AD-752 115

APPROXIMATE VALUES OF INTENSITY OF NATURAL ULTRAVIOLET RADIATION FOR DIFFERENT AMOUNTS OF ATMOSPHERIC OZONE

Paul Bener

Physikalisch-Meteorologisches Observatorium Davos

Prepared for:

Army Research and Development Group (Europe)

June 1972

DISTRIBUTED BY:

NTIS
National Technical Information Service
U. S. DEPARTMENT OF COMMERCE
5285 Port Royal Road, Springfield Va. 22151

AD

AD752115

APPROXIMATE VALUES OF INTENSITY OF NATURAL ULTRAVIOLET RADIATION FOR DIFFERENT AMOUNTS OF ATMOSPHERIC OZONE

Final Technical Report

by
Paul Bener

June 1972

EUROPEAN RESEARCH OFFICE
United States Army
London

Contract Number DAJA37-68-C-1017

E. Flach, Director

PHYSIKALISCH-METEOROLOGISCHES OBSERVATORIUM DAVOS
DAVOS PLATZ, SWITZERLAND

Unclassified
Security Classification

DOCUMENT CONTROL DATA - R & D

(Security classification of title, body of abstract and indexing annotation must be entered when the overall report is classified)

1 ORIGINATING ACTIVITY *(Corporate author)* Dr. Emil Flach, Physikalisch-Meteorologisches Observatorium Davos, Davos Platz, Switzerland	2a. REPORT SECURITY CLASSIFICATION Unclassified 2b. GROUP

3 REPORT TITLE

Approximate values of spectral intensity of natural ultraviolet radiation for different amounts of atmospheric ozone

4 DESCRIPTIVE NOTES *(Type of report and inclusive dates)*

Final Technical Report February 1971 – February 1972

5. AUTHOR(S) *(First name, middle initial, last name)*

Paul Bener

6 REPORT DATE	7a. TOTAL NO OF PAGES	7b. NO OF REFS
June 1972	~~53~~ 69	25

8a. CONTRACT OR GRANT NO DAJA37–68–C–1017	9a. ORIGINATOR'S REPORT NUMBER(S)
b. PROJECT NO 2M061102 B53B	
c.	9b. OTHER REPORT NO(S) *(Any other numbers that may be assigned this report)*
d.	E–1364

10 DISTRIBUTION STATEMENT

This document has been approved for public release and sale; its distribution is unlimited

11 SUPPLEMENTARY NOTES	12 SPONSORING MILITARY ACTIVITY
	U. S. Army Research & Development Group (Europe), Box 15, FPO New York 09510

13 ABSTRACT

The present report deals with the results of measurements and computations of ultraviolet sky, solar, and sun+sky (global) intensity for 15 wavelengths between λ = 297.5 and 380 nm and for 12 values of total amount of atmospheric ozone covering the interval of 0.240 to 0.460 cm in increments of 0 020 cm. The variation of ultraviolet intensity in dependence on Northern Latitude and season and the influence of an assumed reduction of atmospheric ozone is examined The variation of the short wavelength limit of the terrestrial solar spectrum is furthermore discussed. The results on ultraviolet intensity for selected values of ozone and solar altitude are presented in tables. Diagrams demonstrate the variation of global intensity in dependence on the principal parameters.

The present data are based on the results of extensive measurements of ultraviolet sky intensity at Davos, Switzerland (1590 m a.s.l.), and completed by a theoretical computation of direct solar intensity for elevations of 0 to 5 km a.s.l. The values of sky intensity are assumed independent on elevation and constant for solar altitudes from 65° to 90°. The errors thus produced in the results on sky and global intensity are discussed. These data can serve as a provisional basis for a climatology of natural ultraviolet radiation until the results of more comprehensive measurements and theoretical computations will be available

DD FORM 1 NOV 65 1473 REPLACES DD FORM 1473, 1 JAN 64, WHICH IS OBSOLETE FOR ARMY USE

Unclassified
Security Classification

14 KEY WORDS	LINK A		LINK B		LINK C	
	ROLE	WT	ROLE	WT	ROLE	WT
Ultraviolet radiation						
Ultraviolet sky radiation						
Ultraviolet solar radiation						
Ultraviolet global radiation						
Radiation climatology						
Photobiology						
Influence of atmospheric ozone on ultraviolet radiation						
Short wavelength limit of terrestrial solar spectrum						
Geographical distribution of ultraviolet intensity						

AD

APPROXIMATE VALUES OF INTENSITY OF NATURAL ULTRAVIOLET RADIATION FOR DIFFERENT AMOUNTS OF ATMOSPHERIC OZONE

Final Technical Report

by
Paul Bener

June 1972

EUROPEAN RESEARCH OFFICE
United States Army
London

Contract Number DAJA37-68-C-1017

E. Flach, Director

PHYSIKALISCH-METEOROLOGISCHES OBSERVATORIUM DAVOS
DAVOS PLATZ, SWITZERLAND

I (c)

SUMMARY

A better knowledge of natural ultraviolet radiation and its variation and geographical distribution is needed for the solution of various problems of science and for practical applications. A climatology of global radiation for the photobiologically significant wavelengths λ = 307.5 and 350 nm has been derived by Schulze and Gräfe (25). The present report deals with the results of measurements and computations of ultraviolet sky, solar, and global intensity for 15 wavelengths between λ = 297.5 and 380 nm and for 12 values of the total amount of atmospheric ozone covering an interval from 0.240 to 0.460 cm increments of 0.020 cm.

The variation of ultraviolet intensity in dependence on Northern Latitude and season and the influence of an assumed reduction of atmospheric ozone is examined for the different components. The variation of the short wavelength limit of the terrestrial solar spectrum is furthermore discussed. The results are given in tables for selected values of ozone and solar altitude. Diagrams demonstrate the variation of intensity in dependence on the principal parameters.

The present data are based on a detailed evaluation of the results of extensive measurements of ultraviolet sky intensity at Davos, Switzerland (1590 m a.s.l.), and completed by a theoretical computation of direct solar intensity for elevations from 0 to 5 km a.s.l. The values of sky intensity are assumed to be independent on elevation and constant for solar altitudes from 65° to 90°. The errors thus produced in the results on sky and global intensity are discussed.

Proceeding from London's (18) and Sticksel's (19) diagrams of the hemispheric distribution of total ozone and using the values of intensity given in the main table of this report (or better the complete data not fully included in the table) maps of the geographical distribution of ultraviolet intensity can be prepared for the wavelengths, solar altitudes and elevations considered. These data can thus serve as a provisional basis for a climatology of natural ultraviolet radiation until the results of more comprehensive measurements and theoretical computations will be available.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF ILLUSTRATIONS

LIST OF SYMBOLS

D	Relative deviation H(Z)/H(1.59)−1 of the value of sky intensity at the level Z from the corresponding value for the level Z = 1.59 km of Davos, in %.
d	Angle of declination of the sun
F	Factor I(380)/I(330) by which the values of intensity or the different components of UV radiation change from λ = 330 to 380 nm
Ø	Latitude
$G(\lambda, h_o, X, Z)$	Spectral intensity of ultraviolet sun + sky radiation (global radiation) on a horizontal surface in dependence on the principal parameters considered ($Wcm^{-2}\ nm^{-1}$)
$H(\lambda, h_o, X)$	Spectral intensity of ultraviolet sky radiation from the whole sky on a horizontal surface in dependence on the principal parameters considered ($Wcm^{-2}\ nm^{-1}$)
$H''(Z, h_o, \lambda)$	Theoretical values of the relative spectral intensity of ultraviolet sky radiation normalized to 100% for Z = 0 km
$H_z(\lambda, h_o, X)$	Spectral intensity of ultraviolet zenith radiance ($Wcm^{-2}\ nm^{-1}\ ster^{-1}$)
h_o	Solar altitude
h_{om}	Maximum solar altitude attained at latitude Ø for a given value of the sun's declination angle d
I	Stands for the intensity of any of the components H, S, S_n, or G
I_m	Minimum detectable intensity ($Wcm^{-2}\ nm^{-1}$) which determines the short wavelength limit λ_m of the ultraviolet spectrum
k	Decade absorption coefficient of ozone in cm^{-1} for $-44^\circ C$
L	Stands for "location"
λ	Wavelengths in nm (nanometer = 10 Ångstrom units = 10^{-9} m)
λ_m	Short wavelength limit of the ultraviolet spectrum
M	Mean zenith intensity averaged over the results obtained at Biel (316 m a.s.l.), Davos (1580 m a.s.l.), and Weissfluhgipfel (2818 m a.s.l.)
m	Airmass according to Bemporad

N	Stands for North
n	Number of values from which the mean ratio $\bar{q}$ has been determined
Q	Factor by which the intensity of the components H, S, S_n, and G of ultraviolet radiation would be reduced by an assumed reduction R of atmospheric ozone.
q	Ratio of the values of sky intensity obtained with and without clouds respectively
$\bar{q}$	Mean value of q averaged over all solar altitudes considered
R	Assumed percentage reduction of the amount X of atmospheric ozone
r(T)	Statistical error in the results on quantity T
$S(\lambda,h_o,X,Z)$	Spectral intensity of direct solar radiation in dependence on the principal parameters considered (Wcm^{-2} nm^{-1})
$S_o(\lambda)$	Extraterrestrial solar intensity (Wcm^{-2} nm^{-1})
S_n	Vertical component of direct solar intensity
s	Standard deviation of the values of q around the mean value $\bar{q}$
$T(\lambda\ h_o)$	Coefficient in relation (1) describing the variation of sky intensity in dependence on total amount X of ozone
$t_a(\lambda,Z)$	Optical thickness for aerosol scattering
$t_R(\lambda,Z)$	Optical thickness for Rayleigh scattering
V(L)	Deviation of zenith intensity H_z (L) at location L from the mean zenith intensity M averaged over teh results of all three locations
X	Total amount of atmospheric ozone in cm STP
X_o	= 0.3375 cm. Reference value for X
$\bar{X}(\emptyset)$	Average total amount of ozone around each latitude circle considered
$y(h_o)$	Relative slant path through ozone layer normalized to 1.0 for $h_o = 90°$
Z	Elevation a.s.l. in km

I

Introduction

The importance of natural ultraviolet radiation for atmospheric physics, radiation climatology and engineering is widely accepted and has been emphasized in previous reports (1–8). Its significance for ozone research may be mentioned. Most commonly known are the therapeutic effects of UV, such as production of vitamin D in the skin and its bactericide action as well as the photobiological effects of erythema and the stimulation of skin cancer. Materials can be affected by ultraviolet radiation as well as the growth of plants. Less known is the consequence of UV for the orientation and vision of insects. A survey on the influences of natural ultraviolet radiation on man and other living organisms, which has been prepared by various experts, will be published in a forthcoming report (9).

The main facts about ultraviolet intensity may shortly be resumed here. The incoming ultraviolet solar intensity is attenuated in the atmosphere by molecular and aerosol scattering and below $\lambda = 330$ nm through absorption by atmospheric ozone which is distributed in small concentration mainly at heights between 15 and 35 km. The values of the ozone absorption coefficient increase sharply towards shorter wavelengths, and below about 300 nm ozone absorption is the dominant factor determining UV intensity at the earth's surface.

The ozone content of the atmosphere varies with latitude and season and affects the spectral distribution of natural ultraviolet radiation and its dependence on solar altitude. The UV-spectrum below $\lambda = 330$ nm is thus no constant but changes widely with solar altitude and with the actual amount of ozone. The Intensity falls off steeply below 330 nm towards shorter wavelengths. The short wavelength limit of detectable intensity depends on solar altitude and the amount of ozone. The minimum short wavelength limit ever attained on the surface of the earth is $\lambda_m = 286.3$ nm and was observed in 1930 by Götz (10, 11).

Photobiological and other photochemical effects of ultraviolet radiation show a pronounced wavelength dependence represented by their action curves. Many photobiological effects take place in the critical region below $\lambda = 330$ nm, where the shape of the spectrum varies greatly with solar altitude and ozone. It is evident that the spectral distribution and its changes must be known to compute the dose-rate for each process. Climatological measurements and computations of natural ultraviolet intensity intended to meet the needs of scientists working in different fields should thus provide spectral data rather than mean or weighed values of intensity for larger wavelength intervals.

Only too few measurements of ultraviolet solar and sky radiation by means of spectral equipment have been carried out except in ozone research, which has its own special problems. At present no sufficient and comprehensive information exists on the spectral intensity of the different components of ultraviolet radiation and their variation in dependence on the relevant parameters. Such data are urgently needed.

Extensive records of the spectral intensity of natural ultraviolet radiation have been made by the author at Davos (1580 m a.s.l.), near Basle (316 m a.s.l.), and on Weissfluhgipfel (2818 m a.s.l.), Switzerland (1- 5,7). The approximate values of intensity contained in the present report are based on a further evaluation of the results of part of these measurements and completed by a theoretical computation of direct ultraviolet solar intensity. These data may serve as a provisional basis for a tentative climatology of ultraviolet radiation until the results of more comprehensive measurements and theoretical computations will be available.

A knowledgements

We wish to express our sincere gratitude to Dr. L. Lemons of the European Research Office, U. S. Army, London, and to Dr. R. M. Marchgraber, U.S. Army Electronics Command, Fort Monmouth, N.Y., for their interest and support. The original measuring program has been greatly encouraged by Dr. W. Mörikofer, former Director of the Davos Observatory, and by Prof. Z. Sekera of the Department of Meteorology, University of California, Los Angeles. This investigation has been sponsored by the Air Force Cambridge Research Laboratories, through the European Office of Aerospace Research O.A.R., U.S. Air Force, under Contract AF 61(052)–54 and AF 61(052)–618 (Monitor Mr. R. B. Toolin), and the Swiss National Science Foundation.

The extensive calculations and presentation of the results would not have been possible without the most welcome collaboration of R. Brusa, dipl. phys., who prepared and accomplished the computer program with great personal initiative. H. Sonderegger, technician, has drawn the diagrams. All this assistance is gratefully acknowledged by the Project Director and the author.

1. The method of measurement and the computation of the results

The spectrophotometer for measuring the intensity of ultraviolet radiation from the whole sky and from sun+sky on a horizontal surface has been described in former reports (1, 2). The main features may be resumed here.

The radiation is received by an integrating diffuser sphere according to Larché and Schulze (12) installed on the roof of the Davos Observatory. By means of plane mirrors and of a spherical mirror an image of the exit opening of the integrating sphere is produced on the entrance slit of a double monochromator Kipp and Zonen model L 35. The spectral intensity is measured by means of a photomultiplier mounted directly behind the exit slit and recorded by a Speedomax recorder. The overall sensitivity of the apparatus is determined by illuminating the diffuser sphere by means of a tungsten ribbon lamp, which in turn was calibrated at the Happel Radiation Laboratory of the Landessternwarte Heidelberg-Königstuhl, Germany. The calibration included the flux per steradian and nm emitted by the whole ribbon. The spectral bandwidth applied for routine measurements increased from 0.92 nm at 295 nm to 2.0 nm at 370 nm.

The measured values of sky and global intensity have been examined in dependence on wavelength λ, solar altitude h_o, total amount of atmospheric ozone X (cm at STP) and albedo. The results for practically cloudless sky at Davos can be represented by means of an empirical relation (1, 4):

$$\log H(\lambda,h_o,X) = \log H(\lambda,h_o,X_o) - T(\lambda,h_o)\,(X-X_o) \qquad (1)$$

where $H(\lambda,h_o,X_o)$ relates to a reference value X_o = 0.3375 cm of ozone and $T(\lambda,h_o)$ is coefficient. A similar relation has been derived for global intensity $G(\lambda,h_o,X)$. Values for the quantities $H(\lambda,h_o,X_o)$ and $T(\lambda,h_o)$ are given in former reports (1, 4) for various wavelengths and solar altitudes.

Proceeding from these results and considering the seasonal change of ozone the diurnal and annual variation of the spectral intensity of ultraviolet sky and global radiation was derived for practically cloudless days at Davos (4, 13). In addition the influence of clouds on ultraviolet sky radiation was examined (5).

The wavelengths most effective for the photobiological processes of erythema and direct pigmentation are λ = 307.5 and 350 nm respectively These wavelengths have been determined by weighing the spectral distribution of global radiation with the spectral effectiveness of the processes in question. Considering the values of global intensity obtained at Davos (4) and the results of their own measurements, Schulze and Gräfe (25) derived climatological data on global intensity for these special wavelengths. By means of diagrams, maps, and tables the authors demonstrate the diurnal variation and monthly sums of intensity for different latitudes and seasons. These data are widely used in photobiology and dermatology and represent the only world climatology of ultraviolet radiation available at present. It is however desirable to extend these results to a larger number of wavelengths and to sky and solar intensity. The computations and results discussed in the following sections are a step in this direction.

All measurements by means of the spectrophotometer described above were carried out at Davos Observatory, and the results are thus primarily restricted to Davos (1590 m a.s.l.) or to places with similar climatic conditions and altitude. Standard values of ultraviolet intensity should however be available for different altitudes and for any climate or geographical situation. The approximate values of intensity presented in this report have been derived to meet provisionally this demand. The method of computation and the approximations applied will be discussed separately for the different components.

1.1 Ultraviolet sky radiation

The spectral intensity $H(\lambda,h_o,X)$ of ultraviolet sky radiation received from the whole and practically cloudless sky at Davos (1590 m a.s.l.) has been computed for ozone amounts varying in increments of $\Delta X = 0.020$ cm from $X = 0.240$ to 0.460 cm and for different wavelengths and solar altitudes. Relation (1) and the values for the quantities $H(\lambda,h_o,X_o)$ and $T(\lambda,h_o)$ given in (4) were used for the calculation.

1.1.1 Approximation applied for solar altitudes $h_o > 65°$

The maximum solar altitude attained at Davos is $h_o = 66.6°$. The values for $H(\lambda,h_o,X_o)$ and $T(\lambda,h_o)$ could be determined up to solar altitudes of 65° and 50° respectively. No attempt has been made to extrapolate these values to higher solar altitudes. As an approximation the values of $H(\lambda,h_o,X_o)$ and $T(\lambda,h_o)$ for $h_o = 65°$ and 50° respectively have been app[illegible] to compute the sky intensity for solar altitudes exceeding $h_o = 65°$.

The values of intensity obtained by this procedure are too small. Mostly affected are the results for the highest solar altitudes and the shortest wavelengths, where the intensity still increases considerably from $h_o = 65°$ to 90°. The effect of the approximation can be estimated from the trend of the measured values of $H(\lambda,h_o,X_o)$ and from theoretical figures. For $h_o = 90°$ and $\lambda = 297.5$ nm, 302.5 nm and 305.0 nm the errors amount to about 50 % 30 %, and 22 % respectively. A further evaluation of the errors caused by the approximation will be given in the discussion of the results.

1.1.2 Approximation for different elevations a.s.l.

There do not exist any spectral data for ultraviolet sky intensity based on detailed and extensive measurements, which would allow to extrapolate our values $H(\lambda,h_o,X)$ for Davos to different elevations a.s.l. Theoretical results indicate however that the variation of sky intensity from 0 to 3 km height are moderate. Furthermore, our own measurements (7) in 316, 1580 and 2818 m a.s.l. have shown that ultraviolet zenith radiance does not change largely between these levels. The influence of height on sky intensity will therefore be neglected and only the results for Davos (1590 m a.s.l.) will be considered for the present computations as far as sky radiation is concerned. The errors involved in this approximation will now be estimated in some more detail.

Theoretical values $H''(Z,h_o,\lambda)$ of the relative spectral intensity of sky radiation from the whole sky referred to 100 % for Z = 0 km are given in Table 1 These figures have been derived from Dave's and Furukawa's (14) results on sky intensity for a Rayleigh atmosphere in presence of a standard vertical distribution of atmospheric ozone corresponding to X = 0.341 cm. Fig. 1 shows the theoretical variation of sky intensity in dependence on height for selected wavelengths and solar altitudes. For lower solar altitudes and shorter wavelengths the relative intensity increases with increasing height and a maximum is reached at a certain height. For increasing solar altitude and wavelength the maximum shifts to lower heights. For longer wavelengths and higher solar altitudes there is a monotonous decrease of intensity extending from Z = 0 km to greater heights

The percentage values D in Table 1 indicate to what degree the sky intensity at a level Z deviates from the intensity at the level Z = 1.59 km of Davos. These deviations amount to between −20 % and +17 % for λ = 297.5 nm and decrease to between −10 % and +6 % for λ = 360 nm, if elevations $0 \leq Z \leq 3$ km are considered. Relatively small deviations exist also for Z = 4 and 5 km for certain intervals of wavelength and solar altitudes, as can be seen from the table. The values of D represent an estimate of the errors produced, if the influence of height on sky intensity is neglected. The figures in Table 1 relate to a given vertical ozone distribution with X = 0.341 cm and can thus not generally be applied to extrapolate the measured values of sky intensity to different heights. However, theoretical figures for various other vertical distributions and total amounts of ozone which would allow an extrapolation of this kind are not yet published.

The results of our measurements of z e n i t h radiance at Biel (316 m a.s.l.), Davos (1580 m a.s.l.) and Weissfluhgipfel (2818 m a.s.l.) will shortly be considered. The measured variation of z e n i t h radiance in dependence on height is moderate but larger than theoretically expected. The relative deviation $V = H_z(L)/M - 1$ has beyond others been examined, where H_z (L) stands for the values of zenith radiance at one of the locations and where M represents the mean radiance averaged over the results for all three locations. The measured values of V vary between −10% and +14 % for $330 \leq \lambda \leq 380$ nm and on an average over solar altitudes from 5° to 65°. The maximum deviations V amount to −24 % and +30 %. The measured and theoretical variations of z e n i t h radiance with elevation a.s.l. are discussed more closely in a former report (7).

The results discussed above may justify an approximation in which the values of sky intensity measured at Davos are applied for computing global intensity for Z = 0 to 3 km. Tentatively the computations have been extended up to Z = 5 km.

Table 1. Dependence of ultraviolet sky radiation on elevation a.s.l. Relative theoretical values.

Z Elevation a.s.l. in Km

h_o Solar altitude

H'' Intensity of ultraviolet sky radiation from the whole sky on a horizontal surface, normalized to 100.0 % for Z = 0 Km

D Deviation of H''(Z) from the corresponding value for Z = 1.59 Km (Davos) expressed in %.

The values H'' are graphically interpolated from Dave's and Furukawa's theoretical results (14) for a Rayleigh atmosphere with a standard ozone distribution corresponding to X = 0 341 cm.

λ	h_o	Z:	0	1	1.59	2	3	4	5
297.5	5°	H''	100.0	116.0	125.0	131.0	146.4	162 0	179.0
		D	−20.0	−7.2	0.0	4.8	17.1	29.6	43.2
"	15°	H''	100.0	116.0	125.0	131.0	146.6	162.0	179.0
		D	−20.0	−7.2	0.0	4.8	17.3	29.6	43.2
"	30°	H''	100.0	115.0	123.0	127.6	138.7	149.0	158.0
		D	−18.7	−6.5	0.0	3.7	12.8	21.1	28.4
"	60°	H''	100.0	107.3	111.0	112.6	115.9	116.5	114.5
		D	−10.0	−3.3	0.0	1.4	4.4	5.0	3.1
"	90°	H''	100.0	106.0	108.5	110.0	111.4	110.5	107.2
		D	−7.8	−2.3	0.0	1.4	2.7	1.8	−1.2
302.5	5°	H''	100.0	112.0	119.5	124.3	136.5	148.0	159.3
		D	−16.3	−6.3	0.0	4.0	14.2	23.8	33.3
"	15°	H''	100.0	112.0	119.5	124.3	137.2	148.0	159.3
		D	−16.3	−6.3	0.0	4.0	14.8	23.8	33.3
"	30°	H''	100.0	109.2	114.0	117.0	123.3	127.0	128.3
		D	−12.3	−4.2	0.0	2.6	8.2	11.4	12.5
"	60°	H''	100.0	104.5	106.3	107.2	108.1	106.2	102.5
		D	−5.9	−1.7	0.0	0.8	1.7	−0.1	−3.6
"	90°	H''	100.0	103.5	104.9	105.4	104.9	102.2	97.6
		D	−4.7	−1.3	0.0	0.5	0 0	−2.6	−7.0

Table 1. Continued

λ	h_o	Z:	0	1	1.59	2	3	4	5
312.5	5°	H''	100.0	110.5	116.3	120.0	128.6	137.0	144.5
		D	−14.0	−5.0	0.0	3.2	10.6	17.8	24.2
"	15°	H''	100.0	110.0	115.0	118.3	124.5	129.5	132.5
		D	−13.0	−4.3	0.0	2.9	8.3	11.5	13.2
"	30°	H''	100.0	105.5	108.0	109.5	111.4	111.0	108.5
		D	−7.4	−2.3	0.0	1.4	3.1	2.8	0.5
"	60°	H''	100.0	103.3	103.6	103.4	101.4	97.5	93.0
		D	−3.5	−0.3	0.0	−0.2	−2.1	−5.9	−10.2
"	90°	H''	100.0	102.5	102.5	102.0	99.2	95.0	90.0
		D	−2.6	0.0	0.0	−0.5	−3.2	−7.3	−12.2
330	5°	H''	100.0	108.7	113.5	116.5	123.1	130.0	135.3
		D	−11.9	−4.2	0.0	2.6	8.4	14.5	19.2
"	15°	H''	100.0	105.5	108.5	110.3	113.7	115.3	114.5
		D	−7.8	−2.8	0.0	1.7	4.8	6.3	5.5
"	30°	H''	100.0	102.5	103.2	103.5	103.0	100.5	96.5
		D	−3.1	−0.7	0.0	0.3	−0.2	−2.6	−6.5
"	60°	H''	100.0	101.0	100.3	99.4	95.7	91.5	86.0
		D	−0.3	0.7	0.0	−0.9	−4.6	−8.8	−14.3
"	90°	H''	100.0	100.0	98.7	97.5	93.9	89.0	83.5
		D	1.3	1.3	0.0	−1.2	−4.9	−9.9	−15.4
360	5°	H''	100.0	106.2	109.8	111.7	116.2	120.0	122.5
		D	−9.9	−3.3	0.0	1.7	5.8	9.3	11.6
"	15°	H''	100.0	101.6	102.5	102.6	102.7	100.8	97.5
		D	−2.4	−0.9	0.0	0.1	0.2	−1.7	−4.9
"	30°	H''	100.0	99.5	98.5	97.5	94.0	89.5	84.2
		D	1.5	1.0	0.0	−1.1	−4.6	−9.1	−14.5
"	60°	H''	100.0	98.0	95.7	94.0	88.6	82.5	76.5
		D	4.5	2.4	0.0	−1.8	−7.4	−13.8	−20.1
"	90°	H''	100.0	97.0	94.5	92.5	87.2	81.0	75.0
		D	5.8	2.6	0.0	−2.1	−7.7	−14.3	−20.6

1.1.3 Accuracy of the values for $H(\lambda,h_o,X_o)$ and $T(\lambda,h_o)$.

The method for determining the values of $H(\lambda,h_o,X_o)$ and $T(\lambda,h_o)$ has been described in reports (1) and (4) where the scatter and the accuracy is discussed in some detail. The main points may shortly be resumed. The measured values of sky intensity were interpolated for round values of solar altitude and plotted in logarithmic scale in dependence on the mean ozone amount X for the days in question. The coefficients $T(\lambda,h_o)$ are the gradients of the straight lines which have been used to approximate the mean trend of the scattering points in the different plots. By means of these gradients each measured value of sky intensity was normalized to a reference amount X_o = 0.3375 cm of ozone. The values $H(\lambda,h_o,X_o)$ are the means of the normalized intensities obtained by this procedure.

The scatter of the points around the approximating straight lines in the different plots amounts to between ± 10% and ± 38%, the mean being ± 18%, if one case relating to $h_o = 0°$ is excepted. A large part of this scatter reflects real fluctuations of sky intensity from day to day when measurements have been taken. A scatter of this magnitude is involved in the values of $H(\lambda,h_o,X_o)$.

For the majority of the wavelengths and solar altitudes considered the points in the plots of sky intensity versus ozone amount X show a distinct trend and the gradients $T(\lambda,h_o)$ of the approximating lines could be determined with an accuracy of about ± 10% to ± 20%. In these cases the values of $T(\lambda,h_o)$ show an even trend with relatively small scattering if plotted versus the corresponding values of the absorption coefficient k (λ) of ozone. For some solar altitudes the results on $T(\lambda,h_o)$ deviate irregularly from this trend. For these cases the coefficients had to be interpolated from the mean curves representing $T(\lambda,h_o)$ as a function of k (λ).

A percentage error $r(H) = -2.3\,(X-X_o)\;T(\lambda,h_o)\;r(T)$ is produced by an error r(T)% in the coefficients $T(\lambda,h_o)$, if the sky intensity $H(\lambda,h_o,X)$ is computed according to relation (1). The coefficients $T(\lambda,h_o)$ attain values up to 9.9 cm^{-1} at short wavelengths and decrease to zero for $\lambda > 330$ nm. The high values of $T(\lambda,h_o)$ for short wavelengths can be determined more accurately than the smaller values for longer wavelengths. The probable errors in the results on $T(\lambda,h_o)$ can be evaluated from the plots in Fig. 9 of report (1). However, no detailed error analysis on a statistical basis was made for the final values of the coefficients $T(\lambda,h_o)$, which were all determined from the mean curves representing the smoothed trend of $T(\lambda,h_o)$ in dependence on the absorption coefficient k(λ) of ozone.

According to a rough estimate we may put $T(\lambda,h_o)\;r(T) \approx 100\ cm^{-1}$ for all solar altitudes and wavelengths considered. Setting furthermore $X-X_o$ = 0.100 cm we obtain an error of $r(H) \approx \pm 23\%$ for the values of sky intensity computed for maximum or minimum ozone amount.

1.2 Ultraviolet solar intensity

The spectral intensity of direct solar radiation is computed according to formula

$$S(\lambda,h_o,X,Z) = S_o(\lambda)\,10^{-[\,0.4343\,(t_R + t_a)m + k\,y\,X\,]} \qquad (2)$$

where

$S_o(\lambda)$ Extraterrestrial solar intensity in $Wcm^{-2}\ nm^{-1}$

$t_R(\lambda,Z)$ Optical thickness for Rayleigh scattering

$t_a(\lambda,Z)$ Optical thickness for aerosol scattering

$m(h_o)$ Air mass according to Bemporad

$k(\lambda)$	Absorption coefficient for ozone absorption at $-44°C$
$y(h_o)$	Slant path through ozone layer
X	Total amount of atmospheric ozone in cm at STP
Z	Elevation a.s.l. in km

Values proposed by the Standard's Subcommittee of the Solar Radiation Committee of the Journal of Environmental Sciences published by Thekaekara (15) have been applied for the extraterrestrial solar intensity $S_o(\lambda)$. These values represent the mean intensity averaged over a bandwidth of 5 nm. Where necessary the intensity has been interpolated for the wavelengths considered.

Standard values for the optical thickness t_R and t_a are given in Elterman's atmospheric attenuation model 1968 (16) for various wavelengths and elevations a.s.l. in increments of 1 km. Values derived from Elterman's data and interpolated for the wavelengths in question have been used for the computation. Mean values for the ozone absorption coefficient k for $-44°C$ according to Vigroux (17) averaged over a bandwidth of 2.0 nm have been applied.

The factor 0.4343 is introduced because Elterman's values for t_R and t_a relate to the basis e, whereas k represents the decade ozone absorption coefficient derived from Vigroux's data.

Atmospheric ozone is mainly concentrated at heights above 10 km and its influence on direct solar intensity can be described by the total amount X. On the other hand, the values t_R and t_a of optical thickness decrease considerably from 0 to 5 km and determine the variation of direct solar intensity in dependence on elevation. Apart from direct solar intensity the vertical component

$$S_n(\lambda,h_o,X,Z) = S(\lambda,h_o,X,Z)\sin h_o \qquad (3)$$

has been computed.

1.3 Ultraviolet global intensity

Adding the diffuse component H to the vertical component S_n the intensity of sun+sky radiation or global radiation on a horizontal surface is obtained:

$$G(\lambda,h_o,X,Z) = H(\lambda,h_o,X) + S_n(\lambda,h_o,X,Z) \qquad (4)$$

The values for global intensity are thus based on the measured values for $H(\lambda,h_o,X_o)$ and $T(\lambda,h_o)$, as well as on the theoretically computed vertical component S_n of direct solar radiation. Only the latter component varies with elevation Z, whereas according to the approximation discussed in section 1.1.2 the variation of sky intensity in dependence on elevation is neglected. An estimate of the percentage error D thus produced in $H(\lambda,h_o,X)$ is given in Table 1.

The corresponding error caused in the results on global intensity amounts to $D/(1 + S_n/H)$ The ratio S_n/H is small for short wavelengths, low solar altitudes and low elevation a.s.l The whole amount or a large fraction of the error D is transmitted to the values of global intensity in this case On the other hand, for solar altitudes $h_o \geq 60°$ the error remains $\lesssim 0.56$ D for all wavelengths, solar altitudes and ozone amounts considered

A similar consideration applies to the errors caused by the approximation which has been discussed in section 1.1.1. The values of sky intensity for $h_o > 65°$ are too low. The corresponding errors produced in the results on global intensity amount to about 17%, 10%, and 9% for $h_o = 90°$ and λ = 297.5, 302.5, and 305.0 nm respectively. These are estimates for Z = 0 km and X = 0.340 cm. The errors decrease towards longer wavelengths.

1.4 Further remarks

The values of ultraviolet intensity presented in the tables and diagrams of this report are based on available data and on simple computations. A more rigorous treatment would need additional calculations of ultraviolet sky intensity for various distributions and amounts of atmospheric ozone and for different conditions of turbidity. The mathematical methods and computing programs for this purpose are more involved but available in principle. Such computations would allow to interpolate and extrapolate the results of more extensive measurements planned for the future and help to derive an improved climatology of natural ultraviolet radiation.

2. Discussion of the results

2.1. Dependence of the intensity on the different parameters

Part of the results of the computations are presented in Table A which contains the values of intensity for the different components and for selected values of the principal parameters. These results and Figs. 2 – 5 and 7a – d are based on the values of $H(\lambda,h_o,X_o)$ obtained at Davos in "summer conditions", with practically no snow on the ground of the wider surroundings of the place of observation. The complete set of the computed data includes also the results for "winter conditions", when all land around was covered with snow. The computations have furthermore been extended to additional solar altitudes and ozone amounts varying in increments of Δ X = 0.020 cm.

As a consequence of the increased ground reflexion the values of $H(\lambda,h_o,X_o)$ derived from the measurements in "winter conditions" are considerably higher than those for "summer conditions". The increase in $H(\lambda,h_o,X_o)$ amounts to about 30 % on an average over the wavelength region 330 nm $\leqslant \lambda \leqslant$ 380 nm and to about 50 % for 297.5 nm $\leqslant \lambda \leqslant$ 330 nm. It is to say that the results for the two periods are based on different sets of data and influenced by the variation of parameters other than albedo. The values for $H(\lambda,h_o,X_o)$ are reduced to a normalized amount $X = X_o$ of ozone and affected by the limited accuracy of that procedure. The results for $\lambda \geqslant$ 330 nm may therefore allow a better estimate of the albedo effect than the values for shorter wavelengths. The influence of ground reflexion on sky intensity is discussed more closely in report (1), where measured and theoretical results are compared

No values of the coefficient $T(\lambda,h_o)$ in relation (1) could be determined for the shortest wavelengths and lower solar altitudes. This applies for example to the coefficients for λ = 297.5 and $h_o \leqslant 30°$. There exist no results for $H(\lambda,h_o,X)$ and $G(\lambda,h_o,X,Z)$ for these cases which are marked "0" in Table A. The same is true for the components $S(\lambda,h_o,X,Z)$ and $S_n(\lambda,h_o,X,Z)$ which could however have been computed for any solar altitude and wavelength

The data on ultraviolet sky and global intensity in Table A are influenced more or less by the approximations involved in the values for sky intensity This concerns the results for $h_o = 90°$ (see section 1 1.1) and the results for elevations differing considerably from the elevation Z = 1 59 km a.s l of Davos (see section 1.1.2) The effect of these approximations on the values of global intensity is discussed in section 1 2 On the other hand, computed results on direct solar intensity $S(\lambda,h_o,X,Z)$ and its vertical component $S_n(\lambda,h_o,X,Z)$ are not influenced by any approximation of similar significance

Table 2. Intensity (Wcm^{-2} nm^{-1}) of the different components H, S, S_n, and G of natural ultraviolet radiation for Z = 0 km a.s.l. and for selected wavelengths (nm), solar altitudes h_o and amounts X(cm) of ozone. Survey on the results contained in Table A. 1.72 – 7 stands for $1.72.10^{-7}$.

X	h_o	λ:	297.5	302.5	330.0
0.240	5°	H:		2.19– 9	2.03– 6
	60°	"	1.72–7	1.12– 6	2.25– 5
0.340	5°	"		5.41–10	1.90– 6
	60°	"	4.25–8	5.38– 7	2.21– 5
0.440	5°	"		1.34–10	1.77– 6
	60°	"	1.05–8	2.59– 7	2.17– 5
0.240	5°	S:		6.58–18	3.12–10
	60°	"	2.01–7	1.42– 6	2.56– 5
0.340	5°	"		2.63–20	2.82–10
	60°	"	4.35–8	6.62– 7	2.53– 5
0.440	5°	"		1.05–22	2.55–10
	60°	"	9.41–9	3.08– 7	2.49– 5
0.240	5°	S_n:		5.74–19	2.72–11
	60°	"	1.74–7	1.23– 6	2.22– 5
0.340	5°	"		2.29–21	2.46–11
	60°	"	3.77–8	5.73– 7	2.19– 5
0.440	5°	"		9.17–24	2.22–11
	60°	"	8.15–9	2.67– 7	2.16– 5
0.240	5°	G.		2.19– 9	2.03– 6
	60°	"	3.46–7	2.35– 6	4.46– 5
0.340	5°	"		5.41–10	1.90– 6
	60°	"	8.02–8	1.11– 6	4.40– 5
0.440	5°	"		1.34–10	1.77– 6
	60°	"	1.87–8	5.25– 7	4.33– 5

The selected data in Table 2 give a survey on the variation of intensity in the wavelength region 297.5 to 330 nm. The factors F in Table 3 show how the intensity of the various components varies from $\lambda = 330$ to 380 nm.

Table 3. Factor F = I(380) / I(330) by which the intensity of the different components H, S, S_n, and G of natural ultraviolet radiation varies from $\lambda = 330$ to 380 nm. The figures relate to Z = 0 km and X = 0.340 cm

h_o	H	S,S_n	G
5°	1.76	83.3	1.76
10°	1.43	11.5	1.46
20°	1.02	3.65	1.25
40°	0.94	2.06	1.34
60°	1.00	1.73	1.36
90°	1.02	1.62	1.36

Some remarks on the spectral distribution of natural ultraviolet radiation may be in place. The extraterrestrial solar intensity increases from 297.5 to 330 nm by a factor of 1.9, but varies only little in its mean trend from 330 to 380 nm. The absorption coefficient of ozone decreases rapidly from 297.5 to 330 nm and can be neglected between 340 and 380 nm. In consequence we can distinguish two wavelength regions with essentially different trends of intensity: Up to 330 nm the intensity increases by several orders of magnitude and the shape of the spectrum varies with the vertical distribution and total amount of atmospheric ozone. From 330 to 380 nm the variation of intensity in general covers only a fraction of one magnitude, as can be seen from the figures in Table 3. For solar altitudes of $h_o \gtrsim 15°$ these variations are quite small for sky intensity and moderate for global intensity. However, also in this wavelength region an increase exceeding one order of magnitude is found for direct solar intensity at low solar altitudes. In this case the large values of $m(h_o)$ and the diminishing values of t_R and t_a produce a strong decrease of the exponent $0.4343\,(t_R + t_a)m(h_o)$ in relation (2) towards longer wavelengths.

These characteristic features of the ultraviolet spectrum are illustrated in Fig. 2 which shows the spectral distribution of global radiation for different ozone amounts and solar altitudes according to our approximation. These curves demonstrate the steep decrease of intensity below $\lambda = 330$ nm and the flatter trend from $\lambda = 330$ to 380 nm. In addition the strong influence of ozone on the intensity and on the shape of the spectrum can be seen.

