nablfûdeniĭ za dreĭfom l'da; Text in Russian). Prob. Arktiki Antarktiki, Vyp. 21:56-59 incl. tables, diagr., 1965. 6 refs.
DLC, G575.L422

This article presents the continuation of an earlier investigation in which the basic methods of distinguishing the wind- and current-induced components of ice drift were analyzed and a procedure offered for obtaining mean values of wind coefficients for the both components as well as the velocity and direction of the "steady" current, independent of local wind conditions, by correlating the projections of the ice-drift and wind vectors on the coordinate axes. In that procedure the resulting wind vectors had to be preliminarily turned by an angle corresponding to the mean deviation of drift direction from that of the wind. A new way of calculating this angle is offered, which is similar to the K. Watanabe method only more simple and convenient for use with data obtained from the drifting and automatic radio-meteorological stations. -- NSV

SIP 25717 551.322:539

Lavrov, V. V.
ON THE PROBLEM OF MECHANICAL PROPERTIES OF ICE. (K probleme mekhanicheskikh svoĭstv l'da; Text in Russian). Prob. Arktiki Antarktiki, Vyp. 21: 60-65, 1965.
DLC, G575.L422

Difference between mechanical properties of continuous ice covers and small samples of the same ice is discussed with the conclusion that bending strength of the samples may be 2.5 times greater than that of the cover, and that some of the causes for this discrepancy are the differences in scale, crystalline structure, temperature and its distribution, and the errors made in the calculation of stress magnitude at the moment of material failure. Each of these factors is analyzed separately, the discussion including a critical review of most common ice sampling and testing procedures and the suggestions for their improvement. -- NSV

SIP 25718 551.322:539

Ryvlin, A. Îâ. and E. Îû. Petrov
ON EXPERIMENTAL DETERMINATION OF ICE FRICTION COEFFICIENTS UNDER NATURAL CONDITIONS. (K voprosu ob eksperimental'nom opredelenii koeffiĉientov treniîâ l'da v naturnykh usloviîâkh; Text in Russian). Prob. Arktiki Antarktiki, Vyp. 21:66-71 incl. tables, diagr., 1965. 22 refs.
DLC, G575.L422

Static and dynamic coefficients of ice friction against ice and against smooth steel were studied on a lake frozen to the depth of 65 cm in an attempt to bring the experimental conditions as close to nature as possible. The measurement procedure, based on the Coulomb friction-gauge principle, is described in detail. According to the results obtained at +2°C the mean values of the coefficients were 0.08-0.15 for the ice-ice and 0.48-0.91 for the ice-steel friction. They differed considerably from published data on the laboratory results of similar experiments obtained with small samples of the ice-gliding surface. -- NSV

SIP 25719 551.326.7(268.5/.9)

Gudkovich, Z. M.
ANTICYCLONIC CIRCULATION OF ICE IN THE ARCTIC BASIN AND THE DRIFT OF THE NORTH POLE-8 STATION. (Antifâiklonicheskafâ fâirkulfâfâiîâ l'dov v Arkticheskom basseîne i dreĭf stanfâii "Severnyĭ Polîûs-8"; Text in Russian). Prob. Arktiki Antarktiki, Vyp. 23:5-10 incl. maps, 1966. 7 refs.
DLC, G575.L422

Calculation of the "North-Pole-8" drift during the 3-year period 1959-1961 indicated that the movement of ice in the part of Arctic basin adjacent to the northern shore of Alaska and the Canadian Arctic Archipelago can be compared to the rotation of a hard circular plate around its center. At this type of movement the drifting velocities of the ice-blocks removed by the same distance from the revo-

lution center were equal; they increased with further removal from the center in proportion to the distance (radius). All the ice blocks moving in this manner were turned clockwise by 360° around their axes during one complete revoluation. These peculiarities are regarded as characteristical features of ice movement in the region studied, which is a part of a broad area of anticyclonic circulation of water and ice in the American sector of the Arctic basin. -- NSV

SIP 25720 551.343(*684)

Klĭuev, E. V.
APPEARANCE OF THERMOKARST AT THE BOTTOM OF THE LAPTEV SEA. (Proîavlenie termokarsta na dne moriâ Laptevykh; Text in Russian). Prob. Arktiki Antarktiki, Vyp. 23:26-32 incl. illus., diagr., 1966. 8 refs.
DLC, G575.L422

The profiles of the Laptev Sea bottom recorded by echo sounders showed typical thermokarst structures, of assumingly recent origin, occurring at different development stages in the forms of wedge-shaped vertical troughs, large tetragonal or polygonal depressions, and sink holes of varied sizes, depending on the shape of melting ground ice, the most frequent forms of which were veins and lenses. Similar ice forms were widely developed on the adjacent land in the area of the Lena River delta and on the Novosibirsk Islands. Submerged thermokarst was found mostly at the depths exceeding 15 m; it was gradually developing during short periods of positive water temperatures, locally increased by inflows of warm river waters. The general aspect of the sea-bottom relief was very similar to that of the adjacent land, in particular, the large polygonal depressions near the Novosibirsk Islands closely resembling in size and form the polygonal fracture pattern on the tundra surface. -- NSV

SIP 25721 551.324.3(*533)

Pal'gov, Nikolaĭ Nikitich
EXPERIMENT IN CALCULATING MOUNTAIN GLACIER THICKNESS BY THE BALANCE METHOD. (Opyt vychisleniîa moshchnosti gornykh lednikov metofom balansov; Text in Russian). Geograficheskiĭ Sbornik, 17:18-30 incl. tables, diagrs., 1964. 7 refs.
DLC, G58.G34

A discussion is presented on the basic postulates of the balance method and different ways of its application in which three formulas are offered for determining glacier thickness when its form is approximated by a half-ellipse, parabola, and trapezoid. The calculation procedures for using these formulas are explained and illustrated by a practical example of determining the thickness of the Central Tuyuksu Glacier (Kirgizia), in which it is shown that the first two formulas produce almost identical results, the calculation procedures being much simpler than that for the third formula. The advantages of the method described consist in using all the basic field measurements obtained in the study of a glacier in one summer period, and in determining in the course of computation the amount of glacier's run-off and its cross-profile areas which are needed for evaluating the dynamic and hydrological regime of the glacier. The accuracy of the balance method was sustained during the IGY (1960-61) when its results proved to be quite close to those of seismic and electrical sounding. -- NSV

SIP 25722 551.324.3

Starikov, K. Z.
DETERMINING GLACIER THICKNESS ACCORDING TO CHANNEL WIDTH AND SLOPE ANGLES. (Opredelenie moshchnosti lednika po shirine i uglam naklona bortov lozha; Text in Russian). Geograficheskiĭ Sbornik, 17:31-33 incl. diagrs., 1964.
DLC, G58.G34

This method of measuring glacier thickness is based on estimation of width on the surface and slope angle of the channel determined at ten points along the glacier. When the channel sides do not rise above the ice-level, or there is a possibility of slope-angle difference in the upper and lower part of the channel, the angles are determined to an accuracy of 30 ft by drilling bore holes at 3 to 5 m from the ice edge. Only averaged measurement values are used in the computations in which the glacier channels are approximated by an even-power parabola if the shape is symmetrical or by an elliptical curve if asymmetrical. -- NSV

SIP 25723 551.333

Voronov, P. S.
CRYOTECTONICS AND ITS ROLE IN GLACIOLOGY AND GEOLOGY. (Kriotektonika i ee rol' v glîatsiologii i geologii; Text in Russian). Geograficheskiĭ Sbornik, 17:41-49 incl. maps, diagrs., 1964. 21 refs.
DLC, G58.G34

Cryotectonics is defined as a branch of structural glaciology which studies ice movements, the types of tectonic structures formed by ice and the dynamics of their development. Because in polar regions ice is regarded as rock, it is suggested that all the means of geological investigations be applied to the study of ice, including structural and topographic mapping. Such maps should show the lines of outcropping of seasonal ice layers, mode of occurrence, cleavage orientation, faults, thrust-

faults, intrusive ice bodies, zones of structural non-conformance, and the boundaries of basic structurally different glaciological stages. Similar maps prepared by P.S. Voronov and J. H. Zumberg for Antarctica are discussed, and the M.G. Grosval'd technique of drawing glacier cross-sections and cryotectonic schemes of ice movement are explained. It is further suggested that it is necessary to collect all bibliographies on the subject, to develop a legend for cryotectonic maps, and to systematize the existing cryotectonic nomenclature on the basis of geological terminology.
-- NSV

SIP 25724 551.324(*533)

Maksimov, E. V.
BASIC REGULARITIES GOVERNING RECENT GLACIATION IN KIRGHIZ ALATAU. (Osnovnye zakonomernosti sovremennogo oledeneniia v Kirgizskom Alatau; Text in Russian). Geograficheskii Sbornik, 17:51-69 incl. tables, graphs, maps, diagrs., 1964. 28 refs.
DLC, G58.G34

Ten types of glaciers observed in this region are described, among them the rock glaciers widely developed in the Kirghiz Alatau. They usually originated in corries, descended along steep valleys, did not exhibit outcrops of buried ice, and in some cases were associated with the terminal moraines of present glaciers. Their structure is similar to that of buried glaciers, only the activity is greater and the shape narrower. Movement capability of rock glaciers has been proved but the presence of an ice core is considered problematic. A total of 89 rock glaciers covering a general area of 35.9 km^2 were registered, most of them located on the northern slope of the mountains. The region studied was subdivided into eight zones according to qualitative differences in recent glaciation, the various ways of preparing maps of glaciological zonation are discussed, and the distinguishing features of each zone are described separately.
-- NSV

SIP 25725 551.324(*533)

Cherkasov, P. A.
BASIC PECULIARITIES OF GLACIER EXISTENCE ON THE NORTHERN SLOPE OF DZHUNGAR ALATAU. (Osnovnye osobennosti sushchestvovaniia lednikov severnogo sklona Dzhungarskogo Alatau; Text in Russian). Geograficheskii Sbornik, 17:71-80 incl. table, graphs, diagr., 1964. 6 refs.
DLC, G58.G34

Dzhungar Alatau is located in south-east Kazakh SSR presenting a gigantic cascade of horst-graben structure. Two groups of glaciers occupy 9% of the total area: valley glaciers and those descending down the slopes of separate ridges. Their gradual overall reduction has been established and believed to occur in cyclic advance-retreat oscillations amounting to a total of 35 cycles since the time of origin. Extensive study of the region and results obtained concern the hydrological regime of the glaciers and the mathematical evaluation of thickness, volume, and movement rates. -- NSV

SIP 25726 551.579.3(*533)

Shcheglova, O. P.
GLACIATION AND GLACIAL RUN-OFF OF THE ZERAVSHAN RIVER. (Oledenenie i lednikovyi stok r. Zeravshan; Text in Russian). Geograficheskii Sbornik, 17:81-89 incl. tables, map, graphs, 1964. 11 refs.
DLC, G58.G34

A calculation procedure was developed for evaluating the glacial run-off in the total water yield of the Zeravshan River over a period of years. The amount of run-off is based on analysis of the Zeravshan hydrograph at the river's mountain egres, the snow-line oscillations, and the general energy balance of the glaciation zone. Yearly outflow of glacial waters is calculated by subtracting the amount of ground-water supply during the July-September period from the total water discharge during that time because the amount of maximum glacier melting occurs during that period. To obtain more accurate results when estimating mean glacial runoff over a period of years, only those years are considered during which the snow line was at its highest level. The snow gone before the July-September period and its part in the glacial runoff may be neglected.
-- NSV

SIP 25727 551.324(235.21)

Zakhar'ina, N. N. and E. V. Maksimov
SIZE OF RECENT GLACIATION IN KUNGEI-ALATAU. (Razmery sovremennogo oledeneniia Kungei-Alatau; Text in Russian). Geograficheskii Sbornik, 17:90-93 incl. tables, 1964. 18 refs.
DLC, G58.G34

General area of Kungei-Alatau covered by glaciers was determined by aerial photography to verify old estimates of the military topographic maps dated 1915, 1921, 1937 and 1958 according to which it amounted respectively to 150, 237, 90, and 130 km^2. The results indicated that the territory covered by the open glaciers and buried ice (18.7%) amounted to 523 ± 52 km^2, closely approaching that of the Kirghiz Alatau (520 km^2) and slightly less than the Zailiyskii Alatau (544 km^2), the typical feature being the predominance of medium-size glaciers (1.13 km^2). -- NSV

SIP 25728 551.324(*533)

Pal'gov, Nikolaĭ Nikitich
BOL'SHAIA ALMATINKA GLACIERS OF THE ZILIISKII ALATAU RANGE ACCORDING TO 37 YEARS OF THEIR OBSERVATION. (Bol'shealmatinskie ledniki khrebta Zailiĭskiĭ Alatau za 37 let nabliūdeniĭ; Text in Russian). Geograficheskiĭ Sbornik, 17:94-101 incl. table, graph, diagr., 1964. 8 refs.
DLC, G58.G34

The distribution and structure of the major glaciers in the Bol'shaĭa Almatinka river basin are described in detail. Movement rates are estimated. Glacier ablation is discussed on the basis of studies made in 1960 and the data referring to glacial retreat are tabulated. According to new observations the slopes of terminal parts were periodically increasing during retreat and decreasing during advance, which appeared to be a typical feature of all the glaciers in the Zailiyskii Alatau. The observation procedure used was recommended as a pattern for future similar work. -- NSV

SIP 25729 551.324.43:551.466.6

Shnitnikov, A. V.
TIDE-FORMING FORCE AS A FACTOR IN THE VARIATION OF MOUNTAIN GLACIATION. (Prilivoobrazuūshchaĭa sila kak faktor izmenchivosti gornogo oledeneniĭa; Text in Russian). Geograficheskiĭ Sbornik, 17:102-140 incl. tables, graphs, diagrs., 1964. 87 refs.
DLC, G58.G34

Selected world literature is reviewed and conclusions drawn regarding the existence of rythmic patterns in glacial fluctuations as a function of crustal surface variation under the action of extra-terrestrial forces. A definite pattern was clearly indicated during the later Quaternary and related to the rhythmic advance and retreat of the position of the southern permafrost boundary, and other evidence. During this period unusually strong and protracted tide-forming forces were manifested and two phases in world glacier behavior were distinguishable, occurring in different geographic zones, that of a short, intensive transgression and a long-lasting, gradual regression. -- NSV

SIP 25730 551.32(*527)

Simonov, I. M.
STUDY OF SNOW COVER AND UPPER ICE LAYERS IN THE DOMES OF FRANZ-JOSEF LAND. (Izuchenie snezhnogo pokrova i verkhnikh gorizontov l'da na kupolakh zemli Frantsa-Iosifa; Text in Russian). Geograficheskiĭ Sbornik, 17:149-157 incl. illus., tables, map, 1964. 11 refs.
DLC, G58.G34

Glaciological investigation of snow cover and ice domes was carried out on 9 islands of Franz Josef Land, the results showing snow depth variation from 2 cm to about 2 m depending on such underlying surfaces as ice domes, ice-free land, lake- or sea-ice. In the case of ice-domes the depth of snow depended on the height of the dome above sea-level, prevailing wind direction, and the degree of dome convexity. Microscopic study of the upper ice in the domes revealed two layers: the uppermost layer with spongy texture, abundance of air-pores, and mineral inclusions; and a deeper light-blue layer of infiltrated ice containing vertically oriented series of air-bubbles marking the boundaries of the yearly ice layers. Average thickness of these layers ranged from 8 to 10 cm, ice density, 0.87 to 0.89, and the size of individual ice-crystals, 1.5 to 2 cm; the position of main crystal axes ranged from normal to parallel orientation with respect to ice layering. -- NSV

SIP 25731 551.32+551.33+551.34+625.7+629.124.8

Peschanskiĭ, I. S.
STUDY OF ICE AND ICE TECHNOLOGY. (Ledovedenie i ledotekhnika; Text in Russian). Gidrometeorologicheskoe Izdatel'stvo, Leningrad, 1967. 461p. incl. illus., tables, graphs, diagrs. 188 refs.
DLC, GB2403.P4

This is the second edition of the book, expanded and supplemented by the most recent scientific data. The material is presented in seven chapters titled: Ice classification; Ice as a physical body; Ice cover; behavior under load;and the use of its carrying capacity; Methods of ice cover destruction; Ice pressure. The monograph was intended for the specialists in oceanography, marine transport, hydrologists, structural engineers, and college students of the hydrometeorological discipline. -- NSV

SIP 25732 551.578.4:[551.463.6:536.65](265.4)

Matsumoto, S.
BUDGET ANALYSIS ON THE SEA EFFECT SNOW OBSERVED ALONG THE JAPAN SEA COASTAL AREA. J. Meteorol. Soc. Jap., Ser. II, 45(1):53-63 incl. illus., diagrs., tables, February 1967. 19 refs.
DLC, Orientalia Div.

Based on the aerological observations of smaller scale networks which were set up in January of 1963, 1964 and 1965 in Hokuriku district, the Japan Sea coastal area of central Japan, the heat and moisture budgets were compared among these three years. The flux divergence of vapor assumes nearly the same values for three winters, whereas the amount of precipitation changes very much from year to year. Although the difference in the evaporation from the sea surface and that in the convective transfer are estimated to be of considerable amount, the precipitation is principally related to the net transport of condensed water either from or to the surrounding region. The vapor import in 6 hours is compared with 6 hour precipitation within the region. Better relation is found in the precipitation on the downstream side stations. It is shown that the sensible heat increment is nearly twice as much as the latent heat decrement if they are computed by mean flow flux divergence. This circumstance is observed well in the cloud layer regardless of the scale of network. The surplus of the heat energy must be transported by convective activity. It is suggested that, when heavier snowfall is observed, the convective activity is so predominant that more heat energy than that supplied from the sea surface is transported into the cloud layer. (Author's abstract, modified)

SIP 25733 551.574.11:551.577.35:523.16

Maruyama, H. and T. Kitagawa
RELATION OF METEOR STREAM TO NATURAL ICE NUCLEI AND PRECIPITATION. J. Meteorol. Soc. Jap., Ser. II, 45(1):128-136 incl. illus., table, diagrs., February 1967. 7 refs.
DLC, Orientalia Div.

In order to confirm the increase of natural ice nucleus count around the 28th day after a meteor shower, measurements of natural ice nuclei were made with an improved filter paper technique at sufficiently separated two or more sites. The measurements were made continuously for the two periods of more than ten days in May and November, 1962 and January-February, 1963. It was found that the concentration of ice nuclei increased at each site around the same day, that is, the 28th day after major meteor showers. Other increase by local source was seldom found during the periods. From 1960 to 1964, the time variation of all the concentration of measured ice nuclei during the several days around the 28th day after a meteor shower was examined by a mixing cloud chamber or filter paper technique. Almost always the ice nuclei showed unusual increase during the 27th to 29th day after the meteor shower. From the statistical examination, it was recognized that the increment of precipitation amount occurs for the period of the ice nucleus increase following the major meteor shower. (Authors' abstract)

SIP 25734 551.322:539.2

Brill, R. and Tippe, A.
LATTICE PARAMETERS OF ICE I AT LOW TEMPERATURES. (Gitterparameter von eis I bei tiefen Temperaturen; Text in German with English abstract) Acta Crystallogr., 23(3):343-345 incl. illus., diagrs. diagrs., tables, September 1967. 11 refs.
DLC, QD901.I523

Lattice parameters of hexagonal ice have been determined in the temperature interval 15-200°K with a special X-ray powder camera allowing the application of the Straumanis method. Within this temperature interval any temperature can be adjusted with a relative accuracy of better than 1×10^{-2}. The relative error of the magnitude of both the parameters a and c is better than 1×10^{-4}. The expansion coefficients along the a and the c directions, calculated with these lattice parameters, agree very well with the results of dilatometric measurements. Earlier investigations are discussed. (Authors' abstract)

SIP 25735 551.324.8

Robin, G. de Q.
SURFACE TOPOGRAPHY OF ICE SHEETS. Nature, 215(5105):1029-1032 incl. graph, diagr., Sept. 1967. 17 refs.
DLC, Q1.N2

The hypothesis that the thickness of glacier is inversely proportional to the surface slope, provided conditions are uniform around the observation point, does not fit the observations in certain areas. The use of continuous radio echo sounding has provided information which makes a more detailed study of this problem practicable along a line of ice flow to the south of Camp Century in North Greenland. It was found that surface slopes can vary rapidly in response to changing longitudinal stresses caused by ice moving over undulations of the sub-glacial floor. A relationship between surface slopes and

variations of stress along the line of flow is derived from elementary considerations. This relationship provides a satisfactory numerical explanation of observations when stress changes are averaged over a distance of the same order as the depth of ice. This article describes the basic concept which is used and shows how it works in practice. -- NSV

SIP 25736 624.131.436(795)

Cochran, P. H., L. Boersma, and C. T. Youngberg
THERMAL PROPERTIES OF A PUMICE SOIL. Soil Sci. Soc. Amer. Proc. 31(4):454-459 incl. tables, diagrs., July-Aug. 1967. 10 refs.
DLC, S590.S64A13

Dacite pumice materials deposited by the eruption of Mount Mazama cover a land area for as much as 161 km (100 miles) north and east of Crater Lake, Oregon. Frequent night frosts occur in this region. Thermal properties of the pumic material were investigated to determine their affect on the occurrence of low temperatures in the area and thus gain a better understanding of the factors governing the distribution of lodgepole (Pinus contorta Dougl.) and ponderosa pine (Pinus ponderosa Laws). Thermal conductivities were determined experimentally with a line heat source and calculated theoretically. The thermal conductivities of dacite pumice were found to be very low, which may account for the frequent occurrence of night frost in this region. (Authors' abstract)

SIP 25737 551.326.1:551.326.7(*764)

Stonehouse, Bernard
OCCURRENCE AND EFFECTS OF OPEN WATER IN McMURDO SOUND, ANTARCTICA, DURING WINTER AND EARLY SPRING. Polar Rec., 13(87):775-778 incl. map, Sept. 1967. 15 refs.
DLC, G575.P6

Dispersal of fast ice from the eastern shore of McMurdo Sound is aided by a polynya that forms between Cape Royds and Cape Bird almost every boreal winter or spring. Recent observations support the suggestion that the ice edge coincides with a line of junction of 2 strong currents, sweeping respectively from Cape Bird and from the Ross Ice Shelf west of Ross I., and combining to flow southwest and west across the sound. Reports from 3 seasons between 1901 and 1916 and from 12 seasons between 1955 and 1966 show that open water appeared off Cape Royds in 6 of 10 Oct. observations, 7 of 11 Nov. observations, and 13 of 15 Dec. observations. The western side of the sound often retains fast ice until Jan. or Feb. and sometimes retains it from year to year. The presence of the polynya on the eastern shore makes it possible for colonies of Adelie penguins to exist at Capes Bird and Royds. -- DMN

SIP 25738 697.13
624.144.534:621.365

Potter, W. G.
HEATING THE BUILDING ENTRANCE. Air Conditioning, Heating and Ventilating, 64(10):63-70 incl. illus., tables, diagrs., October 1967.
DLC, TH7201.H4

The heating systems used in the entrances of different buildings: banks, department stores, office buildings, shipping docks, and others, are discussed with emphasis on their working principle, material, design, testing and control. The calculation of a concrete slab containing electric heating cables for sidewalk snow melting is presented and the ways of maintaining entryway comfort temperature by marquee heaters, air curtains, convection heaters, and the fan driven downflow cabinet unit systems are explained. -- NSV

SIP 25739 624.144.534:621.365

Potter, W. G.
ELECTRIC SNOW MELTING SYSTEMS. ASHRAE Heating, Refrigerating and Air-Conditioning Journal, 9(10):35-44 incl. illus., tables, diagrs., October 1967.
DLC, TH7201.A22

Three primary electrical techniques for melting snow are discussed: embedded heating cables or wire in pavement; overhead infrared radiants; and exposed heating wires on roof canopies and gutters. These methods are alike in that they all require the prior calculation of heat density necessary to melt snow and the proper layout of equipment to achieve this heat density. Material, equipment, and working principles of snow melting systems are discussed and their design illustrated by a practical example. -- NSV

SIP 25740 551.345(*41:*50)

Brown, R. J. E.
COMPARISON OF PERMAFROST CONDITIONS IN CANADA AND THE USSR. Polar Rec., 13(87):741-751 incl. illus., diagr., Sept. 1967. 31 refs.
DLC, G575.P6

A comparison of permafrost conditions in Canada and the USSR indicates significant differences between the two countries. Although they lie at roughly the same latitude in the Northern Hemisphere, the permafrost region extends farther south in Siberia than in Canada. Ground temperatures at the depth of zero annual amplitude are similar in both countries but permafrost is much thicker in the USSR. At the boundary of the discontinuous and continuous zones, permafrost ranges in thickness from 60 to 100 m in Canada and 250 to 300 m in Siberia. The thickest known permafrost in Canada is about 500 m

in contrast to 600 m in Siberia. A similar relationship between mean annual air temperatures and the distribution of permafrost exists in both countries, but summers are warmer and winters are colder in Siberia. Under similar conditions it is postulated that the active layer can be thicker in Siberia, although there are no comparative observations to validate this suggestion. Differences in snow fall, vegetation, and the history of continental glaciation between Canada and USSR are considered the most important factors causing variations in permafrost conditions. -- NSV

SIP 25741 551.4(571.65)(*531.251)

Nekrasov, Igor' Aleksandrovich
TALIKS OF RIVER VALLEYS AND THE REGULARITIES GOVERNING THEIR DISTRIBUTION IN THE ANADYR RIVER BASIN. (Taliki rechnykh dolin i zakonomernosti ikh rasprostraneniia na primere basseina r. Anadyr'; Text in Russian). Akad. Nauk SSSR, Sibirskoe Otd., Inst. Merzlotovedeniia, Izd-vo "Nauka", Moskva, 138p. incl. illus., tables, maps, diagrs., 1967. 165 refs.
DLC, GB648.79.N4

This monograph reports the results of a detailed investigation of taliks, the term meaning a separate mass of thawed rock within a perennially frozen zone. Proceeding from a review of published information on this subject a new genetic classification of taliks together with detailed description is offered, based on observations in the Anadyr River valley over an area of 250,000 km^2. A discussion concerning the laws governing talik distribution is included. A procedure is developed for locating and mapping the river valley taliks on large-scale maps according to reconnaissance data. Specific plants are believed to be the best indicators of the presence of different talik types. -- NSV

SIP 25742 551.345(571.56)

Grigor'ev, Nikolai Filippovich
PERENNIALLY FROZEN ROCKS IN THE SEA SHORE ZONE OF YAKUTIA. (Mnogoletnemerzlye porody primorskoi zony Yakutii; Text in Russian). Akad. Nauk SSSR, Sibirskoe Otd., Inst. Merzlotovedeniia, Izd-vo "Nauka", Moskva, 180p. incl. illus., tables, maps, diagrs., 1966. 124 refs.
DLC, GB648.55.G7

Conditions favoring the origin, distribution, structure, and temperature of perennially frozen rocks in the near-sea zone of Yakutia are discussed in this monograph with emphasis on the dynamics of cryogenic processes, in particular, the formation of recent perennially frozen rocks in the near-shore parts of an arctic sea bottom, as well as under the lakes and rivers of Northern Yakutia. This work was intended for geologists, geographers, permafrost specialists, and structural engineers. -- NSV

SIP 25743 621.315.1:551.345(*50)

Gal'perin, Vitalii Veniaminovich
ELECTRICAL TRANSMISSION LINES IN REGIONS OF PERENNIALLY FROZEN ROCKS. (Linii elektroperedachi v raĭonakh mnogoletnemerzlykh gruntov; Text in Russian). Izd-vo "Energiia", Moskva-Leningrad, 180p. incl. illus., tables, graphs, diagrs., 1966. 214 refs.
DLC, TK3243.G3

Design, construction, and exploitation of electrical transmission lines in the permafrost regions are discussed. Only features which differ from those of electrical lines built under ordinary conditions, and only those characteristics of perennially frozen ground which have to be accounted for when designing and building electrical transmission lines are treated. The book is intended for electrical engineers, technicians and university students specializing in power-supply systems. -- NSV

SIP 25744 551.345(571.56)

Danilova, N. S.
STRUCTURAL PECULIARITIES OF THE SEASONAL THAWING LAYER IN CENTRAL YAKUTIA. (Nekotorye osobennosti stroeniia sezonnoprotaivaiushchego sloia Tsentral'noĭ Iakutii; Text in Russian). Akad. Nauk SSSR, Sibirskoe Otd., Inst. Merzlotovedeniia, Sezonnoe Protaivanie i Promerzanie Gruntov na Territorii Severo-Vostoka SSSR. Izd-vo "Nauka", Moskva, 21-28 incl. graphs, diagrs., 1966. 6 refs.
DLC, GB648.55.S4

Basic structural features of seasonal freezing-thawing layers in Central Yakutia strongly depend on climate, lithological composition, and texture of surface deposits. Formation of such layers in loam in dry climate in the vegetation zones ranging from steppe to taiga is discussed. Their most persistent feature is the foliated texture which is preserved all through the layer due to the exceptional dryness of air, which in turn affects the cryogenic structure by determining the distribution of ice veinlets among soil flakes. Lenticular or netted cryogenic textures develop only in the uppermost soil layer in taiga which contain some humus and in which is concentrated the major part of fall precipitation. The frost action loosens the taiga soils during thawing causing an increase in the size of aggregates. -- NSV

SIP 25745 551.345:553.068(*684:*531.3)

Demin, A. I.
THERMAL REGIME OF BOTTOM SEDIMENTS IN THE SHALLOW WATERS OF ARCTIC SEAS. (Teplovoĭ rezhim donnykh otlozheniĭ na melkovod'e arkticheskikh morei; Text in Russian). Akad. Nauk SSSR, Sibirskoe Otd., Inst. Merzlotovedeniĭa, Sezonnoe Protaivanie i Promerzanie Gruntov na Territorii Severo-Vostoka SSSR. Izd-vo "Nauka", Moskva, p. 40-46 incl. tables, graphs, 1966.
DLC, GB648.55.S4

This paper reports the investigation at Yana Bay, undertaken to determine thermal regime of bottom deposits and their freezing conditions in the shallow water areas at water-depths of 1.0 to 1.5 m, 1.5 to 2.5, 3 m, and more. In the first case, during winter, water frozen completely and the active layer of bottom sediment frozen to its union with permafrost; in the second case, the layer frozen only to a certain depth under the completely frozen water, while in the third case, the bottom deposits were never frozen above the depth of 4.5 m. Thermistor readings indicated that thawing of bottom sediment continued to the end of August and the maximum depth of 1.3 m; the maximum melting speed was 7.9 cm/24 hrs at the end of July with a gradual decrease to 1 cm/24 hrs. Mean temperature of the upper 10 cm of bottom sediments equalled that of water, but a sudden drop amounting to 1° for every 6 cm in the thawed layer and 1° for every 20 cm in the frozen layer was observed below the upper 10 cm of sediment. -- NSV

SIP 25746 551.345:536

Balobaev, V. T.
CALCULATION OF THAWING DEPTH WITH AN ACCOUNTING FOR EXTERNAL HEAT EXCHANGE. (Raschet glubiny protaivaniĭa s uchetom vneshnego teploobmena; Text in Russian). Akad. Nauk SSSR, Sibirskoe Otd., Inst. Merzlotovedeniĭa, Sezonnoe Protaivanie i Promerzanie Gruntov na Territorii Severo-Vostoka SSSR. Izd-vo "Nauka", Moskva, p. 47-57 incl. tables, graph, 1966. 9 refs.
DLC, GB648.55.S4

An approximate solution of the problem concerning the calculation of thawing-depth variation in time in the course of melting is presented, in which that part of the heat energy spent on evaporation and turbulent heat-exchange in air, and that penetrating the ground are accounted for. The temperature field of air and of frozen and thawed rocks is described by a system of three differential equations of thermal conductivity for certain boundary conditions, assuming that the thermal field of air is quasi-stationary. This system is solved by the method of successive approximations developed by M. E. Shvetsov for the problems of boundary layer dynamics. Its advantage lies in the possibility of reducing the solution of a system of differential equations with moving boundary to the solution of a system of ordinary differential equations with respect to thawing-depth. -- NSV

SIP 25747 551.345:536:519.28

Pavlov, A. V.
ENGINEERING METHODS OF FORECASTING FREEZING AND THAWING DEPTHS. (Metody inzhenernykh prognozov glubiny promerzaniĭa i protaivaniĭa grunta; Text in Russian). Akad. Nauk SSSR, Sibirskoe Otd., Inst. Merzlotovedeniĭa, Sezonnoe Protaivanie i Promerzanie Gruntov na Territorii Severo-Vostoka SSSR. Izd-vo "Nauka", Moskva, p. 58-76 incl. tables, graphs, 1966. 8 refs.
DLC, GB648.55.S4

An attempt is made to increase the accuracy of certain approximate methods developed for the calculation of freezing- and thawing-depths of ground. Such methods are based on the solution of a system of thermal conductivity equations for the frozen and thawed zones without accounting for mass-exchange in the ground. It is believed, that more accurate results may be obtained in two ways: by calculating more precisely the boundary conditions determining heat exchange in the ground, and by developing convenient ways of accounting for water convection and migration in the ground during its freezing and thawing. Only the first way is analyzed in this article for the case of a horizontal terrain, and new equations for depth determination are obtained on the basis of this analysis. The use of these formulas is illustrated by practical examples. -- NSV

SIP 25748 551.345:536:519.28

Demchenko, R. ĭA. and L. P. Pyrkova
CALCULATION OF MINIMUM TEMPERATURE OF THE UPPER LAYERS OF PERENNIALLY FROZEN GROUNDS. (Raschet minimal'noĭ temperatury verkhnikh sloev mnogoletnemerzlykh gruntov; Text in Russian). Akad. Nauk SSSR, Sibirskoe Otd., Inst. Merzlotovedeniĭa, Sezonnoe Protaivanie i Promerzanie Gruntov na Territorii Severo-Vostoka SSSR. Izd-vo "Nauka", Moskva, p. 130-134 incl. graphs, 1966. 2 refs.
DLC, GB648.55.S4

The possibility of forecasting minimum temperature

(t_{min}) of the upper layer of perennially frozen ground for a period of years is discussed. The analysis is based on the relation of minimum annual air temperature to the sum of minus degree days per year and the snow thickness. The differential equations describing the basic laws of thermal conductivity are modified to account for the main factors on which t_{min} is dependent: 1) moisture content, thermal and physical properties of the layer down to the depth of zero amplitudes of annual temperature fluctuation, 2) the sum of minus degree days of air per year, and 3) mean thickness of snow per winter. This method was used in determining t_{min} for the experimental area of the Institute of Geocryology, Siberian Branch of the Academy of Sciences, USSR, at the depth of 2.75 m for the period 1954-1960. According to the theoretical and experimental curves the calculation error did not exceed 0.6°. -- NSV

SIP 25749 54-145:536.421:537:311

Anantha, N. G. and B. Chalmers
ELECTRICAL PHENOMENON OCCURRING DURING FREEZING OF DILUTE AQUEOUS SOLUTIONS. J. Applied Phys., 38(11):4416-4420 incl. diagrs., illus., October 1967. 14 refs.
DLC, QC1.J83

The electrical effects occurring during freezing of dilute aqueous solutions have been studied using NH_4OH and NH_4Cl solutions. The freezing potentials depend on the concentration of the solution and the rate of growth of the solid phase. This effect is an impurity effect and does not appear in pure material. The phenomenon can be explained by a model in which the impurity rejected by the growing solid into the solution ionizes, one kind of ion being adsorbed on the solid surface at the interface and the other kind diffusing into the liquid. The impurity ion adsorbed on the surface moves with the surface and is not incorporated into the solid phase. This effect is confined to a narrow range of concentration of the solutions. (Authors' abstract)

SIP 25750 [691.33:661.312]"324"

Davidson, Mikhail Genrikhovich
NEW TECHNOLOGY OF WORKING CONCRETE IN WINTER (POTASH AS AN ANTI-FREEZE ADMIXTURE). (Novaîa tekhnologiîa betonnykh rabot zimoĭ (potash kak protivomoroznaîa dobavka); Text in Russian). Lenizdat, 139p. incl. illus., tables, graphs, diagrs., 1966.
DLC, TH1461.D28

A procedure of working concrete at minus temperatures using potash as an antifreeze is discussed on the basis of experiments to investigate the effect of potash on the strength of cohesion between concrete and its reinforcement. The use of potash to retard the beginning and end of cement setting, and the method of grouting joints under winter conditions when mounting precast concrete structures without heating them, are stressed. Practical recommendations concerning the preparation of potash-containing concrete mixtures, their packing, transportation and quality control are given. -- NSV

SIP 25751 551.345:551.343.7

Maksimova, L. N., Perl'shtein, G. Z. and N. N. Romanovskiĭ
THE EFFECT OF WATER IN A SEASONAL THAWING LAYER ON ITS THICKNESS AND TEMPERATURE REGIME. (Kharakter vliîaniîa nadmerzlotnykh vod na temperaturnyĭ rezhim i moshchnost' sloîa sezonnogo ottaivaniîa'; Text in Russian). M. G. U. Merzlotnye Issledovaniîa, Vyp. 5:26-42 incl. tables, map, diagrs., 1966. 11 refs.
DLC, GB648.55.M44

Water moving in a seasonal thawing layer was studied in East Siberia in river valleys under different geomorphological and geocryological conditions. Several water zones were found in the thawing layer within the same water-bearing interval; they differed by the conditions of ground-water recharge, the time span of water existence in the zone, and the way the water affected the ground temperature. The size of such zones depended on quantity and distribution of atmospheric precipitation, and slope and freezing conditions of the ground. A scheme is offered for classifying the waters present in a thawed layer according to the rock type in which the waters circulate, their relation to the water-impervious frozen layer beneath, and their recharge conditions. The areal distribution of such waters can be mapped on the basis of this scheme. -- NSV

SIP 25752 551.345:536.242

Krivchuk, L. N.
VARIATION OF THERMAL CONDUCTIVITY OF A MOIST GROUND BECAUSE OF PHASE TRANSITION OF WATER DURING FREEZING. (Izmenenie teploprovodnosti vlazhnykh gruntov za schet fazovykh perekhodov vody pri promerzanii; Text in Russian). M. G. U. Merzlotnye Issledovaniîa, Vyp. 5:92-99 incl. tables, graph, 1966. 9 refs.
DLC, GB648.55.M44

The relative variation (B) of the thermal conductivity coefficient (l) of frozen and thawed soil samples ($B = l_{fr}/l_{thwd}$) with respect to their composition, density, and moisture content was studied experimentally. The results indicated that B of an absolutely dry sample remained practically constant at plus and minus temperatures. It varied in moist soil on account of water freezing, the nature of this

variation depending entirely on the moisture content of soil. For sandy and clayey soils containing 3-7% water, B of the frozen samples was lower than B of the thawed samples due to the disturbance of thermal contacts in the soil by the growing ice crystals. An increase in moisture increases the quantity of heat transmitted through ice crystals, so that at a certain degree of water saturation B = 1. This moisture content was 8 to 10% for sandy soils and approached the maximum molecular moisture content in very fine soils. Further increase in water saturation resulted in a linear increase of B. Formulas are given for calculating B for loam and sandy soils. -- NSV

SIP 25753 551.345:550.7:528.932.6(*531.3)

Kurnishkova, T. V.
EXPERIMENT IN GEOBOTANICAL MAPPING OF PERENNIALLY FROZEN ROCK AREAS IN THE ALDAN REGION OF YAKUT ASSR. (Opyt geobotanicheskogo kartirovaniâ v raĭonakh razvitiâ mnogoletnemerzlykh gornykh porod na primere Aldanskogo raĭona Yakutskoĭ Assr; Text in Russian). M. G. U. Merzlotnye Issledovaniâ, Vyp. 5:171-179 incl. table, 1966. 10 refs.
DLC, GB648.55.M44

Characteristic features of geobotanical mapping in permafrost regions are analyzed taking as an example the preparation of a small scale map for the Aldan region of South Yakutia, which shows the association of plant types with definite complexes of physical and geographical conditions. The map was prepared from aerial photography and land surveying data. Mapping units were differentiated on the basis of a combination of conditions determining the appearance of certain plant cover, relief, local climate, soil, moisture in the ground and the type of its seasonal freezing and thawing. -- NSV

SIP 25754 551.342:551.491.7

Ananĭan, A. A.
ENERGIC INHOMOGENEITY OF WATER IN FINE GRAINED ROCKS. (Energeticheskaiâ neodnorodnost' vody soderzhashcheĭsiâ v tonkodispersnykh gornykh porodakh; Text in Russian). M. G. U. Merzlotnye Issledovaniâ, Vyp. 5:221-228 incl. table, 1966. 18 refs.
DLC, GB648.55.M44

Study of water phases in fine grained frozen rocks indicated the presence of two water types: one which crystallizes at freezing temperature, and another which remains fluid at the same temperature; both types are energically inhomogeneous. This inhomogeneity is produced by the distortion of the molecular structure of water due to the surface activity of rock particles, which changes the forces governing the mobility and interaction between adjacent water molecules. The relationship between the fluid and solid water phases in a freezing rock, with respect to changing temperature, is analyzed and the facts sustaining energic inhomogeneity of water are discussed. -- NSV

SIP 25755 551.345:539.376

Shusherina, E. P.
ON THE COEFFICIENT OF LATERAL DEFORMATION AND VOLUME DEFORMATIONS OF FROZEN SOILS DURING CREEP. (O koeffitsiente poperechnoĭ deformatsii i ob ob"emnykh deformatsiiakh merzlykh gruntov v protsesse polzuchesti; Text in Russian). M. G. U. Merzlotnye Issledovaniâ, Vyp. 4:229-240 incl. tables, graphs, 1966. 9 refs.
DLC, GB648.55.M44

The coefficient of lateral deformation (μ) of frozen loam and clay was determined according to the results of testing these soils for creep and strength under continuous loading under uniaxial compression (σ). Density and moisture contents of the soils were respectively 1.81 to 1.82 g/cm^3 and 26% for loam and 2.06 to 2.08 g/cm^3 and 20 to 24% for clay; testing was conducted at -5, -10 and -20°C and at different compressive forces, which were maintained constant for each individual sample. Lateral deformation was measured at the base and middle of a core sample. The results indicated that in the process of soil creep μ depended on σ, time, temperature, and the type of soils. These relations are illustrated graphically. -- NSV

SIP 25756 551.345:[553.1:554]

Zimovets, B. A.
GEOCHEMICAL SOIL PROCESSES IN FREEZING GROUND OF MONSOON LANDSCAPES. (Pochvenno-geokhimicheskie protsessy musonno-merzlotnykh landshaftov; Text in Russian). Pochvennyĭ Institut im. V. V. Dokuchaeva. 166p. incl. illus., tables, graphs, diagrs., Izd-vo "Nauka", Moscow, 1967. 114 refs.
DLC, Slavic Div.

