

UNIVERSITY OF BERGEN
GEOPHYSICAL INSTITUTE

**THE RADIATION OBSERVATORY
RADIATION YEARBOOK No.32**

RADIATION OBSERVATIONS IN BERGEN, NORWAY

($\Phi = 60^{\circ} 24' \text{ N}$, $\lambda = 5^{\circ} 19' \text{ E}$, $H = 45 \text{ m.}$)

1996



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Arvid Skartveit, Frank Cleveland, Tor de Lange

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INTRODUCTION

The present issue of the Radiation Yearbook from the Geophysical Institute is volume No. 32.

The datalogging system used consists of a Fluke Helios I Computer Front End, a Commodore PC 40 Personal Computer and a Star LC-10 Printer. The Helios I CFE is equipped with scanner cards that can handle dc-voltages in four ranges with a resolution of 0.5 μV for the best range of sensitivity (64 mV full scale). A Basic-program controls the Helios I CFE from the PC 40. Each sensor is scanned every 20 s, and the momentary values are displayed on a screen. Hourly values are accumulated and stored in the PC 40 for subsequent processing and they are also printed on paper.

The GLOBAL RADIATION was measured by means of CM11 pyranometer No. 913438. The sensitivity of this pyranometer was checked against EPAC 13617 on the cloudless day April 26, 1996. The sensitivity was found to be 4.840 $\mu\text{V}/\text{Wm}^{-2}$ as an average for 7 ten minute periods with solar elevation in the range 34 - 42°. No single of these ten minute value was outside the range 4.83 - 4.86 $\mu\text{V}/\text{Wm}^{-2}$. From this it was decided to use CM 11₉₁₃₄₃₈ with sensitivity 4.818 $\mu\text{V}/\text{Wm}^{-2}$ (= 1.0165 times the original K&Z sensitivity from 1991) as was done in 1995.

The DIFFUSE (SKY) RADIATION was measured by the pyranometer CM11₉₂₄₄₁₉. When measuring the sky radiation, the direct solar radiation is constantly shadowed off by means of a 6 cm diameter circular disc mounted on a 30 cm long rotating arm. No kind of shade-ring correction is therefore applied to the measured diffuse radiation. From 17 October 1992 to 25 August 1993, CM11 pyranometers No. 924419 and No. 913438 were run in parallel. Using the original K&Z sensitivities, we found that for 10 cloudless days (April - June 1993) the average noon hour ratio was $\text{CM11}_{924419}:\text{CM11}_{913438} = 1.003$ (with all individual hourly ratios confined within a ± 0.010 interval). Furthermore, for the 15 completely overcast days during February - August 1993 with noon hour diffuse irradiance exceeding 0.42 MJm^{-2} , the average noon hour ratio was $\text{CM 11}_{924419}:\text{CM}_{913438} = 1.007$ (with all individual hourly ratios confined within a ± 0.008 interval). The ratio between these two pyranometers is thus pretty independent of the angular distribution of the incident irradiance. From this it was decided to use CM 11₉₂₄₄₁₉ with a sensitivity 4.430 $\mu\text{V}/\text{Wm}^{-2}$ (1.0216 times the original K&Z sensitivity from 1992). Note that the ratio 1.005 (=1.0216/1.0165) between the two sensitivity correction factors are chosen to make the average overcast/cloudless noon hour ratio $\text{CM11}_{924419}:\text{CM11}_{913438}$ (= 1.005) equal to unity. During 10 overcast days in May - August 1996, the overall $\text{CM11}_{924419}:\text{CM11}_{913438}$ ratio was 0.995, while the average noon ratio was 0.994 (average noon irradiation= 144 Wm^{-2}). On the cloudless day April 26, 1996, however, the $\text{CM11}_{924419}:\text{CM11}_{913438}$ ratio was 0.953, as an average for the last 4

minutes of 8 shading periods with solar elevation $>34^\circ$ and average diffuse irradiance = 66 Wm^{-2} . Although we have no explanation of this discrepancy, we decided to keep the CM1₁₉₂₄₄₁₉ sensitivity $4.430 \mu\text{V/Wm}^{-2}$ fixed in 1996.

As will be seen on Fig. 1, the anemometer mast sticks rather high up into the sky. The mast is, however, not compact, and it is estimated to screen off at most 0.7% of the sky radiation, an amount considered to be negligible. Further, the mountains surrounding Bergen (mean altitude ca 6°) screen off sky radiation on horizontal surface. Assuming Lambertian albedo in the range 0.15 - 0.25, we have estimated (as outlined in [11]) that the hillsides reduce the daily horizontal diffuse irradiation by $\leq 1\%$, except for cloudless winter days (November - January) when the estimated reduction is some 3-4%. However, since the albedo of the hillsides varies in the course of the year, no screening correction is applied to the measured diffuse radiation.

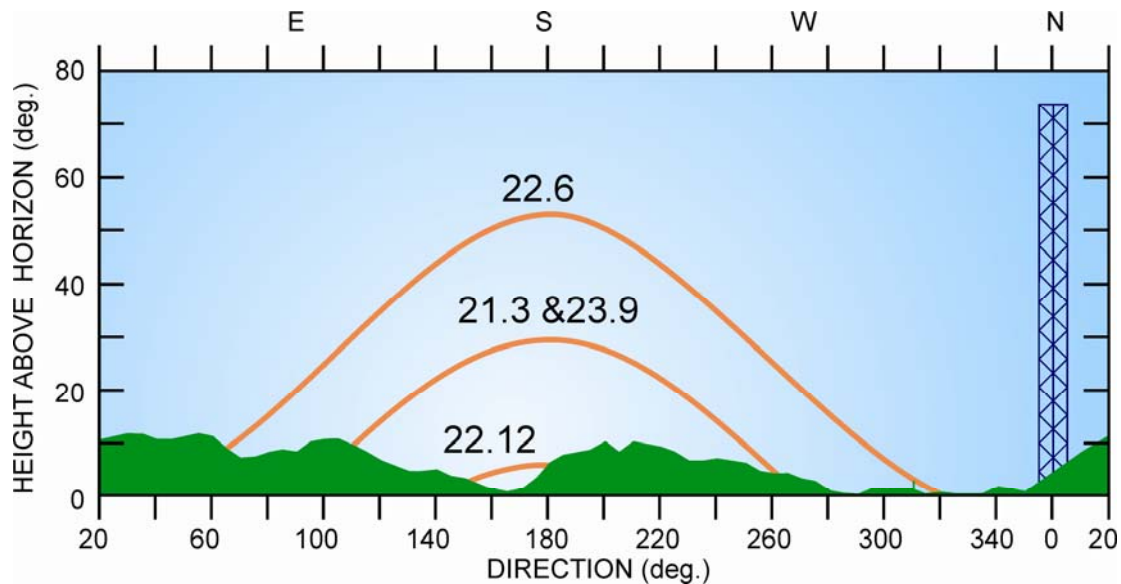


Figure 1. Panorama of the horizon with sun paths, as viewed from the observation tower of the Geophysical institute.

Table 1.

Calculated monthly factors (unity = 1000) by which the elevated horizon (Fig. 1) reduces monthly maximum sunshine duration (N), normal incidence beam irradiation (B), horizontal beam irradiation (I), and global irradiation (G) under cloudless sky. Beam irradiation and sunshine duration at solar elevation $< 2^\circ$ is ignored during these calculations.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
N:	535	779	852	934	934	917	925	948	885	833	611	456
B:	638	894	944	976	978	973	978	985	962	939	740	484
I:	713	954	984	995	996	994	995	997	989	979	820	520
G:	850	968	988	996	997	995	996	998	991	984	895	818

However, the estimated percentage reduction caused by the hillsides covers a substantially wider range for other solar resources under cloudless sky: For maximum sunshine duration the monthly reduction ranges from 54% in December to 5 - 8% in April - August, for normal incidence beam irradiation from 52% in December to 1 - 3% in April - August, for horizontal beam irradiation from 48% in December to 0.3 - 0.6% in April - August, and for global irradiation from 18% in December to 0.2 - 0.5% in April - August (Table 1). These screening effects, which are maximum under cloudless sky, are not corrected for in our tables.

The global radiation and the diffuse radiation are equalized in the computer for hours when the mean solar altitude is so low that the apparent position of the sun will be behind the mountains surrounding Bergen (Fig. 1). For the summer half year (March to September) this equalizing of global and diffuse radiation is done for hourly mean solar altitudes less than 6° in the morning and less than 2° in the afternoon. In the winter half year the limiting solar altitudes are 2° and 7° for the morning and afternoon, respectively. It should be mentioned that the pyranometers for global and diffuse (sky) radiation are ventilated [1]. in order to prevent the hemisphere from being covered by snow or dew, and to minimize zero-point deviations.

The NORMAL INCIDENCE BEAM RADIATION was measured by an Eppley Normal Incidence Pyrheliometer. Model NIP No. 29019, with sensitivity $8.15 \mu\text{V}/\text{Wm}^{-2}$ given by Eppley in 1992. The NIP is mounted on an Eppley Automatic Solar Tracker Model SMT-3. On the cloudless day 26. April 1996, NIP₂₉₀₁₉ was run in parallel with EPAC 13617, and an average sensitivity $8.12 \mu\text{V}/\text{Wm}^{-2}$ was obtained for 7 four minute periods at solar elevations between 34° and 42° . This sensitivity was considered a verification of the original sensitivity, which was therefore kept unchanged.

ULTRAVIOLET RADIATION on a horizontal surface is measured by means of an Eppley Total Ultra Violet Radiometer TUVR No.30072 [2] with wavelength response $.290 - .385 \mu\text{m}$. Ignoring a temperature response of $+0.1\%$ per $^\circ\text{C}$ between -40 and $+25^\circ\text{C}$, we run this TUVR with the sensitivity $202 \mu\text{V}/\text{Wm}^{-2}$ (10°C) given by Eppley upon delivery in November 1994. The (erythemal) UV-B RADIATION is measured in MED (Minimum Erythemal Dose) by the Solar Light UV Biometer 501A No. 1489. During June 7 - 8 1995, this SL501₁₄₈₉ was mounted in parallel with SL501₀₅₈₇ (owned by the Norwegian Radiation Protection Authority) for outdoor comparison at the roof of Chemical Institute, Blindern, Oslo. For two periods with high irradiance (maximum values in the range of 2.5-3.0 MED/hr.) the mean ratio $\text{SL501 A}_{1489} / \text{SL501 A}_{0587}$ was 0.895 and 0.889.

For each month of 1996, the maximum daily MED was found and divided by the corresponding CIE-weighted daily UV-dose calculated [12] from the co-located multichannel filter instrument

GUV-511 No. 9270 (owned by the Norwegian Radiation Protection Authority). This ratio ranged between 195 and 203 $\text{Jm}^{-2}/\text{MED}$ from March to September, and between 2004 and 224 $\text{Jm}^{-2}/\text{MED}$ from October to February.

For the measurement of long-wave radiation a ventilated Eppley pyrgeometer No. 13176 with coated silicon hemisphere is used. This makes it possible to compute the DOWNWARD ATMOSPHERIC RADIATION, since the temperature of the instrument is also recorded. The calibration factor used for the pyrgeometer 1996 was $K_L = 3.342 \mu\text{V}/\text{Wm}^{-2}$. In May – September 1996 this pyrgeometer was run in parallel with the unventilated pyrgeometer No. 27704, having calibration factor $4.00 \mu\text{V}/\text{Wm}^{-2}$ as given by Eppley in October 1989. Under cloudless sky, the downward atmospheric radiation measured with 27704 were slightly higher than that measured with No. 13176. The average difference was 4.1 % and 3.4 % for, respectively, 3 cloudless days and 3 cloudless nights, while the difference under overcast sky was 1.2 %.

The equations used for the evaluation of the long-wave radiation components are:

$$A = \sigma T_i^4 + \frac{U}{K_L} \quad (1)$$

$$Q_e^L = \sigma T_L^4 - A \quad (2)$$

where U is the voltage output of the pyrgeometer, K_L is the calibration factor, and T_i is the pyrgeometer temperature. Moreover, from the downward atmospheric radiation A obtained from (1), and the measured air temperature T_L the EFFECTIVE OUTGOING RADIATION, Q_e^L from a black surface at air temperature is readily obtained from (2).

The DURATION OF SUNSHINE is measured by a Campbell-Stoke sunshine recorder with blue paper strips. The strips are read according to the rules of WMO [3]. Maximum possible duration gives the number of hours the sun is above the natural horizon, as found from the records on days with clear skies at sunrise or sunset. The DURATION OF SUNSHINE is also given as the number of minutes during which the Eppley Normal Incidence Pyrheliometer (NIP No. 29000) recorded irradiance above 120 Wm^{-2} (with one instantaneous recording counted as 20 seconds). (Missing Campbell-Stoke data are, in a few indicated cases, replaced by NIP durations above 200 Wm^{-2}). Since 120 Wm^{-2} is lower than the reported [4] threshold ($205 \pm 35 \text{ Wm}^{-2}$) for burning on our CampbellStoke paper strips, the NIP sunshine duration slightly exceeds that from Campbell-Stoke. Thus, during March - October the sunshine duration was 1075 and 1162 hours recorded by Campbell-Stoke and NIP, respectively. During the 4 remaining winter months the corresponding figures were 150 and 164 hours. This 8-9% duration differences is reasonably consistent with a modelled [9, 10] long-term average difference of 13.5 % between durations above 205 and 120

Wm⁻².

The necessary routine calibrations of the pyranometers and the NIP pyrhelimeter are carried out by means of the absolute self-calibrating cavity pyrhelimeter, EPAC 13617. This pyrhelimeter was compared to the World Radiation Reference Scale (WRR) during the IV, V, VI and VII International Pyrhelimeter Comparisons at the World Radiation Centre, Davos [5-8]. Table 2 shows that the ratio between our EPAC 13617 and WRR has been extremely stable from 1975 to 1990, varying within a range of less than 0.1%. Moreover, during IPC IV the central 84% of the individual ratios was contained within an interval of width 0.0035, while during IPC VII the central 83% of the ratios was contained within an interval of width 0.005.

Table 2. Average ratios between our EPAC 13617 (with manufacturers calibration factor 10024 m⁻²), and, respectively, the working reference instrument PMO2 (or PACRAD III) and the World Radiation Reference Scale (WRR) during 4 International Pyrhelimeter Comparisons. Number N of individual ratios and their standard deviations are also given.

Comparison	N	EPAC-13617/PMO2	std.dev.	EPAC-13617/WRR
IPC IV (1975)	1610	0.9987 *)	0.0019	0.9968
IPC V (1980)	77	0.9962	0.0093	0.9976
IPC VI (1985)	233	0.9962	0.0020	0.9972
IPC VII (1990)	246	0.9972	0.0019	0.9977

*)EPAC-13617/PACRAD-III

On the cloudless day 15. April 1994, Eppley AHF 29224 (purchased by the Norwegian Polar Institute in 1994. and run with manufacturer's calibration factor 19986m⁻²) and our EPAC 13617 (with the IPC VII calibration factor 10047m⁻²) were operated side by side during 10 runs. Each run was scheduled in the same way as at IPC VII. and yielded 8 individual parallel readings 90s apart. For these 10 runs the average AHF/EPAC ratio was 1.0029, with standard deviation 0.0007 and range 0.0021.

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Bergen, February 1997
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LEGEND TO THE TABLES

The tables consist of 4 groups.

A. Hourly values.

The tables, pp. 1 - 55. contain the hourly (and daily) values of the following elements:
 GLOBAL RADIATION (total solar radiation from sun and sky on a horizontal surface).
 DIFFUSE (sky) RADIATION (solar) on a horizontal surface.

ULTRAVIOLET RADIATION from sun and sky on a horizontal surface.

UV-B RADIATION (erythemal radiation from sun and sky on a horizontal surface)

NORMAL INCIDENCE BEAM RADIATION (solar).

DOWNWARD (INCOMING) ATMOSPHERIC RADIATION on a horizontal surface.

EFFECTIVE OUTGOING RADIATION from a horizontal black surface at air temperature.

DURATION OF SUNSHINE (MIN.) from Campbell-Stoke sunshine recorder (with TOTAL given in 0.1 hr). This sunshine duration is the one occurring in the Tables B - C.

DURATION OF SUNSHINE (MIN. NIP>120 W/SQM) from Normal Incidence Pvrheliometer (with TOTAL, given in min).

The tables are listed in the order mentioned separately for each month.

The other groups of tables represent summaries for the year of the values given in Tables A.

B. Daily values.

Mean diurnal variation.

In groups B and C each element is listed separately in monthly succession.

D. Monthly and annual means.

This is one table which gives a summary of all measured radiation components (including the duration of sunshine expressed as percentages of the maximum possible duration), for the months and for the year.

In the tables the hourly values are valid for the hours centred at exact hours EAT (solar time).

Radiation values are given in 10^{-2} - or 10^{-3} MJ/m² referred to the WRR-scale. The UV-B radiation is given in 0.01 MED (Minimum Erythemal Dose).

The duration of sunshine is given in minutes (min), except for totals and for the maximum possible duration (with completely clear skies). These latter values are given in tenths of an hour.

In the tables a dash (-) indicates missing observations, an A in the row for mean values stands for an approximate mean value, based on more than 25 (325) values, but less than a complete month (year). M indicates an average value based on less than 25 (325) days, but more than 10 (250) days.