Fig. 3 shows ultraviolet global intensity for different elevations and wavelengths in dependence on the amount X of atmospheric ozone. These curves represent the sum of $H(X,h_o,\lambda)$ and $S_n(X,h_o,\lambda,Z)$ which are both exponential functions of X The trend of the curves is nearly linear in logarithmic representation. The natural variations of ozone covering an interval of X = 0.240 cm to 0.460 cm cause large changes of global intensity at shorter wavelengths, which correspond to factors of 24 and 5 for $\lambda = 297.5$ and 302.5 nm respectively.

An example for the influence of solar altitude on global intensity is given in Fig. 4 for different wavelengths and for an ozone amount of X = 0.340 cm. The trend from $h_o = 60°$ to 90° is influenced by the errors discussed in section 1.2

The influence of elevation a s l on global intensity is illustrated in Fig 5 for a mean amount X = 0.340 cm of atmospheric ozone and for solar altitudes of h_o = 15°, 30° and 60°

The trend of these curves is affected by the approximation discussed in section 1.1.2 and 1.2. The errors can be estimated from the values D in Table 1 and amount to $\lesssim$ 20% for h_0 = 15° and 30° and to $\lesssim$ 6% for h_0 = 60°, as far as elevations up to Z = 3 km are concerned. The results for higher elevations must be considered as tentative. For certain intervals of wavelengths and solar altitude the errors D are small or moderate also for Z = 4 and 5 km.

The variation of the intensity of the other components in dependence on wavelength, ozone and solar altitude shows essentially a pattern similar to that illustrated in Figs. 2 – 5 for global radiation. However the intensity of direct ultraviolet solar radiation decreases towards lower solar altitudes far more steeply than the intensity of diffuse sky radiation. All the more this applies to the vertical component S_n. Furthermore, at low solar altitude direct solar intensity falls off more rapidly towards shorter wavelengths than sky intensity.

Depending on solar altitude and wavelength sky intensity attains a maximum at a certain elevation or decreases monotonously from Z = 0 km upwards, as can be seen from the theoretical trend in Fig. 1. Direct solar intensity evidently increases with elevation. The same is true for the present results on global intensity where the sky component has been assumed as independent on elevation.

2.2 The influence of an assumed reduction of atmospheric ozone on ultraviolet intensity

The effectiveness of a number of important photobiological processes increases sharply from λ = 320 nm towards shorter wavelengths and maxima are attained between λ = 240 and 300 nm. Many of these effects are detrimental to man, animals or plants. Atmospheric ozone absorbs a considerable part of the incoming solar radiation below 320 nm and works thus as a protection shield against the dangerous shorter wavelengths. Johnston (20) suggested that water and oxides of nitrogen emitted as combustion products by future SST aircraft may catalyse the destruction of atmospheric ozone, whereby the intensity of the harmful ultraviolet radiation would increase at the earth's surface.

It is therefore of interest to examine the effects of an assumed decrease in the total amount of ozone. This question has been studied in connection with the computations described in the foregoing sections. The results are shown in Table B which gives the intensity of the various components of ultraviolet radiation at sea level for three latitudes Ø = 0°, 40°, and 73° and for different assumed reductions of the amount of ozone. These figures relate to the annual mean ozone amount for the latitudes considered and to selected solar altitudes. The table contains furthermore the factors Q by which the intensity is increased by the reduction of ozone.

The average seasonal variations of ozone around the annual mean amount to about ± 18%, ± 11% and ± 4% for the latitudes Ø = 73°, 40°, and 0° respectively. These values allow a comparison with the reductions assumed in Table B.

The figures in Table B show the strong effect produced by even relatively small reductions of ozone. Erythemal effectiveness attains its first maximum near λ = 297.5 nm. At a mean latitude of 40°N global intensity increases at this wavelength by factors of Q = 1.59, 3.21, and 10.3, if the annual mean ozone amount is reduced by 10%, 25%, and 50% respectively.

The influence of an ozone reduction increases from Ø = 0° to 73° and towards shorter wavelengths. For the highest latitude and the shortest wavelength considered the intensity of sky, solar and global radiation is diminished by factors of Q = 14.6, 43.0, and 21.9 in consequence of a 50% ozone reduction. At the shortest wavelengths direct solar intensity is more affected than the sky component. This difference is pronounced for Ø = 73°N

The values of $H(\lambda,h_o,X_o)$ and $T(\lambda,h_o)$ have been derived from measurements of ultraviolet sky intensity over periods where the ozone amount varied between X = 0.270 and 0.405 cm. The data in Table B for a 50% decrease of the mean annual amount of ozone relate to X = 0.124, 0.159, and 0.183 cm for 0°, 40°, and 73° Northern Latitude respectively. The latter values represent 46%, 59%, and 68% respectively of the minimum ozone amount (X = 0.270 cm) observed during the measurements. The values for H, G, and Q in Table B corresponding to a 50% decrease of ozone are thus based on an extrapolation over a rather large interval of ozone amounts, which actually do not exist. These figures should thus be considered to be tentative. More accurate results could be obtained by a theoretical computation of the sky component (see section 1.4). On the other hand, the results on S and S_n are directly computed and not affected by any extrapolation.

2.3 The spectral distribution of ultraviolet solar radiation below λ = 300 nm and the short wavelength limit of the terrestrial solar spectrum. Computed results

The following results have been obtained by straightforward computations and relate to direct solar intensity only. More involved calculations which are outside the scope of this report would have been needed to take also sky and global intensity into consideration. Fig. 6 shows the mean trend of the extraterrestrial solar spectrum derived from Tousey et al. (21,22,23) as well as the terrestrial spectrum for selected latitudes and solar altitudes. The latter curves relate to sea level and to the annual mean amount of ozone for the latitudes considered. Added are the corresponding spectra for an assumed 50% reduction of the ozone amount.

Relation (2) has been used for the computations but attenuation by aerosol scattering was neglected. The values for $t_R(\lambda,Z)$ and $k(\lambda)$ have been derived from Elterman's (16) and Vigroux's (17) data respectively. The ozone absorption coefficient $k(\lambda)$ relates to a bandwidth of 1.0 nm in this case. Mean values for the extraterrestrial intensity $S_o(\lambda)$ averaged over a bandwidth of 1.0 nm and determined from Fig. 16 in (23) have furthermore been applied.

The curves in Fig. 6 show the great influence of atmospheric ozone on direct solar intensity for the shortest wavelengths of the terrestrial spectrum. The extraterrestrial intensity fluctuates greatly within wavelength intervals of 1.0 nm. The short wavelength limit λ_m of the terrestrial spectrum depends thus on the bandwidth applied for the measurements and further on the detectable minimum level I_m of intensity. The values of λ_m listed in Table 4 have been determined from the curves in Fig. 6 and relate to a spectral bandwidth of 1.0 nm and to two different levels $I_m = 10^{-10}$ and 10^{-11} $Wcm^{-2}nm^{-1}$ respectively. Included is furthermore the shift of the short wavelength limit caused by an assumed 50% reduction of ozone. This shift amounts to between 4.5 and 6.3 nm depending on latitude and on the assumed level I_m. There occur thus appreciable but by no means drastic shifts of the short wavelength limit as a consequence of a 50% ozone reduction. Differences of about 5 nm exist also in the values of λ_m for 0° and 73°N. latitude.

To compare conditions with maximum and minimum amounts of ozone the following cases may be considered:

Latitude Ø = 0° minimum amount of ozone X = 0.240 cm

maximum solar altitude $h_o = 90°$

I_m 10^{-10} Wcm^{-2} nm^{-1}

$\lambda_m = 287.7$ nm

Latitude Ø = 73° maximum amount of ozone X = 0.460 cm

maximum solar altitude h_o = 40°

$I_m = 10^{-10}$ $Wcm^{-2}nm^{-1}$

λ_m = 295.5 nm

The shift of λ_m which corresponds to the maximum natural variation of ozone amounts thus to 7.8 nm, as far as direct solar intensity is concerned.

The results on λ_m discussed above relate to solar altitudes $h_o > 40°$. For decreasing solar altitude the limit λ_m moves rapidly towards longer wavelengths.

Table 4. Short wavelength limit λ_m of the ultraviolet solar spectrum for the annual mean amount of ozone at selected latitudes and for an assumed 50% decrease of the ozone amount.

I_m Detectable minimum intensity (Wcm^{-2} nm^{-1})

Ø Latitude

h_o Solar altitude

λ_m Short wavelength limit (nm)

I_m	Ø	h_o	Ozone	λ_m	Shift
10^{-10}	73°N	40°	100%	294.4	5.0
			50%	289.4	
	40°N	60°	100%	290.7	5.0
			50%	285.7	
	0°	60°	100%	289.1	4.5
			50%	283.4	
10^{-11}	73°N	40°	100%	292.7	4.5
			50%	288.2	
	40°N	60°	100%	289.5	5.6
			50%	283.9	
	0°	60°	100%	287.8	6.3
			50%	281.5	

2.4. The variation of ultraviolet intensity in dependence on Northern Latitude

The total amount and vertical distribution of atmospheric ozone varies with season and in dependence on latitude and longitude. Average total amounts of ozone around each latitude circle of the Northern Hemisphere have been determined by London (18) for spring (March, April ,May), summer (June, July, August), fall (September, October, November), and winter (December, January, February). Similar values for the Southern Hemisphere have been published by Sticksel (19). The following results relate to the Northern Latitudes.

Table 5 shows the average ozone amount $\bar{X}(\emptyset)$ as a function of latitude for the four seasons. These figures have been determined from Fig. 4 of London's paper (18). Ozone increases towards North during all seasons and attains a maximum between $\emptyset = 60^\circ - 70^\circ$ (fall, winter, summer) or at $\emptyset = 90^\circ$ (spring). The seasonal variations are smallest at the equator and largest in polar latitudes.

The values h_{om} in Table 5 are maximum solar altitudes for the latitudes in question and for the round values of solar declination indicated for each season. The latter figures deviate only little from the mean values of declination representative for the season. The values h_{om} represent thus approximately the maximum or noon solar altitude for the latitude and the middle of the season.

Table 5. Mean total amount $\bar{X}(\emptyset)$ of atmospheric ozone around each latitude circle for the Northern Hemisphere according to London (18). Maximum solar altitude h_{om} for latitude $\emptyset$ and for the round values d of solar declination representative for the different seasons.

	Spring		Summer		Fall		Winter	
$\emptyset$	d = +10°		d = +20°		d = −10°		d = −20°	
(N)	$\bar{X}(\emptyset)$	h_{om}	$\bar{X}(\emptyset)$	h_{om}	$\bar{X}(\emptyset)$	h_{om}	$\bar{X}(\emptyset)$	h_{om}
0°	0.260	80°	0.256	70°	0.244	80°	0.241	70°
10°	0.268	90°	0.261	80°	0.253	70°	0.247	60°
20°	0.287	80°	0.273	90°	0.261	60°	0.260	50°
30°	0.313	70°	0.292	80°	0.270	50°	0.284	40°
40°	0.352	60°	0.314	70°	0.281	40°	0.318	30°
50°	0.395	50°	0.333	60°	0.299	30°	0.357	20°
60°	0.419	40°	0.346	50°	0.308	20°	0.373	10°
70°	0.430	30°	0.349	40°	0.307	10°	0.370	0°
80°	0.435	20°	0.347	30°	0.299	0°	0.364	
90°	0.436	10°	0.339	20°	0.290		0.361	

For examining the variation of ultraviolet intensity with latitude and season the various components have been computed for the values of $\bar{X}(\emptyset)$ and h_{om} in Table 5. The results are shown in Table C and illustrated in Figs. 7a–d for selected wavelengths and for global intensity. These results represent the approximate maximum intensity for noon. The values of $H(\lambda,h_o,X_o)$ obtained at Davos in "summer conditions" (ground not covered with snow) and "winter conditions" (all surrounding land covered with snow) respectively have been applied for the computations for all seasons. However, no seasonal or geographical variations of albedo have been taken into account. The data in Table C relate to "summer conditions". The corresponding results for "winter conditions" have also been computed for all latitudes and seasons, but are not included in this report. The increase in the measured values of sky intensity caused by the elevated albedo in winter is discussed in section 2.1.

The figures "−1.00E−00" in Table C refer to cases for which no values for the coefficient $T(\lambda,h_o)$ could be determined. The following remarks relate to the variation of the intensity and to the effects of the approximations applied.

The intensity of the components $S(\phi, \lambda)$, $S_n(\phi,\lambda)$ and $G(\phi,\lambda)$ decreases from $\phi = 20°N$ towards higher latitudes. The decrease is more pronounced for shorter wavelengths and higher latitudes. This trend can be explained by the combined effect of the varying amount $\bar{X}(\phi)$ of ozone and of the decreasing solar altitude h_{om}. For latitudes $\phi > 20°N$ the intensity attains a maximum in summer and a minimum in winter and follows thus the annual trend of noon solar altitude. The seasonal decrease of atmospheric ozone from a maximum in spring to a minimum in fall partly counteracts this trend, the effect of solar altitude is however dominant.

A similar variation is found for the values of sky intensity $H(\phi,\lambda)$ as far as latitudes $\phi > 40°N$ are concerned. However the results on sky intensity for $h_{om} > 70°$ are more or less affected by the approximation discussed in section 1.1.1. This applies to the summer values for $\phi < 40°N$ and to the spring values for $\phi < 30°N$. The same is true for the fall values for $\phi < 10°N$ and for the winter values for $\phi = 0°$. The resulting values for $H(\phi,\lambda)$ vary in these cases in dependence on $\bar{X}(\phi)$, but do not change from $h_{om} = 70°$ to $90°$. The errors introduced by this approximation are estimated in section 1.1.1. For $h_{om} = 90°$ and $\lambda = 297.5$, 302.5, and 305.0 nm the values for $H(\phi,\lambda)$ are too low by about 50%, 30% and 22% respectively. Such errors exist in the summer values for $\phi = 20°N$ and in the spring values for $\phi = 10°$. The errors are smaller for longer wavelengths and for solar altitudes h_{om} differing less from $h_{om} = 65°$.

The approximation involved in the values of $H(\phi,\lambda)$ influences also the results on global intensity $G(\phi,\lambda)$ for the latitudes and seasons relating to $h_{om} > 70°$ mentioned above. The values for global intensity are too low in these cases (see section 1.1.2). The errors are smaller than those produced in $H(\phi,\lambda)$ and attain about 17% at maximum. Errors of this amount exist in the results on $G(\phi,\lambda)$ for $\lambda = 297.5$ nm and for $\phi = 20°N$. in summer, and for $\phi = 10°N$. in spring. The corresponding errors for $\lambda = 302.5$ nm amount to $\approx 11\%$. Fluctuations of this magnitude can be caused by short period variations of ozone or turbidity. The accuracy for $G(\phi,\lambda)$ may therefore be satisfactory for most climatological applications, whereas the results on $H(\phi,\lambda)$ relating to $h_{om} > 80°$ and $\lambda \lesssim 310$ nm are seriously affected by the approximation applied.

Maps showing the hemispheric distribution of the mean total amount of atmospheric ozone in dependence on Northern Latitude and Longitude are presented in Figs. 1a – d and Fig. 2 of London's paper (18) for the four seasons and for the annual mean respectively. These curves cover an interval of $0.240 \leq X \leq 0.460$ cm in increments of $\Delta X = 0.020$ cm. Each curve relates to a given ozone amount X and to the corresponding spectra $I(\lambda,h_o,X,Z)$ of the components H,S,S_n, and G. Maps of the geographical distribution of ultraviolet radiation can be prepared by indicating the corresponding intensity $I(\lambda,h_o,X,Z)$ on each curve. The complete set of data covering the total interval of X in increments of $\Delta X = 0.020$ cm should be applied in place of the selected values contained in Table A.

A large number of graphs are needed to present all results in this way. Considering the number of different values of the parameters included in Table A and ignoring the tentative results for $Z = 4$ and 5 km we need 192 diagrams for each solar altitude and elevation or 768 diagrams for each solar altitude.

The curves of constant intensity obtained by means of this procedure do not relate to round values of intensity. Curves of constant round values of intensity could however be interpolated, if considered necessary.

3. The influence of clouds on ultraviolet radiation

Clouds may increase or decrease ultraviolet sky intensity and attenuate direct solar intensity in part or completely. The amount of the latter effect on global radiation depends on the ratio S_n/H of the vertical solar component to the sky component and decreases towards shorter wavelengths and lower solar altitudes.

The influence of clouds on sky intensity has been examined in a former report (5) for various kinds and amounts of cloud and for different solar altitudes. The main results may be resumed shortly. The ratio q of the intensities obtained with and without clouds was determined from measurements of sky intensity under various conditions at Davos (1590 m a.s.l.). The wavelength λ = 330 nm which is little affected by ozone absorption and λ = 370 nm which is not influenced by ozone have been chosen for this investigation. Mean values $\bar{q}$ of the ratio q averaged over all solar altitudes and relating to overcast sky are given in Table 6 for low, middle, and high clouds.

In general, the influence of clouds on ultraviolet sky intensity is relatively moderate for the wavelengths considered. Much larger values up to $\bar{q}$ = 6.2 have been found in a similar study (24) on the effect of clouds on total sky radiation ($0.3\,\mu \lesssim \lambda \lesssim 3.0\,\mu$), as measured by means of a thermoelectric pyranometer. The highest increase of ultraviolet sky intensity corresponding to ratios q = 2.05 and 2.32 for λ = 330 and 370 nm respectively was found for a homogeneous layer of cirrus clouds (Cs neb 10). Values as low as q = 0.06 were obtained on the other hand for h_o = 46.3° during a thunderstorm.

Table 6. Values of the mean ratio $\bar{q}$ for sky radiation of the overcast sky and for all kinds of low, middle, and high clouds. Amount of clouds 8/10 – 10/10.

S Summer period, ground not covered with snow

W Winter period, ground covered with snow

$\bar{q}$ Mean ratio of the values of sky intensity obtained with and without clouds respectively. Averaged over all solar altitudes considered.

n Number of values from which the means $\bar{q}$ have been taken.

s% Standard deviation of the values q around $\bar{q}$

Clouds	Season	λ = 330 nm			λ = 370 nm		
		$\bar{q}$	n	s%	$\bar{q}$	n	s%
Low clouds	S	0.85	37	53	1.03	37	52
inclusive	W	0.73	219	37	0.77	75	41
Cu and Cb	S + W	0.75	256	41	0.86	112	57
Middle clouds	S	0.70	10	63	0.86	10	65
"	W	0.91	41	22	0.94	18	27
"	S + W	0.87	51	31	0.92	28	41
High clouds	S	1.33	4	42	1.44	4	48
"	W	1.07	27	21	1.20	24	26
"	S + W	1.10	31	26	1.23	28	30

4. Concluding remarks

At present only a limited number of spectral data on ultraviolet sky and global intensity is available. Approximations to derive climatological results for different elevations and latitudes had to be applied for this investigation. More extensive measurements and computations are needed to establish a satisfactory climatology of ultraviolet radiation. The following suggestions for future work may be given.

Measuring program:
The intensity should thoroughly be studied in dependence on all parameters, such as ozone, elevation a.s.l., albedo, and turbidity.

Components to be measured:
In general, the radiation from sun, sky, and sun+sky on a horizontal surface has been recorded. The measurements should be extended to sky and global radiation received by differently orientated planes. In addition, measurements of ultraviolet sky radiance along various meridians of the hemisphere should be included. These components may even be more significant than solar, sky, or global radiation on a horizontal surface. Values of ultraviolet sky radiance are well suited for a comparison of measured and theoretically computed results on diffuse sky radiation, as has been discussed in a previous report (7).

Equipment:
Spectrophotometers of high spectral purity and high light power transmission are required to obtain reliable results for wavelengths below $\lambda \approx 320$ nm, where the intensity falls off steeply towards the short wavelength limit. Special attention should be paid to the method of calibration. Automation of the measuring processes and adequate facilities for data acquisition and processing are required to measure and evaluate the large number of data efficiently. A satisfactory compromise between the contradictory demands on sensitivity, accuracy and measuring speed must be found. Integrating spheres or similar devices allowing measurements of radiation from all directions according to the cosine law must be provided and adapted to the optics of the spectrophotometer.

Places of observation:
It would be difficult to analyse the results of measurements obtained in conditions where part of the principal parameters undergo large fluctuations. Plains with practically homogeneous distribution of albedo and clear air (e. g. at high elevations), or where ozone variations are small (at low latitudes) would be well suited for the basic program mentioned. The best solution might be a mobile station for radiation measurements which, within limits, would offer a larger choice of parameter values than a fixed station and facilitate measurements in special conditions. A mobile station for measuring the visible and near infrared intensity of all components mentioned is under development at the World Radiation Center, Davos Observatory. It is planned to extend the measurements to ultraviolet radiation.

Theoretical work:
The mathematical methods for examining the influence of ozone, turbidity, albedo, and elevation on sky and global intensity are available. This opportunity should be exploited to check the results of the basic measuring program. In addition, theoretical results on the world-wide distribution of ultraviolet intensity should be derived. Such data could be compared with the actual intensity and would allow to interpolate or extrapolate the results of measurements to different conditions.

It can be expected that a combined effort, based on measurements and theoretical work, will be the best approach to establish a reliable and comprehensive climatology of ultraviolet radiation

LIST OF REFERENCES

1. Bener, P.: Investigation on the spectral intensity of ultraviolet sky and sun+sky radiation under different conditions of cloudless weather at 1590 m a.s.l. Contract AF 61(052)–54, Technical Summary Report No. 1, Davos, December 1960.

2. Bener, P.: Investigation on the spectral intensity of ultraviolet sky and sun–sky radiation under various conditions at 1590 m a.s.l. Contract AF 61(052)–54. Final Technical Report, Davos, May 1962.

3. Bener, P.: Comparison of measured and theoretical values of the spectral intensity of ultraviolet sky radiation. Contract AF 61(052)–618. Technical Note No. 1, Davos, September 1962.

4. Bener, P.: The diurnal and annual variations of the spectral intensity of ultraviolet sky and global radiation on cloudless days at Davos, 1590 m a.s.l. Contract AF 61(052)–618. Technical Note No. 2, Davos, January 1963.

5. Bener, P.: Investigation on the influence of clouds on ultraviolet sky radiation (at 330 mμ and 370 mμ). Contract AF 61(052)–618, Technical Note No. 3, Davos March 1964.

6. Bener, P.: A new spectrophotometer for measuring ultraviolet sky brightness and direct solar radiation. Contract AF 61(052)–618, Final Scientific Report, Davos, April 1967.

7. Bener, P.: Measured and theoretical values of the spectral intensity of ultraviolet zenith radiation and direct solar radiation at 316, 1590, and 2818 m a.s.l. Contr. F 61052–67–C–0029, Final Scientific Report, Davos, July 1970.

8. Bener, P.: Solar intensity and intensity and polarization of sky radiation for 347.0, 488.0, and 533.5 nm at selected points along the sun's vertical and other meridians measured at 2818 m a.s.l. Final Technical Report, Contract DAJA 37–68–C–1017, Davos, August 1970.

9. Committee to examine and evaluate the state of knowledge of the effects of solar radiation between 230 and 320 nm upon man and other living organisms: Effects of ultraviolet radiation on man and other organisms. A report prepared for the Environmental Studies Board of the National Academy of Sciences/National Academy of Engineering, 2101 Constitution Avenue, Washington, D. C. 20418

10. Gotz, F.W.P.: Die kurzeste Wellenlange des Sonnenlichts Strahlentherapie 40, 690 (1931)

11. Gotz, F.W.P. and Casparis, Ph.: Photographie des ultravioletten Spektralendes Zeitschr. fur angewandte Photographie in Wissenschaft und Technik 4, 65, Heft 5, Nov. 1942

12. Larché, K., and Schulze, R.: Über ein UV-Messgerät mit Vorsatzkugel für Strahlungseinfall unter grossem Winkel. Zeitschr. techn. Physik 23, 144 (1942).

13. Bener, P.: Tages- und Jahresgang der spektralen Intensität der ultravioletten Global- und Himmelsstrahlung bei wolkenfreiem Himmel in Davos (1590 m/M.). Strahlentherapie 123, (2), 306 (1964)

14. Dave, J.V., and Furukawa, P.M.: Scattered radiation in the ozone absorption bands at selected levels of a terrestrial Rayleigh atmosphere. Meteorological Monographs, 7, No. 29, January 1966. Published by the American Meteorological Society, Boston, Mass., USA.

15. Thekaekara, M.P.: Proposed standard values of the solar constant and the solar spectrum. J. Environmental Sciences 13 (4) 6–9, Sept. – Oct. (1970).

16. Elterman, L.: UV, Visible, and IR attenuation for altitudes to 50 km, 1968, AFCRL–68–0135, April 1968, Environmental Research Papers, No. 285. Optical Physics Laboratory, Project 7670. Air Force Cambridge Research Laboratories, Bedford, Mass.

17. Vigroux, E.: Contribution à l'étude expérimentale de l'absorption de l'ozone. Ann. Phys. Ser. 12, vol. 8, p. 709 (1953).

18. London, J.: The distribution of total ozone in the Northern hemisphere. Beiträge zur Physik der freien Atmosphäre 36, 254–263, (1963).

19. Sticksel, Philip. R.: The annual variation of total ozone in the Southern hemisphere. Monthly Weather Review, 98, 787 (1970).

20. Johnston, H.: Reduction of stratospheric ozone by nitrogen oxide catalysts from supersonic transport exhaust. Science 173, 517, August 1971.

21. Tousey, R. et al.: Astrophys J. 119, 590 (1954)

22. Tousey, R. et al.: Rocket exploration of the upper atmosphere. Boyd, R. L. F. and Seaton, M. J., Editors, pp 189–199, Pergamon Press Ltd , London (1954).

23. Tousey, R.: The radiation of the sun. The Middle Ultraviolet, Green, A. E. S., Editor, John Wiley & Sons, New York 1966

24 Bener, P.: Der Einfluss der Bewolkung auf die Himmelsstrahlung. Arch Met Geophys. Biokl B., 12, 442 (1963)

25 Schulze, R and Grafe, K.: Consideration of sky ultraviolet radiation in the measurement of solar ultraviolet radiation In "The biologic effects of ultraviolet radiation", edited by Frederick Urbach. Pergamon Press, Oxford & New York, 1969

Table A. Approximate values of intensity for different components of natural ultraviolet radiation for cloudless sky and selected values of the principal parameters

Designations:

A. S. L.	Elevations a.s.l. in Km
LAMBDA	Wavelength in nm
OZONE	Total amount X of atmospheric ozone in cm at STP
H	Sky intensity $H(\lambda,h_o,X)$ from the whole sky on a horizontal surface
S	Direct solar intensity $S(\lambda,h_o,X,Z)$
SN	Vertical component $S_n(\lambda,h_o,X,Z)$ of direct solar intensity
G	Global intensity $G(\lambda,h_o,X,Z) = H + S_n$

The intensity is expressed in $Wcm^{-2}\ nm^{-1}$. The approximations applied for the computation of the data in this table are discussed in sections 1.1.1, 1.1.2, and 1.2. 1.72 −7 stands for $1.72\ 10^{-7}$.

SOLAR ALTITUDE = 5 DEGREES   OZONE: .240 CM

A.S.L.(KM)	LAMBDA:	297.5	300.0	302.5	305.0	307.5	310.0	312.5	315.0	317.5	320.0	325.0	330.0	340.0	360.0	380.0
	H	0.	0.	2.19E-09	7.04E-09	2.39E-08	4.05E-08	1.20E-07	2.24E-07	4.37E-07	6.95E-07	1.44E-06	2.03E-06	2.32E-06	3.03E-06	3.35E-06
0	S	0.	0.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	SH	0.	0.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	G	0.	0.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1	S	0.	0.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	SH	0.	0.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	G	0.	0.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2	S	0.	0.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	SH	0.	0.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	G	0.	0.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3	S	0.	0.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	SH	0.	0.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	G	0.	0.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4	S	0.	0.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	SH	0.	0.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	G	0.	0.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
5	S	0.	0.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	SH	0.	0.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	G	0.	0.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

SOLAR ALTITUDE = 10 DEGREES   OZONE: .240 CM

A.S.L.(KM)	LAMBDA:	297.5	300.0	302.5	305.0	307.5	310.0	312.5	315.0	317.5	320.0	325.0	330.0	340.0	360.0	380.0
	H	0.	0.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0	S	0.	0.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	SH	0.	0.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	G	0.	0.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1	S	0.	0.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	SH	0.	0.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	G	0.	0.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2	S	0.	0.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	SH	0.	0.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	G	0.	0.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3	S	0.	0.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	SH	0.	0.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	G	0.	0.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4	S	0.	0.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	SH	0.	0.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	G	0.	0.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
5	S	0.	0.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	SH	0.	0.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	G	0.	0.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

SOLAR ALTITUDE = 20 DEGREES OZONE: .240 CM

A.S.L.(KM)	LAMBDA:	297.5	300.0	302.5	305.0	307.5	310.0	312.5	315.0	317.5	320.0	325.0	330.0	340.0	360.0	380.0
	H	0.	6.55E-09	4.30E-08	2.15E-07	6.05E-07	1.14E-06	2.22E-06	3.30E-06	4.54E-06	6.12E-06	8.44E-06	1.09E-05	1.10E-05	1.11E-05	1.08E-05
0	S	0.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	SN	0.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	G	0.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1	S	0.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	SN	0.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	G	0.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2	S	0.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	SN	0.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	G	0.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3	S	0.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	SN	0.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	G	0.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4	S	0.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	SN	0.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	G	0.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
5	S	0.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	SN	0.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	G	0.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

SOLAR ALTITUDE = 40 DEGREES OZONE: .240 CM

A.S.L.(KM)	LAMBDA:	297.5	300.0	302.5	305.0	307.5	310.0	312.5	315.0	317.5	320.0	325.0	330.0	340.0	360.0	380.0
	H	2.59E-08	1.28E-07	4.66E-07	1.51E-06	2.74E-06	3.74E-06	6.63E-06	8.16E-06	1.07E-05	1.31E-05	1.57E-05	1.64E-05	1.83E-05	1.72E-05	1.71E-05
0	S	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	SN	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	G	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1	S	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	SN	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	G	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2	S	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	SN	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	G	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3	S	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	SN	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	G	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4	S	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	SN	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	G	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
6	S	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	SN	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	G	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

SOLAR ALTITUDE = 60 DEGREES OZONE: .240 CM

A.S.L.(KM)	LAMBDA:	297.5	300.0	302.5	305.0	307.5	310.0	312.5	315.0	317.5	320.0	325.0	330.0	340.0	360.0	380.0
	H	1.72E-07	4.40E-07	1.12E-06	2.02E-06	4.61E-06	6.79E-06	9.08E-06	1.14E-05	1.40E-05	1.67E-05	2.10E-05	2.25E-05	2.12E-05	2.03E-05	2.21E-05
0	S	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	SH	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	G	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1	S	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	SH	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	G	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2	S	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	SH	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	G	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3	S	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	SH	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	G	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4	S	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	SH	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	G	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
5	S	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	SH	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	G	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

SOLAR ALTITUDE = 90 DEGREES OZONE: .240 CM

A.S.L.(KM)	LAMBDA:	297.5	300.0	302.5	305.0	307.5	310.0	312.5	315.0	317.5	320.0	325.0	330.0	340.0	360.0	380.0
	H	2.19E-07	4.66E-07	1.27E-06	3.13E-06	4.80E-06	7.55E-06	1.02E-05	1.22E-05	1.54E-05	1.74E-05	2.31E-05	2.31E-05	2.13E-05	2.08E-05	2.31E-05
0	S	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	SH	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	G	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1	S	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	SH	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	G	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2	S	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	SH	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	G	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3	S	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	SH	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	G	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4	S	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	SH	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	G	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
5	S	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	SH	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	G	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

SOLAR ALTITUDE = 5 DEGREES   OZONE = .240 CM

A.S.L.(KM)	LAMBDA:	297.5	300.0	302.5	305.0	307.5	310.0	312.5	315.0	317.5	320.0	325.0	330.0	340.0	360.0	380.0
	H	0.	0.	1.25E-09	4.27E-09	1.49E-08	3.14E-08	6.91E-08	1.72E-07	3.42E-07	5.54E-07	1.22E-06	1.93E-06	2.32E-06	3.03E-06	3.35E-06
0	S	0.	0.	7.23E-19	1.24E-16	3.35E-15	5.27E-14	5.01E-13	2.66E-12	7.77E-12	2.06E-11	9.24E-11	3.08E-10	1.38E-09	5.04E-09	2.31E-08
	SN	0.	0.	6.30E-20	1.13E-17	2.92E-16	4.09E-15	4.30E-14	2.32E-13	6.77E-13	1.80E-12	8.07E-12	2.61E-11	1.05E-10	5.03E-10	2.01E-09
	G	0.	0.	1.25E-09	4.22E-09	1.49E-08	3.14E-08	6.97E-08	1.72E-07	3.42E-07	5.54E-07	1.22E-06	1.93E-06	2.32E-06	3.03E-06	3.31E-06
1	S	0.	0.	1.70E-17	3.38E-15	8.15E-14	1.23E-12	1.11E-11	5.66E-11	1.57E-10	3.95E-10	1.62E-09	4.67E-09	1.67E-08	4.77E-08	2.31E-07
	SN	0.	0.	1.44E-18	2.95E-16	7.10E-15	1.07E-13	9.68E-13	4.93E-12	1.37E-11	3.44E-11	1.41E-10	4.07E-10	1.45E-09	4.16E-09	1.91E-08
	G	0.	0.	1.25E-09	4.22E-09	1.49E-08	3.14E-08	6.97E-08	1.72E-07	3.42E-07	5.54E-07	1.22E-06	1.91E-06	2.32E-06	3.04E-06	3.37E-06
2	S	0.	0.	1.03E-16	2.62E-14	6.13E-13	6.79E-12	7.61E-11	3.60E-10	1.09E-09	2.41E-09	9.19E-09	2.57E-08	7.40E-08	2.73E-07	7.63E-07
	SN	0.	0.	1.42E-17	2.29E-15	5.34E-14	7.60E-13	6.63E-12	3.21E-11	9.52E-11	2.19E-10	8.01E-10	2.24E-09	6.07E-09	1.19E-08	6.72E-08
	G	0.	0.	1.29E-09	4.22E-09	1.49E-08	3.12E-08	6.97E-08	1.72E-07	3.42E-07	5.59E-07	1.22E-06	1.91E-06	2.33E-06	3.05E-06	3.42E-06
3	S	0.	0.	7.29E-16	1.14E-13	2.59E-12	3.51E-11	2.91E-10	1.37E-09	3.55E-09	4.37E-09	3.01E-08	7.91E-08	2.10E-07	6.35E-07	1.62E-06
	SN	0.	0.	6.35E-17	9.91E-15	2.22E-13	3.06E-12	2.54E-11	1.19E-10	3.10E-10	7.25E-10	2.62E-09	6.89E-09	1.90E-08	5.70E-08	1.45E-07
	G	0.	0.	1.29E-09	4.22E-09	1.50E-08	3.10E-08	6.97E-08	1.72E-07	3.42E-07	5.59E-07	1.22E-06	1.91E-06	2.34E-06	3.09E-06	3.49E-06
4	S	0.	0.	2.39E-15	3.57E-13	7.67E-12	1.02E-10	8.32E-10	3.74E-09	1.94E-08	2.17E-08	7.64E-08	1.60E-07	4.75E-07	1.29E-06	2.79E-06
	SN	0.	0.	2.60E-16	3.11E-14	6.69E-13	8.92E-12	7.25E-11	3.30E-10	1.37E-09	1.69E-09	6.66E-09	1.61E-08	4.15E-08	1.09E-07	2.42E-07
	G	0.	0.	1.29E-09	4.22E-09	1.50E-08	3.10E-08	6.96E-08	1.72E-07	3.43E-07	9.60E-07	1.23E-06	1.99E-06	2.30E-06	3.14E-06	3.59E-06
5	S	0.	0.	6.68E-15	9.59E-13	2.02E-11	2.61E-10	2.06E-09	9.16E-09	2.24E-08	4.98E-08	1.62E-07	3.60E-07	9.17E-07	3.11E-06	4.37E-06
	SN	0.	0.	5.82E-16	8.36E-14	1.76E-12	2.27E-11	1.79E-10	7.98E-10	1.99E-09	4.34E-09	1.41E-08	3.14E-08	7.99E-08	1.61E-07	3.80E-07
	G	0.	0.	1.29E-09	4.22E-09	1.53E-08	3.10E-08	6.99E-08	1.72E-07	3.44E-07	5.63E-07	1.23E-06	2.01E-06	2.49E-06	3.21E-06	3.73E-06

SOLAR ALTITUDE = 10 DEGREES   OZONE = .240 CM

A.S.L.(KM)	LAMBDA:	297.5	300.0	302.5	305.0	307.5	310.0	312.5	315.0	317.5	320.0	325.0	330.0	340.0	360.0	380.0
	H	0.	0.	3.47E-09	1.51E-08	9.42E-08	1.23E-07	3.75E-07	6.49E-07	1.32E-06	1.79E-06	3.03E-06	4.72E-06	5.23E-06	5.23E-06	6.45E-06
0	S	0.	0.	4.49E-13	1.17E-11	4.94E-11	5.01E-10	2.04E-09	9.75E-09	1.11E-08	2.01E-08	5.11E-08	1.06E-07	2.32E-07	5.43E-07	2.17E-06
	SN	0.	0.	7.80E-14	2.02E-12	1.59E-11	8.70E-11	3.54E-10	9.36E-10	1.97E-09	3.59E-09	9.02E-09	1.09E-08	4.03E-08	9.44E-08	2.04E-07
	G	0.	0.	3.47E-09	1.51E-08	9.42E-08	1.23E-07	3.75E-07	6.58E-07	1.32E-06	1.60E-06	3.10E-06	4.74E-06	5.33E-06	6.34E-06	6.05E-06
1	S	0.	0.	2.60E-12	6.77E-11	4.99E-10	2.73E-09	1.00E-08	2.96E-08	5.49E-08	9.04E-08	2.42E-07	4.77E-07	9.87E-07	2.03E-06	3.96E-06
	SN	0.	0.	4.46E-13	1.10E-11	8.60E-11	4.79E-10	1.00E-09	9.51E-09	9.71E-09	1.72E-08	4.21E-08	8.20E-08	1.06E-07	3.92E-07	5.87E-07
	G	0.	0.	3.47E-09	1.51E-08	9.43E-08	1.24E-07	3.70E-07	6.94E-07	1.33E-06	1.61E-06	3.13E-06	4.81E-06	5.44E-06	6.60E-06	7.14E-06
2	S	0.	0.	8.31E-12	2.04E-10	1.48E-09	7.60E-09	3.04E-08	8.17E-08	1.51E-07	2.62E-07	6.17E-07	1.17E-06	2.21E-06	4.73E-06	7.66E-06
	SN	0.	0.	1.44E-12	3.54E-11	2.57E-10	1.37E-09	5.23E-09	1.42E-08	2.62E-08	4.55E-08	1.07E-07	2.03E-07	3.91E-07	7.55E-07	1.33E-06
	G	0.	0.	3.47E-09	1.51E-08	9.44E-08	1.29E-07	3.60E-07	6.63E-07	1.35E-06	1.84E-06	2.20E-06	4.93E-06	5.67E-06	7.40E-06	7.78E-06
3	S	0.	0.	1.60E-11	4.49E-10	3.16E-09	1.65E-08	6.27E-08	1.69E-07	3.00E-07	5.10E-07	1.17E-06	2.15E-06	3.01E-06	6.07E-06	1.15E-05
	SN	0.	0.	3.23E-12	7.80E-11	5.53E-10	2.80E-09	1.09E-08	2.97E-08	5.21E-08	8.85E-08	2.03E-07	3.71E-07	6.92E-07	1.19E-06	1.99E-06
	G	0.	0.	3.47E-09	1.52E-08	9.47E-08	1.26E-07	3.69E-07	6.70E-07	1.37E-06	1.00E-06	3.29E-06	5.10E-06	5.99E-06	7.44E-06	8.44E-06
4	S	0.	0.	3.92E-11	8.32E-10	5.76E-09	2.99E-08	1.10E-07	2.86E-07	5.11E-07	8.54E-07	1.90E-06	3.41E-06	5.81E-06	9.72E-06	1.53E-05
	SN	0.	0.	6.12E-12	1.44E-10	1.00E-09	5.13E-09	1.92E-08	4.97E-08	8.87E-08	1.48E-07	3.30E-07	5.91E-07	1.01E-06	1.59E-06	2.66E-06
	G	0.	0.	3.47E-09	1.52E-08	9.52E-08	1.28E-07	3.94E-07	6.99E-07	1.41E-06	1.94E-06	3.42E-06	5.32E-06	6.30E-06	7.74E-06	9.11E-06
5	S	0.	0.	6.14E-11	1.42E-09	9.70E-09	4.09E-08	1.80E-07	4.61E-07	8.00E-07	1.34E-06	2.94E-06	5.04E-06	8.26E-06	1.30E-05	1.95E-05
	SN	0.	0.	1.07E-11	2.46E-10	1.68E-09	8.49E-09	3.12E-08	8.01E-08	1.40E-07	2.32E-07	5.03E-07	8.75E-07	1.43E-06	2.26E-06	3.39E-06
	G	0.	0.	3.48E-09	1.53E-08	9.59E-08	1.32E-07	4.06E-07	7.29E-07	1.46E-06	2.92E-06	3.59E-06	5.60E-06	6.72E-06	8.31E-06	9.04E-06

