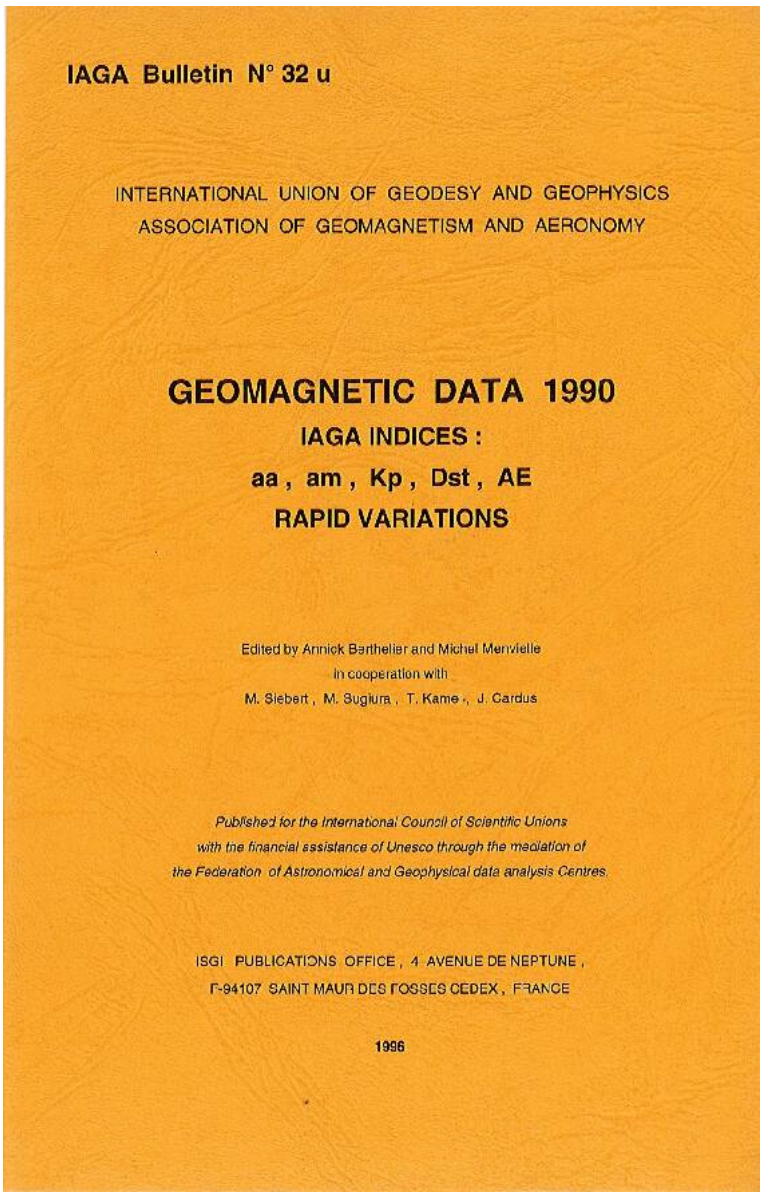

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IAGA Bulletin N° 32 u

INTERNATIONAL UNION OF GEODESY AND GEOPHYSICS
ASSOCIATION OF GEOMAGNETISM AND AERONOMY

GEOMAGNETIC DATA 1990

IAGA INDICES :

aa , am , Kp , Dst , AE

RAPID VARIATIONS

Edited by Annick Berthelier and Michel Menvielle
in cooperation with
M. Siebert , M. Sugiura , T. Kamei , J. Cardus

Published for the International Council of Scientific Unions
with the financial assistance of Unesco through the mediation of
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ISGI PUBLICATIONS OFFICE , 4 AVENUE DE NEPTUNE ,
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FOREWORD

While keeping the Bulletin series as homogeneous as possible, the general information is updated in each issue, and we try to improve contents and presentation as well.

The Bulletin 32 series aims at providing a reference publication with all definitive values of indices and rapid variation data for the year. It however may happen that difficulties in the derivation of some indices could cause significant delays so that it is desirable to issue the Bulletin 32 for the year before their definitive values become available. It has already been the case in the past, and it is unfortunately the case for the AE indices this year. After discussion with M.SUGIURA and T.KAMEI, we decided against our best intentions, to accept this desperate solution and publish provisional AE indices in this issue.

A floppy having the same contents as the Bulletin (except for the rapid variations) is included, with a software for visualizing the tables. The floppies corresponding to the years 1981-1989 have also been prepared, and are now available on request at the ISGI Publication Office (c/o CETP, 4 Avenue de Neptune, F-94107 Saint-Maur des Fossés Cedex, FRANCE).

Annick Berthelier, Michel Menvielle

ACKNOWLEDGEMENTS

We wish to acknowledge J.O.CARDUS, M.SIEBERT, T.KAMEI and M.SUGIURA for their cooperation in preparing the data published in this Bulletin. Thanks are also due to all the organisations, which support efficiently the preparation and distribution of these geomagnetic data (as listed in Table 1, page 10).

Let us add that M.SUGIURA and T.KAMEI wish specially to acknowledge the valuable assistance of T. ARAKI (Data Analysis Center for Geomagnetism and Space Magnetism, Kyoto University) in the preparation of the Dst indices.

As for us, we apologize for the long delay in the publication of the present Bulletin, due to problems in manpower, and we are pleased to express our thanks to all those who helped us in its elaboration.

Annick Berthelier, Michel Menvielle

Saint Maur, Orsay, December 1996

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SECTION 1

PRESENTATION OF THE BULLETIN

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1.1. INTRODUCTION

1.1.1. THE IAGA BULLETIN 32 SERIES

The IAGA Bulletin N°32 series is a yearly compilation of geomagnetic indices and other geomagnetic data, based on the report of a great number of magnetic observatories. The series is the continuation of the former IAGA Bulletin N°12 and is prepared for publication by the Publications Office of the International Service of Geomagnetic Indices (ISGI). The ISGI, formerly called Permanent Service or "C and K center", operates under the supervision of IAGA Division V : Observatories, Instruments, Indices and Data. Since 1956, it belongs to the Federation of Astronomical and Geophysical Data Analysis Services. Its present address is :

ISGI, CETP - CNRS/IPSL/UVSQ, 4 Avenue de Neptune,
F - 94107 Saint-Maur des Fossés CEDEX, FRANCE.

As for 1990, the elaborated data were provided by the following Institutes, under the responsability of the adjoining collaborators :

- Institut für Geophysik, Göttingen (M. SIEBERT) :
  Kp, ap, Ap, Cp, Q-days and D-days.

- Université Paris Sud, Orsay, Paris (M. MENVIELLE) :
  aa, C-days and K-days, an, Kn, An, as, Ks, As, and am, Km, Am.

- Data Analysis Center for Geomagnetism and Spacemagnetism, Kyoto (M. SUGIURA and T.KAMEI)
  Dst, AL, AU, AE.

- Observatorio del Ebro, Roquetas (J.O. CARDUS) :
  Rapid Variations.

The collection and the publication of the daily character figure C and of the international character figure Ci, together with the lists of selected quiet and disturbed days began in 1906.

The three-hourly K indices (scale 0-9) were introduced by Bartels in 1938, and, a few years later, planetary indices Kp were designed. They are computed from the K indices of 12 observatories which were routinely providing data at the time. The K indices of the selected stations for these early years were published in IAGA Bulletins N°12g and 12l. In addition to Kp, the corresponding range values ap and related daily indices Ap and Cp have been regularly published in the IAGA Bulletin N°12.

In accordance with the recommendations of the IAGA Assemblies in Madrid (1969) and in Moscow (1971), the publication of C and K indices of individual observatories in the IAGA Bulletins ended with the 1969 data, while other indices (Dst, an, Kn, as, Ks, am, Km) and a survey of magnetic storms were included since 1970.

This change marked the end of the IAGA Bulletin N°12 series and the beginning of the new IAGA Bulletin N°32 series. The publication of the Ci, Kp, ap, Ap indices, and of the international quiet and disturbed days, Q and D days, continued in the new series. Since 1976, the new index aa is published instead of Ci and the C figures are no longer compiled, according to a recommendation of the IAGA Assembly in Grenoble (1975).

A short recall of the definition of the published indices is given in the section 1.3 below. For more details, including the definition of the K indices, one can refer to the following reports:

- M. Siebert, in "Handbuch der Physik", vol.49/3, 206-275, Springer Verlag, 1971;
- P. N. Mayaud, *Derivation, Meaning and Use of Geomagnetic Indices*, Geophysical Monograph 22, Am. Geophys. Union, Washington D.C., 1980, gives a complete review of the present IAGA indices;
- G.K. Rangarajan, *Indices of geomagnetic activity*, in "Geomagnetism", edited by J.A. Jacobs, Academic, San Diego, 1989;
- M. Menvielle and A. Berthelier, *The K-derived planetary indices: description and availability*, Rev. Geophys., 29, 3, 415-432, 1991;
- A. Berthelier, *The geomagnetic indices : derivation, meaning and uses in solar - terrestrial physics*, in "STPW Proceedings" ed. by J. HRUSKA et al, in vol 3, p. 3-20, US Gov. Publications Office, 1994.

1.1.2. DATA AVAILABILITY

The whole series of geomagnetic indices are available at the World Data Centers (list and addresses in Table 1-a), and the IAGA Bulletins where they are published are available at the ISGI Publications Office (Table 1-c). More detailed information on the length of each series, and on the publication and availability of each index, and of the rapid variations are given below.

- The *K indices* of individual observatories are available for the years 1969-1974, at the World Data Center A (WDC-A, Table 1-a). Besides, the tables of local K indices can be found in the bulletins or yearbooks of many observatories. An extensive study on the K index by P. N. Mayaud and the practical rules for its determination are given in the "Atlas des indices K", IAGA Bulletin N°21, 1967.

- The *aa indices* constitute a series of indices beginning in the year 1868. Its description can be found in the IAGA Bulletin N°33, which contains tables and graphs of aa for the years 1868-1967. The values for the years 1968-1975 are published in the IAGA Bulletin N°39. These indices are regularly published in the IAGA Bulletins N°32 since 1976. They also regularly appear in the monthly tables edited by H. Coffey in the Journal of Geophysical Research and in the Solar Geophysical Data Publications (Table 1-c). They are sent on request by mail before the end of the next month, or by telex within 1 week, and they are available through an e-mail automatic service (ISGI Publications Office, Table 1-c).

- The meaning of *C, Ci, K* and *Kp* is explained in textbooks (e.g. Landolt-Börnstein, Zahlenwerte und Funktionen, Band 3, 731-744, Springer Verlag, 1952), in Terrestrial Magnetism and Atmospheric Electricity (*44*, 411, 1939; *45*, 309, 1941) and in the IAGA Bulletin N°12i. Tables and diagrams of these indices for the whole period 1932-1961 are printed in the IAGA Bulletin N°18. Kp, Ap, Cp are published in the IAGA Bulletin N°32, and also in the monthly tables edited by H. Coffey in the Journal of Geophysical Research and in the Solar Geophysical Data Publications (Table 1-c). They can be sent on request before the end of the next month by the Institut für Geophysik, Göttingen (Table 1-b).

- The *three-hourly indices an, Kn,* and *as, Ks,* for the Northern and Southern hemispheres and the *planetary indices am, Km,* are described by P. N. Mayaud in "Indices Kn, Ks and Km, 1964-1967" (Editions du CNRS, Paris 1968). The indices for the years 1959-1963 are published in the IAGA Bulletin N°39, and for 1964-1967 in the above quoted publication. They are published in the IAGA Bulletins N°32 from 1968 onwards, and also appear in the monthly tables edited by H. Coffey in the Journal of Geophysical Research and in the Solar Geophysical Data Publications (Table 1-c). They are sent on request by mail within 6 weeks after the end of the month, and are available through and e-mail automatic service (ISGI Publications Office, Table 1-c).

- The *equatorial Dst index* is published in the IAGA Bulletin N°32 since 1970. The hourly values of Dst for the years 1957-1970, based on the data of three stations, have been published by M. Sugiura and D. J. Poros in the report X-645-71-278 of the Goddard Space Flight Center. The hourly Dst values for the IGY, based on the data of eight stations, are given in the Annals of the IGY, vol. 35. The same volume contains the three-hourly values of Dst for the IGY as determined by Kertz in a somewhat different way. Recently, M. Sugiura and T. Kamei recomputed an homogeneous series of Dst values, using the data of four stations. These Dst indices values for 1957-1986 are now published in the IAGA Bulletin N° 40 where is inserted a floppy disk containing the hourly Dst values for these 30 years. This report supersedes earlier Dst publications by Sugiura and co-workers.

- The *auroral electrojet index AE* was originally introduced by Davis and Sugiura in 1966 (J. Geophys. Res., *71*, 785). It was first derived at the Geophysical Institute of the University of Alaska, and the hourly values were published for the years 1957-1964 in the University of Alaska Reports prepared by T. N. Davis, Y. S. Wang and C. Echols, and published in 1967 and 1968. The data for 1965 were prepared by NASA ; from 1966 to 1976, they were prepared by WDC-A. Values from 1978 onwards are computed by the Data Analysis Center for Geomagnetism and Spacemagnetism of Kyoto University and published in the data books of this Institute. The hourly mean values are published in the IAGA Bulletins N°32 since 1981.

- Data on *rapid variations* are collected and prepared for publication at the Observatorio del Ebro (Table 1-b), according to the decisions made at the IAGA Assemblies in Madrid (1969) and in Grenoble (1975). They are thus given less extensively than in the former IAGA Bulletins. Provisional lists are available on request at ISGI within 6 weeks after the end of the month (Table 1-c).

Tables 1-a, 1-b and 1-c (next page) give present addresses of the ISGI, of the World Data Centers, and of the National Institutes and Data Centers related to this bulletin.

TABLE 1

a - ISGI and World Data Centers

ISGI	International Service of Geomagnetic Indices Service International des Indices Géomagnétiques CETP -CNRS/UVSQ, 4, Avenue de Neptune F-94107 SAINT MAUR DES FOSSES CEDEX, France Telephone 33 1 45 11 42 30 Telex 264 498 OBSMAUR Telefax 33 1 48 89 44 33
WDC-A	World Data Center-A for Solar-Terrestrial Physics NOAA code E/GC2, 325 Broadway BOULDER, Colorado 80303-3328 U.S.A. Telephone 1 303 497 6324 Telex 592 811 NOAA MASC BDR Telefax 1 303 497 6513
WDC-B	World Data Center-B Soviet Geophysical Committee, Academy of Sciences of the U.S.S.R. Molodezhnaya 3 MOSCOW 117296, U.S.S.R. Telephone 7 095 130 05 46 7 095 228 67 88 Telex 411 478 SGC SU
WDC-C	World Data Center-C2 for Geomagnetism Data Analysis Center for Geomagnetism and Space Magnetism Faculty of Science, Kyoto University KYOTO 606-01, Japan Telephone 81 75 753 3929 Telex 5422302 SCIKYU J Telefax 81 75 722 7884

b - ISGI Collaborating Institutes

M. MENVIELLE	Laboratoire de Physique de la Terre et des Planètes Batiment 504 - Université PARIS-XI F-91405 ORSAY CEDEX, France
M. SIEBERT	Geophysical Institute, Göttingen University Institut für Geophysik der Universitat Göttingen Postfach 2341, Herzberger Landstrasse 180 D-3400 GOTTINGEN, Federal Republic of Germany
J. O. CARDUS	Observatorio del Ebro Roquetas, TARRAGONA, Espagne
M. SUGIURA	Working Group on World Data Centers National Committee on Solar-Terrestrial Physics Science Council of Japan Institute of Research and Development Tokai University, 2 -28 Tomigaya, Shibuya-ku TOKYO 151, Japan

c - Bulletins and publications

• Solar Geophysical Data monthly publications :
NOAA National Geophysical Data Center
325, Broadway E/GC4, Dept. 961
BOULDER, Colorado 80303-3328 U.S.A.

• IAGA Bulletins and ISGI Monthly Bulletins :
ISGI Publications Office
CETP - 4, avenue de Neptune
94107 SAINT MAUR DES FOSSES CEDEX, France
E-mail automatic service : ISGI.DATA@cetp.ipsl.fr

1.2. LIST OF OBSERVATORIES

A list of the magnetic observatories where continuous recordings have been made during at least five consecutive years is given pages 29-37. In this table, the observatories are listed according to the alphabetic order and one has indicated for each station, from left to right :

- its name and three-letter IAGA international code ;
- the geographic and geomagnetic coordinates, and altitude ;
- the K=9 lower limit, given only for the stations which belong to the networks used in Kp, am or aa calculation. (see section 1.3 for the description of these networks in 1990);
- the opening and closing years.

Note that temporary stations do not appear in this table, as for instance those operating during the International Polar and Geophysical years, but they can be found in the more extensive list published in the former IAGA-Bulletin n° 20 (1965).

The values of the parameters given in the table has been obtained from the following publications :

- C.R. Bock and R.W. Schumann : Katalog der Jahres mittel der Magnetischen Elemente der Observatorien und der Stationen an deinen eine Zeitlang erdmagnetische Beobachtungen Stattfanden, Geophysikalisches Institut Postdam Abhandlungen n° 8, Postdam, 1948;
- Annual mean values of Geomagnetic elements, Geomagnetic Bulletin n°10, Institut of Geological Sciences, Edinburgh, 1981 ;
- Yearbooks of individual observatories.

A list of the stations having provided continuous recordings over at least fifty years is given on pages 38-40. When one observatory has moved, the names of the different consecutive sites are indicated. The stations are listed following the alphabetic order of the oldest observatory. One has only indicated in this table the opening and closing years, as the other parameters can be found in the preceeding list.

Figure 1 : Distribution of am observatories

Figure 2 : Distribution of Kp observatories

1.3. IAGA INDICES

1.3.1. aa indices

The aa indices are derived using data from two nearly antipodal observatories, where magnetograms were available since 1868. For each three hour interval, K indices are measured at the two stations and converted back into amplitude; an individual aa index is the average of the northern and southern values, weighted to account for the small difference in latitude of the two stations, or for the slight changes in the very place of the observatory. The observatories used to derive aa are given in Table 2-a (next page), with weighting coefficients given in brackets.

The aa index is in nanotesla (nT) and it represents the activity level at an invariant magnetic latitude of about 50°. The half-daily and daily mean values of aa are very close to the corresponding values of the am indices. The values for 1990 are given pages 46-48 as follows :

N	=	daily values for the Northern observatory (Greenwich day)
S	=	same for the Southern observatory
am, pm	=	half-daily values of aa indices for the half Greenwich day before noon and after noon.
Aa	=	daily value of aa

For each month, the average values of daily N, S and aa, are given at the bottom of the tables.

The letters C and K indicate the quiet 24-hour and 48-hour intervals as obtained from aa : C = really quiet, K = quiet but with one or a few slightly disturbed three-hourly intervals (see section 4). The letter on the left column refers to the 24-hour Greenwich day, that on the right one refers to a period of 48 hours centered on the Greenwich noon. The asterisks mark the five international quietest days of the month (as deduced from Kp, see section 4).

A musical diagram of aa indices (logarithmic scale) is drawn page 45 for the whole year. The monthly and yearly mean values of aa for the years from 1868 onwards are listed pages 49-51. A graph of 12-month running mean values of aa is drawn page 52, covering the full period over which aa has been calculated so far, i.e. 1868-1989. In this graph, the point plotted at the abscissa of a given year corresponds to the average of aa from January to December of that year (unit : nT).

1.3.2. am indices

am, an and as indices are derived from K indices scaled at observatories located in the subauroral zones of the Northern and Southern hemispheres (Figure 1). The stations are arranged in groups (G1 to G9), each group representing a longitude sector in one of the hemisphere (see Table 2-b, next page). The corrected geomagnetic latitude indicated in this Table has been calculated by Mayaud for taking into account the actual topography of the main field.

TABLE 2

a - List of aa observatories

Northern Hemisphere			*Southern Hemisphere*		
Observatory		*Corr. Geom. Lat.*	*Observatory*		*Corr. Geom. Lat.*
1868-1925	Greenwich *(1.007)*		1868-1919	Melbourne *(0.967)*	
1926-1956	Abinger *(0.934)*		1920-1979	Toolangui *(1.033)*	
1957- ...	Hartland *(1.059)*	50.0°	1980- ...	Canberra *(1.084)*	45.2°

b - List of am observatories

Northern Hemisphere				*Southern Hemisphere*			
	Observatory		*Corr. Geom. Lat.*		*Observatory*		*Corr. Geom. Lat.*
G1	Magadan	MGD	53.8°	G6	Eyrewell	EYR	50.2°
	Petropavlosk	PET	46.4°		Canberra	CAN	45.2°
	Memambetsu	MMB	37.4°				
G2	Podkammenkaya	POD	57.2°	G7	Gnangara	GNA	44.1°
	Sverdlovsk (1)	SVD	52.2°		Amsterdam	AMS	48.3°
G3	Hartland	HAD	50.0°	G8	Kerguelen	PAF	58.8°
	Niemegk	NGK	48.8°		Crozet	CZT	52.4°
					Hermanus	HER	41.1°
G4	Ottawa	OTT	58.9°	G9	Argentine Islands	AIA	49.7°
	Frederiksburg	FRD	51.8°		Trelew	TRW	27.8°
G5	Victoria	VIC	53.9°				
	Tucson	TUC	39.7°				

(1) Present name : Ekaterinburg

c - List of Kp observatories

Northern Hemisphere			*Southern Hemisphere*		
Observatory		*Corr. Geom. Lat.*	*Observatory*		*Corr. Geom. Lat.*
Meanook	MEA	62.5°	Eyrewell	EYR	50.2°
Sitka	SIT	60.0°	Canberra	CAN	45.2°
Lerwick	LER	58.9°			
Ottawa	OTT	58.9°			
Lovö	LOV	56.5°			
Eskdalemuir	ESK	54.3°			
Brorfelde	BJE	52.7°			
Fredericksburg	FRD	51.8°			
Wingst	WNG	50.9°			
Hartland	HAD	50.0°			
Niemegk (2)	NGK	48.8°			

(2) Niemegk has replaced Witteveen in the Kp network since April 1st, 1988.

For a given time interval, the K values measured at the observatories of one group are averaged and converted back to amplitude. These amplitudes are weighted for balancing the differences in longitude width of the sectors, and the hemispheric averages of these weighted amplitudes give rise to the three-hour an and as indices respectively; am is equal to (an + as) / 2. Am, An and As are the daily mean values of am, an and as. They are all expressed in nanoteslas.

For the sake of tradition and convenience, Km, Kn, Ks equivalent values are also made available by means of a conversion table (see below); they are as usually expressed by values from 0o to 9o, corresponding to the given interval of am (or an, or as).

am	0.0	1.4	3.4	5.4	7.4	10.4	13.4	16.4	20.4	26.4
Km		0o	0+	1-	1o	1+	2-	2o	2+	3-
am	26.4	33.4	40.4	50.4	60.4	70.4	86.4	103.4	120.4	146.4
Km		3o	3+	4-	4o	4+	5-	5o	5+	6-
am	146.4	173.4	200.4	243.4	286.4	330.4	386.4	443.4	500.4	611.4
Km		6o	6+	7-	7o	7+	8-	8o	8+	9-	9o

Monthly tables of an, and as are given pages 56-67, each line corresponding to a Greenwich UT day. Following values are displayed from left to right :

- Kn (Ks) values for the 8 three-hour intervals ;
- σn (σs) values for the 8 three-hour intervals represent, by a code using one digit from 0 to 9, the variance of the sector values of K in the Northern (Southern) hemisphere calculated for each given three-hour interval;
- an (as) values for the 8 three-hour intervals ;
- An (As) daily mean value.

At the end of each table, one can find the monthly mean value.

Monthly tables of am (pages 68-73) are displayed in a similar way :

- Km values for the 8 three-hour intervals ;
- daily sum ΣKm ;
- am values for the 8 three-hour intervals ;
- Am, daily mean value ;
- Am2, mean value of am over a 48-hour period centered at the middle of the Greenwich day.

Km values are displayed as "musical diagram" according to Bartels solar rotations (page 55). A compilation of the musical diagrams from 1959 onwards is available on request at ISGI Publication Office (Table 1-a). The monthly and yearly mean values of Am from 1959 onwards are given page 74.

1.3.3. Kp indices

The planetary three-hour-range index Kp is the mean standardized K-index from 13 observatories between 44° and 60° northern or southern geomagnetic latitude (Figure 2, and Table 2-c). The scale is 0o to 9o, expressed in thirds of a unit, e.g. 5- is 4 2/3, 5o is 5, 5+ is

5 1/3. This planetary index has been designed to measure solar particle radiation by its magnetic effects.

The other indices derived from Kp are the three-hour index ap (the equivalent range), the daily indices Ap, the Cp and C9 characters that are related to the daily sum of ap.

The three-hour equivalent amplitude ap is deduced from Kp as follows :

Kp	= 0o	0+	1-	1o	1+	2-	2o	2+	3-	3o	3+	4-	4o	4+
ap	= 0	2	3	4	5	6	7	9	12	15	18	22	27	32

Kp	= 5-	5o	5+	6-	6o	6+	7-	7o	7+	8-	8o	8+	9-	9o
ap	= 39	48	56	67	80	94	111	132	154	179	207	236	300	400

In order to use ap as an equivalent amplitude, it is considered in relation to the conditions at a standard station, which is a station having the lower limit of 500 nT for K = 9. At such a station the average range in nT of the most disturbed of the two horizontal components in a three-hour interval can be taken as 2 ap (for instance, for Kp = 3+, ap=18, ie 36 nT). In other words ap is an equivalent amplitude in the unit 2 nT. The column headed Ap gives the daily average for the eight values ap per day. Therefore, Ap may be called the "equivalent daily amplitude Ap", expressed in the unit 2 nT for a standard station. It is recommended to use Ap in preference to the sum of the indices Kp.

The last column gives the daily planetary character figure Cp, as defined in Bulletin 12e, page 111. It should be noted that Cp, introduced for a standardization of the international character figures Ci, has not been approved by the Association. Instead, Ap was preferred. For a rough conversion of Ci figures (prior to 1932) into Ap, the following table (derived from Bulletin 12e, page 111, their Table 2) may be used :

10.Ci	= 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Ap	= 2	4	5	6	8	9	11	12	14	16	19	22	26	31	37	44	52	63	80	110	160

Monthly tables of Kp and derived indices are given pages 78-83. Kp values are displayed as "musical diagrams" according to Bartels solar rotation page 77. These diagrams are also available on request at Geophysical Institute, Göttingen (Table 1-b). The frequencies of Kp indices is given by month page 84. Monthly and yearly mean values of Ap from 1932 onwards are given page 85.

Note - Observatories wishing to compute local equivalent amplitudes ak from their local K indices, may use the conversion table given below, which consists in the amplitudes (in nT) of the middle of each K class, as firstly proposed by Bartels (IATME Bull. 12e, 1951), and following a IAGA WG 5.5 recommandation (Buenos Aires, 1993).

K	=	0	1	2	3	4	5	6	7	8	9
ak	=	2.5	7.5	15	30	55	95	160	275	415	666

These values are given here for a K = 9 lower limit L9 = 500 nT; at stations having a different value of L9, they should be multiplied by L9/500, in order to have ak in nT (see IAGA News 32, page 23).

1.3.4. Dst index

The Dst index for 1990 are derived using the data from the four magnetic observatories given in Table 3.

These observatories were chosen on the basis of the quality of observation and for the reason that their locations are sufficiently distant from the auroral and equatorial electrojets and that they are distributed in longitude as evenly as possible. A map of the network is given in Figure 3.

The baseline

The baseline for H is defined for each observatory in a manner that takes into account the secular variation. For each observatory, the annual mean values of H, calculated from the "five quietest day" for each month, form the data base for the baseline.

It should be remembered that the final Dst values are determined after each calendar year and that therefore in this determination the annual mean values are available only up to and including the year (referred to below as the current year) for which the Dst is to be deduced.

The baseline is expressed by a power series in time and the coefficients for terms up to the quadratic are determined by the method of least squares, using the annual means for the current year and the four preceding years. Thus, the baseline, H_{base} is expressed as

$$H_{base}(\tau) = A + B\tau + C\tau^2 \qquad (1)$$

where τ is time years measured from a reference epoch.

It is noted here that if the polynomial expansion of the annual means is made in a straighforward manner as described above, an artificial discontinuity, although seldom large enough to be recognized by a casual inspection, can be introduced between the baseline value for the last hour of one year and that for the first hour of the following year, because these two baseline values are calculated from two different polynomials. To minimize such a discontinuity the polynomial determination is actually made in two steps.

From the polynomial expansion determined in the first step, the baseline value at the end of current year is calculated. In the second step, this value is included as an additional data point in the polynomial fitting. This procedure has been found to be satisfactory.

The baseline value $H_{base}(T)$ calculated from (1) for each UT hour of the current year is subtracted from the observed H value, $H_{obs}(T)$:

$$\Delta H(T) = H_{obs}(T) - H_{base}(T) \qquad (2)$$

The deviations, $\Delta H(T)$, form the data base in the following derivation for each of the observatories.

TABLE 3

List of Dst observatories

Observatory	*Symbol*	*Dipole Lat.*	*Dipole Long.*
Honolulu	HON	21.0°N	266.4°
San Juan	SJG	29.9°N	3.2°
Hermanus	HER	33.3°S	80.3°
Kakioka	KAK	26.0°N	206.0°

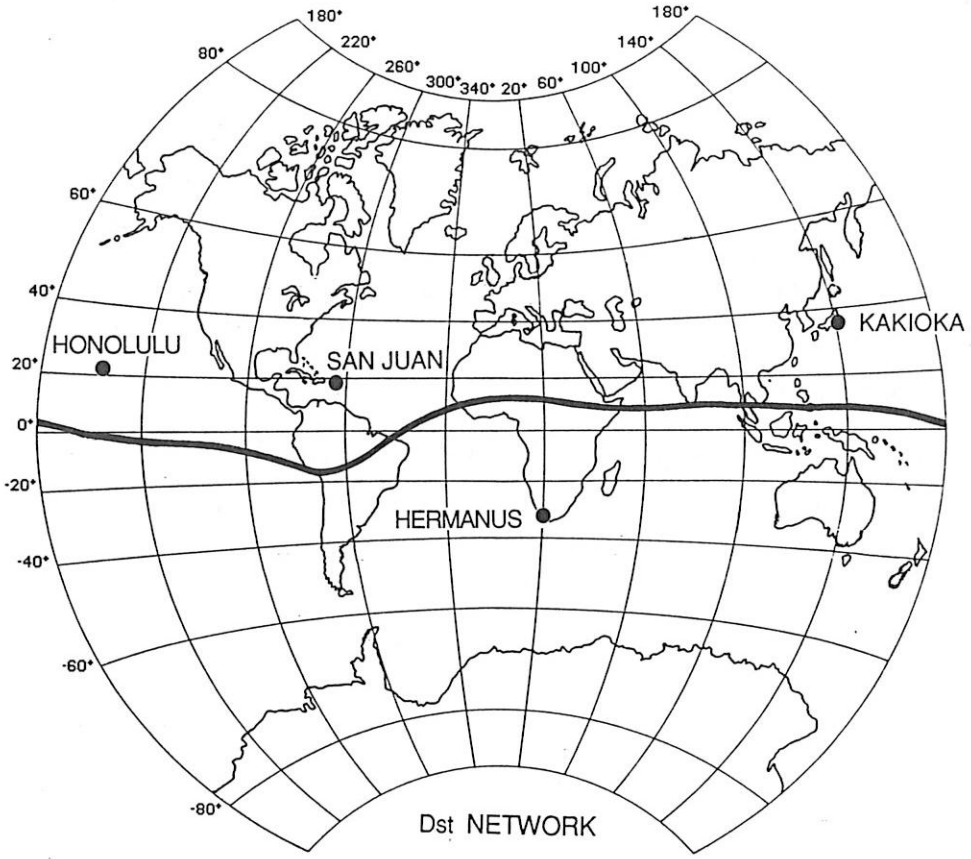

Figure 3 : Distribution of Dst observatories;
the solid line marks the magnetic dip equator.

The Sq elimination

The solar quiet daily variation, Sq, is derived for each observatory as follows. The average Sq variation for each month is determined from the values of H(T) for the internationally selected five quietest days of the month.

These quietest days are determined in UT. In order to define an average Sq variation for the local day of each observatory, we form the averages for the local hours using five quietest days. Also, using hourly values immediately before and immediately after the local days selected, we evaluate the linear change and subtract it from the Sq variation. In this manner we remove from Sq the noncyclic change, which is part of Dst variation, and also evaluate Sq from the midnight level.

The 12 sets of the monthly average Sq so determined for the year are expanded in a double Fourier series with local time, t, and month number, s, as two variables:

$$S_q(t,s) = \sum_m \sum_n A_{mn} \cos(mt + \alpha_m) \cos(ns + \beta_n) \qquad (3)$$

This representation allows us to calculate Sq(T) at any UT hour, T, of the year. This procedure is applied to each observatory.

The Hourly Equatorial Dst Index.

For each observatory the disturbance variation, D(T), is defined by :

$$D(T) = \Delta H(T) - S_q(T) \qquad (4)$$

Then D(T) is averaged over the four observatories and normalized to the dipole equator by :

$$Dst(T) = D(T) \; / \; \cos\varphi$$

where the denominator is the average of the cosines of the dipole latitudes, ϕ_i (i=1,4), of the observatories contributing to the average. This normalization procedure has been found to minimize undesired effects from missing hourly values.

Monthly tables of hourly Dst-values are given pages 92-103, followed by a table of mean values (page 104). The graph of hourly values for the whole year is given pages 89-91; the table of monthly and yearly mean values from 1959 onwards is given page 105.

TABLE 4

List of AE observatories

Observatory	*Symbol*	*Geographic*		*Geomagnetic*	
		Lat. (°N)	*Long. (°E)*	*Lat.(°N)*	*Long. (°E)*
Abisko	ABK	68.36	18.82	66.04	115.08
Dixon Island	DIK	73.55	80.57	63.02	161.57
Cape Chelyuskin	CCS	77.72	104.28	66.26	176.46
Tixie Bay	TIK	71.58	129.00	60.44	191.41
Cape Wellen	CWE	66.17	190.17	61.79	237.10
Barrow	BRW	71.30	203.25	68.54	241.15
College	CMO	64.87	212.17	64.63	256.52
Yellowknife	YKC	62.40	245.60	69.00	292.80
Fort Churchill	FCC	58.80	265.90	68.70	322.77
Poste de la Baleine	PBQ	55.27	282.22	66.58	347.36
Narssarssuaq	NAQ	61.20	314.16	71.21	36.79
Leirvogur	LRV	64.18	338.30	70.22	71.04

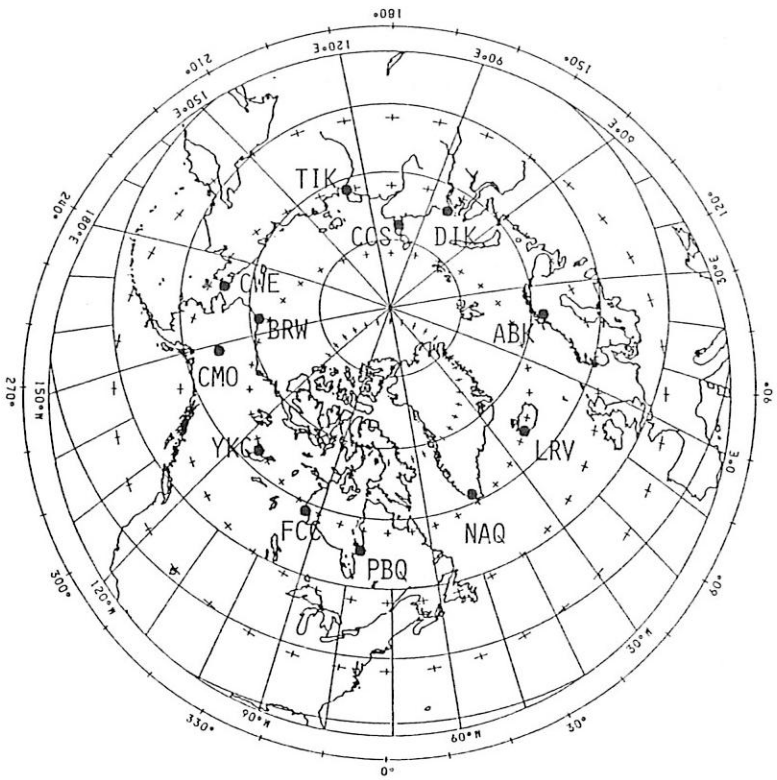

Figure 4 : Distribution of AE(12) stations

1.3.5. AE INDEX

The AE indices are derived from geomagnetic variations in the horizontal component observed at selected observatories along the auroral zone in the northern hemisphere (Figure 4, Table 4). These variations are measured from a base line determined for each of the observatories. For each given time (UT), at one minute intervals the AU and AL indices are respectively defined as the maximum and minimum values among the one minute values of the variations from all the AE observatories at this UT. The AE index is defined by AU-AL, A0 is (AU+AL)/2.

For the sake of simplicity the term "AE (Auroral Electrojet) indices" is generally used to mean all the AE associated indices, i.e. AU, AL, AE and A0. In a superposed plot of one minute values of H from all the AE observatories with a common time axis the AU and AL indices represent the upper and lower envelopes of the plotted points, respectively, and the AE value gives the separation of these envelopes.

The AU and AL indices are intended to represent a measure of the maximum current density of the eastward and westward auroral electrojets, respectively. The AE index represents a measure of global auroral electrojet activity.

One minute values of the AE indices (AU, AL, AE and A0) are calculated at the Data Analysis Center for Geomagnetism and Spacemagnetism, (same address as WDC-C, Table 1-a) and detailed plots and tables are given in the Data Book series of the World Data Center C2 for Geomagnetism. One minute values of these indices are available on magnetic tape at the World Data Center-A for Solar Terrestrial Physics in Boulder, Colorado and at the World Data Center-C2 for Geomagnetism in Kyoto (See Table 1-a).

For the year 1990 the data from Dixon Island were not available in time for the preparation of the AE indices to be published in the present Bulletin 32. Regretably, therefore, Provisional AE indices, AE(11), derived without data from Dixon Island, are given in this issue. It is also noted that in this preliminary version of the AE indices the data from the remaining eleven observatories have been scrutinized with less vigor than usually done in the derivation of the definitive AE indices.

Tables of hourly average of AU, AL and AE are given pages 110-133; graph is given page 109.The hourly averages of AU, AL and AE are computed from the one minute values of the respective indices, therefore they may not necessarily satisfy the relationship AU - AL =AE exactly. Similarly the daily mean indices are averages of the one minute values for the whole day and are not the daily means of the hourly averages. The monthly and yearly mean values from 1957 until 1990 are given page 134.

1.4. CLASSIFICATION OF DAYS

The list of the international five quietest days and the selection of the 24-hour and 48-hour intervals which are really quiet (C) or very quiet (K) are given month by month pages 139-140. They are presented on an annual diagram for 1990 page 138. The list of the international quietest and of the more disturbed days, and a list of magnetic storms are also given page 141. These classifications are made according to the following.

1.4.1. CLASSIFICATION DEDUCED FROM KP INDICES

The selection of the quietest and most disturbed days of each month is made on the basis of three criteria :

(a) = the sum of the eight values of Kp ;
(b) = the sum of the squares of these values ;
(c) = the greatest of the eight values of Kp.

According to each of these criteria, a relative "order number" is assigned to each day of a month, the three order numbers are averaged and the days with the lowest and the highest mean order numbers are selected as the five quietest, the ten quietest and the five most disturbed days (Table page 141, with a list of magnetic storms).

It should be noted that these selection criteria give only a relative indication of the character of the selected days with respect to the other days of the same month. As the general disturbance level may be quite different for different years and also for different months of the same year, the selected quietest days of a month may sometimes be rather disturbed or vice versa.

In order to indicate such a situation, selected days which do not satisfy certain absolute criteria are marked as follows.

- A selected "quiet day" is considered "not really quiet" and is marked by the letter A if for that day : $Ap > 6$, or marked by the letter K if $Ap \leq 6$, with one Kp value greater than 3 or two Kp values greater than 2+.

- A selected "disturbed day" is considered "not really disturbed" and marked by an asterisk if $Ap < 20$ (see P.N. Mayaud, Ann. Géophys., *26*, 901, 1969).

1.4.2. CLASSIFICATION DEDUCED FROM AA INDICES

The selection of the quiet 24-hour intervals is made firstly on the basis of the mean value of aa which must be lower than the fixed value : 13 nT. Then, each individual aa value of the day is represented by a weight p, namely :

p	0	1	2	4	6
aa	≤ 17	$17 < aa \leq 21$	$21 < aa \leq 28$	$28 < aa \leq 32$	> 32

A day with a mean value of $aa \leq 13$nT and for which Σp is higher than, or equal to 4 is a quiet K-day ; if Σp is lower than 4, the day is a really quiet C-day.

The same rules are applied to select the 48-hour quiet or really quiet intervals, with the same limit for the aa mean value (13 nT) and a limit for Σp equal to 6. One must note that in these intervals every local day (0 h to 24 h in local time) is really quiet, at any longitude. For further details, see P. N. Mayaud, *Derivation, Meaning and Use of Geomagnetic Indices*, Geophys. Monograph 22, Am. Geophys. Union, Washington 1980

1.5. RAPID VARIATIONS

1.5.1. STORM SUDDEN COMMENCEMENTS (SSC)

The old definition, that said that "an ssc is a sudden commencement of a magnetic storm", is now changed into "sudden commencements followed by a magnetic storm *or* by an increase in activity lasting at least one hour".

The change was introduced by P. N. Mayaud (IAGA Bulletin 33 : "*A Hundred Years Series of Geomagnetic Data, 1868-1967. Indices aa and storm sudden commencements*"; see also IAGA Bulletin 39 : "*Supplementary Geomagnetic Data 1957-1975*", including a new list of ssc's 1968-1975). In this new definition more importance is given to the change of rhythm in the magnetic activity, than to the amplitude of the magnetic storm, and therefore some ssc's included in the list are not followed by a real magnetic storm.

The routine procedure of the Service in establishing the final list consists essentially of several steps, following as much as possible the instructions given by Mayaud in order to get a continuous series of homogeneous data.

Step 1. From the monthly reports of Rapid Variations prepared by 45 magnetic observatories (see list page 146), a combined list of all events is compiled.

Step 2. This list is checked against the magnetograms of two low latitude observatories (HON and EBR), and cases reported by only a very few observatories and that are clearly not an ssc in the magnetograms of HON and EBR, are eliminated.

Step 3. All other cases are then included in a new list, and copies of the magnetograms for all of them are requested from the five collaborating low latitude observatories, that are regularly spaced in longitude (Table 5a), or from their supplementary observatories (Table 5b).

Step 4. From the copies of the magnetograms sent by the five observatories as a reply to Step 3, every ssc is evaluated independently for each observatory and a number (0 to 3) is assigned to each event, in the following scale :

0. the event could have escaped the attention of the observers or does not deserve to be called an ssc,
1. the event is possibly an ssc, but is not clear enough in itself to be identified as a true ssc without inspection of other records at different longitudes,
2. the event can be unmistakably identified as an ssc from the single record on consideration,
3. is assigned, instead of 2, when the event presents a very sharp change of rhythm in the agitation, has a large amplitude and its general morphology is remarkable.

If an event gets three codes 0 out of the five observatories, it is rejected from the list.

Step 5. Finally the duration in minutes, and the amplitude in nT are measured on the copies from the five observatories and their mean values are calculated.

TABLE 5

a - Collaborating Observatories for Rapid Variations

Observatory	*Symbol*	*Geographic*		*Geomagnetic*	
		Lat. (°N)	*Long. (°E)*	*Lat. (°N)*	*Long. (°E)*
MBOUR	MBO	14.40	343.02	20.68	56.80
FUQUENE	FUQ	5.47	286.27	16.47	357.07
HONOLULU	HON	21.32	202.00	21.46	268.57
PORT MORESBY	PMG	-9.40	147.15	-17.99	219.75
ALIBAG	ABG	18.63	72.87	9.64	145.39

b - Supplementary Observatories

Observatory	*Symbol*	*Geographic*		*Geomagnetic*	
		Lat. (°N)	*Long. (°E)*	*Lat. (°N)*	*Long. (°E)*
TENERIFE	SZT	28.48	343.72	34.60	60.30
SAN JUAN	SJG	18.38	293.88	29.36	5.21
APIA	API	-13.80	188.22	-15.61	261.99
KANOYA	KNY	31.42	130.88	21.12	199.85
HYDERABAD	HYB	17.42	78.55	7.86	150.69

In the list of storm sudden commencements (section 5.1., pages 146-148) the following indications are given for each event :

a) Day, hour and minute (mean value taken from the monthly reports); first and last minutes thus reported are given in brackets at the end of the line.

b) The five number codes (one for each collaborating observatory) ; if some figures are underlined, it means that the replacement observatory was used.

c) The mean average duration, in minutes, of the event and its average amplitude, in nT.

d) The following figures indicate the number of observatories that in the monthly reports have characterized the ssc by each of the three letters A, B, or C, their meaning being :

A = very remarkable
B = fair, ordinary but unmistakable
C = very poor, doubtful.

Please note that the 0 to 3 qualification is given by the Service on Rapid Variations, independently from these A, B, C, qualifications which are given by the observatories, although some sort of correlation must exist among them.

The last group indicates the number of observatories that have classified the event other than an ssc, namely :

si = sudden impulse, but not an ssc,
sfe = solar flare effect
b = bay-like disturbance.

1.5.2 SOLAR FLARE EFFECTS (SFE).

The aim of the Service is to provide a reliable list of times when a magnetic solar flare effect did occur. Unfortunately, the reports on solar flare effects are not provided by all the observatories sending regularly the monthly reports on Rapid Magnetic Variations to the Service. As the sfe is a phenomenon dependent of longitude, it is not an easy task to provide a complete round the world coverage.

Step 1. The list of all times given in the monthly reports from observatories as possible occurrences of sfe's are checked with data taken mainly from Solar Geophysical Data, on the occurrence of alpha-flares, radio bursts or SID's, as, by definition, the crochet-like disturbance in the magnetograms must be an effect from solar activity and more precisely of a light emission from the Sun.

Times that are not correlated with any of these solar or ionospheric phenomena are eliminated from the list except in the cases when they were reported by more than one observatory or when a single observatory gave the time with the indication that it was confirmed. These exceptions try to take into account the fact that the correlation between solar events and magnetic crochets is not hundred percent.

Step 2. The list prepared in such a way is sent to all magnetic observatories, as a *checking list*, and they are asked to inspect their magnetograms and provide their judgement in two steps :

First : Do the magnetic records show a movement at the time given?

The answer is given by the following letters :

A = very clear movement
B = fair, ordinary movement
C = very poor movement
D = movement not observed, although records are satisfactory
E = movement cannot be observed due to heavy disturbance
X = record missing

Please note that this letter index refers only to the existence of a movement in the curves and not to the opinion of this movement being or not being a sfe.

Second : The opinion of this movement being or not a sfe is given after letters A, B, and possibly C, by a number index :

3 certainly a sfe
2 probably a sfe
1 probably not a sfe
0 certainly not a sfe

The answers from observatories are plotted into world maps for each event ; in these maps are also drawn times showing the sunlit hemisphere and the twilight zones.

Step 3. From these maps a judgement is made about the event being or not a sfe. A simultaneous judgment is done about the existence or not of a solar, ionospheric and radio-sun event that could be the cause of the magnetic disturbance. And finally each event is classified as a sfe, a doubtful sfe or a rejected sfe.

Tables for solar flare effects and for doubtful solar flare effects are given in Section 5.2. of the present Bulletin for the year 1990 (pages 151-178). The format is the following :

a) A summary list gives for each month, the day and time of the beginning of sfe; if the sfe is confirmed the letter C follows the time of the event. Then are indicated the number of observatories having reported a movement (letters A, B, C, see explanation in *Step 2* above), and the number of observatories having not reported any movement (letters D, E, X, see *Step 2* above).

b) It is followed by detailed tables giving for each event the list of observatories reporting it with the number-index, arranged according to the classifying letter and to longitude.

Stations in the twilight zone, reporting a movement (A, B, C and also E and X) are indicated by normal brackets; those in the night-side of the earth by square brackets. Station in these two zones reporting D have been omitted from the lists

The separation into such two tables of sfe and "doubtful" sfe may be rather subjective, due to the fact that we do not really know the mechanism linking the radiation emission from a flare and its effect on the magnetic records.

For instance, if we accept that the link is an ionising radiation from a solar flare producing an electric current in some region of the sunlit ionosphere, can this current extend its effect into the night hemisphere of the earth? And can all flares, observed in the alpha-light, produce such ionisation ? We are aware, from observations of solar flux, that not all frequencies produce similar magnetic effects. Satellite observations of X-ray flares may help in solving these and similar questions, but until now we have a fairly good coverage of alpha-flares and a rather limited of X-flares. Moreover it must be taken into account that not all flares have the same emission of energy and that their effects on the earth therefore may be limited to a smaller, or to a larger region of the earth.

Following the same kind of reasoning, we may find different effects due to the geometric relative position of the angle of emission in the Sun and the angle of reception at the earth.

For all these reasons, the tables of solar-flare-effects do not appear to be directly usable for detailed statistical studies, but they may be a good indication for researchers, where to look in the magnetic records when they study some particular event.

SECTION 2

LIST OF OBSERVATORIES

LIST OF OBSERVATORIES

IAGA Code	Name	Geographic		Geomagnetic		Alt. (m)	K=9 lower limit	Open -Closed
		Lat.	Long.	Lat.	Long.			
ABN	ABINGER	51.18	359.61	53.58	84.55	244	520	1925-1957
ABK	ABISKO	68.36	18.82	65.88	115.50	380		1945
AAE	ADDIS ABABA	9.03	38.77	5.19	110.97	2442		1958
ADE	ADELAIDE	-34.60	138.40	-43.99	214.06			1973
AGN	AGINCOURT	43.78	280.73	54.65	349.54	175	700	1881-1969
AHM	AHMEDABAD	23.02	72.60	14.03	145.65			1973
ALE	ALERT	82.50	297.50	86.24	163.08	2260		1961
ABG	ALIBAG	18.63	72.87	9.64	145.39	10		1904
AAA	ALMA ATA	43.25	76.92	33.69	152.21	1300		1963
ALM	ALMERIA	36.85	357.53	40.16	76.83	65		1955
ALU	ALOUSHTA	44.68	34.42	40.86	114.94			1957
AML	AMBERLEY	-43.15	172.72	-47.16	254.00	40	530	1929-1977
AWS	ANDREWS AFB	38.20	282.63	49.13	352.23			1972
ANN	ANNAMALAINAGAR	11.40	79.68	1.77	151.20	0		1957
TAN	ANTANANARIVO	-18.92	47.55	-23.85	114.58	1375		1902
ANO	ANTIPOLO	14.60	121.17	3.50	191.60	220		1910-1938
APA	APATITY	67.55	33.33	62.78	125.99			1973
API	APIA	-13.80	188.22	-15.61	261.99	2		1905
ART	ARCTOWSKI	-62.16	301.52	-51.33	9.25	16		1978
ARE	AREQUIPA	-16.47	288.52	-5.45	359.45			1958
AIA	ARGENTINE ISLAND	-65.20	295.70	-54.23	4.73	10	490	1957
SV3	ARTI	56.43	58.43	48.50	139.90			1973
ASH	ASHKHABAD	37.95	58.10	30.58	134.62		300	1958
ASO	ASO	32.88	131.02	22.58	199.85	570		1940
PEG	ATHENS	37.97	23.72	32.60	121.60	110		1900-1908
AUT	AU-TAU	22.45	114.05	11.20	184.60	60		1928-1939
AVE	AVERROES	37.99	14.02	38.13	93.59	230		1970
BKC	BACK	57.69	265.77	67.43	326.54			1978
BAG	BAGUIO	16.42	120.60	5.61	191.08	440		1967
BAL	BALDWIN	38.78	264.83	48.90	330.60	340		1901-1909
BLC	BAKER LAKE	64.33	263.97	73.67	319.15	30		1951
BNG	BANGUI	4.43	18.57	4.45	90.33	390		1952
BAP	BARRACKPORE	22.78	88.36	12.20	160.30	10		1904-1914
BRW	BARROW	71.30	203.25	69.10	243.67	7		1949
BTH	BARTH	54.37	12.75	55.00	99.90	20		1898-1903
BTV	BATAVIA	-6.18	106.83	-17.19	177.64	10		1884-1944
BJI	BEI-JING	40.06	116.18	29.12	186.20	43		1957
KGD	BEREZNIAKI	49.82	73.08	40.30	150.00			1965
BEL	BELSK	51.83	20.80	50.19	105.24	180		1960
BIN	BINZA	-4.38	15.26	-3.57	85.40	300		1953
BJN	BJORNOYA	74.50	19.20	71.06	124.67	80		1951
BOC	BOCHUM	51.49	7.23	52.42	92.24	120		1893-1912

LIST OF OBSERVATORIES (continued)

IAGA Code	Name	Geographic		Geomagnetic		Alt. (m)	K=9 lower limit	Open -Closed
		Lat.	Long.	Lat.	Long.			
BGA	BORGA	-72.97	356.20	-66.46	42.49			1975
BOX	BOROK	58.03	38.97	52.97	324.23			1977
BOU	BOULDER	40.13	254.77	48.88	319.04	1675		1964
BZR	BOUZAREAH	36.80	3.02	39.20	82.40	340		1912-1920
BJE	BRORFELDE	55.63	11.67	55.80	97.60	80		1978
BVZ	BUDAKESZI	47.52	18.90	46.40	101.80	410		1949-1955
BDV	BUDKOV	49.07	14.02	48.82	97.64	496		1967
BY1	BYRD STATION 1	-79.98	240.00	-70.60	336.60	1515		1957-1961
BY2	BYRD STATION 2	-80.01	240.51	-70.60	336.90	1515		1962-1965
CBB	CAMBRIDGE BAY	69.10	255.00	76.77	299.13	17		1972
CAN	CANBERRA	-35.30	149.00	-43.38	226.09	850	420	1980
CCS	CAPE CHELYUSKIN	77.72	104.28	66.72	177.41	10		1935
CGH	CAPE OF GOOD HOPE	-33.93	18.48	-33.10	81.80			1842-1846
CTO	CAPE TOWN	-33.95	18.47	-33.12	82.06	20		1932-1940
CWE	CAPE WELLEN	66.17	190.17	62.36	239.37	10		1933
CY.	CAPO DI MONTE	40.86	14.26	40.90	94.80	160		1883-1911
CPI	CAPRI	40.55	14.22	40.58	94.60			1957
CAO	CASTELLACCIO	44.43	8.93	45.34	90.82	1175	350	1933
CRC	CASTLE ROCK	37.23	237.87	43.56	301.06		460	1970
HVN	CENTRO GEOFISICO	22.97	277.86	34.00	347.40			1965
CPA	CHA-PA	22.35	103.83	11.38	175.03	1550		1957
CLF	CHAMBON LA FORET	48.02	2.27	50.06	85.71			1936
CLH	CHELTENHAM	38.70	283.20	49.65	352.89	72	530	1901-1956
CBI	CHICHIJIMA	27.15	142.30	17.80	210.78	154		1973
CHR	CHRISTCHURCH	43.54	172.62	47.60	254.3	10		1902-1928
COI	COIMBRA	40.22	351.58	44.53	71.78	140		1866
BOM	COLABA	18.90	72.82	9.70	145.30	10		1846-1905
CMO	COLLEGE 2	64.87	212.17	65.10	259.23	200		1948
CLL	COLLMBERG	51.32	13.00	51.16	97.70			1935
CSS	COLORADO SPRINGS	38.50	255.51	47.36	320.27			1973
COP	COPENHAGEN	55.69	12.58	55.39	99.64			1892-1900
CZT	CROZET	-46.43	51.87	-51.49	111.46	500		1974
DAL	DALLAS	32.98	263.25	42.73	330.14	210		1964-1974
DRS	DAR ES SALAAM	-6.51	39.18	-10.17	108.56			1896-1900
DAV	DAVAO	7.08	125.58	-3.49	196.39			1968
DVS	DAVIS	-68.60	78.00	-76.81	124.34			1973
DBN	DE BILT	52.10	5.18	53.40	90.56			1899-1938
DDI	DEHRA DUN	30.32	78.06	20.50	151.60	680		1903-1943
DIK	DIXON	73.55	80.57	63.36	162.45	20		1933
DOB	DOMBAS	62.07	9.12	61.97	100.94	660		1916
DOU	DOURBES	50.10	4.60	51.60	88.99	208		1955
DL	DUBLIN	53.35	353.73	56.90	80.00			1841-1850

LIST OF OBSERVATORIES (continued)

IAGA Code	Name	Geographic		Geomagnetic		Alt. (m)	K=9 lower limit	Open -Closed
		Lat.	Long.	Lat.	Long.			
DRV	DUMONT DURVILLE	-66.66	140.01	-75.06	232.15	40		1957
TFS	DUSHETI	42.08	44.70	36.50	23.50	982		1938
KIV	DYMER	50.72	30.30	47.30	113.60	100		1964
EAA	EAST ANGLIA	52.63	1.30	54.64	87.01			1973
EIC	EASTER ISLAND	-27.17	250.58	-18.37	324.28			1959-1963
EP.	EASTPORT	44.90	293.02	56.20	4.80			1860-1867
EBR	EBRO	40.82	0.50	43.45	81.13	50		1910
ENB	EIELSON AFB	64.67	212.92	65.06	260.11			1966
ELI	ELIZABETHVILLE	-11.63	27.42	-13.00	95.93	1230		1932-1957
ESK	ESKDALEMUIR	55.32	356.80	58.04	84.07	245	660	1908
EKP	ESKIMO POINT	61.10	265.93	70.78	324.73			1973
EYR	EYREWELL	-43.41	172.35	-47.48	253.71	390	540	1979
FAL	FALMOUTH	50.15	354.92	53.60	79.40	50		1892-1912
FCC	FORT CHURCHILL 1	58.80	265.90	68.53	325.60	15		1964
FCC	FORT CHURCHILL 2	58.77	265.73	68.70	325.20	15		1964
FMM	FORT MCMURRAY	56.70	248.60	64.18	305.05			1973
FSV	FORT SEVERN	55.98	272.35	66.34	336.32			1977
FSM	FORT SMITH	58.00	246.00	65.01	301.02			1973
FYU	FORT YUKON	66.57	214.70	67.08	259.59			1957
FRD	FREDERICKSBURG	38.20	282.63	49.13	352.23	69	520	1956
FTN	FREETOWN	8.46	346.79	14.21	59.59			1961-1967
FUQ	FUQUENE	5.47	286.27	16.47	357.07	2543		1954
FUR	FURSTENFELDBRUCK	48.17	11.28	48.48	94.62	572		1939
GEN	GENOVA MC	44.55	8.96	45.50	91.00	700		1958-1962
GEN	GENOVA C	44.43	8.93	45.50	91.00	350		1933-1969
GIT	GILGIT	35.93	74.30	26.67	148.86	1494		1967
GIM	GILLAM	56.40	265.30	66.11	326.54			1975
GIR	GIRARDVILLE	49.00	287.40	60.01	357.77			1973
GNA	GNANGARA	-31.78	115.95	-42.71	187.94	60	440	1959
GDH	GODHAVN	69.23	306.48	79.25	34.62	8		1926
GOT	GOTTINGEN	51.55	9.97	51.97	95.00	270		1957
GVD	GONZALES VIDELA	-64.82	297.15	-53.88	5.80	60		1961
VLA	GORNOTAYEZHNAYA	43.68	132.17	30.10	199.60	200		1958
GRM	GRAHAMSTOWN	-33.28	26.48	-34.01	90.04	650		1974
GWC	GREAT WHALE RIVER	55.30	282.25	66.21	350.32	25		1965
GRW	GREENWICH	51.48	0.00	53.79	85.10	50		1846-1925
GCK	GROCKA	44.63	20.77	43.28	102.27	231		1958
GUA	GUAM	13.58	144.87	4.57	214.76	150		1957
HLL	HALLET	-72.32	170.22	-74.42	278.16			1957-1963
HBA	HALLEY BAY	-75.50	333.40	-66.36	25.85	30		1957
HBK	HARTEBEESTHOEK	-25.88	27.71	-27.01	93.14			1980
HAD	HARTLAND	50.98	355.52	54.17	80.29	95	530	1957