A. HOURLY VALUES JANUARY

JAN 1996 HOURLY SUMS OF EFFECTIVE OUTGOING RADIATION (FROM A BLACK SURFACE AT AIR TEMPERATURE (0.01 MJ/SQM))

DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL
1	33	33	33	33	33	34	35	36	36	37	39	39	37	37	36	36	36	36	35	35	35	35	34	33	846
2	33	33	33	32	31	28	25	20	21	26	33	34	33	33	34	32	32	33	32	32	33	32	33	33	741
3	35	32	14	10	13	22	12	12	12	11	17	14	6	10	7	8	17	9	6	5	6	5	5	5	293
4	5	5	5	5	4	4	4	4	4	19	7	11	20	31	31	32	30	26	25	26	31	30	28	23	410
5	30	26	27	28	25	17	26	33	34	39	42	42	41	39	36	34	32	33	32	32	32	31	31	31	773
6	31	30	30	31	31	31	31	30	29	30	31	31	30	31	31	31	30	30	29	28	27	28	30	34	725
7	35	25	28	35	36	37	37	37	34	35	31	7	5	4	6	6	8	8	8	5	5	3	5	3	443
8	1	3	4	8	8	5	3	5	9	5	11	12	8	30	36	37	36	36	36	34	34	33	29	8	431
9	5	8	8	14	12	13	13	15	16	18	22	21	21	19	16	14	11	11	9	4	4	3	2	4	283
10	7	7	12	23	17	23	23	19	33	20	14	10	8	7	7	8	8	11	10	8	6	5	5	5	296
11	5	4	4	5	5	5	3	2	2	1	1	2	2	3	3	2	3	4	5	7	7	8	9	8	100
12	5	5	5	6	5	15	15	13	12	12	12	12	12	8	7	7	5	8	9	7	10	13	10	12	225
13	15	11	9	10	13	11	8	16	19	15	15	12	7	6	5	5	7	7	4	3	1	3	3	3	208
14	3	3	3	3	4	7	16	7	7	11	11	10	7	8	7	6	5	12	19	8	8	14	19	23	221
15	19	11	10	11	26	34	34	31	31	31	31	30	26	3	2	3	2	3	3	4	3	3	4	4	359
16	3	3	3	4	3	3	2	2	2	1	.	.	2	3	3	3	3	3	3	7	16	15	22	23	129
17	20	7	8	6	4	3	4	5	6	3	7	4	8	10	6	4	3	2	2	2	2	2	2	2	122
18	2	3	3	3	3	3	2	2	1	1	2	3	3	3	3	3	3	8	30	30	27	29	28	24	219
19	16	5	5	3	4	4	10	12	7	5	6	7	9	11	4	3	4	5	4	5	5	11	25	27	197
20	29	29	28	28	30	31	32	32	33	36	38	38	37	36	35	36	34	33	33	33	33	33	33	33	793
21	33	33	33	34	33	33	33	33	33	33	33	34	36	34	34	32	28	27	27	20	20	15	16	18	705
22	18	16	17	16	31	33	33	15	6	10	23	29	18	12	18	30	32	33	29	3	9	17	18	32	498
23	33	33	30	29	32	32	31	30	28	30	35	23	16	12	30	33	32	31	32	32	25	27	33	32	701
24	32	32	32	32	32	30	5	1	2	3	2	12	21	22	30	36	37	36	34	33	32	28	34	34	592
25	35	34	35	36	35	35	35	34	34	36	37	38	39	36	36	35	35	35	34	34	33	33	33	32	839
26	32	32	31	28	24	20	19	19	19	20	21	31	28	26	29	32	35	33	35	36	35	31	31	33	680
27	34	34	35	34	34	35	35	35	35	39	39	42	41	38	38	38	37	35	34	33	32	28	31	31	847
28	22	29	28	26	26	25	26	22	15	29	30	31	31	29	28	28	27	28	30	30	29	29	29	28	655
29	29	29	29	28	28	28	28	28	29	34	36	34	36	32	31	31	31	29	29	29	28	28	29	28	721
30	28	26	11	5	4	4	4	5	5	5	5	16	28	34	26	27	32	31	30	30	29	29	28	29	471
31	29	29	29	30	31	29	29	29	31	35	37	37	30	8	8	21	13	7	6	7	7	11	6	5	504
MEAN	21	20	19	19	20	20	20	19	19	20	22	21	21	20	20	21	21	21	21	19	19	20	21	21	485

A. HOURLY VALUES FEBRUARY

FEB 1996 HOURLY SUMS OF EFFECTIVE OUTGOING RADIATION (FROM A BLACK SURFACE AT AIR TEMPERATURE (0.01 MJ/SQM))

DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL
1	4	3	3	2	3	5	6	4	4	4	5	7	5	11	18	10	14	11	20	31	31	30	30	29	290
2	30	29	16	12	9	10	9	11	26	33	34	34	36	30	21	10	6	16	29	29	29	31	33	33	556
3	34	34	35	35	35	35	35	35	35	36	38	37	38	36	27	6	10	24	16	11	9	8	16	23	648
4	5	1	2	2	1	3	26	21	3	7	3	2	4	3	2	4	18	22	32	30	8	13	15	11	238
5	5	4	3	3	3	5	5	5	5	13	17	15	17	8	8	9	9	8	7	8	6	8	8	11	190
6	18	13	14	9	10	10	9	11	8	9	9	10	12	13	16	30	32	30	31	33	34	32	32	31	456
7	27	29	27	28	26	27	26	23	27	28	31	31	30	27	25	21	23	24	23	25	24	25	26	26	629
8	26	28	27	26	26	27	26	26	31	35	31	37	40	40	40	39	38	36	36	34	33	30	29	31	772
9	26	23	26	29	29	33	35	36	37	38	38	38	37	37	35	35	36	32	30	31	21	23	23	25	753
10	28	18	18	20	18	16	15	15	14	15	18	21	25	31	28	30	25	15	10	11	12	14	17	12	446
11	12	10	19	12	10	12	7	8	4	4	3	8	8	5	5	9	8	10	6	6	6	7	8	7	194
12	7	9	8	5	7	8	11	10	13	14	13	9	10	11	6	6	8	10	8	8	9	10	10	9	219
13	26	31	32	31	28	23	30	29	36	38	39	38	39	39	39	38	38	38	37	36	36	34	32	28	815
14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	.	1	1	1	.	.	.	.	3	3	2	2	2	3	3	4	6	5	8	10	8	5	6	5	78
17	14	16	27	26	35	35	35	37	39	41	41	41	42	43	42	41	40	39	39	38	38	36	33	30	848
18	31	32	31	29	28	30	31	31	33	38	38	39	41	43	45	44	43	42	41	40	40	41	42	41	894
19	43	43	43	42	40	35	40	40	40	41	42	42	43	43	43	42	41	41	40	39	39	40	39	40	981
20	39	38	37	37	36	36	36	36	39	39	41	41	41	41	41	40	40	39	36	36	34	33	33	33	902
21	33	32	31	31	31	31	28	8	7	8	7	7	6	7	8	9	8	8	8	8	7	6	3	3	335
22	3	3	3	3	2	1	2	3	2	3	3	4	4	4	4	6	6	5	19	23	24	28	30	30	215
23	14	18	21	18	13	4	9	6	5	10	22	17	10	8	9	9	10	14	12	8	5	7	9	267	
24	14	8	5	8	8	7	6	7	8	8	8	8	8	5	5	7	7	3	1	5	8	9	10	10	173
25	8	9	8	4	5	8	8	3	5	3	3	4	4	8	8	10	24	19	14	8	10	11	8	8	200
26	5	6	5	5	4	3	1	3	8	8	8	7	5	5	18	21	15	1	5	4	3	.	3	4	147
27	5	5	5	8	12	12	2	.	.	.	.	1	4	6	4	14	10	8	8	3	4	3	23	25	162
28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MEAN M	18	18	18	17	17	17	18	16	17	19	20	20	20	20	20	20	21	20	21	21	19	19	21	21	456

A. HOURLY VALUES FEBRUARY

FEB 1996 DURATION OF SUNSHINE (MIN. NIP>120 W/SQM)

DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL		
1	
2	11	60	55	52	60	25	.	.	.	.	.	.	.	.	.	.	.	263	
3	31	60	60	60	60	27	.	.	.	.	.	.	.	.	.	.	.	298	
4	
5	
6	
7	43	18	.	.	.	.	.	.	.	.	.	.	.	.	.	61	
8	17	56	22	60	60	43	.	.	.	.	.	.	.	.	.	.	.	258	
9	29	60	60	60	60	12	.	.	.	.	.	.	.	.	.	.	.	281	
10	51	52	.	.	.	.	.	.	.	.	.	.	.	103	
11	
12	13	.	.	.	.	.	.	.	.	.	.	.	.	13	
13	29	60	60	60	60	60	13	.	.	.	.	.	.	.	.	.	.	342	
14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
16
17	10	60	60	60	60	60	60	42	.	.	.	.	.	.	.	.	.	.	412	
18	60	60	60	60	60	51	.	.	.	.	.	.	.	.	.	.	351	
19	18	60	60	60	60	60	56	.	.	.	.	.	.	.	.	.	.	.	434	
20	22	60	60	60	60	60	60	1	.	.	.	.	.	.	.	.	.	.	443	
21
22
23	26	47	3	.	.	.	.	.	.	.	.	.	.	.	.	.	76	
24
25
26	11	7	.	.	.	.	.	.	.	.	.	.	18	
27	1	8	4	.	.	.	.	.	.	.	.	.	13	
28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
MEAN M	0	0	0	0	0	0	0	2	12	22	23	22	24	18	10	0	0	0	0	0	0	0	0	0	0	135	

FEB 1996 DURATION OF SUNSHINE (MIN.)

DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL*	MAX*	PCT	
1	0	46	0
2	36	48	42	60	24	.	.	.	.	.	.	.	.	.	.	.	.	35	48	73
3	30	60	60	60	60	24	.	.	.	.	.	.	.	.	.	.	.	49	49	100
4	0	50	0
5	0	51	0
6	0	52	0
7	12	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	53	4
8	42	12	60	60	42	.	.	.	.	.	.	.	.	.	.	.	.	36	54	67
9	18	60	60	54	48	6	.	.	.	.	.	.	.	.	.	.	.	41	56	73
10	36	42	.	.	.	.	.	.	.	.	.	.	.	13	58	22
11	0	60	0
12	0	61	0
13	24	60	60	60	60	60	12	.	.	.	.	.	.	.	.	.	56	62	90	
14	0	63	0
15	0	65	0
16	0	66	0
17	12	60	60	60	60	60	60	36	.	.	.	.	.	.	.	.	.	.	68	68	100	
18	42	60	54	54	60	48	.	.	.	.	.	.	.	.	.	.	53	71	75	
19	18	60	60	60	60	60	54	.	.	.	.	.	.	.	.	.	.	72	72	100	
20	24	60	60	60	60	60	60	.	.	.	.	.	.	.	.	.	.	74	74	100	
21	0	76	0
22	0	77	0
23	24	48	.	.	.	.	.	.	.	.	.	.	.	.	.	.	12	78	15
24	0	79	0
25	0	79	0
26	6	6	.	.	.	.	.	.	.	.	.	.	.	2	80	3
27	0	80	0
28	0	81	0
29	6	.	.	.	6	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	82	2
MEAN	0	0	0	0	0	0	0	2	9	17	19	18	19	15	7	0	0	0	0	0	0	0	0	0	0	18	65	28

* TOTALS AND MAX ARE GIVEN IN 0.1 HR

A. HOURLY VALUES MARCH

MAR 1996 HOURLY SUMS OF ULTRAVIOLET RADIATION ON A HORIZONTAL SURFACE (KJ/SQM)

Table with columns DAY, 1-24, and TOTAL. Rows 1-31 showing hourly sums of ultraviolet radiation. MEAN row at the bottom shows averages for each day.

MAR 1996 HOURLY DOSES OF UV-B RADIATION ON A HORIZONTAL SURFACE (0.01 MED/HR)

Table with columns DAY, 1-24, and TOTAL. Rows 1-31 showing hourly doses of UV-B radiation. MEAN row at the bottom shows averages for each day.

A. HOURLY VALUES MARCH

MAR 1996	HOURLY SUMS OF EFFECTIVE OUTGOING RADIATION (FROM A BLACK SURFACE AT AIR TEMPERATURE (0.01 MJ/SQM))																								
DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL
1	33	34	35	36	34	33	33	36	38	38	37	37	37	37	37	32	24	24	16	13	18	23	9	8	702
2	8	7	4	3	2	.	.	.	.	-2	-3	-2	-2	-1	.	.	.	.	4	9	9	4	2	3	45
3	2	2	2	1	1	1	1	1	2	2	3	1	2	2	2	3	3	2	3	3	2	8	26	77	
4	26	17	9	4	2	3	4	8	5	7	9	21	14	9	13	16	33	34	33	34	33	33	33	33	433
5	33	33	33	32	32	33	31	29	28	32	29	27	15	8	8	6	5	9	21	19	7	3	2	2	477
6	25	3	2	1	8	21	21	9	12	13	26	33	33	27	30	33	37	36	34	35	32	32	32	31	566
7	30	27	31	31	31	31	31	33	36	36	36	35	35	36	37	39	36	35	33	33	32	32	32	31	799
8	32	32	21	16	26	31	31	33	35	36	36	38	38	38	39	39	37	35	33	33	33	32	32	32	788
9	31	31	31	31	32	33	33	35	38	40	41	42	42	42	43	43	42	39	37	36	36	34	33	33	878
10	33	33	33	33	32	32	33	36	37	38	38	38	38	39	39	38	38	36	36	35	36	36	36	35	858
11	34	34	34	34	35	35	35	34	34	35	35	35	34	36	36	39	38	36	31	31	34	36	35	33	833
12	31	31	35	34	35	36	37	37	36	36	35	35	34	35	36	36	36	35	35	34	33	33	33	31	829
13	31	31	31	31	27	24	28	34	37	37	37	37	35	36	33	35	37	37	35	24	26	33	26	23	765
14	27	27	32	35	37	37	36	33	34	33	30	30	27	28	36	38	39	38	36	36	37	37	37	37	817
15	38	37	37	37	36	35	35	35	37	39	39	40	40	39	39	39	37	35	29	22	26	26	31	32	840
16	32	32	32	32	31	31	31	33	36	38	40	41	39	39	40	40	39	38	36	35	33	32	31	31	842
17	32	31	31	31	30	30	31	34	36	39	41	40	41	40	39	39	38	36	34	33	33	33	32	32	836
18	32	32	26	6	7	14	8	6	14	28	29	31	33	35	31	29	23	31	19	30	31	31	31	30	587
19	30	30	26	11	16	8	11	31	19	10	10	12	12	8	7	6	5	5	21	27	15	6	4	4	334
20	5	6	8	9	10	9	12	9	8	6	4	3	9	11	27	30	30	31	30	28	29	21	9	7	351
21	15	21	25	13	9	6	8	10	13	16	25	23	33	39	38	39	38	38	36	36	35	35	34	13	598
22	12	22	17	33	27	22	37	39	41	41	40	40	42	43	43	43	43	39	37	35	33	33	33	33	828
23	33	32	33	33	34	33	25	23	35	38	26	21	18	10	12	10	8	8	7	6	5	2	2	1	455
24	.	2	3	2	3	4	4	2	3	3	1	1	3	3	3	3	3	.	1	1	1	1	2	6	55
25	3	3	3	3	3	3	3	1	3	6	13	13	4	4	9	10	8	6	5	2	3	9	16	7	140
26	7	5	14	17	30	26	18	18	23	21	34	33	29	14	6	20	33	31	22	13	5	1	1	1	422
27	1	5	5	.	.	-1	.	.	-1	.	.	.	.	2	1	2	4	2	.	.	.	.	.	1	21
28	4	24	23	29	30	34	35	36	37	37	38	39	40	41	41	41	42	41	38	36	36	36	36	36	830
29	34	35	36	37	37	37	37	39	39	41	41	41	42	42	41	39	33	33	36	41	42	41	42	41	927
30	41	41	39	37	36	36	35	38	39	41	40	39	39	39	39	39	39	40	39	38	37	37	36	36	920
31	36	36	36	36	36	37	38	41	44	44	43	42	42	42	44	45	47	46	44	42	40	39	35	31	966
MEAN	24	24	23	22	23	23	23	24	26	27	28	28	27	27	27	28	28	28	26	26	25	24	23	23	607

A. HOURLY VALUES APRIL

APR 1996 HOURLY SUMS OF EFFECTIVE OUTGOING RADIATION (FROM A BLACK SURFACE AT AIR TEMPERATURE (0.01 MJ/SQM))

DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL
1	28	31	26	26	31	31	29	28	35	35	35	34	39	36	36	38	37	37	36	36	36	35	34	33	802
2	33	33	33	32	32	32	31	31	34	30	24	23	18	13	15	13	23	36	33	20	20	30	27	15	631
3	17	16	25	27	25	6	4	3	2	.	1	1	1	1	2	3	3	3	4	5	5	5	5	5	169
4	6	6	7	7	9	9	9	9	9	10	10	11	17	23	14	10	10	11	10	21	13	16	19	22	288
5	25	27	27	26	27	29	32	33	34	32	34	34	35	32	38	41	41	42	40	39	40	39	37	36	820
6	36	36	35	35	34	35	38	40	41	43	46	44	35	40	42	40	41	36	31	32	29	25	21	14	849
7	3	5	10	16	25	25	26	27	24	30	29	35	32	32	37	36	29	30	33	33	34	33	32	31	647
8	31	31	30	26	27	25	13	13	11	8	8	8	8	8	8	7	7	8	8	7	5	3	1	3	304
9	5	5	5	4	5	8	7	10	14	23	32	33	25	31	35	34	34	34	33	32	31	31	30	29	530
10	29	28	28	28	28	29	31	35	38	39	38	36	29	21	23	32	36	36	36	33	28	21	17	10	709
11	10	10	16	9	7	6	4	3	7	9	10	11	14	21	29	38	38	43	44	43	41	41	39	39	532
12	38	38	37	36	37	38	40	44	44	43	44	44	44	45	44	44	45	45	44	43	41	39	38	37	992
13	37	36	36	36	36	36	40	41	44	43	42	42	41	41	41	41	41	41	40	38	37	35	35	34	934
14	34	33	33	33	33	35	38	39	41	41	43	43	43	41	39	40	40	40	39	38	36	33	26	21	882
15	18	14	11	11	10	8	8	8	6	4	3	3	3	3	4	4	4	4	5	6	7	10	6	7	167
16	8	10	10	9	10	18	21	30	30	29	15	8	7	7	7	11	11	8	7	7	9	10	19	28	329
17	31	12	9	8	8	8	8	9	19	15	11	13	20	17	20	17	23	31	38	39	39	40	41	41	517
18	41	42	25	12	8	5	7	12	13	21	22	25	20	20	16	15	10	8	5	4	3	2	3	4	343
19	4	4	4	4	4	6	9	10	13	16	9	8	7	6	7	9	18	10	9	8	7	9	12	9	202
20	8	5	12	10	6	8	5	5	6	8	8	10	23	23	9	5	5	5	5	5	5	4	5	6	191
21	6	4	3	3	2	2	2	3	3	3	4	4	3	1	2	4	5	3	3	2	2	1	1	2	68
22	2	2	2	2	2	2	4	6	4	3	5	12	8	9	12	11	13	13	13	11	11	13	9	4	173
23	5	5	6	8	10	18	16	22	14	24	21	21	30	21	14	14	10	10	9	6	5	6	6	4	305
24	5	4	4	5	7	6	20	20	8	9	10	8	8	7	8	8	7	6	5	9	7	7	9	9	196
25	9	10	13	10	8	4	4	4	3	3	3	2	3	7	8	8	7	13	8	12	14	10	12	30	205
26	33	32	31	31	31	33	33	36	36	37	37	39	38	37	36	35	19	14	11	11	8	6	4	4	632
27	3	3	3	3	3	3	3	3	4	4	7	7	7	5	5	4	3	4	4	5	4	4	3	3	97
28	3	3	3	4	5	4	2	6	5	6	10	13	12	14	23	31	32	32	22	21	30	31	31	33	376
29	33	32	32	31	31	29	27	33	36	31	31	15	13	18	27	16	16	10	14	19	31	32	34	33	624
30	33	33	32	33	33	35	35	35	31	25	21	23	22	17	20	25	37	39	38	37	36	34	32	31	737
MEAN	19	18	18	18	18	18	18	20	20	21	20	20	20	20	21	21	22	22	21	21	20	20	20	19	475

A. HOURLY VALUES MAY

MAY 1996 HOURLY SUMS OF NORMAL INCIDENCE BEAM RADIATION (0.01 MJ/SQM)

DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL
1	47	158	205	265	296	192	105	102	189	129	314	301	274	232	154	22	.	.	.	.	2985
2	57	216	277	310	327	335	340	340	336	325	299	300	275	232	150	22	.	.	.	.	4141
3	4	5	3	.	.	.	.	.	.	.	5	.	.	.	.	.	.	.	.	17
4	3	3	.	.	.	.	.	.	.	.	.	.	3	.	.	.	.	.	9
5
6	6	.	.	.	.	1	10	80	221	110	250	106	156	95	51	.	.	.	.	.	1086
7	2	135	257	290	61	2	.	49	278	254	283	251	193	101	26	3	.	.	.	.	2185
8	3	.	2	.	.	.	.	99	117	11	193	161	200	82	129	18	.	.	.	.	1015
9	92	226	268	299	320	329	334	339	338	333	326	308	278	244	172	43	.	.	.	.	4249
10	105	241	287	314	328	336	340	336	338	329	314	296	267	230	152	44	.	.	.	.	4257
11	1	6	58	33	21	.	.	.	.	.	.	.	.	.	.	.	119
12	3	8	3	4	77	199	66	.	30	47	89	67	7	.	.	.	.	600
13	1	1	10	2	33	.	50	88	22	.	.	.	.	.	.	.	.	.	.	.	207
14	1	.	.	.	.	.	.	.	.	.	.	.	.	1
15
16	136	257	274	247	316	234	149	65	16	25	1	12	19	.	75	50	.	.	.	.	1876
17	8	15	136	10	59	1	.	6	52	17	11	10	41	4	.	.	.	.	.	.	370
18	7	41	59	36	82	2	.	5	.	.	.	.	.	.	.	.	.	.	.	.	232
19	1	.	.	.	2	5	12	.	.	.	.	.	.	.	.	.	.	20
20	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
21	3	.	9	25	19	.	3	.	.	.	.	.	.	.	.	.	.	59
22	5	12	6	.	.	.	2	5	10	27	152	126	68	.	.	.	.	413
23	93	131	19	3	.	.	.	7	.	.	.	.	6	.	.	.	.	.	.	.	259
24	4	20	.	.	.	.	.	.	.	.	.	.	.	.	.	.	24
25	1	.	.	2	.	.	.	.	.	.	.	.	.	.	3
26	2	1	.	10	28	194	294	216	159	199	234	165	80	3	.	.	.	1585
27	.	.	.	1	1	.	11	36	14	24	110	212	327	319	181	226	186	153	154	23	1	.	.	.	1979
28	2	49	169	106	136	311	228	267	99	91	86	8	59	87	17	.	.	.	.	.	1715
29	.	.	.	1	.	.	.	.	.	.	.	.	2	2	.	3	2	28	2	.	.	.	.	.	40
30	14	.	177	152	147	265	288	269	269	298	209	208	228	38	.	.	.	.	.	.	2562
31	53	164	144	139	49	3	.	.	.	552
MEAN	0	0	0	0	18	48	70	67	69	67	66	78	98	85	87	79	85	69	51	14	0	0	0	0	1050

MAY 1996 HOURLY SUMS OF DOWNWARD ATMOSPHERIC RADIATION (0.01 MJ/SQM)

DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL
1	86	85	85	85	85	86	88	92	99	102	100	104	106	98	95	91	89	87	85	84	84	84	87	85	2172
2	86	88	89	90	84	84	86	87	89	90	92	93	94	94	94	92	91	90	89	87	87	87	90	94	2147
3	92	98	104	110	110	106	107	114	118	119	120	120	121	120	121	118	118	119	118	118	116	119	120	120	2744
4	118	118	118	119	121	120	118	117	118	121	121	122	123	123	123	122	121	122	121	122	121	115	114	118	2876
5	115	118	119	118	118	120	121	121	121	121	121	121	120	119	119	118	118	117	117	117	116	113	112	109	2829
6	109	109	108	101	103	110	111	111	111	111	109	105	97	94	90	88	92	90	87	99	85	83	103	111	2417
7	113	115	116	115	109	92	92	95	111	114	116	114	97	96	94	93	92	90	95	97	91	86	85	86	2404
8	86	96	101	100	111	112	112	115	116	116	117	112	109	106	99	95	96	100	92	96	87	86	85	85	2430
9	85	84	83	82	84	85	87	89	90	92	93	93	93	92	90	90	89	87	86	84	84	84	84	84	2094
10	83	83	82	82	82	84	85	87	87	89	91	92	92	94	94	93	93	93	92	90	90	90	92	95	2135
11	103	116	116	117	120	120	121	123	123	122	120	121	122	127	126	126	127	127	125	125	124	123	119	120	2913
12	124	125	124	123	123	123	125	121	121	125	125	123	121	122	128	126	118	113	108	110	113	109	114	118	2882
13	119	126	124	126	121	123	125	126	124	128	126	123	128	132	132	129	128	127	127	127	127	126	125	118	3017
14	121	120	119	121	122	123	123	123	123	123	123	124	123	123	123	123	122	122	122	121	122	122	122	122	2932
15	121	121	121	121	121	120	120	120	121	121	122	123	123	121	121	122	121	121	117	105	100	103	88	87	2781
16	86	85	85	85	86	88	92	94	102	96	105	109	114	115	115	114	111	112	112	116	113	107	101	102	2445
17	101	99	98	93	100	99	98	110	113	117	118	116	112	115	118	109	107	116	105	105	113	112	112	106	2592
18	100	101	100	93	93	97	102	107	105	114	118	118	116	118	117	117	117	117	118	118	118	118	120	120	2662
19	120	121	121	122	123	123	122	123	122	124	124	124	125	126	125	124	124	124	124	123	121	120	121	121	2947
20	123	122	123	123	123	123	123	122	122	122	122	123	123	123	122	123	123	123	123	123	123	123	122	122	2944
21	122	122	121	121	118	118	117	117	118	119	123	123	125	123	123	123	122	122	121	121	110	106	105	111	2851
22	112	114	119	119	121	122	122	118	116	120	123	121	122	124	123	119	116	111	103	95	94	100	113	100	2747
23	92	91	92	92	94	100	109	121	122	124	124	123	125	125	124	124	122	125	124	123	123	124	124	123	2770
24	116	116	116	105	119	119	121	124	119	118	125	123	126	125	124	123	123	123	123	123	123	123	122	122	2901
25	123	122	123	122	123	123	122	121	121	121	122	123	123	124	124	124	123	123	123	123	122	123	122	122	2942
26	122	122	121	121	123	123	122	122	123	122	121	120	118	102	105	100	96	94	93	105	98	92	89	89	2643
27	88	88	95	108	115	115	111	111	114	115	111	109	100	98	108	101	100	100	113	103	103	99	100	95	2500
28	100	102	106	99	97	101	91	98	100	101	103	105	107	102	101	111	106	95	95	99	110	114	117	118	2478
29	117	118	119	121	121	121	121	122	123	124	124	124	125	124	123	122	119	116	111	114	95	95	105	100	2804
30	119	120	116	118	117	112	107	113	117	107	108	109	110	108	108	111	108	111	118	122	124	125	128	131	2767
31	132	133	132	132	133	136	135	139	134	131	132	131	130	128	126	117	109	110	106	103	102	100	98	104	2933
MEAN	108	109	110	109	110	111	111	113	114	115	116	116	115	114	114	113	111	111	109	110	108	107	108	108	2668

A. HOURLY VALUES MAY

MAY 1996 HOURLY SUMS OF EFFECTIVE OUTGOING RADIATION (FROM A BLACK SURFACE AT AIR TEMPERATURE (0.01 MJ/SQM))

DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL
1	30	31	30	29	31	33	34	35	32	28	28	25	24	32	36	39	41	42	41	40	38	36	31	33	799
2	31	29	28	28	34	38	39	39	39	39	40	40	39	39	39	40	40	40	40	39	38	37	35	29	879
3	31	25	18	13	14	19	20	15	10	9	8	7	7	8	8	13	11	9	10	9	9	10	7	6	296
4	7	7	6	5	3	5	7	10	10	9	9	7	5	5	7	7	8	6	6	4	5	10	10	7	165
5	9	5	5	5	5	3	2	1	1	2	1	2	2	4	5	5	5	5	5	3	4	7	8	10	104
6	11	10	11	17	15	9	8	8	8	9	13	18	28	31	34	35	31	32	35	19	33	34	14	6	469
7	5	5	2	2	9	29	33	32	15	8	5	9	32	33	35	36	35	35	29	26	29	33	33	31	541
8	31	21	16	18	8	8	9	7	5	5	4	10	18	20	29	33	31	26	33	27	36	36	36	36	503
9	36	36	36	39	39	39	39	40	40	39	41	41	41	43	44	45	45	46	46	46	45	44	43	42	995
10	43	43	42	41	41	42	42	44	44	42	42	42	44	44	44	46	46	46	46	46	44	43	41	38	1036
11	30	15	16	13	10	11	11	8	9	15	19	19	19	13	10	8	5	2	3	4	5	5	10	8	268
12	4	3	3	5	5	5	4	9	12	9	10	18	21	19	11	13	21	26	29	24	20	22	16	13	322
13	10	4	6	4	9	8	9	8	15	10	16	21	15	10	8	7	4	4	3	3	2	3	3	10	192
14	6	8	7	6	5	4	5	5	5	5	5	6	8	7	8	7	7	6	6	6	5	5	5	5	142
15	5	5	4	3	2	3	2	2	3	4	3	3	4	5	5	5	6	6	9	22	26	23	37	37	224
16	38	38	38	37	38	37	35	35	29	36	26	23	18	18	17	17	19	18	18	12	12	18	23	21	621
17	21	23	23	28	22	23	28	16	14	8	5	6	18	14	10	20	23	12	21	21	13	14	13	18	414
18	23	23	25	32	32	29	24	20	24	15	10	11	14	13	12	12	12	12	11	10	9	10	9	9	401
19	8	8	8	8	8	7	10	12	11	9	11	11	11	11	10	9	8	8	8	9	12	13	13	13	236
20	10	11	8	8	8	8	9	9	9	9	8	8	9	9	9	6	4	3	3	3	3	2	2	1	159
21	2	2	3	3	6	7	10	12	11	14	10	11	7	9	9	9	8	8	8	6	16	19	20	14	224
22	12	10	5	7	5	4	5	12	17	15	9	10	9	7	9	14	18	25	31	35	33	26	12	25	355
23	32	31	30	31	33	33	25	14	13	11	10	12	10	11	8	9	13	10	9	6	5	4	3	5	368
24	12	12	13	23	10	11	10	5	12	15	10	4	2	3	3	3	3	3	3	3	2	2	3	3	170
25	3	2	1	3	2	2	2	3	3	3	3	3	3	5	5	5	5	5	4	3	4	4	4	4	81
26	3	4	5	4	2	1	5	5	5	5	9	12	15	32	28	31	35	37	36	22	28	33	34	33	424
27	33	31	24	12	7	9	15	17	15	15	21	23	33	33	23	29	28	27	14	23	21	25	23	27	528
28	23	21	16	23	26	23	37	30	28	31	28	28	25	30	30	19	24	33	31	26	15	11	8	5	571
29	4	4	5	6	6	5	4	4	3	2	3	6	7	8	9	9	13	16	19	15	32	31	20	24	255
30	6	6	10	10	11	18	26	22	19	31	32	32	32	34	33	33	38	30	18	13	11	10	8	8	491
31	8	8	11	13	13	10	13	10	6	2	3	5	6	8	8	18	26	25	28	30	31	32	34	26	374
MEAN	17	16	15	15	15	16	17	16	15	15	14	15	17	18	18	19	20	19	19	18	19	19	18	18	407

A. HOURLY VALUES MAY

MAY 1996 DURATION OF SUNSHINE (MIN. NIP>120 W/SQM)

DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL	
1	20	55	55	60	60	43	21	23	37	28	60	60	60	60	60	16	.	.	.	.	718	
2	25	60	60	60	60	60	60	60	60	60	60	60	60	60	60	18	.	.	.	.	883	
3	2	.	.	.	.	.	.	.	.	2	
4	1	.	.	.	.	.	1	
5	
6	3	.	.	.	.	.	3	30	50	28	54	27	43	33	30	.	.	.	.	.	301	
7	42	60	60	17	.	.	13	56	56	60	60	60	42	12	.	.	.	.	.	538	
8	1	.	.	.	.	.	.	22	25	3	43	36	53	27	58	8	.	.	.	.	276	
9	32	60	60	60	60	60	60	60	60	60	60	60	60	60	60	26	.	.	.	.	898	
10	33	60	60	60	60	60	60	60	60	60	60	60	60	60	60	29	.	.	.	.	902	
11	1	24	14	9	.	.	.	.	.	.	.	.	.	.	.	48	
12	4	1	1	22	53	21	.	16	19	38	50	.	.	.	.	.	225	
13	5	.	13	.	24	33	12	.	.	.	.	.	.	.	.	.	.	.	87	
14	
15	
16	39	60	60	50	60	52	38	22	6	8	.	5	7	.	46	35	.	.	.	.	488	
17	4	5	35	5	27	.	.	1	28	7	6	5	22	.	.	.	.	.	.	.	145	
18	25	32	24	43	124
19	1	1	7	.	.	.	.	.	.	.	.	.	.	9	
20	
21	2	16	11	.	.	.	.	.	.	.	.	.	.	.	.	29	
22	1	2	1	.	.	.	.	1	2	6	10	51	55	43	.	.	.	.	172	
23	46	53	7	.	.	.	2	.	.	.	.	.	3	.	.	.	.	.	.	.	111	
24	1	6	.	.	.	.	.	.	.	.	.	.	.	.	.	.	7	
25	
26	1	.	.	5	9	47	59	51	41	52	60	60	56	.	.	.	.	.	441	
27	4	10	4	5	26	44	60	60	43	51	47	39	52	14	.	.	.	.	459	
28	16	43	31	30	60	59	60	29	37	31	3	34	60	4	.	.	.	.	.	497	
29	1	.	.	1	13	1	.	.	.	.	.	.	16	
30	6	47	37	52	56	60	59	60	60	52	58	60	13	.	.	.	.	.	.	620	
31	17	50	49	59	28	.	.	.	.	203	
MEAN	0	0	0	0	7	14	17	15	16	13	15	18	21	18	19	18	23	21	22	9	0	0	0	0	265	

MAY 1996 DURATION OF SUNSHINE (MIN.)

DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL*	MAX*	PCT
1	.	.	.	18	48	54	60	60	42	24	24	36	30	54	60	60	60	60	6	.	.	.	.	.	116	145	80
2	.	.	.	24	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	6	.	.	.	.	145	145	100
3	0	146	0
4	0	146	0
5	0	147	0
6	12	54	30	54	24	42	30	18	.	.	.	.	.	.	44	148	30
7	42	60	60	18	.	.	6	60	60	60	60	60	42	.	.	.	.	.	.	.	88	148	59
8	18	30	42	36	60	24	54	6	.	.	.	.	.	.	.	45	149	30
9	.	.	.	36	60	60	60	60	60	60	60	60	60	60	60	60	60	60	24	.	.	.	.	.	150	150	100
10	.	.	.	36	60	60	60	60	60	60	60	60	60	60	60	60	60	60	18	.	.	.	.	.	149	150	99
11	12	12	6	.	.	.	.	.	.	.	.	.	.	.	.	5	151	3
12	18	54	18	.	6	18	36	30	.	.	.	.	.	.	.	30	151	20
13	12	18	30	6	.	.	.	.	.	.	.	.	.	.	.	.	.	11	152	7
14	0	153	0
15	0	153	0
16	.	.	.	42	60	60	60	60	54	30	12	6	6	.	.	6	.	30	12	.	.	.	.	.	73	154	47
17	6	36	6	18	.	.	.	18	6	.	.	18	.	.	.	.	.	.	.	.	18	154	12
18	6	12	6	36	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	10	154	6
19	6	.	.	.	.	.	.	.	.	.	.	.	1	154	1
20	0	155	0
21	12	12	.	.	.	.	.	.	.	.	.	.	.	.	.	4	155	3
22	6	42	60	30	.	.	.	.	.	23	155	15
23	.	.	.	18	24	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	7	156	4
24	6	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	157	1
25	0	157	0
26	6	42	60	48	48	54	60	60	30	.	.	.	.	.	.	68	158	43
27	6	6	6	24	48	60	60	48	48	48	42	48	12	.	.	.	.	.	.	76	158	48
28	12	42	24	24	60	54	60	24	30	24	6	24	42	.	.	.	.	.	.	.	71	158	45
29	6	.	.	.	.	.	.	.	.	1	159	1
30	6	48	30	36	54	60	60	60	60	54	48	54	6	.	.	.	.	.	.	.	96	159	60
31 +	18	48	48	60	18	.	.	.	.	.	.	32	160	20
MEAN	0	0	0	0	6	12	16	14	15	13	13	16	21	18	18	17	22	20	19	5	0	0	0	0	41	153	27

* TOTALS AND MAX ARE GIVEN IN 0.1 HR

+ RM., RECORDED BY THE INSTITUTE'S EPPLEY NIP INSTRUMENT

A. HOURLY VALUES JUNE

JUN 1996 HOURLY SUMS OF GLOBAL RADIATION (0.01 MJ/SQM)

DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL
1	.	.	2	6	17	35	41	80	139	175	252	224	155	157	134	86	55	14	3	.	.	.	.	.	1575
2	.	.	.	4	9	23	40	34	49	64	67	117	126	69	80	77	84	93	51	23	3	.	.	.	1013
3	.	.	2	13	40	70	95	180	221	252	291	292	283	260	230	130	75	43	27	12	.	.	.	.	2516
4	5	8	3	9	13	32	120	216	184	113	108	111	132	73	55	15	3	.	.	.	1200
5	.	.	1	8	13	86	144	168	196	123	83	50	47	31	34	31	9	2	1	2	.	.	.	.	1029
6	.	.	.	4	13	22	30	45	39	81	53	44	140	130	105	118	99	109	37	23	4	.	.	.	1096
7	.	.	3	10	58	95	113	133	105	143	134	108	48	24	16	21	35	7	2	2	.	.	.	.	1057
8	.	.	.	1	2	5	3	8	13	18	16	78	225	231	183	82	52	85	37	19	3	.	.	.	1061
9	.	.	1	7	19	81	151	194	231	259	279	285	269	261	246	197	153	105	59	22	3	.	.	.	2822
10	.	.	3	13	26	31	42	60	47	59	117	107	47	24	42	23	19	10	5	2	2	.	.	.	679
11	.	.	.	2	6	10	22	44	74	175	244	270	278	123	87	57	26	6	3	1	.	.	.	.	1428
12	.	.	.	2	4	7	18	28	15	11	17	36	27	45	46	41	50	43	16	5	3	.	.	.	414
13	.	.	.	3	11	13	15	51	113	123	64	77	64	116	160	75	55	63	33	24	5	.	.	.	1065
14	.	.	4	10	66	108	154	199	238	262	285	213	222	237	181	202	112	61	23	8	3	.	.	.	2588
15	.	.	.	3	8	20	24	41	61	57	49	90	105	100	122	29	57	26	18	3	2	.	.	.	815
16	.	.	3	8	12	32	108	157	227	271	277	285	280	258	200	184	131	71	33	18	3	.	.	.	2558
17	.	.	2	6	13	18	23	14	18	17	9	14	39	61	39	49	54	35	19	9	3	.	.	.	442
18	10	28	59	121	99	131	177	312	292	250	244	215	152	103	62	26	5	.	.	.	2286
19	.	.	4	10	28	120	139	192	237	266	286	291	284	265	235	197	153	103	56	31	7	.	.	.	2904
20	.	.	4	9	64	80	145	243	201	233	166	188	216	152	265	188	165	107	69	32	7	.	.	.	2534
21	.	.	7	19	32	98	154	198	239	253	297	221	225	221	216	198	158	129	51	24	5	.	.	.	2745
22	.	.	3	9	57	61	156	199	239	269	288	293	286	266	234	191	136	95	39	5	1	.	.	.	2827
23	.	.	2	9	18	37	59	158	217	263	262	293	278	263	210	160	140	61	34	11	2	.	.	.	2477
24	.	.	2	10	21	78	73	90	129	199	233	281	291	253	229	147	96	86	48	33	5	.	.	.	2304
25	.	.	5	18	59	95	153	195	200	263	284	285	279	259	231	194	152	73	23	19	4	.	.	.	2791
26	.	.	4	19	32	40	56	103	109	108	99	141	113	105	65	46	16	10	12	6	.	.	.	.	1084
27	.	.	5	13	56	32	93	97	107	104	154	78	91	78	35	50	45	33	41	12	4	.	.	.	1128
28	.	.	5	12	40	51	80	54	61	100	126	156	126	165	157	83	85	45	22	10	1	.	.	.	1379
29	.	.	3	13	23	81	115	172	226	265	251	274	278	221	137	61	34	18	8	4	1	.	.	.	2185
30	5	7	12	17	21	26	27	38	31	20	24	14	10	5	3	3	.	.	.	.	263
MEAN	0	0	2	8	26	49	77	109	129	153	167	179	178	159	143	109	85	57	30	13	3	0	0	0	1676