Soil formation processes characteristical of seasonally freezing ground in the areas of a monsoon-type climate are discussed in this monograph. New material is presented on the chemical composition of soils, vegetation, rocks, ground- and river-waters, and on this basis are determined the biological, hydrochemical, pedological, and geological cycles of chemical elements migration and accumulation. The processes governing redistribution of sesquioxides and silica are especially emphasized; the procedures of zoning and mapping soils on a geochemical basis are analyzed; and the measures for increasing soil fertility recommended. -- NSV

SIP 25757 551.345:528.932.6(573)

Sheveleva, N. S. and L. S. Khomichevskaîa
GEOCRYOLOGICAL CONDITIONS OF NORTH YENISEY. (Geokriologicheskie usloviîa Eniseĭskogo Severa; Text in Russian). Gosstroĭ SSSR, Proizvod. i n.-issl. Inst. po Inzhenernym Izyskaniîam v Stroitel'stve. 126p. incl. illus., tables, maps, graphs, diagrs., Izd-vo "Nauka", Moscow, 1967. 172 refs.
DLC, Slavic Div.

This book presents the characteristics of frozen formations in north Yenisey. Peculiarities of permafrost distribution, the temperature regime, thickness and cryogenic structure of perennially frozen rocks are established by analyzing natural conditions of this region. The procedure of mapping such areas is explained, and illustrated by a geocryological map (scale 1: 2,500,000) of the region described. History of permafrost development during the Quaternary Period and the genesis of cryogenic formations are stressed. -- NSV

SIP 25758 528.7+551.340(*50)

Protas'eva, I. V.
AEROMETHODS IN GEOCRYOLOGY. (Aerometody v geokriologii; Text in Russian). Akad. Nauk SSSR, Sibirskoe Otd. Inst. Merzlotovedeniîa, 195p. incl. illus., tables, diagrs., Izd-vo "Nauka", Moscow, 1967. 199 refs.
DLC, Slavic Div.

The aim of this book is to show the possibility of using aeromethods for studying the conditions under which perennially frozen rocks and the related cryologic phenomena develop. Theoretical and practical conclusions have been made which can be used as a basis for a broader application of the methods described to the study of regional distribution, composition, structure, and properties of perennially frozen rocks. This is the first published manual on the scientific procedures of geocryological investigations, which also generalizes the former experience in applying airborne survey to geocryology and the related subjects, and which proposes the trends of their further development. -- NSV

SIP 25759 624.146.4:626.1:551.328

Zagirov, F. G.
ON THE PROBLEM OF UNDERWATER ICING OF VARIOUS STRUCTURES. (K voprosu obrazovaniîa vnutrivodnogo l'da na telakh razlichnogo stroeniîa; Text in Russian). Meteorologiîa i Gidrologiîa, No. 1:43-45 incl. graph, 1966. 2 refs.
DLC, QC851.M27

This paper reports the results of a 3-year testing (1962-65) of new materials on which ice does not form and which can be used in hydrotechnical practice. The study of the effect of meteorological, hydraulic, and hydrothermal factors of icing of different materials was a part of this investigation. Experiments were conducted under natural conditions in the channel of a hydroelectrical power plant. Metallic sheets covered by the iron, concrete, bitumen, and different polyethylene coatings were immersed and oriented paralliel and perpendicular to cold stream flow. Temperature of water and air, the velocity and direction of wind, the moisture content of air and the stream velocity were observed. The results indicated that a complete icing of iron, concrete, and bitumen required 10 to 15, 15 to 20 and 20 to 25 minutes respectively; the polyethylene films were entirely free of ice. The use of polyethylene coating on slopes and bottoms of water channels, spillway grating, and the submerged parts of structures is recommended to prevent icing. -- NSV

SIP 25760 551.482:551.513

Bagrov, N. A. and A. P. Kukhto
A METHOD FOR FORECASTING ICE PHENOMENA ON RIVERS. (Metod predskazaniîa ledovykh îavleniĭ na rekakh; Text in Russian). Meteorologiia i Gidrologiia, No. 2:22-28 incl. tables, map, 1967. 5 refs.
DLC, QC851.M27

This article reports the results of an attempt to forecast the dates of ice events (grease ice forma-

tion, ice-bound state, ice break-up) on the rivers in the northern and central regions of the USSR from the atmospheric circulation data, without considering the effect of hydrological factors. A set of the coefficients from the Chebyshev polynomial expansion of a certain meteorological field was used in the evaluation of atmospheric circulation because this field characterized the prevailing stream in the troposphere and its contour charts were available for a long series of years. Equations were derived for forecasting different ice events in various regions 25 to 60 days in advance. The predictors - separate components of atmospheric circulation - used in these equations varied for different regions, but the same equation was used for areas occurring under approximately equal meteorological conditions. -- NSV

SIP 25761 551.321:551.322:53

Bulatov, S. N.
ON THE PROCEDURE OF STUDYING RADIATION PROPERTIES OF AN ICE SHEET COVERING WATER BODIES ON LAND. (K metodike izucheniia radiatsionnykh svoistv ledianogo pokrova vod sushi; Text in Russian). Meteorologiia i Gidrologiia, No. 2:108-111 incl. illus., graphs., 1967. 7 refs.
DLC, QC851.M27

The penetrating capacity of solar radiation through ice was evaluated by the total and scattered radiation flux density measured by a pyranometer which was also capable of measuring radiation falling on a perpendicular surface; the radiation falling directly on the pyranometer's thermopile through a spherical glass hood and that passing through a water filter 1 cm thick was also measured. The degree of cloudiness, temperature, pressure, and moisture content of air were observed simultaneously. The results indicated that under a clear sky the scattering and absorption of solar radiation by the atmosphere increases the infrared part in the atmosphere while cloudiness filters out the infrared radiation. A growing scattered radiation component was increasing the penetration capacity of total radiation through water, snow, and ice. -- NSV

SIP 25762 551.322:548.51:546.57'151

Ono, A. and R. Kimura
AN X-RAY DIFFRACTION STUDY OF SILVER IODIDE FROM AEROSOL GENERATORS AND A PRELIMINARY EXPERIMENT ON ICE-NUCLEATING ABILITY OF β-AgI AND γ-AgI. J. Meteorol. Soc. Jap., Ser. II, 45(2):157-166 incl. diagrs., illus., table, April 1967. 8 refs.
DLC, Orientalia Div.

The crystal structure of silver iodide produced by an aerosol generator was studied with the aid of an X-ray diffractometer. The aerosols produced by the vaporization of a mixture of silver iodide and potassium iodide consisted of the hexagonal silver iodide (β-AgI) and some complex, such as KAg_3I_4. Little trace of potassium iodide was detected in the aerosols. The aerosols produced by the vaporization of an iodide ion-rich silver iodide sample consisted mainly of the hexagonal form. On the other hand, the aerosols produced from a sample with an excess of silver ion consisted mainly of the low-temperature cubic form of silver iodide (γ-AgI). The low-temperature cubic form of silver iodide was found to be more efficient in ice-nucleating than the hexagonal form. The different efficiency could be explained in terms of the misfit of the crystal against ice. (Authors' abstract)

SIP 25763 539.17:548.5:536.48

Syōno, S. and R. Kimura
SCATTER OF FREEZING POINTS EXPECTED FROM THE HOMOGENEOUS NUCLEATION. J. Meteorol. Soc. Jap., Ser. II, 45(2):185-189 incl. tables, diagr., April 1967. 10 refs.
DLC, Orientalia Div.

Two theories related to the freezing problem are analyzed to determine the amount of scatter attributable to the nucleation mechanism. One is a stochastic approach to explain observed scatter of freezing points as proposed by Bigg, the other is a thermodynamic nucleation theory which treats the equilibrium between the supercooled water and the ice embryos in it. The purpose of this analysis is to find to what extent the scatter of freezing points can be expected, if the freezing process really has the nucleation mechanism as treated in the theories. -- NSV

SIP 25764 532.543

Sinotin, V. I. and Z. A. Genkin
HYDRAULIC CALCULATION OF FLOW UNDER AN ICE COVER. (Gidravlicheskii raschet potoka pod ledianym pokrovom; Text in Russian). Meteorologiia i Gidrologiia, No. 12:46-48 incl. graph, 1966. 1 ref.
DLC, QC851.M27

When calculating water flow in an ice-bound river the roughness of the ice surface which comes into contact with water has to be accounted for separately since it differs from the roughness of the river channel. The authors have conducted a series of experiments to determine the velocity profile of the stream under the ice and to evaluate the coefficients of ice and river-channel roughness: n_2 and n_1 respectively. A graph relating n_1/n_2 to the ratio of maximal and dynamic stream velocities was plotted in logarithmic coordinates and a general formula for the family of parallel lines on this graph was obtained and transformed into the final equation for n_2. -- NSV

SIP 25765 551.343(571.56)

Ivanov, M. S.
CRYOGENIC PHENOMENA ON THE SEA SIDE OF THE YANA DELTA. (Kriogennye fâvleniĭâ u morskogo kraĭâ del'ty Iany; Text in Russian). Yakutsk, Gosudarstvennyĭ Universitet, Uchenye Zapiski, Vyp. 16:77-83 incl. illus., diagrs., 1965. 3 refs.
DLC, AS262.Y3A3

Cryogenic relief-forms appearing on the northern part of the Yana River delta were studied, with emphasis on frost-fracture structures, thermokarst, and frost heaving. Frost fractures formed on the periodically flooded areas were disappearing with the seasonal thawing of the upper layer of ground. Ground veins were observed on the surface of the marginal parts of the delta, and in a buried state in the floodplain deposits. They gradually disappeared and instead ice veins appeared toward the center of the delta. Frost fractures formed a polygonal pattern without ridges in the marginal parts of the delta, the ridges appearing temporarily during flood periods. The polygons with ridges were developed on the high flood plain where ice veins grew only laterally. -- NSV

SIP 25766 551.343(571.56)

Tolstikhin, O. N.
CHARACTERISTIC FEATURES OF THE CAVING-IN OF SHORES OF THE KOLYMA RIVER AND ITS RIGHT TRIBUTARIES IN RELATION TO COMPOSITION AND STRUCTURE OF TERRACE CUSPS. (Nekotorye osobennosti obrusheniĭâ beregov Kolymy i ee pravykh pritokov v svîâzi s sostavom i stroeniem terrasovykh ustupov; Text in Russian). Yakutsk, Gosudarstvennyĭ Universitet, Uchenye Zapiski, Vyp. 16:85-90 incl. illus., 1965. 3 refs.
DLC, AS262.Y3A3

Destruction of river shores built of perennially frozen rocks was observed in the Kolyma River basin during the summer of 1963. The nature of the process was closely related to the lithological composition, structure, and ice content of the river bench deposits and to the distribution of ice lenses in the bench cliff. Melting of ice in looser sediments resulted in the development of a so-called thawing niche which grew gradually into the cliff undermining the above lying deposits. The same process of intensive ice melting in the terrace slope proceeded differently and led to various forms of slope sculpturing depending on the granular composition of the sediments, the nature of their bedding and the size of buried ice lenses. -- NSV

SIP 25767 551.343(571.56)

Protas'eva, I. V.
DECIPHERING LANDSCAPE AND GEOCRYOLOGICAL FEATURES IN THE LOWER COURSE OF THE YANA RIVER. (Landshaftno-geokriologicheskoe deshifrirovanie v nizov'îâkh r. Yany; Text in Russian). Yakutsk, Gosudarstvennyĭ Universitet, Uchenye Zapiski, Vyp. 16:91-101, 1965. 13 refs.
DLC, AS262.Y3A3

Characteristic features of geocryological structures and relief forms revealed in an aerial photograph of this region are analyzed and the recognition method explained. It is believed that for an accurate mapping of a region, the aerial photography should be combined with field reconnaissance and these results used in the production of the topographic and geocryological maps. Direct indications of the presence of geocryological processes such as frost heaving and solifluction and of different elements of the relief and vegetation are discussed, and the fact that the same structures in different parts of the same territory may appear in different colors on the photograph are explained. -- NSV

SIP 25768 528.93

Shvetsov, V. S.
EDITING THE TOPOGRAPHIC MAPS OF FOREST-TUNDRA AND MOUNTAIN-TUNDRA. (Opyt redaktîâionnykh rabot pri sozdanii topograficheskikh kart na raĭony lesotundry i gornoĭ tundry; Text in Russian). Geodeziîâ i Kartografiîâ, No. 11:51-55, 1965.
DLC, QB275.G45

This is a short discussion on the specific topographic features of different tundra types, the various ways of their mapping, and the development of a legend for indicating the permafrost areas, thermokarst topography, frost heaving, rock glaciers, solifluction, polygonal cracking, naled's, and other cryogenic microforms of the relief. -- NSV

SIP 25769 551.343.2(*56)

Seppälä, Matti
RECENT ICE-WEDGE POLYGONS IN EASTERN ENONTEKIO, NORTHERNMOST FINLAND. Turun Yliopiston Maantieteen Laitoksen Julkaisuja, No. 42: 274-287 incl. illus., graph, diagr., Publ. Inst. Geogr. Univ. Turkuensis, Turku, Finland, 1966. 19 refs.
DLC, GB648.68.F55S46

This paper reports the results of a field study of the origin of shrinkage fracturing of fine grained sediments on the Hietatievat esker. Contraction crack-

ing started in a fine glacial and fluvial sand, exposed at the surface, after the covering dune sand had been blown off by wind. The shrinkage cracks produced by desiccation were forming a typical polygonal pattern; they were gradually filled with the wind-blown coarser material and further expanded and deepened by the accumulation and growth of ice in them. The recent nature of the ice-wedges formed in the fractures was indicated by the absence of any soil-formation processes in the cracks, an abundance of charcoal in the coarser material filling them, and a recent fracturation of the coarse material. -- NSV

SIP 25770 551.343.4(*532.6)

Lukashov, A. A.
STRUCTURAL FEATURES WHICH PREDETERMINE THE FORMATION OF TROUGH ROCK-GLACIERS IN ZABAIKAL'E. (Strukturnoe predopredelenie peremetnykh zemlianykh gletcherov v Zabaĭkal'e; Text in Russian). Geogr. Obshch. SSSR, Zapiski, Zabaĭkal'skiĭ Otd., Vyp. 22:142-144, 1963.
DLC, G23.G272

A short description is presented of the rock-glaciers developing in East Transbaikal in the local troughs characterized by steep slopes and a swampy bottom. Rock waste accumulates at the bottom of such a trough by talus creep and solifluction, its specific structural features being a complex alternation of sand and clay interlayers, ice lenses, and a strong water saturation. The rock glaciers several meters thick moved along the trough bottom under their own weight helped by water lubrication, with a velocity of several millimeters per year. The majority of rock-glaciers were associated with the mountain crests cut by faults or those exposing strongly fractured water-bearing rocks; however, this association was true only for East Transbaikal. -- NSV

SIP 25771 551.578.46:536.2

Dolov, M. A.
CALCULATION OF THERMAL CONDUCTIVITY COEFFICIENT FOR SNOW. (Raschet koeffitsienta temperaturoprovodnosti snega; Text in Russian). Vysokogornyi Geofiz. Inst., Trudy, Fizika Snega i Snezhnye Laviny, Vyp. 6:3-14 incl. tables, graphs, Leningrad, 1967. 19 refs.
DLC, Slavic Div.

The coefficient of thermal conductivity of snow is calculated according to the Tseĭtin, Laĭkhtman and Sychev formulas using the experimental data on temperature distribution in a snow cover obtained by the author. The theoretical results correlate with previously published experimental data on thermophysical characteristics of snow obtained by different investigators. -- NSV

SIP 25772 551.578.46:536.2

Dolov, M. A.
CALCULATION OF HEAT FLUX IN A SNOW COVER. (Raschet potoka tepla v snezhnom pokrove; Text in Russian). Vysokogornyĭ Geofiz. Inst., Trudy, Fizika Snega i Snezhnye Laviny, Vyp. 6:15-24 incl. tables, graphs, Leningrad, 1967. 7 refs.
DLC, Slavic Div.

Heat flux from the atmosphere into a snow cover is calculated according to the Tseĭtin, Laĭkhtman, and Sychev formulas using the experimental data on temperature distribution in snow obtained for the winter and spring periods. The approximate Sychev formula produced exaggerated results; the most reliable data were obtained with the Tseĭtin formula. -- NSV

SIP 25773 551.578.46:551.509.3
551.578.46:539.3

El'mesov, A. M.
COMPRESSIBILITY AND TENSIBILITY OF SNOW UNDER THE ACTION OF CONSTANT AND VARIABLE LOADING. THE POSSIBILITY OF AVALANCHE FORECASTING. (Szhimaemost' i rastiazhimost' snega pod deĭstviem postoiannoĭ i peremennoĭ nagruzok. Vozmozhnost' prognozirovaniia lavin; Text in Russian). Vysokogornyĭ Geofiz. Inst. Trudy, Fizika Snega i Snezhnye Laviny, Vyp. 6:25-39 incl. illus., graphs, Leningrad, 1967. 9 refs.
DLC, Slavic Div.

Relationships in the nature of snow deformation, its rate, and the intensity of loading a snow sample were studied experimentally for two cases: 1) snow compression with a possibility of lateral distortion, and 2) tensile deformation; the mechanical loading was either variable or constant. In both cases the regularities governing snow deformation and the critical rates of snow flow are presented analytically, and the conclusions drawn are used for formulating a semi-empirical theory for forecasting the time of snow sample destruction under loading. It is believed that the start of an avalanche can be predicted on the basis of this theory. -- NSV

SIP 25774 551.578.482

Tebuev, D. I. and V. A. Khalkechev
ON THE PROBLEM OF DETERMINING DYNAMIC CHARACTERISTICS OF CERTAIN AVALANCHE TYPES. (K voprosu opredeleniia dinamicheskikh kharakteristik nekotorykh vidov snezhnykh lavin; Text in Russian). Vysokogornyi Geofiz. Inst., Trudy, Fizika Snega i Snezhnye Laviny, Vyp. 6:40-46, Leningrad, 1967. 5 refs.
DLC, Slavic Div.

Loose snow avalanches are discussed analytically

using the equation of heat inflow from a viscous compressible fluid. The formula for the dynamic viscosity-coefficient of moving snow is derived for a given slope inclination. A formula for determining the general force of snow impact against an immobile obstacle is obtained for certain types of avalanches by generalizing the formulas derived by S. A. Khristianovich, G. K. Sulakvelidze, and L. D. Gongadze for this case. -- NSV

SIP 25775 69(211):624.182

Chitadze, V. S.
MEASURES FOR PROTECTING ENGINEERING STRUCTURES AGAINST AVALANCHES ON THE SLOPE OF THE CHEGET RIDGE. (Mery protivolavinnoi zashchity inzhenernykh sooruzhenii na sklone Chegetskogo Khrebta; Text in Russian). Vysokogornyi Geofiz. Inst., Trudy, Fizika Snega i Snezhnye Laviny, Vyp. 6:96-101, Leningrad, 1967. 8 refs.
DLC, Slavic Div.

Construction used for preventing avalanche danger are grouped into two classes: those designed to withstand direct impact of snow and the ones which prevent the formation of avalanches and are calculated to sustain snow-cover equilibrium on mountain slopes. Different methods of calculating distances between the snow-supporting structures of the second group are discussed and formulas derived for the particular conditions of the Cheget ridge. Wattles made of oak stakes and rhododendron twigs are believed to be most economical and produce the best effect; they can remain for 20-30 years without repair. NSV

SIP 25776 634.932:528.918(571.1)

Motovilov, G. P. (ed.)
AERIAL PHOTOGRAPHY AND MAPPING OF SIBERIAN FORESTS. (Aerofotos"emka i kartografirovanie lesov Sibiri; Text in Russian). Akad. Nauk SSSR, Sibirskoe Otd., Inst. lesa i drevesiny, 171p. incl. illus., tables, maps, graphs, diagrs., Moscow, 1966. 88 refs.
DNAL, SD387.A25A4

Theory and practice of cartography and aerial photography of forests in Siberia and the Far East are discussed emphasizing particular problems associated with this work. A new method of determining seasonal conditions for aerial photography according to phenological maps is explained, different ways of interpreting black-and-white, colored, and spectrozonal prints are analyzed, and a new procedure for combined interpretation developed for the Far East forests is offered. -- NSV

SIP 25777 656.61.052:551.326(*623)

Dick, T. Milne
LIMITS TO NAVIGATION BY ICE IN PORT OF CHURCHILL. Proceed. of Amer. Soc. of Civil Eng. J. of Waterways and Harbors Division, 93(WW4):11-26 incl. map, tables, graphs, diagrs., Nov. 1967.
DLC, TC1.A4

Icing conditions in two zones are discussed as affecting and limiting the navigation season: (1) Hudson Bay; Hudson Strait, eastern end; Hudson Strait, western end; and (2) Churchill Harbor. Mitigation of the ice conditions during freeze-up in Churchill Harbor could extend the shipping season not more than an average of 14 days. Extension of the season would also depend upon certain changes in the conditions of operation. These could be: improvement of aids to navigation with emphasis upon operations in northern waters; provision of escort service by ice breakers in Hudson Bay and Straits; more frequent aerial ice reconnaissance; and use of ice-strengthened ships specially adapted for northern navigation routes. The Churchill River responds to atmospheric cooling quickly, hence, ice production commences in the river before it does in the sea and owing to the surface current distribution makes the harbor untenable. Diversion of the river at Southern Indian Lake would greatly reduce the fresh water flow and cause ice to appear a few days earlier but the volume of ice should be substantially reduced. Local ice production within the harbor would not be affected. -- NSV

SIP 25778 624.146.4:622.235

Tavrizov, V. M.
ICE-BLASTING OPERATIONS. (Ledokol'nye vzryvnye raboty; Text in Russian). Izd-vo "Nedra", 142p. incl. illus., tables, graphs, diagrs., Moscow, 1967. 36 refs.
DLC, Slavic Div.

Ice-blasting methods are described as used to protect different types of construction from moving ice, to prevent floods, and for other similar purposes. The material is presented in 8 chapters which include general information about ice covers and the ice drift process, the organization and preliminary preparations for ice-blasting; technology and calculation of explosive charges and safety rules; and different procedures followed in the blasting of solid ice and drifting ice in ice-jammed areas. -- NSV

SIP 25779 551.578.46:551.573

Meiman, James, R. and Charles W. Slaughter
LONG-CHAIN ALCOHOL SUPPRESSION OF SNOW EVAPORATION. Proc. Amer. Soc. Civil Engrs. J. Hydraulics Div., 93(HY6):271-279 incl. illus., tables, Nov. 1967.
DLC, TC1.A39

Results obtained from studies of hexadecanol distribution on a melting snow surface using isotopes and autoradiographs are given. In addition, investigations of complimentary pan evaporation studies describe the method of applying alcohols and give the effects of a specific mixture of long-chain alcohols on snow evaporation. The combined results indicate that long-chain alcohols can spread on a melting snow surface. The rate of spread of hexadecanol to a concentration sufficient to form a compressed film was less than 1 cm per hr. Under the conditions of the study, 10% emulsion applications of a hexadecanol-octadecanol mixture were far superior to powder applications. An average reduction of 38.3% was obtained with this mixture in those runs having evaporation reductions significant at the 5% level. Although still in the development stage, the autoradiograph technique appears to have promise for future studies of long-chain alcohol distribution on snow surfaces. Longer duration and larger scale studies are necessary to determine the practicality of field applications. -- NSV

SIP 25780 551.32:621.59

Meetham, A. R.
THE DEPTH OF COLD. The English Univ. Press Ltd. London, 173p. incl. illus., tables, graphs, diagrs., 1967.
DLC, QC278.M36

This introduction to low temperatures presents the affect on everyday life as well as technology and science. Its aim is to show the achievements already made in this field and the problems associated with its future progress. It is a part of the "New Science Series" written to attract a wide audience and to make clear the aims and implications of the work of experts in this field. -- NSV

SIP 25781 551.1/.4(*41)

Bird, John Brian
THE PHYSIOGRAPHY OF ARCTIC CANADA, WITH SPECIAL REFERENCE TO THE AREA SOUTH OF PARRY CHANNEL. The Johns Hopkins Press, Baltimore, Maryland, 336p. incl. illus., tables, graphs, maps, diagrs., 1967. 713 refs.
DLC, GB132.N6B5

An examination of the physiography of arctic Canada south of Parry Channel brings together in one work information about the arctic landscape and its evolution accumulated during the last two decades. The material is presented in 23 chapters which deal with general features of the physical geography, climate, distribution of glaciers, permafrost, soils, vegetation, the major episodes in landscape development, the geomorphic processes in the present-day landscape, and the special elements in the landscape. The field work forms the basis of this study, the next most important source of information being air photograph analysis and the work of other scientists. -- NSV

SIP 25782 693.547.3

Timms, Albert G.
PREPARING FOR COLD WEATHER CONCRETING. Modern Concrete, p. 26-27, 30, 32-34, October 1967.
DLC, TA680.M6

Special precautions in making and protecting concrete to be placed in cold weather are pointed out. Although no new developments in this field are mentioned, certain refinements in the methods used are discussed. Satisfactory structures can be built if the concrete during subfreezing weather is maintained at 65°F or higher from the time of placing and for several days thereafter. During this time satisfactory moisture conditions must be maintained. The duration of protection required will vary with conditions favorable to the continuing development of strength; it will also vary with the strength needed immediately after protection. The development of tough transparent plastic sheets and improved heating devices has made it possible to place concrete (except for pavements) economically all winter. -- NSV

SIP 25783 624.143.56

Wood, F. O.
THIS WINTER - USE THE RIGHT DE-ICER ON CONCRETE PAVEMENTS. Modern Concrete, p. 55-56, October, 1967.
DLC, TA680.M6

This is a short discussion on the chemicals being marketed for deicing, and on how to select an inexpensive de-icer that works without harmful effects to concrete, shrubs or building interiors. The following guidelines are recommended: 1) avoid repackaged products for which exorbitant claims are made; 2) insist on knowing the chemical composition of any product used; 3) do not use ammonium nitrates or sulphates on or near concrete surfaces. -- NSV

SIP 25784 624.131.436:551.345:551.579.5

Low, Philip F., Pieter Hoekstra, and Duwayne M. Anderson
SOME THERMODYNAMIC RELATIONSHIPS FOR SOILS AT OR BELOW THE FREEZING POINT: II. EFFECTS OF TEMPERATURE AND PRESSURE ON UNFROZEN SOIL WATER. Res. Rept. 222, Pt. 2, U.S. Army Cold Regions Research and Engineering Laboratory, 9p. incl. table, graphs, July 1967. 8 refs.
CRREL files

Thermodynamic methods are presented for calculating, from the water adsorption isotherms, the change in unfrozen water content of a partially frozen soil with temperature at a constant pressure or with pressure at a constant temperature. Then, using pertinent experimental data for Na-Wyoming bentonite, the increase in unfrozen water caused by a confining pressure of 100 atm is obtained as a function of temperature. Such information is shown to be relevant to the mechanical properties of frozen soils under stress. (Authors' abstract)

SIP 25785 551.324.431(*38)

Mock, Steven J.
ACCUMULATION PATTERNS ON THE GREENLAND ICE SHEET. Res. Rept. 233, U.S. Army Cold Regions Research and Engineering Laboratory, 15p. incl. table, maps, July 1967. 16 refs.
CRREL files

All available mean annual accumulation data on the Greenland ice sheet (excluding the Thule Peninsula) have been collected and analyzed using multiple regression techniques to develop equations capable of predicting mean annual accumulation. The analysis was carried out for north Greenland, south Greenland, and for the transition zone between the two major regions. The resulting equations show that mean annual accumulation can be predicted from the independent parameters, latitude, longitude, and elevation. The patterns of accumulation are shown in a series of isohyetal maps (contours of accumulation in terms of water). The major feature shown is a well defined asymmetry in accumulation; a pronounced east slope maximum in south Greenland and an equally pronounced west slope maximum in north Greenland. Poleward of 69°N, isohyets decrease in elevation to the north. Mean annual accumulation ranges from > 90 gm/cm^2 in southeast Greenland to < 15 gm/cm^2 in northeast Greenland. A brief discussion of mass balance estimates of the Greenland ice sheet and of the relevance of this study to them is included. (Author's abstract)

SIP 25786 541.183:546.57'151

Edwards, Harry W. and M. L. Corrin
THE ADSORPTION OF METHANOL VAPOR ON SILVER IODIDE. J. Phys. Chem., 71(11):3373-3377 incl. graphs, October 1967. 21 refs.
DLC, QD1.J95

The adsorption of methanol vapor on silver iodide was measured at 9.77, 19.79, and 30.02° over the pressure range 0.24-108 mm. The silver iodide was prepared by the reaction of silver and iodine in vacuo with subsequent liquid ammonia treatment. The adsorption isotherms do not fit into the Brunauer classification. The shape of the isotherms indicates the absence of three-dimensional clustering in the adsorbed phase. The dependence of the isosteric heats of adsorption upon surface coverage reveals the dual nature of the silver iodide surface. The surface is heteroenergetic with approximately 12% of the surface consisting of higher energy sites located patchwise over the surface. Selection of methanol vapor as the adsorbate eliminated three-dimensional clustering in the adsorbed phase due to hydrogen bonding, and thus characterization of the silver iodide surface was straightforward. (Authors' abstract)

SIP 25787 551.43:551.343

Vtiûrina, Ekaterina Alekseevna
CRYOGENIC SLOPE TERRACES. (Kriogennye sklonovye terrasy; Text in Russian). Gos. Kom. po Delam Stroitel'stva SSSR, Proizvod. i Nauch.-Issled. Inst. po Inzhenernym Izyskaniîam v Stroitel'stve, Izd-vo, "Nauka", 94p. incl. illus., diagrs., Moscow, 1966. 87 refs.
DLC, GB591.V85

The term cryogenic slope terraces is used for the structures formed on mountain slopes by cryogenic processes, primarily by solifluction and frost weathering. A new hypothesis concerning their origin is offered, as well as a new interpretation of some of their structural and morphological characteristics. An attempt is made to develop a genetic classification of the cryogenic slope terraces, in which different development stages of the terraces and the processes responsible for their origin would be accounted for; this classification may serve as a basis for mapping these relief forms. -- NSV

SIP 25788 551.345:552.5

Zhestkova, T. N.
CRYOGENIC TEXTURES AND THE FORMATION OF ICE IN LOOSE DEPOSITS. (Kriogennye tekstury i l'doobrazovanie v rykhlykh otlozheniiakh; Text in Russian). Akad. Nauk SSSR, Proizvod. i Nauch.-Issled. Inst. po Inzhenernym Izyskaniiam v Stroitel'stve, Izd-vo "Nauka", 106p. incl. illus., tables, graphs, diagrs., Moscow, 1966. 136 refs.
DLC, GB642.Z43

The origin of perennially frozen formations of an epigenetic type are discussed in relation to their lithological composition, structure, the initial moisture content, and the surface temperatures prevailing during the period of their freezing. The discussion includes the effect of homogeneous and inhomogeneous composition of the loose sediments, the role of coarse-grained interlayers of different thickness separating the homogeneous deposits, and their effect on the amount of ice and its distribution with depth. Moisture migration in the deposits which are freezing with and without ground water inflow and the cryogenic textures produced in the result of that is analyzed, and the approximate temperature conditions which prevailed during the separate freezing stages of the formations studied are calculated. -- NSV

SIP 25789 551.525.5(*50)

Kudriavtsev, V. A.
ON THE DEPTH OF YEARLY TEMPERATURE FLUCTUATIONS IN PERENNIALLY FROZEN ROCKS. (O glubine rasprostraneniia godovykh kolebanii temperatur v mnogoletnemerzlykh tolshchakh; Text in Russian). Moskov. Gosud. Univ., Merzlotnye Issledovaniia, Vyp. 6:3-8 incl. table, graph, 1966. 3 refs.
DLC, GB648.55.M44

A mathematical procedure developed for determining depths of yearly temperature fluctuation in frozen rocks (and published in Moscow State Univ. Merzlotnye Issledovaniia, Vyp. 1, 1961) proved very accurate in different regions but the permafrost areas, for which it produced exaggerated results. This discrepancy was explained by the phase transitions of fluid water in the pores of perennially frozen rocks and a new way of accounting for this effect is discussed. -- NSV

SIP 25790 551.579.5:551.345

Melamed, V. G.
MATHEMATICAL FORMULATION OF THE PROBLEM CONCERNING FREEZING OF MOIST GROUND, ACCOUNTING FOR MOISTURE MIGRATION AND CONDITIONS UNDER WHICH ICE INTERLAYERS ARE FORMED. (Matematicheskaia formulirovka zadachi promerzaniia vlazhnykh gruntov s uchetom migratsii vlagi i usloviia obrazovaniia ledianykh prosloev; Text in Russian). Moskov. Gosud. Univ., Merzlotnye Issledovaniia, Vyp. 6:28-37 incl. diagr., 1966. 9 refs.
DLC, GB648.55.M44

This problem is analyzed by solving simultaneously a system of equations describing heat- and mass-transfer in a fine-grained moist medium. Formulas are derived for determining total moisture content (ice + water) at any point of the frozen zone; the formulas relate temperature variations in both frozen and non-frozen zones and the velocity of the freezing front progress to water migration. -- NSV

SIP 25791 551.343.2(*50)

