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# A Reconnaissance Snow Survey Across Northwest Territories and Nunavut, Canada, April 2007

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Prepared for National Science Foundation
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**Abstract:** During April 2007, a coordinated series of snow measurements were made across the Northwest Territories and Nunavut, Canada, during a 4200-km snowmobile traverse from Fairbanks, Alaska, to Baker Lake, Nunavut. While detailed, local snow measurements have been made as part of ongoing studies at tundra field sites in this region (Daring Lake and Trail Valley Creek in the Northwest Territories), systematic measurements at the regional scale have not been previously collected across this region. Consistent with observations of tundra snow in Alaska and northern Manitoba, the snow cover consisted of depth hoar and wind slab with small and ephemeral fractions of new, recent, and icy snow. The snow was shallow (<40 cm deep), usually with less than six layers. Where deposited on lake and river ice, the snow was shallower, denser, and more metamorphosed than where deposited on tundra. The snow characteristics were highly variable at a local scale, but no longitudinal gradients in snow distribution, magnitude, or structure were detected. Lakes and lake ice confounded passive microwave remote sensing of the snow cover in this area because the lake signal overwhelmed the snow signal. Consequently, challenges remain in developing methods to monitor this snow cover by satellite.

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# Preface

This report was prepared by Matthew Sturm, Terrestrial and Cryospheric Sciences Branch (TCSB), Cold Regions Research and Engineering Laboratory (CRREL), U.S. Army Engineer Research and Development Center (ERDC), Hanover, NH; Chris Derksen, Climate Research Division, Environment Canada, Toronto, Ontario; Glen Liston, Cooperative Institute for Research and Engineering in the Atmosphere, Colorado State University, Fort Collins, CO; Arvids Silis, Climate Research Division, Environment Canada, Toronto, Ontario; Daniel Solie, University of Alaska Fairbanks, Fairbanks, AK; Jon Holmgren, TCSB, CRREL/ERDC; and Henry Huntington, Huntington Consulting, Anchorage, AK.

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The report was prepared under the general supervision of Janet Hardy, Chief, TCSB; Dr. Justin Berman, Chief, Research and Engineering Division; and Dr. Robert E. Davis, Director, CRREL.

The Commander and Executive Director of ERDC is COL Richard B. Jenkins. The Director is Dr. James R. Houston.

# 1 Introduction

During April 2007, we made a coordinated series of snow measurements across the Northwest Territories (NWT) and Nunavut, Canada. These were made while traversing by snowmobile from Fairbanks, Alaska, to Baker Lake, Nunavut, as part of the SnowSTAR-2007 expedition. The purpose of the measurements was to document the general nature of the snowpack across this region. Detailed, local snow measurements have been made as part of on-going studies at a few places along the traverse route like Daring Lake and Trail Valley Creek in the Northwest Territories, but to our knowledge, systematic measurements at the regional scale have not been collected in this area before.

# 2 Study Area

The study area and the route of SnowSTAR-2007 are shown in Figure 1. Measurements were made at the 45 locations listed in Table 1. The route included a) long stretches on frozen lakes, including Great Bear Lake, the seventh largest lake in the world, b) areas of rolling tundra, and c) areas of rocky, morainal tundra. A more detailed description of the exploration history and physiography of the region can be found in Tyrrell (1897) and Douglas (1914).

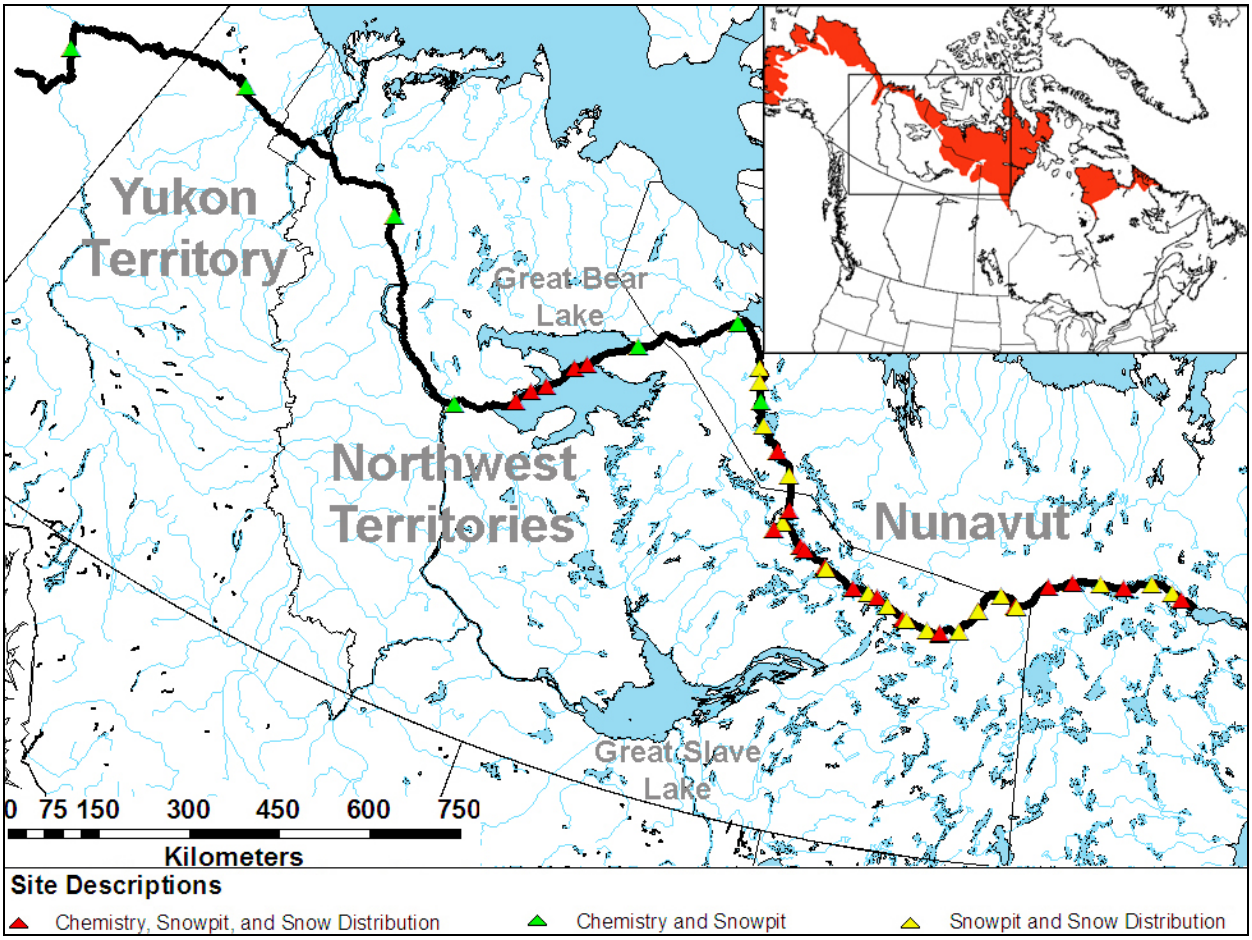



Figure 1. Map of the SnowSTAR-2007 traverse, which started in Fairbanks, Alaska, entered Canada in the Yukon Territory, crossed the Northwest Territories, and ended in Nunavut. Sites where snow measurements were made are denoted by triangles. The approximate extent of tundra snow across continental North America is highlighted in red in the map inset.

Table 1. Sites where snow measurements were made.

| Site Name | Description | Date | Latitude | Longitude | Chemistry | Snowpit | Depth | SWE | Ice Thickness | NIR photos |
|---|---|---|---|---|---|---|---|---|---|---|
| Yukon River | River | 19-Mar-07 | 66.25552 | 144.76890 | √ | √ | | | | √ |
| Porcupine River | River | 25-Mar-07 | 67.56833 | 138.28667 | √ | √ | | | | √ |
| MacKenzie River | River | 30-Mar-07 | 67.16000 | 130.25667 | √ | √ | | | | √ |
| Small lake near Deline | Lake | 01-Apr-07 | 64.93390 | 124.77438 | √ | √ | | | | √ |
| Great Bear 1 (GB1) | Lake | 02-Apr-07 | 65.37922 | 122.66280 | √ | √ | √ | √ | √ | √ |
| Great Bear 2 (GB2) | Lake | 03-Apr-07 | 65.60676 | 122.26140 | √ | √ | √ | √ | √ | √ |
| Great Bear 3 (GB3) | Lake | 03-Apr-07 | 65.78752 | 121.78390 | √ | √ | √ | √ | √ | √ |
| Great Bear 4 (GB4) | Lake | 04-Apr-07 | 66.22479 | 121.06220 | √ | √ | √ | √ | √ | √ |
| Great Bear 5 (GB5) | Lake | 04-Apr-07 | 66.35284 | 120.63710 | √ | √ | √ | √ | √ | √ |
| Dease River | River | 06-Apr-07 | 66.90020 | 118.93787 | √ | √ | | | | √ |
| Bloody Falls | Tundra | 10-Apr-07 | 67.74865 | 115.37532 | √ | √ | | | | √ |
| KD1 | Tundra | 11-Apr-07 | 67.17657 | 113.98170 | | √ | √ | | | √ |
| KD2 | Lake | 11-Apr-07 | 66.95060 | 113.82645 | | √ | √ | | | √ |
| KD3 | Lake | 11-Apr-07 | 66.65447 | 113.55992 | √ | √ | √ | | | √ |
| KD4 | Lake | 11-Apr-07 | 66.29432 | 113.23383 | | √ | √ | | | √ |
| Rockinghorse Lake | Lake | 12-Apr-07 | 65.95683 | 112.42167 | √ | √ | √ | | | √ |
| KD6 | Tundra | 12-Apr-07 | 65.62297 | 111.73620 | | √ | √ | | | √ |
| Yamba Lake | Lake | 13-Apr-07 | 65.08667 | 111.45447 | √ | √ | √ | √ | √ | √ |
| Lake Providence | Tundra | 15-Apr-07 | 64.74738 | 111.85403 | √ | √ | √ | √ | | √ |
| Diavik (DB1) | Tundra | 17-Apr-07 | 64.58344 | 110.75402 | √ | √ | √ | √ | | √ |
| Lac de Gras (DB2) | Lake | 17-Apr-07 | 64.52760 | 110.53655 | √ | √ | √ | √ | √ | √ |
| Thonokied Lake (DB3) | Lake | 18-Apr-07 | 64.35160 | 109.68070 | √ | √ | √ | √ | √ | √ |
| Thonokied (DB4) | Tundra | 18-Apr-07 | 64.31560 | 109.62797 | | √ | √ | √ | | √ |
| Aylmer Lake (DB5) | Lake | 18-Apr-07 | 64.08630 | 108.50971 | √ | √ | √ | √ | √ | √ |
| Aylmer/Clinton-Colden | Tundra | 19-Apr-07 | 64.04894 | 107.90361 | | √ | √ | √ | | √ |
| Clinton-Colden Lake (DB7) | Lake | 19-Apr-07 | 64.01122 | 107.57671 | √ | √ | √ | √ | √ | √ |
| Clinton-Colden | Tundra | 19-Apr-07 | 63.90762 | 107.17368 | | √ | √ | √ | | √ |
| Sifton Lake (DB9) | Lake | 20-Apr-07 | 63.75079 | 106.54487 | √ | √ | √ | √ | √ | √ |
| North Hanbury | Tundra | 20-Apr-07 | 63.73479 | 106.40660 | | √ | √ | √ | | √ |
| West Hoare | Tundra | 20-Apr-07 | 63.61753 | 105.58390 | | √ | √ | √ | | √ |
| Hoare Cabin (DB12) | Tundra | 21-Apr-07 | 63.59357 | 105.14859 | | √ | √ | √ | | √ |
| Hoare Lake (DB13) | Lake | 21-Apr-07 | 63.61069 | 105.12755 | √ | √ | √ | √ | √ | √ |
| Hanbury/Thelon (DB14) | Tundra | 21-Apr-07 | 63.67893 | 104.44458 | | √ | √ | √ | | √ |
| Hornby Point (DB16) | Forest | 22-Apr-07 | 64.03854 | 103.85468 | √ | √ | √ | √ | | √ |

Table 1 (cont.). Sites where snow measurements were made.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Hornby Thelon (DB15) | River | 22-Apr-07 | 64.04111 | 103.84445 | | √ | √ | √ | | √ |
| Thelon Nunavut (DB17) | River | 22-Apr-07 | 64.32897 | 103.10192 | | √ | √ | √ | | √ |
| Thelon Lookout Point | River | 23-Apr-07 | 64.17569 | 102.50803 | √ | √ | √ | √ | | √ |
| Lookout Point (DB19) | Tundra | 23-Apr-07 | 64.16911 | 102.49567 | | √ | √ | √ | | √ |
| Thelon Cabin (DB20) | Tundra | 23-Apr-07 | 64.53258 | 101.35525 | √ | √ | √ | √ | | √ |
| Beverly Lake (DB21) | Lake | 24-Apr-07 | 64.62036 | 100.47297 | √ | √ | √ | √ | √ | √ |
| Aberdeen (DB22) | Tundra | 24-Apr-07 | 64.62642 | 99.44250 | | √ | √ | √ | | √ |
| Aberdeen Lake (DB23) | Lake | 25-Apr-07 | 64.57758 | 98.54950 | √ | √ | √ | √ | √ | √ |
| South Schultz (DB24) | Tundra | 25-Apr-07 | 64.66439 | 97.50247 | | √ | √ | √ | | √ |
| North Baker (DB25) | Tundra | 26-Apr-07 | 64.52308 | 96.75625 | | √ | √ | √ | | √ |
| Baker (DB26) | Tundra | 26-Apr-07 | 64.41800 | 96.40628 | √ | √ | √ | √ | √ | |

# 3 Measurements

At the 45 sites marked in Figure 1, we measured snow depth, density, snow water equivalent (SWE), stratigraphy, and grain size. Our goal was to make measurements at paired sites, one on tundra (land) and one on ice (lake or river ice, depending on what was available: see the Description column in Table 1). It was not always possible to achieve this goal. At selected sites we collected snow samples for analysis of soot content, ionic loading, and mercury (Table 1). These chemical samples were collected on behalf of other research groups. The results will be analyzed and reported elsewhere, but the observed values, by site, appear in Appendices C, D, and E.

Standard methods were used to measure snow stratigraphy, density, and SWE (Colbeck et al. 1992). More extensive depth transects were measured than is customary by using a self-recording snow depth probe (U.S. Patent No. 5864059; *cf*. Sturm and Liston 2003) linked to a GPS. At most sites, 201 depth measurements were made at 0.5-m spacing over a 100-m line. These closely spaced measurements were followed by several hundred more measurements made at random spacings, their locations recorded by the GPS. Bulk SWE and density were determined from snow cores (measured in pairs) taken every 25 m along the sampling line. An ESC-30 snow corer (cross sectional area of 30 $cm^2$) was used for these measurements. Grain size was measured using a stereo-microscope and comparator card. In addition, near-infrared (NIR) images of snowpit faces were made using a Sony DSC-P200 Cybershot 7.2-Mpixel digital camera equipped with an NIR filter (MaxMAx Xnite 850). These were processed in accordance with the methods of Matzl and Schneebeli (2007).

# 4 Results

## General Nature of the Snowpack

With the exception of a single site that was in the taiga forest, all of the snow examined during the traverse could be classified as tundra snow (Sturm et al. 1995). The tundra snow cover is a thin snowpack that consists mainly of wind slab and depth hoar (the latter usually making up layers at the bottom of the pack), with small but variable amounts of new and recent snow at the top of the pack. Features associated with wind deposition and erosion (dunes, sastrugi) are ubiquitous. As suggested in Figure 2, the mature tundra snowpack rarely has more than five to eight layers, a product of a limited number of winter precipitation events. Minus a thin veneer of new recent snow, the top layers are wind slabs due to the free play of the wind during the long winter, and the basal layers are depth hoar due to the strong gradients imposed by the frigid air temperatures. Wind slabs formed in early winter often completely metamorphose into depth hoar by the end of the season due to these gradients.

Tundra snow occurs throughout the tundra regions of the Arctic. Consequently, the snow cover observed on the traverse was similar to the snow cover of northern and western Alaska (Benson 1969, Benson and Sturm 1993, Sturm and Liston 2003), northern Manitoba (Derksen et al. 2003, 2005) and eastern Canada (Granberg 1978). One unintended but interesting result of the traverse is that the measurements confirm that this tundra snow can be found in a broad band stretching over 6000 km from Pt. Lay, Alaska, to Cape Dyer on Baffin Island. One feature of this type of snowpack that is not widely understood is that wind slab layers low in the pack (formed in early winter) completely metamorphose into depth hoar by the end of the winter. The grains in these layers are morphologically similar to regular depth hoar, but the layers are stronger and more cohesive than normal for depth hoar layers, a relict feature of the original wind slab. We call these layers “indurated.”

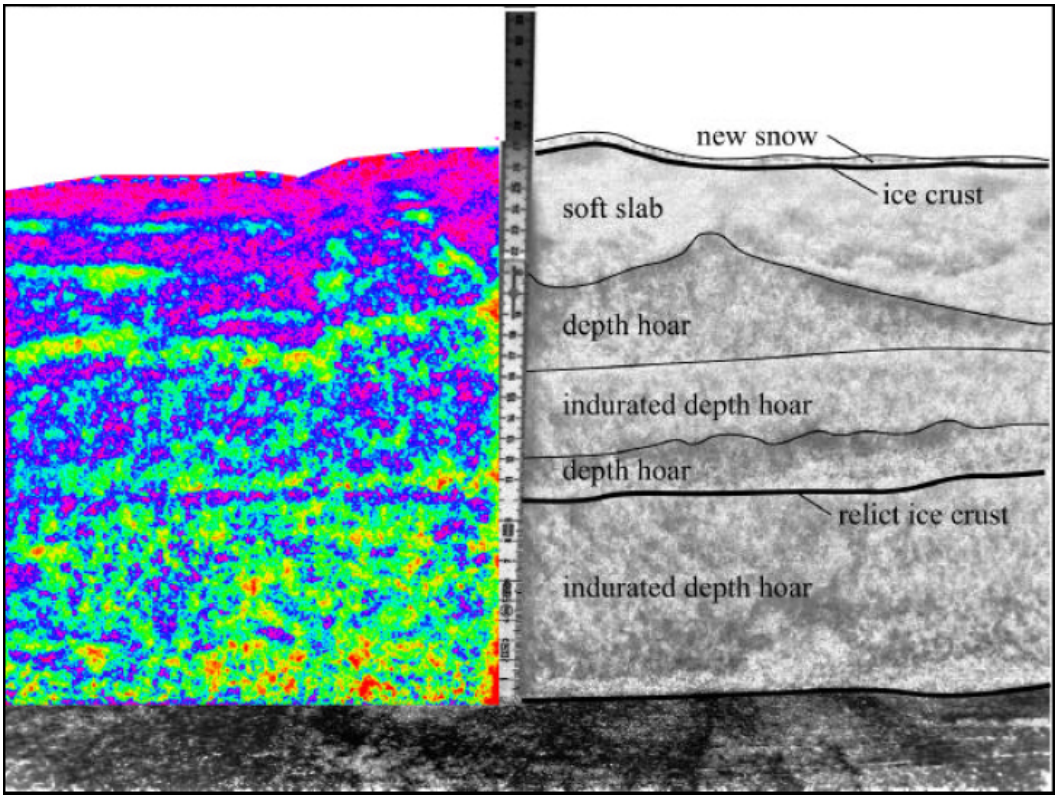
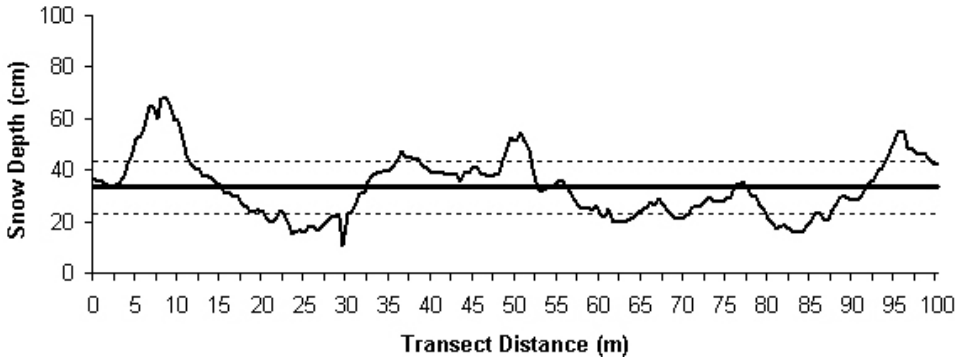



Figure 2. Snow stratigraphy (right) at site KD-7 (Yamba Lake). The color representation of the NIR image of the left side of the snowpit indicates the relative grain size (yellow and red = largest; purple and blue = smallest).

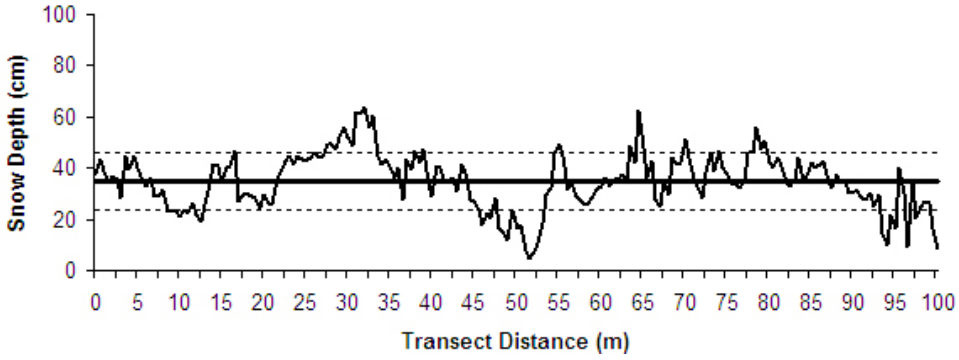
## Distributions of Depth, Density, and SWE

Typical snow depth transect profiles (100 m long) from the traverse are shown in Figures 3a and 3b for lake and tundra sites, respectively. The more spatially expansive roving snow depth measurements for the same sites are shown in Figures 3c and 3d. Similar profiles were obtained at all stations (Figure 1 and Table 1). Greater depth variability over land surfaces compared to lakes is evident in Figure 3, a finding that has been reported before (Sturm and Liston 2003, Derksen et al. 2005).

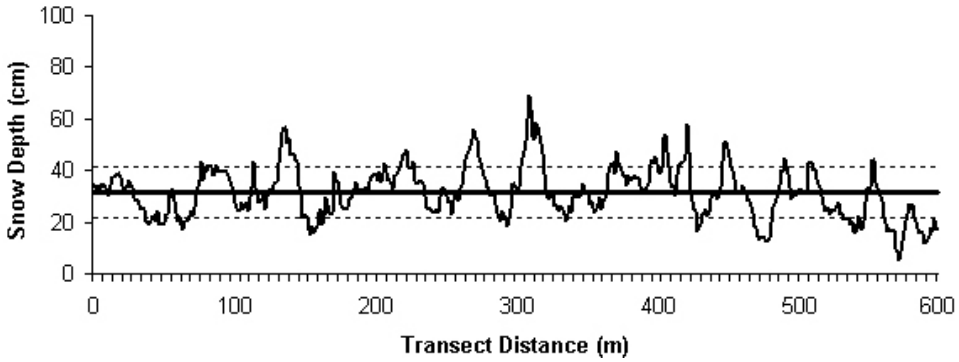
Probability distribution functions (PDFs) of snow depth, density, and SWE measurements based on all measured profiles are shown in Figures 4, 5, and 6, respectively. Statistics describing these PDFs are given in Table 2.



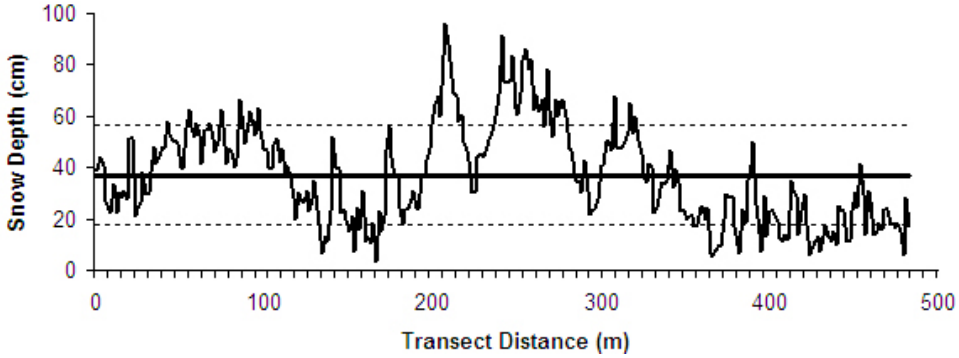

a. Typical 100-m snow depth profile for a lake site.




b. Typical 100-m snow depth profile for a tundra site.




c. Roving snow depth profile for a lake site.

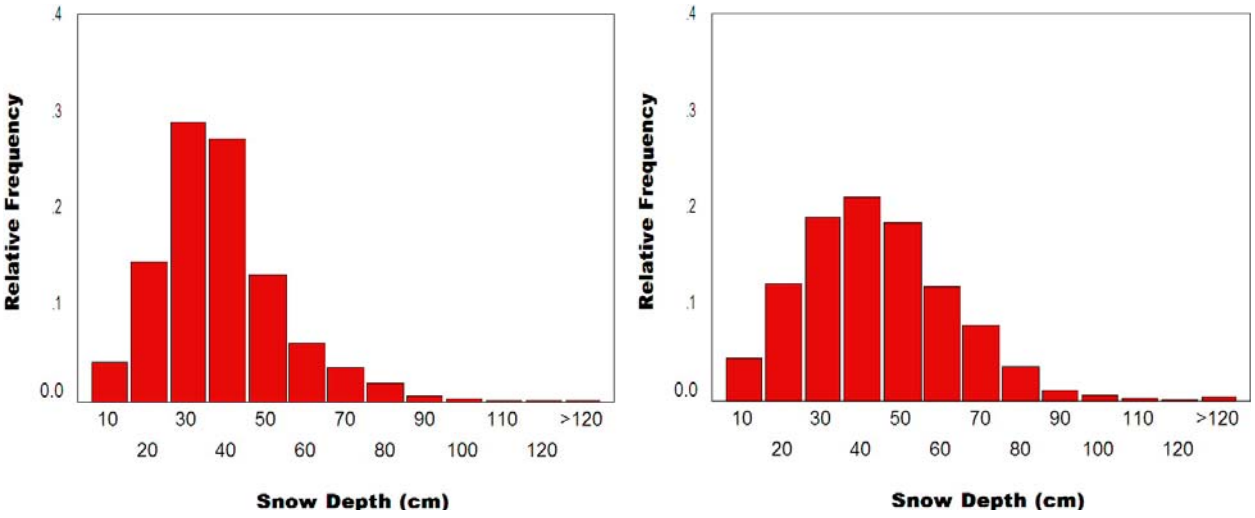



d. Roving snow depth profile for a tundra site.

Figure 3. Typical snow depth profiles for lake and tundra sites. The mean value is shown by the heavy black line; dashed lines indicate ±1 standard deviation.

Table 2. Summary of measured depth, density, and SWE probability distribution functions (see Figures 4–6). Automatic depth probes could only measure up to 122 cm deep, but not deeper, hence the uncertainty in max. and range values.

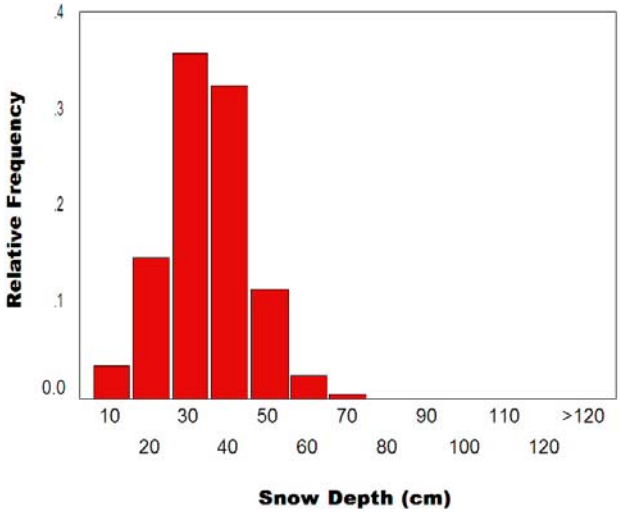
| | Depth (cm) | | | Density (g/cm³) | | | SWE (mm) | | |
|---|---|---|---|---|---|---|---|---|---|
| | All | Tundra | Lakes | All | Tundra | Lakes | All | Tundra | Lakes |
| Mean | 33.1 | 38.9 | 29.2 | 0.356 | 0.347 | 0.379 | 108.7 | 119.9 | 100.7 |
| St. Dev. | 16.2 | 19.5 | 10.4 | 0.066 | 0.055 | 0.065 | 49.6 | 55.8 | 40.1 |
| Min | 0.2 | 0.2 | 0.4 | 0.207 | 0.207 | 0.227 | 12.0 | 18.8 | 12.0 |
| Max | >122 | >122 | 73.9 | 0.627 | 0.627 | 0.559 | 272.0 | 272.0 | 231.0 |
| Range | >122 | >122 | 73.5 | 0.420 | 0.420 | 0.332 | 260.1 | 253.2 | 219.0 |
| CV | 0.49 | 0.50 | 0.36 | 0.19 | 0.16 | 0.17 | 0.46 | 0.47 | 0.40 |
| Skew | 1.21 | 0.78 | 0.00 | 0.55 | 1.22 | 0.18 | 0.57 | 0.33 | 0.56 |
| Kurtosis | 2.99 | 1.31 | -0.23 | 0.95 | 5.04 | 0.30 | –0.04 | –0.46 | 0.44 |




a. All sites.

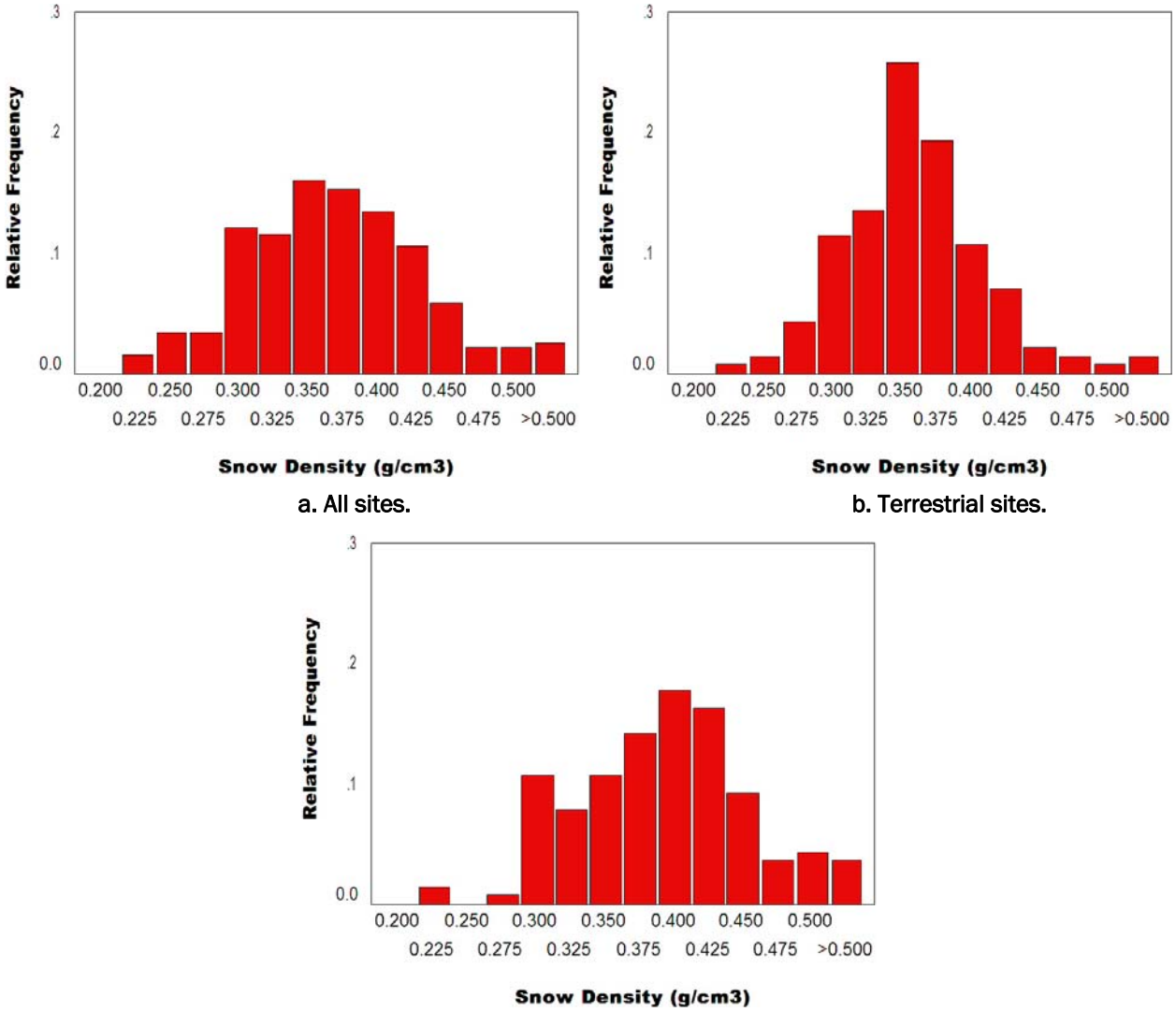



b. Terrestrial sites.




C. Lake/river sites.

Figure 4. PDFs of measured snow depth.




a. All sites.

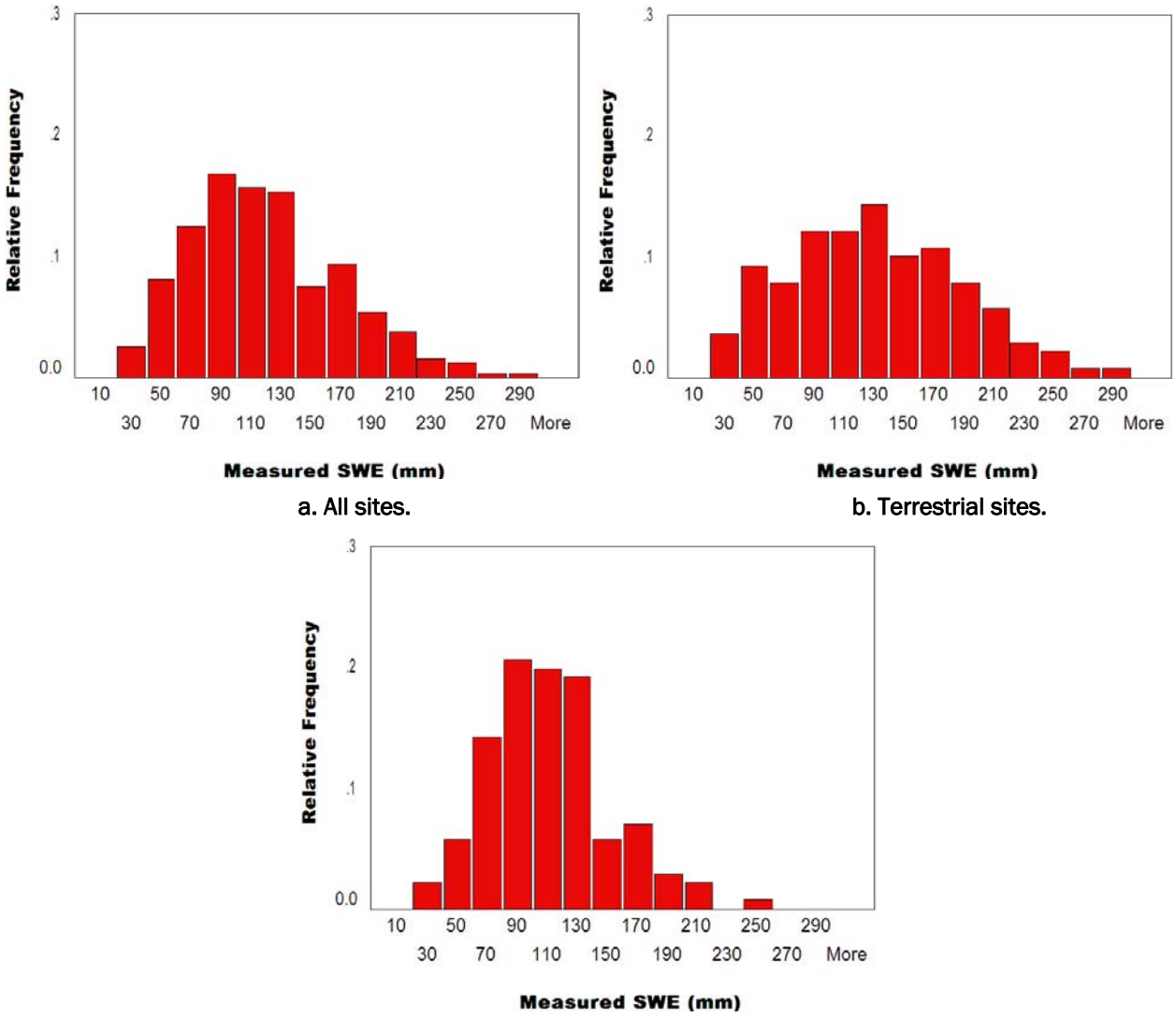
b. Terrestrial sites.

C. Lake/river sites.

Figure 5. PDFs of measured bulk density.

Separate PDFs were plotted for all sites, terrestrial sites, and lake/river sites. For snow depth, all distributions have a peak at approximately 30–40 cm, but differences are clear between terrestrial sites (Fig. 4b) and lake sites (Fig. 4c). Snow depth range and variability were higher at terrestrial sites: the more extensive right skew was driven by variability in snow catchment and retention related to slope and vegetation. These two parameters are absent on lakes, where accumulation patterns are produced solely by wind drifting (Sturm and Liston 2003).

Unlike snow depth, the snow density measured on lakes (Fig. 5c) had a more uniform distribution (i.e., the probability of a bulk density of 0.3 was not significantly different than the probability of density of 0.4) compared




a. All sites.

b. Terrestrial sites.

C. Lake/river sites.

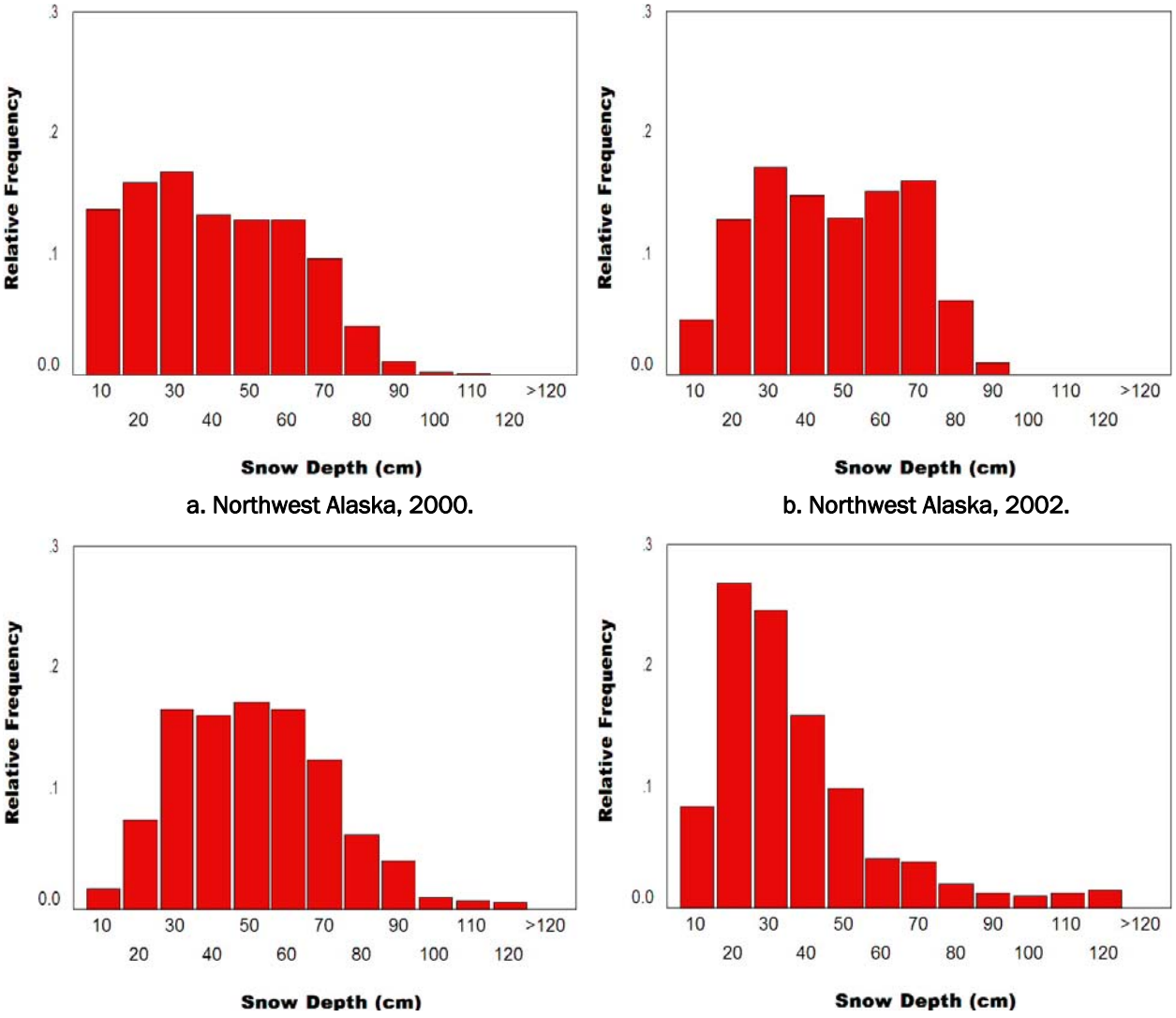
Figure 6. PDFs of measured SWE.

to terrestrial sites (Fig. 5b), which had a normal distribution centered on 0.35. The PDFs illustrate a clear lower threshold in snow density across the entire region of 0.3 g/cm$^3$. Measurements below this value were very rare (appproximately5% of all density measurements) regardless of land cover and substrate. Measured SWE values exhibited greater variability at terrestrial sites (Fig. 6b) versus lake sites (Fig. 6c). The trapping influence of vegetation creates the strong right skew in the terrestrial measurements, while a SWE storage capacity on lakes of approximately 130 mm was evident.

Because SWE is a product of depth and density, the underlying driver of SWE variability can be determined from the PDFs in Figures 4 and 5. On

land, a log-normal distribution for depth was coupled with a sharply peaked density PDF centered on about 0.35. Land snow depths varied with the distribution of tussocks, rocks, and shrubs, possibly even with the micro-topography, but the bulk density was consistent because wind action was the same across all of the vegetation and terrain types. This produced a broad, skewed SWE PDF (Fig. 6b). In contrast, without any shrubs or tussocks, the snow on the lakes and rivers tended to have a uniform depth due to much more consistent, uninterrupted wind action, but the same processes produced a wide range in density due to the successive pattern of hard-packed drifts interspersed with soft snow. For lakes, this density variation broadened the SWE distribution in comparison to the strongly peaked depth distribution. In short, tundra SWE is variable because tundra snow depth is variable (density is relatively constant), while lake/river SWE is variable because lake/river ice snow density is variable (though depth is relatively consistent).

We have compared the depth results shown here from Northwest Territories and Nunavut with results from previous traverses from northwest Alaska (Fig. 7 a, b, and c) (Sturm and Liston 2003) and northern Manitoba (also tundra snow: Fig. 7 d) (Derksen et al. 2005, updated with unpublished data). The results are qualitatively similar, particularly for terrestrial sites, though the Alaskan measurements show a larger modal range. It is possible that this larger modal range arises because the Alaskan data were taken on a south-to-north transect about 1000 km in length. Latitudinal gradients in precipitation and wind across this transect may be larger than those gradients found along the transect described here, which ran basically west to east.




a. Northwest Alaska, 2000.

b. Northwest Alaska, 2002.

c. Northwest Alaska, 2004.

d. Northern Manitoba, 2006.

Figure 7. PDFs of measured snow depths from previous traverses.

## Stratigraphy

Snowpits were excavated to determine the snowpack stratigraphy at each site. Layer and grain types were noted following the classification of Colbeck et al. (1992) as outlined in Table 3. Because depth hoar and wind slab are ubiquitous in the tundra snow, the classification system was broadened for those types of snow to allow for a more nuanced approach. Specifically, in the field we recognized four types of slabs (soft, moderate, hard, and very hard) based on hardness, and we also noted depth hoar layers whose texture indicated they had origins as a wind slab. This type of layer is generally not seen outside of the Arctic. It arises in the Arctic because the temperature gradients are so strong (Sturm et. al. 1995) that

Table 3. Overview of snow grain classification used during the traverse.

| Grain Type | Code | Grain Type | Code |
|---|---|---|---|
| New | 1 | Chains of hoar | 11 |
| Recent | 2 | Chains of hoar, indurated | 12 |
| Fine grains | 3 | Chains of hoar, voids | 13 |
| Medium grains | 4 | Icy hoar | 14 |
| Soft slab | 5 | Snow ice | 15 |
| Moderate slab | 6 | Ice layer | 16 |
| Hard slab | 7 | Melt grain clusters | 17 |
| Very hard slab | 8 | Melt grain clusters with percolation columns | 18 |
| Slab-to-hoar | 9 | Slab-to-hoar, slablike | 19 |
| Depth hoar | 10 | Solid hoar | 20 |

even dense, fine-grained layers of wind slab eventually metamorphose into large, faceted, and striated depth hoar grains. A key characteristic of these slab-to-hoar layers is that they are tough, not fragile like most depth hoar. If comprised of mainly depth hoar crystals, yet still cohesive, we called the layers "indurated." If a significant number of small wind grains remained, we called them "slablike."

Of special stratigraphic note: at over 50% of the sites we visited there was a distinctive ice layer near the surface of the pack. On April 6 a rain-on-snow event was observed in the vicinity of Daring Lake, NWT. This event produced a surface ice crust or glaze that extended from Daring Lake east more than 100 km. Where exposed at the surface, this crust produced a shiny firnspiegel layer (Fig. 8) that at times was so slippery that it was treacherous to walk on. (This feature will be discussed in more detail later.)

As we have noted before for Alaskan tundra snow (Benson 1969, Benson and Sturm 1993), the snowpack of NWT and Nunavut was made up of a limited number of layers, almost always less than seven (Table 4). There were generally more layers on the tundra (terrestrial) than on ice (lake/river) substrates, probably because early season snowfalls fell into the water on lakes and rivers but were preserved on the tundra. In all locations, more than two thirds of the pack by thickness was depth hoar (including slab-to-hoar), while a surprisingly low percentage (11–14%) was wind slab. In northwest Alaska, more typically we have seen about twice this percentage of wind slab. We do not know whether 2007 was a low wind year in Nunavut and NWT, or whether depth hoar metamorphism driven by low temperatures converted more slabs into hoar, or some combination of both; however, as we discuss later, there is some reason to

Figure 8. Firnspiegel (icy, shiny snow) produced by the April 6th rain-on-snow event.

think that metamorphism was more extreme over the traverse route than in northwest Alaska. The contrast in bulk density between tundra and lake sites was expected (windier lakes equal more dense snow layers, hence overall a denser snowpack), but the low density for river sites is more difficult to explain. Despite these minor differences, overall, we suggest that the snow across all terrain units sampled during the traverse tended to be similar. All of it was thin, with relatively few layers, and almost all of it was fully converted into coarse-grained depth hoar by the end of the winter. Table 5 provides the full data that are summarized in Table 4.

Table 4. Stratigraphy statistics.

| | All Sites | Tundra Sites | Lake Sites | River Sites |
|---|---|---|---|---|
| Number of Layers | 5.8 | 6.6 | 4.9 | 5.5 |
| Ave. Layer Thickness (cm) | 6.6 | 6.7 | 6.4 | 6.3 |
| Total Thickness (cm) | 37.1 | 43.4 | 30.1 | 33.6 |
| SWE (cm) | 11.4 | 14.0 | 10.1 | 8.1 |
| Bulk density (g/cm$^3$) | 0.311 | 0.319 | 0.340 | 0.236 |
| Hoar Fraction | 0.71 | 0.65 | 0.76 | 0.71 |
| Slab Fraction | 0.12 | 0.14 | 0.11 | 0.12 |
| Icy Fraction | 0.03 | 0.02 | 0.04 | 0.02 |
| New/Recent Fraction | 0.11 | 0.14 | 0.07 | 0.12 |
| Other Fraction | 0.03 | 0.03 | 0.02 | 0.03 |

Table 5. Summary of snowpack stratigraphic composition by site.

| Site | Description | Number of Layers | Ave. Layer Thickness (cm) | Total Thickness (cm) | SWE (cm) | Bulk Density (g/cm³) |
|---|---|---|---|---|---|---|
| Yukon | River | 4 | 8.3 | 33 | 6.0 | 0.183 |
| Porcupine | River | 6 | 5.3 | 32 | 5.9 | 0.185 |
| Mackenzie | River | 6 | 6.8 | 41 | 7.6 | 0.187 |
| Deline | Lake | 6 | 8.0 | 48 | 9.0 | 0.188 |
| Great Bear 1 | Lake | 4 | 5.5 | 22 | 5.6 | 0.254 |
| Great Bear 2 | Lake | 7 | 5.1 | 36 | 9.7 | 0.270 |
| Great Bear 3 | Lake | 6 | 3.8 | 23 | 7.3 | 0.316 |
| Great Bear 4 | Lake | 4 | 7.0 | 28 | 11.8 | 0.422 |
| Great Bear 5 | Lake | 2 | 11.5 | 23 | 10.7 | 0.465 |
| Dease | River | 6 | 5.7 | 34 | 8.3 | 0.244 |
| Bloody Falls | Tundra | 6 | 7.0 | 42 | 11.5 | 0.274 |
| KD1 | Tundra | 7 | 5.0 | 35 | 11.3 | 0.323 |
| KD2 | Lake | 4 | 4.5 | 18 | 5.6 | 0.309 |
| KD3 | Lake | 5 | 4.1 | 21 | 7.8 | 0.382 |
| KD4 | Lake | 6 | 5.0 | 30 | 10.7 | 0.358 |
| Rockinghorse | Lake | 5 | 6.4 | 32 | 10.2 | 0.320 |
| KD6 | Tundra | 6 | 8.7 | 52 | 18.8 | 0.361 |
| Yamba | Lake | 7 | 4.0 | 28 | 8.0 | 0.287 |
| Lake Providence | Tundra | 8 | 4.0 | 32 | 8.4 | 0.261 |
| Diavik | Tundra | 5 | 6.0 | 30 | 10.4 | 0.346 |
| Lac de Gras | Lake | 7 | 5.1 | 36 | 13.4 | 0.372 |
| Thonokied Lake | Lake | 5 | 6.6 | 33 | 11.2 | 0.340 |
| Thonokied | Tundra | 5 | 11.0 | 55 | 17.2 | 0.313 |
| Aylmer Lake | Lake | 5 | 6.4 | 32 | 10.5 | 0.327 |
| Aylmer/Clinton-Colden | Tundra | 8 | 5.5 | 44 | 15.8 | 0.359 |
| Clinton-Colden Lake | Lake | 4 | 12.5 | 50 | 20.0 | 0.400 |
| Clinton-Colden | Tundra | 5 | 4.6 | 23 | 8.0 | 0.349 |
| Sifton Lake | Lake | 5 | 6.2 | 31 | 11.3 | 0.363 |
| North Hanbury | Tundra | 7 | 4.4 | 31 | 9.0 | 0.289 |
| West Hoare | Tundra | 7 | 9.0 | 63 | 22.8 | 0.362 |
| Hoare Cabin | Tundra | 6 | 6.0 | 35 | 9.7 | 0.276 |
| Hoare Lake | Lake | 5 | 6.2 | 31 | 10.0 | 0.324 |
| Hanbury/Thelon | Tundra | 7 | 6.4 | 45 | 13.7 | 0.305 |
| Hornby Point | Forest | 9 | 9.9 | 89 | 19.6 | 0.220 |
| Hornby Thelon River | River | 4 | 5.8 | 23 | 4.9 | 0.212 |
| Thelon Nunavut | River | 6 | 6.8 | 41 | 12.5 | 0.304 |
| Thelon Lookout Point | River | 7 | 3.1 | 22 | 5.3 | 0.239 |
| Lookout Point | Tundra | 5 | 10.2 | 51 | 18.2 | 0.356 |
| Thelon Cabin | Tundra | 8 | 5.1 | 41 | 11.7 | 0.285 |
| Beverly Lake | Lake | 4 | 8.0 | 32 | 11.6 | 0.364 |
| Aberdeen | Tundra | 8 | 5.9 | 47 | 13.5 | 0.286 |
| Aberdeen Lake | Lake | 3 | 6.3 | 19 | 7.7 | 0.406 |
| South Schultz | Tundra | 9 | 8.8 | 79 | 27.1 | 0.344 |
| North Baker | Tundra | 5 | 6.4 | 32 | 10.9 | 0.340 |
| Baker | River | 5 | 8.6 | 43 | 14.5 | 0.336 |
| ***Average*** | ***All*** | ***5.8*** | ***6.6*** | ***37.1*** | ***11.4*** | ***0.311*** |
| ***Average*** | ***Tundra*** | ***6.6*** | ***6.7*** | ***43.4*** | ***14.0*** | ***0.319*** |
| ***Average*** | ***Lake*** | ***4.9*** | ***6.4*** | ***30.1*** | ***10.1*** | ***0.340*** |
| ***Average*** | ***River*** | ***5.5*** | ***6.3*** | ***33.6*** | ***8.1*** | ***0.236*** |

Table 5 (cont). Summary of snowpack stratigraphic composition by site.

| Site | Description | Fraction (%) | | | | | Grain Long | Grain Short |
|---|---|---|---|---|---|---|---|---|
| | | Hoar | Slab | Wet/Icy | New/ Recent | Other | | |
| Yukon | River | 97.0 | 0.0 | 0.0 | 3.0 | 0.0 | 4.3 | 2.2 |
| Porcupine | River | 46.9 | 12.5 | 0.0 | 21.9 | 18.8 | 4.6 | 1.7 |
| Mackenzie | River | 46.3 | 26.8 | 2.4 | 24.4 | 0.0 | 4.9 | 1.6 |
| Deline | Lake | 83.3 | 0.0 | 2.1 | 14.6 | 0.0 | 9.1 | 3.6 |
| Great Bear 1 | Lake | 81.8 | 0.0 | 0.0 | 18.2 | 0.0 | 3.8 | 0.5 |
| Great Bear 2 | Lake | 91.7 | 0.0 | 8.3 | 0.0 | 0.0 | 5.5 | 1.4 |
| Great Bear 3 | Lake | 90.9 | 0.0 | 9.1 | 0.0 | 0.0 | 3.0 | 1.0 |
| Great Bear 4 | Lake | 96.4 | 0.0 | 3.6 | 0.0 | 0.0 | 2.8 | 1.0 |
| Great Bear 5 | Lake | 97.8 | 0.0 | 0.0 | 2.2 | 0.0 | 2.0 | 1.0 |
| Dease | River | 79.4 | 0.0 | 8.8 | 11.8 | 0.0 | 5.3 | 0.9 |
| Bloody Falls | Tundra | 66.7 | 0.0 | 16.7 | 0.0 | 16.7 | 3.9 | 0.7 |
| KD1 | Tundra | 60.0 | 32.3 | 2.0 | 5.7 | 0.0 | 5.5 | 1.6 |
| KD2 | Lake | 94.4 | 0.0 | 0.0 | 5.6 | 0.0 | 3.4 | 1.8 |
| KD3 | Lake | 57.6 | 39.0 | 3.4 | 0.0 | 0.0 | 2.7 | 0.7 |
| KD4 | Lake | 66.7 | 0.0 | 0.0 | 3.3 | 30.0 | 2.9 | 1.2 |
| Rockinghorse | Lake | 62.5 | 29.7 | 1.6 | 6.3 | 0.0 | 0.9 | 0.3 |
| KD6 | Tundra | 76.9 | 17.1 | 0.2 | 5.8 | 0.0 | 2.3 | 0.6 |
| Yamba | Lake | 75.0 | 20.7 | 0.7 | 3.6 | 0.0 | 2.8 | 0.5 |
| Lake Providence | Tundra | 84.4 | 0.0 | 0.6 | 6.3 | 8.8 | 1.8 | 0.5 |
| Diavik | Tundra | 83.3 | 12.7 | 0.7 | 3.3 | 0.0 | 3.8 | 0.6 |
| Lac de Gras | Lake | 58.3 | 41.7 | 0.0 | 0.0 | 0.0 | 2.4 | 0.5 |
| Thonokied Lake | Lake | 99.1 | 0.0 | 0.9 | 0.0 | 0.0 | 3.5 | 0.9 |
| Thonokied | Tundra | 45.5 | 41.8 | 0.0 | 0.0 | 12.7 | 3.6 | 0.7 |
| Aylmer Lake | Lake | 75.0 | 15.6 | 0.0 | 0.0 | 9.4 | 3.5 | 0.4 |
| Aylmer/Clinton-Colden | Tundra | 40.9 | 45.0 | 0.5 | 6.8 | 6.8 | 2.7 | 0.8 |
| Clinton-Colden Lake | Lake | 91.6 | 0.0 | 0.4 | 8.0 | 0.0 | 2.2 | 0.1 |
| Clinton-Colden | Tundra | 65.2 | 0.0 | 13.0 | 21.7 | 0.0 | 2.5 | 0.4 |
| Sifton Lake | Lake | 50.0 | 0.0 | 43.5 | 6.5 | 0.0 | 4.2 | 0.3 |
| North Hanbury | Tundra | 63.9 | 33.9 | 0.6 | 1.6 | 0.0 | 2.2 | 0.8 |
| West Hoare | Tundra | 93.7 | 0.0 | 3.2 | 3.2 | 0.0 | 4.1 | 0.6 |
| Hoare Cabin | Tundra | 48.0 | 0.0 | 0.6 | 37.1 | 0.0 | 1.3 | 0.5 |
| Hoare Lake | Lake | 73.5 | 19.4 | 0.6 | 6.5 | 0.0 | 1.8 | 3.7 |
| Hanbury/Thelon | Tundra | 48.9 | 20.0 | 0.0 | 26.7 | 4.4 | 2.2 | 1.4 |
| Hornby Point | Forest | 71.9 | 15.7 | 1.1 | 11.2 | 0.0 | 3.0 | 1.1 |
| Hornby Thelon River | River | 89.1 | 8.7 | 2.2 | 0.0 | 0.0 | 5.4 | 1.1 |
| Thelon Nunavut | River | 68.3 | 29.3 | 2.4 | 0.0 | 0.0 | 9.0 | 1.1 |
| Thelon Lookout Point | River | 85.5 | 9.1 | 0.9 | 0.0 | 4.5 | 6.2 | 0.4 |
| Lookout Point | Tundra | 62.7 | 11.8 | 0.0 | 25.5 | 0.0 | 2.1 | 0.6 |
| Thelon Cabin | Tundra | 80.5 | 9.8 | 0.0 | 1.2 | 8.5 | 3.6 | 0.6 |
| Beverly Lake | Lake | 15.6 | 50.0 | 0.0 | 34.4 | 0.0 | 1.8 | 0.3 |
| Aberdeen | Tundra | 68.1 | 0.0 | 0.0 | 31.9 | 0.0 | 3.8 | 0.6 |
| Aberdeen Lake | Lake | 78.9 | 0.0 | 0.0 | 21.1 | 0.0 | 1.6 | 0.4 |
| South Schultz | Tundra | 61.8 | 6.3 | 0.3 | 31.6 | 0.0 | 2.2 | 0.5 |
| North Baker | Tundra | 60.3 | 0.0 | 2.2 | 37.5 | 0.0 | 2.1 | 0.2 |
| Baker | River | 55.8 | 6.5 | 0.5 | 37.2 | 0.0 | 2.5 | 0.6 |
| ***Average*** | ***All*** | ***70.9*** | ***12.3*** | ***3.0*** | ***10.8*** | ***2.7*** | ***3.4*** | ***0.9*** |
| ***Average*** | ***Tundra*** | ***65.3*** | ***13.6*** | ***2.4*** | ***14.5*** | ***3.4*** | ***2.9*** | ***0.7*** |
| ***Average*** | ***Lake*** | ***75.8*** | ***11.4*** | ***3.9*** | ***6.8*** | ***2.1*** | ***3.1*** | ***1.0*** |
| ***Average*** | ***River*** | ***71.0*** | ***11.6*** | ***2.2*** | ***12.3*** | ***2.9*** | ***5.3*** | ***1.2*** |

To look at the stratigraphy in more detail, we have separated the data into two categories: snowpits measured on tundra (terrestrial), and snowpits measured on lake and river ice.