JUN 1996 HOURLY SUMS OF SKY RADIATION ON A HORIZONTAL SURFACE (0.01 MJ/SQM)

DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL
1	.	.	2	6	17	32	39	62	78	71	91	94	83	69	82	68	53	14	3	.	.	.	.	.	864
2	.	.	.	4	9	23	40	34	49	64	66	111	110	68	79	75	74	58	36	14	3	.	.	.	917
3	.	.	2	13	29	52	58	52	46	61	63	59	56	49	47	78	72	41	27	12	.	.	.	.	817
4	5	8	3	9	13	32	106	140	114	109	105	87	50	59	38	14	3	.	.	.	895
5	.	.	1	8	13	31	59	111	120	114	83	50	47	31	34	30	9	2	1	2	.	.	.	.	746
6	.	.	.	4	13	22	30	45	38	80	51	43	121	127	103	87	68	32	28	16	4	.	.	.	912
7	.	.	3	10	18	36	65	100	99	127	117	103	46	23	15	21	34	7	2	2	.	.	.	.	828
8	.	.	.	1	2	5	3	8	13	18	15	69	146	121	107	77	46	42	19	11	3	.	.	.	706
9	.	.	1	7	19	62	40	28	30	31	31	32	54	40	41	24	21	24	31	12	3	.	.	.	531
10	.	.	3	13	26	31	42	60	47	59	113	99	47	24	42	23	19	10	5	2	2	.	.	.	667
11	.	.	.	2	6	10	22	44	70	86	107	129	84	108	85	57	25	6	3	1	.	.	.	.	845
12	.	.	.	2	4	7	18	28	15	11	17	36	27	45	46	41	50	43	16	5	3	.	.	.	414
13	.	.	.	3	11	13	15	51	105	117	64	77	64	101	110	70	53	52	26	13	5	.	.	.	950
14	.	.	4	10	19	22	23	26	29	39	76	176	134	95	103	83	64	56	23	8	3	.	.	.	993
15	.	.	.	3	8	20	24	41	61	57	49	89	103	94	71	29	57	26	18	3	2	.	.	.	755
16	.	.	3	8	12	32	75	103	98	33	36	31	34	46	71	50	55	42	29	16	3	.	.	.	777
17	.	.	2	6	13	18	23	14	18	17	9	14	39	61	39	49	54	34	19	9	3	.	.	.	441
18	10	28	59	82	91	105	106	87	71	47	54	51	29	23	18	11	5	.	.	.	877
19	.	.	4	10	19	34	40	37	31	30	29	28	28	29	26	25	23	21	18	13	7	.	.	.	452
20	.	.	4	9	13	24	77	71	100	109	134	142	149	104	79	39	34	27	31	18	7	.	.	.	1171
21	.	.	7	19	20	27	19	20	23	35	49	123	118	102	62	37	30	47	44	18	5	.	.	.	805
22	.	.	3	9	19	54	29	27	24	26	28	29	29	34	35	41	69	63	24	5	1	.	.	.	549
23	.	.	2	9	18	37	59	48	67	45	66	30	39	36	63	90	43	42	26	11	2	.	.	.	733
24	.	.	2	10	21	32	50	82	111	156	122	70	43	47	34	80	62	30	27	22	5	.	.	.	1006
25	.	.	5	18	31	28	36	28	46	39	33	26	25	24	33	21	21	21	22	15	4	.	.	.	476
26	.	.	4	19	30	40	56	93	105	106	98	136	112	103	65	46	16	10	12	6	.	.	.	.	1057
27	.	.	5	13	44	32	86	90	90	96	121	77	90	74	35	50	45	33	36	10	4	.	.	.	1031
28	.	.	5	12	36	44	75	54	61	100	125	148	125	158	147	82	84	45	22	10	1	.	.	.	1334
29	.	.	3	13	23	67	76	59	58	46	54	50	57	94	116	61	34	18	8	4	1	.	.	.	842
30	5	7	12	17	21	26	27	38	31	20	24	14	10	5	3	3	.	.	.	.	263
MEAN	0	0	2	8	17	29	42	51	59	65	70	78	74	69	65	53	43	31	21	10	3	0	0	0	788

A. HOURLY VALUES JUNE

JUN 1996 HOURLY SUMS OF ULTRAVIOLET RADIATION ON A HORIZONTAL SURFACE (KJ/SQM)

DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL
1	.	.	2	5	13	21	24	39	63	77	107	100	82	79	65	46	25	8	2	.	.	.	.	.	758
2	.	.	.	3	5	15	23	20	28	36	38	60	64	37	42	41	40	31	16	7	2	.	.	.	508
3	.	.	2	7	17	29	40	69	89	102	116	118	114	104	90	58	37	22	13	6	.	.	.	.	1033
4	3	5	3	7	9	21	65	96	85	57	57	55	50	26	16	7	1	.	.	.	563
5	.	.	1	4	9	33	51	66	82	62	44	28	27	19	21	18	6	2	1	1	.	.	.	.	475
6	.	.	.	3	8	13	18	27	25	47	33	27	67	64	51	47	41	35	16	7	2	.	.	.	531
7	.	.	2	8	19	33	44	55	50	66	64	57	28	15	10	12	16	4	1	1	.	.	.	.	485
8	.	.	.	1	2	3	2	5	9	13	12	37	95	94	77	39	19	31	17	8	2	.	.	.	466
9	.	.	1	4	10	28	54	72	90	103	115	118	112	105	95	74	54	35	18	8	2	.	.	.	1098
10	.	.	2	7	13	15	23	31	26	33	62	59	28	15	24	14	12	6	3	1	1	.	.	.	375
11	.	.	.	1	4	6	13	28	50	84	105	111	116	61	46	32	15	4	2	1	.	.	.	.	679
12	.	.	.	1	3	5	10	17	9	8	12	23	18	26	27	25	26	21	9	3	1	.	.	.	244
13	.	.	.	3	6	8	10	28	55	60	35	41	34	57	70	38	27	23	12	8	3	.	.	.	518
14	.	.	3	9	21	36	56	77	95	108	118	95	98	100	77	76	46	27	12	5	1	.	.	.	1060
15	.	.	.	3	5	12	15	24	35	33	28	49	53	50	49	17	30	17	10	2	1	.	.	.	433
16	.	.	1	3	7	17	42	66	93	114	119	122	118	107	84	72	51	31	15	7	2	.	.	.	1071
17	.	.	1	3	8	12	13	9	13	12	7	10	23	35	23	27	27	17	10	5	2	.	.	.	257
18	.	.	.	1	8	21	30	53	51	65	80	126	118	105	95	79	55	35	20	9	3	.	.	.	954
19	.	.	3	9	18	38	54	74	95	110	119	122	119	109	94	75	55	34	18	9	3	.	.	.	1158
20	.	.	3	9	21	33	52	85	82	99	80	86	93	73	101	75	58	36	20	8	2	.	.	.	1016
21	.	.	3	9	18	36	56	75	94	105	123	97	99	95	89	77	57	41	15	8	2	.	.	.	1099
22	.	.	3	9	20	23	57	77	96	111	121	123	120	109	94	75	53	32	11	3	1	.	.	.	1138
23	.	.	1	5	10	19	29	68	88	108	111	123	117	108	86	64	53	28	15	5	1	.	.	.	1039
24	.	.	1	5	17	33	38	43	62	85	102	119	121	106	93	64	44	33	18	9	3	.	.	.	996
25	.	.	2	7	19	35	56	76	85	109	119	122	118	109	95	76	56	33	16	8	3	.	.	.	1144
26	.	.	3	9	13	19	28	48	54	56	54	72	59	55	36	26	9	6	6	3	.	.	.	.	556
27	.	.	2	9	17	15	41	45	49	51	73	41	46	39	18	26	22	15	13	5	2	.	.	.	529
28	.	.	2	6	15	25	36	28	32	51	63	76	63	77	71	42	39	22	11	5	1	.	.	.	665
29	.	.	2	6	13	32	49	70	94	110	109	118	118	98	66	31	18	10	5	2	.	.	.	.	951
30	3	5	8	11	13	17	18	23	19	13	15	9	7	4	2	1	.	.	.	.	168
MEAN	0	0	1	5	12	21	33	46	57	69	75	80	79	71	62	47	35	22	11	5	1	0	0	0	732

JUN 1996 HOURLY DOSES OF UV-B RADIATION ON A HORIZONTAL SURFACE (0.01 MED/HR)

DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL
1	.	.	.	2	6	13	20	41	77	107	156	150	124	111	80	49	20	4	1	.	.	.	.	.	961
2	.	.	.	1	2	9	19	19	35	51	57	97	102	53	55	45	34	18	7	2	.	.	.	.	606
3	.	.	2	7	17	32	71	112	150	185	193	184	157	118	68	35	16	6	2	.	.	.	.	.	1355
4	1	3	2	7	12	30	104	153	137	84	72	60	40	16	7	2	.	.	.	.	730
5	.	.	.	1	5	23	48	80	122	107	77	48	46	30	31	23	7	1	1	.	.	.	.	.	650
6	.	.	.	1	4	9	18	33	34	73	50	43	106	99	73	52	35	22	8	2	.	.	.	.	662
7	.	.	1	3	10	24	46	72	79	113	118	106	48	23	13	15	16	3	1	.	.	.	.	.	691
8	1	2	1	5	8	14	15	62	165	154	112	48	17	22	9	3	1	.	.	.	639
9	.	.	2	6	21	54	93	140	184	221	233	213	187	148	95	54	25	9	3	1	.	.	.	.	1689
10	.	.	1	2	7	12	24	41	39	59	118	114	49	24	36	18	12	5	2	.	.	.	.	.	563
11	.	.	.	1	2	4	11	34	72	129	167	182	188	93	62	36	14	3	1	.	.	.	.	.	999
12	1	3	9	18	11	10	16	35	24	36	34	28	23	14	4	1	.	.	.	.	267
13	.	.	.	1	3	6	9	33	76	94	56	68	56	89	97	47	26	15	6	3	1	.	.	.	686
14	.	.	1	3	10	26	54	96	144	184	215	173	172	164	115	91	45	20	6	2	.	.	.	.	1521
15	.	.	.	1	3	9	15	31	51	52	48	88	94	83	71	20	30	13	5	1	.	.	.	.	615
16	.	.	.	1	4	13	42	83	141	198	224	233	219	182	126	88	48	22	8	2	.	.	.	.	1634
17	.	.	.	1	4	8	11	9	16	16	9	14	33	47	28	27	21	10	5	1	.	.	.	.	260
18	4	15	28	60	68	98	125	200	187	153	120	82	44	21	8	3	1	.	.	.	1217
19	.	.	1	3	9	23	47	82	128	168	195	203	191	160	120	79	45	21	8	3	1	.	.	.	1487
20	.	.	1	3	9	20	41	85	104	142	127	139	146	111	128	79	46	21	8	2	.	.	.	.	1212
21	.	.	1	3	8	24	46	81	124	157	198	156	156	139	113	79	44	22	6	2	1	.	.	.	1360
22	.	.	1	3	9	15	48	83	126	167	196	205	192	162	122	80	44	19	5	1	.	.	.	.	1478
23	.	.	.	2	5	14	29	83	126	173	192	213	195	170	119	72	46	19	8	2	.	.	.	.	1468
24	.	.	.	2	9	23	38	53	90	139	180	217	217	177	138	81	44	24	9	3	1	.	.	.	1445
25	.	.	1	3	10	26	55	98	135	193	227	238	226	192	146	97	55	25	9	3	1	.	.	.	1740
26	.	.	1	3	7	16	33	68	91	105	107	145	115	98	54	33	10	5	3	1	.	.	.	.	895
27	.	.	1	3	8	12	40	57	72	85	132	74	81	63	27	31	21	10	6	2	1	.	.	.	726
28	.	.	1	2	7	19	37	36	49	87	114	142	113	128	104	53	38	17	6	2	.	.	.	.	955
29	.	.	.	2	7	23	48	89	141	186	198	218	212	160	96	39	18	7	2	1	.	.	.	.	1447
30	2	3	8	13	18	25	26	37	30	20	20	10	6	3	1	.	.	.	.	.	222
MEAN	0	0	0	2	6	15	30	55	81	110	128	139	134	112	86	54	31	15	6	2	0	0	0	0	1006

A. HOURLY VALUES JUNE

JUN 1996 HOURLY SUMS OF NORMAL INCIDENCE BEAM RADIATION (0.01 MJ/SQM)

DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL	
1	5	3	27	85	137	203	155	87	116	75	25	1	.	.	.	.	.	.	.	919	
2	5	15	.	.	.	21	103	71	67	1	.	.	.	283	
3	39	46	72	224	264	259	292	294	293	289	278	82	2	.	1	.	.	.	.	.	2435	
4	15	87	83	4	2	38	178	33	75	5	.	.	.	.	520	
5	153	180	91	105	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	537	
6	18	.	.	54	59	231	30	57	15	.	.	.	464	
7	167	171	97	52	5	16	16	3	.	.	.	.	1	.	.	.	.	.	.	.	528	
8	8	92	141	108	5	11	133	76	63	3	.	.	.	640	
9	.	.	.	1	1	40	231	286	300	306	315	316	272	299	307	302	283	243	118	81	6	.	.	.	3707	
10	1	.	.	.	.	.	4	7	.	.	.	.	.	.	.	.	.	.	.	.	12	
11	4	115	169	173	241	15	.	.	.	.	.	.	.	.	.	.	717	
12	1	.	.	.	.	.	.	.	.	.	.	1	
13	7	5	.	.	.	17	69	3	4	33	25	82	10	.	.	.	255	
14	.	.	.	194	237	.	279	301	314	301	256	34	103	185	104	200	86	9	.	.	.	.	.	.	2603
15	5	67	.	.	.	.	.	.	.	.	.	72	
16	62	90	182	322	306	318	314	286	188	232	159	75	12	6	3	.	.	.	2555	
17
18	1	.	60	9	30	82	279	280	275	282	285	262	235	191	112	29	.	.	.	2412	
19	28	242	200	263	307	318	327	329	327	320	315	301	276	239	163	138	45	.	.	.	4138	
20	212	163	132	295	139	158	35	50	75	57	279	258	278	230	168	110	53	.	.	.	2692	
21	38	193	291	311	324	293	316	117	130	157	232	283	275	243	27	37	3	.	.	.	3270	
22	148	13	271	298	320	326	330	330	329	314	301	260	135	94	58	.	.	.	.	.	3527	
23	181	216	291	241	328	304	307	216	119	200	53	27	.	.	.	.	.	2483	
24	131	43	10	23	47	129	261	319	278	294	108	76	158	93	91	19	.	.	.	2080	
25	110	183	250	288	216	301	320	324	325	320	301	305	283	142	1	20	13	.	.	.	3702	
26	.	.	.	1	8	.	.	11	5	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	27
27	53	.	9	8	20	8	36	.	.	5	.	.	.	.	18	12	.	.	.	.	169	
28	15	15	9	.	.	.	.	8	.	6	10	.	3	.	.	.	.	.	.	.	66	
29	31	73	190	247	295	248	280	282	165	26	.	.	.	.	.	.	.	.	.	1837	
30
MEAN	0	0	0	0	34	54	73	100	103	118	121	124	130	119	115	95	86	75	38	29	7	0	0	0	1422	

JUN 1996 HOURLY SUMS OF DOWNWARD ATMOSPHERIC RADIATION (0.01 MJ/SQM)

DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL
1	105	102	106	111	109	114	120	120	115	114	112	113	109	107	110	112	123	123	123	125	125	126	126	124	2774
2	126	126	125	125	126	123	123	124	124	123	125	124	123	125	124	122	114	111	108	100	103	120	119	122	2885
3	120	112	110	102	98	101	103	102	102	105	107	107	107	105	104	109	114	116	114	112	122	123	123	123	2641
4	126	125	125	126	126	127	126	127	128	128	124	122	121	126	123	113	105	121	111	108	119	123	118	118	2916
5	115	119	122	122	121	105	111	119	118	126	131	132	132	130	130	129	131	132	132	131	131	130	131	131	3010
6	130	131	131	130	128	128	129	128	128	127	128	126	126	127	127	126	117	106	111	109	98	98	97	96	2882
7	96	95	96	95	98	101	105	116	120	123	127	128	129	129	130	130	130	131	132	132	134	137	137	137	2888
8	134	133	134	134	134	134	134	134	134	133	131	129	123	120	123	126	129	105	100	98	102	107	98	95	2924
9	115	126	125	123	123	116	102	104	107	110	112	112	113	113	111	106	103	102	103	98	95	100	103	107	2629
10	111	111	113	115	119	125	128	129	130	132	131	131	134	133	133	134	134	134	134	134	133	133	133	133	3077
11	133	133	133	132	131	131	131	129	124	117	116	123	118	129	130	131	130	133	133	134	132	132	132	132	3099
12	132	132	132	132	132	132	132	132	131	128	127	126	128	129	128	127	127	126	127	128	125	126	128	128	3095
13	126	126	127	127	125	124	125	125	124	124	124	124	124	122	117	120	121	120	116	94	94	91	91	90	2801
14	90	89	89	89	93	94	96	98	100	102	107	118	112	106	111	108	110	116	122	123	120	122	123	123	2561
15	125	126	126	126	127	126	127	128	129	131	131	131	130	129	128	130	129	129	129	130	128	128	128	127	3078
16	126	127	127	127	127	128	128	123	120	110	110	111	111	112	113	111	111	108	113	113	122	125	127	127	2857
17	127	123	122	122	126	125	129	129	129	129	130	130	129	127	126	126	125	126	123	124	122	123	123	124	3019
18	122	124	125	125	123	118	125	121	124	123	123	118	116	112	113	112	107	105	104	103	100	99	101	102	2745
19	103	109	104	98	99	104	103	104	105	107	108	108	108	108	106	105	103	102	100	100	97	96	96	95	2468
20	95	95	93	94	96	100	117	115	115	117	120	123	126	119	118	109	109	106	109	114	115	110	110	100	2627
21	99	99	108	106	100	106	103	106	109	110	113	118	116	116	113	111	110	113	125	113	113	118	113	102	2640
22	100	100	99	99	102	125	105	107	108	109	110	111	108	107	106	105	107	117	127	126	126	126	126	126	2682
23	126	125	125	121	123	124	124	106	108	108	108	107	107	106	107	111	104	104	108	119	121	124	126	126	2768
24	121	117	125	124	105	105	111	126	125	128	118	115	114	113	112	113	114	109	107	109	104	104	112	114	2745
25	113	121	123	120	113	104	109	108	110	113	115	115	115	113	115	111	111	109	109	113	109	121	113	107	2710
26	105	105	106	116	124	127	126	126	128	130	130	130	129	129	132	132	131	130	131	131	131	131	129	126	3015
27	120	108	115	98	116	125	123	122	123	126	124	127	128	128	128	127	126	126	123	123	106	105	102	104	2853
28	103	104	108	115	118	115	119	123	123	124	126	126	127	127	127	126	126	127	126	126	128	127	127	127	2925
29	127	127	128	126	125	122	119	116	116	116	116	117	118	118	127	131	131	131	131	131	131	131	130	130	2995
30	131	132	132	132	133	133	133	134	133	133	133	133	132	131	130	129	129	128	128	127	127	127	127	127	3134
MEAN	117	117	118	117	117	118	119	119	120	120	121	121	120	120	119	119	118	118	119	118	117	119	118	117	2848