SOLAR ALTITUDE = 23 DEGREES   OZONE: .280 CM

A.S.L.(KM)	LAMBDA:	297.5	300.0	302.5	305.0	307.5	310.0	312.5	315.0	317.5	320.0	325.0	330.0	340.0	360.0	380.0
	H	0.	4.35E-09	2.19E-08	1.16E-07	3.55E-07	7.46E-07	1.63E-06	2.79E-06	3.88E-06	5.38E-06	7.72E-06	1.07E-05	1.10E-05	1.11E-05	1.05E-05
0	S	0.	2.44E-10	2.76E-09	1.67E-08	5.19E-08	1.30E-07	2.97E-07	5.32E-07	7.71E-07	1.04E-06	1.93E-06	2.94E-06	4.45E-06	5.31E-06	1.05E-05
	SN	0.	8.53E-11	9.44E-10	5.72E-09	1.78E-08	4.45E-08	1.02E-07	1.82E-07	2.64E-07	3.70E-07	6.61E-07	1.01E-06	1.52E-06	2.36E-06	3.65E-06
	G	0.	4.44E-09	2.28E-08	1.22E-07	3.72E-07	7.42E-07	1.79E-06	2.97E-06	4.15E-06	5.75E-06	8.30E-06	1.17E-05	1.25E-05	1.33E-05	1.42E-05
1	S	0.	6.41E-10	6.47E-09	4.10E-08	1.27E-07	3.28E-07	7.05E-07	1.25E-06	1.78E-06	2.47E-06	4.29E-06	6.48E-06	9.20E-06	1.37E-05	1.91E-05
	SN	0.	2.19E-10	2.38E-09	1.42E-08	4.33E-08	1.12E-07	2.41E-07	4.27E-07	6.10E-07	8.44E-07	1.47E-06	2.19E-06	3.18E-06	4.57E-06	6.77E-06
	G	0.	4.97E-09	2.43E-08	1.30E-07	3.98E-07	8.50E-07	1.93E-06	3.21E-06	4.49E-06	6.22E-06	9.19E-06	1.29E-05	1.42E-05	1.58E-05	1.74E-05
2	S	0.	1.17E-09	1.20E-08	7.37E-08	2.22E-07	5.67E-07	1.21E-06	2.11E-06	2.98E-06	4.09E-06	6.97E-06	1.02E-05	1.43E-05	2.02E-05	2.79E-05
	SN	0.	4.60E-10	4.28E-09	2.52E-08	7.61E-08	1.94E-07	4.13E-07	7.20E-07	1.02E-06	1.40E-06	2.34E-06	3.46E-06	4.91E-06	6.90E-06	9.53E-06
	G	0.	4.75E-09	2.62E-08	1.41E-07	4.31E-07	9.40E-07	2.10E-06	3.51E-06	4.90E-06	6.77E-06	1.01E-05	1.42E-05	1.59E-05	1.88E-05	2.01E-05
3	S	0.	1.60E-09	1.70E-08	1.11E-07	3.31E-07	6.35E-07	1.70E-06	3.04E-06	4.26E-06	5.74E-06	9.71E-06	1.39E-05	1.49E-05	2.57E-05	3.63E-05
	SN	0.	6.14E-10	6.51E-09	3.60E-08	1.13E-07	2.65E-07	6.01E-07	1.04E-06	1.46E-06	1.98E-06	3.32E-06	4.77E-06	6.51E-06	8.84E-06	1.17E-05
	G	0.	4.97E-09	2.64E-08	1.54E-07	4.60E-07	1.03E-06	2.29E-06	3.92E-06	5.34E-06	7.39E-06	1.19E-05	1.59E-05	1.75E-05	3.39E-05	2.23E-05
4	S	0.	2.52E-09	2.65E-08	1.63E-07	4.51E-07	1.13E-06	2.33E-06	4.04E-06	5.62E-06	7.59E-06	1.29E-05	1.77E-05	2.37E-05	3.08E-05	3.99E-05
	SN	0.	6.63E-10	9.06E-09	5.23E-08	1.54E-07	3.65E-07	8.09E-07	1.38E-06	1.92E-06	2.59E-06	4.28E-06	6.07E-06	8.09E-06	1.05E-05	1.37E-05
	G	0.	5.22E-09	3.10E-08	1.60E-07	5.09E-07	1.13E-06	2.49E-06	4.17E-06	5.40E-06	7.96E-06	1.23E-05	1.60E-05	1.91E-05	2.16E-05	2.43E-05
5	S	0.	3.40E-09	3.53E-08	2.01E-07	5.90E-07	1.46E-06	3.03E-06	5.17E-06	7.13E-06	9.53E-06	1.55E-05	2.17E-05	2.64E-05	3.33E-05	4.53E-05
	SN	0.	1.16E-09	1.21E-08	6.83E-08	2.02E-07	5.00E-07	1.04E-06	1.77E-06	2.44E-06	3.26E-06	5.32E-06	7.43E-06	9.71E-06	1.23E-05	1.55E-05
	G	0.	5.52E-09	3.40E-08	1.65E-07	5.57E-07	1.25E-06	2.72E-06	4.55E-06	6.32E-06	8.62E-06	1.38E-05	1.81E-05	2.07E-05	2.31E-05	2.61E-05

SOLAR ALTITUDE = 40 DEGREES   OZONE: .280 CM

A.S.L.(KM)	LAMBDA:	297.5	300.0	302.5	305.0	307.5	310.0	312.5	315.0	317.5	320.0	325.0	330.0	340.0	360.0	380.0
	H	1.44E-08	7.46E-08	3.48E-07	1.27E-06	2.21E-06	3.16E-06	5.91E-06	7.57E-06	9.91E-06	1.23E-05	1.51E-05	1.63E-05	1.63E-05	1.72E-05	1.71E-05
0	S	1.28E-08	6.97E-08	2.66E-07	7.33E-07	1.43E-06	2.43E-06	3.79E-06	5.32E-06	4.63E-06	8.12E-06	1.19E-05	1.56E-05	1.96E-05	2.47E-05	3.16E-05
	SN	8.23E-09	4.40E-08	1.71E-07	4.71E-07	8.99E-07	1.56E-06	2.44E-06	3.42E-06	4.26E-06	5.22E-06	7.64E-06	1.00E-05	1.23E-05	1.59E-05	1.83E-05
	G	2.26E-08	1.23E-07	5.19E-07	1.55E-06	3.10E-06	4.72E-06	8.35E-06	1.10E-05	1.42E-05	1.70E-05	2.27E-05	2.83E-05	3.03E-05	3.31E-05	3.74E-05
1	S	2.14E-08	1.15E-07	4.37E-07	1.14E-06	2.25E-06	3.88E-06	6.03E-06	8.40E-06	1.04E-05	1.26E-05	1.83E-05	2.36E-05	2.90E-05	3.56E-05	4.43E-05
	SN	1.38E-08	7.42E-08	2.81E-07	7.68E-07	1.45E-06	2.50E-06	3.87E-06	5.40E-06	6.67E-06	8.11E-06	1.16E-05	1.52E-05	1.86E-05	2.29E-05	2.85E-05
	G	2.82E-08	1.53E-07	6.29E-07	1.84E-06	3.65E-06	5.66E-06	9.78E-06	1.30E-05	1.66E-05	2.05E-05	2.68E-05	3.34E-05	3.63E-05	4.01E-05	4.56E-05
2	S	2.98E-08	1.59E-07	5.94E-07	1.62E-06	3.05E-06	5.21E-06	8.03E-06	1.11E-05	1.37E-05	1.69E-05	2.37E-05	3.03E-05	3.66E-05	4.38E-05	5.32E-05
	SN	1.91E-08	1.02E-07	3.89E-07	1.04E-06	1.96E-06	3.35E-06	5.16E-06	7.14E-06	8.79E-06	1.08E-05	1.53E-05	1.95E-05	2.35E-05	2.82E-05	3.42E-05
	G	3.35E-08	1.81E-07	7.32E-07	2.12E-06	4.16E-06	6.91E-06	1.11E-05	1.47E-05	1.87E-05	2.33E-05	3.03E-05	3.77E-05	4.10E-05	4.54E-05	5.13E-05
3	S	3.77E-08	2.00E-07	7.48E-07	2.02E-06	3.77E-06	6.40E-06	9.81E-06	1.35E-05	1.65E-05	1.99E-05	2.83E-05	3.58E-05	4.26E-05	4.79E-05	5.95E-05
	SN	2.43E-08	1.29E-07	4.81E-07	1.30E-06	2.42E-06	4.12E-06	6.31E-06	8.69E-06	1.06E-05	1.28E-05	1.82E-05	2.30E-05	2.74E-05	3.21E-05	3.83E-05
	G	3.87E-08	2.07E-07	8.29E-07	2.37E-06	4.63E-06	7.28E-06	1.22E-05	1.63E-05	2.05E-05	2.91E-05	3.33E-05	4.13E-05	4.97E-05	4.93E-05	5.54E-05
4	S	4.55E-08	2.40E-07	8.93E-07	2.39E-06	4.44E-06	7.51E-06	1.15E-05	1.57E-05	1.92E-05	2.29E-05	3.24E-05	4.07E-05	4.74E-05	5.49E-05	6.49E-05
	SN	2.93E-08	1.54E-07	5.74E-07	1.54E-06	2.85E-06	4.83E-06	7.38E-06	1.01E-05	1.23E-05	1.47E-05	2.04E-05	2.62E-05	3.37E-05	3.93E-05	4.15E-05
	G	4.37E-08	2.33E-07	9.22E-07	2.61E-06	5.06E-06	7.99E-06	1.33E-05	1.77E-05	2.22E-05	2.71E-05	3.59E-05	4.44E-05	4.90E-05	5.29E-05	5.88E-05
5	S	5.37E-08	2.82E-07	1.04E-06	2.74E-06	5.13E-06	8.64E-06	1.31E-05	1.80E-05	2.18E-05	2.60E-05	3.64E-05	4.54E-05	5.27E-05	3.97E-05	6.90E-05
	SN	3.45E-08	1.81E-07	6.70E-07	1.78E-06	3.30E-06	5.55E-06	8.45E-06	1.19E-05	1.40E-05	1.67E-05	2.34E-05	2.92E-05	3.39E-05	3.84E-05	4.43E-05
	G	4.89E-08	2.60E-07	1.02E-06	2.86E-06	5.50E-06	8.72E-06	1.44E-05	1.91E-05	2.39E-05	2.90E-05	3.85E-05	4.74E-05	5.22E-05	5.34E-05	6.14E-05

SOLAR ALTITUDE = 60 DEGREES OZONE: .280 CM

A.S.L.(KM)	LAMBDA:	297.5	300.0	302.5	305.0	307.5	310.0	312.5	315.0	317.5	320.0	325.0	330.0	340.0	360.0	380.0
	H	9.83E-08	2.75E-07	8.35E-07	2.28E-06	3.88E-06	5.97E-06	8.86E-06	1.08E-05	1.41E-05	1.61E-05	2.11E-05	2.23E-05	2.12E-05	2.03E-05	2.21E-05
0	S	1.09E-07	3.78E-07	1.05E-06	2.27E-06	3.74E-06	5.72E-06	8.09E-06	1.05E-05	1.25E-05	1.47E-05	2.05E-05	2.89E-05	3.03E-05	3.60E-05	4.38E-05
	SN	9.43E-08	3.27E-07	9.07E-07	1.97E-06	3.24E-06	4.96E-06	7.01E-06	9.13E-06	1.09E-05	1.28E-05	1.77E-05	2.21E-05	2.63E-05	3.12E-05	3.79E-05
	G	1.93E-07	6.07E-07	1.74E-06	4.24E-06	7.12E-06	1.09E-05	1.59E-05	1.99E-05	2.49E-05	2.88E-05	3.89E-05	4.44E-05	4.79E-05	5.19E-05	6.00E-05
1	S	1.60E-07	5.50E-07	1.51E-06	3.26E-06	5.32E-06	8.12E-06	1.14E-05	1.48E-05	1.75E-05	2.05E-05	2.81E-05	3.47E-05	4.66E-05	4.72E-05	5.62E-05
	SN	1.36E-07	4.70E-07	1.31E-06	2.82E-06	4.61E-06	7.03E-06	9.38E-06	1.28E-05	1.52E-05	1.77E-05	2.44E-05	3.01E-05	3.52E-05	4.09E-05	4.87E-05
	G	2.37E-07	7.50E-07	2.15E-06	5.10E-06	8.49E-06	1.30E-05	1.87E-05	2.36E-05	2.92E-05	3.36E-05	4.35E-05	5.24E-05	5.64E-05	6.12E-05	7.08E-05
2	S	2.04E-07	6.98E-07	1.91E-06	4.09E-06	6.66E-06	1.01E-05	1.41E-05	1.82E-05	2.15E-05	2.50E-05	3.41E-05	4.18E-05	4.82E-05	5.51E-05	6.44E-05
	SN	1.77E-07	6.05E-07	1.66E-06	3.55E-06	5.77E-06	8.74E-06	1.22E-05	1.58E-05	1.86E-05	2.17E-05	2.95E-05	3.62E-05	4.18E-05	4.77E-05	5.58E-05
	G	2.75E-07	8.84E-07	2.49E-06	5.82E-06	9.65E-06	1.47E-05	2.11E-05	2.66E-05	3.27E-05	3.77E-05	5.37E-05	5.85E-05	6.30E-05	6.80E-05	7.79E-05
3	S	2.43E-07	8.28E-07	2.26E-06	4.82E-06	7.80E-06	1.18E-05	1.64E-05	2.11E-05	2.48E-05	2.87E-05	3.89E-05	4.73E-05	5.40E-05	6.07E-05	7.00E-05
	SN	2.11E-07	7.17E-07	1.95E-06	4.17E-06	6.76E-06	1.02E-05	1.42E-05	1.83E-05	2.14E-05	2.49E-05	3.37E-05	4.10E-05	4.68E-05	5.26E-05	6.06E-05
	G	3.09E-07	9.97E-07	2.79E-06	6.45E-06	1.06E-05	1.62E-05	2.32E-05	2.91E-05	3.55E-05	4.09E-05	5.46E-05	6.33E-05	6.80E-05	7.28E-05	8.27E-05
4	S	2.80E-07	9.43E-07	2.57E-06	5.47E-06	8.82E-06	1.33E-05	1.84E-05	2.36E-05	2.76E-05	3.19E-05	4.30E-05	5.21E-05	5.89E-05	6.52E-05	7.44E-05
	SN	2.42E-07	8.21E-07	2.23E-06	4.74E-06	7.64E-06	1.15E-05	1.60E-05	2.04E-05	2.39E-05	2.76E-05	3.72E-05	4.51E-05	5.10E-05	5.64E-05	6.44E-05
	G	3.40E-07	1.10E-06	3.06E-06	7.01E-06	1.15E-05	1.74E-05	2.48E-05	3.13E-05	3.80E-05	4.37E-05	5.84E-05	6.74E-05	7.22E-05	7.57E-05	8.65E-05
5	S	3.16E-07	1.07E-06	2.89E-06	6.10E-06	9.82E-06	1.47E-05	2.04E-05	2.60E-05	3.04E-05	3.50E-05	4.69E-05	5.65E-05	6.33E-05	6.93E-05	7.81E-05
	SN	2.74E-07	9.25E-07	2.50E-06	5.29E-06	8.50E-06	1.27E-05	1.76E-05	2.25E-05	2.63E-05	3.03E-05	4.06E-05	4.89E-05	5.48E-05	6.00E-05	6.77E-05
	G	3.72E-07	1.20E-06	3.33E-06	7.56E-06	1.24E-05	1.87E-05	2.65E-05	3.34E-05	4.04E-05	4.64E-05	6.17E-05	7.12E-05	7.60E-05	8.03E-05	8.98E-05

SOLAR ALTITUDE = 90 DEGREES OZONE: .280 CM

A.S.L.(KM)	LAMBDA:	297.5	300.0	302.5	305.0	307.5	310.0	312.5	315.0	317.5	320.0	325.0	330.0	340.0	360.0	380.0
	H	1.25E-07	3.21E-07	9.48E-07	2.54E-06	4.10E-06	6.63E-06	9.31E-06	1.16E-05	1.46E-05	1.66E-05	2.24E-05	2.29E-05	2.19E-05	2.08E-05	2.31E-05
0	S	2.50E-07	7.28E-07	1.78E-06	3.52E-06	5.47E-06	7.98E-06	1.08E-05	1.37E-05	1.61E-05	1.86E-05	2.52E-05	3.08E-05	3.59E-05	4.16E-05	4.96E-05
	SN	2.50E-07	7.28E-07	1.78E-06	3.52E-06	5.47E-06	7.98E-06	1.08E-05	1.37E-05	1.61E-05	1.86E-05	2.52E-05	3.08E-05	3.59E-05	4.16E-05	4.96E-05
	G	3.75E-07	1.05E-06	2.73E-06	6.05E-06	9.57E-06	1.46E-05	2.02E-05	2.53E-05	3.07E-05	3.52E-05	4.76E-05	5.37E-05	5.78E-05	6.24E-05	7.27E-05
1	S	3.48E-07	1.01E-06	2.45E-06	4.81E-06	7.43E-06	1.08E-05	1.46E-05	1.84E-05	2.14E-05	2.47E-05	3.32E-05	4.03E-05	4.62E-05	5.26E-05	6.17E-05
	SN	3.48E-07	1.01E-06	2.45E-06	4.81E-06	7.43E-06	1.08E-05	1.46E-05	1.84E-05	2.14E-05	2.47E-05	3.32E-05	4.03E-05	4.62E-05	5.26E-05	6.17E-05
	G	4.73E-07	1.33E-06	3.40E-06	7.35E-06	1.15E-05	1.74E-05	2.39E-05	3.00E-05	3.60E-05	4.13E-05	5.50E-05	6.32E-05	6.81E-05	7.34E-05	8.44E-05
2	S	4.30E-07	1.24E-06	3.00E-06	5.36E-06	9.02E-06	1.30E-05	1.76E-05	2.21E-05	2.56E-05	2.94E-05	3.93E-05	4.73E-05	5.37E-05	6.02E-05	6.94E-05
	SN	4.30E-07	1.24E-06	3.00E-06	5.36E-06	9.02E-06	1.30E-05	1.76E-05	2.21E-05	2.56E-05	2.94E-05	3.93E-05	4.73E-05	5.37E-05	6.02E-05	6.94E-05
	G	5.55E-07	1.56E-06	3.95E-06	8.40E-06	1.31E-05	1.97E-05	2.69E-05	3.36E-05	4.02E-05	4.60E-05	6.10E-05	7.02E-05	7.56E-05	8.10E-05	9.29E-05
3	S	5.01E-07	1.44E-06	3.46E-06	6.75E-06	1.03E-05	1.49E-05	2.00E-05	2.50E-05	2.89E-05	3.31E-05	4.40E-05	5.27E-05	5.92E-05	6.54E-05	7.46E-05
	SN	5.01E-07	1.44E-06	3.46E-06	6.75E-06	1.03E-05	1.49E-05	2.00E-05	2.50E-05	2.89E-05	3.31E-05	4.40E-05	5.27E-05	5.92E-05	6.54E-05	7.46E-05
	G	6.27E-07	1.76E-06	4.41E-06	9.26E-06	1.44E-05	2.15E-05	2.93E-05	3.66E-05	4.35E-05	4.97E-05	6.64E-05	7.56E-05	8.11E-05	8.62E-05	9.77E-05
4	S	5.66E-07	1.62E-06	3.88E-06	7.53E-06	1.15E-05	1.65E-05	2.21E-05	2.76E-05	3.18E-05	3.63E-05	4.80E-05	5.72E-05	6.38E-05	6.96E-05	7.83E-05
	SN	5.66E-07	1.62E-06	3.88E-06	7.53E-06	1.15E-05	1.65E-05	2.21E-05	2.76E-05	3.18E-05	3.63E-05	4.80E-05	5.72E-05	6.38E-05	6.96E-05	7.83E-05
	G	6.91E-07	1.94E-06	4.83E-06	1.01E-05	1.56E-05	2.31E-05	3.14E-05	3.92E-05	4.64E-05	5.29E-05	7.04E-05	8.02E-05	8.57E-05	9.04E-05	1.02E-04
5	S	6.29E-07	1.79E-06	4.28E-06	8.28E-06	1.26E-05	1.81E-05	2.41E-05	3.01E-05	3.45E-05	3.93E-05	5.17E-05	6.14E-05	6.79E-05	7.35E-05	8.23E-05
	SN	6.29E-07	1.79E-06	4.28E-06	8.28E-06	1.26E-05	1.81E-05	2.41E-05	3.01E-05	3.45E-05	3.93E-05	5.17E-05	6.14E-05	6.79E-05	7.35E-05	8.23E-05
	G	7.54E-07	2.11E-06	5.23E-06	1.08E-05	1.67E-05	2.47E-05	3.34E-05	4.16E-05	4.92E-05	5.59E-05	7.41E-05	8.43E-05	8.96E-05	9.43E-05	1.03E-04

SOLAR ALTITUDE = 5 DEGREES OZONE: .320 CM

A.S.L.(KM)	LAMBDA:	297.5	300.0	302.5	305.0	307.5	310.0	312.5	315.0	317.5	320.0	325.0	330.0	340.0	360.0	380.0
	H	0.	0.	7.15E-10	2.03E-09	9.34E-09	2.08E-08	6.13E-08	1.31E-07	2.67E-07	4.49E-07	1.03E-06	1.92E-06	2.32E-06	3.03E-06	3.39E-06
0	S	0.	0.	7.94E-20	2.76E-17	1.06E-15	2.32E-14	2.85E-13	1.61E-12	5.80E-12	1.67E-11	8.29E-11	2.88E-10	1.20E-09	5.08E-09	2.36E-08
	SN	0.	0.	6.92E-21	2.41E-18	9.24E-17	2.02E-15	2.48E-14	1.58E-13	5.06E-13	1.46E-12	7.23E-12	2.51E-11	1.05E-10	5.12E-10	2.06E-09
	G	0.	0.	7.15E-10	2.53E-09	9.34E-09	2.08E-08	6.13E-08	1.31E-07	2.67E-07	4.49E-07	1.03E-06	1.92E-06	2.32E-06	3.03E-06	3.35E-06
1	S	0.	0.	2.19E-18	7.24E-16	2.58E-14	5.41E-13	6.32E-12	3.85E-11	1.17E-10	3.21E-10	1.45E-09	4.68E-09	1.67E-08	6.77E-08	2.25E-07
	SN	0.	0.	1.91E-19	6.31E-17	2.25E-15	4.72E-14	5.50E-13	3.35E-12	1.02E-11	2.79E-11	1.26E-10	4.08E-10	1.46E-09	5.90E-09	1.96E-08
	G	0.	0.	7.15E-10	2.53E-09	9.34E-09	2.08E-08	6.13E-08	1.31E-07	2.67E-07	4.49E-07	1.03E-06	1.92E-06	2.32E-06	3.04E-06	3.37E-06
2	S	0.	0.	1.79E-17	5.62E-15	1.94E-13	3.86E-12	4.32E-11	2.50E-10	7.39E-10	1.96E-09	8.23E-09	2.47E-08	7.88E-08	2.73E-07	7.69E-07
	SN	0.	0.	1.56E-18	4.90E-16	1.69E-14	3.37E-13	3.77E-12	2.18E-11	6.44E-11	1.71E-10	7.17E-10	2.15E-09	6.87E-09	2.38E-08	6.70E-08
	G	0.	0.	7.15E-10	2.53E-09	9.34E-09	2.08E-08	6.14E-08	1.31E-07	2.67E-07	4.49E-07	1.04E-06	1.93E-06	2.33E-06	3.05E-06	3.42E-06
3	S	0.	0.	8.01E-17	2.43E-14	8.07E-13	1.54E-11	1.65E-10	9.28E-10	2.65E-09	6.75E-09	2.69E-08	7.59E-08	2.18E-07	6.54E-07	1.63E-06
	SN	0.	0.	6.98E-18	2.12E-15	7.04E-14	1.34E-12	1.44E-11	8.09E-11	2.31E-10	5.88E-10	2.35E-09	6.62E-09	1.90E-08	5.70E-08	1.42E-07
	G	0.	0.	7.15E-10	2.53E-09	9.34E-09	2.08E-08	6.14E-08	1.32E-07	2.67E-07	4.49E-07	1.04E-06	1.93E-06	2.34E-06	3.09E-06	3.49E-06
4	S	0.	0.	2.62E-16	7.64E-14	2.43E-12	4.50E-11	4.73E-10	2.57E-09	7.13E-09	1.76E-08	6.65E-08	1.80E-07	4.76E-07	1.25E-06	2.79E-06
	SN	0.	0.	2.28E-17	6.66E-15	2.12E-13	3.92E-12	4.12E-11	2.24E-10	6.21E-10	1.53E-09	5.80E-09	1.57E-08	4.15E-08	1.09E-07	2.43E-07
	G	0.	0.	7.15E-10	2.53E-09	9.34E-09	2.08E-08	6.14E-08	1.32E-07	2.68E-07	4.50E-07	1.04E-06	1.94E-06	2.36E-06	3.14E-06	3.59E-06
5	S	0.	0.	7.34E-16	2.05E-13	6.40E-12	1.15E-10	1.17E-09	6.22E-09	1.67E-08	4.04E-08	1.45E-07	3.73E-07	9.17E-07	2.14E-06	4.37E-06
	SN	0.	0.	6.40E-17	1.79E-14	5.58E-13	9.99E-12	1.02E-10	5.42E-10	1.46E-09	3.52E-09	1.26E-08	3.25E-08	7.99E-08	1.87E-07	3.80E-07
	G	0.	0.	7.15E-10	2.53E-09	9.34E-09	2.08E-08	6.14E-08	1.32E-07	2.69E-07	4.52E-07	1.05E-06	1.96E-06	2.40E-06	3.22E-06	3.73E-06

SOLAR ALTITUDE = 10 DEGREES OZONE: .320 CM

A.S.L.(KM)	LAMBDA:	297.5	300.0	302.5	305.0	307.5	310.0	312.5	315.0	317.5	320.0	325.0	330.0	340.0	360.0	380.0
	H	0.	0.	1.83E-09	7.94E-09	2.93E-08	7.05E-08	2.42E-07	4.91E-07	1.01E-06	1.44E-06	2.70E-06	4.60E-06	5.29E-06	6.25E-06	6.45E-06
0	S	0.	0.	1.12E-13	4.41E-12	4.33E-11	2.99E-10	1.43E-09	4.50E-09	9.22E-09	1.77E-08	4.84E-08	1.04E-07	2.32E-07	5.43E-07	1.17E-06
	SN	0.	0.	1.94E-14	7.66E-13	7.52E-12	5.18E-11	2.48E-10	7.82E-10	1.60E-09	3.07E-09	8.41E-09	1.80E-08	4.03E-08	9.44E-08	2.04E-07
	G	0.	0.	1.83E-09	7.94E-09	2.93E-08	7.05E-08	2.42E-07	4.91E-07	1.01E-06	1.44E-06	2.70E-06	4.61E-06	5.33E-06	6.34E-06	6.65E-06
1	S	0.	0.	6.66E-13	2.56E-11	2.42E-10	1.63E-09	7.57E-09	2.34E-08	4.65E-08	8.67E-08	2.26E-07	4.65E-07	9.57E-07	2.03E-06	3.96E-06
	SN	0.	0.	1.16E-13	4.45E-12	4.20E-11	2.83E-10	1.31E-09	4.06E-09	8.08E-09	1.50E-08	3.92E-08	8.07E-08	1.66E-07	3.52E-07	[illegible]
	G	0.	0.	1.83E-09	7.95E-09	2.93E-08	7.08E-08	2.43E-07	4.95E-07	1.02E-06	1.46E-06	2.74E-06	4.68E-06	5.46E-06	6.60E-06	7.14E-06
2	S	0.	0.	2.07E-12	7.72E-11	7.16E-10	4.69E-09	2.13E-08	6.40E-08	1.25E-07	2.30E-07	5.76E-07	1.14E-06	2.20E-06	4.29E-06	7.56E-06
	SN	0.	0.	3.59E-13	1.34E-11	1.24E-10	8.15E-10	3.70E-09	1.11E-08	2.18E-08	3.99E-08	1.00E-07	1.98E-07	3.83E-07	7.45E-07	1.33E-06
	G	0.	0.	1.83E-09	7.96E-09	2.94E-08	7.13E-08	2.46E-07	5.82E-07	1.03E-06	1.48E-06	2.80E-06	4.79E-06	5.67E-06	7.00E-06	7.73E-06
3	S	0.	0.	4.63E-12	1.70E-10	1.54E-09	9.89E-09	4.39E-08	1.30E-07	2.50E-07	4.47E-07	1.09E-06	2.08E-06	3.81E-06	6.87E-06	1.15E-05
	SN	0.	0.	8.03E-13	2.95E-11	2.68E-10	1.72E-09	7.63E-09	2.25E-08	4.34E-08	7.76E-08	1.89E-07	3.62E-07	6.62E-07	1.19E-06	1.99E-06
	G	0.	0.	1.83E-09	7.97E-09	2.96E-08	7.22E-08	2.50E-07	5.13E-07	1.05E-06	1.52E-06	2.89E-06	4.96E-06	5.95E-06	7.44E-06	8.44E-06
4	S	0.	0.	8.76E-12	3.15E-10	2.79E-09	1.76E-08	7.73E-08	2.25E-07	4.25E-07	7.48E-07	1.77E-06	3.32E-06	5.81E-06	9.72E-06	1.53E-05
	SN	0.	0.	1.52E-12	5.47E-11	4.85E-10	3.06E-09	1.34E-08	3.90E-08	7.38E-08	1.30E-07	3.08E-07	5.76E-07	1.01E-06	1.59E-06	2.66E-06
	G	0.	0.	1.83E-09	9.00E-09	2.95E-08	7.36E-08	2.56E-07	5.30E-07	1.08E-06	1.57E-06	3.00E-06	5.17E-06	6.30E-06	7.34E-06	9.11E-06
5	S	0.	0.	1.53E-11	5.36E-10	4.70E-09	2.91E-08	1.26E-07	3.61E-07	6.73E-07	1.17E-06	2.70E-06	4.91E-06	8.26E-06	1.30E-05	1.95E-05
	SN	0.	0.	2.65E-12	9.31E-11	8.17E-10	5.06E-09	2.19E-08	6.28E-08	1.17E-07	2.03E-07	4.69E-07	8.53E-07	1.43E-06	2.26E-06	3.39E-06
	G	0.	0.	1.83E-09	8.04E-09	3.01E-08	7.56E-08	2.64E-07	5.53E-07	1.13E-06	1.64E-06	3.16E-06	5.45E-06	6.72E-06	8.51E-06	9.84E-06

SOLAR ALTITUDE = 20 DEGREES   OZONE: .320 CM

A.S.L.(KM)	LAMBDA:	297.5	300.0	302.5	305.0	307.5	310.0	312.5	315.0	317.5	320.0	325.0	330.0	340.0	360.0	380.0
	H	0.	2.22E-09	1.12E-08	6.27E-08	2.08E-07	4.88E-07	1.28E-06	2.35E-06	3.32E-06	4.72E-06	7.07E-06	1.05E-05	1.10E-05	1.11E-05	1.26E-05
0	S	0.	8.55E-11	1.29E-09	9.85E-09	3.50E-08	1.03E-07	2.45E-07	4.66E-07	6.97E-07	1.01E-06	1.86E-06	2.90E-06	4.45E-06	6.91E-06	1.05E-05
	SN	0.	2.92E-11	4.42E-10	3.37E-09	1.20E-08	3.51E-08	8.37E-08	1.59E-07	2.38E-07	3.45E-07	6.36E-07	9.91E-07	1.52E-06	2.36E-06	3.60E-06
	G	0.	2.25E-09	1.16E-08	6.60E-08	2.20E-07	5.24E-07	1.37E-06	2.51E-06	3.56E-06	5.07E-06	7.70E-06	1.15E-05	1.25E-05	1.35E-05	1.42E-05
1	S	0.	2.20E-10	3.27E-09	2.45E-08	8.54E-08	2.47E-07	5.81E-07	1.09E-06	1.61E-06	2.30E-06	4.13E-06	6.31E-06	9.29E-06	1.37E-05	1.98E-05
	SN	0.	7.51E-11	1.12E-09	8.39E-09	2.92E-08	8.45E-08	1.99E-07	3.74E-07	5.52E-07	7.86E-07	1.41E-06	2.16E-06	3.18E-06	4.67E-06	6.77E-06
	G	0.	2.29E-09	1.23E-08	7.11E-08	2.37E-07	5.73E-07	1.48E-06	2.72E-06	3.87E-06	5.51E-06	8.48E-06	1.27E-05	1.42E-05	1.56E-05	1.74E-05
2	S	0.	4.01E-10	5.87E-09	4.34E-08	1.50E-07	4.23E-07	9.95E-07	1.84E-06	2.70E-06	3.81E-06	6.71E-06	1.00E-05	1.43E-05	2.02E-05	2.79E-05
	SN	0.	1.37E-10	2.01E-09	1.49E-08	5.13E-08	1.46E-07	3.40E-07	6.31E-07	9.23E-07	1.30E-06	2.30E-06	3.44E-06	4.90E-06	6.90E-06	9.53E-06
	G	0.	2.35E-09	1.32E-08	7.75E-08	2.60E-07	6.35E-07	1.62E-06	2.98E-06	4.24E-06	6.02E-06	9.36E-06	1.39E-05	1.59E-05	1.90E-05	2.01E-05
3	S	0.	6.16E-10	8.92E-09	6.54E-08	2.23E-07	6.30E-07	1.45E-06	2.66E-06	3.86E-06	5.38E-06	9.35E-06	1.37E-05	1.90E-05	2.57E-05	3.43E-05
	SN	0.	2.11E-10	3.05E-09	2.24E-08	7.64E-08	2.15E-07	4.95E-07	9.10E-07	1.32E-06	1.84E-06	3.20E-06	4.70E-06	6.51E-06	8.80E-06	1.17E-05
	G	0.	2.43E-09	1.42E-08	8.51E-08	2.85E-07	7.04E-07	1.76E-06	3.26E-06	4.64E-06	6.56E-06	1.03E-05	1.52E-05	1.75E-05	1.99E-05	2.23E-05
4	S	0.	8.65E-10	1.24E-08	9.01E-08	3.04E-07	8.49E-07	1.94E-06	3.54E-06	5.08E-06	7.03E-06	1.20E-05	1.75E-05	2.37E-05	3.08E-05	3.99E-05
	SN	0.	2.96E-10	4.25E-09	3.08E-08	1.04E-07	2.90E-07	6.63E-07	1.21E-06	1.74E-06	2.40E-06	4.12E-06	5.98E-06	8.09E-06	1.05E-05	1.37E-05
	G	0.	2.51E-09	1.54E-08	9.35E-08	3.12E-07	7.79E-07	1.95E-06	3.56E-06	5.06E-06	7.12E-06	1.12E-05	1.65E-05	1.91E-05	2.16E-05	2.43E-05
5	S	0.	1.17E-09	1.66E-08	1.19E-07	3.98E-07	1.10E-06	2.50E-06	4.53E-06	6.45E-06	8.87E-06	1.50E-05	2.14E-05	2.84E-05	3.59E-05	4.53E-05
	SN	0.	3.99E-10	5.66E-09	4.06E-08	1.36E-07	3.77E-07	8.54E-07	1.55E-06	2.21E-06	3.03E-06	5.12E-06	7.33E-06	9.71E-06	1.23E-05	1.55E-05
	G	0.	2.62E-09	1.68E-08	1.03E-07	3.44E-07	8.66E-07	2.14E-06	3.90E-06	5.53E-06	7.75E-06	1.22E-05	1.78E-05	2.07E-05	2.34E-05	2.61E-05

SOLAR ALTITUDE = 40 DEGREES   OZONE: .320 CM

A.S.L.(KM)	LAMBDA:	297.5	300.0	302.5	305.0	307.5	310.0	312.5	315.0	317.5	320.0	325.0	330.0	340.0	360.0	380.0
	H	8.01E-09	5.15E-08	2.49E-07	8.18E-07	1.75E-06	2.65E-06	5.26E-06	7.03E-06	9.20E-06	1.16E-05	1.45E-05	1.82E-05	1.83E-05	1.72E-05	1.71E-05
0	S	5.63E-09	3.90E-08	1.77E-07	5.50E-07	1.13E-06	2.08E-06	3.42E-06	4.95E-06	6.28E-06	7.81E-06	1.17E-05	1.55E-05	1.96E-05	2.47E-05	3.10E-05
	SN	3.62E-09	2.51E-08	1.14E-07	3.54E-07	7.26E-07	1.34E-06	2.20E-06	3.18E-06	4.04E-06	5.02E-06	7.52E-06	9.93E-06	1.26E-05	1.59E-05	2.03E-05
	G	1.16E-08	7.66E-08	3.62E-07	1.17E-06	2.47E-06	3.99E-06	7.46E-06	1.02E-05	1.32E-05	1.66E-05	2.20E-05	2.81E-05	3.09E-05	3.31E-05	3.74E-05
1	S	9.41E-09	6.46E-08	2.90E-07	8.96E-07	1.82E-06	3.33E-06	5.43E-06	7.82E-06	9.84E-06	1.21E-05	1.79E-05	2.34E-05	2.96E-05	3.56E-05	4.43E-05
	SN	6.05E-09	4.15E-08	1.86E-07	5.76E-07	1.17E-06	2.14E-06	3.49E-06	5.03E-06	6.32E-06	7.80E-06	1.15E-05	1.51E-05	1.86E-05	2.29E-05	2.85E-05
	G	1.41E-08	9.30E-08	4.35E-07	1.39E-06	2.92E-06	4.79E-06	8.75E-06	1.21E-05	1.55E-05	1.94E-05	2.60E-05	3.32E-05	3.69E-05	4.01E-05	4.50E-05
2	S	1.31E-08	8.91E-08	3.97E-07	1.22E-06	2.46E-06	4.47E-06	7.23E-06	1.03E-05	1.29E-05	1.59E-05	2.33E-05	3.00E-05	3.66E-05	4.38E-05	5.32E-05
	SN	8.41E-09	5.72E-08	2.55E-07	7.82E-07	1.58E-06	2.87E-06	4.65E-06	6.65E-06	8.32E-06	1.02E-05	1.49E-05	1.93E-05	2.35E-05	2.82E-05	3.42E-05
	G	1.64E-08	1.09E-07	5.04E-07	1.60E-06	3.33E-06	5.52E-06	9.91E-06	1.37E-05	1.75E-05	2.18E-05	2.94E-05	3.75E-05	4.18E-05	4.54E-05	5.13E-05
3	S	1.66E-08	1.12E-07	4.96E-07	1.51E-06	3.04E-06	5.49E-06	8.83E-06	1.26E-05	1.57E-05	1.91E-05	2.78E-05	3.55E-05	4.26E-05	4.99E-05	5.95E-05
	SN	1.07E-08	7.20E-08	3.19E-07	9.74E-07	1.96E-06	3.53E-06	5.68E-06	8.08E-06	1.01E-05	1.23E-05	1.78E-05	2.28E-05	2.74E-05	3.21E-05	3.83E-05
	G	1.57E-08	1.24E-07	5.68E-07	1.79E-06	3.70E-06	6.18E-06	1.09E-05	1.51E-05	1.93E-05	2.39E-05	3.23E-05	4.10E-05	4.57E-05	4.93E-05	5.54E-05
4	S	2.00E-08	1.34E-07	5.92E-07	1.80E-06	3.59E-06	6.45E-06	[illegible]	1.46E-05	1.82E-05	2.21E-05	3.18E-05	4.04E-05	4.78E-05	5.49E-05	6.45E-05
	SN	1.29E-08	8.64E-08	3.81E-07	1.16E-06	2.31E-06	4.14E-06	6.64E-06	9.41E-06	1.17E-05	1.42E-05	2.04E-05	2.60E-05	3.07E-05	3.53E-05	4.15E-05
	G	2.09E-08	1.38E-07	6.30E-07	1.97E-06	4.05E-06	6.79E-06	1.19E-05	1.64E-05	2.09E-05	2.58E-05	3.49E-05	4.41E-05	4.90E-05	5.25E-05	5.86E-05
5	S	2.36E-08	1.58E-07	6.91E-07	2.08E-06	4.14E-06	7.42E-06	1.18E-05	1.67E-05	2.06E-05	2.50E-05	3.57E-05	4.50E-05	5.27E-05	5.97E-05	6.90E-05
	SN	1.52E-08	1.01E-07	4.44E-07	1.34E-06	2.66E-06	4.77E-06	7.60E-06	1.07E-05	1.33E-05	1.61E-05	2.29E-05	2.90E-05	3.39E-05	3.84E-05	4.43E-05
	G	2.32E-08	1.53E-07	6.93E-07	2.16E-06	4.41E-06	7.41E-06	1.29E-05	1.78E-05	2.25E-05	2.77E-05	3.74E-05	4.71E-05	5.22E-05	5.56E-05	6.14E-05