In both cases, the components of the pack were depth hoar (more or less indurated, depending on origin), wind slabs (harder or softer, depending on deposition conditions), new/recent snow (highly dependent on recent wind events), and icy snow. Other than the differences in thickness and density noted in Table 4, there were virtually no statistical differences in the stratigraphy based on the substrate. Allowing for differences in the total number of tundra versus ice snowpits, wind slabs, depth hoar, indurated depth hoar, and slab-to-hoar textures were observed as frequently on the tundra as on lakes and rivers. As we show below, grain sizes and layer hardnesses were also the same over ice as over tundra. Nevertheless, perusal of the NIR photos suggest that the transformation of slabs into depth hoar was in general more complete over an ice substrate. This is illustrated in Figure 9, where side-by-side NIR images from a tundra and lake pair of snowpits shows more distinct (less metamorphosed) layers on the tundra than on the ice. These textural differences were subtle and not captured in the layer classifications done in the field, but they may be real.

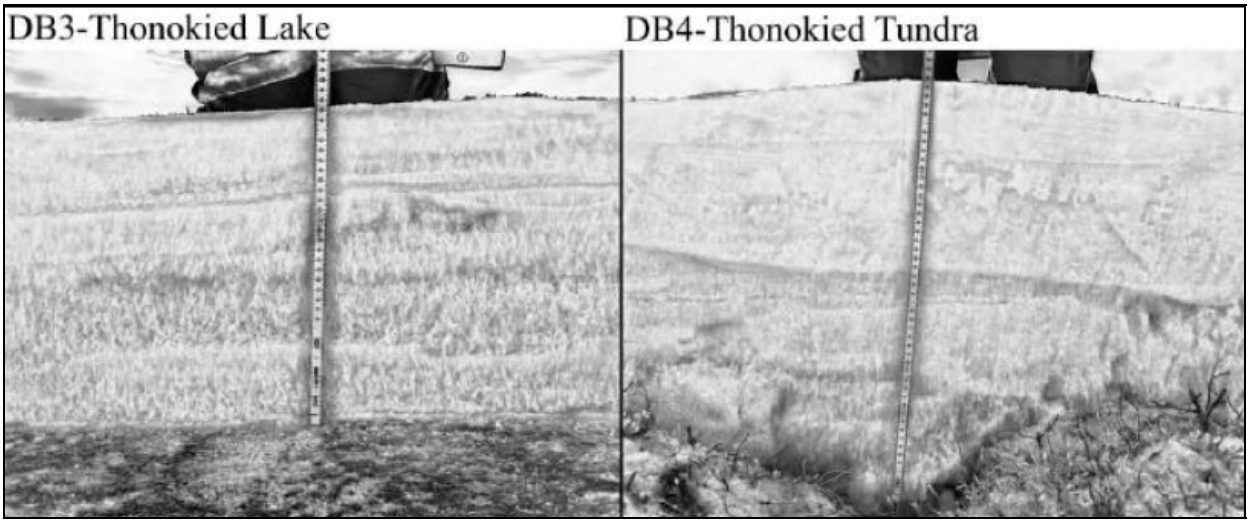



Figure 9. NIR snow stratigraphy photographs for a pair of adjacent lake and tundra sites, showing coarser grains (more depth hoar metamorphism) and less distinct layers on the lake than on the tundra.

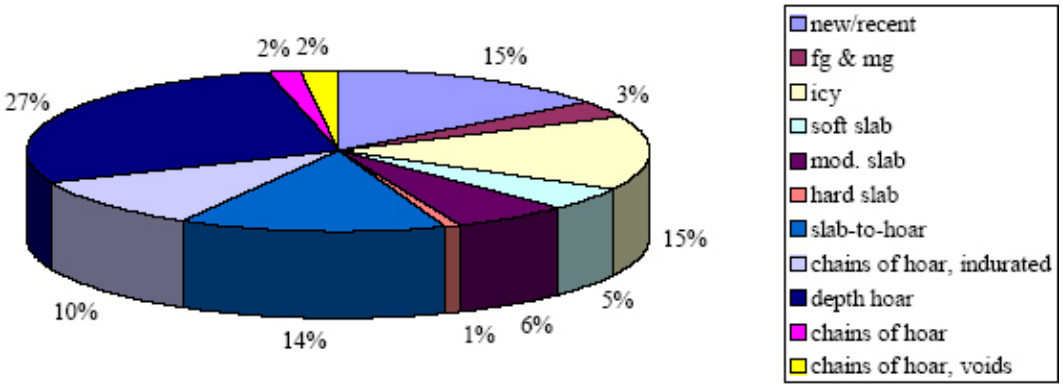
Two of the snow textures (new/recent and icy) tend to change rapidly in response to weather events and by thickness were not major components of the snowpack. What little new/recent snow was present (Table 4: ave.

11% of total pack by thickness) most often was observed to be an ephemeral layer at the top. As soon as the wind started to blow, the thickness of this layer could double, or it could go to zero, a process we watched in action many times. If the last six sites of the traverse (Table 5) are excluded (each of which was about 30% new/recent snow because of a snowstorm), the average percentage of new/recent across the traverse falls to 7.5% of total. While new snow is important in many ways, it is a transient feature of the snowpack and therefore hard to predict in time and space. Icy snow was even a smaller percentage of the pack by thickness, on average 3%. The only exception was on Sifton Lake, where overflow had formed a substantial layer of snow ice at the base of the pack. In general, we found overflow and snow ice to be rare. Most of the other icy layers in the snowpack were the product of a single warm period with rain on snow. These layers were never more than 5 mm thick, though as we discuss later, they may have radiometric importance.

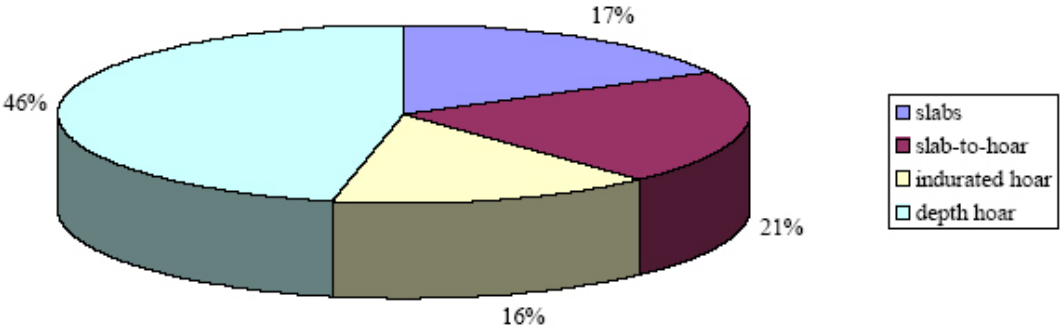
Excluding new/recent and icy snow, we now examine the relative distribution of depth hoar layers and wind slabs. These account for almost 80% by thickness of the pack. The key to understanding the stratigraphy observed on the traverse, and elsewhere in the Arctic on other traverses, is how these two basic types of snow textures play out. They are linked. As noted before, wind slabs can be converted into depth hoar, while depth hoar can be eroded and reconstituted as a wind slab. Strong winds and vigorous wind transport tend to form dense, tough slabs that resist depth conversion. Less strong winds form slabs that are less cohesive and fine-grained and that tend to metamorphose more easily. Early snow and low winter temperatures produce strong temperature gradients across the snowpack that can accelerate slab-to-hoar conversion; late snow and mild temperatures tend to preserve wind slabs.

Figure 10a shows the relative abundance (by count rather than thickness or SWE) of 11 types of snow seen in the 259 layers that were identified in the field. Thirty-three percent of all layers were neither depth hoar nor wind slab. If we remove these layers from the count [remove new, recent, medium and fine-grained (mg/fg) snow, melt clusters, and icy snow] and look at the remaining layers (Fig. 10b), a more interesting story appears. Forty-six percent of this remaining subset is classified as pure depth hoar. These are layers that probably did not start out as wind slabs. They were initially new, recent, or fine-grained snow layers. Seventeen percent was still wind slab at the time of the traverse. The remaining 37% was depth

hoar, with textural indicators suggesting that it had been transformed into depth hoar from wind slab. Adding this 37% to the 18% wind slab that remained suggests that 55% of the snowpack was initially wind slab. In essence, about half the snow started as non-wind-slab snow and became depth hoar, while the other half started as wind slab, but most of it metamorphosed into depth hoar. This initial distribution is consistent with tundra snow results from northwest Alaska (Sturm and Liston 2003; Fig. 2), where about half of the snow was wind slab, half depth hoar. The implication of this finding is that initial slab abundances across the traverse region were more typical of those found elsewhere in the Arctic, but that post-deposition metamorphism resulted in an unusually low percentage of slabs surviving until spring. While it is only speculation, this suggests that in the traverse region, conditions may favor even more extreme metamorphism than is typically found in arctic tundra snow.




a. Percentage of layers (by number of layers) for all layers (259).




b. Percentage of depth hoar and wind slab layers only.

Figure 10. Relative abundance of snow types by layer. Slab-to-hoar and indurated textures are derived from wind slabs.

We have tabulated grain size by snow layer type in Table 6. The values in the table are averages computed for all layers identified as that type of snow. There were 259 layers on which grain size was measured. The

percentages listed in Figure 10a, multiplied times 259, give the approximate *n*-value for each grain size average. Ice layers do not have distinct grains, so they have been excluded from the table. The results show that the largest grains were found in indurated depth hoar layers, as well as depth hoar chain assemblages, and that a) these grains were five times larger than the grains in wind slabs, and b) the hoar grains tended to be plate-like with short to long axial ratios near 1:4.

Table 6. Grain sizes (microscope and comparator card) by snow texture type. The hardness code is a relative measure of layer hardness: the higher the number, the harder the snow.

| | Hardness Code | Grain Size Long Axis (mm) | Grain Size Short Axis (mm) |
|---|---|---|---|
| New/Recent | 2.5 | 0.9 | 0.4 |
| Fine & Medium Grained | 4.6 | 0.9 | 0.4 |
| Soft Slab | 3.2 | 0.8 | 0.3 |
| Mod. Slab | 4.1 | 0.8 | 0.6 |
| Hard Slab | 5.0 | 2.0 | 0.3 |
| All Slabs | 3.8 | 0.9 | 0.5 |
| Slab-to-Hoar | 3.8 | 2.3 | 0.8 |
| Indurated Hoar | 3.5 | 5.7 | 1.1 |
| Slab-to-Hoar & Indurated | 3.7 | 3.8 | 0.9 |
| Depth Hoar | 2.5 | 4.0 | 1.1 |
| Hoar Chains | 2.3 | 6.4 | 1.6 |
| Melt Clusters | 3.6 | 1.3 | 0.5 |

We tested whether for any type of snow layer, the grain sizes differed if the snow was on tundra versus ice substrate but found no significant differences (Table 7).

Table 7. Grain size by snowpit substrate.

| | | Grain Size Long Axis (mm) | Grain Size Short Axis (mm) | Average Density |
|---|---|---|---|---|
| Slabs | Ice | 1.2 | 0.6 | 0.4 |
| | Tundra | 0.7 | 0.4 | 0.4 |
| Slab-to-Hoar | Ice | 2.5 | 0.9 | 0.3 |
| | Tundra | 2.1 | 0.5 | 0.4 |
| Depth Hoar | Ice | 3.7 | 1.0 | 0.3 |
| | Tundra | 4.4 | 1.2 | 0.3 |
| Indurated Hoar | Ice | 5.6 | 1.2 | 0.3 |
| | Tundra | 6.2 | 0.8 | 0.3 |

## Density and SWE

From the single snowpit excavated at each site, mean snowpack density was determined by proportionally weighting the individual layer density measurements. These were compared to the average value determined from 12 direct measurements of bulk density made using the ESC-30 corer along the 100-m sampling line (Fig. 11). There was a tendency for the pit measurements to underestimate density relative to the full 100-m transect mean as measured with a corer. Major outliers at some lake and river sites strongly influenced the relationship, consistent with the finding in Figure 5 that lake density was more locally variable than tundra snow density. Strangely, normally, we have found that the core densities are lower than the ones determined from layer measurements (Sturm et al., in prep.).

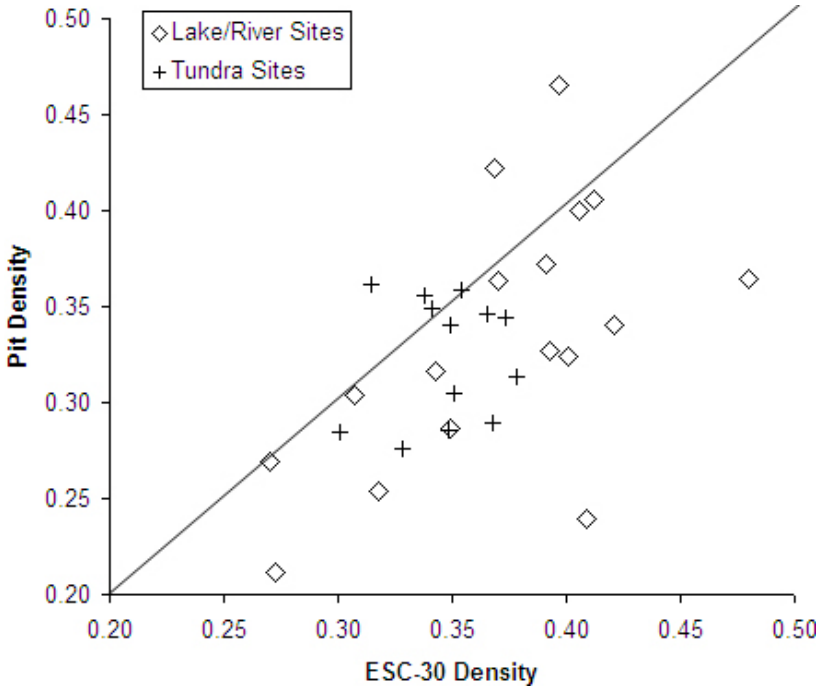
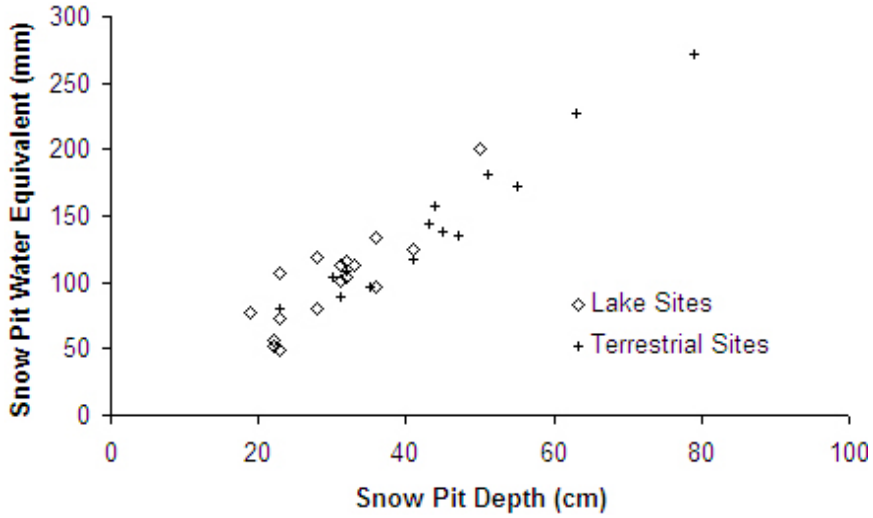



Figure 11. Comparison of mean pit density (n = 1 at each site) with snow core density (n = 12 at each site). $r^2 = 0.27$.

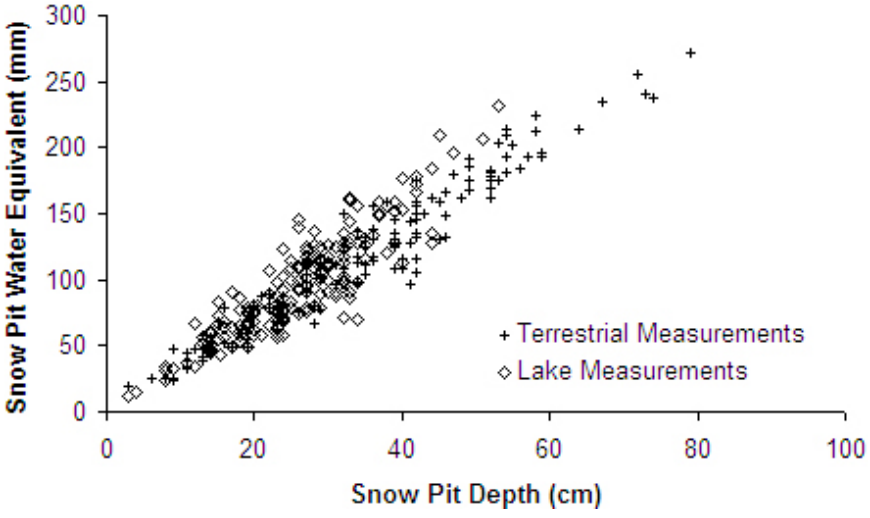
## SWE to Depth Relationship

SWE is the product of depth and density. Being able to infer SWE from a depth measurement is desirable, given the greater ease of acquiring depth versus snow core measurements. Sturm et al. (in review) examined a large dataset of historical measurement triplets (depth, density, SWE) from North America and Europe. From this 25,757-point dataset, it is clear that measurements of snow depth, coupled with contextual spatial and

temporal information (where and when were the measurements made), can produce reliable estimates of SWE based on linear depth versus SWE relationships. Depth and SWE measurements from snowpits (Fig. 12a) and ESC-30 measurements (Fig. 12b) from the traverse were plotted to examine how well these SWE-depth relationships were represented in this new dataset. As with the larger data set, there was a strong correlation between depth and SWE.




a. Snowpit measurements (overall $r^2 = 0.90$).




b. ESC-30 measurements (terrestrial $r^2 = 0.94$; lake $r^2 = 0.78$).

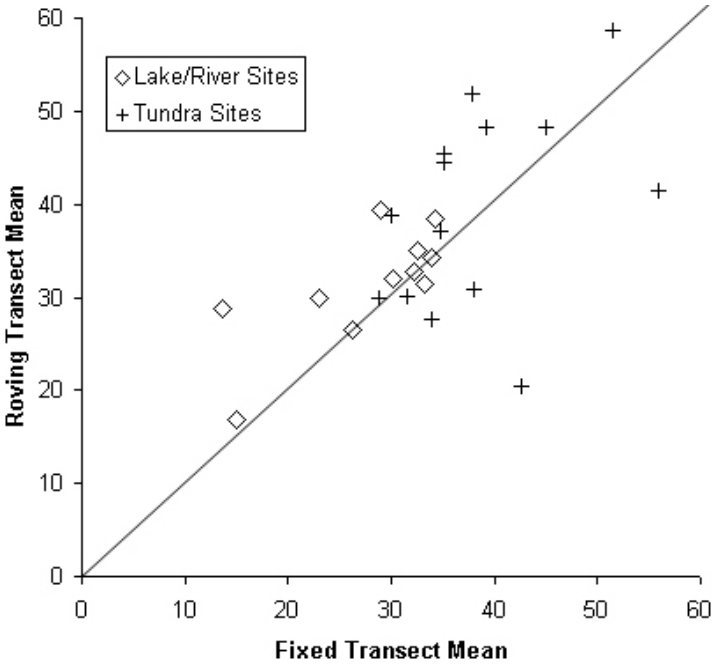
Figure 12. SWE versus depth.

## Fixed Transect vs. Roving Transects

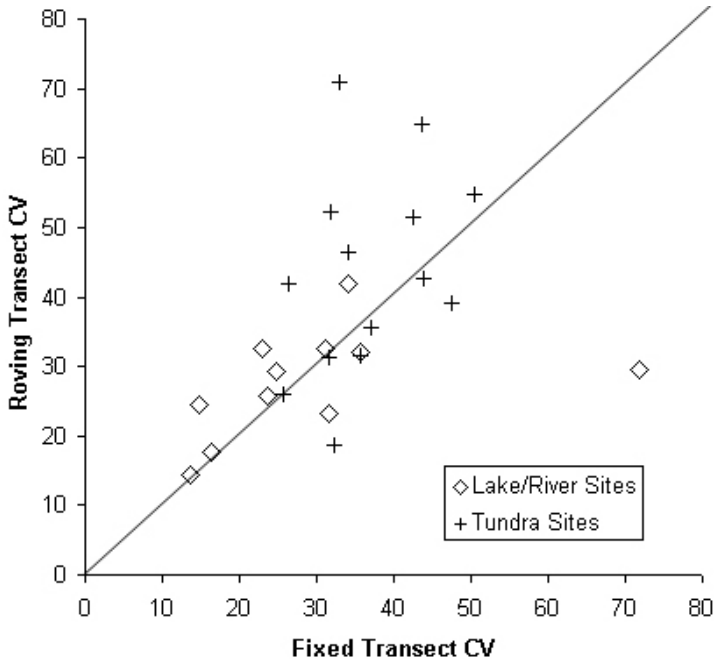
At each site, depth probe and ESC-30 SWE/bulk density measurements were made at fixed intervals (every 50 cm for depth; 25 m for SWE) along a 100-m marked transect (called here the *fixed* transect). Depth measurements were also acquired at irregular intervals (typically every two to three paces) along additional transects that extended away from the 100-m sampling line in order to capture the depth variability over a larger area (called here the *roving* transect). These two datasets allowed a number of sampling-related questions to be addressed:

- How well did the data from the fixed transects match the data from the roving transects?
- How similar were direct measurements of SWE (made using the ESC-30 along the fixed transect) with SWE estimates based on the roving depths and a fixed bulk density value?

Figures 13 and 14 show that the 100-m fixed transects tended to underestimate the mean depth (Fig. 13a) and SWE (Fig. 14a) relative to the roving transects, particularly for the lake and river sites. Essentially, there was a tendency for there to be more snow away from the 100-m transect, suggesting that our site selection choices (motivated by a desire to find consistent, "neutral," flat tundra sites) were not truly random. Greater variability (reflected by higher CV values) was captured by the roving transect measurements of snow depth (Fig. 13b), but this systematic bias was not evident with SWE (Fig. 14b).

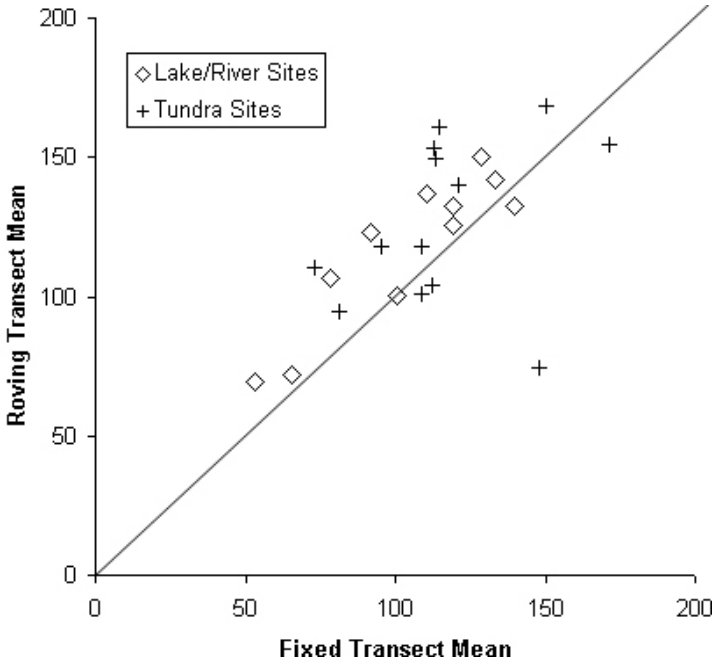



a. Mean fixed transect snow depths (cm) versus roving snow depth transects (also cm).

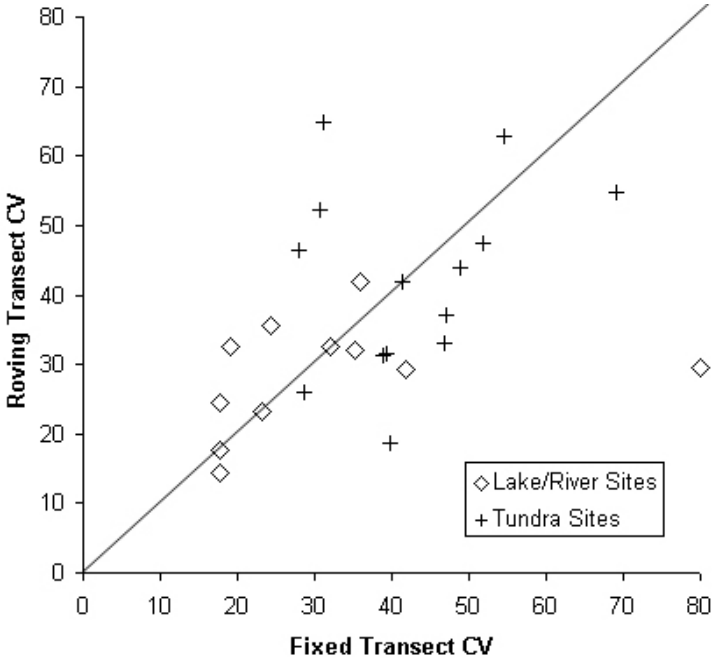



b. CV fixed transect snow depths (cm) versus roving snow depth transects (also cm).

Figure 13. Relationships between fixed and roving transect snow depths (mean and CV).




a. Mean fixed transect SWE measurements versus roving transect estimates of SWE (depth × mean site density).




b. CV fixed transect SWE measurements versus roving transect estimates of SWE (depth × mean site density).

Figure 14. Relationships between fixed and roving transect SWE (mean and CV).

## Longitudinal Gradients

The conventional wisdom is that snow varies along altitudinal and latitudinal gradients, but not necessarily along longitudinal gradients. Since the traverse was basically west to east, here we examine if there were any longitudinal gradients in the snow properties. Storm tracks and synoptic patterns for Northwest Territories and Nunavut are complex, so both latitudinal and east-west snow gradients across NWT and Nunavut are possible.

The most consistent period of sampling occurred during the Daring Lake to Baker Lake portion of the traverse (April 16 to 26). Sample sites were located at least every 1 degree of longitude (Fig. 15). We have used a correlation analysis of mean site values versus longitude to see if there are gradients reflected in the data. Two sites along the Thelon River were omitted from this analysis because the Thelon "Oasis" is known to be an anomalous area, a large outlier of taiga forest hundreds of kilometers north of the normal treeline.

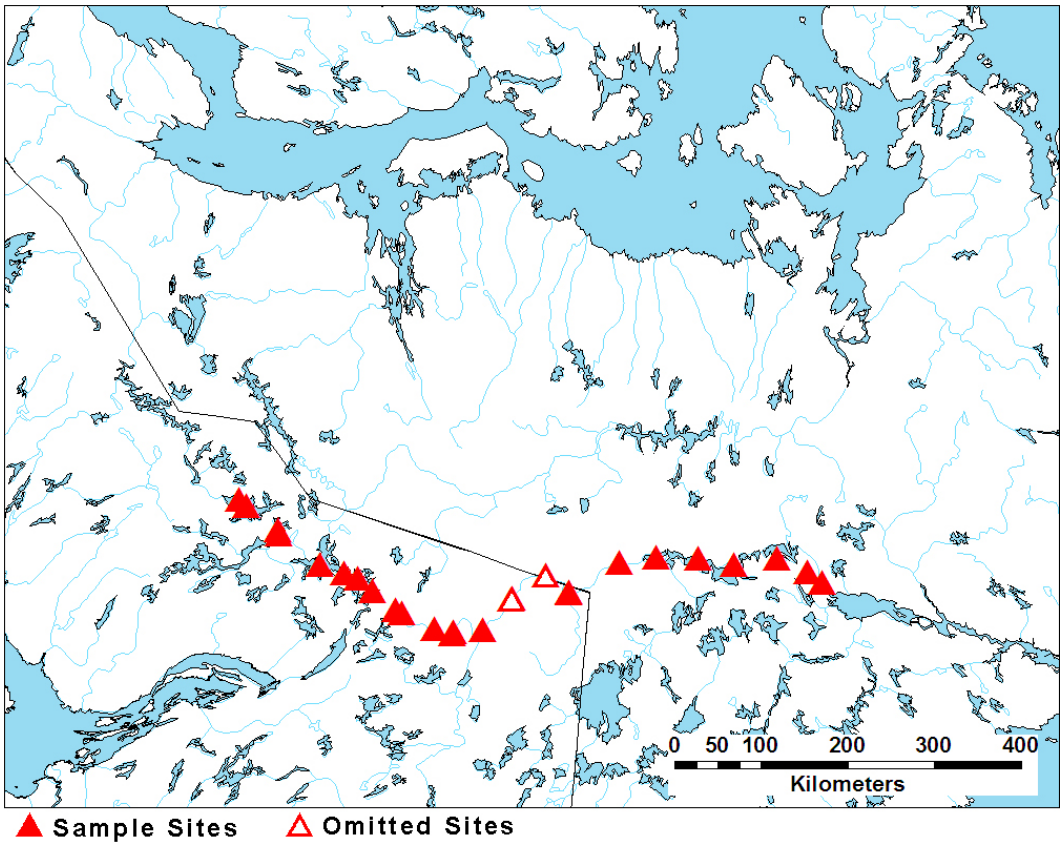



Figure 15. Sites used for analysis of longitudinal gradients.

The results show only weak relationships with longitude for the tundra sites (Table 8), though stronger relationships were evident for the lake sites. The snow cover on the lakes became shallower and more dense and was composed of fewer layers with smaller grains as we moved eastward.

Table 8. Correlation results for snow parameters versus longitude.

| | Tundra | Lakes |
|---|---|---|
| Depth | –0.20 | 0.73 |
| Density | 0.18 | –0.52 |
| SWE | –0.10 | 0.52 |
| Layers | –0.39 | 0.79 |
| Grain Long | 0.25 | 0.61 |

All measurements were also segmented into 1 degree longitudinal bins. Box plots of depth, density, and water equivalent are shown in Figure 16. No longitudinal trends in the variability of snow properties are evident for tundra and lake sites. The speculative depth, density, and SWE gradients for snow on lakes suggested by the correlation analysis are evident in the box plots, but these gradients are very subtle.

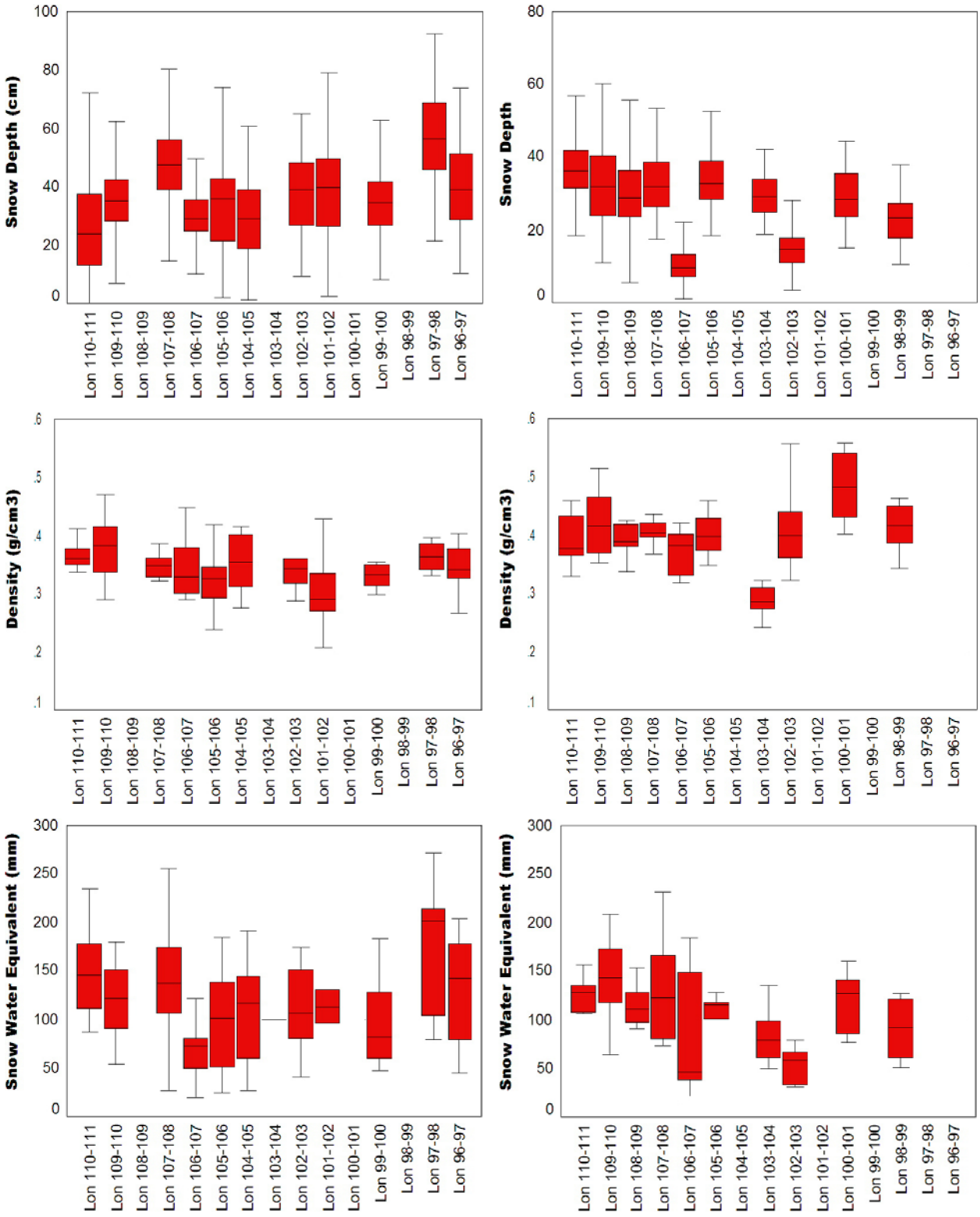



Figure 16. Longitudinal gradients in depth (top), density (middle), and SWE (bottom) for terrestrial (left) and lake (right) measurements.

## The Nature of the North American Tundra Snow Cover

The snow traverse described here caps more than a decade of intense measurements of the snow cover in arctic North America, though mostly in smaller, local areas. In Alaska, a series of over-snow traverses were begun in 1994 in the Kuparuk Basin. These were about 200 km in length. They were then extended to northwest Alaska in 2000, where snow along a 1000-km route between Nome and Barrow was measured. (Olsson et al. 2002, Liston and Sturm 2002, Sturm and Benson 2004, Douglas and Sturm 2004) In Canada, four years of intensive snow sampling to determine landscape controls on snow (re)distribution and provide ground measurements for comparison with satellite and airborne remote sensing data started at Daring Lake in 2003 (Rees et al. 2006). Other campaigns were conducted near Churchill, Manitoba.

Our most significant finding is that the snow cover across this 6000-km-wide region is quite similar from place to place. The depth distribution, the density, the stratigraphy, and the texture show more similarities than differences despite obvious spatial variability and landscape controls. The tundra snow cover (taiga snow is also common in the region but was not heavily sampled during the traverse), as we have shown here (and described elsewhere, Benson and Sturm 1993), is composed of two end-member types of snow: depth hoar and wind slab. The former is coarse grained, the latter fine grained. Due to wind action, the depth and thickness of individual layers vary markedly over short distances, as do the density, hardness, and grain size. Over longer distances, and over the entire region, there is a surprising amount of convergence in the snow properties. The biggest variations in snow properties are not regional—they are local and associated with topographic breaks and local variations in vegetation.

One clear-cut *within-region* source of variation arises from the presence of lakes. Results from previous SnowSTAR campaigns (Sturm and Liston 2003) and measurements from Daring Lake (currently unpublished) are shown in Table 9. A consistent difference between tundra and lake snow properties is evident from multiple years of data and from sites distributed across North America. SWE on lakes tends to be 63–81% of that measured at tundra sites, while the snow density on lakes ranges from 107 to 126% of that measured on land. As discussed in Sturm and Liston (2003), these differences can be readily explained by processes that operate differently on the tundra than on the lakes. The range of values (Table 9) is

surprisingly narrow, given the generally heterogeneous nature of snow cover: 18% for SWE and 19% for density.

Table 9. Comparison of SnowSTAR 2007 data with previous campaigns.

| | Sample Size | | Tundra | | Lake | | Lake-to-Tundra Ratio | |
|---|---|---|---|---|---|---|---|---|
| | Tundra | Lakes | SWE (mm) | Density (g/cm³) | SWE (mm) | Density (g/cm³) | SWE (%) | Density (%) |
| SnowSTAR 2000 | 13 | 13 | 99 | 0.285 | 79 | 0.344 | 80 | 121 |
| SnowSTAR 2002 | 13 | 13 | 94 | 0.277 | 68 | 0.334 | 72 | 121 |
| Daring Lake 2004 | 26 | 49 | 126 | 0.273 | 97 | 0.345 | 77 | 126 |
| Daring Lake 2005 | 55 | 31 | 95 | 0.287 | 75 | 0.346 | 79 | 121 |
| Daring Lake 2006 | 64 | 51 | 137 | 0.293 | 102 | 0.328 | 74 | 112 |
| Daring Lake 2007 | 81 | 52 | 117 | 0.327 | 74 | 0.357 | 63 | 109 |
| SnowSTAR 2007 | 14 | 16 | 118 | 0.347 | 96 | 0.371 | 81 | 107 |

## Passive Microwave Implications

Ultimately, a traverse like ours is not a practical way to assess the snow conditions across such a broad region. It is too time consuming and labor intensive. Remote sensing of the snow is absolutely essential. A primary reason for the measurements acquired along the traverse was to assist in efforts to develop and validate satellite passive microwave SWE retrieval algorithms specific to open tundra environments. Regional brightness temperature patterns from the Advanced Microwave Scanning Radiometer (AMSR-E) are shown in Figure 17 for the Daring Lake to Baker Lake segment of the traverse. Aside from the oasis of trees along the Thelon River, the domain in Figure 17 is largely north of the treeline. As discussed in the previous section, no strong gradients in snow cover properties were measured. Examination of the HYDRO 1K datasets showed no strong gradients in elevation or topographical complexity along the route of this traverse. In spite of this consistency in snow cover, land cover, and topography, the spatial patterns in the AMSR-E measurements (Fig. 17a to 17d) indicate that the primary influence on the satellite signal appears to be the lake fraction.

The Daring Lake to Baker Lake portion of the traverse route shown in Figure 17 can be broken down into three basic units:

- A lake-rich area in the west composed of a connected sequence of large lakes (i.e. Lac de Gras, Thonokied Lake, Afridi Lake, Aylmer Lake, Clinton-Colden Lake);
- A relatively lake-sparse region that includes the Thelon Oasis; and

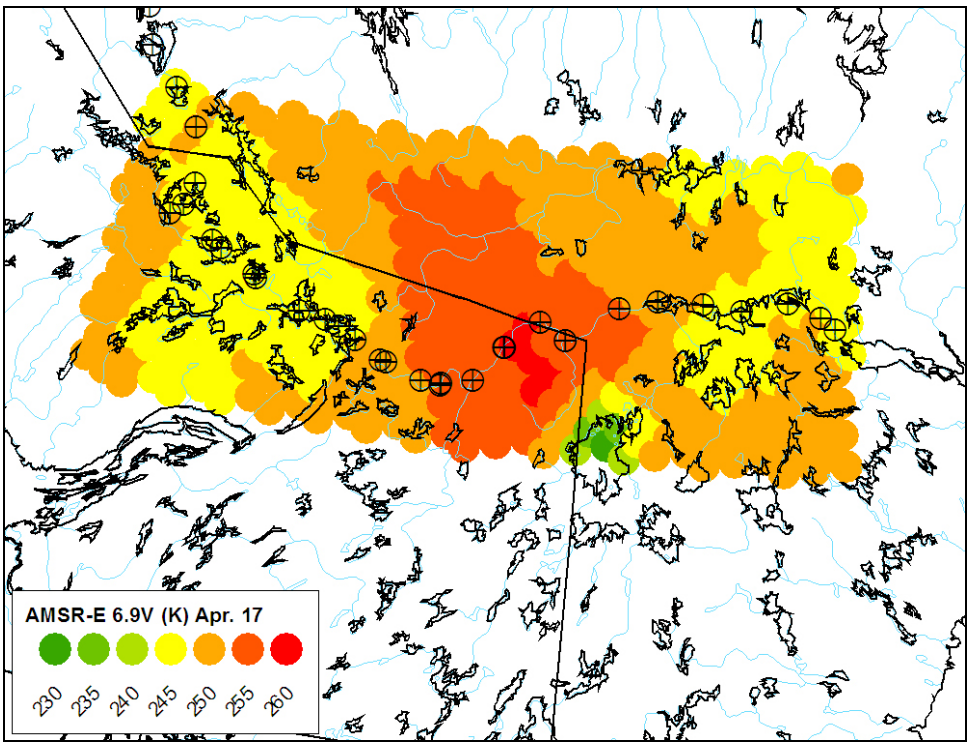
- The interconnected large lake system that flows into Chesterfield Inlet at Baker Lake (Beverly Lake, Aberdeen Lake, Schultz Lake to the north, Lake Dubawnt to the south).

The low-frequency AMSR-E measurements (6.9 and 10.7 GHz) are approximately 5–10 K *lower* across the lake-rich areas (Fig. 17 a and b). The 18.7-GHz measurements exhibit only subtle variations over the region, with a total range of only 5–10 K that is less strongly associated with lake fraction (Fig. 17c). The largest brightness temperature range was observed at 36.5 GHz (Fig. 17d). Unlike the lower frequencies, 36.5-GHz brightness temperatures were up to 30 K *higher* over the two lake-rich portions of the study area.

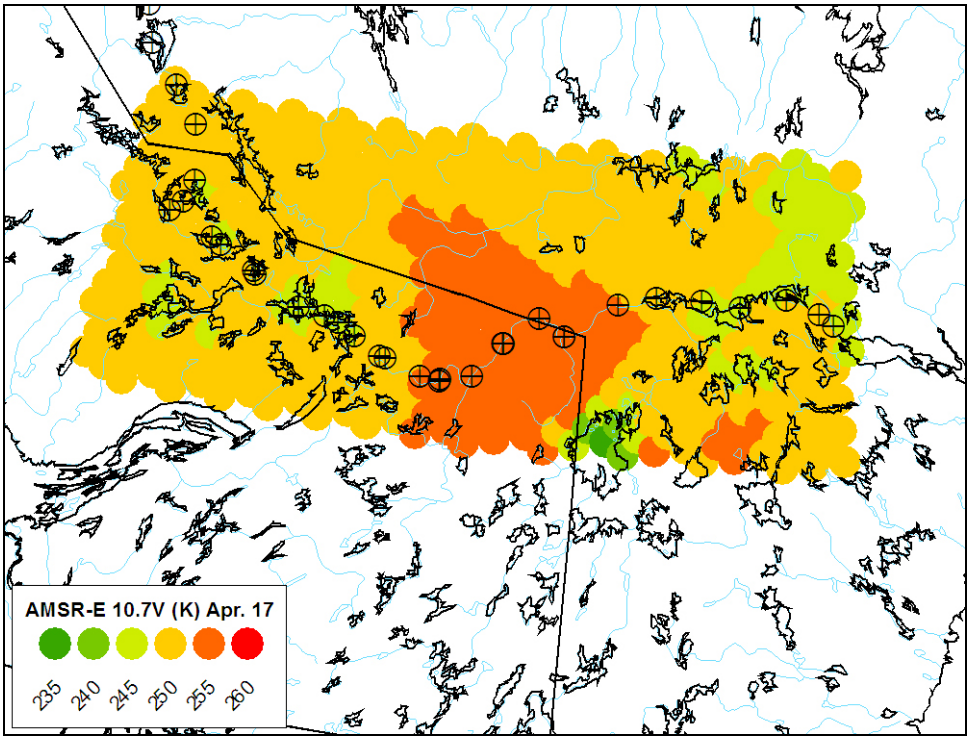
The sensitivity to the lake fraction is problematic for conventional approaches to retrieving SWE from microwave brightness temperatures. Most SWE retrieval algorithms typically exploit the difference between a measurement frequency sensitive to snow grain volume scatter (~37 GHz) with a measurement frequency considered insensitive to snow (~19 GHz) (Chang et al. 1990, Goodison and Walker 1995, Kelly et al. 2003, Mognard and Josberger 2002, Pulliainen 2006). The larger the difference between these two measurements, the higher the SWE. These particular frequencies are commonly used because they extend continuously through the satellite record (1978 to present). The snow surveys, however, indicated no strong longitudinal gradient in flat tundra and lake SWE across the Daring Lake to Baker Lake portion of the traverse. Lake-rich and lake-poor sections of the traverse had similar mean SWEs because the tundra SWE and lake SWE measurements were quite similar (Table 9). If the SWE exhibited only weak regional variations, and 36.5-GHz measurements are predominantly influenced by the volume scatter of the snowpack, the pattern in Figure 17d should be spatially invariant. Instead, the spatial variability driven by the lake fraction is very clear. To compound the issue, the multi-frequency response to the lake fraction is problematic to the application of brightness temperature difference algorithms. If a high lake fraction increases the 36.5-GHz brightness temperatures by 30 K, but decreases lower-frequency (18.7 or 10.7 GHz) brightness temperatures by only 5–10 K, then higher lake fractions will be systematically associated with lower SWE. This is illustrated in Figure 17e, which shows the AMSR-E 36.5–18.7 brightness temperature difference. Across lake-rich areas, the difference is closer to zero than in lake-poor regions, so the retrieved SWE with a simple brightness temperature

difference algorithm uncorrected for lake fraction would have regional biases unrelated to the snowpack.

Time series of AMSR-E brightness temperatures for a lake-rich (near Lac de Gras) and a lake-poor (near Hoare Lake) grid cell are shown in Figure 18. The time series profiles are similar in shape, with differences between the two grid cells due primarily to brightness temperature magnitude. At the lake-rich site, greater separation of the low-frequency channels is driven by the sensitivity of 6.9 and 10.7 measurements to lake ice cover. The lake fraction influence on the 36.5-GHz brightness temperature magnitude is also clear: the low lake fraction brightness temperatures are approximately 10 K lower and extend across a slightly greater seasonal range than the high lake fraction grid cell. Until early January, there is a substantial period of no change in 36.5-GHz brightness temperature, indicating that a critical depth of snow needs to be reached to produce sufficient volume scatter to alter the signal. The 36.5-GHz measurements reach a minimum in mid-March, even though this is not the end of the snow accumulation season and air temperatures remain cold. By this point, brightness temperatures no longer decrease with increasing SWE but actually start to increase, a phenomenon related to the relative scattering influence of grain size in a deepening snowpack and observed in other locations under deep snow conditions (De Seve et al. 1997, Matzler 1994).

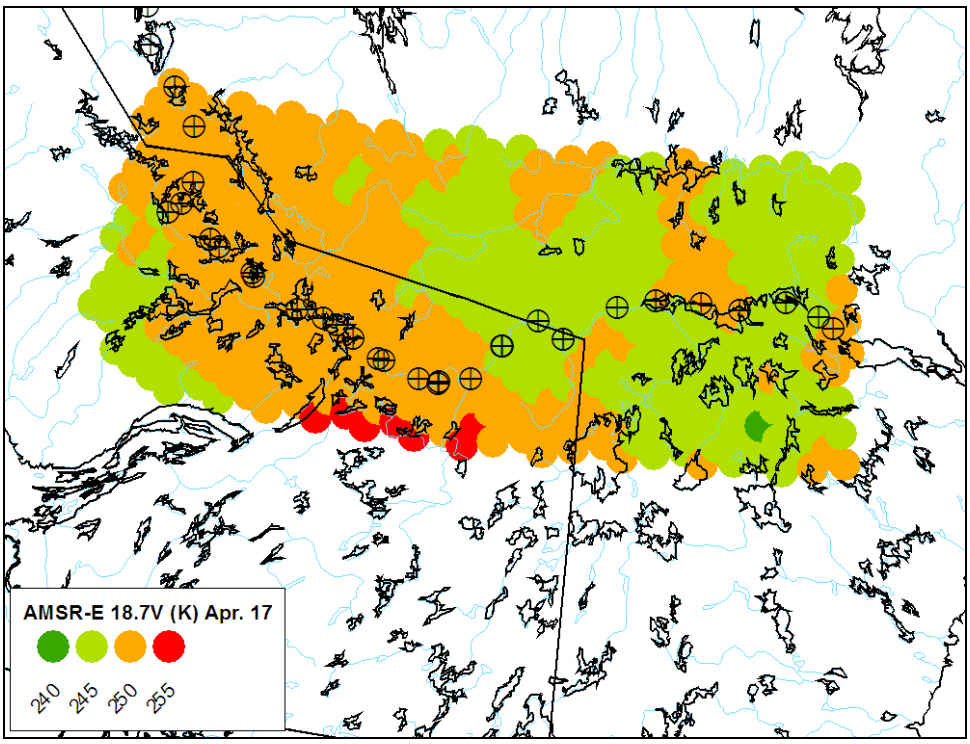



a. 6.9 GHz.