Romanovskii, N. N. and O. G. Bolarskii
POLYGONAL VEIN ICE AND GROUND VEINS IN THE NORTH-EASTERN PART OF THE VITIMO-PATOMSK UPLAND. (Poligonal'no-zhil'nye l'dy i gruntovye zhily v severo-vostochnoi chasti Vitimo-Patomskogo nagor'ia; Text in Russian). Moskov. Gosud. Univ., Merzlotnye Issledovaniia, Vyp. 6: 124-143 incl. diagr., 1966. 5 refs.
DLC, GB648.55.M44

Polygonal veins filled with ice or fine grained sediment, developed mostly in the floodplain deposits in the areas of different surface conditions and lithological composition, were measured, classified, and described. Their origin and the way of determining their age are discussed with the conclusion that there is evidence of a still continuing development of the polygonal vein pattern in the area studied, and that the main process responsible for it is the cyclic freezing-thawing of the floodplain deposits. -- NSV

SIP 25792 551.345:581.5(*50)

Lazukova, G. G.
ON THE STABILITY OF CERTAIN INDICATIVE FEATURES OF PLANTS GROWING IN DIFFERENT REGIONS ABOVE THE PERENNIALLY FROZEN ROCKS LOCATED NOT FAR FROM THE SURFACE. (O postoianstve nekotorykh indikatsionnykh priznakov rastitel'nosti na neglubokо-zalegaiushchikh mnogoletne-merzlykh porodakh razlichnykh raionov; Text in Russian). Moskov. Gosud. Univ., Merzlotnye Issledovaniia, Vyp. 6:166-174, 1966. 6 refs.
DLC, GB648.55.M44

Definite plant communities which reflect the presence of perennially frozen ground at a shallow depth were studied in three regions of Siberia differing by their geographical locations and the type of vegetation. That is, the upper course of the Amur River, the middle course of the Vilyui River and the lower course of the Ob River. Although by their specific composition such plant associations sharply differed from the surrounding environment, they had the same characteristic features and general outlook in all three regions. Their most typical features were: an absolute absence of seedling growth; the presence of dwarfed birch and wild rosemary among bushes; large numbers of swamp plants; and very thick and widely developed peat moss of different varieties. -- NSV

SIP 25793 551.345:53+539.3

Zykov, IU. D.
ULTRASONIC STUDY OF PHYSICAL AND MECHANICAL PROPERTIES OF FROZEN ROCKS AND THE INTERNAL PROCESSES. (Primenenie ul'trazvuka dlîa izucheniîa fiziko-mekhanicheskikh svoĭstv merzlykh porod i proiskhodîashchikh v nikh protsessov; Text in Russian). Moskov. Gosud. Univ., Merzlotnye Issledovaniîa, Vyp. 6:184-198 incl. graph, diagr., 1966. 36 refs.
DLC, GB648.55.M44

This is a review of a number of works dealing with the study of frozen rocks by ultrasonic sounding, which includes description of the apparatus, the first results obtained in determining the velocity of longitudinal waves (V_p) in frozen ground, and its relation to grain sizes of rocks and temperature, as well as the data on different ice and snow properties obtained from V_p readings. Qualitative relationships between the signal amplitude and ice content of rocks were established and the possibility of studying their strength and thermal conductivity by the same method were outlined. In conclusion a number of practical advices and ideas concerning future trends of the research in this field are offered. -- NSV

SIP 25794 551.345:537

Poltev, N. F.
CHANGES IN GRAIN SIZES OF SANDY SOILS UNDER THE ACTION OF ELECTROLYTE SOLUTIONS AND FREEZING-THAWING PROCESSES. (Izmenenie granulometricheskogo sostava peschanykh gruntov pri vozdeĭstvii na nikh rastvorov elektrolitov i protsessa zamerzaniîa-ottaivaniîa; Text in Russian). Moskov. Gosud. Univ., Merzlotnye Issledovaniia, Vyp. 6:199-206 incl. illus., table, 1966. 7 refs.
DLC, GB648.55.M44

This is a report on the results of two tests in which was studied the resistance of a quartz sand to 50 freezing-thawing cycles and the treatments with the 0.5 n solutions of NaCl, Na_2SO_4 and $CaCl_2$. The results indicate destruction of the sand grains exceeding 0.25 mm in diameter and an apparent stability of the smaller particles due to a smaller number of microfractures and defects in the crystalline lattice in this sand fraction. Physical state of the sand treated by these solutions before and during the freezing processes indicated that $CaCl_2$ had the largest effect on the sand grains destruction. -- NSV

SIP 25795 551.345:536

Smirnova, N. N., Moskvina, E. V. and A. A. Ananîan
EXPERIMENT IN MEASURING THERMAL CONDUCTIVITY OF LOOSE ROCKS IN PLACE BY THE CYLINDRICAL PROBE METHOD. (Opyt opredeleniîa teploprovodnosti rykhlykh gornykh porod v polevykh usloviîakh metodom zonda; Text in Russian). Moskov. Gosud. Univ., Merzlotnye Issledovaniîa, Vyp. 6:207-214 incl. table, diagr., 1966. 6 refs.
DLC, GB648.55.M44

A cylindrical probe designed for a direct measurement of the thermal conductivity coefficient of rocks, and consisting of a copper tube containing heating wires and a micro-thermistor, is described, its working principle is analyzed mathematically, and the coefficients of thermal conductivity of various floodplain deposits measured in the field and under the laboratory conditions are tabulated and discussed. -- NSV

SIP 25796 551.345:551.579.5

Ananîan, A. A. and E. V. Moskvina
MOISTURE MIGRATION IN FREEZING FINE-GRAINED ROCKS UNDER THE CONDITIONS OF A CLOSED SYSTEM. (O migratsii vlagi v zamerzaîushchikh tonkodispersnykh gornykh porodakh v usloviîakh zakrytoĭ sistemy; Text in Russian). Moscov. Gosud. Univ., Merzlotnye Issledovaniîa, Vyp. 6: 215-220 incl. table, 1966. 10 refs.
DLC, GB648.55.M44

Pressureless moisture migration in dusty loam in a hydrologically closed system was studied experimentally in an attempt to explain a sudden decrease of moisture saturation immediately below the lower ground freezing boundary. The presence of this moisture depleted zone is explained from the standpoint of energic inhomogeneity of water contained in fine grained rocks. The experimental results indicated that a continuous decrease in the moisture content of the thawed zone adjacent to the frozen part results in the strengthening of water binding, lowering of its energic level, and a decrease in its capacity for migration. -- NSV

SIP 25797 551.345:551.579.5

Ananîân, A. A.
EVALUATING THICKNESSES OF NON-FROZEN WATER LAYERS IN FROZEN ROCKS. (Otsenka tolshchiny sloev nezamerzsheĭ vody v merzlykh gornykh porodakh; Text in Russian). Moskov. Gosud. Univ., Merzlotnye Issledovaniîa, Vyp. 6: 221-228 incl. tables, 1966. 13 refs.
DLC, GB648.55.M44

By author's definition, non-frozen water is that part which does not crystallize in freezing rocks at freezing temperatures but remains fluid and in a dynamic equilibrium with ice crystals. The water occurs in films enveloping rock particles, the film thickness, as determined by the nuclear magnetic resonance method, varying upwards from a monomolecular layer. Moscow State University, Department of Geocryology has developed a procedure for an approximate evaluation of the water-film thicknesses in fine-grained frozen rocks, in which the thickness values are obtained as an averaged result from the division of the volume of non-frozen water by the specific surface of the rock, the specific surface being determined by the method of nitrogen adsorption at low temperatures. -- NSV

SIP 25798 551.345:539.42

Vîâlov, S. S. and Ermakov, V. F.
NEW METHOD OF DETERMINING STRENGTH OF FROZEN GROUND UNDER SUSTAINED LOAD. (Novyĭ metod opredeleniîa dlitel'noĭ prochnosti merzlykh gruntov; Text in Russian). Moskov. Gosud. Univ., Merzlotnye Issledovaniîa, Vyp. 6:229-241 incl. table, graphs, diagrs., 1966. 3 refs.
DLC, GB648.55.M44

The working principle of a new dynamometric stress analyzer designed for testing frozen ground samples is explained and the testing procedure described. The results obtained with Callovian marl for creep under uniaxial compression are presented graphically, discussed, and compared to the data obtained by other standard testing of marl samples. -- NSV

SIP 25799 551.482.215.7:551.326.83(520)

Kamada, Shin-etu
STUDIES ON THE ICE FORMATION AND STREAMFLOW UNDER ICE CONDITIONS IN THE RIVER. (Kasen no keppyō to kore ni tomonau suiri ni kansuru kenkyū; Text in Japanese with English summary). The Civil Eng. Res. Inst., No. 38, 66p. incl. illus. table, diagrs., graphs, November 1965.
DLC, Orientalia Div.

The Ishikari River investigation covers five years of winter period observations which are related to channel discharge in terms of water-stage, river-bed frictional velocity, and formation and displacement of the river ice. Results indicate that the whole frozen ice is displaced vertically by changes in the water-stage and accumulated snow cover, the displacement being periodic across the river's width. The growth of the uppermost layer into snow jam is calculated by heat transfer coefficients varying with wind velocities and air temperature. The river-bed temperature affects the melting of the river ice to a much greater extent than the turbulent dissipation in the parallel flow between two flat planes. -- FMM

SIP 25800 551.482.215.7:551.326.83(520)

Kamada, Shin-etu
SUPPLEMENTARY NOTES ON THE ICE FORMATION AND THE STREAMFLOW UNDER ICE CONDITIONS IN THE RIVER. (Kasen no keppyō to kore ni tomonau suiri ni kansuru kenkyū (tsuiho); Text in Japanese with English summary). The Civil Eng. Res. Inst., No. 42, p. 7-15 incl. tables, graphs, November 1966.
DLC, Orientalia Div.

Stresses on a river bank due to the vertical displacement of the surface ice in a river are obtained by assuming the surface ice to be an elastic plane. The stresses occurring when the surface ice covers the whole water surface in a river are presented. Ice formations are explained by using the heat transfer coefficient from the ice surface to the air. In the preceding paper (SIP 25799) the formula of the formation of the ice covered with the accumulated snow is presented. Generally speaking, the heat transfer coefficient consists of three factors, i.e., the turbulent flow of air over the surface, the evaporation of ice, and the heat radiation. The behavior of these factors in the case of ice formation in a river is explained. The temperature of a river bed is evaluated by measuring the melting velocity of the surface ice: $(6 \sim 10) \times 10^{-3}$°C is obtained as the temperature for the bed in the Ishikari river. Determining the position of the maximum velocity in a vertical direction under the whole frozen surface is very important, since the maximum position is related closely to the frictional velocity when the discharge is given. Data indicate that the distance from the lower limit level of the surface ice to the maximum position is smaller than the distance from the bed to it, and that the ratio of the two distances is 1.14 on an average. (Author's summary)

SIP 25801 624.139.34:69:725.4

Dement'ev, A. I.
DEFORMATION OF BUILDINGS CAUSED BY CRYOGENIC PROCESSES AND THEIR CONTROL. (Deformatsii zdaniĭ vyzyvaemye merzlotnymi protsessami i ikh likvidatsiia; Text in Russian). 103p. incl. illus., map, tables, graphs, diagrs., Stroĭizdat, 1967. 35 refs.
DLC, TA713.D46

Geocryological processes affecting the stability of buildings erected in cold regions are discussed; three general classes of processes are those associated with water freezing, thawing of ice, and cold air temperatures but not related to seasonal thawing-freezing of the ground. Different types of building deformation are analyzed and classified with respect to the processes causing them: seasonal freezing-thawing, frost heaving, frost fracturing, wrong building technique, and incorrect maintenance of the buildings. Recommendations are given on control of cryogenic processes, repair of deformed buildings, and maintenance of structures erected on a perennially frozen ground. -- NSV

SIP 25802 551.324.41(*527)

Razumeĭko, N. G.
HEAT EXCHANGE IN THE ICE OF THE FRANZ JOSEF LAND ICE-FEEDING DOMES. (Teploobmen vo l'du na kupolakh Zemli Frantsa-Iosifa s ledianym pitaniem; Text in Russian). Akad. Nauk SSSR, Inst. Geografii, Teplovoĭ i vodnyĭ rezhim snezhno-lednikovykh tolshch, Izd-vo "Nauka", Moskva, p. 75-80 incl. tables, diagr., 1965. 2 refs.
DLC, GB2405.A36

Vertical distribution of ice temperature in glacial domes and its variation in time were studied to determine the thermal balance of ice covered by 80 cm of snow. The results indicated that thermal exchange between air and ice went through the snow cover, which in turn was reflecting air temperature oscillations. Monthly heat exchange in ice in the ice-nourished domes varied from 0.01 to 1.00 kcal/cm^2, the maximum heat released occurring in March and the maximum heat accumulation in July. In separate years the ice was losing more heat in the winter than obtaining it in the summer, or vice versa, but on the average, over a series of years the yearly heat balance was almost zero with a slight tendency toward a plus balance, despite the negative solar radiation balance on the domal surface. -- NSV

SIP 25803 551.578.42:551.578.45(*50:234.9)

Kotliakov, V. M. and M. A. Plam
CALCULATING THE QUANTITY OF SOLID PRECIPITATION ON MOUNTAIN GLACIERS AND THE ROLE OF SNOW STORMS IN SNOW REDISTRIBUTION (ACCORDING TO INVESTIGATIONS ON EL'BRUS). (Podschet kolichestva tverdykh osadkov na gornykh lednikakh i rol' metelevogo perenosa v ikh pereraspredelenii (po issledovaniiam na El'bruse); Text in Russian). Akad. Nauk SSSR, Inst. Geografii, Teplovoĭ i vodnyĭ rezhim snezhno-lednikovykh tolshch, Izd-vo "Nauka", Moskva, p. 87-117 incl. tables, graphs, diagrs., 1965. 20 refs.
DLC, GB2405.A36

Two indirect methods are offered for determining the sum of atmospheric precipitation falling on glaciers: 1) according to daily snow measurements on an experimental area, and 2) from the data on the intensity and duration of snow storms. The results obtained by both methods were used in checking the accuracy of the precipitation gage readings, and establishing the regularities governing the fallout redistribution on glaciers. The possibility of using this procedure in mountains as well as on forestless plains increased its practical value; the established relationship between the summary snow transfer and its deposition on plane surfaces and in depressed areas during storm made it possible to calculate snow concentration in the wind shadow. It is concluded that, as a rule, the maximum distance of snow transfer in mountains is 100 m. -- NSV

SIP 25804 551.578.45(*526)

Chizhov, O. P. and V. V. Engel'gardt
SNOW TRANSFER BY WIND ON THE NOVAYA ZEMLYA GLACIERS. (Perenos snega vetrom na Novozemel'skom lednikovom pokrove; Text in Russian). Akad. Nauk SSSR, Inst. Geografii, Teplovoĭ i vodnyĭ rezhim snezhno-lednikovykh tolshch, Izd-vo "Nauka", Moskva, p. 142-160 incl. tables, graphs, diagrs., 1965. 20 refs.
DLC, GB2405.A36

A mathematical procedure is offered for estimating the amount of snow transported by storms, its redistribution, and its value in the balance of a glacial cover by comparing the calculated values of snow drift to the precipitation measured. Comparison of the mean snow accumulation values and the precipitation on different areas made it possible to distinguish three zones within one glacier: 1) snow accumulation and partial drift, 2) snow inflow and redistribution, and 3) the area of predominant snow drift increasing down the slope. The mathematical operations are illustrated by the practical example of studying the amounts of precipitation, snow drift and its accumulation along the longitudinal profile of the Shokal'skiĭ glacier. -- NSV

SIP 25805 691.8(*50)

Sizov, V. N.
ERECTION OF BUILDINGS MADE OF LARGE PRECAST SLABS UNDER WINTER CONDITIONS. (Montazh krupnopanel'nykh zdaniĭ v zimnikh usloviĭakh; Text in Russian). Izd-vo "Vysshaĭa Shkola", 170p. incl. illus., tables, graphs, diagrs., Moskva, 1966. 19 refs.
DLC, TH1098.S56

An experimental investigation of durable connections of large slabs is discussed; recommendations are presented for rational design of slab connections for buildings of different number of stories and various layout. Specifications, the use of most effective materials for connections, the methods of grouting, especially in winter time, are also described. Reasons for corrosion of connectors, as well as preventive measures are analyzed. A short description of large slab application in the building industry abroad with basic characteristics of the evolution of such application is also presented.
-- NSV

SIP 25806 666.972.017:620.17

Moskvin, V. M., Kapkin, M. M. and A. M. Podval'nyĭ
STABILITY OF CONCRETE AND REINFORCED CONCRETE AT MINUS TEMPERATURE. (Stoĭkost betona i zhelezobetona pri otritsatel'noĭ temperature; Text in Russian). Gosstroĭ SSSR, Nauchno-Issled. Inst. po betonu i zhelezobetonu, Izd-vo Literatury po stroitel'stvu, Moskva, 132p. incl. illus., tables, graphs, diagrs., 1967. 139 refs.
DLC, Slavic Div.

The resistance of concrete and reinforced concrete to different freezing temperatures are discussed as well as the frost-stability and deformation of concrete structures in the cold regions where temperature may drop to -60°C. Durability of the reinforced concrete structures under these conditions is estimated from the testing and observation data and the analysis of previously published information. Destructive processes originating during freezing from the unbalance between the deformation of concrete and steel are analyzed and different ways of increasing the durability of reinforced concrete under the extreme cold conditions are recommended.
-- NSV

SIP 25807 551.322:548.2

Dibdin, G. H.
E.S.R. OF γ-IRRADIATED SINGLE CRYSTALS OF ICE AT 77°K. Trans. Faraday Soc. 63(537):2098-2111 incl. tables, diagrs., Sept. 1967. 23 refs.
DLC, TK1.F25

The e.s.r. spectra of γ-irradiated single crystals of ice and heavy ice at 77°K have been studied. Analysis shows the complex spectrum to be consistent with OH or OD radicals trapped at 24 sites which differ in orientation but are otherwise indistinguishable. It is suggested that the radical is in a relaxed substitutional site roughly parallel to any one of the perpendicular bisectors of the faces of the two non-equivalent tetrahedra formed by the oxygen atoms in the crystal lattice. The experimentally derived tensors:

$A_x = -(26\pm3)$ gauss, $g_x = 2.0050\pm.001$,
$A_y = -(43.7\pm0.5)$ gauss, $g_y = 2.0090\pm.0005$,
$A_z = \pm(5\pm5)$ gauss, $g_z = 2.0585\pm.002$.

are consistent with theory for OH radicals in the proposed trapping site. Annealing studies show the radicals to disappear according to first-order kinetics; this finding is discussed in terms of the proposal for a substitutional radical site. (Author's abstract)

SIP 25808 551.322:548.2

Brivati, J.A. and others
ELECTRON SPIN RESONANCE STUDIES OF THE HYDROXYL RADICAL IN γ-IRRADIATED ICE. Trans. Faraday Soc. 63(537):2112-2116 incl. table, diagrs., Sept. 1967. 14 refs.
DLC, TK1.F25

A comparison of simulated with experimental electron spin resonance spectra of ice and deuterium oxide γ-irradiated at 77°K indicates that the g- and A-tensors of the hydroxyl radical in ice do not possess axial symmetry, although many interpretative difficulties remain. (Authors' abstract)

SIP 25809 551.574.11:551.594.25

Iribarne, J.V. and B.J. Mason
ELECTRIFICATION ACCOMPANYING THE BURSTING OF BUBBLES IN WATER AND DILUTE AQUEOUS SOLUTIONS. Trans. Faraday Soc. 63(537): 2234-2245 incl. diagrs., Sept. 1967. 11 refs.
DLC, TK1.F25

The electric charges carried on the drops ejected from air bubbles bursting at the surface of water and aqueous solutions have been measured in relation to the bubble size and the concentration of the solution. Drops ejected from pure water and solutions of concentration less than about 10^{-4} M carry

a negative charge, the magnitude of which decreases rapidly with increasing concentration and becomes vanishingly small at concentrations greater than about 10^{-4} M. For more concentrated solutions the drops carry a small positive charge. The negative charging of the drops is explained quantitatively by a thin film of water rising from the inner surface of the bubble cavity to form a small jet that breaks up to produce the drops, their charge resulting from the rupture of the electrical double layer at the air/water interface. The depth of the diffuse double layer is less in solutions of higher concentration and this accounts for the smaller charges on the drops. The positive charging of the drops at high concentrations is attributed to the separation of charge during the break-up of an initially uncharged varicose jet, when water containing an excess of positive ions is forced into the swelling regions that form the drops from the constricting necks between them. (Authors' abstract)

SIP 25810 624.182.3:625.7(43)

Ahlbrecht, Heinz
DEVELOPMENT OF WINTER SERVICE FOR LONG-DISTANCE HIGHWAYS IN WEST GERMANY FROM 1956 TO 1966. (Die Entwicklung des Winterdienstes auf den Bundesfernstrassen von 1956 bis 1966; Text in German). Strassen-und Tiefbau, 21(2):67-84 incl. illus., tables, diagrs., February 1967. 19 refs.
DLC, TE3,S758

Since 1956 the West German state administrations have been reporting costs and operations to the Federal Department of Transportation in the form of standardized data, covering cost of sanding and salting, operation and maintenance of equipment, outlay for snow protection, salaries, and operation of federal and rented vehicles. This article is essentially an administrative report based on these data for the ten winters 1956-1966, but it also touches on problems of engineering interest, such as the use of salt, rather than sand, to prevent skidding, the possible damage caused by salt to various road surface materials, corrosion due to salt and protection against it, heating of roads, etc. A graph is presented, showing the amount of reduction of the skid coefficient on an icy road as a function of speed and the amount of salt used. As shown in another graph, the use of salt has almost entirely replaced sanding in the last years of the report period. In addition to being more effective, salting has also been found to be less expensive, despite the higher unit cost, because of a reduction in operational cost, due to the much smaller amount of material needed. -- GTT

SIP 25811 625.731:624.139(43)

Behr, Heinz
STUDIES OF HEAT INSULATING LAYERS IN ROAD FOUNDATIONS. (Untersuchungen an Wärmedämmschichten im Strassenbau; Text in German). Strassen-und Tiefbau, 21(5):332-340 incl. illus., tables, graphs, diagrs., May 1967. 8 refs.
DLC, TE3,S758

An experimental test of heat insulating effectiveness of a 2.6 cm layer of styropor, a foam material developed at the German Federal Institute of Roads (Bundesanstalt für Strassenwesen) is described. The test installation is a 6 x 12 m area under a cooling device, half of the area being used with the insulating material and the other for control. The styropor layer was placed 50 cm deep under several layers of road material, and vertical styropor plates were inserted at the edges, to a depth of 1.2 m to prevent cooling by horizontal conduction. Temperatures were taken at several depths. Surface temperature was regulated in such a way as to duplicate typical climatic conditions for specific areas in Germany. The results are presented in graphs. The material was found to be adequate, in the thickness tested, for several areas in Germany, but not those where severe winter conditions normally occur. The test also shows that side panels of insulating material should be inserted to a depth of 1.5 m. Other tests, involving plastic properties of foam materials, effects of moisture, etc., are described in general terms. The use of an analog computer in evaluating experiments and deriving empirical formulas is discussed. -- GTT

SIP 25812 625.7:551.525(*57)

Rengmark, Folke
ROAD SURVEYS FOR GROUND FROST PROTECTION IN SWEDEN. (Die Bemessung der Strassen gegen Bodenfrost in Schweden; Text in German). Strassen-und Tiefbau, 21(10):672-677 incl. illus., diagr., graphs, October 1967.
DLC, TE3,S758

The mechanism of frost heaving and the type of damage it produced on various kinds of roads and highways is discussed in relation to the lithological composition of roadbeds, the width of the road, and the regional frost index. It is recommended to put insulating materials under the subbase in road sections of possible frost heaving. Such materials are frigolit and styrofoam plastics produced in Sweden and Switzerland respectively, mineral wool, and tree bark. -- NSV

SIP 25813 621.643:621.59

Parker, C. S.
PIPING FLEXIBILITY STUDY WITH--SLIDING SUPPORT FRICTION AND CRYOGENIC BOWING. Heating, Piping Air Conditioning, 39(11):93-100 incl. illus., diagrs., November 1967.
DLC, TH7201.H45

In this design study of cryogenic industrial piping the problems are outlined and the methods of analysis given as follows: 1) Axisymmetric thick shell computer program--pressure, temperature, and discontinuities (where discontinuity stresses are to be investigated); 2) MEC-21 piping flexibility computer program--weight, thermal displacement, and restraint loads; 3) Detailed analysis--support concentrations and guide clearance, bowing effects, and recycle stability vs buckling. In the results, 5 cases of weight and cold shock were of interest. One, a simple case of thermal contraction (weightless) known as the free thermal case, provides reference displacements for a comparison with other cases. Three of the cases consider an empty pipe that is subsequently filled with either liquid hydrogen or nitrogen. A detailed study was also made for bowing combinations. Subsequent articles are to treat piping pressures and discontinuities, stress intensification at supports, cryogenic bowing, and interference with thermal displacement. -- FMM

SIP 25814 550.362:551.345

Redozubov, D. V.
GEOTHERMAL METHOD OF STUDYING FROZEN ROCKS. (Geotermicheskiĭ metod issledovaniĭa tolshch merzlykh porod; Text in Russian). Akad. Nauk SSSR, Izd-vo "Nauka", Moskva, 155p. 1966. 70 refs.
DLC, GB642.R4

This monograph presents the geothermal method developed by the author for studying frozen rocks in a stationary and non-stationary state. The presentation is based on the analysis of factual data obtained in geothermal investigation of different permafrost regions. The geothermal field in the upper layers of the lithosphere is the object of study; in the permafrost regions it is characterized by phase transformations of water at corresponding temperatures, therefore, in such regions it is a thermodynamic field in which temperature is just one of the parameters determining the field. The analytical discussion is presented in three parts: 1) analysis of the non-stationary state of frozen rocks and their temperature fields; 2) investigation of the stationary state of frozen rocks and their temperature fields, and 3) thermodynamic factors affecting the geothermal field and the technique of geothermal field investigation. -- NSV

SIP 25815 550.831+550.834:551.324.28(744/*745)

Tsukernik, V. B., Frolov, A. I. and P. A. Stroev
COMBINED GEOPHYSICAL STUDIES IN THE WEST ICE SHELF. (Kompleksnye geofizicheskie issledovaniĭa na zapadnom shel'fovom lednike; Text in Russian). Sovet. Antarkt. Eksped., Trudy, Vol. 48: 79-96 incl. illus., tables, graphs, diagrs., 1967. 11 refs.
DLC, G860.S63

Seismic, gravity, and magnetic studies were conducted on the West Ice Shelf to determine ice thickness, the structure of the upper part of the snow-firn cover, and the underlying topography, and to study the magnetic and gravity fields of this region. According to seismic reflections the glacier cross-section consisted of three layers: upper, middle and lower, with the following wave velocities and densities: 1) 2200-2400 m/sec, and 0.4-0.5 g/cm^3; 2) 3000-3300 m/sec. and 0.6-0.7 g/cm^3; and 3) 3700-3850 m/sec. and 0.8 g/cm^3; the total thickness of the snow-firn cover varied from 20 to 40 m.
-- NSV

SIP 25816 550.83(*73)

Bokanenko, L. I. and Yu. N. Avsiuk
RESULTS OF SEISMIC AND GRAVITY SURVEY IN QUEEN MAUD LAND. (Rezul'taty seismogravimetricheskikh issledovaniĭ na zemle korolevy Mod; Text in Russian). Sovet. Antarkt. Eksped., Trudy, Vol. 48:105-127 incl. illus., tables, graphs, diagrs., 1967. 12 refs.
DLC, G860.S63

Four groups of reflections were distinguished on the seismograms obtained in this area: T_1 - related to the snow-firm thickness and the upper ice zones; T_2 - waves reflected from the ice-water boundary; T_3 - reflections from the water-ocean bottom boundary, and T_4 - waves proceeding from the ice-rock boundary. According to the records the seismo-glaciological cross-section consisted of four layers in the floating part of the glacier and of three layers where the glacier rested on solid ground. The upper part of the cross-section was represented by snow-firn layers merging gradually into ice; in these layers the density of material and wave velocities were increasing with depth. Separate more dense interlayers in the snow-firn zone related to the seasonal snow accumulations, did not affect the general pattern of the velocity increase with depth.
-- NSV

SIP 25817 551.578.465(*733)

Barkov, N. I.
STRUCTURE OF SNOW-FIRN COVER IN THE LAZAREV STATION AREA. (Stroenie snezhno-firnovoĭ tolshchi v raĭone stantsii Lazarev; Text in Russian). Sovet. Antarkt. Eksped., Trudy, Vol. 48: 145-151 incl. illus., tables, graphs, 1967. 6 refs.
DLC, G860.S63

Snow cover structure and the variation in its yearly layering were studied in a 35-m deep hole located in the station area. Climatic conditions of the past summer seasons were reconstructed to a certain degree from the results obtained. The upper 80 cm of the snow-firn cross section contained granular snow with a density of 0.38 - 0.44 g/cm^3 and the grain size range 0.2 - 0.44 mm. It was overlying a series of firn and ice layers differing in thickness and structure. Alternating layers of coarse and fine firn with grain sizes and densities ranging correspondingly from 0.8 to 2.8 mm and from 0.40 to 0.53 g/cm^3 prevailed to the depth of 5.0 m, the layer thickness varying from 10 to 20 cm. Ice was encountered mostly in the coarse firn in the form of vertical bodies, thin interlayers, lenses and nodulae. Firn layers in the depth interval 5.0 - 6.3 m contained solid ice layers 15 - 20 cm thick with grain sizes up to 2.8 mm and an average density of 0.50 g/cm^3. Below the 6.3 m mark and down to 10.8 m the firn structure was very similar to that in the upper cross section. The lower part of the snow cover contained little ice, consisting of homogeneous firn layers up to 60 cm thick. -- NSV

SIP 25818 551.326.7(*7)

Serikov, M. I.
STRENGTH OF ANTARCTIC SEA ICE. (Prochnostnye kharakteristiki morskogo Antarkticheskogo l'da; Text in Russian). Sovet. Antarkt. Eksped., Trudy, Vol. 48:190-193 incl. tables, graphs, 1967. 4 refs.
DLC, G860.S63

This paper reports the results of testing Antarctic sea ice for shearing and compressive strength and the resistance to impact. The results indicate that the lower layers of an ice sample have the greatest shearing strength when the sample temperature equals that of the ice cover under natural conditions; several days later, when the ice sample has acquired the temperature of air its middle layers had the greatest shearing strength, as well as the strongest resistance to compression. Ice resistance to impact was affected only by temperature variation in the upper and lower ice layers, while that of the middle layers had practically no effect. Deviations of calculated values of the Young and shear moduli of ice at different levels from their mean values were insignificant. -- NSV

SIP 25819 551.311.2(*531.71)

Grigor'eva, V.G.
ON THE THIXOTROPY OF MARL SOILS IN THE BOL'SHAIA ZEMLIA TUNDRA. (K voprosu o tiksotropii pokrovnykh suglinkov Bol'shezemel'skoĭ tundry; Text in Russian). Moskov. Gosud. Univ. Kaĭnozoĭskiĭ Pokrov Bol'shezemel'skoĭ Tundry, p. 232-237 incl. table, graphs, 1963. 14 refs.
DLC, QE690.P65

This paper reports the results of an investigation of the composition and physical properties of marly soils located in the seasonally thawing zone of the Vorkuta region, undertaken to establish the causes of their thixotropy. The results indicated that at a definite water-solids ratio in the Vorkuta marls, the dust particles do not settle but remain "suspended" in the thin fraction of soil, distributed uniformly over the whole volume. Therefore, no sediment separation into different fractions takes place, but a single loose-network structure prevails in the whole volume of soil, the closed cells of which retain considerable amounts of free water. This is how the so called coagulation structure of soil is formed which is characterized by a great mobility due to the presence of fine water films separating soil particles. -- NSV

SIP 25820 624.139:625.1(*50)

Demanov, D. A.
EXPLOITATION OF THE RIGHT-OF-WAY IN ICING AREAS. (Ekspluatatsiia zemlianogo polotna na uchastkakh s nalednymi iavleniiami; Text in Russian). Kom. po zem. pol. Bor'ba s naledsami na zheleznykh i avtomobil'nykh dorogakh. "Transport", Moskva, Vyp. 7:5-10 incl. table, 1966.
DLC, Slavic Div.

This is a report of a supervising engineer employed on a section of the Dal'nevostochnaia Doroga (Far-East Railroad Line) characterized by frequent development of naled; this type of icing usually occurs in the places where water-bearing formations are tapped or have an exit to the surface. Different ways of coping with naled are discussed and illustrated by practical examples. Drainage proved to give the best results as long as the drain was not installed far below the water exit to the surface, in which case the drain worked satisfactorily but the amount of icing was not reduced. Among the preventive measures mentioned are different protective screens, fences, earth dams, and modern techniques of operating "heated" drainage ditches: warmed channels, inserted air layers and others. -- NSV

SIP 25821 625:551.574.42(*531.4)

Obraztsov, N. P.
CONTROLLING ICING ON RAILROADS AND HIGHWAYS IN THE KRASNOIARSK REGION. (Bor'ba s naledʹami na dorogakh Krasnoʹarskogo kraia; Text in Russian). Kom. po zem. pol. Bor'ba s naledʹami na zheleznykh i avtomobil'nykh dorogakh. "Transport", Moskva, Vyp. 7:17-23, 1966.
DLC, Slavic Div.

The reliability and effectiveness of several permanent and temporary means of icing control are described and evaluated. Regularities governing the formation of local icing on railroad tracks, highways, and bridges are analyzed for the regions with and without perennially frozen ground, and different geological and hydrological conditions. The way icing affects the underlying ground, and the behavior of various types of naled during thawing periods are also analyzed. Observations indicated that thicknesses of naleds produced by water seepage from the ground increase until a stable heat exchange is established between the air and the underground stream, with subsequent melting of the ice at the bottom due to the warming effect of the naled. This ground warming effect of icing combined with the similar effect of ground water is believed to be responsible for the lowering of the permafrost level beneath road bridges and for their deformation.
-- NSV

SIP 25822 625.16:551.574.42(*50)

Peretrukhin, N. A.
CHARACTERISTICS OF RAILWAY DESIGN IN THE AREAS OF NALED DEVELOPMENT. (Osobennosti proektirovaniia zemlianogo polotna na uchastkakh razvitiia naledeĭ; Text in Russian). Kom. po zem. pol. Bor'ba s naledʹami na zheleznykh i avtomobil'nykh dorogakh. "Transport", Moskva, Vyp. 7:29-40 incl. illus., tables, diagrs., 1966. 3 refs.
DLC, Slavic Div.

Experience in building railroads in permafrost areas indicates that the main cause of railway deformation by naled is the insufficient consideration by the designer of the effect of local conditions on the stability and strength of the ground beneath the rails. This problem is discussed from the standpoint of the regularities governing icing processes under natural conditions and the degree of danger these processes present to the railways built under different geological and hydrological conditions. Proper choice of protective measures and different types of constructions which eliminate the causes of icing are analyzed. -- NSV

SIP 25823 625.8:551.574.42

Rumiantsev, E. A.
CERTAIN TYPES OF STRUCTURES DESIGNED TO PREVENT THE FORMATION OF WELL-SPRING NALEDS. (O nekotorykh tipakh protivonaledʹnykh sooruzheniĭ na klîuchevykh naledʹiakh; Text in Russian). Kom. po zem. pol. Bor'ba s naledʹami na zheleznykh i avtomobil'nykh dorogakh. "Transport", Moskva, Vyp. 7:40-46 incl. illus., diagrs., 1966. 9 refs.
DLC, Slavic Div.

The ways of building different types of earth dams, designed to prevent the inflow of spring water to roads and the formation of naled, are discussed for areas of different geological and climatic conditions. It is recommended that ventilating pipe systems be installed beneath such dams, combined with "belts of freezing" behind them. These belts are broad shallow ditches excavated at a certain distance from the dam for capturing, spreading, and a rapid freezing of spring water. The design of these structures is explained and illustrated diagrammatically.
-- NSV

SIP 25824 625:624.135:551.574.42

Bakharev, I. I.
FILTRATION DIKES IN THE AREAS OF NALED DEVELOPMENT. (Fil'truîshchie nasypi na naledʹnykh uchastkakh; Text in Russian). Kom. po zem. pol. Bor'ba s naledʹami na zheleznykh i avtomobil'nykh dorogakh. "Transport", Moskva, Vyp. 7:46-51 incl. diagrs., 1966. 5 refs.
DLC, Slavic Div.

The rationality of building water filtration dikes in cold regions is discussed, and their structure analyzed from two standpoints: their effect on the natural regime of the surface and ground waters and on the formation of naled, and the through-put capacity of a filtration dike in the case of its icing. It is conculded that filtration dikes do not disturb the natural regime of ground waters, they do not contribute to the formation of naled, and therefore may be built in permafrost regions. Through-put of a dike may be increased if needed by installing drainage pipe systems. -- NSV

SIP 25825 624.19:551.574.42

Grifʂyk, V. I.
ON THE ICING OF TUNNELS. (O naledi͡akh v tonnelʹi͡akh; Text in Russian). Kom. po zem. pol. Bor'ba s naledʹi͡ami na zheleznykh i avtomobilʹnykh dorogakh, "Transport", Moskva, Vyp. 7:51-54, 1966. 2 refs.
DLC, Slavic Div.

In Siberia the protection of tunnels from icing is achieved in two ways: by heated water drainage systems, and by treating the tunnel walls with water-impervious chemicals - mostly highmolecular synthetic compounds like methyl acrylamide, or the recently developed procedure of sealing the walls with carbamide and furfural resins; these resins were especially recommended for permeable sandy rocks. Several versions of the methods mentioned are shortly described and their effectiveness is evaluated. -- NSV

SIP 25826 625.8:551.574.42

Rumi͡antʂev, E. A.
FREEZE AND HOT BELTS AND THERMAL CONTROL OF ICED AREAS. (Merzlotnye i teplovye poli͡asa i teplovai͡a melioraʦiʲi͡a naledʹnykh uchastkov; Text in Russian). Kom. po zem. pol. Bor'ba s naledʹi͡ami na zheleznykh i avtomobilʹnykh dorogakh, "Transport", Moskva, Vyp. 7:55-71 incl. tables, graphs, diagrs., 1966. 27 refs.
DLC, Slavic Div.