A. HOURLY VALUES JUNE

JUN 1996 HOURLY SUMS OF EFFECTIVE OUTGOING RADIATION (FROM A BLACK SURFACE AT AIR TEMPERATURE (0.01 MJ/SQM))

DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL
1	25	28	25	20	22	18	12	13	19	19	22	21	25	26	23	20	9	8	7	3	1	1	2	4	373
2	2	2	2	3	3	5	6	6	6	7	5	7	9	7	8	9	17	21	23	30	25	8	8	5	224
3	7	15	16	24	29	27	27	31	32	29	28	30	31	33	34	28	21	20	21	24	13	12	11	7	550
4	3	3	3	2	3	3	3	3	2	2	7	11	15	8	11	21	29	13	22	23	13	8	12	13	233
5	16	13	10	11	13	31	28	20	22	15	11	10	11	11	11	11	6	2	2	2	2	3	5	4	270
6	4	3	4	3	5	5	3	5	4	6	4	5	7	8	9	12	20	32	25	27	34	32	31	30	318
7	30	30	29	29	33	33	31	24	19	19	16	14	12	10	8	6	8	5	2	3	4	4	2	3	374
8	1	1	2	2	2	2	.	.	.	1	1	3	12	16	14	9	5	30	35	36	28	22	30	31	283
9	11	1	1	2	2	13	33	37	36	37	37	37	35	33	34	37	39	39	38	40	40	33	29	25	669
10	21	21	20	18	17	12	10	10	11	9	12	14	9	6	5	4	3	3	1	1	1	2	2	2	214
11	2	2	2	1	1	1	3	5	10	20	24	21	27	15	12	10	8	3	2	.	.	.	.	.	169
12	.	1	1	.	.	.	.	.	.	1	1	3	1	2	4	4	5	5	5	3	5	4	2	2	49
13	3	4	3	3	5	5	4	5	8	8	7	6	7	9	15	11	9	11	14	35	33	35	34	34	308
14	33	33	32	32	35	36	36	36	36	35	31	20	25	31	25	28	26	18	11	9	11	8	6	6	599
15	5	2	1	1	.	1	1	1	1	.	.	2	4	6	9	5	6	5	4	3	5	4	4	4	74
16	5	3	3	3	3	4	5	13	19	31	30	30	30	31	27	30	30	29	23	21	10	5	1	1	387
17	1	5	8	8	5	5	3	2	.	1	.	.	1	5	5	5	6	5	8	6	8	7	6	5	105
18	7	4	3	3	5	13	8	14	13	14	16	23	27	31	30	29	33	33	33	33	33	33	30	29	497
19	27	21	26	32	31	29	31	32	32	32	33	33	33	33	35	35	36	36	36	36	36	35	35	34	779
20	34	35	34	34	34	33	18	26	24	26	22	22	19	23	26	35	35	36	31	23	21	24	23	31	669
21	31	31	22	24	32	31	38	37	36	37	35	30	31	32	34	36	35	30	16	24	21	15	20	30	708
22	30	31	30	30	31	9	32	36	36	33	34	34	34	34	35	34	31	19	7	5	5	5	4	4	583
23	4	4	5	8	6	6	8	29	30	31	31	33	33	33	32	26	32	31	26	13	10	7	4	4	446
24	9	13	5	6	25	28	23	10	12	12	23	27	30	31	32	29	26	30	29	27	30	28	19	16	520
25	17	10	7	11	22	31	31	33	33	32	33	33	35	35	35	36	38	38	31	26	29	15	23	27	661
26	27	26	26	16	9	8	10	10	10	10	11	10	11	11	6	5	5	3	2	2	1	1	3	7	230
27	12	23	16	32	17	7	12	14	13	11	15	11	11	10	9	10	10	10	13	11	28	27	29	26	377
28	27	24	21	15	14	18	16	11	13	12	13	15	13	13	13	12	12	11	11	11	10	10	9	9	333
29	8	8	8	10	12	18	23	30	30	34	33	34	34	33	22	15	13	12	12	11	9	8	6	5	428
30	5	3	2	1	1	1	2	1	1	1	1	1	1	1	2	3	3	3	4	4	4	4	4	4	57
MEAN	14	13	12	13	14	14	15	16	17	18	18	18	19	19	19	19	19	18	16	16	16	13	13	13	383

A. HOURLY VALUES JUNE

JUN 1996 DURATION OF SUNSHINE (MIN. NIP>120 W/SQM)

DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL
1	2	1	8	23	31	46	37	23	28	19	10	.	.	.	.	.	.	.	.	228
2	3	7	.	.	.	7	34	.	.	.	.	.	.	129
3	26	28	34	59	57	55	60	60	60	60	60	18	.	.	.	.	.	.	.	.	577
4	7	33	23	2	1	15	51	14	32	.	.	.	.	.	178
5	51	53	36	35	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	179
6	8	.	.	15	23	60	8	41	5	.	.	.	160
7	55	60	59	34	.	5	6	.	.	.	.	.	.	.	.	.	.	.	.	.	219
8	3	24	36	27	3	6	49	42	40	.	.	.	.	230
9	20	60	60	60	60	60	60	60	60	60	60	60	60	56	50	4	.	.	.	850
10	1	3	.	.	.	.	.	.	.	.	.	.	.	.	4
11	2	31	59	43	57	5	.	.	.	.	.	.	.	.	.	.	197
12
13	3	2	.	.	.	5	19	1	1	12	10	46	1	.	.	.	100
14	57	60	60	60	60	60	60	13	34	59	29	57	26	4	.	.	.	.	.	.	639
15	2	19	.	.	.	.	.	.	.	.	.	21
16	16	25	43	60	60	60	60	60	60	60	59	36	5	.	.	.	.	.	604
17
18	16	2	11	30	59	60	60	60	60	60	60	60	60	58	19	.	.	.	615
19	13	60	50	59	60	60	60	60	60	60	60	60	60	60	60	60	33	.	.	.	935
20	58	41	36	60	37	43	31	39	31	22	58	53	60	56	50	50	38	.	.	.	763
21	14	59	60	60	60	60	60	38	57	60	60	60	60	60	11	20	.	.	.	.	799
22	44	6	60	60	60	60	60	60	60	60	60	60	54	31	20	.	.	.	.	.	755
23	38	60	60	59	60	60	60	59	43	53	24	16	.	.	.	.	.	592
24	39	15	3	7	17	56	60	60	56	60	46	24	52	51	54	13	.	.	.	613
25	42	58	60	60	60	60	60	60	60	60	60	60	60	42	.	7	9	.	.	.	818
26	4	.	.	6	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	10
27	22	.	2	3	9	4	9	.	.	3	.	.	.	.	9	6	.	.	.	.	67
28	6	6	2	.	.	.	.	2	.	1	1	.	.	.	.	.	.	.	.	.	18
29	14	50	60	60	60	60	60	60	60	13	.	.	.	.	.	.	.	.	.	497
30
MEAN	0	0	0	0	11	17	21	24	23	25	28	27	29	27	26	23	22	22	16	16	4	0	0	0	360

JUN 1996 DURATION OF SUNSHINE (MIN.)

DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL*	MAX*	PCT	
1	6	24	30	60	48	54	42	18	12	49	160	31
2	6	.	.	.	6	30	.	30	24	16	160	10
3	.	.	.	6	.	12	48	60	60	60	60	60	60	60	24	.	.	.	.	.	.	.	.	.	85	161	53
4	6	24	24	6	6	48	12	.	.	30	.	.	.	.	.	26	161	16	
5	42	48	24	30	6	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	25	161	16	
6	6	.	.	6	12	48	12	18	17	161	11
7	.	.	.	54	48	.	30	12	.	.	6	.	.	.	.	.	.	.	.	.	.	.	.	.	25	162	15
8	18	42	30	6	42	.	24	24	.	.	.	.	31	162	19	
9	12	60	60	60	60	60	60	60	60	60	60	60	60	60	48	36	.	.	.	.	136	163	83	
10	0	163	0	
11	6	36	48	36	54	6	.	.	.	.	.	.	.	.	.	.	.	31	163	19	
12	0	163	0	
13	6	12	6	6	6	12	30	.	.	.	.	.	12	163	7	
14	.	.	.	60	60	60	60	60	60	54	6	24	60	24	48	30	.	.	.	.	.	.	.	.	101	164	62
15	18	.	.	.	.	.	.	.	.	.	.	3	164	2	
16	18	30	48	60	60	60	60	60	48	60	54	30	.	.	.	.	.	.	98	164	60	
17	0	164	0	
18	18	6	12	18	54	60	60	60	60	60	60	60	60	48	.	.	.	.	96	164	59	
19	.	.	.	12	60	54	60	60	60	60	60	60	60	60	60	60	60	60	48	60	6	.	.	.	150	164	91	
20	.	.	.	60	30	36	60	36	42	.	18	18	18	48	60	54	60	42	42	12	.	.	.	.	106	164	65
21	.	.	.	12	48	60	60	60	60	60	24	36	30	48	60	60	60	12	12	.	.	.	.	.	117	164	71
22	.	.	.	36	6	60	60	60	60	60	60	60	60	60	60	48	24	18	.	.	.	.	.	.	122	164	74
23	36	54	60	60	60	60	60	60	60	54	18	48	12	6	.	.	.	.	.	88	164	54	
24	.	.	.	36	18	6	6	18	42	60	60	60	60	60	36	6	48	42	42	.	.	.	.	.	90	164	55
25	.	.	.	36	54	60	60	60	60	60	60	60	60	60	60	42	.	6	.	.	.	.	.	.	133	164	81
26	0	164	0	
27	.	.	.	18	.	6	6	6	.	6	.	.	.	.	.	.	.	.	.	.	.	.	.	.	7	164	4
28	0	164	0	
29	.	.	.	6	18	60	60	60	60	60	60	60	54	12	.	.	.	.	.	.	.	.	.	.	75	164	46
30	0	163	0	
MEAN	0	0	0	0	10	13	18	22	23	25	26	25	28	27	24	21	20	20	13	11	1	0	0	0	55	163	33	

* TOTALS AND MAX ARE GIVEN IN 0.1 HR

A. HOURLY VALUES JULY

JUL 1996 HOURLY SUMS OF EFFECTIVE OUTGOING RADIATION (FROM A BLACK SURFACE AT AIR TEMPERATURE (0.01 MJ/SQM))

DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL
1	4	4	4	4	5	8	12	8	7	5	3	2	4	4	5	5	4	4	3	3	3	3	3	3	110
2	3	3	3	3	3	3	3	3	3	3	1	1	1	1	2	1	2	2	3	1	2	2	3	2	54
3	2	3	2	1	3	4	5	6	6	7	7	8	11	13	16	28	32	36	36	36	35	32	27	27	383
4	27	23	13	13	9	9	8	8	8	5	4	4	2	5	15	18	11	10	16	23	18	12	5	5	271
5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6	2	4	6	7	7	11	8	6	6	5	5	4	5	4	3	4	4	3	3	3	3	2	4	5	114
7	3	8	14	9	7	8	9	9	10	14	17	14	11	10	6	9	9	17	16	16	17	13	8	5	259
8	13	21	9	7	8	11	12	16	21	23	27	25	30	31	32	26	9	11	9	5	5	5	5	5	366
9	5	5	5	5	5	6	6	7	8	17	21	33	26	25	33	36	36	33	36	37	35	27	31	24	502
10	3	3	3	3	3	3	3	4	5	5	5	5	6	5	1	.	1	1	1	1	.	1	3	4	69
11	4	2	3	3	2	1	.	.	1	.	-1	-1	.	-1	.	1	3	5	5	5	5	6	5	6	54
12	6	9	8	12	13	22	11	26	23	13	14	12	19	25	32	33	33	36	36	35	36	33	30	13	530
13	13	13	11	10	10	9	8	5	3	2	1	1	.	.	.	1	.	.	.	1	3	4	5	7	107
14	5	5	3	3	2	.	.	.	1	.	1	1	2	5	3	2	1	1	2	2	1	2	1	1	44
15	1	2	3	3	2	2	3	5	8	6	5	8	9	8	13	6	6	8	17	16	10	11	8	6	166
16	6	4	6	5	8	6	7	6	6	5	6	6	6	5	6	5	6	4	4	4	4	7	3	5	130
17	5	2	4	4	4	4	3	4	5	7	7	5	6	19	15	16	9	14	19	22	22	10	12	23	241
18	29	28	31	30	33	36	36	35	35	35	35	36	36	36	37	36	37	35	34	36	33	26	26	8	779
19	12	15	16	1	1	2	3	3	8	22	25	28	29	30	29	27	21	21	27	18	18	8	8	7	379
20	6	5	5	5	5	5	5	5	5	6	6	8	12	27	30	31	30	30	27	29	23	26	25	11	367
21	11	11	15	18	13	21	17	27	28	27	28	30	30	30	28	28	28	28	25	25	24	22	21	20	555
22	24	23	19	15	14	10	8	9	10	10	10	10	12	14	15	15	18	23	19	16	17	19	23	21	374
23	18	31	28	23	16	7	8	10	14	10	12	17	11	9	10	15	14	10	14	15	22	13	20	18	365
24	13	14	14	5	5	9	8	13	26	29	29	27	20	20	30	30	30	31	31	30	27	16	4	3	464
25	3	3	3	3	3	3	4	4	5	5	5	5	5	7	13	17	35	35	33	16	10	24	8	4	253
26	3	2	3	2	2	1	2	2	1	1	1	1	3	5	7	8	8	7	7	6	3	4	7	13	99
27	17	12	8	10	8	9	4	3	2	4	3	8	15	15	9	11	13	10	15	6	4	4	8	4	202
28	3	4	1	2	2	2	3	3	5	5	4	7	4	7	10	7	10	12	11	8	8	8	8	12	146
29	9	7	9	8	11	11	10	7	10	11	12	10	9	10	11	12	11	11	16	31	35	33	32	29	355
30	29	29	30	26	29	22	28	33	36	33	31	31	34	35	36	31	31	27	30	20	15	10	12	11	649
31	10	9	10	9	9	7	5	5	3	.	1	1	3	5	8	9	9	10	9	8	8	8	7	6	159
MEAN A	10	10	10	8	8	8	8	9	10	11	11	12	12	14	15	16	15	16	17	16	15	13	12	10	285

A. HOURLY VALUES AUGUST

AUG 1996 HOURLY SUMS OF EFFECTIVE OUTGOING RADIATION (FROM A BLACK SURFACE AT AIR TEMPERATURE (0.01 MJ/SQM))

DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL
1	10	8	6	3	3	4	5	4	4	6	5	3	2	2	2	2	4	8	9	7	10	6	9	3	125
2	4	5	5	3	3	7	5	5	7	7	7	12	11	11	21	9	8	6	7	7	4	4	5	7	170
3	11	12	5	4	7	3	2	.	.	.	1	4	5	2	.	1	2	2	1	1	2	1	1	2	69
4	4	4	6	5	6	6	7	8	9	9	10	10	12	19	26	26	27	33	34	34	32	31	30	29	417
5	29	29	28	28	29	30	33	33	33	32	33	34	33	32	31	31	31	32	31	31	31	31	31	30	746
6	29	28	28	28	27	26	34	36	35	33	33	33	33	32	31	30	32	30	33	26	17	27	31	32	724
7	31	31	27	25	26	30	36	34	36	32	33	31	31	28	23	24	23	20	30	34	32	33	17	18	685
8	29	32	22	21	26	29	30	37	37	35	28	21	22	16	13	17	20	17	12	18	11	9	10	9	521
9	10	9	8	12	15	12	10	10	19	26	20	17	19	18	13	13	12	12	14	17	16	13	19	28	362
10	28	14	17	30	28	30	27	28	28	27	22	23	26	20	19	20	20	20	18	23	34	26	18	23	569
11	23	23	23	23	31	33	33	35	38	36	34	33	36	36	35	33	33	35	37	37	38	38	37	37	797
12	37	37	35	35	37	40	41	41	41	41	39	38	37	37	36	27	24	26	20	18	18	26	30	26	787
13	29	18	20	27	31	33	35	39	41	38	33	37	39	39	41	41	39	40	37	31	30	25	23	14	780
14	13	18	25	18	20	26	28	37	33	36	35	29	30	35	38	38	37	36	33	30	7	4	4	4	614
15	4	4	4	4	4	4	5	5	6	9	10	17	27	26	28	30	30	32	30	30	28	27	25	27	416
16	29	16	13	12	15	3	3	3	6	19	25	21	20	17	13	14	13	18	21	18	12	10	9	4	334
17	4	4	2	5	4	9	6	20	28	22	23	16	20	27	24	22	28	20	17	20	30	28	26	21	426
18	28	28	30	28	26	24	17	10	11	12	13	12	13	13	11	13	21	21	26	27	22	25	30	31	492
19	30	29	27	21	15	20	18	15	17	18	18	18	16	22	21	30	30	24	23	23	20	30	28	31	544
20	29	28	26	24	23	20	26	31	31	31	31	31	31	33	29	22	25	21	22	24	27	18	13	19	615
21	22	26	26	25	25	24	23	21	33	36	35	36	38	39	36	36	25	25	22	15	13	19	21	26	647
22	19	23	22	16	17	28	33	33	33	27	22	15	13	11	12	15	12	10	11	11	15	21	12	12	443
23	9	10	11	13	16	22	17	26	28	32	25	12	10	9	7	8	8	10	19	25	29	32	32	30	440
24	28	22	20	8	5	7	9	8	4	3	8	9	11	15	21	18	19	21	30	22	24	23	28	28	391
25	27	24	12	15	19	21	17	11	10	12	12	11	6	10	15	8	8	15	9	16	18	8	8	13	325
26	10	6	5	5	15	28	24	24	30	15	13	20	19	24	25	17	16	18	15	11	12	20	21	14	407
27	8	7	6	6	5	10	8	7	8	8	8	9	9	12	13	23	18	16	16	9	7	6	10	12	241
28	4	5	7	8	25	26	30	33	32	31	30	34	32	30	33	34	35	35	34	33	33	33	32	31	660
29	31	31	31	31	31	32	33	36	37	36	34	31	27	25	21	19	15	14	11	8	9	6	3	2	554
30	2	4	15	12	17	17	25	14	22	17	12	11	14	8	3	4	5	6	5	4	5	4	3	5	234
31	6	7	6	4	4	5	9	7	7	8	7	9	12	10	18	14	21	33	28	17	26	26	33	36	353
MEAN	19	17	17	16	18	20	20	21	23	22	21	21	21	21	21	21	21	21	21	20	20	20	19	19	480

A. HOURLY VALUES SEPTEMBER

SEP 1996 HOURLY SUMS OF EFFECTIVE OUTGOING RADIATION (FROM A BLACK SURFACE AT AIR TEMPERATURE (0.01 MJ/SQM))

DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL
1	36	35	35	34	33	33	36	40	41	41	40	38	36	34	30	31	32	25	16	10	10	10	7	8	691
2	7	6	6	7	7	7	5	3	2	2	.	.	.	.	2	2	1	2	2	1	1	.	2	3	66
3	3	6	9	8	9	13	13	20	33	24	24	26	27	37	33	37	36	37	36	34	34	33	33	32	597
4	31	30	30	32	33	33	35	36	35	37	38	38	39	39	39	39	41	40	38	36	35	34	33	33	854
5	33	32	31	31	31	32	36	38	39	39	41	41	39	38	38	37	37	38	35	31	32	31	31	30	841
6	30	29	29	28	28	28	30	33	28	31	30	25	22	24	32	27	26	18	22	22	26	23	19	24	634
7	28	25	18	5	19	29	24	31	30	28	31	20	16	15	32	35	35	33	20	18	12	13	14	24	555
8	19	16	8	9	9	12	16	18	20	28	32	33	32	32	35	36	37	37	36	35	32	33	35	34	634
9	34	34	35	34	34	34	35	37	37	37	38	37	31	24	31	15	9	11	9	13	31	31	24	7	662
10	4	4	4	10	26	37	36	37	36	36	30	29	36	37	38	39	39	36	36	35	35	36	31	18	705
11	15	12	10	8	5	4	4	3	3	3	2	1	1	.	.	.	2	6	3	10	24	17	23	20	176
12	31	36	37	38	39	39	38	40	39	39	39	39	39	41	43	44	45	42	44	43	42	41	40	40	958
13	39	39	39	39	40	40	39	41	40	40	42	40	39	37	37	33	35	31	34	26	23	30	30	26	859
14	15	18	27	27	27	28	30	35	37	38	38	37	36	36	37	37	37	36	33	32	33	32	31	31	768
15	31	31	30	29	29	29	30	34	36	36	37	38	34	33	36	38	38	36	33	32	32	31	31	30	794
16	30	29	29	29	29	30	29	31	34	35	33	31	29	26	32	33	34	34	32	31	30	30	29	28	737
17	28	28	28	28	28	28	29	35	36	40	42	41	41	40	41	41	41	39	37	36	34	33	32	31	837
18	31	31	31	31	31	31	31	36	38	39	41	41	39	39	39	40	41	39	37	36	35	35	33	32	857
19	31	31	30	30	29	30	30	36	40	41	42	41	41	40	40	40	41	38	36	34	33	32	31	31	848
20	30	29	31	33	33	32	31	35	36	38	37	36	36	36	37	37	37	37	36	35	35	34	33	33	827
21	33	31	31	30	23	17	11	29	34	33	25	23	22	28	22	16	19	17	11	7	5	6	26	26	525
22	8	8	19	30	29	23	28	29	29	26	20	14	9	8	8	9	8	13	9	10	8	8	10	10	373
23	12	8	9	6	8	20	19	14	24	22	15	8	10	10	11	12	13	16	27	29	13	11	10	12	339
24	12	12	12	12	11	10	11	10	9	9	8	8	8	10	11	12	13	11	10	19	25	28	34	32	337
25	16	16	21	21	22	22	19	20	16	18	35	29	17	19	12	12	14	15	26	12	21	26	14	13	456
26	10	9	8	7	7	7	7	7	8	10	13	17	31	27	28	15	29	29	25	19	16	14	11	8	362
27	8	9	10	8	7	5	5	9	4	3	2	5	4	6	12	8	8	13	14	15	26	23	19	17	240
28	27	26	27	26	28	15	14	6	8	4	5	6	11	21	13	9	18	18	19	12	4	9	18	21	365
29	11	8	9	6	6	5	6	10	8	4	2	4	17	14	18	29	15	12	13	10	5	4	5	3	224
30	5	5	4	3	3	4	3	3	3	3	9	13	9	5	3	4	11	10	3	5	6	6	7	6	133
MEAN	22	21	22	21	22	23	23	25	26	26	26	25	25	25	26	26	26	26	24	23	23	23	23	22	575

A. HOURLY VALUES SEPTEMBER

SEP 1996 DURATION OF SUNSHINE (MIN. NIP>120 W/SQM)

Table with 25 columns (DAY 1-24, TOTAL) and 30 rows (DAY 1-30, MEAN). Shows duration of sunshine in minutes per hour for each day in September 1996.

SEP 1996 DURATION OF SUNSHINE (MIN.)

Table with 25 columns (DAY 1-24, TOTAL*, MAX*, PCT) and 30 rows (DAY 1-30, MEAN). Shows duration of sunshine in minutes per hour, total sunshine, maximum sunshine, and percentage for each day in September 1996.

* TOTALS AND MAX ARE GIVEN IN 0.1 HR + RM., RECORDED BY THE INSTITUTE'S EPPLEY NIP INSTRUMENT

A. HOURLY VALUES OCTOBER

OCT 1996 HOURLY SUMS OF NORMAL INCIDENCE BEAM RADIATION (0.01 MJ/SQM)

Table with columns DAY, 1-24, and TOTAL. Rows 1-31 showing hourly values for normal incidence beam radiation.

OCT 1996 HOURLY SUMS OF DOWNWARD ATMOSPHERIC RADIATION (0.01 MJ/SQM)

Table with columns DAY, 1-24, and TOTAL. Rows 1-31 showing hourly values for downward atmospheric radiation.

A. HOURLY VALUES OCTOBER

OCT 1996 HOURLY SUMS OF EFFECTIVE OUTGOING RADIATION (FROM A BLACK SURFACE AT AIR TEMPERATURE (0.01 MJ/SQM))

DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL	
1	8	4	4	3	4	5	10	13	14	13	14	13	25	8	17	19	30	16	17	13	8	8	7	7	280	
2	6	3	15	8	3	6	8	2	2	2	2	5	5	7	16	17	22	7	5	3	12	5	14	4	179	
3	3	5	10	10	9	8	9	6	4	3	2	2	1	1	.	.	.	.	.	1	1	2	3	3	83
4	3	4	6	7	10	12	13	8	18	10	14	16	23	23	10	6	4	5	2	4	3	3	5	4	213	
5	6	6	6	7	22	22	18	15	16	8	12	28	8	9	8	23	14	18	26	14	10	10	7	4	317	
6	4	1	1	6
7	.	.	.	.	.	.	.	1	1	.	.	.	.	.	1	.	.	1	1	2	1	2	2	3	15
8	7	10	9	15	8	26	29	25	33	22	8	18	24	18	24	22	24	24	19	26	18	12	8	10	439	
9	10	6	8	8	3	1	1	3	5	7	14	26	17	15	16	13	25	10	8	10	14	22	18	8	268	
10	8	13	17	20	9	6	7	14	5	9	15	25	25	24	16	7	12	7	8	6	13	12	13	5	296	
11	7	5	9	7	6	5	4	2	2	2	7	10	8	6	12	9	5	3	2	3	2	1	1	.	118	
12	.	.	.	.	.	1	1	.	1	.	.	.	.	1	2	2	3	3	4	6	23	30	33	33	143
13	34	35	36	34	30	22	16	14	11	10	29	33	10	3	2	2	4	2	3	6	10	10	10	10	376	
14	13	13	12	10	14	15	22	22	27	27	30	32	33	35	32	26	29	21	22	8	13	14	21	18	509	
15	29	25	21	18	16	17	13	15	13	27	37	37	38	27	31	24	22	19	20	16	15	15	13	15	523	
16	14	11	10	8	8	8	7	6	5	6	9	10	13	10	10	10	9	8	8	7	8	10	8	6	209	
17	6	5	5	3	6	8	11	11	9	8	15	23	25	28	34	35	33	33	32	32	31	31	29	30	483	
18	31	31	28	18	11	31	19	17	32	36	36	35	33	35	29	19	14	18	13	10	12	13	9	8	538	
19	7	8	8	9	9	8	10	11	16	22	12	10	8	10	10	10	11	10	9	8	6	6	13	26	257	
20	31	30	31	31	31	31	31	32	35	37	36	36	36	38	37	36	34	32	29	29	26	28	29	22	768	
21	21	18	15	10	5	4	3	3	2	1	2	1	2	2	1	1	2	3	5	7	9	13	19	8	157	
22	6	9	10	22	21	21	19	11	21	10	8	4	6	7	12	9	13	12	12	12	19	14	10	9	297	
23	12	22	28	24	25	17	9	7	5	5	5	6	5	8	6	6	6	13	12	14	11	10	16	12	284	
24	14	20	21	22	21	18	18	21	21	25	28	27	26	28	27	28	27	28	28	28	24	26	27	28	581	
25	28	28	28	25	21	22	20	21	24	23	26	33	27	27	25	26	22	21	20	12	11	10	6	5	511	
26	5	7	10	9	8	8	12	16	8	24	13	12	17	26	21	11	8	6	4	8	28	33	26	7	327	
27	3	2	6	5	3	5	3	3	11	10	9	9	10	9	5	6	10	10	9	13	10	6	15	21	193	
28	15	23	29	28	13	13	17	15	13	6	6	7	5	5	5	3	3	1	1	2	4	4	3	4	225	
29	3	3	3	4	4	5	13	13	8	7	9	10	18	17	17	22	24	28	26	15	28	35	38	37	387	
30	35	34	34	33	33	28	32	26	23	18	8	4	3	3	3	11	9	8	16	26	7	9	13	21	437	
31	12	7	21	20	18	21	15	10	6	5	3	3	2	2	2	1	2	2	2	2	2	1	2	.	161	
MEAN	12	13	14	13	12	13	13	12	13	12	13	15	15	14	14	13	14	12	12	11	12	13	13	12	309	

A. HOURLY VALUES NOVEMBER

NOV 1996 HOURLY SUMS OF EFFECTIVE OUTGOING RADIATION (FROM A BLACK SURFACE AT AIR TEMPERATURE (0.01 MJ/SQM))

DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL
1	.	.	2	2	2	5	13	14	24	34	24	19	22	12	10	10	5	3	2	2	1	.	.	.	206
2	2	2	1	3	2	3	1	2	1	1	1	1	2	2	3	3	3	1	1	1	1	1	1	.	39
3	2	3	3	3	3	2	1	1	.	.	.	.	.	1	3	3	3	3	2	2	3	4	5	6	53
4	11	21	21	33	32	32	27	32	33	32	35	32	14	6	5	3	3	3	4	3	1	4	5	4	396
5	5	4	4	6	5	8	9	7	8	13	8	12	3	2	3	3	2	3	3	3	3	6	10	12	142
6	21	23	16	12	10	5	3	2	3	3	3	20	15	13	5	5	7	33	32	15	9	16	19	16	306
7	24	13	14	21	25	18	18	20	26	32	30	36	38	38	35	35	11	11	2	3	2	2	7	14	475
8	13	2	10	3	13	10	13	5	18	5	3	5	1	2	20	20	16	17	12	10	8	4	3	5	218
9	4	4	8	22	28	19	18	18	31	38	39	34	31	28	19	8	14	4	6	7	12	20	10	8	430
10	7	4	.	.	.	3	1	1	.	.	2	1	4	21	14	10	4	9	9	2	2	.	.	4	98
11	10	18	23	31	31	32	32	33	35	39	40	42	42	39	38	36	36	35	35	35	34	35	36	36	803
12	35	34	33	33	32	33	33	33	34	37	41	40	38	33	37	36	35	34	33	22	3	3	8	5	705
13	3	9	31	33	33	31	24	10	11	34	36	36	36	36	36	36	36	36	34	34	33	33	32	31	704
14	31	27	8	5	14	6	8	5	4	3	2	1	2	2	1	1	1	1	1	.	.	.	.	.	123
15	-1	-1	.	1	2	2	4	5	3	5	5	4	4	1	1	2	1	1	1	5	3	3	4	7	62
16	8	13	13	9	7	11	12	10	15	16	15	11	10	13	9	8	6	4	3	1	.	.	.	.	194
17	3	3	6	5	4	5	19	21	26	25	32	32	33	36	36	37	37	38	37	32	37	39	39	39	621
18	39	39	40	39	39	39	39	39	38	41	41	40	39	38	38	37	37	36	35	35	34	34	35	34	905
19	34	34	34	35	35	34	33	33	35	39	40	41	41	39	39	39	40	36	38	39	36	33	27	27	861
20	25	20	20	21	23	18	16	17	17	19	21	19	18	17	16	15	13	11	10	10	11	12	7	11	387
21	18	26	26	28	29	30	28	23	25	21	33	32	32	33	32	31	32	31	31	32	33	31	31	24	692
22	13	10	3	4	4	3	3	6	9	11	9	21	13	8	8	23	19	29	23	25	9	2	3	12	270
23	13	12	10	8	20	22	19	15	12	13	15	16	22	27	31	34	31	31	31	31	33	36	35	35	552
24	34	33	31	28	26	21	19	18	17	20	21	21	14	9	9	14	16	25	36	34	35	34	33	31	579
25	15	7	26	14	14	22	31	33	32	35	36	35	34	34	34	34	34	34	33	33	33	32	32	32	699
26	32	32	32	31	31	31	30	30	30	33	35	37	33	32	32	31	31	31	31	30	31	31	31	31	759
27	31	31	31	30	31	31	31	30	31	35	38	38	34	33	31	31	31	33	32	33	33	32	32	31	774
28	31	31	31	32	32	32	32	32	33	34	37	39	35	35	36	35	35	34	34	35	37	38	36	39	825
29	40	39	39	31	29	39	39	36	32	33	33	30	25	25	22	23	29	33	28	29	31	33	36	34	768
30	31	29	33	35	36	36	36	36	34	33	35	38	36	38	37	33	31	31	30	30	31	30	31	31	801
MEAN	18	17	18	19	20	19	20	19	21	23	24	24	22	22	21	21	20	21	20	19	18	18	18	19	482

A. HOURLY VALUES NOVEMBER

NOV 1996 DURATION OF SUNSHINE (MIN. NIP>120 W/SQM)

DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL	
1	4	57	32	14	15	.	.	.	.	.	.	.	.	.	.	.	.	122
2
3
4	42	56	60	31	.	.	.	.	.	.	.	.	.	.	.	.	.	189
5
6
7	19	29	12	47	46	25	.	.	.	.	.	.	.	.	.	.	.	178
8	25	12	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	37
9	25	57	56	47	39	9	.	.	.	.	.	.	.	.	.	.	.	233
10
11	25	60	60	60	53	1	.	.	.	.	.	.	.	.	.	.	.	259
12	22	60	60	60	42	.	.	.	.	.	.	.	.	.	.	.	.	244
13	7	52	57	60	46	.	.	.	.	.	.	.	.	.	.	.	.	222
14
15
16
17	11	.	.	.	.	.	.	.	.	.	.	.	.	11
18	12	60	60	60	33	.	.	.	.	.	.	.	.	.	.	.	.	225
19	10	60	60	60	29	.	.	.	.	.	.	.	.	.	.	.	.	219
20
21	10	60	56	20	.	.	.	.	.	.	.	.	.	.	.	.	146
22	2	1	8	.	.	.	.	.	.	.	.	.	.	.	.	.	11
23
24	3	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	10
25	29	41	33	.	.	.	.	.	.	.	.	.	.	.	.	.	103
26	1	60	60	59	.	.	.	.	.	.	.	.	.	.	.	.	.	180
27	59	60	58	.	.	.	.	.	.	.	.	.	.	.	.	.	177
28	58	60	56	.	.	.	.	.	.	.	.	.	.	.	.	.	174
29
30	56	60	52	.	.	.	.	.	.	.	.	.	.	.	.	.	168
MEAN	0	0	0	0	0	0	0	0	7	26	27	25	11	1	0	0	0	0	0	0	0	0	0	0	0	97

NOV 1996 DURATION OF SUNSHINE (MIN.)

DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL*	MAX*	PCT	
1	54	30	12	12	18	58	31
2	0	56	0
3	0	54	0
4	36	48	54	30	.	.	.	.	.	.	.	.	.	.	.	.	.	28	53	53	
5	0	52	0
6	0	51	0
7	18	24	6	36	42	30	.	.	.	.	.	.	.	.	.	.	.	26	50	52	
8 +	24	12	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	6	49	12	
9 +	18	54	54	48	36	6	.	.	.	.	.	.	.	.	.	.	.	36	48	75	
10	0	46	0
11	12	60	60	60	48	.	.	.	.	.	.	.	.	.	.	.	.	40	44	91	
12 +	24	60	60	60	42	.	.	.	.	.	.	.	.	.	.	.	.	41	42	98	
13 +	6	48	54	60	48	.	.	.	.	.	.	.	.	.	.	.	.	36	41	88	
14	0	40	0	
15	0	39	0	
16	0	39	0	
17	6	.	.	.	.	.	.	.	.	.	.	.	.	1	38	3	
18	6	60	60	60	24	.	.	.	.	.	.	.	.	.	.	.	.	35	37	95	
19	60	60	60	30	.	.	.	.	.	.	.	.	.	.	.	.	35	36	97	
20	0	35	0	
21 +	6	54	42	18	.	.	.	.	.	.	.	.	.	.	.	.	20	34	59	
22	0	33	0	
23	0	32	0	
24	6	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	32	3	
25	18	36	24	.	.	.	.	.	.	.	.	.	.	.	.	.	.	13	31	42	
26	54	60	60	.	.	.	.	.	.	.	.	.	.	.	.	.	29	30	97	
27	36	60	60	.	.	.	.	.	.	.	.	.	.	.	.	.	26	29	90	
28	48	60	60	.	.	.	.	.	.	.	.	.	.	.	.	.	28	28	100	
29	0	27	0	
30	54	60	48	.	.	.	.	.	.	.	.	.	.	.	.	.	27	27	100	
MEAN	0	0	0	0	0	0	0	0	5	23	26	24	10	1	0	0	0	0	0	0	0	0	0	0	15	40	40	

* TOTALS AND MAX ARE GIVEN IN 0.1 HR + RM., RECORDED BY THE INSTITUTE'S EPPLLY NIP INSTRUMENT.