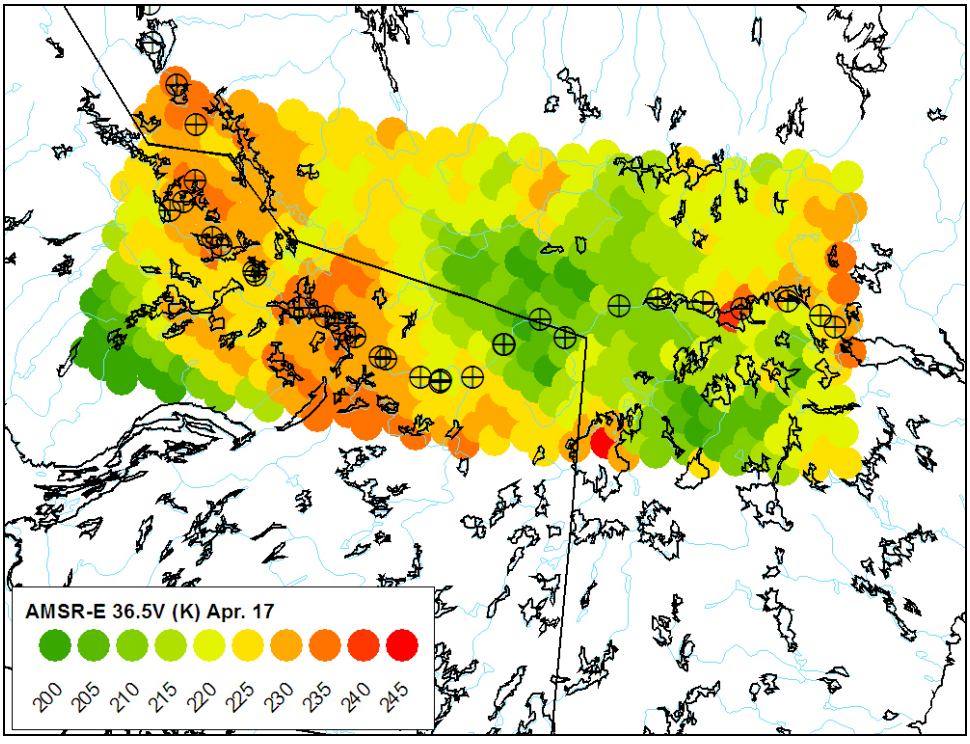



b. 10.7 GHz.

Figure 17. Vertically polarized AMSR-E brightness temperatures for April 17. Symbols denote sample site locations.

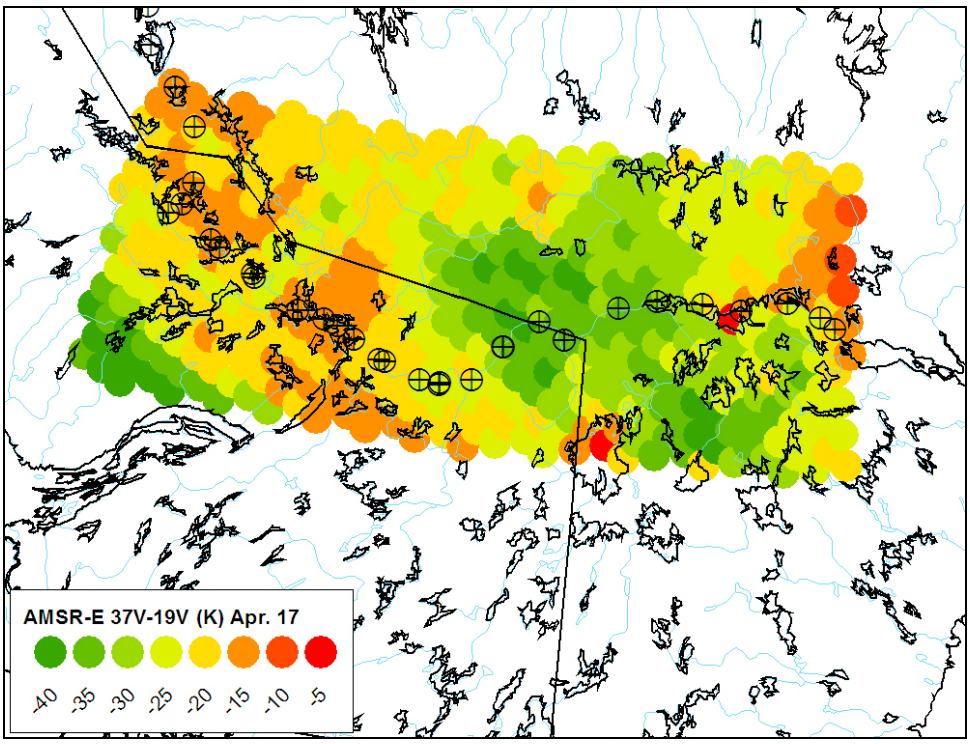



c. 18.7 GHz.

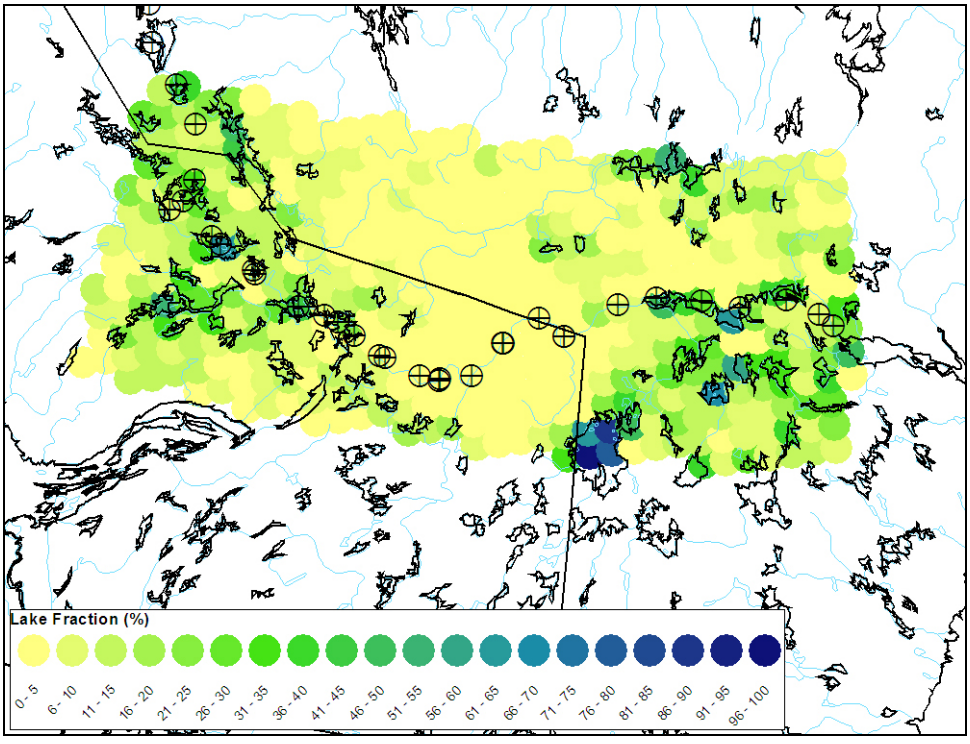



d. 36.5 GHz.

Figure 17 (cont.). Vertically polarized AMSR-E brightness temperatures for April 17.




e. 36.5–18.7.




f. Lake fraction estimates from the USGS in the EASE-Grid.

Figure 17 (cont.). Vertically polarized AMSR-E brightness temperatures for April 17.

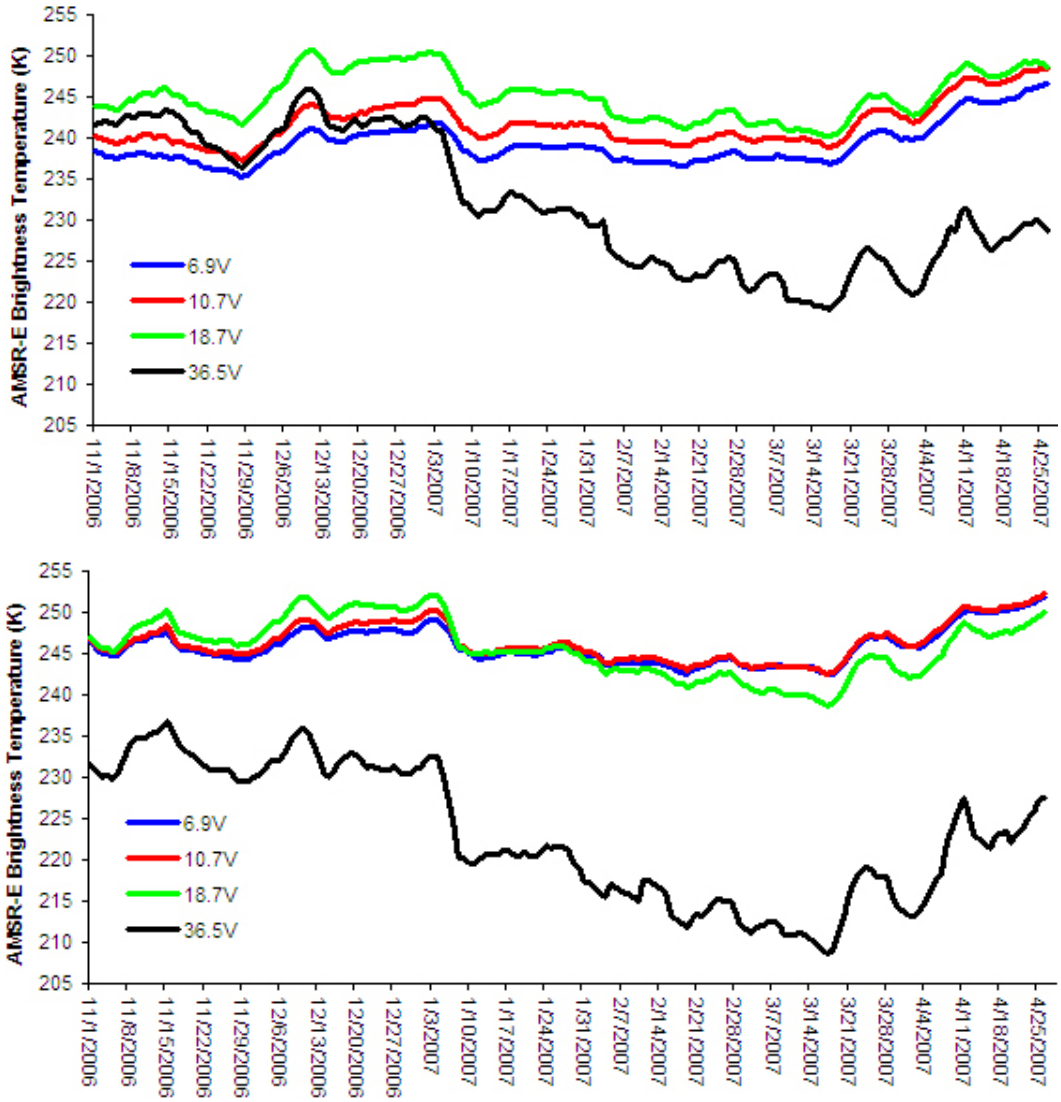



Figure 18. AMSR-E brightness temperature time series for lake-rich (top) and lake-poor (bottom) grid cells.

The choice of polarization is not consistent among microwave SWE algorithms: some utilize horizontal measurements (Chang et al. 1990, and the modified versions of Foster et al. 1997, Kelly et al. 2003), while others are based on vertical measurements (Goodison and Walker 1995, Mognard and Josberger 2002, Goita et al. 2003, Pulliainen 2006). One advantage of vertical polarization measurements is the reduced sensitivity to ice lenses within the snowpack. An opportunity to assess this sensitivity arose because of the rain-on-snow event in the vicinity of Daring Lake on 7 April 2007. The 36.5-GHz polarization gradient (V-H) was calculated for 3 April 2007 (pre-event, cold conditions) and 9 April 2007 (post-event, cold conditions). The difference between these two dates is illustrated in Figure 19. No difference is evident over the majority of the study area, except in

the region of Daring Lake (and west) where the difference in polarization gradient between the two dates reaches 30 K. This difference is driven by a strong response in the horizontal polarization measurements (not shown). The extent of the polarization gradient difference agrees well with observations of a surface ice layer (0.1–0.5 cm thick) at sites extending from north of Yamba Lake, south to Lake Providence, and east to Thonokied Lake (as noted in Fig. 19).

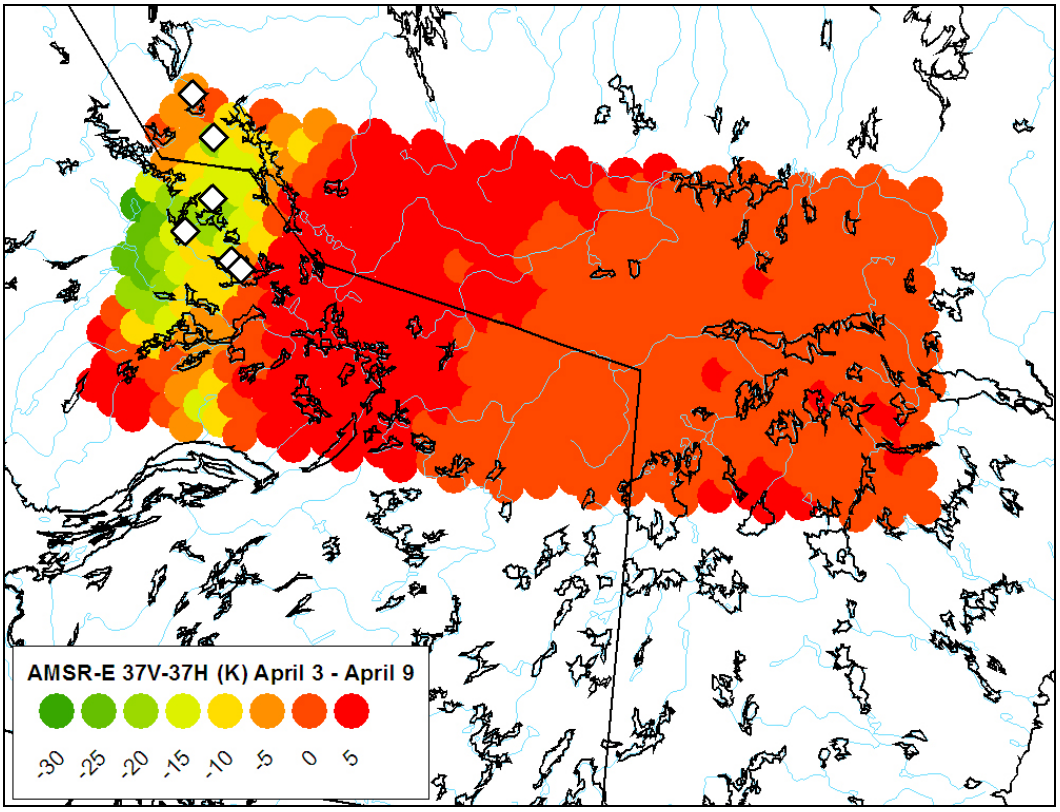



Figure 19. AMSR-E 36.5-GHz polarization gradient (V-H) for April 3 versus April 9 (pre- and post- rain-on-snow event). Symbols denote measurements sites with a surface ice layer.

Given the impact of the sub-grid-scale lake fraction on passive microwave brightness temperatures, the measurements from Great Bear Lake provided an opportunity to examine AMSR-E footprints composed completely of lake ice. We hoped this would allow separation of the snow vs. ice signal. Great Bear Lake was sampled from the southwest (near the community of Deline) to the northeast (towards the Dease Arm) between April 2 and 4, 2007. A general trend of deeper and less dense snow in the south to shallower but more dense snow in the north was identified (Table 10). More clearly defined was the relationship between snow depth and ice thickness: deeper (shallower) snow was associated with thinner (thicker)

ice (Fig. 20). The slope of the snow depth/ice thickness relationship across Great Bear Lake was consistent with other lakes sampled on the traverse (Fig. 20), although the ice was generally thinner, probably due to typically later freeze-up.

Table 10. Summary of measurements across Great Bear Lake (see Fig. 21 for site locations). GBL1 to GBL5 define a line running southwest to northeast.

| Site | Depth (cm) | SWE (mm) | Density (g/cm³) | Ice Thickness (cm) |
|---|---|---|---|---|
| GBL1 | 25.7 | 82.0 | 0.318 | 124 |
| GBL2 | 34.1 | 92.4 | 0.270 | 83 |
| GBL3 | 21.7 | 74.7 | 0.342 | 108 |
| GBL4 | 23.2 | 86.2 | 0.369 | 137 |
| GBL5 | 15.3 | 61.9 | 0.397 | 151 |

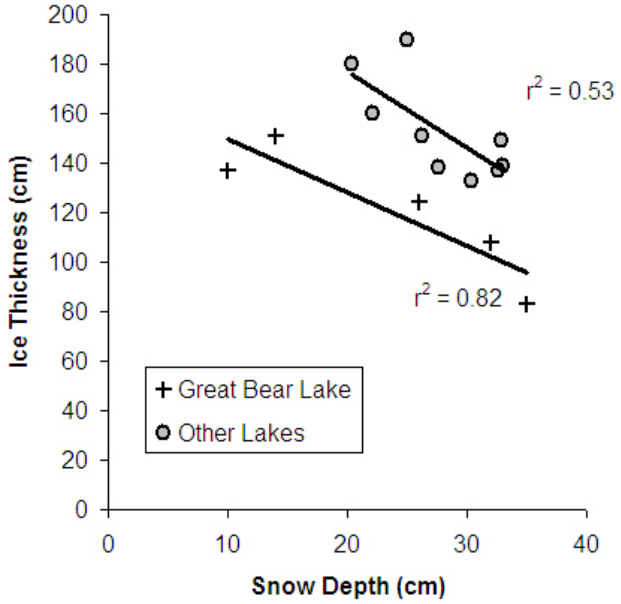
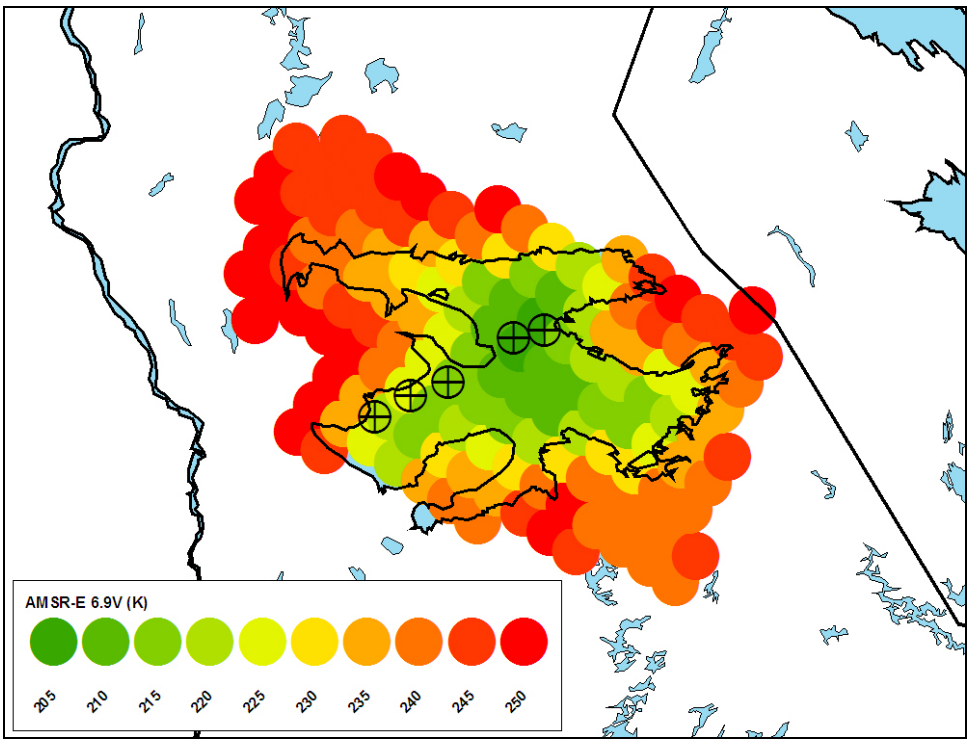


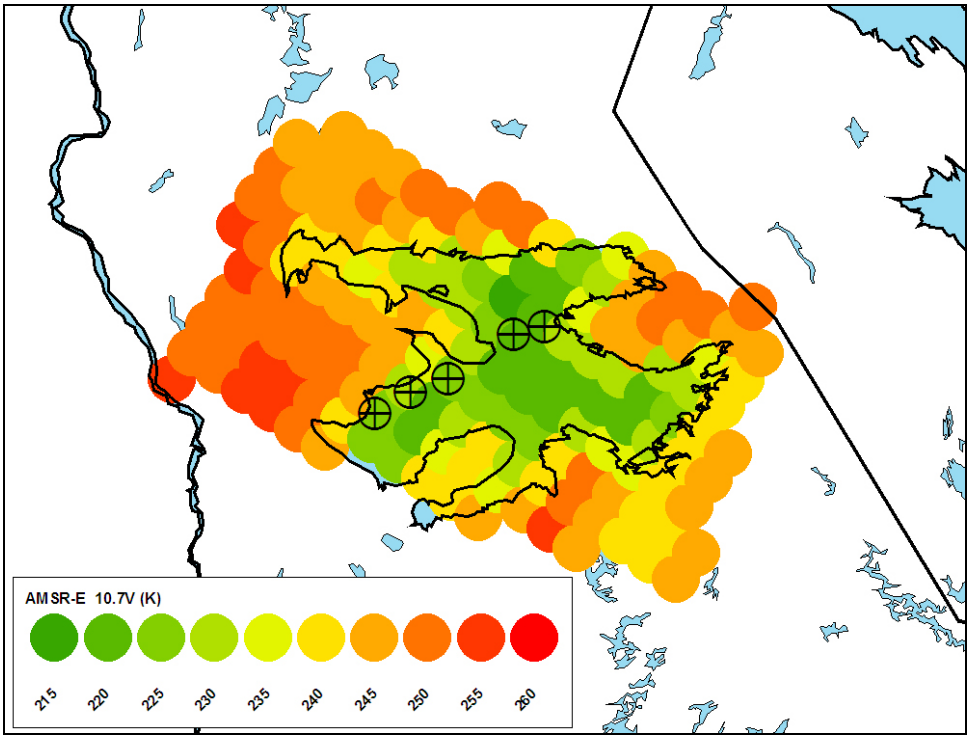

Figure 20. Relationships between snow depth and ice thickness.

Patterns of AMSR-E brightness temperatures across Great Bear Lake are shown in Figure 21a-d. A summary of the brightness temperature ranges observed over homogeneous lake and terrestrial footprints is provided in Table 11. The microwave signature for homogeneous lake ice is 30–50 K lower than the signature for terrestrial areas for 6.9 and 10.7 GHz and 20–50 K higher for 36.5 GHz. These are the frequencies where the contrast between lake and land are greatest. In many ways, the contrast is the same as discussed previously between areas of high and low lake fractions,

though (not surprisingly) the contrast is enhanced when comparing "pure" ice signals to "pure" land signals. The 36.5–18.7-GHz brightness temperature difference is near zero across most of the lake (Fig. 21e). SWE retrievals based on conventional algorithms (which assume that this difference is proportional to the snow cover) would fail, as has been discussed by Duguay et al. (2005) and Green (2006). In short, the lake signal dominates the results, with any gradients in the snowpack virtually invisible.

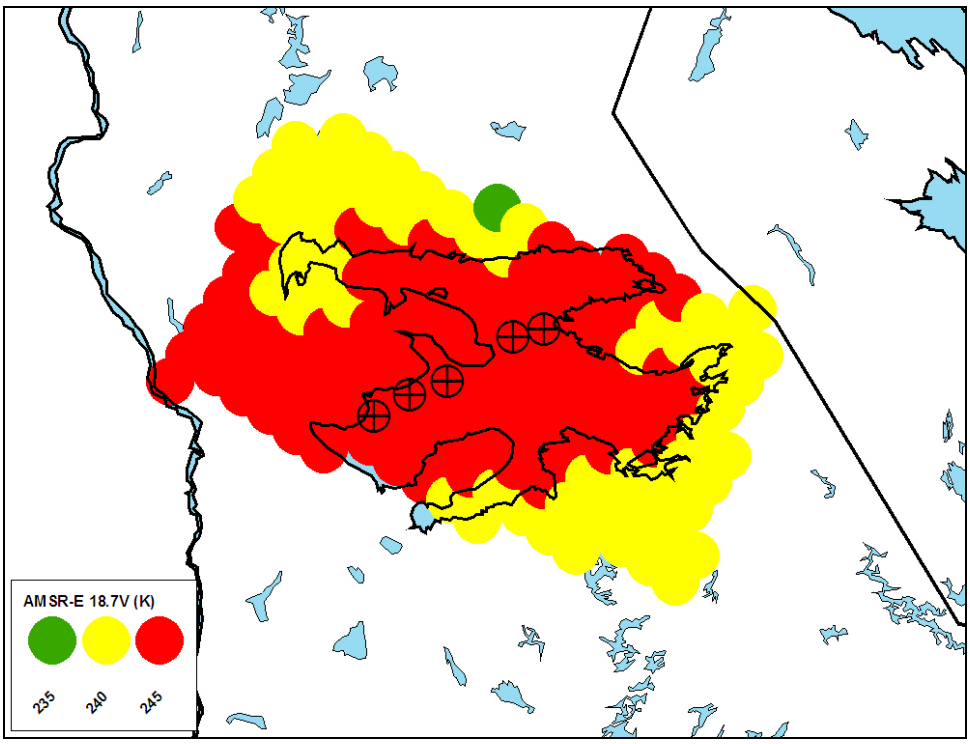



a. 6.9 GHz.

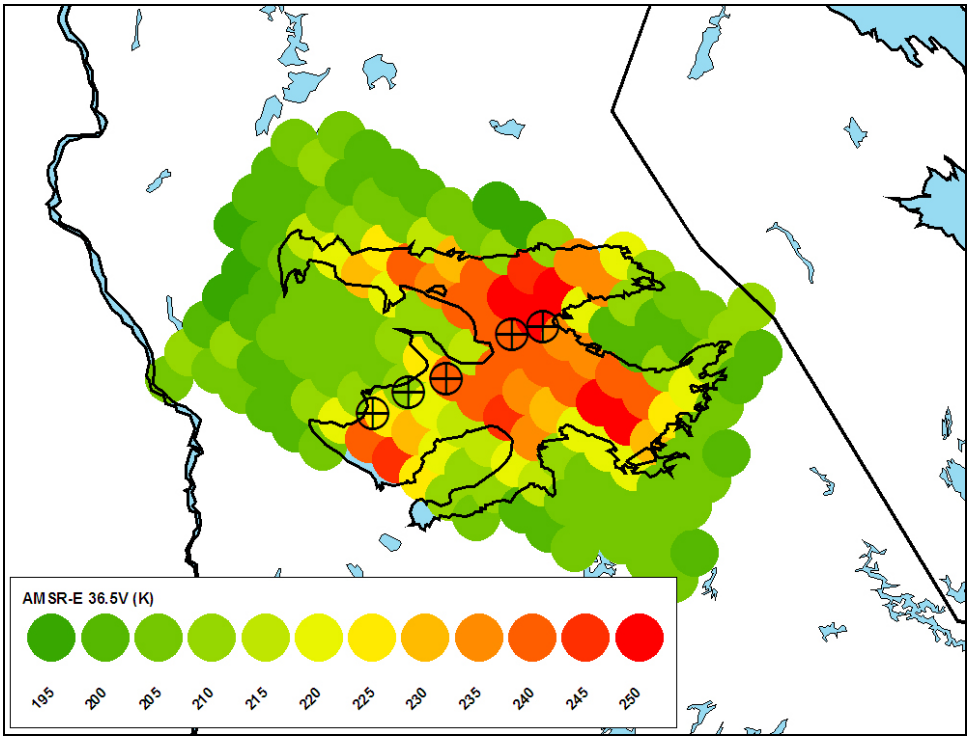



b. 10.7 GHz.

Figure 21. Vertically polarized AMSR-E brightness temperatures for April 3.

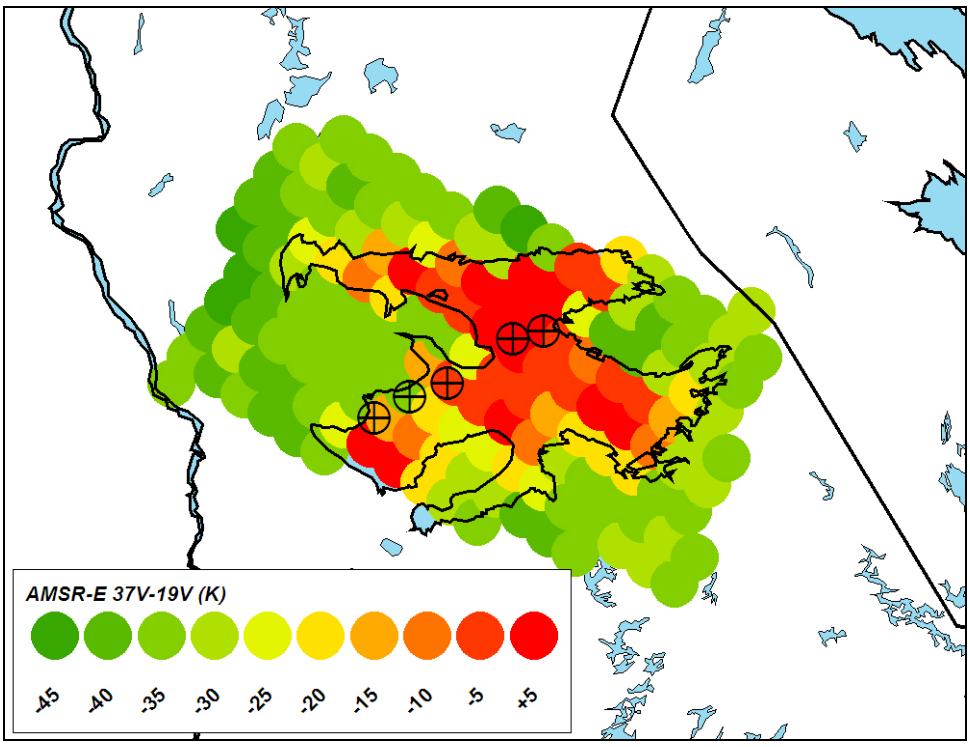



c. 18.7 GHz.




d. 36.5 GHz.

Figure 21 (cont.). Vertically polarized AMSR-E brightness temperatures for April 3.




e. 36.5– 18.7.

Figure 21 (cont.). Vertically polarized AMSR-E brightness temperatures for April 3.

Table 11. AMSR-E Brightness temperature ranges for the Great Bear Lake region.

| Frequency | Brightness Temperature Range (K) | | |
|---|---|---|---|
| | All | Terrestrial | Lake |
| 6.9V | 50 (204-254) | 10 (240-250) | 22 (204-226) |
| 10.7V | 37 (214-251) | 14 (234-248) | 16 (214-230) |
| 18.7V | 11 (234-245) | 6 (234-240) | 4 (240-244) |
| 36.5V | 56 (191-247) | 14 (191-205) | 35 (210-245) |

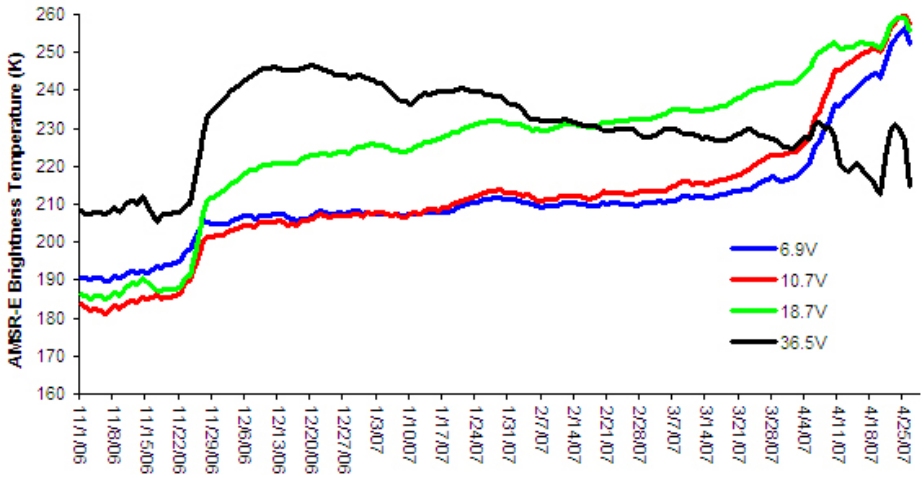
Looking only at the data from Great Bear Lake, a correlation analysis between the AMSR-E data and the surface measurements indicated that increasing snow depth produced higher values of brightness temperature at the lower frequencies and lower brightness temperature values for the higher frequencies. Increasing ice thickness produced the exact opposite effect (Table 12). The linkage between the effect of snow and ice was expected, given the correlation between these two variables (Fig. 20). These results are somewhat unexpected. Airborne measurements described in Hall et al. (1981) showed a correlation in the opposite direction: thinner ice was associated with lower brightness temperatures

at low frequencies. At 36.5 GHz, we found deeper snow (thinner ice) to be associated with lower brightness temperatures.

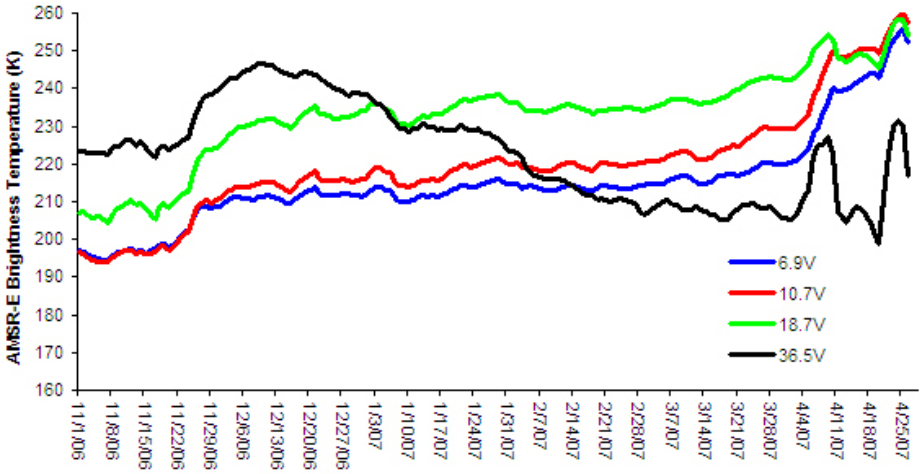
Table 12. Regression results for coincident AMSR-E brightness temperatures and surface measurements of snow depth and ice thickness.

| | 6.9V (K) | 10.7V (K) | 18.7V (K) | 36.5V (K) | 37-19 Crossover (DOY) |
|---|---|---|---|---|---|
| Snow Depth | 0.91 | 0.93 | –0.31 | –0.73 | –0.78 |
| Ice Thickness | –0.86 | –0.96 | 0.40 | 0.86 | 0.90 |

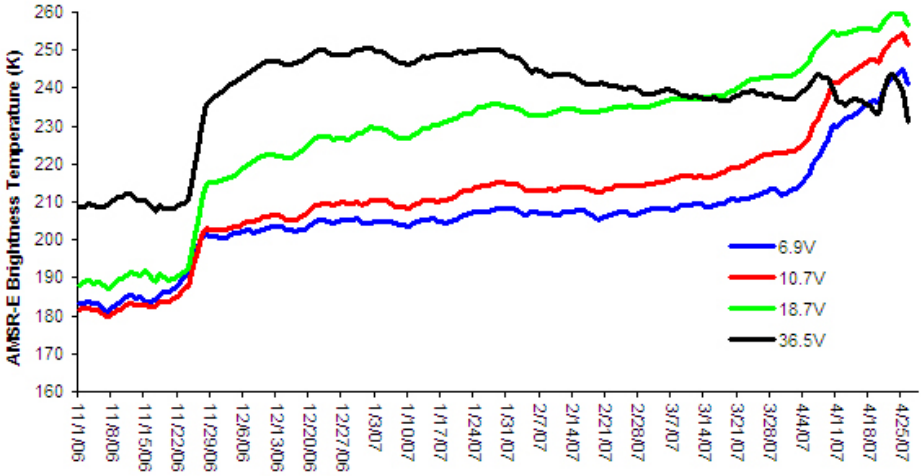
Time series of AMSR-E brightness temperatures at the Great Bear Lake surface measurement sites for the complete winter season are shown in Figure 22. The freeze-up timing in mid-November is clearly identified by a sharp increase in brightness temperatures at all frequencies. A subtle upward drift in 6.9, 10.7, and 18.7 GHz measurements, likely due to increasing ice thickness, occurs until melt onset, at which time brightness temperatures rise sharply again. The 36.5-GHz measurements decrease through the ice-covered season, but unlike at terrestrial sites, they do not fall below the 18.7-GHz signals early in the snow cover season. Instead, this crossover point (36.5 < 18.7 GHz) occurs progressively later in the season as one goes northward (mid-February at site GBL1; early April at site GBL5). The historic literature (Douglas 1914) talks about the climate north of Great Bear Lake being considerably colder than along the southern margin of the lake. The later cross-over date (and thicker ice in the north) may reflect this climatic difference as expressed through the properties of the lake ice and overlying snow cover.




a. Great Bear Lake Site 1.

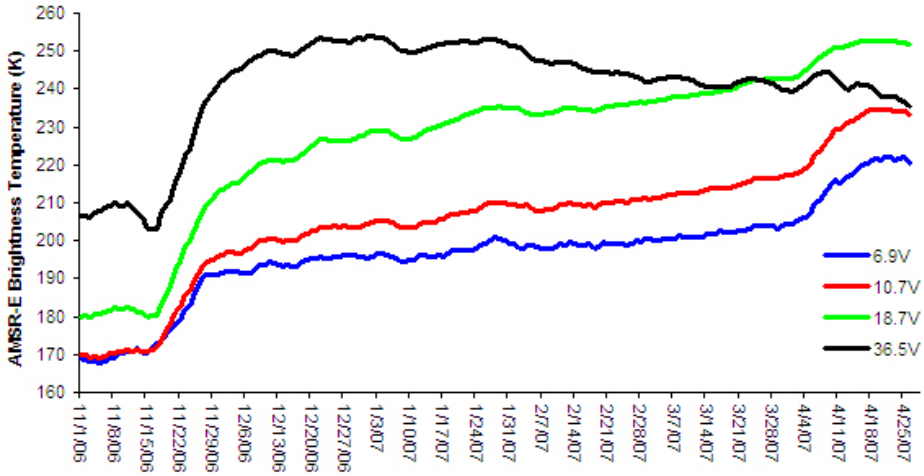



b. Great Bear Lake Site 2.

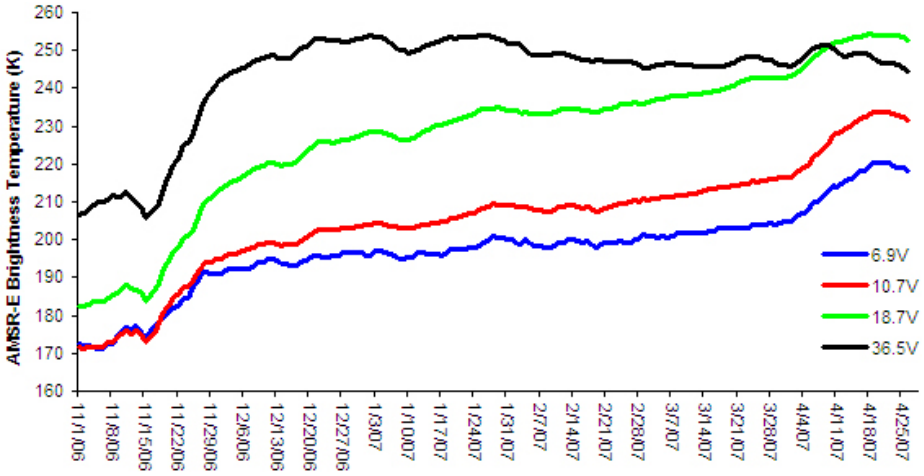



c. Great Bear Lake Site 3.

Figure 22. AMSR-E brightness temperature time series for the Great Bear Lake surface measurement sites.




d. Great Bear Lake Site 4.




e. Great Bear Lake Site 5.

Figure 22 (cont.). AMSR-E brightness temperature time series for the Great Bear Lake surface measurement sites.

# 5 Discussion

Most snow studies are local in nature. It takes a substantial amount of time, effort, and money to collect a comprehensive set of snow measurements at a continental scale. But is collecting such a set valuable? The answer depends on whether the data collected are representative or biased. Collecting data at this large scale can be discouraging because it is easy to see how much of the complexity of the snow cover on the landscape is being ignored. By necessity, one has to drive past many kilometers of snow before stopping at a measurement station. Is that station typical of the snow one has just passed by? Does the necessity of traveling where there is a trail or a lake bias the selection of sample points? There is a constant tension between traveling (there are always time constraints on such a sample campaign) and stopping to make measurements. Despite these issues, the data collected in 2007 show surprisingly consistent patterns, suggesting that the sampling bias was not too severe and that while local variations did exist, regional variations were captured. In addition, working at the continental scale forced us to think broadly about the snow cover, and this is a valuable perspective for climate studies and remote sensing applications.

At the broadest scale, the results validate the idea we put forward in 1995 (Sturm et al. 1995) that there was a distinct class of snow called tundra snow. In general, the snow properties we observed on the traverse were clustered within narrow limits of depth, density, and grain/layer characteristics, and these were similar to the range of properties we had observed farther west in Alaska and farther south in Manitoba. As we discussed previously, the new results, combined with the old, indicate that the tundra snow class stretches over 6000 km across arctic and sub-arctic North America. It is likely that within that band, there are regional differences in the amount of wind slab and depth hoar, but overall, these are second-order effects.

The results also confirm that if we want to use remote sensing to monitor tundra snow, we must deal with the problem of lakes. In particular, our results from Great Bear Lake confirm that when the lake fraction is high, snow cover properties cannot be determined by the current generation of passive microwave sensors and algorithms. It is possible that clever use of

multiple frequencies and polarizations will allow better microwave retrievals in lake-rich country, and research to that end is needed, but it seems likely that multisensor (optical, radar, and passive microwave) techniques, as well as inferential methods and modeling, will be needed to solve this problem.

Lastly, we were able to demonstrate on the traverse that near-infrared photography can be used effectively to document snowpit stratigraphy. Matzl and Schneebeli (2007) showed that the method had promise in this respect, but they did not address how robust or efficient the method might be. The results (Appendix B) speak for themselves: we were able to document stratigraphy rapidly and efficiently in conditions that were often less than favorable. We believe the method should become a standard snowpit practice.

The area of the traverse is a part of the Arctic that is warming rapidly. One ramification of the warming is likely to be a change in the winter snow cover. Unfortunately, we have not found any descriptions of the snow cover against which we can compare our 2007 results. Most travelers across the region were either struggling to stay alive, looking for gold or diamonds, or touring. Our results may be useful in 25 years as a baseline against which present conditions can be compared. We might speculate on several changes in snow characteristics. Rain-on-snow and winter thaw events may become more common. This would lead to more ice layers such as the one we observed at and east of Daring Lake. These layers have implications for wildlife and would clearly complicate remote sensing. Depth hoar percentages might go down, while wind slab percentages go up. Warmer winters would produce less metamorphism, so fewer slabs would be converted into depth hoar. Paradoxically, because slabs have a higher thermal conductivity than depth hoar (Sturm et al. 1997), this might actually lead to lower winter soil temperatures, which has ecosystem impacts.

# 6 Conclusion

Detailed snow measurements made during a 4200-km route from Alaska through Northwest Territories and Nunavut, Canada, in April 2007 show that tundra snow covers much of the region. This snow cover consists of depth hoar and wind slab with small and ephemeral fractions of new, recent, and icy snow. The snow tends to be shallow (<40 cm deep) with less than six layers. Where deposited on lake and river ice, the snow is shallower, denser, and more metamorphosed than where deposited on tundra. Lakes and lake ice confound passive microwave remotes sensing of the snow cover in this area because the lake signal overwhelms the snow signal. Consequently, challenges remain in developing methods to monitor this snow cover by satellite. The traverse, however, demonstrated the practicality of making measurements across the area that can be used to improve remote monitoring methods and that can also provide baseline data against which future changes in snow cover due to climate change can be compared.

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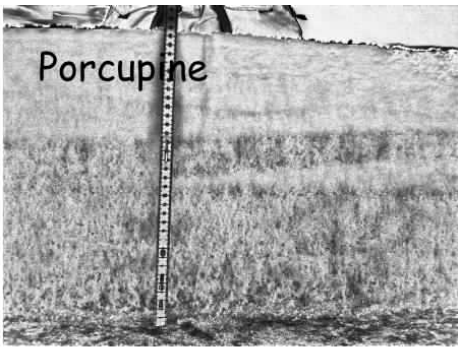
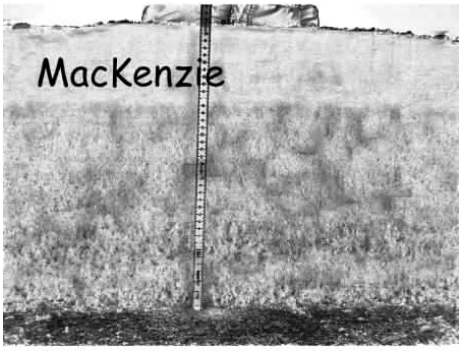
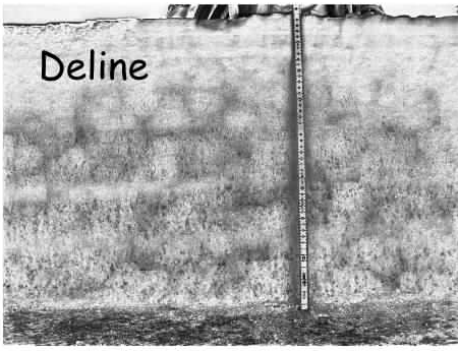
# Appendix A: NIR Images

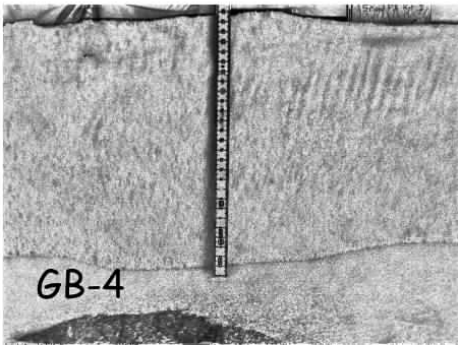



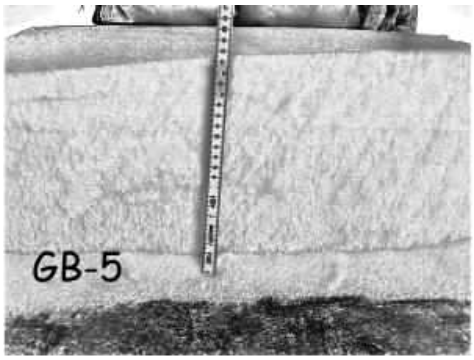







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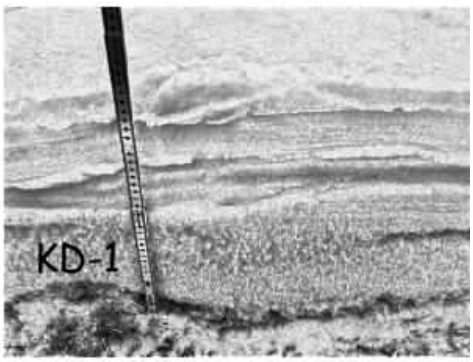
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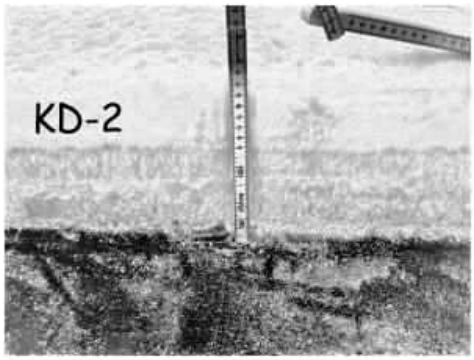
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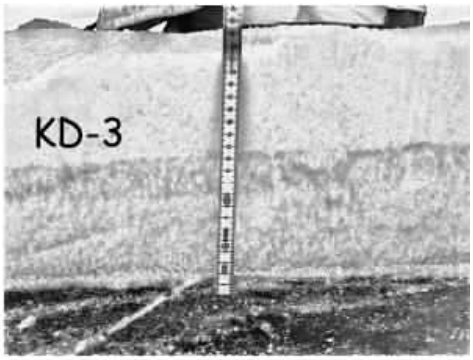
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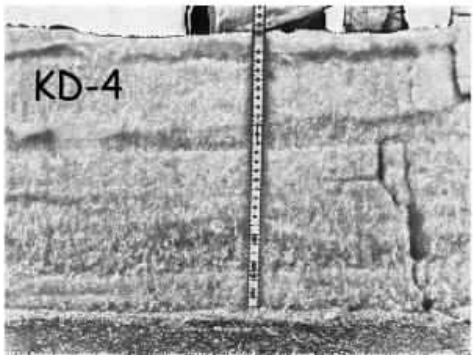
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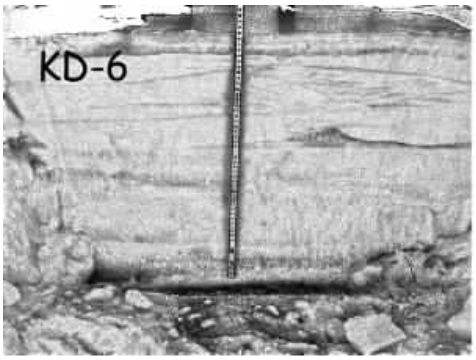
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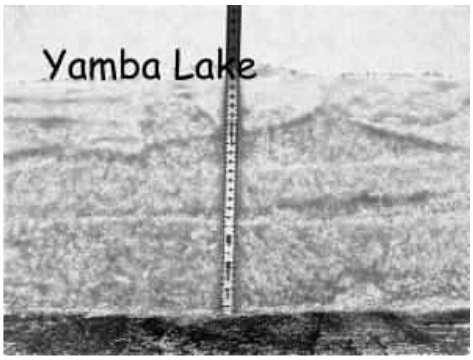
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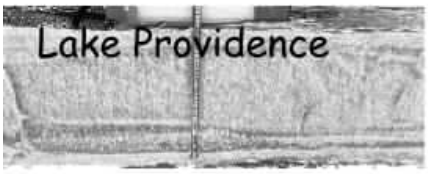
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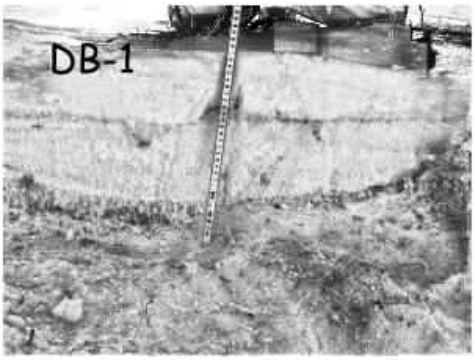
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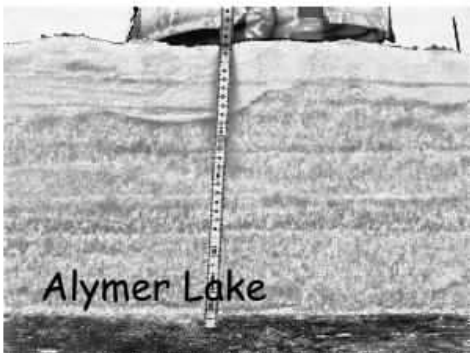
Lac de Gras


Thonokied Lake


DB-4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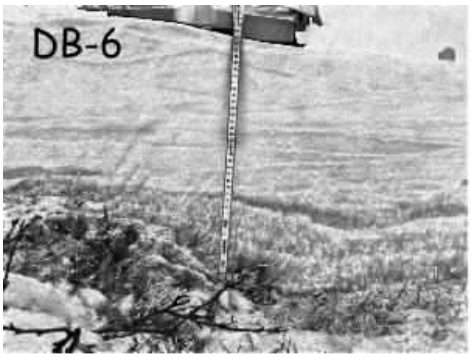
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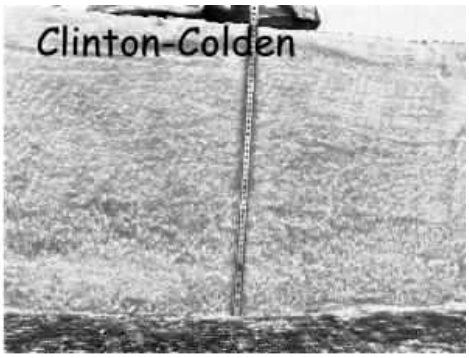
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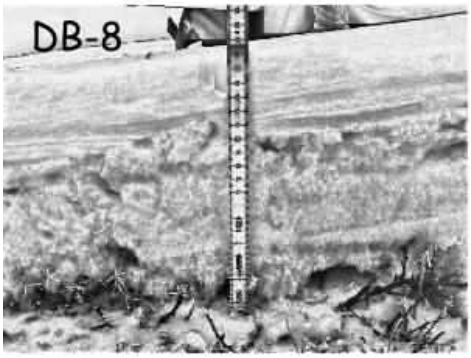

DB-8


Sifton Lake

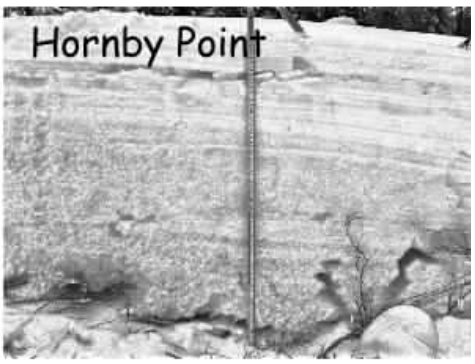

North Hanbury


West Hoare


Hoare Cabin


Hoare Lake


DB-14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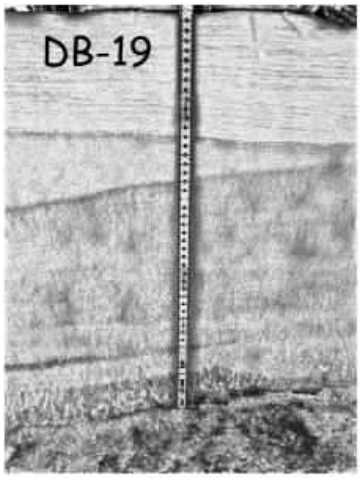
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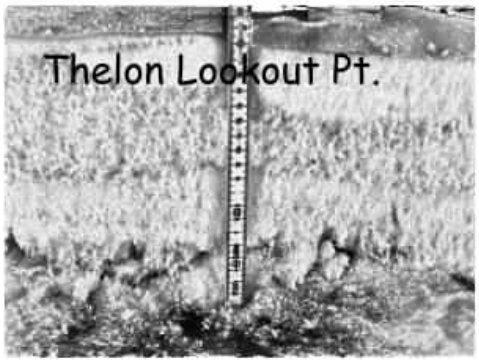
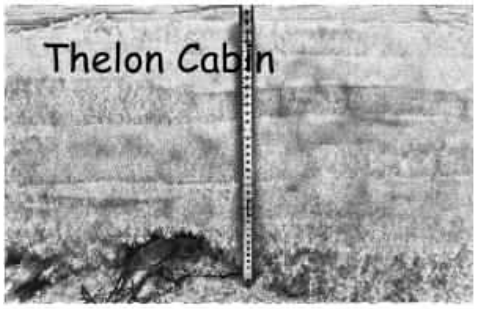
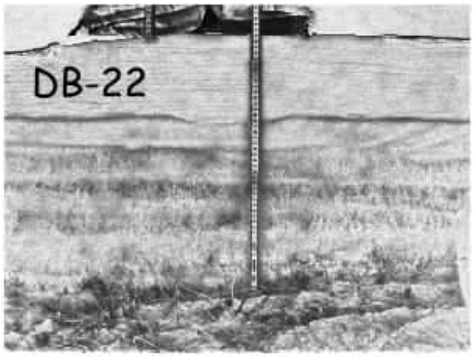
DB-17


Thelon Lookout Pt.