LIST OF OBSERVATORIES (continued)

IAGA Code	Name	Geographic		Geomagnetic		Alt. (m)	K=9 lower limit	Open -Closed
		Lat.	Long.	Lat.	Long.			
HTY	HATIZYO	33.07	139.83	23.45	207.83			1978
HVN	HAVANA	22.97	277.85	33.75	347.53			1964
HII	HEARD ISLAND	-53.03	73.37	-61.50	132.30	10		1950-1954
HIS	HEISS ISLAND	80.62	58.05	71.60	156.33	20		1959
HLP	HEL	54.60	18.82	53.19	104.80	4		1957
HLW	HELWAN	29.87	31.33	26.98	108.01	120		1903-1959
HCR	HERCHMER	57.40	265.90	67.16	326.86			1973
HER	HERMANUS	-34.42	19.23	-33.73	82.67	26	300	1941
HNA	HOLLANDIA	-2.57	140.52	-11.94	212.17	98		1957-1962
HKC	HONG KONG 1	22.30	114.18	11.00	184.70	30		1884-1928
HKC	HONG KONG 2	22.20	114.20	11.22	184.82	555		1972
HON	HONOLULU 1-2-3	21.32	202.00	21.46	268.57	4		1902
HUA	HUANCAYO	-12.05	284.67	-1.06	355.67	3313		1922
HRB	HURBANOVO	47.87	18.18	46.89	101.07	120		1938
HYB	HYDERABAD	17.42	78.55	7.86	150.69	500		1965
IBD	IBADAN	7.43	3.90	10.17	76.46	300		1956
IRT	IRKUTSK	52.17	104.45	41.18	176.22	470		1887-1914
ISL	ISLAND LAKE	53.90	265.30	63.65	327.61			1976
ISK	ISTANBUL KANDILLY	41.07	29.07	38.31	108.87	130		1947
JSS	JASSY	47.18	27.53	44.40	109.60			1935-1957
KAK	KAKIOKA	36.23	140.18	26.62	207.77	28		1913
KNG	KALININGRAD	54.60	20.20	52.94	106.06			1964
KNY	KANOYA	31.42	130.88	21.12	199.85	105		1957
KNZ	KANOZAN	35.25	139.97	25.63	207.70	342		1961
KGD	KARAGANDA	49.82	73.08	40.56	150.04			1966
TFS	KARSANI	41.83	42.70	36.20	123.50	1100		1905-1934
KZN	KAZAN	55.83	48.85	49.36	131.52	80		1909
KEL	KELES	41.42	69.20	32.40	145.20	450		1936-1963
KEM	KEM	65.00	34.40	60.26	124.74			1973
KEW	KEW	51.47	359.68	54.10	85.10	10		1857-1924
KHB	KHABAROVSK	48.48	135.07	38.39	201.74			1972
KIV	KIEV	50.72	30.30	47.42	113.40	100		1963
KIR	KIRUNA	67.83	20.42	65.14	116.19	390		1950
KLY	KLYUCHI	55.03	82.90	44.70	159.00			1967
KOD	KODAIKANAL	10.23	77.47	0.81	148.93	2323		1902
KTS	KORETS	50.60	61.07	42.64	140.10			1968
KOR	KOROR	7.33	134.50	-2.64	205.21	10		1957-1966
MOS	KRASNAYA	55.47	37.32	50.70	121.70	190		1930
KSA	KSARA	33.82	35.88	30.03	113.26	920		1937-1968
KUY	KUYPER	-6.03	106.73	-17.04	177.54	1		1950-1962
KWJ	KWAJALEIN	9.05	167.20	3.13	237.11			1973
AQU	L'AQUILA	42.38	13.32	42.52	94.35	682		1960

LIST OF OBSERVATORIES (continued)

IAGA Code	Name	Geographic		Geomagnetic		Alt. (m)	K=9 lower limit	Open -Closed
		Lat.	Long.	Lat.	Long.			
LQA	LA QUIACA	-22.10	294.40	-11.13	5.01	3464		1920
LAS	LAS ACACIAS	-35.00	302.32	-24.24	11.86	20		1964
LDR	LAUDER	-43.03	169.41	-37.70	232.10	370		1977
LRV	LEIRVOGUR	64.18	338.30	69.71	71.98	30		1957
LNN	LENINGRAD	59.95	30.70	56.14	118.32	70		1869-1877
LER	LERWICK	60.13	358.82	62.15	89.55	105	920	1923
LIS	LISBON	38.72	350.85	43.30	70.60			1890-1900
LGR	LOGRONO	42.45	357.50	45.59	78.66	445		1957
MMK	LOPARSKAYA	68.25	33.08	63.30	126.70	200		1961
LOB	LORING AFB	46.95	292.12	57.95	3.89			1966
LA.	LOS ANGELES	34.05	241.74	41.20	305.70			1882-1889
LMM	LOURENCO MARQUES	-25.92	32.58	-27.98	97.96	40		1957
LOV	LOVO	59.35	17.83	57.84	106.75	25	720	1928
LOZ	LOVOZERO	67.97	35.02	62.90	127.64			1957
LUA	LUANDA	-8.92	13.17	-7.63	82.48	53		1956
LB	LUBECK	53.86	10.69	54.00	97.00			1885-1893
LUK	LUKIAPANG	31.32	121.03	20.20	190.80	100		1908-1933
LNP	LUNPING	25.00	121.17	14.21	191.28		100	1965
LVV	LVOV	49.90	23.75	47.80	107.10	400		1952
LWI	LWIRO	-2.25	28.80	-4.06	99.10	1680		1958-1970
MBO	MBOUR	14.40	343.02	20.68	56.80	10		1952
MCQ	MACQUARIE ISLAND	-54.50	158.95	-60.54	244.48	4		1951
MGD	MAGADAN	60.12	151.02	51.28	212.15		610	1966
MSC	MAISACH	48.20	11.26	48.50	94.90	480		1927-1932
MQ	MAKERSTOUN	55.58	357.48	52.20	85.30			1841-1849
MAB	MANHAY	50.30	5.68	51.60	90.15	440		1936-1971
MAN	MANILA	14.58	120.98	3.50	191.40			1891-1904
MRN	MARION ISLAND	-46.85	37.87	-49.30	96.75	45		1972
AMS	MARTIN DE VIVIES	-37.83	77.57	-46.94	142.78			1981
MSR	MATOCHKIN SHAR	73.26	56.40	64.80	147.40	250		1937-1944
MRI	MAURITIUS	-20.09	57.55	-26.80	124.40	50		1892-1965
MAW	MAWSON	-67.60	62.88	-73.32	106.62	6		1955
MEA	MEANOOK	54.62	246.67	61.88	304.02	686	1360	1916
MEL	MELBOURNE	-37.83	144.98	46.60	222.30	30		1865-1921
MEV	MELVILLE AFB	53.28	299.47	64.05	14.25			1966
MMB	MEMAMBETSU	43.90	144.20	34.61	210.23	39	340	1950
MNK	MINSK	54.10	26.52	51.32	111.51			1961
MIR	MIRNY	-66.55	93.02	-76.80	151.15		20	1956
MLT	MISALLAT	29.52	30.90	26.72	107.52	120		1960
MIU	MIYAZU	35.32	135.11	25.30	203.32			1973
MIZ	MIZUSAWA	39.01	141.08	29.47	208.21			1969
MFP	MOCA	3.35	8.67	5.27	80.39	1949		1958-1971

LIST OF OBSERVATORIES (continued)

IAGA Code	Name	Geographic		Geomagnetic		Alt. (m)	K=9 lower limit	Open -Closed
		Lat.	Long.	Lat.	Long.			
MOL	MOLODEZHNAYA	67.67	45.85	70.10	87.50	854		1965
MOS	MOSCOW	55.48	37.32	50.79	121.62	190		1880-1888
MBC	MOULD BAY	76.30	240.60	79.62	259.89	150		1962
MWC	MT WILSON	34.14	241.97	41.19	306.30			1926-1958
MNH	MUNCHEN	48.15	11.61	48.40	95.20	530		1842-1926
MUT	MUNTINLUPA	14.37	121.02	3.58	191.57	62		1951
MMK	MURMANSK	68.25	33.08	63.45	126.43	210		1958-1960
NCK	NAGYCENK	47.63	16.72	46.93	99.59	160		1961
NAI	NAIROBI	-1.28	36.83	-4.60	107.19	1673		1964
NTS	NANTES	47.25	358.44	50.10	81.70	35		1923-1958
NAQ	NARSSARSSUAQ	61.20	314.6O	70.60	38.66	4		1973
NL	NEW ALESUND	78.92	11.93	75.43	130.70	12		1966
NEW	NEWPORT	48.27	242.88	55.14	302.78	780	700	1966
NYI	NEW YEAR ISLAND	54.65	295.85	43.30	5.20			1902-1916
NCE	NICE	43.72	7.30	45.00	89.00			1889-1901
NGK	NIEMEGK	52.07	12.68	51.94	97.77	78	500	1932
NSM	NITSANIM	31.73	34.60	28.21	111.55	150		1963-1967
NOK	NORILSK	69.20	88.00	58.68	165.77			1969
NKK	NOVOKAZALINSK	45.77	62.12	37.76	139.83			1974
NVL	NOVOLAZAREVSKAYA	-70.77	11.82	-66.76	55.88	460		1961
NVS	NOVOSIBIRSK	55.03	82.90	44.92	159.07		480	1967
NUR	NURMIJARVI	60.52	24.65	57.71	113.51	105		1953
ODE	ODESSA	46.78	30.88	43.52	112.42	50		1896-1925
OGY	O'GYALIA	47.88	18.19	46.80	101.30	110		1906-1912
OKN	OKINAWA	24.75	125.33	14.14	195.18			1977
ORC	ORCADAS DEL SUR	-60.74	315.22	-50.30	20.00	4		1931-1962
OSL	OSLO	59.98	10.72	59.60	101.10			1843-1930
OTT	OTTAWA	45.40	284.45	56.37	354.11	75	790	1968
PAG	PANAGYURISHTE	42.52	24.18	40.61	104.75	556		1948
PPT	PAPEETE	-17.55	210.38	-15.09	284.44			1958
PAB	PARAMARIBO	5.82	304.78	16.41	16.28	2		1957
PET	PARATUNKA	53.10	158.63	44.80	220.00	110		1973
IRK	PATRONY	52.17	104.45	40.90	176.10	500		1959
PEB	PELLY BAY	68.50	270.20	78.39	323.86			1977
PEK	PEKING 1	39.95	116.47	28.70	186.30			1870-1883
PEK	PEKING 2	40.04	116.18	28.80	186.10			1957-1964
PEG	PENDELI	38.03	23.52	36.38	102.73	495		1958
PRF	PERPIGNAN	42.70	2.88	44.90	84.30	30		1890-1900
PIL	PILAR	-31.67	296.12	-20.73	6.39	336		1905
PLS	PLAISANCE	-20.43	57.67	-27.02	124.68	123		1966
PZ	PLESHCHENITZI	54.50	27.88	51.40	113.10	200		1961
POD	PODKAMENAYA TUNG	61.40	90.00	50.84	165.64		670	1968

LIST OF OBSERVATORIES (continued)

IAGA Code	Name	Geographic		Geomagnetic		Alt. (m)	K=9 lower limit	Open -Closed
		Lat.	Long.	Lat.	Long.			
POL	POLA	44.86	13.26	44.80	95.90	30		1883-1922
PAF	PORT AUX FRANCAIS	-49.35	70.22	-57.31	130.79	50	750	1957
PMG	PORT MORESBY	-9.40	147.15	-17.99	219.75	80		1957
PBQ	POSTE DE LA BALEINE	55.30	287.25	66.31	357.38			1984
POT	POSTDAM	52.38	13.06	52.16	98.28	80		1890-1907
PRU	PRUHONICE	49.98	14.55	49.59	98.55	329		1946
QUE	QUETTA	30.18	66.95	21.77	141.35	1737		1953
RIT	RANKIN INLET	62.80	267.90	72.64	326.36			1975
REG	REGENSBERG	47.48	8.44	48.40	91.70	605		1957-1969
RES	RESOLUTE BAY	74.70	265.10	83.14	295.98	25		1954
RDJ	RIO DE JANEIRO	-22.91	316.83	-12.80	26.00	60		1899-1906
ROB	ROBURENT	44.30	7.88	45.41	89.74	815		1964
RSV	RUDE SKOV	55.85	12.45	55.56	99.61	48	600	1907-1978
SAB	SABHAWALA	30.33	77.80	20.78	151.34	498		1964
SFS	SAN FERNANDO	36.47	353.80	40.47	72.90	28		1891
SJG	SAN JUAN 1-2-3	18.38	293.88	29.36	5.21	100		1903
SNA	SANAE	-70.30	357.65	-64.23	46.20	52		1962
STJ	SAINT JOHNS	47.59	307.32	58.20	23.30			1968
PSM	SAINT MAUR	48.81	2.49	50.80	86.60			1883-1900
SMG	SAN MIGUEL	37.77	334.35	45.04	52.61	175		1911
SBA	SCOTT BASE	-77.85	166.78	-78.84	293.24	15		1957
SED	SEDDEN	52.28	13.01	52.10	98.50	40		1908-1931
STF	SDR STROMFJORD	67.02	309.28	76.83	36.25			1972
SSH	SHE-SHAN	31.10	121.19	20.30	191.03	100		1934
SHB	SHEPERD BAY	68.75	266.25	78.14	316.78			1966
SHL	SHILLONG	25.55	91.88	14.99	163.95			1975
SSO	SIMOSATO	33.57	135.93	23.62	204.24	59		1954-1978
SIT	SITKA	57.07	224.67	60.31	278.12	22	1020	1902
SOD	SODANKYLA	67.37	26.63	63.68	120.64	178		1914
SLU	SLUTSK	59.68	30.48	55.80	118.30			1878-1941
SGG	SOUTH GEORGIA	-54.28	323.52	-44.82	27.73		350	1974-1982
SPA	SOUTH POLE	-90.00	0.00	-78.98	0.00	2820		1959
SRE	SREDNIKAN	62.43	152.32	53.67	212.35	61		1936-1966
MGD	STEKOLNI	60.12	151.02	51.00	211.80			1966
ODE	STEPANOVKA	46.78	30.88	43.40	112.50	140		1948
STO	STONYHURST	53.85	357.53	56.52	83.91	116		1865-1967
SUA	SURLARI	44.68	26.25	42.32	107.42	84		1949
SVD	SVERDLOVSK	56.73	61.07	48.64	141.89	290	530	1887-1931
SWI	SWIDER	52.12	21.25	50.38	105.79	100		1921
SYO	SYOWA BASE	-69.03	39.60	-70.10	79.70	15		1958-1970
TAM	TAMANRASSET	22.80	5.53	24.94	81.23	1395		1932
TNG	TANGERANG	-6.17	106.63	-17.18	177.43	14		1964

LIST OF OBSERVATORIES (continued)

IAGA Code	Name	Geographic		Geomagnetic		Alt. (m)	K=9 lower limit	Open -Closed
		Lat.	Long.	Lat.	Long.			
TKT	TASHKENT	41.33	69.62	32.51	145.52	500		1883
TTB	TATUOCA	-1.20	311.48	8.98	220.50	10		1957-1971
TEH	TEHERAN	35.73	51.38	29.36	128.05	1367		1960-1973
SZT	TENERIFE	28.48	343.72	34.60	60.30	310		1959
TEO	TEOLOYUCAN	19.75	260.82	29.35	329.24	2280		1923
TAA	TERRE ADELIE	-66.67	140.02	-75.07	232.18	40		1957
TMP	THOMPSON	55.72	262.12	65.09	322.65			1969
THU	THULE/CAMP TUTO	76.55	291.17	87.53	11.26	480		1932-1952
THL	THULE/QANAQ	77.48	290.83	88.46	14.10	57		1956
TFS	TIFLIS	42.08	44.70	36.62	123.49	982		1879-1905
THY	TIHANY	46.90	17.90	46.01	100.41	187		1949
TKH	TIKHAYA BAY	80.30	52.80	71.74	153.42	10		1932-1958
TIP	TIRUCHIRAPALLI	10.80	78.70	1.26	150.19			1975
TIK	TIXIE BAY	71.58	129.00	60.99	192.81	40		1944
KAK	TOKYO	35.75	139.72	26.10	207.41	20		1897-1912
TOL	TOLEDO	39.88	355.95	43.39	76.18	501		1947
TMK	TOMSK	56.47	84.93	46.21	160.93	200	510	1958-1969
TOO	TOOLANGI	-37.53	145.47	-46.05	222.66	457	510	1922-1980
AGN	TORONTO	43.67	280.50	54.80	349.10			1872-1898
TLE	TOULOUSE	43.61	1.46	46.00	83.20	190		1894-1905
TGO	TOUNGOO	18.93	96.45	7.90	167.80	300		1905-1923
TOH	TOYOHARANEW	46.95	142.75	37.20	208.30	70		1932-1941
TRW	TRELEW	-43.25	294.68	-32.28	4.81		290	1957-1970
TRD	TRIVANDRUM	8.48	76.95	-0.88	148.24	300		1957
TRO	TROMSO	69.67	18.95	67.00	117.16	105		1930
TSN	TSINGTAO	36.07	120.32	25.00	189.90	80		1924-1936
TSU	TSUMEB	-19.22	17.70	-18.59	84.83	1300		1964
TUC	TUCSON	32.25	249.17	40.37	314.57	770	380	1910
TUL	TULSA	35.92	264.22	45.75	330.78	257		1961
UCC	UCCLE	50.80	4.36	52.30	89.40	100		1896-1919
UBA	ULAN BATOR	47.85	106.75	36.84	178.03			1966
WIT	UTRECHT	52.00	5.12	53.40	90.80			1891-1896
VLJ	VAL JOYEUX	48.82	2.02	50.87	85.83			1901-1936
VAL	VALENTIA	51.93	349.75	56.15	74.79	14		1899
VSS	VASSOURAS	-22.40	316.35	-12.53	25.70	457		1915
VIC	VICTORIA	48.52	236.58	54.33	295.66	185	660	1956
VQS	VIEQUES	18.15	294.55	29.11	5.93			1903-1924
VLA	VLADIVOSTOK	43.12	131.90	32.84	199.68			1932
LNN	VOEIKOVO	59.95	30.70	56.00	118.50	70		1947
VOR	VOROSHILOV	43.78	132.03	33.20	199.60	30		1952-1957
VOS	VOSTOK	-78.45	106.87	-89.31	139.62	3500		1958
SVD	VYSOKAYA	56.73	61.07	48.40	141.90	290		1932

LIST OF OBSERVATORIES (continued)

IAGA Code	Name	Geographic		Geomagnetic		Alt. (m)	K=9 lower limit	Open -Closed
		Lat.	Long.	Lat.	Long.			
WAT	WATHEROO	-30.30	115.90	-41.23	187.82	240		1919-1958
WES	WESTON	42.38	288.68	53.40	359.49			1960
WHS	WHITE SHELL	49.80	264.80	59.56	328.39			1975
WIK	WIEN	48.25	16.36	47.60	69.70			1892-1898
WIA	WIEN-AUHOF	48.20	16.24	47.50	69.60	2050		1929-1950
WIK	WIEN-KOBENZL	48.27	16.32	47.62	69.48	400		1954
WLH	WILHELMSHAVEN	53.53	8.15	54.20	94.50	10		1884-1911
WIL	WILKES	-66.25	110.58	-77.26	182.71			1957-1966
WNG	WINGST	53.75	9.07	54.22	95.21	50	550	1939
WNP	WINNIPEG	49.63	262.87	59.19	326.02			1969-1975
WIT	WITTEVEEN	52.82	6.67	53.79	92.39	17	540	1938-1988
YAK	YAKUTSK	62.02	129.72	51.53	195.40	100		1931
TKT	YANGI BAZAR	41.33	69.62	32.30	145.60	500		1964
YAU	YAUCA	-15.53	285.33	-4.54	356.36			1957-1960
YKC	YELLOWKNIFE	62.47	245.53	69.14	296.56	198		1958
YSS	YUZHNO SAKHALINSK	46.95	142.72	37.49	208.45			1948
KNK2	ZAIMISHCHE	55.83	48.85	49.20	131.60	80		1914-1972
ZAR	ZARIA	11.15	7.65	13.12	80.89			1964
ZKW	ZI KA WEI	31.22	121.43	20.20	191.20	10		1875-1907
ZIN	ZINZEN	37.48	126.63	26.60	195.30	50		1921-1941
ZSC	ZO SE	31.10	121.19	20.00	190.80	100		1933-1974
ZUY	ZUY	52.47	104.03	41.20	17.80	430		1915-1958

LIST OF OBSERVATORIES (continued)

Sites of observatories having provided records over 50 years or more

First Observatory Name	Open -Closed	Further Observatories, if any Name	Open -Closed
AGINCOURT	1881 - 1969	OTTAWA	1968 - ...
ALIBAG	1904 - ...		
AMBERLEY	1929 - 1977	LAUDER	1977 - ...
ANTANANARIVO	1890 - ... (1894 - 1901 and 1923 - 1928 missing)		
APIA	1905 - ...		
ASO	1940 - ...		
BATAVIA	1884 - 1944 (1899 - 1902 missing)	KUYPER TANGERANG	1950 - 1962 1964 - ...
CAPE CHELYUSKIN	1935 -... (1946-1950 and 1952-1953 missing))		
CAPE TOWN	1932 - 1940	HERMANUS	1941 - ...
CAPE WELLEN	1933 - ... (1944 - 1949 missing)		
CHELTENHAM	1901 - 1956	FREDERICKSBURG	1956 - ...
COIMBRA	1866 - ...		
COLABA	1846 - 1905	ALIBAG	1904 - ...
DIXON	1933 - ... (1945 and 1947 missing)		
DOMBAS	1916 - ...		
EBRO	1910 - ... (1938 - 1942 missing)		
ESKDALEMUIR	1908 - ...		
FURSTENFELDBRUCK	1939 - ...		
GODHAVN	1926 - ...		
GREENWICH	1846 - 1925	ABINGER HARTLAND	1925 - 1957 1957 - ...
HELWAN	1903 - 1959 (1952 - 1955 missing)	MISSALAT	1960 - ...
HURBANOVO	1938 -...		
HONG KONG	1884 - 1928	AU TAU HONG KONG	1928 - 1939 1972 - ...
HONOLULU	1902 - ...		
HUANCAYO	1922 - ...		
KAZAN	1909 - ...		
KELES	1936 - 1963	YANGI BAZAR	1964 - ...
KEW	1858 - 1924		
KODAIKANAL	1902 - ...		

Sites of observatories having provided records over 50 years or more

First Observatory Name	Open -Closed	Further Observatories, if any Name	Open -Closed
KRASNAYA	1930 - ... (1934 - 1937 and 1939 - 1945 missing)		
LA QUIACA	1920 - ...		
LENINGRAD	1869 - 1877 (1871 missing)	SLUTSK	1878 - 1941
		VOEIKOVO	1947 - ...
LERWICK	1923 - ...		
LOVÖ	1928 - ...		
MANILA	1891 - 1904	ANTIPOLO	1910 - 1938
		MUNTINLUPA	1951 - ...
MAURITIUS	1892 - 1965		
MEANOOK	1916 - ...		
MELBOURNE	1865 - 1921	TOOLANGUI	1922 - 1980
		CANBERRA	1980 - ...
OSLO	1843 - 1930		
PILAR	1905 - ...		
POSTDAM	1890 - 1907	SEDDEN	1908 - 1931
		NIEMEGK	1932 - ...
RUDE SKOV	1907 - 1978	BJORFELDE	1978 - ...
SAINT MAUR	1883 - 1900	VAL JOYEUX	1901 - 1936
		CHAMBON LA FORET	1936 - ...
SAN FERNANDO	1891 - ...		
SAN JUAN (PUERTO RICO)	1903 - 1924 (1925 missing)		
SAN MIGUEL	1911 - ...		
SITKA	1902 - ...		
SODANKYLA	1914 - ... (1945 missing)		
STONYHURST	1865 - 1967 (1944 - 1960 missing)		
SVERDLOVSK	1887 - 1978	VYSOKAYA - DUBRAVA	1932 - ...
SWIDER	1921 - ...		
TEOLOYUCAN	1923 - ...		
TIFLIS	1879 - 1905	KARSANI	1905 - 1934
		DUSHETI	1938 - ...
TIKHAYA BAY	1932 - 1958 (1947 - 1950 missing)	HEISS ISLAND	1959 - ...
TOKYO	1897 - 1912	KAKIOKA	1913 - ...
TROMSÖ	1930 - ...		

LIST OF OBSERVATORIES (continued)

Sites of observatories having provided records over 50 years or more

First Observatory Name	Open -Closed	Further Observatories, if any Name	Open -Closed
TUCSON	1910 - ...		
UCCLE	1896 - 1919	MANHAY	1936 - 1971
		(1943 - 1945 missing)	
		DOURBES	1955 - ...
UTRECHT	1891 - 1896	DE BILT	1899 - 1938
		WITTEVEEN	1938 - 1988
VALENTIA	1899 - ...		
VASSOURAS	1915 - ...		
WATHEROO	1919 - 1958	GNANGARA	1959 - ...
WILHELMSHAFEN	1884 - 1911	WINGST	1939 - ...
YAKUTSK	1931 - ...		
ZAIMISHCHE	1914 - 1972		
ZI - KA - WEI	1875 - 1907	LUKIAPANG	1908 - 1933
		ZO - SE	1933 - 1974

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3.1. aa INDICES

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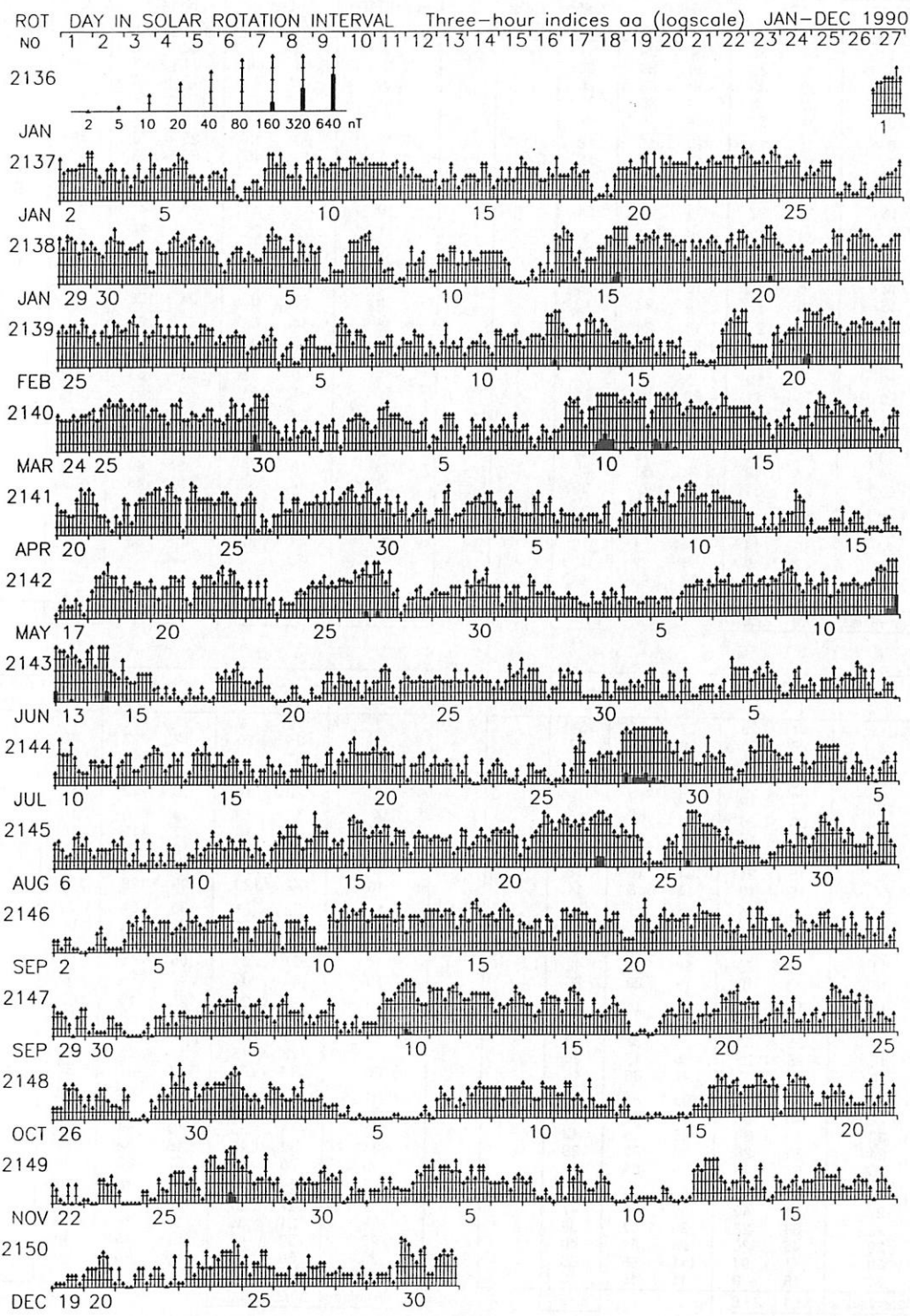


aa INDICES 1990

JANUARY 1990	Day N	Day S	Half Day am	Half Day pm	Daily aa	Quiet Days
1	31	32	24	39	31	
2	35	33	28	39	34	
3	29	23	30	23	26	
4	23	23	16	30	23	
5	34	30	24	40	32	
6	21	14	20	15	18	*
7	13	11	17	7	12	C C *
8	24	29	10	44	27	
9	29	25	31	23	27	
10	31	37	35	34	34	
11	33	37	35	35	35	
12	31	28	32	27	30	
13	18	17	22	13	18	
14	16	14	13	17	15	
15	18	19	15	22	19	
16	23	23	18	28	23	
17	22	23	21	24	23	
18	22	18	18	22	20	
19	9	10	5	14	9	C *
20	25	41	28	38	33	
21	36	37	38	35	37	
22	34	35	37	33	35	
23	38	49	39	49	44	
24	47	49	42	54	48	
25	29	31	33	27	30	
26	22	22	23	20	22	
27	9	5	7	7	7	C K *
28	15	15	9	21	15	*
29	42	49	54	37	46	
30	42	51	30	63	47	
31	30	32	33	29	31	
Mean values	26.9	27.9			27.4	

FEBRUARY 1990	Day N	Day S	Half Day am	Half Day pm	Daily aa	Quiet Days
1	40	38	22	56	39	
2	48	49	51	47	49	
3	20	21	15	26	21	
4	45	41	19	67	43	
5	38	39	48	29	38	
6	20	13	25	8	16	
7	46	46	30	63	47	
8	15	13	22	6	14	*
9	12	17	15	13	14	K *
10	17	24	16	25	21	*
11	19	22	17	24	21	
12	12	10	19	3	11	K K *
13	22	14	8	29	18	*
14	35	62	81	16	48	
15	69	62	24	106	65	
16	64	62	67	60	63	
17	50	58	60	49	54	
18	40	41	35	46	40	
19	50	51	37	65	51	
20	81	51	42	91	67	
21	29	26	29	26	28	
22	36	35	22	49	35	
23	55	54	45	64	55	
24	43	39	33	49	41	
25	47	39	39	48	43	
26	33	37	26	44	35	
27	43	39	53	30	41	
28	43	37	46	35	40	
Mean values	38.3	37.2			37.7	

MARCH 1990	Day N	Day S	Half Day am	Half Day pm	Daily aa	Quiet Days
1	41	28	27	41	34	
2	26	20	20	26	23	
3	25	12	12	25	19	
4	13	8	10	11	10	C *
5	22	15	18	19	19	
6	39	26	40	25	33	
7	15	16	14	17	16	
8	23	16	21	18	20	
9	15	21	21	15	18	
10	15	13	13	15	14	*
11	25	23	27	21	24	
12	61	41	23	79	51	
13	43	46	51	38	45	
14	46	39	58	27	42	
15	23	16	19	20	20	
16	18	12	14	16	15	*
17	7	4	7	4	6	C K *
18	55	51	24	83	53	
19	25	25	38	13	25	
20	45	47	27	65	46	
21	79	92	109	63	86	
22	45	37	35	47	41	
23	45	39	39	45	42	
24	30	26	26	30	28	
25	57	45	38	64	51	
26	57	53	61	49	55	
27	54	40	39	55	47	
28	38	28	29	37	33	
29	45	36	25	56	40	
30	71	94	111	55	83	
31	18	9	11	15	13	C *
Mean values	36.1	31.6			33.8	

APRIL 1990	Day N	Day S	Half Day am	Half Day pm	Daily aa	Quiet Days
1	19	9	11	17	14	*
2	25	20	17	27	22	
3	31	40	30	41	35	
4	24	10	19	15	17	
5	20	19	16	22	19	
6	16	13	14	16	15	*
7	20	15	17	18	18	*
8	14	8	10	12	11	C *
9	53	39	42	50	46	
10	142	126	99	168	134	
11	62	81	83	61	72	
12	113	91	106	98	102	
13	42	55	48	49	48	
14	57	54	65	45	55	
15	28	32	37	24	30	
16	24	20	25	19	22	
17	60	51	56	56	56	
18	45	29	40	34	37	
19	26	13	13	26	20	*
20	27	27	17	37	27	
21	24	20	35	10	22	
22	25	26	18	33	26	
23	48	55	49	54	52	
24	32	46	46	32	39	
25	30	30	37	23	30	
26	23	15	29	10	19	
27	27	21	22	26	24	
28	31	35	28	38	33	
29	52	44	51	45	48	
30	38	23	33	28	30	
Mean values	39.3	35.6			37.4	

aa INDICES 1990 (continued)

MAY 1990	Day N	Day S	Half Day am	Half Day pm	Daily aa	Quiet Days
1	17	14	15	16	16	
2	20	27	22	25	23	
3	34	28	24	38	31	
4	29	16	21	24	23	
5	24	21	26	19	22	
6	14	9	12	11	11	C C *
7	17	8	11	14	12	C C
8	27	11	15	23	19	
9	31	31	26	36	31	
10	59	36	63	32	47	
11	38	26	39	26	32	
12	15	5	12	8	10	C
13	23	14	9	28	19	K
14	7	5	5	7	6	C K *
15	11	7	9	9	9	C C *
16	8	3	4	7	6	C C *
17	10	7	8	9	8	C *
18	45	49	31	63	47	
19	32	25	29	28	28	
20	43	19	24	38	31	
21	38	27	25	40	32	
22	42	55	51	46	48	
23	28	11	22	18	20	
24	21	4	9	16	12	C
25	32	28	28	32	30	
26	74	38	35	77	56	
27	54	64	86	32	59	
28	17	9	9	17	13	C
29	24	15	17	22	20	
30	45	27	32	40	36	
31	25	14	20	19	20	
Mean values	29.1	21.0			25.1	

JUNE 1990	Day N	Day S	Half Day am	Half Day pm	Daily aa	Quiet Days
1	27	19	26	20	23	
2	15	8	13	10	12	C C
3	17	10	11	16	13	C C
4	17	8	14	11	12	C C
5	15	7	11	10	11	C K *
6	30	21	22	29	26	
7	44	24	39	29	34	
8	45	24	37	33	35	
9	48	49	60	38	49	
10	36	26	30	32	31	
11	30	17	22	25	24	
12	124	72	46	151	98	
13	99	62	98	63	80	
14	83	75	79	79	79	
15	24	16	23	18	20	
16	13	5	11	7	9	C C *
17	7	3	5	5	5	C C *
18	26	14	16	24	20	
19	17	6	11	12	12	C K
20	7	2	3	6	5	C C *
21	15	5	5	15	10	C C
22	15	9	15	9	12	C C
23	17	15	14	18	16	
24	18	10	15	13	14	
25	18	11	14	15	15	
26	14	15	16	13	15	C
27	24	14	10	29	19	
28	14	18	22	9	16	
29	20	12	18	14	16	K
30	11	6	5	11	8	C C *
Mean values	29.6	19.5			24.5	

JULY 1990	Day N	Day S	Half Day am	Half Day pm	Daily aa	Quiet Days
1	15	7	9	13	11	C C *
2	20	8	16	12	14	K
3	15	6	13	8	11	C C
4	22	11	9	25	17	
5	28	15	20	23	22	
6	16	8	9	15	12	C
7	16	8	9	15	12	C C
8	21	14	13	22	18	
9	14	4	10	8	9	C *
10	30	19	29	21	25	
11	16	11	13	14	14	
12	22	10	19	13	16	
13	27	18	29	16	22	
14	27	20	15	31	23	
15	19	14	18	15	17	
16	17	7	12	13	12	C C
17	15	5	8	12	10	C C
18	21	11	13	18	16	
19	29	29	26	33	29	
20	31	27	35	23	29	
21	20	9	12	16	14	
22	17	8	14	11	13	C C
23	10	6	9	8	8	C C *
24	10	7	12	5	9	C C *
25	9	6	9	6	8	C C *
26	34	11	7	39	23	
27	23	14	16	21	19	
28	113	122	89	145	117	
29	93	72	117	49	83	
30	27	23	24	26	25	
31	22	6	20	8	14	
Mean values	25.7	17.3			21.5	

AUGUST 1990	Day N	Day S	Half Day am	Half Day pm	Daily aa	Quiet Days
1	37	38	19	56	37	
2	26	9	20	15	17	
3	30	20	18	33	25	
4	21	8	17	12	14	
5	14	6	6	14	10	C C *
6	23	12	14	20	17	
7	19	9	14	14	14	
8	17	7	14	10	12	C C *
9	15	6	11	10	10	C C *
10	15	6	7	14	11	C K *
11	23	16	20	19	20	
12	16	10	16	10	13	C
13	28	34	30	32	31	
14	38	32	47	24	36	
15	46	41	28	59	43	
16	40	30	33	36	35	
17	24	25	22	26	24	
18	26	12	22	16	19	
19	38	13	25	26	25	
20	33	29	35	27	31	
21	54	40	22	72	47	
22	57	58	61	54	58	
23	90	87	89	88	88	
24	41	20	31	29	30	
25	16	8	6	18	12	C
26	71	71	74	68	71	
27	32	23	34	21	28	
28	11	10	13	8	10	C *
29	24	16	16	24	20	
30	42	35	21	56	39	
31	25	25	35	15	25	
Mean values	31.9	24.3			28.1	

aa INDICES 1990 (continued)

SEPTEMBER 1990	Day N	Day S	Half Day am	Half Day pm	Daily aa	Quiet Days
1	34	38	24	47	36	
2	9	4	8	5	6	C *
3	12	3	6	9	8	C C *
4	19	20	11	29	20	
5	26	17	24	19	22	
6	26	24	27	23	25	
7	25	29	28	26	27	
8	29	14	14	30	22	
9	25	12	15	22	19	
10	22	21	17	25	21	
11	48	41	40	49	45	
12	35	32	34	33	33	
13	42	27	36	33	35	
14	50	28	42	36	39	
15	38	51	42	48	45	
16	40	30	42	28	35	
17	26	16	19	23	21	
18	37	31	28	40	34	
19	36	19	24	31	27	
20	31	22	16	36	26	
21	28	25	21	32	26	
22	40	28	26	41	34	
23	24	20	28	16	22	
24	27	25	20	32	26	
25	27	12	19	21	20	
26	29	17	17	29	23	
27	21	11	15	17	16	*
28	20	17	22	14	18	
29	16	11	17	11	14	K *
30	13	5	10	9	9	C C *
Mean values	28.4	21.7			25.0	

OCTOBER 1990	Day N	Day S	Half Day am	Half Day pm	Daily aa	Quiet Days
1	5	4	6	3	4	C C *
2	12	10	9	14	11	C C *
3	19	19	14	24	19	
4	34	28	24	39	31	
5	19	21	19	21	20	
6	22	24	28	18	23	
7	17	15	10	22	16	
8	9	6	7	8	8	C K *
9	26	23	11	39	25	
10	62	78	100	40	70	
11	71	49	61	60	60	
12	45	39	39	45	42	
13	40	25	23	42	33	
14	35	22	24	33	28	
15	40	41	29	51	40	
16	25	14	18	21	20	
17	11	8	16	4	10	C K
18	11	7	4	14	9	C K *
19	24	13	24	14	19	
20	39	29	21	47	34	
21	19	21	26	13	20	
22	20	16	20	16	18	
23	24	17	12	30	21	
24	35	36	42	29	36	
25	20	9	19	10	15	
26	21	17	14	24	19	
27	19	11	12	17	15	
28	8	9	14	3	9	C K *
29	19	23	10	33	21	
30	35	41	49	26	38	
31	47	44	30	61	46	
Mean values	26.9	23.3			25.1	

NOVEMBER 1990	Day N	Day S	Half Day am	Half Day pm	Daily aa	Quiet Days
1	19	15	17	17	17	
2	24	17	19	22	21	
3	13	10	12	11	11	C K
4	7	3	7	3	5	C C *
5	3	2	2	3	2	C C *
6	4	3	3	4	4	C C *
7	11	14	11	15	13	K K
8	20	21	15	26	21	
9	26	19	21	24	23	
10	25	21	23	23	23	
11	21	19	22	18	20	
12	9	18	17	10	13	K K
13	5	6	8	2	5	C C
14	4	2	4	2	3	C C *
15	7	6	4	9	7	C K
16	29	39	33	35	34	
17	29	30	22	37	29	
18	34	28	22	40	31	
19	20	16	21	15	18	
20	11	14	16	9	13	C
21	20	23	19	24	21	
22	6	8	7	7	7	C K
23	11	9	4	16	10	C C
24	5	5	6	4	5	C C *
25	14	9	9	15	12	C K
26	20	22	19	23	21	
27	79	75	46	108	77	
28	34	27	32	29	30	
29	11	8	10	9	10	C
30	21	15	13	23	18	
Mean values	18.1	16.8			17.4	

DECEMBER 1990	Day N	Day S	Half Day am	Half Day pm	Daily aa	Quiet Days
1	13	9	12	10	11	C K
2	11	8	7	13	10	C C
3	17	13	8	22	15	
4	36	28	31	33	32	
5	23	22	21	24	23	
6	12	15	13	14	14	C
7	10	9	13	6	9	C C
8	16	19	9	26	17	K
9	10	14	10	14	12	C K
10	5	4	3	5	4	C C *
11	5	5	4	6	5	C C *
12	15	20	4	32	18	
13	23	26	38	11	25	
14	15	17	17	15	16	K
15	12	10	10	11	11	C K
16	17	20	15	22	19	
17	11	15	14	12	13	C
18	10	10	9	12	10	C C
19	5	7	4	7	6	C C *
20	17	17	11	23	17	K
21	7	8	6	9	7	C K
22	7	12	9	10	10	C K *
23	12	28	23	17	20	
24	30	34	22	42	32	
25	21	18	16	23	20	
26	9	8	9	8	9	C *
27	14	12	14	12	13	C C
28	9	9	9	8	9	C C
29	9	6	7	8	7	C
30	22	53	47	28	37	
31	19	23	15	27	21	
Mean values	14.3	16.1			15.1	

MONTHLY AND YEARLY **aa** 1868 - 1990

Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Annual mean
1868	10.6	16.0	19.7	21.0	16.4	17.9	21.5	19.4	24.0	25.9	13.3	13.7	18.3
1869	19.2	23.6	22.3	29.5	23.1	19.2	17.4	19.9	29.8	17.9	14.7	14.6	20.9
1870	21.6	23.2	21.2	25.8	20.9	16.4	14.1	21.4	35.2	26.2	21.9	19.9	22.3
1871	19.3	24.8	21.4	31.2	17.2	17.1	21.5	23.5	17.7	20.0	28.1	15.7	21.4
1872	17.0	28.0	23.0	23.4	20.4	17.7	25.3	25.2	20.7	38.6	25.0	20.5	23.7
1873	29.4	20.6	24.1	20.8	20.8	25.8	20.6	18.8	19.3	16.6	14.6	12.1	20.3
1874	17.8	16.1	12.7	19.1	14.0	12.8	13.1	13.0	15.7	17.8	14.3	10.1	14.7
1875	10.0	13.5	12.7	12.7	13.0	10.1	11.8	8.7	13.1	11.9	9.8	8.5	11.3
1876	9.8	12.6	11.0	6.5	7.6	7.7	9.1	10.2	10.1	10.5	10.2	10.1	9.6
1877	9.3	9.6	10.4	8.9	13.0	8.9	7.8	7.6	7.4	6.9	11.6	6.8	9.0
1878	7.4	7.5	6.2	8.5	7.3	8.6	4.8	6.4	7.9	6.8	7.1	9.3	7.3
1879	6.2	5.8	8.6	5.6	6.2	5.9	5.8	8.0	8.9	7.0	7.1	9.3	7.1
1880	7.3	4.7	9.8	8.9	13.1	7.3	9.9	23.1	11.4	14.4	14.5	14.6	11.6
1881	15.1	12.8	13.2	11.4	8.5	10.7	12.2	7.8	17.9	14.0	20.2	20.3	13.7
1882	15.7	19.5	16.5	35.9	20.6	19.0	14.5	19.7	15.0	25.0	55.0	20.1	23.0
1883	15.4	26.7	23.3	17.8	13.9	18.5	21.5	12.4	19.5	13.7	17.6	12.0	17.6
1884	9.1	14.3	17.5	15.6	12.8	13.1	15.5	13.0	13.5	16.0	16.9	13.2	14.2
1885	13.2	15.5	13.3	14.0	21.2	14.2	13.0	17.7	22.1	15.9	13.7	12.1	15.5
1886	17.7	17.1	27.6	21.6	22.6	21.6	19.3	18.1	19.0	21.7	20.7	20.6	20.7
1887	16.9	22.9	15.2	20.6	17.3	12.6	12.5	17.2	18.9	14.1	14.6	15.2	16.4
1888	18.2	15.9	15.2	16.4	19.3	14.5	12.9	13.7	15.1	15.0	15.3	14.0	15.5
1889	9.8	11.0	13.9	11.6	10.2	9.9	13.5	12.6	14.6	13.6	18.5	11.8	12.6
1890	11.7	11.8	10.0	8.4	8.4	7.3	10.0	10.3	13.8	15.6	13.3	8.3	10.7
1891	10.4	14.2	20.6	22.5	23.7	11.7	11.2	15.0	22.3	20.7	16.5	16.2	17.1
1892	19.5	35.1	36.3	20.4	25.1	17.7	33.7	22.1	20.1	23.1	15.7	22.1	24.3
1893	18.2	19.1	18.4	14.0	12.0	17.1	14.5	18.5	19.5	20.9	18.5	13.9	17.0
1894	19.2	33.9	20.0	17.4	19.0	20.0	26.3	21.0	22.5	17.0	21.9	12.0	20.7
1895	15.4	20.8	23.0	20.7	16.6	17.6	17.9	10.5	15.9	22.7	22.5	14.5	18.1
1896	25.4	23.6	21.8	17.2	20.6	11.7	15.6	18.1	17.8	17.5	13.1	13.8	18.0
1897	12.0	14.0	14.2	22.2	14.6	12.0	9.3	10.7	11.0	13.8	12.6	17.2	13.6
1898	13.5	15.1	20.5	13.4	15.1	14.3	13.5	14.6	21.5	14.1	13.6	13.0	15.2
1899	14.3	17.8	15.6	14.2	15.9	13.5	11.6	11.4	13.6	9.4	8.7	12.1	13.1
1900	13.5	8.9	12.5	7.2	9.6	4.7	5.2	6.0	5.2	7.1	5.4	5.4	7.6
1901	7.3	7.0	6.5	5.2	6.2	6.0	5.6	6.1	6.0	5.4	5.6	6.4	6.1
1902	6.1	7.6	5.9	7.9	5.6	5.4	6.3	6.2	7.0	7.2	7.6	6.1	6.6
1903	6.5	5.9	6.7	10.3	7.8	11.3	10.8	14.1	14.0	26.3	16.3	13.5	12.0
1904	15.1	12.6	8.7	13.1	13.0	10.5	10.8	10.2	11.2	13.0	11.6	10.6	11.7
1905	16.0	20.3	16.6	16.6	10.6	13.8	11.8	16.8	16.3	11.2	20.1	10.7	15.0
1906	7.6	17.5	14.0	11.6	11.4	11.3	12.4	12.0	14.2	12.7	9.6	16.4	12.5
1907	16.5	25.3	14.3	12.1	16.8	14.9	16.9	15.5	16.8	18.5	14.6	11.5	16.1
1908	13.6	17.0	23.2	15.6	18.9	12.6	10.4	18.2	31.6	15.8	17.4	11.4	17.1
1909	24.8	17.0	19.8	12.1	18.3	11.5	12.6	17.6	27.6	19.4	11.6	13.8	17.2
1910	12.8	14.6	20.9	19.8	17.2	13.7	10.8	20.2	19.2	24.4	17.9	19.5	17.6
1911	21.3	23.7	21.5	21.1	16.6	13.6	15.3	11.9	12.2	12.5	10.6	11.0	15.9
1912	7.6	8.0	7.7	9.4	9.6	8.4	7.8	10.5	9.8	9.5	9.4	9.4	8.9
1913	10.3	9.5	9.9	9.8	9.0	7.0	7.0	6.7	10.0	10.7	7.6	6.6	8.7
1914	7.1	7.3	10.1	13.5	8.1	10.3	12.9	14.9	11.8	13.3	13.4	9.3	11.0
1915	10.9	13.5	15.0	15.3	13.9	17.9	11.2	14.7	17.0	21.3	24.9	12.4	15.7
1916	16.0	11.6	25.0	19.2	20.2	15.7	19.7	21.4	22.4	24.5	24.0	18.9	19.9
1917	25.1	19.1	16.2	16.7	15.9	12.7	14.6	28.1	16.1	20.2	14.8	19.8	18.3
1918	17.8	21.3	19.7	20.5	18.8	15.6	17.4	22.2	28.4	26.4	23.1	28.1	21.6
1919	27.8	26.5	30.7	21.3	27.5	13.9	14.9	22.7	25.3	26.9	14.3	18.4	22.5
1920	16.7	14.1	28.5	17.8	17.7	12.4	14.0	14.8	25.7	17.3	15.1	17.0	17.6

MONTHLY AND YEARLY **aa** 1868 - 1990 (continued)

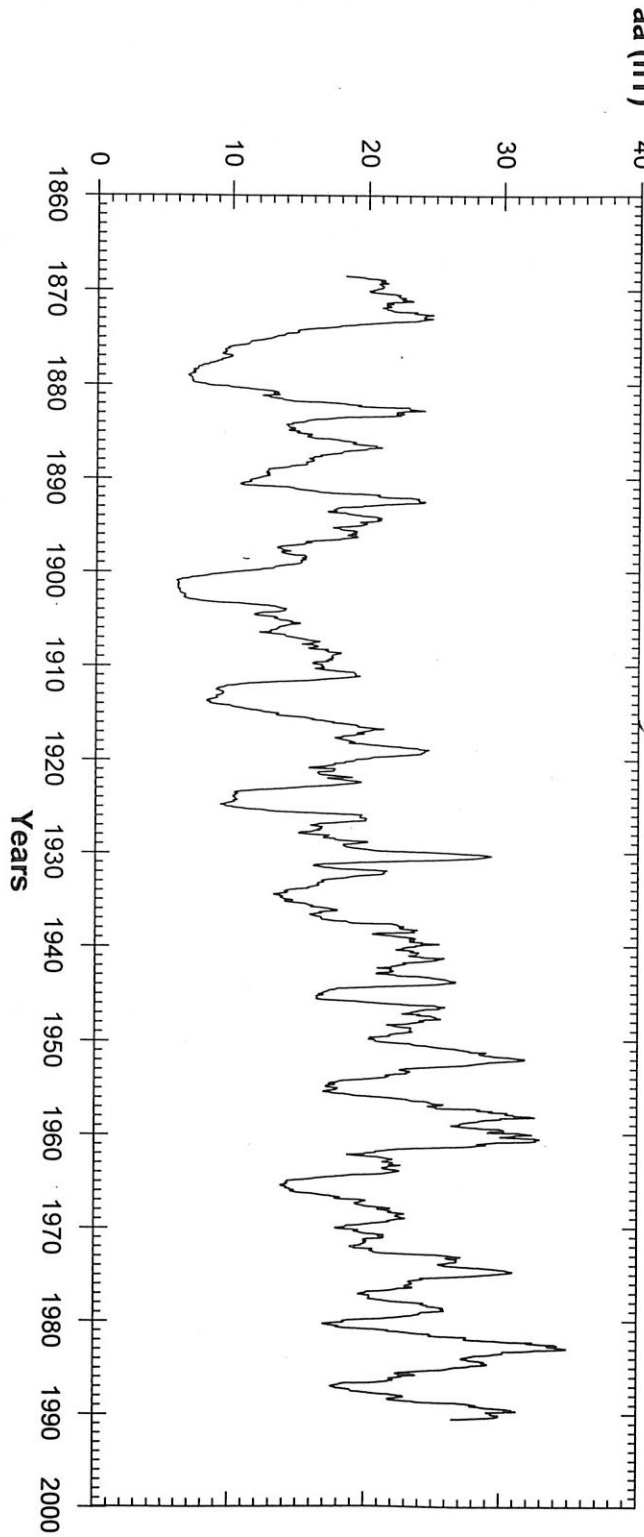
Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Annual mean
1921	11.7	10.6	15.6	17.2	40.5	12.4	13.3	14.6	12.4	16.2	16.2	17.8	16.6
1922	18.0	18.6	24.1	23.5	18.3	18.6	20.0	20.7	19.7	20.1	13.1	10.4	18.8
1923	10.2	13.7	12.1	10.0	10.1	11.1	8.4	7.3	10.7	12.6	7.8	9.6	10.3
1924	13.6	10.9	12.9	7.3	10.2	12.3	9.7	6.9	12.6	8.7	9.3	7.9	10.2
1925	9.4	8.6	8.6	10.8	11.0	17.7	11.8	13.6	18.0	21.7	13.2	12.9	13.1
1926	27.1	26.2	27.6	27.1	19.6	16.2	11.4	13.2	22.7	23.3	11.9	13.3	19.9
1927	15.5	15.2	20.7	15.6	16.8	11.2	16.5	18.5	20.9	24.7	8.0	15.8	16.7
1928	10.1	13.5	11.3	12.8	23.6	20.2	27.8	15.9	19.6	23.4	18.2	15.6	17.7
1929	13.0	24.0	26.2	13.9	16.3	14.7	18.6	15.9	21.5	25.5	22.7	21.0	19.4
1930	20.9	27.9	30.9	38.2	36.4	33.3	28.3	33.3	28.8	29.3	18.8	17.2	28.6
1931	13.0	15.4	12.9	9.9	12.0	14.7	13.1	17.7	21.2	27.3	23.7	21.1	16.8
1932	20.2	21.4	27.9	28.2	22.2	11.8	12.4	19.1	19.1	17.2	13.8	15.3	19.0
1933	15.9	18.4	19.2	21.1	17.5	13.6	12.3	14.2	18.4	16.8	16.0	13.0	16.3
1934	11.5	14.9	20.0	11.3	11.4	10.0	10.3	17.4	17.6	11.6	9.5	15.5	13.4
1935	15.6	16.5	17.8	13.6	11.6	16.4	12.5	9.9	20.8	20.2	15.6	17.7	15.7
1936	17.4	19.8	15.5	22.1	17.5	19.8	18.0	10.2	9.8	15.4	18.0	12.0	16.3
1937	12.2	22.2	18.6	26.3	18.6	18.9	18.8	14.7	14.7	27.8	19.4	16.5	19.0
1938	46.6	26.0	20.4	26.1	23.7	14.8	19.7	19.9	24.7	24.0	17.8	19.5	23.6
1939	13.5	21.7	27.0	36.1	27.8	22.8	26.1	23.0	19.2	28.4	14.6	18.6	23.2
1940	24.8	20.1	43.9	22.4	20.0	23.6	18.4	18.4	20.1	21.9	25.1	23.7	23.6
1941	21.9	27.6	42.9	21.6	19.1	17.4	27.9	22.3	38.2	17.5	23.6	19.3	24.9
1942	14.6	18.8	32.4	24.4	14.2	14.6	23.0	21.9	25.8	30.3	22.8	18.4	21.8
1943	18.1	17.1	21.0	21.9	24.5	21.2	24.4	41.0	35.3	32.8	29.6	23.3	25.9
1944	21.2	17.9	26.6	21.6	16.1	14.9	11.1	16.5	17.5	17.2	11.2	21.8	17.8
1945	16.1	16.4	25.0	19.1	15.4	11.1	15.3	12.1	15.6	17.9	12.0	20.2	16.4
1946	19.2	30.2	43.5	25.0	24.1	22.3	28.6	16.7	41.7	19.6	19.3	14.3	25.3
1947	20.6	17.1	37.9	23.3	19.1	21.1	21.4	32.9	39.1	31.3	20.7	17.9	25.3
1948	20.8	21.0	24.2	17.8	23.7	15.0	16.2	28.3	22.0	36.1	23.1	23.0	22.6
1949	29.8	20.4	24.7	17.6	22.4	17.9	11.8	19.2	17.8	32.8	24.6	15.1	21.2
1950	19.5	23.2	20.6	23.8	21.7	19.0	19.5	30.2	29.3	34.5	28.0	24.0	24.4
1951	23.1	29.2	28.5	32.1	25.5	23.2	25.2	29.7	44.4	30.3	25.7	28.2	28.7
1952	28.5	34.3	40.1	38.0	33.1	23.8	20.8	19.0	28.5	26.4	18.9	23.4	27.9
1953	22.3	21.2	27.4	22.7	21.4	18.4	22.5	26.1	29.0	22.4	20.2	12.6	22.2
1954	13.9	24.5	25.5	20.6	12.0	9.7	13.1	16.5	25.4	21.1	14.5	10.9	17.2
1955	19.3	18.2	23.6	21.1	16.7	15.1	12.3	14.3	19.1	17.8	19.9	14.1	17.6
1956	28.7	23.3	27.6	31.7	29.3	23.5	19.8	20.7	22.4	19.3	32.3	18.2	24.7
1957	28.7	26.8	36.7	28.8	18.1	29.1	21.7	20.7	57.0	24.0	29.5	31.7	29.3
1958	25.5	43.2	36.1	27.6	25.2	29.7	36.0	25.1	26.5	24.7	15.0	27.2	28.4
1959	24.3	35.9	29.9	24.2	25.7	21.6	42.5	31.2	36.1	28.2	32.1	30.8	30.2
1960	25.2	23.5	27.6	51.5	31.6	27.6	28.1	27.2	26.4	45.6	45.9	34.5	32.9
1961	20.6	25.1	22.0	21.8	22.3	20.1	36.0	18.5	20.7	23.3	17.3	21.1	22.4
1962	13.2	19.2	15.5	22.6	13.4	18.1	21.0	26.2	29.8	33.3	22.5	23.5	21.5
1963	19.3	15.3	14.9	18.2	20.4	20.5	20.8	22.5	40.2	23.5	20.7	18.9	21.3
1964	20.1	20.1	21.0	21.7	17.5	15.1	16.9	14.8	18.2	16.9	13.8	10.3	17.2
1965	11.8	16.3	14.3	12.6	10.5	15.7	14.8	16.8	17.5	13.1	11.7	13.8	14.0
1966	14.2	14.8	18.6	12.0	14.8	12.5	17.1	20.0	29.4	17.5	16.8	20.5	17.4
1967	18.9	19.8	13.8	15.5	33.1	18.6	14.4	17.5	24.7	17.8	18.9	24.5	19.8
1968	21.1	26.5	23.3	22.2	21.4	24.9	18.0	20.1	22.0	24.8	26.2	20.3	22.5
1969	17.8	25.8	27.3	23.6	25.2	16.7	15.0	15.3	23.9	17.2	18.7	13.8	20.0
1970	14.4	12.7	26.4	23.1	16.6	18.3	28.4	21.0	19.7	20.6	21.6	16.5	20.0
1971	23.5	21.2	21.1	23.9	21.1	17.0	15.2	17.1	21.4	22.2	18.8	18.6	20.1
1972	21.9	18.3	21.5	18.1	16.6	21.5	14.0	34.2	20.4	20.4	21.8	18.9	20.6
1973	26.1	32.7	36.9	39.6	26.1	27.3	20.9	20.6	22.8	28.2	20.7	19.9	26.8