SOLAR ALTITUDE = 60 DEGREES OZONE: .320 CM

A.S.L.(KM)	LAMBDA:	297.5	300.0	302.5	305.0	307.5	310.0	312.5	315.0	317.5	320.0	325.0	330.0	340.0	360.0	380.0
	H	5.62E-08	1.92E-07	6.23E-07	1.84E-06	3.28E-06	5.24E-06	8.11E-06	1.02E-05	1.33E-05	1.53E-05	2.04E-05	2.22E-05	2.12E-05	2.03E-05	2.21E-05
0	S	5.91E-08	2.45E-07	7.71E-07	1.83E-06	3.19E-06	5.11E-06	7.48E-06	1.00E-05	1.20E-05	1.43E-05	2.02E-05	2.53E-05	3.03E-05	3.60E-05	4.38E-05
	SN	5.12E-08	2.12E-07	6.68E-07	1.59E-06	2.76E-06	4.42E-06	6.48E-06	8.66E-06	1.04E-05	1.24E-05	1.75E-05	2.19E-05	2.63E-05	3.12E-05	3.73E-05
	G	1.07E-07	4.04E-07	1.29E-06	3.43E-06	6.03E-06	9.66E-06	1.46E-05	1.89E-05	2.37E-05	2.77E-05	3.79E-05	4.41E-05	4.75E-05	5.15E-05	6.08E-05
1	S	8.65E-08	3.57E-07	1.11E-06	2.63E-06	4.54E-06	7.24E-06	1.06E-05	1.40E-05	1.68E-05	1.99E-05	2.77E-05	3.45E-05	4.06E-05	4.72E-05	8.62E-05
	SN	7.49E-08	3.09E-07	9.65E-07	2.28E-06	3.93E-06	6.27E-06	9.14E-06	1.22E-05	1.46E-05	1.72E-05	2.40E-05	2.99E-05	3.52E-05	4.09E-05	4.87E-05
	G	1.31E-07	5.01E-07	1.59E-06	4.12E-06	7.21E-06	1.15E-05	1.72E-05	2.24E-05	2.79E-05	3.25E-05	4.44E-05	5.21E-05	5.64E-05	6.12E-05	7.88E-05
2	S	1.11E-07	4.53E-07	1.41E-06	3.31E-06	5.68E-06	9.01E-06	1.31E-05	1.73E-05	2.06E-05	2.43E-05	3.36E-05	4.15E-05	4.82E-05	5.51E-05	6.44E-05
	SN	9.57E-08	3.92E-07	1.22E-06	2.86E-06	4.92E-06	7.80E-06	1.13E-05	1.50E-05	1.79E-05	2.10E-05	2.91E-05	3.60E-05	4.18E-05	4.77E-05	5.58E-05
	G	1.52E-07	5.84E-07	1.84E-06	4.71E-06	8.19E-06	1.30E-05	1.94E-05	2.52E-05	3.12E-05	3.44E-05	4.95E-05	5.81E-05	6.30E-05	6.80E-05	7.79E-05
3	S	1.32E-07	5.37E-07	1.66E-06	3.89E-06	6.65E-06	1.05E-05	1.52E-05	2.00E-05	2.38E-05	2.79E-05	3.83E-05	4.70E-05	5.46E-05	6.07E-05	7.03E-05
	SN	1.14E-07	4.65E-07	1.44E-06	3.37E-06	5.76E-06	9.10E-06	1.31E-05	1.73E-05	2.06E-05	2.41E-05	3.32E-05	4.07E-05	4.68E-05	5.25E-05	6.06E-05
	G	1.70E-07	6.58E-07	2.06E-06	5.21E-06	9.04E-06	1.43E-05	2.12E-05	2.75E-05	3.39E-05	3.95E-05	4.36E-05	6.29E-05	6.80E-05	7.28E-05	8.27E-05
4	S	1.52E-07	6.15E-07	1.90E-06	4.42E-06	7.52E-06	1.18E-05	1.70E-05	2.24E-05	2.65E-05	3.10E-05	4.24E-05	5.18E-05	5.89E-05	6.52E-05	7.44E-05
	SN	1.31E-07	5.33E-07	1.64E-06	3.83E-06	6.51E-06	1.02E-05	1.48E-05	1.94E-05	2.30E-05	2.68E-05	3.67E-05	4.48E-05	5.10E-05	5.64E-05	6.44E-05
	G	1.88E-07	7.25E-07	2.26E-06	5.67E-06	9.79E-06	1.55E-05	2.29E-05	2.96E-05	3.63E-05	4.22E-05	5.71E-05	6.70E-05	7.22E-05	7.67E-05	8.65E-05
5	S	1.71E-07	6.93E-07	2.12E-06	4.93E-06	8.37E-06	1.31E-05	1.88E-05	2.47E-05	2.92E-05	3.40E-05	4.62E-05	5.61E-05	6.33E-05	6.83E-05	7.81E-05
	SN	1.48E-07	6.00E-07	1.84E-06	4.27E-06	7.25E-06	1.14E-05	1.63E-05	2.14E-05	2.53E-05	2.94E-05	4.00E-05	4.86E-05	5.48E-05	6.00E-05	6.77E-05
	G	2.05E-07	7.92E-07	2.46E-06	6.11E-06	1.05E-05	1.66E-05	2.44E-05	3.16E-05	3.86E-05	4.48E-05	6.04E-05	7.08E-05	7.60E-05	8.03E-05	8.98E-05

SOLAR ALTITUDE = 99 DEGREES OZONE: .320 CM

A.S.L.(KM)	LAMBDA:	297.5	300.0	302.5	305.0	307.5	310.0	312.5	315.0	317.5	320.0	325.0	330.0	340.0	360.0	380.0
	H	7.15E-08	2.20E-07	7.07E-07	2.05E-06	3.46E-06	5.82E-06	8.52E-06	1.10E-05	1.38E-05	1.58E-05	2.16E-05	2.28E-05	2.19E-05	2.08E-05	2.31E-05
0	S	1.47E-07	5.00E-07	1.37E-06	2.92E-06	4.76E-06	7.23E-06	1.01E-05	1.31E-05	1.55E-05	1.81E-05	2.49E-05	3.07E-05	3.59E-05	4.16E-05	4.96E-05
	SN	1.47E-07	5.00E-07	1.37E-06	2.92E-06	4.76E-06	7.23E-06	1.01E-05	1.31E-05	1.55E-05	1.81E-05	2.49E-05	3.07E-05	3.59E-05	4.16E-05	4.96E-05
	G	2.19E-07	7.21E-07	2.07E-06	4.97E-06	8.22E-06	1.30E-05	1.87E-05	2.41E-05	2.93E-05	3.39E-05	4.65E-05	5.34E-05	5.78E-05	6.24E-05	7.27E-05
1	S	2.05E-07	6.93E-07	1.88E-06	4.00E-06	6.47E-06	9.78E-06	1.36E-05	1.76E-05	2.07E-05	2.41E-05	3.28E-05	4.01E-05	4.62E-05	5.26E-05	6.17E-05
	SN	2.05E-07	6.93E-07	1.88E-06	4.00E-06	6.47E-06	9.78E-06	1.36E-05	1.76E-05	2.07E-05	2.41E-05	3.28E-05	4.01E-05	4.62E-05	5.26E-05	6.17E-05
	G	2.76E-07	9.13E-07	2.59E-06	6.05E-06	9.93E-06	1.56E-05	2.22E-05	2.86E-05	3.45E-05	3.99E-05	5.44E-05	6.29E-05	6.81E-05	7.34E-05	8.48E-05
2	S	2.53E-07	8.52E-07	2.30E-06	4.87E-06	7.86E-06	1.18E-05	1.64E-05	2.11E-05	2.47E-05	2.86E-05	3.87E-05	4.71E-05	5.37E-05	6.02E-05	6.94E-05
	SN	2.53E-07	8.52E-07	2.30E-06	4.87E-06	7.86E-06	1.18E-05	1.64E-05	2.11E-05	2.47E-05	2.86E-05	3.87E-05	4.71E-05	5.37E-05	6.02E-05	6.94E-05
	G	3.25E-07	1.07E-06	3.01E-06	6.92E-06	1.13E-05	1.76E-05	2.49E-05	3.20E-05	3.85E-05	4.45E-05	6.04E-05	6.98E-05	7.56E-05	8.10E-05	9.25E-05
3	S	2.95E-07	9.88E-07	2.66E-06	5.61E-06	9.01E-06	1.35E-05	1.87E-05	2.39E-05	2.79E-05	3.22E-05	4.34E-05	5.24E-05	5.92E-05	6.54E-05	7.46E-05
	SN	2.95E-07	9.88E-07	2.66E-06	5.61E-06	9.01E-06	1.35E-05	1.87E-05	2.39E-05	2.79E-05	3.22E-05	4.34E-05	5.24E-05	5.92E-05	6.54E-05	7.46E-05
	G	3.67E-07	1.21E-06	3.36E-06	7.66E-06	1.25E-05	1.93E-05	2.72E-05	3.49E-05	4.18E-05	4.81E-05	6.50E-05	7.52E-05	8.11E-05	8.62E-05	9.77E-05
4	S	3.33E-07	1.11E-06	2.98E-06	6.26E-06	1.00E-05	1.50E-05	2.07E-05	2.64E-05	3.07E-05	3.54E-05	4.74E-05	5.70E-05	6.38E-05	6.96E-05	7.85E-05
	SN	3.33E-07	1.11E-06	2.98E-06	6.26E-06	1.00E-05	1.50E-05	2.07E-05	2.64E-05	3.07E-05	3.54E-05	4.74E-05	5.70E-05	6.38E-05	6.96E-05	7.85E-05
	G	4.04E-07	1.33E-06	3.68E-06	8.31E-06	1.35E-05	2.08E-05	2.92E-05	3.73E-05	4.45E-05	5.12E-05	6.90E-05	7.97E-05	8.57E-05	9.04E-05	1.02E-04
5	S	3.70E-07	1.23E-06	3.29E-06	6.88E-06	1.10E-05	1.64E-05	2.25E-05	2.87E-05	3.33E-05	3.83E-05	5.10E-05	6.11E-05	6.79E-05	7.35E-05	8.20E-05
	SN	3.70E-07	1.23E-06	3.29E-06	6.88E-06	1.10E-05	1.64E-05	2.25E-05	2.87E-05	3.33E-05	3.83E-05	5.10E-05	6.11E-05	6.79E-05	7.35E-05	8.20E-05
	G	4.42E-07	1.45E-06	3.99E-06	8.94E-06	1.45E-05	2.22E-05	3.11E-05	3.96E-05	4.72E-05	5.41E-05	7.27E-05	8.39E-05	8.98E-05	9.43E-05	1.05E-04

SOLAR ALTITUDE = 20 DEGREES OZONE: .360 CM

A.S.L.(KM)	LAMBDA:	297.5	300.0	302.5	305.0	307.5	310.0	312.5	315.0	317.5	320.0	325.0	330.0	340.0	360.0	380.0
	H	0.	1.13E-09	5.68E-09	3.39E-08	1.22E-07	3.20E-07	9.76E-07	1.98E-06	2.84E-06	4.15E-06	6.47E-06	1.93E-05	1.10E-05	1.11E-05	1.06E-05
0	S	0.	2.93E-11	6.06E-10	5.01E-09	2.36E-08	7.73E-08	2.02E-07	4.08E-07	6.31E-07	9.38E-07	1.79E-06	2.86E-06	4.45E-06	6.91E-06	1.05E-05
	SN	0.	1.00E-11	2.07E-10	1.99E-09	8.08E-09	2.64E-08	6.89E-08	1.40E-07	2.16E-07	3.21E-07	6.13E-07	9.78E-07	1.52E-06	2.36E-06	3.60E-06
	G	0.	1.14E-09	5.88E-09	3.59E-08	1.30E-07	3.47E-07	1.05E-06	2.12E-06	3.05E-06	4.47E-06	7.08E-06	1.13E-05	1.25E-05	1.35E-05	1.42E-05
1	S	0.	7.53E-11	1.53E-09	1.45E-08	5.76E-08	1.86E-07	4.79E-07	9.58E-07	1.46E-06	2.14E-06	3.98E-06	6.22E-06	9.29E-06	1.37E-05	1.93E-05
	SN	0.	2.57E-11	5.24E-10	4.94E-09	1.97E-08	6.38E-08	1.64E-07	3.28E-07	5.00E-07	7.32E-07	1.36E-06	2.13E-06	3.18E-06	4.67E-06	6.77E-06
	G	0.	1.15E-09	6.20E-09	3.88E-08	1.42E-07	3.84E-07	1.14E-06	2.31E-06	3.34E-06	4.88E-06	7.83E-06	1.24E-05	1.42E-05	1.58E-05	1.74E-05
2	S	0.	1.37E-10	2.75E-09	2.56E-08	1.01E-07	3.23E-07	8.20E-07	1.62E-06	2.44E-06	3.55E-06	6.46E-06	9.91E-06	1.43E-05	2.02E-05	2.79E-05
	SN	0.	4.70E-11	9.42E-10	8.76E-09	3.46E-08	1.10E-07	2.80E-07	5.53E-07	8.35E-07	1.21E-06	2.21E-06	3.39E-06	4.98E-06	6.90E-06	9.53E-06
	G	0.	1.18E-09	6.62E-09	4.27E-08	1.57E-07	4.30E-07	1.26E-06	2.53E-06	3.67E-06	5.36E-06	8.68E-06	1.37E-05	1.59E-05	1.80E-05	2.01E-05
3	S	0.	2.11E-10	4.18E-09	3.86E-08	1.51E-07	4.75E-07	1.19E-06	2.33E-06	3.49E-06	5.01E-06	9.00E-06	1.36E-05	1.98E-05	2.57E-05	3.43E-05
	SN	0.	7.22E-11	1.43E-09	1.32E-08	5.15E-08	1.62E-07	4.08E-07	7.97E-07	1.19E-06	1.71E-06	3.08E-06	4.64E-06	6.51E-06	8.80E-06	1.17E-05
	G	0.	1.20E-09	7.11E-09	4.71E-08	1.74E-07	4.83E-07	1.39E-06	2.78E-06	4.03E-06	5.86E-06	9.55E-06	1.49E-05	1.75E-05	1.99E-05	2.23E-05
4	S	0.	2.96E-10	5.82E-09	5.31E-08	2.05E-07	6.41E-07	1.60E-06	3.10E-06	4.60E-06	6.54E-06	1.16E-05	1.73E-05	2.37E-05	3.08E-05	3.99E-05
	SN	0.	1.01E-10	1.99E-09	1.82E-08	7.01E-08	2.19E-07	5.47E-07	1.06E-06	1.57E-06	2.24E-06	3.96E-06	5.90E-06	8.09E-06	1.05E-05	1.37E-05
	G	0.	1.23E-09	7.67E-09	5.21E-08	1.92E-07	5.39E-07	1.52E-06	3.04E-06	4.41E-06	6.38E-06	1.04E-05	1.62E-05	1.91E-05	2.16E-05	2.43E-05
5	S	0.	4.00E-10	7.76E-09	6.99E-08	2.66E-07	8.32E-07	2.06E-06	3.96E-06	5.84E-06	8.26E-06	1.44E-05	2.11E-05	2.84E-05	3.59E-05	4.53E-05
	SN	0.	1.37E-10	2.66E-09	2.39E-08	9.18E-08	2.84E-07	7.04E-07	1.36E-06	2.00E-06	2.82E-06	4.93E-06	7.23E-06	9.71E-06	1.23E-05	1.55E-05
	G	0.	1.27E-09	8.33E-09	5.78E-08	2.14E-07	6.05E-07	1.68E-06	3.34E-06	4.83E-06	6.97E-06	1.14E-05	1.75E-05	2.07E-05	2.34E-05	2.61E-05

SOLAR ALTITUDE = 40 DEGREES OZONE: .360 CM

A.S.L.(KM)	LAMBDA:	297.5	300.0	302.5	305.0	307.5	310.0	312.5	315.0	317.5	320.0	325.0	330.0	340.0	360.0	380.0
	H	4.46E-09	3.37E-08	1.78E-07	6.23E-07	1.39E-06	2.22E-06	4.66E-06	6.52E-06	8.53E-06	1.09E-05	1.39E-05	1.80E-05	1.83E-05	1.72E-05	1.71E-05
0	S	2.47E-09	2.18E-08	1.17E-07	4.13E-07	9.12E-07	1.79E-06	3.07E-06	4.61E-06	5.95E-06	7.51E-06	1.15E-05	1.53E-05	1.96E-05	2.47E-05	3.15E-05
	SN	1.59E-09	1.40E-08	7.53E-08	2.66E-07	5.86E-07	1.15E-06	1.98E-06	2.96E-06	3.82E-06	4.83E-06	7.37E-06	9.86E-06	1.26E-05	1.59E-05	2.03E-05
	G	6.05E-09	4.78E-08	2.53E-07	8.88E-07	1.97E-06	3.37E-06	6.66E-06	9.48E-06	1.24E-05	1.57E-05	2.13E-05	2.79E-05	3.09E-05	3.31E-05	3.74E-05
1	S	4.13E-09	3.61E-08	1.92E-07	6.73E-07	1.47E-06	2.86E-06	4.88E-06	7.28E-06	9.32E-06	1.17E-05	1.76E-05	2.33E-05	2.90E-05	3.56E-05	4.43E-05
	SN	2.66E-09	2.32E-08	1.24E-07	4.32E-07	9.44E-07	1.84E-06	3.14E-06	4.68E-06	5.99E-06	7.50E-06	1.13E-05	1.49E-05	1.86E-05	2.29E-05	2.85E-05
	G	7.11E-09	5.70E-08	3.02E-07	1.06E-06	2.33E-06	4.06E-06	7.82E-06	1.12E-05	1.45E-05	1.84E-05	2.52E-05	3.30E-05	3.69E-05	4.01E-05	4.56E-05
2	S	5.75E-09	4.98E-08	2.63E-07	9.13E-07	1.99E-06	3.84E-06	6.51E-06	9.62E-06	1.23E-05	1.53E-05	2.28E-05	2.98E-05	3.66E-05	4.38E-05	5.32E-05
	SN	3.69E-09	3.20E-08	1.69E-07	5.87E-07	1.28E-06	2.47E-06	4.18E-06	6.19E-06	7.88E-06	9.83E-06	1.46E-05	1.92E-05	2.35E-05	2.82E-05	3.42E-05
	G	8.15E-09	6.58E-08	3.47E-07	1.21E-06	2.66E-06	4.68E-06	8.87E-06	1.27E-05	1.64E-05	2.07E-05	2.85E-05	3.72E-05	4.18E-05	4.34E-05	5.13E-05
3	S	7.29E-09	6.27E-08	3.29E-07	1.14E-06	2.45E-06	4.72E-06	7.95E-06	1.17E-05	1.48E-05	1.84E-05	2.72E-05	3.53E-05	4.26E-05	4.99E-05	5.95E-05
	SN	4.68E-09	4.03E-08	2.11E-07	7.31E-07	1.58E-06	3.03E-06	5.11E-06	7.52E-06	9.54E-06	1.18E-05	1.75E-05	2.27E-05	2.74E-05	3.21E-05	3.83E-05
	G	9.14E-09	7.40E-08	3.90E-07	1.35E-06	2.97E-06	5.25E-06	9.80E-06	1.40E-05	1.81E-05	2.27E-05	3.14E-05	4.07E-05	4.57E-05	4.93E-05	5.54E-05
4	S	8.79E-09	7.52E-08	3.93E-07	1.35E-06	2.90E-06	5.53E-06	9.30E-06	1.36E-05	1.72E-05	2.12E-05	3.11E-05	4.01E-05	4.72E-05	5.49E-05	6.45E-05
	SN	5.65E-09	4.83E-08	2.52E-07	8.67E-07	1.86E-06	3.56E-06	5.98E-06	8.76E-06	1.11E-05	1.36E-05	2.00E-05	2.58E-05	3.07E-05	3.53E-05	4.19E-05
	G	1.01E-08	8.21E-08	4.30E-07	1.49E-06	3.25E-06	5.77E-06	1.07E-05	1.53E-05	1.96E-05	2.46E-05	3.39E-05	4.38E-05	4.90E-05	5.25E-05	5.88E-05
5	S	1.04E-08	8.82E-08	4.58E-07	1.56E-06	3.35E-06	6.36E-06	1.07E-05	1.56E-05	1.95E-05	2.40E-05	3.50E-05	4.47E-05	5.27E-05	5.97E-05	6.98E-05
	SN	6.66E-09	5.67E-08	2.94E-07	1.00E-06	2.15E-06	4.09E-06	6.85E-06	1.00E-05	1.26E-05	1.54E-05	2.25E-05	2.87E-05	3.39E-05	3.84E-05	4.43E-05
	G	1.11E-08	9.04E-08	4.72E-07	1.63E-06	3.54E-06	6.31E-06	1.15E-05	1.65E-05	2.11E-05	2.64E-05	3.64E-05	4.68E-05	5.22E-05	5.36E-05	6.14E-05

SOLAR ALTITUDE = 60 DEGREES   OZONE: .360 CM

A.S.L.(KM)	LAMBDA:	297.5	300.0	302.5	305.0	307.5	310.0	312.5	315.0	317.5	320.0	325.0	330.0	340.0	360.0	380.0
	H	3.21E-08	1.32E-07	4.65E-07	1.49E-06	2.76E-06	4.60E-06	7.42E-06	9.70E-06	1.26E-05	1.46E-05	1.97E-05	2.20E-05	2.12E-05	[illegible]	2.21E-05
0	S	3.20E-08	1.59E-07	5.68E-07	1.48E-06	2.72E-06	4.56E-06	6.92E-06	9.47E-06	1.16E-05	1.39E-05	1.99E-05	2.92E-05	3.03E-05	3.60E-05	4.38E-05
	SN	2.77E-08	1.38E-07	4.92E-07	1.28E-06	2.35E-06	3.95E-06	5.99E-06	8.21E-06	1.00E-05	1.21E-05	1.72E-05	2.10E-05	2.63E-05	3.12E-05	3.74E-05
	G	5.99E-08	2.70E-07	9.57E-07	2.77E-06	5.12E-06	8.55E-06	1.34E-05	1.79E-05	2.26E-05	2.67E-05	3.69E-05	4.38E-05	4.75E-05	5.15E-05	6.00E-05
1	S	4.69E-08	2.32E-07	8.21E-07	2.13E-06	3.87E-06	6.46E-06	9.76E-06	1.33E-05	1.62E-05	1.93E-05	2.73E-05	3.43E-05	4.06E-05	4.72E-05	5.62E-05
	SN	4.06E-08	2.00E-07	7.11E-07	1.84E-06	3.35E-06	5.60E-06	8.45E-06	1.15E-05	1.40E-05	1.67E-05	2.36E-05	2.97E-05	3.52E-05	4.09E-05	4.87E-05
	G	7.28E-08	3.33E-07	1.18E-06	3.33E-06	6.12E-06	1.02E-05	1.59E-05	2.12E-05	2.66E-05	3.13E-05	4.34E-05	5.10E-05	5.64E-05	6.12E-05	7.03E-05
2	S	5.99E-08	2.94E-07	1.04E-06	2.67E-06	4.84E-06	8.04E-06	1.21E-05	1.64E-05	1.98E-05	2.36E-05	3.31E-05	4.13E-05	4.82E-05	5.51E-05	6.44E-05
	SN	5.19E-08	2.55E-07	8.97E-07	2.31E-06	4.20E-06	6.96E-06	1.05E-05	1.42E-05	1.72E-05	2.04E-05	2.87E-05	3.58E-05	4.18E-05	4.77E-05	5.58E-05
	G	8.40E-08	3.87E-07	1.36E-06	3.80E-06	6.96E-06	1.16E-05	1.79E-05	2.39E-05	2.98E-05	3.50E-05	4.84E-05	5.70E-05	6.30E-05	6.80E-05	7.71E-05
3	S	7.15E-08	3.49E-07	1.22E-06	3.14E-06	5.67E-06	9.37E-06	1.40E-05	1.89E-05	2.28E-05	2.71E-05	3.77E-05	4.68E-05	5.40E-05	6.07E-05	7.03E-05
	SN	6.19E-08	3.02E-07	1.06E-06	2.72E-06	4.91E-06	8.12E-06	1.21E-05	1.64E-05	1.98E-05	2.35E-05	3.27E-05	4.05E-05	4.68E-05	5.24E-05	6.09E-05
	G	9.40E-08	4.34E-07	1.52E-06	4.21E-06	7.68E-06	1.27E-05	1.96E-05	2.61E-05	3.24E-05	3.81E-05	5.24E-05	6.25E-05	6.80E-05	7.24E-05	8.27E-05
4	S	8.22E-08	3.99E-07	1.40E-06	3.57E-06	6.41E-06	1.06E-05	1.58E-05	2.12E-05	2.55E-05	3.01E-05	4.17E-05	5.15E-05	5.89E-05	6.52E-05	7.44E-05
	SN	7.12E-08	3.46E-07	1.21E-06	3.03E-06	5.55E-06	9.14E-06	1.36E-05	1.84E-05	2.21E-05	2.61E-05	3.61E-05	4.46E-05	5.10E-05	5.64E-05	6.44E-05
	G	1.03E-07	4.78E-07	1.67E-06	4.52E-06	8.32E-06	1.37E-05	2.11E-05	2.81E-05	3.47E-05	4.07E-05	5.59E-05	6.66E-05	7.22E-05	7.67E-05	8.69E-05
5	S	9.29E-08	4.50E-07	1.56E-06	3.98E-06	7.14E-06	1.17E-05	1.74E-05	2.34E-05	2.80E-05	3.30E-05	4.53E-05	5.58E-05	6.33E-05	6.93E-05	7.81E-05
	SN	8.05E-08	3.89E-07	1.35E-06	3.45E-06	6.18E-06	1.01E-05	1.51E-05	2.03E-05	2.43E-05	2.80E-05	3.94E-05	4.83E-05	5.48E-05	6.00E-05	6.77E-05
	G	1.13E-07	5.21E-07	1.82E-06	4.94E-06	8.94E-06	1.47E-05	2.35E-05	3.00E-05	3.69E-05	4.32E-05	5.91E-05	7.03E-05	7.60E-05	8.03E-05	9.18E-05

SOLAR ALTITUDE = 90 DEGREES   OZONE: .360 CM

A.S.L.(KM)	LAMBDA:	297.5	300.0	302.5	305.0	307.5	310.0	312.5	315.0	317.5	320.0	325.0	330.0	340.0	360.0	380.0
	H	4.09E-08	1.51E-07	5.28E-07	1.66E-06	2.92E-06	5.11E-06	7.60E-06	1.04E-05	1.31E-05	1.51E-05	2.09E-05	2.26E-05	2.19E-05	2.00E-05	2.31E-05
0	S	8.65E-08	3.44E-07	1.05E-06	2.43E-06	4.15E-06	6.55E-06	9.47E-06	1.25E-05	1.50E-05	1.77E-05	2.46E-05	3.09E-05	3.59E-05	4.16E-05	4.98E-05
	SN	8.65E-08	3.44E-07	1.05E-06	2.43E-06	4.15E-06	6.55E-06	9.47E-06	1.25E-05	1.50E-05	1.77E-05	2.46E-05	3.05E-05	3.59E-05	4.16E-05	4.98E-05
	G	1.27E-07	4.95E-07	1.58E-06	4.09E-06	7.06E-06	1.17E-05	1.73E-05	2.29E-05	2.81E-05	3.27E-05	4.59E-05	5.31E-05	5.78E-05	6.24E-05	7.27E-05
1	S	1.20E-07	4.76E-07	1.44E-06	3.32E-06	5.64E-06	8.86E-06	1.28E-05	1.68E-05	2.00E-05	2.35E-05	3.23E-05	3.99E-05	4.62E-05	5.26E-05	6.17E-05
	SN	1.20E-07	4.76E-07	1.44E-06	3.32E-06	5.64E-06	8.86E-06	1.28E-05	1.68E-05	2.00E-05	2.35E-05	3.23E-05	3.99E-05	4.62E-05	5.26E-05	6.17E-05
	G	1.61E-07	6.28E-07	1.97E-06	4.98E-06	8.55E-06	1.40E-05	2.06E-05	2.72E-05	3.31E-05	3.85E-05	5.32E-05	6.25E-05	6.81E-05	7.34E-05	8.41E-05
2	S	1.49E-07	5.86E-07	1.76E-06	4.05E-06	6.84E-06	1.07E-05	1.53E-05	2.01E-05	2.39E-05	2.79E-05	3.82E-05	4.68E-05	5.37E-05	6.02E-05	6.94E-05
	SN	1.49E-07	5.86E-07	1.76E-06	4.05E-06	6.84E-06	1.07E-05	1.53E-05	2.01E-05	2.39E-05	2.79E-05	3.82E-05	4.68E-05	5.37E-05	6.02E-05	6.94E-05
	G	1.90E-07	7.37E-07	2.29E-06	5.71E-06	9.76E-06	1.58E-05	2.31E-05	3.05E-05	3.69E-05	4.30E-05	5.91E-05	6.94E-05	7.56E-05	8.10E-05	9.23E-05
3	S	1.74E-07	6.79E-07	2.04E-06	4.66E-06	7.65E-06	1.22E-05	1.75E-05	2.28E-05	2.70E-05	3.14E-05	4.28E-05	5.22E-05	5.92E-05	6.55E-05	7.46E-05
	SN	1.74E-07	6.79E-07	2.04E-06	4.66E-06	7.65E-06	1.22E-05	1.75E-05	2.28E-05	2.70E-05	3.14E-05	4.28E-05	5.22E-05	5.92E-05	6.55E-05	7.46E-05
	G	2.14E-07	8.30E-07	2.56E-06	6.32E-06	1.08E-05	1.73E-05	2.53E-05	3.32E-05	4.01E-05	4.69E-05	6.37E-05	7.40E-05	8.11E-05	8.52E-05	9.77E-05
4	S	1.96E-07	7.63E-07	2.28E-06	5.20E-06	8.73E-06	1.36E-05	1.93E-05	2.52E-05	2.97E-05	3.45E-05	4.67E-05	5.67E-05	6.38E-05	6.96E-05	7.85E-05
	SN	1.96E-07	7.63E-07	2.28E-06	5.20E-06	8.73E-06	1.36E-05	1.93E-05	2.52E-05	2.97E-05	3.45E-05	4.67E-05	5.67E-05	6.38E-05	6.96E-05	7.85E-05
	G	2.37E-07	9.15E-07	2.81E-06	6.86E-06	1.16E-05	1.87E-05	2.71E-05	3.55E-05	4.26E-05	4.96E-05	6.76E-05	7.93E-05	8.57E-05	9.04E-05	1.02E-04
5	S	2.18E-07	8.46E-07	2.52E-06	5.72E-06	9.58E-06	1.48E-05	2.11E-05	2.74E-05	3.22E-05	3.74E-05	5.04E-05	6.08E-05	6.79E-05	7.33E-05	8.20E-05
	SN	2.18E-07	8.46E-07	2.52E-06	5.72E-06	9.58E-06	1.48E-05	2.11E-05	2.74E-05	3.22E-05	3.74E-05	5.04E-05	6.08E-05	6.79E-05	7.33E-05	8.20E-05
	G	2.59E-07	9.98E-07	3.05E-06	7.38E-06	1.25E-05	1.99E-05	2.89E-05	3.78E-05	4.53E-05	5.24E-05	7.13E-05	8.34E-05	8.90E-05	9.43E-05	1.05E-04

SOLAR ALTITUDE = 5 DEGREES   OZONE: .400 CM

A.S.L.(KM)	LAMBDA:	297.5	300.0	302.5	305.0	307.5	310.0	312.5
	H	0.	0.	2.34E-10	9.08E-10	3.64E-09	8.94E-09	3.15E-08
0	S	0.	0.	9.58E-22	1.27E-18	1.07E-16	4.47E-15	9.21E-14
	SN	0.	0.	8.35E-23	1.10E-19	9.29E-18	3.90E-16	8.02E-15
	G	0.	0.	2.34E-10	9.08E-10	3.64E-09	8.94E-09	3.14E-08
1	S	0.	0.	2.64E-20	3.32E-17	2.60E-15	1.05E-13	2.04E-12
	SN	0.	0.	2.30E-21	2.89E-18	2.26E-16	9.11E-15	1.76E-13
	G	0.	0.	2.34E-10	9.08E-10	3.64E-09	8.94E-09	3.14E-08
2	S	0.	0.	2.16E-19	2.57E-16	1.95E-14	7.46E-13	1.40E-11
	SN	0.	0.	1.88E-20	2.24E-17	1.70E-15	6.50E-14	1.22E-12
	G	0.	0.	2.34E-10	9.08E-10	3.64E-09	8.94E-09	3.14E-08
3	S	0.	0.	9.66E-19	1.12E-15	8.11E-14	2.98E-12	5.35E-11
	SN	0.	0.	8.42E-20	9.72E-17	7.07E-15	2.59E-13	4.66E-12
	G	0.	0.	2.34E-10	9.08E-10	3.64E-09	8.94E-09	3.14E-08
4	S	0.	0.	3.16E-18	3.50E-15	2.44E-13	8.69E-12	1.53E-10
	SN	0.	0.	2.76E-19	3.05E-16	2.13E-14	7.57E-13	1.33E-11
	G	0.	0.	2.34E-10	9.08E-10	3.64E-09	8.94E-09	3.14E-08
5	S	0.	0.	8.85E-18	9.41E-15	6.43E-13	2.21E-11	3.76E-10
	SN	0.	0.	7.72E-19	8.20E-16	5.60E-14	1.93E-12	3.29E-11
	G	0.	0.	2.34E-10	9.08E-10	3.64E-09	8.94E-09	3.15E-08

A.S.L.(KM)	LAMBDA:	315.0	317.5	320.0	325.0	330.0	340.0	360.0	380.0
	H	7.72E-08	1.63E-07	2.90E-07	7.45E-07	1.02E-06	2.32E-06	3.05E-06	3.33E-06
0	S	8.35E-13	3.24E-12	1.10E-11	6.65E-11	2.66E-10	1.22E-09	5.88E-09	2.38E-08
	SN	7.28E-14	2.82E-13	9.60E-13	5.80E-12	2.31E-11	1.05E-10	5.12E-10	2.03E-09
	G	7.72E-08	1.63E-07	2.90E-07	7.45E-07	1.02E-06	2.32E-06	3.03E-06	3.33E-06
1	S	1.74E-11	6.94E-11	2.11E-10	1.16E-09	4.31E-09	1.67E-08	6.77E-08	2.25E-07
	SN	1.59E-12	5.70E-12	1.84E-11	1.01E-10	3.74E-10	1.44E-09	5.90E-09	1.90E-08
	G	7.72E-08	1.63E-07	2.90E-07	7.45E-07	1.02E-06	2.32E-06	3.04E-06	3.37E-06
2	S	1.19E-10	4.12E-10	1.29E-09	6.99E-09	2.28E-08	7.88E-08	2.73E-07	7.03E-07
	SN	1.01E-11	3.59E-11	1.12E-10	5.75E-10	1.98E-09	6.87E-09	2.38E-08	[illegible]
	G	7.72E-08	1.63E-07	2.90E-07	7.46E-07	1.02E-06	2.33E-06	3.05E-06	3.42E-06
3	S	4.28E-10	1.44E-09	4.45E-09	2.16E-08	7.08E-08	2.11E-07	6.94E-07	1.63E-06
	SN	3.73E-11	1.29E-10	3.88E-10	1.88E-09	6.10E-09	1.90E-08	[illegible]	[illegible]
	G	7.72E-08	1.64E-07	2.90E-07	7.47E-07	1.03E-06	2.34E-06	3.09E-06	3.45E-06
4	S	1.19E-09	3.98E-09	1.16E-08	5.33E-08	1.66E-07	4.76E-07	1.25E-06	2.73E-06
	SN	1.03E-10	3.47E-10	1.01E-09	4.65E-09	1.45E-08	4.15E-08	1.09E-07	[illegible]
	G	7.73E-08	1.64E-07	2.91E-07	7.50E-07	1.03E-06	2.36E-06	3.14E-06	3.53E-06
5	S	2.67E-09	[illegible]	2.66E-08	1.10E-07	3.44E-07	9.17E-07	2.11E-06	4.37E-06
	SN	2.50E-10	8.14E-10	2.32E-09	1.01E-08	3.00E-08	7.99E-08	[illegible]	[illegible]
	G	7.74E-08	1.64E-07	2.92E-07	7.50E-07	1.05E-06	2.40E-06	[illegible]	3.73E-06

SOLAR ALTITUDE = 10 DEGREES   OZONE: .400 CM

A.S.L.(KM)	LAMBDA:	297.5	300.0	302.5	305.0	307.5	310.0	312.5
	H	0.	0.	5.07E-10	2.20E-09	8.58E-09	2.30E-08	1.01E-07
0	S	0.	0.	6.90E-15	6.32E-13	1.02E-11	1.06E-10	7.00E-10
	SN	0.	0.	1.20E-15	1.10E-13	1.77E-12	1.84E-11	1.22E-10
	G	0.	0.	5.07E-10	2.20E-09	8.58E-09	2.31E-08	1.01E-07
1	S	0.	0.	4.12E-14	3.67E-12	5.68E-11	5.78E-10	3.72E-09
	SN	0.	0.	7.15E-15	6.37E-13	9.87E-12	1.00E-10	6.49E-10
	G	0.	0.	5.07E-10	2.20E-09	8.59E-09	2.31E-08	1.02E-07
2	S	0.	0.	1.28E-13	1.11E-11	1.68E-10	1.67E-09	1.05E-08
	SN	0.	0.	2.22E-14	1.92E-12	2.92E-11	2.89E-10	1.82E-09
	G	0.	0.	5.07E-10	2.21E-09	8.61E-09	2.33E-08	1.03E-07
3	S	0.	0.	2.86E-13	2.44E-11	3.63E-10	3.51E-09	2.16E-08
	SN	0.	0.	4.96E-14	4.23E-12	6.30E-11	6.09E-10	3.74E-09
	G	0.	0.	5.07E-10	2.21E-09	8.64E-09	2.37E-08	1.05E-07
4	S	0.	0.	5.41E-13	4.51E-11	6.97E-10	6.24E-09	3.80E-08
	SN	0.	0.	9.40E-14	7.83E-12	1.14E-10	1.08E-09	6.49E-09
	G	0.	0.	5.07E-10	2.21E-09	8.69E-09	2.41E-08	1.08E-07
5	S	0.	0.	9.42E-13	7.68E-11	1.11E-09	1.03E-08	6.18E-08
	SN	0.	0.	1.64E-13	1.33E-11	1.92E-10	1.79E-09	1.07E-08
	G	0.	0.	5.07E-10	2.22E-09	8.77E-09	2.48E-08	1.12E-07