Hornby-Thelon


Thelon Cabin


Beverly Lake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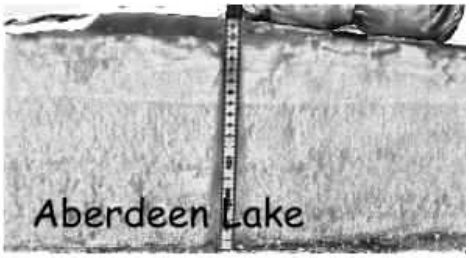
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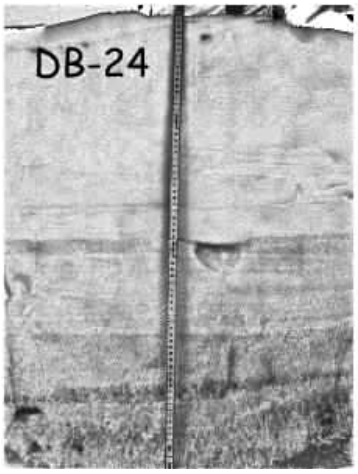
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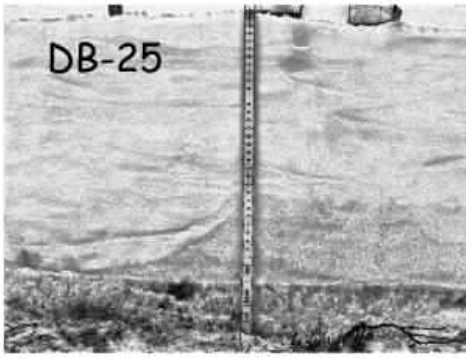
DB-25

# Appendix B: Snow Depths

| GB1 | GB1 | GB1 | GB1 | GB1 | GB1 | GB1 | GB2 | GB2 | GB2 | GB2 | GB2 | GB2 | GB2 | GB3 | GB3 | GB3 | GB3 | GB3 | GB3 | GB3 | GB4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 23.8 | 26.3 | 29.4 | 28.1 | 22.5 | 42.8 | 29.3 | 48.4 | 22.0 | 37.9 | 43.2 | 35.9 | 34.5 | 39.4 | 38.8 | 26.9 | 37.4 | 53.2 | 32.1 | 19.9 | 34.0 | 10.9 |
| 25.3 | 30.5 | 25.1 | 26.9 | 26.9 | 45.1 | 28.7 | 48.7 | 18.7 | 42.8 | 40.7 | 35.8 | 36.4 | 33.6 | 38.2 | 27.8 | 38.9 | 49.2 | 32.8 | 19.7 | 31.5 | 18.2 |
| 26.5 | 33.3 | 24.4 | 24.7 | 29.5 | 39.0 | 27.2 | 42.8 | 13.3 | 43.5 | 36.6 | 37.3 | 34.2 | 35.5 | 34.9 | 33.0 | 35.7 | 48.4 | 31.5 | 16.7 | 34.0 | 17.2 |
| 28.1 | 46.7 | 24.2 | 27.1 | 30.4 | 36.5 | 28.0 | 41.7 | 11.2 | 37.2 | 34.8 | 35.6 | 33.4 | 37.2 | 35.7 | 30.9 | 30.5 | 42.7 | 26.3 | 11.9 | 33.4 | 13.5 |
| 33.3 | 44.0 | 27.0 | 25.6 | 31.7 | 34.7 | 27.2 | 38.7 | 10.6 | 35.3 | 30.9 | 35.6 | 37.1 | 38.1 | 29.6 | 32.9 | 34.3 | 45.4 | 28.4 | 15.0 | 32.2 | 10.1 |
| 30.2 | 42.2 | 26.8 | 24.6 | 32.3 | 33.7 | 25.3 | 42.0 | 12.9 | 35.6 | 35.4 | 34.8 | 34.4 | 34.0 | 32.8 | 32.2 | 36.3 | 42.5 | 22.7 | 15.7 | 34.1 | 9.7 |
| 35.7 | 40.1 | 28.3 | 24.4 | 31.6 | 31.0 | 25.2 | 37.4 | 14.7 | 32.8 | 36.2 | 28.5 | 29.8 | 35.8 | 32.4 | 34.0 | 44.1 | 46.9 | 26.0 | 18.1 | 35.9 | 12.3 |
| 35.5 | 35.4 | 28.6 | 22.4 | 30.4 | 31.6 | 23.3 | 33.3 | 16.2 | 32.8 | 30.4 | 29.8 | 33.4 | 37.5 | 33.7 | 34.5 | 43.2 | 39.7 | 22.7 | 16.6 | 32.5 | 11.1 |
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| 37.1 | 30.1 | 29.2 | 25.3 | 30.6 | 28.9 | 27.4 | 30.5 | 17.3 | 42.3 | 32.3 | 33.6 | 38.4 | 35.5 | 24.9 | 34.6 | 37.3 | 22.3 | 27.1 | 19.1 | 28.9 | 7.1 |
| 40.2 | 34.2 | 28.8 | 25.0 | 30.4 | 28.7 | 30.8 | 31.8 | 25.8 | 47.9 | 38.5 | 38.6 | 39.3 | 38.0 | 26.5 | 35.9 | 33.6 | 25.7 | 29.6 | 18.1 | 31.0 | 11.9 |
| 37.1 | 34.7 | 30.6 | 26.1 | 29.6 | 27.6 | 32.6 | 30.7 | 20.7 | 48.1 | 38.2 | 36.3 | 34.4 | 36.1 | 26.4 | 23.2 | 33.8 | 22.6 | 32.3 | 19.8 | 25.7 | 14.7 |
| 35.5 | 36.2 | 30.9 | 25.6 | 31.1 | 30.7 | 32.2 | 34.0 | 17.1 | 41.3 | 41.6 | 32.4 | 33.0 | 36.9 | 27.2 | 36.3 | 27.1 | 31.5 | 35.9 | 24.5 | 28.6 | 13.2 |
| 31.2 | 37.0 | 29.3 | 28.3 | 30.1 | 26.6 | 29.9 | 43.4 | 17.8 | 36.7 | 38.9 | 35.1 | 29.2 | 41.0 | 34.3 | 31.6 | 29.9 | 27.9 | 32.7 | 29.2 | 31.3 | 13.2 |
| 32.6 | 38.2 | 29.7 | 33.3 | 30.5 | 25.3 | 30.2 | 35.9 | 21.3 | 38.2 | 34.0 | 38.7 | 35.9 | 38.7 | 34.3 | 26.1 | 28.8 | 32.3 | 34.8 | 25.2 | 28.2 | 11.5 |
| 36.6 | 36.4 | 29.5 | 32.5 | 35.8 | 22.3 | 21.7 | 38.0 | 23.8 | 39.0 | 28.4 | 37.6 | 37.7 | 37.7 | 33.3 | 22.6 | 28.1 | 32.2 | 34.9 | 27.2 | 30.7 | 15.3 |
| 32.8 | 33.2 | 29.2 | 29.6 | 33.2 | 22.6 | 25.9 | 37.7 | 25.0 | 43.8 | 29.8 | 34.7 | 40.1 | 32.2 | 28.7 | 33.1 | 25.9 | 32.2 | 37.9 | 24.1 | 29.9 | 18.1 |
| 32.4 | 30.3 | 24.8 | 32.4 | 33.1 | 23.2 | 21.6 | 40.0 | 27.2 | 35.4 | 32.2 | 33.1 | 41.1 | 37.0 | 27.8 | 34.3 | 23.7 | 35.8 | 34.3 | 24.7 | 27.1 | 17.5 |
| 30.3 | 32.7 | 24.5 | 33.2 | 32.5 | 21.8 | 22.0 | 40.1 | 20.5 | 38.3 | 29.8 | 29.0 | 31.5 | 30.7 | 28.8 | 21.3 | 20.9 | 36.9 | 36.4 | 22.7 | 26.3 | 15.3 |
| 30.0 | 33.6 | 24.2 | 34.1 | 32.0 | 23.8 | 22.7 | 43.4 | 24.4 | 39.8 | 34.9 | 31.4 | 31.4 | 31.1 | 31.0 | 26.8 | 16.2 | 35.7 | 33.2 | 24.8 | 28.9 | 13.2 |
| 28.2 | 33.3 | 23.5 | 36.5 | 32.0 | 21.9 | 25.0 | 43.6 | 20.3 | 43.8 | 33.2 | 36.0 | 30.4 | 34.5 | 31.8 | 29.6 | 14.7 | 37.4 | 30.3 | 23.9 | 32.0 | 14.8 |
| 28.7 | 32.7 | 21.5 | 38.3 | 32.1 | 26.1 | 23.3 | 41.2 | 20.7 | 44.4 | 35.3 | 26.7 | 34.8 | 33.7 | 38.4 | 29.6 | 13.3 | 34.3 | 31.0 | 22.7 | 27.8 | 13.1 |
| 27.7 | 36.5 | 24.2 | 38.9 | 33.9 | 26.9 | 23.2 | 45.0 | 21.2 | 37.0 | 42.0 | 34.4 | 32.2 | 35.5 | 36.1 | 23.8 | 12.3 | 32.0 | 31.7 | 20.9 | 32.0 | 19.4 |
| 27.2 | 36.3 | 26.0 | 37.5 | 32.3 | 27.7 | 24.1 | 51.2 | 25.7 | 37.5 | 48.7 | 35.5 | 30.3 | 35.9 | 31.5 | 20.3 | 16.9 | 39.5 | 30.4 | 18.4 | 31.0 | 22.0 |
| 29.5 | 35.8 | 20.9 | 37.0 | 28.7 | 28.3 | 26.9 | 45.2 | 28.8 | 38.9 | 39.5 | 31.9 | 33.9 | 36.5 | 32.8 | 20.3 | 14.9 | 38.8 | 28.3 | 22.8 | 31.6 | 18.8 |
| 25.1 | 31.4 | 21.6 | 37.6 | 26.6 | 30.1 | 27.5 | 47.6 | 30.1 | 32.2 | 37.8 | 31.3 | 29.6 | 34.2 | 33.9 | 20.0 | 19.0 | 32.8 | 30.8 | 21.6 | 32.6 | 17.3 |
| 26.2 | 28.0 | 22.6 | 37.6 | 28.1 | 28.1 | 26.5 | 48.6 | 28.4 | 32.9 | 39.2 | 40.3 | 34.5 | 30.0 | 33.3 | 19.5 | 21.7 | 34.2 | 28.3 | 19.4 | 28.3 | 12.0 |
| 27.2 | 22.8 | 23.4 | 38.5 | 29.5 | 26.7 | 27.4 | 48.9 | 24.0 | 32.6 | 49.5 | 42.5 | 34.4 | 31.2 | 30.1 | 24.1 | 31.0 | 36.9 | 28.9 | 20.4 | 30.6 | 15.7 |
| 30.7 | 20.6 | 23.6 | 36.6 | 29.5 | 27.2 | 18.3 | 47.2 | 26.7 | 31.5 | 46.5 | 40.6 | 36.2 | 25.8 | 30.3 | 27.8 | 26.2 | 34.6 | 31.6 | 17.5 | 26.0 | 15.8 |
| 30.0 | 18.6 | 22.3 | 36.2 | 30.0 | 24.5 | 22.6 | 42.7 | 28.5 | 30.9 | 43.6 | 41.7 | 39.6 | 30.1 | 33.6 | 30.4 | 26.6 | 31.8 | 24.7 | 13.3 | 25.7 | 19.8 |
| 30.1 | 21.7 | 21.5 | 36.1 | 27.1 | 30.4 | 23.6 | 36.4 | 27.7 | 33.6 | 44.4 | 47.6 | 41.0 | 31.6 | 38.7 | 33.4 | 25.3 | 33.3 | 23.4 | 18.5 | 25.9 | 21.6 |
| 28.4 | 23.9 | 19.7 | 34.9 | 30.0 | 31.4 | 26.2 | 37.3 | 29.3 | 34.7 | 47.3 | 47.5 | 39.5 | 29.6 | 43.6 | 31.8 | 25.3 | 26.8 | 24.8 | 14.2 | 25.8 | 26.5 |
| 26.2 | 23.5 | 22.0 | 34.7 | 29.6 | 26.1 | 27.1 | 36.1 | 37.1 | 36.5 | 47.3 | 50.8 | 37.5 | 36.7 | 35.0 | 27.2 | 24.0 | 23.2 | 22.0 | 16.0 | 23.2 | 20.8 |
| 26.4 | 21.3 | 24.9 | 34.6 | 29.7 | 23.7 | 26.5 | 38.1 | 36.8 | 37.5 | 44.3 | 49.1 | 33.0 | 35.9 | 31.4 | 22.8 | 25.4 | 22.5 | 25.9 | 13.9 | 20.9 | 26.1 |
| 28.0 | 22.3 | 22.3 | 34.2 | 31.9 | 26.0 | 27.1 | 35.7 | 32.1 | 40.1 | 42.5 | 48.3 | 34.2 | 37.4 | 29.2 | 21.7 | 29.8 | 22.0 | 25.5 | 19.0 | 18.5 | 27.1 |
| 29.4 | 21.7 | 26.5 | 36.3 | 32.6 | 26.5 | 25.4 | 34.3 | 28.5 | 41.4 | 41.0 | 44.5 | 34.1 | 33.8 | 29.9 | 21.2 | 28.6 | 22.6 | 31.3 | 19.6 | 17.1 | 24.8 |
| 34.0 | 21.7 | 24.5 | 37.2 | 31.8 | 27.9 | 28.7 | 29.8 | 28.1 | 40.4 | 39.0 | 35.3 | 36.3 | 34.5 | 27.2 | 21.5 | 30.4 | 19.9 | 27.6 | 18.4 | 18.4 | 21.8 |
| 33.9 | 24.4 | 24.5 | 33.4 | 31.4 | 26.1 | 28.9 | 27.0 | 32.8 | 40.1 | 40.2 | 33.5 | 34.5 | 34.8 | 24.9 | 20.3 | 30.8 | 22.5 | 26.5 | 12.6 | 15.0 | 21.5 |
| 35.6 | 28.6 | 25.4 | 35.6 | 35.1 | 22.8 | 30.2 | 25.0 | 36.4 | 33.8 | 39.6 | 35.0 | 33.4 | 31.8 | 24.8 | 25.1 | 31.9 | 23.6 | 23.2 | 13.6 | 13.9 | 17.6 |
| 33.9 | 30.2 | 25.3 | 32.4 | 37.5 | 22.0 | 30.5 | 30.1 | 34.7 | 38.7 | 41.3 | 36.6 | 32.9 | 34.8 | 19.3 | 23.4 | 30.7 | 24.2 | 28.3 | 15.7 | 15.4 | 16.2 |
| 27.7 | 32.4 | 25.5 | 31.0 | 38.1 | 21.8 | 28.3 | 30.3 | 32.3 | 41.7 | 43.8 | 43.8 | 33.2 | 43.6 | 26.8 | 22.8 | 29.9 | 26.1 | 30.5 | 19.4 | 19.3 | 14.8 |
| 30.9 | 34.3 | 25.5 | 28.9 | 36.8 | 23.2 | 25.0 | 30.0 | 30.8 | 41.6 | 39.5 | 40.8 | 34.7 | 43.4 | 21.5 | 22.4 | 33.5 | 30.1 | 25.7 | 20.0 | 21.4 | 8.0 |
| 33.1 | 36.6 | 25.7 | 25.4 | 36.3 | 25.6 | 34.6 | 27.6 | 32.2 | 36.2 | 34.5 | 41.4 | 31.2 | 35.6 | 16.0 | 14.6 | 34.3 | 32.7 | 20.6 | 22.9 | 21.5 | 21.1 |
| 26.6 | 39.3 | 26.4 | 24.4 | 34.6 | 28.1 | 30.5 | 28.0 | 32.4 | 39.2 | 32.0 | 43.1 | 36.5 | 30.3 | 18.0 | 21.3 | 31.8 | 33.4 | 21.7 | 25.0 | 23.2 | 25.5 |
| 27.6 | 40.3 | 32.3 | 22.6 | 29.3 | 29.5 | 27.7 | 27.9 | 31.3 | 38.4 | 33.7 | 43.1 | 40.0 | 30.6 | 14.1 | 12.4 | 31.8 | 32.6 | 18.1 | 25.0 | 26.3 | 19.1 |
| 24.9 | 38.5 | 34.5 | 23.4 | 29.9 | 30.0 | 26.9 | 27.6 | 35.3 | 41.9 | 36.3 | 40.8 | 42.6 | 30.9 | 18.1 | 9.6 | 28.9 | 35.0 | 14.6 | 26.4 | 24.5 | 15.8 |
| 22.1 | 34.6 | 31.8 | 23.0 | 30.8 | 24.9 | 27.9 | 27.7 | 33.2 | 36.7 | 43.3 | 37.5 | 45.9 | 30.7 | 16.7 | 11.2 | 33.9 | 37.0 | 14.0 | 25.0 | 27.9 | 24.2 |
| 22.3 | 35.8 | 30.9 | 20.2 | 29.5 | 22.6 | 26.2 | 24.3 | 32.1 | 35.7 | 40.1 | 37.5 | 41.3 | 36.0 | 15.1 | 10.3 | 30.3 | 35.0 | 12.2 | 29.5 | 24.5 | 20.5 |
| 22.6 | 41.2 | 28.3 | 20.6 | 29.4 | 22.9 | 26.8 | 25.6 | 32.9 | 44.7 | 39.0 | 30.9 | 42.2 | 35.7 | 17.5 | 12.6 | 28.1 | 40.8 | 11.6 | 28.7 | 21.9 | 18.9 |
| 22.3 | 41.4 | 33.3 | 22.3 | 27.0 | 23.5 | 19.4 | 28.7 | 26.8 | 47.6 | 33.3 | 30.1 | 41.5 | 34.5 | 18.7 | 19.8 | 20.3 | 37.8 | 12.2 | 31.1 | 23.5 | 30.2 |
| 22.0 | 47.6 | 30.4 | 21.1 | 30.4 | 26.8 | 21.1 | 17.0 | 32.3 | 46.4 | 35.0 | 40.0 | 47.2 | 37.5 | 24.0 | 21.0 | 20.2 | 34.9 | 14.1 | 35.6 | 26.2 | 24.2 |
| 15.0 | 49.5 | 26.4 | 22.0 | 31.3 | 33.5 | 19.8 | 17.3 | 35.4 | 45.9 | 37.7 | 43.3 | 44.5 | 35.4 | 27.7 | 23.2 | 25.4 | 33.7 | 15.4 | 34.4 | 27.8 | 23.6 |
| 21.8 | 42.9 | 23.0 | 21.5 | 27.5 | 30.1 | 21.4 | 24.6 | 29.1 | 36.5 | 35.7 | 39.3 | 41.4 | 34.9 | 26.8 | 21.1 | 19.9 | 46.9 | 16.9 | 33.8 | 29.6 | 16.3 |
| 21.8 | 35.2 | 24.2 | 21.6 | 26.6 | 28.1 | 23.2 | 25.3 | 33.5 | 43.7 | 39.5 | 33.6 | 39.9 | 29.7 | 25.3 | 28.0 | 18.5 | 42.1 | 16.1 | 38.8 | 28.6 | 22.9 |
| 25.3 | 38.1 | 22.4 | 19.7 | 22.2 | 26.6 | 23.2 | 26.4 | 28.5 | 48.3 | 42.1 | 30.0 | 38.9 | 28.3 | 22.0 | 25.9 | 19.8 | 41.7 | 19.1 | 36.8 | 26.0 | 23.1 |
| 23.4 | 38.7 | 23.5 | 21.8 | 24.1 | 28.1 | 23.9 | 29.7 | 27.0 | 49.0 | 45.3 | 33.4 | 34.7 | 26.8 | 18.6 | 28.6 | 16.4 | 45.9 | 26.1 | 39.0 | 20.9 | 16.0 |
| 20.9 | 37.1 | 22.9 | 19.9 | 26.0 | 26.3 | 24.7 | 31.9 | 26.9 | 41.7 | 43.8 | 37.2 | 35.1 | 31.6 | 16.6 | 24.5 | 19.1 | 46.1 | 26.8 | 39.4 | 22.2 | 20.4 |
| 23.5 | 31.9 | 20.9 | 19.5 | 28.5 | 27.1 | 27.5 | 34.3 | 29.2 | 43.2 | 40.9 | 42.9 | 38.7 | 34.9 | 18.4 | 20.5 | 21.2 | 46.5 | 35.9 | 31.4 | 23.5 | 18.2 |
| 24.6 | 31.3 | 21.9 | 22.5 | 29.5 | 27.8 | 32.4 | 35.5 | 28.0 | 42.7 | 37.2 | 36.0 | 36.1 | 35.5 | 22.5 | 21.7 | 15.5 | 45.4 | 43.2 | 30.0 | 23.6 | 18.4 |
| 25.1 | 33.5 | 22.0 | 22.3 | 28.9 | 28.1 | 34.1 | 35.8 | 27.2 | 41.0 | 33.3 | 33.3 | 30.3 | 35.8 | 23.1 | 24.5 | 22.9 | 47.5 | 1.2 | 27.8 | 24.8 | 17.6 |
| 26.9 | 30.4 | 20.5 | 20.2 | 29.7 | 28.3 | 35.2 | 35.8 | 28.3 | 37.4 | 32.4 | 33.9 | 31.8 | 34.9 | 24.1 | 22.6 | 22.9 | 51.4 | 41.8 | 31.9 | 29.9 | 25.0 |
| 26.2 | 29.5 | 21.6 | 18.6 | 33.0 | 29.0 |  | 27.7 | 29.7 | 39.0 | 31.4 | 38.0 | 30.4 | 36.6 | 21.6 | 21.9 | 24.9 | 44.1 | 36.3 | 33.8 | 38.3 | 21.4 |
| 25.0 | 25.1 | 23.7 | 20.3 | 32.9 | 29.5 |  | 15.3 | 30.9 | 41.2 | 36.4 | 37.9 | 32.3 |  | 11.9 | 28.9 | 24.4 | 40.5 | 33.5 | 35.4 | 29.3 | 20.6 |
| 25.8 | 35.7 | 25.8 | 20.0 | 36.8 | 28.0 |  | 15.8 | 31.9 | 38.3 | 37.1 | 39.8 | 33.9 |  | 12.5 | 25.6 | 27.4 | 38.4 | 34.8 | 34.9 |  | 22.5 |
| 22.0 | 35.1 | 27.9 | 21.1 | 36.3 | 27.1 |  | 16.7 | 29.8 | 38.7 | 32.8 | 36.9 | 35.1 |  | 16.2 | 26.6 | 28.8 | 34.1 | 27.0 | 35.3 |  | 23.6 |
| 23.5 | 33.7 | 28.2 | 22.1 | 37.1 | 27.5 |  | 17.0 | 32.5 | 37.2 | 34.6 | 40.0 | 34.3 |  | 25.0 | 26.9 | 34.4 | 31.0 | 24.1 | 35.9 |  | 24.6 |
| 22.6 | 34.6 | 27.9 | 19.1 | 39.3 | 27.5 |  | 18.3 | 31.4 | 33.9 | 37.2 | 35.1 | 30.9 |  | 28.7 | 28.4 | 30.4 | 28.5 | 23.0 | 35.9 |  | 22.1 |
| 24.4 | 33.0 | 24.5 | 19.9 | 40.3 | 29.7 |  | 23.8 | 32.5 | 31.6 | 35.2 | 36.5 | 39.4 |  | 23.4 | 33.7 | 28.1 | 28.0 | 21.2 | 35.0 |  | 22.7 |
| 26.3 | 31.1 | 27.8 | 18.4 | 39.4 | 30.7 |  | 20.6 | 37.6 | 34.7 | 35.3 | 38.0 | 42.2 |  | 17.9 | 35.8 | 28.8 | 27.2 | 20.9 | 32.6 |  | 16.6 |
| 27.3 | 29.2 | 28.3 | 21.2 | 38.1 | 21.9 |  | 17.2 | 37.9 | 37.8 | 37.7 | 34.8 | 37.6 |  | 20.2 | 36.4 | 29.5 | 30.1 | 21.8 | 33.1 |  | 22.0 |
| 23.6 | 26.6 | 27.4 | 24.0 | 38.2 | 27.8 |  | 14.3 | 38.9 | 35.8 | 33.6 | 37.5 | 32.8 |  | 22.7 | 37.5 | 34.2 | 31.1 | 25.0 | 34.0 |  | 16.1 |
| 24.7 | 26.6 | 28.1 | 22.9 | 39.4 | 28.4 |  | 18.7 | 36.1 | 39.9 | 31.7 | 40.3 | 30.2 |  | 25.7 | 39.6 | 39.7 | 30.8 | 25.6 | 30.9 |  | 15.5 |
| 23.1 | 27.4 | 29.0 | 21.8 | 39.6 | 29.0 |  | 24.3 | 32.8 | 41.2 | 31.4 | 34.7 | 30.2 |  | 24.9 | 35.1 | 42.6 | 32.0 | 23.6 | 30.4 |  | 20.2 |

Note: The columns represent different sites; the rows represent points along a transect; the units are centimeters.

| GB4 | GB4 | GB4 | GB4 | GB4 | GB4 | GB5 | GB5 | GB5 | GB5 | GB5 | GB5 | GB5 | KD1 | KD1 | KD2 | KD2 | KD3 | KD3 | KD4 | KD4 | RHL | RHL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 27.7 | 56.5 | 33.3 | 11.7 | 29.0 | 22.0 | 20.7 | 5.0 | 16.4 | 3.8 | 18.9 | 22.0 | 19.5 | 31.0 | 32.5 | 14.9 | 26.9 | 23.8 | 20.3 | 20.7 | 22.7 | 17.6 | 24.0 |
| 31.9 | 53.0 | 39.1 | 10.3 | 25.3 | 27.0 | 20.6 | 5.8 | 20.0 | 2.0 | 23.8 | 21.1 | 15.6 | 45.0 | 56.6 | 11.5 | 26.4 | 19.2 | 18.7 | 25.8 | 26.5 | 20.4 | 17.6 |
| 41.8 | 46.3 | 24.0 | 9.9 | 25.0 | 27.1 | 18.3 | 10.5 | 25.0 | 7.3 | 14.8 | 24.4 | 14.7 | 29.7 | 76.1 | 22.5 | 23.5 | 16.6 | 21.9 | 25.6 | 20.5 | 18.1 | 12.2 |
| 39.2 | 43.0 | 34.1 | 14.1 | 21.6 | 23.6 | 20.8 | 10.8 | 25.0 | 7.1 | 11.4 | 12.1 | 14.7 | 32.8 | 58.1 | 27.0 | 21.0 | 22.9 | 14.1 | 26.7 | 27.4 | 14.6 | 22.1 |
| 34.2 | 43.2 | 34.4 | 17.5 | 22.7 | 22.8 | 22.1 | 13.2 | 9.8 | 5.3 | 8.6 | 19.1 | 14.1 | 25.8 | 32.9 | 26.0 | 21.3 | 19.2 | 15.7 | 24.4 | 23.3 | 14.6 | 21.9 |
| 27.7 | 41.0 | 29.5 | 16.6 | 22.2 | 13.5 | 12.2 | 10.5 | 8.3 | 5.1 | 7.6 | 19.4 | 22.8 | 34.4 | 42.3 | 23.9 | 17.6 | 20.2 | 13.9 | 21.3 | 26.0 | 15.1 | 17.3 |
| 34.0 | 34.2 | 31.0 | 20.9 | 21.9 | 14.7 | 26.3 | 9.9 | 8.4 | 9.8 | 9.4 | 14.6 | 17.5 | 37.9 | 59.1 | 24.8 | 22.3 | 25.0 | 17.7 | 17.8 | 18.6 | 16.7 | 18.2 |
| 26.9 | 33.9 | 27.8 | 15.8 | 21.6 | 17.9 | 28.1 | 13.8 | 8.9 | 10.2 | 11.7 | 15.1 | 14.8 | 25.8 | 59.6 | 22.3 | 26.7 | 27.0 | 17.2 | 17.8 | 20.1 | 15.4 | 24.2 |
| 22.3 | 32.3 | 25.0 | 21.5 | 21.2 | 21.1 | 31.7 | 12.0 | 11.1 | 4.5 | 12.2 | 15.2 | 18.5 | 31.8 | 57.2 | 22.4 | 27.8 | 25.1 | 22.2 | 19.9 | 26.4 | 16.6 | 20.3 |
| 22.6 | 32.7 | 24.4 | 26.5 | 21.5 | 23.9 | 31.3 | 15.9 | 12.3 | 14.4 | 13.4 | 17.8 | 19.3 | 45.3 | 65.4 | 26.7 | 27.6 | 35.9 | 20.5 | 21.3 | 25.9 | 15.9 | 23.2 |
| 24.1 | 32.3 | 26.1 | 36.2 | 15.9 | 25.7 | 35.2 | 20.2 | 10.8 | 9.5 | 16.6 | 21.2 | 22.9 | 37.7 | 48.5 | 24.0 | 27.8 | 31.0 | 32.5 | 26.7 | 25.6 | 15.6 | 26.4 |
| 23.6 | 37.4 | 26.3 | 35.0 | 10.6 | 26.7 | 33.5 | 13.8 | 12.1 | 14.0 | 18.3 | 22.5 | 21.7 | 32.8 | 49.7 | 26.8 | 31.8 | 31.5 | 29.5 | 24.0 | 25.3 | 18.4 | 27.6 |
| 28.2 | 31.6 | 26.6 | 32.8 | 23.3 | 26.5 | 29.0 | 8.8 | 15.7 | 17.7 | 16.4 | 23.5 | 15.6 | 31.7 | 59.8 | 31.0 | 35.8 | 31.9 | 19.8 | 29.1 | 26.7 | 18.0 | 36.1 |
| 24.4 | 35.2 | 24.9 | 31.5 | 24.9 | 26.2 | 21.9 | 6.7 | 11.0 | 21.8 | 14.6 | 25.0 | 11.9 | 28.8 | 47.0 | 30.8 | 32.6 | 36.5 | 14.1 | 30.1 | 23.1 | 16.2 | 39.3 |
| 22.4 | 35.7 | 25.7 | 27.6 | 16.4 | 22.3 | 11.5 | 6.8 | 5.3 | 38.9 | 16.4 | 20.8 | 14.1 | 35.3 | 57.8 | 30.5 | 24.9 | 31.2 | 28.8 | 32.6 | 22.1 | 21.2 | 47.5 |
| 22.4 | 31.0 | 16.1 | 28.9 | 16.2 | 27.1 | 9.3 | 12.6 | 5.3 | 17.7 | 12.3 | 22.7 | 16.3 | 37.6 | 72.5 | 23.6 | 28.1 | 25.9 | 23.7 | 30.4 | 22.5 | 32.3 | 49.2 |
| 21.8 | 30.2 | 20.2 | 26.2 | 17.4 | 26.0 | 9.4 | 6.6 | 7.2 | 12.3 | 9.7 | 23.6 | 12.6 | 44.8 | 54.4 | 28.0 | 19.1 | 24.3 | 27.8 | 29.0 | 29.4 | 36.8 | 47.1 |
| 25.0 | 29.6 | 21.4 | 29.4 | 18.4 | 17.7 | 12.7 | 14.7 | 9.1 | 10.6 | 10.4 | 24.2 | 7.2 | 33.3 | 58.1 | 23.7 | 20.4 | 24.0 | 22.3 | 30.3 | 23.5 | 22.7 | 18.5 |
| 25.4 | 31.3 | 18.1 | 28.5 | 16.2 | 13.7 | 13.7 | 22.8 | 7.2 | 9.3 | 11.2 | 30.3 | 7.6 | 30.9 | 42.5 | 25.5 | 25.7 | 28.9 | 18.6 | 32.3 | 24.1 | 19.4 | 30.7 |
| 21.8 | 33.7 | 16.0 | 25.8 | 16.2 | 13.2 | 11.4 | 31.4 | 10.6 | 13.8 | 14.6 | 31.8 | 7.5 | 33.0 | 36.5 | 27.5 | 29.7 | 25.4 | 19.0 | 31.1 | 23.5 | 19.1 | 30.8 |
| 21.2 | 33.7 | 19.4 | 22.0 | 16.0 | 12.5 | 11.4 | 35.3 | 13.7 | 18.2 | 13.7 | 30.1 | 11.0 | 45.8 | 38.9 | 23.3 | 27.4 | 22.0 | 21.8 | 34.5 | 33.8 | 18.2 | 27.5 |
| 18.8 | 36.9 | 17.6 | 22.8 | 12.8 | 12.0 | 14.5 | 25.5 | 20.7 | 17.3 | 9.6 | 30.5 | 9.8 | 34.8 | 44.6 | 21.7 | 30.8 | 25.0 | 22.7 | 37.4 | 25.3 | 19.0 | 33.3 |
| 19.7 | 47.7 | 18.9 | 19.9 | 13.3 | 12.9 | 12.1 | 15.7 | 19.6 | 23.4 | 10.9 | 28.1 | 7.3 | 30.4 | 47.7 | 23.3 | 32.7 | 20.0 | 24.4 | 32.4 | 28.5 | 15.0 | 3.3 |
| 19.9 | 50.4 | 23.0 | 17.4 | 16.7 | 15.3 | 12.1 | 14.0 | 15.4 | 15.4 | 7.5 | 23.9 | 5.3 | 37.0 | 74.2 | 24.9 | 36.8 | 18.4 | 30.1 | 30.2 | 28.3 | 15.4 | 121.5 |
| 24.2 | 46.4 | 27.1 | 22.1 | 22.0 | 15.7 | 13.6 | 14.4 | 13.7 | 15.7 | 9.3 | 21.5 | 6.5 | 33.8 | 53.1 | 23.8 | 31.9 | 15.0 | 29.1 | 25.8 | 27.6 | 12.4 | 38.5 |
| 21.1 | 45.8 | 22.7 | 18.6 | 14.3 | 18.6 | 13.9 | 14.6 | 14.3 | 12.9 | 8.6 | 23.9 | 8.4 | 24.2 | 48.3 | 24.6 | 29.4 | 17.8 | 35.7 | 25.5 | 32.4 | 16.4 | 40.4 |
| 21.6 | 42.1 | 18.9 | 16.4 | 18.9 | 15.3 | 10.8 | 17.5 | 14.2 | 15.8 | 8.3 | 31.5 | 6.2 | 21.9 | 45.8 | 22.2 | 30.2 | 20.4 | 37.8 | 32.1 | 32.5 | 13.0 | 33.8 |
| 17.3 | 35.3 | 25.6 | 13.2 | 20.5 | 15.8 | 9.6 | 17.2 | 28.6 | 16.2 | 5.6 | 28.4 | 4.4 | 15.9 | | 23.1 | | 20.7 | | 22.9 | | 10.5 | 31.5 |
| 25.0 | 30.2 | 25.8 | 10.2 | 20.5 | 19.2 | 8.3 | 20.4 | 23.2 | 17.3 | 5.5 | 22.0 | 6.7 | 62.3 | | 26.3 | | 22.7 | | 24.7 | | 12.5 | 29.3 |
| 18.9 | 39.6 | 20.8 | 12.6 | 19.2 | 22.9 | 7.8 | 21.4 | 17.8 | 21.0 | 4.5 | 18.2 | 7.7 | 26.2 | | 27.8 | | 28.6 | | 20.5 | | 9.5 | |
| 23.1 | 38.3 | 23.0 | 9.1 | 20.0 | 21.9 | 9.7 | 22.1 | 16.2 | 24.9 | 7.7 | 21.4 | 10.1 | 39.0 | | 26.2 | | 35.4 | | 21.9 | | 9.9 | |
| 22.1 | 36.8 | 20.6 | 4.5 | 22.4 | 18.0 | 0.8 | 26.7 | 17.6 | 27.3 | 5.4 | 15.3 | 10.7 | 39.0 | | 22.7 | | 33.9 | | 23.0 | | 25.2 | |
| 30.7 | 30.7 | 17.9 | 5.6 | 21.0 | 18.5 | 0.8 | 29.2 | 12.5 | 32.2 | 4.7 | 16.3 | 9.7 | 18.2 | | 24.2 | | 35.1 | | 26.8 | | 21.6 | |
| 32.9 | 29.3 | 18.1 | 5.4 | 21.1 | 17.9 | 0.8 | 32.7 | 13.2 | 28.6 | 6.4 | 12.9 | 11.3 | 43.5 | | 28.5 | | 36.5 | | 24.6 | | 19.0 | |
| 35.7 | 23.7 | 19.3 | 4.5 | 22.0 | 21.6 | 5.4 | 32.2 | 11.3 | 27.4 | 8.0 | 11.0 | 12.5 | 35.5 | | 23.1 | | 29.8 | | 26.1 | | 19.8 | |
| 28.2 | 26.9 | 20.3 | 4.4 | 22.9 | 22.6 | 5.3 | 27.8 | 12.8 | 25.8 | 6.5 | 10.0 | 13.1 | 39.1 | | 27.5 | | 34.5 | | 28.8 | | 18.1 | |
| 27.4 | 28.0 | 21.2 | 7.7 | 21.0 | 20.5 | 2.4 | 26.4 | 18.8 | 21.6 | 3.5 | 11.1 | 13.1 | 49.9 | | 33.8 | | 32.9 | | 27.3 | | 21.0 | |
| 26.1 | 30.4 | 21.5 | 7.2 | 21.8 | 19.2 | 9.8 | 28.7 | 19.8 | 35.7 | 9.2 | 13.2 | 15.7 | 31.7 | | 35.9 | | 32.5 | | 28.7 | | 17.2 | |
| 22.6 | 24.1 | 21.5 | 13.1 | 22.8 | 21.1 | 10.0 | 29.4 | 24.5 | 34.7 | 5.8 | 13.8 | 20.3 | 34.7 | | 37.3 | | 26.8 | | 32.2 | | 21.6 | |
| 26.8 | 23.5 | 20.6 | 9.5 | 19.3 | 21.4 | 9.7 | 33.5 | 17.3 | 32.4 | 6.9 | 13.7 | 18.3 | 15.2 | | 42.1 | | 16.8 | | 34.6 | | 16.5 | |
| 30.0 | 25.5 | 19.1 | 6.8 | 17.6 | 24.4 | 12.8 | 28.9 | 12.5 | 29.6 | 3.8 | 16.4 | 15.2 | 28.1 | | 38.2 | | 18.2 | | 29.5 | | 21.4 | |
| 31.0 | 28.5 | 13.8 | 8.9 | 14.9 | 23.8 | 14.7 | 27.5 | 16.8 | 26.3 | 6.5 | 22.9 | 13.7 | 32.6 | | 37.8 | | 21.8 | | 34.6 | | 19.7 | |
| 30.2 | 30.0 | 12.5 | 12.9 | 10.8 | 25.7 | 17.4 | 29.6 | 16.1 | 23.3 | 11.3 | 24.3 | 11.1 | 32.6 | | 41.2 | | 20.7 | | 30.6 | | 24.0 | |
| 29.5 | 41.7 | 11.3 | 14.2 | 8.4 | 24.2 | 11.4 | 28.2 | 13.4 | 18.1 | 16.4 | 23.8 | 20.2 | 24.7 | | 39.3 | | 18.9 | | 31.2 | | 27.8 | |
| 25.0 | 41.0 | 11.9 | 17.9 | 11.7 | 24.6 | 5.4 | 30.5 | 10.5 | 16.2 | 17.8 | 21.0 | 18.0 | 36.1 | | 34.8 | | 17.1 | | 26.7 | | 28.6 | |
| 22.4 | 38.4 | 17.5 | 18.1 | 9.0 | 24.7 | 8.9 | 31.6 | 11.3 | 13.0 | 21.2 | 18.4 | 21.5 | 51.8 | | 30.1 | | 14.6 | | 23.8 | | 36.8 | |
| 23.2 | 37.3 | 14.8 | 12.5 | 10.5 | 26.3 | 8.5 | 36.1 | 13.0 | 17.4 | 21.4 | 27.9 | 20.6 | 19.8 | | 33.1 | | 16.8 | | 23.6 | | 38.8 | |
| 14.8 | 38.0 | 15.4 | 14.5 | 11.3 | 24.0 | 12.9 | 40.0 | 5.6 | 20.3 | 9.4 | 27.5 | 24.6 | 56.9 | | 33.7 | | 17.2 | | 21.4 | | 44.1 | |
| 18.5 | 37.0 | 14.0 | 10.0 | 12.5 | 27.4 | 11.3 | 44.3 | 9.0 | 21.1 | 8.0 | 21.8 | 27.0 | 73.2 | | 33.9 | | 17.5 | | 19.9 | | 31.2 | |
| 22.6 | 36.8 | 14.1 | 8.3 | 9.8 | 25.3 | 13.2 | 40.2 | 11.7 | 24.1 | 10.8 | 27.3 | 25.5 | 54.6 | | 29.1 | | 25.3 | | 22.4 | | 21.2 | |
| 24.4 | 40.9 | 14.4 | 9.9 | 14.9 | 23.5 | 7.1 | 29.0 | 11.1 | 23.4 | 9.7 | 17.0 | 29.4 | 57.3 | | 27.2 | | 22.6 | | 25.1 | | 25.4 | |
| 22.1 | 41.2 | 16.3 | 11.2 | 18.1 | 25.8 | 9.6 | 30.0 | 11.4 | 15.0 | 16.8 | 32.1 | 28.5 | 47.0 | | 28.6 | | 21.2 | | 25.5 | | 31.6 | |
| 20.4 | 38.2 | 20.7 | 11.8 | 17.3 | 28.4 | 13.4 | 29.3 | 11.5 | 18.1 | 12.6 | 12.8 | 25.5 | 41.4 | | 28.4 | | 22.5 | | 26.8 | | 38.6 | |
| 19.4 | 38.6 | 17.6 | 12.2 | 16.9 | 27.1 | 14.9 | 29.3 | 12.9 | 19.9 | 18.0 | 14.2 | 24.3 | 53.9 | | 25.1 | | 18.3 | | 26.6 | | 40.5 | |
| 14.8 | 42.6 | 16.8 | 13.6 | 22.5 | 19.9 | 19.5 | 28.1 | 13.7 | 20.6 | 17.7 | 15.0 | 23.3 | 60.7 | | 20.4 | | 15.2 | | 28.8 | | 32.4 | |
| 20.3 | 39.7 | 14.1 | 18.4 | 21.8 | 17.1 | 14.7 | 32.9 | 16.1 | 14.3 | 19.7 | 20.4 | 28.4 | 62.2 | | 18.8 | | 24.3 | | 25.3 | | 34.8 | |
| 30.4 | 41.7 | 19.5 | 20.7 | 18.6 | 13.9 | 8.5 | 36.2 | 15.2 | 15.0 | 7.8 | 26.0 | 28.3 | 66.6 | | 19.6 | | 17.6 | | 22.6 | | 34.7 | |
| 27.4 | 42.1 | 17.5 | 22.6 | 16.8 | 16.7 | 7.2 | 31.6 | 9.9 | 12.2 | 17.6 | 31.8 | 26.9 | 52.7 | | 20.5 | | 19.4 | | 24.3 | | 37.0 | |
| 21.6 | 46.1 | 21.4 | 28.9 | 16.2 | 18.5 | 4.7 | 17.9 | 7.0 | 14.4 | 20.2 | 21.1 | | 68.6 | | 18.8 | | 21.6 | | 26.6 | | 46.6 | |
| 22.4 | 43.4 | 17.5 | 28.9 | 14.6 | 18.0 | 7.7 | 14.5 | 4.5 | 15.1 | 21.2 | 23.0 | | 54.1 | | 21.2 | | 17.6 | | 25.3 | | 48.6 | |
| 19.7 | 44.2 | 23.3 | 27.6 | 10.7 | 25.1 | 9.0 | 17.6 | 3.6 | 15.8 | 9.0 | 23.9 | | 60.4 | | 20.1 | | 18.0 | | 24.4 | | 54.8 | |
| 20.7 | 47.4 | 23.8 | 29.0 | 16.1 | 21.4 | 11.9 | 16.6 | 2.9 | 13.7 | 15.3 | 23.6 | | 64.6 | | 22.6 | | 17.1 | | 25.4 | | 59.4 | |
| 21.0 | 48.7 | 22.9 | 27.7 | 19.2 | | 17.4 | 14.6 | 8.7 | 12.9 | 17.2 | 28.2 | | 76.7 | | 22.7 | | 18.2 | | 28.5 | | 57.3 | |
| 16.6 | 46.6 | 20.4 | 25.3 | 21.8 | | 18.3 | 17.9 | 3.2 | 13.4 | 16.4 | 29.3 | | 68.7 | | 23.8 | | 18.9 | | 29.1 | | 49.0 | |
| 15.6 | 47.0 | 17.1 | 26.4 | 21.2 | | 13.2 | 16.9 | 4.4 | 12.9 | 17.3 | 25.2 | | 51.4 | | 27.1 | | 20.6 | | 28.5 | | 52.2 | |
| 15.0 | 45.3 | 16.9 | 24.6 | 19.9 | | 7.5 | 13.7 | 2.9 | 12.4 | 17.6 | 35.0 | | 67.3 | | 32.1 | | 13.0 | | 27.1 | | 48.0 | |
| 17.0 | 39.1 | 11.6 | 24.1 | 21.5 | | 1.5 | 18.6 | 1.9 | 11.4 | 13.9 | 33.7 | | 67.1 | | 32.5 | | 12.9 | | 21.9 | | 47.2 | |
| 14.7 | 39.1 | 16.3 | 27.7 | 23.6 | | 1.7 | 19.4 | 9.0 | 12.1 | 9.2 | 30.1 | | 84.0 | | 34.8 | | 14.8 | | 21.8 | | 40.9 | |
| 17.3 | 42.6 | 5.6 | 30.4 | 25.7 | | 3.8 | 14.6 | 16.0 | 15.4 | 10.0 | 19.7 | | 45.1 | | 28.1 | | 21.4 | | 25.0 | | 43.3 | |
| 18.4 | 37.7 | 12.2 | 33.1 | 23.5 | | 1.2 | 16.3 | 19.6 | 23.4 | 19.8 | 20.6 | | 36.8 | | 30.0 | | 26.4 | | 25.5 | | 33.5 | |
| 19.9 | 35.9 | 13.2 | 36.7 | 23.4 | | 5.4 | 19.4 | 15.4 | 17.9 | 7.5 | 21.0 | | 14.4 | | 29.3 | | 28.3 | | 20.8 | | 34.2 | |
| 31.4 | 30.7 | 15.2 | 37.1 | 19.8 | | 6.8 | 18.3 | 11.3 | 24.0 | 8.0 | 22.7 | | 25.7 | | 27.5 | | 23.1 | | 21.3 | | 29.0 | |
| 40.0 | 37.2 | 19.5 | 39.5 | 21.8 | | 6.7 | 14.4 | 7.9 | 16.5 | 11.9 | 18.9 | | 40.3 | | 30.1 | | 22.3 | | 21.3 | | 24.5 | |