Two types of belts are used for preventing the icing of roads by capturing water flowing toward the road; these "belts" are ditches 5-10 m wide and 0.5-1.0 m deep dug out at a 50-100 m distance from the road. Their function is to prevent water from entering the road either by its spreading and rapid freezing in the freeze belt or by evacuation through the "heated" ditch built in such a way that the ground along its perimeter maintains positive temperatures during the major part of the winter season. Ways of calculating the dimensions of the belts are discussed and their effectiveness under different conditions is evaluated. -- NSV

SIP 25827 551.311:551.332(*762)

McCraw, J. D.
SOME SURFACE FEATURES OF McMURDO SOUND REGION, VICTORIA LAND, ANTARCTICA. N. Z. J. Geol. Geophys., 10(2):394-417 incl. illus., map, May 1967. 17 refs.
DLC, QE1.N55

Photographs and descriptive notes are given of the following: (1) weathering forms, including felsenmeer, shattered boulders, cavernous weathering, and wind abrasion; (2) movement of debris, including screes, rock glaciers, solifluction slopes and terraces, nivation cirques, and wind transport deposits; (3) glacial and fluvioglacial deposits, including kame terraces and moraines, and lone kames; and (4) patterned ground. -- DMN

SIP 25828 551.324.28(*881)

Heine, A. J.
THE McMURDO ICE SHELF, ANTARCTICA: A PRELIMINARY REPORT. N. Z. J. Geol. Geophys., 10(2):474-478 incl. tables, map, May 1967. 4 refs.
DLC, QE1.N55

The glaciological program begun during the 1962-63 austral summer on that portion of the Ross Ice Shelf between Ross and White Is. involved measurement of the following parameters: absolute movement, direction of movement, compression and extension strain rates, 10-m density profiles, and accumulation rates. Preliminary examination of the data shows little direct relation between orientation of maximum compression and absolute speed of movement and direction. (Author., mod.)

SIP 25829 550.34(*7):551.324.24(*7)

Evison, F. E.
NOTES ON THE ASEISMICITY OF ANTARCTICA. N. Z. J. Geol. Geophys., 10(2):479-483, May 1967. 14 refs.
DLC, QE1.N55

Compared with other continents, Antarctica is remarkably free from earthquakes, especially in view of the active volcanism and other signs of instability. If earthquake activity is affected by variations in the thickness of the ice cap, any future earthquake of even moderate magnitude may be expected to yield useful information about the source mechanism of earthquakes and also about ice-cap dynamics. (Auth., mod.)

SIP 25830 551.324.28(*881)

Risk, G. F. and M. P. Hochstein
SUBSURFACE MEASUREMENTS ON THE McMURDO ICE SHELF, ANTARCTICA. N. Z. J. Geol. Geophys., 10(2):484-497 incl. tables, graphs, map, May 1967. 13 refs.
DLC, QE1.N55

Three holes--31, 32, and 57 m deep--were drilled near the seaward edge of the Ross Ice Shelf between

Ross and White Is.; ice thicknesses at the drill sites were calculated to be 33, 48, and 94 m, respectively. The rate of melting at the bottom of the shelf was 1 m/yr at two drill sites. The vertical density gradient in each of the holes is larger than that observed at Little America Station, and the density increases abruptly by about 0.1 g/cm^3 at the top of a brine-soaked layer estimated to be less than 6 m thick in each hole. Temperature profiles can be explained on the assumption that the brine moves horizontally through the shelf from the seaward edge to the interior and supplies heat to the shelf by convection and by liberation of latent heat during freezing. The observed brine level in the holes is about 20% lower than the hydrostatic level. (Auth., mod.)

SIP 25831 631.4(*762)

McCraw, J. D.
SOILS OF TAYLOR DRY VALLEY, VICTORIA LAND, ANTARCTICA, WITH NOTES ON SOILS FROM OTHER LOCALITIES IN VICTORIA LAND. N. Z. J. Geol. Geophys., 10(2):498-539 incl. illus., table, diagrs., maps, May 1967. 55 refs.
DLC, QE1.N55

A map and descriptions of the soils of Taylor Valley are presented. Soils from Hallett Station, Ross I., and other areas near McMurdo Sound are described and compared with those of Taylor Valley. The role of the soil-forming factors and the nature of the soil-forming processes in Victoria Land are discussed. Soils on slightly elevated gentle slopes on moraine or similar parent material may be regarded as zonal soils. They are virtually lithochromic, coarse textured, structureless, and without humic horizons. Two groups are recognized: (1) soils in arid Taylor Valley, which have a surface or subsurface layer slightly to moderately cemented with calcium carbonate or gypsum and are underlain at depths of about 12 in. by frozen ground; and (2) soils outside Taylor Valley, in areas where more moisture is available, probably from more frequent summer snowfalls, and soluble materials are distributed throughout the soils and do not form surface crusts. Soils with much moisture and those rich in organic matter are classed as intrazonal. (Author's abstract, modified)

SIP 25832 551.481.18(*762)

Bell, R. A. I.
LAKE MIERS, SOUTH VICTORIA LAND, ANTARCTICA. N. Z. J. Geol. Geophys., 10(2):540-556 incl. illus., table, graphs, map, May 1967. 23 refs.
DLC, QE1.N55

The morphology, physics, and chemistry of Lake Miers, a warm freshwater lake, are discussed. The presence of rock debris on the floating lake ice has led to the formation of dirt cones and melt pools. Fossil levels of these pools show that the annual ablation is 15 to 20 cm. Despite a mean annual air temperature of -20°C, the bottom waters of the lake are at +5°C. This is shown to be a natural example of solar heat storage, and the observed temperature profile is satisfactorily accounted for. Chemical evidence suggests that the lake has been filled by fresh water containing K, Na, Cl, and O_2, and that it is now stagnant below the 4°C depth. In the lower zone, Ca, Mg, CO_2, and SiO_2 diffuse upward from the lake bed. Their release may be caused by anaerobic biological activity. (Author's abstract, modified)

SIP 25833 551.326.85(*762)

Bradley, J. and D. F. Palmer
ICE-CORED MORAINES AND ICE DIAPIRS, LAKE MIERS, VICTORIA LAND, ANTARCTICA. N. Z. J. Geol. Geophys., 10(2):599-623 incl. illus., diagrs., map, May 1967. 25 refs.
DLC, QE1.N55

Lake Miers is covered by a thick ice sheet which is domed over most of its area and thrust into sharp debris-covered ridges around its margin. Except in summer, the shore ice is frozen to the lake bed. The margin of the floating ice raft is thrust over the fast shore ice to form pressure ridges. The debris cover resulting from upward migration of infrozen gravels causes locally increased insolation. Because the cover is thin, heat is conducted to the underlying ice, and ablation is increased. These moraines are young and active. Ice domes in the center of the lake are related to the ridges and are caused not only by the same compressive forces as the ridges, but also by upwelling of the ice in diapirs. The arching process is dynamic and self-perpetuating. When continued for several years, it becomes diapiric. (Authors' abstract, modified)

SIP 25834 551.321.1:539.219.3

Ramseier, Rene O.
SELF-DIFFUSION IN ICE MONOCRYSTALS. Res. Rept. 232, U. S. Army Cold Regions Research and Engineering Laboratory, 45p. incl. tables, graphs, diagrs., illus., Oct. 1967. 53 refs.
CRREL files

The self-diffusion of tritium, parallel and perpendicular to the optical axis of naturally occurring and artificially grown ice monocrystals, were studied between -2.5 and -35.9C. The artificial ice monocrystals were grown using a zone-melting technique.

Activated samples were stored for several weeks, then sectioned by microtome and analyzed in a liquid scintillation counter to obtain the self-diffusion coefficients. The plane source solution of Fick's second law was used in treating the data. The diffusion coefficients were found to be identical for both types of ice. A slight anisotropy was found due to the geometry of the crystal; however, the activation energy was found to be 0.62 eV for all cases. Based on the experimental data, it is concluded that the diffusion takes place by a vacancy mechanism and that entire H_2O molecules are diffusing, i.e., molecular diffusion occurs. Theoretical calculations using the atomic diffusion theory and Zener's theory for D_0 are in excellent agreement with the experimentally determined diffusion coefficient. (Author's abstract)

SIP 25835 551.326.7:539.3/.4

Weeks, W. F. and A. Assur
THE MECHANICAL PROPERTIES OF SEA ICE. Cold Regions Science and Engineering II-C3, U. S. Army Cold Regions Research and Engineering Laboratory, 94p. incl. illus., tables, graphs, diagrs., Sept. 1967. 199 refs.
CRREL files

This review discusses the state of thinking of each of the main national groups investigating sea ice and gives an overall appraisal of the field as a whole. Emphasis is placed on (1) the physical basis for interpreting sea ice strength (phase relations, air volume, and structural considerations), (2) theoretical considerations (strength models, air bubbles and salt reinforcement, and interrelations between growth conditions and strength), (3) experimental results (tensile, flexural, shear, and compressive strength, elastic modulus, shear modulus and Poisson's ratio, time dependent effects, and creep), and (4) plate characteristics. The paper includes a review of problems in sea ice investigations, relates the chemical, crystallographic, mechanical, and physical aspects involved, and concludes by showing how to utilize this knowledge to solve practical problems. (Authors' abstract)

SIP 25836 551.578.4:551.324:061.3=82

Khmaladze, G. N. and Tsomaia, V. Sh.
RESULTS OF THE WORK OF THE TRANSCAUCASIAN SNOW-GLACIER COMMISSION AT THE TRANSCAUCASIAN HYDROMETEOROLOGICAL INSTITUTE DURING 1960-1965. (Rezul'taty rabot Zakavkazskoĭ snego-lednikovoĭ komissii pri Zak-NIGMI za 1960-1965 gg; Text in Russian). Zakavk. Nauchno-Issled. Gidromet. Inst., Trudy, Vyp. 20: 5-7,. 1966.
DLC, Slavic Div.

The Commission, organized in Dec. 1959, consists of 17 representatives of 14 organizations of the Caucasian republics engaged in investigations of snow cover, avalanches, and glaciers. The principal task of the Commission is the unified study and coordinated planning and intensification of theoretical investigations designed to improve the hydrometeorological servicing of the national economy. During the past 5 yrs 3 conferences (Baku, 1960; Tiflis, 1962; and Erevan, 1965) were held with the participation of from 120 to 130 representatives of scientific and other interested agencies. This paper describes the work of these conferences, the systematic glaciological investigation on 17 glaciers (as compared with 3 in 1960), and refers to a number of pbulished monographs, scientific papers, and reference books. The authors call attention to a number of shortcomings, including the lack of observations on the elements of the heat balance at the Krestovyy Pereval Snow-Avalanche Station and at the Kozbegi High Mountain Station. (Meteorol. & Geoastrophys. Abstracts)

SIP 25837 551.578.71(479.22)=82

Bartishvili, G. S. and Kuvaeva, G. M.
FORMATION OF CERTAIN FORMS OF CONGEALED ICE IN THE ATMOSPHERE. (Ob obrazovanii nekotorykh vidov konzheliatsionnogo l'da v atmosfere; Text in Russian). Zakavk. Nauchno-Issled. Gidromet. Inst., Trudy, Vyp. 20:31-39 incl. diagrs, 1966. Refs.
DLC, Slavic Div.

Presents results of a study of the structure of natural hailstones conducted in the summers of 1962-1964 on the South-Georgian upland (elev. 2200/m) by the Samarskaia Expedition. The hailstones were studied in the field without freezing. After recording the shapes and sizes and photographing the hailstones their central parts (0.4-0.8 mm thick) were cut out and examined in reflected, through, and polarized light; they were also photographed with a mirror camera with different filters. Hailstones of 47 hail storms averaging 10-15 mm with a maximum of 32 mm were studied. After each storm several hundred hailstones were examined and up to 100 of various sizes were photographed. Several photographs (with mm scales) of hailstones with large air inclusion are shown and discussed. On the basis of the obtained information an attempt was made to explain the mechanization of formation of some types of ice on hailstones. The authors believe that the ice deposited on the hailstones is formed from supercooled cloud droplets under conditions of wet and dry growth. (Meteorol. & Geoastrophys. Abstracts)

SIP 25838 551.578.46(234.9)(479.22)=82

Kotliakov, V. M.
CHARACTERISTICS OF ACCUMULATION ON GLACIERS DURING ABNORMALLY SNOWY WINTERS, BASED ON ELBRUS INVESTIGATIONS. (Osobennosti akkumuliatsii na lednikakh v anomal'no snezhnye zimy po issledovaniiam na El'bruse; Text in Russian). Zakavk. Nauchno-Issled. Gidromet. Inst., Trudy, Vyp. 20:57-64 incl. diagrs., tables, 1966. Ref.
DLC, Slavic Div.

During the 1962-63 winter, which was extremely severe with heavy snows in all of the Northern Hemisphere including the Caucasus, the Inst. of Geog., Acad. of Sc. of the U. S. S. R. continued observations on the southern slope of Elbrus at the ice base (elev. 3750 m) which included daily measurements of depth and density of snow on a special plot and blizzard measurements. In 1961-62 when the depth of snow was ≤2 m, sufficient accuracy was attained by correcting for settling only in the surface layers of freshly fallen snow. However, in case of winters with exceptionally heavy snowfalls it is necessary to take into account settling in the entire depth. The method used in determining and applying the correction to the 1962-63 records is described. Results of measurements are tabulated and shown in graphs which include mass curves of snow accumulation on a firn field in the 1958-59, 1961-62, 1962-63 winters. Following are some of the conclusions from the analysis of the presented data. In exceptionally snowy winters snow accumulation on a glacier can be 2.0-2.5 times the average. There are fewer ground blizzards in snowy winters (400 against the usual 600-800 hrs) and the removal of snow is reduced from the usual 20-30% to 7-8%. In snowy winters snow accumulation is much more uniform than usual. (Meteorol. & Geoastrophys. Abstracts)

SIP 25839 551.578.46:551.571(234.9)47=82

Kuvaeva, G. M.
DETERMINATION OF THE COEFFICIENT OF WATER VAPOR DIFFUSION IN SNOW. (K voprosu opredeleniia velichiny koeffitsienta diffuzii vodianogo para v snegu; Text in Russian). Zakavk. Nauchno-Issled. Gidromet. Inst., Trudy, Vyp. 20:75-78 incl. tables, 1966. Ref.
DLC, Slavic Div.

The results obtained by Yosida (1955), Pavlov (1962), and Yin-Chao Yen (1963) are discussed. According to Yosida's and Pavlov's results the coefficient does not depend on snow density. In 1958-60 the author conducted experiments without considering density and structure of snow. Since 1964 an attempt has been made to determine the effect of structure. The experiments which are still continuing are conducted in the laboratory and in the field in the Elbrus area and on Krestovy Pereval. The coefficient D is computed as in the cited investigations. This paper describes the experimental procedure. Although insufficient for final conclusions the preliminary results presented in tables indicate that, other conditions being equal, the diffusion is greater in snow with a coarse grain than with a fine grain structure. (Meteorol. & Geoastrophys. Abstracts).

SIP 25840 551.578.46:551.579.4(479.22)=82

Sidorova, L. V.
EFFECT OF HEIGHT OF THE SNOW COVER ON NATURAL REGULATION OF RIVER RUNOFF IN EASTERN GEORGIA. (Vliianie vysoty snezhnogo pokrova na estestvennuiu zaregulirovannost' stoka rek Vostochnoĭ Gruzii; Text in Russian). Zakavk. Nauchno-Issled. Gidromet. Inst., Trudy, Vyp. 20: 101-109, incl. diagrs., table, 1966. Refs.
DLC, Slavic Div.

The coefficient of natural streamflow regulation (φ) first proposed by Sokolovskiĭ (1952) is the ratio of the area up to mean discharge on the hydrograph to its entire area. For the rivers of eastern Georgia φ varies from 0.41 to 0.85, it ranges from 0.60 to 0.72 for most of them. Plotted data show that φ increases with the average elevation of the catchments. Another set of graphs shows that φ increases with the snow cover, but a further analysis indicates that this holds only for the long term mean and for an entire river basin. A still further study of the relationship for individual years for river basins in different physiographic regions showed that the Spring flow and its ratio to the annual flow Q_{spr}/Q_{ann} increases. With an increase in this ratio, φ decreases. The overall final conclusion is that φ increases with an increase in the long term average depth of snow on an entire river basin and that for individual years and for some specific elevation φ decreases with the depth of snow. (Meteorol. & Geoastrophys. Abstracts)

SIP 25841 551.509.39:551.579.4:551.579.2(479.24)=82

Pastukhova, G. F.
USE OF SNOW SURVEY RESULTS IN BACKGROUND FORECASTS OF FLOODS ON RIVERS OF AZERBAIJANIAN S. S. R. (Ispol'zovanie rezul'tatov snegos"emok v fonovykh prognozakh polovod'ia po rekam Azerbaĭdzhanskoĭ SSR; Text in Russian). Zakavk. Nauchno-Issled. Gidromet. Inst., Trudy, Vyp. 20:110-112 incl. diagrs., 1966.
DLC, Slavic Div.

Scatter diagram with regression lines of April-June discharge vs. snow water equivalent are given for 6 index rivers representing the hydrologic regions of

Azerbaijanian and Dagestan. The best relationship exists on the Turianchai and Sulak Rivers of the northern and northeastern slopes of the main Caucasian mountain range where snow melt forms a larger part of stream flow. In practical forecasting for the spring period it is quite necessary to consider spring precipitation. The author uses the atmospheric circulation index which gives a verification of about 80%. (Meteorol. & Geoastrophys. Abstracts)

SIP 25842 551.578.48:624.182=82

Bozhevol'nov, B. P.
ARTIFICIAL TRIGGERING OF AVALANCHES. (Voprosy iskusstvennogo obrusheniia snezhnykh lavin; Text in Russian). Zakavk. Nauchno-Issled. Gidromet. Inst., Trudy, Vyp. 20:139-155 incl. diagrs., tables, 1966. Refs.
DLC, Slavic Div.

Existing methods, including artillery and mortar shelling, small rockets, and hand grenades are discussed briefly. Reliable methods of forecasting the time of onset of avalanche danger, on which artificial triggering must be based, are a meteorological problem which is not discussed. This paper deals with the engineering aspects--the conversion of the explosion energy into forces that affect the equilibrium of the snow cover on a slope. A nomogram (Bababuev and Sulakvelidze, 1953) for determining the maximum equilibrium depth of snow is shown. The forces acting on the snow released by explosions in the air, and at the ground surface under the snow are analyzed and various formulas are derived. It is concluded that the problem of explosions in the air has as yet not been worked out. The action of explosions under the snow can be considered as supplemental inertia forces applied to the snow. The developed theoretical basis of triggering makes it possible also to determine the required explosive charge and to compute the resistance coefficient when shelling fails to produce an avalanche. (Meteorol. & Geoastrophys. Abstracts)

SIP 25843 551.578.46:551.578.482=82

Moskalev, Iu. D.
CALCULATIONS OF THE STABILITY OF A SNOW MASS ALONG ANGLES OF DISPLACEMENT. (Raschety ustoichivosti snezhnoi tolshchi po uglam sdviga; Text in Russian). Zakavk. Nauchno-Issled. Gidromet. Inst., Trudy, Vyp. 20:156-165 incl. diagrs., 1966. Refs.
DLC, QC851.T52

A method is presented for graphical and analytical solutions of problems in the stability of snow on a slope governed and not governed by Coulomb's law. The solution is extended to the case of a snow layer containing gravitational water. Practical recommendations are given for the determination of points of origin of avalanches in a known snow situation. Proposed also are methods of reverse computations of the strength parameters of snow and a method of constructing a characteristic strength curve of snow from measured cohesion and temporary resistance to rupture. Three nomograms for computing stability of the snow cover are shown. (Meteorol. & Geoastrophys. Abstracts)

SIP 25844 551.578.466:624.144.4: 551.578.48:624.182=82

Bozhevol'nov, B. P.
COMBATING AVALANCHES BY PREVENTION OF SNOW ACCUMULATION IN AVALANCHE BASINS. (Bor'ba so snezhnymi lavinami preduprezhdeniem snegonakoplenila v lavinosborakh; Text in Russian). Zakavk. Nauchno-Issled. Gidromet. Inst., Trudy, Vyp. 20:166-177 incl. diagrs., tables, 1966. Refs.
DLC, QC851.T52

The means of combating avalanches are grouped into: 1) measures to prevent accumulation of snow in avalanche basins, 2) structures to hold the snow cover on the slope, 3) protection against moving avalanches, and 4) artificial triggering. This paper deals with the 1st of these groups which in effect reduces to combating transfer of snow by blizzards. The only Soviet paper on this subject (Goff and Otten, 1938) and the experience in Switzerland and Austria are referred to. In this paper, the author applies the theory developed in combating drifts on railroads to the avalanche problem. The protection of the Kuibyshev Railroad at kilometer 1727 from avalanches is used as a concrete example to illustrate the procedure. The occurrence of ground blizzard winds and the accumulation of snow in various directions are shown in tables and in a graph. Values used in the construction of the duration curve of the volume of blizzard (drifted) snow are tabulated. The probability volume (400 m^3/running meter) to be provided for in the design is obtained from the curve. The type of snow fences to be used are obtained from a list of structures and plantings taken from the Instructions of the Ministry of Transport, U.S.S.R. (1958). (Meteorol. & Geoastrophys. Abstracts)

SIP 25845 551.578.48:551.324.43(47 + 57)=82

Losev, K. S.
ROLE OF AVALANCHES IN THE MASS BUDGET OF GLACIERS. (Rol'lavin v bludzhete massy lednikov; Text in Russian). Zakavk. Nauchno-Issled. Gidromet. Inst., Trudy, Vyp. 20:178-182 incl. tables, 1966. Refs.
DLC, QC851.T52

For a quantitative evaluation of avalanche feedings, the author utilized data on the amount of snow moved by avalanches from slopes onto valley floors; tabulated results show that in most cases it constitutes about 10% of the maximum snow accumulation. Calculations show that for small glaciers, with ratios of their areas to those of their catchments of 0.15 to 0.65, the amount of avalanche feeding can constitute 15-65%. Values for valley- and small glaciers with snow cover due to avalanches ranging from 0.3 to 30% are tabulated. Reported cases of snow field 50, 60 and 100 m deep formed by avalanches in the U.S.S.R. are discussed; the melting of the 100 m field took several years. Following are some of the conclusions. Avalanches together with snow drifting cause concentrations of snow on mountain glaciers. Supplementary feeding by avalanches ranges from a few to 200% of the maximum snow accumulation. Glaciers with avalanche feeding are most common in Central Asia. In individual cases ablation of glaciers occurs by avalanches from their surfaces. (Meteorol. & Geoastrophys. Abstracts)

SIP 25846 551.578.48:624.182=82

Chitadze, V. S.
RULES FOR TAKING CERTAIN AVALANCHE CONTROL MEASURES. (Pravila provedeniia nekotorykh protivolavinnykh profilakticheskikh meropriiatiĭ; Text in Russian). Zakavk. Nauchno-Issled. Gidromet. Inst., Trudy, Vyp. 22:173-177, 1966. Refs.
DLC, QC851.T52

Instructions are presented for preparing and carrying out operations for artificially removing snow from avalanche slopes by artillery barrages and by explosions. The procedures are outlined in detail. (Meteorol. & Geoastrophys. Abstracts)

SIP 25847 551.578.46:551.524=82

Dolov, M. A. and M. Ch. Zalikhanov
TEMPERATURE FIELD AND HEAT FLOW IN SNOW COVER. (Temperaturnoe pole i potoki tepla v snezhnom pokrove; Text in Russian). Zakavk. Nauchno-Issled. Gidromet. Inst., Trudy, Vyp. 22: 178-186 incl. diagrs., tables, 1966. Refs.
DLC, QC851.T52

The temperature field in a snow cover and the heat exchange of snow with the surrounding environment are examined for both dry and wet snow. A snow layer of considerable thickness is divided into 2 parts and the temperature fields and heat fluxes are examined separately in each layer. Also the influence of snow density upon the heat exchange with the surrounding environment by means of molecular conductivity is investigated. The derivations of the equation for calculating the temperature fields, the heat flux in the snow, and the heat flux from the soil into snow for dry and wet snow are presented. Also the results of calculations are given. (Meteorol. & Geoastrophys. Abstracts)

SIP 25848 551.521:551.578.46(234.9)(479.22)=82

Samukashvili, R. D.
PENETRATION OF SOLAR RADIATION INTO THE SNOW COVER DURING THE THAWING PERIOD OF THE HIGH-ALTITUDE OBSERVATORY ON MT. ELBRUS. (Proniknovenie solnechnoĭ radiatsii v tolshchu snezhnogo pokrova v period ego taianiia na vysokogornoĭ observatorii El'brus; Text in Russian). Zakavk. Nauchno-Issled. Gidromet. Inst., Trudy, Vyp. 22:187-193 incl. tables, 1966. Refs.
DLC, QC851.T52

The results of observations on the penetration of direct, scattered, and global radiation into a snow layer during the spring of 1963 recorded at the High Altitude Obs. on Mt. Elbrus are presented. The coefficients of absorption for different kinds of snow encountered at a height of 2140 m a. s. l. during the period of snow melting were calculated by the Bouguer-Lambert formula. (Meteorol. & Geoastrophys. Abstracts)

SIP 25849 551.578.46:551.508.79=82

El'mesov, A. M.; Khulamkhanov, V. Kh. and M. M. Keshtov
COMPRESSIBILITY OF SNOW, AND METHODS OF INVESTIGATING IT. (K voprosu o szhimaemosti snega i metod ee issledovaniia; Text in Russian). Zakavk. Nauchno-Issled. Gidromet. Inst., Trudy, Vyp. 22:194-201 incl. diagrs., 1966. Refs.
DLC, QC851.T52

An instrument for investigating the compressibility, hardness, and elastic-viscous properties of snow is described with the aid of a photograph. The dependence of deformation upon stress in case the loads exceed considerably the carrying capacity of the snow being investigated is examined and the curve of the dependence of relative deformation upon external stress is expressed by the equation

$$\epsilon = \frac{\sigma}{a + b\sigma}$$

where a and b are empirical coefficients, constant for a given snow layer at a particular temperature; ϵ = relative deformation; and σ = external stress. The dependence of snow deformation upon its initial density during the action of the same load upon it is examined experimentally and the resulting curves obtained are expressed by the equation

$$\epsilon = a_1 - b_{1\rho_0}$$

where a_1 and b_1 are empirical constants and ρ_0 = initial density. The equation for the final density is given by the equation

$$\rho = \frac{\rho_0}{a_2 + b_1\rho_0} .$$

(Meteorol. & Geoastrophys. Abstracts)

SIP 25850 551.343.4(234.9)

Kovalev, P.V.
GLACIAL AND PERIGLACIAL SOLIFLUCTION IN THE GREAT CAUCASUS. (Glîâcial'nye i perigliâcial'nye selevye potoki Bol'shogo Kavkaza; Text in Russian). Zakavk. Nauchno-Issled. Gidromet. Inst., Trudy, Vyp. 22:208-218 incl. tables, 1966. 34 refs.
DLC, QC851.T52

A discussion is presented on the causes of solifluction in the Great Caucasus and the relationship between the solifluction processes and the activities of recent and ancient glaciers, as well as other phenomena (frost weathering, nivation) which supply solid material for the flow of slope deposits and quite often are causing it. Different causes of solifluction are grouped into four classes: climatic, mechanical, seismic, and volcanic, each class having a more detailed subdivision. The classification chart showing the factors responsible for different types of such phenomena, a short characteristic of each type separated, the conditions of its origin, and the areas of its development, is presented. -- NSV

SIP 25851 551.578.46:551.507.354: 551.321.7(479.24)=82

Babaev, A.D.
STUDY OF SNOW COVER IN AZERBAIJAN. (Izuchenie snezhnogo pokrova territorii Azerbaĭdzhana; Text in Russian). Zakavk. Nauchno-Issled. Gidromet. Inst., Trudy, Vyp. 22:219-221, 1966.
DLC, QC851.T52

The use of route survey and airplane survey methods to investigate snow cover in Azerbaijan and the difficulties and disadvantages of these methods are discussed. The use of helicopters is proposed since they are easily maneuverable, can remain stationary in the atmosphere, and have a circular field of vision. The use of helicopter surveying together with motion picture photography for investigation of the snow cover is described. Also the studies on snow accumulation, avalanches, and the role of snow in runoff are discussed. (Meteorol. & Geoastrophys. Abstracts)

SIP 25852 551.32+551.33+551.34 +625.7+629.124.8

Peschanskiĭ, I.S.
ICE SCIENCE AND ICE TECHNIQUE. (Ledovedenie i Ledotekhnika; Text in Russian). Leningrad, Gidrometeorologicheskoe Izdatel'stvo, 460p. incl. illus., tables, graphs, diagrs., 1967. 188 refs.
DLC, GB2403.P4

The second revised and supplemented edition of the book published under the same title in 1963 (SIP 22906) reflects the achievements of modern science in the study of sea ice and reports the results of extensive research in ice cover types, cover destruction, and behavior under load. The effect of ice on various structures is analyzed. Ice carrying capacity and the estimation of critical load are discussed analytically. -- NSV

SIP 25853 534.22 + 551.32

Bogorodskiĭ, V.V. and G.P. Khokhlov
ACOUSTICAL CHARACTERISTICS OF ICE UNDER STATIC PRESSURE. (Akusticheskie kharakteristiki l'da nakhodîâshchegosîâ pod staticheskim davleniem; Text in Russian). Akad. Nauk SSSR, Akusticheskiĭ Zhurnal, 13(1):18-22 incl. illus., graphs, 1967. 5 refs.
DLC, QC221.A53

Results are reported of an experimental study of sound velocity variation in ice samples occurring under hydrostatic pressure ranging from 0 to 500 at. It was noticed that with increasing pressure the mass density of ice increased from 0.9 g/cm^3 at p = 0 to 1.0 g/cm^3 at p = 500 at. A considerable variation of sound velocity in the ice measured in different directions at p = 0 is explained by the anisotropy of ice structure and air inclusions. At high pressures the anisotropy effect disappeared and the sound velocity became equal in the longitudinal and transverse directions. The increase in pressure also caused a slight increase in the velocity of sound. The results obtained make it possible to account for the variation of sound velocity in the body of a glacier and to measure more accurately its thickness. -- NSV

SIP 25854 624.138.4.139.26

Nazarov, A.V., Tolokonnikova, M.V., and A.S. Sokolov
CHEMICAL PROTECTION OF GROUND FROM FREEZING. (Khimicheskaia zashchita gruntov ot promerzaniia; Text in Russian). Izv. Vyssh. Ucheb. Zaved, Stroitel'stvo i Arkhitektura, No. 10:164-170 incl. tables, graphs, 1966. 5 refs.
DLC, TH4.R8

Results obtained in testing a method designed for

protecting soil from freezing by saturating it with sodium and potassium chloride solutions show lowering of its freezing temperature. This technique provided a secure protection of soil from freezing in the Central USSR when 1 g of the chemicals was spread in the form of a powder or water solution over 1 cm^2 of soil. Application of smaller doses resulted in the formation of individual ice interlayers in soil. Better results were obtained when the chemicals were uniformly spread over the surface rather than introduced into the ground through boreholes, and when the ground was treated with the chemicals during the middle of September. -- NSV

SIP 25855 551.345(573)

Shastkevich, IU. G.
PERENNIALLY FROZEN ROCKS OF THE HIGH MOUNTAINS OF THE UDOKAN RIDGE AND THE CONDITIONS UNDER WHICH THEIR TEMPERATURE REGIME WAS FORMED. (Mnogoletnemerzlye porody vysokogornoĭ chasti khrebta Udokan i usloviĭa formirovaniĭa ikh temperaturnogo rezhima; Text in Russian). Akad. Nauk SSSR, Sibirskoe Otd. Inst. Merzlotovedeniia, Geokriologicheskie usloviia Zabaĭkal'skogo Severa, Moskva, p. 24-43 incl. illus., tables, graphs, diagrs., 1966. 22 refs.
DLC, GB648.55.A658

Geocryological conditions in the water-divide areas of the Udokan Ridge sharply differ in the thickness of the frozen zone, temperature, and the composition and physical properties of rocks from those in the valleys. The frozen zone thicknesses under the water-divides exceeded 900 m, while under the river valleys they amounted only to 100-120 m and were characterized by tubular isolated taliks. Deep rock freezing in the water-divide areas was caused by a low mean annual temperature of the surface, a considerable heat-conductivity of rocks (especially of silicified sandstones), a small inflow of the interrestrial heat (0.030 kcal/m^2 hr) and an insignificant effect of ground waters below the freezing zone on the temperature of perennially frozen strata.
-- NSV

SIP 25856 551.345(573)

Zabolotnik, S. I.
PERENNIALLY FROZEN ROCKS OF THE VERKHNE-KALARSKAIA BASIN. (Mnogoletnemerzlye gornye porody Verkhne-Kalarskoĭ kotloviny; Text in Russian). Akad. Nauk SSSR, Sibirskoe Otd. Inst. Merzlotovedeniia, Geokriologicheskie usloviia Zabaĭkal'skogo Severa, Moskva, p. 68-82 incl. illus., map, tables, graphs, diagrs., 1966. 7 refs.
DLC, GB648.55.A658

The perennially frozen rocks of this basin were studied and subsequently mapped according to the "landscape method" based on distinguishing cryolithological varieties of ground in the seasonally freezing-thawing zone. Typical localities were distinguished in which the intensity and course of cryogenic processes were similar. This distinction was based on the composition and origin of the deposit, the hypsometric position of the area, and the nature of its vegetation. For each area the thickness of the seasonally thawing zone was determined as well as temperature variation in the ground, its moisture content, and thermophysical characteristics. To determine the relationships among these factors the process of ground thawing was calculated according to the V. T. Balobaev formula; the theoretical results closely correlated with field data. -- NSV

SIP 25857 624.139:551.345:539.3

Votiakov, I. N.
ENGINEERING AND GEOLOGICAL CHARACTERISTICS OF GROUND IN THE NIZHNE-INGAMAKITSKAIA BASIN. (Inzhenerno-geologicheskaia kharakteristika gruntov Nizhne-Ingamakitskoĭ kotloviny; Text in Russian). Akad. Nauk SSSR, Sibirskoe Otd. Inst. Merzlotovedeniia, Geokriologicheskie usloviia Zabaĭkal'skogo Severa, Moskva, p. 132-151 incl. illus., tables, graphs, diagrs., 1966. 6 refs.
DLC, GB648.55.A658

The technique of building on frozen coarse-grained alluvial deposits and moraines is discussed on the basis of the results obtained in the study and experimental testing of physical and mechanical properties of such grounds. It is concluded that the alluvial deposits are practically incompressible under load, so that the compressibility coefficient can be neglected in the calculations. When total moisture content of the ground is below 10% the method of gradual ground thawing can be used when erecting small and average structures; when the ground has a higher amount of ice it should be kept frozen especially for the erection of large buildings.
-- NSV

SIP 25858 624.144.4:625.71

Grcić, Josip
DYNAMICS OF SNOW STORMS AND ROAD PROTECTION FROM SNOW DRIFT. (Dinamika snježnih zapuha i zaštita saobracajnica; Text in Croatian). Ceste i Mostovi, 14, No. 1-6:214-231 incl. illus., map, tables, graphs, diagrs., Jan.-June 1966. 10 refs.
DLC, TE4.C4

More than 90% of snow accumulates on the roads by snow drift. During a storm the effective zone of snow movement usually does not exceed 2 km; the

length of this distance depends on wind direction and topography. Formulas are derived for calculating wind velocity variation at small altitudes and in different geographical areas. No general law governing snow movement could be obtained since it is affected by many factors some of which are topography, type of vegetation near the road, and the road profile. Different countermeasures designed to protect roads from blowing snow are discussed with the conclusion that movable wooden fences consisting of a wooden frame supporting straw-thatching are most convenient and economical for road protection from snow. Such fences are manufactured in Finland and Denmark, last 3 to 4 seasons, and can be rolled up for easy transportation. -- NSV

SIP 25859 629.124.791:624.021/09

Popov, IÛ. N., Faddeev, O.V., Kheisin, D.E., and A.A. Yakovlev
STRENGTH OF SHIPS NAVIGATING IN ICE. (Prochnost' sudov plavaiushchikh vo l'dakh; Text in Russian). Leningrad, Izd-vo "Sudostroenie", 223p. incl illus., tables, graphs, diagrs., 1967. 58 refs.
DLC, Slavic Div.