A.S.L.(KM)	LAMBDA:	315.0	317.5	320.0	325.0	330.0	340.0	360.0	380.0
	H	2.40E-07	5.94E-07	9.31E-07	2.05E-06	4.35E-06	5.23E-06	5.25E-06	6.45E-06
0	S	2.77E-09	6.39E-09	1.36E-08	4.21E-08	9.04E-08	2.32E-07	5.63E-07	1.17E-06
	SN	4.81E-10	1.11E-09	2.36E-09	7.32E-09	1.71E-08	[illegible]	[illegible]	[illegible]
	G	2.41E-07	5.95E-07	9.34E-07	2.06E-06	4.37E-06	[illegible]	[illegible]	[illegible]
1	S	1.44E-08	3.22E-08	6.66E-08	1.97E-07	4.41E-07	9.37E-07	2.03E-06	3.96E-06
	SN	2.49E-09	5.60E-09	1.16E-08	3.41E-08	7.67E-08	[illegible]	[illegible]	[illegible]
	G	2.43E-07	5.99E-07	9.43E-07	2.09E-06	4.42E-06	[illegible]	[illegible]	[illegible]
2	S	3.93E-08	8.66E-08	1.77E-07	5.01E-07	1.08E-06	2.24E-06	4.29E-06	7.65E-06
	SN	6.83E-09	1.51E-08	3.07E-08	8.70E-08	1.88E-07	[illegible]	[illegible]	[illegible]
	G	2.47E-07	6.09E-07	9.62E-07	2.14E-06	4.54E-06	[illegible]	[illegible]	[illegible]
3	S	7.97E-08	1.73E-07	3.44E-07	9.48E-07	1.98E-06	3.81E-06	6.87E-06	1.15E-05
	SN	1.38E-08	3.00E-08	5.97E-08	1.65E-07	[illegible]	[illegible]	[illegible]	[illegible]
	G	2.54E-07	6.24E-07	9.91E-07	2.22E-06	4.69E-06	[illegible]	[illegible]	[illegible]
4	S	1.38E-07	2.94E-07	5.75E-07	1.54E-06	3.15E-06	5.81E-06	9.72E-06	1.53E-05
	SN	2.40E-08	5.11E-08	9.99E-08	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	G	2.64E-07	6.45E-07	1.03E-06	2.32E-06	4.90E-06	[illegible]	[illegible]	[illegible]
5	S	2.22E-07	4.66E-07	9.01E-07	2.35E-06	4.66E-06	8.26E-06	1.30E-05	1.95E-05
	SN	3.86E-08	8.09E-08	1.56E-07	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	G	[illegible]	6.79E-07	1.09E-06	2.46E-06	5.16E-06	[illegible]	[illegible]	[illegible]

SOLAR ALTITUDE = 20 DEGREES OZONE: .400 CM

A.S.L.(KM)	LAMBDA:	297.5	300.0	302.5	305.0	307.5	310.0	312.5	315.0	317.5	320.0	325.0	330.0	340.0	360.0	380.0
	H	0.	9.75E-10	2.69E-09	1.63E-08	7.10E-08	2.10E-07	7.49E-07	1.67E-06	2.43E-06	3.64E-06	9.92E-06	1.01E-05	1.11E-05	1.11E-05	1.16E-05
0	S	0.	1.00E-11	2.64E-10	3.42E-09	1.59E-08	5.43E-08	1.60E-07	3.97E-07	4.71E-07	8.73E-07	1.72E-06	2.82E-06	[illegible]	[illegible]	[illegible]
	SN	0.	3.43E-12	9.72E-11	1.17E-09	5.45E-09	2.08E-08	9.60E-08	1.22E-07	1.95E-07	2.99E-07	5.59E-07	9.45E-07	[illegible]	[illegible]	[illegible]
	G	0.	5.74E-10	2.99E-09	1.95E-08	7.73E-08	2.38E-07	6.01E-07	1.79E-06	2.02E-06	3.94E-06	6.51E-06	1.13E-05	[illegible]	[illegible]	[illegible]
1	S	0.	2.54E-11	7.18E-10	8.52E-09	3.88E-08	1.41E-07	3.39E-07	8.39E-07	1.32E-06	1.99E-06	3.43E-06	6.15E-06	[illegible]	[illegible]	[illegible]
	SN	0.	6.63E-12	2.46E-10	2.91E-09	1.33E-08	4.61E-08	1.35E-07	2.67E-07	4.92E-07	6.61E-07	1.11E-06	2.11E-06	[illegible]	[illegible]	[illegible]
	G	0.	5.83E-10	3.14E-09	2.13E-08	8.91E-08	2.58E-07	8.08E-07	1.96E-06	2.08E-06	4.32E-06	7.23E-06	1.22E-05	[illegible]	[illegible]	[illegible]
2	S	0.	4.71E-11	1.29E-09	1.51E-08	6.82E-08	2.43E-07	6.79E-07	1.42E-06	2.21E-06	3.30E-06	6.22E-06	9.77E-06	1.43E-05	2.02E-05	2.73E-05
	SN	0.	1.61E-11	4.41E-10	5.10E-09	2.33E-08	8.33E-08	2.31E-07	4.65E-07	7.50E-07	1.13E-06	2.13E-06	3.34E-06	[illegible]	[illegible]	[illegible]
	G	0.	5.91E-10	3.33E-09	2.35E-08	9.92E-08	2.93E-07	9.70E-07	2.15E-06	3.10E-06	4.77E-06	8.05E-06	1.34E-05	1.59E-05	1.60E-05	2.16E-05
3	S	0.	7.24E-11	1.96E-09	2.27E-08	1.02E-07	3.58E-07	9.82E-07	2.04E-06	3.16E-06	4.66E-06	8.67E-06	1.34E-05	1.91E-05	2.57E-05	3.43E-05
	SN	0.	2.47E-11	6.71E-10	7.77E-09	3.47E-08	1.22E-07	3.30E-07	6.93E-07	1.08E-06	1.60E-06	2.94E-06	4.57E-06	[illegible]	[illegible]	[illegible]
	G	0.	5.94E-10	3.56E-09	2.61E-08	1.07E-07	3.32E-07	1.04E-06	2.37E-06	3.51E-06	5.24E-06	8.69E-06	1.40E-05	1.75E-05	1.95E-05	2.23E-05
4	S	0.	1.02E-10	2.73E-09	3.13E-08	1.38E-07	4.83E-07	1.32E-06	2.71E-06	4.16E-06	6.09E-06	1.12E-05	1.70E-05	[illegible]	[illegible]	[illegible]
	SN	0.	3.43E-11	9.34E-10	1.07E-08	4.73E-08	1.65E-07	4.58E-07	9.24E-07	1.42E-06	2.09E-06	3.82E-06	5.82E-06	[illegible]	[illegible]	[illegible]
	G	0.	6.09E-10	3.82E-09	2.90E-08	1.19E-07	3.79E-07	1.20E-06	2.60E-06	3.83E-06	5.72E-06	9.74E-06	1.59E-05	1.91E-05	2.11E-05	2.43E-05
5	S	0.	1.37E-10	3.65E-09	4.12E-08	1.81E-07	6.27E-07	1.70E-06	3.47E-06	5.28E-06	7.69E-06	1.39E-05	2.08E-05	2.85E-05	[illegible]	4.53E-05
	SN	0.	4.69E-11	1.24E-09	1.41E-08	6.19E-08	2.15E-07	5.80E-07	1.19E-06	1.81E-06	2.63E-06	4.75E-06	7.11E-06	[illegible]	[illegible]	[illegible]
	G	0.	6.21E-10	4.14E-09	3.24E-08	1.34E-07	5.24E-07	1.32E-06	2.80E-06	4.22E-06	6.27E-06	1.07E-05	1.72E-05	2.07E-05	[illegible]	[illegible]

SOLAR ALTITUDE = 40 DEGREES OZONE: .400 CM

A.S.L.(KM)	LAMBDA:	297.5	300.0	302.5	305.0	307.5	310.0	312.5	315.0	317.5	320.0	325.0	330.0	340.0	360.0	380.0
	H	2.46E-09	7.21E-08	1.26E-07	4.74E-07	1.10E-06	1.66E-06	4.17E-06	6.05E-06	7.52E-06	1.03E-05	1.33E-05	1.79E-05	1.83E-05	1.72E-05	1.71E-05
0	S	1.09E-09	1.22E-08	7.76E-08	3.10E-07	7.36E-07	1.53E-06	2.77E-06	4.49E-06	8.63E-06	7.22E-06	1.12E-05	1.52E-05	1.96E-05	[illegible]	[illegible]
	SN	6.98E-10	7.64E-09	4.99E-08	1.99E-07	4.73E-07	9.45E-07	1.70E-06	2.70E-06	3.58E-06	4.65E-06	7.20E-06	[illegible]	[illegible]	[illegible]	[illegible]
	G	3.14E-09	2.97E-08	1.77E-07	6.73E-07	1.57E-06	2.64E-06	5.99E-06	9.01E-06	1.15E-05	1.49E-05	2.36E-05	2.77E-05	[illegible]	[illegible]	[illegible]
1	S	1.62E-09	2.02E-08	1.27E-07	5.05E-07	1.19E-06	2.45E-06	4.40E-06	6.77E-06	6.02E-06	1.17E-05	1.72E-05	2.31E-05	[illegible]	[illegible]	[illegible]
	SN	1.17E-09	1.30E-08	8.19E-08	3.28E-07	7.02E-07	1.98E-06	2.63E-06	5.35E-06	5.57E-06	7.49E-06	1.11E-05	1.40E-05	[illegible]	[illegible]	[illegible]
	G	3.65E-09	3.91E-08	2.09E-07	7.49E-07	1.80E-06	3.43E-06	7.90E-06	1.04E-05	1.30E-05	1.75E-05	2.44E-05	3.24E-05	[illegible]	[illegible]	[illegible]
2	S	2.53E-09	2.79E-08	1.74E-07	6.86E-07	1.60E-06	3.29E-06	5.80E-06	8.96E-06	1.16E-05	1.47E-05	2.23E-05	2.96E-05	[illegible]	[illegible]	[illegible]
	SN	1.62E-09	1.79E-08	1.12E-07	4.41E-07	1.03E-06	2.12E-06	3.77E-06	5.74E-06	7.47E-06	9.44E-06	1.45E-05	1.90E-05	[illegible]	[illegible]	[illegible]
	G	4.10E-09	4.00E-08	2.40E-07	9.15E-07	2.13E-06	3.97E-06	7.94E-06	1.10E-05	1.54E-05	1.97E-05	2.77E-05	3.69E-05	[illegible]	[illegible]	[illegible]
3	S	3.20E-09	3.51E-08	2.18E-07	8.53E-07	1.98E-06	4.05E-06	7.16E-06	1.09E-05	1.41E-05	1.77E-05	2.66E-05	3.50E-05	[illegible]	[illegible]	[illegible]
	SN	2.08E-09	2.29E-08	1.40E-07	5.49E-07	1.27E-06	2.60E-06	4.60E-06	7.00E-06	9.05E-06	1.14E-05	1.73E-05	2.29E-05	[illegible]	[illegible]	[illegible]
	G	4.54E-09	4.46E-08	2.68E-07	1.02E-06	2.37E-06	4.46E-06	8.77E-06	1.31E-05	1.70E-05	2.10E-05	3.05E-05	4.04E-05	[illegible]	[illegible]	[illegible]
4	S	3.48E-09	4.20E-08	2.60E-07	1.01E-06	2.34E-06	4.75E-06	8.30E-06	1.27E-05	1.63E-05	2.04E-05	3.05E-05	3.98E-05	[illegible]	[illegible]	[illegible]
	SN	2.46E-09	2.70E-08	1.67E-07	6.51E-07	1.50E-06	3.05E-06	5.38E-06	8.19E-06	1.05E-05	1.31E-05	1.98E-05	2.55E-05	[illegible]	[illegible]	[illegible]
	G	4.96E-09	4.91E-08	2.95E-07	1.11E-06	2.60E-06	4.91E-06	9.55E-06	1.42E-05	1.84E-05	2.34E-05	3.29E-05	4.35E-05	[illegible]	[illegible]	[illegible]
5	S	4.56E-09	4.93E-08	3.04E-07	1.17E-06	2.70E-06	5.40E-06	9.59E-06	1.45E-05	1.85E-05	2.31E-05	3.43E-05	4.44E-05	[illegible]	[illegible]	[illegible]
	SN	2.93E-09	3.17E-08	1.95E-07	7.54E-07	1.74E-06	3.51E-06	6.10E-06	9.30E-06	1.19E-05	1.54E-05	2.29E-05	2.90E-05	[illegible]	[illegible]	[illegible]
	G	5.41E-09	5.34E-08	3.23E-07	1.23E-06	2.84E-06	5.37E-06	1.03E-05	1.94E-05	[illegible]	2.51E-05	3.55E-05	4.66E-05	[illegible]	[illegible]	[illegible]

SOLAR ALTITUDE = 60 DEGREES OZONE: .400 CM

A.S.L.(KM)	LAMBDA:	297.5	300.0	302.5	305.0	307.5	310.0	312.5	315.0	317.5	320.0	325.0	330.0	340.0	360.0	380.0
	H	1.04E-08	9.07E-08	3.47E-07	1.21E-06	2.33E-06	4.84E-06	6.79E-06	9.19E-06	1.19E-05	1.39E-05	1.91E-05	2.19E-05	2.12E-05	2.03E-05	2.31E-05
0	S	1.74E-08	1.03E-07	4.14E-07	1.20E-06	2.32E-06	4.67E-06	6.40E-06	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	SN	1.50E-08	8.94E-08	3.62E-07	1.08E-06	2.01E-06	3.62E-06	5.59E-06	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	G	3.34E-08	1.83E-07	7.59E-07	2.24E-06	4.34E-06	7.90E-06	1.23E-05	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1	S	2.94E-08	1.94E-07	6.64E-07	1.72E-06	3.30E-06	5.77E-06	9.02E-06	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	SN	2.20E-08	1.30E-07	5.23E-07	1.43E-06	2.80E-06	5.00E-06	7.81E-06	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	G	4.04E-08	2.21E-07	8.70E-07	2.63E-06	5.19E-06	9.04E-06	1.40E-05	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2	S	3.29E-08	1.91E-07	7.03E-07	2.10E-06	4.13E-06	7.17E-06	1.12E-05	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	SN	2.01E-08	1.69E-07	6.61E-07	1.67E-06	3.56E-06	6.21E-06	9.07E-06	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	G	4.65E-08	2.30E-07	1.01E-06	3.07E-06	5.91E-06	1.03E-05	1.65E-05	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3	S	3.60E-08	2.26E-07	9.61E-07	2.54E-06	4.84E-06	8.30E-06	1.30E-05	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	SN	3.30E-08	1.90E-07	7.60E-07	1.20E-06	4.19E-06	7.24E-06	1.12E-05	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	G	5.19E-08	2.07E-07	1.13E-06	3.40E-06	6.52E-06	1.13E-05	1.90E-05	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4	S	4.46E-08	2.59E-07	1.03E-06	2.60E-06	5.47E-06	9.42E-06	1.46E-05	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	SN	3.80E-08	2.74E-07	8.90E-07	2.50E-06	4.74E-06	8.10E-06	1.26E-05	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	G	5.70E-08	3.15E-07	1.24E-06	3.76E-06	7.07E-06	1.22E-05	1.94E-05	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
5	S	5.04E-08	2.92E-07	1.19E-06	3.22E-06	6.07E-06	1.05E-05	1.61E-05	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	SN	4.30E-08	2.91E-07	9.93E-07	2.70E-06	5.27E-06	9.03E-06	1.39E-05	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	G	6.20E-08	3.43E-07	1.34E-06	3.99E-06	7.60E-06	1.31E-05	2.07E-05	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

SOLAR ALTITUDE = 90 DEGREES OZONE: .400 CM

A.S.L.(KM)	LAMBDA:	297.5	300.0	302.5	305.0	307.5	310.0	312.5	315.0	317.5	320.0	325.0	330.0	340.0	360.0	380.0
	H	2.34E-08	1.04E-07	3.94E-07	1.34E-06	2.46E-06	4.49E-06	7.14E-06	9.03E-06	1.24E-05	1.44E-05	2.02E-05	2.25E-05	2.11E-05	2.08E-05	2.31E-05
0	S	5.09E-08	2.36E-07	8.03E-07	2.32E-06	3.61E-06	5.93E-06	8.89E-06	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	SN	5.07E-08	2.30E-07	8.03E-07	2.02E-06	3.61E-06	5.93E-06	8.79E-06	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	G	7.43E-08	3.41E-07	1.28E-06	3.30E-06	6.37E-06	1.04E-05	1.59E-05	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1	S	7.09E-08	3.27E-07	1.11E-06	2.70E-06	4.91E-06	8.03E-06	1.19E-05	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	SN	7.09E-08	3.27E-07	1.11E-06	2.70E-06	4.91E-06	8.03E-06	1.19E-05	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	G	9.43E-08	4.31E-07	1.50E-06	4.11E-06	7.37E-06	1.29E-05	1.91E-05	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2	S	8.76E-08	4.93E-07	1.35E-06	3.30E-06	5.96E-06	9.70E-06	1.43E-05	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	SN	8.76E-08	4.03E-07	1.35E-06	3.30E-06	5.90E-06	9.70E-06	1.43E-05	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	G	1.11E-07	5.07E-07	1.75E-06	4.71E-06	8.42E-06	1.42E-05	2.15E-05	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3	S	1.02E-07	4.07E-07	1.56E-06	3.67E-06	6.64E-06	1.11E-05	1.63E-05	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	SN	1.07E-07	4.47E-07	1.16E-06	3.07E-06	6.04E-06	1.11E-05	1.63E-05	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	G	1.25E-07	5.71E-07	1.90E-06	5.22E-06	9.30E-06	1.54E-05	2.39E-05	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4	S	1.15E-07	5.25E-07	1.79E-06	4.32E-06	7.60E-06	1.23E-05	1.80E-05	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	SN	1.15E-07	5.25E-07	1.79E-06	4.32E-06	7.60E-06	1.23E-05	1.80E-05	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	G	1.39E-07	6.29E-07	2.14E-06	5.67E-06	1.01E-05	1.65E-05	2.52E-05	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
5	S	1.28E-07	5.02E-07	1.93E-06	4.75E-06	8.34E-06	1.34E-05	1.97E-05	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	SN	1.28E-07	5.02E-07	1.93E-06	4.75E-06	8.34E-06	1.34E-05	1.97E-05	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	G	1.51E-07	6.60E-07	2.33E-06	6.10E-06	1.08E-05	1.79E-05	2.56E-05	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

SOLAR ALTITUDE = 5 DEGREES   OZONE: .440 CM

A.S.L.(KM)	LAMBDA:	297.5	300.0	302.5	305.0	307.5	310.0	312.5	315.0	317.5	320.0	325.0	330.0	340.0	360.0	380.0
	H	0.	0.	1.34E-10	5.44E-10	2.28E-09	5.60E-09	2.29E-08	9.92E-08	1.20E-07	2.33E-07	6.34E-07	1.79E-06	2.32E-06	3.03E-06	3.15E-06
0	S	0.	0.	1.05E-22	2.71E-19	3.30E-17	1.97E-15	5.24E-14	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	SN	0.	0.	9.17E-26	2.30E-20	2.94E-16	1.71E-16	4.90E-15	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	G	0.	0.	1.34E-10	5.44E-10	2.28E-09	5.60E-09	2.29E-08	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1	S	0.	0.	2.90E-21	7.10E-18	8.23E-16	4.59E-14	1.10E-12	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	SN	0.	0.	2.53E-22	6.19E-19	7.17E-17	4.00E-15	1.01E-13	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	G	0.	0.	1.34E-10	5.44E-10	2.28E-09	5.60E-09	2.29E-08	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2	S	0.	0.	2.37E-20	5.51E-17	6.19E-15	3.40E-13	7.99E-12	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	SN	0.	0.	2.07E-21	4.80E-18	5.39E-16	2.80E-14	6.93E-13	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	G	0.	0.	1.34E-10	5.44E-10	2.28E-09	5.60E-09	2.29E-08	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3	S	0.	0.	1.06E-19	2.39E-16	2.97E-14	1.31E-12	3.04E-11	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	SN	0.	0.	9.29E-21	2.08E-17	2.24E-15	1.14E-13	2.65E-12	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	G	0.	0.	1.34E-10	5.44E-10	2.28E-09	5.60E-09	2.29E-08	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4	S	0.	0.	3.47E-19	7.58E-16	7.75E-14	3.02E-12	8.70E-11	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	SN	0.	0.	3.03E-20	6.53E-17	6.75E-15	3.33E-13	7.59E-12	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	G	0.	0.	1.34E-10	5.44E-10	2.28E-09	5.60E-09	2.29E-08	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
5	S	0.	0.	9.72E-19	2.01E-15	2.04E-13	9.73E-12	2.15E-10	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	SN	0.	0.	3.47E-20	1.75E-16	1.74E-14	8.40E-13	1.87E-11	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	G	0.	0.	1.34E-10	5.44E-10	2.28E-09	5.60E-09	2.29E-08	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

SOLAR ALTITUDE = 10 DEGREES   OZONE: .440 CM

A.S.L.(KM)	LAMBDA:	297.5	300.0	302.5	305.0	307.5	310.0	312.5	315.0	317.5	320.0	325.0	330.0	340.0	360.0	380.0
	H	0.	0.	2.67E-10	1.16E-09	4.64E-09	1.32E-08	6.93E-08	2.12E-07	4.55E-07	7.49E-07	1.79E-06	4.22E-06	5.29E-06	6.25E-06	6.45E-06
0	S	0.	0.	1.71E-15	2.39E-13	4.94E-12	6.31E-11	4.91E-10	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	SN	0.	0.	2.98E-16	4.16E-14	6.57E-13	1.10E-11	6.92E-11	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	G	0.	0.	2.67E-10	1.16E-09	4.64E-09	1.32E-08	6.94E-08	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1	S	0.	0.	1.02E-14	1.39E-12	2.79E-11	3.44E-10	2.60E-09	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	SN	0.	0.	1.78E-15	2.41E-13	4.74E-12	5.90E-11	4.92E-10	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	G	0.	0.	2.67E-10	1.16E-09	4.65E-09	1.32E-08	6.90E-08	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2	S	0.	0.	3.17E-14	4.19E-12	8.16E-11	9.92E-10	7.34E-09	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	SN	0.	0.	5.51E-15	7.27E-13	1.42E-11	1.72E-10	1.27E-09	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	G	0.	0.	2.67E-10	1.16E-09	4.69E-09	1.33E-08	6.86E-08	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3	S	0.	0.	7.10E-14	9.22E-12	1.74E-10	2.09E-09	1.51E-08	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	SN	0.	0.	1.23E-14	1.60E-12	3.05E-11	3.63E-10	2.62E-09	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	G	0.	0.	2.67E-10	1.16E-09	4.67E-09	1.35E-08	6.80E-08	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4	S	0.	0.	1.35E-13	1.71E-11	3.16E-10	3.72E-09	2.60E-08	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	SN	0.	0.	2.34E-14	2.96E-12	5.53E-11	6.46E-10	4.62E-09	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	G	0.	0.	2.67E-10	1.16E-09	4.70E-09	1.34E-08	7.00E-08	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
5	S	0.	0.	2.34E-13	2.91E-11	5.36E-10	6.16E-09	4.33E-08	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	SN	0.	0.	4.07E-14	5.05E-12	9.30E-11	1.07E-09	7.52E-09	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	G	0.	0.	2.67E-10	1.17E-09	4.73E-09	1.42E-08	7.29E-08	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

SOLAR ALTITUDE = 20 DEGREES   OZONE: .440 CM

A.S.L.(KM)	LAMBDA:	297.5	300.0	302.5	305.0	307.5	310.0	312.5	315.0	317.5	320.0	325.0	330.0	340.0	360.0	380.0
	H	0.	2.93E-10	1.47E-09	9.92E-09	4.22E-08	1.37E-07	5.67E-07	1.41E-06	2.08E-06	3.29E-06	5.42E-06	9.07E-06	1.15E-05	1.11E-05	1.30E-05
0	S	0.	3.44E-12	1.33E-10	2.02E-09	1.07E-08	4.40E-08	1.37E-07	3.13E-07	9.17E-07	8.13E-07	1.66E-06	2.72E-06	4.45E-06	6.91E-06	1.23E-05
	SN	0.	1.10E-12	4.96E-11	6.99E-10	3.67E-09	1.50E-08	4.60E-08	1.07E-07	1.77E-07	2.74E-07	5.00E-07	9.51E-07	1.37E-06	2.35E-06	3.67E-06
	G	0.	2.94E-10	1.52E-09	1.06E-08	4.54E-08	1.52E-07	6.14E-07	1.52E-06	2.25E-06	3.44E-06	5.99E-06	1.00E-05	1.25E-05	1.35E-05	1.42E-05
1	S	0.	8.49E-12	3.37E-10	5.02E-09	2.62E-08	1.06E-07	3.29E-07	7.35E-07	1.20E-06	1.49E-06	3.59E-06	6.05E-06	9.29E-06	1.37E-05	1.91E-05
	SN	0.	3.03E-12	1.15E-10	1.72E-09	8.96E-09	3.63E-08	1.11E-07	2.51E-07	4.09E-07	6.34E-07	1.26E-06	2.07E-06	3.17E-06	4.67E-06	6.77E-06
	G	0.	2.96E-10	1.59E-09	1.16E-08	9.11E-08	1.74E-07	6.70E-07	1.66E-06	2.40E-06	3.83E-06	6.60E-06	1.19E-05	1.42E-05	1.50E-05	1.74E-05
2	S	0.	1.61E-11	6.05E-10	8.49E-09	4.60E-08	1.64E-07	5.97E-07	1.24E-06	2.00E-06	3.07E-06	5.99E-06	9.61E-06	1.43E-05	2.07E-05	2.73E-05
	SN	0.	9.52E-12	2.07E-10	3.04E-09	1.57E-08	6.28E-08	1.90E-07	4.24E-07	6.84E-07	1.05E-06	2.05E-06	3.29E-06	4.94E-06	6.91E-06	9.31E-06
	G	0.	2.90E-10	1.60E-09	1.30E-08	9.79E-08	2.08E-07	7.57E-07	1.03E-06	2.70E-06	4.25E-06	7.47E-06	1.32E-05	1.59E-05	1.60E-05	2.01E-05
3	S	0.	2.49E-11	9.19E-10	1.34E-08	6.69E-08	2.70E-07	8.93E-07	1.79E-06	2.86E-06	4.34E-06	8.34E-06	1.32E-05	1.91E-05	2.57E-05	3.41E-05
	SN	0.	8.40E-12	3.14E-10	4.58E-09	2.34E-08	9.24E-08	2.77E-07	6.11E-07	1.77E-06	1.46E-06	2.65E-06	4.51E-06	6.51E-06	8.80E-06	1.17E-05
	G	0.	3.01E-10	1.79E-09	1.49E-08	8.96E-08	2.30E-07	8.44E-07	2.02E-06	3.05E-06	4.60E-06	8.24E-06	1.44E-05	1.79E-05	1.99E-05	2.23E-05
4	S	0.	3.40E-11	1.28E-09	1.84E-08	9.32E-08	3.64E-07	1.09E-06	2.38E-06	3.77E-06	5.67E-06	1.07E-05	1.66E-05	2.37E-05	3.01E-05	3.93E-05
	SN	0.	1.19E-11	4.38E-10	6.31E-09	3.19E-08	1.25E-07	3.71E-07	8.12E-07	1.29E-06	1.94E-06	3.67E-06	5.74E-06	8.09E-06	1.09E-05	1.37E-05
	G	0.	3.04E-10	1.91E-09	1.62E-08	7.40E-08	2.62E-07	9.36E-07	2.22E-06	3.36E-06	5.14E-06	9.10E-06	1.56E-05	1.91E-05	2.11E-05	2.43E-05
5	S	0.	4.70E-11	1.71E-09	2.43E-08	1.22E-07	4.73E-07	1.40E-06	3.05E-06	4.74E-06	7.15E-06	1.34E-05	2.05E-05	2.95E-05	3.31E-05	4.53E-05
	SN	0.	1.61E-11	5.84E-10	8.31E-09	4.17E-08	1.62E-07	4.70E-07	1.04E-06	1.63E-06	2.45E-06	4.57E-06	7.01E-06	9.71E-06	1.42E-05	1.58E-05
	G	0.	3.09E-10	2.06E-09	1.82E-08	8.34E-08	2.99E-07	1.04E-06	2.45E-06	3.71E-06	5.64E-06	9.99E-06	1.69E-05	2.07E-05	3.31E-05	2.61E-05

SOLAR ALTITUDE = 40 DEGREES   OZONE: .440 CM

A.S.L.(KM)	LAMBDA:	297.5	300.0	302.5	305.0	307.5	310.0	312.5	315.0	317.5	320.0	325.0	330.0	340.0	360.0	380.0
	H	1.38E-09	1.45E-08	9.13E-08	3.61E-07	8.72E-07	1.55E-06	3.71E-06	5.62E-06	7.35E-06	9.65E-06	1.26E-05	1.18E-05	1.63E-05	1.72E-05	1.71E-05
0	S	4.77E-10	6.62E-09	5.15E-08	2.33E-07	5.95E-07	1.32E-06	2.49E-06	3.39E-06	5.34E-06	6.95E-06	1.10E-05	1.51E-05	1.95E-05	2.47E-05	3.15E-05
	SN	3.07E-10	4.36E-09	3.31E-08	1.55E-07	3.82E-07	8.45E-07	1.60E-06	2.37E-06	3.42E-06	4.47E-06	7.07E-06	9.72E-06	1.25E-05	1.59E-05	2.01E-05
	G	1.69E-09	1.84E-08	1.24E-07	5.11E-07	1.25E-06	2.44E-06	5.32E-06	8.18E-06	1.08E-05	1.41E-05	1.99E-05	2.75E-05	3.45E-05	3.31E-05	3.74E-05
1	S	7.98E-10	1.13E-08	8.44E-08	3.79E-07	9.58E-07	2.11E-06	3.96E-06	6.38E-06	8.38E-06	1.08E-05	1.69E-05	2.29E-05	2.91E-05	3.51E-05	4.43E-05
	SN	5.13E-10	7.26E-09	5.43E-08	2.44E-07	6.16E-07	1.35E-06	2.55E-06	4.05E-06	5.37E-06	6.95E-06	1.08E-05	1.47E-05	1.86E-05	2.25E-05	2.84E-05
	G	1.89E-09	2.17E-08	1.46E-07	6.05E-07	1.49E-06	2.91E-06	6.26E-06	9.67E-06	1.27E-05	1.66E-05	2.30E-05	3.25E-05	3.69E-05	4.01E-05	4.50E-05
2	S	1.11E-09	1.56E-08	1.16E-07	5.15E-07	1.29E-06	2.82E-06	5.26E-06	8.33E-06	1.10E-05	1.42E-05	2.19E-05	2.95E-05	3.69E-05	4.33E-05	5.33E-05
	SN	7.13E-10	1.00E-08	7.43E-08	3.31E-07	8.32E-07	1.82E-06	3.39E-06	5.36E-06	7.07E-06	9.13E-06	1.41E-05	1.90E-05	2.37E-05	2.79E-05	3.43E-05
	G	2.09E-09	2.49E-08	1.66E-07	6.92E-07	1.70E-06	3.37E-06	7.11E-06	1.10E-05	1.44E-05	1.87E-05	2.60E-05	3.67E-05	4.13E-05	4.54E-05	5.11E-05
3	S	1.41E-09	1.96E-08	1.45E-07	6.41E-07	1.60E-06	3.47E-06	6.45E-06	1.01E-05	1.33E-05	1.70E-05	2.61E-05	3.47E-05	4.28E-05	4.91E-05	5.93E-05
	SN	9.05E-10	1.26E-08	9.29E-08	4.12E-07	1.03E-06	2.23E-06	4.14E-06	6.52E-06	8.55E-06	1.09E-05	1.68E-05	2.25E-05	2.76E-05	3.18E-05	3.91E-05
	G	2.23E-09	2.71E-08	1.84E-07	7.73E-07	1.90E-06	3.79E-06	7.88E-06	1.21E-05	1.59E-05	2.06E-05	2.86E-05	4.01E-05	4.57E-05	4.91E-05	5.54E-05
4	S	1.70E-09	2.35E-08	1.73E-07	7.60E-07	1.89E-06	4.07E-06	7.54E-06	1.17E-05	1.54E-05	1.96E-05	2.93E-05	3.95E-05	4.74E-05	5.43E-05	6.44E-05
	SN	1.09E-09	1.51E-08	1.11E-07	4.88E-07	1.21E-06	2.62E-06	4.85E-06	7.59E-06	9.92E-06	1.26E-05	1.92E-05	2.57E-05	3.07E-05	3.51E-05	4.16E-05
	G	2.47E-09	2.96E-08	2.02E-07	8.49E-07	2.09E-06	4.17E-06	8.90E-06	1.32E-05	1.73E-05	2.23E-05	3.12E-05	4.32E-05	4.94E-05	5.25E-05	5.86E-05
5	S	2.00E-09	2.76E-08	2.01E-07	8.81E-07	2.18E-06	4.69E-06	8.63E-06	1.35E-05	1.75E-05	2.22E-05	3.36E-05	4.48E-05	5.27E-05	3.01E-05	6.93E-05
	SN	1.29E-09	1.77E-08	1.29E-07	5.66E-07	1.40E-06	3.01E-06	5.55E-06	8.66E-06	1.13E-05	1.43E-05	2.16E-05	2.86E-05	3.41E-05	3.01E-05	4.43E-05
	G	2.67E-09	3.22E-08	2.21E-07	9.27E-07	2.27E-06	4.57E-06	9.26E-06	1.43E-05	1.86E-05	2.39E-05	3.44E-05	4.61E-05	5.22E-05	3.31E-05	6.14E-05

SOLAR ALTITUDE = 60 DEGREES   OZONE: .440 CM

A.S.L.(KM)	LAMBDA:	297.5	300.0	302.5	305.0	307.5	310.0	312.5	315.0	317.5	320.0	325.0	330.0	340.0	360.0	380.0
	H	1.05E-08	6.24E-08	2.59E-07	9.76E-07	1.96E-06	3.55E-06	6.22E-06	8.70E-06	1.13E-05	1.33E-05	1.84E-05	2.17E-05	2.12E-05	2.03E-05	2.21E-05
0	S	9.41E-09	6.70E-08	3.68E-07	9.86E-07	1.90E-06	3.63E-06	5.92E-06	8.51E-06	1.07E-05	1.31E-05	1.93E-05	2.49E-05	3.03E-05	3.43E-05	4.17E-05
	SN	1.15E-09	5.69E-08	2.67E-07	8.36E-07	1.71E-06	3.15E-06	5.13E-06	7.37E-06	9.26E-06	1.13E-05	1.67E-05	2.13E-05	2.57E-05	2.97E-05	3.59E-05
	G	1.07E-08	1.28E-07	9.25E-07	1.01E-05	3.60E-06	6.09E-06	1.13E-05	1.61E-05	2.06E-05	2.46E-05	3.51E-05	4.33E-05	4.75E-05	5.15E-05	6.00E-05
1	S	1.36E-08	9.75E-08	4.45E-07	1.39E-06	2.62E-06	5.13E-06	8.34E-06	1.23E-05	1.39E-05	1.82E-05	2.69E-05	3.30E-05	4.09E-05	4.72E-05	5.67E-05
	SN	1.19E-08	8.44E-08	3.69E-07	1.20E-06	2.44E-06	4.46E-06	7.22E-06	1.03E-05	1.29E-05	1.58E-05	2.27E-05	2.95E-05	3.52E-05	4.13E-05	4.87E-05
	G	2.24E-08	1.47E-07	6.44E-07	2.10E-06	4.40E-06	8.01E-06	1.34E-05	1.79E-05	2.42E-05	2.91E-05	4.13E-05	5.11E-05	5.66E-05	6.12E-05	7.00E-05
2	S	1.76E-08	1.24E-07	5.62E-07	1.74E-06	3.52E-06	6.40E-06	1.03E-05	1.47E-05	1.43E-05	2.23E-05	3.21E-05	4.00E-05	4.66E-05	5.51E-05	6.44E-05
	SN	1.53E-08	1.07E-07	4.86E-07	1.51E-06	3.05E-06	5.54E-06	8.95E-06	1.27E-05	1.50E-05	1.93E-05	2.74E-05	3.45E-05	4.10E-05	4.77E-05	5.30E-05
	G	2.58E-08	1.70E-07	7.45E-07	2.40E-06	5.02E-06	9.09E-06	1.52E-05	2.14E-05	2.71E-05	3.26E-05	4.62E-05	5.71E-05	6.30E-05	6.64E-05	7.79E-05
3	S	2.10E-08	1.47E-07	6.43E-07	2.05E-06	4.13E-06	7.46E-06	1.20E-05	1.70E-05	2.11E-05	2.58E-05	3.69E-05	4.62E-05	5.30E-05	6.07E-05	7.00E-05
	SN	1.82E-08	1.27E-07	5.74E-07	1.77E-06	3.57E-06	6.46E-06	1.04E-05	1.47E-05	1.62E-05	2.21E-05	3.17E-05	4.01E-05	4.64E-05	5.15E-05	6.01E-05
	G	2.87E-08	1.90E-07	8.33E-07	2.75E-06	5.54E-06	1.00E-05	1.64E-05	2.34E-05	2.90E-05	3.54E-05	5.01E-05	6.10E-05	6.80E-05	7.20E-05	8.27E-05
4	S	2.42E-08	1.68E-07	7.57E-07	2.33E-06	4.66E-06	8.48E-06	1.35E-05	1.90E-05	2.35E-05	2.84E-05	4.35E-05	5.09E-05	5.49E-05	6.52E-05	7.44E-05
	SN	2.09E-08	1.46E-07	6.55E-07	2.02E-06	4.04E-06	7.28E-06	1.17E-05	1.65E-05	2.05E-05	2.50E-05	3.51E-05	4.41E-05	5.10E-05	5.65E-05	6.44E-05
	G	3.14E-08	2.08E-07	9.14E-07	2.91E-06	6.00E-06	1.08E-05	1.79E-05	2.52E-05	3.17E-05	3.79E-05	5.35E-05	6.50E-05	7.22E-05	7.67E-05	8.65E-05
5	S	2.73E-08	1.89E-07	8.40E-07	2.60E-06	5.19E-06	9.32E-06	1.49E-05	2.10E-05	2.56E-05	3.12E-05	4.41E-05	5.52E-05	6.33E-05	6.03E-05	7.01E-05
	SN	2.36E-08	1.64E-07	7.34E-07	2.29E-06	4.90E-06	8.06E-06	1.29E-05	1.82E-05	2.24E-05	2.75E-05	3.82E-05	4.74E-05	5.46E-05	6.03E-05	6.77E-05
	G	3.42E-08	2.26E-07	9.93E-07	3.22E-06	6.46E-06	1.16E-05	1.91E-05	2.69E-05	3.37E-05	4.03E-05	5.66E-05	6.95E-05	7.80E-05	8.01E-05	8.91E-05