| KD6 | KD6 | YL | YL | PROV | PROV | PROV | PROV | PROV | PROV | PROV | PROV | DB1 | DB1 | DB1 | DB1 | DB1 | DB1 | DB1 | DB1 | DB1 | DB1 | DB2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 32.2 | 12.5 | 21.2 | 30.9 | 46.0 | 21.2 | 60.7 | 76.0 | 15.2 | 60.6 | 25.9 | 46.2 | 28.1 | 13.3 | 61.9 | 41.5 | 14.5 | 13.5 | 11.7 | 26.3 | 11.3 | 20.9 | 31.1 |
| 26.9 | 12.6 | 23.8 | 27.6 | 55.6 | 31.4 | 38.5 | 45.8 | 27.7 | 69.5 | 23.9 | 96.4 | 28.1 | 20.2 | 61.5 | 45.8 | 20.1 | 23.6 | 9.9 | 11.2 | 29.6 | 32.9 | 31.7 |
| 26.2 | 31.9 | 22.5 | 25.7 | 56.0 | 30.6 | 30.2 | 31.6 | 9.9 | 57.8 | 44.8 | 100.7 | 28.7 | 15.7 | 59.6 | 49.9 | 19.3 | 12.9 | 14.0 | 3.5 | 40.0 | 28.9 | 32.6 |
| 28.2 | 23.7 | 21.4 | 27.7 | 45.0 | 19.6 | 34.5 | 18.8 | 14.3 | 67.7 | 70.9 | 104.6 | 24.0 | 18.1 | 63.1 | 41.7 | 25.6 | 6.9 | 23.9 | 7.9 | 23.1 | 32.3 | 34.7 |
| 41.3 | 40.1 | 21.0 | 26.7 | 37.6 | 12.9 | 15.1 | 30.2 | 39.2 | 89.2 | 71.8 |  | 22.3 | 23.6 | 64.9 | 43.8 | 21.9 | 15.7 | 58.8 | 14.9 | 4.5 |  | 36.9 |
| 38.9 | 33.7 | 23.0 | 31.6 | 34.6 | 6.4 | 40.4 | 29.7 | 13.6 | 121.5 | 54.9 |  | 20.7 | 29.3 | 70.5 | 54.1 | 35.5 | 5.1 | 24.5 | 6.5 | 3.6 |  | 37.2 |
| 39.5 | 44.2 | 25.4 | 29.8 | 57.3 | 12.3 | 50.2 | 38.3 | 22.8 | 121.6 | 49.3 |  | 25.1 | 30.8 | 60.2 | 37.9 | 51.2 | 24.1 | 5.0 | 13.2 | 15.5 |  | 39.7 |
| 40.4 | 40.4 | 24.9 | 33.4 | 19.6 | 19.7 | 36.0 | 41.5 | 30.5 | 72.8 | 63.7 |  | 42.9 | 26.9 | 62.3 | 29.6 | 31.0 | 11.0 | 8.3 | 11.6 | 18.6 |  | 39.0 |
| 31.3 | 44.5 | 23.5 | 31.7 | 34.2 | 15.8 | 40.7 | 50.0 | 27.0 | 55.5 | 55.9 |  | 47.4 | 23.0 | 68.2 | 34.7 | 6.0 | 7.1 | 14.5 | 2.0 | 4.6 |  | 36.4 |
| 40.8 | 31.8 | 22.8 | 33.0 | 52.1 | 99.7 | 32.1 | 55.0 | 26.7 | 8.1 | 19.9 |  | 43.1 | 22.0 | 69.8 | 43.2 | 19.7 | 17.0 | 4.8 | 21.3 | 3.5 |  | 37.2 |
| 44.2 | 40.1 | 27.2 | 35.2 | 21.5 | 121.6 | 37.2 | 86.0 | 9.5 | 8.1 | 19.0 |  | 45.1 | 28.7 | 61.0 | 59.4 | 22.6 | 3.8 | 9.7 | 20.2 | 10.7 |  | 36.8 |
| 24.4 | 38.3 | 27.1 | 35.1 | 18.1 | 103.4 | 50.0 | 46.9 | 32.1 | 6.2 | 8.3 |  | 53.5 | 30.3 | 62.4 | 60.5 | 20.2 | 17.0 | 5.8 | 10.8 | 5.8 |  | 37.9 |
| 48.0 | 41.6 | 29.0 | 38.2 | 16.8 | 58.3 | 11.4 | 118.3 | 25.2 | 43.5 | 55.4 |  | 57.9 | 27.8 | 64.9 | 35.2 | 31.6 | 32.1 | 2.7 | 3.3 | 22.0 |  | 38.1 |
| 39.7 | 48.2 | 22.9 | 34.7 | 14.1 | 41.2 | 33.4 | 121.6 | 26.1 | 64.4 | 40.8 |  | 56.8 | 36.9 | 63.7 | 27.0 | 10.8 | 8.1 | 2.3 | 9.8 | 30.4 |  | 36.4 |
| 45.9 | 29.0 | 31.7 | 37.4 | 12.0 | 49.8 | 46.8 | 121.6 | 31.5 | 85.4 | 37.7 |  | 50.4 | 33.6 | 66.1 | 25.2 | 19.5 | 20.1 | 2.5 | 0.2 | 33.4 |  | 32.7 |
| 41.7 | 34.6 | 37.1 | 37.1 | 27.9 | 38.6 | 50.3 | 121.6 | 29.9 | 48.8 | 27.5 |  | 46.5 | 32.7 | 72.1 | 40.6 | 34.9 | 10.3 | 6.2 | 2.6 | 4.9 |  | 31.0 |
| 34.7 | 32.1 | 40.4 | 39.4 | 27.1 | 64.7 | 48.8 | 121.6 | 26.2 | 10.2 | 4.5 |  | 42.8 | 26.6 | 66.8 | 36.4 | 52.1 | 8.1 | 5.1 | 18.7 | 18.0 |  | 28.6 |
| 40.1 | 23.6 | 40.7 | 36.6 | 27.0 | 53.4 | 51.8 | 106.9 | 27.4 | 21.2 | 24.6 |  | 37.1 | 37.5 | 75.1 | 55.8 | 20.9 | 17.2 | 12.8 | 17.6 | 33.4 |  | 26.3 |
| 28.0 | 39.3 | 43.5 | 34.5 | 29.2 | 30.1 | 43.0 | 97.0 | 39.0 | 24.1 | 33.1 |  | 38.7 | 39.6 | 6.6 | 41.3 | 26.6 | 10.7 | 9.9 | 6.6 | 36.6 |  | 24.5 |
| 35.2 | 43.4 | 37.7 | 30.8 | 21.1 | 34.9 | 32.0 | 53.6 | 37.1 | 27.0 | 57.8 |  | 33.4 | 41.0 | 66.2 | 42.2 | 35.9 | 9.9 | 11.2 | 14.8 | 19.5 |  | 30.4 |
| 31.8 | 39.3 | 37.5 | 33.9 | 33.7 | 50.5 | 46.7 | 41.7 | 47.6 | 12.2 | 33.9 |  | 21.6 | 41.0 | 57.6 | 46.6 | 33.9 | 14.8 | 4.1 | 21.2 | 21.3 |  | 32.7 |
| 36.4 | 27.9 | 32.9 | 32.7 | 53.5 | 88.5 | 27.9 | 21.6 | 55.9 | 24.3 | 57.9 |  | 30.6 | 27.7 | 58.1 | 24.3 | 14.0 | 17.3 | 7.0 | 10.6 | 21.1 |  | 15.1 |
| 37.9 | 28.5 | 29.8 | 31.8 | 33.9 | 78.0 | 52.0 | 20.6 | 36.2 | 20.1 | 28.3 |  | 42.9 | 21.3 | 51.2 | 29.6 | 20.9 | 17.7 | 9.4 | 21.9 | 11.5 |  | 25.6 |
| 36.0 | 20.9 | 27.8 | 32.9 | 42.7 | 101.0 | 102.3 | 43.4 | 38.1 | 18.0 | 47.4 |  | 49.0 | 25.8 | 46.1 | 36.1 | 41.2 | 10.4 | 10.7 | 20.3 | 13.7 |  | 37.2 |
| 47.3 | 21.0 | 26.1 | 37.3 | 21.7 | 121.5 | 5.3 | 57.0 | 48.6 | 18.5 | 42.6 |  | 45.4 | 25.0 | 58.4 | 33.7 | 36.0 | 23.9 | 9.8 | 16.9 | 12.3 |  | 37.6 |
| 45.6 | 29.7 | 25.0 | 37.1 | 10.9 | 121.5 | 13.0 | 102.2 | 38.3 | 36.2 | 53.6 |  | 47.4 | 30.6 | 65.5 | 27.9 | 18.4 | 19.0 | 22.6 | 6.5 | 23.5 |  | 22.9 |
| 37.4 | 17.4 | 25.9 | 35.7 | 40.6 | 121.5 | 50.7 | 70.4 | 40.2 | 13.9 | 30.0 |  | 52.3 | 31.6 | 62.5 | 29.0 | 18.7 | 19.2 | 20.3 | 19.1 | 7.8 |  | 36.6 |
| 38.1 |  | 28.6 |  | 18.6 | 121.6 | 7.4 | 41.6 | 28.7 | 13.9 | 22.9 |  | 54.7 | 35.0 | 57.3 | 37.6 | 3.3 | 8.5 | 16.5 | 14.6 | 31.4 |  | 31.0 |
| 48.4 |  | 29.9 |  | 62.8 | 121.5 | 15.2 | 21.5 | 38.4 | 5.3 | 18.0 |  | 46.2 | 39.5 | 61.7 | 33.3 | 27.9 | 23.4 | 20.2 | 18.0 | 14.8 |  | 41.7 |
| 40.9 |  | 37.6 |  | 26.7 | 121.5 | 14.7 | 5.6 | 46.0 | 30.4 | 63.4 |  | 47.4 | 29.8 | 74.3 | 25.5 | 12.2 | 11.6 | 2.4 | 7.8 | 11.6 |  | 42.9 |
| 23.5 |  | 36.8 |  | 52.9 | 121.5 | 0.6 | 12.8 | 42.6 | 30.9 | 50.6 |  | 45.7 | 27.5 | 65.3 | 40.8 | 16.6 | 16.2 | 4.1 | 17.4 | 7.7 |  | 37.7 |
| 32.2 |  | 32.2 |  | 28.3 | 121.5 | 32.3 | 14.8 | 54.8 | 12.8 | 25.8 |  | 42.3 | 25.1 | 55.8 | 51.2 | 13.7 | 7.2 | 13.6 | 13.2 | 11.6 |  | 35.5 |
| 41.6 |  | 32.0 |  | 44.0 | 121.5 | 22.8 | 20.1 | 61.8 | 7.8 | 27.6 |  | 43.8 | 23.4 | 52.7 | 50.0 | 28.3 | 15.5 | 2.3 | 11.8 | 29.4 |  | 36.0 |
| 26.4 |  | 24.8 |  | 15.6 | 121.5 | 12.6 | 11.8 | 96.4 | 5.5 | 37.6 |  | 35.4 | 23.7 | 62.1 | 54.9 | 48.4 | 37.2 | 3.7 | 2.6 | 25.7 |  | 31.9 |
| 33.4 |  | 24.4 |  | 10.1 | 76.7 | 60.1 | 12.7 | 53.2 | 26.9 | 13.0 |  | 45.1 | 33.5 | 68.6 | 39.3 | 42.4 | 3.3 | 11.9 | 19.9 | 7.8 |  | 35.2 |
| 20.1 |  | 23.5 |  | 51.8 | 12.4 | 51.4 | 8.2 | 71.7 | 25.0 | 44.6 |  | 38.5 | 32.6 | 3.2 | 40.0 | 26.6 | 21.3 | 7.5 | 24.9 | 10.1 |  | 32.5 |
| 31.9 |  | 26.5 |  | 21.4 | 12.7 | 82.4 | 21.8 | 52.6 | 16.3 | 19.2 |  | 41.1 | 31.2 | 56.7 | 19.7 | 6.6 | 12.7 | 3.0 | 29.1 | 13.6 |  | 32.3 |
| 35.7 |  | 30.0 |  | 24.3 | 18.4 | 120.7 | 20.1 | 67.4 | 7.9 | 34.2 |  | 37.8 | 37.3 | 68.9 | 22.7 | 17.2 | 18.2 | 3.9 | 15.6 | 26.9 |  | 33.1 |
| 33.4 |  | 26.9 |  | 17.1 | 61.7 | 121.6 | 11.0 | 65.9 | 11.0 | 24.3 |  | 28.8 | 35.9 | 67.5 | 28.9 | 11.7 | 16.8 | 19.2 | 5.8 | 25.1 |  | 30.2 |
| 25.0 |  | 24.6 |  | 23.2 | 107.3 | 121.6 | 15.8 | 56.4 | 11.0 | 44.4 |  | 30.6 | 34.4 | 62.0 | 38.7 | 16.6 | 40.2 | 4.9 | 17.0 | 24.2 |  | 28.2 |
| 29.9 |  | 25.4 |  | 12.0 | 19.3 | 66.7 | 12.9 | 57.1 | 6.2 | 37.7 |  | 27.2 | 25.1 | 64.9 | 32.2 | 11.8 | 19.4 | 2.2 | 6.6 | 30.7 |  | 29.4 |
| 36.4 |  | 21.9 |  | 23.5 | 28.0 | 28.0 | 55.6 | 25.6 | 4.4 | 39.2 |  | 34.4 | 24.7 | 61.5 | 24.1 | 9.3 | 14.6 | 9.3 | 12.1 | 29.4 |  | 29.9 |
| 37.9 |  | 30.6 |  | 20.0 | 12.0 | 16.7 | 22.7 | 45.7 | 19.5 | 52.8 |  | 35.8 | 32.3 | 94.1 | 30.3 | 36.6 | 16.2 | 16.0 | 5.2 | 23.8 |  | 29.8 |
| 37.4 |  | 30.5 |  | 15.2 | 43.1 | 10.8 | 18.0 | 11.8 | 26.7 | 67.0 |  | 26.9 | 23.2 | 85.3 | 9.4 | 26.0 | 11.1 | 19.9 | 7.6 | 35.9 |  | 32.2 |
| 35.6 |  | 31.8 |  | 17.3 | 28.6 | 28.1 | 34.4 | 25.1 | 25.7 | 38.3 |  | 49.5 | 28.6 | 84.9 | 13.0 | 21.7 | 8.3 | 17.6 | 18.2 | 35.9 |  | 33.1 |
| 27.5 |  | 29.3 |  | 40.1 | 9.8 | 22.7 | 16.8 | 24.3 | 27.6 | 57.6 |  | 33.5 | 42.2 | 95.6 | 33.1 | 10.1 | 12.9 | 12.4 | 5.1 | 40.9 |  | 32.4 |
| 26.3 |  | 30.6 |  | 9.6 | 13.9 | 38.5 | 15.4 | 31.2 | 6.3 | 69.1 |  | 40.1 | 48.3 | 92.9 | 27.1 | 18.2 | 7.1 | 0.4 | 2.8 | 53.4 |  | 31.9 |
| 33.2 |  | 29.7 |  | 14.0 | 23.1 | 14.9 | 11.6 | 14.5 | 5.0 | 12.0 |  | 40.8 | 48.2 | 94.1 | 31.8 | 4.7 | 29.3 | 0.5 | 5.0 | 40.2 |  | 28.7 |
| 34.8 |  | 33.2 |  | 20.0 | 73.5 | 0.2 | 14.8 | 40.6 | 38.1 | 66.0 |  | 42.7 | 55.8 | 85.4 | 17.0 | 29.4 | 16.3 | 12.5 | 14.9 | 39.0 |  | 31.2 |
| 32.3 |  | 34.7 |  | 0.4 | 84.6 | 0.2 | 11.0 | 5.1 | 16.5 | 64.3 |  | 43.2 | 63.6 | 70.7 | 32.8 | 41.2 | 7.1 | 6.4 | 7.5 | 37.0 |  | 35.8 |
| 37.8 |  | 38.6 |  | 9.3 | 72.8 | 0.2 | 8.9 | 27.6 | 16.9 | 25.7 |  | 31.9 | 56.8 | 76.2 | 32.1 | 19.2 | 10.7 | 5.1 | 12.4 | 22.0 |  | 27.1 |
| 24.6 |  | 42.2 |  | 34.7 | 17.8 | 0.2 | 6.0 | 19.5 | 25.4 | 63.9 |  | 31.7 | 53.9 | 68.9 | 36.9 | 21.1 | 16.2 | 12.6 | 16.0 | 20.4 |  | 24.3 |
| 21.7 |  | 36.9 |  | 17.6 | 13.6 | 74.2 | 35.9 | 34.3 | 15.2 | 51.3 |  | 33.3 | 47.1 | 69.0 | 35.7 | 5.8 | 10.3 | 21.2 | 3.9 | 27.6 |  | 27.7 |
| 27.2 |  | 34.8 |  | 24.0 | 29.0 | 16.1 | 11.9 | 22.1 | 19.7 | 50.4 |  | 36.7 | 45.5 | 62.8 | 23.0 | 23.0 | 11.2 | 8.4 | 2.9 | 18.2 |  | 27.4 |
| 37.3 |  | 32.4 |  | 8.2 | 19.6 | 14.7 | 38.4 | 33.4 | 30.0 | 58.5 |  | 39.6 | 40.2 | 57.8 | 10.8 | 15.7 | 5.2 | 15.7 | 14.0 | 52.0 |  | 32.2 |
| 21.1 |  | 33.2 |  | 28.9 | 0.2 | 62.8 | 1.4 | 24.6 | 29.3 | 68.3 |  | 39.2 | 34.3 | 24.8 | 41.9 | 5.0 | 8.6 | 29.4 | 16.1 | 38.7 |  | 24.5 |
| 33.6 |  | 36.0 |  | 6.7 | 33.3 | 34.6 | 18.6 | 50.9 | 22.3 | 82.3 |  | 18.8 | 25.5 | 29.9 | 43.0 | 15.1 | 12.2 | 4.2 | 12.0 | 23.0 |  | 26.8 |
| 25.4 |  | 36.6 |  | 5.5 | 21.4 | 22.3 | 48.7 | 1.1 | 23.7 | 114.5 |  | 29.7 | 18.8 | 28.1 | 34.2 | 15.9 | 15.4 | 6.1 | 6.3 | 26.6 |  | 28.3 |
| 36.9 |  | 35.7 |  | 0.4 | 23.8 | 58.3 | 27.6 | 5.6 | 13.2 | 54.7 |  | 24.2 | 32.5 | 49.2 | 27.5 | 20.3 | 10.2 | 11.9 | 32.3 | 18.5 |  | 31.2 |
| 38.9 |  | 40.7 |  | 26.5 | 11.9 | 75.2 | 18.3 | 13.9 | 20.0 | 42.7 |  | 32.6 | 21.6 | 62.6 | 16.9 | 20.0 | 11.3 | 16.8 | 26.6 | 19.4 |  | 33.8 |
| 22.3 |  | 44.4 |  | 8.7 | 7.8 | 121.6 | 71.8 | 35.9 | 15.3 | 17.0 |  | 28.1 | 20.4 | 49.7 | 21.5 | 3.6 | 6.2 | 4.5 | 26.9 | 22.6 |  | 31.4 |
| 20.9 |  | 44.3 |  | 8.2 | 4.6 | 86.9 | 38.7 | 32.9 | 12.9 | 12.9 |  | 30.9 | 21.6 | 51.5 | 33.0 | 15.4 | 1.7 | 20.3 | 3.8 | 15.3 |  | 30.2 |
| 37.0 |  | 34.5 |  | 0.2 | 14.0 | 72.1 | 16.0 | 44.0 | 4.3 | 24.6 |  | 26.4 | 23.7 | 49.3 | 30.3 | 32.0 | 29.9 | 5.5 | 16.4 | 7.8 |  | 30.0 |
| 35.3 |  | 30.2 |  | 69.3 | 15.6 | 56.7 | 14.3 | 37.8 | 18.0 | 14.6 |  | 22.2 | 20.6 | 40.3 | 26.4 | 12.7 | 10.4 | 13.9 | 43.0 | 46.9 |  | 29.8 |
| 34.5 |  | 28.8 |  | 84.6 | 38.0 | 61.8 | 32.8 | 55.0 | 13.2 | 54.8 |  | 24.3 | 24.0 | 41.0 | 34.7 | 2.8 | 2.5 | 11.8 | 31.0 | 38.5 |  | 32.7 |
| 29.8 |  | 29.3 |  | 32.6 | 46.3 | 58.0 | 47.6 | 43.9 | 15.7 | 54.8 |  | 16.4 | 26.4 | 29.3 | 37.8 | 31.9 | 12.4 | 7.8 | 28.6 | 40.8 |  | 33.4 |
| 38.7 |  | 35.9 |  | 20.3 | 49.3 | 17.6 | 11.1 | 29.9 | 34.0 | 58.0 |  | 19.1 | 35.7 | 40.2 | 31.2 | 11.0 | 12.5 | 10.7 | 13.9 | 24.4 |  | 32.6 |
| 37.0 |  | 40.1 |  | 0.4 | 70.1 | 0.2 | 3.4 | 6.0 | 24.2 | 63.8 |  | 21.2 | 43.4 | 25.7 | 26.6 | 15.8 | 12.1 | 21.5 | 12.1 | 26.8 |  | 30.3 |
| 21.1 |  | 41.8 |  | 5.4 | 68.5 | 30.0 | 11.3 | 47.7 | 70.5 | 57.8 |  | 16.5 | 51.7 | 17.9 | 16.8 | 6.2 | 11.8 | 15.9 | 38.8 | 33.1 |  | 31.3 |
| 38.1 |  | 32.5 |  | 24.4 | 29.5 | 2.3 | 40.1 | 47.0 | 63.6 | 52.2 |  | 25.8 | 54.3 | 27.7 | 8.7 | 4.8 | 8.1 | 12.1 | 37.5 | 16.4 |  | 31.7 |
| 31.2 |  | 31.1 |  | 19.7 | 26.8 | 37.6 | 35.6 | 10.9 | 55.3 | 121.3 |  | 22.5 | 54.5 | 57.0 | 4.2 | 4.8 | 11.2 | 20.0 | 23.6 | 21.5 |  | 33.5 |
| 26.4 |  | 28.1 |  | 24.8 | 25.1 | 22.1 | 37.4 | 40.4 | 18.2 | 121.6 |  | 20.0 | 55.0 | 28.4 | 4.6 | 6.2 | 1.8 | 16.9 | 7.2 | 26.1 |  | 33.6 |
| 15.9 |  | 28.8 |  | 12.5 | 28.8 | 71.8 | 18.6 | 65.3 | 40.2 | 121.6 |  | 13.8 | 61.1 | 35.0 | 17.8 | 14.0 | 14.8 | 36.0 | 15.4 | 37.7 |  | 33.9 |

| DB2 | DB2 | DB2 | DB2 | DB2 | DB2 | DB2 | DB3 | DB3 | DB3 | DB3 | DB3 | DB3 | DB3 | DB3 | DB3 | DB4 | DB4 | DB4 | DB4 | DB4 | DB4 | DB4 | DB5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 35.3 | 37.3 | 40.3 | 56.4 | 22.4 | 29.8 | 40.4 | 36.7 | 47.6 | 29.4 | 36.2 | 31.5 | 36.2 | 25.3 | 19.0 | 21.2 | 37.4 | 27.6 | 46.1 | 38.3 | 39.5 | 62.8 | 28.4 | 30.1 |
| 38.5 | 44.9 | 43.7 | 59.7 | 24.8 | 37.4 | 33.3 | 35.8 | 44.6 | 27.4 | 33.7 | 34.4 | 34.6 | 24.7 | 23.1 | 21.2 | 43.1 | 43.4 | 39.0 | 29.7 | 22.3 | 68.4 | 28.8 | 29.4 |
| 41.9 | 34.4 | 39.7 | 55.3 | 28.0 | 10.1 | 35.0 | 35.3 | 45.2 | 28.5 | 33.6 | 35.6 | 34.8 | 26.2 | 25.1 | 21.4 | 38.8 | 39.6 | 46.6 | 30.3 | 23.4 | 61.9 | 17.0 | 26.1 |
| 44.5 | 42.0 | 42.9 | 49.1 | 33.8 | 23.3 | 28.0 | 34.0 | 43.8 | 27.5 | 29.6 | 35.6 | 36.0 | 23.0 | 22.2 | 18.9 | 35.2 | 46.9 | 40.4 | 37.9 | 19.5 | 66.6 | 9.7 | 30.6 |
| 42.1 | 41.8 | 46.7 | 52.7 | 44.3 | 27.5 | 33.1 | 33.8 | 44.3 | 28.8 | 28.3 | 42.6 | 34.7 | 20.3 | 23.9 | 20.7 | 36.7 | 42.1 | 37.4 | 48.3 | 15.2 | 55.9 | 6.3 | 29.8 |
| 39.8 | 32.7 | 45.1 | 53.9 | 46.5 | 40.7 | 30.1 | 34.2 | 41.3 | 29.6 | 29.0 | 54.9 | 30.2 | 23.2 | 29.0 | 16.7 | 35.5 | 47.5 | 34.0 | 41.1 | 20.8 | 78.2 | 23.6 | 28.6 |
| 34.3 | 31.4 | 49.5 | 54.6 | 44.0 | 32.6 | 31.9 | 34.6 | 41.0 | 34.1 | 25.3 | 56.8 | 25.8 | 26.0 | 30.5 | 15.5 | 28.2 | 34.0 | 33.6 | 44.1 | 7.3 | 62.3 | 18.7 | 28.0 |
| 31.1 | 31.8 | 37.6 | 47.3 | 49.7 | 31.0 | 29.9 | 37.8 | 39.0 | 34.4 | 25.1 | 56.4 | 24.8 | 23.9 | 31.4 | 22.7 | 44.9 | 29.1 | 32.1 | 47.8 | 24.6 | 52.2 | 35.1 | 26.1 |
| 30.6 | 34.0 | 34.3 | 45.1 | 42.7 | 31.3 | 33.0 | 42.0 | 38.9 | 35.8 | 25.0 | 50.8 | 25.0 | 29.3 | 28.8 | 17.9 | 39.7 | 40.8 | 34.8 | 47.6 | 15.7 | 66.3 | 40.5 | 25.9 |
| 29.8 | 33.3 | 31.7 | 45.1 | 44.9 | 30.5 | 34.7 | 46.8 | 38.6 | 33.1 | 20.3 | 52.3 | 24.4 | 31.4 | 30.9 | 17.0 | 44.7 | 40.4 | 46.1 | 58.1 | 31.2 | 59.8 | 49.9 | 32.1 |
| 30.6 | 32.7 | 32.6 | 44.4 | 41.3 | 31.5 | 30.1 | 51.7 | 38.9 | 30.3 | 19.8 | 46.1 | 23.7 | 29.9 | 33.7 | 20.5 | 40.3 | 34.5 | 46.1 | 53.6 | 11.3 | 65.8 | 25.4 | 27.3 |
| 30.6 | 25.6 | 24.5 | 42.8 | 38.6 | 34.9 | 35.4 | 53.4 | 37.9 | 29.6 | 18.8 | 46.7 | 25.1 | 30.4 | 43.6 | 27.5 | 34.6 | 35.3 | 56.1 | 50.9 | 13.4 | 66.3 | 14.4 | 25.4 |
| 36.3 | 29.4 | 33.5 | 39.1 | 37.7 | 50.2 | 36.2 | 56.3 | 38.9 | 26.2 | 22.5 | 44.3 | 23.4 | 30.9 | 50.5 | 32.9 | 32.9 | 35.5 | 47.2 | 50.0 | 10.4 | 59.8 | 7.4 | 27.6 |
| 34.7 | 26.7 | 29.3 | 48.2 | 36.5 | 58.3 | 36.8 | 64.8 | 37.9 | 24.1 | 22.1 | 43.6 | 29.5 | 35.0 | 51.5 | 33.4 | 36.4 | 31.2 | 51.0 | 49.2 | 18.6 | 47.1 | 29.1 | 28.6 |
| 30.2 | 29.9 | 30.0 | 48.8 | 30.1 | 56.6 | 39.0 | 65.2 | 35.4 | 20.9 | 20.6 | 34.1 | 33.1 | 32.1 | 45.7 | 43.9 | 29.2 | 41.7 | 42.1 | 40.4 | 3.0 | 46.4 | 13.4 | 28.0 |
| 27.8 | 27.8 | 18.5 | 49.3 | 31.1 | 46.9 | 32.7 | 59.9 | 39.5 | 19.2 | 24.7 | 31.4 | 33.7 | 30.8 | 42.2 | 44.2 | 28.8 | 38.0 | 39.9 | 39.3 | 23.2 | 37.9 | 23.0 | 28.4 |
| 31.6 | 25.6 | 36.8 | 53.1 | 34.4 | 43.2 | 35.8 | 68.0 | 38.9 | 17.2 | 19.1 | 21.5 | 30.4 | 27.1 | 40.1 | 35.7 | 31.9 | 27.5 | 43.8 | 55.2 | 15.3 | 35.1 | 23.3 | 28.4 |
| 31.7 | 33.2 | 37.2 | 54.6 | 34.0 | 43.9 | 38.6 | 67.5 | 41.2 | 18.4 | 19.0 | 23.0 | 27.7 | 28.5 | 36.6 | 33.4 | 23.1 | 27.0 | 40.6 | 62.3 | 21.1 | 34.0 | 21.9 | 26.2 |
| 38.8 | 32.1 | 46.2 | 56.0 | 38.5 | 38.5 | 33.6 | 66.1 | 41.0 | 18.6 | 20.0 | 22.0 | 27.5 | 25.7 | 32.2 | 32.0 | 22.7 | 24.0 | 34.1 | 56.0 | 46.8 | 30.5 | 18.8 | 25.0 |
| 32.7 | 30.6 | 48.2 | 51.2 | 49.4 | 37.2 | 39.6 | 59.2 | 38.5 | 17.4 | 22.7 | 17.2 | 23.3 | 23.8 | 30.9 | 28.4 | 23.3 | 17.6 | 32.9 | 51.9 | 56.2 | 42.9 | 12.4 | 25.2 |
| 33.3 | 29.4 | 48.6 | 50.7 | 47.9 | 36.1 | 35.8 | 59.0 | 37.9 | 15.8 | 22.7 | 15.3 | 28.5 | 25.3 | 30.7 | 22.2 | 21.2 | 22.5 | 35.7 | 57.2 | 44.3 | 31.2 | 10.9 | 23.9 |
| 34.4 | 27.8 | 45.9 | 55.7 | 53.9 | 32.0 | 33.4 | 52.3 | 37.3 | 15.6 | 30.6 | 18.2 | 30.1 | 29.8 | 34.1 | 19.9 | 23.9 | 20.5 | 43.9 | 52.7 | 36.3 | 21.5 | 13.7 | 26.7 |
| 31.6 | 35.3 | 44.5 | 50.8 | 47.3 | 36.1 | 37.8 | 46.2 | 38.0 | 16.8 | 29.6 | 16.0 | 28.1 | 24.7 | 32.9 | 16.6 | 22.1 | 28.6 | 34.7 | 41.3 | 37.2 | 23.8 | 12.0 | 26.2 |
| 32.9 | 36.9 | 36.0 | 49.0 | 47.7 | 37.4 | 40.4 | 42.4 | 38.5 | 18.1 | 32.6 | 18.7 | 32.8 | 27.8 | 31.0 | 17.8 | 26.5 | 16.7 | 36.8 | 54.8 | 24.2 | 23.9 | 34.6 | 28.9 |
| 33.9 | 28.6 | 30.4 | 45.4 | 52.7 | 38.9 | 29.9 | 40.8 | 43.7 | 20.6 | 23.9 | 23.8 | 34.0 | 29.1 | 28.0 | 16.4 | 22.0 | 14.4 | 41.9 | 54.4 | 18.0 | 27.9 | 30.8 | 27.6 |
| 35.3 | 26.7 | 25.9 | 47.6 | 48.5 | 33.3 | 32.3 | 40.2 | 48.8 | 22.7 | 20.5 | 24.8 | 39.7 | 30.2 | 28.0 | 17.0 | 18.8 | 12.2 | 40.2 | 56.9 | 23.5 | 40.7 | 28.8 | 27.8 |
| 30.5 | 27.4 | 27.6 | 46.4 | 47.5 | 40.0 | 28.7 | 37.2 | 52.5 | 23.6 | 22.3 | 18.8 | 44.0 | 38.9 | 23.8 | 10.1 | 25.4 | 23.9 | 41.7 | 51.0 | 23.7 | 40.8 | 14.0 | 28.6 |
| 31.0 | 29.3 | 27.9 | 48.2 | 45.8 | 44.0 | 31.1 | 37.3 | 51.5 | 20.8 | 18.9 | 22.2 | 45.8 | 43.0 | 18.1 | 8.7 | 34.0 | 16.3 | 43.0 | 46.2 | 27.5 | 50.0 | 23.3 | 28.8 |
| 29.2 | 27.5 | 26.8 | 49.5 | 48.3 | 48.7 | 26.4 | 36.9 | 54.6 | 20.5 | 16.8 | 29.6 | 49.1 | 42.9 | 17.5 | 5.5 | 41.7 | 17.7 | 35.0 | 50.1 | 30.6 | 50.6 | 29.9 | 25.7 |
| 32.3 | 27.6 | 31.5 | 55.6 | 39.6 | 54.5 | 27.1 | 34.7 | 51.6 | 24.5 | 20.5 | 23.5 | 51.8 | 39.0 | 14.7 | 8.8 | 40.8 | 8.1 | 32.5 | 62.7 | 24.3 | 46.5 | 17.7 | 24.3 |
| 35.5 | 35.1 | 28.8 | 46.8 | 37.7 | 61.4 | 29.8 | 34.2 | 48.0 | 27.2 | 20.3 | 22.9 | 56.2 | 47.7 | 13.0 | 12.7 | 34.2 | 4.8 | 37.4 | 56.0 | 23.4 | 67.5 | 5.9 | 25.5 |
| 34.5 | 35.3 | 31.5 | 41.5 | 37.6 | 47.9 | 24.2 | 31.2 | 40.8 | 29.6 | 22.6 | 23.6 | 53.2 | 43.1 | 14.7 | 20.3 | 40.2 | 6.9 | 35.1 | 41.6 | 36.2 | 47.9 | 8.0 | 23.8 |
| 34.6 | 24.5 | 40.7 | 44.5 | 36.8 | 49.8 | 25.4 | 31.7 | 32.8 | 29.9 | 24.2 | 39.4 | 52.0 | 41.2 | 13.8 | 23.0 | 40.5 | 10.8 | 35.1 | 47.2 | 36.9 | 47.1 | 11.3 | 22.3 |
| 35.9 | 32.2 | 36.5 | 49.4 | 35.7 | 37.3 | 30.4 | 29.7 | 31.8 | 28.7 | 22.1 | 35.6 | 45.6 | 38.0 | 12.6 | 27.1 | 46.6 | 18.4 | 30.1 | 46.3 | 42.5 | 47.7 | 13.1 | 18.7 |
| 36.4 | 34.8 | 40.0 | 53.2 | 34.5 | 31.2 | 25.7 | 29.3 | 33.2 | 28.6 | 25.8 | 36.4 | 40.7 | 37.6 | 13.3 | 25.0 | 27.2 | 29.8 | 30.6 | 39.9 | 47.3 | 50.3 | 7.2 | 16.0 |
| 38.4 | 33.5 | 41.3 | 45.3 | 34.1 | 31.0 | 27.6 | 26.8 | 33.6 | 28.5 | 31.1 | 27.3 | 38.0 | 34.0 | 13.8 | 27.0 | 29.6 | 32.3 | 30.8 | 43.2 | 56.5 | 54.2 | 13.3 | 17.4 |
| 37.2 | 35.6 | 32.6 | 43.0 | 35.9 | 34.3 | 29.5 | 25.8 | 34.0 | 30.4 | 36.1 | 25.3 | 36.7 | 37.9 | 19.7 | 22.4 | 30.5 | 45.7 | 28.4 | 66.3 | 64.6 | 65.4 | 17.6 | 17.5 |
| 33.7 | 34.1 | 36.2 | 41.8 | 33.6 | 35.3 | 36.5 | 23.7 | 35.7 | 33.0 | 43.5 | 25.3 | 33.5 | 36.2 | 25.8 | 18.0 | 28.8 | 49.1 | 27.6 | 60.6 | 67.7 | 53.2 | 13.3 | 18.7 |
| 32.9 | 36.8 | 35.9 | 37.8 | 30.3 | 27.8 | 40.1 | 24.6 | 36.4 | 35.6 | 36.4 | 25.3 | 33.0 | 37.1 | 28.7 | 15.8 | 28.4 | 44.8 | 30.5 | 49.6 | 59.9 | 59.6 | 11.2 | 18.5 |
| 34.8 | 38.1 | 42.7 | 39.1 | 26.8 | 28.4 | 36.6 | 24.3 | 33.7 | 35.9 | 40.6 | 25.5 | 29.9 | 38.5 | 32.5 | 15.9 | 24.3 | 31.7 | 24.9 | 57.0 | 83.4 | 50.7 | 15.1 | 18.9 |
| 33.4 | 35.5 | 40.0 | 47.0 | 25.3 | 24.7 |  | 23.8 | 30.7 | 39.9 | 39.3 | 29.0 | 31.4 | 36.6 | 34.2 | 15.9 | 29.5 | 34.8 | 29.6 | 61.9 | 96.0 | 45.5 | 9.6 | 18.3 |
| 36.9 | 39.2 | 38.3 | 39.1 | 31.6 | 26.4 |  | 21.3 | 28.0 | 41.0 | 41.8 | 30.4 | 27.3 | 37.5 | 39.8 | 12.2 | 26.1 | 28.9 | 14.6 | 56.3 | 88.2 | 37.1 | 25.2 | 16.7 |
| 37.5 | 42.7 | 39.6 | 36.8 | 33.7 | 32.4 |  | 19.4 | 25.5 | 45.1 | 41.3 | 33.1 | 23.4 | 34.5 | 39.5 | 11.7 | 25.6 | 27.4 | 9.7 | 52.7 | 74.9 | 34.0 | 22.7 | 17.8 |
| 40.5 | 40.9 | 44.0 | 40.1 | 42.2 | 36.1 |  | 21.3 | 25.2 | 47.8 | 38.1 | 35.4 | 22.3 | 33.2 | 44.8 | 14.2 | 35.2 | 25.4 | 21.4 | 63.3 | 69.2 | 41.7 | 23.1 | 18.5 |
| 36.7 | 39.8 | 41.9 | 39.8 | 38.8 | 28.8 |  | 24.2 | 25.6 | 52.5 | 38.9 | 32.8 | 20.7 | 32.0 | 38.5 | 17.4 | 38.5 | 26.5 | 16.5 | 54.8 | 68.0 | 40.3 | 11.3 | 18.4 |
| 36.4 | 33.7 | 48.3 | 37.5 | 32.3 | 23.7 |  | 22.8 | 24.6 | 55.0 | 41.9 | 32.0 | 24.2 | 33.3 | 33.8 | 16.3 | 42.9 | 29.2 | 39.8 | 47.6 | 58.0 | 22.7 | 12.0 | 20.8 |
| 41.4 | 37.2 | 53.5 | 37.4 | 34.0 | 37.9 |  | 18.9 | 26.1 | 54.6 | 40.7 | 32.2 | 21.2 | 34.7 | 29.2 | 21.2 | 45.0 | 31.8 | 30.1 | 46.9 | 60.3 | 24.5 | 23.2 | 19.4 |
| 41.3 | 37.6 | 53.2 | 35.7 | 35.0 | 33.9 |  | 15.3 | 23.3 | 49.0 | 39.6 | 32.7 | 18.7 | 42.4 | 31.6 | 18.1 | 41.5 | 32.9 | 8.9 | 40.0 | 50.1 | 31.7 | 30.2 | 22.3 |
| 40.1 | 37.6 | 42.1 | 32.8 | 32.9 | 40.2 |  | 16.4 | 21.8 | 48.2 | 39.7 | 33.8 | 21.2 | 43.8 | 31.5 | 17.3 | 45.0 | 35.9 | 34.8 | 39.8 | 47.0 | 34.2 | 24.3 | 22.1 |
| 37.3 | 37.3 | 38.0 | 40.3 | 31.7 | 41.0 |  | 16.3 | 25.3 | 46.8 | 39.9 | 30.8 | 25.1 | 42.6 | 30.2 |  | 43.5 | 32.9 | 20.2 | 48.5 | 38.2 | 33.8 | 41.3 | 23.1 |
| 37.8 | 32.9 | 49.6 | 38.7 | 23.4 | 42.4 |  | 16.1 | 20.1 | 46.3 | 39.7 | 35.3 | 34.7 | 45.2 | 32.8 |  | 42.6 | 35.3 | 24.7 | 51.6 | 30.2 | 35.0 | 29.4 | 22.7 |
| 44.7 | 35.3 | 43.7 | 36.4 | 23.6 | 33.3 |  | 18.1 | 19.9 | 46.7 | 38.2 | 37.7 | 34.9 | 39.6 | 31.9 |  | 44.2 | 35.6 | 26.7 | 41.8 | 30.1 | 46.5 | 14.0 | 23.2 |
| 43.1 | 31.9 | 48.5 | 33.2 | 27.0 | 44.5 |  | 17.7 | 19.6 | 44.3 | 35.9 | 38.2 | 32.4 | 38.7 | 31.7 |  | 45.8 | 37.4 | 26.5 | 47.1 | 44.1 | 32.2 | 30.6 | 25.0 |
| 38.5 | 39.8 | 51.0 | 45.6 | 32.0 | 36.1 |  | 16.2 | 20.1 | 43.0 | 34.0 | 38.9 | 33.5 | 41.0 | 32.1 |  | 44.2 | 35.3 | 16.5 | 37.6 | 45.5 | 39.3 | 26.9 | 25.2 |
| 43.1 | 40.8 | 52.2 | 38.2 | 32.3 | 28.8 |  | 18.5 | 21.2 | 42.2 | 27.5 | 36.5 | 41.2 | 52.3 | 32.2 |  | 44.4 | 48.6 | 8.4 | 40.8 | 44.2 | 34.0 | 13.7 | 25.4 |
| 44.5 | 29.9 | 51.4 | 38.8 | 28.4 | 23.5 |  | 19.5 | 21.7 | 35.2 | 25.8 | 39.2 | 44.4 | 53.9 | 42.9 |  | 49.2 | 42.0 | 39.5 | 36.0 | 46.3 | 22.7 | 15.3 | 24.4 |
| 42.7 | 34.3 | 46.7 | 35.2 | 32.1 | 20.0 |  | 21.4 | 23.9 | 33.5 | 24.6 | 35.2 | 47.3 | 47.7 | 43.3 |  | 49.5 | 62.2 | 39.1 | 28.1 | 51.0 | 23.4 | 18.2 | 22.4 |
| 35.0 | 36.8 | 55.5 | 46.9 | 34.0 | 18.6 |  | 22.4 | 24.2 | 31.2 | 24.4 | 38.7 | 51.0 | 35.5 | 40.1 |  | 47.1 | 47.9 | 44.1 | 19.6 | 52.3 | 19.8 | 15.6 | 22.7 |
| 35.1 | 40.0 | 64.7 | 42.4 | 34.0 | 19.4 |  | 21.6 | 25.4 | 34.0 | 27.4 | 42.8 | 69.1 | 33.7 | 41.0 |  | 52.2 | 35.9 | 40.7 | 30.2 | 56.4 | 21.0 | 23.9 | 22.0 |
| 35.5 | 43.0 | 56.7 | 42.9 | 33.9 | 20.6 |  | 10.8 | 27.4 | 32.9 | 25.0 | 35.9 | 64.0 | 33.4 | 37.0 |  | 55.7 | 42.5 | 27.1 | 27.6 | 63.9 | 21.2 | 23.8 | 22.7 |
| 34.3 | 44.2 | 55.9 | 43.7 | 34.1 | 21.2 |  | 22.9 | 26.3 | 34.8 | 27.4 | 36.1 | 53.3 | 30.2 | 34.7 |  | 52.1 | 27.6 | 23.7 | 26.0 | 68.5 | 17.0 | 17.8 | 23.3 |
| 36.3 | 41.2 | 55.3 | 41.2 | 27.5 | 23.0 |  | 23.9 | 28.7 | 33.5 | 24.5 | 34.7 | 52.1 | 37.9 | 33.4 |  | 48.7 | 24.7 | 22.4 | 31.1 | 91.7 | 17.9 | 18.3 | 24.1 |
| 37.6 | 38.2 | 59.3 | 40.0 | 24.9 | 34.3 |  | 27.1 | 26.0 | 32.0 | 29.7 | 32.9 | 58.3 | 42.3 | 27.0 |  | 62.1 | 35.4 | 33.5 | 23.3 | 73.8 | 24.0 | 16.4 | 22.5 |
| 36.7 | 39.4 | 62.0 | 36.1 | 26.1 | 21.9 |  | 31.1 | 24.1 | 30.1 | 33.4 | 38.1 | 57.3 | 43.2 | 24.6 |  | 61.1 | 29.9 | 22.5 | 27.5 | 72.8 | 25.2 | 18.6 | 18.5 |
| 40.0 | 36.6 | 47.5 | 38.4 | 21.8 | 20.2 |  | 31.0 | 22.2 | 34.4 | 43.4 | 38.0 | 50.8 | 43.3 | 24.9 |  | 63.8 | 44.2 | 30.2 | 34.8 | 74.1 | 19.6 | 15.3 | 13.7 |
| 43.7 | 42.8 | 50.9 | 35.6 | 25.9 | 30.9 |  | 35.7 | 21.3 | 37.7 | 33.3 | 40.8 | 46.7 | 46.0 | 25.3 |  | 55.7 | 41.7 | 28.0 | 23.5 | 83.9 | 24.0 | 5.8 | 20.8 |
| 47.0 | 40.7 | 65.0 | 37.6 | 24.1 | 32.2 |  | 38.2 | 21.2 | 37.6 | 27.6 | 43.1 | 38.7 | 58.1 | 22.9 |  | 60.5 | 42.3 | 30.9 | 11.6 | 63.1 | 6.5 | 28.5 | 22.0 |
| 40.5 | 46.2 | 60.5 | 36.8 | 29.9 | 33.8 |  | 39.0 | 21.8 | 39.1 | 28.3 | 45.9 | 32.4 | 47.7 | 24.5 |  | 44.8 | 51.5 | 27.5 | 6.7 | 60.6 | 5.3 | 16.9 | 15.6 |
| 37.6 | 43.7 | 49.7 | 35.8 | 27.7 | 32.5 |  | 39.4 | 23.2 | 38.8 | 28.8 | 46.6 | 29.8 | 31.1 | 25.3 |  | 41.5 | 44.2 | 51.0 | 13.0 | 68.9 | 7.9 |  | 14.9 |
| 46.4 | 42.4 | 46.1 | 39.8 | 25.7 | 36.8 |  | 39.5 | 25.8 | 37.4 | 32.3 | 47.8 | 28.7 | 24.7 | 26.1 |  | 43.5 | 35.7 | 51.0 | 11.1 | 81.3 | 9.7 |  | 13.8 |
| 46.6 | 43.9 | 51.8 | 28.6 | 33.5 | 39.7 |  | 40.0 | 25.7 | 34.0 | 24.8 | 41.3 | 32.1 | 24.4 | 27.5 |  | 41.0 | 32.9 | 21.2 | 22.8 | 86.3 | 9.2 |  | 15.7 |
| 40.1 | 36.6 | 48.4 | 26.2 | 29.7 | 34.4 |  | 41.4 | 26.2 | 32.3 | 29.7 | 40.9 | 26.2 | 16.6 | 23.3 |  | 35.9 | 28.4 | 24.2 | 52.1 | 78.5 | 19.8 |  | 18.6 |
| 36.8 | 41.2 | 59.7 | 27.8 | 29.5 | 32.8 |  | 44.1 | 28.0 | 33.0 | 33.1 | 43.2 | 27.3 | 17.5 | 23.8 |  | 40.0 | 38.5 | 26.3 | 40.0 | 82.4 | 29.8 |  | 17.6 |

| DB5 | DB5 | DB5 | DB5 | DB5 | DB5 | DB5 | DB6 | DB6 | DB6 | DB6 | DB6 | DB6 | DB6 | DB6 | DB6 | DB7 | DB7 | DB7 | DB7 | DB7 | DB7 | DB7 | DB7 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 18.4 | 36.3 | 28.6 | 25.1 | 35.5 | 38.8 | 26.6 | 35.5 | 30.8 | 49.4 | 42.9 | 32.0 | 77.3 | 44.3 | 80.6 | 39.8 | 49.2 | 28.2 | 30.0 | 30.5 | 16.0 | 47.9 | 30.9 | 32.9 |
| 18.1 | 38.4 | 44.0 | 29.1 | 31.9 | 40.1 | 33.1 | 37.8 | 39.5 | 50.0 | 43.0 | 36.5 | 77.9 | 32.4 | 65.9 | 41.3 | 47.0 | 28.3 | 28.1 | 24.9 | 24.9 | 47.9 | 36.0 | 32.0 |
| 20.5 | 40.0 | 50.3 | 32.7 | 32.7 | 41.1 | 31.8 | 44.2 | 37.2 | 55.0 | 39.8 | 30.7 | 77.7 | 41.8 | 71.3 | 54.0 | 48.3 | 27.5 | 28.0 | 26.5 | 30.1 | 45.2 | 54.2 | 31.2 |
| 20.7 | 42.0 | 35.6 | 28.4 | 32.0 | 37.5 | 33.2 | 69.2 | 43.5 | 52.4 | 34.6 | 32.5 | 78.9 | 41.0 | 60.0 | 53.8 | 51.2 | 27.7 | 28.6 | 28.8 | 24.5 | 47.2 | 59.2 | 31.0 |
| 21.3 | 41.4 | 30.1 | 27.1 | 30.1 | 34.4 | 33.6 | 67.1 | 37.3 | 44.7 | 41.4 | 30.1 | 75.7 | 39.6 | 62.3 | 77.2 | 53.4 | 26.4 | 28.9 | 24.3 | 24.3 | 53.6 | 63.6 | 35.5 |
| 21.7 | 43.2 | 28.2 | 27.2 | 31.6 | 31.4 | 34.7 | 73.1 | 40.4 | 42.1 | 13.3 | 34.1 | 73.5 | 20.3 | 54.0 | 60.3 | 48.6 | 30.7 | 28.2 | 25.2 | 30.0 | 59.3 | 60.8 | 37.5 |
| 21.6 | 41.0 | 30.2 | 30.3 | 34.6 | 31.5 | 43.5 | 71.7 | 49.2 | 44.4 | 45.0 | 28.3 | 71.6 | 54.7 | 61.5 | 54.0 | 43.0 | 32.5 | 30.5 | 24.8 | 29.4 | 50.5 | 57.4 | 35.7 |
| 23.0 | 41.3 | 28.7 | 36.9 | 41.0 | 30.9 | 40.4 | 74.4 | 51.2 | 44.1 | 51.0 | 39.8 | 65.1 | 50.4 | 69.0 | 51.7 | 40.8 | 37.8 | 31.9 | 24.8 | 31.4 | 46.2 | 58.3 | 33.5 |
| 24.9 | 40.8 | 36.9 | 32.5 | 39.3 | 31.2 | 34.4 | 75.9 | 38.9 | 43.3 | 51.4 | 41.8 | 68.7 | 66.7 | 59.8 | 47.9 | 38.5 | 33.1 | 34.5 | 27.6 | 32.4 | 56.6 | 56.7 | 41.6 |
| 27.5 | 39.5 | 34.8 | 29.7 | 44.4 | 37.1 | 34.3 | 79.7 | 52.6 | 41.5 | 61.8 | 43.3 | 72.7 | 33.4 | 59.4 | 58.9 | 36.9 | 37.0 | 32.5 | 29.1 | 26.1 | 53.9 | 53.0 | 47.1 |
| 27.6 | 36.9 | 33.6 | 26.3 | 43.7 | 28.2 | 36.5 | 79.6 | 53.7 | 38.8 | 59.4 | 39.4 | 73.2 | 57.0 | 60.4 | 49.1 | 34.9 | 39.3 | 29.6 | 28.7 | 30.0 | 50.2 | 52.0 | 46.3 |
| 26.5 | 39.1 | 32.7 | 26.3 | 48.9 | 34.5 | 38.0 | 78.4 | 48.9 | 39.1 | 65.6 | 40.3 | 74.4 | 65.1 | 69.7 | 53.4 | 33.3 | 41.2 | 32.5 | 33.6 | 30.3 | 48.0 | 45.3 | 47.1 |
| 25.3 | 36.7 | 26.6 | 30.8 | 44.1 | 33.9 | 34.1 | 77.4 | 43.7 | 39.1 | 65.3 | 41.6 | 68.9 | 56.4 | 64.5 | 53.3 | 32.4 | 41.6 | 32.0 | 33.7 | 35.9 | 39.8 | 42.4 | 46.9 |
| 23.3 | 38.1 | 21.0 | 34.0 | 42.3 | 27.6 | 28.1 | 79.9 | 43.2 | 36.4 | 54.4 | 43.2 | 68.8 | 60.0 | 72.6 | 66.1 | 31.5 | 41.6 | 23.1 | 34.5 | 41.7 | 36.2 | 39.8 | 46.8 |
| 24.0 | 39.0 | 23.7 | 24.0 | 41.8 | 22.8 | 23.6 | 78.3 | 48.4 | 38.9 | 53.1 | 45.3 | 72.3 | 59.2 | 72.9 | 71.5 | 30.4 | 41.1 | 26.9 | 35.5 | 39.0 | 40.8 | 37.5 | 50.9 |
| 23.8 | 37.8 | 25.8 | 22.6 | 41.3 | 20.3 | 24.8 | 77.5 | 50.9 | 38.9 | 45.6 | 43.1 | 73.9 | 71.1 | 67.2 | 69.7 | 28.4 | 41.6 | 26.4 | 40.4 | 34.9 | 40.0 | 38.1 | 50.5 |
| 23.5 | 36.1 | 25.4 | 20.2 | 38.8 | 21.2 | 28.0 | 77.7 | 53.9 | 44.0 | 56.8 | 44.3 | 76.2 | 67.2 | 66.8 | 70.9 | 26.6 | 42.4 | 22.1 | 42.2 | 29.4 | 42.0 | 45.3 | 47.7 |
| 25.3 | 36.1 | 26.7 | 18.2 | 37.4 | 23.8 | 31.2 | 80.0 | 55.1 | 42.7 | 55.0 | 43.7 | 70.1 | 66.7 | 63.7 |  | 26.7 | 43.2 | 23.9 | 45.9 | 25.8 | 43.2 | 42.8 | 45.7 |
| 27.6 | 34.6 | 31.8 | 17.6 | 40.8 | 25.0 | 31.7 | 76.9 | 52.3 | 45.4 | 60.4 | 46.2 | 67.8 | 70.6 | 50.4 |  | 26.2 | 44.6 | 26.2 | 38.2 | 24.2 | 44.1 | 39.3 | 53.6 |
| 29.1 | 36.6 | 27.2 | 23.2 | 37.1 | 24.9 | 33.2 | 74.0 | 52.4 | 48.3 | 54.8 | 49.1 | 70.2 | 73.4 | 71.2 |  | 25.5 | 44.4 | 27.7 | 39.6 | 28.5 | 40.7 | 39.3 | 52.7 |
| 29.1 | 36.5 | 28.9 | 21.2 | 38.2 | 22.8 | 34.7 | 73.2 | 52.5 | 45.0 | 51.5 | 49.2 | 73.4 | 71.5 | 65.4 |  | 26.4 | 43.9 | 28.7 | 45.1 | 31.0 | 38.7 | 41.7 | 60.0 |
| 29.3 | 39.4 | 24.6 | 24.5 | 37.5 | 24.9 | 33.9 | 73.2 | 47.8 | 40.7 | 54.4 | 49.0 | 69.2 | 70.2 | 62.1 |  | 25.5 | 43.9 | 31.4 | 41.7 | 26.2 | 34.8 | 39.7 | 57.2 |
| 29.4 | 40.0 | 24.5 | 24.3 | 36.8 | 27.2 | 30.2 | 72.3 | 58.3 | 53.5 | 61.2 | 52.1 | 78.8 | 73.4 | 63.6 |  | 24.9 | 40.1 | 32.7 | 46.0 | 24.0 | 34.3 | 43.0 | 61.5 |
| 26.9 | 36.1 | 27.2 | 25.8 | 36.4 | 29.3 | 32.8 | 71.8 | 51.2 | 52.7 | 54.0 | 48.9 | 80.1 | 79.5 | 68.3 |  | 26.5 | 41.3 | 33.7 | 47.9 | 20.7 | 36.3 | 39.2 | 63.0 |
| 29.4 | 37.4 | 29.9 | 24.9 | 36.5 | 33.2 | 33.3 | 72.8 | 54.3 | 42.0 | 57.3 | 48.4 | 67.7 | 84.5 | 64.1 |  | 25.3 | 37.8 | 33.3 | 40.6 | 17.4 | 32.3 | 32.4 | 61.5 |
| 29.3 | 34.1 | 28.9 | 24.2 | 32.6 | 29.4 | 32.8 | 70.7 | 49.3 | 33.8 | 53.4 | 46.9 | 71.1 | 87.2 | 58.8 |  | 25.7 | 39.7 | 32.5 | 46.1 | 14.2 | 32.2 | 34.6 | 56.1 |
| 32.1 | 30.8 | 35.7 | 26.7 | 33.1 | 27.8 | 29.9 | 69.7 | 38.4 | 46.0 | 56.9 | 49.9 | 66.6 | 80.2 | 70.2 |  | 26.5 | 42.6 | 33.1 | 42.2 | 13.4 | 27.8 | 35.1 | 49.4 |
| 32.1 | 29.4 | 36.9 | 31.2 | 36.5 | 30.8 | 28.2 | 70.5 | 32.9 | 53.3 | 57.5 | 48.9 | 68.3 | 92.2 | 69.1 |  | 27.7 | 40.9 | 31.8 | 47.4 | 13.7 | 30.5 | 36.6 | 43.5 |
| 33.5 | 30.2 | 39.1 | 35.2 | 39.7 | 35.8 | 25.4 | 69.3 | 32.2 | 58.5 | 52.2 | 49.7 | 70.2 | 86.4 | 69.3 |  | 29.0 | 45.0 | 31.6 | 51.0 | 14.5 | 24.3 | 38.7 | 40.4 |
| 35.0 | 27.3 | 40.5 | 37.7 | 34.6 | 37.3 | 21.8 | 69.4 | 41.5 | 59.9 | 48.7 | 53.5 | 64.7 | 87.7 | 66.1 |  | 29.7 | 46.6 | 31.6 | 43.1 | 22.2 | 22.3 | 38.5 | 38.7 |
| 34.8 | 24.8 | 43.4 | 45.2 | 32.4 | 38.6 | 20.5 | 68.5 | 42.2 | 52.2 | 43.9 | 58.9 | 72.0 | 86.5 | 68.6 |  | 27.8 | 45.3 | 39.0 | 39.1 | 23.0 | 22.6 | 41.8 | 32.1 |
| 33.2 | 24.7 | 41.3 | 39.8 | 31.0 | 36.5 | 21.8 | 67.1 | 26.5 | 40.1 | 36.5 | 49.7 | 67.5 | 85.3 | 58.0 |  | 28.5 | 42.0 | 42.9 | 44.4 | 23.7 | 26.9 | 39.8 | 30.1 |
| 33.4 | 23.1 | 39.9 | 39.5 | 33.0 | 33.6 | 27.1 | 67.3 | 29.7 | 53.5 | 33.2 | 56.3 | 72.3 | 95.2 | 72.1 |  | 28.8 | 46.5 | 38.1 | 37.5 | 24.6 | 24.0 | 45.1 | 27.5 |
| 34.3 | 23.5 | 40.7 | 31.7 | 32.0 | 29.9 | 29.6 | 67.6 | 43.2 | 52.0 | 38.1 | 50.6 | 76.8 | 100.0 | 59.6 |  | 36.4 | 50.6 | 34.4 | 37.1 | 26.1 | 33.0 | 31.4 | 23.6 |
| 38.7 | 23.1 | 37.4 | 37.4 | 34.5 | 26.4 | 36.8 | 69.6 | 35.5 | 31.4 | 37.8 | 52.9 | 78.2 | 100.8 | 76.9 |  | 40.2 | 52.3 | 33.7 | 40.1 | 33.1 | 23.9 | 31.2 | 23.9 |
| 41.2 | 24.1 | 37.1 | 41.1 | 30.0 | 32.7 | 32.6 | 58.6 | 33.7 | 61.0 | 43.0 | 54.1 | 74.6 | 98.7 | 67.8 |  | 40.6 | 49.1 | 32.5 | 44.7 | 32.4 | 25.7 | 29.5 | 25.5 |
| 40.9 | 23.5 | 35.7 | 43.7 | 26.1 | 34.5 | 28.9 | 54.3 | 34.6 | 59.4 | 40.8 | 47.8 | 74.5 | 86.0 | 55.9 |  | 37.8 | 48.7 | 30.9 | 33.9 | 31.7 | 26.3 | 33.7 | 29.4 |
| 45.7 | 24.0 | 35.0 | 46.7 | 26.1 | 34.4 | 29.3 | 65.5 | 39.2 | 58.5 | 45.1 | 55.1 | 53.9 | 86.4 | 61.0 |  | 35.2 | 46.2 | 31.6 | 36.5 | 26.2 | 25.9 | 33.8 | 29.8 |
| 47.4 | 23.6 | 31.1 | 41.1 | 25.5 | 37.1 | 28.1 | 60.3 | 41.7 | 58.2 | 40.9 | 54.6 | 63.0 | 86.1 | 69.3 |  | 32.7 | 45.3 | 32.3 | 30.9 | 22.3 | 25.9 | 31.5 | 31.7 |
| 46.0 | 21.9 | 34.6 | 50.2 | 29.1 | 40.1 | 22.7 | 56.3 | 40.7 | 57.6 | 41.5 | 44.9 | 76.1 | 69.1 | 55.4 |  | 30.0 | 43.5 | 32.1 | 30.0 | 26.9 | 22.2 | 31.5 | 30.8 |
| 44.4 | 25.7 | 39.1 | 48.5 | 28.4 | 43.6 | 24.1 | 56.1 | 32.5 | 59.7 | 45.2 | 53.4 | 67.3 | 68.1 | 56.8 |  | 28.1 | 41.1 | 33.2 | 29.0 | 28.1 | 21.1 | 38.1 | 31.2 |
| 46.6 | 27.3 | 39.5 | 36.7 | 33.9 | 42.3 | 23.8 | 34.9 | 35.8 | 59.6 | 43.2 | 48.5 | 67.0 | 51.0 | 68.1 |  | 22.2 | 39.7 | 35.4 | 24.3 | 20.8 | 19.9 | 35.0 | 34.9 |
| 46.2 | 30.5 | 38.0 | 41.3 | 30.6 | 47.4 | 24.6 | 53.2 | 29.2 | 60.0 | 44.6 | 59.6 | 63.9 | 64.0 | 57.3 |  | 22.8 | 36.3 | 30.8 | 29.5 | 18.9 | 18.2 | 35.1 | 31.8 |
| 55.6 | 32.4 | 38.9 | 34.4 | 35.0 | 47.1 | 26.0 | 36.5 | 35.6 | 60.1 | 38.4 | 49.8 | 64.4 | 66.3 | 62.3 |  | 24.6 | 34.1 | 28.4 | 30.0 | 20.4 | 18.5 | 34.1 | 32.3 |
| 55.4 | 31.2 | 40.4 | 27.5 | 34.7 | 48.2 | 24.0 | 49.8 | 43.8 | 60.5 | 40.5 | 50.2 | 67.7 | 60.7 | 60.3 |  | 22.3 | 34.9 | 26.6 | 28.4 | 21.4 | 22.1 | 32.1 | 37.1 |
| 53.8 | 36.9 | 38.7 | 28.9 | 36.3 | 45.8 | 29.0 | 60.3 | 48.3 | 61.8 | 34.7 | 52.2 | 65.7 | 75.9 | 43.9 |  | 24.2 | 31.6 | 26.9 | 33.6 | 19.2 | 21.8 | 26.3 | 39.1 |
| 5.5 | 38.9 | 45.0 | 31.6 | 40.4 | 44.8 | 26.6 | 54.6 | 43.1 | 62.4 | 29.1 | 44.8 | 65.4 | 76.8 | 62.1 |  | 24.3 | 32.6 | 25.3 | 32.6 | 17.4 | 32.8 | 24.9 | 47.8 |
| 53.7 | 36.6 | 41.1 | 29.2 | 41.4 | 46.4 | 29.6 | 60.1 | 48.3 | 62.7 | 37.1 | 49.1 | 61.5 | 63.5 | 54.8 |  | 20.5 | 31.8 | 24.5 | 33.8 | 19.3 | 47.5 | 26.6 | 50.0 |
| 50.9 | 35.4 | 40.4 | 31.4 | 47.7 | 46.6 | 32.0 | 60.7 | 50.2 | 64.5 | 32.5 | 64.9 | 58.6 | 62.1 | 45.1 |  | 22.7 | 31.1 | 22.6 | 33.2 | 19.7 | 49.4 | 27.2 | 46.1 |
| 52.6 | 35.1 | 37.9 | 29.8 | 45.0 | 47.6 | 34.2 | 52.1 | 44.4 | 66.4 | 33.8 | 55.6 | 62.3 | 58.4 | 55.1 |  | 27.7 | 32.9 | 24.1 | 29.8 | 21.0 | 48.2 | 28.5 | 41.1 |
| 51.3 | 33.2 | 42.8 | 30.4 | 47.0 | 41.0 | 30.7 | 57.1 | 52.4 | 61.6 | 40.1 | 46.7 | 39.8 | 53.5 | 48.8 |  | 28.0 | 35.9 | 22.9 | 33.3 | 22.3 | 48.8 | 36.0 | 42.7 |
| 50.6 | 35.1 | 42.9 | 26.0 | 51.6 | 31.4 | 29.7 | 59.9 | 47.4 | 57.0 | 42.1 | 56.1 | 49.8 | 53.2 | 52.5 |  | 24.2 | 31.3 | 22.2 | 31.3 | 20.0 | 51.0 | 39.5 | 33.4 |
| 45.8 | 32.9 | 45.0 | 27.3 | 49.8 | 29.5 | 33.5 | 60.8 | 48.7 | 68.9 | 38.9 | 53.2 | 70.3 | 51.6 | 51.8 |  | 18.3 | 31.3 | 20.6 | 32.4 | 17.7 | 49.1 | 36.0 | 31.2 |
| 41.8 | 30.7 | 40.7 | 29.6 | 47.0 | 33.7 | 38.9 | 56.5 | 45.6 | 69.6 | 34.0 | 58.8 | 79.7 | 54.1 | 49.9 |  | 20.8 | 31.4 | 21.8 | 33.0 | 17.4 | 45.0 | 34.8 | 27.7 |
| 42.3 | 27.3 | 46.2 | 25.6 | 39.5 | 35.0 | 34.4 | 58.7 | 41.4 | 68.6 | 30.1 | 54.9 | 77.4 | 65.7 | 64.1 |  | 24.9 | 41.5 | 21.8 | 32.6 | 18.8 | 40.1 | 35.5 | 36.8 |
| 41.6 | 31.8 | 50.4 | 27.2 | 35.8 | 33.0 | 35.1 | 56.9 | 45.2 | 38.5 | 31.9 | 55.0 | 76.4 | 53.2 | 73.3 |  | 25.1 | 36.8 | 48.6 | 31.0 | 20.9 | 39.7 | 28.0 | 25.8 |
| 35.9 | 29.1 | 46.9 | 24.4 | 33.2 | 33.2 | 39.9 | 60.6 | 54.1 | 69.8 | 31.6 | 42.9 | 86.4 | 76.5 | 73.2 |  | 21.6 | 37.3 | 52.4 | 37.0 | 19.8 | 39.8 | 24.6 | 31.3 |
| 45.3 | 29.3 | 47.7 | 21.5 | 29.5 | 30.0 | 37.4 | 49.0 | 48.6 | 82.7 | 29.1 | 39.6 | 87.8 | 79.8 | 73.8 |  | 22.9 | 35.9 | 47.9 | 44.7 | 23.6 | 39.4 | 26.9 | 31.8 |
| 44.2 | 28.2 | 44.8 | 27.5 | 29.8 | 28.3 | 33.4 | 55.8 | 45.7 | 80.9 | 27.7 | 36.1 | 91.1 | 64.0 | 67.1 |  | 23.4 | 37.3 | 44.1 | 36.2 | 31.7 | 30.5 | 25.8 | 31.8 |
| 45.3 | 30.8 | 39.2 | 27.9 | 28.4 | 25.9 | 28.1 | 52.7 | 48.9 | 83.8 | 34.2 | 52.0 | 80.3 | 57.0 | 62.8 |  | 23.7 | 36.7 | 39.7 | 33.3 | 33.1 | 31.2 | 28.2 | 36.5 |
| 44.5 | 30.0 | 33.8 | 25.9 | 24.6 | 24.2 | 27.7 | 29.0 | 41.0 | 82.8 | 33.7 | 47.4 | 77.1 | 43.7 | 70.9 |  | 19.2 | 37.0 | 38.9 | 28.4 | 31.1 | 33.8 | 21.2 | 40.7 |
| 2.4 | 29.4 | 25.8 | 29.7 | 27.6 | 23.7 | 26.1 | 24.0 | 38.4 | 73.6 | 38.1 | 53.3 | 82.9 | 55.2 | 67.2 |  | 17.5 | 40.5 | 38.8 | 28.1 | 32.3 | 34.4 | 20.8 | 47.9 |
| 41.1 | 29.5 | 23.6 | 30.6 | 26.5 | 22.5 | 26.0 | 35.2 | 46.3 | 69.8 | 43.2 | 45.6 | 78.6 | 66.1 | 60.6 |  | 18.6 | 43.6 | 35.6 | 37.8 | 37.3 | 33.3 | 17.3 | 62.1 |
| 39.5 | 28.4 | 23.6 | 37.4 | 25.7 | 27.0 | 22.5 | 38.4 | 42.9 | 69.1 | 42.4 | 35.4 | 70.0 | 56.8 | 48.8 |  | 20.1 | 42.6 | 32.7 | 33.8 | 40.7 | 29.9 | 17.1 | 69.8 |
| 35.1 | 23.9 | 20.6 | 32.9 | 24.6 | 24.9 | 22.0 | 26.2 | 41.3 | 69.1 | 43.5 | 31.9 | 66.5 | 69.6 | 38.3 |  | 20.6 | 45.5 | 35.0 | 38.7 | 43.2 | 25.8 | 24.0 | 67.6 |
| 34.5 | 21.4 | 18.5 | 31.9 | 19.4 | 22.2 | 24.3 | 42.0 | 40.7 | 64.5 | 53.5 | 58.0 | 69.1 | 86.6 | 34.5 |  | 23.1 | 40.1 | 30.4 | 41.3 | 44.4 | 27.5 | 27.7 | 58.8 |
| 34.2 | 18.3 | 21.2 | 35.2 | 22.8 | 20.8 | 26.4 | 38.6 | 32.9 | 67.8 | 53.6 | 60.1 | 65.5 | 78.2 | 39.2 |  | 22.1 | 38.3 | 26.5 | 41.7 | 48.6 | 26.6 | 28.1 | 46.7 |
| 35.1 | 22.3 | 18.8 | 33.2 | 31.0 | 24.5 | 31.4 | 38.0 | 41.7 | 67.3 | 46.3 | 68.4 | 66.4 | 77.9 | 48.0 |  | 21.8 | 35.9 | 27.1 | 38.9 | 52.8 | 25.8 | 20.7 | 42.2 |
| 35.1 | 21.0 | 19.9 | 33.8 | 28.0 | 23.8 | 29.7 | 39.5 | 49.8 | 66.6 | 37.2 | 64.0 | 61.2 | 82.2 | 43.1 |  | 20.4 | 36.0 | 30.8 | 33.6 | 49.8 | 23.2 | 20.7 | 38.0 |
| 35.9 | 21.7 | 20.4 | 34.7 | 26.6 | 19.8 | 25.7 | 36.3 | 54.6 | 62.7 | 39.3 | 74.6 | 69.1 | 76.1 | 53.4 |  | 23.4 | 34.8 | 26.5 | 24.4 | 49.8 | 21.8 | 19.8 | 38.6 |
| 31.4 | 17.0 | 18.9 | 37.5 | 28.7 | 22.8 | 26.9 | 24.3 | 50.5 | 55.7 | 35.3 | 74.0 | 60.1 | 63.0 | 40.2 |  | 23.7 | 33.3 | 28.8 | 24.4 | 49.3 | 23.7 | 19.5 | 41.8 |
| 32.9 | 19.9 | 22.6 | 41.2 | 32.3 | 21.5 | 30.2 | 39.1 | 57.5 | 64.3 | 42.6 | 77.6 | 55.6 | 54.0 | 35.2 |  | 24.3 | 32.1 | 24.2 | 22.8 | 45.2 | 30.6 | 22.6 | 38.3 |
| 35.7 | 21.9 | 25.4 | 43.2 | 33.0 | 21.8 | 29.9 | 40.5 | 53.1 | 52.2 | 39.8 | 81.5 | 61.5 | 65.1 | 42.4 |  | 22.0 | 30.5 | 26.4 | 16.9 | 47.3 | 33.3 | 29.1 | 36.8 |