The theory of ship building is presented with emphasis on the calculation of structural frames and their strength in different vessel types navigating in ice covered seas. Methods are discussed for determining ice pressure on ship frames in relation to different navigational conditions, as well as the strength of ice. A classificiation of sea ice is proposed, and the nature of ice-cover deformation and its physical and mechanical properties are discussed. -- NSV

SIP 25860 551.579.2:662.87(5)

Dolgushin, L.D., Kemmerikh, A.O., Krenke, A.N., Lebedeva, I.M., Markin, V.A., Osipova, G.B., Pototaeva, O.V., and I.F. Khmelevskoĭ
FIELD STUDIES ON THE SUBJECT "DEVELOPMENT OF SCIENTIFIC PRINCIPLES OF INTENSIFIED ARTIFICIAL MELTING OF GLACIERS IN CENTRAL ASIA." (Polevye issledovaniĭa po teme "Razrabotka nauchnykh osnov iskusstvennogo usileniĭa taĭaniĭa lednikov Srednei Azii"; Text in Russian). Inst. Geogr. Akad. Nauk SSSR, Materialy glîâtsiologicheskikh issledovaniĭ Khronika obsuzhdeniĭa, Vyp. 11:5-15 incl. illus., tables, graphs, diagrs., 1965.
DLC, QE575.A43

This paper reports experimental results obtained in artificial intensification of ice and snow melting by black body dusting, with the conclusion that: 1) Spraying of 50-100 g/m^2 coal dust over glaciers increases ice melting by 20-45% in July and August despite a high natural polution of the glacier surfaces. 2) Maximum effect is obtained during first few days with subsequent gradual leveling of ice-melting intensity due to washing away of coal dust by melt waters. 3) Glacier ablation can be considerably prolonged by coal-dusting the snow cover on the glaciers during spring months. 4) Reliable data on the effectiveness of the black body dusting methods may be obtained only if the experimentation continues through the whole ablation period of a glacier. -- NSV

SIP 25861 551.521.1:551.578.46:551.322

Karol', B.P.
ON THE METHODS OF MEASURING PENETRATION OF RADIATION INTO SNOW, FIRN, AND ICE (REVIEW OF LITERATURE). (O metodakh izmereniĭa proniknoveniĭa radiatsii v sneg, firn i led (obzor literatury); Text in Russian). Akad. Nauk SSSR. Inst. geogr., Mater. glîâtsiol. issled. Khronika, obsuzhdeniĭa, No. 11:167-176 incl. table, 1965. 62 refs.
DLC, QE575.A43

Because of relative transparency of snow, firn and ice, the penetrating solar energy creates an illumination inside the snow and ice layers. The spectral composition of this internal radiation and the radiation balance inside snow and ice are discussed. The methods of studying and measuring the penetration of solar radiation into snow, firn, river and sea ice are analyzed with the conclusion that special small-size and highly sensitive measuring instruments are needed which would not overly shade the inflowing radiation. An international standard should be worked out for such instruments to make possible the comparison of their readings. -- NSV

SIP 25862 551.32:528.72

Cheremnykh, G.D.
THE POSSIBILITY OF A BROADER USE OF AERIAL PHOTOGRAPHY IN GLACIOLOGICAL STUDIES. (O rasshirenii vozmozhnosti ispol'zovaniĭa materialov aerofotos"emki pri glîâtsiologicheskikh issledovaniĭakh; Text in Russian). Akad. Nauk SSSR. Inst. geogr., Mater. glîâtsiol. issled. Khronika, obsuzhdeniĭa, No. 11:178-179, 1965.
DLC, QE575.A43

The possibility of improving the magnification power of the SD-1 stereograph (designed by F.V. Drobyshev) is briefly discussed. A 5-fold magnification of the photographs, compared to the initial scale of the aerial-photographic survey, was obtained by chang-

ing the pantograph construction and by designing certain mutually interchangeable details. The procedure of determining variations in glacier volumes according to the photographs by determining the variation in the glacier surface directly from negatives is briefly described. It is believed, that the use of the improved SD-1 model will lower the error in such determinations from 30 to 10%. -- NSV

SIP 25863 551.322:5.001(*41)

Pounder, E. R.
ICE RESEARCH PROJECT. Ann. Rept. 1966, Macdonald Phys. Lab., McGill Univ. 23p. incl. graphs, Jan. 31, 1967. 8 refs. (Rept. G-13, Contract HQ DEV 35; Proj. No. D45-95-10-09).
DLC, Tech. Rept. Collection

Considerable progress is reported in the studies of the electrical and acoustical properties of sea ice. The first stage of the former program (in the 20 to 50 x 10^6 Hz range) is now essentially completed and was reported at the Low Temperature Conference in Japan. Some difficulty was encountered in interpreting the acoustical measurements but averaging techniques now under development are starting to give consistent and interesting results. The study of ice drift in the Gulf of St. Lawrence has shown that historical records lack the necessary precision to develop relations which could lead to improvements in ice forecasting techniques, and experimental observations on ice drift in the Gulf are proposed. Short reports are included on the other experimental programs of the Project. Progress is good on the energy exchange and crystal growth studies, but little has been accomplished on the very low temperature experiments on single ice crystals. (Author's abstract)

SIP 25864 551.574.14:551.578.71

Brownscombe, J. L. and J. Hallett
EXPERIMENTAL AND FIELD STUDIES OF PRECIPITATION PARTICLES FORMED BY THE FREEZING OF SUPERCOOLED WATER. Quart. J. Roy. Meteorol. Soc., 93(398):455-473 incl. illus., graphs, tables, Oct. 1967. 33 refs.
DLC, QC851.R8

Drops which freeze in isolation or by accretion on an ice particle are found to be single or polycrystalline depending on the drop supercooling and the particle temperature. Subsequent growth from the vapour depends on the number and orientation of these crystals. The airflow around the particle, characterized by the Reynolds Number, Re, is important in the initial accretion process. The particle falls steadily for small Re, but oscillates and eventually tumbles as Re approaches 500. The deformation of accreted drops depends both on the dendrite freezing velocity and on the drop impact kinetic energy. Viscous dissipation becomes important as the deformation exceeds 10. The heat economy of a freezing accreted drop is dominated by a collecting particle which is large compared with the drop. Symmetrical freezing only occurs for surface temperature approaching 0°C, or when the drop accretes on a narrow spike. Drops accreting on particles growing spongily may interact first with a liquid layer and produce splash droplets. Opacity is related to bubble size. Opaque ice forms when the particle is growing spongily or dry, with transparent ice forming when the growth is just wet. Just spongy growth at low temperatures is associated with small crystals and opaque ice. (Authors' abstract, modified)

SIP 25865 551.594.12:551.594.252:551.594.253

Abbas, M. A. and J. Latham
AN EXPERIMANTAL INVESTIGATION OF THE SELECTIVE ION-CAPTURE THEORY OF CLOUD ELECTRIFICATION. Quart. J. Roy. Meteorol. Soc., 93(398):474-482 incl., graphs, diagr., Oct. 1967. 10 refs.
DLC, QC851.R8

Measurements made of the charges acquired by water drops and smooth ice spheres suspended in electric fields and exposed to streams of positive ions only, negative ions only, and ions of both signs present in equal and unequal concentrations were found to be in excellent quantitative agreement with the equations of Whipple and Chalmers. Electrical masking was probably responsible for the slightly increased charging obtained when the experiments were repeated with ice spheres of irregular surface structure. The charges acquired by drops falling through ion streams in electric fields are explicable in terms of the Wilson process. (Authors' abstract)

SIP 25866 551.583.2:551.324:58

Mercer, J. H.
GLACIER RESURGENCE AT THE ATLANTIC/SUB-BOREAL TRANSITION. Quart. J. Roy. Meteorol. Soc., 93(398):528-534 incl. table, Oct. 1967. 24 refs.
DLC, QC851.R8

Some mountain glaciers in both the Northern and Southern Hemispheres advanced in late Atlantic and early sub-Boreal time, between about 5,200 and 4,600 radiocarbon years ago, and several in the Southern Hemisphere reached their greatest postglacial extents. This suggests that the cool phase was as severe as at the start of the sub-Atlantic (ca. 2,800 radiocarbon years ago), but many botanists believe that the fluctuation was weak.

Much botanical evidence indicates that the cool phase was followed by renewed warmth and divided the Hypsithermal Interval into two parts of unequal length. (Author's abstract)

SIP 25867 551.578.71

Browning, K.A.
THE LOBE STRUCTURE OF GIANT HAILSTONES. Quart. J. Roy. Meteorol. Soc., 92(391):1-14 incl. illus., graphs, Jan. 1966. 10 refs. DISCUSSION. Ibid. 93(398):556-559, Oct. 1967.
DLC, QC851.R8

Photographs of thin sections through five giant hailstones are presented to portray their bubble and crystal structures. These are interpreted to show that the hailstones grew as three-dimensional arrays of more or less completely frozen lobes, sometimes but not always separated by regions of spongy ice characterized by radial lines of bubbles. Some lobes contained regularly spaced hyperfine growth layers consisting of series of concentric bubble fronts a few hundred microns apart. These layers are interpreted as being due to fluctuations in growth rate associated with the tumbling of the hailstones. The growing surfaces of the lobes were strongly convex outward. This caused successive growth layers to become convoluted or scalloped. When the surface of a whole hailstone was viewed it sometimes created the false impression that the stone was an aggregate of much smaller hailstones. The presence of surface knobs associated with the lobes significantly enhances the efficiency of heat loss from the hailstone surface. Such an effect is important in that it reduces the proportion of unfrozen water incorporated within a rapidly growing hailstone. There is even some evidence that a giant 8 cm diameter hailstone can grow in this way without becoming appreciably spongy. (Author's abstract)

SIP 25868 551.551.4:551.578.7(682)

Carte, A.E.
FEATURES OF TRANSVAAL HAILSTORMS. Quart. J. Roy. Meteorol. Soc., 92(391):290-296 incl. illus., graphs, Jan. 1966. 7 refs. DISCUSSION. Ibid. 93(398):559-560, Oct. 1967.
DLC, QC851.R8

Hailstorms in the vicinity of Johannesburg and Pretoria, South Africa, are being studied mainly by means of a dense network of voluntary observers. The storms have shown great variability. A characteristic of sustained storms is their tendency to move to the left of the mid-tropospheric winds, whereas in the Northern Hemisphere movement is to the right. One of these storms appeared to be multicellular at a stage when hailstones up to 6 cm diameter were falling. Another produced large spongy hailstones along part of its path. (Author's abstract)

SIP 25869 551.578.71(682)

Carte, A.E. and R.E. Kidder
TRANSVAAL HAILSTONES. Quart. J. Roy. Meteorol. Soc., 92(391):382-391 incl. illus., graphs, table, Jan. 1966. 12 refs. DISCUSSION. Ibid. 93(398):560-561, Oct. 1967.
DLC, QC851.R8

Characteristics of a large number of hailstones which have fallen in the Pretoria-Johannesburg area in the past five years have been summarized under the following headings: size distributions, shapes, growth centers, layers and internal structures. Most hailstorms did not produce large hailstones. Only 4 per cent of over 5,000 hail reports were of stones exceeding 3 cm diameter. With increases in size of the largest hailstones, broader size spectra tended to occur and the modal size of hailstones reported as being most common increased. Spheroidal shapes were encountered more often than others in practically all size groups but their relative frequency diminished with size. A high proportion of the hailstones had opaque growth centers. An investigation of layering revealed that many hailstones have more changes of opacity than of crystal structure. Two, three and four crystal layers were often found in medium, large and extra-large stones. A simple up-and-down trajectory can account for the structure of many stones. Slushy ice may form on large hailstones but it is not an essential growth stage. (Authors' abstract)

SIP 25870 624.144.4:625.7

Cron, Frederick W.
SNOWDRIFT CONTROL THROUGH HIGHWAY DESIGN. Public Roads, 34(11):227-234 incl. illus., Dec. 1967. 15 refs.
DLC, TE23.P86

In areas that are subject to large and frequent snowfalls, drifting snow on highways presents a serious maintenance problem. The author discusses the research that has been accomplished in this field and presents recommendations for dealing with the problem of snowdrift control. In many areas of the country, particularly the northern States, the maintenance costs of highways during the snow season can be reduced considerably if the problem of drifting snow is considered when a highway is in the design stages. Research shows that when topographic conditions are favorable the sweep of the wind can be

used to control the accumulation of snowdrift on highways. In areas where blowing snow is a problem, information on prevailing winds and drifting should be considered in the selection of a highway location. The profile and cross sectional design can also provide snow control by taking advantage of the wind and should be considered when a highway is initially planned. Appurtenances such as curbs, guardrails, fences, signs, etc., must also enter consideration for snow control because they are obstacles to the free movement of the wind and therefore contribute to the formation of drifts. By generally streamlining the area surrounding the highway, drifting is minimized, the esthetic qualities are enhanced, and the operational safety is increased. (Author's abstract)

SIP 25871 624.152:553.61(*58)

Bjerrum, L.
PROBLEMS OF BUILDING FOUNDATIONS ON SENSITIVE NORWEGIAN CLAYS. (Problemes de foundation dans les argiles sensibles de Norvege; Text in French). Norges Geotekniske Institutt, Nr. 67, 10p. incl. illus., graphs, diagrs., Oslo 1966. 7 refs. (Reprinted from Sols Soils, 3(11): 11-20, Paris, Dec. 1964.
DLC, TA710.A1078

Fluidity and high instability of Norwegian clays are related to the isostatic uplift of Norway after the melting of glaciers, which resulted in the elevation of marine clays above sea level and caused the replacement of salt water in clay pores by fresh water, thus reducing the yield point of the clays and their capacity to adsorb water. Several examples of building on such clays are discussed. When erecting a six-story building on the clays, especially when the bedrock occurs at a considerable depth, the foundation pit is excavated in small sections and each excavated section is immediately filled with concrete and the fill; this way the amount of settling is less than 2.5 cm. -- NSV

SIP 25872 551.345(234.9)

Ruguzov, I.A.
"PERMAFROST" IN THE ZHELEZNOVODSK REGION. ("Vechnaya merzlota" v raĭone Zheleznovodska; Text in Russian). Priroda, 8:115, 1967.
DLC, Q4.P8

The presence of a "permanently frozen" area on the Razvalka Mountain near Zheleznovodsk, Caucasus, at elevation 720 m is briefly discussed. Underground currents of cold air sustain a zero temperature of soils near the surface; ice interlayers are found at a 3 cm depth. Plants typical of northern regions grow in this area, sharply differing from the surrounding vegetation of a southern type. Pending further investigations, it is suggested that the localized permafrost could have been caused by CO_2 accumulation in a solid state in a sealed cave during a very long period, and its subsequent release to the surface through fractures which have developed much later in the cave walls. -- NSV

SIP 25873 623.438:625.03

Kalliomäki, Yli A. K.
CAN THE TANKS PASS THROUGH FROM HERE OR THERE? (Päliseekö se...päliseekö tästä...tuosta; Text in Finnish). Hakku Pioneerien Lehti 3:15-21 incl. illus., 1967.
DLC, Unbound periodical

The ability of a tank to traverse country terrain under different winter conditions is analyzed, and formulas are offered for calculating the strength of ice on the ice-bound lakes and its capacity of supporting a moving tank. A snow blanket or a thin layer of frozen snow does not noticeably affect the motion of a tank, but it obliterates obstacles such as large stones, hollows, non-frozen soft spots in the terrain; therefore, the route of a tank under such conditions should be checked in advance. A tank can move independently of the snow-depth in a smooth field of snow, up to 1 to 2 m deep, if the air temperature is above 0°C. According to calculations, the ice cover on a lake must be about 60 cm thick to support tanks moving at 20 m intervals from one another. Blizzards can make tank movement entirely impossible due to poor visibility. The use of "infrared-devices" during the short dark winter days depends completely on the weather conditions. -- NSV

SIP 25874 551.343(234.8)

Troĭtskiĭ, L.S.
CRYOGENIC-SOLIFLUCTION DENUDATION IN THE POLAR URALS. (O merzlotnosolifluktsionnoĭ denudatsii na Polyarnom Urale; Text in Russian). Akad. Nauk SSSR. Inst. geogr., Mater. glyatsiol. issled. Khronika, obsuzhdeniya, No. 12:193-144 incl. illus., diagr., 1966. 10 refs.
DLC, QE575.A43

This report was made in relation to the controversy concerning the origin of mountain terraces. The regularities governing distribution of various forms of terraces originating from combined effects of freezing and solifluction and the intensity of the processes forming such structures are discussed, the velocities of earth slides on gently sloping mountain terraces are measured, and the period of time needed for a complete "run-off" of a strip of col-

luvial soils 1 m thick from a plateau 1 km wide is calculated. Variations in climatic conditions were not considered in the calculations. The results indicate that the above process would require 50-70 thousand years; this means that during the Quaternary period the plateau could have been lowered by 15-20 m on account of solifluction. -- NSV

SIP 25875 551.244(234.9)

Golubev, G.N.
FORMATION AND PROGNOSTICATION OF GLACIAL MUDFLOWS. (O formirovanii i prognozirovanii glîâtsial'nykh selenî; Text in Russian). Akad. Nauk SSSR. Inst. geogr., Mater. glîâtsiol. issled. Khronika, obsuzhdeniîâ, No. 12:144-149 incl. illus., diagrs., 1966. 5 refs.
DLC, QE575.A43

In high-mountain regions mudflows originate in the glacial-nival altitude belts in which high humidity is combined with an abundance of loose soil. Two types of mud flow are distinguished in the Central Caucasus: glacial - associated with glacier melting, and dependent on the snow and ice regime, and the mud flows produced by torrential rains which are of a smaller size and occur less frequently than the first type. The investigation indicated predominance of the glacial mud flows in river valley slopes. It is believed that soil absorbs most of the water accumulating at the top of glaciers during melting periods thus preparing suitable conditions for mud flows, while occasional hard rains, with their much smaller water volumes, may start the flows. A method is offered for calculating the degree of mud flow danger at different stages of the glacial ablation periods. -- NSV

SIP 25876 551.578.463(*50)

Vologicheva, N.A. and E.S. Troshkina
STUDYING SNOW STRUCTURE. (Izuchenie struktury snega; Text in Russian). Akad. Nauk SSSR. Inst. geogr., Mater. glîâtsiol. issled. Khronika, obsuzhdeniîâ, No. 12:149-152 incl. illus., graphs, 1966.
DLC, QE575.A43

Snow structure was studied in the Botanical Garden of the Moscow State University during the winters 1961-62 and 1963-64. The results indicated that the development of snow crystals depended on the form and size of fresh snow flakes falling during the whole period of snow recrystallization. The stellate crystals predominating in atmospheric precipitation changed within two weeks into rime crystals when the temperature gradient was large. Rime is very sensitive to temperature variation in air and the snow, which is reflected in the multiple variation of crystal sizes in the upper part of a rime layer. The snow recrystallization processes proceed differently on different underlying surfaces: larger crystals with weaker bonds grow on ice surfaces compared to those growing on a grass-covered ground. -- NSV

SIP 25877 551.578.48(*50)

Losev, K.S.
AVALANCHES IN THE USSR (DISTRIBUTION, ZONING, POSSIBILITIES OF FORECASTING). (Laviny SSSR (rasprostranenie, rayonirovanie, vozmozhnosti prognoza); Text in Russian). Leningrad, Gidrometeorologicheskoe Izd-vo, 130p. incl. illus., map, tables, graphs, diagrs., 1966. 150 refs.
DLC, GB2507.L68

The distribution of avalanches over the USSR territory is discussed with the conclusion that they develop with various degrees of intensity in all the mountain regions of the country. New indications are described according to which the degree of avalanche danger during summer can be determined; such indications are the relief forms, vegetation types, particular kinds of soil, névé basins, and others, with emphasis on the hydrological symptoms of avalanche danger. The existing methods of snow slide forecasting are analyzed and several new ways of prognosis are offered. An attempt is made to subdivide mountain regions of the USSR on the basis of a genetic classification of avalanches, according to the degree of snow slide danger and the avalanche-forming factors. -- NSV

SIP 25878 551.326.83:624.145.6(573)

Liser, L. ÎÀ.
SPRING ICE JAMS ON SIBERIAN RIVERS. (Vesennie zatory l'da na rekakh Sibiri; Text in Russian). Gidrometeorologicheskoe izdatel'stvo, Leningrad, 103p. incl. illus., maps, graphs, diagrs., 1967. 41 refs.
DLC, GB1355.L5

This book presents a review of current opinions on the mechanism of ice clogging, a discussion on the conditions favoring this state, the possibility of forecasting approximate dates and places of such events, and the analysis of modern procedures for their liquidation. The discussion is illustrated by systematized data on ice jams on Siberian rivers with an emphasis on the role of water-freezing conditions, hydraulic regime, and hydrotechnical construction in ice clogging of rivers. -- NSV

SIP 25879 634.0.116.12:634.0.221.223(*537)

Maĭorov, M.E.
SNOW ACCUMULATION IN RELATION TO GRADUAL FELLING OF TREES IN PINE FORESTS OF BSSR. (Snegonakoplenie v svîazi s postepennymi rubkami v sosnovykh tipakh lesa BSSR; Text in Russian). Izv. Vyssh. Ucheb. Zav., Lesnoĭ Zhurnal, 2:22-24 incl. table., 1967. 12 refs.
DLC, SD1.R92

Variation in the nature of snow accumulation was noticed in three forest sections of different categories; it was expressed in the following. 1) a reverse, almost linear, relationship between the density of canopy and the snow cover thickness; 2) snow density depending on the geometry of felling areas, kind of wind, and density of canopy; 3) the largest water reserves in snow cover accumulating in narrow felling areas due to the specific wind conditions and the absence of snow drift. Comparison of water reserves in snow, expressed in millimeters of water layer, indicated a decrease with increasing age of the trees. -- NSV

SIP 25880 631.4

Shelopaev, G.I.
CALCULATING FREEZING DEPTH OF BARE GROUND. (Raschet glubiny promerzaniîa ogolennogo grunta; Text in Russian). Izv. Vyssh. Ucheb. Zav. Lesnoĭ Zhurnal, 2:75-79 incl. map, graphs, diagr., 1967. 8 refs.
DLC, SD1.R92

This article presents an analytical discussion of soil freezing, in which the moisture migration in soil and heat flow from the underlying thawed layer to the front of freezing are taken into consideration. It is based on the well known equation of thermal balance between the frozen and thawed zones, which follows the heat-conductivity law of Fourier. The curves of temperature variation in a freezing ground and of the relationship between the amount of fluid water and temperature for different types of soil are presented, and the use of the formula derived for calculating freezing depths is illustrated by a practical example. -- NSV

SIP 25881 551.345(*531.71)

Archegova, I.B.
SOIL AND MICRORELIEF OF THE VORKUTA TUNDRA. (Pochvennyĭ pokrov i elementy mikrorel'efa Vorkutskoĭ tundry; Text in Russian). Vsesoîuz. Geogr. Obshch., Komi Filial, Izvestiîa, T. 2, 1(11):55-63 incl. diagrs., 1967. 8 refs.
DLC, G23.G2625

The tundra described, located between 67°-67°4' of north lat. and 63°-65° of east. long., is characterized by gently rolling topography and dusty-loam soils ranging in thickness from 0.5 to 5 m; they cover solid permafrost at least 100 m thick with mean annual temperature of -1.5°C. Frost heaving hummocks and spots were the most typical cryogenic features of the southern part of this area, the northern part having a hillocky-sink-hole relief; however, the landscape elements of both types were encountered in some areas. Both microrelief types are described in detail and their origin discussed with the conclusion that they were formed under different conditions and followed different development cycles. Soils of both landscapes have an almost identical lower part of the profile differing only by the thickness of the uppermost layer. Cryogenic migration of moisture and dissolved substances toward freezing surface and weak permeability of the thixotropic zone prevented intensive exchange of substances between the upper and lower part of the soil profiles. -- NSV

SIP 25882 625.12.033.37+625.711.3

Symposium on Controlling Frost Heave, Novosibirsk, Oct. 1963
CONTROLLING FROST HEAVING ON HIGHWAYS AND RAILROADS. (Bor'ba s puchinami na zheleznykh i avtomobil'nykh dorogakh; Text in Russian). Kom. po zem. pol. Izd-vo "Transport", Moskva, 215p. incl. illus., tables, graphs, diagrs., 1965.
DLC, TE210.R84

The reports heard at this conference were grouped according to the following subjects and presented in six chapters: 1) Control of frost heaving on highway and railroad subgrades and evaluation of the effectiveness of different preventive measures; 2) Analysis of practical examples in which attempts were made to use inexpensive chemicals and waste products of chemical industry in frost-heaving control: 3) Design of railroad and highway subgrades in the frost-heaving regions; 4) Theory of frost heaving; 5) Observation, investigation, and prevention of frost heaving, and the repair of damages caused by it; 6) Discussions. -- NSV

SIP 25883 551.343

Pchelintsev, A. M.
BASIC CAUSES AND CONDITIONS OF HEAVING FOR SEASONALLY FREEZING GROUNDS. (Osnovnye prichiny i usloviîa pucheniîa sezonno-promerzaîushchikh gruntov; Text in Russian). Kom. po zem. pol. Bor'ba s puchinami na zheleznykh i avtomobil'nykh dorogakh., p. 122-130 incl. diagr., 1965. 19 refs.
DLC, TE210.R84

Frost heaving produced by the following five causes,

related to ice formation in seasonally freezing ground, is discussed analytically: segregation ice, vein ice, ice cement, anisotropy of ice crystal growth, and the formation of microscopic voids in frozen ground. Formulas are given for calculating the magnitude of heaving from a uniform and non-uniform accumulation of the segregation ice, the height of heaving on account of vein ice and ice crystals and the appearance of stratified texture, and a generalized formula for estimating the magnitude of heaving resulting from joint effect of all five causes. -- NSV

SIP 25884 552.1:551.322:536.421.4

Ananĭan, A.A.
THE NATURE OF BOUND WATER AND PHASE TRANSITIONS OF WATER INTO ICE IN FINE GRAINED ROCKS. (Priroda svĭazannoĭ vody i fazovye perekhody vody v led v tonkodispersnykh gornykh porodakh; Text in Russian). Kom. po zem. pol. Bor'ba s puchinami na zheleznykh i avtomobil'-nykh dorogakh., p. 131-138, 1965. 15 refs.
DLC, TE210.R84

The physical nature of pressureless moisture migration and the separation of ice in fine grained freezing rocks are discussed analytically from the standpoint of molecular structure of water and the conditions of its crystallization. It is concluded that strong frost effect on clays and shales compared to the very slight deformation of coarser rocks is explained by the pressureless moisture inflow into the freezing zone due to the difference in water contents between the frozen and non-frozen layers, which depends in a definite way on the distortion of molecular structure of water in fine grained rocks due to their greater specific surface. -- NSV

SIP 25885 551.345:539.42

Titov, V.P.
STRENGTH OF THAWING GROUND. (Prochnost' ottaivaiushchikh gruntov; Text in Russian). Kom. po zem. pol. Bor'ba s puchinami na zheleznykh i avtomobil'nykh dorogakh., p. 178-183 incl. table, graph, 1965.
DLC, TE210.R84

The process by which a frozen soil recovers its strength after thawing was studied in relation to building roads on excessively moisture-saturated ground. The results indicated that the strength of soil decreases during its thawing on account of moisture accumulation in winter, and due to structural changes produced by freezing. At constant density and moisture content the strength of ground is minimal during its transition from a frozen to a thawed state; after thawing it increases with time, reaching the values higher than those before freezing. After repeated freezings the drop in the strength of the soil samples studied was smaller than that after the first freezing; this is believed to explain multiple deformations on roads during the first few years after their construction. -- NSV

SIP 25886 551.345:539.3:621.039.85

Il'in, N. I.
MEASURING STRUCTURAL CHANGES IN GROUND BY THE METHOD OF SEEPING RADIOACTIVELY LABELED SOLUTION. (Izmerenie strukturnykh kharakteristik gruntov metodom fil'tratsii radioaktivnogo indikatora; Text in Russian). Kom. po zem. pol. Bor'ba s puchinami na zheleznykh i avtomobil'nykh dorogakh., p. 183-188 incl. table, graphs, diagr., 1965. 10 refs.
DLC, TE210.R84

Changes in the pore structure of sands and turfs influenced by freeze-thaw cycles were studied by saturating their samples with a solution labeled by radioactive substances--a method developed by M. P. Volarovich and N. V. Churaev and described in the monograph "Studying the properties of turf and the processes proceeding in it with the aid of radioactive isotopes" (Issledovanie svoĭstv torfa i protekaĭushchikh v nem protsessov pri pomoshchi radioactivnykh isotopov. M., Izd-vo AN SSSR, 1960). The experimental procedure is briefly discussed and the formulas used in calculating pore-diameters, the coefficient of pore-channel curvature, and the specific surface of the samples, on the basis of the experimental results, are presented. The most convenient labeling isotopes were sulfur-35 for sand, sandy marl, turf and organic ooze, and tritium (H^3) for clay and marl. -- NSV

SIP 25887 551.345:539.42

Ĭusha, N.D.
INSTRUMENT FOR MEASURING LINEAR DEFORMATION OF FREEZING-THAWING GROUND. (Pribor dlia izmereniia lineĭnykh deformatsiĭ promerzaiushchikh-protaivaiushchikh gruntov; Text in Russian). Kom. po zem. pol. Bor'ba s puchinami na zheleznykh i avtomobil'nykh dorogakh., p. 195-199 incl. diagrs., 1965.
DLC, TE210.R84

An electrical device designed for measuring linear deformations of ground and especially suited for operation under the rigid climatic conditions of Siberia and the Extreme North is described in detail and illustrated diagrammatically. It consists of an electrical indicator and a series of metallic rings installed into the ground in a bore-hole. It is used in determining the magnitude of frost heaving

in separate layers of earth, sagging of the perennially frozen ground due to its thawing, the amount of settling caused by natural compaction of earth, and the approximate freezing depth of the ground. The procedure of working with this instrument may be combined with the study of thermal regime of the ground by installing thermometers in the bore-hole and observing them in the periods between the measurement of ground deformation. This device may have extensive applications in scientific research laboratories and major organizations dealing with highway and foundation design. -- NSV

SIP 25888 551.345(571.531)

Nekrasov, I. A. and N. I. Novikov
HISTORY OF THE STUDY OF PERENNIALLY FROZEN ROCKS AND CRYOGENIC PHENOMENA IN PRIBAIKAL'E AND ZABAIKAL'E. (Istoriîa issledovaniîa mnogoletnemerzlykh gornykh porod i kriogennykh îavleniĭ na territorii Pribaĭkal'îa i Zabaĭkal'îa; Text in Russian). Akad. Nauk SSSR, Sibirskoe Otd. Inst. Merzlotovedeniîa, Geokriologicheskie usloviîa Zabaĭkal'îa i Pribaĭkal'îa, p. 5-50 incl. maps, 1967. 287 refs.
DLC, Slavic Div.

A review is presented of the literature on perennially frozen rocks in the Pribaikal'e and Zabaikal'e territories published during the last century, with the conclusion that this subject received little attention prior to 1960; starting with this year the Moscow State University and the Institute of Geocryology, Acad. of Sci. USSR conducted extensive studies in the south of this region and a narrow strip along the Trans-Siberia railroad. The following areas have not been investigated: Stanovoĭ, Patomsk and Olekminsk plateaus and the Delîun-Uransk, Severo-Muĭsk, Barguzinsk, Ikatsk and Malkhanskiĭ ridges. Geocryological maps (scale 1:30,000,000) show schematically approximate geocryological conditions in these regions. -- NSV

SIP 25889 551.345(571.531)

Leshchikov, F. N. and N. E. Zarubin
GEOCRYOLOGICAL CONDITIONS OF PRIBAĬKAL'E. (Geokriologicheskie usloviîa Pribaĭkal'îa; Text in Russian). Akad. Nauk SSSR, Sibirskoe Otd. Inst. Merzlotovedeniîa, Geokriologicheskie usloviîa Zabaĭkal'îa i Pribaĭkal'îa, p. 51-70 incl. illus., tables, map, diagr., 1967. 28 refs.
DLC, Slavic Div.

A discussion is presented on the hydrological and geothermal processes taking place in freezing, frozen, and thawing rocks, the phenomena related to them, their manifestations in the folded mountain regions, and the regularities governing their distribution and intensity. The territory studied represents an intricate combination of different geocryological conditions: continuously distributed perennially frozen rocks in high mountains, large masses of isolated permafrost cut by through-taliks along the course of ascending ground waters in the zones of tectonic disturbance, and a double-layer structure of thick frozen zones. The processes responsible for frost heaving, solifluction, and naleds are discussed in relation to building and road maintenance. -- NSV

SIP 25890 551.345(571.531)

Mel'nichuk, N. L.
GEOCRYOLOGICAL CONDITIONS OF THE SOUTHERN PART OF VITIMSKOE PLATEAU. (Geokriologicheskie usloviîa îuzhnoĭ chasti Vitimskogo ploskogor'îa; Text in Russian). Akad. Nauk SSSR, Sibirskoe Otd. Inst. Merzlotovedeniîa, Geokriologicheskie usloviîa Zabaĭkal'îa i Pribaĭkal'îa, p. 70-78 incl. illus., table, map, diagr., 1967.
DLC, Slavic Div.

This is a description of principal geocryological phenomena observed on the plateau (taliks, frost heaving, naled, solifluction) with an attempt for a genetic classification of taliks and frost heaving hills. Data concerning the variation of the seasonal depth of thawing in different parts of the Vitimskoe Plateau is tabulated and their discussion illustrated by a geocryological map and a hydro-geological cross-section of the plateau showing the lower boundary of permafrost, the piezometric level of ground waters beneath it, and the amount of water pressure in wells. -- NSV

SIP 25891 551.345(*532.5)

Nekrasov, I. A. and G. E. Li
PERENNIALLY FROZEN ROCKS OF TUNKA TROUGH. (Mnogoletnemerzlye porody Tunkinskoĭ vpadiny; Text in Russian). Akad. Nauk SSSR, Sibirskoe Otd. Inst. Merzlotovedeniîa, Geokriologicheskie usloviîa Zabaĭkal'îa i Pribaĭkal'îa, p. 78-90 incl. map, graphs, 1967. 24 refs.
DLC, Slavic Div.

Widespread opinion concerning the presence of 750-1100 m. thick perennially frozen rocks in the Tunka Trough was disproved by the results of thermal studies and modeling of the hydrological conditions of the territory. Apparently in the lake - swamp area (the central part) of the trough permafrost thickness amounts to 100 m, while on the high post-glacial terraces it varies from a few meters to 250 m depending on the local position of the basalt

intrusion. A through-talik functions under the Irkutsk River channel becoming gradually limited by permafrost in the lateral directions. It is believed that perennially frozen rocks are entirely absent in the Badar sands area characterized only by seasonal freezing to a 4-5 m depth. -- NSV

SIP 25892 551.345(571.531)

Shpolîanskaîa, N.A.
PERENNIALLY FROZEN ROCKS IN SOUTH ZABAIKAL'E AND THE PRINCIPAL PHYSICAL AND GEOGRAPHICAL FACTORS OF THEIR FORMATION. (Mnogoletnemerzlye porody îuzhnogo Zabaĭkal'îa i vedushchie fiziko-geograficheskie faktory ikh formirovaniîa; Text in Russian). Akad. Nauk SSSR, Sibirskoe Otd. Inst. Merzlotovedeniîa, Geokriologicheskie usloviîa Zabaĭkal'îa i Pribaĭkal'îa, p. 90-103 incl. tables, maps, 1967. 16 refs.
DLC, Slavic Div.

Zabaĭkal'e is characterized by exceedingly variable cryological conditiond due to its geographic position at the border of permafrost regions. The regularities governing permafrost distribution in the South Zabaĭkal'e were studied with the conclusion that locally, permafrost is associated with lower relief, the variations in its development in mountainous areas also depending on the steepness and exposure of mountain slopes. On the regional scale, there was a gradual variation of thickness and absolute temperature of the perennially frozen ground from west to east, the thickest series with the lowest temperature were associated with the elevated strongly dissected areas; temperature increased with the decrease in the degree of topographic dissection the highest temperature being observed in wide weakly dissected basins. A table is presented which shows the relation among permafrost thickness, topography, lighology, and vegetation. -- NSV

SIP 25893 551.345(571.531)

Tolstov, A.N.
SOME DATA ON PERENNIALLY FROZEN ROCKS IN PRIBAĬKAL'E AND NORTHERN ZABAĬKAL'E. (Nekotorye dannye o mnogoletnemerzlykh gornykh porodakh Pribaĭkal'îa i severnogo Zabaĭkal'îa; Text in Russian). Akad. Nauk SSSR, Sibirskoe Otd. Inst. Merzlotovedeniîa, Geokriologicheskie usloviîa Zabaĭkal'îa i Pribaĭkal'îa, p. 104-113 incl. tables, graph, diagr., 1967.
DLC, Slavic Div.

Conditions of frozen rock development in these territories and the associated phenomena are briefly described and discussed, with the conclusion that perennially frozen strata, the upper surface of which joins the seasonally freezing layer, are developed in Pribaĭkal'e in separated areas 200 to 800 m long with taliks located under the deep never freezing rivers (Lena, Karenga, Upper Angara). In the North Zabaĭkal'e permafrost is continuous, its taliks also being restricted to major rivers and lakes. Through-taliks were observed in the intermontane basins as well as in the tectonically disturbed zones and in the places where ground waters ascend from below the permafrost cutting through the frozen formations. -- NSV

SIP 25894 551.345:551.579.4(571.531)

Koldysheva, R. ÎA.
WATER-BEARING FRACTURED ZONE IN THE PERMAFROST AREA OF BURIÀTIIÀ. (Vodonosnaîa treshchinovataîa zona oblasti rasprostraneniîa mnogoletnemerzlykh tolshch Buriàtii; Text in Russian). Akad. Nauk SSSR, Sibirskoe Otd. Inst. Merzlotovedeniîa, Geokriologicheskie usloviîa Zabaĭkal'îa i Pribaĭkal'îa, p. 113-117 incl. table, 1967. 6 refs.
DLC, Slavic Div.