MONTHLY AND YEARLY **aa** 1868 - 1990 (continued)

Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Annual mean
1974	25.8	26.4	33.7	32.9	29.2	29.2	32.0	30.2	33.7	37.3	26.8	27.5	30.4
1975	27.6	31.1	32.0	24.3	22.7	20.7	21.7	18.1	16.9	20.2	29.3	21.1	23.8
1976	23.3	28.5	33.4	25.4	23.7	17.5	18.4	17.7	23.7	20.4	16.9	18.6	22.3
1977	18.7	21.0	19.9	24.9	20.1	14.2	22.9	23.2	23.0	20.9	17.3	17.0	20.3
1978	24.6	26.2	25.9	31.3	31.2	28.3	19.9	25.6	27.0	20.8	24.6	22.0	25.6
1979	27.3	23.7	26.9	33.5	21.0	18.3	17.9	26.0	22.0	19.3	17.1	16.8	22.5
1980	19.3	17.6	12.8	18.7	15.7	20.3	17.1	16.0	14.4	22.3	23.7	22.1	18.3
1981	16.8	22.9	27.1	33.4	27.3	18.1	27.6	24.3	20.8	34.4	24.5	19.7	24.8
1982	23.5	49.3	27.6	32.2	26.2	31.5	42.4	32.0	45.9	28.9	33.7	34.5	33.8
1983	26.6	40.8	34.2	36.3	32.1	25.1	21.4	25.2	24.0	28.8	34.1	26.4	29.5
1984	23.8	26.5	31.3	33.1	27.5	24.0	26.7	26.2	33.2	33.7	31.5	29.4	28.9
1985	26.1	24.4	19.2	30.0	15.7	20.1	23.7	22.3	21.4	22.5	24.0	21.5	22.5
1986	22.7	40.5	21.3	14.4	18.9	16.0	16.5	22.6	25.0	18.8	21.5	15.4	21.0
1987	14.8	16.8	17.8	13.0	14.8	13.3	19.2	24.3	30.3	25.7	22.3	15.9	19.0
1988	22.4	23.3	24.8	25.2	20.5	19.9	20.1	20.5	22.5	23.1	23.2	25.5	22.6
1989	33.9	27.4	60.0	32.7	25.7	24.9	14.3	28.3	26.6	31.3	34.6	31.3	31.0
1990	27.4	37.7	33.8	37.4	25.1	24.5	21.5	28.1	25.0	25.1	17.4	15.1	26.4

Unit : nT

TWELVE - MONTH RUNNING MEAN VALUES OF **aa** 1868 - 1990



SECTION 3

3.2. an, as, am INDICES

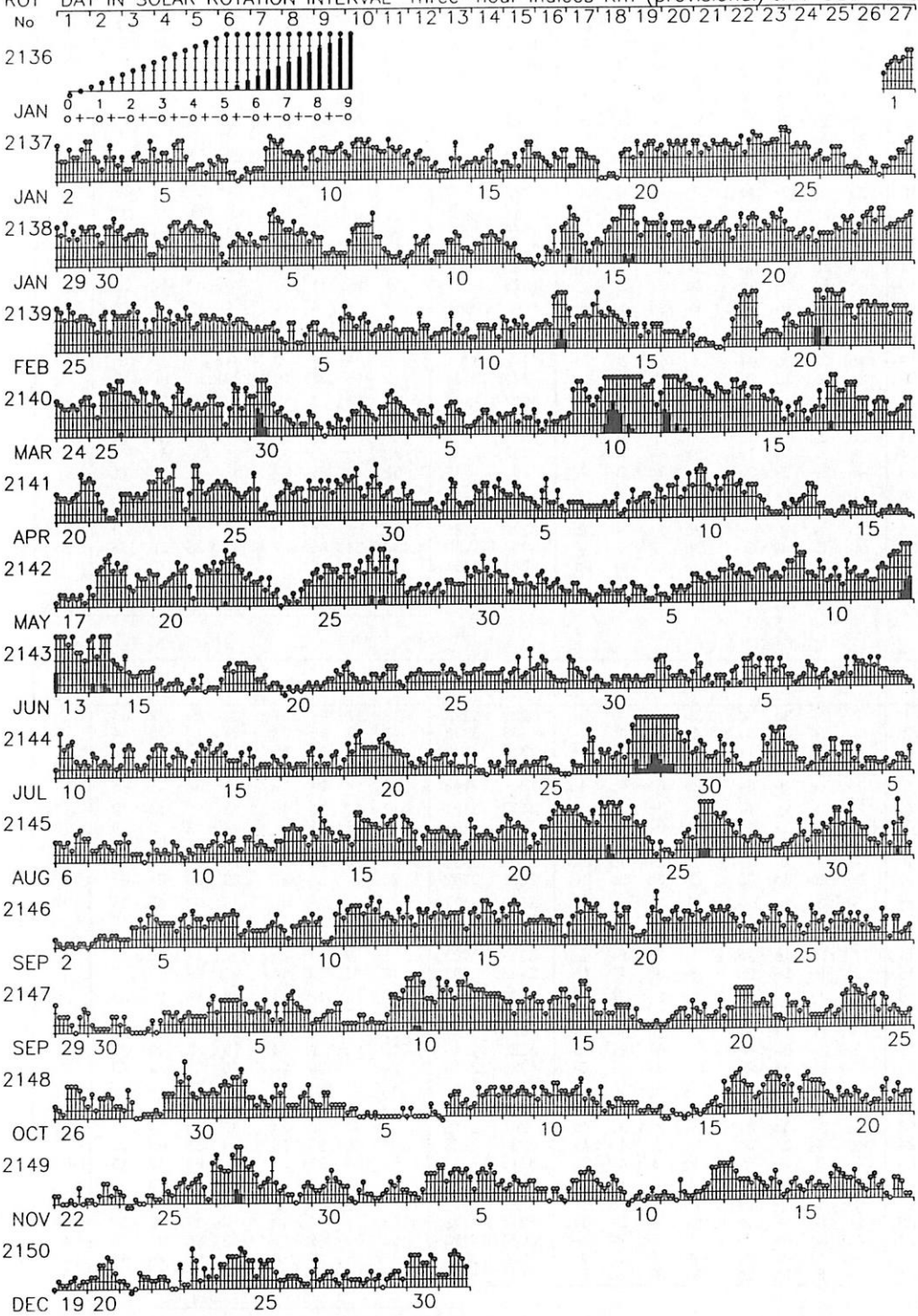
Musical diagram of **Km** 1990 55

Monthly tables of three-hour indices :
an, **as**, **Kn**, **Ks** and daily **An**, **As** values 56

Monthly tables of three-hour indices :
am, **Km** and daily **Am** values 68

Monthly and yearly mean values of **Am**
1959 - 1990 74

MUSICAL DIAGRAM OF **Km** 1990



an , as INDICES 1990

JANUARY 1990																			
	Kn								σ n		an								An
1	2-	3-	2+	3+	3-	3+	4o	3+	1213	3443	12	21	17	35	22	40	52	37	30
2	3+	2-	2-	3o	2+	2+	3o	4-	4222	2335	37	11	11	27	17	19	29	48	25
3	4-	2+	2o	1+	3-	3+	2+	2o	5212	4414	48	18	14	9	22	35	18	14	22
4	2+	1+	1o	2o	3o	2o	2o	3+	3222	2213	17	10	6	15	27	15	14	37	18
5	3o	2o	2o	2+	2+	4-	3+	4-	1124	3435	28	14	15	20	18	42	36	42	27
6	3-	2-	2-	1+	1+	1+	2o	2o	4122	3135	24	11	12	10	8	8	14	14	13
7	2+	2o	2o	1o	1o	0+	0+	1-	3421	1112	18	15	15	7	7	2	3	5	9
8	1-	1+	1o	1o	3o	4+	4-	3o	2202	1323	5	8	6	7	27	62	42	28	23
9	4-	2+	3-	2o	3-	2+	1o	3o	2121	2234	43	17	21	14	23	18	7	30	22
10	3o	2-	3-	3o	3-	3-	3o	3o	4223	3343	31	13	26	32	24	25	31	28	26
11	3-	2o	3o	4o	4-	4-	4-	3-	3134	2234	21	15	28	52	46	41	47	23	34
12	3-	3-	2+	4o	3o	3-	3o	2o	2214	2352	22	22	17	52	28	26	31	15	27
13	2+	2-	2+	2+	2+	2+	1+	2-	3233	2424	17	13	19	20	18	17	8	11	15
14	1+	1o	1o	2-	3+	2o	1o	1+	4123	2122	9	7	7	13	39	14	6	10	13
15	2-	2o	2-	2o	3o	3+	2-	1-	1523	3324	11	15	11	14	29	39	12	5	17
16	1o	1o	1o	2-	1+	3o	4-	3o	1102	2541	7	7	6	11	9	33	41	33	18
17	2+	2o	2-	1+	2-	2+	2-	3-	4121	1325	17	14	11	9	11	18	11	23	14
18	2+	1o	1o	3-	3o	2+	2-	2+	2223	2335	20	7	7	21	27	18	12	17	16
19	1o	0o	0o	0+	1-	0+	2o	2o	1112	3201	6	1	1	2	4	3	15	16	6
20	2o	2-	3o	2o	3o	4-	3+	2+	2221	3432	15	13	27	16	29	50	38	18	26
21	3o	2o	3o	3+	4-	3-	3+	3-	4224	2343	30	14	31	35	43	26	34	22	29
22	4-	3+	2+	3o	3-	3o	3+	3-	3222	3421	41	37	18	31	21	27	38	26	30
23	3o	3-	2+	3o	4-	3-	3+	4-	2311	3353	30	26	18	31	41	21	39	45	31
24	4-	3+	3o	3+	3+	3+	4+	5-	4402	2522	48	40	29	37	35	36	69	79	47
25	4o	2+	3-	3o	3o	3o	2-	2-	1232	4343	59	18	26	27	32	31	13	11	27
26	2o	2-	1+	3-	3o	3-	2-	1o	4311	2433	16	11	8	26	27	24	13	6	16
27	1o	1+	1-	1-	1-	2-	2-	0+	1212	2223	6	9	5	4	4	11	12	3	7
28	1-	1-	2-	1+	2o	2+	3-	3o	3322	1131	4	5	11	8	16	17	24	28	14
29	4-	3-	4-	3o	3o	3-	3+	3+	3234	1133	44	24	45	27	31	25	36	35	33
30	4-	3o	3-	2o	4-	4o	4+	3o	2231	3351	42	31	22	14	43	57	70	31	39
31	4-	2+	3o	3o	4-	4-	3o	1+	1302	4312	49	19	29	29	44	41	33	9	32
											Monthly mean value of An								22.8

JANUARY 1990																			
	Ks								σ s		as								As
1	2-	2+	3o	3o	3-	3o	4-	4o	3222	1222	12	17	29	27	24	29	42	54	29
2	4-	2+	2+	3+	3-	2+	3o	4-	4333	3233	45	19	18	36	24	17	28	44	29
3	3+	3o	2+	1+	2+	3o	2+	2-	2312	3132	39	27	17	10	19	32	19	13	22
4	2o	1+	2-	3-	3-	2-	2o	3+	1331	2133	16	8	11	21	25	13	15	39	19
5	3o	2+	3-	2+	2o	3o	4o	4-	1211	2143	27	17	24	19	14	32	51	45	29
6	2+	2-	1+	1+	2-	1o	2-	1+	3422	2121	17	12	10	10	13	6	13	10	11
7	2o	2o	3-	1o	1o	0+	1-	1+	2221	2122	16	15	21	7	7	2	5	10	10
8	1+	2-	1+	2-	3o	4o	4o	4-	2321	1234	8	12	9	12	32	55	54	46	29
9	4-	3-	3-	3-	3-	2+	1o	2+	2222	2332	48	22	22	21	24	18	7	20	23
10	3o	2o	3o	3o	3-	3o	3o	3+	2221	3132	28	14	30	27	23	28	28	35	27
11	3-	3-	3+	4-	4-	3+	4-	3o	3323	3132	26	23	35	49	45	37	47	31	37
12	3o	3o	3-	3o	3o	3-	3o	2o	2322	1243	27	27	21	32	27	21	27	16	25
13	3-	2-	3-	2+	2-	2o	1o	2-	3421	3331	24	12	21	18	13	14	7	11	15
14	1-	1o	1o	2o	3o	2+	1+	2-	3332	2123	5	6	7	15	32	17	10	13	13
15	2-	2-	1+	2o	3-	3o	2-	1o	2423	2232	12	13	10	14	22	29	13	7	15
16	2-	2o	2-	3-	1o	2+	3+	3o	5421	2231	13	14	12	24	6	19	38	33	20
17	2+	2+	2o	2-	1+	2+	2-	2+	2542	2231	18	20	16	12	8	18	13	20	16
18	3-	1+	1+	2+	3-	2o	1+	2o	4423	3222	23	8	10	19	23	15	10	15	15
19	2-	0+	0+	1-	1-	0+	2+	3o	3222	1145	13	3	2	4	5	2	19	27	9
20	3-	2+	3+	2+	3-	3+	3+	3-	4323	2213	24	18	38	20	25	37	34	23	27
21	3+	3-	3+	3o	3o	3o	4-	2+	3131	3021	35	23	34	32	32	30	45	18	31
22	3o	3+	2o	3+	3-	3o	3o	3+	1323	2421	32	36	16	36	21	32	33	34	30
23	4-	3+	3o	3+	3+	2+	3+	4o	2241	3113	44	37	30	34	37	18	34	59	37
24	4o	4-	3+	3o	3+	3+	4o	4+	2320	2222	51	48	39	30	35	36	58	62	45
25	4+	3-	3-	3-	3o	3-	2-	2o	3212	2213	63	24	26	25	31	24	12	15	28
26	2o	1+	2o	3o	3-	3-	2-	1-	2251	2243	15	10	14	28	22	22	12	5	16
27	1-	1-	1-	0+	1-	2-	1o	0+	3321	2322	4	5	5	2	4	13	6	2	5
28	1+	1+	2-	2-	2+	2+	2+	3+	6312	1142	8	8	13	13	17	17	19	37	17
29	4o	3o	4+	3-	4-	3-	4-	4-	0034	3423	56	30	65	26	46	26	41	45	42
30	4-	4o	3o	2+	4-	4-	5-	4-	2224	3202	49	55	31	18	46	47	74	46	46
31	4-	3-	3o	3o	3+	3+	3o	1+	1121	3342	47	24	31	32	37	36	27	9	30
											Monthly mean value of As								24.1

FEBRUARY 1990																				
	Kn								σ n		an									An
1	1+	3-	2-	3-	4-	5-	4+	3o	2532	4243	9	23	13	21	41	73	70	29		35
2	4-	4-	3+	4-	4-	4o	4-	3+	2214	4333	42	48	35	42	42	60	48	35		44
3	2+	1+	1-	2-	2+	3o	3-	2+	3123	2333	18	8	5	13	19	28	26	20		17
4	3o	3-	2+	2o	3-	5o	5o	5-	5342	3432	31	21	18	15	25	96	102	81		49
5	4o	3+	3+	5-	3o	4-	3o	2+	1235	4432	57	39	37	72	33	43	32	17		41
6	3o	3-	3-	1o	1o	2-	1o	1+	5222	0112	31	24	25	7	6	13	7	8		15
7	1o	2-	4-	4-	4o	4o	4o	4+	1323	4355	7	13	42	49	52	57	57	69		43
8	3o	2+	2o	1+	1+	1o	1-	0+	4222	2112	28	20	14	8	8	7	5	3		12
9	0+	1o	2+	2-	2o	3o	1o	1o	2143	1311	2	7	20	12	16	27	6	6		12
10	1o	1o	2-	2o	3o	3-	2-	1+	1012	3224	7	6	13	16	30	26	13	9		15
11	1-	2-	2-	2+	3-	3o	3o	2o	1522	2541	5	13	13	18	23	30	32	16		19
12	3-	2-	2-	2-	1o	1-	0+	0+	2322	1221	24	13	13	12	6	4	2	2		10
13	0o	1o	0o	1+	1+	3+	2-	4-	2112	2524	1	6	1	10	9	36	11	49		15
14	4o	5+	4+	4-	2+	2o	1o	2o	3643	2111	52	120	66	41	19	16	7	14		42
15	2o	2-	3o	3o	4+	4+	6-	6-	2321	1562	14	13	29	31	61	65	131	137		60
16	5o	6-	4o	3-	4o	4o	4-	4o	5542	4534	103	124	56	21	52	54	48	53		64
17	4+	4o	3o	4o	4-	4o	3+	4-	3233	4334	69	53	27	51	48	51	40	42		48
18	3+	2+	3+	3+	4-	3o	4-	4-	4222	3233	38	19	37	37	43	28	42	46		36
19	4o	3+	2+	4-	5-	4o	5-	5-	7523	5433	59	39	19	44	74	51	73	80		55
20	4o	3-	4-	4-	5-	4+	5o	4+	1222	3463	56	25	48	44	74	67	89	61		58
21	3+	3-	2o	3-	3+	2+	3o	2o	4311	2232	37	26	16	22	35	19	33	16		26
22	3-	2+	3-	3-	4-	3o	4o	4o	3323	2250	21	19	22	21	41	31	59	54		34
23	4o	3-	3+	4o	4+	5o	4-	4o	0223	1332	54	21	35	55	65	88	50	59		53
24	4+	3o	3+	3+	4-	4o	4+	4o	4142	4444	65	33	38	35	42	53	62	57		48
25	4-	4o	3o	4+	4-	3o	4-	3+	1424	5352	49	56	31	69	49	29	50	38		46
26	3o	3-	2o	4-	4o	2o	4o	4-	1213	3231	31	23	14	41	53	14	52	45		34
27	3+	4-	4o	4+	4o	2o	3+	2+	5224	4133	34	44	54	63	58	16	34	18		40
28	3+	5-	4-	3o	4-	3o	4-	3-	1332	2231	34	76	45	27	45	28	45	24		41
											Monthly mean value of An									36.1

FEBRUARY 1990																				
	Ks								σ s		as									As
1	2-	2+	2+	3o	4-	4+	4o	3-	3444	1243	11	19	18	27	46	61	55	24		33
2	4-	4o	4-	3o	4-	4o	4-	3o	5342	3234	45	51	45	31	43	57	45	31		44
3	3-	1+	1-	2-	3-	3-	2+	2+	1224	3211	22	10	5	11	23	23	18	17		16
4	3o	2o	2o	2+	3o	5+	5+	4o	2224	3232	28	14	15	20	29	104	118	57		48
5	4o	3+	3o	4o	3-	3o	3-	2o	2322	2122	51	36	31	55	23	33	25	14		34
6	3-	2+	2+	1o	1o	2-	1+	1+	2223	3222	23	19	17	6	7	13	8	8		13
7	1+	3-	3+	4o	4o	4+	4-	5-	4341	1422	9	21	34	51	53	61	48	73		44
8	3o	2+	1+	1+	0+	1-	1o	1-	3222	0242	32	18	10	8	3	5	6	4		11
9	1o	1+	2+	2-	2o	2+	1-	2-	3453	3223	7	10	18	12	15	18	4	11		12
10	1+	1+	2+	2o	3o	2+	1+	2o	2532	2413	10	9	19	14	29	18	10	14		15
11	1+	2-	2o	2+	3-	3-	3-	2+	2332	2223	10	13	16	19	21	23	23	17		18
12	3+	2o	2-	2o	1-	0+	0+	0+	2321	1213	34	15	12	15	5	3	2	3		11
13	0+	1o	0o	2-	1+	3+	1o	3o	2213	3323	2	6	1	12	8	40	7	31		13
14	4o	6-	5-	4+	3-	2o	1+	2-	1351	3122	56	145	85	68	22	15	8	13		52
15	2+	2-	3+	3+	4o	4o	5+	6o	3111	1010	17	13	36	36	54	59	110	170		62
16	6-	6-	3+	3-	4o	4-	4-	4o	2212	5212	132	137	40	24	59	44	49	60		68
17	5o	4o	3-	4-	4-	3+	3+	4-	3324	5343	99	56	26	48	45	39	34	45		49
18	3o	2o	4-	3+	4-	3o	4-	4+	2021	2123	32	16	42	39	48	27	42	62		39
19	5-	3o	2+	4-	4+	4o	4+	5-	4232	3423	73	31	19	46	68	52	69	86		56
20	4+	3o	4o	3+	5-	4-	5+	4o	2243	3354	63	28	51	40	74	49	104	53		58
21	3o	3-	2o	3-	3-	2+	3+	2o	2422	2311	27	26	16	24	23	19	35	14		23
22	2+	3-	3-	2+	3o	3o	5-	4+	2124	1042	20	21	26	17	30	32	71	68		36
23	4+	2+	3o	4+	4+	5-	4-	5o	2222	1324	64	20	31	63	64	84	43	89		57
24	5-	3-	3o	3o	4-	4-	4o	5-	5221	2133	78	25	31	28	41	50	56	85		49
25	4-	4-	3o	4-	4-	3o	4o	3+	3523	2242	49	50	30	49	41	28	57	40		43
26	4-	3-	2o	3o	3+	2o	4o	4-	4231	3413	41	24	15	33	39	14	53	43		33
27	4-	3+	4-	5-	3+	2+	3+	2+	5342	2313	48	34	49	78	40	17	38	18		40
28	3+	5-	4+	3o	4-	3o	4-	3o	1262	1345	38	82	66	30	44	27	50	33		46
											Monthly mean value of As									36.5

MARCH 1990																		
	Kn								σ n		an							An
1	3+	3+	3-	3-	3+	4-	3+	3+	2233	3333	40	36	23	26	37	42	37	34	34
2	3-	3o	3-	3+	3-	3o	3o	3-	3333	3323	26	30	23	39	22	30	29	25	28
3	2+	2o	2o	2o	2+	3-	3+	2o	2230	4255	18	16	16	15	20	22	34	16	20
4	1o	1-	3-	3o	1o	1o	2-	2+	2245	0233	6	5	21	29	6	6	13	18	13
5	3-	2+	2-	2o	1+	2-	1+	3+	3222	3222	24	19	11	14	10	13	9	38	17
6	4o	3+	3-	2+	3o	4-	3o	2-	3411	3333	60	36	26	17	33	45	27	11	32
7	2-	2o	2o	2o	3o	2+	1+	2o	3120	2323	13	15	14	15	31	17	10	14	16
8	2+	2-	2-	3+	2+	3-	2-	2o	3122	2131	18	13	11	35	20	26	11	14	19
9	1+	2o	2o	4-	2o	3-	2-	2-	2414	4233	10	14	15	42	15	21	11	13	18
10	1+	1+	3-	2+	3-	2o	2+	1+	2122	2222	8	8	21	18	21	15	18	9	15
11	3o	3-	2o	3-	2+	3o	2o	2o	5244	2215	30	24	14	25	20	31	16	14	22
12	2o	3-	2+	3o	2o	5o	6-	6+	4211	2254	16	21	17	28	16	98	132	200	66
13	6-	3+	3-	3-	3+	4-	3+	4o	3133	4674	136	38	23	24	38	43	38	54	49
14	5-	3o	3-	4-	4o	3+	3-	2+	2123	3522	81	33	26	49	51	35	25	19	40
15	3+	2+	2+	2-	3-	2o	2+	2+	5233	4143	36	19	19	11	21	14	19	20	20
16	2+	2o	1+	2-	2o	1+	2-	2+	4622	3223	17	15	10	12	16	10	11	20	14
17	1+	1-	1o	1-	1-	1-	0+	1-	4102	1233	8	4	6	5	5	5	3	4	5
18	1o	1+	3-	3o	5-	5o	4+	5-	2211	2234	7	10	26	33	81	97	65	81	50
19	5-	2+	1+	2-	2-	2o	1+	3o	2323	1235	74	19	10	13	11	14	10	32	23
20	3o	3-	2o	3o	3+	4-	3o	6o	2221	4413	30	22	15	28	37	42	32	150	45
21	6+	4+	6-	5o	5-	5-	5o	4-	4261	3452	183	70	139	100	76	76	89	50	98
22	4-	3-	4-	4o	4o	4-	4+	4-	3123	3212	49	24	44	53	56	50	61	44	48
23	4-	4-	3+	4-	4o	4o	4o	3+	2233	3242	42	44	35	48	51	52	51	35	45
24	3o	3o	3-	3o	3o	3-	3+	3o	1212	1242	28	29	24	28	33	25	38	33	30
25	3+	3o	2+	4o	4o	5o	4+	5o	4123	2424	38	33	19	51	59	88	62	93	55
26	5o	4-	4o	4-	3+	5-	4+	3+	6242	2222	91	49	55	47	38	78	62	37	57
27	4-	4o	3o	3o	2+	4+	4+	4o	2110	2315	47	52	33	29	18	65	65	59	46
28	3o	3+	3o	3o	3-	3+	4-	4-	3411	1133	31	38	33	31	26	34	41	45	35
29	3-	3o	2-	3o	5-	4+	3o	4o	2432	3345	23	27	12	27	77	70	28	59	40
30	3+	4-	7-	7-	5+	5-	3+	2+	4525	5122	35	48	226	217	108	75	37	20	96
31	2+	2-	2o	1o	2+	2-	2-	2+	1321	1223	17	12	15	7	18	11	11	20	14
											Monthly mean value of An								35.8

MARCH 1990																		
	Ks								σ s		as							As
1	4+	3+	2o	3-	4-	3+	3o	3+	2422	2223	70	35	16	24	41	37	27	40	36
2	3-	3-	2+	3o	2+	3o	3-	3o	2222	1124	26	22	20	30	19	29	24	28	25
3	2o	2o	2o	2-	2+	2+	3-	2o	3121	1431	14	14	14	13	19	17	23	14	16
4	1o	1+	2+	2o	1-	0+	1+	2o	3223	2211	7	8	18	15	5	3	10	14	10
5	2+	3-	1+	2o	1+	1+	1+	3o	1312	1333	18	22	10	15	10	10	8	28	15
6	4o	3+	3o	2+	3+	3o	2o	2-	2221	2323	51	37	31	18	35	32	16	12	29
7	2o	2+	2+	2+	3o	2o	1+	2o	2211	0254	16	18	17	19	32	14	10	14	18
8	2o	2o	2-	3o	3-	2+	1+	1+	0221	2132	16	16	12	30	21	17	8	10	16
9	2o	2o	2o	3+	1+	2o	1+	2o	3412	1545	15	14	14	40	10	16	9	15	17
10	2o	1+	2o	2-	3-	2-	2o	1+	3202	2222	14	10	16	13	21	13	16	9	14
11	3o	3-	2-	3-	2o	3-	2+	2-	1213	1233	30	23	12	25	15	26	19	12	20
12	2o	2+	2+	2+	2+	5o	6-	6+	1311	5375	14	19	18	19	18	89	125	183	61
13	6-	4o	2+	3o	3-	3o	2+	4o	4132	2234	127	53	18	31	22	31	20	60	45
14	5o	3+	3o	4-	3+	3o	3-	2+	5203	2123	87	38	32	45	35	30	26	19	39
15	3o	2+	2o	1+	2+	2-	2+	3-	5443	5354	32	19	15	9	17	13	19	22	18
16	2o	1+	2-	1+	2-	1o	1+	2o	2132	2433	16	10	12	10	11	7	10	16	12
17	1o	0+	1o	1-	0+	0+	0+	0+	0122	1112	7	2	7	5	2	2	2	3	4
18	1+	1+	3-	4-	5-	5-	5-	5-	1331	1341	8	9	25	48	73	75	77	85	50
19	5o	2+	1o	1+	1+	1+	1o	2+	4321	3344	91	20	6	10	9	8	7	20	21
20	3o	2o	2o	3-	3-	3o	3o	6+	3413	3335	27	15	15	23	23	28	30	174	42
21	6o	4o	5o	5-	5-	4+	5-	3+	5685	3222	154	58	102	86	79	69	74	35	82
22	4-	3-	3o	4-	4-	3+	4o	3+	5445	4432	47	25	31	48	44	34	51	39	40
23	4-	4-	3o	4-	3o	4-	3+	3-	3445	4433	43	42	29	44	33	45	37	24	37
24	4-	3-	2+	3-	3-	3-	3o	3+	4233	3522	42	26	19	24	25	21	28	37	28
25	4-	3o	2o	4-	4-	4o	4o	5-	4314	4315	42	31	14	48	46	58	52	74	46
26	5-	4-	4-	4-	3+	4o	4o	3o	4565	4442	79	50	46	41	36	54	52	28	48
27	4-	4-	3-	2+	2-	4-	5-	4o	4324	4432	50	43	26	20	11	45	79	59	42
28	3-	3o	2+	3-	3-	3-	4-	3+	2542	2233	25	31	19	22	23	25	42	38	28
29	3o	3o	1o	2+	4+	4o	2+	4o	3314	6536	28	31	6	19	65	52	20	55	35
30	4-	3+	6+	6o	4+	4+	2+	2-	3586	4742	43	39	193	155	70	68	19	13	75
31	2o	2-	1+	1o	2o	1-	1+	2+	4431	4443	16	11	8	6	15	5	9	18	11
											Monthly mean value of As								31.6

APRIL 1990																	
	Kn								σ n		an						An
1	2-	1+	1+	0+	1+	1+	2o	2+	1242	3312	13	9	9	2	10	8	16	17	11
2	1+	2o	3-	3-	3+	3o	3-	2+	3131	2222	9	14	22	22	35	29	22	19	22
3	2-	3-	2+	4-	4o	4-	3+	3o	2322	3330	11	22	19	45	53	45	40	29	33
4	2o	2o	2o	2+	3-	2o	3o	1+	4431	2323	15	15	14	17	24	16	28	8	17
5	2-	1+	3-	3-	3o	2+	2o	1+	2242	1122	13	9	25	24	28	17	14	9	17
6	1o	1+	2-	3-	3-	2+	1+	2+	2332	3132	7	10	12	25	26	18	9	19	16
7	2-	2o	2o	2+	2-	3o	2o	2o	2122	2221	12	14	15	19	11	27	16	14	16
8	2+	1+	0+	1+	2o	2-	2-	2-	3222	1222	19	9	3	10	16	12	11	13	12
9	2o	2+	4+	5o	5o	5-	4-	3-	2223	3342	14	17	69	94	93	76	41	23	53
10	3+	4+	6-	7-	8-	7-	7-	5o	3335	5454	35	63	146	243	336	232	223	95	172
11	5+	6-	5o	5+	4+	5-	5-	3-	6876	5543	113	138	100	110	69	79	85	24	90
12	4-	7-	7-	6-	6-	5-	5+	4+	2243	3453	44	237	228	137	126	75	117	69	129
13	4-	4o	5o	4o	4-	4-	5-	4-	2265	3224	44	57	91	58	47	43	78	47	58
14	3+	4o	5o	5-	4o	5-	4-	4-	2444	1222	37	53	87	81	59	73	47	50	61
15	4o	4o	3+	3o	4-	3o	3-	2o	3423	1134	54	56	38	33	43	28	25	14	36
16	2o	2o	3-	3+	2+	2-	2+	2+	4515	1133	15	15	24	35	17	11	18	20	19
17	3+	2+	5-	5+	5o	4o	3+	4+	3333	5223	36	18	73	114	102	57	39	64	63
18	4o	5-	3-	3+	3o	2o	3-	3o	4623	0213	57	80	26	35	29	15	26	30	37
19	2+	1+	1+	2-	2o	2+	3o	3o	4322	0363	17	8	8	11	15	19	31	28	17
20	3-	2+	2+	2o	2+	3-	4+	4-	2432	1232	24	18	18	16	17	26	63	44	28
21	4o	3+	3-	2o	1+	1+	1o	2-	1232	1322	59	38	23	16	8	9	7	12	22
22	2-	2+	3o	2o	3-	3-	3o	4o	2342	3333	11	19	29	15	23	24	30	52	25
23	4o	5o	5-	4-	4o	5o	3+	3o	2232	4421	54	87	75	43	57	95	34	31	60
24	2-	3o	5o	5o	3+	3o	3o	3o	2226	3201	13	31	90	93	40	27	29	31	44
25	3+	3+	4-	4-	3+	3o	3-	3o	4332	4220	38	34	49	43	34	27	23	29	35
26	3o	5-	3o	1+	2o	1+	1+	2+	1432	2232	31	72	31	10	14	10	9	20	25
27	3-	3+	3o	3-	3+	3+	2o	3o	3342	3434	25	36	30	23	34	35	15	28	28
28	3-	3+	4-	3o	4o	3o	4-	3+	3454	2132	26	35	48	32	53	28	43	39	38
29	4o	4-	4o	5o	3o	3-	3+	4o	5317	3133	52	49	51	92	28	24	40	59	49
30	5-	3o	3-	3-	3o	2+	2o	4-	4412	5332	79	31	24	22	32	17	16	46	33
											Monthly mean value of An								42.2

APRIL 1990																	
	Ks								σ s		as						As
1	2-	1o	1-	0+	2-	1-	2o	1+	3231	3332	13	6	4	2	11	4	14	9	8
2	1-	2-	2o	2+	3-	3-	2o	1+	2323	3331	5	12	14	18	25	21	15	10	15
3	2-	2+	2+	3+	4o	3o	3o	2+	4446	6212	11	17	20	36	55	28	27	20	27
4	3-	2-	2-	2o	3-	2-	3-	1o	2233	3221	21	12	13	16	21	12	26	6	16
5	1+	1+	2+	3-	3-	2+	2o	1-	3144	4523	10	8	20	24	24	18	14	5	15
6	1o	1+	2o	2+	2o	1+	1o	2-	3211	1432	6	10	14	17	14	10	6	13	11
7	1+	2+	2+	2+	1o	2+	1+	1+	2212	2223	10	18	17	17	7	18	10	10	13
8	2o	1+	0+	1+	2-	1+	1-	1+	6121	3222	16	10	3	8	12	8	5	8	9
9	1+	2o	4o	5-	4o	4-	3+	2+	4122	3243	10	15	56	82	57	49	36	17	40
10	4-	4-	5+	7-	7+	7-	7-	5o	3452	4597	42	49	116	222	328	203	214	97	159
11	6-	5o	5o	5-	5-	5-	5-	3-	6564	2452	134	93	90	84	78	73	82	22	82
12	4-	7-	6o	5-	5+	5-	5+	4+	2423	4345	46	208	165	82	120	81	106	66	109
13	4o	4-	5-	4-	4-	4-	4+	4o	4232	2215	56	47	72	48	41	44	61	58	53
14	4-	4-	5-	5-	4-	5-	3+	4o	3334	2526	43	49	72	79	48	78	37	56	58
15	4-	4o	3o	3-	4-	3o	3-	1+	1324	2143	49	56	32	24	41	27	25	9	33
16	2+	2-	2+	3o	2-	1+	2o	2o	2315	2322	17	12	19	29	13	9	16	16	16
17	4o	2o	4o	6-	5o	4-	4-	5-	5323	2334	51	16	51	128	98	45	45	73	63
18	4o	4+	3o	3-	3-	1+	2+	3o	5544	3122	57	61	28	24	26	10	18	32	32
19	3-	2-	1o	1+	1+	2o	3-	3o	6723	2231	26	12	7	10	10	16	24	33	17
20	3-	2+	2+	2-	2o	3-	5-	4-	2143	3334	26	17	18	12	14	23	74	50	29
21	5-	4-	3-	1+	1o	0+	0o	1o	2424	3112	73	47	22	9	6	2	1	6	21
22	2o	3-	3-	2-	3-	2+	3-	4o	5422	5221	16	24	23	13	26	19	23	54	25
23	4-	5-	4+	3+	4+	5o	3o	3+	2442	3213	42	72	66	36	61	103	29	38	56
24	1o	3o	5o	5o	4-	3o	3o	3+	3135	2223	7	27	100	89	43	28	27	38	45
25	4-	3+	4-	3+	3-	2+	2o	3-	5343	2123	43	39	44	39	25	19	16	26	31
26	3+	4+	3+	1-	1+	1-	0+	2-	2442	3122	38	63	37	5	8	5	3	13	22
27	3-	4o	3o	2+	3o	3-	2o	4-	2421	4134	22	51	33	19	27	24	14	42	29
28	3o	3-	4-	3o	4-	3-	4o	3+	3452	2233	28	25	43	30	42	23	56	35	35
29	4-	4-	4o	4+	3+	2+	3+	4+	6444	4156	47	45	60	65	35	18	37	69	47
30	5+	3+	3-	2+	3-	2-	2-	3o	9651	6122	114	37	22	19	25	13	13	33	35
											Monthly mean value of As								38.4

	MAY	1990																	
	Kn								σ n		an								An
1	3-	3-	2-	2o	2o	2o	2o	2-	4310	2222	22	26	13	15	15	14	15	11	16
2	1+	2-	2+	3+	4-	2o	2o	2-	2224	3232	9	13	20	36	41	15	14	13	20
3	1+	3+	2+	3+	4-	2+	3+	4-	2342	3342	10	34	20	40	44	18	40	44	31
4	3o	2+	3-	3o	3o	3-	2+	2o	1321	3210	30	18	21	28	29	25	17	15	23
5	2-	2-	3-	4-	2-	3-	3-	1+	1213	3333	13	11	25	43	13	22	22	10	20
6	1o	2-	2-	2o	2o	1+	1+	2-	1212	1222	7	13	13	15	14	9	10	12	12
7	1+	2-	2-	1+	2-	3-	1-	1+	1221	3232	8	11	11	10	13	24	5	9	11
8	2o	3-	2o	2+	3-	3-	2+	4-	2122	2333	15	25	14	17	26	23	17	49	23
9	3o	2+	3+	3+	4-	2o	3o	4+	2323	3333	28	17	38	35	49	16	28	63	34
10	3+	5-	5o	4+	3+	3o	4-	3o	2333	2433	37	76	96	65	36	32	41	30	52
11	4-	4+	4+	3o	3+	2+	3o	3+	3454	2222	48	67	61	30	39	20	31	37	42
12	3o	2-	2-	1+	1o	1-	1+	2o	2442	2323	27	12	13	8	6	4	9	14	12
13	1o	1+	1+	2o	2+	4-	3o	3o	3333	2304	7	10	10	14	17	41	29	30	20
14	2-	1o	1o	1o	1-	1o	1+	1-	4122	3222	13	6	6	6	5	7	9	5	7
15	1+	2-	1+	1o	2+	2o	2-	1-	2441	1334	8	11	9	7	17	14	12	4	10
16	1o	1o	1+	1o	1+	1o	1o	1-	3123	2233	7	6	10	7	9	6	6	5	7
17	1+	2-	2o	2-	2-	1+	2o	1o	1232	1231	8	11	15	11	11	9	14	7	11
18	2o	2-	4-	4o	4+	5o	4-	4-	3343	3442	14	13	46	51	70	96	47	49	48
19	3+	4-	2+	2+	3+	3o	3o	3o	3233	1222	39	46	19	18	34	29	27	33	31
20	3+	3+	2+	3-	3o	3+	4o	4-	5633	2324	36	37	19	23	29	40	55	43	35
21	3+	1+	1+	3+	3o	4-	4-	5-	3312	1123	38	10	10	39	31	43	48	82	38
22	4-	4+	5+	4+	5o	4-	4-	3o	3364	5331	44	69	106	66	89	49	41	28	62
23	3o	3-	3-	3-	2o	3o	1+	2-	4431	1323	28	22	25	26	16	28	10	12	21
24	1-	1+	1o	2-	1+	2+	3o	3o	2222	1353	4	10	7	13	8	19	31	31	15
25	3-	3+	3o	4-	4o	3+	3+	3o	2343	3222	24	38	29	43	55	35	37	29	36
26	4-	4o	3-	3+	5-	3o	5-	6o	5522	4122	50	56	25	37	71	33	76	169	65
27	4-	5+	6-	5-	3o	4o	2o	3o	5431	2512	44	116	125	79	29	60	16	27	62
28	2-	2-	2o	2+	2o	2+	2-	2o	3223	3222	11	11	14	19	14	19	13	15	15
29	2+	2o	3-	3-	2+	2+	2+	3+	2342	2212	18	14	24	23	18	19	17	37	21
30	3-	3+	4-	5-	4-	3o	4o	3o	2333	2343	21	34	45	81	44	30	55	31	43
31	3-	3-	2-	3-	2+	2o	3-	2+	2133	2222	25	26	13	24	18	15	25	20	21
											Monthly mean value of An								27.9

	MAY	1990																	
	Ks								σ s		as								As
1	2o	3-	2-	1+	2-	1+	2o	1+	3322	2323	16	25	11	10	11	9	14	8	13
2	1-	2-	2+	3+	4-	1o	1o	2o	2212	6231	4	13	17	40	41	7	6	14	18
3	2-	3-	3-	3o	3+	2-	3o	4-	2460	1213	12	25	22	32	34	13	30	42	26
4	3-	2o	2o	3o	3-	2-	2-	2-	2231	3223	23	14	14	27	22	12	11	13	17
5	2-	1+	2+	4-	1+	1o	3-	1-	1232	2333	11	8	20	41	8	7	21	5	15
6	1-	2-	1+	1+	1+	1-	1-	1o	2222	1322	4	11	10	10	8	5	5	6	7
7	1+	1+	2-	1+	1+	2-	0+	0+	3221	2211	8	8	12	10	8	13	2	2	8
8	1o	2+	2-	2-	2-	2-	1o	3-	2212	2132	6	18	12	11	11	13	6	21	12
9	3-	2o	3o	3o	4-	2o	3-	4o	2032	2232	22	16	30	31	44	15	22	57	30
10	3o	4+	4+	4+	3-	2o	3+	2-	2623	2241	30	66	68	67	24	16	36	13	40
11	4-	4o	4-	3-	3o	2o	3-	3-	3454	2013	44	54	47	26	31	16	21	25	33
12	3+	2-	1+	0+	0+	0+	0o	1-	5332	2111	34	13	10	3	3	2	1	5	9
13	0+	1+	1+	1+	1+	3-	3-	3-	1221	3332	2	9	8	8	9	24	24	21	13
14	1-	1+	1-	0o	0o	0o	1-	0+	1211	1122	5	8	4	1	1	1	5	3	4
15	1+	1+	1-	1o	1o	1-	0+	0o	1432	2321	8	9	4	7	7	4	3	1	5
16	0+	0+	1-	0+	1-	0+	0+	0+	2132	2111	2	2	4	2	4	2	2	2	3
17	0+	1o	1+	1o	1-	1-	1-	0+	4221	3322	3	6	8	6	5	4	4	2	5
18	2-	1o	3+	4-	4o	4+	4-	4+	1114	0335	13	7	34	41	59	65	45	67	41
19	3+	4o	2-	1+	3o	3-	2+	4-	3221	3314	39	58	12	9	28	21	17	43	28
20	3-	3o	2o	2o	2o	3o	4o	3o	1422	1243	25	29	14	15	15	27	58	32	27
21	4-	2o	1-	3o	3-	4-	3-	3o	3432	1220	45	15	4	32	24	48	26	32	28
22	3+	4-	5-	4o	5-	4-	4-	3-	2353	3223	34	49	85	54	71	48	42	24	51
23	3-	2-	2-	3-	1+	2o	1-	2-	3433	4012	23	11	13	22	9	16	5	11	14
24	0+	1-	1-	1-	0o	1-	1+	1o	1321	1232	2	4	5	4	1	5	9	7	5
25	3o	3o	2o	4-	4-	3o	3+	3-	3333	3212	29	29	16	41	44	30	35	21	31
26	4o	3+	3-	3-	3+	3-	4-	6-	6642	3233	51	39	22	24	37	23	45	132	47
27	3+	5o	6-	4o	3-	4o	2+	2o	3334	1422	36	101	123	60	25	60	18	14	55
28	1-	2-	1+	2o	1o	2o	1-	1+	2223	2322	5	13	10	15	6	14	5	8	10
29	2-	1+	2+	2o	2-	2-	2-	3+	3111	1143	12	8	17	15	12	13	12	36	16
30	3-	3o	3-	4-	3-	2+	4o	3-	5221	2152	24	29	22	48	25	17	53	22	30
31	3-	3-	1+	2o	2-	1+	3-	2o	2230	4122	24	22	9	16	13	10	25	14	17
											Monthly mean value of As								21.2

JUNE 1990																		
	Kn								σ n		an							An
1	2-	3o	3o	2+	2o	3-	3-	2o	3333	2331	13	30	32	19	15	21	23	14	21
2	2-	2-	2o	2o	2-	2-	1+	1o	2221	1232	11	12	14	16	13	12	9	6	12
3	1+	2-	1+	2-	2+	2-	2o	2o	2321	1222	9	13	8	11	19	12	15	15	13
4	1o	3-	2+	2o	2-	1o	1+	2o	2332	2322	7	21	19	14	11	6	8	15	13
5	1+	1o	1o	2o	2o	2o	1+	2+	1323	2223	9	7	7	15	15	14	9	18	12
6	3-	3-	3-	2+	3o	3-	3-	3o	3212	3222	22	21	23	20	27	26	25	33	25
7	4-	4+	3+	3o	3o	3o	3o	3-	3321	1222	46	68	37	28	33	28	27	24	36
8	3+	3+	3+	3+	2+	3o	3-	3+	3232	2214	34	39	34	38	18	30	23	36	32
9	3+	4-	5-	5-	5-	3o	3o	3o	2343	4303	36	49	84	81	73	31	29	30	52
10	4o	3o	2+	3-	3o	3-	2o	3+	1023	2214	56	29	17	22	31	24	15	39	29
11	2+	3-	3-	3-	3o	2+	2+	3o	2213	2131	17	25	24	24	29	18	18	28	23
12	3+	3+	4+	4+	4+	6-	7-	7o	4223	3145	40	37	65	69	68	143	211	247	110
13	6o	5+	5+	4+	6-	4+	4o	4-	3434	4243	171	113	108	68	124	61	57	48	94
14	5o	6o	3+	5+	6-	6-	4-	3o	2122	2221	89	147	39	112	135	127	42	28	90
15	3-	4-	3-	2o	3-	2+	2o	2+	2332	3333	21	41	21	15	21	17	15	18	21
16	2o	1+	2-	1o	1+	1+	1+	1+	5111	2232	16	8	11	7	9	9	10	8	10
17	0+	1o	2-	1o	3-	1-	1o	1-	2231	9323	2	6	11	7	25	5	6	5	8
18	1o	2-	3-	3-	2+	3-	3o	3-	2323	3233	6	13	21	21	18	24	30	21	19
19	2+	2+	2-	2-	2+	1o	1+	1+	1222	3213	17	19	13	12	18	7	8	8	13
20	1o	1-	1-	1-	1o	1+	1o	1o	5211	2234	6	4	5	5	7	8	7	7	6
21	1-	1+	1o	1o	2-	2-	2+	2+	2221	3333	5	8	6	7	13	12	17	17	11
22	2o	3-	2-	2-	1+	2-	1+	2-	3323	2123	15	23	12	12	9	12	8	13	13
23	2-	1+	2o	2+	3o	3-	1+	1o	2133	3332	13	9	15	20	27	22	8	6	15
24	2-	2o	2+	2+	2+	2o	2o	2+	1112	1233	13	16	17	20	17	16	15	19	17
25	2o	3-	2o	2+	2+	1+	3-	2+	2423	2331	14	22	15	18	17	10	22	17	17
26	2o	2+	2o	3-	2o	2o	2o	2o	1232	2242	15	17	14	23	14	14	14	15	16
27	2-	1+	2o	2+	3o	2-	2+	4+	2132	2324	11	8	15	20	31	12	18	65	23
28	2+	3-	3+	3-	2-	2-	1+	1+	2233	1221	17	23	39	24	13	11	9	8	18
29	1+	3+	3o	2+	2+	2-	2+	1+	1322	3222	8	37	28	20	17	13	19	9	19
30	1+	1o	1-	1o	1+	1+	1+	2-	1113	2222	8	7	5	7	10	10	9	11	8
											Monthly mean value of An								26.5

JUNE 1990																		
	Ks								σ s		as							As
1	2-	3-	3-	2o	2-	2-	3-	1+	2241	3233	11	22	23	14	12	11	23	10	16
2	1+	1+	2-	2-	1o	1o	0+	1-	2242	1224	8	8	13	11	7	7	3	4	8
3	0+	1+	1-	1-	1+	1o	1o	2-	2322	3333	3	9	5	5	9	6	7	11	7
4	0+	2-	1+	1+	1-	0o	0o	1o	1233	2113	2	11	8	10	4	1	1	7	6
5	1o	1-	0+	1o	1o	1-	1-	1+	3202	1223	6	4	3	7	6	4	5	8	5
6	3-	2+	2+	2-	2+	2o	2-	3o	5412	4330	23	20	17	11	19	16	12	32	19
7	3-	4-	3+	2+	3-	2o	2+	2o	2443	4333	22	49	39	20	24	15	17	15	25
8	3o	4-	3+	3-	2o	2o	2o	3+	5442	5213	28	46	34	26	15	14	14	35	27
9	3+	4-	5o	4+	4+	3-	2+	2-	4355	4212	36	44	98	61	64	22	19	13	45
10	4-	3o	2-	2o	3o	2o	1+	4-	3211	3215	48	28	11	14	29	16	9	48	25
11	3-	3o	2+	2-	3-	2-	1+	3o	3332	4314	22	27	17	13	22	11	9	28	19
12	3+	3-	4-	4+	4o	5+	6o	6+	4221	3245	36	24	44	66	59	120	158	197	88
13	7-	5o	5o	4o	5-	3+	3o	3-	5573	3323	219	88	92	56	74	38	33	21	78
14	5-	5+	3o	5o	5+	5o	3o	2+	4214	2333	84	120	28	92	113	103	31	20	74
15	2+	4-	2-	1o	1-	1+	1+	2-	3322	3214	18	43	12	7	4	10	8	13	14
16	3-	1o	1-	0+	0+	0+	1o	0+	6111	2232	22	6	4	2	3	3	7	3	6
17	0+	0+	1o	0o	0o	0o	0+	0+	2211	0112	2	3	7	1	0	1	2	2	2
18	0+	1o	2o	3-	2o	2+	3-	2+	1334	3124	2	6	16	25	14	17	24	19	15
19	2+	2+	1o	1o	1+	0+	0+	0+	1322	4101	17	19	6	6	9	2	3	2	8
20	0+	0o	0+	0o	0o	0o	0+	0+	1020	1122	2	0	3	0	1	1	2	3	2
21	0+	1-	0+	0+	1-	1-	2-	1o	1112	5323	2	5	2	2	5	5	11	7	5
22	2o	2+	1+	1-	1-	1-	0+	1o	2113	2202	15	17	10	5	4	5	3	7	8
23	1+	1o	1+	2+	2-	2-	0+	0+	2424	5222	8	7	9	18	11	13	3	3	9
24	1o	1+	1+	2-	1o	1+	1o	1+	3331	0221	6	10	10	12	7	10	7	9	9
25	1+	2o	2-	2-	1+	1-	2o	1+	3521	2211	9	14	12	12	8	5	15	9	11
26	1+	2-	2-	2o	1+	2-	1+	1o	3322	3312	8	13	12	15	10	11	8	7	11
27	1+	1o	1+	2-	3-	1o	1+	3o	4422	2335	8	7	10	12	22	6	10	31	13
28	2o	2o	3o	3-	1+	1o	1-	1o	3532	2135	14	16	28	22	10	6	4	6	13
29	0+	3-	2+	1+	1+	1o	2-	0+	2334	1212	3	25	19	9	8	6	11	3	11
30	1+	0+	0+	0+	1o	1-	0+	1+	5221	4221	8	3	2	2	7	4	3	9	5
											Monthly mean value of As								19.5

JULY 1990																			
	Kn								σ n		an								An
1	1+	1+	2-	2-	1+	1+	2-	3-	3232	2223	10	8	12	11	9	10	11	23	12
2	3-	3-	2o	2-	2-	2o	2-	1+	2233	2243	24	24	15	12	12	14	12	9	15
3	2o	3+	2+	1+	2o	1o	2-	2-	1231	2133	15	37	18	10	14	7	12	13	16
4	2-	1o	2+	2+	1+	3o	3o	3+	2133	2212	11	7	18	19	8	27	30	40	20
5	3-	3o	2o	3-	2+	2-	3o	3-	2124	2233	21	28	14	21	20	12	29	21	21
6	2-	2-	1+	1+	2o	3-	3-	2-	1222	0423	11	12	8	10	15	23	21	13	14
7	1+	2-	2-	1o	2o	1+	2o	3-	2211	1231	8	13	12	7	14	8	14	26	13
8	2-	3-	2+	3-	2+	3-	2+	2+	3232	1232	11	21	20	23	17	24	19	20	19
9	2-	2o	1+	2-	2-	2-	1+	1o	2322	3433	12	14	10	12	13	13	10	6	11
10	1-	4+	3-	4-	4-	2o	2-	2+	2335	3133	5	66	21	46	49	16	13	18	29
11	2-	2+	2+	2-	2o	1+	3o	1+	2323	2203	12	19	18	11	14	9	29	10	15
12	1+	3-	3o	3-	2o	1+	2-	2+	2233	2232	10	22	31	22	15	8	12	19	17
13	3-	3+	3o	2+	2-	3-	3-	2+	2223	2231	26	38	31	18	11	21	24	17	23
14	2+	1o	2-	2+	3o	3o	3+	3-	4221	1022	17	6	11	17	28	29	37	21	21
15	2+	3-	2+	2-	2-	2o	3-	2-	4323	1233	20	24	17	13	12	16	21	11	17
16	2+	2o	1+	2-	2-	2-	3-	2o	3133	3323	19	16	8	11	12	12	23	16	15
17	1+	2o	1+	1o	2-	2-	2o	2+	3112	2224	10	16	8	7	13	13	14	20	13
18	3-	2-	3-	1+	2-	2+	2+	1+	2322	3343	22	12	21	10	12	17	19	10	15
19	2+	3-	2+	4-	4o	3o	3o	3o	2224	1123	18	25	19	45	56	28	28	30	31
20	3+	4-	4+	3o	3o	3-	3-	2+	1322	3211	35	45	61	30	27	22	22	18	33
21	2-	2-	1+	2-	2o	2+	3-	2-	2423	2252	11	12	9	12	14	19	23	12	14
22	2-	2-	2+	2-	2o	1+	1+	2+	2331	2423	13	12	18	12	14	9	9	17	13
23	1+	2o	1o	1-	1-	2-	1+	2-	2522	1212	8	15	6	5	5	11	8	11	9
24	1o	2+	2o	1+	1-	1+	2o	1o	1222	3246	7	19	14	10	5	9	14	6	11
25	1+	2-	2o	2o	2-	1o	1o	0+	2243	2333	9	11	15	16	11	6	6	3	10
26	0+	0+	1+	1+	1+	3-	5-	4o	2231	3532	3	3	10	8	10	26	71	59	24
27	1+	3-	2+	3-	2o	2+	3o	2o	2222	2310	10	23	18	26	16	18	31	15	20
28	3+	5-	6o	5+	5+	6-	7-	6o	3225	2254	35	77	169	112	116	129	202	153	124
29	6-	6-	6o	6-	5+	4o	3o	4-	4335	4113	127	146	152	134	109	55	31	44	100
30	2+	3-	3o	3+	2-	2o	3-	4-	3233	1132	18	23	31	34	12	14	23	44	25
31	3o	1+	3o	2o	2-	1-	1o	1+	2333	2311	27	10	27	15	11	4	6	8	14
											Monthly mean value of An								23.7