A. HOURLY VALUES DECEMBER

DEC 1996 HOURLY SUMS OF EFFECTIVE OUTGOING RADIATION (FROM A BLACK SURFACE AT AIR TEMPERATURE (0.01 MJ/SQM))

DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL	
1	31	31	29	15	15	16	9	10	10	5	2	3	3	12	7	3	2	7	9	5	6	7	8	10	255	
2	7	6	7	5	5	5	8	5	9	5	10	14	30	24	30	17	16	10	9	7	12	14	11	7	273	
3	6	7	3	3	2	1	4	4	4	5	10	5	4	2	2	7	19	8	22	22	21	25	15	13	214	
4	11	5	3	5	10	10	10	10	5	9	18	23	21	20	8	7	5	12	22	15	11	3	3	2	248	
5	3	3	3	3	1	3	5	13	15	9	11	7	4	2	4	5	7	2	8	12	16	15	17	25	193	
6	17	12	9	14	15	13	16	7	7	13	27	24	8	5	21	24	18	17	32	31	32	29	15	9	415	
7	28	28	29	10	5	10	9	13	12	9	13	17	8	8	8	6	6	5	5	4	2	1	1	1	238	
8	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	24
9	2	2	1	1	1	2	1	1	1	1	.	1	1	2	3	3	4	3	3	3	3	4	4	3	50	
10	3	3	4	5	5	4	5	6	5	5	5	6	10	23	30	28	19	26	28	28	27	18	5	1	299	
11	-1	-1	-1	1	.	2	1	.	.	.	3	9	5	1	.	.	3	.	.	1	1	.	.	.	24	
12	.	1	1	1	1	.	.	1	1	1	2	1	2	6	5	8	19	30	36	39	39	40	39	38	311	
13	38	37	37	36	36	34	33	34	34	35	36	36	21	31	9	4	18	19	25	24	28	15	15	13	648	
14	12	13	14	17	18	25	23	13	9	6	5	5	7	6	7	8	7	5	7	15	10	8	8	8	256	
15	19	36	37	37	38	38	39	40	44	46	46	45	43	38	31	11	15	18	10	18	1	5	9	7	671	
16	2	4	2	-1	1	3	19	22	20	13	15	3	10	23	28	26	27	25	15	7	6	5	5	5	285	
17	10	13	15	16	11	10	11	14	9	8	7	5	6	4	3	3	1	.	-1	.	.	.	1	3	149	
18	7	8	10	13	18	20	22	34	39	39	40	40	40	40	41	41	41	39	37	36	36	36	36	35	748	
19	35	34	33	33	33	33	34	34	35	36	36	35	31	33	34	33	33	33	33	32	31	32	32	32	800	
20	31	32	30	31	33	33	32	31	29	27	20	21	25	15	10	8	10	7	6	1	.	.	.	4	436	
21	5	3	1	2	13	12	6	15	6	28	19	5	24	15	5	6	11	24	24	12	8	10	6	15	275	
22	23	14	20	10	11	14	10	10	12	10	10	12	11	11	11	7	6	6	6	13	15	11	21	22	296	
23	8	8	18	31	29	28	26	24	30	28	14	8	7	7	5	4	6	5	4	3	3	3	5	16	320	
24	21	14	5	8	5	1	1	3	5	17	23	16	8	3	16	15	16	26	26	30	28	28	30	31	376	
25	30	29	28	28	28	22	21	9	7	5	3	3	3	3	4	5	4	4	3	3	3	3	2	2	252	
26	1	.	.	.	1	3	3	2	1	1	.	.	.	1	2	3	3	2	1	1	1	.	.	.	26	
27	.	2	5	2	2	2	9	8	15	2	1	1	1	1	2	1	3	12	14	14	30	30	27	21	205	
28	24	31	31	31	30	23	11	17	22	12	13	15	24	15	20	26	19	10	10	21	29	21	9	7	471	
29	7	19	18	29	30	28	27	33	33	33	36	36	36	35	35	35	35	33	33	33	34	34	35	36	743	
30	36	37	40	40	41	41	40	39	31	37	41	41	39	39	40	39	40	40	40	39	34	22	28	31	895	
31	38	35	30	33	36	36	37	36	35	35	36	36	35	31	17	13	6	7	19	17	13	15	16	9	621	
MEAN	15	15	15	15	15	15	15	16	16	15	16	15	15	15	14	13	14	14	16	16	16	14	13	13	355	

B. DAILY VALUES

1996 DAILY TOTALS OF GLOBAL RADIATION (0.01 MJ/SQM)												
DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	84	90	823	1263	2026	1575	511	564	1555	530	255	28
2	65	277	214	1137	2448	1013	444	1060	421	314	35	53
3	76	319	245	193	704	2516	1419	448	1578	79	30	28
4	88	133	538	793	689	1200	1007	1561	1707	474	222	62
5	112	149	619	1455	324	1029	-	2318	1649	392	85	53
6	86	111	770	1518	1449	1096	636	2228	1386	85	83	70
7	53	254	956	1393	1896	1057	1354	1618	1332	81	248	48
8	47	360	975	451	1243	1061	2101	1476	1270	556	116	15
9	38	325	1031	1247	2589	2822	2361	891	1432	389	265	24
10	39	293	1043	1308	2629	679	605	1240	1369	489	68	39
11	18	135	1001	861	925	1428	678	1625	317	185	254	48
12	39	278	1024	1982	1309	414	1848	1962	1537	69	261	20
13	39	463	1005	1958	1134	1065	403	2110	1397	392	234	79
14	48	-	991	1958	588	2588	400	1814	1431	540	62	24
15	93	-	1064	356	539	815	1158	1391	1228	477	53	75
16	21	39	1140	860	1987	2558	690	1178	1217	151	91	37
17	44	564	1215	870	1216	442	1241	1647	1343	402	114	30
18	9	467	968	1106	1069	2286	2758	822	1318	463	184	71
19	56	608	596	638	672	2904	2171	1407	1298	168	185	73
20	166	618	522	810	609	2534	1539	1633	1244	602	89	108
21	132	187	1003	137	907	2745	2087	1637	870	98	148	61
22	112	182	1308	566	1129	2827	651	883	616	274	108	45
23	166	337	784	1143	971	2477	710	721	555	144	92	88
24	132	64	264	469	561	2304	2224	547	245	299	86	60
25	190	138	546	616	559	2791	1065	444	615	209	84	29
26	127	249	1157	2123	1684	1084	582	1319	495	200	122	12
27	221	214	281	561	2164	1128	923	773	269	93	130	29
28	226	-	1538	1219	2179	1379	875	1829	448	114	120	56
29	229	1577	1829	778	2185	877	1269	430	177	93	73	73
30	129	1588	2107	2571	263	2346	723	338	172	114	83	83
31	241	1642	872	738	804	96	81	81	81	81	81	81
MEAN	101	274 M	917	1098	1304	1676	1213 A	1288	1030	281	134	52

1996 DAILY TOTALS OF SKY RADIATION ON A HORIZONTAL SURFACE (0.01 MJ/SQM)												
DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	41	90	172	580	621	864	508	533	424	416	164	28
2	52	97	212	636	331	917	440	808	421	277	35	53
3	64	86	243	193	684	817	1013	446	520	79	30	28
4	83	133	401	722	671	895	804	1052	221	323	112	62
5	68	149	402	758	322	746	-	433	-	344	84	49
6	46	111	448	543	828	912	632	569	638	85	81	53
7	36	223	149	750	736	828	1189	948	621	81	122	48
8	47	158	159	445	734	706	1001	742	519	348	98	15
9	38	149	147	820	348	531	864	803	348	301	108	24
10	39	237	156	624	359	667	602	965	335	339	67	39
11	18	135	240	532	815	845	672	928	316	184	76	48
12	39	264	241	249	946	414	1021	517	182	69	92	20
13	39	116	348	262	963	950	402	505	276	205	78	42
14	48	-	530	273	583	993	400	779	226	348	62	24
15	67	-	253	355	535	755	1037	994	216	256	53	35
16	21	39	245	577	1028	777	686	881	353	150	91	37
17	44	121	236	828	980	441	991	809	173	304	108	30
18	9	246	438	679	927	877	395	803	173	201	65	35
19	56	132	485	593	651	452	871	1117	162	154	55	47
20	71	147	481	659	601	1171	1000	585	196	109	88	79
21	83	187	567	137	841	805	976	568	475	98	93	54
22	104	182	234	549	990	549	642	646	438	262	101	45
23	116	246	594	809	868	733	667	505	456	144	90	65
24	115	64	264	393	535	1006	980	517	245	265	82	49
25	77	138	523	598	544	476	847	419	435	200	46	29
26	115	243	482	357	832	1057	571	830	414	172	56	12
27	72	205	277	542	938	1031	765	712	265	93	59	29
28	90	-	230	871	1016	1334	832	388	327	114	47	52
29	75	333	852	750	842	812	545	344	171	90	35	35
30	97	242	805	861	263	638	666	303	146	46	44	44
31	89	256	676	723	690	96	41	41	41	41	41	41
MEAN	63	156 M	322	566	726	788	766 A	700	346	204	79	40

B. DAILY VALUES

1996 DAILY TOTALS OF ULTRAVIOLET RADIATION ON A HORIZONTAL SURFACE (0.001 MJ/SQM)												
DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	23	49	301	509	766	758	291	282	619	236	103	16
2	42	101	128	455	900	508	264	525	241	162	21	37
3	34	112	135	120	370	1033	628	257	606	49	19	22
4	34	62	223	393	348	563	473	659	647	216	90	30
5	45	94	269	574	185	475	-	918	616	194	39	25
6	46	58	297	571	617	531	350	901	539	55	56	34
7	29	112	348	564	753	485	631	713	528	57	105	24
8	32	133	341	216	555	466	939	649	524	226	55	10
9	24	128	356	501	953	1098	966	422	565	171	105	14
10	24	113	367	524	959	375	349	562	544	196	44	21
11	13	75	363	361	460	679	391	693	188	100	96	23
12	23	114	373	705	560	244	807	783	572	43	79	12
13	22	167	353	709	517	518	253	810	542	160	93	34
14	27	-	362	709	322	1060	246	734	529	198	38	17
15	44	-	295	198	295	433	563	610	489	182	30	37
16	14	28	391	416	794	1071	359	556	482	77	46	23
17	27	195	414	421	563	257	598	712	482	158	65	19
18	7	186	366	488	530	954	1088	401	480	195	71	37
19	29	202	267	352	364	1158	898	623	471	90	68	35
20	63	209	257	430	339	1016	691	678	451	204	45	35
21	63	101	377	97	447	1099	900	637	371	53	61	26
22	56	98	455	284	512	1138	333	373	291	120	50	21
23	57	161	306	476	456	1039	352	330	260	79	43	25
24	42	42	139	234	308	996	871	275	136	136	40	19
25	70	79	274	321	304	1144	504	238	272	110	56	12
26	54	115	488	795	706	556	319	572	253	95	52	8
27	77	97	167	311	894	529	458	386	145	53	48	16
28	81	-	600	536	923	665	439	711	193	61	49	26
29	81	-	591	666	395	951	423	544	200	85	41	36
30	65	202	602	757	1032	168	946	371	157	69	49	40
31	85	-	608	-	385	-	401	380	-	53	-	40
MEAN	43	113 M	349	456	565	732	558 A	558	413	125	59	25

1996 DAILY DOSES OF UV-B RADIATION ON A HORIZONTAL SURFACE (0.01 MED)												
DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	16	23	237	584	727	961	366	329	795	207	59	9
2	17	40	128	527	882	606	351	633	317	142	12	19
3	16	41	159	147	363	1355	779	353	754	48	11	11
4	14	27	227	518	351	730	525	925	836	177	53	12
5	18	41	306	713	192	650	-	1258	787	158	17	10
6	16	23	318	680	649	662	406	1181	695	46	33	13
7	12	41	306	714	804	691	824	927	619	51	56	11
8	10	43	268	227	566	639	1262	812	720	166	32	6
9	8	55	261	618	1056	1689	1279	581	699	136	51	5
10	8	53	240	658	1053	563	496	751	626	152	22	7
11	5	43	237	424	631	999	602	924	205	88	49	11
12	10	64	238	774	705	267	984	1009	595	40	47	4
13	7	99	199	785	676	686	340	1013	641	141	46	11
14	11	-	223	760	419	1521	353	905	601	160	28	7
15	17	-	252	185	353	615	751	921	571	146	19	11
16	7	18	257	445	873	1634	515	847	525	72	23	9
17	12	124	279	469	642	260	900	975	540	131	25	7
18	4	125	269	500	620	1217	1603	543	532	157	27	11
19	14	117	206	311	447	1487	1353	852	536	73	24	10
20	34	174	181	435	445	1212	1007	892	500	146	17	11
21	32	86	270	94	583	1360	1279	797	414	41	27	12
22	26	67	328	345	604	1478	411	412	313	88	25	9
23	27	120	222	536	534	1468	424	379	264	69	17	11
24	25	33	128	226	349	1445	1081	358	131	115	16	10
25	30	52	342	334	366	1740	660	271	280	85	24	5
26	24	79	471	900	848	895	440	664	272	63	24	3
27	31	75	194	386	1076	726	562	432	146	30	27	5
28	40	-	603	536	1278	955	567	820	167	38	23	9
29	40	-	592	677	493	1447	523	674	175	47	17	11
30	32	-	635	740	1446	222	1250	448	140	35	19	11
31	40	-	632	-	443	-	516	440	-	32	-	11
MEAN	19	67 M	297	508	660	1006	747 A	720	480	99	29	9

B. DAILY VALUES

1996 DAILY TOTALS OF NORMAL INCIDENCE BEAM RADIATION (0.01 MJ/SQM)												
DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	337	.	2121	1547	2985	919	2	42	2323	331	378	.
2	90	904	.	1144	4141	283	.	368	.	83	.	5
3	89	1180	3	.	17	2435	1041	.	2285	.	.	.
4	26	1	341	93	9	520	333	1163	3298	346	506	.
5	373	.	575	1433	.	537	-	3492	3269	160	1	25
6	351	.	926	2149	1086	464	.	2977	2005	.	3	119
7	179	99	2468	1300	2185	528	209	1212	1739	.	596	.
8	.	886	2461	17	1015	640	1440	1353	1691	601	97	.
9	.	747	2650	913	4249	3707	2551	107	2279	216	802	.
10	.	221	2592	1472	4257	12	.	414	2466	396	.	.
11	.	2	2108	957	119	717	1	1219	.	4	907	.
12	.	32	2069	3800	600	1	1657	2664	3251	.	896	.
13	.	1418	1721	3723	207	255	.	3093	2499	512	826	313
14	.	-	1210	3563	1	2603	.	1972	2910	589	.	.
15	164	-	2075	.	.	72	229	743	2539	623	.	356
16	.	.	2369	573	1876	2555	.	396	2063	1	.	.
17	.	1783	2553	99	370	.	399	1547	2930	410	17	.
18	.	784	1205	694	232	2412	4228	34	2908	884	726	329
19	.	1862	278	78	20	4138	1989	490	2906	47	806	213
20	632	1810	64	217	1	2692	903	1834	2691	1861	1	246
21	272	2	1041	.	59	3270	1655	1889	947	.	317	54
22	29	1	2665	19	413	3527	13	529	400	22	24	.
23	285	270	425	511	259	2483	61	362	216	.	1	167
24	78	.	.	187	24	2080	2068	46	.	83	23	81
25	684	1	29	28	3	3702	654	41	371	19	232	.
26	63	40	1453	3214	1585	27	11	1017	192	104	479	.
27	890	27	.	18	1979	169	246	128	6	1	513	1
28	782	-	3159	742	1715	66	49	3007	286	.	553	4
29	875		2870	1839	40	1837	199	1514	232	24	7	327
30	145		3173	2738	2562	.	2735	77	74	135	536	346
31	818		3256		552		16	377		.		368
MEAN	231	483 M	1544	1102	1050	1422	756 A	1100	1626	240	308	95

1996 DAILY TOTALS OF DOWNWARD ATMOSPHERIC RADIATION (0.01 MJ/SQM)												
DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	1614	2427	2073	1980	2172	2774	3055	3092	2594	2815	2840	2490
2	1756	2141	2696	2168	2147	2885	3052	3059	3217	2858	3136	2643
3	2400	2084	2729	2676	2744	2641	2788	3132	2708	3023	3053	2687
4	2301	2459	2472	2574	2876	2916	2987	2932	2483	2848	2576	2705
5	1951	2519	2368	2088	2829	3010	-	2655	2526	2772	2849	2671
6	1915	2283	2315	2105	2417	2882	3060	2828	2692	3159	2576	2399
7	2415	1977	2051	2476	2404	2888	3014	2936	2805	3159	2352	2640
8	2573	1817	2046	2683	2430	2924	2926	3085	2674	2670	2553	2929
9	2828	1830	2018	2545	2094	2629	2759	3193	2576	2830	2360	2914
10	2787	2189	2003	2385	2135	3077	3115	3133	2463	2724	2692	2613
11	2841	2497	1944	2415	2913	3099	3145	2915	2884	2966	1989	2846
12	2828	2538	1928	1898	2882	3095	2730	2988	2242	2894	1983	2533
13	2876	1924	2021	2013	3017	2801	3047	2919	2361	2691	2022	2009
14	2863	-	2055	2098	2932	2561	3114	3005	2414	2790	2717	2441
15	2626	-	2044	2771	2781	3078	3001	2963	2388	2864	2962	1919
16	2745	2781	2033	2832	2445	2857	3042	3026	2449	3011	2802	2385
17	2848	1894	2008	2741	2592	3019	2947	3044	2441	2639	2260	2580
18	2670	1728	2253	2801	2662	2745	2541	3040	2430	2628	1828	1928
19	2658	1664	2439	2841	2947	2468	2884	3095	2468	2942	1786	1688
20	1938	1795	2456	2844	2944	2627	2921	3041	2497	2343	2302	2160
21	1983	2323	2314	2968	2851	2640	2913	3080	2661	2919	2010	2427
22	2235	2494	2059	2952	2747	2682	3165	3206	2813	2809	2458	2380
23	1931	2530	2402	2972	2770	2768	3111	3210	2822	2960	2203	2325
24	2001	2708	2721	2908	2901	2745	2978	3102	2844	2738	2125	2298
25	1724	2653	2667	2817	2942	2710	3019	3068	2805	2825	1950	2454
26	1894	2681	2279	2462	2643	3015	3109	3048	2907	2865	1858	2773
27	1734	2620	2758	2911	2500	2853	3020	3166	3001	2926	1825	2601
28	1939	-	2028	2570	2478	2925	3046	2797	2771	2833	1777	2261
29	1932		1919	2294	2804	2995	2873	2971	2952	2626	1916	2029
30	2220		1870	2202	2767	3134	2632	3123	2978	2453	1731	1749
31	2195		1812		2933		3090	2924		2832		1928
MEAN	2297	2262 M	2219	2533	2668	2848	2969 A	3025	2662	2820	2316	2400

B. DAILY VALUES

1996 DAILY TOTALS OF EFFECTIVE OUTGOING RADIATION FROM A BLACK SURFACE AT AIR TEMPERATURE (0.01 MJ/SQM)

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	846	290	702	802	799	373	110	125	691	280	206	255
2	741	556	45	631	879	224	54	170	66	179	39	273
3	293	648	77	169	296	550	383	69	597	83	53	214
4	410	238	433	288	165	233	271	417	854	213	396	248
5	773	190	477	820	104	270	-	746	841	317	142	193
6	725	456	566	849	469	318	114	724	634	6	306	415
7	443	629	799	647	541	374	259	685	555	15	475	238
8	431	772	788	304	503	283	366	521	634	439	218	24
9	283	753	878	530	995	669	502	362	662	268	430	50
10	296	446	858	709	1036	214	69	569	705	296	98	299
11	100	194	833	532	268	169	54	797	176	118	803	24
12	225	219	829	992	322	49	530	787	958	143	705	311
13	208	815	765	934	192	308	107	780	859	376	704	648
14	221	-	817	882	142	599	44	614	768	509	123	256
15	359	-	840	167	224	74	166	416	794	523	62	671
16	129	78	842	329	621	387	130	334	737	209	194	285
17	122	848	836	517	414	105	241	426	837	483	621	149
18	219	894	587	343	401	497	779	492	857	538	905	748
19	197	981	334	202	236	779	379	544	848	257	861	800
20	793	902	351	191	159	669	367	615	827	768	387	436
21	705	335	598	68	224	708	555	647	525	157	692	275
22	498	215	828	173	355	583	374	443	373	297	270	296
23	701	267	455	305	368	446	365	440	339	284	552	320
24	592	173	55	196	170	520	464	391	337	581	579	376
25	839	200	140	205	81	661	253	325	456	511	699	252
26	680	147	422	632	424	230	99	407	362	327	759	26
27	847	162	21	97	528	377	202	241	240	193	774	205
28	655	-	830	376	571	333	146	660	365	225	825	471
29	721	927	624	255	428	355	554	224	387	768	743	743
30	471	920	737	491	57	649	234	133	437	801	895	895
31	504	966	374	159	353	161	621					
MEAN	485	456 M	607	475	407	383	285 A	480	575	309	482	355