This short report presents data available on a widely developed zone of fracturing in the igneous rocks located immediately beneath the bottom of perennially frozen formations, which represents a natural water reservoir. Its origin is partially explained by multiple freezing and thawing of rocks due to the fluctuation of climatic conditions. -- NSV

SIP 25895 551.578.4:551.594.25:551.578.7

Burrows, D.A., P.V. Hobbs, and W.D. Scott
FACTORS AFFECTING THE ELECTRIC CHARGE ACQUIRED BY AN ICE SPHERE MOVING THROUGH NATURAL SNOWFALL. Monthly Review, 95(12): 878-883 incl. illus., diagrs., Dec. 1967. 9 refs.
DLC, QC983.A2

The factors affecting the electric charge acquired by an ice sphere moving through natural snowfall have been investigated experimentally. When graupel particles were in the air the sphere always received a positive charge. If graupel was not present the sign of the charge appeared to be related to the direction of the atmospheric electric field. When the field was directed downwards the ice sphere received negative charge, and when the field was directed upwards the sphere received positive charge. The results are explained in terms of the direct transfer to the ice sphere of some of the net charge on the ice particles in the air making a glancing contact with the ice sphere. The charges that an ice sphere received by this mechanism appeared to be much larger than any charges that might have been generated by asymmetrical rubbing between the ice particles in the air and the surface of the ice sphere. (Author's abstract)

SIP 25896 551.578.4+.41

Gunn, K. L. S.
THE NUMBER FLUX OF SNOW CRYSTALS AT THE GROUND. Monthly Review, 95(12):921-924 incl. illus., graphs, table, Dec. 1967. 2 refs.
DLC, QC983.A2

Many measurements of the snowfall rate R and the average mass per crystal $\bar{m}$ have provided values of $R/\bar{m}$, the number of snow crystals reaching unit area of the surface per unit time. A typical number is 1 per cm.^{2} per sec. Over a whole season's data, the flux is proportional to the snowfall rate. Specifically, two-thirds of the measurements lie within a factor two of a locus $R/\bar{m}$ (cm.$^{-2}$ sec.$^{-1}$) = 1.5 $R^{1.0}$ where R is in millimeters of water per hour. Thus the principal contribution to any increase in the snowfall rate is the formation of new crystals, rather than the growth of existing ones. (Author's abstract)

SIP 25897 551.326.83:551.482.215(775)

Carey, Kevin L.
OBSERVED CONFIGURATION AND COMPUTED ROUGHNESS OF THE UNDERSIDE OF RIVER ICE, ST. CROIX RIVER, WISCONSIN. U.S. Geol. Survey, Prof. Paper 550-B:B192-B198 incl. illus., table, 1966. 11 refs.
DLC, QE75.P9

Ripple- and dune-like features on the underside of the cover of river ice on the St. Croix River, Wis., change with time and closely resemble ripples and dunes found on alluvial steambeds. In 12 observations the wavelength and amplitude of the "ice-dunes" averaged about 0.65 foot and 0.07 foot, respectively. In all dune profiles the steeper slopes were on the downstream sides of the features. No suspended sediment or frazil (slush) ice was present in the flow. It is suggested that the features may owe their origin to fluid turbulence. The Manning roughness coefficient, calculated for the underside of the ice by a new method which uses the results of discharge measurements through the ice and supporting field data, is related to the observed characteristics of the underside of the ice. (Author's abstract)

SIP 25898 551.326.83:551.482.215(775)

Carey, Kevin L.
THE UNDERSIDE OF RIVER ICE, ST. CROIX RIVER, WISCONSIN. U.S. Geol. Survey, Prof. Paper 550-B:C195-C199 incl. table, diagr., 1967. 2 refs.
DLC, QE75.P9

Ripplelike and dunelike features have been found during a second winter on the underside of the ice cover on the St. Croix River, Wis. Profiles of the features and measurements of ablation and accretion show that the features began to form when the underside of the ice was accreting, and continued their development during ablation. The Belokon-Sabaneev formula, $n_I = (2n^{3/2} - n_B^{3/2})^{2/3}$, satisfactorily shows the relationship between the roughness coefficients for the ice, the bed, and the total channel. Calculations of the roughness coefficients for the underside of the ice, n_I, range from 0.0039 to 0.0142, except for one calculation which indicates no retardation of the flow by the ice cover. This anomaly is believed to be caused by an incorrect estimate of the effective size of the roughness projections of the bed. Caution is therefore given that the computed (published) values of the ice-roughness parameters are slightly smaller than actual. (Author's abstract)

SIP 25899 551.326.83:551.482.215(775)

Carey, Kevin L.
ANALYTICAL APPROACHES TO COMPUTATION OF DISCHARGE OF AN ICE-COVERED STREAM. U.S. Geol. Survey, Prof. Paper 550-B:C200-C207 incl. tables, graphs, 1967. 3 refs.
DLC, QE75.P9

Two analytical methods for computing winter discharge of an ice-covered stream have recently been developed from observations on the St. Croix River, Wis. One method is based on pipe-flow equations, and the other method on an analogy with methods used to compute open-water discharge for streams affected by backwater. Accuracy of computed discharge in the first method is within ±19 percent of measured discharge, whereas the second method gives results within ±9 percent. Relationships in both methods are developed with data either recorded or measured in the field. After the relationships have been developed for a particular stream-gaging station, only recorded data (water-surface stage at both ends of a reach) are needed to compute discharge. (Author's abstract)

SIP 25900 551.578.71

Khemani, L. T.
NATURE OF HAIL EMBRYOS - A SUGGESTION. J. Meteorol. Soc. Jap., Ser. II, 45(4):275-278 incl. tables, graphs, Aug. 1967. 8 refs.
DLC, Orientalia Div.

Precipitation samples collected on rain occasions with and without hail have been chemically analyzed for Cl^-, SO_4^{--}, Na^+, K^+ and Ca^{++}. Higher ionic concentrations were noted in rain water when the rain occasion was associated with hail than when it was not. The finding helps corroborate Ludlam's (1958) suggestion that hail embryos form on giant hydroscopic aerosols. (Author's abstract)

SIP 25901 548.5:536.422.15

Levi, L. and T. Kobayashi
ICE FILAMENTS GROWN IN A GRADIENT OF VAPOUR PRESSURE. J. Meteorol. Soc. Jap., Ser. II, 45(4):315-325 incl. illus., table, diagrs., Aug. 1967. 3 refs.
DLC, Orientalia Div.

It has been observed that when ice crystals are nucleated on fine threads in a low-pressure diffusion chamber, they grow preferentially upward and sublimate downward leaving, between crystals and threads, thin filaments and sheets of ice. The features and growth process of these structures are presently studied. Filaments and edges of sheets have a typical shape, formed by a nearly periodical series of "beads" and "necks". During growth, new beads appear at the base of the filaments, while all the structure looks as if it were rising up against the vapour flux. The phenomenon is explained by considering an alternate process of condensation upward and evaporation downward of the ice surface, due to the uni-directional vapour flux. It is shown that the vapour density in the region where filaments form is near to equilibrium, and the typical shape of "beads" and "necks" is related to the compensating effect of the different equilibrium vapour pressure at their surfaces, due to their different curvature. The interpretation of the present phenomenon may be applied to explain the formation of ice filaments observed in more general conditions. (Authors' abstract)

SIP 25902 541.182.65

Fedotova, V.A., Kh. Khodzhaeva and P.A. Rebinder
ELASTICITY MODULI, EFFECTIVE AND PLASTIC VISCOSITY OF SOLID-LIKE COAGULATION STRUCTURES THIXOTROPICALLY HARDENED TO THE LIMIT. (Moduli elastichnosti, effektivnaîa i plasticheskaîa vîazkost' predel'no tiksotropno-uprochennykh tverdoobraznykh koagulîatsionnykh struktur; Text in Russian). Akad. Nauk SSSR, Dokl. 177(1): 155-158 incl. graphs, 1967 6 refs.
DLC, AS262.S3663

Two plastic-flow variations: the Shvedov creep and the Bingham plastic flow have been established for the thixotropically limit hardened water suspension of bentonite, in the process of testing it for shear deformation. In relation to that, an attempt was made to determine elastic constants: the moduli of a fast and a slow highly elastic shear deformation of a structurized system in the whole she[illegible]-stress interval. A wide family of the curves [illegible]ting the development of shear deformation in time with respect to pressure was obtained in the process of testing. These curves are presented and discussed. -- NSV

SIP 25903 551.578.42

Kopanev, I.D.
SNOW COVER DISTRIBUTION. (O raspredelenii snezhnogo pokrova; Text in Russian). Leningrad. Glavnaîa Geofizicheskaîa Observ. Trudy, Vol. 195: 216-221 incl. tables, 1966.
DLC, QC801.L46

This report presents comparative characteristics of snow accumulation in open and sheltered areas according to the snow survey data and the readings of permanent stakes. A definite relationship was established between the amounts of atmospheric precipitation and maximum water reserves in the snow for different regions of the USSR plains; which strongly depended on certain local factors. It is concluded that the existing technique of snow cover and precipitation measurement can be much improved, and the material discussed in this article is of a definite interest from this standpoint. -- NSV

SIP 25904 551.322:548.51:551.577

Murty, Bh. V. Ramana, A.K. Roy and R.K. Kapoor
SOURCES OF ORIGIN AND METEOROLOGICAL IMPORTANCE OF HYGROSCOPIC AND ICE-FORMING NUCLEI. Tellus, 19(1):136-142 incl. tables, graphs, 1967. 24 refs.
DLC, QC801.T4

During the monsoon, hygroscopic nuclei of sea origin play an important role in inland precipitation. Such nuclei fractions in the total aerosol constitute a more dependable criterion for maritime airmasses than other types. Development of rain has been suggested by large concentrations of hygroscopic and ice-forming aerosols. It does not appear that ice-forming nuclei originate from the sea but are of varied origin and might be maritime, continental, stratospheric, etc. (Authors' abstract, modified)

SIP 25905 625.7:624.139(*50)

Komitet po Zemlîanomu Polotnu
CONSTRUCTION AND EXPLOITATION OF SUBGRADES BUILT OF DUSTY ROCKS. PROCEEDINGS OF THE CONFERENCE HELD AT IRKUTSK IN SEPTEMBER 1962. (Sooruzhenie i ekspluatatsiîa zemlîanogo polotna iz pylevatykh gruntov; Trudy soveshchaniîa v g. Irkutske v sentîabre 1962 g.; Text in Russian). Izd-vo "Transport", Moskva, 223p. incl. illus., tables, graphs, diagrs., 1964. 38 refs.
DLC, TE210.R85

The technique of building highways and railroads in the Urals, Siberia and the North on the grounds the grain-size composition of which is characterized by a large dust-fraction is analyzed. Basic causes of soil slides on slopes and subbase deformations are discussed as well as the most effective methods of

controlling frost heaving, naled formation, strengthening side slopes, and repairing different frost damages. The trends of future investigations in this field are outlined. -- NSV

SIP 25906 625.7:624.139(*50)

Bolshtĭanskiĭ, M. P.
CALCULATION OF GRAVEL-SURFACING THICKNESS FOR HIGHWAYS IN THE REGIONS OF DEEP SEASONAL FREEZING. (Raschet tolshchiny graviĭnykh odezhd avtomobil'nykh dorog dlĭa raĭonov glubokogo sezonnogo promerzaniĭa; Text in Russian). Kom. po zem. pol. Sooruzhenie i ekspluatatsiĭa zemlĭanogo polotna iz pylevatykh gruntov. Izd-vo "Transport", Moskva., p. 113-118 incl. table, graph, diagr., 1964.
DLC, TE210.R85

This article presents a version of the Soĭuzdornii method originally developed for calculating minimum building material needed for road construction, and modified for evaluating the thickness of gravel-topping on highways, accounting for the variation of mechanical properties of ground with a grain-size composition characterized by a large dust fraction, and its state of stress under freezing-thawing conditions. The calculation procedure is described and the use of an auxiliary table and diagram is explained. -- NSV

SIP 25907 624.139:625.1(*50)

Brediuk, G. P.
CONTROLLING FROST DEFORMATION OF SUBGRADES IN SIBERIAN RAILROADS. (Bor'ba s merzlotnymi deformatsiĭami zemlĭanogo polotna na zheleznykh dorogakh Sibiri; Text in Russian). Kom. po zem. pol. Sooruzhenie i ekspluatatsiĭa zemlĭanogo polotna iz pylevatykh gruntov. Izd-vo "Transport", Moskva., p. 137-154 incl. tables, graphs, diagrs., 1964.
DLC, TE210.R85

Grounds of different lithological composition are classified according to their ability to separate during freezing into partially dehydrated mineral aggregates and ice, into those subject to strong and medium frost heaving, and those remaining undeformed under normal freezing conditions. The first class includes sandy loam and loam with a large dust fraction, the second,clays, loams, dusty sands, and the third,pure sand and gravel. The second class grounds are widely developed in Siberia, however, the intensity of cryogenic processes in them depends on the degree of pre-winter moisture saturation and local hydrological conditions. In Siberia maximum frost heaving was observed in mountainous taĭga and the forest-steppe regions with rolling topography. Under these conditions the effective way of controlling frost heaving of railroad subgrades was placing an insulating layer of asbestos under the rails in the sections of maximum traffic and frost hazard; technical details of this procedure are explained and illustrated diagrammatically. -- NSV

SIP 25908 625.7:624.139(*50)

Tĭurin, I. M.
THERMAL TREATMENT OF GROUND AS A METHOD OF CONTROLLING ITS DEFORMATION. (Obzhig gruntov kak meto' bor'by s deformatsiĭami zemlĭanogo polotna; Text in Russian). Kom. po zem. pol. Sooruzhenie i ekspluatatsiĭa zemlĭanogo polotna iz pylevatykh gruntov. Izd-vo Transport, Moskva p. 192-196 incl. tables, 1964.
DLC, TE210.R85

This method was developed for diminishing moisture absorption and swelling of fine marls of the following grain-size and mineralogical composition: 2-22% sand, 44-76% dust; 10-35% clay; 31.6-73.4% quartz, 10.8-28.2% feldspar, 2.8-4.2% iron hydroxides, 0.08-1.85% mica. Porosity and moisture content were ranging respectively from 35 to 40% and from 17 to 27%. The results indicated that swelling of the marly grounds heated to 200, 300, 400 and 500°C amounted to 20, 11, 7 and 0% respectively. This technique was used for stabilizing the walls of drainage ditches and preventing soil slide on slopes. -- NSV

SIP 25909 551.574.1

Miloshev, G. and L. Krustanov
ON THE FREEZING ACTION OF COMPLETELY WETTABLE CONDENSATION NUCLEI. Bulgarska Akademiĭa na Naukite, Sofia, Doklady, 19(9):787-790 incl. diagrs., 1966. Refs.
DLC, Q69.B93

The freezing action of completely wettable spheric condensation nuclei was analyzed theoretically. It was found that condensation nuclei easily form crystal nuclei, not only in large drops, but even more easily in small droplets, provided they contain a nucleus with a radius exceeding by about 1/3 the radius of crystal embryo with the corresponding supercooling. Wettable condensation nuclei are ready embryos of ice crystals and represent the most active freezing nuclei. (Meteorol. & Geoastrophys. Abstracts)

SIP 25910 551.508.79:551.574.1=40

Genadiev, N.
APPARATUS FOR STUDYING THE FREEZING OF WATER DROPS. (Dispositif pour l'etude de la congélation de gouttes d'eau; Text in French). Bulgarska Akademiia na Naukite, Sofia, Doklady, 19(10):901-904 incl. diagrs., 1966. Refs.
DLC, Q69.B93

A thermoelectric freezing chamber shaped as an octagonal prism, its electric circuit and its measuring system provided with a microscope destined for studying the freezing of droplets, is described. At room temperature of 25°C and an optimum feeding current, a temperature of -37°C is reached in the chamber. The freezing speed of a suspended droplet may be varied between 0.5 and 30°C/min. (Meteorol. & Geoastrophys Abstracts)

SIP 25911 624.139.62:624.133

Sanger, Frederick J.
GROUND FREEZING IN CONSTRUCTION. Proc. Amer. Soc. Civ. Engr., J. Soil Mech. & Found., 94(5743):131-158 incl. diagrs., graphs, tables, appendixes I-II, Jan. 1968. 34 refs.
DLC, TA710.A495

Artificial ground freezing is a valuable aid, and at times may be the only means possible, for excavation. The soil becomes stabilized to give shear strength for a retaining structure and a water stop. Design includes strength and deformation of a viscoelastic material in a structure, and of heat flow in a material in which water changes to ice causing radical changes in thermal parameters. Examples show how the rheological parameters of strain, temperature, stress and time for typical soils are related. Techniques and design data are given for the structural design of a cylindrical cofferdam. Thermal parameters and techniques, with assumptions and consequent equations for design, are provided with examples of two typical soils, straight and curved walls, for computing time of freezing, temperatures, energy and refrigeration-load from which cost estimates may be made for a particular job. Construction practices are discussed, with special attention to the hazards of the ground freezing technique. (Author's abstract)

SIP 25912 625.768.5

Shalman, D.A.
SNOW-PLOWS. (Snegoochistiteli; Text in Russian). "Mashinostroenie", Leningrad, 189p. incl. illus., tables, graphs, diagrs., 1967. 34 refs.
DLC, TD868.S5

Domestic and foreign experience in design and the theoretical and experimental study of snow plows used on highways and airfields is generalized in this book. Snow plows are classified and the most modern types of the machines which are already on the market or still in the process of construction are described. Equipment for experimental testing and the testing procedures are analyzed. The first and last chapters of the book deal with physical and mechanical properties of snow, and the prospects of further development and improvement of the domestic snow plows. -- NSV

SIP 25913 591.9+581.9:551.32(99)

Andriiashev, A.P.
ON MICROFLORA AND FAUNA ASSOCIATED WITH THE ANTARCTIC FAST ICE. (O mikroflore i faune, sviazannoĭ s Antarkticheskim pripaĭnym l'dom; Text in Russian). Zoologicheskiĭ Zh. V. 46, Vyp. 10:1585-1592 incl. graph, diagr., 1967. 20 refs.
DLC, QL1.Z747

The biological community associated with Antarctic fast ice was studied during the austral summer of 1965-66. Data on microalgae was very similar to that obtained by J. S. Bunt and E. J. F. Wood (1963); about 50 species of diatoms were discovered in the core samples of ice from the Alasheev Bay (Enderby Land), their maximum quantities (37 million cells) living in the lower layers of loose ice. Two faunal assemblages depended on ice as a pasture and a shelter: 1) those inhabiting, or at least temporarily inhabiting, the lower layer of loose ice and 2) the organisms which do not enter the ice but are trophically related to the ice-inhabiting assemblage. Microflora affects the amount of light penetrating through the ice cover; instrument measurements show that during spring the amount of light penetrating the sub-ice waters is greatly decreased due to intensive growth of the diatoms. At the end of December, when the algae are returned to the waters by thawing ice, the water illumination increases about 100 times. -- NSV

SIP 25914 691.322:536.4

Vladimirov, A. P. and E. ÎU. Braĭnina
UNLOADING AND WARMING NON-METALLIC BUILDING MATERIALS UNDER WINTER CONDITIONS. (Vygruzka i podogrev nerudnykh stroitel'nykh materialov v zimnikh usloviiakh; Text in Russian). Ministerstvo Stroitel'stva RSFSR, Nauch. Issled. Inst. po Stroitel'stvu, 164p. incl. illus., tables, graphs, diagrs., Moskva, 1962. 53 refs.
DLC, TS159.V5

This book is based on the results of a research program initiated by NIIZhelezobeton in which the authors participated, and on the generalization of the formerly published domestic and foreign experience in this field. It describes the principal characteristics of all presently employed methods of defrosting building materials and the basic data necessary for selecting, designing, and using different means of loosening materials such as sand, gravel, limestone, clay, and coal frozen during their transportation by train. Different vibrating mechanisms, milling devices, and steam and gas heaters designed for use directly in railroad vans and warehouses are described and their use and maintenance explained. -- NSV

SIP 25915 624.144.532:66.099.5:661.66

Cook, R. Gordon, and Mason D. Wade, Jr.
SUCCESSFUL ICE DUSTING AT FAIRBANKS, ALASKA, 1966. Proc. Amer. Soc. Civ. Engr., J. Hydraul. Div., 94(HY1):31-41 incl. illus., diagrs., map, Jan. 1968.
DLC, TC1.A39

The ice and snow cover of the Chena River was dusted with coal dust and fly ash in the spring of 1966 to increase the absorption of solar energy and hasten melting. Because of a near-record snowfall during the winter of 1965-1966, a good deal of concern was felt for the flood damage which would result if an ice jam were to form at the mouth of the Chena River just downstream from Fairbanks. It was hoped that dusting would increase the absorption of the solar radiation to sufficiently weaken and melt the ice to prevent a jam. Theoretically, dusting could increase the radiation absorbed at breakup time in Fairbanks enough to melt and additional 2 cm of ice per day. Measurements of melting rates made in the dusted and clean sections of the river and observations of the river during breakup showed that dusting apparently had a significant beneficial effect. Because of its specific nature and lack of control, this experiment cannot be considered conclusive. (Authors' abstract)

SIP 25916 631.41(571.64)

Ivlev, A. M.
THE SAKHALIN SOILS. (Pochvy Sakhalina; Text in Russian). Akad. Nauk SSSR, Sibirskoe Otd. Sakhalinskiĭ Kompleksnyĭ Nauch. Issled. Inst. Moskva, "Nauka", 111p. incl. tables, diagrs., 1965. 91 refs.
DLC, S599.S35I9

A general description is presented of the geographical, geological, hydrological and climatic conditions on Sakhalin Island, its vegetation, and different types of soils with a discussion of their origin and the nature of recent soil-forming processes. The author's objective is to present new information on the unique soil of Sakhalin, which topic has not been sufficiently studied and not often discussed in the literature. The microflora and microbiological activity in the soils, their content of microelements and the role of microelements in the process of soil formation and plant life are not considered. -- NSV

SIP 25917 551.578.4:551.579.2(234.42)=84

Chomicz, Kazimierz
SNOW AND AVALANCHES IN THE TATRA MOUNTAINS IN 1962. (Snieg i lawiny w Tatrach w roku 1962; Text in Polish). Prace, Państwowy Institut Hydrologiczno-Meteorologiczny, No. 87:3-45 incl. diagrs., tables, 1966.
DLC, Slavic Div.

This is a continuation of research on physical properties of snow and on avalanches in the area of Tatra Mountains. The snow conditions were very favorable to the conducting of research, and the number of fallen avalanches was very high. The land measurements were made from March 20 to 24, 1962, i.e., in a period corresponding to the maximum of snow masses and characteristic for the flow of thaw waters. These measurements deal with depth of snow cover and reservoirs as investigated with a cone sonde. In places important from the point of view of occurrence of avalanches, this year the number fell from 158 on 112 paths. The elaborate study is illustrated with 26 photographs and 4 charts, showing the location of measuring posts, depth of snow cover, reservoirs in snow and the paths of falling avalanches. (Author's abstract)

SIP 25918 551.578.4(234.42)=84

Chomicz, Kazimierz and Maria Klapa
SNOW RESEARCH IN HALA GĄSIENICOWA IN 1962. (Badania śniegu na Hali Gąsienicowej w 1962 roku; Text in Polish). Prace, Państwowy Instytut Hydrologiczno-Meteorologiczny, No. 87:47-57 incl. diagrs., tables, 1966.
DLC, Slavic Div.

Snow research in Hala Gąsienicowa was conducted in a small field in the lower part of the valley, below the meteorological station. The present research program embraced, besides those conducted in the past years, measurements of physical properties of snow, also the investigations in the layer of air above the snow cover at the 5, 50 and 100 cm height. Since the data from the level 0.5 m and 1.0 m differed little, the data for the level 1 m are omitted. A new feature begun in 1962 deals with the morphology of snow crystals and grains. In this work there are presented 16 most interesting photographs, each classified according to the international scheme and to the classification proposed by Nakaya. (Author's abstract)

SIP 25919 551.578.46(234.42)=84

Rajwa, Apoloniusz
DEVELOPMENT OF SNOW DENSITY OF KASPROWY WIERCH IN THE WINTER 1959/1960. (Kształtowanie się gęstości śniegu na Kasprowym Wierchu w 1959/1960 roku; Text in Polish). Prace, Państwowy Instytut Hydrologiczno-Meteorologiczny, No. 87:59-64 incl. diagrs., tables, 1966. Refs.
DLC, Slavic Div.

Results of the measurements of snow density in Kasprowy Wierch during the winter 1959/1960 are summarized. The analysis of the formation of snow density on slopes obtained with 4 main methods is based on 250 measurements. A great differentiation of snow density on several slopes, in the period of a relatively stabilized snow cover is shown. Average snow densities for winter 1959/1960 were S-0.36, E-0.35, W-0.33, and N-0.27 g/cm^3. This distribution of snow density in summit parts of Tatra Mountains depends mainly on the daily course and on the intensity of insolation. (Author's abstract)

SIP 25920 551.574.42:621.315(438)=84

Sadowski, Maciej
ICE ACCRETION ON ELECTRIC WIRES IN POLAND. (Oblodzenie przewodów w Polsce; Text in Polish). Prace, Państwowy Instytut Hydrologiczno-Meteorologiczny, No. 87:65-79 incl. diagrs., tables. Refs.
DLC, Slavic Div.

On the basis of the observations of ice accretion on electric wires in 1956-1961 it was stated that the average number of days with ice accretion of wires was 12.3; almost 70% of cases of ice accretion occurred in Dec., Jan. and Feb. Soft rime occurred most frequently (about 43%), then glaze (about 33%), hard rime (about 13%), and snow pellets (about 12%). Soft and hard rime occurred most frequently in Jan. and Feb., glaze in Dec., snow pellets in late autumn and early spring. In plains weight values of ice accretion reached 160 g, in mountains, 580 g per running meter of wire. Ice accretion in Poland does not pose a serious threat to communication and power lines. (Author's abstract)

SIP 25921 624.143.56:629.139.85

Harris, J.C., J.R. Gibson and D. Street
CHEMICAL MEANS FOR PREVENTION OF ACCUMULATION OF ICE, SNOW, AND SLUSH ON RUNWAYS. Monsanto Research Corporation (Federal Aviation Agency) SRD Report No. 65-13, 28p. incl. illus., tables, maps, appendixes A-I, March 1965.
DDC, AD615420

The objective of this contract was to develop a mixture capable of melting snow, ice, and slush at temperatures as low as -10°F. This mixture was to be of reasonable cost, be noncorrosive to aircraft and not cause deterioration of runway pavements. Nine primary deicers were tested and many mixtures of them were subjected to primary and secondary screening. These mixtures were then combined with potential corrosion inhibitors and the inhibitors needed was determined. The application rate to produce melting at -10°F was quite nominal (2 oz/ft^2), and the compositions had at most slight spalling effect on concrete. The prime candidate for runway deicing has the following composition: Tripotassium phosphate 75% - formamide 25%. While the cost of these materials exceeds that of calcium chloride, the combination does not cause the extent of corrosion obtained with calcium chloride. A second combination proved outstanding for preventive corrosion of steel not under the potentially high stress of landing gear. Suitable for road usage was calcium chloride to which was added 1% by weight of Emulsifier STH. This composition retained all its ice-melting qualities with marked corrosion control. Because of the outstanding ice-melting and corrosion-controlled properties of the recommended runway deicer, and its superiority in these qualities to now available compositions, it should be field tested. (Authors' abstract modified)

SIP 25922 551.508.824:621.396.933.2:551.326.14: 551.465.5(268)(268.53)=82

Iŭrokin, A. I. and IU. N. Sinŭrin
SOME RESULTS OF THE ANALYSIS OF THE DRIFT OF RADIO-BEACONS AND OF THE DRIFT OF AUTOMATIC RADIO METEOROLOGICAL STATIONS IN THE ARCTIC OCEAN. (Nekotorye rezul'taty analiza dreĭfa radiovekh i dreĭfuŭshchikh avtomaticheskikh radiometeorologicheskikh stantsiĭ v Severnom Ledovitom okeane; Text in Russian). Meteorol. Gidrol., No. 9:40-43 incl. diagrs., table, Sept. 1966.
DLC, QC851.M27

Since 1952-1953 the Arctic and Antarctic Scientific Research Institut has been running a program of placing radio beacons and automatic meteorological stations on the polar ice to the north of Russia. This note gives a report of the progress of this work. The movement of the beacons and stations has been followed to determine the movement of the ice mass, and in consequence the currents in the underlying water. The automatic meteorological stations relay data on temperature, pressure, wind speed and direction. Statistics are given of the number of stations (274 separate units) set up during 1953-1965. A plot is given of their initial positions, and data on the number of stations lost in the different months of the year are illustrated graphically. Some plots of drifts show the main current directions in the Laptev Sea. (Authors' abstract)

SIP 25923 551.578.46(430.1)=30

Haase, Egbert
CONSIDERATIONS OF METHODS FOR DETERMINING THE SNOW LINE, BASED ON RECENT SNOW LINE DETERMINATIONS IN THE SOUTHERN BLACK FOREST. (Gedanken zu Schneegrenzbestimmungsmethoden aufgrund neuer Schneegrenzbestimmungen im Südschwarzwald; Text in German). Naturforschende Gesellschaft zu Freiburg im Breisgau, Berichte, 56(1):17-22 incl. table, 1966. Refs.
DLC, Q49.F861

The different snow boundary concepts, namely: temporary snow boundary; local, orographic or actual snow boundary; and climatic, or better, regional or ideal snow boundary are defined. An attempt is made to establish so-called "small regional" snow line values for the entire glacier system of the Haslach Valley. The peak method and Höffer's method used to determine the position of the snow line are described and the results obtained are given in a table. (Author's abstract)

SIP 25924 551.578.71

Macklin, W. C. and G. S. Payne
THEORETICAL STUDY OF THE ICE ACCRETION PROCESS. Quart. J. Roy. Meteorol. Soc., 93(396): 195-213 incl. diagrs., tables, April 1967. Refs.
DLC, QC851.R8

Calculations made of the freezing and subsequent cooling times of a thin water film on the surface of a ventilated sphere initially at a uniform temperature show that both the freezing and cooling processes are dominated by the sphere temperature. Except at sphere temperatures within a few degrees of 0°C, the freezing time of the water film is short compared with the total time taken to remove the latent heat of fusion by the forced convection process. Values of the freezing and subsequent cooling times of the water film are presented for various values of the ambient temperature, sphere radius, and film thickness. The liquid water concentrations required to maintain a sphere at a steady temperature have been computed and found to compare well with those given by the simple heat balance relation for a spherical hailstone. Thus, the simple heat balance relations are useful for predicting values for the mean temperatures of an accreting surface in a steady state situation. (Authors' abstract)

SIP 25925 551.311.2:54-148(45)

Stefani, E.
STUDY OF THIXOTROPIC PROPERTIES OF CLAYEY SOIL IN THE OSPO VALLEY (TRIESTE). (Misura delle proprieta tixotropiche di terreni argillosi della valle dell'Ospo (Trieste); Text in Italian). Geotecnica, Milano, 13(1-2):16-21 incl. illus., map, graphs, diagrs., 1966. 3 refs.
DLC, Slavic Div.

A brief geological history of this region is given and a geological profile across the valley is presented. The ancient channel of the valley was filled with plastic blue marine silty clays overlying clayey sands and limestone breccia. Shear strength variation of this clay was determined as a function of time elapsed since the exertion of a dynamic action on the clay, by measuring the force required for pulling out cylindrical concrete model piles driven into a remoulded sample. Series of pulling tests were performed by means of a sensitive beam scale at certain time intervals up to 27 days after driving the piles into the soil. The instruments used are described and curves of thixotropic strengthening of the clays are presented.
-- NSV

SIP 25926 551.574.1:547.466

Parungo, Farn P. and James P. Lodge, Jr.
AMINO ACIDS AS ICE NUCLEATORS. J. Atmos. Sci., 24(3):274-277 incl. diagrs., tables, May 1967. Refs.
DLC, QC851.A283

The authors' recent studies on phenols and benzoic acids suggest that the ability of solid organic compounds to nucleate freezing of supercooled water may be predicted, at least in a limited number of cases, from purely thermodynamic considerations. A report that pure, optically active amino acids nucleate freezing at temperatures different from their inactive forms suggests that a quantitative study of the differences might be revealing. It was found that differences in nucleation temperature were related in a linear manner to differences in heat of solution of active and racemic forms. Tyrosine is an exception to the above behavior. It is suggested that nucleation on one of the forms may occur at the phenolic group. (Authors' abstract)

SIP 25927 551.578.71

Hitschfeld, Walter and Matthew Stauder
TEMPERATURE OF HAILSTONES. J. Atmos. Sci., 24(3):293-297 incl. diagrs., May 1967. Refs.
DLC, QC851.A283

A rigorous study was made of the temperature profile in spherical and homogeneous hailstones falling through clear air. It is found that a stone 1 cm in radius is liable to be a dozen degrees Celsius colder than the ambient air. For larger stones, the temperature difference becomes greater. The cooling effect of hail on the air is relatively small, if hail-size distributions of the sort commonly observed at the ground are considered. When a stone (1.1 cm in radius) falls through cloud, its heat capacity delays the commencement of wet growth by as much as 2 km. On the other hand, when hail grows in surroundings of high liquid water content, the heat capacity term of even the largest hail in the heat balance equation is quite unimportant. Such growth normally leads to mixtures of water and ice. (Authors' abstract)

SIP 25928 551.578.42(574.1):551.578.46=82

Rylov, S. P.
DISTRIBUTION OF SNOW COVER ON SMALL CATCHMENT BASINS OF A SEMIARID ZONE IN WESTERN KAZAKHSTAN. (O raspredelenii snezhnogo pokrova na malykh vodosborakh polupustynnoĭ zony Zapadnogo Kazakhstana; Text in Russian). Alma-Ata, Kazakhstan, Nauchno-Issledovatel'skiĭ Gidrometeorologicheskiĭ Institut, Trudy, No. 25:141-165 incl. diagrs., tables, 1966. Refs.
DLC, QC851.A277A1

Using as an example the small catchment basins of the western Kazakhstan runoff stations situated in the semi-arid zone, the author investigated the characteristics of the distribution of snow supplies in relation to the terrain. A detailed snow survey carried out on a meadow showed that a reduction in the number of snow surveys to 3-4 practically did not lower the accuracy of the snow reserves. The proportion of snow reserves in ravines and thalweg for years differing in snow transport amounted to 9-28% of the total for the catchment basins. Snow reserves determined from snow surveys in the channels of meadows by measuring heights and densities of snow at those points have in most cases large deviations which may amount to 200-300% of the snow reserves obtained by a detailed survey. The coefficient of variation of snow reserves depends directly upon the magnitude of the snow reserves, snow transport, and dissection of the terrain of the catchment basin. A verification of P. P. Kuz'min's approximate formula, applied to this region, showed a fully satisfactory relationship between data obtained with approximate and computational formulas; the mean deviation for different catchment basins was 6-10% and the maximum deviation 10-26%. (Author's abstract modified)

SIP 25929 551.574.2:551.509.617=03.82

Morachevskiĭ, V. G.
ACTIVITY OF AgI PARTICLES AS ICE-FORMING NUCLEI. (Ob aktivnosti chastits AgJ v kachestve l'doobrazuiushchikh iader; Text in Russian). Akad. Nauk SSSR, Izv. Fizika Atmosfery i Okeana, 3(1): 105-107 incl. diagrs., Jan. 1967. Refs.
DLC, Slavic Div.