JULY 1990																			
	Ks								σ s		as								As
1	1o	1-	1+	1-	0+	1-	1-	3-	3244	1223	6	4	9	5	2	5	5	21	7
2	3o	3o	2-	1-	0+	1+	1-	0+	4342	2412	30	28	13	5	3	8	4	3	12
3	1o	3-	2o	0+	0+	0+	1-	1-	3320	0232	7	25	15	3	3	3	5	4	8
4	1o	0+	1+	1+	0+	2+	2+	2+	2121	2131	6	2	8	8	2	20	18	17	10
5	2-	2+	1o	2+	3-	2o	2o	1+	2113	2122	11	17	6	20	22	14	14	10	14
6	1+	1-	0+	0+	0+	1+	2-	1+	4311	1232	9	5	2	2	2	10	13	8	6
7	1-	1+	2-	0+	1-	1-	1+	3-	2340	2222	5	8	11	3	5	4	9	21	8
8	1o	3-	2+	2o	1+	2+	2o	3-	3341	1232	6	25	17	14	10	18	14	22	16
9	1+	1+	1+	1-	1o	1-	0+	0+	3131	1322	8	8	8	4	6	4	3	3	6
10	1-	4o	3-	2+	3o	1+	1-	1+	2312	1323	4	51	22	18	28	8	5	8	18
11	1+	2o	2-	1-	1+	1-	3-	0+	2322	4230	8	14	13	4	10	5	26	3	10
12	1+	3-	3o	2o	1o	0+	1o	2-	3343	2233	8	21	33	15	6	3	6	13	13
13	3-	3o	3+	3o	0+	1+	3o	2o	2221	0235	26	28	35	28	3	10	27	16	22
14	2o	1-	1+	2o	3o	2-	3+	2+	0225	3211	16	4	9	15	31	13	35	18	18
15	3-	3o	2+	1+	1o	1o	2+	1o	4512	4343	23	33	19	8	7	7	20	7	16
16	3o	2-	1-	1-	0+	1-	2-	1o	3231	1333	27	13	4	4	2	4	12	7	9
17	1-	2-	1o	0+	0+	0+	1o	2+	3321	1233	5	13	6	2	2	3	6	19	7
18	3-	1o	2-	1-	0+	2o	2+	1-	3122	0443	22	7	13	5	3	16	20	5	11
19	1+	3-	2+	3+	3+	2o	3-	2o	4534	3132	9	26	19	36	39	14	21	16	23
20	2o	3o	4-	3-	3-	2-	2+	2o	2433	4312	16	27	41	25	22	12	18	14	22
21	2-	1o	1-	2-	1o	1+	2+	1+	3325	3311	12	7	4	11	6	8	17	8	9
22	1+	2-	2-	1-	2-	1o	0+	2-	3323	2322	8	12	12	5	13	6	3	13	9
23	1o	1+	0+	0+	0o	1+	1o	1+	3101	1412	6	10	3	2	1	8	6	8	6
24	1-	2o	1o	1+	0o	0+	1-	0+	4431	1122	4	14	7	9	1	2	4	3	6
25	1o	1o	1+	1+	1-	0+	0+	0+	3331	3122	6	7	9	8	4	2	3	2	5
26	0+	0+	1o	1-	0+	1+	3+	3-	2202	1313	2	2	7	4	2	8	40	23	11
27	1+	2+	2o	2-	1o	1+	3-	1+	3123	0322	8	17	15	13	7	10	23	10	13
28	3-	4o	6-	5o	6-	6-	6o	6+	3341	1243	22	60	135	89	139	139	170	180	117
29	6o	5+	5o	5+	5-	4-	3o	4-	6344	2234	159	120	100	112	81	43	33	48	87
30	2-	2-	3-	2+	1+	1+	2-	4-	2235	3343	12	13	21	19	8	8	11	41	17
31	3-	1+	3-	1o	0+	0+	0+	1-	2332	0124	22	9	21	7	3	2	3	5	9
											Monthly mean value of As								17.6

AUGUST 1990																		
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1	1+	2-	4-	3o	5-	4-	4+	4-	2351	2222	10	13	45	31	73	44	64	49	41
2	2+	3-	3-	2o	2-	1+	1+	3-	2223	3143	19	23	23	14	13	8	10	23	17
3	2o	1+	2o	3+	3o	2+	2+	3-	4224	0323	16	8	14	35	29	18	19	22	20
4	3-	1+	3-	1o	2o	2-	2-	1+	3231	1231	25	10	21	7	14	12	12	9	14
5	1o	1+	1+	1+	2o	2-	1+	2+	1233	1221	7	10	8	8	14	12	10	20	11
6	2o	2o	2o	2+	2-	3o	3o	2o	3233	3121	15	14	15	17	12	28	29	16	18
7	2+	1+	2-	2-	2+	2o	2-	2o	2333	2342	19	10	11	13	19	14	11	15	14
8	2o	2+	2o	1+	2-	1+	1-	1o	0222	4431	15	19	14	8	11	10	5	6	11
9	2o	2-	1+	2o	1+	2+	2o	1+	3422	1211	14	11	8	14	8	19	16	8	12
10	1o	2-	1+	2o	2o	2-	2+	2+	2222	4332	6	12	8	15	15	12	17	19	13
11	3o	2o	3-	2o	3-	2o	2-	3-	5264	2223	29	14	25	15	21	15	12	21	19
12	2o	2+	2-	2+	2o	2-	2-	2o	3133	0231	14	18	12	18	15	11	12	16	15
13	2+	3o	3o	4-	3+	3o	3-	2o	2524	4431	18	31	29	44	37	31	22	15	28
14	3-	2+	5o	4-	3o	3o	2+	3-	2212	1222	23	19	88	49	31	31	18	26	36
15	3-	2+	2o	4o	5-	4o	4-	3+	2222	3024	21	20	14	56	80	54	50	39	42
16	3+	3+	4+	4-	4-	4+	2+	4-	2324	2322	38	37	67	44	44	62	17	49	45
17	3+	3o	3o	2-	3-	3+	3-	3o	2122	3222	37	31	27	11	24	34	25	31	28
18	3o	3o	3-	2+	3-	3-	2o	2+	1222	3222	33	29	22	20	23	23	15	18	23
19	3+	3+	2+	2o	3o	3-	2+	2+	2222	1433	40	36	19	16	28	23	17	19	25
20	3o	4o	3+	3o	4-	3o	3-	2-	4422	4432	30	53	40	27	45	32	26	12	33
21	2o	2-	3o	3+	4-	4+	5o	5-	4323	2323	16	12	29	40	47	67	91	73	47
22	4+	5-	5-	5-	4+	3+	3+	4o	4334	3454	65	76	81	85	63	40	38	60	64
23	3+	5+	5o	6-	6-	5o	5+	4-	2664	4363	39	110	88	145	143	94	120	48	98
24	4-	5-	3+	3o	4-	2+	2o	1-	1313	5342	43	77	38	32	50	18	14	4	35
25	2-	1+	1+	1-	2-	2-	2+	3o	3331	2232	11	9	9	5	11	13	20	27	13
26	2-	3+	6-	6-	6o	5o	4o	4+	3333	4324	13	39	122	123	147	97	55	62	82
27	4o	4-	3+	3-	4-	2+	2o	2+	3414	3224	59	41	34	24	44	19	15	19	32
28	2+	2+	2o	2o	2+	1+	1+	2-	2333	2222	19	18	14	14	19	10	10	12	15
29	2-	2-	2o	4-	3-	2o	4-	3-	3224	2233	11	11	16	44	21	14	45	21	23
30	2o	3o	3o	4-	4+	5-	3+	4o	4223	5334	14	27	27	43	67	85	36	52	44
31	4o	4-	3+	3-	3-	2o	2-	2-	1241	2322	55	46	36	25	21	15	13	12	28
											Monthly mean value of An								30.5

AUGUST 1990																			
	Ks								σ s		as								As
1	1-	1-	3+	2o	4-	3+	4+	4o	2231	3333	5	5	40	15	44	37	65	54	33
2	3o	3-	2+	1-	1-	0+	1-	2+	3313	2134	27	24	17	5	5	2	4	18	13
3	2+	1o	2-	3o	3-	1+	3-	3o	3313	2224	18	7	13	28	23	8	23	27	18
4	3-	1+	2o	0+	1-	1o	1+	1-	3131	2313	21	8	14	2	5	6	9	4	9
5	1-	1-	0+	1-	1+	1+	1-	2o	1223	2332	4	5	3	4	8	9	5	16	7
6	2-	2-	1+	2-	1-	2o	3o	2+	4322	2212	12	11	10	12	4	16	29	20	14
7	2o	1+	1+	1+	1+	1+	1+	2o	3113	2121	16	9	8	9	10	9	8	14	10
8	2o	3-	2o	0+	0+	1-	0o	1-	3312	2211	14	23	14	3	3	4	1	4	8
9	2o	1+	1-	1-	1-	2o	1+	0+	4321	2132	16	9	4	5	4	14	9	3	8
10	0+	1o	1+	1o	1o	1-	2-	2-	2032	4322	2	7	8	7	7	4	11	11	7
11	3-	2-	3-	2-	2+	1-	1o	2-	3232	4232	26	13	24	12	19	5	6	13	15
12	2o	3-	1+	2o	1o	0+	0+	2-	2315	3222	14	26	10	14	7	3	3	12	11
13	2o	3+	3-	3o	3o	3-	2+	2-	3432	3432	15	37	25	29	29	24	18	11	24
14	2+	2o	4o	4o	3-	3-	2o	3-	1232	2222	17	14	59	51	23	21	14	22	28
15	2+	2-	1+	5-	4o	4o	4-	3+	2334	2223	18	13	8	78	51	57	45	38	39
16	3o	3-	4-	3+	4-	4o	2-	4o	2221	2426	29	26	44	36	42	56	13	60	38
17	4o	3+	3-	1o	2+	3o	3-	2+	3112	4421	51	34	21	6	18	32	26	17	26
18	3o	3o	3-	2-	2o	2o	1+	1+	4122	2211	28	28	21	13	16	15	8	10	17
19	4o	3o	2o	2-	2+	1+	2o	3-	5322	1112	53	29	15	13	17	10	14	22	22
20	3o	4o	4-	3o	3o	3-	3o	1o	3464	3241	29	53	43	32	33	26	27	7	31
21	2o	1+	3+	3-	4-	4+	5o	5-	2252	2114	15	10	35	24	41	63	90	73	44
22	4+	5-	4+	5-	4o	4o	3+	4+	4453	3134	64	79	70	76	57	52	38	63	62
23	4-	5-	4o	6o	5+	4+	5-	3+	5668	3353	48	74	54	168	115	65	83	40	81
24	4-	4+	3+	3-	3+	2+	1+	0+	2431	1340	46	70	36	24	34	17	9	3	30
25	1+	1-	1o	0+	1+	1+	2-	2+	3212	4323	9	5	6	3	8	9	13	17	9
26	1+	4-	6-	6-	6-	5o	4o	3o	5332	3542	10	49	134	132	143	94	55	33	81
27	4o	3+	3o	2-	3-	2-	1+	1+	1313	3444	54	39	28	13	24	11	9	9	23
28	2+	2o	2-	1+	1+	0+	0+	1o	3322	2213	17	16	13	8	10	3	2	6	9
29	1+	2-	2-	3o	2o	1+	4o	3-	2411	3541	8	12	13	29	15	10	52	22	20
30	3-	3-	3-	3+	4+	4+	3+	4-	3441	4214	21	24	24	36	66	70	34	47	40
31	5-	3o	3-	3-	2+	1+	1+	1+	4222	3431	85	31	22	23	20	9	8	8	26
											Monthly mean value of As								25.9

SEPTEMBER 1990																				
	Kn								σn		an									An
1	2o	3-	1+	3+	6-	4-	2+	2-	2314	5324	16	23	8	34	127	42	19	11		35
2	1+	0+	0+	1-	1o	1-	1o	1-	3223	2213	8	3	3	5	6	4	7	4		5
3	0+	1o	1o	2-	1+	1o	2-	2-	2013	3234	3	7	7	11	10	7	11	13		9
4	1+	1o	1+	2+	2+	3o	2+	3o	3221	2214	8	7	9	17	19	27	20	29		17
5	3o	3-	2+	3-	3o	3-	2-	3-	3222	1322	30	21	19	23	28	21	12	26		23
6	3-	2o	3+	3o	3-	2+	3-	3-	3232	2222	22	14	37	33	23	19	23	22		24
7	3-	2+	3-	3o	4-	3+	2-	2o	3322	3323	23	19	26	30	44	36	13	14		26
8	2o	2-	2-	2-	2-	2+	2+	3o	1222	3355	15	12	12	12	11	18	18	30		16
9	2+	2-	1+	2+	2+	3-	3-	3-	4322	2422	18	12	8	17	19	24	23	24		18
10	3-	3-	2+	1+	1+	1+	3o	4o	2245	3212	23	21	20	10	9	10	31	53		22
11	3-	3o	4-	4o	4o	4-	4-	4+	3124	3232	24	33	47	59	54	44	50	61		47
12	4-	4-	3o	3o	3-	3-	3+	3-	5232	3231	45	44	27	32	23	24	34	26		32
13	4+	3-	2+	3+	3o	3+	3-	3+	5222	1322	62	22	18	35	31	40	26	38		34
14	3+	3+	3o	3o	3o	3o	3+	2+	2321	1332	38	39	30	30	33	33	35	17		32
15	3o	4-	3-	4o	4+	4-	3o	2+	3414	2322	28	42	26	54	66	49	31	20		40
16	3o	3-	4-	4o	4-	3o	2+	3-	3331	3012	28	21	44	55	44	29	17	24		33
17	3-	2+	3-	2+	2o	2o	3o	3-	2223	1232	22	19	22	20	16	14	28	25		21
18	1o	2o	3-	4o	3o	4-	4-	3o	1534	1444	7	15	25	51	33	42	45	33		31
19	4-	3-	3-	2o	2o	3+	3-	3+	4220	0344	46	25	22	15	15	39	24	37		28
20	3o	2o	1+	2-	2-	3-	3o	4+	6123	3343	33	14	8	11	13	25	31	61		25
21	3o	2+	3-	3o	3+	3-	3o	3o	5321	3222	30	20	21	31	34	22	27	32		27
22	3-	3o	3o	2o	3-	3+	3o	3+	4332	2143	25	30	31	15	25	36	30	36		29
23	3o	3o	3-	2o	2-	3o	2o	2+	3221	2423	27	29	24	16	12	27	15	18		21
24	2-	2+	3o	2+	4-	4-	3-	2o	3442	5313	12	19	29	20	46	43	26	14		26
25	3o	3-	2o	2-	1+	2-	3o	3-	1311	2254	31	22	16	11	9	13	29	25		20
26	2+	2o	2-	2o	3-	3-	3+	2+	3234	2333	17	16	12	16	22	26	36	17		20
27	2+	2o	3-	2-	2+	2-	2-	1+	4142	3222	19	14	22	12	20	13	11	9		15
28	3-	2+	1o	2o	2+	1-	1o	2-	3422	3222	23	17	7	15	18	5	7	11		13
29	2+	2-	2-	2o	1o	0+	2-	3-	3231	1223	18	12	13	14	7	3	13	22		13
30	2+	1o	1-	1o	1+	1o	2o	2+	4322	2022	19	7	5	6	8	7	14	17		10
											Monthly mean value of An									23.7

SEPTEMBER 1990																				
	Ks								σs		as									As
1	2o	3-	1+	3o	6-	3+	3-	1+	1412	5322	15	23	8	31	130	40	21	8		35
2	1o	0+	0o	1-	0+	0o	0+	0+	3211	2112	6	3	1	4	3	1	2	3		3
3	0+	0+	1-	1+	1-	1-	1-	1-	1022	3432	2	3	5	8	5	4	5	4		5
4	1+	1-	1o	2-	1+	3-	2o	3o	2213	3215	8	5	7	12	9	26	15	30		14
5	4-	3-	2+	2o	2o	2+	2-	2+	2210	2221	45	21	17	16	14	18	12	17		20
6	3o	2-	3+	2+	3-	1+	2+	2+	4232	3233	30	11	36	20	21	10	19	20		21
7	3o	3-	3-	3o	3o	3+	1o	1+	2221	2323	31	21	22	28	31	38	7	10		24
8	2o	2-	2-	2-	1+	2o	2+	3o	3223	5342	14	13	12	13	10	14	17	31		16
9	2o	1+	1-	2o	2-	2o	3-	2+	1325	4123	15	10	5	14	11	15	21	18		14
10	3+	2o	3-	0+	0+	1-	3-	4o	2222	1121	39	15	22	3	2	5	26	54		21
11	3-	3o	4o	3+	3+	3o	4-	4+	3212	3335	24	31	51	39	39	31	49	67		41
12	3o	4o	3-	3-	3-	2+	4-	3o	4431	2222	33	52	22	25	22	19	47	27		31
13	4+	3-	2-	3o	3-	3+	3-	3o	5223	3122	63	22	13	28	25	35	21	32		30
14	4-	3+	3o	3o	3o	3-	3+	2-	3423	2242	46	36	27	27	27	26	38	12		30
15	3o	4-	3-	4o	4o	3+	3o	2+	3624	4232	33	44	21	57	51	37	33	18		37
16	3o	2+	4-	4o	4-	3-	2-	2+	4333	3323	32	20	42	56	46	25	12	17		31
17	2o	2o	2+	2o	2-	2-	3-	3-	2234	5221	16	15	17	15	13	13	21	21		16
18	1o	2o	3-	4-	3o	4-	4-	4-	3543	2224	7	15	24	42	28	49	47	45		32
19	4-	3-	3-	2-	2-	4-	2+	3+	4222	4323	48	22	22	13	11	42	18	34		26
20	3+	1+	1-	1+	1+	3o	4-	5o	5222	4225	38	9	5	8	9	28	43	98		30
21	3o	2o	2+	3-	3o	2o	3o	3o	5211	3022	33	14	17	25	31	16	28	27		24
22	3-	4-	3+	2+	3-	3+	3-	3o	2552	2222	21	43	35	17	26	39	25	32		30
23	3+	3+	2+	2+	1+	3-	2-	1+	1154	2232	40	34	20	17	10	22	11	8		20
24	1+	2-	3o	2+	3+	3o	3-	2-	1252	4022	9	12	30	17	37	32	22	12		21
25	3o	3-	2o	1+	1-	1+	3+	2+	4202	3433	29	22	16	10	5	9	34	20		18
26	2-	2o	1+	2o	3-	3-	3-	2-	1412	3313	11	14	8	14	21	22	25	11		16
27	3-	2o	2o	1o	2o	1o	1-	1+	2152	2413	23	14	15	6	15	7	5	9		12
28	3-	2o	1o	3-	2+	1-	1+	2-	3313	3333	24	14	6	21	18	4	8	13		14
29	2+	2-	2-	2-	1o	0o	1+	2o	2432	1132	20	12	11	12	6	1	10	16		11
30	2-	1o	1-	0+	0+	0+	2-	1+	1232	1211	11	6	5	3	2	3	11	10		6
											Monthly mean value of As									21.6

OCTOBER 1990																				
	Kn								σ n		an									An
1	1+	1+	1o	0+	1-	1-	1-	1-	2413	3231	9	10	6	3	5	5	5	5		6
2	1+	0+	1+	2-	2+	1+	2o	1+	2112	2223	8	2	8	11	17	10	14	10		10
3	2-	2-	1+	2o	2o	2-	3-	3+	2210	1222	11	11	9	15	15	12	25	37		17
4	2o	3-	3-	3-	3o	3+	4o	3o	3221	2251	14	21	25	26	30	35	54	28		29
5	2o	2o	3-	2+	3+	2+	1+	3o	1221	3322	16	16	22	17	35	17	10	27		20
6	1+	3-	4-	4-	2+	2+	2o	2o	2353	1112	10	23	48	47	20	17	16	15		25
7	1+	2-	2-	2o	2+	2+	3-	3-	1213	5223	8	12	11	15	19	18	24	21		16
8	1+	1o	1o	1+	2-	2o	1+	1+	2102	3412	9	6	6	8	12	14	8	10		9
9	1-	1o	1o	2-	3o	4-	3o	4-	2223	1302	5	7	7	13	31	42	29	48		23
10	4+	5-	5-	5o	4+	3+	3-	3o	4346	3424	70	74	85	98	63	36	25	27		60
11	4+	3+	5-	4o	3+	4+	4+	5-	4243	2534	67	38	74	52	35	62	61	77		58
12	4o	4o	4-	4-	3+	3+	3+	4-	2533	2344	55	57	48	47	37	39	37	43		45
13	3o	3-	3-	2o	3-	3-	4-	3+	4212	4343	31	22	24	16	26	24	50	38		29
14	4-	3-	3-	2-	3-	3o	3o	4-	3433	2242	47	23	23	13	22	31	32	43		29
15	4-	3+	3-	3+	5-	4o	4-	3-	4535	3333	46	36	22	36	73	56	48	22		42
16	2o	2-	3o	2o	2o	2+	2+	3-	1144	2235	14	13	27	16	14	20	20	26		19
17	3-	2-	3-	1+	1o	0+	1-	1o	3143	3332	21	12	21	8	6	3	5	6		10
18	0+	1-	2-	2o	2+	2+	2+	2-	3335	5643	3	4	11	15	18	19	20	13		13
19	3o	2+	2-	2+	1+	1+	2o	3-	6312	2313	31	18	12	18	9	9	14	25		17
20	1+	2o	2o	3+	4-	4+	4o	4o	2113	2344	10	16	14	35	42	65	57	54		37
21	3-	2+	3o	3-	4-	1+	2o	1+	3223	5134	22	17	27	25	42	10	14	8		21
22	3o	2+	2+	2-	3-	3-	1+	1+	4423	4322	32	18	19	12	25	26	10	8		19
23	1+	1+	2-	2o	1+	2-	3o	4-	2233	2253	8	9	12	14	9	11	30	48		18
24	4o	3+	3+	3o	4o	3o	3o	2-	4331	3132	57	34	40	31	53	31	33	13		37
25	3o	3-	2-	2o	2-	2-	1+	2o	3213	1121	33	24	12	16	13	11	9	14		17
26	1o	1o	1o	3o	3o	3+	3o	2o	1113	3133	7	7	6	27	27	34	27	14		19
27	1+	2+	1o	2o	2+	2+	2+	2-	2612	3432	10	19	7	14	19	20	17	11		15
28	1+	1o	2o	2-	1-	0+	1-	1-	3213	4243	8	6	16	11	5	2	4	4		7
29	0+	1o	1-	2+	2o	2+	4-	3+	3022	1233	3	6	4	17	16	20	42	36		18
30	5o	4-	2+	2+	2+	2o	2+	3-	5424	0232	93	42	18	18	19	16	20	25		31
31	2+	3+	3+	3o	3+	4-	4o	3+	3643	5453	17	34	35	33	38	45	52	34		36
											Monthly mean value of An									24.3

OCTOBER 1990																				
	Ks								σ s		as									As
1	1o	1+	1-	0+	0+	0o	0+	1-	3311	1112	6	10	4	2	2	1	2	4		4
2	1+	0+	1+	2-	2o	1+	2o	1o	1113	3303	10	2	8	12	15	9	16	7		10
3	2o	2o	2-	2-	2-	2-	2+	3+	3232	2411	14	16	12	12	11	12	19	34		16
4	2o	3o	3o	3-	3o	3o	4o	3-	2433	3432	15	27	29	25	32	29	54	21		29
5	2+	2o	3-	3-	3o	2o	2-	3-	1422	3342	17	16	22	21	32	15	11	23		20
6	1+	2+	3-	3o	2+	2+	2+	2+	1412	3321	8	20	25	33	17	19	18	18		20
7	1+	1+	1+	2-	2o	2o	3-	3-	1322	2323	8	9	9	12	15	15	24	24		15
8	1-	1o	1o	1o	1+	1+	1-	1o	1112	1423	5	6	6	6	10	8	4	7		7
9	1o	1o	1-	2-	3+	3+	3o	4-	1524	3413	6	6	4	11	40	38	33	42		23
10	5-	5-	5+	5+	4+	3+	3o	2+	5534	3323	74	72	119	119	63	38	32	20		67
11	5-	3+	4o	4-	3o	4-	4+	5o	4421	1234	84	39	60	49	33	49	69	101		61
12	4-	4-	4o	4-	3o	3+	3+	3+	2552	4222	43	47	55	42	33	37	36	36		41
13	3o	3-	2+	2-	3-	2+	4-	3o	5312	2431	32	21	17	11	23	20	44	27		24
14	3o	2+	3-	2-	2o	3o	3o	4o	2121	1014	29	18	26	13	15	32	29	53		27
15	4-	3o	2+	3o	4o	4o	4-	3-	5311	3235	46	30	18	29	52	60	46	26		38
16	2o	1+	3-	2-	1+	3-	2+	3-	1343	2233	14	10	25	12	10	21	17	21		16
17	2+	1+	2-	1o	1-	1-	0+	1o	4331	3413	20	10	12	6	5	4	2	6		8
18	1-	0+	1-	1+	1+	2o	1+	1o	3223	4211	4	3	5	8	9	14	9	6		7
19	2o	2-	2-	2+	1+	1+	2o	3-	4414	2314	16	13	13	18	9	8	14	23		14
20	1+	2+	3-	4o	4o	4+	4o	4o	3214	4522	9	18	21	51	55	69	57	59		42
21	3-	3-	3-	2+	3-	1o	1+	1o	2424	4422	21	21	24	20	26	7	9	7		17
22	3o	3-	3-	2-	2+	3-	1o	1+	5422	1222	33	21	24	11	19	23	7	8		18
23	2-	1+	2-	2o	1+	1+	3o	4-	3223	2315	12	8	13	15	8	10	33	43		18
24	5o	4+	4-	3+	4o	3-	3+	1+	1222	1231	94	64	44	36	52	23	35	10		45
25	3o	3-	1+	2-	2-	1o	1+	2o	5221	3533	27	24	10	13	13	7	9	15		15
26	1+	1-	0+	4-	3o	3+	3o	2o	3423	4222	8	5	3	41	27	37	31	16		21
27	1+	2+	1o	2+	2o	2o	2o	1o	1521	2352	8	19	7	17	16	16	16	6		13
28	1+	1o	3o	2o	0+	0+	0+	1o	1212	1113	8	7	27	15	2	2	2	6		9
29	1-	1+	1-	3-	3-	2+	4+	4-	1222	2142	4	10	4	21	23	18	63	45		24
30	5+	3+	2+	2-	2+	2+	3-	3-	1533	2311	118	39	20	11	19	18	21	24		34
31	2+	3o	3+	3o	3+	4o	4+	4-	3312	3132	18	29	34	28	39	54	66	46		39
											Monthly mean value of As									23.9

NOVEMBER 1990																					
	Kn								σ n		an										An
1	2o	2o	1+	2+	2o	1+	2-	3o	3032	2123	16	15	8	18	15	8	11	27			15
2	3-	3o	1+	1+	1+	2+	2o	3o	3531	2313	21	30	8	8	10	17	14	32			18
3	2-	2-	1+	2-	2+	2-	1+	2-	2222	2322	12	13	9	13	17	11	9	12			12
4	1+	1-	1-	1o	1-	1-	1-	0+	3221	2332	10	4	5	7	4	4	5	2			5
5	0+	0+	0+	0o	0+	0+	0+	1o	2111	1333	3	2	2	1	3	3	3	6			3
6	0+	0+	0+	0o	0o	1-	1+	1o	3221	1122	3	3	3	1	1	4	8	6			4
7	0o	0+	1o	2o	2+	3-	2-	2-	2115	3432	1	2	7	14	18	21	12	11			11
8	1o	1+	3-	2-	2+	3o	3o	2+	3342	2435	7	8	21	13	17	31	27	19			18
9	3o	2+	3o	2o	2+	3o	3-	2+	2244	3543	27	19	29	14	17	30	25	20			23
10	3-	2o	3o	2+	2o	4-	4-	3-	3243	3544	25	15	29	18	14	41	41	22			26
11	2+	2-	2+	3-	3+	2o	2o	2-	4224	4203	17	13	19	25	37	15	15	11			19
12	1o	2+	1-	1o	1o	2+	2-	1o	1122	0421	7	18	4	7	6	17	11	6			10
13	1o	1o	1+	1-	1-	1o	1-	1-	2112	1222	7	6	8	4	5	7	4	4			6
14	1-	0o	0o	1-	0+	0o	0o	0o	2212	1111	5	1	1	5	2	1	1	1			2
15	1-	0+	0o	0+	1o	1o	1+	1o	1213	1210	5	3	1	3	6	7	10	6			5
16	2o	2+	3o	4-	4-	3+	3o	3o	1135	4245	16	18	28	43	49	39	28	32			32
17	1+	2o	3-	3+	4o	4o	3o	3-	2435	3532	10	15	23	35	53	54	33	23			31
18	3o	2+	2-	3-	4-	4-	3-	3+	5335	5346	33	20	11	22	46	42	26	34			29
19	3o	3-	2-	1+	1+	3-	2o	2-	4232	3312	31	21	12	9	9	22	14	13			16
20	1+	2o	2o	1+	1+	1o	1+	1+	3322	2112	10	16	15	9	10	7	8	9			11
21	2o	3-	2-	2-	3-	1+	2-	2+	4342	3214	16	26	11	12	26	10	12	17			16
22	1-	1-	0o	0o	1-	0+	2o	0o	2111	3232	5	4	0	1	5	3	15	1			4
23	0+	0+	0o	1-	2+	2+	1+	2o	2111	2424	2	2	1	5	18	17	8	14			8
24	1+	1-	0o	0o	0+	0o	0+	1-	3210	1131	9	4	1	0	2	1	3	5			3
25	1-	0+	1-	2o	2-	1o	2-	2+	2212	2345	5	2	4	15	11	6	12	18			9
26	2+	2-	1+	2-	3-	2o	1-	3o	2322	3512	20	11	10	13	26	16	5	33			17
27	4o	3o	3-	3o	4-	6+	6+	4o	2323	1582	54	33	26	27	49	200	177	52			77
28	3o	4-	2+	2-	2o	2+	4o	2o	1332	1232	33	41	18	11	14	19	58	15			26
29	1o	2o	1o	1-	0+	1o	2-	2-	2312	0033	7	14	6	4	3	6	12	13			8
30	2-	1+	1o	1+	2o	3+	2o	2-	3312	1213	11	8	7	10	16	39	16	13			15
											Monthly mean value of An										16.0

NOVEMBER 1990																					
	Ks								σ s		as										As
1	2+	2-	1+	2o	1+	1+	2-	3o	1212	3332	17	13	9	14	10	9	12	32			15
2	2+	3-	2-	1+	1o	2+	2+	3o	2422	2311	19	25	11	9	7	17	17	29			17
3	2-	1+	1+	3-	2+	1+	1+	1+	2112	2413	11	8	10	25	19	8	8	8			12
4	1+	1-	1o	1o	0+	0+	1-	0+	1123	2221	9	4	6	6	3	3	5	2			5
5	1o	0+	0+	0+	0+	0+	0+	1o	3201	2211	6	3	3	2	3	3	2	6			4
6	1-	1+	0+	0+	0+	0+	1o	1-	4123	1234	4	8	3	3	2	3	6	5			4
7	1-	0+	1+	2o	3-	2o	1+	1+	5226	2242	4	2	10	16	21	15	9	10			11
8	1o	1+	3-	2o	3-	2+	3-	2o	2530	2223	6	10	21	16	22	18	22	14			16
9	3-	2+	3-	2-	2+	2o	2o	2o	2212	3221	23	18	25	11	19	16	15	14			18
10	3-	2-	2+	2+	2o	3-	3-	2o	3232	2322	25	11	20	17	16	24	23	15			19
11	2+	2o	2o	3o	3o	1+	3-	2o	1246	3432	17	16	16	27	28	9	21	14			19
12	2-	3+	1+	1+	1o	2-	2-	1+	2542	1333	12	37	8	10	6	11	11	10			13
13	1+	2-	1+	1-	0+	1o	1-	0+	2231	1322	8	11	10	5	2	6	5	3			6
14	1o	0+	0o	1-	1-	0o	0+	0+	3112	1111	6	2	1	5	4	1	2	2			3
15	1+	1o	1-	1-	1o	1+	2-	1o	1223	3332	8	6	4	4	6	9	12	7			7
16	3+	2+	4-	3o	4-	2+	3-	3-	4344	3322	37	19	47	33	45	19	26	24			31
17	2-	2o	3o	3o	4-	3+	3o	3-	4212	2124	11	14	27	30	42	39	33	22			27
18	3o	3-	1-	2+	3+	4-	3+	3o	2324	2223	31	23	5	17	34	43	34	28			27
19	3-	3+	2-	2-	1o	2+	2-	2o	1421	1220	24	34	13	13	6	20	11	16			17
20	2o	2+	2o	1+	2-	1+	2-	1+	2322	2132	15	20	16	9	13	10	11	9			13
21	3-	3o	1+	2o	3o	2-	2o	2o	4331	3441	23	30	9	14	28	11	14	15			18
22	1+	1+	1o	0+	1o	1-	2o	0+	5332	2311	10	8	6	3	7	5	14	2			7
23	1-	1o	0+	1o	2o	2o	1-	1+	3222	3121	4	7	2	6	15	14	4	9			8
24	1+	1o	0+	0o	1-	0+	0+	1o	2111	3123	8	6	2	1	5	2	3	7			4
25	1+	1o	1o	2+	1+	1+	1+	2o	2222	3321	8	7	6	18	8	8	9	14			10
26	2-	2o	2+	2+	2+	1o	0+	4+	1412	3224	13	16	17	19	20	6	3	65			20
27	5-	4-	3o	3+	5o	6o	6o	4+	3312	3434	73	41	29	34	90	159	151	63			80
28	4-	4-	3-	2o	2+	3-	4o	2o	2331	1243	41	44	25	14	17	22	56	15			29
29	2-	2-	1o	1o	0+	1-	2o	2o	3222	1112	12	13	7	6	2	5	14	15			9
30	2-	1+	2-	2-	3-	3o	2+	2o	1222	2113	12	10	11	11	24	28	18	15			16
											Monthly mean value of As										16.2

DECEMBER 1990																				
	Kn								σ n		an									An
1	2-	2-	0+	0+	1+	2o	1-	1-	5311	1221	11	12	2	2	8	15	5	5		8
2	0+	1-	1-	1+	2-	2-	2+	1+	1121	2224	2	4	4	8	13	12	19	9		9
3	1o	1-	1o	0+	1o	3-	3-	2+	4212	1334	7	4	6	2	7	23	22	20		11
4	3o	3o	2o	3o	3+	3o	2+	3o	3423	4233	31	30	14	30	34	29	19	33		28
5	2+	1o	3o	4-	3-	4-	3-	2o	3033	2443	18	6	27	41	26	42	25	14		25
6	2o	1o	1+	3-	2o	2-	2-	1+	4122	1332	14	6	8	23	16	12	13	9		13
7	2-	1+	1+	1o	0+	1+	1o	0+	2211	2422	11	10	8	6	3	9	7	3		7
8	0+	1o	2o	1+	3-	2+	3-	2+	1332	2222	2	6	14	10	26	20	23	17		15
9	1+	1+	1o	2-	3-	2o	1+	1-	2312	3022	10	9	7	11	21	15	9	5		11
10	0o	0o	0+	1-	0+	1-	1o	0+	1122	2342	0	1	2	4	2	4	6	2		3
11	0+	0+	0o	0o	1-	2-	1+	0+	2211	2133	2	3	1	1	4	11	8	2		4
12	0o	0+	0+	1o	2-	3o	3o	3o	0221	3022	0	2	3	6	12	29	27	29		14
13	3+	3o	4-	3-	2o	2-	2o	1+	4233	3232	37	27	41	26	14	12	16	9		23
14	2+	2-	1+	1o	2o	3-	2-	0+	5221	1422	17	12	10	7	15	22	11	3		12
15	1o	1+	2o	1o	1+	2o	2o	1o	2321	2233	6	10	15	7	8	16	14	7		10
16	1+	1+	2-	2o	3o	3o	2o	2-	4432	1502	10	9	11	16	31	29	15	12		17
17	2-	2o	1+	1o	1o	2o	2o	1+	2220	0412	13	16	8	6	6	15	16	10		11
18	1+	1-	0o	2o	2+	2-	1-	0+	2113	2222	10	4	1	15	19	11	5	2		8
19	0o	0+	0+	0o	1o	1+	1-	0+	1211	1122	1	3	2	1	6	8	5	3		4
20	1-	1+	1+	2+	3-	3+	3-	2-	1223	3533	5	8	10	17	23	35	25	11		17
21	1-	1o	0+	0o	0o	2-	1+	1+	2120	1223	5	7	3	0	1	11	9	8		6
22	1-	1o	1+	1o	1o	0o	0+	2o	1221	1121	4	7	8	6	6	1	2	14		6
23	0+	1-	3o	3-	1+	2-	1o	3-	2232	2224	3	5	30	24	8	13	7	23		14
24	1o	2o	2-	3-	3o	3+	4-	3+	2213	3455	7	14	13	25	27	38	48	39		26
25	2+	3-	1+	2+	3-	3o	3o	2-	4524	3343	20	21	10	20	22	30	27	11		20
26	1o	1-	1o	1o	1+	1o	1o	1-	3203	4432	7	4	6	6	10	7	6	4		6
27	1+	3-	1o	1+	2o	2-	1+	1-	1313	4222	8	22	7	9	14	11	9	5		11
28	1+	1+	1-	1o	1o	1-	1+	1+	3211	2221	8	10	5	7	6	4	8	8		7
29	1-	1o	0o	1o	1+	2-	2-	1o	1112	2332	5	6	1	7	8	13	11	7		7
30	2+	3-	2+	3o	2o	2o	3o	2-	1210	1222	17	24	18	29	16	15	27	13		20
31	1o	1+	1o	3o	4-	3o	3-	2o	2313	3233	6	8	7	27	41	29	22	16		20
											Monthly mean value of An									12.7

DECEMBER 1990																				
	Ks								σ s		as									As
1	2-	1+	1-	0+	1o	2-	1o	1+	3211	3224	12	10	5	2	7	11	6	9		8
2	1o	1o	1+	2-	2-	1+	2o	1+	3223	2211	6	7	9	11	12	10	15	8		10
3	1+	1+	1o	1o	1+	3-	2o	3-	3322	2222	9	9	7	7	9	26	15	26		14
4	3+	3+	2o	3-	3o	3o	3-	3o	1322	1330	36	40	16	21	27	30	23	32		28
5	2+	2-	2+	3-	2+	3+	3-	2-	2312	3122	17	13	19	23	20	34	26	13		21
6	2-	2-	2-	2o	2o	2-	2-	2o	2222	3324	13	11	12	16	16	12	13	16		14
7	2+	1o	1+	1+	1-	2-	1+	0+	3231	2232	17	7	9	8	4	12	8	3		9
8	1-	1+	2o	2+	3o	3+	3+	3o	2524	2541	4	9	14	17	27	40	35	30		22
9	2+	2-	1+	1+	2+	2o	2-	1+	4123	3343	20	13	8	9	20	15	12	8		13
10	0o	0+	1o	1o	0+	1-	1o	1-	1222	1312	1	3	6	7	2	4	6	5		4
11	1+	1o	1o	1-	0o	2o	1o	1-	3221	1543	8	7	6	4	1	15	6	5		7
12	1o	1+	1+	1+	2-	3-	3+	4-	2331	2242	6	8	8	8	12	26	37	44		19
13	3+	3+	4-	3o	2-	2o	2-	1+	3524	2532	37	40	44	31	13	15	13	9		25
14	3-	2o	2o	1+	2o	2+	1+	0+	5232	2330	22	16	14	9	14	20	10	3		14
15	1o	2-	2-	1+	1-	1+	2-	2-	3322	2233	6	13	13	9	5	10	12	12		10
16	2-	1+	1+	3-	3o	3-	2+	2o	2232	1233	12	10	10	22	27	26	18	16		18
17	2+	3o	2o	1+	1+	2o	2o	1+	1111	1334	17	28	14	10	9	15	16	10		15
18	2o	1o	0+	2-	2-	2-	1-	1-	2323	3333	15	6	3	13	12	11	5	5		9
19	1-	1+	1o	1-	1-	1+	1-	1o	3331	2423	4	9	7	5	5	9	4	7		6
20	1+	1+	1+	3-	2+	3-	3-	1+	4532	1121	8	8	9	21	17	25	26	9		15
21	1-	1+	1-	0o	0+	2-	2-	2-	2441	1422	4	8	4	1	2	12	13	11		7
22	1o	1+	1+	2-	1+	0+	1-	3-	4222	3232	7	9	10	12	8	3	5	22		10
23	1o	1-	4-	3-	1+	2o	2-	3o	5331	2231	6	5	50	24	9	16	11	30		19
24	2-	3-	3-	3o	3o	3o	3+	3+	3230	1123	13	22	22	32	33	29	39	34		28
25	2+	3-	1+	3-	2+	3-	3o	1+	3211	1211	20	22	10	22	19	23	30	10		20
26	1o	1o	1+	1+	2-	1o	1-	1-	2431	4132	7	7	9	10	12	7	5	4		8
27	2-	2+	1+	1+	2-	2-	1-	1-	2232	4233	12	19	9	10	13	11	4	5		10
28	1o	2o	1o	1o	1o	1-	1o	2-	2310	2222	7	16	6	7	7	4	6	13		8
29	1o	1+	1-	1o	1+	1+	2-	1o	2221	2213	6	10	5	6	8	10	11	6		8
30	2+	4-	4-	3+	3-	3-	3+	3o	3541	1235	17	42	44	34	21	21	38	29		31
31	1o	1o	2o	3o	3o	3+	3-	2o	3232	2421	7	7	14	29	32	40	23	14		21
											Monthly mean value of As									14.5

am INDICES 1990

JANUARY 1990																				
	Km								Σ Km	am									Am	Am2
1	2-	2+	3-	3o	3-	3+	4-	4-	23.0	12	19	23	31	23	34	47	45		29	24
2	4-	2o	2o	3o	2+	2+	3o	4-	22.0	41	15	15	32	20	18	28	46		27	28
3	4-	3-	2o	1+	2+	3o	2+	2o	19.3	44	22	15	9	20	33	18	14		22	21
4	2+	1+	1+	2+	3-	2o	2o	3+	17.3	17	9	9	18	26	14	14	38		18	19
5	3o	2o	2+	2+	2o	3+	4-	4-	22.3	27	15	19	19	16	37	44	43		28	23
6	2+	2-	2-	1+	1+	1o	2o	2-	13.0	20	12	11	10	10	7	14	12		12	18
7	2+	2o	2+	1o	1o	0+	1-	1+	11.0	17	15	18	7	7	2	4	8		10	10
8	1o	1+	1+	1+	3o	4o	4-	3+	19.0	6	10	8	9	30	58	48	37		26	21
9	4-	2+	3-	2+	3-	2+	1o	3-	19.7	45	20	21	18	24	18	7	25		22	28
10	3o	2-	3o	3o	3-	3-	3o	3o	22.0	30	13	28	30	23	26	30	32		27	26
11	3-	2+	3o	4-	4-	3+	4-	3o	25.3	24	19	32	50	45	39	47	27		35	32
12	3-	3-	2+	4-	3o	3-	3o	2o	22.0	25	25	19	42	28	24	29	15		26	27
13	3-	2-	2+	2+	2o	2o	1+	2-	16.0	21	13	20	19	15	15	8	11		15	16
14	1o	1o	1o	2o	3+	2o	1+	2-	13.3	7	7	7	14	36	15	8	12		13	13
15	2-	2o	2-	2o	3-	3+	2-	1o	16.0	12	14	11	14	25	34	12	6		16	15
16	1+	1+	1+	2+	1+	3-	3+	3o	16.7	10	10	9	17	8	26	40	33		19	18
17	2+	2+	2o	1+	1+	2+	2-	3-	16.0	17	17	14	10	10	18	12	21		15	18
18	3-	1+	1+	2+	3-	2o	2-	2o	16.0	22	8	8	20	25	16	11	16		16	13
19	1+	0+	0+	0+	1-	0+	2+	3-	8.3	9	2	2	3	5	3	17	22		8	14
20	2+	2o	3o	2+	3o	4-	3+	3-	22.3	19	16	32	18	27	43	36	21		27	24
21	3o	2+	3o	3+	3+	3o	3+	2+	23.7	32	19	33	34	38	28	39	20		30	31
22	3+	3+	2+	3o	3-	3o	3+	3o	24.0	36	36	17	33	21	30	35	30		30	30
23	3+	3o	3-	3o	3+	2+	3+	4o	25.0	37	31	24	32	39	20	36	52		34	34
24	4-	4-	3+	3+	3+	3+	4+	4+	29.3	50	44	34	34	35	36	63	70		46	40
25	4+	3-	3-	3-	3o	3o	2-	2-	21.7	61	21	26	26	32	27	12	13		27	30
26	2o	1+	2-	3o	3-	3-	2-	1-	15.7	15	10	11	27	24	23	13	5		16	15
27	1-	1o	1-	0+	1-	2-	1+	0+	6.7	5	7	5	3	4	12	9	2		6	9
28	1o	1o	2-	1+	2+	2+	3-	3o	15.3	6	7	12	10	17	17	22	32		15	19
29	4-	3o	4o	3o	3+	3-	3+	3+	26.3	50	27	55	27	38	26	38	40		38	32
30	4-	4-	3-	2o	4-	4o	5-	3+	27.7	45	43	26	16	45	52	72	38		42	38
31	4-	3-	3o	3o	3+	3+	3o	1+	23.3	48	21	30	30	40	39	30	9		31	33
										Monthly mean value of Am									23.4	

FEBRUARY 1990																				
	Km								Σ Km	am									Am	Am2
1	1+	3-	2o	3-	4-	4+	4+	3-	23.7	10	21	15	24	43	67	63	26		34	35
2	4-	4-	3+	3+	4-	4o	4-	3o	28.3	43	49	40	36	42	59	47	33		44	37
3	2+	1+	1-	2-	3-	3-	3-	2+	16.3	20	9	5	12	21	26	22	19		17	25
4	3o	2+	2+	2+	3o	5o	5+	4+	27.7	29	17	17	17	27	100	110	69		48	42
5	4o	3+	3+	4+	3o	3+	3o	2o	26.3	54	38	34	64	28	38	28	16		38	43
6	3o	3-	3-	1o	1o	2-	1o	1+	14.3	27	21	21	7	7	13	7	8		14	21
7	1+	2+	3+	4-	4o	4o	4o	5-	27.3	8	17	38	50	53	59	52	71		44	28
8	3o	2+	2-	1+	1o	1o	1o	1-	12.0	30	19	12	8	6	6	6	4		11	23
9	1-	1+	2+	2-	2o	3-	1-	1+	12.7	4	9	19	12	15	22	5	8		12	10
10	1+	1+	2o	2o	3o	3-	2-	2-	15.7	8	8	16	15	29	22	11	11		15	14
11	1+	2-	2o	2+	3-	3-	3o	2o	17.7	8	13	14	19	22	26	27	16		18	18
12	3o	2o	2-	2-	1-	0+	0+	0+	10.0	29	14	12	13	5	3	2	3		10	12
13	0+	1o	0o	2-	1+	3+	1+	3+	12.3	2	6	1	11	8	38	9	40		14	28
14	4o	6-	5-	4o	3-	2o	1+	2-	26.0	54	133	76	55	21	15	8	13		47	35
15	2o	2-	3o	3+	4o	4+	5+	6o	29.7	16	13	33	34	58	62	120	154		61	54
16	5+	6-	4-	3-	4o	4-	4-	4o	32.7	118	131	48	22	55	49	49	56		66	71
17	5-	4o	3-	4-	4-	4-	3+	4-	29.3	84	54	26	50	47	45	37	44		48	45
18	3+	2+	3+	3+	4-	3o	4-	4o	26.7	35	17	40	38	46	27	42	54		37	40
19	4+	3+	2+	4-	5-	4o	5-	5-	31.7	66	35	19	45	71	52	71	83		55	49
20	4o	3o	4-	4-	5-	4o	5o	4o	32.0	59	27	50	42	74	58	96	57		58	52
21	3o	3-	2o	3-	3o	2+	3+	2o	21.0	32	26	16	23	29	19	34	15		24	35
22	3-	2+	3-	2+	3+	3o	4+	4+	25.0	21	20	24	19	36	31	65	61		35	34
23	4o	2+	3o	4o	4+	5-	4-	5-	30.7	59	20	33	59	64	86	47	74		55	50
24	5-	3o	3+	3o	4-	4o	4o	5-	30.3	72	29	35	31	41	51	59	71		49	53
25	4-	4o	3o	4o	4-	3o	4o	3+	28.7	49	53	30	59	45	29	54	39		45	43
26	3+	3-	2o	3+	4-	2o	4o	4-	24.7	36	23	14	37	46	14	52	44		33	40
27	4-	3+	4o	5-	4-	2+	3+	2+	27.3	41	39	52	71	49	17	36	18		40	42
28	3+	5-	4o	3o	4-	3o	4-	3o	28.3	36	79	55	28	44	28	48	29		43	38
										Monthly mean value of Am									36.3	

am INDICES 1990 (continued)

MARCH 1990																				
	Km								Σ Km	am									Am	Am2
1	4o	3+	2+	3-	3+	3+	3o	3+	25.3	55	35	20	25	39	40	32	37	35	34
2	3-	3-	3-	3+	2+	3o	3o	3-	22.3	26	26	21	35	20	29	27	26	26	26
3	2o	2o	2o	2o	2+	2+	3o	2o	17.7	16	15	15	14	19	20	29	15	18	19
4	1o	1o	2+	3-	1o	1-	2-	2o	12.3	7	7	20	22	6	4	12	16	12	15
5	3-	2+	2-	2o	1+	2-	1+	3o	16.0	21	20	11	15	10	12	8	33	16	19
6	4o	3+	3o	2+	3+	3+	3-	2-	23.7	56	37	29	18	34	38	21	12	31	23
7	2o	2o	2o	2+	3o	2o	1+	2o	16.7	14	16	15	17	31	15	10	14	17	20
8	2+	2o	2-	3o	3-	3-	1+	2-	17.3	17	15	11	32	21	22	9	12	17	18
9	2-	2o	2o	4-	2-	2+	1+	2o	16.7	12	14	14	41	12	19	10	14	17	16
10	2-	1+	2+	2o	3-	2o	2+	1+	15.7	11	9	18	16	21	14	17	9	14	16
11	3o	3-	2-	3-	2+	3o	2+	2-	19.3	30	23	13	25	17	28	18	13	21	19
12	2o	2+	2+	3-	2+	5o	6-	6+	28.7	15	20	17	23	17	93	128	192	63	51
13	6-	4-	3-	3o	3o	3+	3o	4o	28.3	132	46	21	28	30	37	29	57	48	63
14	5-	3+	3o	4-	4-	3o	3-	2+	26.3	84	36	29	47	43	32	25	19	39	34
15	3+	2+	2+	1+	2+	2-	2+	3-	18.3	34	19	17	10	19	13	19	21	19	20
16	2+	2-	2-	2-	2o	1+	1+	2+	14.3	17	12	11	11	14	8	10	18	13	12
17	1o	0+	1o	1-	0+	1-	0+	0+	4.7	7	3	7	5	3	4	2	3	4	10
18	1o	1+	3-	3+	5-	5-	5-	5-	27.0	7	10	26	40	77	86	71	83	50	33
19	5-	2+	1+	2-	1+	2-	1+	3-	17.0	82	20	8	11	10	11	8	26	22	36
20	3o	2+	2o	3-	3o	3+	3o	6o	25.3	28	19	15	25	30	35	31	162	43	53
21	6o	4+	6-	5o	5-	5-	5-	4-	38.7	169	64	121	93	77	72	81	43	90	71
22	4-	3-	3+	4-	4-	4-	4o	4-	28.3	48	25	38	50	50	42	56	42	44	49
23	4-	4-	3o	4-	4-	4-	4-	3o	28.0	42	43	32	46	42	48	44	29	41	39
24	3+	3o	3-	3-	3o	3-	3o	3+	23.7	35	27	22	26	29	23	33	35	29	33
25	3+	3o	2o	4-	4o	5-	4o	5-	29.3	40	32	16	50	53	73	57	84	51	47
26	5-	4-	4-	4-	3+	4+	4o	3o	30.3	85	50	50	44	37	66	57	32	53	52
27	4-	4-	3o	3-	2o	4o	5-	4o	27.7	48	47	29	25	15	55	72	59	44	41
28	3o	3+	3-	3-	3-	3o	4-	4-	24.7	28	35	26	26	24	30	42	42	32	34
29	3-	3o	1+	3-	5-	4+	3-	4o	25.3	25	29	9	23	71	61	24	57	37	57
30	3+	4-	7-	6+	5o	5-	3o	2+	35.0	39	44	209	186	89	72	28	17	86	59
31	2+	2-	2-	1o	2o	1+	1+	2+	13.7	17	12	11	7	16	8	10	19	13	21
										Monthly mean value of Am								33.7	

APRIL 1990																				
	Km								Σ Km	am									Am	Am2
1	2-	1o	1o	0+	2-	1o	2o	2-	10.3	13	7	7	2	11	6	15	13	9	12
2	1o	2-	2+	2+	3o	3-	2+	2o	17.3	7	13	18	20	30	25	18	14	18	18
3	2-	2+	2+	4-	4o	3+	3o	3-	23.0	11	19	20	41	54	37	33	25	30	24
4	2+	2-	2o	2o	3-	2o	3o	1o	16.7	18	13	14	16	22	14	27	7	16	22
5	2-	1+	3-	3-	3-	2+	2o	1o	16.3	12	8	22	24	26	17	14	7	16	16
6	1o	1+	2-	3-	2+	2o	1+	2o	14.3	7	10	13	21	20	14	8	16	14	15
7	2-	2o	2o	2+	1+	3-	2-	2-	15.3	11	16	16	18	9	22	13	12	15	13
8	2+	1+	0+	1+	2o	1+	1+	2-	11.7	17	9	3	9	14	10	8	11	10	20
9	2-	2o	4+	5o	5-	4+	3+	2+	27.7	12	16	63	88	75	63	38	20	47	55
10	3+	4o	6-	7-	8-	7-	7-	5o	45.7	39	56	131	233	332	217	219	96	165	122
11	6-	5+	5o	5o	5-	5-	5-	3-	37.7	124	116	95	97	74	76	83	23	86	133
12	4-	7-	6+	5+	6-	5-	5+	4+	42.0	45	222	196	109	123	78	112	67	119	90
13	4-	4o	5-	4o	4-	4-	4+	4o	32.0	50	52	82	53	44	44	69	52	56	67
14	3+	4o	5-	5-	4o	5-	4-	4o	33.0	40	51	80	80	54	76	42	53	60	54
15	4o	4o	3+	3o	4-	3o	3-	2-	25.3	52	56	35	28	42	27	25	12	35	37
16	2o	2-	3-	3o	2o	1+	2+	2+	17.3	16	13	22	32	15	10	17	18	18	31
17	4-	2+	4+	6-	5o	4o	4-	4+	33.0	44	17	62	121	100	51	42	69	63	47
18	4o	5-	3o	3o	3o	2-	3-	3o	25.0	57	71	27	29	27	12	22	31	35	37
19	3-	1+	1+	1+	2-	2+	3o	3o	16.7	21	10	8	10	13	18	28	30	17	19
20	3-	2+	2+	2o	2o	3-	4+	4-	22.0	25	17	18	14	15	25	68	47	29	29
21	4+	4-	3-	2-	1o	1-	1-	1+	16.0	66	43	22	12	7	5	4	9	21	25
22	2-	3-	3-	2o	3-	3-	3o	4o	21.3	13	22	26	14	25	22	27	53	25	29
23	4-	5-	4+	3+	4o	5o	3o	3+	31.3	48	79	70	39	59	99	32	34	58	51
24	1+	3o	5o	5o	4-	3o	3o	3+	27.3	10	29	95	91	41	28	28	35	45	47
25	4-	3+	4-	4-	3o	3-	2+	3o	25.3	41	37	46	41	30	23	20	28	33	34
26	3+	4+	3+	1o	2-	1o	1o	2o	17.7	34	67	34	7	11	7	6	16	23	25
27	3-	4-	3o	3-	3o	3o	2o	3+	23.3	24	43	32	21	30	29	15	35	29	25
28	3o	3o	4-	3o	4-	3-	4-	3+	26.0	27	30	45	31	48	25	49	37	37	39
29	4-	4-	4o	5-	3o	3-	3+	4+	29.3	49	47	56	78	31	21	39	64	48	45
30	5o	3+	3-	3-	3o	2o	2o	3+	24.0	97	34	23	21	29	15	15	40	34	31
										Monthly mean value of Am								40.4	

am INDICES 1990 (continued)

	MAY				1990															
	Km								Σ Km	am									Am	Am2
1	2+	3-	2-	2-	2-	2-	2o	1+	15.0	19	25	12	12	13	11	14	10	15	18
2	1o	2-	2+	3+	4-	2-	1+	2-	16.7	6	13	18	38	41	11	10	13	19	18
3	2-	3o	3-	3+	3+	2o	3+	4-	23.0	11	29	21	36	39	15	35	43	29	25
4	3o	2o	2+	3o	3-	2+	2o	2o	19.3	27	16	18	27	26	18	14	14	20	24
5	2-	1+	3-	4-	1+	2o	3-	1+	16.7	12	9	23	42	10	14	21	8	17	16
6	1o	2-	2-	2-	2-	1o	1+	1+	11.3	6	12	11	12	11	7	8	9	10	11
7	1+	1+	2-	1+	1+	2+	1-	1o	11.0	8	9	12	10	10	19	4	6	10	11
8	2-	3-	2-	2o	2+	2+	2-	3+	17.7	11	21	13	14	18	18	12	35	18	18
9	3-	2o	3+	3o	4-	2o	3-	4o	23.3	25	16	34	33	46	15	25	60	32	37
10	3+	5-	5-	4+	3o	3-	3+	3-	28.7	34	71	82	66	30	24	39	21	46	44
11	4-	4+	4o	3o	3+	2+	3-	3o	26.3	46	61	54	28	35	18	26	31	37	30
12	3o	2-	2-	1-	1-	0+	1-	1+	10.0	31	12	12	5	4	3	5	10	10	14
13	1-	1+	1+	2-	2-	3o	3o	3-	15.3	5	9	9	11	13	32	27	26	17	11
14	1+	1o	1-	0+	0+	1-	1o	1-	6.0	9	7	5	3	3	4	7	4	5	11
15	1+	1+	1o	1o	2-	1+	1+	0+	9.3	8	10	7	7	12	9	8	2	8	6
16	1-	1-	1o	1-	1o	1-	1-	0+	5.7	5	4	7	4	6	4	4	3	5	6
17	1-	1+	2-	1+	1+	1o	1+	1-	9.3	5	9	12	9	8	7	9	4	8	12
18	2-	1+	3+	4-	4+	5-	4-	4o	26.7	13	10	40	46	64	80	46	58	45	32
19	3+	4o	2o	2-	3o	3-	3-	3+	22.7	39	52	15	13	31	25	22	38	29	36
20	3o	3o	2o	2+	3-	3o	4o	3+	23.3	31	33	16	19	22	33	56	37	31	29
21	4-	2-	1o	3+	3o	4-	3+	4o	23.7	41	12	7	36	27	46	37	57	33	42
22	3+	4o	5o	4o	5-	4-	4-	3-	31.0	39	59	96	60	80	49	42	26	56	44
23	3-	2+	2+	3-	2-	3-	1o	2-	17.0	26	17	19	24	12	22	7	12	17	23
24	0+	1o	1o	1+	1-	2-	2+	2+	10.7	3	7	6	8	5	12	20	19	10	16
25	3-	3+	3-	4-	4-	3o	3+	3-	25.0	26	34	23	42	50	32	36	25	34	30
26	4-	4-	3-	3o	4o	3o	4+	6o	30.3	50	47	24	30	54	28	61	151	56	58
27	3+	5+	6-	4+	3o	4o	2+	2+	30.3	40	109	124	70	27	60	17	20	58	51
28	1+	2-	2-	2+	1+	2+	1+	2-	13.7	8	12	12	17	10	17	9	11	12	18
29	2o	2-	2+	2+	2o	2o	2o	3+	17.7	15	11	20	19	15	16	14	36	18	22
30	3-	3o	3o	4+	3+	3-	4o	3o	26.0	23	32	33	65	34	23	54	27	36	28
31	3-	3-	2-	2+	2o	2-	3-	2+	18.0	24	24	11	20	15	13	25	17	19	23
										Monthly mean value of Am								24.5	