| DB7 | DB8 | DB8 | DB8 | DB8 | DB8 | DB8 | DB8 | DB9 | DB9 | DB9 | DB9 | DB9 | DB9 | DB9 | DB9 | DB10 | DB10 | DB10 | DB10 | DB10 | DB11 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 36.6 | 24.8 | 33.0 | 19.9 | 58.9 | 63.9 | 101.9 | 17.9 | 32.9 | 2.2 | 11.4 | 33.0 | 31.6 | 29.4 | 30.9 | 28.5 | 24.3 | 33.0 | 26.0 | 34.2 | 39.9 | 32.0 |
| 34.6 | 27.6 | 36.1 | 20.6 | 73.2 | 28.5 | 78.9 | 16.9 | 33.0 | 6.2 | 11.9 | 27.8 | 29.0 | 29.0 | 25.5 | 32.5 | 29.3 | 34.8 | 24.0 | 43.5 | 36.1 | 54.9 |
| 29.9 | 22.7 | 51.1 | 24.2 | 43.1 | 13.5 | 86.4 | 17.2 | 27.4 | 4.3 | 13.0 | 28.6 | 27.3 | 29.9 | 24.9 | 33.6 | 35.3 | 21.4 | 27.9 | 22.2 | 32.9 | 32.8 |
| 32.5 | 17.9 | 47.5 | 22.7 | 27.9 | 23.0 | 92.2 | 13.1 | 21.3 | 2.3 | 12.4 | 35.8 | 29.2 | 30.6 | 25.2 | 26.0 | 36.4 | 25.0 | 22.6 | 21.6 | 47.4 | 35.6 |
| 33.7 | 24.9 | 41.8 | 21.0 | 66.4 | 16.0 | 79.8 | 14.1 | 21.8 | 6.6 | 13.4 | 31.9 | 27.9 | 27.0 | 26.8 | 22.4 | 33.9 | 22.3 | 23.5 | 44.2 | 23.0 | 40.2 |
| 37.3 | 21.6 | 43.8 | 21.6 | 68.5 | 27.8 | 82.2 | 12.1 | 21.1 | 9.2 | 12.6 | 40.7 | 23.6 | 27.8 | 32.0 | 25.7 | 32.3 | 33.0 | 23.5 | 22.6 | 28.4 | 49.7 |
| 31.5 | 25.0 | 41.1 | 17.4 | 59.8 | 29.8 | 83.1 | 16.1 | 22.0 | 13.4 | 11.5 | 36.8 | 18.7 | 26.0 | 34.8 | 23.2 | 35.7 | 25.2 | 23.3 | 40.1 | 26.2 | 52.9 |
| 31.6 | 23.4 | 41.1 | 22.2 | 81.9 | 27.2 | 78.7 | 10.2 | 19.1 | 14.9 | 13.3 | 35.5 | 17.2 | 26.9 | 23.4 | 22.0 | 37.5 | 27.3 | 22.4 | 38.6 | 61.2 | 44.8 |
| 34.7 | 23.7 | 39.6 | 32.0 | 59.4 | 32.7 | 74.5 | 17.2 | 16.0 | 13.2 | 13.8 | 32.7 | 16.5 | 27.7 | 23.1 | 18.4 | 36.4 | 32.2 | 28.4 | 16.4 | 71.8 | 43.0 |
| 32.7 | 19.3 | 42.1 | 11.8 | 24.2 | 34.2 | 73.6 | 12.9 | 16.7 | 9.9 | 13.4 | 31.4 | 19.2 | 30.4 | 24.8 | 16.3 | 34.2 | 40.0 | 28.9 | 35.3 | 80.2 | 52.5 |
| 43.3 | 17.5 | 44.6 | 26.4 | 29.7 | 29.0 | 56.0 |  | 14.9 | 16.6 | 16.8 | 35.8 | 18.4 | 36.1 | 17.4 | 15.1 | 32.7 | 44.0 | 30.2 | 17.0 | 69.0 | 41.1 |
| 49.0 | 16.7 | 42.0 | 23.2 | 77.0 | 22.3 | 62.4 |  | 13.9 | 14.9 | 17.5 | 34.6 | 22.6 | 31.4 | 18.0 | 15.8 | 42.0 | 40.0 | 27.5 | 29.1 | 79.2 | 21.2 |
| 50.8 | 19.8 | 53.1 | 25.9 | 32.5 | 26.6 | 64.9 |  | 12.2 | 8.9 | 16.0 | 39.0 | 25.9 | 32.5 | 16.1 | 19.9 | 43.9 | 26.9 | 11.2 | 7.4 | 86.4 | 17.9 |
| 41.5 | 15.5 | 52.8 | 19.9 | 41.0 | 37.6 | 64.6 |  | 9.6 | 7.3 | 14.2 | 31.0 | 23.8 | 37.2 | 8.8 | 18.2 | 30.4 | 27.9 | 25.3 | 40.5 | 78.3 | 24.2 |
| 35.4 | 12.2 | 46.2 | 27.2 | 40.7 | 32.3 | 63.0 |  | 11.6 | 7.9 | 17.0 | 24.5 | 25.1 | 42.8 | 14.4 | 18.7 | 28.7 | 25.4 | 29.9 | 50.5 | 89.7 | 23.1 |
| 40.4 | 8.6 | 43.8 | 23.3 | 47.0 | 24.5 | 68.4 |  | 11.3 | 9.2 | 21.7 | 21.4 | 28.6 | 45.1 | 14.3 | 19.1 | 22.8 | 45.7 | 31.5 | 28.1 | 87.9 | 7.1 |
| 35.0 | 14.4 | 45.5 | 29.7 | 55.8 | 28.4 | 71.7 |  | 12.2 | 8.1 | 21.5 | 22.0 | 20.6 | 42.0 | 14.0 | 15.8 | 29.8 | 41.5 | 33.7 | 37.5 | 113.1 | 21.8 |
| 30.8 | 18.7 | 36.5 | 21.1 | 38.1 | 39.6 | 84.1 |  | 11.0 | 12.8 | 13.6 | 22.7 | 16.3 | 33.9 | 15.8 | 11.8 | 27.9 | 40.9 | 26.3 | 37.4 | 118.6 | 17.3 |
| 26.1 | 21.6 | 40.0 | 4.1 | 74.1 | 44.4 | 81.1 |  | 13.0 | 13.4 | 13.5 | 22.1 | 24.0 | 33.6 | 15.9 | 11.9 | 35.2 | 21.0 | 33.0 | 48.5 | 101.5 | 24.0 |
| 29.2 | 14.5 | 44.3 | 7.3 | 55.4 | 49.7 | 62.5 |  | 14.8 | 13.5 | 13.9 | 25.0 | 22.7 | 37.0 | 22.8 | 18.8 | 29.8 | 16.6 | 37.5 | 38.0 | 109.3 | 54.0 |
| 28.3 | 24.6 | 33.8 | 18.1 | 24.8 | 54.7 | 59.7 |  | 15.2 | 10.0 | 23.7 | 25.9 | 17.2 | 32.8 | 26.0 | 19.7 | 35.4 | 23.7 | 41.1 | 40.8 | 99.2 | 47.1 |
| 33.2 | 18.1 | 35.2 | 21.7 | 19.3 | 57.6 | 73.4 |  | 13.8 | 7.1 | 24.2 | 27.3 | 15.2 | 34.2 | 26.9 | 17.6 | 35.8 | 19.4 | 41.3 | 26.1 | 98.4 | 24.8 |
| 32.8 | 25.8 | 27.7 | 7.4 | 42.9 | 66.7 | 63.0 |  | 13.9 | 4.9 | 24.6 | 33.4 | 14.8 | 44.4 | 38.3 | 14.9 | 42.3 | 20.8 | 39.8 | 19.9 | 78.2 | 17.9 |
| 34.3 | 37.5 | 20.7 | 18.7 | 65.1 | 49.3 | 65.0 |  | 15.2 | 3.7 | 29.7 | 34.6 | 23.2 | 48.4 | 43.0 | 16.1 | 48.3 | 21.6 | 42.5 | 18.0 | 93.0 | 48.6 |
| 31.8 | 46.8 | 24.6 | 20.8 | 49.9 | 48.9 | 75.0 |  | 11.1 | 1.0 | 30.0 | 29.9 | 26.6 | 37.9 | 34.9 | 18.5 | 44.3 | 17.5 | 40.7 | 46.4 | 64.5 | 34.4 |
| 36.7 | 42.5 | 34.6 | 14.0 | 21.8 | 55.6 | 77.9 |  | 6.4 | 1.1 | 34.2 | 31.6 | 25.9 | 41.5 | 36.8 | 16.9 | 40.2 | 18.9 | 49.3 | 34.6 | 26.9 | 46.3 |
| 36.4 | 42.3 | 34.8 | 13.1 | 25.4 | 57.6 | 71.8 |  | 8.2 | 1.3 | 35.4 | 38.3 | 25.9 | 36.8 | 33.9 | 17.8 | 39.9 | 7.7 | 41.0 | 30.2 | 20.7 | 46.1 |
| 37.7 | 45.1 | 49.3 | 11.3 | 48.9 | 66.9 | 70.1 |  | 9.3 | 2.8 | 31.5 | 39.7 | 21.7 | 38.2 | 30.9 | 21.0 | 36.2 | 0.4 | 37.7 | 18.6 | 9.3 | 43.8 |
| 36.8 | 47.2 | 46.8 | 11.3 | 64.5 | 71.5 | 65.5 |  | 9.1 | 4.0 | 31.4 | 35.1 | 24.5 | 36.9 | 26.3 | 20.5 | 27.3 | 0.5 | 26.1 | 25.7 | 22.2 | 32.9 |
| 37.1 | 46.5 | 47.3 | 19.7 | 42.1 | 68.2 | 71.8 |  | 8.8 | 5.2 | 38.6 | 34.2 | 22.8 | 34.4 | 23.2 | 16.6 | 35.2 | 2.3 | 23.9 | 51.0 | 29.1 | 45.4 |
| 37.4 | 45.3 | 43.6 | 45.6 | 26.9 | 59.5 | 73.4 |  | 6.9 | 2.9 | 41.7 | 24.9 | 26.3 | 34.3 | 23.4 | 17.2 | 27.8 | 7.9 | 18.7 | 48.5 | 25.8 | 42.7 |
| 34.5 | 47.6 | 32.7 | 30.3 | 28.8 | 69.7 | 68.1 |  | 8.3 | 3.5 | 38.3 | 23.7 | 27.1 | 30.4 | 23.0 | 22.3 | 9.9 | 14.3 | 20.9 | 51.2 | 53.6 | 47.5 |
| 32.7 | 45.1 | 39.7 | 36.1 | 19.5 | 77.5 | 62.4 |  | 5.5 | 2.8 | 36.8 | 22.6 | 29.7 | 34.1 | 25.1 | 30.0 | 32.1 | 18.5 | 26.1 | 40.1 | 25.5 | 35.3 |
| 30.2 | 47.7 | 40.0 | 23.8 | 32.6 | 62.5 | 57.1 |  | 5.1 | 3.8 | 39.5 | 18.8 | 33.7 | 43.3 | 25.5 | 27.2 | 28.7 | 23.5 | 29.7 | 51.0 | 26.9 | 50.5 |
| 34.4 | 48.8 | 40.0 | 18.2 | 35.0 | 52.9 | 56.4 |  | 5.3 | 3.1 | 39.0 | 27.9 | 36.8 | 48.9 | 25.4 | 24.3 | 27.6 | 27.7 | 27.7 | 62.9 | 48.9 | 39.4 |
| 31.0 | 50.5 | 41.5 | 16.8 | 37.0 | 65.4 | 55.0 |  | 5.9 | 4.7 | 42.9 | 33.0 | 44.8 | 44.5 | 23.7 | 19.4 | 36.0 | 27.8 | 28.7 | 49.8 |  | 38.7 |
| 29.6 | 47.5 | 34.5 | 16.8 | 22.4 | 68.5 | 53.1 |  | 7.5 | 6.0 | 42.1 | 29.7 | 40.0 | 39.9 | 29.8 | 25.7 | 28.2 | 29.3 | 34.1 | 118.1 |  | 27.6 |
| 34.8 | 46.1 | 40.1 | 18.2 | 26.9 | 73.6 | 54.2 |  | 6.6 | 3.7 | 5.2 | 25.2 | 33.0 | 35.9 | 23.2 | 25.9 | 31.5 | 33.7 | 39.0 | 113.1 |  | 38.1 |
| 39.5 | 43.8 | 62.2 | 18.5 | 15.2 | 72.7 | 50.6 |  | 6.9 | 6.9 | 34.5 | 32.4 | 32.6 | 32.6 | 28.0 | 21.6 | 31.5 | 31.4 | 32.6 | 109.9 |  | 46.7 |
| 39.7 | 47.2 | 69.0 | 24.9 | 30.8 | 65.9 | 50.8 |  | 9.2 | 7.4 | 31.5 | 28.0 | 35.9 | 28.7 | 31.4 | 19.6 | 28.7 | 37.2 | 29.5 | 33.6 |  | 38.2 |
| 38.7 | 43.4 | 60.2 | 33.5 | 23.0 | 58.2 | 51.9 |  | 9.8 | 6.8 | 32.3 | 26.1 | 34.4 | 20.7 | 37.5 | 26.2 | 37.0 | 37.8 | 29.2 | 30.4 |  | 42.5 |
| 36.5 | 51.6 | 65.6 | 36.8 | 22.6 | 70.5 | 45.9 |  | 6.9 | 8.5 | 32.3 | 25.7 | 33.5 | 19.0 | 29.0 | 24.3 | 20.5 | 43.4 | 28.1 | 44.2 |  | 35.9 |
|  | 54.7 | 72.1 | 54.6 | 19.0 | 72.9 | 46.4 |  | 4.5 | 9.2 | 35.0 | 25.6 | 31.9 | 15.6 | 38.8 | 27.7 | 25.8 | 40.2 | 25.6 | 28.8 |  | 29.4 |
|  | 59.1 | 68.0 | 54.4 | 44.5 | 67.2 | 43.7 |  | 6.6 | 9.6 | 31.5 | 18.3 | 29.4 | 13.8 | 35.7 | 27.7 | 26.7 | 58.1 | 22.8 | 35.5 |  | 23.8 |
|  | 55.0 | 77.3 | 55.6 | 54.6 | 57.4 | 34.6 |  | 8.1 | 9.9 | 31.0 | 22.3 | 25.0 | 13.5 | 32.6 | 29.4 | 17.5 | 58.5 | 29.7 | 26.8 |  | 42.6 |
|  | 52.2 | 75.8 | 56.4 | 43.1 | 67.2 | 45.6 |  | 12.5 | 8.6 | 34.8 | 27.8 | 24.0 | 10.7 | 39.3 | 32.9 | 16.3 | 51.4 | 27.0 | 20.1 |  | 38.3 |
|  | 37.9 | 60.5 | 45.3 | 42.0 | 90.0 | 43.2 |  | 13.4 | 5.6 | 33.2 | 28.4 | 24.0 | 11.9 | 41.4 | 29.1 | 35.1 | 55.3 | 31.6 | 17.2 |  | 36.4 |
|  | 18.9 | 62.6 | 48.5 | 36.7 | 94.5 | 40.6 |  | 14.0 | 6.9 | 39.2 | 25.6 | 23.7 | 13.2 | 43.4 | 27.7 | 31.1 | 52.9 | 32.8 | 17.3 |  | 26.1 |
|  | 19.3 | 44.6 | 39.0 | 71.5 | 83.2 | 39.2 |  | 14.8 | 7.5 | 34.0 | 23.4 | 23.0 | 19.1 | 42.0 | 23.7 | 51.9 | 43.6 | 29.5 | 0.6 |  | 17.0 |
|  | 15.9 | 44.5 | 28.8 | 37.2 | 90.4 | 37.9 |  | 14.4 | 7.9 | 26.0 | 19.4 | 25.5 | 15.2 | 44.0 | 23.5 | 40.9 | 29.1 | 27.1 | 1.8 |  | 19.7 |
|  | 21.8 | 56.7 | 21.0 | 35.8 | 90.6 | 42.0 |  | 13.8 | 10.4 | 22.8 | 21.3 | 22.3 | 20.8 | 50.8 | 20.4 | 41.7 | 27.4 | 15.3 | 1.3 |  | 12.9 |
|  | 34.0 | 49.9 | 21.0 | 49.3 | 95.4 | 44.7 |  | 14.1 | 6.3 | 31.4 | 22.3 | 22.5 | 20.5 | 43.1 | 23.3 | 34.1 | 37.0 | 12.6 | 1.3 |  | 3.3 |
|  | 38.9 | 52.5 | 19.2 | 50.6 | 103.6 | 43.7 |  | 14.2 | 8.9 | 27.9 | 26.2 | 20.6 | 20.6 | 38.4 | 27.8 | 37.9 | 55.7 | 10.7 | 14.2 |  | 11.1 |
|  | 39.8 | 46.9 | 11.1 | 62.7 | 112.1 | 32.9 |  | 11.7 | 10.0 | 24.0 | 23.9 | 22.1 | 25.9 | 36.4 | 33.2 | 31.3 | 48.5 | 11.7 | 30.6 |  | 10.1 |
|  | 43.5 | 42.0 | 21.4 | 76.0 | 100.6 | 33.9 |  | 7.9 | 10.7 | 29.4 | 21.0 | 26.4 | 24.7 | 36.1 | 35.4 | 34.7 | 30.0 | 15.8 | 31.5 |  | 3.1 |
|  | 50.5 | 45.8 | 31.3 | 80.6 | 97.0 | 33.1 |  | 7.1 | 10.3 | 32.8 | 19.3 | 26.7 | 30.0 | 35.3 | 44.8 | 33.3 | 26.0 | 19.3 | 14.9 |  | 12.5 |
|  | 52.8 | 66.6 | 26.6 | 70.2 | 99.3 | 31.2 |  | 7.2 | 11.0 | 34.7 | 22.8 | 34.3 | 40.4 | 35.5 | 52.2 | 24.7 | 25.6 | 9.2 | 9.2 |  | 16.1 |
|  | 51.8 | 40.0 | 11.5 | 59.4 | 115.5 | 28.7 |  | 5.9 | 12.7 | 31.8 | 21.4 | 36.8 | 40.2 | 37.6 | 46.2 | 16.7 | 40.4 | 34.0 | 11.6 |  | 22.2 |
|  | 49.2 | 48.0 | 16.7 | 47.0 | 121.6 | 29.2 |  | 8.4 | 9.2 | 35.3 | 27.7 | 38.3 | 41.3 | 41.3 | 41.2 | 18.3 | 24.8 | 36.6 | 12.5 |  | 20.2 |
|  | 48.9 | 51.3 | 31.7 | 58.1 | 121.4 | 27.6 |  | 8.6 | 8.4 | 36.6 | 38.0 | 35.3 | 42.2 | 43.0 | 34.9 | 25.1 | 28.4 | 16.0 | 28.1 |  | 14.7 |
|  | 51.5 | 36.3 | 12.6 | 57.9 | 118.0 | 28.9 |  | 8.6 | 7.7 | 32.9 | 32.2 | 31.5 | 39.1 | 43.3 | 33.4 | 27.1 | 24.2 | 35.0 | 21.3 |  | 12.5 |
|  | 50.5 | 19.7 | 41.6 | 69.3 | 121.6 | 23.4 |  | 9.8 | 5.8 | 27.3 | 26.1 | 31.0 | 37.5 | 43.9 | 32.3 | 18.5 | 28.8 | 14.3 | 28.2 |  | 12.2 |
|  | 52.1 | 1.6 | 44.2 | 68.0 | 117.1 | 22.0 |  | 12.1 | 5.0 | 33.4 | 19.7 | 26.2 | 31.4 | 42.8 | 35.8 | 24.7 | 19.1 | 27.2 | 21.2 |  | 13.8 |
|  | 53.3 | 16.7 | 51.4 | 59.5 | 119.0 | 21.3 |  | 11.9 | 5.3 | 34.5 | 18.1 | 27.2 | 26.8 | 38.9 |  | 28.8 | 24.7 | 28.8 | 31.8 |  | 17.1 |
|  | 55.3 | 35.1 | 57.0 | 67.3 | 119.3 | 21.1 |  | 12.6 | 7.8 | 49.4 | 18.2 | 31.0 | 28.1 | 39.2 |  | 25.3 | 29.0 | 12.6 | 22.6 |  | 26.4 |
|  | 57.7 | 50.6 | 54.4 | 65.4 | 109.8 | 22.4 |  | 9.0 | 8.3 | 39.9 | 20.8 | 38.8 | 20.9 | 33.2 |  | 31.1 | 29.3 | 17.4 | 11.4 |  | 18.9 |
|  | 60.7 | 57.0 | 52.8 | 54.9 | 121.6 | 19.4 |  | 7.7 | 8.3 | 37.8 | 21.1 | 41.1 | 16.9 | 35.0 |  | 28.1 | 38.1 | 28.5 | 16.3 |  | 17.1 |
|  | 60.7 | 55.6 | 48.4 | 45.6 | 121.3 | 18.3 |  | 11.3 | 8.3 | 37.0 | 26.8 | 42.6 | 18.2 | 31.6 |  | 29.2 | 27.7 | 28.4 | 19.1 |  | 14.6 |
|  | 58.7 | 47.1 | 61.2 | 33.3 | 93.7 | 18.3 |  | 8.8 | 9.6 | 31.4 | 31.1 | 47.2 | 15.0 | 34.0 |  | 28.6 | 34.9 | 23.6 | 15.3 |  | 14.5 |
|  | 59.2 | 48.6 | 55.1 | 38.7 | 104.9 | 23.7 |  | 6.2 | 10.0 | 31.4 | 26.8 | 51.8 | 16.9 | 35.1 |  | 19.5 | 30.1 | 23.0 | 11.5 |  | 11.1 |
|  | 60.4 | 45.7 | 56.0 | 67.5 | 103.9 | 21.2 |  | 4.8 | 10.5 | 32.9 | 27.8 | 53.5 | 16.4 | 35.6 |  | 32.2 | 26.9 | 63.8 | 12.6 |  | 4.7 |
|  | 51.7 | 47.5 | 42.8 | 57.1 | 92.2 | 17.1 |  | 5.6 | 11.4 | 34.3 | 30.2 | 45.3 | 19.3 | 37.9 |  | 29.7 | 22.1 | 28.2 | 41.2 |  | 12.9 |
|  | 53.5 | 37.1 | 31.6 | 65.7 | 92.9 | 17.2 |  | 3.7 | 10.5 | 29.9 | 36.2 | 35.6 | 25.1 | 32.3 |  | 33.0 | 25.0 | 28.6 | 48.6 |  | 11.4 |

| DB11 | DB11 | DB11 | DB11 | DB11 | DB12 | DB12 | DB12 | DB12 | DB12 | DB12 | DB12 | DB13 | DB13 | DB13 | DB13 | DB13 | DB13 | DB13 | DB13 | DB13 | DB13 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3.6 | 11.8 | 34.5 | 16.8 | 20.9 | 65.6 | 36.3 | 36.6 | 34.3 | 37.3 | 48.4 | 39.8 | 29.2 | 20.7 | 34.1 | 39.3 | 38.2 | 27.1 | 36.0 | 33.0 | 16.3 | 32.7 |
| 10.0 | 8.7 | 23.4 | 15.4 | 27.9 | 45.4 | 38.4 | 37.1 | 30.0 | 48.5 | 58.0 | 26.7 | 29.7 | 19.4 | 32.4 | 37.9 | 29.8 | 27.5 | 36.1 | 27.7 | 14.8 | 32.5 |
| 19.9 | 7.7 | 22.5 | 27.4 | 26.1 | 45.9 | 51.1 | 42.3 | 7.8 | 39.4 | 61.7 | 29.7 | 30.2 | 18.5 | 34.0 | 46.2 | 30.9 | 22.4 | 32.8 | 26.5 | 14.5 | 24.0 |
| 13.7 | 6.9 | 19.4 | 33.2 | 22.3 | 53.7 | 43.9 | 37.7 | 21.4 | 28.5 | 60.5 | 25.6 | 31.4 | 20.7 | 32.7 | 47.4 | 29.7 | 26.2 | 35.1 | 25.5 | 28.3 | 33.3 |
| 17.1 | 15.9 | 8.7 | 23.0 | 20.1 | 47.4 | 45.1 | 39.6 | 37.3 | 31.9 | 62.4 | 70.1 | 30.5 | 22.5 | 34.9 | 50.5 | 30.3 | 19.8 | 35.2 | 27.0 | 26.8 | 30.1 |
| 11.0 | 18.5 | 38.5 | 12.1 | 22.2 | 40.6 | 42.8 | 42.8 | 47.3 | 33.6 | 74.0 | 59.0 | 28.6 | 26.9 | 35.4 | 51.6 | 35.7 | 25.7 | 35.9 | 32.7 | 23.2 | 26.3 |
| 13.0 | 21.0 | 35.1 | 36.0 | 25.8 | 28.2 | 42.1 | 44.0 | 35.6 | 30.9 | 69.7 | 65.1 | 32.0 | 28.9 | 42.3 | 55.0 | 35.7 | 23.1 | 35.2 | 41.4 | 19.5 | 20.4 |
| 12.0 | 39.0 | 50.4 | 41.7 | 31.4 | 29.0 | 36.5 | 45.5 | 28.7 | 18.1 | 71.0 | 72.4 | 31.6 | 26.4 | 41.5 | 48.4 | 32.4 | 25.8 | 33.2 | 39.3 | 20.5 | 21.0 |
| 16.5 | 43.2 | 40.9 | 26.6 | 26.9 | 17.3 | 40.1 | 40.5 | 26.1 | 21.2 | 90.1 | 64.4 | 32.0 | 25.2 | 41.3 | 46.1 | 40.2 | 24.6 | 28.5 | 36.8 | 19.3 | 19.0 |
| 17.7 | 28.4 | 46.7 | 35.3 | 23.6 | 27.9 | 36.4 | 41.5 | 34.2 | 33.0 | 86.2 | 84.8 | 36.9 | 26.0 | 38.2 | 36.0 | 38.3 | 28.5 | 30.0 | 43.3 | 22.9 | 12.2 |
| 12.5 | 35.4 | 34.1 | 41.7 | 30.7 | 23.6 | 38.4 | 46.6 | 46.1 | 15.9 | 79.2 | 95.4 | 36.1 | 25.7 | 39.0 | 35.1 | 35.4 | 26.7 | 28.5 | 39.5 | 22.3 | 14.1 |
| 21.6 | 30.3 | 39.6 | 45.6 | 27.6 | 17.5 | 42.8 | 48.1 | 54.7 | 16.0 | 105.0 | 77.7 | 36.7 | 29.3 | 45.1 | 32.3 | 37.0 | 24.1 | 28.0 | 33.1 | 21.7 | 18.1 |
| 35.6 | 27.9 | 35.8 | 45.2 | 25.8 | 23.7 | 40.9 | 41.2 | 67.8 | 18.2 | 78.6 | 51.2 | 36.4 | 32.2 | 44.3 | 36.5 | 35.1 | 21.6 | 28.2 | 26.2 | 23.2 | 20.1 |
| 32.6 | 45.7 | 32.8 | 49.6 | 26.8 | 31.4 | 39.4 | 40.4 | 54.2 | 18.4 | 77.7 | 45.7 | 41.5 | 31.2 | 44.5 | 39.1 | 37.0 | 21.6 | 31.0 | 21.3 | 26.0 | 23.9 |
| 26.6 | 48.6 | 26.2 | 36.5 | 35.2 | 23.2 | 38.3 | 45.1 | 31.1 | 17.8 | 77.9 | 45.6 | 38.3 | 27.7 | 41.8 | 38.2 | 41.2 | 19.5 | 31.7 | 25.6 | 34.4 | 24.1 |
| 30.9 | 41.3 | 29.9 | 35.7 | 33.6 | 38.2 | 37.5 | 35.0 | 57.7 | 26.2 | 97.7 | 37.3 | 32.0 | 29.3 | 44.3 | 34.0 | 48.4 | 21.6 | 30.2 | 26.4 | 33.7 | 24.2 |
| 16.6 | 38.1 | 16.2 | 36.0 | 35.2 | 34.1 | 34.4 | 42.1 | 49.1 | 44.4 | 121.6 | 14.7 | 32.4 | 31.5 | 49.0 | 27.1 | 45.3 | 21.0 | 36.3 | 30.1 | 33.7 | 27.6 |
| 33.7 | 28.4 | 18.5 | 25.3 | 35.4 | 26.3 | 33.3 | 40.6 | 40.5 | 58.6 | 115.0 | 7.5 | 33.2 | 31.9 | 45.1 | 26.2 | 49.1 | 25.1 | 32.3 | 27.5 | 23.4 | 28.5 |
| 21.7 | 30.2 | 14.5 | 21.5 | 38.9 | 20.2 | 32.7 | 32.0 | 47.7 | 43.9 | 102.3 | | 38.6 | 32.0 | 44.0 | 27.0 | 48.8 | 21.9 | 29.0 | 32.0 | 20.3 | 26.8 |
| 36.6 | 27.1 | 25.1 | 19.9 | 40.1 | 14.6 | 37.1 | 34.1 | 33.5 | 13.0 | 90.2 | | 44.0 | 31.6 | 41.0 | 27.9 | 49.0 | 19.9 | 29.8 | 35.0 | 14.1 | |
| 49.0 | 23.6 | 16.8 | 18.4 | 38.3 | 16.2 | 38.5 | 46.0 | 35.9 | 35.6 | 96.7 | | 45.9 | 32.3 | 39.0 | 27.4 | 54.3 | 21.9 | 31.8 | 38.7 | 17.0 | |
| 54.7 | 16.5 | 17.8 | 20.6 | 35.1 | 12.1 | 38.5 | 45.7 | 42.6 | 19.1 | 104.7 | | 48.7 | 25.2 | 38.6 | 32.1 | 58.3 | 22.8 | 34.0 | 49.4 | 15.7 | |
| 59.9 | 29.6 | 15.2 | 21.3 | 33.8 | 18.6 | 37.4 | 45.3 | 57.8 | 19.6 | 91.0 | | 51.7 | 24.5 | 37.5 | 36.8 | 55.0 | 26.8 | 33.7 | 42.2 | 18.3 | |
| 39.4 | 24.5 | 14.4 | 15.6 | 35.3 | 28.0 | 32.9 | 46.4 | 41.0 | 25.3 | 57.5 | | 49.9 | 21.5 | 35.0 | 42.2 | 55.6 | 24.8 | 34.7 | 38.1 | 19.5 | |
| 22.9 | 19.8 | 14.5 | 15.1 | 34.8 | 20.2 | 32.2 | 40.2 | 29.1 | 40.7 | 63.8 | | 52.0 | 22.9 | 35.2 | 44.9 | 51.4 | 26.8 | 37.6 | 37.6 | 26.0 | |
| 20.3 | 18.8 | 17.0 | 18.9 | 34.2 | 20.7 | 35.8 | 31.1 | 23.4 | 34.8 | 42.1 | | 54.9 | 21.7 | 34.0 | 48.1 | 46.7 | 30.3 | 45.7 | 38.5 | 25.5 | |
| 18.2 | 53.4 | 18.3 | 16.4 | 36.2 | 17.2 | 39.6 | 30.1 | 48.4 | 34.9 | 33.1 | | 52.5 | 20.9 | 37.5 | 52.6 | 45.2 | 30.7 | 45.3 | 45.4 | 30.8 | |
| 16.2 | 67.2 | 23.9 | 17.9 | 41.7 | 14.7 | 40.4 | 38.3 | 53.8 | 35.2 | 39.8 | | 49.4 | 21.6 | 40.3 | 56.8 | 47.9 | 33.0 | 51.2 | 45.5 | 30.8 | |
| 17.7 | 48.5 | 18.7 | 20.9 | 34.5 | 12.1 | 43.7 | 42.6 | 55.3 | 60.1 | 37.3 | | 40.5 | 21.9 | 39.5 | 57.5 | 53.0 | 33.9 | 49.0 | 40.5 | 35.6 | |
| 32.8 | 52.3 | 18.6 | 15.8 | 41.7 | 14.2 | 42.7 | 42.6 | 39.2 | 48.6 | 42.0 | | 32.3 | 25.2 | 37.6 | 59.6 | 55.1 | 37.2 | 49.8 | 35.1 | 40.4 | |
| 30.0 | 70.4 | 18.2 | 28.6 | 43.5 | 11.7 | 38.8 | 28.1 | 77.0 | 45.5 | 36.3 | | 31.9 | 27.9 | 37.6 | 56.8 | 61.6 | 37.8 | 53.8 | 31.5 | 38.0 | |
| 30.2 | 65.7 | 26.8 | 24.8 | 48.7 | 16.2 | 40.2 | 49.4 | 42.7 | 36.8 | 44.5 | | 28.2 | 30.9 | 33.6 | 51.3 | 62.3 | 41.6 | 56.4 | 28.9 | 43.7 | |
| 25.0 | 65.1 | 25.7 | 32.0 | 51.0 | 18.9 | 39.6 | 45.1 | 47.0 | 44.2 | 41.9 | | 27.2 | 34.7 | 36.1 | 50.6 | 58.7 | 36.8 | 55.2 | 30.6 | 43.9 | |
| 25.5 | 65.4 | 25.1 | 18.5 | 55.6 | 16.8 | 40.0 | 40.4 | 44.2 | 48.0 | 46.6 | | 30.3 | 33.8 | 37.5 | 50.3 | 57.1 | 44.7 | 49.5 | 28.2 | 42.9 | |
| 23.3 | 62.1 | 19.4 | 21.4 | 66.7 | 28.6 | 37.2 | 39.7 | 40.3 | 50.0 | 68.9 | | 33.2 | 37.4 | 37.5 | 48.5 | 51.5 | 44.6 | 43.1 | 29.8 | 44.8 | |
| 32.8 | 54.1 | 8.4 | 19.6 | 64.8 | 39.9 | 37.6 | 41.9 | 40.0 | 46.6 | 57.6 | | 36.1 | 40.2 | 38.4 | 51.4 | 47.3 | 43.8 | 43.4 | 26.2 | 41.8 | |
| 27.6 | 54.3 | 32.1 | 19.3 | 71.3 | 44.6 | 38.3 | 41.3 | 47.0 | 44.0 | 51.9 | | 36.5 | 41.0 | 33.0 | 47.9 | 42.1 | 37.1 | 40.4 | 26.9 | 37.2 | |
| 25.8 | 61.8 | 21.5 | 15.1 | 75.6 | 37.9 | 38.6 | 45.8 | 50.2 | 48.2 | 62.5 | | 30.9 | 37.5 | 33.6 | 45.1 | 36.0 | 32.2 | 42.0 | 23.7 | 31.3 | |
| 20.7 | 39.5 | 24.8 | 21.4 | 75.6 | 36.3 | 37.7 | 45.3 | 46.0 | 38.3 | 79.5 | | 29.0 | 40.8 | 35.2 | 40.4 | 30.6 | 26.5 | 48.1 | 26.1 | 24.9 | |
| 24.8 | 43.9 | 38.1 | 18.1 | 81.7 | 38.9 | 38.3 | 55.1 | 54.0 | 49.6 | 82.1 | | 31.7 | 40.5 | 37.1 | 36.4 | 31.4 | 24.4 | 42.7 | 25.9 | 17.8 | |
| 33.9 | 50.5 | 48.2 | 21.0 | 87.8 | 31.6 | 38.6 | 56.1 | 51.7 | 55.3 | 79.6 | | 29.4 | 41.5 | 31.6 | 37.6 | 31.1 | 25.0 | 40.6 | 22.8 | 19.8 | |
| 39.4 | 51.3 | 47.7 | 19.7 | 92.4 | 30.6 | 39.4 | 59.6 | 62.5 | 60.9 | 79.7 | | 27.7 | 42.7 | 30.4 | 43.1 | 28.3 | 24.8 | 39.5 | 21.9 | 22.9 | |
| 41.5 | 38.6 | 42.3 | 17.7 | 96.3 | 32.0 | 39.1 | 61.5 | 62.7 | 72.8 | 76.4 | | 28.5 | 42.5 | 34.8 | 42.4 | 17.3 | 25.8 | 42.5 | 20.4 | 21.0 | |
| 49.9 | 33.3 | 32.6 | 17.6 | 100.9 | 32.9 | 39.6 | 55.9 | 69.3 | 59.2 | 64.5 | | 28.5 | 43.6 | 34.5 | 49.3 | 17.5 | 25.3 | 42.7 | 21.1 | 19.5 | |
| 43.2 | 29.6 | 46.0 | 21.5 | | 28.2 | 41.3 | 48.0 | 64.5 | 52.8 | 40.1 | | 29.6 | 44.4 | 34.5 | 52.9 | 21.0 | 24.1 | 37.4 | 21.3 | 23.6 | |
| 46.8 | 37.4 | 42.2 | 17.6 | | 13.7 | 42.4 | 46.5 | 59.3 | 61.4 | 23.8 | | 29.5 | 45.1 | 33.1 | 48.2 | 24.0 | 21.9 | 45.5 | 21.9 | 24.4 | |
| 52.1 | 45.0 | 40.4 | 13.1 | | 13.3 | 42.3 | 52.9 | 58.0 | 53.0 | 28.5 | | 28.8 | 49.6 | 29.0 | 43.4 | 25.4 | 16.6 | 44.6 | 24.4 | 30.6 | |
| 45.1 | 50.1 | 29.8 | 12.9 | | 17.7 | 41.8 | 50.4 | 57.4 | 65.4 | 26.0 | | 26.6 | 50.0 | 31.2 | 36.8 | 23.8 | 17.1 | 54.7 | 28.3 | 24.2 | |
| 20.1 | 51.6 | 51.3 | 12.3 | | 22.4 | 36.4 | 51.3 | 54.4 | 59.6 | 37.0 | | 30.3 | 46.3 | 28.3 | 37.4 | 24.7 | 17.1 | 47.7 | 29.6 | 24.9 | |
| 14.7 | 49.0 | 42.1 | 20.3 | | 11.7 | 43.2 | 47.0 | 56.1 | 65.5 | 38.2 | | 29.6 | 46.9 | 28.5 | 44.6 | 22.7 | 19.5 | 40.2 | 32.0 | 26.2 | |
| 28.5 | 49.6 | 37.9 | 10.9 | | 28.3 | 22.2 | 44.7 | 55.4 | 63.9 | 25.5 | | 27.8 | 46.1 | 35.3 | 47.9 | 19.7 | 20.1 | 35.9 | 31.4 | 27.4 | |
| 25.4 | 59.1 | 32.7 | 14.9 | | 27.6 | 29.3 | 42.4 | 49.5 | 60.5 | 26.4 | | 25.4 | 47.9 | 37.7 | 49.4 | 18.6 | 22.0 | 39.1 | 43.9 | 30.7 | |
| 15.3 | 74.1 | 18.8 | 12.2 | | 39.4 | 35.2 | 43.6 | 69.2 | 58.1 | 8.5 | | 21.9 | 48.8 | 32.6 | 48.6 | 19.8 | 24.7 | 38.5 | 51.2 | 30.1 | |
| 25.4 | 55.9 | 16.2 | 9.8 | | 31.1 | 31.9 | 42.6 | 60.6 | 36.6 | 12.5 | | 23.2 | 46.6 | 32.0 | 44.0 | 17.4 | 25.1 | 40.7 | 58.7 | 35.6 | |
| 28.8 | 63.1 | 19.5 | 8.3 | | 30.1 | 41.1 | 46.9 | 51.4 | 26.9 | 28.2 | | 25.9 | 45.8 | 31.0 | 40.3 | 21.3 | 24.9 | 42.2 | 56.6 | 39.2 | |
| 26.0 | 40.0 | 21.9 | 11.8 | | 40.4 | 44.5 | 40.6 | 47.9 | 24.7 | 28.0 | | 27.9 | 43.8 | 32.6 | 39.6 | 21.2 | 27.9 | 37.5 | 61.5 | 40.7 | |
| 14.5 | 35.1 | 18.3 | 16.8 | | 17.1 | 35.5 | 28.3 | 31.5 | 25.4 | 29.3 | | 25.2 | 38.0 | 32.2 | 37.1 | 38.5 | 25.2 | 39.9 | 64.4 | 44.9 | |
| 24.2 | 47.1 | 18.0 | 13.7 | | 33.2 | 8.9 | 33.2 | 25.3 | 34.6 | 26.4 | | 27.1 | 42.1 | 32.5 | 33.4 | 31.0 | 22.8 | 39.0 | 64.2 | 54.6 | |
| 17.7 | 30.9 | 18.9 | 9.2 | | 46.5 | 4.6 | 43.3 | 25.5 | 60.2 | 24.4 | | 32.7 | 42.0 | 33.7 | 27.6 | 27.0 | 24.8 | 39.4 | 64.3 | 48.1 | |
| 67.4 | 38.4 | 32.4 | 10.5 | | 46.2 | 4.8 | 25.1 | 30.1 | 70.6 | 30.3 | | 36.1 | 39.6 | 32.7 | 22.1 | 33.3 | 23.7 | 38.5 | 73.9 | 44.3 | |
| 48.7 | 46.8 | 28.4 | 5.4 | | 38.7 | 4.0 | 24.6 | 59.4 | 86.7 | 26.4 | | 35.6 | 36.5 | 34.6 | 23.6 | 34.6 | 29.4 | 47.6 | 68.3 | 42.9 | |
| 19.4 | 40.7 | 25.0 | 10.1 | | 41.1 | 1.8 | 38.5 | 35.4 | 67.0 | 14.7 | | 27.9 | 33.1 | 32.5 | 21.1 | 39.4 | 29.1 | 54.8 | 72.1 | 42.1 | |
| 24.6 | 41.3 | 34.4 | 15.6 | | 39.3 | 3.9 | 33.0 | 20.5 | 53.8 | 12.3 | | 25.2 | 36.4 | 31.5 | 19.3 | 35.9 | 26.9 | 42.2 | 60.0 | 34.9 | |
| 19.2 | 56.0 | 35.2 | 25.9 | | 32.1 | 7.2 | 26.3 | 37.7 | 58.6 | 12.9 | | 26.1 | 30.4 | 30.5 | 20.9 | 36.5 | 22.6 | 43.0 | 53.3 | 30.8 | |
| 32.2 | 38.7 | 22.4 | 24.0 | | 33.4 | 6.2 | 21.8 | 34.4 | 47.9 | 36.5 | | 24.1 | 34.3 | 26.5 | 27.1 | 35.7 | 26.7 | 44.5 | 44.9 | 25.9 | |
| 35.8 | 44.3 | 41.6 | 18.8 | | 44.0 | 8.6 | 13.8 | 25.6 | 34.6 | 30.3 | | 23.5 | 29.5 | 27.3 | 22.5 | 32.8 | 26.0 | 45.7 | 36.8 | 24.1 | |
| 37.8 | 49.3 | 35.6 | 25.5 | | 45.7 | 18.4 | 24.0 | 35.3 | 48.2 | 24.8 | | 20.7 | 31.6 | 27.4 | 24.7 | 29.2 | 28.8 | 40.6 | 29.2 | 26.2 | |
| 39.5 | 48.0 | 20.1 | 25.0 | | 45.1 | 24.7 | 21.3 | 46.4 | 28.6 | 25.3 | | 20.9 | 27.9 | 29.1 | 26.5 | 28.0 | 33.7 | 40.7 | 30.1 | 22.3 | |
| 18.9 | 40.9 | 5.9 | 22.9 | | 42.9 | 35.2 | 30.9 | 37.6 | 25.7 | 33.5 | | 23.0 | 30.9 | 30.6 | 31.4 | 27.3 | 36.3 | 41.0 | 27.5 | 21.4 | |
| 13.5 | 38.7 | 4.4 | 23.0 | | 42.9 | 34.2 | 11.5 | 36.8 | 35.7 | 27.6 | | 23.0 | 26.6 | 34.0 | 33.7 | 32.1 | 39.5 | 37.8 | 32.1 | 23.1 | |
| 8.6 | 52.9 | 4.8 | 19.0 | | 41.9 | 35.8 | 19.9 | 35.5 | 41.2 | 19.2 | | 21.5 | 31.2 | 37.8 | 37.5 | 23.1 | 42.5 | 32.7 | 24.6 | 25.9 | |
| 18.9 | 31.4 | 34.6 | 17.4 | | 40.2 | 18.5 | 29.9 | 52.1 | 51.7 | 28.0 | | 23.0 | 30.9 | 38.9 | 33.8 | 21.4 | 37.5 | 30.9 | 25.3 | 25.2 | |
| 12.5 | 23.6 | 23.7 | 16.8 | | 36.6 | 34.6 | 46.6 | 29.1 | 48.4 | 25.3 | | 23.1 | 33.8 | 36.1 | 33.4 | 25.3 | 42.1 | 32.8 | 31.7 | 29.4 | |