SOLAR ALTITUDE = 90 DEGREES   OZONE: .440 CM

A.S.L.(KM)	LAMBDA:	297.5	300.0	302.5	305.0	307.5	310.0	312.5	315.0	317.5	320.0	325.0	330.0	340.0	360.0	380.0
	H	1.34E-08	7.16E-08	2.94E-07	1.09E-06	2.07E-06	3.94E-06	6.54E-06	9.31E-06	1.17E-05	1.37E-05	1.95E-05	2.23E-05	2.19E-05	2.08E-05	2.31E-05
0	S	2.99E-08	1.63E-07	6.16E-07	1.68E-06	3.19E-06	5.37E-06	8.27E-06	1.14E-05	1.40E-05	1.64E-05	2.39E-05	3.02E-05	3.59E-05	4.16E-05	4.96E-05
	SN	2.99E-08	1.63E-07	6.16E-07	1.68E-06	3.19E-06	5.37E-06	8.27E-06	1.14E-05	1.40E-05	1.64E-05	2.39E-05	3.02E-05	3.59E-05	4.16E-05	4.90E-05
	G	4.33E-08	2.34E-07	9.10E-07	2.76E-06	5.22E-06	9.32E-06	1.40E-05	2.07E-05	2.57E-05	3.05E-05	4.34E-05	5.26E-05	5.70E-05	6.24E-05	7.27E-05
1	S	4.17E-08	2.29E-07	8.40E-07	2.30E-06	4.28E-06	7.24E-06	1.11E-05	1.53E-05	1.46E-05	2.23E-05	3.15E-05	3.95E-05	4.67E-05	5.26E-05	6.17E-05
	SN	4.17E-08	2.29E-07	8.40E-07	2.30E-06	4.24E-06	7.24E-06	1.11E-05	1.53E-05	1.46E-05	2.23E-05	3.15E-05	3.95E-05	4.67E-05	5.26E-05	6.17E-05
	G	5.51E-08	2.97E-07	1.14E-06	3.38E-06	6.39E-06	1.12E-05	1.77E-05	2.48E-05	3.04E-05	3.60E-05	5.11E-05	6.11E-05	6.01E-05	7.34E-05	8.48E-05
2	S	5.15E-08	2.77E-07	1.04E-06	2.80E-06	5.19E-06	8.79E-06	1.34E-05	1.83E-05	2.22E-05	2.66E-05	3.72E-05	4.64E-05	5.37E-05	6.02E-05	6.94E-05
	SN	5.15E-08	2.77E-07	1.04E-06	2.80E-06	5.19E-06	8.79E-06	1.34E-05	1.83E-05	2.22E-05	2.66E-05	3.72E-05	4.64E-05	5.37E-05	6.02E-05	6.94E-05
	G	6.49E-08	3.48E-07	1.33E-06	3.88E-06	7.27E-06	1.27E-05	1.99E-05	2.76E-05	3.40E-05	4.03E-05	5.67E-05	6.87E-05	7.59E-05	8.11E-05	9.23E-05
3	S	6.01E-08	3.21E-07	1.20E-06	3.22E-06	5.96E-06	1.00E-05	1.52E-05	2.08E-05	2.52E-05	2.99E-05	4.17E-05	5.17E-05	5.97E-05	6.54E-05	7.44E-05
	SN	6.01E-08	3.21E-07	1.20E-06	3.22E-06	5.96E-06	1.00E-05	1.52E-05	2.08E-05	2.52E-05	2.99E-05	4.17E-05	5.17E-05	5.97E-05	6.54E-05	7.39E-05
	G	7.34E-08	3.92E-07	1.49E-06	4.31E-06	8.03E-06	1.40E-05	2.14E-05	3.01E-05	3.69E-05	4.30E-05	6.12E-05	7.40E-05	8.11E-05	8.67E-05	9.77E-05
4	S	6.78E-08	3.61E-07	1.34E-06	3.59E-06	6.62E-06	1.11E-05	1.69E-05	2.29E-05	2.77E-05	3.28E-05	4.55E-05	5.61E-05	6.30E-05	6.95E-05	7.83E-05
	SN	6.78E-08	3.61E-07	1.34E-06	3.59E-06	6.62E-06	1.11E-05	1.69E-05	2.29E-05	2.77E-05	3.28E-05	4.55E-05	5.61E-05	6.30E-05	6.95E-05	7.83E-05
	G	8.12E-08	4.32E-07	1.64E-06	4.68E-06	8.70E-06	1.51E-05	2.34E-05	3.22E-05	3.94E-05	4.65E-05	6.50E-05	7.05E-05	8.57E-05	9.04E-05	1.02E-04
5	S	7.54E-08	4.00E-07	1.48E-06	3.95E-06	7.27E-06	1.22E-05	1.84E-05	2.50E-05	3.00E-05	3.55E-05	4.91E-05	6.02E-05	6.79E-05	7.33E-05	8.23E-05
	SN	7.54E-08	4.00E-07	1.48E-06	3.95E-06	7.27E-06	1.22E-05	1.84E-05	2.50E-05	3.00E-05	3.55E-05	4.91E-05	6.02E-05	6.79E-05	7.33E-05	8.23E-05
	G	8.87E-08	4.71E-07	1.78E-06	5.04E-06	9.34E-06	1.61E-05	2.49E-05	3.43E-05	4.10E-05	4.92E-05	6.40E-05	8.25E-05	8.90E-05	9.43E-05	1.03E-04

Table B. Influence of an assumed percentage reduction of atmospheric ozone on the intensity of different components of ultraviolet radiation at selected latitudes and solar altitudes

Designations:

WL	Wavelength λ in μ
LA	Northern Latitude Ø
SA	Solar altitude
I	Intensity of the different components of ultraviolet radiation ($Wcm^{-2}\ nm^{-1}$) for the annual mean amount of atmospheric ozone for the latitudes considered
Q	Factor I(R)/I(O) by which the intensity of the different components is reduced by an assumed percentage reduction R of the annual mean amount of ozone
H	Sky intensity from the whole sky on a horizontal surface
S	Direct solar intensity
SN	Vertical component of solar intensity
G	Global intensity

OZONE-REDUCTION: %				0		5		10		25		50	
WL	LA	SA		I	Q	I	Q	I	Q	I	Q	I	Q
.2975	0	60	M	1.53E-07	1.00	1.82E-07	1.19	2.15E-07	1.42	3.64E-07	2.38	8.67E-07	5.67
			S	1.77E-07	1.00	2.14E-07	1.21	2.59E-07	1.46	4.57E-07	2.59	1.18E-06	6.63
			SN	1.53E-07	1.00	1.85E-07	1.21	2.24E-07	1.46	3.96E-07	2.59	1.02E-06	6.63
			G	3.15E-07	1.00	3.67E-07	1.20	4.43E-07	1.44	7.68E-07	2.46	1.89E-06	6.13
.2975	40	60	M	5.73E-08	1.00	7.16E-08	1.25	8.94E-08	1.56	1.74E-07	3.04	5.31E-07	9.27
			S	6.23E-08	1.00	7.73E-08	1.28	9.83E-08	1.63	2.04E-07	3.38	6.91E-07	11.45
			SN	5.23E-08	1.00	6.67E-08	1.28	8.51E-08	1.63	1.77E-07	3.38	5.98E-07	11.45
			G	1.13E-07	1.00	1.38E-07	1.26	1.75E-07	1.59	3.51E-07	3.21	1.13E-06	10.31
.2975	73	40	M	4.08E-09	1.00	5.34E-09	1.31	6.98E-09	1.71	1.56E-08	3.83	5.98E-08	14.66
			S	2.19E-09	1.00	3.18E-09	1.46	4.64E-09	2.12	1.43E-08	6.56	9.41E-08	43.04
			SN	1.41E-09	1.00	2.05E-09	1.46	2.93E-09	2.12	9.22E-09	6.56	6.05E-08	43.04
			G	5.49E-09	1.00	7.39E-09	1.35	9.96E-09	1.82	2.48E-08	4.53	1.20E-07	21.92
.3000	0	60	M	3.76E-07	1.00	4.22E-07	1.12	4.74E-07	1.26	6.72E-07	1.79	1.20E-06	3.20
			S	5.32E-07	1.00	6.08E-07	1.14	6.96E-07	1.31	1.04E-06	1.96	2.04E-06	3.83
			SN	4.61E-07	1.00	5.27E-07	1.14	6.03E-07	1.31	9.02E-07	1.96	1.76E-06	3.83
			G	8.36E-07	1.00	9.49E-07	1.13	1.08E-06	1.29	1.57E-06	1.88	2.97E-06	3.55
.3000	40	60	M	1.95E-07	1.00	2.26E-07	1.16	2.62E-07	1.35	4.10E-07	2.11	8.66E-07	4.45
			S	2.49E-07	1.00	2.96E-07	1.19	3.51E-07	1.41	5.89E-07	2.37	1.39E-06	5.60
			SN	2.16E-07	1.00	2.56E-07	1.19	3.04E-07	1.41	5.10E-07	2.37	1.21E-06	5.60
			G	4.18E-07	1.00	4.82E-07	1.16	5.67E-07	1.38	9.21E-07	2.24	2.07E-06	5.05
.3000	73	40	M	3.17E-08	1.00	3.84E-08	1.21	4.66E-08	1.47	8.33E-08	2.63	2.19E-07	6.92
			S	2.00E-08	1.00	2.61E-08	1.30	3.40E-08	1.70	7.55E-08	3.78	2.85E-07	14.27
			SN	1.28E-08	1.00	1.68E-08	1.30	2.19E-08	1.70	4.85E-08	3.78	1.83E-07	14.27
			G	4.45E-08	1.00	5.52E-08	1.24	6.85E-08	1.54	1.32E-07	2.96	4.02E-07	9.04
.3025	0	60	M	1.05E-06	1.00	1.15E-06	1.10	1.26E-06	1.20	1.66E-06	1.58	2.61E-06	2.48
			S	1.33E-06	1.00	1.47E-06	1.10	1.61E-06	1.21	2.15E-06	1.61	3.45E-06	2.59
			SN	1.16E-06	1.00	1.27E-06	1.10	1.40E-06	1.21	1.86E-06	1.61	2.99E-06	2.59
			G	2.21E-06	1.00	2.42E-06	1.10	2.66E-06	1.20	3.52E-06	1.59	5.60E-06	2.54
.3025	40	60	M	6.29E-07	1.00	7.07E-07	1.12	7.95E-07	1.26	1.13E-06	1.79	2.02E-06	3.21
			S	7.80E-07	1.00	8.81E-07	1.13	9.95E-07	1.28	1.43E-06	1.84	2.64E-06	3.39
			SN	6.75E-07	1.00	7.63E-07	1.13	8.62E-07	1.28	1.24E-06	1.84	2.28E-06	3.38
			G	1.30E-06	1.00	1.47E-06	1.13	1.65E-06	1.27	2.37E-06	1.82	4.31E-06	3.30
.3025	73	40	M	1.69E-07	1.00	1.97E-07	1.17	2.30E-07	1.36	3.64E-07	2.15	7.82E-07	4.62
			S	1.10E-07	1.00	1.33E-07	1.21	1.60E-07	1.46	2.82E-07	2.56	7.22E-07	6.56
			SN	7.08E-08	1.00	8.54E-08	1.21	1.03E-07	1.46	1.81E-07	2.56	4.64E-07	6.56
			G	2.40E-07	1.00	2.83E-07	1.18	3.33E-07	1.39	5.45E-07	2.27	1.25E-06	5.19
.3050	0	60	M	2.69E-06	1.00	2.88E-06	1.07	3.07E-06	1.14	3.74E-06	1.39	5.20E-06	1.93
			S	2.69E-06	1.00	2.87E-06	1.07	3.07E-06	1.14	3.74E-06	1.39	5.22E-06	1.94
			SN	2.33E-06	1.00	2.49E-06	1.07	2.66E-06	1.14	3.24E-06	1.39	4.52E-06	1.94
			G	5.02E-06	1.00	5.36E-06	1.07	5.73E-06	1.14	6.98E-06	1.39	9.72E-06	1.94
.3050	40	60	M	1.86E-06	1.00	2.02E-06	1.09	2.20E-06	1.18	2.83E-06	1.52	4.32E-06	2.32
			S	1.85E-06	1.00	2.01E-06	1.09	2.19E-06	1.19	2.83E-06	1.53	4.33E-06	2.34
			SN	1.60E-06	1.00	1.74E-06	1.09	1.90E-06	1.19	2.45E-06	1.53	3.75E-06	2.34
			G	3.46E-06	1.00	3.76E-06	1.09	4.09E-06	1.18	5.28E-06	1.53	8.06E-06	2.33
.3050	73	40	M	5.98E-07	1.00	6.77E-07	1.13	7.67E-07	1.28	1.12E-06	1.87	2.08E-06	3.48
			S	3.96E-07	1.00	4.51E-07	1.14	5.14E-07	1.30	7.63E-07	1.93	1.47E-06	3.72
			SN	2.54E-07	1.00	2.90E-07	1.14	3.31E-07	1.30	4.90E-07	1.93	9.45E-07	3.72
			G	8.52E-07	1.00	9.67E-07	1.14	1.10E-06	1.29	1.61E-06	1.88	3.03E-06	3.55
.3075	0	60	M	4.44E-06	1.00	4.68E-06	1.05	4.94E-06	1.11	5.79E-06	1.30	7.54E-06	1.70
			S	4.24E-06	1.00	4.45E-06	1.05	4.68E-06	1.10	5.42E-06	1.28	6.95E-06	1.64
			SN	3.67E-06	1.00	3.86E-06	1.05	4.05E-06	1.10	4.70E-06	1.28	6.02E-06	1.64
			G	8.11E-06	1.00	8.54E-06	1.05	8.99E-06	1.11	1.05E-05	1.29	1.36E-05	1.67
.3075	40	60	M	3.29E-06	1.00	3.53E-06	1.07	3.77E-06	1.15	4.63E-06	1.40	6.49E-06	1.97
			S	3.20E-06	1.00	3.41E-06	1.07	3.64E-06	1.14	4.40E-06	1.37	6.04E-06	1.89
			SN	2.77E-06	1.00	2.96E-06	1.07	3.15E-06	1.14	3.81E-06	1.37	5.23E-06	1.89
			G	6.07E-06	1.00	6.48E-06	1.07	6.92E-06	1.14	8.44E-06	1.39	1.17E-05	1.93
.3075	73	40	M	1.34E-06	1.00	1.49E-06	1.11	1.66E-06	1.24	2.28E-06	1.70	3.87E-06	2.89
			S	8.83E-07	1.00	9.74E-07	1.10	1.07E-06	1.22	1.44E-06	1.63	2.35E-06	2.66
			SN	5.68E-07	1.00	6.26E-07	1.10	6.90E-07	1.22	9.26E-07	1.63	1.51E-06	2.66
			G	1.91E-06	1.00	2.12E-06	1.11	2.35E-06	1.23	3.20E-06	1.68	5.38E-06	2.82
.3100	0	60	M	6.61E-06	1.00	6.88E-06	1.04	7.17E-06	1.08	8.09E-06	1.22	9.89E-06	1.50
			S	6.26E-06	1.00	6.49E-06	1.04	6.72E-06	1.07	7.47E-06	1.19	8.92E-06	1.42
			SN	5.42E-06	1.00	5.62E-06	1.04	5.82E-06	1.07	6.47E-06	1.19	7.72E-06	1.42
			G	1.20E-05	1.00	1.25E-05	1.04	1.30E-05	1.08	1.46E-05	1.21	1.76E-05	1.46
.3100	40	60	M	5.26E-06	1.00	5.54E-06	1.05	5.84E-06	1.11	6.82E-06	1.30	8.83E-06	1.68
			S	5.13E-06	1.00	5.36E-06	1.05	5.61E-06	1.09	6.43E-06	1.25	8.07E-06	1.57
			SN	4.44E-06	1.00	4.65E-06	1.05	4.86E-06	1.09	5.57E-06	1.25	6.99E-06	1.57
			G	9.70E-06	1.00	1.02E-05	1.05	1.07E-05	1.10	1.24E-05	1.28	1.58E-05	1.63
.3100	73	40	M	2.16E-06	1.00	2.34E-06	1.08	2.54E-06	1.18	3.24E-06	1.50	4.87E-06	2.26
			S	1.75E-06	1.00	1.87E-06	1.07	2.01E-06	1.15	2.48E-06	1.42	3.52E-06	2.01
			SN	1.12E-06	1.00	1.20E-06	1.07	1.29E-06	1.15	1.59E-06	1.42	2.26E-06	2.01
			G	3.28E-06	1.00	3.54E-06	1.08	3.83E-06	1.17	4.83E-06	1.47	7.13E-06	2.17

WL	LA	SA	OZONE-REDUCTION %	0 I	0 Q	5 I	5 Q	10 I	10 Q	25 I	25 Q	50 I	50 Q
.3125	0	60	H	9.50E-06	1.00	9.76E-06	1.03	1.00E-05	1.06	1.09E-05	1.15	1.25E-05	1.32
			S	8.61E-06	1.00	8.82E-06	1.02	9.03E-06	1.05	9.72E-06	1.13	1.10E-05	1.27
			SN	7.45E-06	1.00	7.64E-06	1.02	7.82E-06	1.05	8.41E-06	1.13	9.50E-06	1.27
			G	1.70E-05	1.00	1.74E-05	1.03	1.79E-05	1.05	1.93E-05	1.14	2.20E-05	1.30
.3125	40	60	H	8.13E-06	1.00	8.42E-06	1.04	8.73E-06	1.07	9.70E-06	1.19	1.16E-05	1.42
			S	7.50E-06	1.00	7.74E-06	1.03	7.98E-06	1.06	8.77E-06	1.17	1.02E-05	1.27
			SN	6.50E-06	1.00	6.70E-06	1.03	6.91E-06	1.06	7.59E-06	1.17	8.87E-06	1.37
			G	1.46E-05	1.00	1.51E-05	1.03	1.56E-05	1.07	1.73E-05	1.18	2.04E-05	1.40
.3125	73	40	H	4.60E-06	1.00	4.85E-06	1.05	5.12E-06	1.11	6.00E-06	1.30	7.83E-06	1.70
			S	3.03E-06	1.00	3.18E-06	1.05	3.33E-06	1.10	3.85E-06	1.27	4.89E-06	1.62
			SN	1.95E-06	1.00	2.04E-06	1.05	2.14E-06	1.10	2.47E-06	1.27	3.15E-06	1.62
			G	6.55E-06	1.00	6.90E-06	1.05	7.26E-06	1.11	8.48E-06	1.29	1.10E-05	1.68
.3150	0	60	H	1.13E-05	1.00	1.15E-05	1.02	1.17E-05	1.03	1.23E-05	1.09	1.34E-05	1.18
			S	1.10E-05	1.00	1.12E-05	1.02	1.14E-05	1.03	1.20E-05	1.09	1.30E-05	1.18
			SN	9.53E-06	1.00	9.69E-06	1.02	9.85E-06	1.03	1.04E-05	1.09	1.13E-05	1.19
			G	2.08E-05	1.00	2.12E-05	1.02	2.15E-05	1.03	2.26E-05	1.09	2.46E-05	1.18
.3150	40	60	H	1.03E-05	1.00	1.05E-05	1.02	1.07E-05	1.04	1.14E-05	1.11	1.27E-05	1.24
			S	1.00E-05	1.00	1.02E-05	1.02	1.05E-05	1.04	1.11E-05	1.11	1.24E-05	1.24
			SN	8.67E-06	1.00	8.86E-06	1.02	9.05E-06	1.04	9.65E-06	1.11	1.07E-05	1.24
			G	1.89E-05	1.00	1.93E-05	1.02	1.98E-05	1.04	2.11E-05	1.12	2.35E-05	1.24
.3150	73	40	H	6.45E-06	1.00	6.67E-06	1.03	6.90E-06	1.07	7.65E-06	1.19	9.07E-06	1.41
			S	4.56E-06	1.00	4.71E-06	1.03	4.87E-06	1.07	5.38E-06	1.18	6.34E-06	1.39
			SN	2.93E-06	1.00	3.03E-06	1.03	3.13E-06	1.07	3.44E-06	1.14	4.07E-06	1.39
			G	9.38E-06	1.00	9.70E-06	1.03	1.00E-05	1.07	1.11E-05	1.18	1.31E-05	1.40
.3175	0	60	H	1.47E-05	1.00	1.49E-05	1.02	1.52E-05	1.03	1.60E-05	1.09	1.74E-05	1.18
			S	1.30E-05	1.00	1.31E-05	1.01	1.33E-05	1.03	1.38E-05	1.06	1.47E-05	1.13
			SN	1.12E-05	1.00	1.14E-05	1.01	1.15E-05	1.03	1.19E-05	1.06	1.27E-05	1.13
			G	2.59E-05	1.00	2.63E-05	1.02	2.67E-05	1.03	2.79E-05	1.08	3.01E-05	1.16
.3175	40	60	H	1.33E-05	1.00	1.36E-05	1.02	1.39E-05	1.04	1.49E-05	1.11	1.66E-05	1.24
			S	1.21E-05	1.00	1.23E-05	1.02	1.25E-05	1.03	1.31E-05	1.08	1.42E-05	1.17
			SN	1.05E-05	1.00	1.06E-05	1.02	1.08E-05	1.03	1.13E-05	1.08	1.23E-05	1.17
			G	2.38E-05	1.00	2.42E-05	1.02	2.47E-05	1.04	2.62E-05	1.10	2.88E-05	1.21
.3175	73	40	H	8.44E-06	1.00	8.73E-06	1.03	9.04E-06	1.07	1.00E-05	1.19	1.19E-05	1.41
			S	5.90E-06	1.00	6.05E-06	1.03	6.20E-06	1.05	6.68E-06	1.13	7.56E-06	1.28
			SN	3.79E-06	1.00	3.89E-06	1.03	3.98E-06	1.05	4.29E-06	1.13	4.86E-06	1.28
			G	1.22E-05	1.00	1.26E-05	1.03	1.30E-05	1.06	1.43E-05	1.17	1.67E-05	1.37
.3200	0	60	H	1.67E-05	1.00	1.69E-05	1.01	1.72E-05	1.03	1.80E-05	1.08	1.94E-05	1.16
			S	1.51E-05	1.00	1.52E-05	1.01	1.54E-05	1.02	1.58E-05	1.05	1.65E-05	1.09
			SN	1.31E-05	1.00	1.32E-05	1.01	1.33E-05	1.02	1.37E-05	1.05	1.43E-05	1.09
			G	2.98E-05	1.00	3.01E-05	1.01	3.05E-05	1.02	3.16E-05	1.06	3.37E-05	1.13
.3200	40	60	H	1.53E-05	1.00	1.56E-05	1.02	1.59E-05	1.04	1.69E-05	1.10	1.86E-05	1.21
			S	1.43E-05	1.00	1.45E-05	1.01	1.47E-05	1.02	1.52E-05	1.06	1.61E-05	1.12
			SN	1.24E-05	1.00	1.26E-05	1.01	1.27E-05	1.02	1.32E-05	1.06	1.39E-05	1.12
			G	2.76E-05	1.00	2.82E-05	1.02	2.86E-05	1.03	3.00E-05	1.08	3.25E-05	1.17
.3200	73	40	H	1.08E-05	1.00	1.11E-05	1.03	1.16E-05	1.06	1.25E-05	1.15	1.43E-05	1.33
			S	7.47E-06	1.00	7.60E-06	1.02	7.74E-06	1.04	8.16E-06	1.09	8.92E-06	1.19
			SN	4.80E-06	1.00	4.89E-06	1.02	4.97E-06	1.04	5.25E-06	1.09	5.73E-06	1.19
			G	1.56E-05	1.00	1.60E-05	1.03	1.64E-05	1.05	1.77E-05	1.13	2.01E-05	1.29
.3250	0	60	H	2.17E-05	1.00	2.19E-05	1.01	2.21E-05	1.02	2.29E-05	1.05	2.41E-05	1.11
			S	2.07E-05	1.00	2.08E-05	1.00	2.09E-05	1.01	2.12E-05	1.02	2.17E-05	1.05
			SN	1.80E-05	1.00	1.80E-05	1.00	1.81E-05	1.01	1.84E-05	1.02	1.88E-05	1.05
			G	3.96E-05	1.00	4.00E-05	1.01	4.03E-05	1.02	4.13E-05	1.04	4.29E-05	1.08
.3250	40	60	H	2.04E-05	1.00	2.07E-05	1.01	2.10E-05	1.03	2.19E-05	1.07	2.34E-05	1.15
			S	2.02E-05	1.00	2.03E-05	1.01	2.04E-05	1.01	2.08E-05	1.03	2.15E-05	1.06
			SN	1.75E-05	1.00	1.76E-05	1.01	1.77E-05	1.01	1.80E-05	1.03	1.86E-05	1.06
			G	3.79E-05	1.00	3.83E-05	1.01	3.87E-05	1.02	3.99E-05	1.05	4.20E-05	1.11
.3250	73	40	H	1.38E-05	1.00	1.41E-05	1.02	1.43E-05	1.04	1.51E-05	1.10	1.66E-05	1.20
			S	1.14E-05	1.00	1.15E-05	1.01	1.17E-05	1.02	1.20E-05	1.05	1.26E-05	1.10
			SN	7.35E-06	1.00	7.42E-06	1.01	7.49E-06	1.02	7.70E-06	1.05	8.07E-06	1.10
			G	2.11E-05	1.00	2.15E-05	1.02	2.19E-05	1.03	2.28E-05	1.08	2.47E-05	1.17
.3300	0	60	H	2.24E-05	1.00	2.25E-05	1.00	2.25E-05	1.00	2.27E-05	1.01	2.29E-05	1.02
			S	2.54E-05	1.00	2.56E-05	1.00	2.57E-05	1.00	2.58E-05	1.01	2.60E-05	1.02
			SN	2.21E-05	1.00	2.22E-05	1.00	2.22E-05	1.00	2.23E-05	1.01	2.25E-05	1.02
			G	4.46E-05	1.00	4.47E-05	1.00	4.48E-05	1.00	4.50E-05	1.01	4.55E-05	1.02
.3300	40	60	H	2.22E-05	1.00	2.22E-05	1.00	2.23E-05	1.01	2.25E-05	1.01	2.28E-05	1.03
			S	2.53E-05	1.00	2.54E-05	1.00	2.54E-05	1.00	2.56E-05	1.01	2.59E-05	1.02
			SN	2.19E-05	1.00	2.20E-05	1.00	2.20E-05	1.00	2.22E-05	1.01	2.24E-05	1.02
			G	4.41E-05	1.00	4.42E-05	1.00	4.43E-05	1.00	4.47E-05	1.01	4.52E-05	1.03
.3300	73	40	H	1.80E-05	1.00	1.81E-05	1.00	1.81E-05	1.01	1.83E-05	1.02	1.86E-05	1.03
			S	1.53E-05	1.00	1.54E-05	1.00	1.54E-05	1.01	1.56E-05	1.02	1.58E-05	1.04
			SN	9.84E-06	1.00	9.87E-06	1.00	9.91E-06	1.01	1.00E-05	1.02	1.02E-05	1.04
			G	2.78E-05	1.00	2.79E-05	1.00	2.80E-05	1.01	2.83E-05	1.02	2.88E-05	1.03

Table C. Variation of the different components of natural ultraviolet radiation in dependence on Northern Latitude

Designations:

WL	Wavelength λ in μ
LAT	Northern Latitude Ø
H	Sky intensity from the whole sky on a horizontal surface
S	Direct solar intensity
SN	Vertical component of direct solar intensity
G	Global intensity
MEAN	Mean of the values of intensity obtained for the different seasons

The values of intensity (Wcm^{-2} nm^{-1}) have been computed for the average total amount of atmospheric ozone for the different seasons and around the latitude circles considered. These results relate to cloudless sky.

LAT	SEASON	WL:	.2975	.3000	.3025	.3050	.3075	.3100	.3125	.3150	.3175	.3200	.3250	.3300	.3400	.3600	.3800
0	SPRING	M	1.05E-07	3.57E-07	1.10E-06	2.62E-06	4.47E-06	7.07E-06	9.73E-06	1.19E-05	1.50E-05	1.70E-05	2.24E-05	2.30E-05	2.13E-05	2.08E-05	2.31E-05
		S	3.02E-07	8.26E-07	1.93E-06	3.70E-06	5.65E-06	8.12E-06	1.09E-05	1.37E-05	1.60E-05	1.64E-05	2.49E-05	3.03E-05	3.33E-05	4.10E-05	4.90E-05
		SN	2.97E-07	8.14E-07	1.91E-06	3.65E-06	5.56E-06	8.00E-06	1.07E-05	1.35E-05	1.57E-05	1.51E-05	2.45E-05	2.98E-05	3.46E-05	4.04E-05	4.83E-05
		G	4.03E-07	1.20E-06	3.00E-06	6.46E-06	1.00E-05	1.51E-05	2.05E-05	2.54E-05	3.07E-05	3.51E-05	4.73E-05	5.26E-05	5.07E-05	6.12E-05	7.14E-05
	SUMMER	M	1.75E-07	4.01E-07	1.13E-06	2.88E-06	4.54E-06	7.17E-06	9.62E-06	1.20E-05	1.51E-05	1.71E-05	2.23E-05	2.30E-05	2.13E-05	2.08E-05	2.31E-05
		S	2.43E-07	7.04E-07	1.65E-06	3.30E-06	5.10E-06	7.40E-06	1.00E-05	1.27E-05	1.48E-05	1.71E-05	2.33E-05	2.85E-05	3.39E-05	3.92E-05	4.71E-05
		SN	2.33E-07	6.62E-07	1.59E-06	3.10E-06	4.79E-06	6.95E-06	9.42E-06	1.19E-05	1.39E-05	1.61E-05	2.19E-05	2.68E-05	3.14E-05	3.68E-05	4.43E-05
		G	4.03E-07	1.06E-06	2.72E-06	5.98E-06	9.33E-06	1.41E-05	1.92E-05	2.39E-05	2.90E-05	3.32E-05	4.40E-05	4.98E-05	5.33E-05	5.76E-05	6.74E-05
	FALL	M	2.37E-07	4.49E-07	1.23E-06	[illegible]	4.78E-06	7.45E-06	1.01E-05	1.21E-05	1.53E-05	1.73E-05	2.31E-05	2.31E-05	2.11E-05	2.08E-05	2.31E-05
		S	3.74E-07	9.02E-07	2.15E-06	3.99E-06	5.97E-06	8.45E-06	1.12E-05	1.40E-05	1.62E-05	1.80E-05	2.50E-05	3.04E-05	3.53E-05	4.10E-05	4.90E-05
		SN	3.59E-07	9.47E-07	2.12E-06	3.93E-06	5.88E-06	8.32E-06	1.10E-05	1.38E-05	1.59E-05	1.83E-05	2.40E-05	2.99E-05	3.43E-05	4.04E-05	4.83E-05
		G	5.70E-07	1.40E-06	3.36E-06	7.00E-06	1.07E-05	1.58E-05	2.11E-05	2.59E-05	3.13E-05	3.56E-05	4.77E-05	5.30E-05	5.07E-05	6.12E-05	7.14E-05
	WINTER	M	2.10E-07	4.62E-07	1.26E-06	3.12E-06	4.84E-06	7.52E-06	1.01E-05	1.22E-05	1.54E-05	1.74E-05	2.31E-05	2.31E-05	2.19E-05	2.08E-05	2.31E-05
		S	3.07E-07	8.18E-07	1.85E-06	3.55E-06	5.38E-06	7.70E-06	1.03E-05	1.29E-05	1.50E-05	1.73E-05	2.35E-05	2.86E-05	3.35E-05	3.92E-05	4.71E-05
		SN	2.83E-07	7.09E-07	1.77E-06	3.34E-06	5.06E-06	7.23E-06	9.68E-06	1.21E-05	1.41E-05	1.63E-05	2.20E-05	2.69E-05	3.14E-05	3.68E-05	4.43E-05
		G	5.04E-07	1.23E-06	3.03E-06	6.40E-06	9.90E-06	1.48E-05	1.98E-05	2.43E-05	2.95E-05	3.37E-05	4.52E-05	4.99E-05	5.33E-05	5.76E-05	6.74E-05
	MEAN	M	1.91E-07	4.25E-07	1.19E-06	2.97E-06	4.60E-06	7.30E-06	9.95E-06	1.20E-05	1.52E-05	1.72E-05	2.24E-05	2.30E-05	2.19E-05	2.08E-05	2.31E-05
		S	3.33E-07	8.28E-07	1.92E-06	3.64E-06	5.53E-06	7.92E-06	1.06E-05	1.33E-05	1.55E-05	1.79E-05	2.42E-05	2.94E-05	3.44E-05	4.01E-05	4.81E-05
		SN	2.97E-07	7.38E-07	1.33E-06	3.50E-06	5.32E-06	7.63E-06	1.02E-05	1.28E-05	1.49E-05	1.72E-05	2.33E-05	2.84E-05	3.31E-05	3.86E-05	4.63E-05
		G	4.33E-07	1.22E-06	3.03E-06	6.47E-06	9.38E-06	1.49E-05	2.02E-05	2.49E-05	3.01E-05	3.44E-05	4.62E-05	5.14E-05	5.50E-05	5.34E-05	6.94E-05

LAT	SEASON	WL:	.2975	.3000	.3025	.3050	.3075	.3100	.3125	.3150	.3175	.3200	.3250	.3300	.3400	.3600	.3800
10	SPRING	M	1.43E-07	3.59E-07	1.03E-06	2.76E-06	4.32E-06	6.69E-06	9.56E-06	1.18E-05	1.46E-05	1.66E-05	2.20E-05	2.30E-05	2.13E-05	2.09E-05	2.31E-05
		S	2.93E-07	8.15E-07	1.93E-06	3.72E-06	5.70E-06	8.22E-06	1.11E-05	1.39E-05	1.62E-05	1.87E-05	2.53E-05	3.06E-05	3.59E-05	4.16E-05	4.96E-05
		SN	2.93E-07	8.15E-07	1.93E-06	3.72E-06	5.70E-06	8.22E-06	1.11E-05	1.39E-05	1.62E-05	1.87E-05	2.53E-05	3.08E-05	3.59E-05	4.16E-05	4.96E-05
		G	4.41E-07	1.17E-06	2.95E-06	6.42E-06	1.00E-05	1.51E-05	2.06E-05	2.57E-05	3.11E-05	3.50E-05	4.79E-05	5.38E-05	5.76E-05	6.24E-05	7.27E-05
	SUMMER	M	1.03E-07	3.33E-07	1.09E-06	2.80E-06	4.45E-06	7.05E-06	9.71E-06	1.19E-05	1.50E-05	1.70E-05	2.27E-05	2.30E-05	2.19E-05	2.08E-05	2.31E-05
		S	2.35E-07	8.13E-07	1.92E-06	3.68E-06	5.63E-06	8.10E-06	1.09E-05	1.37E-05	1.59E-05	1.84E-05	2.49E-05	3.03E-05	3.53E-05	4.16E-05	4.90E-05
		SN	2.93E-07	8.06E-07	1.89E-06	3.63E-06	5.54E-06	7.98E-06	1.07E-05	1.35E-05	1.57E-05	1.81E-05	2.45E-05	2.98E-05	3.46E-05	4.04E-05	4.83E-05
		G	4.50E-07	1.19E-06	2.95E-06	6.43E-06	9.99E-06	1.50E-05	2.04E-05	2.54E-05	3.07E-05	3.51E-05	4.72E-05	5.28E-05	5.07E-05	6.12E-05	7.14E-05
	FALL	M	1.82E-07	4.13E-07	1.15E-06	2.93E-06	4.60E-06	7.24E-06	9.88E-06	1.20E-05	1.51E-05	1.72E-05	2.29E-05	2.30E-05	2.19E-05	2.08E-05	2.31E-05
		S	2.59E-07	7.26E-07	1.73E-06	3.35E-06	5.15E-06	7.46E-06	1.01E-05	1.27E-05	1.49E-05	1.72E-05	2.34E-05	2.86E-05	3.35E-05	3.92E-05	4.71E-05
		SN	2.43E-07	6.32E-07	1.62E-06	3.15E-06	4.84E-06	7.01E-06	9.47E-06	1.20E-05	1.40E-05	1.61E-05	2.20E-05	2.68E-05	3.14E-05	3.68E-05	4.43E-05
		G	4.20E-07	1.09E-06	2.78E-06	6.07E-06	9.44E-06	1.42E-05	1.94E-05	2.40E-05	2.91E-05	3.33E-05	4.48E-05	4.99E-05	5.33E-05	5.76E-05	6.74E-05
	WINTER	M	1.50E-07	3.81E-07	1.06E-06	2.71E-06	4.47E-06	6.84E-06	9.53E-06	1.13E-05	1.47E-05	1.67E-05	2.17E-05	2.24E-05	2.12E-05	2.03E-05	2.21E-05
		S	1.81E-07	5.40E-07	1.35E-06	2.71E-06	4.26E-06	6.29E-06	8.63E-06	1.10E-05	1.30E-05	1.51E-05	2.07E-05	2.56E-05	3.03E-05	3.60E-05	4.38E-05
		SN	1.53E-07	4.68E-07	1.17E-06	2.34E-06	3.69E-06	5.44E-06	7.47E-06	9.55E-06	1.12E-05	1.31E-05	1.80E-05	2.21E-05	2.63E-05	3.12E-05	3.79E-05
		G	3.12E-07	8.48E-07	2.23E-06	5.00E-06	8.16E-06	1.21E-05	1.70E-05	2.09E-05	2.59E-05	2.98E-05	3.97E-05	4.46E-05	4.75E-05	5.15E-05	5.00E-05
	MEAN	M	1.62E-07	3.84E-07	1.09E-06	2.79E-06	4.46E-06	6.95E-06	9.67E-06	1.17E-05	1.49E-05	1.69E-05	2.25E-05	2.29E-05	2.17E-05	2.07E-05	2.28E-05
		S	2.53E-07	7.25E-07	1.73E-06	3.30E-06	5.18E-06	7.52E-06	1.02E-05	1.28E-05	1.50E-05	1.73E-05	2.30E-05	2.88E-05	3.37E-05	3.94E-05	4.74E-05
		SN	2.47E-07	6.33E-07	1.65E-06	3.21E-06	4.94E-06	7.16E-06	9.68E-06	1.22E-05	1.43E-05	1.65E-05	2.24E-05	2.74E-05	3.21E-05	3.75E-05	4.50E-05
		G	4.33E-07	1.06E-06	2.74E-06	6.00E-06	9.40E-06	1.41E-05	1.94E-05	2.40E-05	2.92E-05	3.34E-05	4.49E-05	5.03E-05	5.38E-05	5.82E-05	6.79E-05