	JUNE				1990															
	Km								Σ Km	am									Am	Am2
1	2-	3-	3o	2+	2-	2o	3-	2-	17.7	12	26	27	17	13	16	23	12	18	17
2	1+	1+	2o	2o	1+	1+	1o	1-	11.0	10	10	14	14	10	10	6	5	10	11
3	1o	2-	1o	1+	2o	1+	2-	2-	11.7	6	11	7	8	14	9	11	13	10	10
4	1-	2o	2o	2-	1+	1-	1-	2-	10.7	5	16	14	12	8	4	4	11	9	9
5	1+	1-	1-	2-	1+	1+	1o	2-	9.7	8	5	5	11	10	9	7	13	9	11
6	3-	3-	2+	2o	3-	3-	2+	3o	20.3	23	21	20	15	23	21	19	32	22	23
7	3+	4o	3+	3-	3o	3-	3-	2+	24.0	34	59	38	24	29	22	22	19	31	30
8	3o	4-	3+	3o	2+	3-	2+	3+	23.7	31	43	34	32	17	22	18	35	29	36
9	3+	4-	5o	5-	4+	3-	3-	3-	29.0	36	46	91	71	69	26	24	21	48	37
10	4o	3o	2o	2+	3o	2+	2-	4-	22.0	52	29	14	18	30	20	12	43	27	28
11	2+	3-	2+	2+	3-	2o	2o	3o	19.3	20	26	20	19	26	14	14	28	21	29
12	3+	3o	4o	4+	4+	6-	6+	7-	37.7	38	30	55	68	63	131	185	222	99	83
13	6+	5o	5o	4+	5o	4-	4-	3+	36.3	195	101	100	62	99	50	45	34	86	103
14	5o	6-	3o	5o	6-	5+	3+	3-	35.7	87	134	33	102	124	115	37	24	82	61
15	2+	4-	2o	2-	2-	2o	2-	2o	17.0	19	42	16	11	13	14	12	15	18	30
16	2+	1o	1+	1-	1o	1o	1+	1o	9.7	19	7	8	4	6	6	8	6	8	9
17	0+	1-	1+	1-	2-	0+	1-	0+	6.0	2	5	9	4	12	3	4	3	5	8
18	1-	1+	2+	3-	2o	3-	3o	2+	17.0	4	9	18	23	16	21	27	20	17	13
19	2+	2+	1+	1+	2o	1-	1o	1-	11.7	17	19	9	9	14	5	6	5	11	11
20	1-	0+	1-	0+	1-	1-	1-	1-	4.7	4	2	4	3	4	4	4	5	4	5
21	0+	1o	1-	1-	1+	1+	2o	2-	9.0	3	6	4	5	9	9	14	12	8	8
22	2o	2+	2-	1+	1o	1+	1o	1+	12.0	15	20	11	8	6	8	6	10	11	11
23	2-	1+	2-	2+	2+	2+	1o	1-	13.3	11	8	12	19	19	18	6	4	12	11
24	1+	2-	2-	2o	2-	2-	2-	2o	13.7	9	13	13	16	12	13	11	14	13	13
25	2-	2+	2-	2o	2-	1+	2+	2-	14.7	12	18	13	15	12	8	18	13	14	14
26	2-	2o	2-	2+	2-	2-	2-	2-	14.3	11	15	13	19	12	12	11	11	13	13
27	1+	1o	2-	2o	3-	1+	2o	4-	15.7	10	7	12	16	26	9	14	48	18	17
28	2o	2+	3o	3-	2-	1+	1o	1o	15.0	16	19	33	23	12	8	6	7	16	18
29	1-	3o	3-	2o	2-	1+	2o	1o	14.3	5	31	24	14	13	10	15	6	15	11
30	1+	1-	1-	1-	1+	1o	1o	1+	8.0	8	5	4	4	8	7	6	10	7	8
										Monthly mean value of Am								23.0	

JULY 1990																		
	Km								Σ Km	am							Am	Am2
1	1+	1o	1+	1+	1-	1o	1+	3-	10.7	8	6	10	8	5	7	8	22	9	11
2	3o	3-	2o	1+	1+	2-	1+	1o	14.3	27	26	14	9	8	11	8	6	14	14
3	2-	3o	2+	1o	1+	1-	1+	1+	12.7	11	31	17	6	8	5	9	9	12	11
4	1+	1-	2-	2o	1-	3-	3-	3o	14.7	9	5	13	14	5	23	24	28	15	14
5	2o	3-	1+	2+	3-	2-	3-	2o	17.3	16	22	10	20	21	13	21	16	17	16
6	1+	1+	1-	1o	1+	2o	2+	1+	11.3	10	9	5	6	9	16	17	10	10	12
7	1o	1+	2-	1-	1+	1o	2-	3-	11.3	7	10	11	5	9	6	11	23	10	13
8	1+	3-	2+	2+	2-	3-	2o	3-	17.7	8	23	19	18	13	21	16	21	17	14
9	1+	2-	1+	1+	1+	1+	1o	1-	10.0	10	11	9	8	9	9	7	4	8	16
10	1-	4o	3-	3o	3+	2-	1+	2-	18.3	5	59	22	32	38	12	9	13	24	17
11	1+	2o	2o	1+	2-	1o	3o	1o	13.3	10	16	15	8	12	7	28	6	13	16
12	1+	3-	3o	2+	1+	1o	1+	2o	15.0	9	21	32	18	10	6	9	16	15	18
13	3-	3o	3o	3-	1o	2o	3-	2o	19.0	26	33	33	23	7	16	26	16	23	17
14	2o	1-	1+	2o	3o	3-	3+	2+	17.3	16	5	10	16	30	21	36	19	19	19
15	3-	3o	2+	2-	1+	2-	3-	1+	16.7	21	29	18	11	9	12	21	9	16	18
16	3-	2o	1o	1o	1o	1+	2+	2-	13.0	23	14	6	7	7	8	18	12	12	11
17	1o	2o	1o	1-	1o	1+	1+	2+	10.7	7	15	7	5	7	8	10	19	10	11
18	3-	1+	2+	1o	1o	2+	2+	1o	14.0	22	9	17	7	7	17	19	7	13	15
19	2-	3-	2+	3+	4-	3-	3-	3-	21.7	13	25	19	40	48	21	24	23	27	25
20	3-	3+	4o	3o	3-	2+	2+	2o	22.3	26	36	51	28	24	17	20	16	27	23
21	2-	1+	1o	2-	1+	2-	2+	1+	12.3	12	9	6	12	10	13	20	10	12	13
22	1+	2-	2o	1+	2-	1+	1o	2o	12.3	10	12	15	9	13	8	6	15	11	11
23	1o	2-	1-	1-	0+	1+	1o	1+	8.0	7	12	5	4	3	10	7	10	7	9
24	1o	2o	1+	1+	0+	1-	1+	1-	8.7	6	16	10	9	3	5	9	4	8	8
25	1o	1+	2-	2-	1+	1-	1-	0+	8.7	7	9	12	12	8	4	4	2	7	6
26	0+	0+	1+	1o	1o	2+	4o	4-	14.0	2	2	8	6	6	17	56	41	17	14
27	1+	2+	2o	2+	2-	2o	3o	2-	16.3	9	20	16	20	12	14	27	12	16	38
28	3o	4+	6o	5o	6-	6-	6+	6o	42.0	29	69	152	100	127	134	186	167	121	97
29	6-	6-	6-	6-	5o	4-	3o	4-	38.0	143	133	126	123	95	49	32	46	93	90
30	2o	2+	3-	3o	1+	2-	2+	4-	19.0	15	18	26	27	10	11	17	42	21	29
31	3-	1+	3-	2-	1o	0+	1-	1o	11.3	24	10	24	11	7	3	4	7	11	16
										Monthly mean value of Am								20.5	

AUGUST 1990																		
	Km								Σ Km	am							Am	Am2
1	1o	1+	4-	3-	4o	4-	4+	4o	24.7	7	9	42	23	58	41	64	51	37	25
2	3-	3-	2+	1+	1+	1-	1o	2+	14.3	23	24	20	10	9	5	7	20	15	25
3	2+	1+	2-	3o	3-	2-	3-	3-	18.0	17	8	13	32	26	13	21	25	19	16
4	3-	1+	2+	1-	1+	1+	1+	1o	12.0	23	9	18	5	10	9	10	7	11	13
5	1-	1o	1o	1o	2-	2-	1o	2+	10.3	5	7	6	6	11	11	7	18	9	10
6	2o	2-	2-	2o	1+	3-	3o	2+	16.7	14	13	13	15	8	22	29	18	17	14
7	2+	1+	1+	2-	2o	2-	1+	2o	13.7	17	9	10	11	15	12	10	15	12	14
8	2o	3-	2o	1o	1o	1o	0+	1-	10.7	14	21	14	6	7	7	3	5	10	11
9	2o	1+	1o	1+	1o	2o	2-	1o	11.3	15	10	6	9	6	16	12	6	10	8
10	1-	1+	1+	2-	2-	1+	2o	2o	12.0	4	9	8	11	11	8	14	15	10	12
11	3o	2o	3-	2-	2+	1+	1+	2+	16.7	27	14	25	13	20	10	9	17	17	15
12	2o	3-	2-	2o	2-	1o	1+	2o	14.3	14	22	11	16	11	7	8	14	13	17
13	2+	3+	3o	3+	3o	3o	2+	2-	22.0	17	34	27	37	33	28	20	13	26	26
14	2+	2+	5-	4-	3o	3-	2o	3-	23.3	20	17	73	50	27	26	16	24	32	29
15	2+	2o	2-	4+	4+	4o	4-	3+	25.7	19	16	11	67	65	56	47	38	40	36
16	3o	3o	4o	3+	4-	4o	2o	4o	27.0	33	31	56	40	43	59	15	55	42	41
17	4-	3o	3-	1+	3-	3o	3-	3-	21.7	44	33	24	9	21	33	25	24	27	30
18	3o	3o	3-	2+	2+	2+	2-	2o	19.3	30	28	22	17	20	19	11	14	20	23
19	4-	3o	2+	2o	3-	2o	2o	3-	20.3	46	33	17	15	22	16	15	21	23	25
20	3o	4o	4-	3o	3+	3o	3-	1+	24.0	29	53	42	30	39	29	26	9	32	26
21	2o	2-	3o	3o	4-	4+	5o	5-	27.3	15	11	32	32	44	65	90	73	45	48
22	4+	5-	5-	5-	4o	4-	3+	4+	33.7	64	77	75	81	60	46	38	62	63	71
23	4-	5o	5-	6o	6-	5-	5o	4-	38.3	44	92	71	156	129	79	102	44	90	69
24	4-	5-	3+	3o	4-	2+	2-	1-	23.0	45	73	37	28	42	17	12	4	32	40
25	1+	1o	1o	1-	1+	2-	2+	3-	12.0	10	7	7	4	10	11	17	22	11	30
26	2-	4-	6-	6-	6-	5o	4o	4-	35.0	12	44	128	128	145	95	55	48	82	54
27	4o	3+	3o	2+	3+	2o	2-	2o	21.7	56	40	31	19	34	15	12	14	28	39
28	2+	2+	2-	2-	2o	1o	1o	1+	13.3	18	17	13	11	15	7	6	9	12	15
29	1+	2-	2o	3+	2+	2-	4-	3-	18.7	9	11	14	36	18	12	49	21	21	20
30	2+	3-	3-	3+	4+	5-	3+	4-	27.0	17	26	25	39	67	77	35	49	42	37
31	4+	3+	3o	3-	3-	2-	2-	1+	20.7	70	38	29	24	21	12	11	10	27	33
										Monthly mean value of Am								28.2	

SEPTEMBER 1990																				
	Km								Σ Km	am									Am	Am2
1	2o	3-	1+	3o	6-	4-	2+	1+	22.0	15	23	8	33	128	41	20	9		35	22
2	1o	0+	0+	1-	1-	0+	1-	0+	4.3	7	3	2	4	4	2	5	3		4	16
3	0+	1-	1o	1+	1+	1-	1+	1+	8.0	2	5	6	9	8	5	8	9		7	6
4	1+	1o	1+	2o	2o	3-	2+	3o	15.7	8	6	8	14	14	26	17	29		15	16
5	3+	3-	2+	2+	3-	2+	2-	3-	20.0	37	21	18	20	21	20	12	21		21	22
6	3-	2-	3+	3-	3-	2o	3-	3-	20.3	26	13	36	26	22	15	21	21		23	22
7	3o	2+	3-	3o	3+	3+	1+	2-	20.7	27	20	24	29	37	37	10	12		25	20
8	2o	2-	2-	2-	2-	2o	2+	3o	16.0	14	12	12	13	11	16	17	30		16	17
9	2o	2-	1o	2o	2o	2+	3-	3-	16.3	16	11	7	15	15	20	22	21		16	17
10	3o	2+	3-	1o	1o	1o	3o	4o	18.0	31	18	21	7	6	7	28	54		22	25
11	3-	3o	4-	4-	4-	3+	4-	4+	28.0	24	32	49	49	46	37	49	64		44	37
12	3+	4-	3-	3o	3-	3-	3+	3o	24.3	39	48	25	28	22	21	40	27		31	36
13	4+	3-	2o	3o	3o	3+	3-	3+	24.3	62	22	15	31	28	37	24	35		32	31
14	4-	3+	3o	3o	3o	3o	3+	2o	24.3	42	38	28	28	30	29	37	15		31	33
15	3o	4-	3-	4o	4o	4-	3o	2+	26.3	30	43	23	55	58	43	32	19		38	35
16	3o	2+	4-	4o	4-	3o	2o	2+	24.0	30	20	43	55	45	27	14	20		32	30
17	2+	2+	2+	2+	2o	2-	3-	3-	18.3	19	17	20	17	15	13	24	23		19	22
18	1o	2o	3-	4-	3o	4-	4-	3+	23.0	7	15	24	47	30	46	46	39		32	27
19	4-	3-	3-	2o	2-	3+	3-	3+	22.0	47	24	22	14	13	40	21	35		27	27
20	3+	2-	1o	1+	2-	3-	3+	5-	19.7	35	11	7	9	11	26	37	80		27	26
21	3o	2+	2+	3o	3o	2+	3o	3o	22.0	32	17	19	28	33	19	28	30		26	29
22	3-	3+	3o	2o	3-	3+	3o	3+	23.3	23	36	33	16	25	38	28	34		29	28
23	3+	3o	3-	2+	2-	3-	2-	2-	19.0	34	32	22	17	11	25	13	13		21	23
24	1+	2o	3o	2+	4-	3+	3-	2-	20.0	10	15	29	18	42	37	24	13		24	21
25	3o	3-	2o	2-	1o	2-	3o	3-	17.7	30	22	16	11	7	11	31	22		19	20
26	2o	2o	1+	2o	3-	3-	3o	2o	17.7	14	15	10	15	22	24	30	14		18	17
27	3-	2o	2+	1+	2+	1+	1+	1+	14.7	21	14	19	9	18	10	8	9		14	16
28	3-	2o	1o	2+	2+	1-	1+	2-	14.0	23	16	6	18	18	5	8	12		13	13
29	2+	2-	2-	2-	1o	0+	2-	2+	12.7	19	12	12	13	6	2	12	19		12	11
30	2o	1o	1-	1-	1-	1-	2-	2-	9.0	15	7	5	5	5	5	13	13		9	8
										Monthly mean value of Am									22.7	

OCTOBER 1990																				
	Km								Σ Km	am									Am	Am2
1	1+	1+	1-	0+	0+	0+	0+	1-	5.3	8	10	5	2	3	3	3	5		5	7
2	1+	0+	1+	2-	2o	1+	2o	1+	11.3	9	2	8	12	16	9	15	8		10	9
3	2-	2o	2-	2-	2-	2-	3-	3+	16.3	13	14	11	13	13	12	22	36		17	17
4	2o	3-	3o	3-	3o	3o	4o	3-	23.0	14	24	27	26	31	32	54	24		29	24
5	2+	2o	3-	2+	3+	2o	1+	3-	18.7	17	16	22	19	34	16	10	25		20	25
6	1+	3-	3+	3+	2+	2+	2+	2o	19.7	9	22	36	40	18	18	17	16		22	19
7	1+	1+	1+	2o	2+	2o	3-	3-	15.7	8	10	10	14	17	16	24	23		15	14
8	1o	1o	1o	1o	2-	2-	1o	1+	9.7	7	6	6	7	11	11	6	8		8	11
9	1o	1o	1-	2-	3+	3+	3o	4-	17.7	6	7	5	12	35	40	31	45		23	36
10	5-	5-	5o	5+	4+	3+	3o	3-	33.0	72	73	102	109	63	37	29	24		64	56
11	5-	3+	4+	4-	3+	4o	4+	5o	32.7	75	39	67	50	34	56	65	89		59	52
12	4-	4o	4o	4-	3+	3+	3+	3+	28.7	49	52	51	44	35	38	36	39		43	42
13	3o	3-	3-	2-	3-	3-	4-	3o	22.0	31	21	21	13	24	22	47	33		27	29
14	3+	2+	3-	2-	2+	3o	3o	4-	22.0	38	20	25	13	18	31	30	48		28	30
15	4-	3o	2+	3o	4+	4o	4-	3-	26.7	46	33	20	33	62	58	47	24		40	32
16	2o	2-	3-	2o	2-	3-	2+	3-	17.7	14	12	26	14	12	21	19	24		18	24
17	2+	2-	2+	1o	1-	1-	1-	1o	10.3	20	11	17	7	5	4	4	6		9	11
18	1-	0+	1+	2-	2-	2+	2o	1+	11.3	4	3	8	11	13	17	15	9		10	10
19	3-	2o	2-	2+	1+	1+	2o	3-	16.0	23	15	12	18	9	9	14	24		16	17
20	1+	2+	2+	4-	4-	4+	4o	4o	25.7	9	17	17	43	49	67	57	57		40	29
21	3-	2+	3-	3-	3+	1+	2-	1+	18.0	21	19	25	22	34	8	11	8		19	29
22	3o	2+	3-	2-	3-	3-	1+	1+	17.7	32	19	21	12	22	25	9	8		19	16
23	1+	1+	2-	2o	1+	1+	3o	4-	15.7	10	9	13	14	8	10	32	46		18	25
24	5-	4-	4-	3o	4o	3o	3+	2-	27.0	76	49	42	33	53	27	34	11		41	31
25	3o	3-	2-	2o	2-	1+	1+	2o	15.7	30	24	11	14	13	9	9	15		16	19
26	1o	1o	1-	3+	3o	3+	3o	2o	17.3	7	6	5	34	27	36	29	15		20	16
27	1+	2+	1o	2o	2+	2+	2o	1+	14.7	9	19	7	15	18	18	16	8		14	17
28	1+	1o	3-	2-	0+	0+	0+	1-	8.3	8	7	22	13	3	2	3	5		8	10
29	0+	1+	1-	2+	2+	2+	4o	4-	17.0	3	8	4	19	19	19	52	41		21	22
30	5+	3+	2+	2o	2+	2+	2+	3-	22.7	106	40	19	15	19	17	20	24		33	32
31	2+	3o	3+	3o	3+	4-	4o	3+	26.0	18	31	35	31	39	50	59	40		38	27
										Monthly mean value of Am									24.2	

NOVEMBER 1990																				
	Km								Σ Km	am									Am	Am2
1	2+	2o	1+	2o	2-	1+	2-	3o	15.3	17	14	8	16	12	9	12	29	15	23
2	2+	3o	1+	1+	1+	2+	2o	3o	16.7	20	27	10	9	8	17	16	30	17	16
3	2-	2-	1+	2+	2+	1+	1+	1+	13.3	12	11	9	19	18	9	9	10	12	12
4	1+	1-	1o	1o	0+	0+	1-	0+	5.7	9	4	6	7	3	3	5	2	5	6
5	1-	0+	0+	0o	0+	0+	0+	1o	3.3	4	2	2	1	3	3	3	6	3	3
6	0+	1o	0+	0+	0+	0+	1o	1o	4.7	3	6	3	2	2	3	7	6	4	5
7	0+	0+	1+	2o	2+	2+	1+	2-	11.7	3	2	9	15	19	18	10	11	11	10
8	1o	1+	3-	2o	2+	3-	3-	2o	16.7	7	9	21	14	19	24	24	16	17	17
9	3-	2+	3o	2-	2+	3-	2+	2+	19.3	25	19	27	13	18	23	20	17	20	20
10	3-	2-	3-	2+	2o	3o	3o	2+	19.7	25	13	25	17	15	32	32	19	22	21
11	2+	2o	2+	3-	3o	2-	2+	2-	18.0	17	15	17	26	33	12	18	13	19	19
12	1+	3o	1o	1+	1o	2o	2-	1+	12.7	9	27	6	9	6	14	11	8	11	12
13	1o	1+	1+	1-	1-	1o	1-	0+	7.0	7	8	9	4	4	6	5	3	6	6
14	1o	0+	0o	1-	0+	0o	0o	0+	2.7	6	2	1	5	3	1	1	2	3	4
15	1o	1-	0+	1-	1o	1+	2-	1o	7.7	7	4	2	4	6	8	11	7	6	11
16	3o	2+	3+	3+	4-	3o	3o	3o	24.7	27	19	37	38	47	29	27	28	32	23
17	1+	2o	3-	3o	4-	4-	3o	3-	22.0	10	14	25	32	47	46	33	23	29	28
18	3o	3-	1+	2+	3+	4-	3o	3o	22.3	32	21	8	19	40	43	30	31	28	28
19	3o	3o	2-	2-	1+	3-	2-	2o	17.0	27	27	13	11	8	21	12	15	17	21
20	2-	2+	2o	1+	2-	1+	1+	1+	13.0	13	18	16	9	12	8	9	9	12	14
21	2+	3o	1+	2-	3o	2-	2-	2o	16.7	19	28	10	13	27	11	13	16	17	12
22	1o	1o	0+	0+	1o	1-	2o	0+	6.7	7	6	3	2	6	4	14	2	6	8
23	0+	1-	0o	1o	2o	2o	1o	2-	8.7	3	4	1	6	16	15	6	12	8	6
24	1+	1-	0o	0o	1-	0+	0+	1o	4.3	8	5	1	0	4	2	3	6	4	7
25	1o	1-	1-	2o	1+	1o	2-	2o	10.3	6	5	5	16	9	7	11	16	9	9
26	2o	2o	2-	2o	3-	2-	1-	4-	16.3	16	14	13	16	23	11	4	49	18	22
27	4+	3+	3o	3o	4+	6+	6o	4o	34.3	64	37	28	30	70	180	164	58	79	52
28	3+	4-	3-	2-	2o	2+	4o	2o	21.7	37	43	21	12	15	20	57	15	28	45
29	1+	2-	1o	1-	0+	1o	2-	2o	9.7	9	13	6	5	2	6	13	14	9	14
30	2-	1+	1+	2-	2+	3o	2+	2o	15.7	12	9	9	11	20	33	17	14	16	12
										Monthly mean value of Am								16.1	

DECEMBER 1990																				
	Km								Σ Km	am									Am	Am2
1	2-	2-	1-	0+	1+	2-	1o	1o	9.3	12	11	4	2	8	13	6	7	8	11
2	1-	1-	1o	1+	2-	2-	2+	1+	10.7	4	5	7	9	13	11	17	8	9	8
3	1+	1o	1o	1-	1+	3-	2+	3-	13.0	8	7	6	4	8	24	18	23	12	16
4	3+	3+	2o	3-	3o	3o	3-	3o	23.0	34	35	15	26	30	29	21	32	28	24
5	2+	1+	3-	3o	3-	3+	3-	2-	19.7	17	10	23	32	23	38	25	13	23	21
6	2-	1+	1+	2+	2o	2-	2-	2-	13.7	13	8	10	19	16	12	13	12	13	15
7	2o	1+	1+	1o	0+	1+	1+	0+	9.0	14	8	8	7	3	10	8	3	8	10
8	0+	1+	2o	2-	3-	3o	3o	3-	16.7	3	8	14	13	26	30	29	23	18	13
9	2o	2-	1o	1+	2+	2o	1+	1o	12.7	15	11	7	10	20	15	10	6	12	13
10	0o	0+	1-	1o	0+	1-	1o	1-	4.7	1	2	4	6	2	4	6	4	4	6
11	1-	1-	1-	0+	0+	2-	1o	1-	6.0	5	5	4	3	3	13	7	4	6	5
12	0+	1-	1-	1o	2-	3o	3o	3+	13.7	3	5	5	7	12	27	32	36	16	18
13	3+	3o	4-	3o	2o	2-	2o	1+	20.0	37	33	43	28	14	13	14	9	24	22
14	2+	2o	2-	1+	2o	3-	1+	0+	13.7	20	14	12	8	14	21	10	3	13	12
15	1o	2-	2o	1+	1o	2-	2-	1+	11.7	6	11	14	8	7	13	13	9	10	11
16	2-	1+	1+	2+	3o	3o	2o	2o	16.7	11	10	10	19	29	27	16	14	17	15
17	2o	3-	2-	1+	1+	2o	2o	1+	14.3	15	22	11	8	8	15	16	10	13	14
18	2-	1-	0+	2o	2o	2-	1-	1-	9.7	13	5	2	14	15	11	5	4	9	8
19	0+	1o	1-	0+	1-	1+	1-	1-	5.7	2	6	4	3	5	8	5	5	5	7
20	1o	1+	1+	2+	2+	3o	3-	1+	15.3	6	8	9	19	20	30	25	10	16	10
21	1-	1+	0+	0o	0o	2-	2-	1+	7.0	5	8	3	0	1	11	11	9	6	10
22	1-	1+	1+	1+	1o	0+	1-	2+	9.0	5	8	9	9	7	2	4	18	8	11
23	1-	1-	3+	3-	1+	2o	1+	3o	15.0	5	5	40	24	8	15	9	27	17	15
24	1+	2+	2+	3o	3o	3o	4-	3+	22.0	10	18	18	28	30	33	43	36	27	22
25	2+	3-	1+	3-	2+	3-	3o	2-	18.7	20	22	10	21	20	26	28	11	20	21
26	1o	1o	1+	1+	2-	1o	1o	1-	9.0	7	6	8	8	11	7	6	4	7	12
27	1+	2+	1+	1+	2-	2-	1o	1-	11.3	10	20	8	9	13	11	7	5	10	9
28	1o	2-	1o	1o	1o	1-	1o	2-	9.0	7	13	6	7	7	4	7	11	8	8
29	1o	1+	0+	1o	1+	2-	2-	1o	9.3	6	8	3	6	8	12	11	6	8	13
30	2+	3o	3o	3o	2+	2+	3o	3-	21.7	17	33	31	32	18	18	32	21	25	18
31	1o	1+	2-	3o	3+	3+	3-	2o	18.3	7	8	11	28	37	34	23	15	20	18
										Monthly mean value of Am								13.5	

MONTHLY AND YEARLY **am** 1959 - 1990

Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Annual mean
1959	25.5	35.8	30.2	24.2	25.6	22.8	42.2	31.6	37.0	28.3	33.0	31.7	30.6
1960	25.7	23.5	27.3	53.5	31.5	27.4	27.4	27.9	27.1	45.0	44.5	32.2	32.7
1961	19.5	24.1	21.3	20.7	21.1	20.3	34.4	17.8	19.4	22.0	15.7	19.6	21.3
1962	13.0	18.4	14.0	21.6	12.8	17.1	19.9	24.9	27.8	29.9	20.4	21.1	20.1
1963	17.3	13.9	13.2	15.4	17.9	17.9	19.5	21.2	38.0	22.2	19.0	16.9	19.4
1964	17.9	17.5	19.0	19.7	15.9	13.7	15.4	13.3	16.2	15.0	12.5	9.3	15.4
1965	10.9	14.7	13.2	11.5	9.8	14.9	13.6	14.8	16.2	11.8	10.9	12.3	12.9
1966	12.8	13.2	17.8	11.1	14.0	11.6	15.4	18.2	28.2	16.2	15.4	18.5	16.1
1967	17.7	18.4	12.0	14.0	32.8	17.8	12.8	15.3	24.0	16.8	17.4	23.2	18.5
1968	19.3	25.1	21.9	20.2	21.5	24.3	16.4	18.5	21.1	24.1	25.1	17.7	21.2
1969	15.3	23.5	26.1	22.4	23.6	15.7	12.4	13.5	21.7	14.5	16.9	11.9	18.1
1970	12.5	11.2	24.9	21.0	14.1	16.2	25.5	18.5	17.6	19.2	19.9	14.9	18.0
1971	21.0	19.0	18.4	23.2	20.3	15.8	13.8	15.9	20.1	19.4	17.0	18.2	18.5
1972	20.6	16.9	18.9	17.3	16.2	21.0	12.9	32.2	19.4	19.4	21.1	16.9	19.4
1973	25.0	29.8	34.9	39.5	25.9	26.5	20.4	20.1	21.9	27.4	20.1	19.2	25.8
1974	24.1	25.2	33.7	31.5	28.0	27.2	33.2	30.3	33.5	37.2	27.1	26.1	29.8
1975	25.9	29.5	30.8	24.7	23.3	19.8	21.4	17.9	15.9	18.4	28.8	20.3	23.0
1976	22.0	26.8	33.4	26.4	22.9	16.9	16.2	16.0	21.8	19.2	15.2	18.1	21.2
1977	18.5	20.0	18.7	25.0	18.9	13.9	22.9	22.6	23.9	20.7	16.9	16.8	19.9
1978	24.6	25.4	25.9	32.2	32.5	28.3	18.9	24.3	26.8	19.7	24.3	22.1	25.4
1979	26.5	24.2	27.6	35.3	21.6	17.4	17.9	25.9	21.1	18.6	16.9	16.2	22.4
1980	18.0	17.9	11.8	17.3	15.1	19.4	16.1	15.8	13.7	22.6	22.4	22.5	17.7
1981	16.4	23.3	28.4	35.9	28.3	17.7	28.7	24.2	19.8	34.5	24.9	18.6	25.1
1982	20.7	48.2	26.8	31.8	26.0	32.1	43.7	32.2	50.4	29.0	34.5	35.6	34.1
1983	25.7	39.3	34.3	35.2	32.0	24.1	21.8	25.8	23.0	27.3	32.0	24.1	28.6
1984	20.6	25.7	30.5	34.1	26.5	23.8	26.8	25.7	33.1	33.3	31.5	28.0	28.3
1985	25.0	23.3	17.8	30.3	14.8	19.4	24.4	22.3	20.8	23.0	23.5	21.4	22.1
1986	21.3	40.5	20.7	13.4	18.4	15.2	15.0	22.5	25.6	18.0	20.7	14.7	20.4
1987	13.5	16.6	16.9	11.8	13.5	12.8	17.3	23.5	29.7	24.7	21.3	14.9	18.0
1988	21.0	22.4	23.3	24.4	18.7	18.1	18.4	19.1	20.0	20.9	22.1	24.6	21.1
1989	32.6	25.9	61.8	33.7	25.6	24.9	13.2	30.4	25.9	32.6	33.3	29.2	30.8
1990	23.4	36.3	33.7	40.4	24.5	23.0	20.5	28.2	22.7	24.2	16.1	13.5	25.5

Unit : nT

SECTION 3

3.3. Kp INDICES

Musical diagram of **Kp** 1990 77

Monthly tables of three-hour indices :

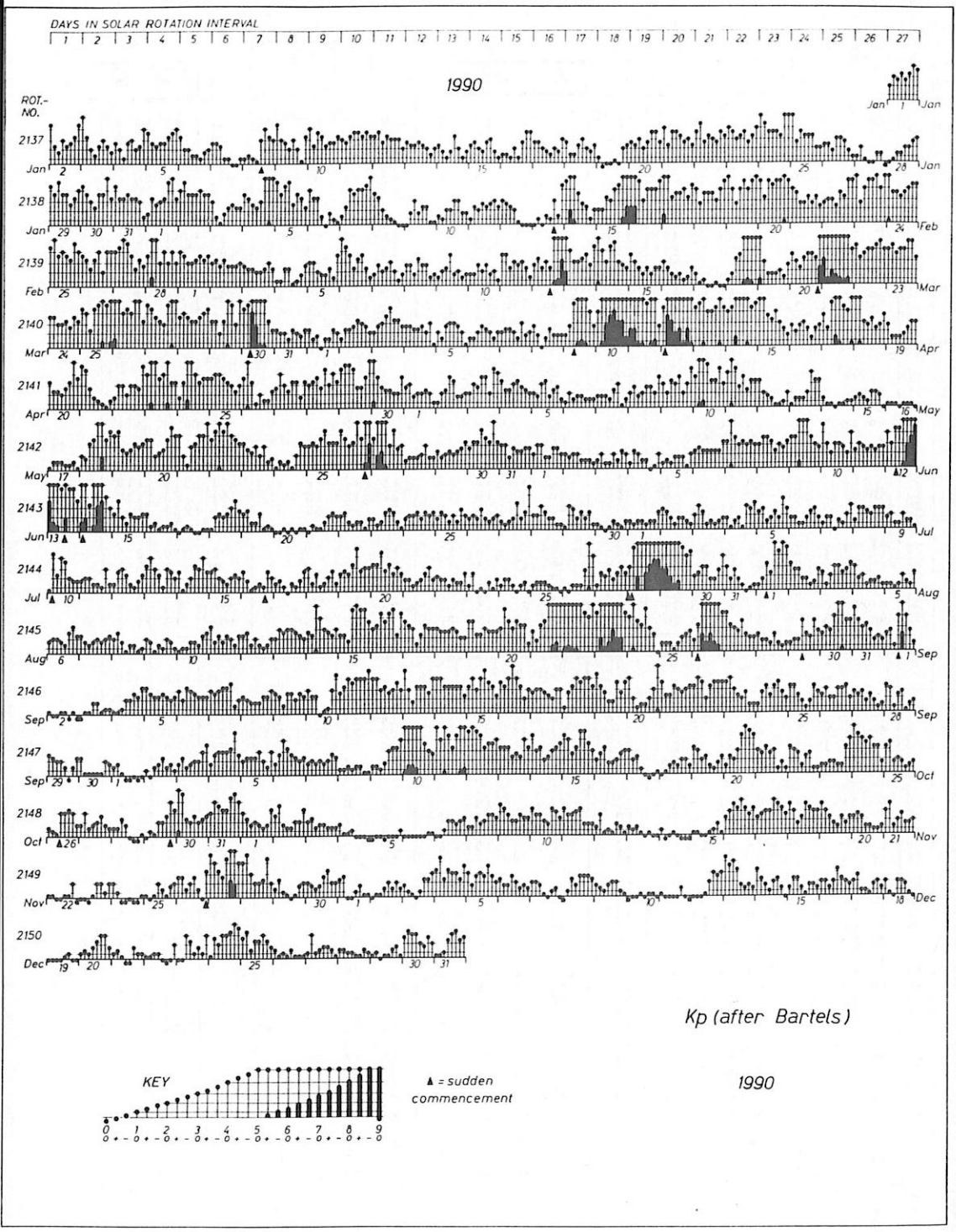
Kp, **ap** and daily **Ap** and **Cp** values 78

Frequencies of **Kp** indices 84

Monthly and yearly mean values of **Ap**

1932 - 1990 85

MUSICAL DIAGRAM OF **Kp** 1990



Kp INDICES 1990

	Kp								Sum	Jan 1990 ap								Sum	Ap	Cp
1	2o	3o	3-	3+	3-	3+	4o	4-	25-	7	15	12	18	12	18	27	22	131	16	0.9
2	4+	2+	2-	3o	2+	3-	3+	4+	24o	32	9	6	15	9	12	18	32	133	17	0.9
3	5o	3+	2o	1+	2+	3o	2+	2-	21o	48	18	7	5	9	15	9	6	117	15	0.8
4	3-	2o	1o	3-	3o	2o	2+	4o	20-	12	7	4	12	15	7	9	27	93	12	0.7
5	4-	3-	2+	3-	3-	3+	4-	4o	25o	22	12	9	12	12	18	22	27	134	17	0.9
6	3+	2o	2o	1+	1+	1o	2-	2o	15-	18	7	7	5	5	4	6	7	59	7	0.4
7	3-	3-	2+	1o	1o	0+	0+	1o	11+	12	12	9	4	4	2	2	4	49	6	0.3
8	1o	1+	1o	1-	3o	4o	3+	3o	17+	4	5	4	3	15	27	18	15	91	11	0.7
9	4+	3o	3-	2o	3o	2o	1-	3+	21o	32	15	12	7	15	7	3	18	109	14	0.8
10	4o	2+	4-	3+	2+	3-	3-	3+	24+	27	9	22	18	9	12	12	18	127	16	0.9
11	3o	3-	3+	4-	4-	3+	4-	3+	27-	15	12	18	22	22	18	22	18	147	18	1.0
12	3+	4-	3-	3+	3o	3o	3o	2o	24o	18	22	12	18	15	15	15	7	122	15	0.9
13	3-	2+	2+	3-	2+	2o	1+	2o	18-	12	9	9	12	9	7	5	7	70	9	0.5
14	2+	2-	1o	2-	3+	2o	1o	2-	15-	9	6	4	6	18	7	4	6	60	8	0.4
15	2+	3-	2o	2-	3-	3o	2-	1o	17o	9	12	7	6	12	15	6	4	71	9	0.5
16	1+	1+	1o	2o	1o	3-	4-	4-	17-	5	5	4	7	4	12	22	22	81	10	0.6
17	3-	3-	2o	2-	1+	2o	2-	3o	17o	12	12	7	6	5	7	6	15	70	9	0.5
18	3-	1+	1+	2+	3o	2o	2-	2+	17-	12	5	5	9	15	7	6	9	68	8	0.5
19	1o	0o	0+	0+	1-	0+	2o	2+	7o	4	0	2	2	3	2	7	9	29	4	0.1
20	3-	2+	3o	2o	3-	4-	4-	3-	23-	12	9	15	7	12	22	22	12	111	14	0.8
21	4o	2+	4-	4-	3+	3-	3o	2+	25o	27	9	22	22	18	12	15	9	134	17	0.9
22	4-	4+	3-	3+	3o	3-	4-	3+	27-	22	32	12	18	15	12	22	18	151	19	1.0
23	4o	4-	3o	3+	4-	3-	3+	4o	28-	27	22	15	18	22	12	18	27	161	20	1.0
24	5o	4+	4-	4-	4-	3+	5o	5o	34-	48	32	22	22	22	18	48	48	260	32	1.3
25	5o	3-	4-	3+	3+	3+	2o	2o	25+	48	12	22	18	18	18	7	7	150	19	1.0
26	2+	2+	2-	3o	3o	3-	2-	1o	18-	9	9	6	15	15	12	6	4	76	10	0.5
27	1o	2o	1-	0+	0+	1+	1+	0o	7o	4	7	3	2	2	5	5	0	28	4	0.1
28	0+	1-	1+	1+	2o	2o	3-	3o	13+	2	3	5	5	7	7	12	15	56	7	0.4
29	4+	4-	5-	4-	4-	3-	3+	4o	30o	32	22	39	22	22	12	18	27	194	24	1.2
30	4+	4-	3o	2+	4-	4-	5o	3+	29o	32	22	15	9	22	22	48	18	188	24	1.1
31	4+	3+	3+	4-	3+	3+	3o	1+	26-	32	18	18	22	18	18	15	5	146	18	1.0

	Kp								Sum	Feb 1990 ap								Sum	Ap	Cp
1	2-	3+	3-	3o	3+	5-	5o	3+	27o	6	18	12	15	18	39	48	18	174	22	1.1
2	4o	5-	4-	4-	4-	4o	4-	4-	31o	27	39	22	22	22	27	22	22	203	25	1.2
3	3o	1+	1-	2-	2+	3-	2+	2+	16+	15	5	3	6	9	12	9	9	68	8	0.5
4	4-	3+	3-	2+	3o	5o	5+	5o	30+	22	18	12	9	15	48	56	48	228	28	1.2
5	5-	4-	4+	5-	3-	4-	3+	2+	29+	39	22	32	39	12	22	18	9	193	24	1.2
6	4o	3+	3+	1+	0+	2-	1o	1-	16-	27	18	18	5	2	6	4	3	83	10	0.6
7	1+	2+	4o	4-	4o	4o	4+	5o	29-	5	9	27	22	27	27	32	48	197	25	1.2
8	4-	3+	2o	1+	1o	1-	0+	0+	13-	22	18	7	5	4	3	2	2	63	8	0.4
9	0+	2-	3o	2-	2+	2+	1-	1-	13-	2	6	15	6	9	9	3	3	53	7	0.3
10	1+	1o	2o	2o	3o	3o	2-	2-	16-	5	4	7	7	15	15	6	6	65	8	0.4
11	1o	2+	2o	3-	2+	3-	3o	2+	18+	4	9	7	12	9	12	15	9	77	10	0.5
12	3o	3-	2+	2o	1-	0+	0+	0+	12-	15	12	9	7	3	2	2	2	52	6	0.3
13	0+	1o	0+	1+	1o	3o	1+	4+	13-	2	4	2	5	4	15	5	32	69	9	0.5
14	5-	6+	5+	4-	3-	2+	1o	2o	28o	39	94	56	22	12	9	4	7	243	30	1.3
15	2o	2o	3+	3o	4o	4+	6-	7-	31o	7	7	18	15	27	32	67	111	284	36	1.4
16	7-	7-	5-	3o	4o	4o	4o	5-	38-	111	111	39	15	27	27	27	39	396	50	1.6
17	6o	5o	3+	4-	4-	4o	3+	4+	33+	80	48	18	22	22	27	18	32	267	33	1.3
18	4o	3-	4-	4-	4-	3o	4o	5-	29+	27	12	22	22	22	15	27	39	186	23	1.1
19	5o	4o	3-	4o	5-	4o	5-	5o	34o	48	27	12	27	39	27	39	48	267	33	1.3
20	5-	3+	5-	4+	5-	5-	5+	5-	36+	39	18	39	32	39	39	56	39	301	38	1.4
21	4o	4-	3-	3-	3+	3-	3+	2+	25-	27	22	12	12	18	12	18	9	130	16	0.9
22	3-	3o	3o	2+	4-	3+	5-	5-	27+	12	15	15	9	22	18	39	39	169	21	1.1
23	5o	3-	4o	5-	5-	5o	4o	5o	35o	48	12	27	39	39	48	27	48	288	36	1.4
24	5+	4-	4-	3+	4-	4o	4+	4+	32+	56	22	22	18	22	27	32	32	231	29	1.3
25	4+	5o	4-	4o	4-	3+	5-	4o	33-	32	48	22	27	22	18	39	27	235	29	1.3
26	4-	3+	2+	3+	4o	2o	4o	4o	27-	22	18	9	18	27	7	27	27	155	19	1.0
27	4o	4+	5o	5-	4-	2+	3+	3-	30o	27	32	48	39	22	9	18	12	207	26	1.2
28	4-	6o	5o	3o	4o	3o	4o	3o	32-	22	80	48	15	27	15	27	15	249	31	1.3

Kp INDICES 1990 (continued)

	Kp								Sum	Mar 1990 ap								Sum	Ap	Cp
1	4o	4-	3o	3o	3+	4-	3+	4-	28-	27	22	15	15	18	22	18	22	159	20	1.0
2	3o	3+	3-	3+	3-	3-	3-	3o	23+	15	18	12	18	12	12	12	15	114	14	0.8
3	3-	2+	2+	2o	2o	2+	3o	2+	19o	12	9	9	7	7	9	15	9	77	10	0.5
4	1o	1o	2+	2+	1-	1o	2-	3-	13-	4	4	9	9	3	4	6	12	51	6	0.3
5	3o	3o	2o	2-	2-	2+	1+	4-	19-	15	15	7	6	6	9	5	22	85	11	0.6
6	5o	4+	4-	2+	3+	4-	2+	1+	26o	48	32	22	9	18	22	9	5	165	21	1.1
7	2-	3-	2o	2+	3o	2o	1o	2-	16+	6	12	7	9	15	7	4	6	66	8	0.4
8	3-	3-	2-	3+	3-	3-	1+	2-	19-	12	12	6	18	12	12	5	6	83	10	0.6
9	1+	2o	2+	4-	2-	2o	1+	2-	16o	5	7	9	22	6	7	5	6	67	8	0.5
10	2-	2-	3-	2o	3-	2-	2o	1o	15+	6	6	12	7	12	6	7	4	60	8	0.4
11	4-	4-	2+	3o	3-	3o	2+	1+	22o	22	22	9	15	12	15	9	5	109	14	0.8
12	3-	3+	2+	3o	2+	5+	6-	7+	32o	12	18	9	15	9	56	67	154	340	42	1.5
13	6+	4o	3o	3o	3+	4-	3-	4+	30+	94	27	15	15	18	22	12	32	235	29	1.3
14	5+	4o	3o	4+	5-	3o	3-	2+	29+	56	27	15	32	39	15	12	9	205	26	1.2
15	4-	3o	2+	2-	2+	2-	2+	2+	19+	22	15	9	6	9	6	9	9	85	11	0.6
16	3o	2+	2-	1+	2-	1o	1+	2+	15-	15	9	6	5	6	4	5	9	59	7	0.4
17	2-	1-	1o	0+	0+	1-	0+	0+	5+	6	3	4	2	2	3	2	2	24	3	0.1
18	1o	2-	3+	4-	5+	6-	5+	5o	31o	4	6	18	22	56	67	56	48	277	35	1.4
19	6-	3o	2-	2-	2-	2o	1+	3-	20-	67	15	6	6	6	7	5	12	124	16	0.9
20	4-	3o	2+	3+	4-	4-	3+	7-	30-	22	15	9	18	22	22	18	111	237	30	1.3
21	7+	6-	6+	6o	6-	5+	6-	4o	46o	154	67	94	80	67	56	67	27	612	76	1.8
22	4+	3+	4-	4o	4o	4+	5-	4o	32+	32	18	22	27	27	32	39	27	224	28	1.2
23	4o	4+	4-	4o	4o	5-	5-	3+	33-	27	32	22	27	27	39	39	18	231	29	1.3
24	4-	4-	3o	3o	3+	3-	4-	3+	26+	22	22	15	15	18	12	22	18	144	18	1.0
25	4+	4o	2+	4+	5-	6-	5-	6-	36-	32	27	9	32	39	67	39	67	312	39	1.4
26	6o	5o	4o	4+	4o	5o	5o	3+	37-	80	48	27	32	27	48	48	18	328	41	1.5
27	5-	4+	4-	3+	3o	5-	5+	5o	34o	39	32	22	18	15	39	56	48	269	34	1.3
28	4-	4o	4-	3+	3+	4-	4o	4+	30o	22	27	22	18	18	22	27	32	188	24	1.1
29	3+	3+	2o	3+	5+	5-	3o	5o	30o	18	18	7	18	56	39	15	48	219	27	1.2
30	4+	5-	8o	7o	5+	5+	3+	2+	40+	32	39	207	132	56	56	18	9	549	69	1.7
31	2+	2o	2o	1+	2+	2o	2-	2+	16o	9	7	7	5	9	7	6	9	59	7	0.4

	Kp								Sum	Apr 1990 ap								Sum	Ap	Cp
1	2+	1+	2-	0+	1+	1+	2+	2o	13-	9	5	6	2	5	5	9	7	48	6	0.3
2	1+	2+	2+	3-	3+	3o	3-	2o	20-	5	9	9	12	18	15	12	7	87	11	0.6
3	2o	3-	3o	4-	4+	3+	3+	3-	25o	7	12	15	22	32	18	18	12	136	17	0.9
4	3-	3-	2+	2+	3-	2o	3o	1-	18+	12	12	9	9	12	7	15	3	79	10	0.6
5	2o	1+	3-	3o	3o	3-	2o	1-	17+	7	5	12	15	15	12	7	3	76	10	0.5
6	1+	1+	2o	3-	2+	2o	1+	2o	15o	5	5	7	12	9	7	5	7	57	7	0.4
7	2o	2+	2+	2o	1+	3o	2-	2o	17-	7	9	9	7	5	15	6	7	65	8	0.4
8	3-	2-	0+	1+	2+	2-	2-	2-	13+	12	6	2	5	9	6	6	6	52	6	0.3
9	2-	3-	5-	5+	6-	5+	4o	3-	32o	6	12	39	56	67	56	27	12	275	34	1.4
10	4o	5+	7o	8-	8o	7+	7+	6o	53-	27	56	132	179	207	154	154	80	989	124	1.9
11	7-	7-	5+	5+	5-	5+	6-	3-	42+	111	111	56	56	39	56	67	12	508	64	1.7
12	4+	8-	7+	6+	7-	5+	7-	5+	50-	32	179	154	94	111	56	111	56	793	99	1.9
13	4+	5-	5+	4o	4o	4+	5+	4+	36+	32	39	56	27	27	32	56	32	301	38	1.4
14	4o	4+	6o	5o	5o	5+	4+	5-	39-	27	32	80	48	48	56	32	39	362	45	1.5
15	5o	5o	4-	3+	4o	3o	2+	2-	28o	48	48	22	18	27	15	9	6	193	24	1.2
16	3-	2o	3-	3o	2+	1+	2+	3-	19o	12	7	12	15	9	5	9	12	81	10	0.6
17	4-	2+	5-	6o	5+	4+	4o	5+	36-	22	9	39	80	56	32	27	56	321	40	1.5
18	5o	5+	3o	3-	3+	2+	3-	4-	28o	48	56	15	12	18	9	12	22	192	24	1.2
19	3-	1+	1+	1+	2-	2+	3o	3o	17-	12	5	5	5	6	9	15	15	72	9	0.5
20	3+	2+	2+	2o	3-	3+	5o	4-	25-	18	9	9	7	12	18	48	22	143	18	1.0
21	5-	4+	3-	2-	1+	1o	1-	1+	18-	39	32	12	6	5	4	3	5	106	13	0.8
22	2-	3o	3o	2o	3o	3o	3-	5-	23o	6	15	15	7	15	15	12	39	124	16	0.9
23	4o	6-	5o	4-	4o	6-	3+	3+	35-	27	67	48	22	27	67	18	18	294	37	1.4
24	2-	3+	6o	5o	4o	3+	4-	4-	31-	6	18	80	48	27	18	22	22	241	30	1.3
25	4-	4o	4o	4-	3+	3o	2+	3o	27o	22	27	27	22	18	15	9	15	155	19	1.0
26	4-	5+	3+	1o	2o	1+	1+	2+	20+	22	56	18	4	7	5	5	9	126	16	0.9
27	3-	4o	3o	2+	3+	3+	2-	3+	24-	12	27	15	9	18	18	6	18	123	15	0.9
28	3o	3+	4-	3-	4+	3o	4o	3+	27+	15	18	22	12	32	15	27	18	159	20	1.0
29	4+	5-	5-	4+	3-	3-	4-	5o	32o	32	39	39	32	12	12	22	48	236	30	1.3
30	6-	4-	3-	2+	2+	2o	2o	4-	24+	67	22	12	9	9	7	7	22	155	19	1.0

Kp INDICES 1990 (continued)

	Kp								Sum	May 1990				ap				Sum	Ap	Cp
1	3-	3o	2-	2o	2o	2+	2o	1o	17-	12	15	6	7	7	9	7	4	67	8	0.5
2	1o	2o	2+	4-	3+	2-	2-	2o	18-	4	7	9	22	18	6	6	7	79	10	0.6
3	2o	3o	3-	4-	4-	2o	4+	4o	25+	7	15	12	22	22	7	32	27	144	18	1.0
4	3+	2+	2+	3o	3+	3-	2+	2o	21+	18	9	9	15	18	12	9	7	97	12	0.7
5	2o	2-	3o	3+	2-	2+	3-	1+	18o	7	6	15	18	6	9	12	5	78	10	0.5
6	1o	2o	1+	2-	2-	1+	1+	1+	12-	4	7	5	6	6	5	5	5	43	5	0.2
7	2-	2-	2-	1+	2+	3o	1-	1+	14-	6	6	6	5	9	15	3	5	55	7	0.3
8	2o	3-	2-	2o	3-	3-	2o	4-	19+	7	12	6	7	12	12	7	22	85	11	0.6
9	3o	2o	3+	3o	4-	2o	3o	4+	24+	15	7	18	15	22	7	15	32	131	16	0.9
10	4-	5+	6-	5-	3+	3+	4+	3o	33+	22	56	67	39	18	18	32	15	267	33	1.3
11	4o	5+	4+	3-	4-	2+	3+	3+	29o	27	56	32	12	22	9	18	18	194	24	1.2
12	3+	2o	2-	1+	1-	1-	1o	2o	13-	18	7	6	5	3	3	4	7	53	7	0.3
13	1-	1+	1+	1+	2o	4o	3+	3+	17+	3	5	5	5	7	27	18	18	88	11	0.6
14	1+	1-	1-	0+	1-	1-	1o	1o	6+	5	3	3	2	3	3	4	4	27	3	0.1
15	1+	2-	1+	1o	2o	2o	2-	0+	11+	5	6	5	4	7	7	6	2	42	5	0.2
16	1-	1-	1-	0+	1-	1-	1-	0+	5-	3	3	3	2	3	3	3	2	22	3	0.0
17	1-	1+	1+	1+	1o	1o	1+	1-	9-	3	5	5	5	4	4	5	3	34	4	0.1
18	2o	2-	3+	4-	5o	6+	4-	4+	30o	7	6	18	22	48	94	22	32	249	31	1.3
19	4o	4+	3-	2+	3-	3+	3o	3+	26-	27	32	12	9	12	18	15	18	143	18	1.0
20	4-	4-	2o	2+	3-	4-	5-	4o	27-	22	22	7	9	12	22	39	27	160	20	1.0
21	4o	2o	1o	3o	3+	4o	4o	5o	26+	27	7	4	15	18	27	27	48	173	22	1.1
22	4-	4+	5+	4+	5o	4o	4-	3+	34-	22	32	56	32	48	27	22	18	257	32	1.3
23	3+	3-	2+	3o	2o	3o	1+	2-	19+	18	12	9	15	7	15	5	6	87	11	0.6
24	1-	1+	1o	1+	1-	2o	3+	3o	13+	3	5	4	5	3	7	18	15	60	8	0.4
25	3o	3+	3o	4-	4+	3+	3+	3+	27+	15	18	15	22	32	18	18	18	156	20	1.0
26	4+	4-	3o	3+	5o	4-	6-	7+	36o	32	22	15	18	48	22	67	154	378	47	1.5
27	4-	6+	7-	5+	3o	4+	3-	3o	35o	22	94	111	56	15	32	12	15	357	45	1.5
28	1+	2-	2-	2-	2o	3o	2-	2-	15-	5	6	6	6	7	15	6	6	57	7	0.4
29	2+	2-	2o	2+	2o	2+	3-	3+	19-	9	6	7	9	7	9	12	18	77	10	0.5
30	3-	3+	3+	4+	4-	3+	5o	3+	29o	12	18	18	32	22	18	48	18	186	23	1.1
31	3o	3o	2-	3-	2+	2+	3-	3-	20+	15	15	6	12	9	9	12	12	90	11	0.6

	Kp								Sum	Jun 1990				ap				Sum	Ap	Cp
1	2o	3o	3o	2-	2-	3-	3-	2o	19-	7	15	15	6	6	12	12	7	80	10	0.6
2	2o	2-	2o	2o	1+	1+	1+	1o	13-	7	6	7	7	5	5	5	4	46	6	0.3
3	1+	2o	1o	1o	2o	1+	2+	2o	13o	5	7	4	4	7	5	9	7	48	6	0.3
4	1o	2+	2o	1+	1+	0+	1-	2o	11o	4	9	7	5	5	2	3	7	42	5	0.2
5	1o	1+	1o	2-	2-	2-	1-	2o	11o	4	5	4	6	6	6	3	7	41	5	0.2
6	2+	3-	2+	2+	2+	2+	2+	3+	20o	9	12	9	9	9	9	9	18	84	10	0.6
7	3+	5+	4-	3o	3+	3o	3+	3o	28o	18	56	22	15	18	15	18	15	177	22	1.1
8	3o	4-	4-	3+	2+	3o	3-	3+	25o	15	22	22	18	9	15	12	18	131	16	0.9
9	4-	4-	6-	5o	5o	4-	3o	3-	32+	22	22	67	48	48	22	15	12	256	32	1.3
10	5-	3o	2o	3o	3o	3-	2o	4o	24+	39	15	7	15	15	12	7	27	137	17	0.9
11	2+	3o	3-	2+	3-	2+	3-	3-	21-	9	15	12	9	12	9	12	12	90	11	0.6
12	4o	3o	4+	4+	5+	7o	8-	8+	44o	27	15	32	32	56	132	179	236	709	89	1.8
13	8-	6o	6-	5-	6+	5-	5-	4-	43+	179	80	67	39	94	39	39	22	559	70	1.7
14	6o	6+	3+	6-	7+	8-	4o	3o	43+	80	94	18	67	154	179	27	15	634	79	1.8
15	2+	4-	2o	1+	2+	2o	2o	2+	18o	9	22	7	5	9	7	7	9	75	9	0.5
16	2+	1o	1+	1-	1o	1o	1+	1-	9+	9	4	5	3	4	4	5	3	37	5	0.2
17	0+	1-	1o	1-	0+	0+	1-	1-	5-	2	3	4	3	2	2	3	3	22	3	0.0
18	1-	2o	2+	2o	2+	3o	4-	3-	19-	3	7	9	7	9	15	22	12	84	10	0.6
19	2+	3-	1+	1+	2+	1-	1o	1-	12+	9	12	5	5	9	3	4	3	50	6	0.3
20	0+	0+	1-	0+	1-	0+	1-	1-	4o	2	2	3	2	3	2	3	3	20	2	0.0
21	0+	1o	1-	1-	1+	2o	2+	2o	10+	2	4	3	3	5	7	9	7	40	5	0.2
22	2o	2+	1+	1o	1+	1+	1-	2-	12-	7	9	5	4	5	5	3	6	44	6	0.2
23	2-	1o	1+	2+	3-	2+	1+	1-	13+	6	4	5	9	12	9	5	3	53	7	0.3
24	2-	2o	2o	2+	2-	2+	2o	2+	16+	6	7	7	9	6	9	7	9	60	8	0.4
25	2-	2+	2o	1+	2o	1+	3-	2o	15+	6	9	7	5	7	5	12	7	58	7	0.4
26	2-	2o	2-	3-	2-	1+	2-	2o	15-	6	7	6	12	6	5	6	7	55	7	0.3
27	1+	1o	1+	2-	3+	2-	2+	5-	17+	5	4	5	6	18	6	9	39	92	12	0.7
28	2o	2o	3o	2+	2-	2-	1o	1o	15-	7	7	15	9	6	6	4	4	58	7	0.4
29	1-	3o	3-	2-	2+	2-	2+	1o	15+	3	15	12	6	9	6	9	4	64	8	0.4
30	1o	1-	0+	1-	1+	1o	1-	1+	7o	4	3	2	3	5	4	3	5	29	4	0.1