| DB14 | DB14 | DB14 | DB14 | DB14 | DB15 | DB15 | DB15 | DB15 | DB15 | DB16 | DB16 | DB17 | DB17 | DB17 | DB17 | DB17 | DB17 | DB17 | DB17 | DB18 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 38.1 | 26.7 | 29.0 | 18.7 | 26.7 | 26.9 | 24.2 | 21.7 | 25.5 | 25.5 | 81.2 | 70.0 | 40.1 | 25.9 | 34.0 | 34.4 | 31.9 | 27.0 | 34.2 | 28.7 | 16.3 |
| 36.3 | 24.8 | 27.9 | 21.9 | 26.2 | 27.0 | 24.5 | 22.4 | 25.4 | 25.6 | 82.5 | 80.9 | 41.9 | 24.8 | 34.1 | 37.3 | 32.3 | 30.0 | 31.0 | 30.0 | 19.4 |
| 40.0 | 22.1 | 27.5 | 19.6 | 26.7 | 26.2 | 26.1 | 23.4 | 23.2 | 23.9 | 91.3 | 77.2 | 38.1 | 21.4 | 34.8 | 38.2 | 30.9 | 25.0 | 30.1 | 34.6 | 18.6 |
| 38.6 | 24.7 | 25.7 | 10.4 | 26.8 | 25.2 | 24.5 | 23.7 | 24.4 | 23.7 | 90.1 | 69.1 | 39.4 | 27.5 | 36.4 | 39.2 | 29.6 | 28.9 | 31.5 | 35.2 | 13.7 |
| 41.5 | 31.9 | 24.3 | 8.6 | 26.5 | 24.9 | 24.2 | 23.9 | 24.7 | 23.7 | 83.5 | 75.4 | 40.6 | 25.8 | 37.4 | 36.1 | 27.6 | 37.3 | 34.8 | 32.1 | 14.6 |
| 39.9 | 45.1 | 22.3 | 20.7 | 31.4 | 24.7 | 24.3 | 25.0 | 26.6 | 23.7 | 76.7 | 69.1 | 38.1 | 28.4 | 33.5 | 42.4 | 30.9 | 34.4 | 36.5 | 32.1 | 12.7 |
| 37.1 | 50.1 | 21.7 | 11.6 | 30.3 | 25.4 | 24.4 | 20.6 | 26.9 | 25.3 | 79.4 | 68.6 | 34.8 | 27.1 | 28.9 | 40.2 | 33.4 | 27.0 | 46.1 | 30.0 | 15.6 |
| 35.3 | 40.4 | 16.6 | 10.7 | 25.8 | 24.7 | 25.6 | 25.0 | 23.0 | 29.0 | 76.6 | 69.8 | 36.0 | 29.2 | 35.6 | 36.8 | 31.0 | 31.8 | 44.8 | 31.3 | 11.4 |
| 33.9 | 36.6 | 16.1 | 11.5 | 22.0 | 27.0 | 28.9 | 28.4 | 25.0 | 35.0 | 78.2 | 89.5 | 34.1 | 30.0 | 35.3 | 37.1 | 31.3 | 31.6 | 39.6 | 27.7 | 13.2 |
| 34.4 | 38.6 | 14.1 | 18.7 | 24.1 | 26.9 | 27.3 | 31.1 | 23.8 | 40.1 | 80.7 | 85.8 | 29.8 | 29.2 | 36.2 | 36.8 | 30.4 | 34.0 | 40.2 | 25.1 | 8.5 |
| 32.7 | 35.1 | 8.6 | 15.1 | 28.3 | 27.7 | 29.3 | 31.9 | 24.9 | 32.6 | 77.7 | 82.9 | 35.0 | 30.9 | 36.9 | 36.2 | 27.6 | 32.4 | 39.3 | 24.3 | 10.3 |
| 28.6 | 41.0 | 8.1 | 12.1 | 33.0 | 27.5 | 29.6 | 36.4 | 24.0 | 28.2 | 76.8 | 78.9 | 35.2 | 35.6 | 37.2 | 38.2 | 29.3 | 32.3 | 38.5 | 26.4 | 10.3 |
| 23.6 | 41.0 | 11.8 | 14.1 | 38.5 | 27.0 | 31.7 | 38.3 | 27.1 | 34.5 | 71.4 | 71.0 | 33.9 | 35.1 | 38.9 | 37.5 | 28.5 | 36.7 | 30.1 | 27.1 | 12.2 |
| 24.3 | 42.1 | 13.7 | 8.3 | 38.5 | 29.4 | 33.6 | 41.2 | 32.6 | 33.0 | 82.5 | 67.9 | 28.6 | 30.2 | 33.8 | 36.7 | 30.5 | 31.7 | 26.9 | 27.9 | 12.6 |
| 21.9 | 43.2 | 22.4 | 12.8 | 38.8 | 29.3 | 32.5 | 39.5 | 27.2 | 22.9 | 72.7 | 76.5 | 38.4 | 27.4 | 36.9 | 35.2 | 34.5 | 30.4 | 28.0 | 39.0 | 10.5 |
| 22.1 | 39.7 | 27.9 | 19.2 | 40.1 | 30.3 | 32.6 | 32.2 | 24.8 | 25.5 | 67.6 | 84.7 | 37.1 | 28.1 | 37.1 | 34.0 | 33.8 | 36.7 | 30.4 | 42.4 | 11.6 |
| 25.1 | 43.1 | 17.2 | 16.0 | 44.2 | 31.1 | 34.3 | 25.2 | 24.6 | 24.1 | 63.5 | 84.3 | 36.8 | 28.4 | 39.8 | 32.5 | 32.3 | 40.5 | 28.4 | 36.4 | 8.0 |
| 23.7 | 56.4 | 15.4 | 14.0 | 45.4 | 33.2 | 34.3 | 25.1 | 23.5 | 20.9 | 68.1 | 74.3 | 28.3 | 27.6 | 39.7 | 32.8 | 31.6 | 34.8 | 25.5 | 31.8 | 10.4 |
| 27.5 | 51.3 | 12.4 | 11.6 | 48.1 | 30.9 | 33.0 | 25.8 | 23.0 | 26.8 | 72.6 | 80.0 | 33.8 | 23.5 | 37.7 | 31.9 | 32.8 | 28.5 | 24.7 | 30.5 | 9.4 |
| 24.0 | 40.9 | 9.8 | 11.8 | 43.4 | 29.0 | 30.3 | 24.5 | 20.6 | 22.8 | 80.0 | 68.1 | 33.4 | 28.2 | 36.9 | 32.3 | 31.1 | 26.6 | 27.4 | 29.5 | 11.2 |
| 21.6 | 37.1 | 10.3 | 14.3 | 36.0 | 27.7 | 25.9 | 25.3 | 19.9 | 18.7 | 73.2 | 75.8 | 32.1 | 28.0 | 27.7 | 30.3 | 33.1 | 28.1 | 32.3 | 27.1 | 16.5 |
| 17.8 | 41.7 | 6.8 | 12.6 | 37.0 | 26.8 | 23.0 | 23.3 | 22.2 | 18.0 | 79.5 | 71.0 | 30.2 | 29.2 | 35.7 | 32.0 | 32.0 | 26.1 | 42.5 | 25.7 | 19.4 |
| 16.6 | 38.9 | 5.1 | 12.8 | 31.5 | 24.8 | 21.3 | 22.4 | 24.3 | 19.2 | 88.2 | 69.3 | 28.8 | 30.1 | 36.0 | 33.2 | 30.5 | 28.5 | 43.9 | 25.6 | 18.4 |
| 20.8 | 36.9 | 3.1 | 21.6 | 35.1 | 25.4 | 19.4 | 22.4 | 22.4 | 20.9 | 79.8 | 87.5 | 26.1 | 29.9 | 35.2 | 34.7 | 33.3 | 30.5 | 39.2 | 33.3 | 19.0 |
| 18.9 | 35.1 | 1.1 | 10.5 | 37.8 | 23.0 | 21.4 | 21.5 | 23.0 | 24.2 | 78.1 | 81.0 | 31.4 | 29.3 | 33.4 | 33.4 | 33.1 | 34.4 | 35.2 | 29.7 | 16.2 |
| 19.3 | 42.9 | 4.2 | 9.8 | 30.3 | 22.3 | 21.7 | 22.3 | 25.5 | 23.8 | 76.6 | 81.3 | 30.9 | 29.6 | 33.7 | 32.0 | 33.2 | 27.7 | 26.9 | 39.0 | 18.1 |
| 20.2 | 43.6 | 2.3 | 14.6 | 24.9 | 22.9 | 21.3 | 25.7 | 23.8 | 20.5 | 83.0 | 49.4 | 23.2 | 29.6 | 28.9 | 33.3 | 32.5 | 30.7 | 34.4 | 41.8 | 20.1 |
| 19.5 | 42.9 | 7.4 | 17.3 | 26.2 | 23.0 | 20.8 | 23.8 | 24.5 | 23.0 | 82.7 | 89.2 | 30.4 | 32.2 | 36.6 | 33.7 | 31.9 | 31.2 | 34.2 | 38.8 | 19.8 |
| 23.3 | 44.3 | 9.1 | 20.1 | 26.1 | 18.8 | 20.3 | 21.0 | 26.2 | 28.0 | 84.9 | 72.5 | 26.1 | 24.3 | 29.4 | 33.4 | 32.3 | 31.3 | 35.4 | 36.5 | 17.1 |
| 20.2 | 45.8 | 9.7 | 30.6 | 37.0 | 19.6 | 21.6 | 20.1 | 26.0 | 34.2 | 73.6 | 79.5 | 29.0 | 34.6 | 35.7 | 32.3 | 30.4 | 31.0 | 39.2 | 39.5 | 20.4 |
| 21.6 | 43.9 | 16.3 | 37.5 | 41.2 | 19.6 | 22.4 | 21.8 | 26.5 | 38.6 | 81.3 | 81.7 | 30.8 | 32.3 | 36.0 | 33.4 | 32.5 | 29.6 | 35.3 | 52.1 | 16.3 |
| 23.9 | 42.9 | 14.2 | 36.4 | 36.4 | 22.9 | 22.8 | 22.0 | 26.5 | 26.3 | 71.2 | 91.5 | 31.5 | 37.1 | 33.9 | 33.5 | 37.0 | 30.7 | 32.1 | 48.8 | 13.0 |
| 30.9 | 42.9 | 12.3 | 41.5 | 23.1 | 26.2 | 24.5 | 22.7 | 27.7 | 23.2 | 76.2 | 79.6 | 31.5 | 36.4 | 35.5 | 33.8 | 36.3 | 31.1 | 31.2 | 54.9 | 13.8 |
| 29.1 | 43.5 | 11.0 | 43.8 | 18.6 | 26.5 | 24.6 | 22.5 | 39.4 | 24.2 | 75.6 | 77.6 | 34.1 | 37.0 | 34.7 | 37.3 | 38.0 | 31.3 | 29.3 | 50.5 | 11.7 |
| 24.9 | 46.6 | 11.3 | 37.8 | 15.8 | 29.9 | 26.6 | 23.4 | 36.8 | 24.8 | 60.1 | 74.4 | 31.1 | 36.4 | 33.4 | 35.2 | 31.8 | 35.9 | 27.8 | 45.4 | 13.4 |
| 18.9 | 49.6 | 11.8 | 35.7 | 21.7 | 31.6 | 27.2 | 24.8 | 25.2 | 28.2 | 67.5 | 74.9 | 35.5 | 35.7 | 30.6 | 34.9 | 34.9 | 35.6 | 25.5 | 40.4 | 15.3 |
| 14.0 | 54.0 | 12.0 | 22.7 | 25.0 | 30.7 | 31.7 | 28.7 | 25.8 | 27.1 | 87.5 | 94.4 | 34.2 | 37.5 | 28.9 | 32.5 | 29.3 | 32.1 | 31.8 | 32.0 | 15.1 |
| 17.0 | 49.8 | 9.6 | 22.1 | 23.2 | 34.9 | 35.2 | 34.4 | 21.4 | 25.0 | 64.9 | 64.7 | 37.5 | 39.0 | 31.4 | 29.3 | 27.9 | 30.9 | 33.6 | 30.7 | 17.0 |
| 19.5 | 53.6 | 7.9 | 25.6 | 24.4 | 36.0 | 30.7 | 37.1 | 18.7 | 21.7 | 78.9 | 70.0 | 37.3 | 37.4 | 30.3 | 28.7 | 28.9 | 31.8 | 29.0 | 30.9 | 17.3 |
| 20.7 | 54.9 | 8.2 | 26.0 | 18.5 | 36.7 | 25.8 | 37.4 | 20.2 | 22.1 | 73.8 | 79.4 | 34.3 | 37.9 | 28.5 | 30.5 | 28.4 | 32.5 | 31.2 | 32.0 | 17.5 |
| 26.4 | 55.5 | 7.1 | 28.5 | 22.0 | 36.4 | 24.7 | 32.9 | 23.0 | 27.7 | 81.6 | 82.3 | 36.0 | 37.2 | 27.0 | 30.8 | 27.5 | 30.8 | 30.4 | 34.8 | 14.9 |
| 31.2 | 56.7 | 8.1 | 36.6 | 22.8 | 34.7 | 22.1 | 27.4 | 25.9 | 36.2 | 62.8 | 78.0 | 36.4 | 37.7 | 26.7 | 28.5 | 31.6 | 28.2 | 30.2 | 35.5 | 14.2 |
| 44.7 | 55.3 | 11.8 | 27.0 | 25.6 | 33.5 | 22.9 | 25.6 | 26.5 | 22.9 | 75.0 | 95.7 | 36.4 | 37.7 | 22.1 | 29.4 | 29.9 | 32.1 | 30.5 | 31.2 | 15.3 |
| 36.8 | 60.9 | 11.9 | 33.1 | 34.0 | 33.1 | 22.8 | 26.4 | 26.2 | 25.7 | 75.2 | 97.9 | 34.1 | 36.1 | 27.0 | 28.1 | 31.1 | 31.2 | 31.0 | 31.0 | 16.2 |
| 35.3 | 56.1 | 14.9 | 36.8 | 29.5 | 32.3 | 22.5 | 25.4 | 26.8 | 27.3 | 79.9 | 89.4 | 35.4 | 30.6 | 25.6 | 30.5 | 36.1 | 31.9 | 32.6 | 32.8 | 16.1 |
| 35.1 | 51.7 | 19.3 | 27.9 | 30.8 | 30.5 | 23.3 | 24.2 | 21.9 | 26.9 | 74.8 | 94.8 | 35.0 | 35.2 | 24.9 | 30.1 | 31.8 | 26.8 | 32.1 | 32.4 | 13.2 |
| 29.5 | 48.9 | 14.0 | 21.0 | 39.9 | 29.8 | 25.2 | 24.0 | 22.0 | 27.4 | 86.0 | 81.3 | 32.6 | 39.1 | 25.7 | 29.8 | 29.4 | 25.5 | 27.0 | 35.3 | 12.3 |
| 26.8 | 47.7 | 11.8 | 23.7 | 38.1 | 28.7 | 25.1 | 24.9 | 24.2 | 26.3 | 79.8 | 79.8 | 31.6 | 39.3 | 27.6 | 35.5 | 25.2 | 27.1 | 31.4 | 35.7 | 10.2 |
| 30.9 | 42.3 | 13.7 | 22.0 | 34.6 | 28.7 | 25.4 | 27.4 | 26.0 | 25.0 | 78.9 | 75.1 | 31.7 | 37.1 | 28.9 | 34.1 | 24.5 | 25.8 | 30.7 | 37.3 | 11.4 |
| 36.5 | 37.6 | 13.8 | 38.5 | 37.3 | 29.2 | 25.2 | 26.2 | 26.0 | 25.3 | 82.6 | 78.1 | 31.5 | 32.3 | 29.2 | 36.1 | 25.0 | 31.2 | 30.6 | 37.3 | 13.4 |
| 38.0 | 45.7 | 6.5 | 36.8 | 21.9 | 27.7 | 26.0 | 26.0 | 25.1 | 24.4 | 76.0 | 72.6 | 29.2 | 34.9 | 29.6 | 37.4 | 24.2 | 30.6 | 29.8 | | 12.6 |
| 34.2 | 41.2 | 6.9 | 38.8 | 18.5 | 24.9 | 26.4 | 26.2 | 26.2 | 29.7 | 75.3 | 86.3 | 29.4 | 33.9 | 26.4 | 37.7 | 26.5 | 31.1 | 30.3 | | 10.7 |
| 31.9 | 45.9 | 6.4 | 33.7 | 29.9 | 27.7 | 25.1 | 25.4 | 18.5 | 28.6 | 75.2 | | 24.7 | 29.5 | 31.5 | 35.6 | 23.4 | 32.4 | 32.3 | | 11.9 |
| 29.8 | 41.4 | 5.5 | 36.2 | 27.0 | 27.1 | 25.4 | 25.8 | 26.0 | 31.5 | 79.7 | | 22.9 | 24.1 | 27.0 | 29.9 | 25.0 | 31.4 | 29.6 | | 11.1 |
| 33.1 | 38.4 | 4.5 | 50.7 | 32.4 | 25.7 | 28.4 | 23.8 | 27.0 | 29.8 | 71.0 | | 29.0 | 35.0 | 30.4 | 30.6 | 29.7 | 33.1 | 26.9 | | 13.4 |
| 30.7 | 40.4 | 37.7 | 44.5 | 31.8 | 24.6 | 25.6 | 23.0 | 32.5 | 28.8 | 72.0 | | 24.8 | 37.9 | 42.5 | 31.8 | 28.9 | 31.7 | 27.2 | | 16.3 |
| 36.0 | 40.6 | 38.3 | 37.9 | 43.4 | 28.3 | 27.8 | 22.2 | 39.4 | 26.9 | 75.9 | | 27.9 | 35.1 | 35.7 | 36.1 | 28.7 | 31.8 | 26.1 | | 10.5 |
| 34.0 | 46.4 | 36.4 | 31.4 | 55.4 | 30.4 | 26.6 | 21.6 | 28.6 | 29.1 | 75.0 | | 28.9 | 37.9 | 37.3 | 35.3 | 30.1 | 34.0 | 27.0 | | 8.4 |
| 30.4 | 50.9 | 30.6 | 27.4 | 51.0 | 29.4 | 24.4 | 21.8 | 25.3 | 34.3 | 80.0 | | 29.2 | 33.6 | 36.5 | 38.9 | 30.0 | 42.8 | 28.5 | | 7.9 |
| 33.5 | 46.6 | 33.1 | 23.5 | 49.9 | 26.3 | 24.9 | 20.5 | 27.3 | 34.2 | 78.0 | | 30.7 | 37.7 | 37.0 | 33.1 | 30.3 | 39.7 | 28.2 | | 3.4 |
| 33.4 | 30.2 | 28.9 | 26.9 | 56.3 | 22.3 | 22.9 | 20.4 | 26.4 | 32.3 | 86.1 | | 30.4 | 37.7 | 34.4 | 38.2 | 29.5 | 42.2 | 28.6 | | 10.5 |
| 31.3 | 38.1 | 21.1 | 35.0 | 62.7 | 21.7 | 23.5 | 20.5 | 25.9 | 26.8 | 74.7 | | 26.6 | 36.3 | 35.9 | 37.8 | 29.2 | 38.2 | 29.2 | | 15.7 |
| 31.5 | 35.7 | 35.6 | 34.5 | 65.2 | 23.0 | 25.0 | 25.3 | 26.5 | | 77.9 | | 33.7 | 30.9 | 32.2 | 35.9 | 26.1 | 44.6 | 28.3 | | 20.1 |
| 31.0 | 32.0 | 37.0 | 32.8 | 70.9 | 23.7 | 25.0 | 27.5 | 23.9 | | 71.5 | | 31.5 | 34.0 | 33.7 | 35.1 | 24.5 | 45.4 | 30.1 | | 23.4 |
| 27.1 | 31.6 | 37.1 | 37.6 | 68.8 | 22.5 | 23.9 | 32.5 | 24.1 | | 71.6 | | 33.5 | 31.4 | 33.7 | 35.5 | 24.8 | 37.7 | 29.4 | | 25.2 |
| 24.3 | 32.5 | 26.1 | 34.9 | | 23.2 | 23.0 | 29.6 | 25.1 | | 73.0 | | 32.7 | 30.5 | 30.3 | 37.0 | 25.2 | 35.9 | 29.4 | | 25.7 |
| 25.7 | 30.1 | 27.7 | 25.5 | | 23.4 | 23.0 | 31.6 | 26.5 | | 76.8 | | 30.2 | 32.2 | 36.9 | 38.0 | 24.3 | 34.6 | 31.4 | | 27.5 |
| 23.1 | 29.9 | 38.4 | 33.6 | | 22.6 | 22.8 | 24.8 | 32.8 | | 81.2 | | 27.7 | 31.4 | 38.9 | 39.2 | 24.7 | 33.5 | 34.6 | | 31.9 |
| 29.2 | 28.2 | 29.0 | 35.5 | | 23.8 | 26.0 | 31.4 | 38.6 | | 70.5 | | 20.7 | 32.9 | 34.4 | 37.9 | 31.3 | 31.4 | 40.0 | | 28.4 |
| 28.1 | 30.3 | 34.8 | 33.0 | | 22.1 | 23.1 | 37.3 | 29.3 | | 87.3 | | 26.0 | 34.8 | 35.6 | 32.5 | 34.5 | 30.9 | 33.1 | | 28.2 |
| 27.2 | 25.3 | 32.7 | 36.2 | | 20.7 | 22.1 | 43.9 | 26.9 | | 65.8 | | 26.6 | 34.9 | 36.5 | 30.6 | 33.4 | 30.8 | 27.7 | | 24.1 |
| 25.1 | 28.8 | 25.9 | 32.6 | | 21.8 | 20.9 | 32.6 | 29.3 | | 70.8 | | 23.7 | 31.3 | 35.8 | 31.5 | 30.0 | 31.8 | 28.5 | | 15.8 |
| 23.1 | 28.0 | 21.5 | 29.8 | | 23.4 | 21.8 | 24.9 | 25.3 | | 77.5 | | 25.6 | 31.4 | 35.2 | 31.3 | 28.7 | 33.5 | 31.4 | | 17.3 |

| DB18 | DB18 | DB18 | DB18 | DB18 | DB18 | DB18 | DB18 | DB18 | DB19 | DB19 | DB19 | DB19 | DB19 | DB19 | DB19 | DB20 | DB20 | DB20 | DB20 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 19.5 | 14.8 | 26.7 | 5.6 | 11.9 | 6.6 | 16.2 | 20.0 | 24.5 | 47.6 | 20.4 | 32.3 | 20.1 | 27.8 | 24.2 | 25.1 | 42.8 | 17.7 | 4.3 | 61.8 |
| 18.3 | 9.6 | 29.2 | 2.1 | 13.6 | 5.7 | 11.3 | 21.9 | 20.6 | 44.5 | 25.3 | 32.2 | 25.0 | 25.9 | 17.2 | 29.1 | 44.0 | 12.3 | 2.7 | 57.5 |
| 15.5 | 10.7 | 21.2 | 4.7 | 13.7 | 5.4 | 16.2 | 25.4 | 23.7 | 31.2 | 17.9 | 33.4 | 34.9 | 32.6 | 29.6 | 31.4 | 44.3 | 25.8 | 6.2 | 61.2 |
| 15.3 | 8.2 | 14.2 | 6.6 | 20.3 | 8.7 | 14.3 | 23.8 | 23.3 | 27.4 | 21.2 | 34.9 | 35.2 | 35.3 | 31.0 | 39.4 | 41.1 | 30.4 | 13.2 | 61.8 |
| 14.4 | 9.7 | 13.7 | 9.7 | 19.1 | 10.0 | 13.7 | 25.1 |  | 25.6 | 21.8 | 32.2 | 39.0 | 36.6 | 34.6 | 37.1 | 42.1 | 27.7 | 13.4 | 77.8 |
| 13.0 | 11.8 | 14.9 | 15.7 | 16.3 | 13.7 | 17.1 | 23.5 |  | 20.6 | 23.8 | 37.0 | 47.9 | 39.5 | 27.6 | 35.3 | 48.8 | 29.1 | 16.8 | 69.3 |
| 11.2 | 7.7 | 18.0 | 21.3 | 18.6 | 9.7 | 12.5 | 24.7 |  | 13.5 | 20.0 | 37.0 | 47.4 | 34.0 | 30.5 | 35.0 | 52.2 | 32.3 | 17.0 | 55.9 |
| 13.2 | 10.4 | 18.9 | 24.5 | 22.1 | 10.9 | 15.4 | 24.0 |  | 9.0 | 22.1 | 39.4 | 48.3 | 45.6 | 27.0 | 32.1 | 52.6 | 21.3 | 12.2 | 46.3 |
| 13.7 | 10.0 | 18.6 | 19.7 | 20.7 | 13.5 | 14.9 | 23.1 |  | 31.4 | 21.4 | 39.7 | 47.9 | 47.9 | 27.8 | 29.9 | 55.1 | 31.5 | 9.9 | 54.9 |
| 13.8 | 10.4 | 16.1 | 24.5 | 15.6 | 14.9 | 19.4 | 18.7 |  | 37.0 | 21.0 | 41.7 | 55.5 | 49.1 | 17.2 | 26.6 | 53.9 | 36.4 | 9.1 | 55.8 |
| 19.1 | 11.6 | 18.0 | 22.4 | 23.9 | 22.5 | 14.0 | 19.5 |  | 40.2 | 18.4 | 32.8 | 64.6 | 36.7 | 23.2 | 21.8 | 59.1 | 37.6 | 11.0 | 65.1 |
| 20.8 | 12.3 | 21.5 | 24.5 | 27.0 | 23.8 | 16.8 | 22.3 |  | 36.0 | 17.8 | 35.7 | 55.5 | 38.1 | 16.1 | 16.3 | 55.7 | 36.2 | 15.5 | 61.8 |
| 22.5 | 13.6 | 28.8 | 27.0 | 20.4 | 17.2 | 16.6 | 23.0 |  | 17.8 | 16.7 | 33.9 | 59.3 | 38.3 | 22.1 | 18.5 | 56.4 | 37.4 | 20.0 | 62.4 |
| 19.4 | 19.5 | 29.4 | 29.1 | 21.9 | 8.9 | 19.0 | 25.3 |  | 21.8 | 20.0 | 37.6 | 52.4 | 34.7 | 18.5 |  | 55.2 | 36.6 | 21.2 | 65.8 |
| 21.8 | 20.6 | 33.5 | 17.3 | 17.1 | 25.0 | 20.3 | 21.9 |  | 26.9 | 20.3 | 40.4 | 49.0 | 32.8 | 24.7 |  | 55.6 | 33.9 | 19.0 | 65.3 |
| 21.1 | 17.9 | 38.2 | 16.9 | 9.7 | 13.7 | 18.0 | 26.6 |  | 26.9 | 22.6 | 44.2 | 33.6 | 37.1 | 16.2 |  | 54.3 | 39.8 | 12.5 | 57.7 |
| 22.7 | 15.2 | 33.6 | 16.5 | 10.8 | 15.6 | 23.5 | 21.5 |  | 28.8 | 29.6 | 42.7 | 34.1 | 42.0 | 20.4 |  | 51.3 | 40.6 | 24.9 | 56.2 |
| 22.1 | 10.0 | 23.9 | 12.1 | 12.1 | 16.5 | 23.9 | 25.0 |  | 33.8 | 35.9 | 43.9 | 29.7 | 32.9 | 18.1 |  | 54.3 | 42.0 | 25.0 | 40.9 |
| 17.8 | 10.2 | 19.3 | 13.6 | 7.7 | 18.2 | 14.0 | 25.0 |  | 45.5 | 39.5 | 39.2 | 24.4 | 35.2 | 19.6 |  | 59.6 | 39.5 | 16.4 | 32.5 |
| 14.9 | 7.0 | 19.7 | 13.3 | 4.5 | 16.3 | 12.2 | 26.4 |  | 45.6 | 43.6 | 38.2 | 27.1 | 33.1 | 17.6 |  | 56.7 | 40.0 | 25.5 | 29.7 |
| 9.3 | 7.9 | 21.9 | 12.3 | 4.4 | 17.5 | 14.5 | 25.3 |  | 47.8 | 38.4 | 44.8 | 22.8 | 29.0 | 15.8 |  | 54.6 | 46.7 | 25.9 | 29.7 |
| 10.4 | 8.8 | 21.8 | 10.4 | 5.8 | 16.1 | 16.2 | 23.2 |  | 43.3 | 38.9 | 41.0 | 19.8 | 25.1 | 25.5 |  | 43.2 | 44.7 | 25.1 | 28.0 |
| 11.4 | 8.6 | 19.0 | 14.9 | 1.5 | 23.5 | 23.6 | 22.2 |  | 41.0 | 44.8 | 37.1 | 25.4 | 19.3 | 27.2 |  | 48.5 | 38.7 | 26.0 | 24.5 |
| 13.6 | 7.9 | 15.8 | 12.0 | 2.8 | 20.6 | 35.0 | 16.7 |  | 41.0 | 39.1 | 38.3 | 30.7 | 19.8 | 29.3 |  | 54.0 | 42.9 | 27.0 | 26.3 |
| 17.8 | 7.2 | 19.1 | 12.1 | 1.3 | 18.9 | 34.2 | 19.8 |  | 43.5 | 45.2 | 37.1 | 28.0 | 24.6 | 37.1 |  | 47.3 | 49.8 | 31.6 | 30.4 |
| 19.1 | 6.0 | 22.7 | 12.9 | 2.4 | 17.2 | 30.3 | 18.2 |  | 43.3 | 48.1 | 38.7 | 34.4 | 32.6 | 41.9 |  | 54.0 | 50.7 | 43.2 | 21.5 |
| 16.8 | 8.1 | 23.1 | 16.7 | 2.4 | 15.2 | 24.7 | 23.5 |  | 43.8 | 50.0 | 47.3 | 38.2 | 25.3 | 39.5 |  | 55.4 | 25.4 | 48.9 | 20.9 |
| 14.8 | 10.4 | 13.3 | 16.3 | 9.1 | 15.1 | 19.3 | 15.2 |  | 42.7 | 57.4 | 53.1 | 33.8 | 31.2 | 39.8 |  | 58.0 | 26.6 | 49.3 | 14.7 |
| 9.8 | 12.8 | 6.9 | 11.6 | 7.7 | 20.3 | 28.5 | 21.6 |  | 41.1 | 57.1 | 40.4 | 33.5 | 36.1 | 37.3 |  | 49.2 | 31.1 | 56.4 | 12.6 |
| 9.3 | 15.6 | 13.6 | 12.5 | 3.8 | 22.8 | 17.9 | 22.7 |  | 43.0 | 58.6 | 42.2 | 31.6 | 35.0 | 43.0 |  | 49.0 | 38.4 | 60.3 | 12.8 |
| 10.3 | 17.8 | 17.6 | 14.8 | 1.8 | 16.2 | 20.0 | 19.3 |  | 40.4 | 60.5 | 57.3 | 29.2 | 31.6 | 42.1 |  | 48.4 | 47.9 | 65.4 | 8.5 |
| 13.3 | 26.7 | 16.6 | 7.8 | 1.4 | 15.7 | 26.2 | 19.4 |  | 44.1 | 63.8 | 57.7 | 39.6 | 25.0 | 33.4 |  | 47.4 | 47.3 | 61.6 | 8.4 |
| 18.1 | 14.4 | 14.7 | 5.7 | 1.3 | 15.9 | 21.2 | 18.0 |  | 48.3 | 65.0 | 55.3 | 32.4 | 25.7 | 20.1 |  | 45.3 | 37.7 | 58.8 | 3.9 |
| 14.5 | 14.2 | 13.1 | 13.7 | 5.3 | 17.4 | 24.3 | 19.0 |  | 48.9 | 60.8 | 53.7 | 33.9 | 38.0 | 21.1 |  | 48.3 | 44.4 | 70.9 | 7.2 |
| 16.9 | 13.4 | 14.8 | 21.4 | 5.0 | 14.2 | 21.1 | 15.9 |  | 50.5 | 61.9 | 57.4 | 24.7 | 28.7 | 23.4 |  | 48.7 | 46.0 | 66.0 | 9.1 |
| 17.9 | 12.3 | 21.7 | 27.7 | 6.2 | 14.2 | 20.5 | 19.6 |  | 48.6 | 57.6 | 56.3 | 16.9 | 30.4 | 23.2 |  | 47.0 | 51.0 | 72.0 | 9.5 |
| 16.1 | 8.5 | 17.5 | 27.9 | 0.8 | 13.1 | 15.6 | 20.2 |  | 46.9 | 58.0 | 60.1 | 14.9 | 25.6 | 28.2 |  | 45.8 | 50.6 | 77.2 | 19.0 |
| 15.6 | 10.0 | 14.9 | 21.8 | 10.6 | 14.4 | 26.7 | 21.1 |  | 42.8 | 58.9 | 60.6 | 21.4 | 30.0 | 38.5 |  | 45.4 | 42.5 | 77.3 | 21.3 |
| 11.8 | 11.9 | 18.5 | 14.1 | 4.0 | 15.7 | 17.2 | 27.4 |  | 46.0 | 65.1 | 60.7 | 19.6 | 27.7 | 49.6 |  | 47.3 | 44.4 | 78.8 | 46.3 |
| 13.6 | 13.4 | 16.3 | 10.8 | 10.4 | 18.7 | 15.0 | 27.7 |  | 45.4 | 61.4 | 59.1 | 21.4 | 25.7 | 50.3 |  | 48.4 | 43.7 | 72.0 | 45.3 |
| 15.8 | 9.8 | 11.0 | 11.6 | 10.6 | 19.1 | 15.2 | 23.4 |  | 38.9 | 55.9 | 55.3 | 26.3 | 26.3 | 36.1 |  | 39.0 | 48.6 | 66.5 | 47.1 |
| 17.6 | 9.3 | 10.1 | 8.4 | 10.3 | 24.4 | 10.0 | 35.2 |  | 42.8 | 60.4 | 57.1 | 24.7 | 30.4 | 43.5 |  | 34.0 | 40.5 | 72.9 | 51.6 |
| 23.7 | 10.2 | 10.7 | 12.2 | 8.6 | 23.8 | 18.5 | 26.8 |  | 36.8 | 56.3 | 55.8 | 35.4 | 38.8 | 36.7 |  | 38.5 | 39.3 | 74.2 | 60.9 |
| 21.6 | 14.4 | 8.6 | 16.1 | 7.8 | 17.2 | 13.8 | 25.0 |  | 31.6 | 57.0 | 52.3 | 33.3 | 31.3 | 40.4 |  | 30.5 | 39.1 | 72.7 | 55.3 |
| 17.8 | 17.2 | 9.2 | 14.8 | 4.2 | 12.9 | 33.9 | 23.8 |  | 21.8 | 55.6 | 49.4 | 38.3 | 34.1 | 41.0 |  | 27.5 | 41.1 | 68.9 | 48.9 |
| 17.7 | 18.4 | 7.8 | 20.9 | 9.7 | 14.0 | 13.5 | 19.6 |  | 18.7 | 53.6 | 53.8 | 33.8 | 41.2 | 35.6 |  | 29.1 | 36.4 | 66.8 | 29.7 |
| 21.4 | 15.9 | 9.6 | 24.6 | 4.4 | 15.7 | 10.7 | 22.4 |  | 18.1 | 52.1 | 49.6 | 25.1 | 30.8 | 33.4 |  | 32.5 | 38.0 | 62.3 | 26.8 |
| 22.5 | 17.1 | 16.6 | 14.3 | 6.0 | 13.1 | 15.9 | 19.6 |  | 15.5 | 49.3 | 50.2 | 14.6 | 36.5 | 38.9 |  | 37.8 | 37.1 | 63.0 | 22.2 |
| 16.2 | 20.7 | 19.4 | 9.7 | 8.9 | 17.3 | 28.3 | 15.2 |  | 15.3 | 46.1 | 48.7 | 16.6 | 29.2 | 47.1 |  | 37.7 | 38.5 | 65.0 | 21.3 |
| 11.2 | 22.0 | 23.2 | 11.8 | 8.1 | 17.2 | 20.8 | 12.8 |  | 16.2 | 45.1 | 50.6 | 20.3 | 35.4 | 50.7 |  | 39.6 | 42.6 | 66.9 | 20.3 |
| 11.0 | 17.9 | 19.1 | 8.9 | 8.0 | 16.6 | 24.9 | 14.3 |  | 15.8 | 48.7 | 46.1 | 16.6 | 24.8 | 49.8 |  | 42.8 | 42.6 | 58.8 | 16.7 |
| 9.2 | 18.5 | 18.9 | 8.3 | 10.3 | 15.1 | 14.9 | 20.0 |  | 19.4 | 49.4 | 48.0 | 18.6 | 22.4 | 37.0 |  | 43.1 | 38.9 | 62.5 | 28.7 |
| 7.3 | 17.4 | 18.8 | 12.1 | 5.9 | 14.7 | 21.8 | 16.1 |  | 21.1 | 46.9 | 46.7 | 26.3 | 22.1 | 44.0 |  | 43.2 | 36.3 | 64.4 | 29.3 |
| 6.8 | 16.8 | 10.5 | 11.0 | 7.1 | 15.0 | 10.8 | 17.3 |  | 19.5 | 45.8 | 38.8 | 20.2 | 27.2 | 43.5 |  | 45.6 | 32.4 | 67.1 | 24.6 |
| 7.5 | 7.7 | 11.2 | 12.6 | 5.5 | 11.1 | 10.1 | 17.3 |  | 23.3 | 41.2 | 43.2 | 22.1 | 34.7 | 34.4 |  | 43.0 | 32.1 | 67.7 | 22.8 |
| 8.7 | 18.2 | 11.1 | 8.3 | 7.3 | 14.0 | 12.4 | 17.1 |  | 19.8 | 44.6 | 43.5 | 20.5 | 37.8 | 38.0 |  | 43.9 | 33.3 | 65.8 | 24.6 |
| 11.3 | 20.5 | 18.5 | 10.4 | 8.3 | 21.3 | 14.8 | 17.4 |  | 15.6 | 33.1 | 21.8 | 31.1 | 32.3 | 33.2 |  | 34.6 | 25.1 | 62.9 | 58.3 |
| 4.3 | 16.2 | 8.3 | 12.4 | 8.4 | 31.9 | 12.5 | 18.0 |  | 18.2 | 27.3 | 21.2 | 29.6 | 34.2 | 40.4 |  | 24.2 | 22.6 | 46.8 | 54.1 |
| 16.6 | 11.3 | 9.1 | 5.9 | 10.1 | 29.6 | 13.4 | 18.6 |  | 18.2 | 32.9 | 19.9 | 28.6 | 39.7 | 34.5 |  | 30.5 | 22.3 | 61.8 | 46.6 |
| 17.1 | 12.6 | 11.9 | 6.0 | 15.5 | 24.5 | 16.1 | 20.2 |  | 16.4 | 30.1 | 15.6 | 37.6 | 23.1 | 37.4 |  | 31.2 | 17.6 | 59.1 | 71.1 |
| 17.3 | 17.8 | 4.9 | 10.0 | 9.6 | 25.7 | 16.0 | 27.4 |  | 25.4 | 28.1 | 34.9 | 37.9 | 24.2 | 14.8 |  | 35.9 | 14.9 | 58.0 | 63.2 |
| 18.0 | 17.5 | 5.6 | 16.1 | 13.9 | 22.2 | 15.8 | 31.1 |  | 22.5 | 29.8 | 34.8 | 31.2 | 26.3 | 43.9 |  | 35.3 | 14.0 | 50.9 | 59.1 |
| 23.5 | 15.7 | 10.6 | 16.0 | 12.2 | 24.3 | 15.3 | 26.3 |  | 25.3 | 28.1 | 40.9 | 35.9 | 25.2 | 41.2 |  | 28.3 | 13.1 | 61.6 | 54.5 |
| 17.4 | 24.8 | 13.6 | 12.4 | 19.1 | 22.0 | 16.0 | 26.4 |  | 24.8 | 29.6 | 41.5 | 20.2 | 20.2 | 37.6 |  | 32.1 | 11.2 | 67.2 | 82.0 |
| 29.2 | 26.7 | 18.5 | 8.2 | 19.8 | 24.5 | 15.7 | 29.9 |  | 21.7 | 28.1 | 31.2 | 21.7 | 22.9 | 47.0 |  | 25.5 | 18.8 | 67.7 | 61.5 |
| 27.8 | 26.6 | 20.3 | 11.8 | 21.5 | 19.4 | 11.5 | 25.2 |  | 20.8 | 28.1 | 13.6 | 22.4 | 21.1 | 48.3 |  | 22.4 | 21.8 | 64.1 | 70.7 |
| 22.6 | 29.8 | 24.0 | 9.0 | 20.0 | 21.5 | 11.0 | 33.0 |  | 21.1 | 26.9 | 17.7 | 22.0 | 38.2 | 42.8 |  | 26.9 | 18.6 | 69.3 | 72.4 |
| 15.7 | 30.6 | 19.7 | 9.9 | 11.0 | 24.5 | 15.2 | 26.2 |  | 26.7 | 29.2 | 11.9 | 22.8 | 22.3 | 38.2 |  | 24.5 | 14.0 | 54.2 | 75.3 |
| 16.1 | 32.9 | 15.5 | 10.3 | 6.6 | 25.7 | 18.8 | 23.2 |  | 29.8 | 33.7 | 11.1 | 15.1 | 16.5 | 33.8 |  | 27.8 | 15.3 | 46.9 | 68.4 |
| 18.0 | 35.7 | 19.5 | 14.0 | 6.8 | 29.0 | 24.4 | 22.8 |  | 26.5 | 32.8 | 7.6 | 17.9 | 27.1 | 37.7 |  | 24.2 | 7.4 | 55.5 | 67.9 |
| 18.7 | 37.4 | 15.2 | 13.6 | 13.7 | 26.4 | 22.4 | 20.9 |  | 26.0 | 28.7 | 25.5 | 16.4 | 30.4 | 31.8 |  | 29.7 | 7.5 | 48.9 | 74.3 |
| 17.4 | 33.0 | 10.0 | 9.6 | 7.0 | 24.0 | 17.3 | 21.3 |  | 25.9 | 25.3 | 28.7 | 21.8 | 30.7 | 26.2 |  | 34.4 | 2.4 | 54.8 | 79.4 |
| 14.3 | 24.0 | 3.3 | 8.6 | 12.8 | 21.1 | 22.3 | 22.3 |  | 24.8 | 26.7 | 21.4 | 27.8 | 33.5 | 22.3 |  | 35.4 | 3.5 | 53.3 | 74.0 |

| DB20 | DB21 | DB21 | DB21 | DB21 | DB21 | DB21 | DB22 | DB22 | DB22 | DB22 | DB23 | DB23 | DB23 | DB23 | DB23 | DB23 | DB23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 78.3 | 29.1 | 27.7 | 15.7 | 27.6 | 33.3 | 26.9 | 41.6 | 23.6 | 32.4 | 43.4 | 30.8 | 14.5 | 14.6 | 34.8 | 21.5 | 23.8 | 37.7 |
| 67.4 | 27.8 | 26.8 | 16.5 | 33.5 | 28.8 | 30.3 | 38.8 | 25.6 | 30.4 | 48.4 | 26.8 | 14.3 | 13.3 | 32.8 | 40.4 | 21.8 | 41.2 |
| 68.2 | 26.5 | 27.0 | 15.1 | 48.8 | 25.0 | 22.1 | 33.3 | 29.3 | 26.8 | 51.5 | 20.8 | 15.8 | 12.4 | 39.7 | 52.7 | 31.4 | 37.3 |
| 65.0 | 31.4 | 27.1 | 17.3 | 40.6 | 20.1 | 25.2 | 25.2 | 31.4 | 24.2 | 47.7 | 17.7 | 13.6 | 12.7 | 31.9 | 49.6 | 32.0 | 37.4 |
| 17.3 | 36.0 | 30.7 | 18.0 | 38.1 | 19.6 | 28.3 | 27.2 | 30.3 | 34.6 | 38.6 | 17.0 | 14.2 | 11.9 | 25.2 | 33.1 | 35.7 | 29.6 |
| 51.2 | 28.5 | 33.9 | 17.5 | 40.4 | 26.7 | 36.6 | 31.8 | 31.4 | 35.4 | 41.0 | 15.2 | 14.4 | 13.5 | 27.7 | 35.2 | 28.4 | 30.4 |
| 60.5 | 26.5 | 34.2 | 19.6 | 67.3 | 28.5 | 19.7 | 34.9 | 12.6 | 40.4 | 35.3 | 13.7 | 15.4 | 13.1 | 28.3 | 31.9 | 26.3 | 28.7 |
| 55.1 | 22.4 | 36.9 | 20.5 | 47.6 | 31.1 | 23.2 | 37.8 | 8.9 | 37.7 | 35.4 | 11.9 | 18.1 | 11.9 | 24.1 | 30.3 | 27.7 | 29.3 |
| 60.4 | 33.9 | 39.3 | 20.3 | 40.5 | 26.6 | 34.9 | 39.4 | 18.8 | 33.2 | 35.9 | 10.2 | 18.4 | 11.7 | 20.2 | 28.6 | 18.4 | 30.1 |
| 55.8 | 25.6 | 39.7 | 21.0 | 41.2 | 21.6 | 38.5 | 34.5 | 10.0 | 40.0 | 33.5 | 11.8 | 19.7 | 12.0 | 29.8 | 22.8 | 22.0 | 25.9 |
| 62.7 | 28.2 | 38.1 | 21.4 | 41.9 | 25.6 | 33.8 | 38.5 | 21.0 | 40.2 | 39.6 | 14.6 | 23.2 | 11.9 | 23.2 | 14.0 | 23.0 | 30.8 |
| 64.2 | 29.7 | 38.4 | 19.7 | 44.3 | 32.2 | 28.9 | 26.6 | 25.5 | 40.4 | 28.6 | 12.1 | 27.5 | 13.1 | 17.4 | 14.6 | 26.5 | 24.5 |
| 62.3 | 27.0 | 38.0 | 22.4 | 42.9 | 33.8 | 22.3 | 41.8 | 28.2 | 42.5 | 28.1 | 18.3 | 27.1 | 12.0 | 19.6 | 19.9 | 28.8 | 36.2 |
|  | 28.5 | 38.0 | 19.7 | 46.0 | 45.4 | 25.4 | 45.3 | 17.0 | 36.7 | 29.3 | 23.2 | 30.2 | 11.9 | 25.3 | 23.3 | 31.3 | 27.8 |
|  | 26.8 | 37.3 | 19.3 | 44.2 | 48.7 | 24.4 | 50.1 | 8.1 | 40.2 | 28.6 | 15.0 | 31.2 | 17.9 | 27.2 | 19.1 | 34.8 | 36.5 |
|  | 26.4 | 41.4 | 19.9 | 41.7 | 46.6 | 25.5 | 54.5 | 12.3 | 41.4 | 19.8 | 14.2 | 30.1 | 23.9 | 29.2 | 23.2 | 38.8 | 35.4 |
|  | 25.4 | 36.7 | 20.9 | 45.3 | 37.5 | 25.8 | 52.7 | 21.1 | 17.3 | 26.4 | 18.5 | 30.2 | 24.8 | 28.6 | 14.2 | 32.8 |  |
|  | 24.3 | 37.1 | 24.5 | 43.7 | 34.9 | 18.0 | 56.4 | 18.0 | 34.6 | 27.4 | 18.1 | 27.1 | 24.9 | 30.4 | 16.9 | 37.4 |  |
|  | 23.3 | 36.1 | 27.3 | 33.7 | 31.4 | 18.8 | 62.8 | 12.5 | 35.0 | 20.4 | 19.9 | 29.3 | 26.3 | 36.8 | 26.4 | 38.8 |  |
|  | 21.1 | 37.0 | 26.8 | 26.4 | 36.5 | 28.9 | 74.6 | 12.8 | 37.1 | 13.1 | 21.6 | 26.2 | 26.6 | 41.8 | 26.9 | 29.3 |  |
|  | 24.2 | 38.4 | 28.4 | 24.7 | 26.8 | 18.4 | 75.5 | 20.1 | 37.9 | 39.8 | 22.4 | 27.5 | 24.9 | 46.5 | 30.7 | 25.3 |  |
|  | 20.7 | 38.5 | 28.3 | 25.8 | 26.8 | 34.8 | 76.1 | 27.9 | 38.5 | 45.4 | 22.7 | 19.7 | 25.5 | 41.2 | 29.5 | 20.1 |  |
|  | 21.4 | 41.5 | 31.3 | 18.4 | 29.4 | 40.6 | 69.0 | 27.5 | 36.8 | 43.0 | 23.6 | 17.8 | 25.5 | 48.3 | 31.7 | 14.4 |  |
|  | 20.8 | 39.5 | 34.4 | 15.7 | 32.0 | 31.3 | 62.0 | 13.7 | 36.5 | 39.2 | 25.0 | 19.4 | 25.6 | 32.4 | 36.7 | 13.1 |  |
|  | 19.4 | 40.2 | 35.4 | 16.2 | 29.6 | 20.9 | 45.0 | 14.7 | 28.6 | 41.7 | 17.4 | 17.1 | 26.6 | 22.6 | 36.2 | 16.2 |  |
|  | 20.9 | 41.7 | 35.4 | 24.3 | 37.0 | 16.4 | 54.8 | 26.9 | 31.7 | 54.4 | 19.2 | 19.9 | 28.0 | 18.1 | 58.3 | 14.5 |  |
|  | 20.2 | 44.3 | 35.8 | 27.0 | 42.7 | 20.3 | 37.4 | 26.1 | 38.2 | 45.2 | 21.2 | 21.1 | 26.9 | 24.1 | 52.3 | 17.7 |  |
|  | 19.6 | 38.6 | 34.3 | 15.2 | 33.7 | 18.2 | 48.6 | 21.9 | 36.6 | 45.9 | 25.5 | 24.4 | 27.8 | 18.3 | 42.4 | 20.6 |  |
|  | 17.6 | 39.3 | 30.3 | 17.5 | 36.7 | 15.8 | 49.0 | 26.4 | 28.5 | 51.6 | 37.7 | 25.4 | 26.6 | 26.0 | 39.1 | 23.2 |  |
|  | 18.1 | 39.7 | 30.9 | 12.5 | 37.5 | 24.9 | 44.1 | 28.5 | 36.0 | 40.4 | 42.3 | 25.2 | 26.7 | 33.3 | 45.1 | 33.2 |  |
|  | 16.4 | 33.2 | 28.9 | 12.7 | 33.4 | 16.3 | 41.9 | 19.7 | 34.3 | 54.4 | 45.6 | 19.9 | 26.6 | 31.2 | 46.3 | 25.9 |  |
|  | 19.7 | 31.5 | 30.8 | 16.3 | 25.2 | 16.1 | 34.2 | 30.0 | 34.8 | 51.3 | 47.8 | 24.4 | 27.3 | 40.0 | 50.9 | 14.6 |  |
|  | 19.1 | 33.9 | 31.4 | 21.8 | 8.3 | 17.4 | 42.2 | 36.3 | 41.9 | 46.7 | 45.0 | 22.0 | 27.2 | 40.4 | 54.0 | 32.7 |  |
|  | 20.0 | 32.8 | 30.6 | 27.2 | 8.9 | 14.2 | 38.4 | 38.9 | 38.0 | 51.5 | 47.5 | 22.4 | 28.3 | 38.4 | 51.2 | 44.6 |  |
|  | 22.6 | 31.0 | 29.4 | 18.3 | 13.9 | 16.1 | 42.0 | 38.2 | 33.8 | 50.2 | 44.2 | 25.9 | 27.5 | 46.3 | 45.2 | 33.7 |  |
|  | 23.8 | 30.5 | 32.5 | 14.4 | 18.7 | 17.8 | 44.2 | 38.3 | 35.7 | 27.9 | 36.3 | 28.2 | 28.5 | 48.3 | 49.7 | 39.4 |  |
|  | 22.9 | 33.3 | 30.3 | 10.4 | 26.9 | 21.7 | 43.7 | 38.0 | 45.2 | 51.9 | 35.6 | 30.9 | 26.8 | 41.2 | 57.1 | 39.9 |  |
|  | 23.6 | 36.8 | 26.5 | 20.5 | 29.9 | 24.7 | 42.8 | 36.4 | 39.2 | 51.0 | 31.7 | 35.6 | 26.6 | 41.8 | 56.5 | 29.3 |  |
|  | 23.5 | 38.7 | 27.2 | 22.3 | 30.5 | 32.9 | 42.2 | 29.1 | 45.6 | 41.4 | 30.1 | 32.6 | 25.7 | 31.7 | 46.9 | 33.0 |  |
|  | 23.5 | 37.5 | 26.3 | 14.7 | 24.5 | 29.6 | 49.6 | 30.8 | 39.0 | 40.5 | 26.7 | 31.7 | 24.6 | 20.7 | 39.8 | 39.7 |  |
|  | 23.7 | 38.2 | 33.2 | 17.3 | 22.8 | 23.9 | 48.9 | 33.3 | 46.4 | 21.5 | 25.6 | 29.3 | 24.1 | 22.6 | 33.9 | 25.7 |  |
|  | 25.5 | 36.7 | 35.9 | 15.1 | 21.7 | 25.7 | 46.4 | 36.7 | 36.7 | 57.3 | 23.8 | 31.7 | 23.9 | 26.4 | 39.8 | 28.3 |  |
|  | 27.4 | 35.7 | 39.2 | 20.6 | 16.9 | 42.4 | 45.6 | 32.0 | 47.9 | 36.2 | 27.7 | 32.3 | 23.0 | 41.6 | 31.3 | 29.1 |  |
|  | 26.5 | 37.0 | 39.0 | 28.4 | 17.0 | 35.3 | 38.3 | 33.2 | 46.2 | 34.2 | 20.9 | 32.0 | 23.8 | 37.0 | 35.6 | 31.1 |  |
|  | 22.5 | 37.9 | 36.1 | 35.5 | 19.4 | 40.9 | 42.7 | 32.2 | 46.1 | 34.5 | 19.4 | 28.9 | 26.6 | 28.0 | 38.6 | 22.9 |  |
|  | 24.1 | 34.7 | 37.9 | 36.1 | 14.5 | 38.5 | 52.4 | 30.5 | 45.1 | 54.0 | 21.7 | 29.8 | 24.9 | 29.9 | 50.0 | 19.1 |  |
|  | 23.2 | 39.4 | 36.5 | 34.1 | 14.2 | 38.4 | 29.6 | 34.9 | 43.6 | 46.7 | 20.8 | 24.0 | 24.2 | 21.8 | 45.8 | 25.7 |  |
|  | 25.6 | 37.4 | 36.6 | 37.7 | 10.4 | 32.4 | 17.7 | 21.6 | 43.7 | 16.5 | 20.3 | 29.0 | 26.2 | 20.9 | 44.4 | 15.1 |  |
|  | 25.9 | 37.3 | 30.6 | 33.0 | 17.5 | 15.7 | 16.3 | 13.3 | 42.9 | 37.8 | 26.2 | 25.8 | 25.2 | 27.4 | 45.2 | 19.7 |  |
|  | 25.4 | 37.6 | 25.4 | 44.4 | 20.7 | 13.9 | 20.9 | 18.7 | 41.6 | 49.5 | 29.9 | 27.1 | 23.7 | 40.6 | 35.0 | 20.2 |  |
|  | 23.8 | 35.7 | 32.7 | 40.9 | 23.3 | 25.3 | 30.4 | 15.5 | 48.3 | 31.0 | 31.6 | 28.3 | 21.2 | 25.6 | 26.9 | 16.1 |  |
|  | 23.4 | 31.5 | 37.5 | 32.8 | 21.8 | 34.9 | 27.3 | 39.2 | 51.4 | 20.0 | 26.0 | 21.2 | 21.2 | 21.0 | 22.5 | 21.3 |  |
|  | 23.9 | 25.8 | 35.7 | 28.4 | 23.2 | 42.9 | 34.5 | 42.9 | 49.8 | 39.2 | 27.4 | 19.4 | 28.6 | 14.9 | 25.7 | 16.3 |  |
|  | 21.7 | 26.0 | 38.5 | 28.9 | 21.2 | 48.4 | 32.0 | 41.1 | 54.0 | 41.0 | 27.6 | 23.8 | 26.0 | 19.2 | 25.1 | 15.2 |  |
|  | 32.0 | 25.0 | 36.8 | 28.1 | 25.1 | 48.7 | 32.7 | 33.8 | 51.5 | 41.4 | 25.6 | 22.4 | 23.8 | 17.3 | 25.7 | 16.5 |  |
|  | 35.6 | 21.1 | 31.2 | 17.8 | 18.1 | 33.6 | 34.9 | 17.4 | 43.7 | 40.2 | 23.2 | 27.7 | 22.1 | 18.4 | 27.2 | 29.0 |  |
|  | 29.7 | 20.4 | 22.1 | 16.6 | 13.7 | 24.2 | 37.7 | 21.0 | 41.1 | 41.6 | 27.4 | 29.8 | 25.7 | 18.3 | 29.3 | 30.0 |  |
|  | 30.5 | 19.6 | 22.4 | 23.5 | 10.0 | 31.7 | 37.6 | 33.0 | 41.6 | 33.6 | 24.3 | 19.5 | 26.5 | 20.2 | 29.8 | 24.1 |  |
|  | 28.3 | 20.9 | 16.9 | 26.2 | 14.8 | 34.0 | 31.7 | 35.7 | 35.9 |  | 21.0 | 20.0 | 32.4 | 11.0 | 27.8 | 17.0 |  |
|  | 31.9 | 22.5 | 22.6 | 24.2 | 10.1 | 28.6 | 24.9 | 32.3 | 42.9 |  | 21.1 | 22.6 | 30.1 | 17.5 | 24.1 | 15.7 |  |
|  | 32.1 | 26.8 | 21.7 | 18.6 | 8.4 | 31.5 | 13.9 | 28.0 | 51.8 |  | 19.3 | 20.3 | 20.8 | 23.4 | 24.6 | 30.8 |  |
|  | 32.0 | 28.6 | 27.3 | 22.6 | 20.3 |  | 11.0 | 26.7 | 44.3 |  | 18.4 | 19.0 | 22.9 | 25.0 | 28.1 | 31.3 |  |
|  | 28.4 | 30.7 | 20.9 | 26.8 | 19.4 |  | 14.9 | 20.8 | 62.6 |  | 20.5 | 21.7 | 28.0 | 29.2 | 23.5 | 24.2 |  |
|  | 34.7 | 26.6 | 27.3 | 21.8 | 23.4 |  | 2.7 | 24.5 | 46.8 |  | 17.1 | 18.8 | 29.6 | 30.7 | 22.3 | 26.6 |  |
|  | 33.5 | 25.6 | 28.5 | 27.6 | 33.6 |  | 11.2 | 27.8 | 46.8 |  | 17.3 | 15.7 | 29.4 | 40.0 | 20.0 | 29.3 |  |
|  | 28.7 | 23.7 | 24.1 | 20.3 | 39.1 |  | 20.1 | 31.8 | 25.8 |  | 16.6 | 16.2 | 21.8 | 34.0 | 17.3 | 31.7 |  |
|  | 31.1 | 20.4 | 23.3 | 25.2 | 33.8 |  | 18.1 | 32.7 | 34.9 |  | 15.7 | 13.6 | 14.2 | 23.3 | 17.0 | 34.3 |  |
|  | 35.0 | 21.3 | 23.1 | 24.0 | 29.8 |  | 15.5 | 32.1 | 46.3 |  | 16.1 | 17.6 | 13.2 | 21.9 | 18.4 | 35.9 |  |
|  | 30.4 | 20.9 | 23.8 | 23.2 | 26.5 |  | 17.4 | 33.2 | 38.4 |  | 15.5 | 15.0 | 15.8 | 38.2 | 21.5 | 37.6 |  |
|  | 27.6 | 21.1 | 39.3 | 30.2 | 26.4 |  | 18.9 | 34.3 | 26.2 |  | 16.0 | 19.4 | 31.3 | 37.4 | 40.5 | 40.5 |  |
|  | 28.5 | 22.1 | 39.8 | 35.1 | 24.7 |  | 12.5 | 31.8 | 32.1 |  | 16.6 | 16.1 | 37.7 | 35.5 | 20.5 | 32.2 |  |
|  | 26.1 | 19.9 | 45.0 | 40.9 | 28.7 |  | 28.1 | 30.3 | 32.1 |  | 13.9 | 18.8 | 46.3 | 24.7 | 36.0 | 31.2 |  |
|  | 26.7 | 19.0 | 33.4 | 36.4 | 45.4 |  | 26.9 | 32.9 | 41.8 |  | 13.7 | 14.5 | 45.9 | 22.7 | 26.3 | 39.2 |  |