LAT	SEASON	WL:	.2375	.3000	.3025	.3050	.3075	.3100	.3125	.3150	.3175	.3200	.3250	.3300	.3400	.3600	.3800
20	SPRING	M	1.13E-07	3.00E-07	9.00E-07	2.44E-06	3.98E-06	6.48E-06	9.17E-06	1.15E-05	1.45E-05	1.65E-05	2.22E-05	2.29E-05	2.19E-05	2.08E-05	2.31E-05
		S	2.10E-07	6.39E-07	1.61E-06	3.26E-06	5.14E-06	7.59E-06	1.04E-05	1.33E-05	1.56E-05	1.61E-05	2.47E-05	3.02E-05	3.53E-05	4.10E-05	4.30E-05
		SN	2.37E-07	6.29E-07	1.59E-06	3.21E-06	5.06E-06	7.47E-06	1.03E-05	1.31E-05	1.53E-05	1.74E-05	2.43E-05	2.97E-05	3.43E-05	4.04E-05	4.83E-05
		G	3.20E-07	9.29E-07	2.49E-06	5.65E-06	9.04E-06	1.40E-05	1.94E-05	2.45E-05	2.96E-05	3.43E-05	4.05E-05	5.26E-05	5.67E-05	6.12E-05	7.14E-05
	SUMMER	M	1.36E-07	3.42E-07	9.47E-07	2.03E-06	4.23E-06	6.78E-06	9.46E-06	1.17E-05	1.47E-05	1.67E-05	2.25E-05	2.30E-05	2.19E-05	2.08E-05	2.31E-05
		S	2.74E-07	7.77E-07	1.87E-06	3.63E-06	5.00E-06	8.12E-06	1.10E-05	1.38E-05	1.62E-05	1.86E-05	2.53E-05	3.08E-05	3.59E-05	4.16E-05	4.36E-05
		SN	2.74E-07	7.77E-07	1.87E-06	3.63E-06	5.00E-06	8.12E-06	1.10E-05	1.36E-05	1.62E-05	1.86E-05	2.53E-05	3.08E-05	3.59E-05	4.16E-05	4.96E-05
		G	4.12E-07	1.12E-06	2.86E-06	6.20E-06	9.82E-06	1.49E-05	2.04E-05	2.55E-05	3.09E-05	3.54E-05	4.76E-05	5.36E-05	5.74E-05	6.24E-05	7.27E-05
	FALL	M	1.23E-07	3.34E-07	9.66E-07	2.52E-06	4.21E-06	6.35E-06	9.24E-06	1.11E-05	1.44E-05	1.64E-05	2.15E-05	2.24E-05	2.12E-05	2.33E-05	2.21E-05
		S	1.40E-07	4.04E-07	1.21E-06	2.51E-06	4.03E-06	6.04E-06	8.40E-06	1.08E-05	1.28E-05	1.49E-05	2.06E-05	2.55E-05	3.03E-05	3.00E-05	4.38E-05
		SN	1.20E-07	4.02E-07	1.03E-06	2.18E-06	3.49E-06	5.23E-06	7.27E-06	9.37E-06	1.11E-05	1.29E-05	1.74E-05	2.21E-05	2.63E-05	3.12E-05	3.79E-05
		G	2.54E-07	7.36E-07	2.31E-06	4.69E-06	7.70E-06	1.16E-05	1.65E-05	2.05E-05	2.55E-05	2.94E-05	3.93E-05	4.45E-05	4.75E-05	5.15E-05	5.00E-05
	WINTER	M	5.91E-08	2.11E-07	6.91E-07	1.31E-06	3.46E-06	4.77E-06	7.95E-06	9.65E-06	1.26E-05	1.46E-05	1.85E-05	2.00E-05	1.99E-05	1.90E-05	1.90E-05
		S	6.43E-08	2.56E-07	7.45E-07	1.68E-06	2.83E-06	4.42E-06	6.36E-06	8.41E-06	1.01E-05	1.20E-05	1.69E-05	2.12E-05	2.57E-05	3.12E-05	3.57E-05
		SN	5.23E-08	1.36E-07	5.71E-07	1.28E-06	2.17E-06	3.39E-06	4.87E-06	6.44E-06	7.74E-06	9.17E-06	1.29E-05	1.63E-05	1.97E-05	2.39E-05	2.37E-05
		G	1.12E-07	4.37E-07	1.25E-06	3.20E-06	5.63E-06	8.16E-06	1.28E-05	1.61E-05	2.03E-05	2.43E-05	3.14E-05	3.68E-05	3.96E-05	4.29E-05	4.93E-05
	MEAN	M	1.13E-07	2.97E-07	8.87E-07	2.38E-06	3.97E-06	6.09E-06	8.95E-06	1.10E-05	1.40E-05	1.61E-05	2.12E-05	2.22E-05	2.12E-05	2.02E-05	2.20E-05
		S	1.75E-07	5.34E-07	1.35E-06	2.77E-06	4.40E-06	6.54E-06	9.04E-06	1.16E-05	1.37E-05	1.59E-05	2.19E-05	2.69E-05	3.18E-05	3.75E-05	4.53E-05
		SN	1.65E-07	5.01E-07	1.27E-06	2.58E-06	4.08E-06	6.05E-06	8.34E-06	1.07E-05	1.26E-05	1.46E-05	2.01E-05	2.47E-05	2.92E-05	3.43E-05	4.14E-05
		G	2.75E-07	7.98E-07	2.15E-06	4.95E-06	8.05E-06	1.21E-05	1.73E-05	2.17E-05	2.66E-05	3.06E-05	4.13E-05	4.69E-05	5.04E-05	5.45E-05	6.33E-05
LAT	SEASON	WL:	.2375	.3000	.3025	.3050	.3075	.3100	.3125	.3150	.3175	.3200	.3250	.3300	.3400	.3600	.3800
30	SPRING	M	7.69E-08	2.35E-07	7.46E-07	2.13E-06	3.56E-06	5.96E-06	8.66E-06	1.11E-05	1.40E-05	1.60E-05	2.17E-05	2.28E-05	2.19E-05	2.08E-05	2.31E-05
		S	1.11E-07	3.99E-07	1.13E-06	2.49E-06	4.13E-06	6.37E-06	9.05E-06	1.18E-05	1.41E-05	1.65E-05	2.29E-05	2.83E-05	3.33E-05	3.92E-05	4.71E-05
		SN	1.34E-07	3.75E-07	1.05E-06	2.34E-06	3.66E-06	5.99E-06	8.50E-06	1.11E-05	1.32E-05	1.55E-05	2.15E-05	2.66E-05	3.14E-05	3.38E-05	4.43E-05
		G	1.63E-07	6.10E-07	1.81E-06	4.47E-06	7.45E-06	1.19E-05	1.72E-05	2.22E-05	2.72E-05	3.15E-05	4.32E-05	4.94E-05	5.33E-05	5.76E-05	5.74E-05
	SUMMER	M	1.03E-07	2.96E-07	8.38E-07	2.36E-06	3.90E-06	6.38E-06	9.07E-06	1.14E-05	1.44E-05	1.64E-05	2.21E-05	2.29E-05	2.19E-05	2.08E-05	2.31E-05
		S	1.36E-07	6.09E-07	1.56E-06	3.18E-06	5.05E-06	7.49E-06	1.03E-05	1.32E-05	1.55E-05	1.80E-05	2.40E-05	3.02E-05	3.53E-05	4.10E-05	4.30E-05
		SN	1.93E-07	6.00E-07	1.54E-06	3.14E-06	4.97E-06	7.38E-06	1.02E-05	1.30E-05	1.53E-05	1.77E-05	2.42E-05	2.97E-05	3.40E-05	4.04E-05	4.83E-05
		G	2.93E-07	8.86E-07	2.40E-06	5.52E-06	8.87E-06	1.38E-05	1.92E-05	2.44E-05	2.96E-05	3.41E-05	4.04E-05	5.26E-05	5.67E-05	6.12E-05	7.14E-05
	FALL	M	5.14E-08	1.92E-07	6.43E-07	1.62E-06	3.32E-06	4.62E-06	7.78E-06	9.52E-06	1.24E-05	1.40E-05	1.83E-05	2.05E-05	1.99E-05	1.96E-05	1.96E-05
		S	5.31E-08	2.27E-07	6.84E-07	1.58E-06	2.70E-06	4.28E-06	6.22E-06	8.28E-06	9.39E-06	1.14E-05	1.68E-05	2.12E-05	2.57E-05	3.12E-05	3.57E-05
		SN	4.43E-08	1.74E-07	5.24E-07	1.21E-06	2.07E-06	3.28E-06	4.77E-06	6.34E-06	7.05E-06	9.10E-06	1.29E-05	1.62E-05	1.97E-05	2.39E-05	2.97E-05
		G	9.53E-08	3.65E-07	1.17E-06	3.02E-06	5.39E-06	7.90E-06	1.25E-05	1.59E-05	2.03E-05	2.37E-05	3.12E-05	3.68E-05	3.96E-05	4.29E-05	4.93E-05
	WINTER	M	1.30E-08	7.53E-08	2.36E-07	1.05E-06	2.16E-06	3.11E-06	5.84E-06	7.51E-06	9.63E-06	1.23E-05	1.50E-05	[illegible]	1.33E-05	1.72E-05	1.71E-05
		S	1.13E-08	6.50E-08	2.95E-07	7.13E-07	[illegible]	2.39E-06	3.75E-06	5.20E-06	[illegible]	6.09E-06	1.19E-05	1.55E-05	1.36E-05	2.47E-05	3.16E-05
		SN	7.53E-09	4.70E-08	1.34E-07	4.50E-07	6.00E-07	1.54E-06	2.41E-06	3.40E-06	4.24E-06	5.23E-06	7.67E-06	9.99E-06	1.20E-05	1.99E-05	2.03E-05
		G	2.12E-08	1.18E-07	5.31E-07	1.50E-06	3.04E-06	4.64E-06	8.25E-06	1.09E-05	1.41E-05	1.75E-05	2.27E-05	2.83E-05	3.09E-05	3.31E-05	3.74E-05
	MEAN	M	6.24E-08	1.97E-07	6.95E-07	1.84E-06	3.23E-06	5.01E-06	7.04E-06	9.37E-06	1.20E-05	1.40E-05	1.93E-05	2.11E-05	2.05E-05	1.94E-05	2.07E-05
		S	9.43E-08	3.25E-07	9.08E-07	1.99E-06	3.31E-06	5.13E-06	7.34E-06	9.05E-06	1.15E-05	1.35E-05	1.91E-05	2.36E-05	2.95E-05	3.40E-05	4.16E-05
		SN	8.74E-08	2.98E-07	8.22E-07	1.79E-06	2.95E-06	4.55E-06	6.46E-06	8.40E-06	1.01E-05	1.19E-05	1.60E-05	2.06E-05	2.46E-05	2.32E-05	3.56E-05
		G	1.50E-07	4.35E-07	1.47E-06	3.63E-06	6.19E-06	9.56E-06	1.43E-05	1.93E-05	2.27E-05	2.07E-05	3.59E-05	4.18E-05	4.31E-05	4.97E-05	5.84E-05

LAT	SEASON	WL:	.2975	.3000	.3025	.3050	.3075	.3100	.3125	.3150	.3175	.3200	.3250	.3300	.3400	.3600	.3800
40	SPRING	H	3.59E-08	1.42E-07	4.93E-07	1.56E-06	2.66E-06	4.72E-05	7.55E-06	9.80E-06	1.27E-05	1.47E-05	1.99E-05	2.20E-05	2.12E-05	2.03E-05	2.21E-05
		S	3.02E-08	1.73E-07	6.04E-07	1.55E-06	2.81E-06	4.66E-06	7.03E-06	9.56E-06	1.17E-05	1.40E-05	1.99E-05	2.52E-05	3.03E-05	3.60E-05	4.36E-05
		SN	3.13E-08	1.50E-07	5.23E-07	1.34E-06	2.43E-06	4.04E-05	6.09E-06	8.29E-06	1.01E-05	1.21E-05	1.73E-05	2.18E-05	2.63E-05	3.12E-05	3.79E-05
		G	6.73E-08	2.93E-07	1.02E-06	2.89E-06	5.29E-06	8.76E-06	1.36E-05	1.81E-05	2.29E-05	2.69E-05	3.71E-05	4.39E-05	4.75E-05	5.15E-05	6.00E-05
	SUMMER	H	7.76E-08	2.33E-07	7.39E-07	2.12E-06	3.55E-06	5.94E-06	8.64E-06	1.10E-05	1.39E-05	1.59E-05	2.17E-05	2.26E-05	2.19E-05	2.08E-05	2.31E-05
		S	1.10E-07	3.95E-07	1.12E-06	2.48E-06	4.12E-06	6.35E-05	9.03E-06	1.18E-05	1.40E-05	1.65E-05	2.29E-05	2.83E-05	3.35E-05	3.92E-05	4.71E-05
		SN	1.05E-07	3.71E-07	1.05E-06	2.33E-06	3.87E-06	5.97E-06	8.48E-06	1.11E-05	1.32E-05	1.55E-05	2.15E-05	2.66E-05	3.14E-05	3.68E-05	4.43E-05
		G	1.61E-07	6.04E-07	1.79E-05	4.45E-06	7.42E-06	1.19E-05	1.71E-05	2.21E-05	2.71E-05	3.14E-05	4.32E-05	4.94E-05	5.33E-05	5.76E-05	6.74E-05
	FALL	H	1.42E-08	7.78E-08	3.45E-07	1.07E-06	2.19E-06	3.15E-05	5.89E-06	7.56E-06	9.89E-06	1.23E-05	1.50E-05	1.83E-05	1.83E-05	1.72E-05	1.71E-05
		S	1.25E-08	6.67E-08	2.64E-07	7.28E-07	1.39E-06	2.42E-05	3.78E-06	5.31E-06	6.62E-06	8.11E-06	1.19E-05	1.56E-05	1.96E-05	2.47E-05	3.16E-05
		SN	8.00E-09	4.42E-08	1.70E-07	4.68E-07	8.94E-07	1.55E-06	2.43E-06	3.42E-06	4.25E-06	5.21E-06	7.68E-05	1.00E-05	1.26E-05	1.59E-05	2.63E-05
		G	2.23E-08	1.22E-07	5.14E-07	1.53E-06	3.09E-06	4.70E-05	8.32E-06	1.10E-05	1.41E-05	1.75E-05	2.27E-05	2.83E-05	3.09E-05	3.31E-05	3.74E-05
	WINTER	H	-1.00E+00	1.44E-08	6.66E-08	3.14E-07	8.40E-07	1.53E-06	3.23E-06	4.86E-06	6.42E-06	8.80E-06	1.11E-05	1.49E-05	1.53E-05	1.47E-05	1.42E-05
		S	-1.00E+00	5.40E-09	3.60E-08	1.49E-07	3.66E-07	7.83E-07	1.45E-06	2.29E-06	3.07E-06	4.30E-06	6.42E-06	8.93E-06	1.21E-05	1.63E-05	2.21E-05
		SN	-1.00E+00	2.70E-09	1.80E-08	7.47E-08	1.83E-07	3.91E-07	7.24E-07	1.15E-06	1.53E-06	2.30E-06	3.21E-06	4.47E-06	6.03E-06	8.14E-06	1.10E-05
		G	-1.00E+00	1.71E-08	8.46E-08	3.89E-07	1.02E-06	1.93E-05	3.95E-06	6.01E-06	7.96E-06	1.09E-05	1.43E-05	1.94E-05	2.13E-05	2.28E-05	2.92E-05
	MEAN	H	-1.00E+00	1.17E-07	4.11E-07	1.26E-06	2.36E-06	3.84E-06	6.33E-06	8.32E-06	1.07E-05	1.30E-05	1.69E-05	1.95E-05	1.92E-05	1.82E-05	1.91E-05
		S	-1.00E+00	1.61E-07	5.07E-07	1.23E-06	2.17E-06	3.55E-05	5.32E-06	7.25E-06	8.85E-06	1.07E-05	1.53E-05	1.95E-05	2.39E-05	2.90E-05	3.51E-05
		SN	-1.00E+00	1.42E-07	4.42E-07	1.05E-06	1.84E-06	2.99E-06	4.43E-06	5.99E-06	7.27E-06	8.71E-06	1.24E-05	1.57E-05	1.91E-05	2.30E-05	2.84E-05
		G	-1.00E+00	2.59E-07	8.52E-07	2.32E-06	4.20E-06	6.82E-05	1.08E-05	1.43E-05	1.80E-05	2.17E-05	2.93E-05	3.52E-05	3.83E-05	4.12E-05	4.75E-05

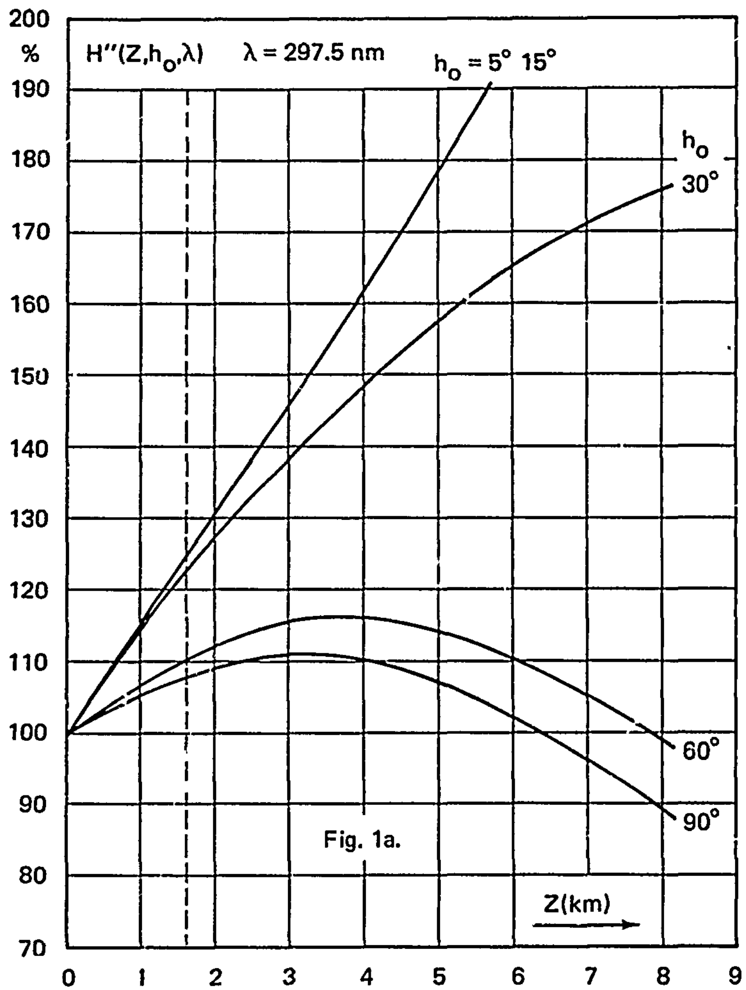
LAT	SEASON	WL:	.2975	.3000	.3025	.3050	.3075	.3100	.3125	.3150	.3175	.3200	.3250	.3300	.3400	.3600	.3800
50	SPRING	H	8.95E-09	5.95E-08	2.57E-07	9.37E-07	1.95E-06	3.08E-05	5.90E-06	8.04E-06	1.05E-05	1.26E-05	1.65E-03	2.01E-05	1.39E-05	1.90E-05	1.96E-05
		S	6.71E-09	4.93E-08	2.32E-07	7.43E-07	1.54E-06	2.87E-05	4.72E-06	6.86E-06	6.66E-06	1.07E-05	1.59E-05	2.08E-05	2.57E-05	3.12E-05	3.07E-05
		SN	5.14E-09	3.76E-08	1.78E-07	5.69E-07	1.18E-06	2.20E-05	3.62E-06	5.25E-06	6.63E-06	8.22E-06	1.22E-03	1.59E-05	1.97E-05	2.39E-03	2.97E-05
		G	1.41E-08	9.73E-08	4.35E-07	1.51E-06	3.13E-06	5.27E-06	9.52E-06	1.33E-05	1.71E-05	2.08E-05	2.87E-05	3.60E-05	3.96E-05	4.29E-05	4.93E-05
	SUMMER	H	4.69E-08	1.70E-07	5.66E-07	1.72E-06	3.10E-06	5.02E-06	7.68E-06	1.01E-05	1.31E-05	1.51E-05	2.02E-05	2.21E-05	2.12E-05	2.03E-05	2.21E-05
		S	4.64E-08	2.13E-07	6.98E-07	1.71E-06	3.03E-06	4.92E-06	7.29E-06	9.82E-06	1.19E-05	1.42E-05	2.31E-05	2.53E-05	3.03E-05	3.60E-05	4.38E-05
		SN	4.19E-08	1.85E-07	6.05E-07	1.48E-06	2.62E-06	4.26E-06	6.32E-06	8.51E-06	1.03E-05	1.23E-05	1.74E-03	2.19E-05	2.63E-05	3.12E-05	3.79E-05
		G	8.88E-08	3.55E-07	1.17E-06	3.20E-06	5.72E-06	9.28E-06	1.42E-05	1.86E-05	2.34E-05	2.74E-05	3.76E-05	4.40E-05	4.75E-05	5.15E-05	6.00E-05
	FALL	H	-1.00E+00	1.90E-08	8.79E-08	3.93E-07	1.00E-06	1.76E-06	3.55E-06	5.19E-06	6.83E-06	9.33E-06	1.15E-05	1.50E-05	1.53E-05	1.47E-05	1.42E-05
		S	-1.00E+00	7.68E-09	4.62E-08	1.78E-07	4.17E-07	8.59E-07	1.54E-06	2.40E-06	3.17E-06	4.10E-06	6.50E-05	8.97E-06	1.21E-05	1.63E-05	2.21E-05
		SN	-1.00E+00	3.84E-09	2.31E-08	8.90E-08	2.08E-07	4.29E-07	7.72E-07	1.20E-06	1.58E-06	2.05E-06	3.25E-06	4.49E-06	6.03E-06	8.14E-06	1.10E-05
		G	-1.00E+00	2.28E-08	1.11E-07	4.82E-07	1.21E-06	2.19E-05	4.32E-06	6.39E-06	8.42E-06	1.14E-05	1.47E-05	1.95E-05	2.13E-05	2.28E-05	2.52E-05
	WINTER	H	-1.00E+00	1.19E-09	5.97E-09	3.55E-08	1.27E-07	3.30E-07	9.98E-07	2.01E-06	2.67E-06	4.19E-06	6.51E-06	1.03E-05	1.10E-05	1.11E-05	1.06E-05
		S	-1.00E+00	3.15E-11	6.39E-10	6.02E-09	2.43E-08	7.88E-08	2.04E-07	4.12E-07	6.35E-07	9.42E-07	1.80E-06	2.86E-06	4.45E-06	6.91E-06	1.05E-05
		SN	-1.00E+00	1.08E-11	2.18E-10	2.06E-09	8.30E-09	2.70E-08	6.99E-08	1.41E-07	2.17E-07	3.22E-07	6.14E-07	9.77E-07	1.52E-06	2.36E-06	3.60E-06
		G	-1.00E+00	1.20E-09	6.19E-09	3.76E-08	1.36E-07	3.57E-07	1.07E-06	2.15E-06	3.09E-06	4.51E-06	7.13E-05	1.13E-05	1.25E-05	1.35E-05	1.42E-05
	MEAN	H	-1.00E+00	6.24E-08	2.29E-07	7.71E-07	1.54E-06	2.55E-05	4.58E-06	6.32E-06	8.31E-06	1.03E-05	1.37E-05	1.69E-05	1.68E-05	1.63E-05	1.66E-05
		S	-1.00E+00	6.75E-08	2.44E-07	6.59E-07	1.25E-06	2.18E-05	3.44E-06	4.87E-06	6.09E-06	7.49E-06	1.11E-05	1.45E-05	1.81E-05	2.26E-05	2.68E-05
		SN	-1.00E+00	5.65E-08	2.02E-07	5.35E-07	1.00E-06	1.73E-05	2.69E-06	3.77E-06	4.68E-06	5.72E-06	8.36E-05	1.08E-05	1.34E-05	1.64E-05	2.06E-05
		G	-1.00E+00	1.19E-07	4.31E-07	1.31E-06	2.55E-06	4.28E-05	7.27E-06	1.01E-05	1.30E-05	1.60E-05	2.20E-05	2.77E-05	3.02E-05	3.27E-05	3.72E-05

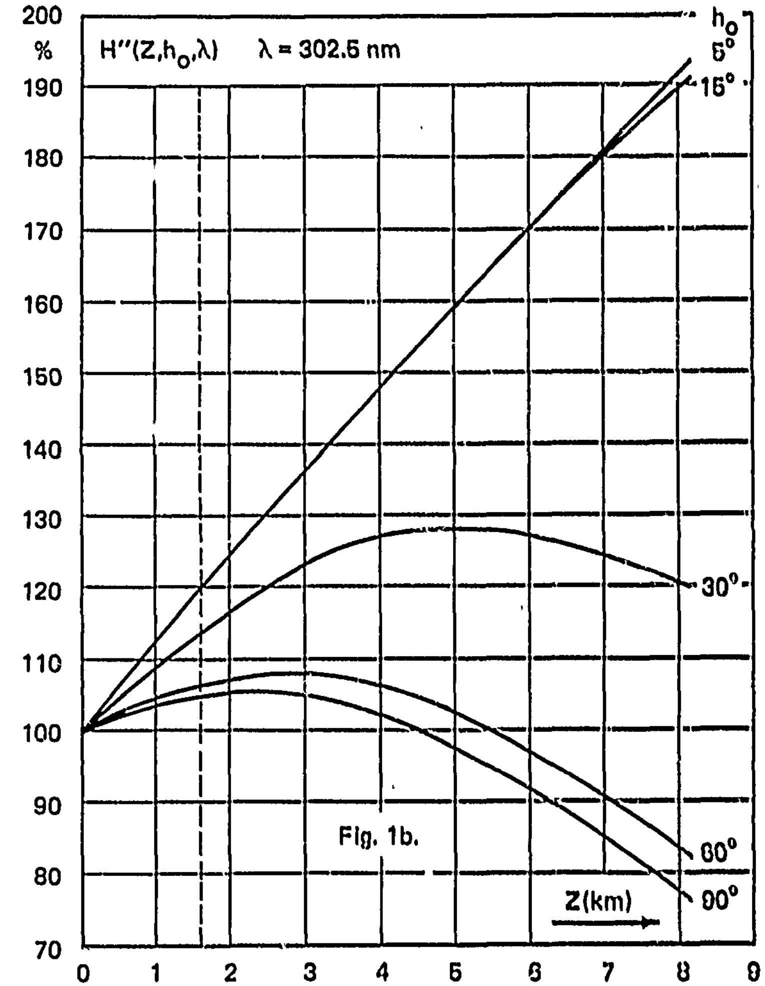
LAT	SEASON	WL:	.2375	.3000	.3025	.3050	.3075	.3100	.3125	.3150	.3175	.3200	.3250	.3300	.3400	.3600	.3800
60	SPRING	H	1.68E-09	1.81E-08	1.09E-07	4.17E-07	9.85E-07	1.71E-06	3.95E-06	5.84E-06	7.64E-06	9.96E-06	1.31E-05	1.79E-05	1.83E-05	1.72E-05	1.71E-05
		S	7.35E-10	9.25E-09	6.33E-06	2.71E-07	6.65E-07	1.43E-05	2.63E-06	4.15E-06	5.49E-06	7.69E-06	1.11E-05	1.51E-05	1.96E-05	2.47E-05	3.16E-05
		SN	4.73E-10	5.95E-09	4.10E-08	1.74E-07	4.28E-07	9.16E-07	1.69E-06	2.66E-06	3.53E-06	4.56E-06	7.15E-06	9.74E-06	1.26E-05	1.59E-05	2.03E-05
		G	2.35E-09	2.40E-08	1.50E-07	5.90E-07	1.41E-06	2.62E-05	5.64E-06	8.51E-06	1.12E-05	1.45E-05	2.02E-05	2.76E-05	3.09E-05	3.31E-05	3.74E-05
	SUMMER	H	1.76E-08	9.42E-08	3.68E-07	1.21E-06	2.40E-06	3.61E-06	6.58E-06	8.59E-06	1.12E-05	1.34E-05	1.72E-05	2.03E-05	1.93E-05	1.90E-05	1.96E-05
		S	1.50E-08	8.97E-08	3.55E-07	9.98E-07	1.92E-06	3.35E-06	5.26E-06	7.38E-06	9.16E-06	1.12E-05	1.63E-05	2.09E-05	2.57E-05	3.12E-05	3.87E-05
		SN	1.20E-08	6.87E-08	2.72E-07	7.65E-07	1.47E-06	2.57E-05	4.03E-06	5.66E-06	7.02E-06	8.55E-06	1.25E-05	1.60E-05	1.97E-05	2.39E-05	2.97E-05
		G	2.97E-08	1.63E-07	6.40E-07	1.98E-06	3.87E-06	6.18E-05	1.06E-05	1.42E-05	1.82E-05	2.19E-05	2.96E-05	3.63E-05	3.46E-05	4.29E-05	4.93E-05
	FALL	H	-1.00E+00	2.71E-09	1.37E-08	7.54E-08	2.44E-07	5.55E-07	1.39E-06	2.47E-06	3.48E-06	4.91E-06	7.26E-06	1.06E-05	1.10E-05	1.11E-05	1.06E-05
		S	-1.00E+00	1.17E-10	1.62E-09	1.15E-08	3.93E-08	1.11E-07	2.59E-07	4.84E-07	7.18E-07	1.03E-06	1.88E-05	2.91E-06	4.45E-06	6.91E-06	1.05E-05
		SN	-1.00E+00	4.01E-11	5.53E-10	3.94E-09	1.35E-08	3.81E-08	8.86E-08	1.66E-07	2.46E-07	3.52E-07	6.43E-07	9.94E-07	1.52E-06	2.36E-06	3.60E-06
		G	-1.00E+00	2.75E-09	1.42E-08	7.93E-08	2.58E-07	5.93E-07	1.48E-06	2.64E-06	3.73E-06	5.26E-06	7.90E-06	1.16E-05	1.25E-05	1.35E-05	1.42E-05
	WINTER	H	-1.00E+00	-1.00E+00	7.81E-10	3.40E-09	1.30E-06	3.36E-08	1.36E-07	3.39E-07	7.11E-07	1.08E-06	2.25E-06	4.43E-06	5.29E-06	6.25E-06	6.45E-06
		S	-1.00E+00	-1.00E+00	1.77E-14	1.22E-12	1.66E-11	1.50E-10	8.91E-10	3.26E-09	7.23E-09	1.48E-08	4.42E-08	1.00E-07	2.32E-07	5.43E-07	1.17E-06
		SN	-1.00E+00	-1.00E+00	3.07E-15	2.12E-13	2.88E-12	2.61E-11	1.55E-10	5.66E-10	1.26E-09	2.58E-09	7.67E-09	1.74E-08	4.03E-08	9.44E-08	2.04E-07
		G	-1.00E+00	-1.00E+00	7.81E-10	3.40E-09	1.30E-08	3.36E-08	1.36E-07	3.39E-07	7.12E-07	1.08E-06	2.26E-06	4.45E-06	5.33E-06	5.34E-06	6.65E-06
	MEAN	H	-1.00E+00	-1.00E+00	1.23E-07	4.27E-07	9.11E-07	1.48E-05	3.01E-06	4.31E-06	5.75E-06	7.33E-06	9.94E-05	1.33E-05	1.36E-05	1.34E-05	1.34E-05
		S	-1.00E+00	-1.00E+00	1.05E-07	3.20E-07	6.57E-07	1.22E-06	2.04E-06	3.00E-06	3.84E-06	4.83E-06	7.33E-06	9.77E-06	1.25E-05	1.58E-05	2.05E-05
		SN	-1.00E+00	-1.08E+00	7.63E-08	2.36E-07	4.78E-07	8.81E-07	1.45E-06	2.12E-06	2.70E-06	3.37E-06	5.06E-05	6.70E-06	8.40E-06	1.06E-05	1.35E-05
		G	-1.00E+00	-1.00E+00	2.01E-07	6.63E-07	1.39E-06	2.36E-06	4.47E-06	6.43E-06	8.45E-06	1.07E-05	1.50E-05	[illegible]	2.21E-05	2.39E-05	2.69E-05

LAT	SEASON	WL:	.2375	.3000	.3025	.3050	.3075	.3100	.3125	.3150	.3175	.3200	.3250	.3300	.3400	.3600	.3800
70	SPRING	H	-1.00E+00	2.78E-09	1.23E-08	8.42E-08	2.94E-07	6.74E-07	1.85E-06	3.32E-06	4.47E-06	6.52E-06	9.00E-06	1.43E-05	1.53E-05	1.47E-05	1.42E-05
		S	-1.00E+00	6.75E-10	8.27E-09	5.35E-08	1.70E-07	4.53E-07	9.94E-07	1.77E-06	2.53E-06	3.48E-06	5.36E-05	8.69E-06	1.21E-05	1.63E-05	2.21E-05
		SN	-1.00E+00	3.37E-10	4.13E-09	2.68E-08	8.51E-08	2.26E-07	4.97E-07	6.86E-07	1.26E-06	1.74E-06	2.98E-06	4.35E-06	6.03E-06	8.14E-06	1.10E-05
		G	-1.00E+00	3.12E-09	1.70E-08	1.11E-07	3.79E-07	9.00E-07	2.35E-06	4.21E-06	5.73E-06	6.26E-06	1.20E-05	1.67E-05	2.13E-05	2.28E-05	2.52E-05
	SUMMER	H	5.24E-09	3.79E-08	1.95E-07	6.71E-07	1.48E-06	2.33E-06	4.84E-06	6.66E-06	8.71E-06	1.11E-05	1.40E-05	1.81E-05	1.83E-05	1.72E-05	1.71E-05
		S	3.10E-09	2.56E-08	1.31E-07	4.47E-07	9.67E-07	1.86E-05	3.16E-06	4.70E-06	6.04E-06	7.59E-06	1.15E-05	1.54E-05	1.96E-05	2.47E-05	3.16E-05
		SN	1.99E-09	1.64E-08	8.43E-08	2.87E-07	6.22E-07	1.20E-05	2.03E-06	3.02E-06	3.88E-06	4.88E-06	7.41E-06	9.87E-06	1.26E-05	1.59E-05	2.03E-05
		G	7.23E-09	5.43E-08	2.60E-07	9.59E-07	2.10E-06	3.53E-06	6.87E-06	9.68E-06	1.26E-05	1.60E-05	2.14E-05	2.79E-05	3.39E-05	3.31E-05	3.74E-05
	FALL	H	-1.00E+00	-1.00E+00	2.23E-09	9.78E-09	3.58E-06	8.45E-05	2.79E-07	5.37E-07	1.10E-06	1.55E-06	2.82E-06	4.64E-06	5.29E-06	6.25E-06	6.45E-06
		S	-1.00E+00	-1.00E+00	1.76E-13	6.05E-12	5.48E-11	3.53E-10	1.60E-09	4.88E-09	9.79E-09	1.64E-08	4.95E-08	1.04E-07	2.32E-07	5.43E-07	1.17E-06
		SN	-1.00E+00	-1.00E+00	3.05E-14	1.05E-12	9.52E-12	6.13E-11	2.78E-10	8.47E-10	1.70E-09	3.20E-09	8.60E-09	1.81E-08	4.03E-08	9.44E-08	2.04E-07
		G	-1.00E+00	-1.00E+00	2.25E-09	9.78E-09	3.58E-08	8.46E-08	2.79E-07	5.38E-07	1.10E-06	1.55E-06	2.83E-06	4.65E-06	5.33E-06	6.34E-06	6.65E-06
	WINTER	H	-1.00E+00	-1.00E+00	-1.00E+00	4.40E-10	1.26E-09	2.76E-03	7.98E-09	1.70E-08	3.07E-08	5.12E-08	1.45E-07	3.26E-07	5.10E-07	6.45E-07	6.73E-07
		S	-1.00E+00	-1.00E+00	-1.00E+00	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
		SN	-1.00E+00	[illegible]	-1.00E+00	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
		G	-1.00E+00	-1.00E+00	-1.00E+00	4.40E-10	1.26E-09	2.76E-03	7.98E-09	1.70E-08	3.07E-08	5.12E-08	1.45E-07	3.26E-07	5.10E-07	6.45E-07	6.73E-07
	MEAN	H	-1.00E+00	-1.00E+00	-1.00E+00	1.91E-07	4.52E-07	7.72E-07	1.74E-06	2.63E-06	3.58E-06	4.80E-06	6.50E-06	9.34E-06	9.35E-06	9.70E-06	9.61E-06
		S	-1.00E+00	-1.00E+00	-1.00E+00	1.25E-07	2.84E-07	5.79E-07	1.04E-06	1.62E-06	2.14E-06	2.77E-06	4.39E-06	6.04E-06	7.37E-06	1.04E-05	1.37E-05
		SN	-1.00E+00	-1.00E+00	-1.00E+00	7.65E-08	1.77E-07	3.56E-07	6.33E-07	9.77E-07	1.29E-06	1.06E-06	2.60E-05	3.56E-06	4.66E-06	6.33E-06	7.89E-06
		G	-1.00E+00	-1.00E+00	-1.00E+00	2.70E-07	6.29E-07	1.13E-06	2.38E-06	3.61E-06	4.66E-06	6.46E-06	9.10E-06	1.29E-05	1.45E-05	1.57E-05	1.79E-05

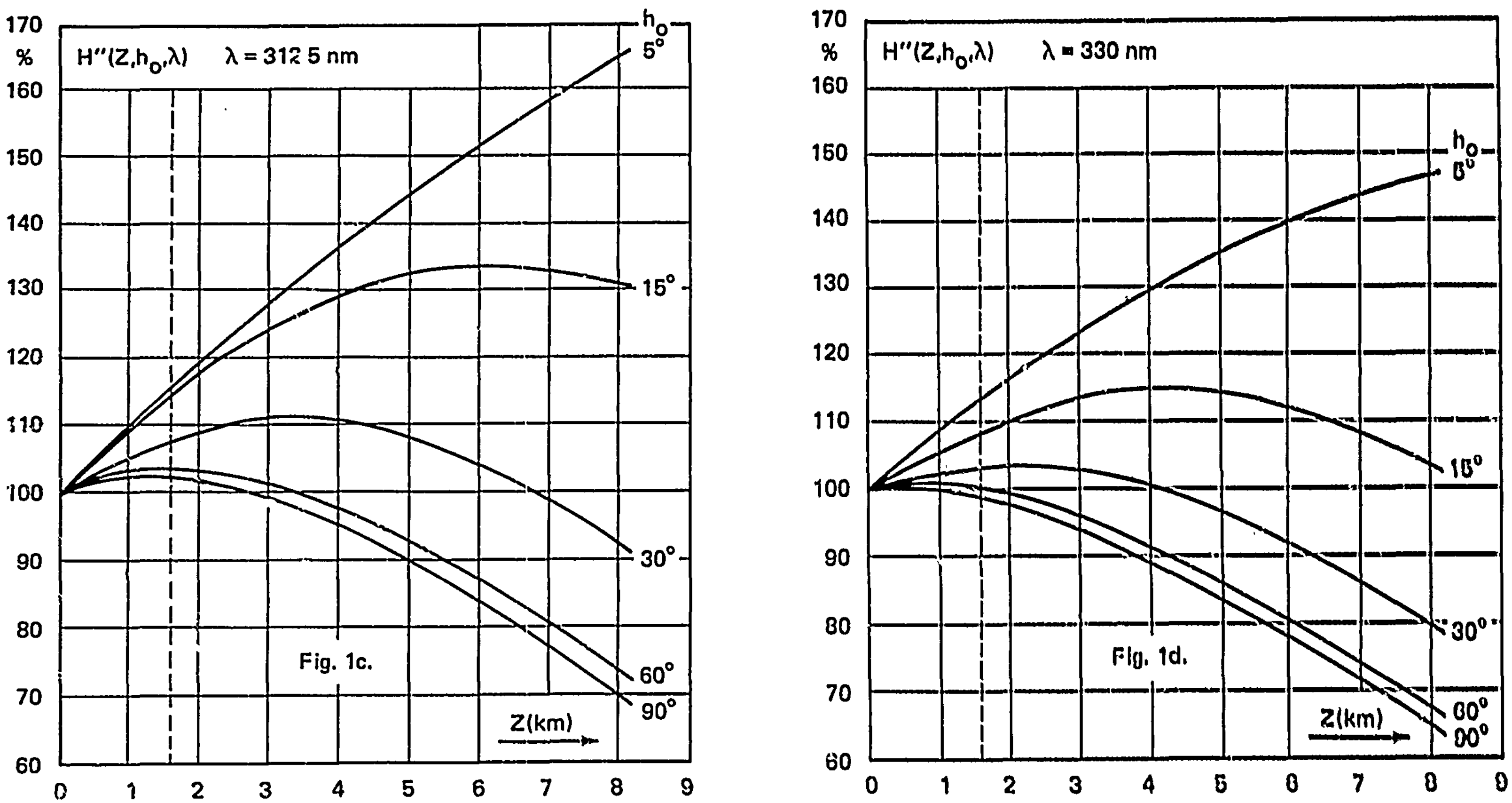
LAT	SEASON	WL:	.2975	.3000	.3025	.3050	.3075	.3100	.3125	.3150	.3175	.3200	.3250	.3300	.3400	.3600	.3800
80	SPRING	H	-1.00E+00	3.18E-10	1.50E-09	1.07E-08	4.51E-08	1.45E-07	5.67E-07	1.44E-06	2.12E-06	3.25E-06	5.40E-06	3.90E-06	1.10E-05	1.11E-05	1.06E-05
		S	-1.00E+00	3.30E-12	1.45E-10	2.15E-09	1.12E-08	4.55E-08	1.40E-07	3.18E-07	5.23E-07	6.23E-07	1.07E-06	2.78E-06	4.45E-06	6.91E-06	1.05E-05
		SN	-1.00E+00	1.34E-12	4.90E-11	7.34E-10	3.65E-09	1.56E-08	4.79E-08	1.09E-07	1.79E-07	2.80E-07	5.70E-07	9.51E-07	1.52E-06	2.36E-06	3.60E-06
		G	-1.00E+00	3.20E-10	1.65E-09	1.14E-08	4.89E-08	1.60E-07	6.34E-07	1.55E-06	2.30E-06	3.53E-06	6.35E-06	1.08E-05	1.25E-05	1.39E-05	1.42E-05
	SUMMER	H	-1.00E+00	9.40E-09	4.33E-08	2.24E-07	6.40E-07	1.24E-06	2.60E-06	4.41E-06	5.65E-06	6.18E-06	1.05E-05	1.48E-05	1.53E-05	1.47E-05	1.42E-05
		S	-1.00E+00	3.15E-09	2.46E-08	1.15E-07	3.00E-07	6.79E-07	1.31E-06	2.15E-06	2.92E-06	3.86E-06	6.30E-06	8.67E-06	1.21E-05	1.63E-05	2.21E-05
		SN	-1.00E+00	1.58E-09	1.23E-08	5.73E-08	1.50E-07	3.40E-07	5.57E-07	1.07E-06	1.46E-06	1.99E-06	3.15E-06	4.43E-06	6.03E-06	8.14E-06	1.10E-05
		G	-1.00E+00	1.10E-08	5.58E-08	2.81E-07	7.90E-07	1.58E-06	3.45E-06	5.48E-06	7.30E-06	1.01E-05	1.37E-05	1.92E-05	2.13E-05	2.26E-05	2.52E-05
	FALL	H	-1.00E+00	-1.00E+00	-1.00E+00	1.09E-09	2.74E-09	5.24E-09	1.25E-08	2.27E-08	3.96E-08	6.37E-08	1.64E-07	3.38E-07	5.10E-07	6.45E-07	6.73E-07
		S	-1.00E+00	-1.00E+00	-1.00E+00	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
		SN	-1.00E+00	-1.00E+00	-1.00E+00	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
		G	-1.00E+00	-1.00E+00	-1.00E+00	1.09E-09	2.74E-09	5.24E-09	1.25E-08	2.27E-08	3.96E-08	6.37E-08	1.64E-07	3.38E-07	5.10E-07	6.45E-07	6.73E-07
	WINTER	H	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00
		S	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00
		SN	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00
		G	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00
	MEAN	H	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00
		S	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00
		SN	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00
		G	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00

LAT	SEASON	WL:	.2975	.3000	.3025	.3050	.3075	.3100	.3125	.3150	.3175	.3200	.3250	.3300	.3400	.3600	.3800
90	SPRING	H	-1.00E+00	-1.00E+00	2.65E-10	1.24E-09	4.93E-09	1.39E-08	6.63E-08	2.18E-07	4.67E-07	7.65E-07	1.82E-06	4.24E-06	5.29E-06	6.25E-06	6.49E-06
		S	-1.00E+00	-1.00E+00	1.97E-15	2.64E-13	5.31E-12	6.64E-11	5.09E-10	2.22E-09	5.41E-09	1.21E-08	3.90E-08	9.60E-08	2.32E-07	5.43E-07	1.17E-06
		SN	-1.00E+00	-1.00E+00	3.42E-16	4.56E-14	9.21E-13	1.15E-11	8.63E-11	3.86E-10	9.40E-10	2.09E-09	6.47E-09	1.67E-08	4.03E-08	9.44E-08	2.04E-07
		G	-1.00E+00	-1.00E+00	2.65E-10	1.24E-09	4.94E-09	1.39E-08	6.63E-08	2.18E-07	4.66E-07	7.67E-07	1.92E-06	4.26E-06	5.33E-06	6.34E-06	6.69E-06
	SUMMER	H	-1.00E+00	1.61E-09	8.09E-09	4.66E-08	1.62E-07	4.00E-07	1.13E-06	2.17E-06	3.08E-06	4.44E-06	6.70E-06	1.04E-05	1.13E-05	1.11E-05	1.06E-05
		S	-1.00E+00	5.11E-11	8.95E-10	7.64E-09	2.90E-08	8.95E-08	2.23E-07	4.37E-07	6.65E-07	9.73E-07	1.63E-06	2.68E-06	4.43E-06	6.91E-06	1.05E-05
		SN	-1.00E+00	1.75E-11	3.07E-10	2.61E-09	9.91E-09	3.06E-08	7.62E-08	1.49E-07	2.27E-07	3.33E-07	6.25E-07	9.84E-07	1.52E-06	2.36E-06	3.60E-06
		G	-1.00E+00	1.53E-09	8.40E-09	4.94E-08	1.72E-07	4.30E-07	1.20E-06	2.32E-06	3.31E-06	4.77E-06	7.40E-06	1.14E-05	1.23E-05	1.35E-05	1.42E-05
	FALL	H	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00
		S	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00
		SN	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00
		G	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00
	WINTER	H	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00
		S	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00
		SN	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00
		G	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00
	MEAN	H	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00
		S	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00
		SN	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00
		G	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00	-1.00E+00





Figs. 1a – b. Relative variation $H''(Z,h_o,\lambda,X)$ of ultraviolet sky intensity in dependence on elevation Z for selected wavelengths and solar altitudes h_o. Amount of ozone X = 0.341 cm. Theoretical results interpolated from Dave and Furukawa (14). The dotted line indicates the elevation Z = 1.59 km of Davos, Switzerland.