Kp INDICES 1990 (continued)

	Kp	Sum	Jul 1990	ap	Sum	Ap	Cp
1	1+ 1o 1+ 1+ 1o 1+ 1+ 2+	11o	5 4 5 5	4 5 5 9	42	5	0.2
2	3- 2+ 2- 1o 2- 2- 1+ 1o	13+	12 9 6 4	6 6 5 4	52	6	0.3
3	2o 3o 2+ 1o 1+ 1o 1+ 2-	14-	7 15 9 4	5 4 5 6	55	7	0.3
4	2- 1- 1+ 2- 1- 3o 3- 3+	15o	6 3 5 6	3 15 12 18	68	8	0.5
5	2+ 3- 1+ 2- 2+ 2- 4- 3-	18+	9 12 5 6	9 6 22 12	81	10	0.6
6	2- 2- 1o 1o 2- 2+ 3- 2-	14-	6 6 4 4	6 9 12 6	53	7	0.3
7	1o 2- 2- 0+ 1+ 1o 2o 3o	12o	4 6 6 2	5 4 7 15	49	6	0.3
8	1+ 3- 3- 2+ 2o 3- 3- 3-	19o	5 12 12 9	7 12 12 12	81	10	0.6
9	2- 2o 1o 1o 2o 1+ 1+ 1-	11o	6 7 4 4	7 5 5 3	41	5	0.2
10	1- 4+ 2+ 4o 4- 2o 2- 2-	20+	3 32 9 27	22 7 6 6	112	14	0.8
11	2- 2o 2o 1+ 1+ 1o 3o 1+	14-	6 7 7 5	5 4 15 5	54	7	0.3
12	1+ 3- 3o 2+ 1+ 1o 2- 2+	16-	5 12 15 9	5 4 6 9	65	8	0.4
13	3+ 4o 3o 2+ 1o 3o 3- 2o	21+	18 27 15 9	4 15 12 7	107	13	0.8
14	3- 1- 1+ 2o 3+ 3o 4o 3-	20-	12 3 5 7	18 15 27 12	99	12	0.7
15	3- 3o 2o 2- 1+ 2o 2+ 2o	17o	12 15 7 6	5 7 9 7	68	8	0.5
16	3- 2- 1- 1o 1+ 1o 3- 2o	13o	12 6 3 4	5 4 12 7	53	7	0.3
17	1+ 2- 1o 0+ 1+ 1o 2- 3-	11o	5 6 4 2	5 4 6 12	44	6	0.2
18	3o 1+ 2+ 1o 1+ 2o 3- 1+	15o	15 5 9 4	5 7 12 5	62	8	0.4
19	2+ 3- 2+ 3+ 5- 3- 3o 3o	24o	9 12 9 18	39 12 15 15	129	16	0.9
20	3+ 3+ 4+ 3- 3+ 2+ 3o 2+	25-	18 18 32 12	18 9 15 9	131	16	0.9
21	2- 2- 1o 1+ 2- 2+ 3o 2-	14+	6 6 4 5	6 9 15 6	57	7	0.4
22	2o 2- 2- 1o 2- 1+ 1+ 2+	13o	7 6 6 4	6 5 5 9	48	6	0.3
23	1o 2+ 0+ 1- 0+ 1+ 1- 2-	8+	4 9 2 3	2 5 3 6	34	4	0.1
24	1o 2- 2- 1o 0+ 1o 1+ 0+	8+	4 6 6 4	2 4 5 2	33	4	0.1
25	1o 1+ 1+ 1+ 1o 1- 1- 0+	8-	4 5 5 5	4 3 3 2	31	4	0.1
26	1- 0+ 1o 1o 1o 3- 5+ 4o	16o	3 2 4 4	4 12 56 27	112	14	0.8
27	1o 2+ 2o 3- 2- 2+ 3o 2+	17+	4 9 7 12	6 9 15 9	71	9	0.5
28	3o 5- 6+ 5o 7- 7+ 8- 8-	48+	15 39 94 48	111 154 179 179	819	102	1.9
29	7o 7o 6+ 6- 6o 5- 4o 4+	45o	132 132 94 67	80 39 27 32	603	75	1.8
30	2o 2+ 3o 3o 2- 2- 3- 4o	20+	7 9 15 15	6 6 12 27	97	12	0.7
31	3o 2- 3- 2- 1o 0+ 1- 1o	12o	15 6 12 6	4 2 3 4	52	6	0.3

	Kp	Sum	Aug 1990	ap	Sum	Ap	Cp
1	1o 2- 3+ 2+ 5o 4+ 5o 5-	27+	4 6 18 9	48 32 48 39	204	26	1.2
2	3+ 3- 3- 2- 2- 1o 1+ 3-	17o	18 12 12 6	6 4 5 12	75	9	0.5
3	2+ 1o 2o 3o 3o 2+ 3- 3+	20-	9 4 7 15	15 9 12 18	89	11	0.6
4	3o 2- 2o 1o 1+ 1+ 2- 1o	13o	15 6 7 4	5 5 6 4	52	6	0.3
5	1o 1o 1- 1o 2o 1+ 1o 2+	10+	4 4 3 4	7 5 4 9	40	5	0.2
6	2- 2o 2o 2- 1+ 3- 3+ 2+	17o	6 7 7 6	5 12 18 9	70	9	0.5
7	2+ 2- 1+ 2- 2o 2- 2o 2+	15o	9 6 5 6	7 6 7 9	55	7	0.3
8	2o 3- 2- 1- 1+ 1+ 1- 1o	11+	7 12 6 3	5 5 3 4	45	6	0.3
9	2o 2- 1- 1+ 1o 2o 2- 1o	11+	7 6 3 5	4 7 6 4	42	5	0.2
10	1- 1o 1o 2- 2- 1+ 2+ 3-	12+	3 4 4 6	6 5 9 12	49	6	0.3
11	3+ 2- 2+ 2- 2+ 2o 1+ 2+	17o	18 6 9 6	9 7 5 9	69	9	0.5
12	2+ 3- 1+ 2o 1+ 1o 1+ 2o	14o	9 12 5 7	5 4 5 7	54	7	0.3
13	2o 3o 3- 3o 3o 3- 2+ 2o	21-	7 15 12 15	15 12 9 7	92	12	0.7
14	3- 2+ 5+ 4o 3o 3- 2+ 3o	25+	12 9 56 27	15 12 9 15	155	19	1.0
15	2+ 2+ 2- 5- 5o 5- 5- 4-	29o	9 9 6 39	48 39 39 22	211	26	1.2
16	3o 3+ 4+ 4- 4+ 5- 2+ 4+	30o	15 18 32 22	32 39 9 32	199	25	1.2
17	4- 3+ 3o 1+ 2+ 3+ 3o 3o	23o	22 18 15 5	9 18 15 15	117	15	0.8
18	3o 3- 3- 3- 3o 3- 2o 2o	21-	15 12 12 12	15 12 7 7	92	12	0.7
19	4- 4- 2+ 2+ 3o 3- 3- 3-	23o	22 22 9 9	15 12 12 12	113	14	0.8
20	3o 5- 4- 3o 4- 3+ 3+ 1+	26o	15 39 22 15	22 18 18 5	154	19	1.0
21	3- 2- 3+ 4- 5o 6- 6o 5o	33o	12 6 18 22	48 67 80 48	301	38	1.4
22	5+ 6- 5+ 5+ 5o 4+ 4o 5o	40o	56 67 56 56	48 32 27 48	390	49	1.6
23	4+ 6+ 5+ 6o 7o 6+ 6+ 4+	46o	32 94 56 80	132 94 94 32	614	77	1.8
24	4o 5+ 4- 3+ 5- 3o 2+ 0+	27-	27 56 22 18	39 15 9 2	188	24	1.1
25	1+ 1+ 1+ 1- 1+ 2o 2+ 3-	13o	5 5 5 3	5 7 9 12	51	6	0.3
26	2- 3+ 7- 6o 7- 6o 6- 4+	40+	6 18 111 80	111 80 67 32	505	63	1.7
27	4+ 3+ 3o 3- 4- 2+ 2o 2o	23+	32 18 15 12	22 9 7 7	122	15	0.9
28	2+ 2- 2- 1+ 2+ 1+ 1o 1+	13o	9 6 6 5	9 5 4 5	49	6	0.3
29	1+ 2- 2- 4- 2+ 2o 4- 3-	19o	5 6 6 22	9 7 22 12	89	11	0.6
30	2+ 3o 3- 4o 5o 5+ 4- 4-	30-	9 15 12 27	48 56 22 22	211	26	1.2
31	5- 4- 3o 3+ 3- 2- 2o 2-	23-	39 22 15 18	12 6 7 6	125	16	0.9

Kp INDICES 1990 (continued)

	Kp								Sum	Sep 1990				ap				Sum	Ap	Cp
1	2+	3-	1o	4o	7-	4o	3-	1+	25-	9	12	4	27	111	27	12	5	207	26	1.2
2	1-	0+	0+	1-	1-	0o	1-	0o	3+	3	2	2	3	3	0	3	0	16	2	0.0
3	0o	1-	1-	2-	2-	1-	1o	1o	7+	0	3	3	6	6	3	4	4	29	4	0.1
4	1-	1-	1o	2o	2o	3-	2+	3+	15-	3	3	4	7	7	12	9	18	63	8	0.4
5	3+	3-	2+	2+	3-	2+	2o	2+	20o	18	12	9	9	12	9	7	9	85	11	0.6
6	3o	2o	3+	3o	3-	2+	2+	2+	21o	15	7	18	15	12	9	9	9	94	12	0.7
7	3o	3-	3o	3+	3+	4-	1+	2o	22+	15	12	15	18	18	22	5	7	112	14	0.8
8	2+	2o	2-	2-	2-	2+	2+	3o	17o	9	7	6	6	6	9	9	15	67	8	0.5
9	3-	2+	1+	3-	3-	2o	3-	2+	19-	12	9	5	12	12	7	12	9	78	10	0.5
10	3o	2+	2+	0+	1-	1o	3o	4+	17o	15	9	9	2	3	4	15	32	89	11	0.6
11	3-	3+	4o	4-	4o	4o	4o	5-	30+	12	18	27	22	27	27	27	39	199	25	1.2
12	4o	4o	3o	3+	3-	3o	4-	3o	27-	27	27	15	18	12	15	22	15	151	19	1.0
13	5-	3o	2-	3+	3+	3+	3-	4o	26o	39	15	6	18	18	18	12	27	153	19	1.0
14	4o	4o	3+	3+	3+	3+	3+	2+	27o	27	27	18	18	18	18	18	9	153	19	1.0
15	3+	4o	3o	4o	5-	4-	3+	2+	28+	18	27	15	27	39	22	18	9	175	22	1.1
16	4-	3+	4o	5o	4o	3+	2o	3o	28+	22	18	27	48	27	18	7	15	182	23	1.1
17	3-	3o	3o	3-	2+	2o	3o	3o	22-	12	15	15	12	9	7	15	15	100	12	0.7
18	1o	3-	3+	4o	4-	4o	4o	3+	26o	4	12	18	27	22	27	27	18	155	19	1.0
19	4+	3+	3-	2-	2-	4-	3-	4-	24-	32	18	12	6	6	22	12	22	130	16	0.9
20	4o	2o	1o	1+	1+	2o	3o	5+	20o	27	7	4	5	5	7	15	56	126	16	0.9
21	4-	2+	2+	3+	3o	3-	3o	3+	24-	22	9	9	18	15	12	15	18	118	15	0.8
22	3+	4o	4-	2o	3+	4-	4-	4-	27+	18	27	22	7	18	22	22	22	158	20	1.0
23	4-	4o	3o	2+	2o	3-	1+	1+	20+	22	27	15	9	7	12	5	5	102	13	0.7
24	1+	3-	3+	2+	3+	4-	3-	2o	21+	5	12	18	9	18	22	12	7	103	13	0.7
25	3+	3+	2+	2-	1o	2-	3+	3-	19+	18	18	9	6	4	6	18	12	91	11	0.7
26	2+	3o	2o	2o	3o	3o	3+	2o	21-	9	15	7	7	15	15	18	7	93	12	0.7
27	3-	2+	3-	2-	2+	2-	1o	1+	16-	12	9	12	6	9	6	4	5	63	8	0.4
28	3+	3o	1o	2+	3-	1-	1+	2-	16o	18	15	4	9	12	3	5	6	72	9	0.5
29	3-	2+	2o	2o	1+	0o	1+	2+	14o	12	9	7	7	5	0	5	9	54	7	0.3
30	2+	1-	1-	1-	1-	1-	2o	2-	9+	9	3	3	3	3	3	7	6	37	5	0.2

	Kp								Sum	Oct 1990				ap				Sum	Ap	Cp
1	1+	2-	1-	0o	0o	0+	0o	0+	4+	5	6	3	0	0	2	0	2	18	2	0.0
2	1o	0+	1+	2-	2+	1+	2-	1o	11-	4	2	5	6	9	5	6	4	41	5	0.2
3	2-	2+	1+	2-	2o	2o	3o	4-	18-	6	9	5	6	7	7	15	22	77	10	0.5
4	2-	3-	3o	3o	3o	3+	5-	3-	24o	6	12	15	15	15	18	39	12	132	16	0.9
5	2o	2+	2+	2+	3o	2o	1+	3o	18+	7	9	9	9	15	7	5	15	76	10	0.5
6	2-	3-	4o	3+	3-	2+	2o	2+	21o	6	12	27	18	12	9	7	9	100	12	0.7
7	2-	2o	2-	2o	2-	2o	3-	2+	16o	6	7	6	7	6	7	12	9	60	8	0.4
8	1o	1o	1+	1o	1+	1+	1-	1-	8+	4	4	5	4	5	5	3	3	33	4	0.1
9	1+	1+	1o	2-	3o	3+	3+	4o	19o	5	5	4	6	15	18	18	27	98	12	0.7
10	5+	6o	6o	6-	5o	4-	3o	3-	37+	56	80	80	67	48	22	15	12	380	48	1.6
11	5o	4o	5+	4+	3+	4+	5+	6-	37+	48	27	56	32	18	32	56	67	336	42	1.5
12	5-	5o	5-	4+	3+	4-	4-	4o	33+	39	48	39	32	18	22	22	27	247	31	1.3
13	3+	3+	3+	2+	3-	2+	4o	3+	25-	18	18	18	9	12	9	27	18	129	16	0.9
14	4+	3o	3+	2o	2+	3o	3+	4-	25o	32	15	18	7	9	15	18	22	136	17	0.9
15	4+	4o	3-	3+	5-	5-	4-	3o	30+	32	27	12	18	39	39	22	15	204	26	1.2
16	2o	3-	3+	2-	2-	2o	3-	3o	19o	7	12	18	6	6	7	12	15	83	10	0.6
17	3o	2o	2+	1o	0+	0o	0+	1-	10-	15	7	9	4	2	0	2	3	42	5	0.2
18	0+	1-	1+	2-	1+	2o	2o	1+	11-	2	3	5	6	5	7	7	5	40	5	0.2
19	3+	3o	2o	2+	1+	1o	2-	2+	17o	18	15	7	9	5	4	6	9	73	9	0.5
20	1+	2+	2o	3o	4+	5o	5-	4+	27o	5	9	7	15	32	48	39	32	187	23	1.1
21	3o	3-	3+	3-	3o	1o	2-	1o	18+	15	12	18	12	15	4	6	4	86	11	0.6
22	3+	3o	3-	1+	2+	3-	1o	1o	17+	18	15	12	5	9	12	4	4	79	10	0.6
23	1+	1+	2-	2-	1+	1+	3+	4o	16o	5	5	6	6	5	5	18	27	77	10	0.5
24	5o	4+	4o	4-	4o	3+	3+	2-	29+	48	32	27	22	27	18	18	6	198	25	1.2
25	3+	4-	2-	2o	2-	1o	1+	2-	16+	18	22	6	7	6	4	5	6	74	9	0.5
26	1+	1o	1-	3o	3o	3+	3o	2-	17o	5	4	3	15	15	18	15	6	81	10	0.6
27	2-	3o	1+	2-	2o	3-	2-	1+	15+	6	15	5	6	7	12	6	5	62	8	0.4
28	1+	1+	2+	2-	0+	0o	0o	1-	8-	5	5	9	6	2	0	0	3	30	4	0.1
29	0+	1o	1-	2o	2o	3-	4o	3+	16o	2	4	3	7	7	12	27	18	80	10	0.6
30	6-	5-	2+	2o	3-	2o	2+	3-	24+	67	39	9	7	12	7	9	12	162	20	1.0
31	3o	4o	4-	3+	3+	4+	5-	4o	30+	15	27	22	18	18	32	39	27	198	25	1.2

Kp INDICES 1990 (continued)

	Kp								Sum	Nov 1990	ap								Sum	Ap	Cp
1	3o	2+	2-	2o	2-	1+	2-	3+	17o	15	9	6	7	6	5	6	18	72	9	0.5
2	3-	4-	2-	1+	1+	2o	2o	3+	18o	12	22	6	5	5	7	7	18	82	10	0.6
3	2o	2+	1+	2-	2-	1+	1+	1+	13o	7	9	5	6	6	5	5	5	48	6	0.3
4	2-	1-	1-	1o	0+	0+	0+	0o	5o	6	3	3	4	2	2	2	0	22	3	0.0
5	0o	0+	0+	0o	0+	0+	0+	1o	3-	0	2	2	0	2	2	2	4	14	2	0.0
6	0+	0+	0+	0+	0+	0+	1-	1-	3+	2	2	2	2	2	2	3	3	18	2	0.0
7	0+	0+	1o	2o	2o	2-	2o	2+	12-	2	2	4	7	7	6	7	9	44	6	0.2
8	1+	1+	2+	2-	2o	3-	3-	2+	16+	5	5	9	6	7	12	12	9	65	8	0.4
9	4-	3+	3-	2o	2o	3-	2+	2+	21o	22	18	12	7	7	12	9	9	96	12	0.7
10	3+	3-	3-	2o	2-	3+	3o	2+	21o	18	12	12	7	6	18	15	9	97	12	0.7
11	3+	3-	3-	3o	3+	2-	2-	2-	20o	18	12	12	15	18	6	6	6	93	12	0.7
12	1+	3-	1-	1o	1-	2-	1+	1-	10o	5	12	3	4	3	6	5	3	41	5	0.2
13	1+	1o	1+	1-	0+	1-	0+	0+	6o	5	4	5	3	2	3	2	2	26	3	0.1
14	1o	0o	0+	1-	0+	0o	0o	0o	2+	4	0	2	3	2	0	0	0	11	1	0.0
15	1-	1-	0+	0+	1-	1o	2-	1-	6o	3	3	2	2	3	4	6	3	26	3	0.1
16	2+	3o	4-	3+	4o	3+	3-	3+	26-	9	15	22	18	27	18	12	18	139	17	0.9
17	2+	3-	3o	3o	4o	4-	3+	3-	25-	9	12	15	15	27	22	18	12	130	16	0.9
18	4-	3o	2-	2+	4-	3+	3o	3o	24-	22	15	6	9	22	18	15	15	122	15	0.9
19	4-	3o	2+	2-	1+	2+	2-	2+	18+	22	15	9	6	5	9	6	9	81	10	0.6
20	2+	3-	2+	1+	1+	1o	1o	1+	13+	9	12	9	5	5	4	4	5	53	7	0.3
21	3o	4-	1+	2o	3-	2-	2-	2o	18o	15	22	5	7	12	6	6	7	80	10	0.6
22	1-	1-	0+	0+	1-	1-	2o	0o	5+	3	3	2	2	3	3	7	0	23	3	0.1
23	0+	0+	0o	1-	2o	2o	1o	2o	8+	2	2	0	3	7	7	4	7	32	4	0.1
24	2o	1o	0o	0o	0+	0o	0o	1-	4o	7	4	0	0	2	0	0	3	16	2	0.0
25	1-	0+	1-	2o	1+	1-	2-	2o	9+	3	2	3	7	5	3	6	7	36	4	0.2
26	3-	3-	1+	2o	3-	1+	0+	3+	16+	12	12	5	7	12	5	2	18	73	9	0.5
27	5-	4o	3+	3-	4+	7-	6+	4o	36o	39	27	18	12	32	111	94	27	360	45	1.5
28	4o	5-	3o	2o	2o	2+	4+	2o	24+	27	39	15	7	7	9	32	7	143	18	1.0
29	1+	2+	1o	1-	0+	1-	2-	2o	10o	5	9	4	3	2	3	6	7	39	5	0.2
30	2o	2-	1+	2-	3-	3+	2o	2o	17-	7	6	5	6	12	18	7	7	68	8	0.5

	Kp								Sum	Dec 1990	ap								Sum	Ap	Cp
1	2+	3-	0+	0+	1o	2-	1-	1-	10-	9	12	2	2	4	6	3	3	41	5	0.2
2	0+	1-	1-	1+	2o	1+	2o	1+	10-	2	3	3	5	7	5	7	5	37	5	0.2
3	2-	1o	1-	0+	1o	2+	2+	3o	12+	6	4	3	2	4	9	9	15	52	6	0.3
4	3+	4+	2+	3+	3o	3o	2+	4-	25+	18	32	9	18	15	15	9	22	138	17	0.9
5	3o	2-	3-	3o	3-	4-	3-	2o	21+	15	6	12	15	12	22	12	7	101	13	0.7
6	2+	2-	2-	3-	2o	1+	2-	1+	15-	9	6	6	12	7	5	6	5	56	7	0.4
7	2o	2o	2-	1-	0+	1o	1+	0+	9+	7	7	6	3	2	4	5	2	36	4	0.2
8	0o	1o	2+	2-	3-	3-	3-	2+	15+	0	4	9	6	12	12	12	9	64	8	0.4
9	2-	1+	1o	2-	2o	2o	1o	1-	11+	6	5	4	6	7	7	4	3	42	5	0.2
10	0o	0+	0+	1-	0+	1-	1-	0+	3+	0	2	2	3	2	3	3	2	17	2	0.0
11	1-	0+	0+	0+	0+	1+	0+	0o	4-	3	2	2	2	2	5	2	0	18	2	0.0
12	0+	0+	0+	1-	2o	3o	3-	3o	12+	2	2	2	3	7	15	12	15	58	7	0.4
13	4+	4-	4o	3+	2-	1+	2-	1+	21+	32	22	27	18	6	5	6	5	121	15	0.9
14	3+	2+	2-	1o	2o	2+	1+	0+	14+	18	9	6	4	7	9	5	2	60	8	0.4
15	1+	2+	2+	1+	1-	2-	2-	1+	13-	5	9	9	5	3	6	6	5	48	6	0.3
16	2o	2o	1+	2o	3+	2+	2o	2-	17-	7	7	5	7	18	9	7	6	66	8	0.4
17	2o	3-	1o	1o	1-	2-	2o	1+	12+	7	12	4	4	3	6	7	5	48	6	0.3
18	2o	1-	0+	2o	2o	2-	1-	0+	10-	7	3	2	7	7	6	3	2	37	5	0.2
19	0+	0+	0+	0+	1-	1o	0+	0+	4-	2	2	2	2	3	4	2	2	19	2	0.0
20	1o	1+	1o	2-	2+	3o	3o	2-	15o	4	5	4	6	9	15	15	6	64	8	0.4
21	1o	1+	1-	0o	0o	2-	1o	1o	7-	4	5	3	0	0	6	4	4	26	3	0.1
22	1-	1-	1o	1o	0+	0o	0+	2o	6o	3	3	4	4	2	0	2	7	25	3	0.1
23	0+	0+	3o	2+	1o	2-	1o	3o	13-	2	2	15	9	4	6	4	15	57	7	0.4
24	1-	3-	2o	3o	3o	3+	4o	4-	22+	3	12	7	15	15	18	27	22	119	15	0.8
25	3-	3+	1+	2+	2+	3o	2+	2-	19o	12	18	5	9	9	15	9	6	83	10	0.6
26	1+	1-	1o	1-	1+	1-	1-	1-	7o	5	3	4	3	5	3	3	3	29	4	0.1
27	1o	3o	1o	1+	2-	2-	1+	1-	12-	4	15	4	5	6	6	5	3	48	6	0.3
28	1+	1+	1o	1o	1-	1-	1+	1o	8+	5	5	4	4	3	3	5	4	33	4	0.1
29	1-	1o	0+	1-	1-	1+	2-	1-	7o	3	4	2	3	3	5	6	3	29	4	0.1
30	3-	3+	3o	3o	2o	2-	3-	2o	20+	12	18	15	15	7	6	12	7	92	12	0.7
31	1-	1-	1o	2+	3o	3+	2+	3-	16o	3	3	4	9	15	18	9	12	73	9	0.5

FREQUENCIES OF **Kp** INDICES 1990

Kp	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0 o	2	.	.						4	6	13	6
+	8	9	4	2	4	10	9	1	3	8	31	32
-	5	6	3	3	18	23	12	6	16	8	25	35
1 o	15	7	8	2	11	20	34	16	10	15	12	28
+	15	7	10	18	22	26	35	24	12	26	23	27
-	13	7	22	13	23	21	38	26	14	27	24	27
2 o	25	9	14	18	28	31	18	22	20	22	28	23
+	23	17	28	23	16	32	24	28	31	19	18	20
-	34	16	19	28	18	16	26	25	28	18	20	15
3 o	24	17	23	20	22	17	19	21	25	23	12	18
+	31	20	23	18	29	8	7	15	33	25	15	9
-	29	26	24	15	19	9	2	15	15	9	8	4
4 o	9	28	15	14	9	3	6	4	21	12	5	2
+	8	10	12	12	12	2	3	9	2	9	2	2
-	1	21	10	9	2	5	3	8	3	8	2	
5 o	6	13	7	9	5	2	1	8	1	5		
+		4	9	15	4	2	1	7	1	3		
-		1	8	5	2	3	1	3	.	3	.	
6 o		2	2	4	.	2	1	4	.	2	.	
+		1	2	1	2	2	2	3	.		1	
-		3	1	4	1	.	1	2	1		1	
7 o			1	1	.	1	2	1				
+			2	3	1	1	1					
-			.	2		3	2					
8 o			1	1		.						
+						1						
9 - o												
	248	224	248	240	248	240	248	248	240	248	240	248

LIST OF Kp', 1990

Reduction of Kp to Kp' due to solar flare effects as far as data were available.

Month	Day	Eighth	Kp	Kp'
May	10	7	4+	4o
	12	4	1+	1o
	15	5	2o	2-

MONTHLY AVERAGES OF Ap AND Cp, 1990

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Ap	14	23	23	27	16	16	14	19	14	15	9	7	16.3
Cp	0.73	1.01	0.95	1.01	0.72	0.58	0.53	0.79	0.71	0.69	0.43	0.34	0.71

MONTHLY AND YEARLY **Ap** 1932 - 1990

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
1932	11	12	18	17	15	7	7	12	12	10	8	9	11.5
1933	10	11	12	12	12	8	7	9	12	10	9	7	10.1
1934	6	8	11	6	7	5	6	9	10	6	5	8	7.2
1935	9	10	10	8	6	9	7	5	13	12	8	9	8.9
1936	9	11	9	15	10	12	11	5	5	9	10	5	9.1
1937	7	13	12	20	13	12	12	10	9	20	12	10	12.5
1938	28	16	13	18	18	9	13	12	17	16	10	11	15.3
1939	7	15	19	28	21	15	19	19	13	22	9	11	16.5
1940	15	12	36	18	13	16	12	11	14	14	16	15	16.1
1941	14	18	33	15	11	11	19	16	27	11	16	11	16.8
1942	9	12	22	17	8	8	13	13	17	22	15	11	13.8
1943	11	9	13	14	14	12	15	31	25	24	20	14	17.0
1944	13	12	17	15	9	8	6	9	10	11	6	14	10.8
1945	10	10	17	13	9	7	9	7	10	11	8	13	10.4
1946	12	22	33	20	18	16	22	11	34	13	12	9	18.6
1947	12	12	32	18	14	16	16	25	32	23	14	11	18.8
1948	12	13	17	13	19	10	10	20	15	27	16	13	15.4
1949	20	14	19	14	18	14	8	14	13	25	15	9	15.4
1950	12	18	14	18	16	14	14	25	22	28	20	16	18.1
1951	16	22	21	27	20	17	20	22	40	24	18	20	22.3
1952	19	26	33	34	27	18	15	13	23	20	12	15	21.2
1953	15	15	21	16	16	13	16	19	21	16	14	7	15.7
1954	9	16	16	14	7	6	8	10	17	15	9	6	11.0
1955	12	12	14	14	11	9	8	9	13	11	13	8	11.3
1956	18	15	20	27	26	17	13	15	18	14	24	10	18.0
1957	17	17	26	21	11	22	16	14	49	14	18	18	20.1
1958	15	27	26	20	17	24	25	18	20	16	8	15	19.2
1959	14	24	24	17	19	15	32	23	28	19	22	19	21.3
1960	15	14	18	42	24	20	20	20	20	36	32	21	23.6
1961	12	16	14	14	13	14	28	11	13	16	10	12	14.4
1962	7	11	8	14	7	9	12	15	19	20	13	13	12.3
1963	11	9	8	10	11	11	12	13	28	15	12	11	12.6
1964	12	12	13	13	10	9	9	8	11	10	7	5	9.9
1965	6	9	8	8	6	10	8	9	10	7	6	7	7.7
1966	7	8	13	7	9	6	9	11	21	11	9	11	10.2
1967	11	11	7	9	25	12	8	9	16	10	10	14	12.0
1968	11	16	13	13	13	17	10	12	14	16	17	10	13.5
1969	8	15	17	14	17	9	8	8	15	9	10	7	11.3
1970	7	7	18	15	9	10	19	13	11	12	12	9	11.9
1971	12	12	11	15	13	9	8	9	13	12	11	10	11.3
1972	13	10	12	11	10	14	8	24	13	12	14	10	12.6
1973	16	20	25	30	17	17	12	12	14	18	12	11	17.0
1974	15	16	23	21	18	17	24	19	23	26	18	15	19.6
1975	16	18	20	16	13	11	12	10	10	12	18	12	13.9
1976	13	17	23	17	14	10	9	9	13	12	9	10	12.9
1977	10	11	11	16	11	8	14	13	16	13	10	10	11.9
1978	15	16	17	24	25	20	13	17	18	12	15	13	17.0
1979	16	15	19	25	14	12	12	18	14	12	10	9	14.5
1980	10	11	8	11	10	13	11	10	8	14	13	13	11.1
1981	9	14	18	28	20	12	19	15	12	23	15	10	16.3
1982	12	33	18	22	17	22	30	21	36	18	21	21	22.4
1983	16	27	23	24	22	15	12	16	14	17	21	15	18.5
1984	13	17	21	25	17	15	16	16	24	23	21	18	18.8
1985	16	15	11	21	9	11	14	13	13	14	15	13	13.7
1986	14	27	13	8	12	8	8	12	17	11	13	8	12.5
1987	8	10	10	7	8	7	11	14	19	16	13	9	11.0
1988	13	15	14	16	12	11	10	10	12	13	12	13	12.7
1989	19	15	41	23	16	17	8	20	17	21	19	16	19.5
1990	14	23	23	27	16	16	14	19	14	15	9	7	16.3

SECTION 3

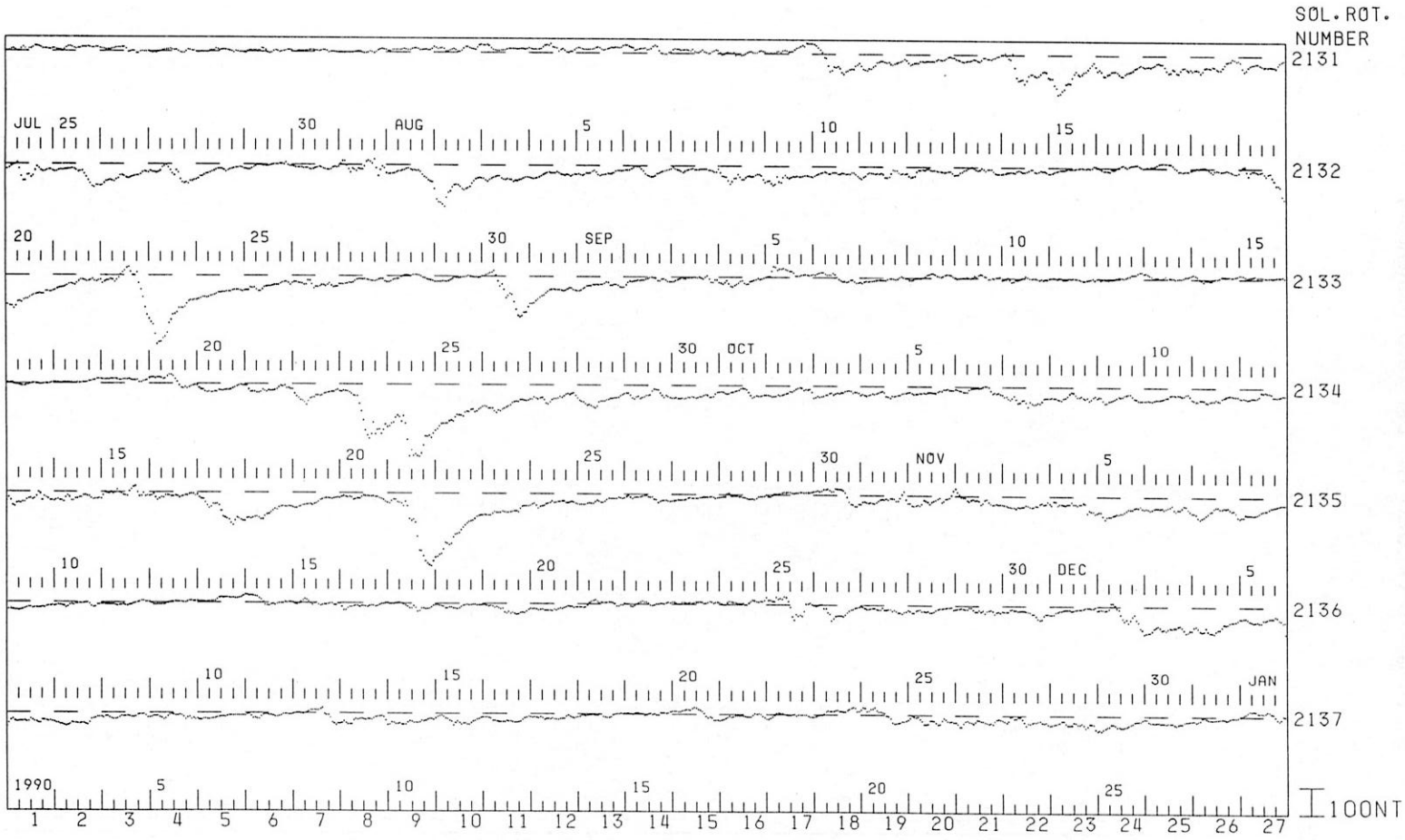
3.4. Dst INDICES

Hourly values of **Dst** 1990 (graph) 89

Monthly tables of **Dst** hourly values 92

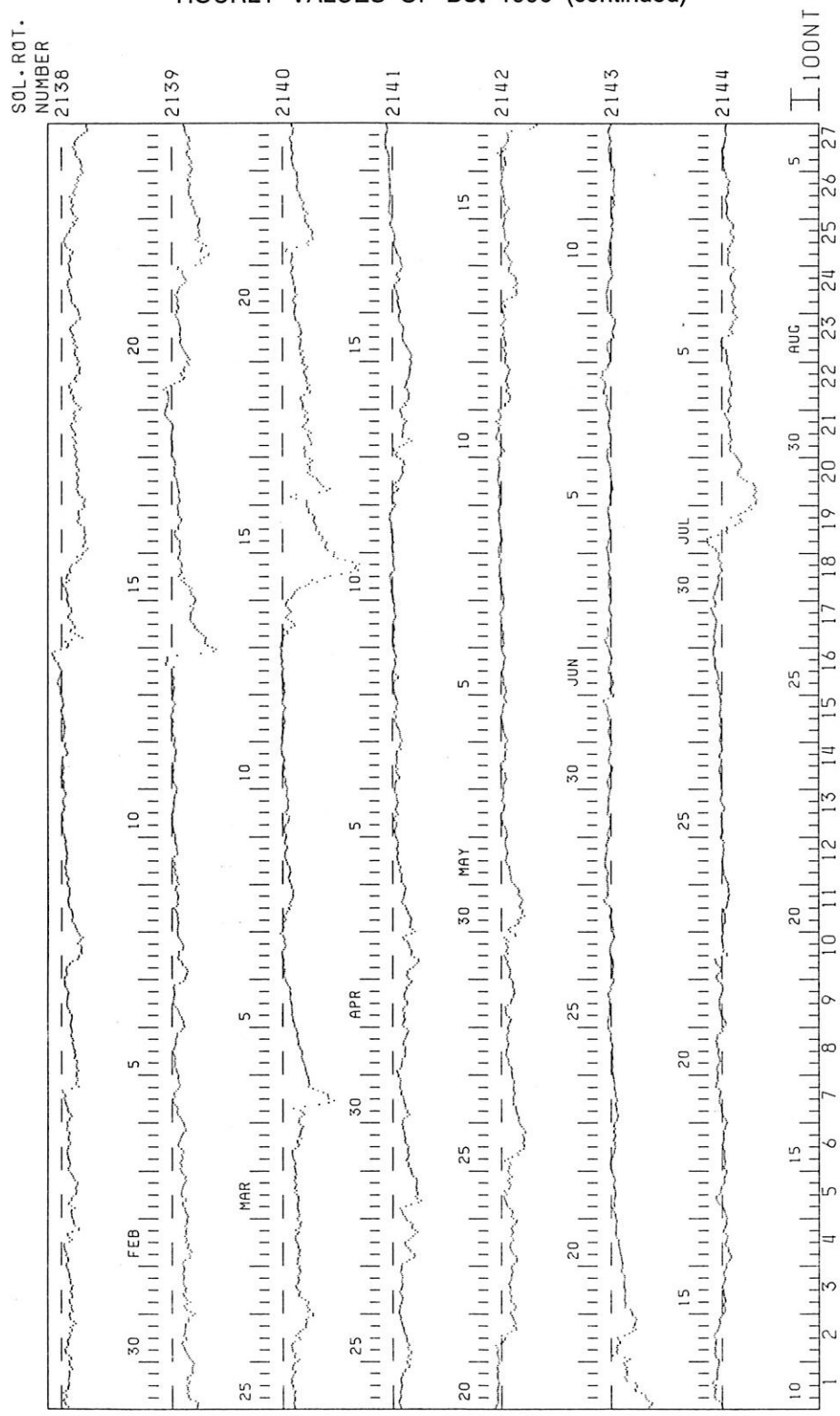
Tables of daily means of **Dst** 104

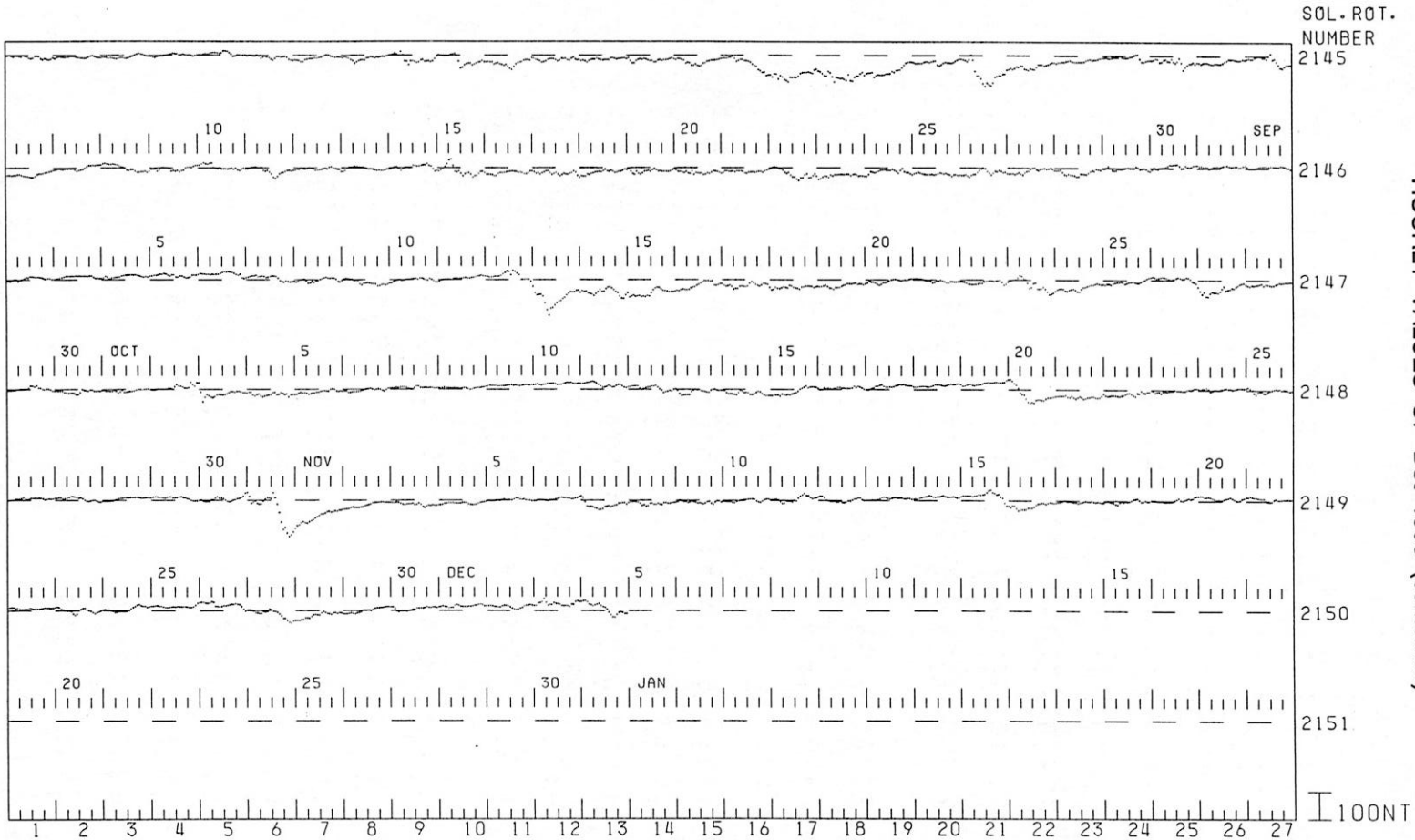
Monthly and yearly mean values
1957 - 1990 105



HOURLY VALUES OF **Dst** 1990

HOURLY VALUES OF **Dst** 1990 (continued)





HOURLY VALUES OF **Dst** 1990 (continued)

JANUARY 1990

DAY	UNIT=NT 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	U.T. 24
1	-45	-46	-44	-43	-47	-53	-56	-59	-58	-55	-60	-60	-50	-50	-47	-43	-43	-43	-36	-40	-48	-52	-59	-57
2	-53	-40	-30	-26	-33	-36	-34	-34	-34	-33	-37	-35	-26	-31	-35	-37	-41	-41	-30	-30	-32	-35	-32	-35
3	-37	-40	-40	-44	-44	-48	-51	-49	-45	-39	-40	-40	-42	-42	-41	-40	-44	-46	-38	-27	-25	-22	-19	-19
4	-19	-22	-17	-16	-21	-25	-27	-27	-25	-20	-15	-17	-16	-15	-16	-19	-19	-17	-10	-9	-9	-8	-13	-21
5	-20	-19	-15	-15	-15	-19	-22	-28	-24	-16	-10	-8	-10	-12	-13	-11	-13	-18	-27	-21	-18	-26	-23	-27
6	-25	-29	-29	-25	-24	-26	-27	-25	-24	-22	-20	-19	-17	-17	-18	-14	-12	-12	-13	-12	-12	-12	-13	-12
7	-13	-8	-7	-14	-22	-21	-24	-25	-16	-10	-8	-9	-11	-11	-13	-16	-17	-15	-12	-7	-6	-7	-8	-8
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14	-14	-12	-9	-9	-10	-9	-7	-6	-7	-9	-9	-4	-5	-13	-15	-17	-17	-14	-6	-4	-2	-3	-1	-2
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22	-29	-35	-44	-45	-32	-25	-23	-27	-29	-33	-26	-20	-20	-24	-25	-28	-30	-32	-30	-35	-24	-18	-16	-19
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UNIT=NT

DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	U.T. 24
1	-21	-22	-28	-28	-26	-20	-23	-19	-15	-13	-12	-13	-32	-41	-33	-26	-25	-42	-66	-67	-53	-48	-47	-46
2	-42	-40	-40	-38	-40	-51	-39	-29	-31	-39	-40	-46	-55	-57	-58	-54	-57	-61	-62	-51	-47	-44	-39	-34
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4	-24	-31	-33	-40	-36	-29	-25	-25	-22	-19	-17	-15	-12	-17	-15	-8	-5	-40	-65	-55	-56	-62	-61	-56
5	-58	-57	-64	-59	-57	-58	-61	-58	-49	-51	-54	-50	-52	-47	-46	-44	-41	-46	-42	-38	-37	-41	-41	-38
6	-36	-35	-37	-38	-41	-41	-40	-33	-33	-27	-24	-23	-23	-23	-25	-25	-26	-29	-26	-23	-17	-15	-16	-14
7	-13	-16	-22	-23	-20	-20	-23	-31	-34	-43	-61	-66	-67	-76	-74	-75	-76	-73	-62	-68	-73	-80	-70	-66
8	-60	-58	-54	-53	-47	-41	-40	-44	-43	-42	-41	-37	-31	-29	-29	-26	-26	-28	-31	-32	-31	-31	-32	-27
9	-23	-23	-28	-28	-22	-18	-20	-19	-16	-15	-19	-20	-20	-23	-21	-23	-22	-20	-19	-18	-15	-18	-17	-15
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13	2	3	2	3	5	10	12	10	7	4	3	-2	-4	1	5	9	9	19	24	24	29	32	22	0
14	-22	-27	-27	-17	-40	-79	-66	-52	-35	-38	-51	-51	-44	-42	-34	-27	-27	-33	-39	-39	-38	-29	-29	-25
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16	-82	-92	-99	-82	-83	-89	-91	-86	-87	-91	-87	-87	-87	-86	-73	-64	-60	-66	-68	-65	-64	-65	-78	-87
17	-85	-81	-87	-89	-78	-68	-64	-62	-57	-61	-63	-59	-59	-63	-65	-59	-58	-67	-66	-59	-55	-55	-58	-60
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24	-78	-74	-77	-77	-73	-72	-68	-59	-53	-55	-55	-49	-44	-52	-50	-54	-59	-64	-76	-87	-97	-98	-94	-94
25	-90	-93	-93	-95	-86	-67	-62	-61	-56	-62	-58	-58	-54	-62	-65	-56	-58	-67	-76	-75	-75	-75	-77	-81
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MARCH 1990

UNIT=NT

DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	U.T. 24
1	-57	-60	-56	-52	-49	-49	-42	-40	-41	-51	-51	-38	-35	-36	-37	-39	-41	-44	-48	-53	-49	-51	-44	-38
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5	-47	-45	-43	-44	-38	-37	-31	-28	-26	-22	-16	-10	-8	-7	-9	-9	-12	-12	-11	-9	-8	-11	-30	-43
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29	-47	-46	-43	-47	-47	-43	-39	-38	-36	-36	-37	-47	-57	-61	-55	-54	-69	-61	-65	-66	-67	-71	-75	-66
30	-59	-61	-62	-70	-79	-74	-66	-41	-82	-133	-167	-187	-167	-166	-164	-149	-129	-111	-95	-98	-96	-96	-95	-93
31	-88	-88	-85	-84	-83	-80	-78	-74	-72	-70	-72	-72	-71	-66	-63	-58	-59	-59	-57	-54	-54	-56	-53	-50

APRIL 1990

UNIT=NT

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
																								U.T.
1	-45	-45	-43	-40	-39	-38	-35	-37	-36	-35	-35	-35	-33	-31	-29	-29	-31	-30	-28	-30	-27	-21	-17	-13
2	-13	-10	-5	-8	-9	-10	-3	-7	-5	-6	-7	-2	0	0	0	-6	-11	-13	-10	-7	-10	-7	-4	6
3	0	-3	-6	-4	-2	-8	-13	-10	-7	-15	-19	-26	-24	-32	-26	-30	-35	-38	-40	-39	-40	-41	-34	-35
4	-32	-28	-27	-23	-25	-28	-30	-29	-28	-26	-20	-18	-15	-12	-10	-12	-11	-14	-19	-18	-12	-10	-12	-14
5	-15	-15	-10	-8	-9	-11	-14	-21	-24	-25	-26	-17	-12	-17	-22	-22	-21	-21	-23	-20	-16	-17	-18	-18
6	-20	-17	-13	-12	-13	-13	-9	-3	-3	-6	-11	-9	-6	-6	-9	-9	-6	-1	0	0	2	1	1	-1
7	-2	0	1	-2	-5	-5	-6	-8	-5	-9	-12	-10	-7	-5	-5	-6	-10	-13	-8	-3	-2	-3	-5	-7
8	-8	-11	-10	-6	-9	-9	-8	-5	-3	-1	1	-2	-3	-6	-2	1	0	-3	0	1	2	2	0	2
9	5	3	2	0	-4	-3	-9	-21	-19	-8	-33	-47	-44	-35	-23	-15	-20	-26	-33	-27	-22	-15	-15	-18
10	-23	-34	-39	-45	-47	-55	-65	-86	-98	-128	-110	-155	-175	-216	-250	-276	-266	-270	-281	-257	-229	-202	-187	-189
11	-190	-166	-159	-157	-159	-163	-144	-148	-147	-134	-136	-123	-124	-125	-121	-117	-114	-117	-119	-112	-98	-97	-98	-91
12	-89	-91	-90	-52	-33	-52	-136	-163	-174	-150	-142	-137	-130	-126	-113	-102	-94	-104	-101	-101	-94	-103	-111	-101
13	-84	-83	-83	-86	-80	-83	-107	-108	-104	-101	-96	-95	-106	-98	-84	-76	-81	-88	-94	-95	-83	-84	-93	-86
14	-75	-77	-75	-76	-72	-68	-70	-81	-102	-104	-92	-93	-101	-92	-88	-91	-88	-84	-80	-81	-88	-93	-82	-74
15	-77	-75	-80	-69	-68	-75	-64	-64	-66	-67	-70	-68	-61	-67	-71	-69	-67	-63	-64	-59	-51	-49	-47	-45
16	-45	-46	-47	-49	-50	-45	-40	-43	-49	-55	-49	-47	-48	-49	-42	-42	-42	-39	-39	-36	-32	-35	-39	-40
17	-36	-32	-33	-36	-38	-37	-37	-15	-19	-54	-96	-91	-97	-113	-112	-108	-111	-112	-106	-96	-96	-90	-84	-85
18	-83	-84	-95	-88	-79	-78	-73	-78	-80	-73	-69	-65	-66	-63	-57	-55	-54	-57	-59	-57	-57	-57	-54	-55
19	-49	-44	-41	-40	-38	-36	-36	-37	-40	-41	-37	-34	-35	-35	-35	-31	-28	-31	-38	-40	-40	-42	-37	-35
20	-32	-30	-28	-24	-24	-28	-30	-31	-29	-29	-32	-33	-35	-33	-31	-31	-33	-38	-37	-46	-48	-61	-63	-56
21	-54	-66	-57	-60	-69	-70	-60	-57	-62	-60	-54	-54	-53	-51	-46	-43	-43	-41	-37	-36	-34	-30	-32	-29
22	-25	-25	-27	-29	-28	-33	-34	-37	-38	-36	-31	-27	-32	-35	-37	-38	-35	-36	-38	-37	-34	-30	-33	-35
23	-35	-37	-53	-63	-79	-83	-82	-68	-66	-59	-51	-47	-48	-60	-68	-77	-84	-94	-85	-74	-73	-76	-67	-54
24	-50	-46	-40	-37	-34	-29	-50	-70	-96	-106	-92	-86	-94	-93	-88	-90	-88	-90	-91	-91	-88	-78	-72	-72
25	-70	-67	-59	-61	-59	-51	-56	-59	-61	-57	-58	-58	-61	-55	-49	-46	-49	-46	-45	-45	-42	-39	-40	-36
26	-39	-38	-44	-55	-63	-56	-56	-49	-48	-48	-44	-43	-42	-40	-33	-33	-35	-29	-28	-29	-29	-31	-29	-22
27	-24	-20	-17	-29	-34	-34	-36	-37	-37	-46	-48	-49	-47	-49	-49	-41	-41	-43	-48	-51	-54	-58	-61	-55
28	-43	-37	-41	-45	-48	-44	-44	-46	-39	-41	-46	-55	-57	-54	-47	-45	-45	-46	-50	-54	-53	-62	-69	-73
29	-62	-58	-54	-58	-57	-66	-78	-84	-92	-98	-97	-82	-70	-71	-72	-70	-64	-63	-60	-55	-44	-40	-51	-71
30	-84	-75	-66	-67	-68	-68	-71	-69	-65	-59	-58	-53	-52	-48	-39	-35	-39	-42	-44	-45	-46	-49	-50	-46

MAY 1990

UNIT=NT

DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	U.T. 24
1	-41	-33	-35	-34	-34	-36	-29	-27	-31	-31	-24	-24	-20	-19	-18	-21	-22	-19	-17	-21	-21	-22	-20	-16
2	-13	-12	-10	-9	-12	-16	-16	-17	-10	-7	-13	-22	-17	-13	-14	-17	-19	-22	-19	-18	-16	-17	-12	-10
3	-11	-12	-12	-13	-16	-26	-28	-22	-17	-15	-21	-15	-15	-19	-18	-18	-19	-16	-18	-19	-33	-27	-31	-31
4	-38	-37	-31	-30	-29	-29	-26	-22	-18	-16	-11	-10	-16	-15	-8	-10	-18	-16	-16	-21	-21	-18	-15	-14
5	-10	-10	-8	-6	-7	-6	-8	-12	-22	-23	-15	-7	-6	-8	-11	-13	-13	-11	-11	-16	-14	-11	-9	-6
6	-8	-9	-6	-4	-4	-8	-6	-7	-7	-10	-9	-8	-7	-6	-9	-13	-14	-12	-9	-9	-8	-10	-9	-5
7	-6	-6	-5	-1	2	1	-1	1	2	4	4	6	7	4	-1	-9	-10	-7	-5	-5	-6	-7	-5	-4
8	-5	-3	0	0	-2	-7	-4	-3	-3	-1	4	1	2	2	2	2	6	9	6	7	5	0	-3	-10
9	-13	-8	-2	-2	0	-4	-10	-19	-24	-16	-7	-15	-25	-30	-33	-37	-41	-39	-38	-40	-47	-43	-44	-31
10	-19	-14	-20	-9	-7	-28	-44	-55	-73	-62	-39	-39	-41	-38	-42	-43	-43	-49	-54	-46	-37	-37	-34	-30
11	-32	-39	-51	-47	-57	-62	-63	-62	-64	-60	-57	-48	-52	-54	-55	-60	-63	-64	-66	-66	-67	-66	-70	-73
12	-71	-67	-71	-73	-69	-65	-60	-55	-51	-46	-41	-40	-39	-39	-40	-42	-43	-41	-37	-31	-26	-25	-25	-26
13	-30	-31	-28	-25	-23	-22	-20	-24	-23	-20	-18	-17	-12	-10	-9	-17	-25	-29	-22	-17	-20	-30	-34	-39
14	-36	-34	-31	-32	-30	-24	-19	-17	-15	-12	-9	-8	-9	-11	-10	-10	-10	-6	-4	0	5	6	4	0
15	-1	0	6	11	9	9	10	8	7	6	6	6	5	5	7	7	6	7	6	6	7	9	8	10
16	11	10	9	10	10	10	10	9	11	14	16	21	21	25	23	22	22	22	22	18	17	16	17	20
17	23	19	17	12	11	12	13	11	12	14	13	12	9	8	9	12	13	13	13	9	13	15	12	7
18	9	6	9	12	14	13	9	15	19	1	-8	-14	-16	-3	-24	-39	-57	-55	-48	-54	-52	-47	-45	-41
19	-36	-37	-50	-55	-54	-48	-38	-37	-39	-39	-34	-33	-37	-36	-33	-30	-34	-38	-40	-40	-41	-45	-42	-39
20	-41	-49	-58	-59	-59	-56	-46	-41	-38	-35	-34	-36	-39	-46	-44	-38	-41	-46	-42	-39	-44	-52	-57	-59
21	-46	-39	-42	-44	-41	-33	-24	-22	-20	-17	-13	-12	-22	-18	-13	-30	-34	-37	-32	-25	-32	-41	-33	-29
22	-27	-31	-31	-37	-33	-15	-27	-42	-65	-61	-70	-83	-86	-85	-81	-85	-86	-83	-80	-90	-89	-83	-77	-71
23	-68	-65	-66	-66	-61	-59	-57	-56	-55	-46	-47	-46	-46	-46	-50	-52	-48	-46	-48	-47	-49	-49	-45	-42
24	-41	-41	-40	-41	-38	-31	-28	-29	-28	-23	-20	-21	-21	-23	-26	-28	-29	-25	-23	-24	-22	-27	-30	-27
25	-26	-30	-33	-36	-39	-31	-22	-20	-18	-20	-17	-26	-37	-38	-41	-47	-47	-51	-49	-50	-45	-45	-46	-44
26	-39	-32	-33	-36	-35	-35	-32	-27	-23	-26	-20	-17	-13	-26	-20	-23	-27	-24	-20	-29	-21	-13	-54	-53
27	-35	-29	-36	-53	-64	-68	-63	-74	-87	-78	-79	-81	-72	-69	-74	-77	-81	-75	-69	-63	-67	-67	-63	-55
28	-50	-42	-39	-38	-39	-35	-36	-34	-31	-32	-24	-21	-18	-21	-21	-24	-25	-24	-21	-19	-18	-17	-18	-20
29	-24	-24	-22	-23	-19	-16	-8	-9	-8	-2	-2	-2	-6	-11	-13	-14	-15	-10	-5	-8	-11	-9	-11	-12
30	-11	-11	-12	-14	-18	-22	-19	-18	-17	-1	-8	-2	-1	-3	-11	-18	-16	-17	-18	-18	-24	-17	-17	-19
31	-25	-27	-22	-17	-16	-12	-11	-10	-10	-10	-7	-5	-2	-3	-5	-8	-8	-9	-11	-13	-22	-19	-14	-14