Studies of the efficiency of AgI particles as nuclei for ice formation were carried out in a cold chamber at temperatures down to -35°C. The results are presented in graphs. Preliminary conclusions state that in the choice of a reagent as an initial stimulator of epistatic growth of the solid phase, most attention should be paid to the electrokinetic potential distribution. If an adsorptive layer of the highest degree of homogeneity, as in semiconductors, is desired, a crystalline priming tagged with β-emitters is suggested. (Author's abstract)

SIP 25930 551.574.1:536.421

Levkov, L. and N. Genadiev
RELATION BETWEEN FREEZING TEMPERATURE OF SUPERCOOLED WATERDROPS AND COOLING RATE. Bulgarska Akademiia na Naukite, Sofia, Doklady, 19(12):1139-1142 incl. diagrs., 1966. Refs.
DLC, Q69.B93

An investigation to determine whether the cooling rate and the freezing temperature of water are related. It was found that the mean deviations for the different cooling rates are very small and vary between +0.16°C and -0.15°C in an irregular way. It is assumed that with more experimental data available, the small discrepancies in temperature will tend to zero. (Authors' abstract)

SIP 25931 625.85

Kovalev, IÂ. N. and V. D. Akel'ev
ON THE PROBLEM OF DETERMINING THE MINIMUM WINTER DESIGN TEMPERATURE FOR ASPHALT-CONCRETE PAVINGS. (K voprosu opredeleniîa zimneĭ raschetnoĭ temperatury asfal'tobetonnykh pokrytiĭ; Text in Russian). Izvestiîa Vyssh. Ucheb. Zavedeniĭ, Stroitel'stvo i Arkhitektura, No. 5:145-147 incl. graph, diagr., 1966. 2 refs.
DLC, TH4.R8

In the result of experimental investigations, empirical formulas were obtained for determining minimum winter temperatures for asphalt-concrete pavements (without snow cover), employed under different climatic conditions. The knowledge of this temperature makes it possible to determine more accurately the temperature of brittleness of the bitumens used in asphalt and, if needed, to establish the kind and quantity of the admixtures controlling thermal stability of bitumens. -- NSV

SIP 25932 624.131.439.9:69.059.22

Guminskiĭ, B. M.
THIXOTROPY OF WEAK MOIST CLAYEY SOILS AS ONE OF THE POSSIBLE CAUSES OF DEFORMATIONS OF STRUCTURES ERECTED ON SUCH SOILS. (Tiksotropiîa slabykh vodonasyshchennykh glinistykh gruntov kak odna iz vozmozhnykh prichin deformatsiĭ sooruzheniĭ vozvodimykh na nikh; Text in Russian). Izvestiîa Vyssh. Ucheb. Zavedeniĭ, Stroitel'stvo i Arkhitektura, No. 1:11-15 incl. diagr., 1967. 3 refs.
DLC, TH4.R8

Experimental study of thixotropic properties of clayey soils have shown that the thixotropic changes can be induced by simple causes such as workers walking in foundation pits, or any crumpling of clay in the pit. In explaining the nature of thixotropy to construction workers, the following information is also given for dealing with such soils: 1) Concrete shall be placed in the foundation excavation immediately after its digging is finished to avoid clay swelling and rupture of its structural bonds. Pockets between the excavation walls and the basement must be filled immediately with pulverized clay. 2) Experiments indicated that a thin interlayer of sand (grain size 0.25 mm), poured over the clayey ground "like a sandy rain" (rather than thrown-in separate larger portions) before placing the coarser fill - has prevented thixotropic phenomena. The thickness of this layer is determined experimentally. -- NSV

SIP 25933 551.326.85:551.526(77)

Bilello, Michael A.
WATER TEMPERATURES IN A SHALLOW LAKE DURING ICE FORMATION, GROWTH AND DECAY. Res. Rept. 213, U.S. Army Cold Regions Research and Engineering Laboratory, 24p. incl. illus., diagrs., graphs, map, Dec. 1967.
CRREL files

Continuous water temperature measurements were made in a shallow lake in upper Michigan prior to and during ice formation, and during ice growth and decay. Several full circulations or "overturns" at 4°C were observed during autumn and the temperature throughout the lake just prior to complete freeze-over reduced to a minimum of +0.2°C. After a permanent ice cover had formed, the water beneath the ice began to warm up. Within a 25-day period during December the water temperature near the bottom of the lake increased from +0.3°C to 3.0°C. Quantitative analysis of this heat gain showed that it came principally from the energy stored during the summer in the underlying soils. Evaluation of the effect of solar radiation demonstrated that the sun during December contributed very little heat to the water because of the absorption qualities of the cover of snow and bubbly ice. During the ice thaw period in April a unique reduction in temperature was recorded throughout the main mass of water. Since the lake is thermally stratified, it was assumed that this cooling could only result from mechanical action in the water. This phenomenon probably tak. ɔ place as the surface water from melting snow around the area flows into the lake and causes overturning. (Author's abstract)

SIP 25934 551.324.24:624.14(*38)

Mellor, Malcolm and Sherwood Reed
ICE CAP STRAINS AND SOME EFFECTS ON ENGINEERING STRUCTURES. Tech. Rept. 202, U. S. Army Cold Regions Research and Engineering Laboratory, 14p. incl. diagrs., table, Dec. 1967. 14 refs.
CRREL files

The components of strain for the upper layers of ice sheets are given in terms of ice flow velocity and snow accumulation rate. Methods of estimating the components of strain rate which are necessary for design of engineering structures are outlined, and representative measured values are given. The relation between observed structural deformation and ice cap straining is discussed. (Authors' abstract)

SIP 25935 629.139.85:551.578.46(*765)

Abele, Gunars and Guenther Frankenstein
SNOW AND ICE PROPERTIES AS RELATED TO ROADS AND RUNWAYS IN ANTARCTICA. Tech. Rept. 176, U. S. Army Cold Regions Research and Engineering Laboratory, 40p., incl. illus., diagrs., graphs, tables, Oct. 1967. 51 refs.
CRREL files

Dynamic tests were performed to determine the Young's modulus of sea ice, derived from longitudinal wave velocities measured with a soniscope. Static tests consisted of standard ring tensile strength and simple beam or flexural strength tests. The strength data were plotted on a base of the brine volume for each test. The test results indicate that the annual sea ice at McMurdo Sound is capable of supporting cargo type aircraft. Snow runways capable of supporting a C-130 aircraft on wheels and providing marginal support to a C-121 can be constructed either with the Peter plow or with the pulvimixer. However, the runway would be reliable only during comparatively low temperatures (< -15°C). Peter snow miller processing and bulldozer compaction methods appear to be feasible for effective depth processing and compaction of high strength snow pavements. The criteria for support of various types of aircraft on a snow runway are presented. (Authors' abstract)

SIP 25936 551.324:[550,93:539.16]

Oeschger, H., C.C. Langway, Jr. and B. Alder
AN IN SITU GAS EXTRACTION SYSTEM FOR RADIOCARBON DATING GLACIER ICE. Res. Rept. 236, U. S. Army Cold Regions Research and Engineering Laboratory, 4p. incl. illus., table, Oct. 1967. 5 refs.
CRREL files

In March 1966 at the Tuto ice tunnel, Greenland, a team from USA CRREL and the University of Bern tested a new down-borehole device which would allow gas to be extracted from within shallow or deep boreholes. The tunnel ice was unfractured and its temperature was constant at -10°C. A location where, in 1964, C-14 age dates had been obtained was used as a check point for the down-borehole tests. Comparative samples show good agreement and indicate a mean value of 5120 years B. P. for the age of ice at this location. The simplicity of the down-borehole gas extraction system enables application of the carbon dating method to any natural, undisturbed glacier ice mass which can be sampled by boring. The gas extraction apparatus and field experiments are described. (Authors' abstract)

SIP 25937 624.046

Panfilov, D. F.
CALCULATING CARRYING CAPACITY OF ICE COVER ACCOUNTING FOR ITS INHOMOGENEITY WITH THICKNESS. (Raschet nesushchel sposobnosti ledianogo pokrova s uchetom neodnorodnosti ego po tolshchine; Text in Russian). Izvestiia Vyssh. Ucheb. Zavedenii, Stroitel'stvo i Arkhitektura, No. 2:3-8 incl. tables, 1966. 2 refs.
DLC, TH4.R8

Ice cover may consist of several layers with different ice structure; because in nature these layers occur under different temperature conditions, the mechanical properties of ice vary with its thickness according to very complicated laws. A method is offered for calculating carrying capacity of an inhomogeneous ice cover taking into consideration the variations of its mechanical properties with thickness. A theoretical analysis is presented of the temperature effect on stress distribution along the thickness of a structurally homogeneous ice cover. It is established that at usual temperatures of ice the temperature factor may vary the maximum value of stress by 5 to 10%. A problem is solved of stress distribution along the thickness of a two-layer ice cover; it is shown that the presence of the upper layer of turbid ice may affect the carrying capacity of ice cover, especially when the greatest tensile stress is developing in the upper surface of ice. -- NSV

SIP 25938 551.343.74(912)(*50)

Zavarina, M.V. and TS. A. Shver
RESULTS OF CLIMATOLOGIC INVESTIGATIONS WITH RELATION TO MAPPING THE USSR TERRITORY ACCORDING TO ICING INTENSITY. (Rezul'taty klimatologicheskikh razrabotok primenitel'no k gololednomu raĭonirovaniĭu territorii SSSR; Text in Russian). Leningrad, Glavnaĭa Geofizicheskaĭa Observatoriĭa, Trudy, Prikladnaĭa klimatologiĭa, Vyp. 200:16-32 incl. tables, graphs, 1966. 15 refs.
DLC, QC801.L46

Separate problems related to subdivision of the USSR territory according to the intensity of icing processes are discussed in connection with an attempt to improve the existing procedure of calculating ice load on electrical wires and tall buildings, used in engineering design. Formulas are presented which were derived by the Leningrad Main Geophysical Observatory for calculating the norm of glaze thickness according to weight of ice deposit per unit length of wire. Further improvements and simplification of procedures by nomograms were developed in the All-Union Scientific Research Institute of Power Engineering. The concept "norm of glaze thickness" was introduced especially for this type of mapping, defined as the thickness of the wall of ice accumulated on a wire, calculated according to given formula reduced to the height of wire suspension (maximum 12 m) and wire thickness (10 mm). The use and limitations of the statistical tables and graphs presented are explained. Problems related to icing of wires and structures exceeding 50-100 m in height are not discussed. -- NSV

SIP 25939 548.1:539.2:516.6

McGaw, Richard
SYSTEMATIC PACKING FROM THE STANDPOINT OF THE PRIMITIVE CELL. Res. Rept. 201, U.S. Army Cold Regions Research and Engineering Laboratory, 29p. incl. tables, graphs, Dec. 1967. 25 refs.
CRREL files

The systematic packing of uniform spheres is generalized by describing the primitive rhombohedral cell which characterizes the arrangement between layers. Volume and porosity are found to depend on only two angular parameters, α and β:

$$V = 8R^3 \sin\alpha \sin\beta$$

$$n = 1 - \frac{\pi}{6 \sin\alpha \sin\beta},$$

β is the angle between rows in a layer, and α is the altitude angle between members of adjacent layers. An azimuth angle γ determines the position of the plane in which α is measured but does not enter into the porosity calculation. Four critical stacking arrangements are described, the porosities of which may be written as functions of the single parameter β. The stable packings studied by Graton and Fraser (1935) are special cases of the critical positions. Typically unstable packings lie between these positions. Tables and graphs are presented which give the porosity of the primitive cell, as a function of α and β, over the entire range from open to close packing for every possible layer configuration. (Author's abstract)

SIP 25940 551.322:537.311

Camp, P.R., W. Kiszenick, and D.A. Arnold
ELECTRICAL CONDUCTION IN ICE. Res. Rept. 198, U.S. Army Cold Regions Research and Engineering Laboratory, 59p. incl. tables, graphs, diagrs., appendix, Sept. 1967. 21 refs.
CRREL files

In an attempt to resolve the conflict existing in the literature as to dc electrical conductivity of ice, an extensive series of measurements has been made. Since surface conduction is a possible cause of some of the confusion, both bulk and surface conductivity have been measured at dc and audio-frequencies. Evidence was found for significant surface conductivity when slight contamination was present. In order to explain these results quantitatively, it is necessary to postulate a surface conduction region whose thickness varies with temperature. Extrinsic bulk conductivity due to trace impurities has been found to play an important part also and probably accounts for some of the disagreement in the literature. Using ice of the highest purity, both measurements show that, for a fresh sample, the dc conductivity is nearly independent of temperature down to temperatures at which the high freqency ac and dc conductivities are about equal. The results suggest that the high frequency conductivity is limited by 2 processes in parallel and that the dc conductivity is limited by the same 2 processes in series. (Authors' abstract)

SIP 25941 551.322:535:551.324=30

Ambach, W. and P. Awecker
LIGHT SCATTERING IN GLACIER ICE. (Zur Lichtstreuung im Gletschereis; Text in German). Arch. Meteorologie, Geophys. Bioklimatologie, Ser. B, 15(1/2):175-185 incl. diagrs., tables, 1967. Refs.
DLC, QC851.A732

Extinction in glacier ice has been evaluated by a special set of equations which especially take into consideration the influence of a directed light flux. For the numerical calculations the dispersion function for air bubbles enclosed in the ice has been evaluated according to the laws of geometrical optics. As a result dependence of the albedo on the zenith-angle of the oriented light flux, depencence of the ratio between light from above and from below, and the extinction coefficient of the light fluxes in a boundary layer on the depth below the glacier surface are obtained. (Meteorol. & Geoastro. Abstract)

SIP 25942 551.311.235(*50)

Kalinin, A.M.
CONCERNING ONE CHARACTERISTIC FEATURE OF SLOPE PROCESSES. (Ob odnoĭ osobennosti sklonovykh protsessov; Text in Russian). Moskovskiĭ Universitet. Vestnik. Ser. 5. Geografiia, No. 3: 94-95, 1967.
DLC, G1.M68

The hypothesis concerning "vertical projection" of heavy particles during water erosion of slopes, according to which they maintain their position in plan regardless of the erosion intensity, was studied in a model simulating wash-out of sandy slopes with the inclination angles varying from 0 to 20°. The sand contained separate pieces of quartz weighing 50 to 55 g; "rain" intensity varied from 0.5 to 1.8 mm/min. Slow-motion films of this process indicated imperceptible movement of the heavy pieces down the slope, the displacement distance being proportional to the thickness of the removed sand layer and the slope angle. Empirical formulas obtained for calculating this distance (L) at different slope angles are presented; they indicate that the weight of the particles and the degree of their superficial roughness have little effect on L. -- NSV

SIP 25943 551.311.21+551.578.48(*50)

Vinogradov, IU. B., I.I. Kherkheulidze, I.A. Il'in and V. S. Chitadze
STUDY OF MUDFLOWS AND AVALANCHES. (Izuchenie selei snezhnykh lavin; Text in Russian). Meteorol. i Gidrol., No. 11:63-70, 1967.
DLC, QC851.M27

Recent investigations of the phenomena and the countermeasures include discussions on the special measuring instruments, calculation procedures, and the forecast of mudflows and avalanches. Three types of protection from avalanches are distinguished: 1) engineering structures preventing avalanche movement (protective walls, stone and earth dams, artificial obstacles in the path of an avalanche), and those designed to stop or divert an avalanche; 2) engineering structures preventing the movement of snow-masses and the formation of an avalanche: slope terraces, wooden and metallic fences, stone and concrete walls, moats, forest strips; and 3) prevention of catastrophies by employing signs in the danger area, light signals, traffic regulation, rescue-squad organization, and different ways of destroying snow accumulations on slopes, mainly by blasting. The formula of Khristianovich-Gongadze derived for obtaining the impact force of an avalanche was checked under natural conditions and gave greatly exaggerated results. -- NSV

SIP 25944 551.345:551.24

Liubimov, B.P.
CRYOGENIC RELIEF AND PERMAFROST AS INDICATION OF NEOTECTONIC MOVEMENTS. (Merzlotnyĭ rel'ef i vechnaia merzlota kak pokazatel' neotektonicheskikh dvizheniĭ; Text in Russian). Materialy VIII vsesoiuznogo mezhduvedomstvennogo soveshchaniia po geokriologii (Merzlotovedeniiu), Vyp. 6:5-13 incl. diagrs., 1966. 7 refs.
DLC, GB641.V88

The relationship between permafrost thickness, its areal distribution, and recent tectonic movements was studied in rock outcrops and in the process of exploratory drilling. It is believed that the amplitude of tectonic movements, approximate age, changes in the direction of movements and structural inheritance may be determined from studying facies changes of perennially frozen rocks. Such an analysis accounts for permafrost development in space and time, and combines the interpretation of data on the permafrost topography, climatic, geological, geographical, and geomorphological conditions of territory development. A group of factors entirely dependent on tectonic influence are discussed for plicated and mass movements, and the use of the analytical procedure offered is illustrated by the practical example of studying the Bol'shaia Zemlia tundra. -- NSV

SIP 25945 624.139.22:624.15(*50)

Laletin, N. V.
BEARING SOILS AND FOUNDATIONS. (Osnovaniâ i fundamentry; Text in Russian). Izd-vo "Vysshaîa shkola", 380p. incl. illus., tables, graphs, diagrs., Moskva, 1964. 44 refs.
DLC, TA775.L3

A discussion is presented of a wide area of theoretical and practical problems related to the design and building of foundations, and their bearing soils for different types of buildings and structures erected in varied geographical and climatic regions and under different hydrological and geological conditions. Chapter 19 (pages 340-354) deals with the building properties of permafrost and the techniques of building on perennially frozen ground, as well as the control of naled and frost heaving. Chapter 20 (pages 355-360) deals with the foundation building on sagging ground and moist fines. -- NSV

SIP 25946 631.4:551.3

KuznecSov, M. S.
THE EFFECT OF FREEZING AND SUBSEQUENT THAWING ON THE RESISTANCE OF LIGHT BROWN SOILS TO EROSION IN THE ERGENEI REGION (ACCORDING TO STUDY OF SAMPLES WITH DISTURBED STRUCTURES). (O vliâNii promorazhivaniâ i posleduîshchego ottaivaniâ na protivoerozionnuîû stoîkost' svetlo-kashtanovykh pochv Ergeneî (issledovanie obrazcSov narushennogo slozheniâ); Text in Russian). Moskovskiî Universitet. Vestnik. Ser. B. Biologiâ, Pochvovedenie, No. 4:98-104 incl. table, graph, 1967. 19 refs.
DLC, G1.M68

The effect of soil freezing in winter on the intensity of its erosion during thaw was studied experimentally on light and heavy loam samples. Freezing-thawing of the absolutely dry, air-dry, and the maximum hygroscopic saturation samples did not affect initial resistance to erosion; the same was true for the samples containing 50% of total moisture-saturation, but the strength of those with 75% saturation was lowered and the effect became stronger with the increase in the initial water content and the number of freezing-thawing cycles. This was explained by increased growth of ice veinlets in soils, which weaken and disrupt cohesion between soil particles. The process studied had a greater effect on the heavy loam than on the light loam. -- NSV

SIP 25947 551.322:548.5

Bychkov, N. V., N. N. IArtseva, and A. V. Bromberg
STUDY OF ICE FORMING ABILITY OF METALDEHYDE AND PHLOROGLUCINOL AEROSOLS. (Issledovanie l'doobrazuîûshcheî aktivnosti aerozoleî metal'degida i floroglîûcSina; Text in Russian). Leningrad, Glavnaîa Geofizicheskaîa Observatoriîa, Trudy, Vyp. 186:3-9, 1966. 10 refs.
DLC, QC801.L46

Ice forming ability of metaldehyde and phloroglucinol aerosols obtained by thermal dispersion (sublimation in a flux of hot air) was studied experimentally in view of determining temperature relationships of ice nucleation during seeding of supercooled fogs. The curves relating the amount of icing nuclei produced to the temperature of supercooled fog are presented. They indicate that the ice forming ability of the aerosols obtained by the procedure described is quite comparable to that of AgI fumes. A great advantage of both substances is their higher temperature threshold of ice nucleation than that of AgI and their stability toward ultraviolet radiation. -- NSV

SIP 25948 551.576:551.322:548.5

Piotrovich, V. V.
PHLOROGLUCINOL AS A CRYSTALLIZER OF WATER DROPS IN SUPERCOOLED FOG AND CLOUDS. (Floroglîûcîn-kristallizator kapel' vody pereokhlazhdennogo tumana i oblachnosti; Text in Russian). Leningrad, Glavnaîa Geofizicheskaîa Observatoriîa, Trudy, Vyp. 186:10-17 incl. tables, 1966. 1 ref.
DLC, QC801.L46

First results obtained in the laboratory and field investigations of the phloroglucinol seeding of supercooled clouds and fog in 1949-51 are reported. Effectiveness of the phloroglucinol sublimation products at -10°C temperature of the fog has exceeded that of solid CO_2 and was increasing with the increase in blow off, indicating that particle coagulation in phloroglucinol may be considerable and that it can lower the effectiveness of this agent, which also depends on the moisture content and other characteristics of the supercooled fog. The effect of ice, light, and the time length of particle existence on the stability of the phloroglucinol sublimation products was also studied. Field experiments with this substance produced weaker effects than those with CO_2, in particular no optic phenomena (like halo) were visible; this was explained by the use of insufficient quantities of the seeding agent. -- NSV

SIP 25949 551.322:548.5

Gromova, T. N., N. V. Gliki and P. N. Krasikov
EFFECT OF ADDING SURFACE-ACTIVE SUBSTANCES TO PHLOROGLUCINOL, AgI, AND PbI_2 SOLUTIONS ON THEIR ICE FORMING ABILITY. (Vliianie primesei poverkhnostno-aktivnykh veshchestv na l'doobrazuiushchuiu effektivnost' rastvorov floroglitsina, iodistogo serebra i iodistogo svintsa; Text in Russian). Leningrad, Glavnaia Geofizicheskaia Observatoriia, Trudy, Vyp. 186:18-25 incl. tables, graphs, 1966. 11 refs.
DLC, QC801.L46

Laboratory investigations of the effect of surface-active-substances (SAS) on ice nucleators have shown that 1% concentration of SAS added to the seeding agents lowers their freezing temperature by 4 to 7°C, so that the threshold temperature for the crystallization of a supercooled fog is lowered by 3 to 8°C. The yield of ice nuclei during the atomization of AgI, PbI_2 and $C_6H_3(OH)_3$ in the fog chamber depended on the SAS concentration in the solutions; an increase in SAS concentration from 10^{-7} to 10^{-1}% resulted in the decrease of ice crystals from 2×10^{12} to $5 \times 10^{10} g^{-1}$; this relation was more pertinent for the colloidal solution of AgI than for the true solutions of PbI_2 and $C_6H_3(OH)_3$. In the supercooled fog droplets of the atomized ice nucleators froze rapidly with the separation of SAS particles, which in turn served as additional icing nuclei. Calculations have shown that the number of drops of the atomized solutions was twice smaller than that of ice crystals. -- NSV

SIP 25950 551.576:551.322:548.5

Sumin, Iu. P.
EXPERIMENTAL STUDY OF ARTIFICIAL NUCLEATION OF A SUPERCOOLED IRREGULARLY LAYERED CLOUD BY PYROTECHNIC COMPOUNDS CONTAINING AgI AND PbI_2. (Eksperimental'nye issledovaniia kristallizatsii pereokhlazhdennoi sloistoobraznoi oblachnosti pirotekhnicheskimi sostavami s AgJ i PbJ_2; Text in Russian). Leningrad, Glavnaia Geofizicheskaia Observatoriia, Trudy, Vyp. 186:26-37 incl. tables, graphs, 1966. 10 refs.
DLC, QC801.L46

Experimental results show that pyrotechnic compounds 5-36 and 8-55, containing AgI and PbI_2, are effective ice nucleators at cloud temperatures of -7,5°, -8,7°C and lower. The velocity of the nucleation-front propagation increased with rising wind velocity, at the same time its value for a point-source of icing nuclei was smaller than that for a plane-source. Depending on cloud density, the crystallization zone either increased in time to a complete disappearance of the cloud layer, or attained its maximum with subsequent decrease in size on account of moisture drops penetrating into it. Usually, the size of the zone crystallized by one pyro-cartridge amounted to 20-30 km^2 in one hour. The time of the appearance of a clearance in the solid layer of a supercooled cloud depended on cloud density and wind velocity within it; the empirical formula for this relationship is presented.
-- NSV

SIP 25951 551.574.1

Miloshev, G.
ORIENTED CRYSTALLIZATION (EPITAXIS) ON ISOMORPHOUS CONDENSATION NUCLEI. (Orientirovannaia kristallizatsiia (epitaksiia) na izomorfnykh fadrakh kondensatsii; Text in Russian). Leningrad, Glav. Geofiz. Observ., Trudy, 186:120-125 incl. diagrs, 1966. Refs.
DLC, QC801.L46

The conditions of oriented growth of crystals on a surface in the absence or in the presence of adsorption of admixtures are examined. The most general expressions for the criterion of epitaxis in the presence of adsorption are given by the formulas:

$$\Delta\varphi_{min_1} = \left\{\left(\frac{2\sigma}{C_{11}+C_{12}}\right)\left(1-\frac{2W}{\psi}\right)\left[1-3\frac{n^3}{n_3^3}\left(\frac{\psi'-W}{\psi-2W}\right)+2\frac{n^3}{n_3^3}\right]\right\}^{1/n}\left(1+\frac{\psi'-\psi+W-\varepsilon}{kTS}\right)\cdot 2,$$

and

$$\Delta\varphi_{min_2} = \left\{\left(\frac{2\sigma}{C_{11}+C_{12}}\right)\left(1-\frac{2W}{\psi}\right)\left[1-\frac{n^3}{n_3^3}\left(\frac{\psi'-W}{\psi-2W}\right)\right]\right\}^{1/n}\left(1+\frac{\psi'-\psi+W-\varepsilon}{kTS}\right)\cdot 2.$$

In the case of W = 0 (i.e., in the absence of adsorption) these formulas are transformed into the expression for $\Delta\varphi_{min}$ given by the formulas:

$$\Delta\varphi_{min_1} = \left[\left(\frac{2\sigma}{C_{11}+C_{12}}\right)\left(1-3\frac{n^3}{n_3^3}\frac{\psi'}{\psi}+2\frac{n^3}{n_3^3}\right)\right]^{1/n}\left(1+\frac{\psi'-\psi-\varepsilon}{kTS}\right)\cdot 2,$$

and

$$\Delta\varphi_{min_2} = \left[\left(\frac{2\sigma}{C_{11}+C_{12}}\right)\left(1-\frac{n^3}{n_3^3}\frac{\psi'}{\psi}\right)\right]^{1/n}\left(1+\frac{\psi'-\psi-\varepsilon}{kTS}\right)\cdot 2.$$

In the case of $n = n_3$ and $n = 0$ these are the expressions obtained:

$$\Delta\varphi_{min_1} = \left[\left(\frac{2\sigma}{C_{11}+C_{12}}\right)\left(1-\frac{\psi'}{\psi}\right)\right]^{1/n}\left(1+\frac{\psi'-\psi-\varepsilon}{kTS}\right)\cdot 2,$$

and

$$\Delta\varphi_{min_2} = \left(\frac{2\sigma}{C_{11}+C_{12}}\right)^{1/n}\left(1+\frac{\psi'-\psi-\varepsilon}{kTS}\right)\cdot 2.$$

(Meteorol. & Geoastrophys. Abstract)

SIP 25952 551.576:551.322:548.5

Shishkin, N. S.
ON THE CONDITIONS OF SNOW, GRAUPEL, AND HAIL GROWTH IN CLOUDS. (Ob usloviiakh rosta snega, krupy i grada v oblakakh; Text in Russian). Leningrad, Glavnaia Geofizicheskaia Observatoriia, Trudy, Vyp. 186:136-144 incl. graphs, 1966. 10 refs.
DLC, QC801.L46

A mathematical analysis deals with the transition zones between the formation of flat snow crystals, graupel, and hail, taking the equality of the coagulation and sublimation velocities of the growth of an ice particle as a criterion for the transition, and disregarding the coagulation of ice crystals with each other, which results in the formation of snow flakes. Certain characteristic elements of clouds are discussed which favor the growth of ice particles by coagulation and the formation of dense and loose ice layers on their surface, depending on temperature and the quantity of moisture received by the ice particle. Curves relating the sizes of graupel to the water content of supercooled clouds, and those showing the variation of water content in a cloud with altitude are presented. -- NSV

SIP 25953 551.324.4(*533)

Shcheglova, O. P. (ed.)
MOUNTAIN GLACIATION OF UZBEKISTAN AND ADJACENT TERRITORIES. (Gornoe oledenenie Uzbekistana i smezhnykh territorii; Text in Russian). Akad. Nauk Uzbekskoĭ SSR, Inst. Geologii i Geofiziki. Tashkent, 117p. incl. illus., tables, graphs, diagrs., 1966. 194 refs.
DLC, Slavic Div.

The first issue of the proceedings of the Laboratory of Glaciology organized by the Geological Institute, Academy of Sciences, UzbekSSR deals with a symposium on the problems of mass and energy exchange of the Uzbekistan glaciers and those in the adjacent regions, which includes a review of literature and the results of theoretical and experimental investigations of the dynamics and geological activity of glaciers as well as their thermal and material balance. It contains the following works: M. N. Nekhorosheva and A. A. Tikhanovskaia, who have tried to relate thermal balance of a glacier surface to different types of synoptic processes; M. A. Nasyrova and K. G. Sadykova present the results of their investigation of the transportation capacity of glaciers and glacial streams; A. A. Kreiter discusses black body radiation; and V. F. Suslov, A. A. Akbarov and N. I. Timokhina describe a first experience in systematizing limnological data on the practically unexplored Kichik-Alai ridge. -- NSV

SIP 25954 551.324.51(235.2)

Shumskiĭ, P. A. and V. A. Litosh
STRESS AND STRAIN RATE AT THE SURFACE OF A GLACIER (THE SOLUTION OF A PLANE PROBLEM RELATED TO THE FEDCHENKO GLACIER). (Naprĭazhenie i skorost' deformatsii na poverkhnosti ledника (reshenie ploskoĭ zadachi primenitel'no k ledniku Fedchenko); Text in Russian). Akad. Nauk Uzbekskoĭ SSR, Inst. Geologii i Geofiziki. Tashkent, Gornoe oledenenie Uzbekistana i smezhnykh territoriĭ, p. 7-25 incl. tables, graphs, 1966. 6 refs.
DLC, Slavic Div.

Boundary conditions for calculating the velocity of ice movement in glaciers occurring in a state of plane stress-strain are discussed, as well as the theory of determining boundary conditions from experimental data, illustrated by an example of its application to the longitudinal profile of the Fedchenko Glacier. Since it is practically impossible to measure stress and strain rate at the bottom of a mountain glacier, the boundary conditions are given only on its free upper surface. As far as this is an open surface, the boundary conditions sufficient for solving the problems of ice movement must include the values of the unknown functions and their derivatives in a nontangential direction (the Cauchy problem). Therefore, it is necessary to know stress deviators and strain rates on the glacier surface as well as the gradients of their variation along a direction other than that which is tangential to the glacier surface (for example, in the vertical direction); the article shows how to determine these values. -- NSV

SIP 25955 551.324.414:66.099.5:661.666(t

Kreĭter, A. A.
THE EFFECT OF ARTIFICIAL DUSTING ON THE SNOW AND ICE SURFACE IN THE CENTRAL ASIA MOUNTAINS. (O vozdeĭstvii iskusstvennogo zapyleniia na poverkhnost' snega i l'da v gorakh Sredneĭ Azii; Text in Russian). Akad. Nauk Uzbekskoĭ SSR, Inst. Geologii i Geofiziki. Tashkent, Gornoe oledenenie Uzbekistana i smezhnykh territoriĭ, p. 77-81 incl. tables, graph, 1966. 8 refs.
DLC, Slavic Div.

This is a short report on the results of coal-dusting of the Barkrak Glacier of the Pskemskii Mountain Range in August 1962. Coal dust was spread in quantities of 5 to 10 g/m^2 and in a few cases 25 and 50 g/m^2. The best effect was produced by the dust fraction 0.1 to 0.4 mm. It is believed that fine fractions cover snow and ice more evenly and

densely, thus increasing their melting rates. Small doses of the dust had an effect on clean surfaces and practically no effect on the naturally polluted snow and ice, in which cases the doses had to be increased to 25 or 50 g/m^2. The evaluated amount of heat expenditure for evaporation, which lowers thawing intensity of the blackened surface, was approximately 60-70 cal/cm^2 per day. The reduction of surface reflected radiation decreased rapidly due to washing away of dust by melt waters. The snow surface was more affected by this treatment than the ice, since the melt water of the snow penetrates into the cover displacing the coal particles not deeper than 5 cm downward, decreasing the amount of heat spent for evaporation. -- NSV

SIP 25956 551.345:551.46(*50)

Dmitriev, IU. V.
ON THE POSITION OF PERMAFROST BENEATH SMALL STREAMS. (O polozhenii vechnoĭ merzloty pod malymi vodotokami; Text in Russian). Materialy VIII Vsesoĭuz. Mezhduved. Soveshch. po Geokriologii (merzlotovedeniiu), Vyp. 2:185-195 incl. graphs, diagrs., Yakutsk, 1966.
DLC, GB641.V88

A short review of the existing conflicting opinions on the subject is followed by a mathematical analysis of the position of the top of perennially frozen rocks (Tpf) beneath small permanent and intermittent streams under different geological conditions. The calculations were based on the investigation results obtained from 50 small streams; the following equation was solved for all stream cross-sections: $k_i = h_i^{cp}/h_0^{cp}$; where k_i is the coefficient of comparison characterizing Tpf variation at typical points of the stream; h_i^{cp}, h_i^{cp} is the mean depth of Tpf occurrence, correspondingly, at the typical points within and outside the stream channel. It was assumed that permafrost preserves its initial position at $K_i = 1$; its top is raised at $k_i < 1$ and lowered at $k_i > 1$. Two formulas were derived for calculating Tpf position: $h_{pi} = h_o(1.55h_{bi} + 1)$ for permanent shallow streams with broad channels and for intermittent streams, and $h_{pi} = h_o(0.028t_b^2.h_{bi}^2 + 1.35)$ for both types of streams with well defined channels; here: t_b - water temperature, h_b - water depth, h_p, h_o are correspondingly, depths to Tpf beneath and beyond the stream channel. -- NSV

SIP 25957 691.32:551.34

Maso, Jean-Claude
MECHANISM OF FROST ACTION ON CONCRETE. DETERMINING ITS FROST-RESISTANCE THRESHOLD. (Mécanisme de l'action du gel sur les bétons. Détermination des seuils de gélivité; Text in French). C. R. Acad. Sc. Paris, Serie D., Vol. 263:929-932, Oct. 1966. 4 refs.
DLC, Q46.A14

Frost-resistance threshold was established for concrete during the study of the regularities governing volume decrease of cement during its hydration. The behavior of freezing concretes is explained in terms of their composition as well as temperature. It is shown that dehydration of concrete during freezing is related to the hydrostatic pressure, originating when water in the concrete turns to ice. Under such conditions concrete will be destroyed if the volume of this ice exceeds certain limits. The following cases are discussed theoretically: 1) water inflow into the cement mixture from outside; 2) no such water inflow; and, 3) a part of the water which enters the mixer is separated. Frost-resistance threshold is calculated according to formulas derived. -- NSV

SIP 25958 548.524:551.574.1=82

Gliki, N. V. and T. N. Gromova
SIMPLER TYPES OF CRYSTALLIZATION FOR SUPERCOOLED WATER DROPLETS. (Prosteĭshie tipy kristallizatsii pereokhlazhdennykh kapel' vody; Text in Russian). Kristallografiia, Moscow, No. 11: 794-801, Sept.-Oct. 1966. Refs.
DLC, QD901.K7

Microscopic study in polarized light of crystallization dynamics for supercooled droplets of water with AgI, PbI_2, NiO, and phloroglucinol additions, to determine elementary processes of crystallization producing spherical single crystals of ice during the freezing of droplets 500 to 1000 μ in diameter. The process of nucleation and the distribution of additions in freezing droplets at temperatures down to -3°C is investigated. The experimental and theoretical results for the crystallization front configuration are compared. The time-dependent profile form of the phase interfaces in a droplet is studied by color cinematography. (Meteorol. & Geoastrophys. Abstract)

SIP 25959 551.322(234.9)

Voloshina, A. P.
THERMAL BALANCE AT THE SURFACE OF HIGH MOUNTAIN GLACIERS IN SUMMER. (Teplovoĭ balans poverkhnosti vysokogornykh ledrikov v letniĭ period; Text in Russian). Akad. Nauk SSSR, Inst. Geografii. "Nauka", Moscow, 149p. incl. tables, graphs, diagrs., 1966. 75 refs.
DLC, QE576.V57

Field investigation data on which this work is based were obtained during the International Geophysical Year and the following years (1958-1962) on the El'brus Mountain and other areas of the Central Caucasus. The basic topic of this monograph is the analysis of thermal balance at glacier surfaces and a quantitative evaluation of the role of its separate components in the glacier ablation. No single answer is given to the controversial problem of what is more important for the ablation—solar radiation or heat inflow from air, because the data obtained by different investigators were modified by different factors such as geographical position of the glaciers, the type of weather prevailing during the observation period, and the method of calculating the characteristics of vertical turbulent exchange. On El'brus the solar radiation was mainly responsible for snow and ice melting, the maximum registered ablation values falling on cloudless days. -- NSV

SIP 25960 551.521.1(*3:50)

Chernigovskiĭ, N. T. and M. S. Marshunova
CLIMATE OF SOVIET ARCTIC REGIONS (RADIATION REGIME). (Klimat Sovetskoĭ Arktiki (radiatsionnyĭ rezhim); Text in Russian). Leningrad, Arkt. Antarkt. Nauch.-Issled. Inst., 155p. incl. illus., maps, tables, graphs, diagrs., 1965. 134 refs.
DLC, QC911.C52

The results of many years of actinometric observations carried out at the polar and drifting stations as well as during marine expeditions and flights over the territory are generalized and systematized in this monograph. Basic elements of radiation are analyzed and the methods of calculating separate components of radiation balance are discussed analytically with an attempt to increase their accuracy. The regularities governing geographic distribution of these components in the Arctic regions have been detected. Schematic maps of monthly values of global and absorbed radiation, radiation balance, and natural illumination are presented, as well as the tables of the observation data analyzed. -- NSV

SIP 25961 551.466.7:551.467

Legen'kov, A. P.
REFLECTION OF HIGH TIDE WAVES FROM ICE EDGE. (K voprosu ob otrazhenii prilivnykh voln ot kromki l'dov; Text in Russian). Leningrad, Arkt. Antarct. Inst., Trudy, Vol. 269:57-63 incl. tables, diagrs., 1966. 3 refs.
DLC, G600.L4

Reflection takes place when waves approach fast ice from clear water and vice-versa, when the waves emerge from beneath the ice into the clear water area; this is caused by the difference in water depths under the ice and in the clear area, by the elastic resistance of ice to vertical water oscillations, and by ice friction. Frictional reflection depends mostly on the absolute water depth and wave periods. A mathematical discussion is presented of a simple problem: frictional reflection of a free plane tidal wave in an infinite channel partially covered by ice. It is assumed that ice does not move in the horizontal direction and that it does not resist the vertical water oscillations. The last condition was added to separate frictional reflection from other types. Formulas are derived for the relations among the intensities of reflected, transient, and incident waves, the velocities of wave propagation, and the coefficients of wave attenuations in clear water and beneath ice. -- NSV

SIP 25962 551.465.152(268.51)

Smetannikova, A. V.
RELATION BETWEEN TURBULENT HEAT EXCHANGE AND EVAPORATION IN THE KARA SEA DURING SUMMER-FALL SEASON. (Sootnoshenie mezhdy turbulentnym teploobmenom i isparieniem v Karskom more v letne-osennii period; Text in Russian). Leningrad, Arkt. Antarkt. Inst., Trudy, Vol. 269:67-70 incl. table, graph, diagrs., 1966. 2 refs.
DLC, G600.L4

Relation between turbulent heat exchange (P) and evaporation (LE) in the Kara Sea was calculated for the period July-October according to the Konstantinov and Sverdrup formulas:

$$P = \frac{0{,}130\rho(T_s - T)}{\ln\frac{z_v}{z_0}\ln\frac{z_T}{z_0}\left(1-0{,}5\frac{\ln\frac{200}{z}}{\ln\frac{200}{z_0}}\right)},$$

where P is heat flow in turbulent exchange; v is wind velocity at the level z_v; T_B and T is temperature of water and air respectively; z_T is the level of temperature measurement; z_0 is the coefficient of sea roughness.

$$LE = \frac{0{,}0069(E-e)v}{0{,}0672\lg\frac{z_e+z_0}{z_0}\lg\frac{z_0+z_0}{z_0}}\cdot\Delta z v,$$

where LE is heat flow on account of evaporation; (E - e) is moisture deficit; z_e is the height of air moisture measurement; z is thickness of the laminary layer. The results indicate that when the difference between the air and water temperature is negative P is two times larger than LE; at a small positive difference (1.5°C) heat loss on account of evaporation is twice as large in turbulent exchange; P and LE are approximately equal when temperature difference varies from 3 to 4°C. -- NSV

SIP 25963 551.509.67(*50)

Sulakvelidze, G.K., N.Sh. Bibilashvili and V.F. Lapcheva
FORMATION OF PRECIPITATION AND MODIFICATION OF HAIL PROCESSES. (Obrazovanie osadkov i vozdeistvie na gradovye protsessy; Text in English). Translated from Russian by Israel Program for Scientific Translations, Jerusalem, 208p. incl. illus., tables, graphs, diagrs., 1967. Refs.
DLC, QC925.S9

Results of theoretical and experimental investigations into the formation of precipitation in the form of showers from convective clouds and new concepts of the mechanism of hail formation are presented in this work. Methods are described for the detection of hail centers by radar and for the determination of the size of hailstones in convective clouds. The method is explained for modifying hail processes, developed in 1960-1962 and used in 1963 for protecting agricultural crops from hail damage. The organization of these operations and their results are also described. (Authors' abstract)

SIP 25964 778.35:551.345:551.326(*50)

Kudritskiĭ, D.M. and G.G. Samoĭlovich (eds.)
AEROMETHODS EMPLOYED IN THE STUDY OF NATURAL RESOURCES. (Aerometody izucheniĭa prirodnykh resursov; Text in Russian). Gos. Izd. Geogr. Lit., Moscow, 1962.
DLC, TA593.A56