1996 DAILY TOTALS OF SUNSHINE DURATION (0.1 HR AND IN PCT OF MAXIMUM POSSIBLE)

DAY	JAN HR PCT	FEB HR PCT	MAR HR PCT	APR HR PCT	MAY HR PCT	JUN HR PCT	JUL HR PCT	AUG HR PCT	SEP HR PCT	OCT HR PCT	NOV HR PCT	DEC HR PCT
1	19 86	. .	78 95	81 72	116 80	49 31	. .	1 1	87 69	17 18	18 31	. .
2	2 9	35 73	. .	55 49	145 100	16 10	. .	14 9	. .	3 3	. .	. .
3	6 27	49 100	. .	. .	. .	85 53	38 23	. .	99 79	. .	. .	. .
4	2 9	. .	14 17	4 3	. .	26 16	14 9	51 34	113 93	18 20	28 53	. .
5	22 96	. .	34 40	80 68	. .	25 16	14 9	139 93	116 97	6 7	. .	1 4
6	22 96	. .	52 60	85 72	44 30	17 11	. .	120 81	74 63	. .	. .	5 22
7	12 52	2 4	84 98	64 54	88 59	25 15	9 6	49 33	73 62	. .	26 52	. .
8	. .	36 67	68 78	. .	45 30	31 19	49 30	53 36	80 70	32 37	6 12	. .
9	. .	41 73	90 100	50 40	150 100	136 83	100 62	3 2	79 69	10 12	36 75	. .
10	. .	13 22	91 100	74 59	149 99	. .	. .	19 13	109 96	19 23	. .	. .
11	. .	. .	84 93	43 34	5 3	31 19	. .	49 34	. .	. .	40 91	. .
12	. .	. .	79 87	128 100	30 20	. .	69 43	106 73	109 99	. .	41 98	. .
13	. .	56 90	82 89	128 99	11 7	12 7	. .	136 94	93 85	18 22	36 88	19 90
14	. .	. .	66 71	121 93	. .	101 62	. .	91 64	107 99	39 48	. .	. .
15	7 24	. .	82 87	. .	. .	3 2	12 8	45 32	101 94	31 39	. .	20 95
16	. .	. .	96 100	24 18	73 47	98 60	. .	14 10	95 90	. .	. .	. .
17	. .	68 100	98 100	3 2	18 12	. .	16 10	77 55	106 100	19 24	1 3	. .
18	. .	53 75	59 61	34 25	10 6	96 59	154 97	. .	105 100	39 49	35 95	20 100
19	. .	72 100	14 14	3 2	1 1	150 91	79 50	27 20	104 100	2 3	35 97	17 85
20	33 100	74 100	2 2	12 9	. .	106 65	37 24	85 62	103 100	74 96	. .	18 90
21	12 35	. .	54 54	. .	4 3	117 71	69 44	98 72	38 38	. .	20 59	. .
22	1 3	. .	100 100	1 1	23 15	122 74	. .	32 24	20 20	1 1	. .	. .
23	18 50	12 15	27 27	25 18	7 4	88 54	2 1	21 15	9 9	. .	. .	11 55
24	4 11	. .	. .	8 6	1 1	90 55	102 66	3 2	. .	1 1	1 3	4 20
25	38 100	. .	3 3	1 1	. .	133 81	28 18	1 1	14 14	. .	13 42	. .
26	3 8	2 3	57 55	108 77	68 43	. .	. .	53 40	10 10	6 9	29 97	. .
27	39 100	. .	. .	1 1	76 48	7 4	13 8	6 5	. .	. .	26 90	. .
28	40 100	. .	107 100	32 23	71 45	. .	2 1	127 97	11 12	. .	28 100	. .
29	40 98	2 2	101 94	77 54	1 1	75 46	9 6	63 48	13 14	1 2	. .	18 86
30	6 14	6 14	109 100	107 74	96 60	. .	103 67	4 3	4 4	8 13	27 100	20 95
31	36 82	. .	111 100	111 100	32 20	32 20	. .	20 16	20 16	. .	. .	21 100
MEAN	12 35	18 28	59 62	45 35	41 27	55 33	30 19	49 34	62 56	11 14	15 40	6 27

C. MEAN DIURNAL VARIATION

1996 MEAN DIURNAL VARIATION OF GLOBAL RADIATION (0.01 MJ/SQM)																									
MONTH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL
JAN	4	15	24	26	19	9	3	.	.	.	.	.	.	.	.	.	101
FEB M	5	18	38	50	51	49	36	20	6	.	.	.	.	.	.	.	.	274
MAR	2	13	51	82	109	132	138	127	109	82	51	19	3	.	.	.	.	.	.	917
APR	3	16	43	71	100	122	130	136	118	111	99	75	49	21	4	.	.	.	.	.	1098
MAY	.	.	.	4	15	36	64	82	104	110	123	143	152	125	109	89	73	45	23	6	.	.	.	.	1304
JUN	.	.	2	8	26	49	77	109	129	153	167	179	178	159	143	109	85	57	30	13	3	.	.	.	1676
JUL A	.	.	1	5	14	27	39	62	83	106	119	123	127	130	123	101	68	49	28	9	1	.	.	.	1213
AUG	.	.	.	1	8	29	56	83	120	140	143	148	149	132	107	81	52	29	10	1	.	.	.	.	1288
SEP	6	28	68	99	121	137	133	127	113	93	64	34	8	.	.	.	.	.	.	1030
OCT	2	10	23	35	44	49	45	37	23	10	2	.	.	.	.	.	.	.	281
NOV	8	22	31	34	23	11	5	.	.	.	.	.	.	.	.	.	134
DEC	1	7	15	14	9	5	1	.	.	.	.	.	.	.	.	.	52
MEAN A	0	0	0	2	6	14	27	46	65	82	93	98	94	82	68	49	32	18	8	2	0	0	0	0	786

1996 MEAN DIURNAL VARIATION OF SKY RADIATION ON A HORIZONTAL SURFACE (0.01 MJ/SQM)																									
MONTH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL
JAN	3	8	12	14	14	9	3	.	.	.	.	.	.	.	.	.	63
FEB M	4	12	20	25	27	26	21	14	6	.	.	.	.	.	.	.	.	156
MAR	2	10	20	29	36	41	44	43	36	29	20	10	2	.	.	.	.	.	.	322
APR	3	10	22	34	44	57	64	68	64	64	51	39	27	13	4	.	.	.	.	.	566
MAY	.	.	.	4	12	22	35	47	61	63	72	81	78	65	55	48	38	25	14	5	.	.	.	.	726
JUN	.	.	2	8	17	29	42	51	59	65	70	78	74	69	65	53	43	31	21	10	3	.	.	.	788
JUL A	.	.	1	5	13	23	33	45	59	70	75	75	72	76	68	56	40	31	19	7	1	.	.	.	766
AUG	.	.	.	1	8	20	32	41	56	70	76	83	80	70	57	47	32	19	7	1	.	.	.	.	700
SEP	5	15	25	28	33	38	44	45	40	30	23	14	5	.	.	.	.	.	.	346
OCT	2	9	18	26	30	32	31	27	19	9	2	.	.	.	.	.	.	.	204
NOV	6	11	15	17	15	10	5	.	.	.	.	.	.	.	.	.	79
DEC	1	5	9	10	9	5	1	.	.	.	.	.	.	.	.	.	40
MEAN A	0	0	0	2	4	9	16	23	32	39	44	48	46	41	33	25	17	11	5	2	0	0	0	0	399

1996 MEAN DIURNAL VARIATION OF ULTRAVIOLET RADIATION ON A HORIZONTAL SURFACE (0.001 MJ/SQM)																									
MONTH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL
JAN	2	6	9	10	9	6	2	.	.	.	.	.	.	.	.	.	43
FEB M	3	8	15	20	21	19	15	9	3	.	.	.	.	.	.	.	.	113
MAR	1	7	18	31	42	51	54	50	40	29	18	8	1	.	.	.	.	.	.	349
APR	2	7	17	29	40	51	56	58	53	48	40	29	18	8	2	.	.	.	.	.	456
MAY	.	.	.	2	7	15	26	36	46	50	56	64	66	56	47	38	28	17	8	2	.	.	.	.	565
JUN	.	.	1	5	12	21	33	46	57	69	75	80	79	71	62	47	35	22	11	5	1	.	.	.	732
JUL A	.	.	.	3	7	13	20	28	40	51	57	59	59	60	55	43	29	19	11	4	1	.	.	.	558
AUG	.	.	.	1	4	12	23	35	51	61	65	67	66	58	46	33	21	11	4	1	.	.	.	.	558
SEP	4	13	25	38	47	55	56	53	46	36	24	12	4	.	.	.	.	.	.	413
OCT	1	5	10	15	19	22	20	16	10	5	1	.	.	.	.	.	.	.	125
NOV	4	8	12	13	11	7	3	.	.	.	.	.	.	.	.	.	59
DEC	1	3	6	6	6	3	.	.	.	.	.	.	.	.	.	.	25
MEAN A	0	0	0	1	3	6	12	19	28	35	40	43	41	36	28	20	13	7	3	1	0	0	0	0	335

C. MEAN DIURNAL VARIATION

1996 MEAN DIURNAL VARIATION OF UV-B RADIATION ON A HORIZONTAL SURFACE (0.01 MED/HR)																									
MONTH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL
JAN	1	2	4	5	4	2	1	.	.	.	.	.	.	.	.	19
FEB M	1	4	8	13	15	13	9	4	1	.	.	.	.	.	.	.	.	67
MAR	3	10	22	37	50	55	49	36	21	10	3	.	.	.	.	.	.	.	297
APR	3	10	24	42	63	76	82	72	58	42	23	10	3	.	.	.	.	.	.	508
MAY	.	.	.	1	3	8	20	34	54	67	82	96	97	76	54	36	21	9	3	1	.	.	.	.	660
JUN	.	.	.	2	6	15	30	55	81	110	128	139	134	112	86	54	31	15	6	2	.	.	.	.	1006
JUL A	.	.	.	1	3	9	18	34	55	79	96	101	98	91	73	47	24	12	4	1	.	.	.	.	747
AUG	2	7	17	35	64	89	102	108	103	82	56	33	16	6	1	.	.	.	.	.	720
SEP	2	7	20	39	60	77	81	74	58	37	18	6	1	.	.	.	.	.	.	480
OCT	2	7	12	18	21	18	12	6	2	.	.	.	.	.	.	.	.	99
NOV	2	4	6	7	6	3	1	.	.	.	.	.	.	.	.	.	29
DEC	1	2	3	2	1	.	.	.	.	.	.	.	.	.	.	9
MEAN A	0	0	0	0	1	4	9	18	31	45	55	60	56	45	32	19	9	4	1	0	0	0	0	0	390

1996 MEAN DIURNAL VARIATION OF NORMAL INCIDENCE BEAM RADIATION (0.01 MJ/SQM)																									
MONTH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL
JAN	7	51	77	66	30	.	.	.	.	.	.	.	.	.	.	.	231
FEB M	6	38	78	88	85	89	66	31	1	.	.	.	.	.	.	.	.	483
MAR	15	125	154	173	195	195	181	175	154	121	48	8	.	.	.	.	.	.	1544
APR	4	29	68	90	110	111	105	104	85	81	96	91	74	43	11	.	.	.	.	.	1102
MAY	18	48	70	67	69	67	66	78	98	85	87	79	85	69	51	14	.	.	.	.	1050
JUN	34	54	73	100	103	118	121	124	130	119	115	95	86	75	38	29	7	.	.	.	1422
JUL A	9	14	15	30	35	48	56	60	71	73	84	81	61	57	42	19	2	.	.	.	756
AUG	6	38	71	92	115	110	97	91	99	97	89	74	58	45	18	1	.	.	.	.	1100
SEP	3	61	146	176	180	185	162	154	149	154	132	97	27	1	.	.	.	.	.	1626
OCT	5	23	32	41	46	35	30	20	9	1	.	.	.	.	.	.	.	240
NOV	15	76	90	85	38	4	.	.	.	.	.	.	.	.	.	.	308
DEC	17	54	25	.	.	.	.	.	.	.	.	.	.	.	.	95
MEAN A	0	0	0	0	6	16	31	56	71	88	98	93	84	73	70	58	43	27	14	5	1	0	0	0	833

1996 MEAN DIURNAL VARIATION OF DOWNWARD ATMOSPHERIC RADIATION (0.01 MJ/SQM)																									
MONTH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL
JAN	94	95	96	96	95	94	95	96	97	96	96	97	97	98	97	96	95	96	95	96	96	95	94	95	2297
FEB M	94	95	94	95	95	96	95	96	96	95	95	95	95	95	95	95	94	94	92	92	93	93	92	92	2262
MAR	91	91	91	92	91	91	91	92	93	94	94	95	95	97	96	94	93	92	91	91	91	91	91	92	2219
APR	102	103	103	103	103	104	105	105	107	107	109	110	110	110	109	109	107	106	105	104	104	103	103	103	2533
MAY	108	109	110	109	110	111	111	113	114	115	116	116	115	114	114	113	111	111	109	110	108	107	108	108	2668
JUN	117	117	118	117	117	118	119	119	120	120	121	121	120	120	120	119	119	118	119	118	117	119	118	117	2848
JUL A	123	122	123	124	125	125	126	126	126	127	127	127	127	126	124	124	123	122	120	120	120	121	121	123	2969
AUG	123	124	125	125	124	124	125	126	126	128	130	130	130	130	129	129	128	127	125	125	124	123	123	123	3025
SEP	110	110	109	109	108	108	109	110	111	112	113	115	115	115	114	114	112	111	111	111	110	109	108	109	2662
OCT	117	117	115	116	117	116	116	117	117	119	119	117	118	119	119	119	118	119	118	119	118	117	116	117	2820
NOV	99	99	98	97	96	96	95	96	95	95	96	96	97	96	96	96	97	95	96	97	98	97	98	97	2316
DEC	100	99	99	99	99	99	99	99	99	99	99	101	101	101	101	102	101	101	99	99	99	101	102	101	2400
MEAN A	107	107	107	107	107	107	107	108	109	109	110	110	110	110	110	109	108	108	107	107	107	107	106	107	2589

C. MEAN DIURNAL VARIATION

1996 MEAN DIURNAL VARIATION OF EFFECTIVE OUTGOING RADIATION FROM A BLACK SURFACE AT AIR TEMPERATURE (0.01 MJ/SQM)																										
MONTH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL	
JAN	21	20	19	19	20	20	20	19	19	20	22	21	21	20	20	21	21	21	21	19	19	19	20	21	21	485
FEB M	18	18	18	17	17	17	18	16	17	19	20	20	20	20	20	20	21	20	21	21	19	19	21	21	456	
MAR	24	24	23	22	23	23	23	24	26	27	28	28	27	27	27	28	28	28	26	26	25	24	23	23	607	
APR	19	18	18	18	18	18	18	20	20	21	20	20	20	20	21	21	22	22	21	21	20	20	20	19	475	
MAY	17	16	15	15	15	16	17	16	15	15	14	15	17	18	18	19	20	19	19	18	19	19	18	18	407	
JUN	14	13	12	13	14	14	15	16	17	18	18	18	19	19	19	19	19	18	16	16	16	13	13	13	383	
JUL A	10	10	10	8	8	8	8	9	10	11	11	12	12	14	15	16	15	16	17	16	15	13	12	10	285	
AUG	19	17	17	16	18	20	20	21	23	22	21	21	21	21	21	21	21	21	21	20	20	20	19	19	480	
SEP	22	21	22	21	22	23	23	25	26	26	26	25	25	25	26	26	26	26	24	23	23	23	23	22	575	
OCT	12	13	14	13	12	13	13	12	13	12	13	15	15	14	14	13	14	12	12	11	12	13	13	12	309	
NOV	18	17	18	19	20	19	20	19	21	23	24	24	22	22	21	21	20	21	20	19	18	18	18	19	482	
DEC	15	15	15	15	15	15	15	16	16	15	16	15	15	15	14	13	14	14	16	16	16	14	13	13	355	
MEAN A	17	17	17	16	17	17	18	18	19	19	19	19	19	20	20	20	20	20	19	19	18	18	18	17	441	

1996 MEAN DIURNAL VARIATION OF SUNSHINE DURATION (MIN)																											
MONTH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL*	MAX*	PCT
JAN	2	18	24	18	8	.	.	.	.	.	.	.	.	.	.	.	12	31	35
FEB	2	9	17	19	18	19	15	7	.	.	.	.	.	.	.	.	.	.	18	65	28
MAR	4	33	36	38	41	41	39	39	36	31	16	3	.	.	.	.	.	.	59	95	62
APR	1	8	18	21	25	26	24	24	19	19	23	24	21	13	4	.	.	.	.	.	45	130	35
MAY	6	12	16	14	15	13	13	16	21	18	18	17	22	20	19	5	.	.	.	.	41	153	27
JUN	10	13	18	22	23	25	26	25	28	27	24	21	20	20	13	11	1	.	.	.	55	163	33
JUL	3	3	3	8	7	11	12	12	14	16	18	21	15	16	13	7	.	.	.	.	30	158	19
AUG	2	13	21	24	29	27	22	21	24	24	23	20	17	16	9	.	.	.	.	.	49	141	34
SEP	1	15	34	37	38	39	35	34	33	35	32	30	11	.	.	.	.	.	.	.	62	108	56
OCT	1	6	9	10	11	10	9	7	3	.	.	.	.	.	.	.	.	.	11	78	14
NOV	5	23	26	24	10	1	.	.	.	.	.	.	.	.	.	.	.	15	40	40
DEC	8	18	8	.	.	.	.	.	.	.	.	.	.	.	.	.	6	22	27
MEAN	0	0	0	0	2	4	8	13	16	21	23	21	19	17	16	14	12	8	5	2	0	0	0	0	34	99	34

*TOTALS AND MAX ARE GIVEN IN 0.1 H

D. MONTHLY AND ANNUAL MEANS

1996 MONTHLY AND ANNUAL MEANS OF RADIATION COMPONENTS IN BERGEN														
UNITS RADIATION VALUES: 0.01 MJM ⁻² DAY ⁻¹ (UV:KJM ⁻² DAY ⁻¹ ; UV-B: 0.01 MED/DAY), SUNSHINE DURATION: 0.1 HR														
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR	
GLOBAL RADIATION	101	274 M	917	1098	1304	1676	1213 A	1288	1030	281	134	52	786 A	
SKY RADIATION	63	156 M	322	566	726	788	766 A	700	346	204	79	40	399 A	
NORMAL INCIDENCE BEAM	231	483 M	1544	1102	1050	1422	756 A	1100	1626	240	308	95	833 A	
ULTRAVIOLET RADIATION	43	113 M	349	456	565	732	558 A	558	413	125	59	25	335 A	
UV-B RADIATION	19	67 M	297	508	660	1006	747 A	720	480	99	29	9	390 A	
ATMOSPHERIC RADIATION	2297	2262 M	2219	2533	2668	2848	2969 A	3025	2662	2820	2316	2400	2589 A	
EFFECTIVE RADIATION	485	456 M	607	475	407	383	285 A	480	575	309	482	355	441 A	
DURATION OF SUNSHINE	12	18	59	45	41	55	30	49	62	11	15	6	34	
DURATION OF SUNSHINE (PCT)	35	28	62	35	27	33	19	34	56	14	40	27	34	