JUNE 1990

UNIT=NT

DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	U.T. 24
1	-17	-21	-21	-18	-20	-13	-11	-12	-12	-10	-6	-4	-7	-9	-12	-12	-13	-13	-16	-18	-14	-10	-7	-5
2	-6	-11	-13	-12	-11	-9	-10	-11	-11	-5	-3	-6	-4	-2	-2	-4	-2	1	-1	-7	-10	-13	-12	-11
3	-12	-13	-12	-10	-6	-4	-4	-4	-1	2	0	3	5	3	2	2	3	4	3	-1	-3	-2	5	4
4	6	7	7	6	3	2	-6	-7	-3	-1	1	-1	1	0	2	3	5	5	5	4	5	8	5	2
5	2	1	2	3	6	5	3	3	3	4	5	7	9	10	7	7	6	5	3	4	5	3	6	10
6	6	0	-5	-15	-11	-4	0	0	5	14	16	14	11	6	5	6	0	8	15	4	-1	-2	1	7
7	6	0	-17	-18	-30	-35	-36	-36	-30	-22	-23	-30	-26	-25	-20	-22	-24	-26	-30	-32	-35	-29	-25	-18
8	-17	-19	-17	-20	-21	-16	-14	-11	-19	-20	-18	-14	-14	-8	-11	-15	-12	-11	-2	-8	-13	-19	-13	-14
9	-10	-8	-7	-18	-15	-7	-12	-24	-42	-57	-61	-58	-58	-48	-56	-62	-57	-57	-56	-49	-40	-31	-31	-32
10	-37	-37	-42	-34	-30	-27	-21	-15	-16	-19	-25	-29	-29	-20	-16	-16	-16	-14	-15	-12	-9	-12	-13	-15
11	-17	-13	-15	-21	-26	-32	-29	-19	-15	-13	-16	-12	-12	-10	-10	-6	-7	-3	-1	-3	-5	-7	-5	-5
12	-10	-12	-11	-19	-20	-17	-15	-15	3	10	-9	-19	-12	-17	-23	-28	-27	-29	-27	-24	-41	-108	-121	-132
13	-136	-139	-147	-150	-137	-129	-125	-124	-111	-90	-87	-95	-94	-89	-58	-55	-50	-59	-58	-59	-54	-58	-51	-48
14	-59	-69	-50	-9	-24	-21	-25	-22	-25	-34	-33	-28	-25	-50	-67	-79	-90	-81	-86	-87	-89	-93	-89	-79
15	-77	-75	-71	-52	-53	-54	-52	-50	-52	-52	-52	-53	-53	-49	-49	-49	-49	-50	-51	-50	-45	-40	-39	-43
16	-42	-44	-42	-40	-40	-38	-36	-34	-33	-32	-30	-29	-29	-29	-23	-20	-19	-19	-20	-20	-20	-20	-22	-22
17	-19	-18	-17	-13	-10	-9	-14	-13	-12	-13	-15	-17	-18	-17	-17	-14	-12	-11	-13	-16	-15	-11	-8	-6
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19	-16	-23	-24	-27	-27	-23	-22	-22	-20	-18	-20	-24	-23	-19	-18	-19	-16	-14	-14	-15	-14	-12	-12	-10
20	-9	-9	-7	-7	-10	-7	-6	-7	-8	-8	-7	-6	-6	-7	-8	-7	-5	-1	-1	-1	-2	-2	2	7
21	8	8	9	9	7	7	3	3	4	4	2	2	3	3	1	5	8	7	1	-3	0	-4	-9	-12
22	-12	-7	-7	-8	-9	-8	-11	-11	-9	-10	-8	-4	0	0	1	1	1	-1	-3	-7	-11	-14	-12	-11
23	-8	-11	-10	-6	-4	-5	-3	3	3	-2	-5	-5	-1	4	14	21	23	15	10	9	11	8	9	10
24	10	10	13	12	12	8	9	12	16	18	19	19	18	18	17	15	14	12	11	14	15	11	9	5
25	7	11	9	6	5	1	-1	0	1	-1	3	10	10	7	8	7	7	6	7	5	7	4	3	1
26	2	7	7	10	10	8	4	4	2	-6	-8	-8	-3	4	6	5	3	1	-2	-1	2	1	-3	-4
27	-6	-3	1	3	5	6	5	3	-2	1	1	7	8	3	7	8	10	10	12	17	24	23	7	-11
28	-12	-5	2	2	-7	-10	-11	-10	-4	-6	0	5	6	4	5	0	-3	-3	-4	-5	-3	0	2	4
29	6	10	14	17	20	13	6	8	7	8	9	-1	-3	-2	-1	-3	-5	-3	0	4	4	3	1	-2
30	-3	-1	3	3	0	1	4	6	5	5	5	4	2	4	6	4	0	1	3	3	6	5	6	7

JULY 1990

UNIT=NT

DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	U.T. 24
1	8	10	13	12	8	6	7	4	0	-1	-1	1	2	1	3	2	1	3	5	5	7	9	7	7
2	2	-1	-2	-1	2	1	-3	-5	-9	-8	-6	-5	-5	-3	-1	-3	-3	0	-1	0	2	4	7	10
3	10	11	9	12	9	1	-3	3	-1	-3	-3	-2	1	1	2	5	6	7	5	3	1	2	3	4
4	8	10	14	15	14	11	11	13	23	23	22	18	17	18	20	27	34	28	27	27	16	9	9	4
5	1	-1	3	3	3	8	10	10	11	10	5	-5	-12	-11	-8	-7	-10	-12	-15	-18	-16	-17	-8	-4
6	2	9	9	10	10	10	11	11	13	13	15	13	10	9	8	7	5	0	-5	-8	-4	-6	-3	-1
7	1	4	5	6	7	5	3	5	6	2	3	2	1	0	-3	-5	-5	-6	-9	-7	-2	-6	-9	-8
8	-8	-7	-6	-3	-2	-4	-10	-15	-11	-13	-9	-9	-15	-13	-11	-10	-12	-13	-12	-11	-13	-12	-14	-14
9	-14	-14	-10	-5	-2	2	3	3	4	4	6	6	6	3	1	-2	2	2	4	8	8	5	2	-1
10	-4	-3	-2	0	9	21	25	27	24	24	22	27	22	32	29	18	16	16	17	16	15	13	10	10
11	9	12	20	22	25	22	23	24	21	22	21	19	25	27	23	17	13	10	8	5	5	8	3	-2
12	-8	-13	-14	-13	-9	-10	-15	-15	-12	-10	-10	-9	-8	-3	-4	-8	-11	-14	-14	-10	-8	-10	-15	-18
13	-18	-19	-26	-30	-35	-35	-31	-25	-26	-24	-16	-13	-17	-19	-21	-22	-16	-7	-8	-13	-15	-19	-18	-18
14	-21	-18	-15	-12	-11	-8	-3	7	13	17	19	18	9	3	4	1	0	-7	-11	-11	-10	-12	-16	-19
15	-18	-11	-9	-13	-14	-13	-11	-11	-10	-11	-11	-6	-5	-3	-6	-8	-8	-8	-8	-8	-7	-13	-15	-17
16	-20	-17	-14	-8	-4	-2	0	0	1	3	7	9	6	7	5	3	4	10	21	19	18	13	14	14
17	14	13	16	17	15	11	7	5	6	9	12	12	10	10	16	16	17	20	16	15	14	5	-4	-2
18	-8	-16	-17	-13	-10	-5	1	2	4	6	8	7	6	8	7	4	1	-1	-4	-5	-5	-3	2	11
19	16	18	16	10	3	1	5	13	18	20	23	0	-20	-20	-7	-10	-6	-6	-5	-3	-3	-2	-3	-6
20	-6	-6	-6	-7	-11	-14	-13	-13	-13	-12	-9	-9	-17	-20	-21	-22	-26	-24	-27	-29	-26	-27	-26	-23
21	-25	-22	-18	-16	-13	-9	-10	-9	-6	-6	-5	-4	-4	-4	-6	-8	-7	-9	-10	-7	-7	-11	-6	1
22	3	0	-6	-6	-4	-1	-2	-1	-1	-3	1	-1	-2	-9	-12	-11	-5	-2	2	2	1	-3	-3	-4
23	-1	1	0	-1	2	1	2	3	5	7	7	6	2	1	-1	-1	5	7	4	-1	-3	-3	-2	1
24	4	6	4	2	1	-2	-2	0	5	6	2	1	2	5	5	5	2	2	3	1	2	1	3	5
25	4	5	8	12	11	10	17	15	9	10	12	14	15	20	22	23	23	23	22	24	29	29	29	29
26	28	25	23	22	25	27	27	24	23	24	21	20	20	17	18	21	25	28	31	34	37	23	20	22
27	24	28	29	24	23	20	17	15	13	11	8	10	11	8	3	-3	-1	4	3	-1	5	11	10	8
28	9	18	21	31	44	49	66	50	38	11	-22	-19	-23	-20	-52	-65	-74	-69	-36	-62	-70	-87	-110	-101
29	-107	-125	-126	-129	-122	-117	-123	-128	-122	-125	-120	-116	-93	-80	-71	-60	-61	-61	-66	-73	-73	-72	-67	-62
30	-57	-53	-47	-34	-31	-33	-34	-28	-33	-38	-35	-33	-32	-32	-32	-28	-26	-29	-30	-24	-20	-16	-13	-25
31	-27	-30	-35	-31	-27	-27	-29	-35	-36	-33	-31	-32	-37	-38	-37	-32	-31	-32	-34	-34	-28	-27	-26	-22

AUGUST 1990

DAY	UNIT=NT 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	U.T. 17	18	19	20	21	22	23	24
1	-20	-22	-21	-22	-19	-18	-17	-9	1	-2	1	-2	-5	-27	-41	-38	-30	-35	-40	-44	-41	-51	-57	-52
2	-44	-42	-45	-51	-46	-42	-39	-44	-42	-39	-39	-44	-47	-50	-48	-43	-37	-34	-33	-35	-37	-45	-49	-43
3	-28	-24	-24	-24	-24	-25	-24	-30	-24	-24	-31	-34	-41	-40	-46	-44	-36	-32	-34	-42	-43	-43	-37	-30
4	-24	-22	-19	-19	-21	-21	-22	-21	-19	-16	-15	-18	-21	-25	-25	-24	-22	-25	-27	-30	-24	-18	-18	-16
5	-11	-11	-8	-7	-8	-6	-8	-9	-6	-4	-3	-6	-9	-9	-11	-13	-14	-15	-17	-16	-14	-15	-15	-16
6	-10	-5	-4	-7	-9	-5	-6	-8	-9	-4	-7	-8	-13	-16	-13	-6	-5	-7	-16	-19	-15	-17	-20	-17
7	-12	-16	-11	-9	-10	-10	-11	-10	-9	-7	-7	-8	-10	-12	-13	-13	-14	-13	-10	-6	-4	-7	-10	-11
8	-12	-10	-10	-11	-13	-12	-13	-14	-16	-13	-11	-11	-13	-14	-12	-8	-5	-2	1	4	2	0	-3	-5
9	-6	-7	-10	-11	-8	-7	-5	-5	-3	-1	0	3	5	3	3	-1	-1	1	-1	-2	-1	-3	-6	-4
10	-1	0	-1	1	4	2	4	6	7	7	6	4	6	13	13	12	7	1	-7	-5	-1	-2	-2	-3
11	-2	-5	-3	-3	-5	-5	-1	-6	-13	-10	-7	-9	-12	-17	-21	-14	-7	-7	-9	-8	-7	-10	-17	-21
12	-22	-20	-21	-22	-27	-26	-19	-17	-15	-15	-14	-12	-13	-11	-9	-6	-3	-1	-2	-6	-8	-10	-9	-9
13	-10	-12	-8	-11	-13	-19	-23	-32	-27	-23	-20	-20	-21	-13	-12	-8	-9	-13	-9	-10	-8	-7	-8	-5
14	-3	-1	1	5	2	-3	11	-1	-24	-25	-38	-24	-24	-26	-30	-28	-21	-19	-25	-25	-24	-27	-24	-16
15	-6	-1	-4	-5	-5	-5	-5	1	3	4	-3	-25	-50	-47	-38	-34	-33	-32	-39	-36	-32	-28	-27	-22
16	-27	-27	-26	-27	-27	-36	-33	-30	-35	-37	-40	-37	-44	-51	-55	-45	-35	-30	-28	-26	-21	-19	-19	-21
17	-12	-13	-18	-20	-23	-29	-27	-24	-18	-16	-15	-16	-20	-24	-21	-14	-15	-14	-20	-21	-14	-10	-17	-20
18	-19	-23	-21	-24	-29	-22	-19	-17	-17	-13	-17	-19	-21	-19	-20	-19	-13	-12	-14	-17	-15	-14	-13	-13
19	-16	-12	-23	-32	-31	-23	-18	-16	-18	-15	-17	-21	-23	-22	-28	-27	-21	-19	-22	-20	-19	-18	-15	-12
20	-16	-19	-14	-15	-19	-21	-33	-29	-31	-40	-40	-35	-41	-43	-40	-33	-31	-25	-24	-21	-21	-21	-19	-17
21	-14	-13	-13	-13	-11	-10	-7	-14	-25	-22	-18	-18	-23	-22	-25	-29	-36	-41	-44	-55	-59	-65	-64	-76
22	-74	-74	-81	-70	-71	-88	-76	-81	-90	-93	-98	-82	-83	-82	-83	-79	-69	-66	-65	-65	-63	-66	-68	-56
23	-53	-60	-63	-69	-76	-78	-61	-66	-80	-99	-82	-84	-87	-85	-89	-93	-73	-94	-95	-82	-78	-78	-70	-65
24	-75	-69	-67	-67	-65	-82	-76	-73	-75	-74	-73	-70	-70	-69	-61	-64	-58	-57	-55	-48	-39	-31	-28	-27
25	-27	-29	-33	-32	-32	-32	-29	-26	-26	-29	-26	-24	-23	-38	-42	-37	-31	-28	-30	-30	-31	-29	-24	-20
26	-16	-16	-18	-21	-25	-18	0	-20	-60	-76	-75	-86	-103	-113	-101	-107	-111	-101	-81	-78	-75	-76	-71	-70
27	-55	-54	-49	-53	-50	-43	-46	-40	-42	-51	-54	-57	-50	-53	-54	-46	-36	-36	-36	-40	-38	-36	-32	-29
28	-29	-32	-28	-28	-26	-27	-24	-22	-21	-25	-26	-27	-26	-26	-26	-25	-21	-18	-16	-19	-18	-18	-16	-13
29	-12	-11	-9	-12	-13	-11	-9	-9	-9	-4	-9	-11	-11	-10	-7	-5	-1	1	2	-14	-25	-26	-22	-20
30	-20	-20	-18	-13	-15	-26	-25	-18	-15	-22	-23	-13	-24	-29	-23	-11	-28	-54	-44	-37	-31	-31	-26	-33
31	-27	-29	-33	-29	-28	-28	-30	-33	-34	-31	-31	-33	-32	-29	-24	-20	-15	-16	-15	-17	-19	-20	-19	-16

SEPTEMBER 1990

UNIT=NT

DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	U.T. 24
1	-17	-14	-12	-15	-14	-9	-5	-4	-5	-9	-9	-14	-3	6	-16	-13	-24	-35	-46	-48	-41	-36	-37	-34
2	-31	-29	-29	-30	-29	-29	-26	-26	-29	-31	-32	-33	-34	-36	-36	-32	-25	-23	-23	-21	-19	-18	-16	-14
3	-11	-9	-8	-6	-8	-9	-7	-7	-5	-6	-6	-9	-14	-12	-9	-8	-4	1	5	5	6	5	7	7
4	8	12	13	11	9	9	11	9	8	5	2	0	-3	-9	-11	-8	-8	-13	-17	-17	-16	-16	-13	-17
5	-13	-7	-6	-6	-13	-10	-1	0	-2	-2	-5	-13	-11	-13	-11	-16	-12	-10	-3	0	0	-1	3	6
6	6	7	11	15	12	10	13	14	-1	-4	-5	-2	-5	-5	-5	-6	-5	-4	-7	-4	-9	-12	-6	-4
7	-6	-6	-4	0	0	1	0	-2	0	-11	-14	-11	-17	-24	-36	-40	-33	-24	-20	-18	-15	-12	-11	-13
8	-11	-10	-8	-8	-4	-7	-7	-5	-3	-4	-7	-11	-10	-9	-8	-5	-4	-6	-1	1	-3	-5	-7	-8
9	-16	-16	-12	-4	-1	0	1	3	2	0	-1	0	-4	-5	-7	-6	-8	-10	-12	-11	-12	-12	-10	-7
10	-8	-6	-3	1	1	-5	-12	-6	0	0	-1	0	5	4	2	3	5	7	7	12	5	3	-7	-15
11	-12	-15	-10	-4	2	11	24	27	5	-16	-17	-14	-22	-31	-24	-21	-20	-25	-36	-30	-30	-23	-16	-15
12	-20	-26	-25	-26	-27	-31	-30	-23	-20	-20	-19	-17	-16	-15	-14	-15	-16	-19	-18	-20	-24	-24	-21	-14
13	-14	-17	-23	-20	-25	-21	-17	-13	-13	-20	-26	-23	-19	-25	-31	-27	-22	-25	-25	-22	-20	-14	-18	-30
14	-37	-31	-33	-33	-25	-27	-23	-21	-18	-17	-16	-17	-13	-8	-14	-16	-12	-15	-20	-18	-15	-15	-11	-8
15	-9	-7	-15	-23	-26	-16	-22	-25	-21	-15	-14	-12	-16	-10	-6	-9	-14	-13	-16	-15	-16	-16	-14	-9
16	-7	-10	-16	-16	-18	-20	-16	-21	-23	-14	-26	-20	-21	-22	-21	-27	-25	-21	-23	-18	-13	-14	-16	-18
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19	-32	-43	-41	-35	-31	-33	-37	-28	-31	-27	-27	-26	-26	-26	-26	-25	-25	-30	-26	-25	-27	-32	-30	-31
20	-33	-33	-26	-16	-17	-20	-18	-14	-11	-10	-9	-11	-11	-12	-8	-11	-15	-21	-12	-5	-16	-19	-19	-23
21	-27	-23	-21	-17	-21	-23	-25	-26	-26	-26	-25	-28	-26	-24	-20	-21	-24	-21	-25	-27	-33	-27	-26	-29
22	-28	-29	-29	-27	-31	-35	-29	-25	-25	-18	-12	-7	-3	-5	-15	-21	-27	-21	-14	-16	-12	-14	-19	-17
23	-22	-24	-23	-22	-25	-22	-19	-24	-27	-20	-15	-13	-6	-3	-2	-8	-11	-6	-5	-4	-7	-5	-3	-6
24	-11	-12	-11	-10	-17	-25	-28	-24	-26	-27	-29	-33	-32	-23	-23	-24	-25	-20	-14	-11	-13	-6	-7	-9
25	-4	-5	0	4	-3	-10	-12	-11	-6	-6	-6	-4	-2	-1	-3	-3	-3	2	-1	-6	-5	-4	-6	-12
26	-13	-8	-1	-5	-6	-2	0	0	2	5	9	8	10	10	11	5	-3	-2	6	1	0	2	7	8
27	8	4	5	3	4	1	-5	-1	2	3	4	1	3	5	7	7	4	2	3	4	4	0	1	5
28	6	3	-4	-4	-4	-3	0	2	4	4	4	4	2	4	3	3	2	2	5	4	3	0	-1	-6
29	-8	-9	-9	-5	-2	-3	-9	-5	-2	2	6	5	9	9	8	7	8	6	5	2	0	3	2	-1
30	-1	1	3	4	5	8	10	10	10	11	10	12	11	12	11	11	11	10	12	12	7	3	3	2

OCTOBER 1990

DAY	UNIT=NT 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	U.T. 17	18	19	20	21	22	23	24
1	3	4	10	7	1	4	5	6	7	8	12	13	15	15	16	16	16	16	14	12	9	8	9	8
2	11	12	14	14	16	18	18	21	19	14	12	16	16	8	8	12	12	8	4	5	8	15	15	15
3	17	21	20	19	17	18	16	18	17	18	18	21	25	27	26	28	26	25	21	17	14	18	4	2
4	5	7	9	12	12	14	8	9	11	9	5	7	9	12	11	9	3	-6	-10	-12	-7	-9	-12	-10
5	-9	-12	-10	-4	-2	-1	-8	-16	-15	-10	-13	-8	-7	-2	1	4	6	3	2	3	3	-1	-9	-12
6	-6	0	2	1	0	-2	-7	-5	-6	-18	-22	-16	-16	-14	-16	-17	-18	-19	-26	-25	-21	-20	-22	-20
7	-15	-14	-10	-6	-5	-3	-6	-5	-2	-1	-1	1	1	1	-1	3	3	0	-4	-5	1	-2	-7	-12
8	-12	-9	-4	-2	-1	-1	-1	-2	2	3	3	2	2	4	5	3	3	5	6	8	11	12	14	12
9	11	9	7	7	8	10	9	10	13	19	24	29	27	16	31	28	21	16	-2	-1	-1	0	-1	-9
10	-28	-52	-59	-58	-58	-64	-89	-114	-133	-108	-105	-96	-88	-83	-80	-73	-68	-59	-53	-48	-49	-48	-43	-42
11	-50	-44	-47	-46	-53	-54	-57	-62	-54	-48	-40	-47	-46	-37	-31	-29	-34	-41	-48	-51	-63	-71	-72	-59
12	-51	-67	-64	-60	-65	-63	-62	-66	-64	-66	-62	-63	-51	-41	-34	-31	-32	-38	-43	-44	-46	-49	-48	-48
13	-46	-43	-45	-40	-38	-40	-41	-39	-33	-31	-29	-24	-20	-15	-11	-6	-7	-6	-8	-7	-23	-24	-21	-17
14	-17	-23	-27	-25	-22	-28	-38	-36	-36	-28	-26	-28	-29	-26	-16	-10	-14	-20	-24	-26	-22	-16	-17	-20
15	-32	-41	-39	-31	-35	-37	-33	-29	-31	-33	-24	-25	-31	-33	-35	-38	-30	-29	-27	-26	-26	-27	-32	-29
16	-27	-29	-28	-25	-22	-28	-33	-34	-38	-32	-32	-31	-27	-23	-21	-17	-17	-18	-16	-15	-20	-17	-18	-21
17	-18	-14	-8	-12	-12	-14	-19	-23	-19	-13	-13	-11	-8	-3	-1	0	-2	-4	-6	-4	-3	-4	-1	1
18	1	2	3	1	1	0	-4	-7	-7	-9	-14	-12	-7	-7	-4	-7	-9	-13	-14	-9	-9	-10	-10	-9
19	-9	-10	-11	-14	-18	-19	-20	-20	-19	-17	-16	-16	-9	-8	-7	-6	-6	-8	-6	-5	-4	-11	-22	-18
20	-10	-6	-4	-3	-2	5	14	11	4	0	-14	-34	-31	-16	-13	-36	-37	-35	-29	-37	-47	-57	-54	-51
21	-45	-39	-36	-35	-37	-43	-45	-41	-38	-37	-40	-46	-47	-37	-30	-29	-26	-23	-21	-21	-18	-15	-17	-20
22	-19	-21	-17	-17	-21	-15	-13	-11	-11	-9	-12	-17	-14	-11	-10	-9	-12	-13	-13	-9	-6	-3	2	6
23	7	9	7	4	5	7	8	7	5	2	0	1	2	5	8	5	2	3	8	7	1	-7	-10	-14
24	-28	-43	-54	-46	-62	-63	-51	-46	-48	-48	-50	-44	-34	-25	-41	-38	-37	-32	-33	-27	-23	-18	-15	-13
25	-19	-23	-25	-21	-23	-21	-20	-18	-16	-23	-18	-19	-21	-23	-22	-18	-16	-12	-13	-12	-11	-11	-10	-10
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27	-9	-8	-9	-9	-10	-14	-15	-17	-16	-16	-18	-22	-21	-14	-3	-6	-7	-9	-5	-5	-9	-9	-8	-9
28	-7	-7	-10	-10	-10	-10	-7	-10	-16	-12	-7	-13	-13	-11	-10	-10	-8	-5	-3	-3	-4	-3	-2	-1
29	-4	-5	-5	-3	-1	-2	-2	-2	-1	2	2	-2	7	14	9	9	6	2	2	4	23	14	9	21
30	21	-13	-48	-32	-22	-26	-31	-33	-29	-23	-21	-22	-23	-21	-19	-15	-11	-11	-13	-10	-10	-12	-15	-15
31	-16	-13	-13	-23	-27	-22	-20	-27	-30	-27	-25	-24	-22	-15	-14	-23	-21	-15	-18	-22	-20	-30	-23	-22

NOVEMBER 1990

UNIT=NT

DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	U.T. 24
1	-22	-21	-17	-14	-16	-15	-17	-21	-19	-16	-16	-13	-13	-10	-8	-8	-9	-9	-3	-1	-3	-9	-11	-8
2	-10	-9	-9	-14	-14	-12	-12	-12	-11	-10	-7	-4	-2	-1	1	-2	-5	-3	-1	-3	-7	-9	-4	1
3	2	2	2	5	4	5	6	5	5	1	0	-2	4	9	9	4	3	4	4	3	4	4	1	2
4	3	3	4	5	4	4	3	2	4	3	2	1	2	4	2	0	-3	-2	1	3	4	4	5	6
5	8	9	12	11	11	11	9	9	10	10	11	12	13	14	12	13	11	10	11	13	14	14	13	14
6	14	15	17	14	12	15	16	18	18	18	19	17	14	14	15	17	20	22	21	22	18	18	18	20
7	18	17	19	21	22	25	26	24	20	15	9	5	5	8	12	9	5	7	11	15	15	10	5	4
8	6	7	9	9	10	9	2	-4	0	4	5	6	9	9	11	5	-1	-6	-15	-12	-10	-7	-9	-3
9	-1	-8	-19	-25	-24	-23	-23	-22	-12	-6	-3	-5	-4	-8	-9	-11	-13	-14	-6	-3	-3	-5	-7	-6
10	-7	-8	-15	-20	-19	-20	-21	-23	-15	-8	-10	-15	-14	-15	-21	-22	-20	-14	-10	-12	-18	-23	-26	-25
11	-25	-25	-23	-23	-23	-27	-20	-23	-24	-21	-23	-20	-17	-15	-9	-2	2	5	10	3	6	7	6	5
12	2	-4	-4	4	1	3	1	-1	2	3	5	5	3	3	1	1	1	3	9	5	9	7	3	-2
13	-4	-5	-1	2	4	9	9	13	15	9	6	6	7	6	8	12	13	16	15	16	13	12	12	11
14	7	6	7	8	9	9	9	7	7	9	12	15	15	15	13	11	11	13	15	17	16	16	17	18
15	16	10	11	14	16	17	13	12	14	15	16	18	21	22	24	22	21	24	24	22	22	23	24	30
16	34	34	28	20	14	4	-14	-20	-22	-36	-48	-52	-49	-51	-41	-39	-39	-41	-42	-36	-32	-32	-31	-29
17	-27	-26	-25	-25	-25	-23	-29	-30	-25	-31	-35	-31	-27	-30	-36	-34	-30	-30	-28	-28	-31	-32	-31	-25
18	-17	-24	-26	-25	-23	-23	-24	-25	-27	-24	-23	-19	-15	-14	-18	-24	-26	-15	-16	-7	-13	-14	-11	-10
19	-4	-6	-13	-11	-11	-15	-9	-8	-11	-8	-7	-6	-3	-5	-5	-5	-7	-7	-4	-1	-3	-1	3	3
20	2	-1	3	3	5	1	-9	-6	-2	-2	-4	0	0	2	3	1	1	-1	0	1	4	4	4	3
21	5	7	4	-3	-13	-20	-11	-8	-8	-13	-14	-10	-5	-3	0	1	0	1	-3	-1	-2	-4	-7	-5
22	-4	-3	-2	-1	2	3	3	4	7	3	0	2	5	5	5	5	5	5	4	0	1	3	2	3
23	5	5	7	6	3	4	6	8	11	11	9	8	5	7	3	-2	-5	-7	-4	-3	-2	-5	-8	-9
24	-6	-6	-7	-7	-5	-4	-2	1	4	5	5	7	7	6	8	8	8	8	8	5	5	6	6	6
25	6	8	9	9	8	8	6	5	8	9	9	6	7	7	9	10	7	7	3	1	-3	-5	-5	-4
26	-3	-1	-6	-8	-8	-8	-1	-1	5	9	5	5	4	-2	-7	-8	-6	-2	0	3	4	8	12	22
27	25	10	-14	-10	-6	-14	-17	-16	-7	2	7	6	4	24	6	-17	-47	-82	-109	-102	-122	-135	-129	-118
28	-105	-95	-92	-84	-80	-84	-86	-80	-77	-73	-67	-63	-58	-53	-53	-49	-44	-43	-46	-45	-41	-42	-39	-38
29	-36	-35	-34	-33	-29	-28	-29	-29	-29	-28	-27	-23	-21	-19	-16	-12	-11	-11	-10	-9	-9	-10	-10	-11
30	-11	-12	-12	-10	-11	-14	-17	-19	-16	-16	-16	-14	-19	-18	-13	-18	-26	-29	-24	-21	-22	-20	-21	-21

UNIT=NT

DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	U.T. 24
1	-20	-19	-18	-14	-13	-12	-12	-12	-13	-13	-13	-13	-11	-11	-12	-16	-18	-19	-19	-17	-14	-11	-9	-8
2	-6	-4	-5	-5	-5	-3	-3	-3	0	2	-1	1	0	-2	1	5	5	1	0	2	-1	-2	-3	-4
3	-5	-4	0	0	0	-2	-3	-4	-1	-1	0	2	4	6	8	6	6	5	5	2	3	5	6	9
4	13	7	-9	-24	-26	-25	-27	-30	-32	-37	-36	-33	-26	-25	-23	-27	-24	-21	-20	-14	-13	-12	-12	-17
5	-12	-9	-8	-7	-9	-10	-14	-22	-20	-25	-23	-14	-13	-17	-18	-14	-17	-19	-12	-12	-14	-14	-12	-11
6	-10	-8	-3	-6	-8	-8	-12	-9	-5	-8	-10	-13	-12	-14	-16	-13	-8	-7	-14	-17	-9	-4	-5	-9
7	-7	-6	-8	-8	-8	-11	-12	-7	-4	-3	-3	1	1	1	2	2	1	-5	-8	-10	-5	0	2	2
8	-1	0	2	2	-1	-8	-14	-13	-5	-5	-6	-9	-3	-4	5	12	17	22	14	13	8	4	5	7
9	10	13	12	7	0	-4	-7	-7	-6	-9	-8	-4	-10	-11	-8	-4	-4	-1	3	4	7	6	0	-3
10	-2	-2	-1	-1	0	0	1	4	8	9	8	5	4	5	8	8	6	7	7	4	4	5	5	2
11	3	4	4	6	8	9	11	12	15	13	9	9	11	11	13	15	12	10	9	9	11	9	6	7
12	11	14	14	14	14	14	12	13	15	18	17	18	20	26	33	35	26	23	18	20	10	6	-12	-22
13	-22	-27	-21	-22	-31	-39	-36	-35	-35	-34	-29	-29	-29	-25	-19	-14	-13	-11	-12	-15	-12	-9	-10	-12
14	-11	-10	-9	-6	-3	-3	-6	-6	-8	-9	-9	-12	-10	-8	-6	-4	-6	-6	-4	-7	-8	-7	-8	-10
15	-9	-6	-5	-6	-9	-11	-15	-17	-9	-5	-9	-6	-6	-5	-2	3	4	5	0	-7	-6	-2	-5	-5
16	-1	-2	-2	-4	-4	-4	-5	-7	-6	-7	-6	-4	0	3	7	0	-2	1	4	7	4	6	13	14
17	15	16	15	10	11	12	10	7	5	2	2	1	1	4	6	8	11	7	3	-1	-2	0	5	8
18	12	11	14	12	10	9	8	6	6	6	0	-5	-6	-4	2	5	1	1	2	3	3	4	3	3
19	6	8	9	9	5	6	4	2	3	4	3	6	6	3	3	4	3	5	6	8	7	7	6	7
20	9	10	9	3	1	-2	-3	-3	-6	-14	-20	-15	-3	2	6	6	0	-3	-4	-9	-13	-9	-7	-3
21	1	3	1	0	-3	-5	-10	-9	-6	-6	-7	-7	-4	-2	4	9	12	17	19	15	13	13	9	11
22	13	13	14	15	13	13	10	8	8	9	10	11	10	12	11	11	11	11	10	9	9	11	17	24
23	26	27	27	24	23	25	30	27	13	12	11	12	15	14	17	18	20	20	22	20	18	12	3	-4
24	0	1	-1	-4	-11	-11	-13	-13	-6	-8	-7	3	1	-5	-6	-9	-15	-22	-31	-31	-38	-45	-47	-40
25	-38	-38	-39	-36	-35	-29	-29	-30	-24	-18	-16	-18	-19	-11	-6	-9	-13	-14	-16	-10	-10	-13	-10	-11
26	-14	-15	-14	-12	-11	-12	-15	-11	-10	-8	-2	0	-1	-1	-3	1	5	7	7	8	9	10	11	11
27	10	10	5	-4	-8	-5	-4	-4	-6	-3	0	2	2	6	6	6	6	8	11	9	8	10	10	8
28	10	12	14	12	11	6	8	9	16	19	17	13	12	12	12	13	13	14	16	17	20	21	19	14
29	14	15	16	14	12	12	10	10	14	17	16	14	10	6	3	1	2	6	9	14	17	17	19	17
30	16	16	25	26	29	41	27	17	19	19	26	23	22	21	16	15	16	15	13	21	20	30	33	30
31	30	33	34	29	21	18	14	18	21	23	16	11	9	2	-8	-18	-25	-26	-16	-9	-7	-8	-13	-13

DAILY MEANS OF EQUATORIAL DST FOR 1990

DAY	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
1	-50	-32	-46	-33	-26	-13	5	-25	-19	10	-12	-14
2	-35	-46	-37	-6	-15	-7	-1	-42	-27	13	-7	-1
3	-38	-28	-22	-22	-20	-2	3	-33	-4	19	4	2
4	-18	-32	-17	-20	-20	2	17	-21	-2	4	3	-21
5	-18	-50	-23	-18	-11	5	-3	-10	-6	-5	11	-14
6	-19	-28	-39	-7	-8	3	6	-10	0	-13	17	-10
7	-13	-51	-21	-6	-2	-24	0	-10	-13	-4	14	-4
8	-7	-38	-16	-3	0	-14	-10	-8	-6	3	1	2
9	-27	-20	-9	-18	-24	-37	1	-3	-6	12	-11	-1
10	-35	-9	-12	-153	-38	-22	16	3	0	-71	-17	4
11	-29	-11	-7	-132	-58	-13	16	-9	-13	-49	-12	9
12	-26	-9	-20	-108	-47	-30	-11	-13	-21	-52	3	15
13	-18	10	-94	-91	-23	-92	-20	-14	-21	-26	9	-23
14	-9	-38	-49	-84	-13	-55	-3	-16	-19	-24	12	-7
15	-1	-34	-27	-65	7	-53	-10	-20	-15	-31	19	-6
16	2	-80	-20	-44	16	-29	4	-32	-19	-25	-22	0
17	-11	-66	0	-72	13	-14	11	-18	-16	-9	-29	7
18	-7	-50	-13	-68	-17	-10	-1	-18	-23	-6	-19	4
19	8	-53	-37	-38	-40	-19	2	-20	-30	-12	-6	5
20	-4	-52	-31	-36	-46	-5	-17	-27	-16	-20	1	-3
21	-23	-39	-106	-50	-29	3	-9	-30	-25	-33	-5	3
22	-28	-31	-74	-33	-63	-7	-3	-76	-20	-11	2	12
23	-23	-51	-62	-66	-53	3	2	-78	-13	3	2	18
24	-34	-69	-40	-74	-29	13	3	-61	-19	-38	3	-15
25	-38	-71	-61	-53	-36	5	17	-30	-4	-18	5	-21
26	-27	-54	-71	-40	-28	2	24	-63	2	-1	1	-3
27	-14	-51	-57	-42	-66	6	12	-45	3	-11	-36	3
28	5	-55	-53	-49	-28	-2	-20	-23	1	-8	-64	14
29	-26	0	-53	-67	-12	5	-96	-11	1	4	-21	12
30	-33	0	-106	-56	-14	3	-32	-25	8	-19	-18	22
31	-36	0	-69	0	-13	0	-31	-25	0	-21	0	6
MEAN	-20	-41	-42	-52	-24	-13	-4	-26	-11	-14	-6	0

ANNUAL MEAN -21

MONTHLY AND YEARLY **Dst** 1957 - 1990 (continued)

Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Annual mean
1957	-19.8	-24.1	-41.3	-27.8	-5.2	-10.0	-11.7	-3.5	-64.0	-14.4	-20.7	-18.5	-21.6
1958	-18.3	-28.1	-32.3	-19.6	-10.8	-22.8	-27.5	-13.8	-24.9	-17.7	-1.1	-18.9	-19.6
1959	-10.5	-31.5	-25.1	-22.6	-14.3	-6.5	-35.6	-32.0	-39.2	-25.3	-35.1	-30.1	-25.6
1960	-17.7	-11.8	-11.5	-58.3	-28.6	-18.2	-20.7	-21.9	-30.8	-53.9	-54.5	-42.3	-30.9
1961	-17.2	-21.5	-13.6	-11.8	-7.0	-6.5	-28.3	-7.2	-8.8	-28.3	-17.5	-10.9	-14.9
1962	-3.1	-5.4	0.5	-7.6	2.1	0.2	1.1	-7.4	-19.6	-17.9	-11.6	-12.3	-6.7
1963	-6.1	-2.2	1.8	2.0	1.1	0.0	1.9	-4.2	-29.5	-23.3	-15.4	-7.9	-6.8
1964	-8.8	-9.2	-9.8	-10.1	-4.0	-0.2	1.9	2.3	-0.3	-6.2	-0.2	5.9	-3.2
1965	5.7	-1.0	0.8	-3.4	5.7	0.3	1.5	2.5	-2.2	5.3	4.6	2.4	1.9
1966	4.2	0.1	-8.2	-1.6	-3.4	0.2	-3.2	-2.1	-25.2	-10.7	-8.1	-13.9	-6.0
1967	-18.6	-19.3	-2.7	-6.1	-32.6	-25.7	-9.7	-5.0	-20.6	-14.1	-11.8	-18.1	-15.3
1968	-20.4	-26.8	-20.8	-13.9	-12.6	-13.0	-5.4	-6.2	-11.8	-16.6	-32.5	-13.7	-16.1
1969	-7.2	-21.6	-29.1	-19.8	-16.3	-2.5	3.6	-0.3	-8.3	-10.8	-4.1	2.3	-9.4
1970	-3.0	0.0	-28.5	-25.8	-10.2	-12.1	-20.4	-21.4	-13.2	-20.1	-21.5	-17.3	-16.2
1971	-15.0	-17.9	-15.0	-26.6	-17.2	-8.7	-3.5	-9.4	-16.8	-15.6	-14.9	-24.2	-15.4
1972	-19.8	-17.9	-16.9	-15.1	-8.2	-16.4	-10.1	-36.4	-22.7	-22.2	-24.2	-9.9	-18.3
1973	-12.8	-20.4	-23.9	-46.3	-17.0	-10.1	-1.2	-2.9	-10.8	-13.7	-7.3	-0.2	-13.8
1974	-4.2	-5.6	-16.3	-13.7	-8.4	-5.7	-26.6	-13.3	-20.8	-23.0	-17.1	-12.0	-13.9
1975	-10.4	-13.4	-18.2	-10.4	-6.3	0.5	-7.0	-9.0	-4.2	-9.9	-21.4	-9.5	-9.9
1976	-12.3	-11.3	-24.1	-24.6	-13.2	-4.4	-5.7	-7.5	-12.2	-16.2	-14.9	-16.1	-13.5
1977	-13.6	-14.6	-10.9	-23.3	-13.7	-3.6	-13.7	-19.3	-23.5	-25.4	-19.4	-22.4	-17.0
1978	-19.4	-26.1	-28.1	-30.8	-34.5	-14.9	-9.2	-12.1	-27.1	-22.7	-27.4	-13.9	-22.1
1979	-28.8	-26.2	-30.4	-33.4	-12.7	-4.3	1.8	-10.8	-19.3	-18.9	-11.6	-2.5	-16.3
1980	-13.1	-18.5	-3.1	-9.4	-6.6	-11.7	-6.6	-4.3	-4.8	-22.2	-18.1	-19.9	-11.5
1981	-8.5	-21.6	-35.0	-43.5	-29.9	-2.9	-21.6	-26.6	-19.9	-42.5	-27.5	-12.5	-24.4
1982	-4.0	-50.0	-18.8	-25.0	-2.7	-12.4	-31.2	-23.5	-47.8	-23.9	-26.0	-20.0	-23.5
1983	-21.2	-38.0	-35.6	-23.2	-18.5	-10.0	-1.8	-9.9	-4.8	-15.7	-17.5	-10.5	-17.1
1984	-7.5	-18.5	-26.0	-24.8	-17.6	-10.7	-9.5	-12.2	-22.6	-22.2	-20.6	-16.4	-17.4
1985	-18.5	-19.6	-9.6	-22.8	-7.7	-6.2	-11.1	-12.0	-14.2	-21.2	-18.5	-28.1	-15.8
1986	-15.5	-44.9	-26.0	-11.4	-12.4	-2.7	-1.7	-10.9	-23.1	-13.5	-18.7	-8.9	-15.6
1987	-4.5	-8.0	-9.0	-4.0	-2.0	-3.6	-5.3	-15.7	-22.3	-27.9	-22.8	-15.8	-11.8
1988	-24.0	-23.1	-19.9	-23.4	-17.7	-7.8	-10.8	-16.7	-19.0	-23.6	-23.4	-29.6	-19.9
1989	-31.7	-24.1	-64.9	-39.7	-23.5	-25.7	0.4	-25.5	-34.0	-29.0	-37.0	-22.0	-29.7
1990	-20.3	-40.6	-41.7	-51.7	-23.8	-13.2	-4.2	-26.3	-11.5	-14.2	-5.7	-0.1	-21.0

Unit : nT

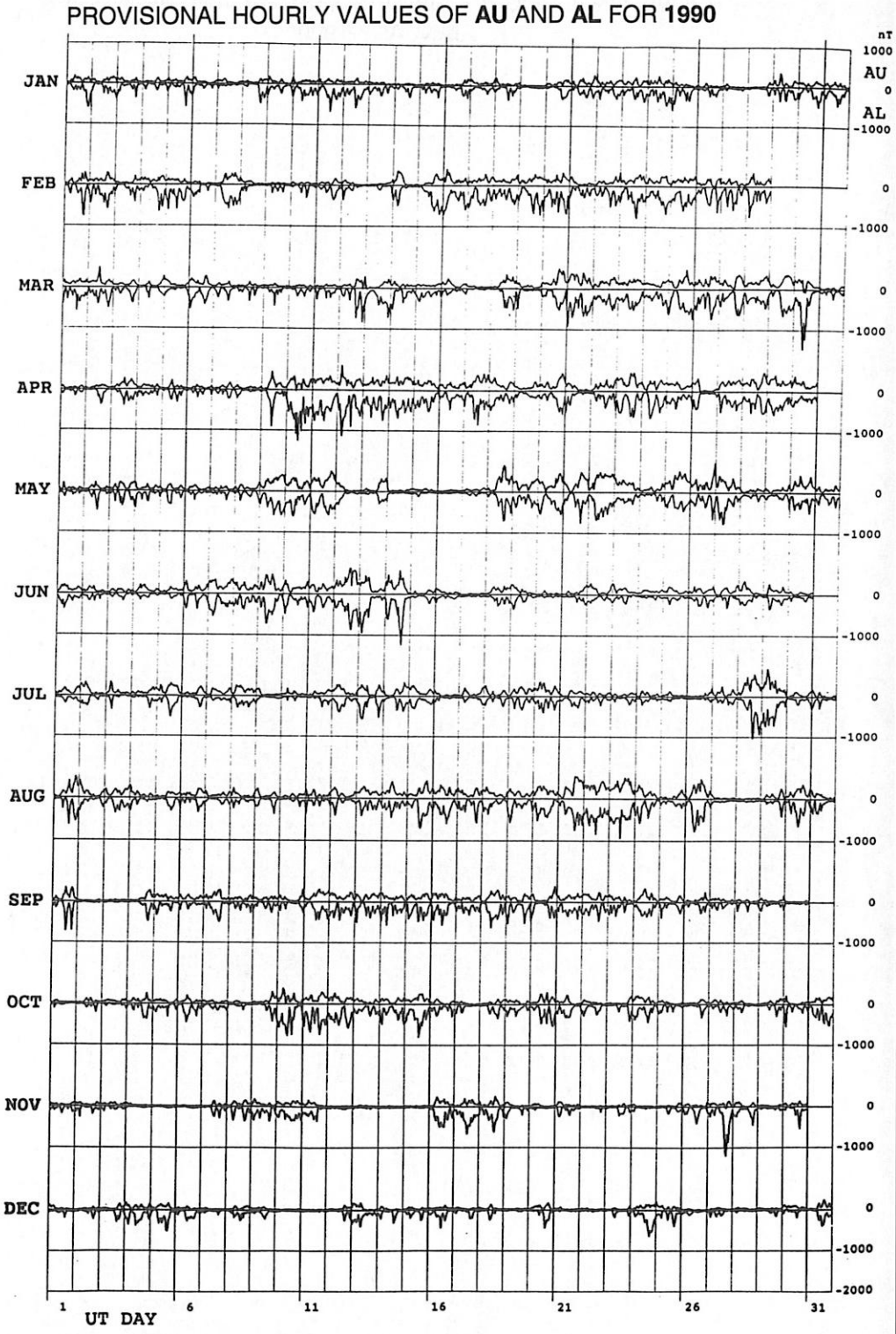
SECTION 3

3.5. AU, AL, AE INDICES

Provisional Hourly Values of **AU** and **AL** for **1990** (graph) 109

Provisional Hourly values of **AU**, **AL** and **AE** indices
Jan - Dec 1990 110

Monthly and yearly mean values of **AE**
Jan 1957 - December 1990 134


PROVISIONAL HOURLY VALUES OF AU AND AL FOR 1990
nT
1000
AU
0
AL
-1000
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
0
-1000
-2000
1
6
11
16
21
26
31
UT DAY

Provisional Hourly Values (nT) of AU, AL and AE Indices JANUARY 1990

DAY\UT		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	MEAN
1	AU	14	11	16	39	79	39	119	194	122	88	138	99	115	66	34	36	84	105	87	86	154	92	30	68	80
	AL	-40	-33	-19	-26	-73	-129	-193	-144	-65	-188	-108	-98	-175	-159	-25	-72	-205	-213	-190	-457	-602	-566	-326	-231	-181
	AE	54	44	35	66	152	169	314	340	189	277	247	198	290	226	60	109	291	319	278	544	758	659	357	301	262
2		74	85	82	47	25	24	24	16	9	18	67	81	49	92	131	57	69	119	129	111	163	126	118	47	73
		-171	-65	-3	-10	-27	-32	-33	-22	-28	-32	-121	-263	-69	-107	-127	-278	-129	-111	-220	-241	-233	-176	-276	-365	-131
		245	152	86	58	52	56	57	39	37	51	189	345	120	199	259	335	200	231	350	354	398	303	396	413	205
3		112	93	64	110	120	49	47	37	31	32	22	26	31	52	54	77	55	122	41	38	29	34	12	17	54
		-277	-173	-209	-65	-11	-42	-83	-68	-58	-58	-33	-31	-31	-126	-175	-45	-84	-355	-87	-25	-46	-21	-19	-26	-89
		389	267	274	176	133	92	131	105	90	91	56	58	63	178	229	122	141	479	129	63	76	56	31	43	145
4		18	24	39	40	40	32	37	42	32	25	33	42	72	122	119	68	28	42	38	42	40	58	73	102	50
		-58	-63	-162	-68	-24	-8	-16	-29	-20	-8	-51	-45	-151	-177	-117	-27	-35	-47	-49	-31	-22	-21	-73	-190	-62
		77	88	201	109	65	41	54	72	53	35	85	88	225	299	237	96	64	90	88	75	63	80	148	293	114
5		125	78	56	42	69	58	84	99	65	48	51	41	58	46	52	22	114	137	174	71	105	84	65	99	77
		-126	-75	-15	-8	-26	-61	-74	-104	-15	-72	-81	-95	-48	-17	-26	-60	-337	-569	-187	-44	-141	-246	-201	-294	-122
		251	154	72	51	96	121	159	204	81	121	133	138	107	64	79	83	453	708	362	116	246	330	267	393	200
6		101	148	140	66	48	36	50	36	34	34	43	35	31	19	5	8	4	5	18	24	54	48	73	87	48
		-237	-107	-34	-22	-24	-23	-40	-42	-47	-43	-128	-104	-53	-23	-22	-30	-39	-44	-131	-32	-23	-29	-26	-41	-56
		339	256	176	89	73	60	91	78	81	77	171	140	85	43	28	39	44	50	150	58	78	79	100	129	105
7		72	70	76	60	53	108	107	100	36	36	36	32	26	22	10	6	2	1	8	20	42	35	55	36	44
		-126	-35	-37	-36	-68	-11	-57	-70	-45	-23	-30	-54	-47	-21	-16	-18	-20	-37	-41	-30	-16	-15	-12	-14	-37
		199	106	114	97	122	120	165	171	83	59	67	87	75	44	28	26	23	39	51	52	60	51	68	51	82
8		46	35	36	45	60	57	25	29	25	17	18	23	26	25	27	27	107	107	55	72	100	79	114	85	52
		-17	-48	-63	-52	-83	-27	-8	-7	-10	-10	-16	-16	-20	-24	-17	-62	-393	-489	-244	-211	-354	-345	-209	-75	-117
		64	83	99	98	145	86	33	36	36	28	35	40	47	50	45	90	502	598	300	284	455	426	325	161	169
9		57	175	121	74	43	70	56	58	30	25	26	54	110	106	47	19	19	11	16	6	6	13	50	170	57
		-281	-176	-83	-78	-76	-111	-139	-76	-40	-53	-47	-135	-225	-240	-83	-64	-46	-54	-30	-33	-38	-34	-129	-297	-107
		339	352	204	153	121	182	196	135	71	78	74	190	335	347	131	83	66	65	47	40	44	49	179	468	165
10		94	22	21	22	48	44	55	55	90	71	76	116	69	90	71	98	16	52	79	62	57	66	78	114	65
		-201	-69	-55	-23	-99	-106	-93	-207	-414	-232	-144	-301	-238	-272	-265	-212	-74	-137	-290	-185	-103	-115	-238	-276	-181
		296	92	77	46	148	151	149	262	505	304	220	417	307	363	337	312	92	190	370	248	161	183	316	390	247
11		68	131	32	47	37	62	52	92	103	139	88	71	79	53	41	26	74	133	103	86	76	98	45	29	74
		-123	-136	-51	-37	-45	-85	-122	-189	-338	-260	-296	-674	-513	-221	-98	-206	-343	-390	-262	-205	-314	-224	-89	-105	-222
		191	268	84	85	83	148	175	281	442	400	385	746	593	275	140	233	418	525	367	292	390	322	135	134	296
12		57	44	64	34	70	52	64	80	54	42	84	119	157	69	45	35	59	36	51	63	94	67	48	60	64
		-279	-296	-143	-106	-237	-252	-137	-174	-104	-54	-145	-588	-491	-270	-311	-386	-359	-251	-191	-102	-136	-99	-58	-138	-221
		336	341	207	141	308	305	202	255	159	97	229	707	649	341	358	422	420	288	242	166	231	167	107	198	286
13		51	41	47	39	20	42	54	48	18	29	54	40	56	50	18	8	17	22	10	14	12	23	24	17	31
		-245	-191	-155	-102	-60	-62	-113	-165	-78	-106	-270	-277	-193	-77	-37	-39	-189	-211	-41	-38	-36	-36	-73	-79	-120
		297	232	203	142	80	105	168	214	97	136	324	317	250	127	56	48	207	235	52	53	49	60	97	97	152
14		11	19	31	22	15	9	20	19	16	30	31	32	42	43	25	22	38	17	14	11	7	10	12	19	22
		-44	-53	-107	-82	-20	-19	-20	-38	-77	-64	-168	-111	-75	-275	-302	-169	-65	-33	-31	-38	-38	-39	-27	-26	-80
		56	73	139	105	37	29	41	59	95	95	200	144	117	318	328	192	104	51	47	50	46	50	40	46	103
15		18	24	27	12	19	66	47	62	36	31	43	68	69	34	36	33	53	60	21	23	18	11	8	15	35
		-20	-30	-105	-30	-53	-190	-91	-39	-55	-34	-160	-171	-79	-64	-133	-97	-185	-310	-88	-21	-31	-32	-27	-16	-86
		39	54	132	42	73	256	139	102	92	67	204	239	149	99	170	131	240	371	110	46	51	45	36	31	122

PROVISIONAL HOURLY VALUES OF AU, AL AND AE INDICES
JANUARY 1990

16	15	18	20	22	16	15	31	18	14	22	40	31	23	30	33	25	47	106	163	86	91	177	155	135	55
	-14	-11	-14	-11	-12	-31	-36	-30	-57	-62	-108	-64	-55	-50	-32	-39	-230	-263	-243	-93	-209	-314	-88	-84	-90
	29	30	34	34	29	48	68	48	72	86	149	96	80	80	66	65	279	371	408	180	300	492	243	220	146
17	169	138	96	95	71	70	89	39	37	60	54	57	64	60	115	29	82	44	35	65	53	66	112	189	79
	-90	-115	-49	-69	-3	-12	-34	-8	-46	-36	-44	-92	-61	-48	-99	-122	-214	-119	-73	-69	-49	-28	-93	-154	-72
	260	254	146	165	74	83	125	47	85	96	100	150	125	109	214	152	298	165	109	135	103	94	206	344	152
18	201	114	86	32	33	30	50	40	26	31	35	66	44	37	33	13	15	16	52	78	36	60	91	57	53
	-124	-73	-51	-64	-7	-6	-26	-29	-16	-41	-42	-177	-363	-103	-34	-119	-252	-98	-159	-101	-39	-34	-57	-50	-86
	325	188	137	97	42	37	77	70	44	73	78	244	408	140	68	133	268	115	213	181	76	95	148	108	140
19	17	9	24	27	22	18	17	19	19	21	19	15	16	16	17	14	10	12	16	16	19	14	22	40	18
	-17	-14	-8	-6	-8	-8	-8	-10	-23	-21	-21	-20	-25	-34	-25	-32	-42	-39	-35	-39	-40	-31	-28	-29	-23
	35	24	33	33	30	27	26	30	44	44	42	36	42	51	43	47	52	52	52	56	60	46	51	70	43
20	62	60	76	64	32	33	28	74	49	41	101	111	103	117	38	53	137	162	172	115	174	105	60	79	85
	-30	-33	-23	-3	-3	0	1	-16	-20	-28	-32	-72	-66	-57	-307	-331	-265	-284	-260	-244	-138	-76	-96	-60	-102
	93	94	100	68	36	33	27	91	70	69	134	184	169	175	345	385	403	447	434	360	312	182	157	140	188
21	61	145	57	28	28	36	63	166	178	133	221	90	109	52	53	92	91	49	48	112	151	287	227	160	110
	-57	-83	-2	-11	-12	-25	-130	-213	-210	-131	-177	-72	-173	-272	-278	-204	-46	-32	-65	-215	-299	-211	-126	-122	-132
	120	229	59	40	40	61	194	380	390	264	399	163	283	325	332	297	139	82	113	328	451	498	353	282	243
22	152	121	37	44	126	68	51	45	135	109	91	103	162	107	56	35	69	93	147	128	166	173	163	155	106
	-122	-87	-317	-199	-49	-19	-36	-98	-93	-78	-165	-51	-79	-39	-39	-136	-222	-253	-320	-174	-199	-216	-107	-80	-132
	275	208	355	243	176	88	88	144	230	188	257	155	241	146	95	172	292	348	469	303	365	390	270	235	239
23	112	70	71	85	146	140	116	101	57	67	138	175	243	184	65	35	34	50	102	166	144	136	166	66	111
	-63	-214	-136	-94	-63	-45	-90	-72	-30	-20	-149	-301	-290	-124	-238	-133	-70	-68	-129	-285	-388	-348	-159	-184	-154
	176	284	208	180	210	187	207	174	87	88	288	477	534	309	305	169	105	119	233	453	533	485	326	251	266
24	132	53	179	100	90	102	176	120	77	152	274	179	114	89	67	37	152	156	93	197	132	105	114	29	122
	-199	-212	-71	-82	-44	-223	-112	-65	-168	-376	-277	-140	-284	-201	-105	-123	-269	-468	-486	-359	-236	-401	-254	-580	-239
	333	265	251	182	134	326	288	186	246	529	552	319	399	290	174	162	422	625	580	558	368	507	369	609	361
25	48	105	129	62	60	43	56	80	70	52	38	82	85	38	60	45	36	26	33	8	10	27	53	30	53
	-335	-420	-178	-15	-49	-81	-220	-115	-24	-63	-92	-219	-347	-111	-284	-345	-208	-97	-56	-32	-20	-30	-28	-35	-142
	384	525	308	78	110	124	276	196	94	116	132	302	433	150	346	391	245	125	91	41	30	57	82	66	196
26	49	19	13	14	23	29	56	119	88	11	43	46	53	28	29	32	17	53	22	18	25	29	29	41	37
	-58	-37	-27	-25	-44	-58	-74	-43	-20	-17	-128	-227	-49	-41	-189	-176	-149	-241	-135	-51	-41	-36	-58	-38	-82
	107	57	41	40	69	88	132	163	109	29	172	273	103	70	220	210	167	295	159	71	67	66	87	80	120
27	58	42	58	105	71	45	28	21	21	20	20	10	19	13	13	8	3	10	18	17	7	6	9	5	26
	-19	-18	-22	-76	-11	-7	-4	-11	-14	-21	-27	-30	-35	-34	-32	-35	-37	-39	-87	-43	-19	-19	-18	-19	-28
	78	60	80	181	82	53	32	33	36	42	47	41	55	48	46	44	40	50	106	61	27	26	28	25	55
28	4	6	11	8	11	11	14	20	19	16	17	18	15	20	26	20	14	22	49	83	144	70	91	87	33
	-24	-21	-14	-10	-2	-3	-3	-2	-5	-10	-15	-19	-23	-24	-23	-27	-33	-30	-83	-199	-189	-39	-26	-20	-35
	29	29	26	19	14	16	18	23	25	27	32	38	39	46	50	47	48	53	133	284	335	111	118	107	69
29	156	194	77	58	65	96	361	322	88	58	39	116	106	74	37	34	41	21	64	173	178	141	120	110	114
	-65	-179	-13	-22	-40	-109	-358	-114	-34	-34	-46	-301	-342	-79	-35	-65	-132	-68	-86	-192	-300	-297	-270	-125	-138
	222	373	90	81	105	206	720	438	123	92	85	417	449	153	74	100	174	90	152	367	480	439	391	236	252
30	134	134	102	136	114	73	44	49	123	83	49	38	62	74	102	143	178	123	125	109	90	85	65	78	96
	-283	-129	-107	-85	7	-17	-29	-39	-102	-50	-24	-49	-97	-277	-239	-263	-187	-376	-509	-319	-347	-65	-153	-125	-161
	418	263	210	222	107	91	74	90	227	133	74	89	160	352	342	408	366	499	635	430	439	151	219	204	258
31	91	85	139	110	62	36	80	79	101	118	176	101	83	57	81	147	79	55	77	103	47	33	39	33	84
	-162	-259	-173	-90	-53	-44	-90	-64	-143	-136	-199	-160	-304	-460	-250	-378	-268	-154	-129	-199	-66	-22	-23	-20	-160
	253	345	313	201	116	81	171	144	245	255	376	263	388	518	333	527	349	210	207	303	114	55	63	54	245