This collective work treats 35 topics on different natural sciences, discussed by different authors, in 5 parts and containing the following 3 items of interest to cold regions research: 1) Part I. Use of aerial photography in geological and geomorphological studies: 3. Study of permafrost (I.V. Protas'eva) p. 46-52. 2) Part II. Use of aerial photography in studying soils: 11. The study of soils in the northern taiga (N. A. Kreida p. 122-129. 3) Part IV. Use of aerial photography in studying water resources: 28. Ice regime of the seas (A. V. Bushuev, G.V. Gonin, and V.S. Loshchilov) p. 257-269. -- NSV

SIP 25965 528.77:551.482.215.72(*50)

Chernogorov, V.P.
AERIAL PHOTOGRAPHY OF SNOW COVER IN THE UPPER COURSE OF THE ANGREN RIVER FOR HYDROLOGICAL PURPOSES. (Aerofotos"emka snezhnogo pokrova v verkhov'iakh r. Angren dlia gidrologicheskikh tseleĭ; Text in Russian). Sredneaziatskiĭ Nauch. Issled. Gidrometeorologicheskiĭ Inst., 128p. incl. tables, graphs, diagrs., Leningrad, 1966. 35 refs.
DLC, GB665.C55

Terrain interpretation of airphotos furnishes snow cover data for the basin of the mountain river during thaw. The snow cover thickness in the basin is calculated at different levels and the procedure for determining the snow line elevation on the date of aerial photography is discussed. Different methods of estimating give the amount of water reserves in snow and the data obtained are used for illustrating the procedure of a long-range estimation of water discharge for the river. -- NSV

SIP 25966 551.578.462:551.579.2(*429)

Quick, M.C.
COMPARISON OF MEASURED AND THEORETICAL SNOWPACK TEMPERATURES. J. Hydrol. (Amsterdam), 5(1):1-20 incl. diagrs., graphs, March 1967. 5 refs.
DLC, GB651.J6

A theoretical and experimental study has been made of the heat exchange at the surface of a snowpack, the purpose of this study being to construct a mathematical model from which it will be possible to calculate rates of snowmelt from meteorological data. Theoretical solutions of the heat flow equation were found for constant and sinusoidally varying surface temperature profiles for both a homogeneous and nonhomogeneous snowpack. In the nonhomogeneous snowpack an exponential type of variation for density and conductivity was assumed. These theoretical results were compared with the results obtained in field measurements of snow temperatures. A description of the apparatus developed for this work is given. It is shown that the theoretical model appears to be good for temperatures below freezing. However, modification of the snowpack during melting of the snow requires additional experimental measurement of these modifications, and corresponding

modification of the mathematical model. This study is related to a flood forecasting study previously made for the Fraser River system in British Columbia. (Author's abstract)

SIP 25967 551.326.7:551.465.71(*60)

Weller, G.
HEAT-ENERGY TRANSFER THROUGH A FOUR-LAYER SYSTEM: AIR, SNOW, SEA ICE, SEA WATER. J. Geophys. Res., 73(4):1209-1220 incl. tables, graph, diagr., Feb. 15, 1968. 13 refs.
DLC, QC811.J6

The heat-energy transfer through a four-layer system of air, snow, sea ice, and sea water is determined numerically, and the optical, thermal, and composition properties of the solid layer are discussed. The annual sea ice investigated was close to the Australian National Antarctic Research Expedition station of Mawson. The observation was made over a period of five months from the middle of June to the middle of November 1965. Net long-wave radiation losses through the surface of the sea ice are high to balance a large heat flux from the water below. The disappearance of the snow cover over the ice in summer results in a drop of the albedo from 75 to 37%. Idealized curvature characteristics of measured wind and temperature profiles are used over the sea ice to compute the eddy heat flux. The aerodynamic roughness parameter z_0 is computed to have a mean value of 0.013 cm. The latent heat flux at the upper boundary and eddy heat flux at the lower boundary are treated as remainder terms in the energy balance equation. Advection of heat by water currents is considered, and error estimates of the heat budget components are discussed. The heat exchange between the sea ice and the atmosphere is compared with the heat exchange between an ice-free ocean surface and the atmosphere and is found to be an order of magnitude smaller. (Author's abstract, modified)

SIP 25968 551.326.7:54-38

Untersteiner, Norbert
NATURAL DESALINATION AND EQUILIBRIUM SALINITY PROFILE OF PERENNIAL SEA ICE. J. Geophys. Res., 73(4):1251-1257 incl. table, graphs, Feb. 15, 1968. 15 refs.
DLC, QC811.J6

Owing to the great local and temporal scatter of ice salinity, the shape of its steady-state profile in ice of equilibrium thickness is only approximately known. Hence the purpose of theorizing on the way in which it establishes itself is to suggest pertinent experiments rather than to explain physical causes. Four mechanisms of salt migration are discussed: (1) 'Brine pocket diffusion,' as explained by W.G. Whitman; it is too slow to be of significance here. (2) 'Gravity drainage,' as observed in the laboratory by W.D. Kingery and W.H. Goodnow. It is unlikely to occur in natural, thick floating ice. Their basic concept may, however, be applicable in a modified form as a 'flushing' mechanism. (3) 'Flushing' or washing-out, a quantitative calculation that assumes the replacement of brine by meltwater from the surface to be a function of ice salinity and maximum temperature, leads to a steady-state salinity profile similar to that suggested by observations. (4) 'Brine expulsion,' as a result of temperature changes and the separation of liquid and gaseous inclusions during the cooling cycle is also treated numerically and results, as does (3), in a steady-state salinity profile resemblant of observations. (Author's abstract)

SIP 25969 551.345.3:536

Votiākov, I.N.
VARIATION IN VOLUME OF FROZEN FINE-GRAINED SOILS DUE TO PHASE TRANSITION OF WATER AT TEMPERATURE FLUCTUATIONS. (Ob"emnye izmeneniiā merzlykh dispersnykh gruntov v sviāzi s fazovymi perekhodami vody pri temperaturnykh kolebaniiākh; Text in Russian). Materialy VIII Vsesoiuz. mezhduvedomstvennogo soveshchaniiā po geokriologii (merzlotovedeniiū), Vyp. 5: 11-21 incl. illus., tables, graphs, Yakutsk, 1966.
DLC, GB641.V88

Fine-grained frozen soil represents a complicated 4-component system consisting of mineral skeleton, cementing ice, non-frozen water, and water vapors; theoretically, the volume of this system must increase with temperature drop and decrease with its rise. Entirely opposite results were obtained during experimentation with various soils at different minus temperature intervals. The results indicated the variation of soil expansion and contraction within broad limits, depending on its grain sizes, moisture content, temperature, mineralogical composition, and the type and quantity of the water-soluble salts. Coagulation of colloidal and mineral soil particles and partial dehydration proceeded parallel to water freezing, decreasing soil volume until the total moisture in the soil was frozen. Temperature increase was accompanied by ice melting, hydration of colloidal aggregates, their peptization, and consequent increase in soil volume. Absolute increment in volume continued for several days after the sample temperature reached that of the surrounding medium, due to complex structural transformation, the appearance of internal stresses, and their relaxation in time. -- NSV

SIP 25970 624.139:624.15:539.42

Ponomarev, V. D.
EXPERIMENTAL STUDY OF THE STRESS-STRAIN STATE OF THAWING BEARING SOILS. (Eksperimental'nye issledovaniîa naprîazhenno-deformativnogo sostoîaniîa ottaivaîushchikh osnovaniĭ; Text in Russian). Materialy VIII Vsesoîûz. mezhduvedomstvennogo soveshchaniîa po geokriologii (merzlotovedeniîû), Vyp. 5:37-50 incl. graphs, diagrs., Yakutsk, 1966. 15 refs.
DLC, GB641.V88

A thawing bearing soil represents a heterogeneous medium consisting of a thawed zone overlying a frozen one, both being heterogeneous horizontally, and a temperature variation with depth. This anisotropy affects the distribution of stresses along the thickness and bottom of a foundation, i.e. its settling. This article concerns only the structure of a thawing bearing soil along the vertical and the stress distribution in the same direction, which were studied in a model under the guidance of N.A. Tsytovich. The results obtained are presented graphically, the curves relating variation of the porosity coefficient of the thawing soil to the thawing depth, and showing the course of soil deformation under different loads. The results indicated that cyclic freezing-thawing lowers the capacity of soil to swell by moisture absorption. At any time, soil porosity increases with depth, determining its mechanical properties, i.e., the variation of the mechanical properties of a thawing soil is proportional to that of its porosity, which is especially typical of fines (clay, loam, marl).
-- NSV

SIP 25971 624.147:539.3

Korzhavin, K. N. and F. I. Ptukhin
EVALUATING COMPRESSION STRENGTH OF ICE UNDER SHORT-LASTING RAPIDLY INCREASING LOADS. (K otsenke predela prochnosti l'da na szhatie pri kratkovremennykh bystro vozrastaîûshchikh nagruzkakh; Text in Russian). Materialy VIII Vsesoîûz. mezhduvedomstvennogo soveshchaniîa po geokriologii (merzlotovedeniîû), Vyp. 5:61-72 incl. table, graphs, Yakutsk, 1966. 10 refs.
DLC, GB641.V88

A mathematical analysis is presented of ice strength variation under the action of repeated loading which increases in time and rapidly reaches the limiting values, but which has so short a duration that the rheological factors related to the action (creep, stress relaxation), though affecting the ice strength, are not readily apparent. In addition, ice strength was tested experimentally in view of disagreements in published data on the effect of loading speed on the ice strength limits. Although the testing procedure involved rapidly increasing intermittent loading, it was of a static rather than percussion nature. Both theoretical and experimental results indicated lowering of the ice strength limit with an increasing load rate. -- NSV

SIP 25972 624.147:625.8(*50)

Savko, N. F.
DETERMINING CARRYING CAPACITY OF WINTER HIGHWAYS BUILT OF SNOW AND ICE. (K voprosu opredeleniîa nesushcheĭ sposobnosti snezhnoledîanykh konstruktsiĭ avtozimnikov; Text in Russian). Materialy VIII Vsesoîûz. mezhduvedomstvennogo soveshchaniîa po geokriologii (merzlotovedeniîû), Vyp. 5:80-92 incl. table, graphs, diagrs., Yakutsk, 1966. 10 refs.
DLC, GB641.V88

Winter highways (called "avtozimnik") built of ice and snow in the Soviet Union usually have one of the following types of structure: a) a layer of packed ice or snow resting on a frozen ground foundation, or b) a frozen ground foundation covered by a layer of packed snow topped by a snow-ice plate. Deep tracks and bumps are more readily formed in type (a) while (b) is characterized by cracks and ruts. Two mathematical procedures are presented for calculating the carrying capacity of snow and ice pavements of both types of winter highways for motor-vehicles of different weight. Formulas are derived for stress distribution with depth in a homogeneous snow layer and in the snow-ice layer, and for the settling of the snow-ice mass under load. Comparison of the theoretical data obtained to the field measurements showed good correlation.
-- NSV

SIP 25973 624.139.62:539.32:551.596

Zykov, îû. D.
ULTRASONIC METHODS USED IN THE STUDY OF ELASTIC PROPERTIES OF FROZEN GROUND SAMPLES. (Primenenie ul'trazvukovykh metodov dlîa izucheniîa uprugikh svoĭstv merzlykh gruntov na obraztsakh; Text in Russian). Materialy VIII Vsesoîûz. mezhduvedomstvennogo soveshchaniîa po geokriologii (merzlotovedeniîû), Vyp. 5:129-138 incl. graphs, diagrs., Yakutsk, 1966. 6 refs.
DLC, GB641.V88

The article presents a short review of the theory of elastic wave propagation (the longitudinal (P), transverse (S), and Rayleigh (R) waves) in limited bodies, as well as the results of testing the UP-2 ultrasonic device, and the development of a procedure for a more accurate determination of the wave velocities V_p and V_S. The frozen rock samples

were prepared artificially by saturating natural sand with water and cooling it to a frozen state. The principal object of the study was the recognition of the phases corresponding to the S or R waves on the wave record, rather than the correlation of wave velocities and the elasticity moduli with the known rock properties. The results obtained with the UP-2 are presented graphically, discussed, and recommendations offered for further improvements of the theoretical part of this method, and of some structural details in the data units of the UP-2. -- NSV

SIP 25974 624.139:624.15(*50)

Dalmatov, B.I., V.S. Lastochkin and V.M. Ulitskiĭ
PERFORMANCE OF UPLIFT RESISTING FOUNDATIONS IN HEAVING GROUND. (Issledovanie raboty ankernykh fundamentov v puchinistykh gruntakh; Text in Russian). Materialy VIII Vsesoûz. mezhduvedomstvennogo soveshchaniîa po geokriologii (merzlotovedeniîû), Vyp. 5:160-168 incl. table, diagrs., Yakutsk, 1966. 1 ref.
DLC, GB641.V88

In the areas of deep seasonal ground freezing, light buildings are erected on special columnar foundations equipped with an "anchor" plate, placed below the freezing depth, and designed to resist the pull-out stresses of the frost heaving ground. It is assumed that the forces keeping such foundations in place exceed the weight of the ground overlying the anchor plate. The normal forces acting along the upper surface of the plate counteract the tangential forces of frost heaving thus stabilizing the foundation. Experimental testing of this technique in models and on experimental grounds with seasonal freezing depth of 3 m, indicated great stability of the foundations and the dependence of their performance on the size of the plate overhang and the strength of normal pressures acting on the upper surface of the plate during frost heaving. -- NSV

SIP 25975 551.324.5(*733)

Kruchinin, IÛ. A. S. Pinter, and I.M. Simonov
DETERMINING THE VELOCITY AND DIRECTION OF GLACIER MOVEMENT IN THE REGION OF NOVOLAZAREVSKAYA STATION. (Opredelenie skorosti i napravleniîa dvizheniîa lednikov v raĭone stant͡sii Novolazarevskoĭ; Text in Russian). Informat͡sionnyĭ Bîûl. Sov. Antarkt. Eksp., No. 61:26-31 incl. tables, map, diagr., 1967.
DLC, Q115.S686

A new procedure used in determining the annual velocity and the direction of glacier movements in this area is described in detail, the formulas used in calculating the elements of triangulation are presented, and the problems associated with this work are discussed. The measurements of the triangle base, its sides and the angles were obtained with an accuracy of ± 13 cm, ± 85 cm, and ± 14" respectively. -- NSV

SIP 25976 551.326.7(*746)

Petrov, I.G.
DISTRIBUTION OF ICE AND SNOW THICKNESS IN THE DAVIS SEA NEAR-SHORE. (K raspredeleniîû tolshchiny l'da i snega v pribrezhnoĭ chasti morîa Deĭvisa; Text in Russian). Informat͡sionnyĭ Bîûl. Sov. Antarkt. Eksp., No. 61:56-60 incl. tables, graph, diagr., 1967.
DLC, Q115.S686

This paper reports the results of an expedition undertaken to measure the thickness of shore ice and of the snow covering it over a distance of 35 km from the shore, with simultaneous measurement of wind force and direction at different distances from the shore. A snow-ice-cover profile was plotted from the data obtained; it indicates a clearly defined zone of wind calm with its center about 10 km from the shore. Maximum snow accumulation and minimum ice thickness were observed in this zone; the latter is explained by the insulating properties of snow and retarded ice formation. It is believed that thinning of the ice sheet under this zone indicates a constant rather than random nature of maximum snow accumulation at that distance from the shore. -- NSV

SIP 25977 551.321.61:621.396.933:534.88(*7)

Fedorov, B.A.
RADIO ECHO SOUNDING OF ANTARCTIC ICE SHEETS. (Primenenie aktivnoĭ radiolokat͡sii dlîa izucheniîa antarkticheskikh lednikov; Text in Russian). Informat͡sionnyĭ Bîûl. Sov. Antarkt. Eksp., No. 62:19-24 incl. diagrs., 1967.
DLC, Q115.S686

The method described is based on the ability of electromagnetic waves to propagate in dielectrical media reflecting from the boundaries between layers differing in electrical and magnetic properties. Glacier thicknesses, the depths to various structural layers or inhomogeneities in ice are obtained according to the velocity of wave propagation with the error not exceeding ± 2 to 3%. The calculation procedure of this method is explained and illustrated by two cross-sections of the same ice sheet plotted according to the data obtained on land and from a plane equipped with special apparatus. -- NSV

SIP 25978 551.324:528.7

Schytt, Valter
THE PURPOSE OF GLACIER MAPPING. Can. J. Earth Sci., 3(6):743-746, Nov. 1966.
DLC, QE1.C17

As an introduction to the Symposium on Glacier Mapping and for the purpose of providing a basis for further discussion, the requirements in various types of glacier maps are differentiated. Most maps of glaciers are not made specifically for glaciologists but as part of a general geographical survey program. It is very important that glaciologists define their most urgent requirements, remembering that glaciers normally cover a fairly small percentage of a total area to be mapped. Standardized symbols would be good; standardized content might be better. The glaciological content has to be adapted to the scale of the map and to the needs of specialized research. (Author's abstract)

SIP 25979 551.324:528.7:778.35

Blachut, T.J. and F. Müller
SOME FUNDAMENTAL CONSIDERATIONS ON GLACIER MAPPING. Can. J. Earth Sci., 3(6): 747-759 incl. illus., tables, diagrs., map, Nov. 1966. 24 refs.
DLC, QE1.C17

Five glacier maps at scales of 1:5,000 and 1:10,000 were produced by the Photogrammetric Research Section of the National Research Council and the Axel Heiberg Island Expedition of McGill University for use in glaciological research in the Canadian Arctic. After general comments on the need for and scope of glacier mapping, the authors discuss in some detail the main problems encountered. It is maintained that glacier maps belong to the class of 'special maps' and that the specifications for them should be set by the glaciologists. Accuracy requirements, choice of mapping scale and contour interval, delineation of various glacier units, extent of detail plotting, etc. are critically reviewed. The 1:10,000 map of the entire White Glacier catchment area, accompanying this paper, is an example of a map which serves various glaciological purposes, primarily calculations of mass change. To facilitate future glacier mapping, the authors suggest that clear definitions of glaciological terms such as 'active glacier' or 'glacierized area' should be established and that their cartographical presentation should be further standardized. (Authors' abstract)

SIP 25980 551.324:528.7

Ewing, Karen J. and Melvin G. Marcus
CARTOGRAPHIC REPRESENTATION AND SYMBOLIZATION IN GLACIER MAPPING. Can. J. Earth Sci., 3(6):761-769 incl. tables, Nov. 1966. 17 refs.
DLC, QE1.C17

In glacier cartography, as in all mapping, questions of convention and standardization have long plagued cartographers. National and international efforts at standardization have generally failed. To assess the styles, techniques, and status of glacier representation, several hundred maps of glaciers and related features were examined and evaluated. As a result it is suggested that there is room for innovation and that greater attention be devoted to the following problems: (1) color symbolization, (2) perception of symbols and color by map users, (3) inclusion of more symbolic information on medium-scale maps, and (4) effects of automated cartography on representation techniques. (Authors' abstract)

SIP 25981 551.324:778.35:528.7(*38)

Helk, J. V.
GLACIER MAPPING IN GREENLAND. Can. J. Earth Sci., 3(6):771-774 incl. illus., Nov. 1966.
DLC, QE1.C17

The history and problems of mapping in Greenland are briefly reviewed, with particular reference to the Indlandsis (the Ice Cap) and the glaciers. The author calls for greater collaboration between the glaciologist and the topographer, and cautions against placing too great reliance on the present maps for calculations of the volume of the Indlandsis. Techniques now being developed will lead to a much more accurate assessment of volume. Finally, the regime of an ice-dammed lake in southwest Greenland is discussed on the basis of photogrammetric data and as an example of how such data can be used to explain glaciological phenomena. (Author's abstract)

SIP 25982 551.324:778.35:528.7(235.24:*58)

Kick, W.
MEASURING AND MAPPING OF GLACIER VARIATIONS. Can. J. Earth Sci., 3(6):775-781, Nov. 1966. 11 refs.
DLC, QE1.C17

One of the main purposes of glacier mapping is to determine the temporary state of glaciers and to investigate glacier variations by successive mappings. The author illustrates this work with particular reference to terrestrial photogrammetric surveys of mountain glaciers in the Nanga Parbat

region of the Himalaya and of the Tunsbergdalsbre in southwest Norway, in both cases 24 years after R. Finsterwalder's original surveys. The author s' ows that the most important index of variation is the height variation of the surface level in the region of the firn line. The accuracy necessary for measuring the height variation and the scale of map plotting are discussed. Field methods are also discussed, and information is given on the measurement of volumetric changes from contour-line shifts and on the measurement of velocity profiles by terrestrial photogrammetry. (Author's abstract)

SIP 25983 551.324:528.7(*49:*41)

Konecny, Gottfried
APPLICATIONS OF PHOTOGRAMMETRY TO SURVEYS OF GLACIERS IN CANADA AND ALASKA. Can. J. Earth Sci., 3(6):783-798 incl. illus., graphs, maps, tables, Nov. 1966. 16 refs.
DLC, QE1.C17

The paper emphasizes that the choice of a proper procedure is essential for efficient glacier surveying. Terrestrial versus aerial photogrammetry and the use of electronic surveying procedures versus triangulation have been tested in surveys on the Athabasca and Saskatchewan glaciers, and on glaciers in northern Ellesmere Island, southeastern Alaska, and the Yukon Territory. The Otto Fiord glacier survey in northern Ellesmere I. demonstrates that no ground control is needed for volumetric glacier studies. Accurate maps needed for other studies depend on the establishment of control. Control can most efficiently be determined by tellurometer and phototheodolite with helicopter support, as shown in Alaskan glacier surveys. For large glaciers photography provides a good means of extending control from tellurometer traverse stations, as demonstrated in the Mount Kennedy survey. Simple one-color maps are an economical means of preserving survey results for future glaciological evaluation. (Author's abstract)

SIP 25984 551.324:778.35:528.7(494)

Kasser, P. and H. Roethlisberger
SOME PROBLEMS OF GLACIER MAPPING EXPERIENCED WITH THE 1:10,000 MAP OF THE ALETSCH GLACIER. Can. J. Earth Sci., 3(6): 799-809 incl. illus., diagrs., table, Nov. 1966. 6 refs.
DLC, QE1.C17

The difficulties of the aerial survey of the Aletsch Glacier lay in establishing ground control in the high mountains and locally on the moving glacier surface, and in plotting featureless névés on the autograph. The major problem in plotting proved to be the delineation of the margins of active glaciers where marginal zones were thickly covered with debris or fresh snow, or where it was necessary to define the boundary between the active glacier and stagnant ice. The distinction between active and stagnant ice is based on movement and nourishment, that is, on characteristics not directly visible in the air photographs, and the boundary is too often a matter of personal judgment. The authors hold that this boundary would be better omitted on an accurate map of the type discussed, while the glacierized area should be represented only in so far as ice is clearly indicated by surface features. A further provisional boundary might be given to indicate suspected buried ice. The paper emphasizes the importance of favorable glacier conditions when the control photographs are taken, to facilitate the mapping and interpretation of glaciological features. (Authors' abstract)

SIP 25985 551.324:778.35:528.7(79)

Meier, Mark F.
SOME GLACIOLOGICAL INTERPRETATIONS OF REMAPPING PROGRAMS ON SOUTH CASCADE, NISQUALLY, AND KLAWATTI GLACIERS, WASHINGTON. Can. J. Earth Sci., 3(6):811-818 incl. illus., diagrs., maps, Nov. 1966. 6 refs.
DLC, QE1.C17

Remapping programs on glaciers are undertaken to determine changes in ice thickness and volume, which supposedly reflect glacier response to changing climate. However, thickness changes, derived photogrammetrically, cannot be used to determine ablation or other specific mass budget quantities, or response characteristics, without concurrent measurements made on the glacier surface. The varied nature of the difficulty is illustrated by the following example: (1) data from South Cascade Glacier demonstrate that the rate of change of thickness is the vectorial combination of emergence velocity, specific net budget rate, and (in the accumulation area only) a compaction velocity; (2) limitations on the use of photogrammetric data to detect and interpret kinematic waves are illustrated by results from Nisqually Glacier; (3) changes in two lobes of Klawatti Glacier show that climatic changes cannot be extrapolated from single-glacier maps because of meso-scale meteorological complications. (Author's abstract)

SIP 25986 551.324.8:528.7(*49)

Field, William O.
MAPPING GLACIER TERMINI IN SOUTHERN ALASKA, 1931-1964. Can. J. Earth Sci., 3(6): 819-825, Nov. 1966. 16 refs.
DLC, QE1.C17

A program to map changes in the positions of glacier

termini in the coastal mountains of southern Alaska was initiated by the author in 1931, and since 1941 has been sponsored by the American Geographical Society. Wherever possible, stations previously used for surveys or photography were reoccupied, including a few established as early as the 1880's. After nine field trips, 50 triangulation networks have been established to cover 76 different termini of large and small glaciers, of which 26 are tidal. Photographs were taken from the principal stations to record changes in the topography and vegetation cover. The principal glaciers of Glacier Bay in southeastern Alaska and of Prince William Sound in southcentral Alaska have been surveyed five times. The surveys, supported by the photographic record, have documented pronounced advances of 8 termini and appreciable recession of 37; the remaining glaciers have either oscillated or remained virtually unchanged. The reason for the program, the instrumentation and procedures, and the field problems encountered are discussed, and recommendations are made for the future. (Author's abstract)

SIP 25987 551.324:528.7:778.35(*49)

Petrie, G. and R.J. Price
PHOTOGRAMMETRIC MEASUREMENTS OF THE ICE WASTAGE AND MORPHOLOGICAL CHANGES NEAR THE CASEMENT GLACIER, ALASKA. Can. J. Earth Sci., 3(6):827-840 incl. illus., tables, maps, diagrs., Nov. 1966. 7 refs.
DLC, QE1.C17

Two sets of maps were compiled for the Casement Glacier and its outwash area from aerial photography taken in 1948 and 1963 and plotted on a Wild B-8 aviograph. The major problems resulted from lack of measured ground control; they were overcome by stereotemplet triangulation for planimetric control and by the use of the extensive bodies of water to provide both model levelling and a height datum. An analysis of the accuracy of the results is made. Comparison of the two sets of maps reveals extensive ice wastage, with a maximum retreat of the ice front of 1.5 km. Large masses of stagnant ice have been detached from the glacier and covered by fluvioglacial deposits. The development of landforms in these deposits resulting from the wastage of the buried ice is discussed. (Authors' abstract)

SIP 25988 551.324:528.7(*50)

Avsiuk, G.A., O. N. Vinogradov, and V.I. Kravtsova
EXPERIENCE IN GLACIOLOGICAL MAPPING OF ICE SHEETS AND MOUNTAIN GLACIERS. Can. J. Earth Sci., 3(6):841-847, Nov. 1966, 22 refs.
DLC, QE1.C17

As a result of the I.G.Y.-I.G.C. programs, the whole complex of glacier processes has received particular attention in the USSR. This has led to the development and perfection of cartographic methods in the study of glaciers. Three main lines in glacier mapping are being followed in the USSR in the preparation of (a) general geographical maps of glacierized areas, (b) special glaciological maps, and (c) glacier atlases. The characteristics of the various types of maps are described, and details are given on their preparation and on the representation used for natural features and glacier processes. New applications of cartographic methods to glaciological investigations are indicated. (Authors' abstract)

SIP 25989 551.324:528.7(494)

Haefeli, R.
SOME NOTES ON GLACIER MAPPING AND ICE MOVEMENT. Can. J. Earth Sci., 3(6):863-876 incl. illus., diagrs., Nov. 1966. 19 refs.
DLC, QE1.C17

Since the time of Agassiz, 1840, the Unteraar Glacier has maintained its role as a focus of glaciological research for mapping, seismic sounding, glacier movement, and hydrology. Variations of the velocity of the Unteraar Glacier with ice thickness and time are presented and discussed. The new map of the Aletsch Glacier at the scale of 1:10,000 enables the author to demonstrate the extent to which detailed mapping of the surface features of a glacier facilitates the study of surface velocity. (Author's abstract)

SIP 25990 551.324:778.35:535.392(*58)

Østrem, Gunnar
SURFACE COLORING OF GLACIERS FOR AIR PHOTOGRAPHY. Can. J. Earth Sci., 3(6):877-880 incl. illus., map, Nov. 1966. 4 refs.
DLC, QE1.C17

To make glacier mapping possible in white firn areas where stereo-effect is difficult to obtain, a large number of surface markers were placed on the glacier before air photographs were taken. Experiments proved that 3- to 5-kg powdered dye (yellow or brown ochre, or lamp black), packed in

paper bags, made excellent surface markers when thrown from between 50- and 100-m elevation above the glacier surface. Color circles, applied by hand, also proved to be a good means for identifying ablation stakes, etc., in the firn area. An example of a map is given where the construction of contour lines was based upon the easily determinable dye markers that were clearly visible on vertical photographs taken from 7,300-m altitude. (Author's abstract)

SIP 25991 551.324:778.34(*464.2)

Poulin, Ambrose O. and T. A. Harwood
INFRARED MAPPING OF THERMAL ANOMALIES IN GLACIERS. Can. J. Earth Sci., 3(6):881-885 incl. illus., Nov. 1966.
DLC, QE1.C17

All-season aerial reconnaissance of the Arctic has been advanced with the development of airborne, infrared scanners. The utility of such equipment for detecting and studying the progression of thermal anomalies of glaciological interest is discussed with reference to specific examples of imagery obtained during three seasons on Project "Bold Survey" under conditions of both daylight and darkness. Where possible, comparisons are made between infrared thermal imagery and conventional aerial photography. (Authors' abstract)

SIP 25992 551.324:528.47(*38)

Waite, Amory H., Jr.
INTERNATIONAL EXPERIMENTS IN GLACIER SOUNDING, 1963 AND 1964. Can. J. Earth Sci., 3(6):887-892 incl. illus., graph, Nov. 1966. 6 refs.
DLC, QE1.C17

In 1963 and 1964, under the sponsorship of the United States Army, specialists in ice sounding from various countries assembled at Camp TUTO, Greenland, to evaluate the latest sounding techniques. These international experiments showed that British and American radio-sounding systems gave results of comparable accuracy to those obtained by seismic sounding. In the two seasons bottom profiles of the ice cap were obtained along traverses totalling about 640 km. Ice thicknesses up to 2,000 m were measured as fast as the support vehicles could travel across the ice cap. (Author's abstract)

SIP 25993 551.324:912:629.136.2(*7)

Robin, G. de Q.
MAPPING THE ANTARCTIC ICE SHEET BY SATELLITE ALTIMETRY. Can. J. Earth Sci., 3(6):893-901 incl. illus., table, Nov. 1966. 7 refs.
DLC, QE1.C17

It is proposed that a radio altimeter be installed in a satellite to measure its height above the surface. It should work at a frequency of the order of 10^4 Mc/s and measure heights to an accuracy as close as practicable to ± 5 m. Heights above the ocean would be extrapolated to calculate satellite heights above sea level while over the Antarctic continent, and the difference between this calculated height and the measured height would give the surface elevation. Geometrical sounding errors and systematic errors may cause errors up to 50 m on relatively flat ice sheets, but incremental errors over 10 km should be of the order of 10 m. The systematic coverage of the Antarctic continent by a few weeks' observations from a satellite should make a detailed contour map practicable. The system would not be satisfactory for the peripheral areas where many slopes exceed 1:200 and are less regular than elsewhere, but these areas are being surveyed by conventional methods. (Authors' abstract)

SIP 25994 551.324:778.35:528.7(*41)

Arnold, K. C.
THE GLACIOLOGICAL MAPS OF MEIGHEN ISLAND, N.W.T. Can. J. Earth Sci., 3(6):903-908, Nov. 1966. 5 refs.
DLC, QE1.C17

The small ice cap on Meighen Island has been studied since 1959 by scientists working with the Polar Continental Shelf Project, Department of Mines and Technical Surveys, Ottawa. The Surveys and Mapping Branch of the same Department has produced a glaciological map of the ice cap, at the scale of 1:25,000, from special photography taken from a height of 2,260 m in 1960, and a 1:50,000 map of the whole island, showing features of glaciological interest, from standard mapping photography taken from a height of 9,150 m in 1959. The control, photography, and compilation methods used in producing these maps are discussed, and an account is given of the special features shown on them. (Author's abstract)

SIP 25995 551.324:778.35:528.7(*41)

Paterson, W. S. B.
TEST OF CONTOUR ACCURACY ON A PHOTOGRAMMETRIC MAP OF ATHABASCA GLACIER. Can. J. Earth Sci., 3(6):909-915 incl. map, Nov. 1966. 7 refs.
DLC, QE1.C17

An independent survey of the positions and elevations of 59 surface markers set in the lower part of Athabasca Glacier permits assessment of the accuracy of contours on a large-scale map of the glacier. The root mean square difference between the elevation at each marker as determined from the survey and from the map was 49 cm. This is an upper limit to the standard error of the contours. It is less than three times the theoretical error and about 15% of the contour interval. (Author's abstract)

SIP 25996 551.578.46(47:212.1)

Grishin, I. S.
SNOW COVER AND THE CALCULATION OF SNOW FRESHETS IN THE FOREST-STEPPE AND STEPPE ZONES. (Snezhnyĭ pokrov i raschet snegovykh pavodkov v lesostepnoĭ i stepnoĭ zonakh; Text in Russian). Akad. Nauk SSSR, Inst. Geografii, 128p. incl. illus., tables, maps, graphs, diagrs., "Nauka", Moscow, 1966. 94 refs.
DLC, GB2507.G7

This monograph presents the results obtained in the study of snow cover in the Don Basin in relation to the development of a new analytic method of snow freshet calculation and forecasting. The plotting of the snow-water reserve maps, the improvement of this method, and the justification of the basic parameters used in it, are emphasized. A large volume of the observation data obtained by the author and other investigators is generalized and new analytical and empirical relationships are being related to the formation of snow cover and snow freshets. The importance of this work lies also in its practical aspect: the mathematical operations discussed may be used in hydrological calculations, forecasting, and mapping of snow covers in open terrains.
-- NSV

SIP 25997 551.508.9:551.324.433=30(*32)

Karbaum, H.
AN ABLATOGRAPH. (Ein Ablatograph; Text in German). Zeitschrift für Meteorologie, Berlin, 18(11/12):408-413 incl. diagrs., 1966.
DLC, QC851.Z4

On the middle Lovén glacier at Svalbard, Spitsbergen, an ablatograph was tested in summer 1964. The operation of such a reliable instrument permits a time resolution of measuring data obtained from ablation measuring rods, and provides improvement and simplification of the work required for the investigation of the ice budget of glaciers. (Author's abstract)

SIP 25998 539.17:548.5:536.48

Abraham, Farid F.
A REEXAMINATION OF HOMOGENEOUS NUCLEATION THEORY: THERMODYNAMIC ASPECTS. J. Atmos. Sci., 25(1):47-53 incl. diagr., Jan. 1968. 9 refs.
DLC, QC851.A283

This paper presents a thermodynamic discussion of homogeneous nucleation. Some serious misconceptions are exposed concerning the proper thermodynamic energy representation that is required for the nucleation problem. The thermodynamic definition of surface tension is found, and the conditions for unstable equilibrium between a liquid drop and its vapor-air environment are developed. A derivation of Kelvin's equation is presented, and the free energy barrier that a cluster of molecules must surmount in order to become a growing drop is discussed. The conventional approach to this problem is compared with our treatment. (Author's abstract)

SIP 25999 551.574.1:536.421.4

Dye, J. E. and P. V. Hobbs
THE INFLUENCE OF ENVIRONMENTAL PARAMETERS ON THE FREEZING AND FRAGMENTATION OF SUSPENDED WATER DROPS. J. Atmos. Sci., 25(1):82-96 incl. illus., diagrs., tables, Jan. 1968. 20 refs.
DLC, QC851.A283

The fragmentation of freezing water droplets in natural clouds has been postulated by several workers, and this phenomenon has been observed in numerous laboratory investigations. However, the profound effect that environmental conditions can have on fragmentation has not been fully appreciated. In the first part of this paper the factors that might affect the freezing behavior and fragmentation of a water drop are discussed, and, where possible, are analyzed in detail. In the second part of the paper results are presented of laboratory experiments on the freezing of suspended water drops 1 mm in diameter. Drops nucleated in air under equilibrium conditions were never observed to shatter and only one drop in ten ejected an ice splinter. The shattering and large splinter counts from suspended drops nucleated in air which have been reported by other workers are attributed to the contamination of the drops by carbon dioxide and nucleation under non-equilibrium conditions. Drops frozen in hydrogen shattered frequently if the temperature was lower than -9°C. Drops frozen in helium at -10 to -12°C shattered on occasions. In a mixture of air and carbon dioxide the shattering behavior was very dependent on the concentration of carbon dioxide. Large numbers of ice splinters were detected only if a drop shattered. (Authors' abstract)

SIP 26000 551.322:548.51:54-145:539.199

Parungo, Farn P. and Janet Wood
FREEZING OF AQUEOUS SOLUTIONS OF MACROMOLECULES. J. Atmos. Sci., 25(1):154-155, Jan. 1968. 9 refs.
DLC, QC851.A283

To confirm ice nucleation on surfaces the freezing of a group of sols and nucleation temperatures of water droplets on corresponding solids was investigated. Macromolecular species which did and did not show line broadening of water protons were selected. The following compounds were used: agar, gelatin, citrus pectin, polyvinyl pyrrolidone, starch, methoxycellulose, ovalbumin, porcine pepsin, bovine albumen, polyvinol alcohol, ribonucleic acid and deoxyribonucleic acid. No important change in freezing point was observed for any solution of any concentration. There is no obvious relationship to effects previously reported from NMR data, to the viscosity of the solutions or any obvious parameter. It thus appears that the water immobilized in the structure of some macromolecules is not held in an ice-like lattice, whatever the NMR spectrum may look like. None of the macromolecular species tested is particularly active as a nucleating agent, whether in solution or as a solid. -- FMM

AUTHOR INDEX

TITLE INDEX

GEOGRAPHIC INDEX

SUBJECT INDEX