| DB24 | DB24 | DB24 | DB24 | DB24 | DB24 | DB25 | DB25 | DB25 | DB25 | DB25 | DB26 | DB26 | DB26 | DB26 | DB26 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72.4 | 69.7 | 30.3 | 46.1 | 16.5 | 57.1 | 53.7 | 53.9 | 47.5 | 57.0 | 57.4 | 32.1 | 36.9 | 47.5 | 47.6 | 30.8 |
| 76.6 | 61.6 | 29.4 | 50.3 | 8.6 | 41.6 | 59.2 | 45.4 | 37.2 | 46.5 | 45.7 | 35.2 | 22.4 | 38.6 | 46.4 | 24.3 |
| 74.2 | 60.0 | 26.6 | 55.9 | 9.1 | 47.6 | 51.5 | 43.0 | 52.2 | 43.4 | 45.4 | 26.7 | 37.8 | 46.8 | 49.6 | 24.5 |
| 75.4 | 63.7 | 29.9 | 41.3 | 9.1 | 41.0 | 53.2 | 32.9 | 48.1 | 45.1 | 40.7 | 32.6 | 32.0 | 45.5 | 41.1 | 28.9 |
| 66.3 | 54.2 | 25.1 | 42.4 | 34.8 | 47.0 | 45.1 | 34.0 | 50.5 | 38.9 | 43.7 | 29.9 | 30.8 | 42.6 | 44.7 | 27.0 |
| 74.2 | 59.4 | 26.7 | 40.0 | 33.8 | 61.3 | 46.8 | 25.7 | 60.7 | 32.3 | 57.8 | 30.3 | 33.5 | 46.1 | 44.2 | 37.5 |
| 75.7 | 60.7 | 26.1 | 26.2 | 51.4 | 30.6 | 41.6 | 32.3 | 58.6 | 36.0 |  | 35.4 | 28.5 | 47.5 | 52.2 | 30.8 |
| 79.8 | 56.7 | 28.0 | 37.2 | 76.8 | 50.1 | 41.2 | 41.6 | 59.8 | 35.9 |  | 23.0 | 30.1 | 49.9 | 49.2 | 33.9 |
| 72.6 | 39.3 | 21.5 | 11.0 | 35.1 | 45.6 | 44.9 | 38.7 | 57.4 | 38.1 |  | 30.6 | 32.1 | 47.2 | 51.2 | 30.0 |
| 71.9 | 62.7 | 28.7 | 12.0 | 61.6 | 48.7 | 42.4 | 34.3 | 57.6 | 37.2 |  | 31.0 | 28.4 | 48.2 | 53.6 | 33.8 |
| 70.3 | 65.1 | 32.7 | 12.5 | 60.2 | 43.2 | 48.0 | 27.4 | 56.3 | 41.8 |  | 26.7 | 23.0 | 46.2 | 42.5 | 36.0 |
| 76.7 | 60.1 | 33.2 | 39.8 | 57.2 | 59.3 | 36.4 | 27.4 | 60.6 | 41.3 |  | 25.1 | 19.6 | 42.6 | 52.8 | 32.7 |
| 74.1 | 58.7 | 37.4 | 22.2 | 53.0 | 43.3 | 36.4 | 35.4 | 58.5 | 41.2 |  | 27.9 | 18.6 | 43.0 | 53.9 | 35.7 |
| 67.6 | 61.8 | 45.1 | 23.8 | 55.6 | 37.1 | 35.3 | 32.1 | 59.6 | 36.1 |  | 29.9 | 23.9 | 50.6 | 53.3 | 26.6 |
| 71.1 | 70.2 | 33.2 | 17.3 | 63.1 | 33.0 | 37.5 | 31.3 | 59.8 | 31.2 |  | 32.1 | 21.6 | 50.2 | 56.0 | 28.8 |
| 70.9 | 73.7 | 39.1 | 19.6 | 62.8 | 30.3 | 43.8 | 29.3 | 55.3 | 33.7 |  | 26.7 | 19.1 | 49.0 | 60.3 | 28.8 |
| 68.2 | 68.6 | 39.2 | 33.2 | 60.4 | 41.9 | 44.7 | 28.6 | 54.2 | 41.3 |  | 17.9 | 28.5 | 45.8 | 60.9 | 32.9 |
| 77.4 | 74.8 | 46.1 | 31.3 | 85.1 | 39.2 | 50.1 | 25.9 | 53.1 | 38.1 |  | 28.1 | 35.7 | 39.2 | 64.4 | 27.4 |
| 73.9 | 92.6 | 44.4 | 29.0 | 60.1 | 49.5 | 41.4 | 30.7 | 54.7 | 47.4 |  | 24.8 | 32.3 | 42.2 | 67.0 | 29.7 |
| 69.6 | 89.2 | 42.3 | 29.3 | 52.2 | 46.6 | 43.6 | 34.4 | 58.0 | 49.5 |  | 22.7 | 36.1 | 42.3 | 63.0 | 25.4 |
| 83.1 | 84.3 | 43.6 | 27.2 | 47.4 | 51.3 | 42.1 | 37.7 | 59.9 | 48.9 |  | 27.8 | 32.7 | 42.6 | 65.5 | 35.4 |
| 62.2 | 68.0 | 27.2 | 14.0 | 33.7 | 39.0 | 36.0 | 32.9 | 63.2 | 47.5 |  | 29.7 | 27.2 | 43.4 | 62.8 | 29.3 |
| 73.9 | 78.8 | 47.3 | 16.7 | 55.5 | 18.1 | 47.5 | 22.1 | 60.0 | 50.3 |  | 33.7 | 28.7 | 42.7 | 49.2 | 35.4 |
| 71.2 | 73.8 | 41.9 | 9.2 | 63.9 | 26.1 | 48.9 | 21.7 | 57.8 | 47.8 |  | 23.7 | 19.0 | 42.4 | 50.1 | 38.4 |
| 70.0 | 55.2 | 45.3 | 18.3 | 59.7 | 45.0 | 49.6 | 21.1 | 53.8 | 45.0 |  | 28.1 | 25.8 | 47.4 | 63.9 | 40.1 |
| 82.0 | 59.4 | 47.1 | 20.9 | 56.4 | 44.0 | 47.5 | 23.1 | 52.7 | 49.5 |  | 33.0 | 20.1 | 44.1 | 68.7 | 37.2 |
| 71.3 | 55.4 | 48.6 | 21.6 | 66.1 | 59.5 | 41.9 | 22.5 | 53.7 | 42.8 |  | 22.4 | 28.4 | 43.6 | 59.0 | 39.9 |
| 63.3 | 60.5 | 57.0 | 10.4 | 51.5 | 59.6 | 43.8 | 24.5 | 53.1 | 46.3 |  | 26.2 | 35.1 | 43.3 | 66.3 | 35.9 |
| 66.2 | 61.9 | 53.7 | 28.8 | 61.5 | 56.8 | 40.0 | 15.7 | 52.7 | 42.0 |  | 24.0 | 32.4 | 44.2 | 63.9 | 44.9 |
| 71.1 | 52.9 | 42.8 | 28.9 | 46.0 | 41.2 | 44.7 | 12.8 | 51.3 | 35.6 |  | 21.1 | 31.2 | 45.2 | 50.8 | 46.5 |
| 61.3 | 63.6 | 43.2 | 31.4 | 38.8 | 42.1 | 55.8 | 10.1 | 57.7 | 55.3 |  | 18.2 | 29.9 | 41.9 | 52.4 | 29.1 |
| 63.9 | 61.8 | 34.8 | 20.0 | 35.0 | 36.6 | 53.3 | 12.2 | 49.2 | 60.1 |  | 16.8 | 27.7 | 48.2 | 57.4 | 35.6 |
| 72.7 | 49.7 | 33.8 | 16.8 | 41.1 | 27.8 | 43.4 | 15.7 | 46.6 | 59.2 |  | 21.3 | 28.9 | 45.3 | 65.2 | 45.9 |
| 70.2 | 56.5 | 36.8 | 12.6 | 39.5 | 42.4 | 44.6 | 25.1 | 54.4 | 51.9 |  | 16.7 | 31.1 | 53.9 | 57.7 | 45.9 |
| 52.7 | 50.1 | 37.0 | 41.0 | 48.8 | 43.5 | 45.6 | 21.5 | 54.1 | 46.0 |  | 18.1 | 33.0 | 51.7 | 65.1 | 28.6 |
| 57.9 | 45.5 | 32.3 | 25.4 | 44.6 | 39.5 | 43.9 | 24.2 | 51.0 | 47.8 |  | 18.5 | 31.3 | 52.8 | 65.7 | 42.3 |
| 58.6 | 47.1 | 37.7 | 20.1 | 38.4 | 48.1 | 41.2 | 21.1 | 55.4 | 42.4 |  | 22.6 | 35.1 | 50.6 | 56.3 | 20.6 |
| 49.9 | 50.3 | 53.5 | 4.4 | 42.6 | 56.5 | 28.8 | 16.5 | 54.3 | 32.2 |  | 21.1 | 31.0 | 54.3 | 60.2 | 37.5 |
| 36.8 | 47.7 | 49.1 | 24.5 | 60.9 | 81.5 | 40.8 | 28.6 | 59.7 | 37.0 |  | 22.8 | 35.6 | 52.2 | 47.9 | 42.8 |
| 50.1 | 52.7 | 36.4 | 34.6 | 57.9 |  | 43.3 | 37.2 | 60.9 | 42.7 |  | 21.6 | 33.6 | 59.7 | 40.1 | 39.6 |
| 61.9 | 52.1 | 45.5 | 33.3 | 52.8 |  | 41.5 | 31.2 | 66.7 | 52.1 |  | 26.5 | 34.7 | 54.3 | 44.8 | 35.1 |
| 61.4 | 51.9 | 46.1 | 11.6 | 57.3 |  | 41.8 | 23.9 | 66.3 | 45.6 |  | 26.9 | 38.8 | 56.6 | 41.4 | 34.8 |
| 66.6 | 52.6 | 40.8 | 16.7 | 50.5 |  | 37.7 | 26.8 | 63.6 | 41.2 |  | 34.5 | 35.8 | 48.5 | 25.0 | 41.6 |
| 67.9 | 54.6 | 46.2 | 48.6 | 75.0 |  | 41.8 | 28.6 | 67.5 | 47.4 |  | 33.0 | 40.8 | 51.0 | 47.9 | 25.4 |
| 70.6 | 52.1 | 44.9 | 34.1 | 78.4 |  | 53.3 | 31.2 | 64.3 | 40.9 |  | 26.9 | 36.0 | 55.2 | 64.8 | 36.2 |
| 69.5 | 47.7 | 46.3 | 44.0 | 69.2 |  | 38.6 | 36.8 | 57.0 | 44.6 |  | 26.9 | 33.3 | 59.4 | 54.6 | 37.0 |
| 73.5 | 44.9 | 46.4 | 20.4 | 83.2 |  | 54.7 | 32.2 | 60.1 | 47.2 |  | 27.8 | 17.1 | 57.2 | 61.1 | 39.0 |
| 69.6 | 48.6 | 37.2 | 21.6 | 86.6 |  | 42.0 | 27.0 | 60.1 | 53.2 |  | 31.8 | 32.3 | 66.3 | 56.5 | 45.7 |
| 58.9 | 50.5 | 38.1 | 33.5 | 97.5 |  | 47.0 | 22.2 | 70.0 | 23.9 |  | 25.1 | 30.1 | 60.2 | 55.2 | 34.9 |
| 57.5 | 46.3 | 40.0 | 15.1 | 73.0 |  | 47.1 | 30.5 | 22.5 | 57.7 |  | 23.6 | 31.0 | 54.2 | 46.0 | 51.9 |
| 49.5 | 47.4 | 42.6 | 44.6 | 62.4 |  | 60.5 | 31.6 | 65.4 | 40.7 |  | 23.0 | 28.1 | 62.1 | 58.8 | 51.9 |
| 50.1 | 48.2 | 34.0 | 60.7 | 52.7 |  | 54.9 | 27.7 | 65.7 | 45.7 |  | 27.3 | 32.1 | 55.1 | 63.1 | 49.7 |
| 54.1 | 44.4 | 38.3 | 38.1 | 51.9 |  | 65.4 | 23.6 | 64.8 | 45.7 |  | 28.8 | 38.2 | 58.5 | 59.9 | 46.6 |
| 64.6 | 53.8 | 43.3 | 26.6 | 42.6 |  | 57.1 | 21.2 | 63.6 | 43.3 |  | 31.3 | 35.7 | 57.8 | 38.0 | 48.2 |
| 58.6 | 44.5 | 38.0 | 40.4 | 42.5 |  | 64.8 | 30.6 | 61.9 | 42.3 |  | 31.9 | 38.7 | 59.7 | 81.5 | 45.8 |
| 54.7 | 52.0 | 25.6 | 38.3 | 32.9 |  | 63.8 | 36.0 | 60.1 | 51.7 |  | 27.2 | 39.7 | 51.8 | 55.9 | 47.8 |
| 68.5 | 58.6 | 51.4 | 24.8 | 57.4 |  | 64.3 | 31.8 | 54.9 | 54.5 |  | 24.2 | 38.5 | 62.1 | 54.9 | 44.7 |
| 69.8 | 53.7 | 40.2 | 27.4 | 54.5 |  | 65.3 | 31.9 | 57.4 | 55.1 |  | 24.5 | 38.2 | 60.1 | 47.5 | 51.8 |
| 62.4 | 55.3 | 34.1 | 45.2 | 50.2 |  | 64.5 | 16.2 | 60.4 | 45.0 |  | 21.3 | 34.7 | 55.4 | 42.7 | 51.0 |
| 67.8 | 62.8 | 33.9 | 52.4 | 63.3 |  | 59.1 | 35.0 | 63.6 | 48.0 |  | 19.0 | 26.0 | 54.8 | 50.0 | 43.4 |
| 68.9 | 64.7 | 37.5 | 44.9 | 57.8 |  | 67.6 | 30.1 | 64.6 | 57.7 |  | 20.8 | 47.9 | 58.3 | 51.4 | 45.4 |
| 76.4 | 62.5 | 40.3 | 43.4 | 57.3 |  | 55.5 | 38.7 | 65.0 | 46.9 |  | 17.1 | 41.6 | 52.3 | 43.8 | 45.1 |
| 68.3 | 54.8 | 42.2 | 32.7 | 47.2 |  | 68.1 | 34.1 | 59.3 | 43.3 |  | 26.6 | 41.1 | 50.9 | 37.1 | 36.4 |
| 74.7 | 64.4 | 41.4 | 25.8 | 49.9 |  | 61.9 | 39.2 | 58.1 | 45.4 |  | 35.7 | 42.2 | 56.2 | 7.6 | 42.8 |
| 74.7 | 58.6 | 30.8 | 26.4 | 38.5 |  | 62.4 | 40.8 | 56.5 | 46.3 |  | 21.9 | 38.8 | 55.3 | 10.5 | 27.1 |
| 71.5 | 54.1 | 37.6 | 27.8 | 75.7 |  | 66.4 | 50.2 | 55.2 | 57.7 |  | 31.6 | 21.3 | 56.3 | 15.6 | 14.6 |
| 58.0 | 63.7 | 44.1 | 29.9 | 37.2 |  | 65.4 | 47.7 | 64.7 | 58.4 |  | 26.6 | 43.4 | 55.1 | 18.7 | 38.5 |
| 63.0 | 44.1 | 51.6 | 26.1 | 58.6 |  | 54.9 | 38.1 | 63.7 | 40.7 |  | 30.8 | 44.4 | 54.9 | 16.8 | 31.0 |
| 61.3 | 50.3 | 29.5 | 43.7 | 68.8 |  | 64.5 | 38.4 | 68.7 | 47.1 |  | 29.1 | 42.2 | 50.9 | 26.0 | 29.0 |
| 70.3 | 60.1 | 34.5 | 20.1 | 60.8 |  | 62.4 | 38.4 | 67.6 | 47.8 |  | 35.4 | 41.6 | 64.9 | 23.7 | 21.8 |
| 69.5 | 53.5 | 22.4 | 8.9 | 53.0 |  | 71.5 | 38.7 | 60.1 | 46.5 |  | 42.5 | 45.2 | 59.8 | 16.7 |  |
| 73.9 | 35.3 | 35.5 | 15.6 | 54.7 |  | 73.5 | 40.7 | 53.2 | 44.6 |  | 36.6 | 46.4 | 52.4 | 20.9 |  |
| 78.6 | 30.2 | 33.3 | 28.8 | 57.4 |  | 61.2 | 51.0 | 60.6 | 48.9 |  | 28.7 | 46.8 | 60.6 | 25.6 |  |

# Appendix C: Soot Measurements

| Site | Latitude | Longitude | mg C/cm² from visual comparison with standards | ng C/g from visual comparison with standard filters | Comments |
|---|---|---|---|---|---|
| Yukon River | 66.25552 | 144.76890 | 0.0020 | 17.55 | surface |
| | | | 0.0025 | 12.60 | 0-20 cm depth |
| Porcupine River | 67.56833 | 138.28667 | 0.0005 | 4.01 | surface |
| | | | 0.0014 | 9.28 | 0-20 cm depth |
| Mackenzie River | 67.16000 | 130.25667 | 0.0005 | 3.69 | surface |
| | | | 0.0085 | 44.78 | 0-20 cm depth |
| Small Lake near Deline | 64.93390 | 124.77438 | 0.0010 | 7.07 | surface |
| | | | 0.0012 | 12.99 | 0-20 cm depth |
| Great Bear Lake 1 (GB-1) | 65.37922 | 122.66280 | 0.0009 | 5.78 | surface |
| | | | 0.0006 | 3.89 | 0-20 cm depth |
| Great Bear Lake 2 | 65.60676 | 122.26140 | 0.0006 | 4.88 | surface |
| | | | 0.0005 | 3.48 | 0-20 cm depth |
| Great Bear Lake 3 | 65.78752 | 121.78390 | 0.0009 | 6.44 | surface |
| | | | 0.0009 | 6.81 | 0-20 cm depth |
| Great Bear Lake 4 | 66.22479 | 121.06220 | 0.0006 | 6.34 | surface |
| | | | 0.0009 | 6.86 | 0-20 cm depth |
| Great Bear Lake 5 | 66.35284 | 120.63710 | 0.0007 | 6.55 | surface |
| | | | 0.0008 | 6.85 | 0-20 cm depth |
| Dease River | 66.90020 | 118.93787 | 0.0020 | 19.35 | surface |
| | | | 0.0010 | 6.04 | 0-20 cm depth |
| Bloody Falls | 67.74865 | 115.37532 | 0.0030 | 37.06 | surface (dirt?) |
| | | | 0.0120 | 103.57 | 0-20 cm depth (dirt) |
| KD3 | 66.65447 | 113.55992 | 0.0030 | 23.13 | surface |
| | | | 0.0007 | 5.25 | 0-20 cm depth |
| Rockinghorse Lake | 65.95683 | 112.42167 | 0.0004 | 4.07 | surface |
| | | | 0.0013 | 7.60 | 0-20 cm depth |
| Yamba Lake | 65.08667 | 111.45447 | 0.0007 | 7.42 | surface |
| | | | 0.0010 | 9.25 | 0-20 cm depth |
| Lake Providence | 64.74738 | 111.85403 | 0.0013 | 14.85 | surface |
| | | | 0.0012 | 9.17 | 0-20 cm depth |
| Diavik (DB-1) | 64.58344 | 110.75402 | 0.0030 | 27.17 | surface |
| | | | 0.0030 | 19.57 | 0-20 cm depth |

| | | | | | |
|---|---|---|---|---|---|
| Lac De Gras | 64.52760 | 110.53655 | 0.0040 | 41.38 | surface |
| | | | 0.0010 | 8.84 | 0-20 cm depth |
| Thonokied Lake | 64.35160 | 109.68070 | 0.0012 | 9.42 | surface |
| | | | 0.0010 | 8.32 | 0-20 cm depth |
| Alymer Lake | 64.08630 | 108.50971 | 0.0020 | 19.35 | surface |
| | | | 0.0022 | 16.07 | 0-20 cm depth |
| Clinton-Colden Lake | 64.01122 | 107.57671 | 0.0009 | 10.18 | surface |
| | | | 0.0012 | 8.44 | 0-20 cm depth |
| Sifton Lake | 63.75079 | 106.54487 | 0.0005 | 4.10 | surface |
| | | | 0.0010 | 6.12 | 0-20 cm depth |
| Hoare Lake | 63.61069 | 105.12755 | 0.0010 | 11.22 | surface |
| | | | 0.0012 | 9.31 | 0-20 cm depth |
| Hornby Point | 64.03854 | 103.85468 | 0.0010 | 7.25 | surface |
| | | | 0.0008 | 6.06 | 0-20 cm depth |
| Thelon Lookout Point | 64.17569 | 102.50803 | 0.0015 | 11.93 | surface |
| | | | 0.0020 | 11.16 | 0-20 cm depth |
| Thelon Cabin | 64.53258 | 101.35525 | 0.0005 | 4.33 | surface |
| | | | 0.0010 | 5.74 | 0-20 cm depth |
| Beverly Lake | 64.62036 | 100.47297 | 0.0005 | 3.40 | surface |
| | | | 0.0005 | 4.04 | 0-20 cm depth |
| Aberdeen Lake | 64.57758 | 98.54950 | 0.0004 | 3.77 | surface |
| | | | 0.0004 | 3.52 | 0-20 cm depth |
| Baker | 64.41800 | 96.40628 | 0.0008 | 7.43 | surface |
| | | | 0.0007 | 4.46 | 0-20 cm depth |

# Appendix D: Mercury Measurements

| Site | Latitude | Longitude | From visual comparison with standards | | Depth | Hg sample name | Hg sample name on tape | Hg conc (pg/g) | Notes | Collection time |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | (mgC/cm²) | (ngC/g) | | | | | | |
| Yukon River | 66.25552 | 144.76890 | 0.00200 | 17.54959 | surface | 25W35 | 07-28 | 10.70 | top 2-3 cm | |
| | | | 0.00250 | 12.59748 | 0-20 cm | 25W43 | 07-27 | 2.32 | | |
| Porcupine River | 67.56833 | 138.28667 | 0.00050 | 4.01371 | surface | 25W17 | 07-105 | 6.90 | surface | 17:53 |
| | | | 0.00140 | 9.27752 | 0-20 cm | G222 | 07-110 | 7.12 | | |
| Mackenzie River | 67.16000 | 130.25667 | 0.00050 | 3.68796 | surface | G58 | 07-66 | 11.35 | | 9:40 |
| | | | 0.00850 | 44.78233 | 0-20 cm | G100 | 07-65 | 5.34 | | |
| Small Lake near Deline | 64.93390 | 124.77438 | 0.00100 | 7.06858 | surface | G30 | 07-62 | 23.07 | | 15:50 |
| | | | 0.00120 | 12.99416 | 0-20 cm | G43 | 07-102 | 8.55 | | |
| Great Bear Lake 1 (GB-1) | 65.37922 | 122.66280 | 0.00090 | 5.78339 | surface | CRREL-103 | 07-44 | 5.30 | | 16:30 |
| | | | 0.00060 | 3.88502 | 0-20 cm | 25W13 | 07-43 | 4.99 | | |
| Great Bear Lake 2 | 65.60676 | 122.26140 | 0.00060 | 4.87800 | surface | G82 | 07-52 | 3.98 | | 10:00 |
| | | | 0.00050 | 3.47635 | 0-20 cm | – | 07-2 | 4.34 | | |
| Great Bear Lake 3 | 65.78752 | 121.78390 | 0.00085 | 6.43746 | surface | G11 | 07-34 | 9.85 | | 13:30 |
| | | | 0.00090 | 6.81309 | 0-20 cm | G50 | 07-32 | 5.35 | | |
| Great Bear Lake 4 | 66.22479 | 121.06220 | 0.00060 | 6.33533 | surface | CRREL-118 | 07-16 | 8.00 | | 11:15 |
| | | | 0.00090 | 6.85695 | 0-20 cm | 25W49 | 07-17 | 2.89 | | |
| Great Bear Lake 5 | 66.35284 | 120.63710 | 0.00070 | 6.54883 | surface | G218 | 07-20 | 6.97 | | 14:00 |
| | | | 0.00080 | 6.85438 | 0-20 cm | 25W50? | 07-18 | 1.57 | | |
| Dease River | 66.90020 | 118.93787 | 0.00200 | 19.35126 | surface | G210 | 07-108 | 26.68 | | 10:10 |
| | | | 0.00100 | 6.04439 | 0-20 cm | 25W51 | 07-15 | 6.00 | | |
| Bloody Falls | 67.74865 | 115.37532 | 0.00300 | 37.05859 | surface (dirt?) | 25W56 | 07-19 | 32.04 | all new snow from last night | 11:10 |
| | | | 0.01200 | 103.56899 | 0-20 cm (dirt) | 25W37 | 07-21 | 2.35 | | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| KD3 | 66.65447 | 113.55992 | 0.00300 | 23.13355 | surface | G40 | 07-63 | 3.77 | | 15:00 |
| | | | 0.00070 | 5.25452 | 0-20 cm | G5 | 07-69 | 2.90 | | |
| Rockinghorse Lake | 65.95683 | 112.42167 | 0.00036 | 4.07150 | surface | G41 | 07-48 | 4.29 | all new surface snow: 1 day overnight | 12:45 |
| | | | 0.00130 | 7.60482 | 0-20 cm | G74 | 07-58 | 1.72 | | |
| Yamba Lake | 65.08667 | 111.45447 | 0.00070 | 7.42201 | surface | G14 | 07-36 | 4.91 | | 12:30 |
| | | | 0.00100 | 9.25342 | 0-20 cm | G26 | 07-37 | 3.14 | | |
| Lake Providence | 64.74738 | 111.85403 | 0.00130 | 14.85117 | surface | CRREL 100? | 07-107 | 4.41 | | 16:00 |
| | | | 0.00120 | 9.17005 | 0-20 cm | G227? | 07-106 | 6.59 | | |
| Diavik (DB-1) | 64.58344 | 110.75402 | 0.00300 | 27.16751 | surface | 25W12 | 07-82 | 5.43 | | 13:00 |
| | | | 0.00300 | 19.57454 | 0-20 cm | G215 | 07-83 | 2.00 | | |
| Lac De Gras | 64.52760 | 110.53655 | 0.00400 | 41.37707 | surface | G9 | 07-40 | 30.55 | | 14:00 |
| | | | 0.00100 | 8.83573 | 0-20 cm | G27 | 07-41 | 5.65 | | |
| Thonokied Lake | 64.35160 | 109.68070 | 0.00120 | 9.42478 | surface | G216 | 07-81 | 3.07 | | 14:00 |
| | | | 0.00100 | 8.31598 | 0-20 cm | 25W34 | 07-30 | 1.34 | | |
| Alymer Lake | 64.08630 | 108.50971 | 0.00200 | 19.35126 | surface | CRREL-136 | 07-79 | 2.06 | | 18:30 |
| | | | 0.00220 | 16.07326 | 0-20 cm | – | 07-100 | 1.02 | | |
| Clinton-Colden Lake | 64.01122 | 107.57671 | 0.00090 | 10.17876 | surface | G53 | 07-9 | 3.27 | | 13:30 |
| | | | 0.00120 | 8.43544 | 0-20 cm | G88 | 07-8 | 2.27 | | |
| Sifton Lake | 63.75079 | 106.54487 | 0.00050 | 4.10434 | surface | G225 | 07-115 | 6.09 | | 10:00 |
| | | | 0.00100 | 6.11704 | 0-20 cm | G220 | 07-114 | 6.90 | | |
| Hoare Lake | 63.61069 | 105.12755 | 0.00100 | 11.21997 | surface | G33 | 07-70 | 7.24 | snowing lightly; new and recent | 10:30 |
| | | | 0.00120 | 9.30842 | 0-20 cm | G70 | 07-67 | 1.76 | | |
| Hornby Point | 64.03854 | 103.85468 | 0.00100 | 7.24983 | surface | G72 | 07-38 | 7.47 | | 10:00 |
| | | | 0.00080 | 6.05608 | 0-20 cm | G98 | 07-39 | 1.89 | | |
| Thelon Lookout Point | 64.17569 | 102.50803 | 0.00150 | 11.92823 | surface | G23 | 07-104 | 9.40 | | 11:00 |
| | | | 0.00200 | 11.16092 | 0-20 cm | CRREL-128 | 07-103 | 1.91 | | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Thelon Cabin | 64.53258 | 101.35525 | 0.00050 | 4.32770 | surface | G80 | 07-10 | 11.51 | | 17:00 |
| | | | 0.00100 | 5.74422 | 0-20 cm | G96 | 07-61 | 2.10 | | |
| Beverly Lake | 64.62036 | 100.47297 | 0.00050 | 3.40199 | surface | G214 | 07-99 | 4.00 | | 11:00 |
| | | | 0.00050 | 4.03919 | 0-20 cm | 25W33 | 07-31 | BD | | |
| Aberdeen Lake | 64.57758 | 98.54950 | 0.00040 | 3.76991 | surface | G61 | 07-49 | 3.94 | | 11:00 |
| | | | 0.00040 | 3.52206 | 0-20 cm | G13 | 07-50 | 2.29 | | |
| Baker | 64.41800 | 96.40628 | 0.00080 | 7.42975 | surface | G206 | 07-80 | 7.91 | | 13:00 |
| | | | 0.00072 | 4.45785 | 0-20 cm | CRREL-115 | 07-101 | 2.10 | | |

# Appendix E: Ion Measurements

| Site | Latitude | Longitude | Depth | From visual comparison with standards | | IC Name | S cond (µS) | Chloride (µM) | Bromide (µM) | Nitrate (µM) | Sulfate (µM) | Sodium (µM) | Ammonium (µM) | Potassium (µM) | Magnesium (µM) | Calcium (µM) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | (mgC/cm²) | (ngC/g) | | | | | | | | | | | |
| Yukon River | 66.25552 | 144.76890 | surface | 0.00200 | 17.54959 | S 40 | 4.4 | 6.2299 | 0.0671 | 3.2058 | 4.0692 | 3.0342 | 3.8527 | 1.5172 | 2.0373 | 7.4249 |
| | | | 0-20 cm | 0.00250 | 12.59748 | V 40 | 4.41 | 1.985 | 0.019 | 2.261 | 1.279 | 1.233 | 0.3897 | 0.5011 | 0.786 | 3.2743 |
| Porcupine River | 67.56833 | 138.28667 | surface | 0.00050 | 4.01371 | S 18 | 3.56 | 0.703 | 0.026 | 1.434 | 0.663 | 0.4667 | 0.4804 | 0.0619 | 0.1635 | 0.6741 |
| | | | 0-20 cm | 0.00140 | 9.27752 | V 18 | | | | | | | | | | |
| Mackenzie River | 67.16000 | 130.25667 | surface | 0.00050 | 3.68796 | S 44 | 5.04 | 6.187 | 0.041 | 2.727 | 2.364 | 1.3471 | 0.7467 | 0.1184 | 0.4343 | 1.5422 |
| | | | 0-20 cm | 0.00850 | 44.78233 | V 44 | 4.06 | 2.221 | 0.019 | 1.814 | 0.659 | 0.8084 | 0.7355 | 0.054 | 0.4674 | 1.2824 |
| Small Lake near Deline | 64.93390 | 124.77438 | surface | 0.00100 | 7.06858 | S 09 | 7.38 | 5.851 | 0.082 | 2.983 | 1.988 | 1.7388 | 0.7023 | 0.2467 | 1.1326 | 2.1555 |
| | | | 0-20 cm | 0.00120 | 12.99416 | V 09 | 3.97 | 1.789 | 0.021 | 2.739 | 2.031 | 0.7589 | 0.5416 | 0.1095 | 1.3405 | 2.6104 |
| Great Bear Lake 1 (GB-1) | 65.37922 | 122.66280 | surface | 0.00090 | 5.78339 | S 48 | 5.94 | 2.518 | 0.059 | 1.998 | 1.819 | 1.4756 | 0.4409 | 0.0722 | 0.5399 | 1.0553 |
| | | | 0-20 cm | 0.00060 | 3.88502 | V 48 | 5.09 | 2.536 | 0.010 | 3.649 | 0.997 | 1.5043 | 0.7076 | 0.0656 | 0.8907 | 1.6214 |
| Great Bear Lake 2 | 65.60676 | 122.26140 | surface | 0.00060 | 4.87800 | S 24 | 3.91 | 4.011 | 0.035 | 1.650 | 1.972 | 2.8181 | 1.3236 | 0.1171 | 0.6169 | 0.7779 |
| | | | 0-20 cm | 0.00050 | 3.47635 | V 24 | | | | | | | | | | |
| Great Bear Lake 3 | 65.78752 | 121.78390 | surface | 0.00085 | 6.43746 | S 02 | 8.24 | 4.792 | 0.083 | 3.592 | 2.267 | 2.4545 | 0.5928 | 0.1086 | 0.6812 | 1.0313 |
| | | | 0-20 cm | 0.00090 | 6.81309 | V 02 | 6.14 | 4.502 | 0.041 | 2.915 | 2.075 | 2.7632 | 0.5343 | 0.1494 | 1.4412 | 1.8724 |
| Great Bear Lake 4 | 66.22479 | 121.06220 | surface | 0.00060 | 6.33533 | S 30 | 11.64 | 10.151 | 0.099 | 2.690 | | 2.7822 | 1.0249 | 0.1437 | 0.8769 | 1.4553 |
| | | | 0-20 cm | 0.00090 | 6.85695 | V 30 | | | | | | | | | | |
| Great Bear Lake 5 | 66.35284 | 120.63710 | surface | 0.00070 | 6.54883 | S 32 | 8.36 | 8.503 | 0.090 | 4.598 | 4.185 | 4.593 | 0.9983 | 0.3928 | 1.6117 | 1.243 |
| | | | 0-20 cm | 0.00080 | 6.85438 | V 32 | | | | | | | | | | |
| Dease River | 66.90020 | 118.93787 | surface | 0.00200 | 19.35126 | S 36 | | | | | | | | | | |
| | | | 0-20 cm | 0.00100 | 6.04439 | V 36 | 4.83 | 3.621 | 0.033 | 3.872 | 1.576 | 1.9472 | 0.6492 | 0.1262 | 0.4816 | 1.1734 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Bloody Falls | 67.74865 | 115.37532 | surface (dirt?) | 0.00300 | 37.05859 | S 17 | 11.66 | 9.280 | 0.154 | 20.111 | 11.388 | 6.3548 | 9.4557 | 0.8347 | 4.4286 | 9.2302 |
| | | | 0-20 cm (dirt) | 0.01200 | 103.56899 | V 17 | | | | | | | | | | |
| KD3 | 66.65447 | 113.55992 | surface | 0.00300 | 23.13355 | S 04 | 8.16 | 5.738 | 0.113 | 10.740 | 7.786 | 3.8647 | 5.3958 | 0.299 | 2.5876 | 5.4442 |
| | | | 0-20 cm | 0.00070 | 5.25452 | V 04 | 5.35 | 5.649 | 0.055 | 5.373 | 2.968 | 2.9419 | 1.7012 | 0.2352 | 1.0537 | 1.2598 |
| Rockinghorse Lake | 65.95683 | 112.42167 | surface | 0.00036 | 4.07150 | S 19 | 9.98 | 1.072 | 0.011 | 11.298 | 1.583 | 0.3886 | 2.596 | 0.0546 | 0.5412 | 2.2 |
| | | | 0-20 cm | 0.00130 | 7.60482 | V 19 | 10.23 | 3.134 | 0.021 | 6.951 | 2.359 | 1.7612 | 0.6559 | 0.1216 | 0.4786 | 0.8357 |
| Lake Providence | 64.74738 | 111.85403 | surface | 0.00130 | 14.85117 | S 13 | 8.76 | 0.992 | 0.049 | 6.405 | 4.412 | 0.7471 | 4.6318 | 0.1764 | 0.6678 | 1.0158 |
| | | | 0-20 cm | 0.00120 | 9.17005 | V 13 | 9.37 | 4.243 | 0.043 | 8.244 | 2.883 | 1.9404 | 2.1344 | 0.1381 | 0.8125 | 0.957 |
| Yamba Lake | 65.08667 | 111.45447 | surface | 0.00070 | 7.42201 | S 01 | 7.38 | 0.791 | 0.019 | 6.187 | 2.824 | | | | | |
| | | | 0-20 cm | 0.00100 | 9.25342 | V 01 | 7.19 | 3.996 | 0.030 | 5.201 | 3.075 | 2.364 | 1.1829 | 0.1378 | 0.8496 | 0.8785 |
| Diavik (DB-1) | 64.58344 | 110.75402 | surface | 0.00300 | 27.16751 | S 26 | 6.91 | 1.4633 | 0.0687 | 11.2045 | 7.8117 | 1.1574 | 6.0205 | 0.4598 | 1.7084 | 2.5479 |
| | | | 0-20 cm | 0.00300 | 19.57454 | V 26 | 6.82 | 6.618 | 0.060 | 5.273 | 4.441 | 3.5594 | 0.8874 | 10.6649 | 2.9673 | 23.3018 |
| Lac De Gras | 64.52760 | 110.53655 | surface | 0.00400 | 41.37707 | S 42 | 7.25 | 2.000 | 0.073 | 8.510 | 6.521 | 1.4562 | 6.5668 | 1.3398 | 3.4266 | 3.9442 |
| | | | 0-20 cm | 0.00100 | 8.83573 | V 42 | 7.11 | 3.000 | 0.038 | 7.136 | 3.527 | 1.5287 | 2.3044 | 0.3638 | 1.766 | 1.7678 |
| Thonokied Lake | 64.35160 | 109.68070 | surface | 0.00120 | 9.42478 | S 15 | 8.9 | 1.837 | 0.036 | 7.085 | 4.688 | 1.1382 | 4.8578 | 0.1132 | 0.6709 | 1.2846 |
| | | | 0-20 cm | 0.00100 | 8.31598 | V 15 | 12.18 | 1.504 | 0.018 | 4.767 | 2.757 | 1.2077 | 2.2048 | 0.2372 | 0.5916 | 1.2022 |
| Alymer Lake | 64.08630 | 108.50971 | surface | 0.00200 | 19.35126 | S 22 | 9.36 | 4.397 | 0.050 | 8.574 | 10.381 | 1.2932 | 8.0554 | 0.265 | 1.0363 | 2.5682 |
| | | | 0-20 cm | 0.00220 | 16.07326 | V 22 | 7.93 | 3.550 | 0.043 | 5.844 | 3.985 | 1.7529 | 2.1725 | 0.1412 | 0.6649 | 1.732 |
| Clinton-Colden Lake | 64.01122 | 107.57671 | surface | 0.00090 | 10.17876 | S 49 | 8.29 | 2.218 | 0.095 | 6.157 | 5.834 | 1.7325 | 4.45 | 0.1261 | 0.7215 | 1.4622 |
| | | | 0-20 cm | 0.00120 | 8.43544 | V 49 | 8.05 | 16.0627 | 0.0316 | 8.4294 | 5.6372 | 8.6827 | 2.985 | 0.4954 | 1.8788 | 2.1182 |
| Sifton Lake | 63.75079 | 106.54487 | surface | 0.00050 | 4.10434 | S 33 | 5.43 | 2.015 | 0.037 | 3.671 | 1.882 | 1.5373 | 1.3974 | 0.1782 | 0.5633 | 1.0392 |
| | | | 0-20 cm | 0.00100 | 6.11704 | V 33 | 5.94 | 4.845 | 0.041 | 5.194 | 3.157 | 3.1065 | 1.2436 | 0.1823 | 0.8609 | 1.0521 |
| Hoare Lake | 63.61069 | 105.12755 | surface | 0.00100 | 11.21997 | S 46 | 8.04 | 2.9885 | 0.0505 | 6.4819 | 5.6605 | 1.8514 | 3.8621 | 0.5824 | 0.9722 | 1.9471 |
| | | | 0-20 cm | 0.00120 | 9.30842 | V 46 | 6.02 | 5.682 | 0.032 | 5.904 | 1.823 | 2.8906 | 0.9042 | 0.1209 | 0.6117 | 0.8269 |
| Hornby Point | 64.03854 | 103.85468 | surface | 0.00100 | 7.24983 | S 43 | 10.06 | 3.373 | 0.064 | 5.991 | 4.144 | 2.1128 | 2.4159 | 0.1111 | 0.6122 | 1.0547 |
| | | | 0-20 cm | 0.00080 | 6.05608 | V 43 | | | | | | | | | | |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Thelon Lookout Point | 64.17569 | 102.50803 | surface | 0.00150 | 11.92823 | S 31 | 10.38 | 6.5061 | 0.1716 | 10.4943 | 7.0638 | 2.9642 | 2.6739 | 0.2559 | 1.0622 | 2.0695 |
| | | | 0-20 cm | 0.00200 | 11.16092 | V 31 | 10.5 | 6.921 | 0.047 | 10.991 | 3.197 | 3.5536 | 1.7366 | 0.2701 | 0.9212 | 1.1588 |
| Thelon Cabin | 64.53258 | 101.35525 | surface | 0.00050 | 4.32770 | S 11 | 5.07 | 2.344 | 0.041 | 2.998 | 1.529 | 1.8126 | 1.4166 | 0.115 | 0.4557 | 0.7797 |
| | | | 0-20 cm | 0.00100 | 5.74422 | V 11 | 7.82 | 10.733 | 0.030 | 3.894 | 2.619 | 6.8053 | 1.371 | 0.4999 | 1.9161 | 1.3921 |
| Beverly Lake | 64.62036 | 100.47297 | surface | 0.00050 | 3.40199 | S 14 | 9.18 | 9.256 | 0.072 | 7.628 | 3.698 | 4.8728 | 2.3825 | 0.1861 | 1.0144 | 0.9749 |
| | | | 0-20 cm | 0.00050 | 4.03919 | V 14 | 6.55 | 11.297 | 0.062 | 5.313 | 2.764 | 7.7667 | 1.819 | 0.3058 | 1.6805 | 1.2641 |
| Aberdeen Lake | 64.57758 | 98.54950 | surface | 0.00040 | 3.76991 | S 50 | 7.48 | 2.478 | 0.033 | 2.842 | 1.619 | 1.2717 | 1.9798 | 0.0547 | 0.2864 | 0.7604 |
| | | | 0-20 cm | 0.00040 | 3.52206 | V 50 | 8 | 3.658 | 0.059 | 6.201 | 2.558 | 2.2895 | 3.1973 | 0.1265 | 0.558 | 0.9445 |
| Baker | 64.41800 | 96.40628 | surface | 0.00080 | 7.42975 | S 29 | 5.48 | 2.491 | 0.046 | 3.156 | 2.209 | 1.5987 | 2.8999 | 0.0855 | 0.3995 | 0.8056 |
| | | | 0-20 cm | 0.00072 | 4.45785 | V 29 | 5.69 | 3.228 | 0.070 | 6.509 | 3.499 | 2.0106 | 4.7294 | 0.1535 | 0.8198 | 1.5877 |

# Appendix F: Isotope Measurements

| Site Name | Latitude | Longitude | Pit Interval | Sample designator | $\delta^{18}O$ | δD (‰) | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Average | Standard dev. | Average | Standard dev. |
| Yukon River | 66.25552 | 144.76890 | surface | S 40 | –36.7 | 0.1 | –272.1 | 0.5 |
| | 66.25552 | 144.76890 | 0-20 cm | V 40 | –32.7 | 0.1 | –241.5 | 0.7 |
| Porcupine River | 67.56833 | 138.28667 | surface | S 18 | –34.9 | 0.1 | –266.5 | 0.3 |
| | 67.56833 | 138.28667 | 0-20 cm | V 18 | –32.2 | 0.1 | –243.7 | 0.7 |
| Mackenzie River | 67.16000 | 130.25667 | surface | S 44 | –28.7 | 0.0 | –213.9 | 0.6 |
| | 67.16000 | 130.25667 | 0-20 cm | V 44 | | | | |
| Small Lake near Deline | 64.93390 | 124.77438 | surface | S 09 | –26.8 | 0.0 | –205.7 | 0.6 |
| | 64.93390 | 124.77438 | 0-20 cm | V 09 | | | | |
| Great Bear Lake 1 (GB-1) | 65.37922 | 122.66280 | surface | S 48 | –28.3 | 1.2 | –214.0 | 0.6 |
| | 65.37922 | 122.66280 | 0-20 cm | V 48 | –28.8 | 0.1 | –219.2 | 0.3 |
| Great Bear Lake 2 | 65.60676 | 122.26140 | surface | S 24 | –28.0 | 0.0 | –212.3 | 0.7 |
| | 65.60676 | 122.26140 | 0-20 cm | V 24 | | | | |
| Great Bear Lake 3 | 65.78752 | 121.78390 | surface | S 02 | | | | |
| | 65.78752 | 121.78390 | 0-20 cm | V 02 | –27.4 | 0.1 | –209.6 | 0.8 |
| Great Bear Lake 4 | 66.22479 | 121.06220 | surface | S 30 | –28.7 | 0.2 | –222.5 | 1.4 |
| | 66.22479 | 121.06220 | 0-20 cm | V 30 | | | | |
| Great Bear Lake 5 | 66.35284 | 120.63710 | surface | S 32 | –29.7 | 0.1 | –232.6 | 0.3 |
| | 66.35284 | 120.63710 | 0-20 cm | V 32 | | | | |
| Dease River | 66.90020 | 118.93787 | surface | S 36 | –28.7 | 0.0 | –229.1 | 0.2 |
| | 66.90020 | 118.93787 | 0-20 cm | V 36 | | | | |
| Bloody Falls | 67.74865 | 115.37532 | surface (dirt?) | S 17 | | | | |
| | 67.74865 | 115.37532 | 0-20 cm (dirt) | V 17 | –29.7 | 0.1 | –226.3 | 0.8 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| KD3 | 66.65447 | 113.55992 | surface | S 04 | –26.3 | 0.1 | –204.3 | 0.4 |
| | 66.65447 | 113.55992 | 0-20 cm | V 04 | –31.1 | 0.1 | –237.5 | 0.4 |
| Rockinghorse Lake | 65.95683 | 112.42167 | surface | S 19 | –26.2 | 0.4 | –197.7 | 1.3 |
| | 65.95683 | 112.42167 | 0-20 cm | V 19 | –25.9 | 0.1 | –193.3 | 1.0 |
| Lake Providence | 64.74738 | 111.85403 | surface | S 13 | –23.5 | 0.0 | –173.2 | 0.3 |
| | 64.74738 | 111.85403 | 0-20 cm | V 13 | –28.9 | 0.1 | –221.4 | 0.4 |
| Yamba Lake | 65.08667 | 111.45447 | surface | S 01 | –24.0 | 0.1 | –187.8 | 0.8 |
| | 65.08667 | 111.45447 | 0-20 cm | V 01 | –26.5 | 0.2 | –202.4 | 1.0 |
| Diavik (DB-1) | 64.58344 | 110.75402 | surface | S 26 | –23.8 | 0.3 | –177.8 | 1.0 |
| | 64.58344 | 110.75402 | 0-20 cm | V 26 | –27.8 | 0.0 | –207.6 | 0.5 |
| Lac De Gras | 64.52760 | 110.53655 | surface | S 42 | –24.2 | 0.1 | –178.7 | 0.7 |
| | 64.52760 | 110.53655 | 0-20 cm | V 42 | –30.7 | 0.0 | –238.4 | 0.3 |
| Thonokied Lake | 64.35160 | 109.68070 | surface | S 15 | | | | |
| | 64.35160 | 109.68070 | 0-20 cm | V 15 | –23.9 | 0.0 | –179.1 | 0.6 |
| Alymer Lake | 64.08630 | 108.50971 | surface | S 22 | –19.2 | 0.1 | –144.3 | 0.7 |
| | 64.08630 | 108.50971 | 0-20 cm | V 22 | –30.1 | 0.0 | –230.5 | 0.3 |
| Clinton-Colden Lake | 64.01122 | 107.57671 | surface | S 49 | –23.7 | 0.2 | –180.9 | 1.6 |
| | 64.01122 | 107.57671 | 0-20 cm | V 49 | –24.8 | 0.1 | –186.3 | 0.2 |
| Sifton Lake | 63.75079 | 106.54487 | surface | S 33 | –27.1 | 0.1 | –208.7 | 0.4 |
| | 63.75079 | 106.54487 | 0-20 cm | V 33 | –29.1 | 0.0 | –222.6 | 0.5 |
| Hoare Lake | 63.61069 | 105.12755 | surface | S 46 | –24.6 | 0.0 | –182.1 | 0.2 |
| | 63.61069 | 105.12755 | 0-20 cm | V 46 | –27.6 | 0.1 | –208.9 | 0.1 |
| Hornby Point | 64.03854 | 103.85468 | surface | S 43 | | | | |
| | 64.03854 | 103.85468 | 0-20 cm | V 43 | –27.8 | 0.0 | –207.0 | 0.2 |
| Thelon Lookout Point | 64.17569 | 102.50803 | surface | S 31 | | | | |
| | 64.17569 | 102.50803 | 0-20 cm | V 31 | –29.2 | 0.0 | –220.8 | 0.5 |
| Thelon Cabin | 64.53258 | 101.35525 | surface | S 11 | –26.7 | 0.0 | –198.0 | 0.6 |
| | 64.53258 | 101.35525 | 0-20 cm | V 11 | | | | |
| Beverly Lake | 64.62036 | 100.47297 | surface | S 14 | –24.2 | 0.1 | –186.6 | 0.6 |
| | 64.62036 | 100.47297 | 0-20 cm | V 14 | –25.1 | 0.0 | –190.5 | 0.4 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Aberdeen Lake | 64.57758 | 98.54950 | surface | S 50 | –24.7 | 0.1 | –180.3 | 0.3 |
| | 64.57758 | 98.54950 | 0-20 cm | V 50 | –25.4 | 0.0 | –193.2 | 1.1 |
| Baker | 64.41800 | 96.40628 | surface | S 29 | –24.4 | 0.0 | –179.5 | 0.2 |
| | 64.41800 | 96.40628 | 0-20 cm | V 29 | –25.3 | 0.1 | –188.1 | 0.7 |

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**14. ABSTRACT**

During April 2007, a coordinated series of snow measurements were made across the Northwest Territories and Nunavut, Canada, during a 4200-km snowmobile traverse from Fairbanks, Alaska, to Baker Lake, Nunavut. While detailed, local snow measurements have been made as part of ongoing studies at tundra field sites in this region (Daring Lake and Trail Valley Creek in the Northwest Territories), systematic measurements at the regional scale have not been previously collected across this region. Consistent with observations of tundra snow in Alaska and northern Manitoba, the snow cover consisted of depth hoar and wind slab with small and ephemeral fractions of new, recent, and icy snow. The snow was shallow (<40 cm deep), usually with less than six layers. Where deposited on lake and river ice, the snow was shallower, denser, and more metamorphosed than where deposited on tundra. The snow characteristics were highly variable at a local scale, but no longitudinal gradients in snow distribution, magnitude, or structure were detected. Lakes and lake ice confounded passive microwave remote sensing of the snow cover in this area because the lake signal overwhelmed the snow signal. Consequently, challenges remain in developing methods to monitor this snow cover by satellite.

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