Figs. 1c–d. Relative variation $H''(Z,h_o,\lambda,X)$ of ultraviolet sky intensity in dependence on elevation Z for selected wavelengths and solar altitudes h_o. Amount of ozone X = 0.341 cm. Theoretical results interpolated from Dave and Furukawa (14). The dotted line indicates the elevation Z = 1.59 km of Davos, Switzerland.

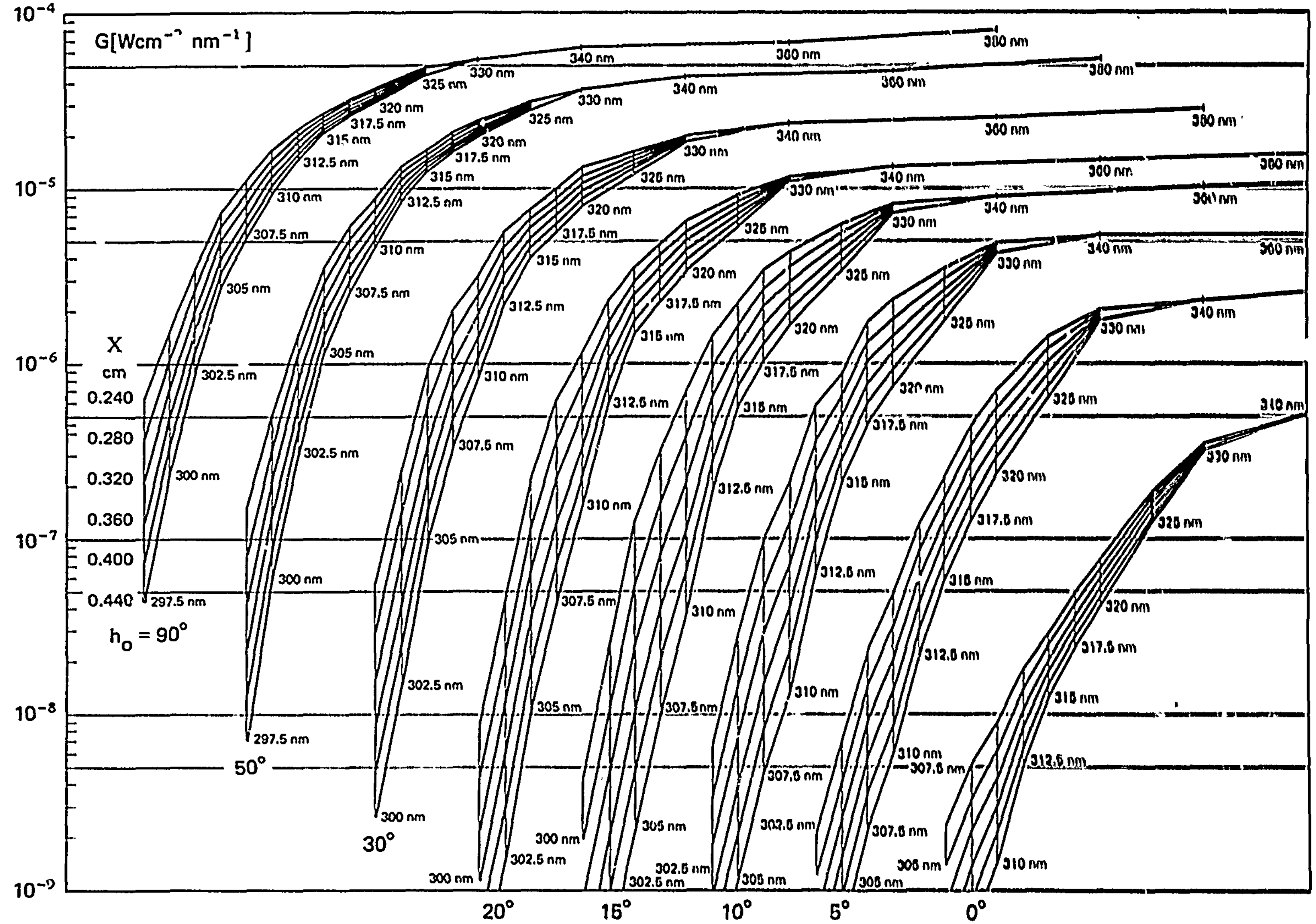


Fig. 2 Ultraviolet global spectra $G(\lambda, X, h_o, Z)$ for different solar altitudes h_o and amounts X of atmospheric ozone. Elevation Z = 0, no clouds, ground not covered with snow.

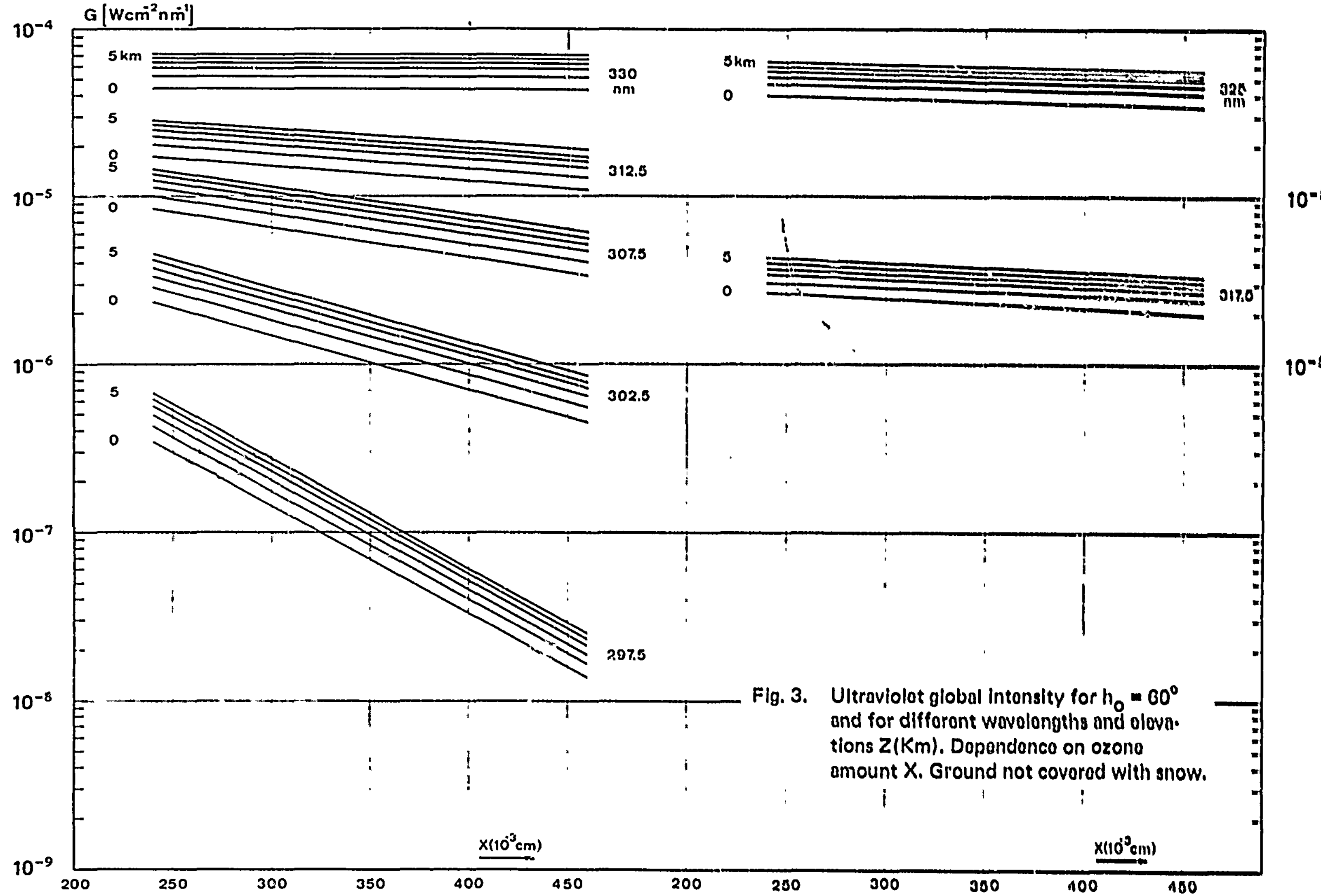


Fig. 3. Ultraviolet global intensity for $h_o = 60°$ and for different wavelengths and elevations Z(Km). Dependence on ozone amount X. Ground not covered with snow.

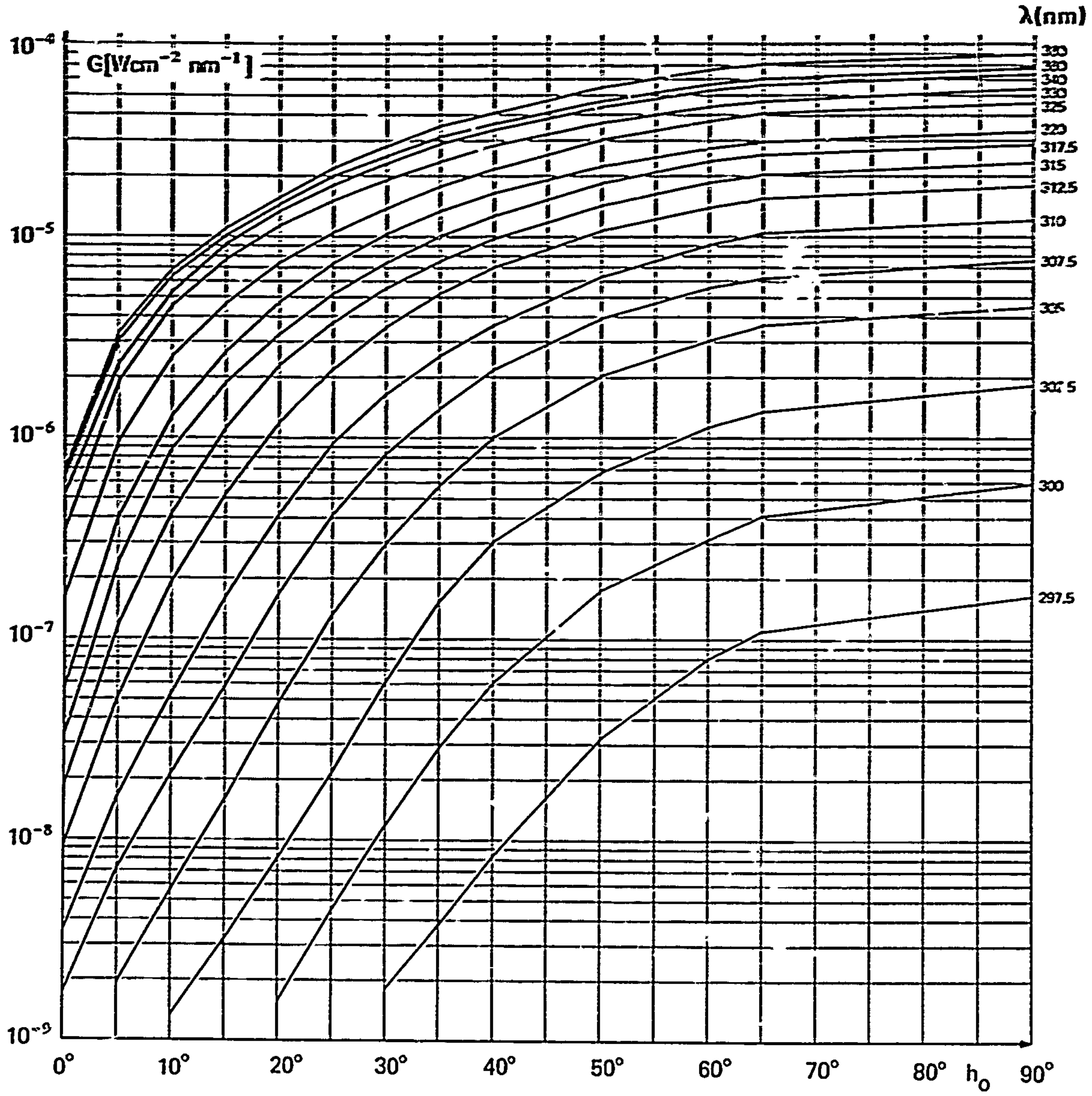


Fig. 4 Ultraviolet global intensity for various wavelengths and for X = 0.340 cm and Z = 0 Km. Dependence on solar altitude h_o. Ground not covered with snow.

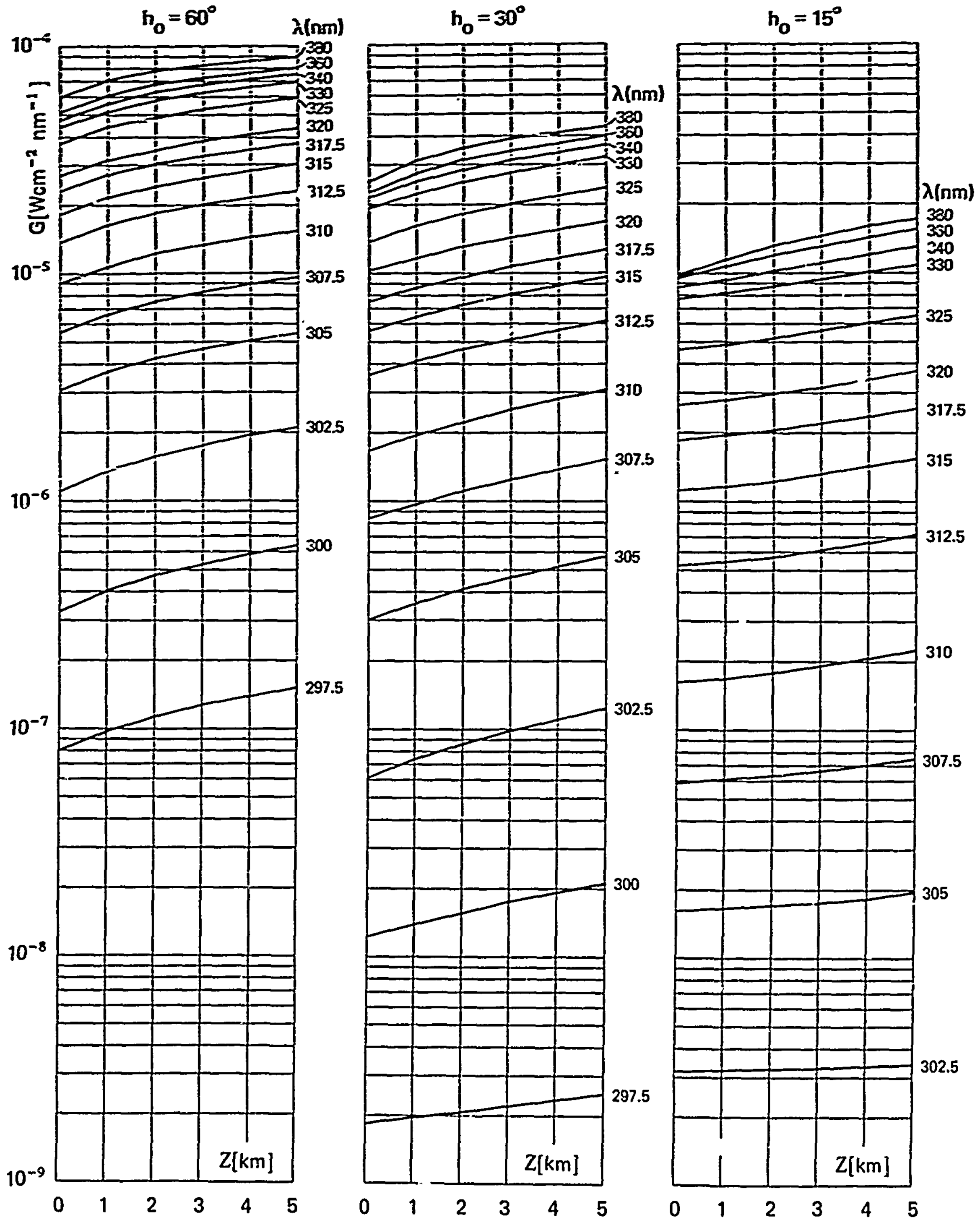


Fig. 5 Dependence of ultraviolet global intensity on elevation Z. For various wavelengths and selected solar altitudes h_o. Ozone amount X = 0.340 cm. Ground not covered with snow.

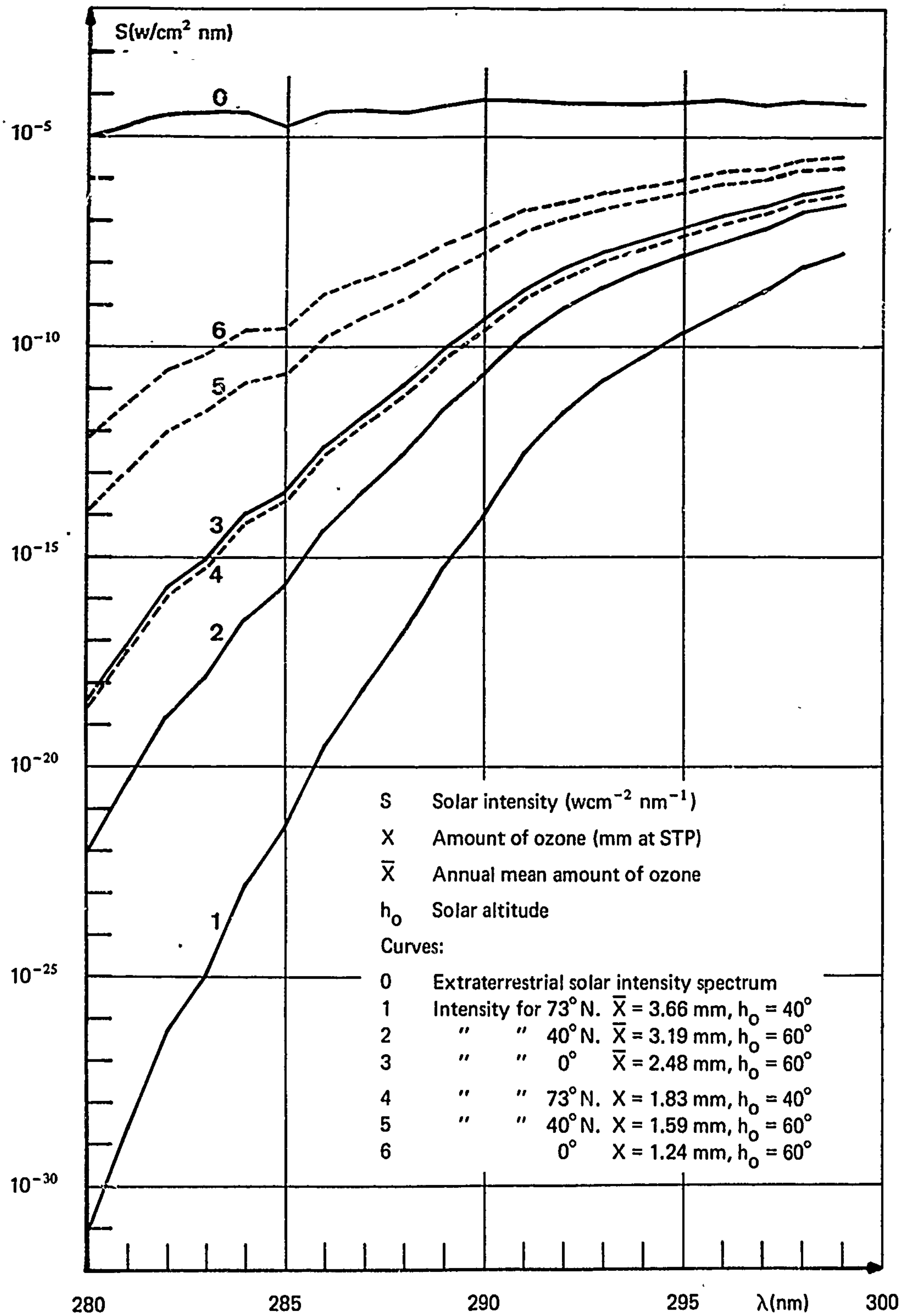


Fig. 6. Spectral distribution of ultraviolet solar intensity for the annual mean amount of atmospheric ozone at different latitudes and for an assumed 50% decrease of the annual mean ozone amount.

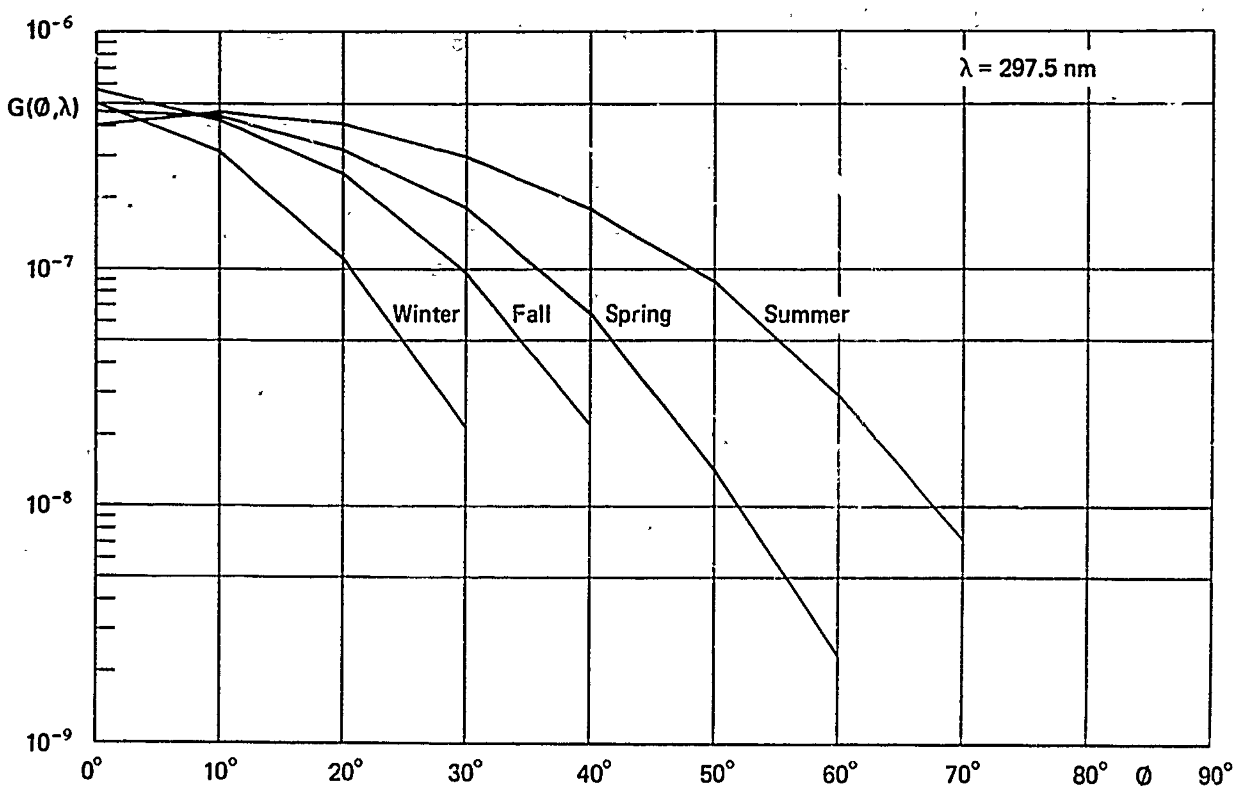


Fig. 7 a. Dependence of global intensity G(Ø, λ) on Northern Latitude Ø. For noon solar altitude. Z = 0 Km, λ = 297.5 nm. Ground not covered with snow.

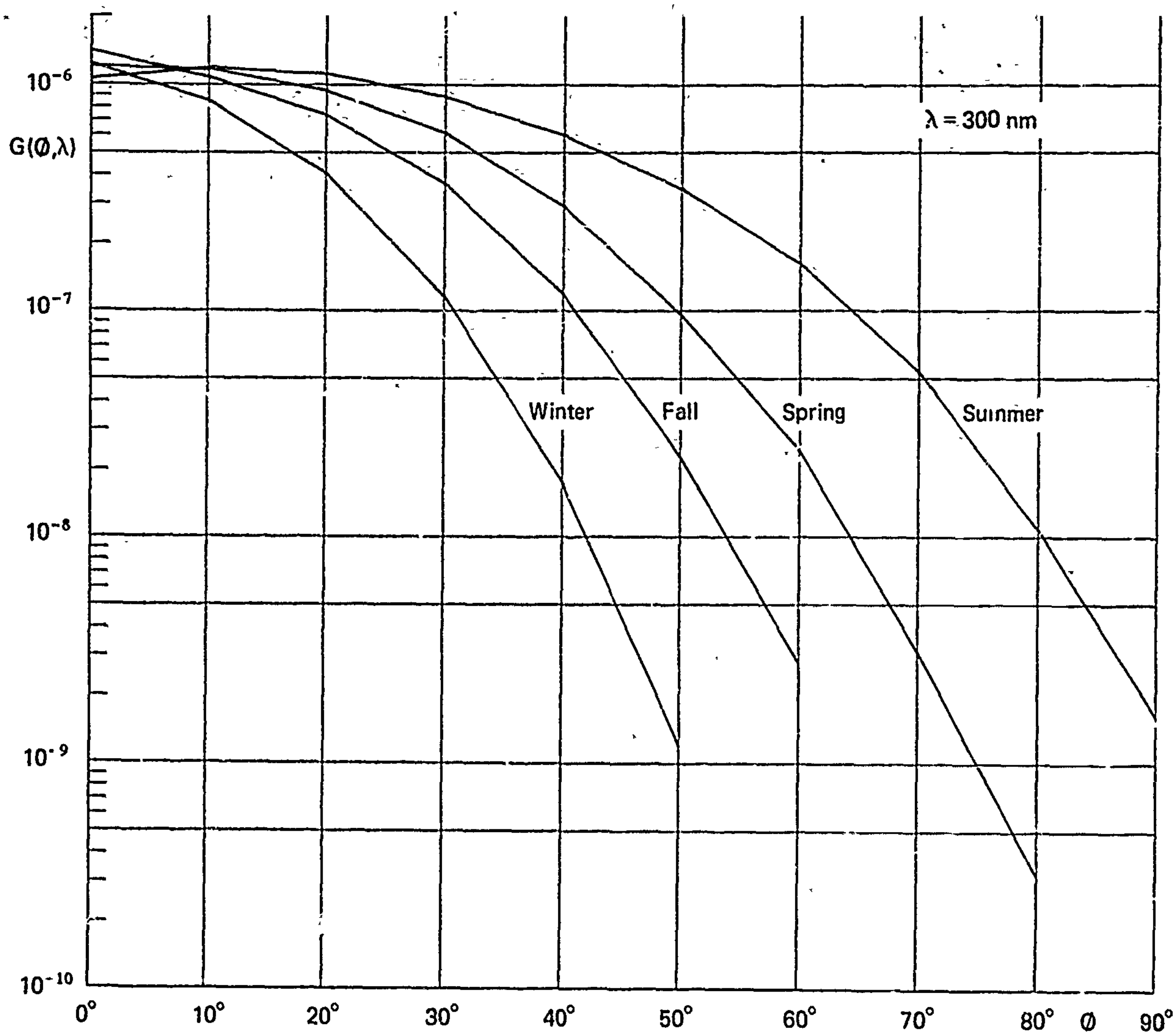


Fig. 7b. Same for λ = 300 nm

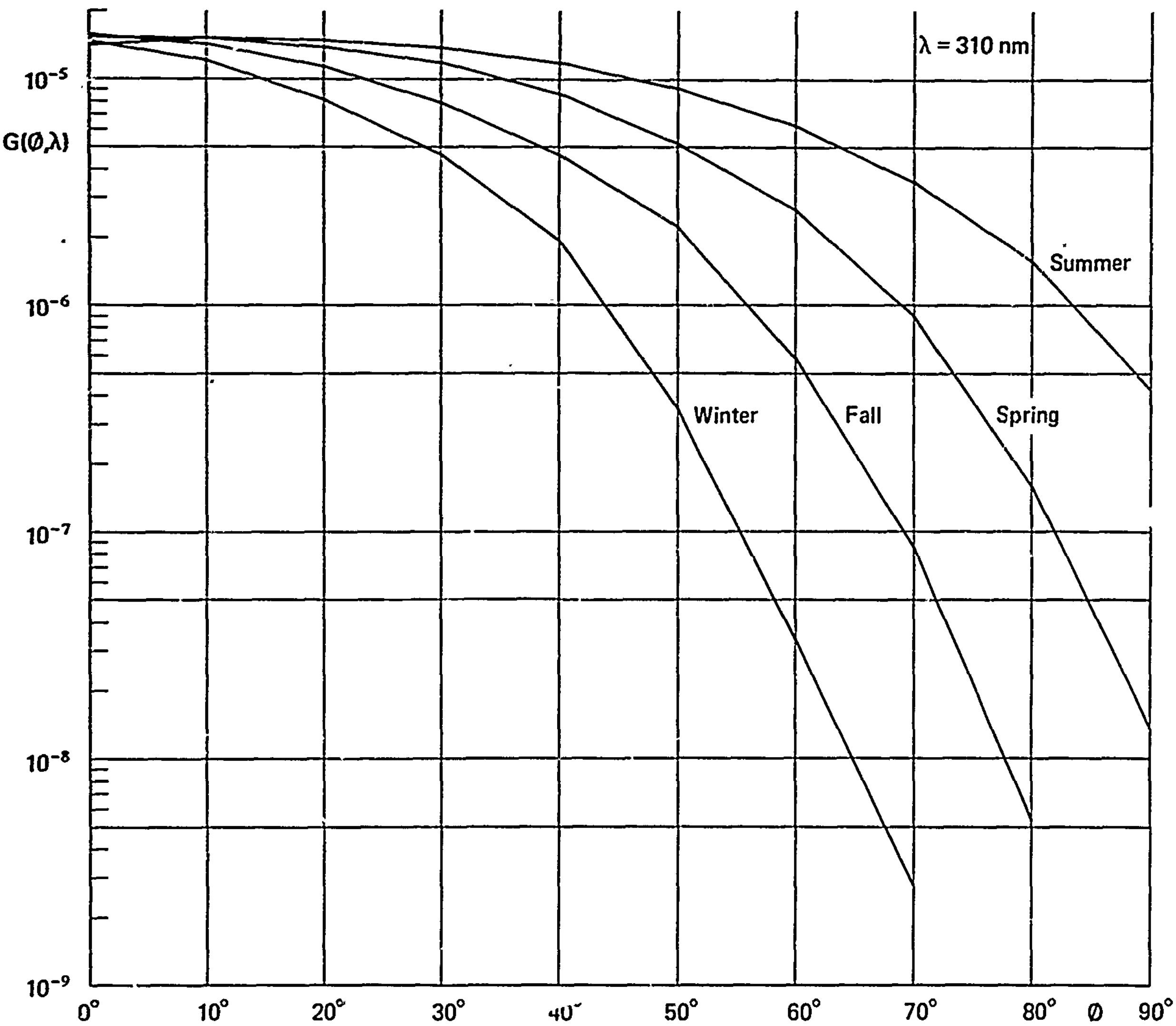


Fig. 7c. Same for λ = 310 nm

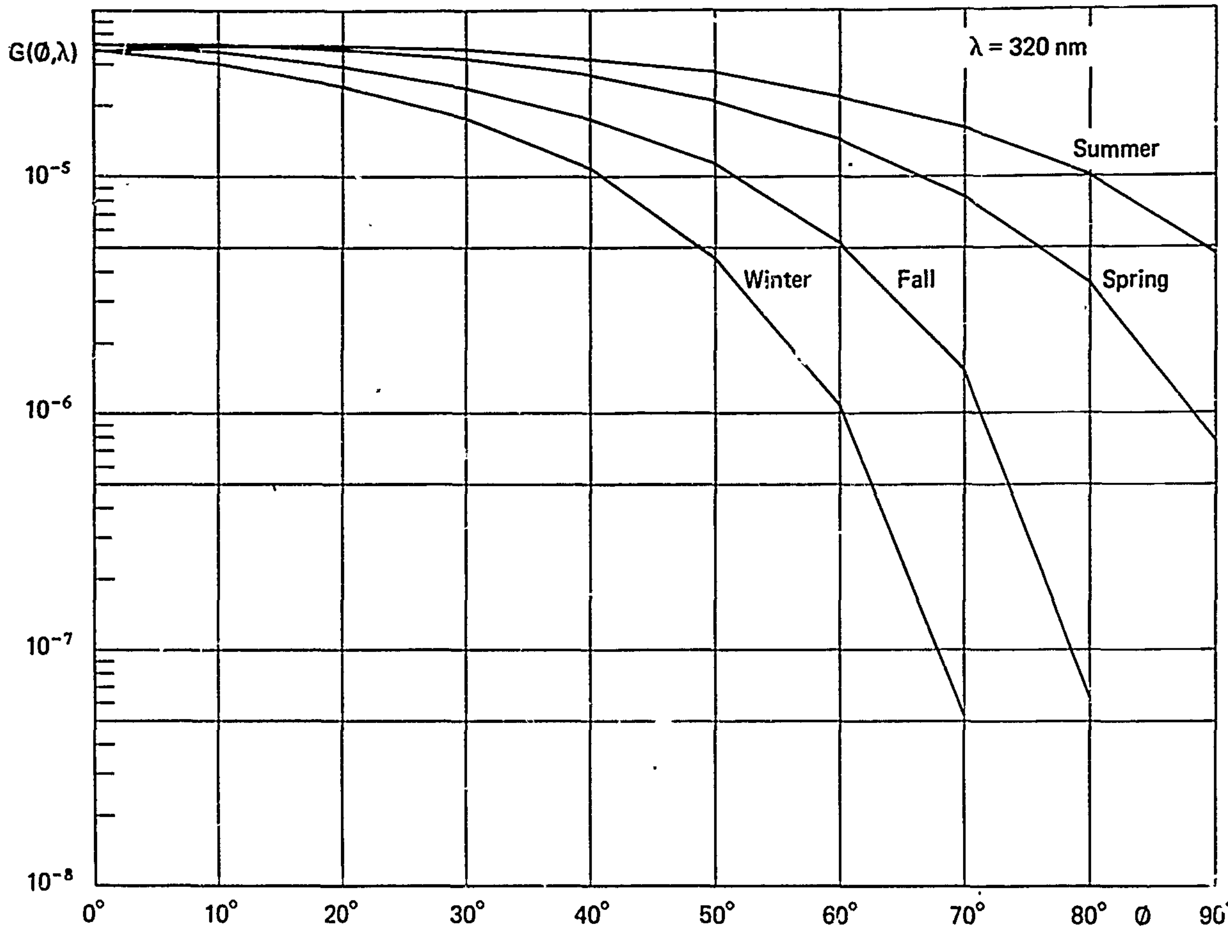


Fig. 7d. Same for λ = 320 nm