Provisional Hourly Values (nT) of AU, AL and AE Indices FEBRUARY 1990

DAY\UT		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	MEAN
1	AU	30	26	17	33	80	101	144	52	22	26	25	73	62	150	123	66	274	132	129	300	173	65	53	115	95
	AL	-21	-38	-19	-16	-181	-241	-40	-6	-8	-11	-17	-130	-234	-212	-150	-100	-239	-730	-768	-326	-109	-16	-91	-202	-163
	AE	52	64	37	50	263	344	185	59	32	37	43	204	297	363	274	167	515	863	899	627	282	82	144	317	258
2	AU	101	102	106	60	124	133	134	80	76	120	132	99	67	102	78	186	302	284	174	109	143	138	104	70	126
	AL	-462	-347	-91	-15	-109	-268	-131	-35	-96	-276	-271	-233	-322	-467	-222	-364	-573	-576	-246	-240	-172	-254	-64	-103	-247
	AE	564	450	198	76	234	402	267	117	174	397	405	333	391	570	302	551	877	862	421	349	316	392	169	173	375
3	AU	63	50	51	37	25	18	28	36	25	26	47	29	19	23	28	35	29	93	212	127	79	113	88	146	59
	AL	-163	-68	-7	-6	-8	-9	-7	-11	-20	-52	-106	-112	-64	-94	-290	-177	-101	-262	-428	-169	-44	-99	-167	-122	-108
	AE	226	120	58	44	33	28	36	48	46	79	153	141	83	118	319	213	131	357	642	297	125	212	256	269	168
4	AU	172	119	106	178	124	98	134	125	41	50	76	105	106	93	63	77	180	90	176	196	205	195	97	82	120
	AL	-101	-114	-178	-79	-51	-64	-76	-21	-2	-8	-17	-113	-82	-80	-113	-172	-252	-656	-466	-248	-556	-406	-134	-146	-172
	AE	274	235	284	258	177	163	211	148	44	59	94	220	189	174	176	250	434	746	643	444	761	602	231	229	294
5	AU	83	111	152	99	110	128	120	104	89	127	91	131	77	40	44	47	72	137	77	47	39	49	32	27	85
	AL	-314	-427	-617	-147	-121	-183	-253	-117	-278	-304	-602	-332	-106	-145	-207	-348	-408	-400	-352	-94	-44	-94	-139	-122	-256
	AE	398	539	770	247	233	313	375	223	368	432	694	464	184	185	253	396	481	538	430	142	84	143	171	150	342
6	AU	34	31	35	59	67	50	35	40	67	18	14	11	15	12	7	20	34	34	26	23	20	17	17	15	29
	AL	-149	-184	-303	-302	-194	-251	-152	-148	-202	-14	-13	-13	-21	-15	-21	-56	-163	-51	-16	-15	-7	-9	-16	-20	-97
	AE	184	216	339	362	263	302	189	190	270	33	28	25	38	28	28	78	199	86	43	39	28	27	34	35	128
7	AU	14	15	28	20	35	43	61	100	254	261	112	124	198	177	197	279	221	184	296	202	193	89	67	170	139
	AL	-22	-37	-44	-17	-34	-121	-260	-342	-419	-479	-489	-434	-599	-314	-284	-312	-459	-539	-325	-396	-504	-410	-399	-248	-312
	AE	37	54	73	38	71	166	322	443	675	741	603	559	798	493	482	592	681	724	622	598	698	500	466	418	452
8	AU	132	84	71	53	44	61	73	79	64	83	67	43	29	20	13	16	17	15	15	10	17	10	7	9	43
	AL	-122	-65	-163	-63	-34	-179	-69	-47	-34	-40	-21	-43	-22	-19	-18	-12	-14	-15	-15	-10	-9	-11	-14	-14	-44
	AE	254	149	235	117	79	241	144	127	99	125	90	88	52	40	32	30	32	31	31	21	27	22	23	24	88
9	AU	10	13	16	17	16	19	59	34	29	19	32	47	36	25	34	27	39	33	32	18	17	22	18	26	27
	AL	-16	-17	-14	-21	-7	-29	-209	-76	-28	-45	-85	-166	-72	-21	-44	-111	-185	-14	-11	-7	-5	-7	-15	-19	-51
	AE	28	32	32	39	24	49	269	112	58	65	118	214	109	47	79	140	225	49	45	26	23	30	35	47	79
10	AU	46	65	55	32	29	27	24	35	44	70	45	25	26	62	54	75	47	53	32	27	41	35	41	27	42
	AL	-34	-44	-9	-1	-1	-1	-1	-53	-73	-199	-30	-8	-27	-33	-308	-211	-38	3	-1	-11	-23	-16	-65	-19	-50
	AE	81	110	65	35	31	29	27	90	118	270	77	34	54	96	364	287	85	50	34	39	66	51	107	46	94
11	AU	34	29	36	40	76	67	58	52	36	69	60	81	25	24	34	44	98	164	168	100	80	47	82	41	64
	AL	-18	-34	-37	-56	-106	-79	-35	-41	-49	-188	-159	-107	-29	-20	-149	-292	-363	-318	-242	-123	-113	-24	-84	-52	-113
	AE	53	64	74	97	183	148	94	95	87	257	220	188	55	45	185	338	462	484	412	224	193	72	167	93	179
12	AU	48	98	130	126	68	68	65	38	36	57	64	33	19	20	18	14	17	13	13	14	14	14	15	17	42
	AL	-31	-361	-201	-55	-100	-69	-30	-60	-104	-119	-126	-24	-10	-13	-61	-26	-22	-19	-15	-7	-1	-1	-7	-13	-62
	AE	81	460	332	183	170	138	96	100	141	177	191	58	31	35	80	41	40	34	29	22	17	17	23	31	105
13	AU	14	13	16	20	18	18	20	19	19	22	37	31	39	34	28	28	32	49	47	57	68	62	91	153	39
	AL	-8	-8	-3	-24	-1	-7	-24	-3	-5	-40	-100	-119	-95	-29	-16	-21	-19	-33	-11	-5	3	3	-60	-317	-39
	AE	22	22	20	45	19	26	44	22	25	62	137	151	135	64	46	50	52	82	59	63	65	59	151	470	79
14	AU	46	115	126	209	358	319	326	291	251	175	64	31	16	18	11	15	13	19	13	11	11	29	25	21	105
	AL	-368	-221	-105	-321	-507	-423	-172	-64	-47	-30	-32	-43	-65	-37	-25	-23	-22	-25	-29	-21	-22	-28	-20	-23	-111
	AE	415	336	232	531	865	743	498	355	299	206	96	75	82	56	37	39	36	44	43	33	34	58	47	45	217
15	AU	11	10	8	6	11	19	55	55	63	65	68	55	44	59	67	206	279	286	234	147	167	130	190	138	99
	AL	-29	-25	-24	-25	-79	-109	-155	-124	-143	-151	-285	-154	-152	-486	-517	-632	-516	-484	-342	-553	-715	-642	-499	-617	-311
	AE	41	36	33	32	91	129	212	180	207	216	354	210	196	547	585	840	797	771	577	701	882	773	690	755	411

PROVISIONAL HOURLY VALUES OF AU, AL AND AE INDICES
FEBRUARY 1990

16	219	86	189	406	265	332	244	146	107	87	52	74	150	76	160	129	71	123	99	111	184	192	47	42	150
	-723	-612	-599	-469	-354	-250	-218	-101	-186	-148	-147	-161	-276	-303	-383	-311	-122	-254	-215	-146	-532	-606	-483	-431	-335
	944	698	789	876	620	583	463	248	294	236	200	236	427	380	545	441	194	379	315	258	716	798	530	473	485
17	124	96	106	70	133	139	126	95	102	176	195	106	169	146	150	193	296	217	99	64	105	177	224	199	146
	-545	-467	-257	-240	-308	-97	-22	-55	-111	-409	-365	-489	-424	-405	-318	-486	-484	-343	-65	-63	-197	-368	-378	-200	-296
	669	564	363	311	443	238	150	152	215	586	560	596	595	552	470	680	781	561	165	128	303	545	603	399	443
18	180	113	94	115	122	128	122	92	132	175	115	104	90	98	87	71	84	168	179	136	165	185	273	165	133
	-96	-166	-336	-192	-179	-90	-77	-277	-208	-196	-90	-256	-349	-247	-88	-72	-209	-309	-411	-331	-465	-404	-207	-258	-230
	277	280	430	308	302	219	200	370	342	371	205	361	440	346	176	144	294	478	591	468	630	589	481	423	364
19	73	49	119	153	88	134	59	77	104	164	192	112	106	206	176	305	226	218	189	240	192	225	177	159	156
	-361	-204	-205	-14	-20	-62	-54	-134	-129	-245	-194	-217	-344	-593	-679	-348	-204	-160	-404	-474	-718	-439	-342	-624	-299
	434	255	324	168	110	197	114	212	235	411	387	331	451	801	857	654	432	380	595	715	910	665	519	783	456
20	158	175	79	179	129	97	93	123	138	175	109	292	145	169	120	76	166	334	246	231	199	163	142	125	161
	-271	-250	-252	-167	-64	-113	-271	-514	-304	-397	-454	-123	-151	-647	-437	-127	-176	-337	-305	-509	-676	-687	-232	-314	-324
	430	425	332	347	194	212	364	639	444	573	563	416	297	817	558	204	343	673	552	740	875	851	375	440	486
21	203	247	198	137	78	103	68	44	29	42	31	34	32	45	37	38	19	56	84	50	58	48	49	34	73
	-263	-149	-42	-42	-60	-105	-14	-21	-29	-108	-222	-240	-78	-287	-280	-140	-30	-105	-228	-231	-86	-67	-64	-40	-122
	467	397	241	180	138	209	83	66	59	151	254	275	111	333	318	179	50	162	314	283	145	115	114	74	197
22	42	52	87	130	119	87	82	137	115	53	72	60	68	85	101	97	64	133	186	266	144	108	158	344	116
	-142	-232	-212	-187	-15	-82	-253	-206	-96	-4	-39	-107	-122	-215	-519	-395	-124	-111	-224	-484	-412	-305	-216	-388	-212
	185	285	299	317	135	169	337	344	212	58	111	167	191	301	621	494	190	245	410	750	557	413	375	732	329
23	113	101	165	134	68	59	125	136	153	166	148	140	80	179	221	219	205	283	301	155	195	273	161	70	160
	-315	-123	-143	-72	-11	-13	-109	-334	-218	-253	-129	-419	-370	-377	-723	-788	-302	-300	-375	-184	-179	-386	-366	-345	-285
	429	225	309	207	81	73	235	471	372	420	278	561	451	558	945	1008	508	584	677	341	375	659	527	416	446
24	102	80	215	196	149	153	92	106	78	133	161	91	106	98	248	260	233	243	246	279	129	89	98	41	151
	-231	-267	-250	-219	-103	-133	-94	-224	-195	-299	-171	-89	-318	-263	-384	-463	-363	-441	-536	-683	-428	-422	-338	-359	-303
	334	347	467	416	253	288	186	331	274	433	333	181	425	362	633	724	597	686	783	963	557	511	436	401	455
25	54	157	152	94	138	168	210	171	128	200	104	148	256	173	187	116	104	222	180	218	169	184	273	233	168
	-391	-291	-294	-347	-175	-138	-129	-116	-98	-291	-455	-590	-455	-371	-489	-308	-170	-388	-391	-450	-320	-256	-313	-191	-309
	445	448	447	442	314	307	340	289	227	493	560	740	713	546	678	425	275	611	571	669	490	441	587	424	478
26	84	104	84	96	41	59	96	73	70	109	206	200	157	217	82	41	15	17	14	170	178	219	213	75	109
	-159	-150	-55	-112	-163	-51	-15	-5	-30	-206	-304	-416	-439	-448	-202	-52	-29	-15	-22	-238	-630	-380	-235	-288	-194
	243	255	140	210	204	111	112	79	101	316	512	617	597	666	286	94	45	33	37	409	809	600	449	363	304
27	131	99	143	83	77	95	176	223	115	63	119	104	128	159	144	48	27	43	75	85	79	37	43	78	99
	-170	-111	-82	-19	-38	-317	-483	-120	-69	-56	-173	-584	-405	-356	-418	-65	-20	-72	-154	-214	-69	-21	-29	-62	-171
	301	210	226	103	116	413	660	344	186	119	293	689	534	516	564	115	48	116	229	300	149	59	72	141	271
28	79	69	106	131	258	190	347	186	66	47	174	80	68	147	77	67	65	61	98	159	170	224	127	98	129
	-60	-48	-220	-746	-513	-428	-407	-242	-73	-115	-361	-79	-108	-337	-172	-100	-138	-66	-235	-409	-307	-238	-173	-98	-236
	139	117	327	878	772	619	756	429	139	163	536	160	177	485	250	168	204	127	333	569	478	463	301	197	366

Provisional Hourly Values (nT) of AU, AL and AE Indices MARCH 1990

DAY\UT		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	MEAN
1	AU	111	169	76	100	88	62	61	61	113	130	134	65	111	144	109	181	202	103	116	97	135	91	179	121	115
	AL	-399	-137	-29	-76	-297	-139	-27	-66	-151	-234	-92	-89	-184	-565	-199	-338	-366	-229	-239	-218	-256	-142	-216	-182	-203
	AE	510	307	106	177	386	203	89	128	266	365	228	154	296	709	309	520	569	332	356	315	392	233	396	304	319
2		87	113	104	137	143	124	129	115	139	271	484	223	75	74	65	51	47	122	119	176	160	107	118	69	135
		-18	-88	-171	-107	-84	-219	-244	-100	-242	-411	-316	-101	-55	-136	-192	-152	-84	-223	-377	-497	-380	-272	-49	-63	-191
		105	202	276	244	228	343	373	216	383	683	801	326	131	211	258	204	132	345	497	673	540	379	168	132	327
3		48	62	42	42	42	65	62	76	77	66	39	29	48	38	32	54	70	130	147	139	89	51	35	26	64
		-29	-54	-111	-26	-22	-112	-170	-156	-49	-96	-8	-19	-63	-49	-134	-104	-200	-364	-382	-193	-167	-104	-14	-15	-110
		78	117	153	69	65	179	253	233	128	162	48	49	112	88	167	159	270	495	530	333	258	156	50	43	175
4		19	18	18	16	25	20	23	59	75	127	64	20	26	17	15	17	19	24	43	61	71	151	170	266	57
		-14	-10	-11	-9	-5	-3	-2	-127	-146	-277	-55	-18	-25	-27	-27	-21	-20	-23	-47	-115	-130	-155	-183	-210	-69
		35	29	29	26	30	24	25	187	223	405	120	39	52	45	43	40	40	48	91	177	203	307	354	477	127
5		177	185	160	148	122	114	46	53	60	54	59	35	27	35	27	29	32	38	32	27	26	74	84	95	72
		-220	-124	-130	-81	-73	-66	-33	-56	-57	-37	-77	-57	-21	-20	-8	-42	-33	-24	-23	-18	-16	-44	-93	-202	-65
		397	310	290	231	196	181	80	110	118	93	137	93	49	56	36	73	66	64	56	46	43	118	178	298	138
6		155	162	224	175	172	118	104	84	157	85	64	83	65	54	125	263	265	184	70	69	56	42	29	25	118
		-193	-509	-377	-290	-260	-254	-176	-117	-154	-92	-17	-156	-149	-217	-311	-418	-333	-261	-133	-92	-39	-23	-14	-28	-192
		349	672	602	466	432	372	280	203	312	179	83	241	215	273	437	683	599	445	203	162	95	66	44	54	311
7		28	28	45	67	89	89	41	24	61	44	69	73	78	89	149	43	27	17	29	38	14	20	29	49	52
		-35	-69	-98	-206	-248	-133	-22	-13	-40	-8	-89	-84	-137	-333	-299	-77	-68	-58	-26	-44	-14	-10	-10	-39	-90
		64	97	144	275	338	223	63	38	102	53	159	159	217	423	449	120	95	76	56	82	29	31	40	89	143
8		45	21	31	43	20	20	27	41	43	68	142	59	37	46	31	80	56	26	24	24	29	34	58	34	43
		-125	-66	-64	-132	-79	-22	-12	-30	-75	-53	-335	-139	-27	-36	-44	-221	-134	-23	-10	-12	-9	-8	-31	-18	-71
		171	88	95	177	100	42	40	72	119	123	478	199	64	84	76	302	191	49	35	37	39	43	89	53	115
9		47	46	45	31	39	55	56	53	42	59	99	62	32	42	18	34	28	29	32	28	24	52	25	22	42
		-18	-19	-16	-22	-44	-119	-102	-47	-128	-122	-441	-88	-56	-176	-62	-48	-130	-41	-11	-5	-2	-35	-14	-18	-74
		66	66	62	54	84	176	159	102	172	182	542	151	89	220	81	83	159	71	45	34	28	88	41	41	117
10		23	19	30	34	24	35	54	46	61	62	41	52	58	64	45	26	26	19	30	68	55	28	23	24	39
		-19	-14	-35	-53	-6	-25	-88	-207	-169	-109	-35	-50	-89	-131	-214	-105	-28	-32	-36	-106	-80	-13	-15	-17	-70
		43	33	65	88	30	61	143	254	232	172	76	104	148	196	261	131	55	52	67	175	136	43	39	42	110
11		29	30	59	40	34	37	40	36	35	47	70	93	44	52	51	62	42	59	71	74	49	32	30	39	48
		-20	-62	-278	-139	-19	-30	-26	-13	-9	-9	-83	-256	-70	-83	-76	-239	-150	-108	-123	-116	-27	-26	-13	-23	-83
		50	93	338	180	54	69	67	50	45	58	154	350	115	137	128	302	193	167	195	190	77	60	44	63	132
12		32	27	56	64	88	69	63	67	79	89	41	30	31	38	47	229	197	213	152	140	198	-29	68	282	95
		-23	-38	-170	-195	-189	-32	-16	-33	-123	-299	-95	-28	-16	-22	-37	-735	-489	-488	-101	-80	-307	-836	-489	-401	-218
		55	65	227	260	278	102	80	101	202	390	137	59	48	62	85	964	686	701	254	221	506	806	558	684	314
13		32	-26	-15	12	25	1	14	8	10	7	23	16	12	51	72	83	110	160	149	138	124	232	167	88	62
		-249	-170	-126	-121	-64	-70	-49	-66	-94	-125	-178	-185	-414	-369	-197	-302	-386	-379	-327	-341	-385	-720	-550	-376	-260
		282	142	109	133	90	71	64	75	105	134	203	202	427	421	269	385	497	540	477	480	509	952	718	465	323
14		76	87	157	160	78	98	62	35	27	34	89	98	81	29	75	108	54	61	76	80	45	68	64	44	74
		-413	-512	-257	-67	-46	-63	-67	-43	-20	-31	-56	-355	-230	-246	-206	-96	-78	-69	-106	-122	-24	-46	-108	-125	-141
		490	599	414	228	125	162	130	80	48	66	146	454	313	276	282	205	132	131	182	203	71	114	172	170	216
15		75	103	91	79	55	77	89	81	73	65	69	74	72	57	65	64	84	44	60	102	83	118	107	116	79
		-187	-217	-295	-312	-181	-94	-228	-204	-187	-103	-89	-76	-77	-169	-204	-127	-119	-103	-75	-166	-65	-39	-67	-198	-149
		262	321	387	393	237	172	318	287	262	169	159	151	151	227	270	192	203	148	135	268	148	158	175	315	230

PROVISIONAL HOURLY VALUES OF **AU**, **AL** AND **AE** INDICES
MARCH 1990

16	119	165	116	89	111	158	238	183	152	121	96	78	68	27	34	37	27	28	31	61	90	111	89	113	98
	-190	-63	-68	-34	-63	-156	-151	-102	-99	-94	-44	-34	-31	-35	-78	-55	-41	-22	-14	-35	-47	-84	-98	-146	-74
	309	229	185	124	175	315	389	286	252	216	141	114	100	63	113	93	68	51	46	97	137	196	188	261	173
17	76	53	44	50	44	41	52	62	34	33	27	25	26	33	44	27	22	25	25	28	29	33	34	31	37
	-55	-19	-14	-12	-19	-23	-14	-12	1	-2	-5	-13	-24	-25	-23	-27	-30	-33	-28	-18	-8	-7	-12	-14	-18
	132	73	58	62	64	65	67	76	33	36	33	39	52	59	68	56	53	59	54	47	39	41	47	46	57
18	29	27	40	49	33	32	35	71	137	152	151	217	142	161	340	251	215	227	173	191	285	176	113	192	143
	-18	-18	-20	-15	-10	-9	-11	-32	-87	-43	-52	-147	-470	-276	-474	-467	-220	-184	-222	-256	-325	-536	-414	-84	-183
	48	45	60	64	44	41	48	105	224	195	204	366	614	438	816	719	436	411	395	448	611	713	528	277	327
19	145	99	144	72	34	33	37	52	54	46	93	58	45	76	69	44	19	19	30	21	36	44	40	129	60
	-100	-477	-184	-34	-15	-6	-29	-38	-44	-49	-53	-37	-33	-33	-32	-54	-28	-30	-30	-22	-29	-34	-38	-97	-64
	246	577	328	106	49	40	68	91	98	96	147	96	79	110	103	99	47	49	61	45	66	79	80	227	124
20	162	140	124	155	133	137	100	106	98	165	248	180	92	137	337	492	444	394	341	444	384	167	151	182	221
	-198	-170	-160	-173	-45	-32	-10	-51	-22	-50	-213	-162	-213	-311	-453	-472	-520	-315	-367	-361	-267	-127	-37	-456	-216
	360	311	285	329	179	170	110	159	120	215	463	344	306	449	792	966	966	710	708	805	651	294	189	639	438
21	171	236	331	379	339	370	209	356	345	295	156	139	80	129	400	357	213	220	136	257	273	150	79	20	235
	-911	-469	-317	-380	-695	-661	-483	-189	-335	-251	-470	-213	-90	-129	-536	-670	-540	-399	-644	-564	-555	-504	-309	-390	-446
	1083	705	649	760	1035	1032	694	546	681	547	627	354	171	259	937	1028	754	619	780	822	828	654	388	410	682
22	39	130	116	88	67	74	200	142	206	159	129	183	184	140	113	88	238	237	228	295	264	129	195	132	157
	-206	-158	-261	-239	-154	-197	-147	-209	-270	-329	-239	-296	-395	-275	-185	-110	-321	-444	-524	-368	-476	-279	-209	-198	-270
	246	289	379	329	222	272	349	352	477	489	369	480	580	416	300	199	560	682	753	663	741	409	404	331	429
23	100	165	118	166	102	180	143	113	96	186	237	171	167	158	260	168	187	240	226	188	220	165	112	141	167
	-242	-281	-238	-208	-314	-268	-236	-121	-123	-287	-452	-488	-453	-282	-525	-422	-296	-404	-340	-319	-288	-173	-50	-161	-290
	342	446	357	375	417	448	380	235	220	475	691	660	622	441	786	591	484	644	567	508	508	339	164	303	459
24	140	132	159	140	142	126	127	108	131	111	102	87	65	108	68	45	64	148	201	157	171	192	219	229	132
	-204	-167	-136	-170	-208	-149	-213	-291	-241	-191	-152	-59	-44	-215	-225	-123	-106	-182	-390	-380	-279	-246	-391	-609	-224
	345	299	295	311	350	277	340	400	374	304	255	148	111	325	294	169	171	331	591	537	450	438	611	839	357
25	187	187	199	154	60	44	34	55	115	237	234	164	152	227	315	315	482	275	186	110	165	195	126	101	180
	-605	-374	-177	-177	-45	-16	-14	-28	-121	-275	-470	-473	-429	-320	-451	-556	-535	-513	-549	-621	-501	-445	-731	-518	-373
	793	563	376	332	105	61	49	85	238	513	705	639	583	548	767	872	1019	789	736	732	667	641	858	619	554
26	111	202	135	151	263	187	173	114	85	103	270	204	134	71	99	333	310	243	275	323	237	183	218	223	194
	-376	-456	-500	-220	-176	-342	-258	-151	-123	-96	-461	-318	-50	-89	-131	-527	-737	-664	-489	-408	-407	-200	-132	-201	-313
	488	658	635	372	440	530	431	266	209	200	732	523	185	161	231	861	1048	908	765	731	644	383	351	425	507
27	134	159	161	104	228	246	195	129	82	106	110	73	42	24	37	196	315	305	359	332	295	290	171	109	175
	-303	-417	-254	-85	-289	-256	-194	-200	-163	-141	-86	-79	-33	-38	-58	-302	-567	-633	-462	-639	-546	-442	-307	-99	-275
	438	576	416	190	517	503	389	329	246	249	198	153	75	63	96	499	884	939	822	971	842	732	479	209	451
28	61	112	85	157	157	163	191	129	153	130	170	187	122	156	118	237	210	229	244	284	312	332	210	226	182
	-74	-120	-317	-341	-268	-231	-209	-188	-202	-193	-198	-329	-164	-243	-256	-263	-365	-285	-264	-300	-469	-437	-235	-170	-255
	136	232	403	500	426	395	401	318	356	325	369	518	287	401	376	501	576	514	508	584	781	769	446	396	438
29	151	64	86	143	83	100	61	40	69	84	111	164	195	269	292	349	305	359	334	321	294	260	130	119	183
	-96	-39	-43	-165	-81	-21	-7	-15	-8	-35	-147	-331	-581	-661	-448	-484	-566	-565	-439	-379	-489	-508	-439	-424	-290
	248	103	130	309	166	122	69	57	78	120	259	497	777	932	741	834	872	924	773	700	783	768	570	543	474
30	244	215	167	231	268	201	170	243	-61	28	-72	146	223	198	163	142	126	72	59	58	59	61	51	40	126
	-318	-181	-270	-245	-391	-287	-398	-989	-1461	-793	-1220	-832	-190	-376	-368	-215	-99	-39	-75	-34	-34	-26	-26	-43	-371
	563	397	439	477	660	490	569	1233	1400	821	1148	979	414	575	533	358	226	112	135	93	94	88	77	83	498
31	49	29	16	13	16	26	37	43	36	39	10	22	47	53	43	16	1	3	9	15	61	93	85	75	35
	-51	-65	-87	-52	-31	-49	-120	-37	-21	-29	-38	-40	-97	-235	-101	-31	-35	-33	-25	-33	-63	-100	-125	-63	-65
	100	95	104	66	48	77	159	80	58	69	50	63	145	289	145	48	36	37	34	50	125	193	211	139	101

Provisional Hourly Values (nT) of AU, AL and AE Indices APRIL 1990

DAY\UT	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	MEAN
1 AU	59	78	68	26	17	13	16	32	34	38	25	25	48	38	27	24	16	27	72	66	66	21	24	48	38
AL	-52	-111	-90	-24	-14	-16	-16	-17	-24	-63	-31	-33	-59	-163	-136	-32	-30	-32	-83	-73	-89	-21	-15	-20	-52
AE	112	190	158	50	32	30	33	49	59	102	56	59	108	203	164	58	47	60	157	139	156	43	40	69	91
2	26	25	23	24	28	35	39	47	44	74	68	52	75	58	93	94	65	87	68	49	48	31	38	35	51
	-21	-21	-19	-17	-20	-16	-9	-12	-10	-36	-45	-196	-150	-283	-384	-304	-89	-97	-79	-22	-29	-7	-8	-11	-79
	48	47	43	42	48	52	49	60	54	111	114	249	227	342	478	399	155	184	148	72	78	40	47	46	131
3	34	52	37	40	82	117	82	59	127	114	175	134	273	100	46	98	159	172	250	193	165	90	105	82	116
	-13	-23	-11	-17	-16	-83	-82	-39	-59	-132	-163	-285	-403	-138	-45	-132	-314	-259	-172	-252	-283	-124	-64	-125	-135
	48	75	49	58	99	201	164	100	188	247	339	420	677	239	93	231	473	432	423	446	448	214	170	208	252
4	40	37	47	31	47	98	105	99	75	91	84	92	59	40	86	41	39	44	109	105	47	40	26	20	63
	-200	-57	-52	-119	-55	-183	-139	-90	-77	-108	-127	-150	-86	-35	-116	-87	-25	-40	-101	-164	-14	0	-1	-4	-85
	241	95	100	151	102	281	245	189	154	201	213	244	147	77	203	130	64	86	210	270	61	41	27	25	148
5	31	17	18	24	24	29	49	91	144	237	74	30	48	58	92	61	32	67	86	33	36	38	33	29	58
	-23	-50	-22	-10	-8	-9	-23	-166	-243	-261	-84	-29	-52	-168	-321	-196	-53	-84	-174	-57	-26	-11	-14	-37	-88
	55	68	41	35	33	39	72	258	388	500	159	61	102	228	414	258	86	153	262	92	62	49	48	67	147
6	25	17	20	20	27	45	66	41	36	105	89	53	40	60	64	29	27	23	24	27	35	27	58	85	44
	-36	-16	-10	-10	-17	-74	-111	-32	-13	-59	-203	-79	-34	-34	-108	-136	-44	-2	-1	0	-1	-2	-25	-134	-49
	62	34	31	31	45	120	178	75	50	166	294	133	76	96	174	166	73	26	26	26	36	29	83	220	94
7	32	21	24	33	36	26	37	24	68	77	101	66	45	49	44	100	159	172	102	51	32	34	61	81	61
	-41	-6	-15	-22	-55	-101	-95	-35	-21	-31	-137	-47	-41	-40	-57	-216	-214	-206	-93	-6	-7	-16	-37	-99	-68
	74	28	39	56	92	128	133	61	90	110	238	114	88	91	102	317	374	378	196	58	40	51	98	180	131
8	113	83	39	43	31	25	21	25	30	36	46	45	56	65	53	45	46	63	33	30	24	38	55	68	46
	-222	-163	-112	-103	-27	-17	-25	-22	-16	-13	-26	-32	-43	-68	-34	-29	-36	-36	-14	-14	-5	-22	-26	-68	-49
	335	246	153	147	59	44	47	49	47	50	74	78	101	134	88	75	83	99	48	46	30	60	82	137	96
9	27	20	19	36	33	39	106	191	235	453	306	225	134	54	116	142	151	168	98	68	70	53	58	74	120
	-29	-19	-21	-29	-38	-125	-195	-241	-344	-904	-588	-322	-172	-67	-62	-73	-95	-114	-86	-33	-173	-39	-101	-192	-169
	56	40	41	66	72	165	302	434	581	1358	895	549	307	122	179	217	247	283	185	102	243	93	159	267	290
10	141	173	236	286	239	313	339	83	-31	126	167	141	140	0	258	256	115	126	65	104	64	234	273	171	167
	-328	-539	-483	-305	-502	-610	-744	-576	-1095	-566	-1256	-723	-511	-1026	-512	-170	-702	-836	-411	-433	-672	-424	-447	-472	-598
	469	713	720	592	742	924	1083	660	1063	693	1424	866	652	1025	770	427	818	964	477	538	738	658	721	644	766
11	203	277	161	210	263	236	276	277	271	178	159	235	238	297	248	237	350	271	185	201	212	190	150	159	229
	-358	-655	-758	-554	-529	-628	-578	-260	-260	-645	-531	-764	-515	-419	-413	-426	-473	-536	-477	-341	-230	-151	-98	-97	-446
	561	934	921	766	793	866	855	538	533	825	692	1000	755	718	663	663	824	808	663	543	443	341	249	256	675
12	188	113	207	600	367	291	293	268	96	255	172	154	201	99	47	97	188	259	231	265	285	216	175	103	215
	-296	-499	-337	-954	-1142	-702	-684	-634	-384	-414	-146	-158	-900	-317	-115	-114	-140	-454	-429	-455	-605	-653	-423	-287	-469
	485	613	545	1555	1510	995	978	902	481	670	319	313	1102	418	163	212	329	714	661	721	890	870	599	391	685
13	152	134	116	158	139	165	217	182	325	138	188	208	263	257	159	108	119	234	225	178	300	371	227	174	197
	-213	-335	-178	-157	-363	-344	-369	-668	-396	-165	-278	-410	-482	-491	-194	-132	-183	-537	-749	-515	-335	-458	-427	-163	-356
	366	470	295	316	504	511	587	852	722	305	468	619	746	750	354	241	303	771	974	694	635	830	654	338	554
14	173	186	185	198	184	180	260	341	154	119	232	229	146	171	297	322	287	345	253	313	287	229	133	247	228
	-271	-433	-252	-206	-312	-241	-434	-578	-687	-432	-461	-444	-411	-231	-295	-556	-493	-380	-196	-358	-502	-529	-193	-286	-383
	445	620	439	405	497	422	696	920	842	552	694	673	558	403	593	878	781	726	449	672	790	759	327	534	611
15	148	169	167	260	141	129	148	112	136	210	208	179	181	262	226	249	128	158	183	144	100	69	38	126	161
	-351	-450	-346	-232	-401	-394	-189	-143	-167	-322	-249	-194	-325	-495	-517	-422	-134	-185	-281	-171	-87	-55	-40	-76	-259
	501	620	514	493	543	525	338	255	305	533	459	374	507	758	744	672	264	344	464	316	187	124	79	203	422

16	170	126	153	135	76	71	55	153	160	148	215	120	113	80	130	83	73	82	62	169	147	149	204	145	126
	-199	-127	-137	-159	-66	-9	-20	-167	-233	-241	-462	-192	-171	-175	-167	-152	-82	-109	-99	-152	-135	-109	-217	-245	-159
	369	253	292	296	143	80	75	321	394	391	679	313	285	256	298	235	156	191	163	322	283	259	422	391	286
17	211	66	85	95	110	170	76	158	244	238	224	362	390	363	242	205	193	296	424	373	206	267	397	296	237
	-391	-93	-43	-40	-94	-158	-107	-111	-194	-667	-715	-372	-338	-847	-357	-190	-333	-271	-231	-464	-304	-254	-382	-386	-306
	604	160	129	136	205	329	184	270	439	906	940	736	728	1211	600	395	526	568	656	838	510	522	779	683	544
18	216	212	187	262	335	264	180	149	142	136	104	102	139	111	84	49	26	73	151	228	211	203	189	137	162
	-339	-483	-423	-342	-365	-211	-160	-169	-146	-237	-95	-96	-237	-257	-134	-51	-74	-113	-213	-320	-209	-126	-197	-267	-219
	557	696	611	606	701	476	341	320	289	375	200	199	378	370	220	101	102	188	364	549	421	330	386	404	383
19	120	100	123	74	55	57	50	56	79	70	60	65	73	92	62	88	91	100	177	232	186	106	118	180	101
	-118	-73	-162	-93	-26	-19	-14	-22	-54	-47	-45	-67	-78	-102	-124	-154	-113	-156	-143	-156	-179	-115	-84	-158	-96
	239	174	286	168	83	77	65	79	134	117	106	133	153	196	188	243	205	256	321	389	365	221	202	338	197
20	120	178	125	101	95	177	234	197	87	66	47	107	119	81	103	119	221	281	360	324	443	407	291	241	189
	-146	-190	-99	-72	-61	-101	-232	-145	-67	-39	-33	-62	-167	-120	-183	-176	-322	-445	-527	-387	-424	-583	-310	-130	-209
	267	370	226	174	157	279	467	343	155	106	82	170	288	202	287	296	543	727	888	711	868	991	602	372	399
21	125	166	201	183	168	152	70	125	142	105	85	35	28	40	43	27	29	19	41	55	34	29	23	23	81
	-527	-270	-126	-324	-351	-160	-55	-72	-111	-62	-47	-39	-30	-24	-27	-31	-90	-37	-35	-35	-24	-36	-36	-40	-108
	653	437	328	509	520	313	127	198	254	169	133	75	59	66	71	60	120	56	77	90	60	67	61	64	190
22	29	36	73	83	185	114	62	100	213	147	133	129	104	195	296	147	118	83	171	124	75	169	272	305	140
	-43	-43	-31	-66	-218	-238	-84	-71	-191	-88	-127	-99	-161	-424	-366	-260	-177	-91	-160	-205	-49	-54	-277	-474	-167
	73	80	106	150	404	353	147	173	406	236	261	229	267	620	663	408	295	176	332	331	125	224	550	780	308
23	339	272	291	321	319	303	155	230	150	131	153	145	337	457	414	370	459	355	153	103	170	218	185	236	261
	-212	-298	-502	-538	-524	-438	-171	-140	-54	-93	-107	-217	-309	-619	-602	-400	-639	-548	-134	-35	-104	-218	-208	-180	-304
	551	571	795	860	844	742	328	371	204	225	261	364	647	1078	1017	771	1098	904	288	138	274	436	393	416	566
24	182	133	72	53	32	153	170	275	205	193	192	262	154	43	85	169	198	275	292	229	182	164	210	214	172
	-119	-39	-21	-20	-22	-57	-197	-648	-675	-586	-458	-361	-302	-65	-120	-203	-357	-537	-406	-372	-355	-166	-96	-304	-270
	302	173	95	74	55	210	367	925	881	780	650	624	458	110	206	372	556	813	699	602	538	330	306	519	444
25	218	158	204	178	209	183	177	142	215	258	181	177	102	62	78	75	102	114	140	158	129	135	146	218	157
	-302	-232	-292	-312	-202	-145	-216	-213	-426	-391	-105	-178	-127	-206	-75	-48	-93	-131	-186	-157	-59	-91	-122	-238	-189
	520	390	497	491	412	329	395	357	642	650	288	357	230	269	153	123	195	246	326	315	189	226	269	457	347
26	227	209	184	241	269	330	156	20	18	24	33	40	39	33	31	21	16	17	19	34	36	62	63	86	92
	-423	-181	-312	-428	-430	-399	-147	-35	-29	-27	-27	-40	-20	-17	-16	-23	-44	-20	-23	-28	-28	-30	-56	-124	-121
	651	391	497	670	701	730	305	56	48	52	61	80	60	51	48	45	61	38	43	63	66	92	120	210	214
27	69	84	178	198	257	254	189	133	177	209	281	266	179	177	252	267	200	220	254	270	296	279	190	217	212
	-72	-42	-131	-505	-335	-164	-117	-66	-179	-298	-196	-206	-253	-360	-367	-319	-223	-201	-453	-347	-291	-291	-266	-241	-247
	141	126	310	705	594	419	307	201	357	508	478	474	433	539	620	587	424	422	708	618	587	570	457	459	460
28	151	207	205	207	243	190	168	147	325	291	318	218	251	199	58	72	114	173	229	340	454	447	373	227	234
	-220	-111	-137	-208	-226	-232	-153	-238	-523	-248	-279	-275	-422	-245	-42	-82	-109	-148	-408	-532	-539	-515	-458	-273	-276
	371	318	343	416	471	424	323	386	849	540	599	495	674	445	102	155	223	321	638	874	994	962	832	500	511
29	194	194	289	321	323	310	341	412	275	161	220	212	142	200	281	263	189	164	195	199	215	243	307	131	241
	-179	-155	-298	-313	-387	-505	-577	-416	-378	-351	-470	-438	-305	-344	-452	-356	-271	-230	-176	-119	-288	-116	-224	-312	-319
	373	350	588	635	712	816	920	828	655	513	691	651	448	546	735	620	461	395	372	319	504	359	532	444	561
30	183	293	380	236	220	228	247	192	164	269	275	179	117	103	142	108	109	118	134	163	152	158	190	240	192
	-342	-352	-233	-198	-251	-213	-162	-153	-74	-85	-166	-158	-204	-134	-234	-153	-149	-167	-261	-153	-140	-100	-155	-199	-185
	527	646	614	435	473	442	409	347	239	355	443	338	323	238	376	262	258	287	397	317	293	259	346	440	378

Provisional Hourly Values (nT) of AU, AL and AE Indices MAY 1990

DAY\UT		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	MEAN
1	AU	70	17	11	19	189	51	7	11	48	60	42	30	57	49	40	30	21	20	30	64	60	37	37	20	42
	AL	-56	-40	-46	-42	-91	-156	-31	-19	-33	-27	-47	-46	-39	-119	-65	-92	-45	-25	-27	-100	-45	-38	-30	-26	-53
	AE	127	58	58	62	281	208	39	31	81	88	90	77	97	170	106	123	68	46	57	164	106	76	68	46	97
2		14	24	24	12	43	64	100	128	73	56	199	120	102	85	45	27	24	21	34	31	38	93	49	48	61
		-32	-40	-39	-25	-20	-72	-144	-176	-43	-22	-161	-312	-484	-142	-78	-27	-23	-30	-35	-24	-34	-109	-78	-33	-91
		46	65	64	38	63	137	244	306	117	79	362	433	587	229	124	55	48	52	69	56	73	203	127	82	152
3		41	43	32	14	116	154	85	27	36	182	200	175	162	144	52	38	24	33	50	143	183	163	203	189	104
		-31	-95	-30	-25	-71	-275	-134	-15	-21	-80	-323	-157	-378	-272	-58	-24	-16	-31	-33	-141	-255	-154	-185	-369	-132
		73	140	63	40	188	430	220	42	58	262	524	332	541	417	111	64	41	64	83	286	439	317	388	559	237
4		196	57	32	30	18	29	61	46	54	71	56	150	90	26	40	28	47	26	97	123	95	58	54	90	66
		-414	-142	-67	-40	-76	-78	-233	-113	-53	-66	-64	-255	-266	-78	-22	-38	-70	-17	-98	-81	-40	-30	-32	-160	-106
		610	200	100	71	95	109	295	160	107	137	120	407	358	106	64	67	118	45	196	205	137	89	87	252	172
5		61	24	19	12	15	16	48	123	132	166	126	53	41	22	25	49	39	46	75	126	94	51	36	35	60
		-77	-35	-34	-37	-32	-30	-36	-283	-314	-327	-324	-35	-21	-15	-28	-88	-58	-50	-52	-191	-147	-39	-21	-27	-96
		139	59	54	49	48	47	85	406	447	495	451	89	63	38	54	138	98	97	129	319	243	91	58	64	157
6		13	18	24	17	98	61	99	82	111	135	117	80	39	33	22	10	18	22	19	32	43	79	66	47	54
		-24	-27	-40	-42	-51	-124	-81	-29	-57	-232	-89	-83	-48	-36	-47	-70	-65	-48	-23	-34	-62	-46	-50	-29	-60
		38	46	65	61	150	186	180	112	168	367	207	164	89	70	71	81	84	71	43	67	106	127	117	77	115
7		40	48	41	28	42	87	60	33	22	47	111	41	57	88	79	108	40	23	18	28	26	26	25	79	50
		-30	-48	-61	-83	-28	-29	-110	-44	-32	-33	-92	-41	-38	-68	-51	-233	-117	-75	-20	-6	-22	-25	-27	-63	-57
		71	97	102	111	71	117	170	78	55	80	203	83	95	156	132	342	158	99	39	36	49	52	52	144	108
8		103	50	21	23	118	146	142	114	37	23	57	73	61	56	49	37	34	43	39	43	57	76	151	215	74
		-69	-32	-30	-35	-75	-248	-135	-38	-31	-37	-39	-52	-100	-115	-150	-142	-47	-15	-2	-5	-30	-65	-160	-300	-81
		173	83	51	60	194	395	277	153	69	61	97	126	162	173	200	180	82	58	42	48	88	142	312	515	156
9		146	101	87	53	107	252	220	298	215	179	170	246	200	313	282	338	249	302	361	371	391	396	370	208	244
		-322	-173	-88	-60	-51	-92	-210	-404	-281	-234	-161	-261	-381	-591	-472	-416	-340	-252	-255	-490	-591	-530	-476	-425	-315
		468	276	177	115	158	346	431	702	497	414	333	509	583	906	755	755	591	554	616	861	983	927	846	633	560
10		139	149	123	212	182	281	311	330	243	321	222	126	44	118	68	48	107	219	153	245	251	218	93	62	178
		-298	-283	-272	-282	-212	-271	-569	-618	-530	-193	-342	-153	-126	-225	-135	-109	-97	-214	-334	-252	-197	-138	-91	-66	-250
		438	433	396	495	395	554	881	949	774	515	566	281	171	345	204	159	205	435	489	499	448	357	185	128	429
11		207	230	304	330	245	291	242	329	233	136	112	74	131	238	275	252	299	356	345	491	459	419	291	260	273
		-209	-405	-491	-539	-549	-287	-388	-345	-230	-130	-67	-83	-247	-412	-359	-480	-535	-574	-387	-327	-447	-392	-446	-336	-361
		416	636	797	870	796	579	631	676	465	267	179	158	380	652	635	733	835	931	733	819	906	811	737	597	635
12		203	170	207	153	100	137	97	97	18	27	33	17	7	7	4	0	16	14	9	18	17	8	22	25	59
		-302	-274	-321	-230	-179	-171	-128	-71	-33	-42	-53	-54	-39	-31	-21	-27	-30	-40	-45	-62	-58	-44	-40	-41	-97
		505	445	528	384	280	309	225	168	51	69	86	71	47	39	26	28	47	55	56	82	76	53	63	67	157
13		16	23	30	59	70	40	42	24	16	17	13	11	9	12	18	82	216	198	319	243	242	241	324	279	106
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		58	64	75	109	128	106	117	59	52	55	54	51	45	49	59	182	521	449	573	432	476	470	495	497	216
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		107	63	47	42	66	83	47	48	43	54	50	64	72	66	45	38	36	72	79	79	79	94	112	117	67
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		114	113	87	99	100	163	144	79	60	66	85	106	93	119	78	44	33	70	83	52	57	56	52	50	84

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	46	54	51	50	54	52	52	54	58	69	79	75	84	77	64	62	62	55	46	48	46	53	56	64	59
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	63	66	70	95	122	99	134	129	69	61	85	106	159	162	103	75	70	79	78	112	134	102	101	98	99
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	-116	-97	-32	-33	-25	-24	-68	-45	-101	-173	-350	-261	-230	-157	-400	-705	-688	-192	-149	-207	-255	-334	-519	-278	-227
	199	183	59	58	61	73	108	114	288	484	699	648	462	424	972	1352	1297	490	429	531	437	626	913	644	481
19	202	243	238	273	183	57	34	109	140	180	165	175	182	169	35	56	130	191	265	208	280	262	321	319	184
	-108	-161	-289	-384	-314	-107	-84	-86	-205	-161	-119	-124	-291	-212	-51	-58	-185	-195	-397	-316	-204	-243	-305	-314	-205
	310	404	527	658	499	164	119	196	347	342	285	301	475	383	88	115	316	387	663	526	484	506	627	635	390
20	293	197	228	256	202	166	25	40	126	114	147	142	163	111	122	125	349	234	298	446	450	402	266	218	213
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	573	688	764	597	471	264	80	75	221	275	287	309	466	347	327	339	718	668	751	821	910	954	716	473	504
21	257	177	201	141	81	23	13	21	43	91	173	224	175	117	255	342	489	450	417	350	347	300	319	69	211
	-291	-149	-181	-202	-76	-44	-33	-14	-21	-43	-157	-362	-279	-162	-214	-433	-755	-446	-188	-232	-287	-266	-173	-65	-211
	549	327	384	345	158	68	47	37	66	134	331	587	455	280	470	776	1245	898	605	582	634	566	493	135	424
22	60	115	116	245	72	294	348	444	356	438	490	353	410	343	467	404	429	387	418	365	396	465	417	339	340
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	115	195	223	453	226	568	1009	1130	855	1094	1004	766	782	940	926	749	805	924	797	628	642	818	702	564	705
23	360	260	193	186	267	230	188	294	298	245	226	193	185	238	232	191	225	244	92	56	67	111	106	62	198
	-250	-218	-138	-121	-151	-146	-202	-163	-152	-266	-232	-225	-207	-135	-207	-141	-196	-293	-138	-50	-37	-115	-109	-71	-165
	611	479	332	309	420	377	390	458	450	513	459	419	394	374	440	333	422	538	231	107	106	226	216	135	364
24	56	37	38	58	70	58	72	82	65	117	142	86	40	35	29	64	95	86	50	67	117	228	146	180	84
	-47	-46	-49	-49	-93	-42	-34	-60	-43	-35	-81	-40	-22	-33	-40	-105	-211	-110	-54	-38	-67	-219	-130	-110	-73
	104	83	88	107	164	101	106	143	108	152	223	126	62	69	70	170	307	197	106	107	185	448	278	291	158
25	250	230	225	270	299	186	88	104	341	431	346	321	374	521	444	334	357	447	474	361	286	270	274	270	313
	-346	-281	-378	-240	-219	-95	-72	-44	-198	-372	-357	-370	-402	-347	-226	-202	-298	-465	-408	-320	-319	-280	-258	-178	-278
	597	512	604	511	519	281	161	150	539	803	704	692	777	870	672	538	656	913	882	681	606	551	532	449	592
26	197	156	198	208	271	336	90	49	196	206	175	87	201	87	253	256	146	90	86	122	236	390	598	727	223
	-164	-231	-222	-257	-325	-298	-113	-25	-60	-183	-198	-70	-171	-229	-364	-326	-168	-63	-57	-93	-228	-660	-445	-326	-220
	362	388	422	466	597	635	203	74	257	390	375	157	374	317	618	584	316	154	144	215	464	1051	1044	1054	444
27	203	139	189	403	399	274	336	311	249	285	159	128	60	158	145	190	359	271	161	83	121	154	120	109	209
	-105	-69	-216	-476	-662	-485	-465	-772	-740	-341	-428	-290	-130	-153	-217	-209	-309	-333	-136	-60	-107	-218	-141	-141	-300
	309	210	405	880	1063	760	802	1085	990	627	589	420	191	312	364	400	669	605	299	144	229	373	262	251	510
28	76	29	19	12	3	38	48	34	58	98	79	39	85	45	33	61	111	93	74	76	63	47	40	106	57
	-123	-79	-53	-46	-52	-48	-60	-71	-72	-124	-130	-40	-38	-67	-45	-21	-122	-210	-149	-72	-47	-58	-50	-105	-78
	199	110	72	59	56	87	109	106	131	223	210	79	123	112	80	83	234	304	224	148	112	106	91	212	136
29	128	67	81	31	19	10	32	74	64	77	87	76	81	75	61	65	155	108	72	78	64	69	197	187	82
	-149	-151	-69	-68	-53	-42	-40	-58	-47	-49	-49	-43	-82	-146	-105	-128	-173	-149	-85	-25	-22	-49	-172	-395	-98
	277	219	151	99	73	53	73	133	112	127	137	120	164	223	166	195	328	257	158	104	87	119	370	582	180
30	80	68	105	183	309	227	172	197	186	431	327	205	168	174	114	177	188	242	331	401	217	165	143	128	206
	-130	-71	-77	-252	-415	-297	-248	-294	-222	-386	-364	-165	-184	-203	-138	-233	-121	-322	-503	-319	-131	-117	-167	-145	-229
	211	140	184	436	726	525	420	492	409	818	692	372	354	379	253	411	309	565	834	720	349	283	311	274	436
31	103	67	145	172	85	44	28	29	66	111	126	79	93	79	82	114	95	70	79	190	191	120	92	71	97
	-118	-138	-239	-279	-120	-29	-30	-28	-44	-98	-123	-128	-151	-279	-228	-216	-94	-64	-90	-223	-345	-159	-99	-106	-143
	223	206	386	452	206	75	59	58	110	210	249	208	245	359	311	331	190	135	170	414	537	280	191	178	241

Provisional Hourly Values (nT) of AU, AL and AE Indices JUNE 1990

DAY\UT		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	MEAN
1	AU	34	64	97	137	192	144	219	174	136	179	60	90	71	73	49	82	66	94	94	145	137	122	85	37	108
	AL	-61	-102	-195	-181	-287	-161	-380	-289	-216	-181	-60	-61	-117	-124	-204	-116	-75	-109	-110	-105	-145	-121	-62	-31	-146
	AE	95	166	292	320	481	306	600	465	353	361	122	153	189	198	254	199	141	204	206	251	283	243	148	70	254
2		48	78	27	58	60	109	170	143	112	106	172	77	54	36	26	34	36	40	58	46	28	22	23	32	66
		-48	-63	-67	-75	-73	-142	-186	-145	-92	-24	-108	-189	-76	-45	-33	-44	-157	-42	-46	-51	-22	-30	-39	-35	-76
		97	141	94	133	134	252	357	290	205	132	282	267	131	81	60	80	193	83	105	98	52	53	63	69	144
3		20	22	48	76	90	78	48	45	33	92	86	82	102	83	58	33	25	36	47	85	57	32	59	45	58
		-30	-32	-41	-72	-104	-54	-26	-27	-25	-29	-76	-92	-91	-98	-179	-137	-62	-25	-17	-36	2	-12	-46	-51	-57
		51	55	89	150	195	133	75	72	59	122	163	176	195	181	239	171	87	62	65	122	55	44	105	97	115
4		28	20	29	60	92	132	215	105	182	174	210	134	122	77	63	55	50	37	44	35	49	99	92	69	91
		-23	-21	-27	-19	-81	-69	-164	-91	-89	-60	-56	-86	-98	-113	-102	-23	-36	-7	-23	-19	-12	-50	-61	-45	-57
		53	42	56	80	174	202	381	197	273	236	268	221	221	191	167	79	86	45	67	55	63	150	153	114	149
5		64	28	42	23	39	63	29	31	47	79	84	156	129	100	87	88	105	92	57	57	84	76	65	114	72
		-24	-16	-26	-18	-30	-27	-25	-16	-15	-20	-22	-113	-130	-119	-90	-62	-79	-44	-33	-6	-22	-66	-40	-54	-46
		89	46	69	42	69	91	55	47	63	100	107	271	260	220	179	151	185	136	91	64	106	143	106	168	119
6		172	240	300	220	72	40	83	30	59	71	74	157	150	87	195	165	89	60	60	80	103	133	212	205	127
		-134	-271	-364	-305	-58	-36	-37	-25	-33	-27	-29	-41	-190	-376	-174	-130	-129	-97	-35	-32	-54	-42	-138	-213	-124
		307	512	664	527	130	77	121	56	93	100	105	200	341	464	369	296	218	157	95	112	157	177	351	418	252
7		291	309	258	328	299	317	342	214	111	112	164	158	159	94	112	136	181	156	254	255	235	334	339	307	228
		-271	-408	-407	-415	-553	-479	-351	-177	-39	-41	-106	-117	-268	-204	-253	-232	-327	-230	-336	-217	-175	-260	-249	-198	-263
		562	718	667	744	852	797	693	392	151	155	272	275	428	299	365	368	508	387	591	473	412	595	588	506	492
8		248	267	184	270	143	91	83	188	195	190	286	179	121	88	94	82	145	114	89	146	225	175	191	118	163
		-309	-257	-123	-252	-279	-98	-28	-100	-359	-303	-392	-208	-127	-91	-105	-220	-204	-195	-41	-69	-100	-209	-224	-107	-183
		558	524	308	524	423	190	111	290	554	493	678	388	248	180	200	303	349	309	130	215	326	385	416	225	347
9		112	102	274	272	91	142	299	463	435	286	279	218	379	480	358	218	78	82	120	131	84	52	113	157	218
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		202	176	601	594	183	246	538	1182	1156	782	675	669	818	1002	784	590	198	268	290	216	96	65	162	276	490
10		219	330	229	241	116	54	35	62	142	126	136	130	159	148	146	165	108	143	156	157	132	235	304	176	160
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		479	812	541	520	210	80	71	118	238	269	293	243	334	428	277	326	174	267	288	258	214	393	630	355	326
11		159	146	216	215	225	169	65	59	55	163	123	129	144	253	213	150	136	69	107	147	153	170	192	133	150
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		289	358	403	487	674	524	192	112	73	221	187	221	341	589	528	369	325	159	183	210	273	310	407	273	321
12		160	235	342	189	212	321	237	173	229	240	410	285	360	412	624	622	206	571	557	591	549	222	252	277	345
		-166	-326	-324	-279	-177	-186	-181	-118	-285	-290	-431	-284	-409	-222	-579	-852	-862	-540	-386	-406	-384	-346	-620	-805	-394
		327	562	667	468	391	508	419	293	516	532	842	570	770	635	1203	1475	1069	1112	944	999	934	569	874	1083	740
13		203	304	276	272	281	449	300	391	407	204	77	56	60	47	85	51	72	81	114	151	102	104	72	178	181
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		639	1085	1225	948	704	971	671	761	985	495	150	119	129	147	169	104	116	172	161	213	244	240	153	277	453
14		326	214	473	298	273	344	215	130	121	159	219	231	222	579	351	360	395	240	147	126	77	23	43	34	233
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		445	790	1088	780	538	444	366	251	264	306	540	746	543	1323	1364	1597	1132	576	246	243	173	99	121	111	587
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		84	69	68	126	177	76	62	44	37	50	65	60	52	59	98	128	238	332	299	206	174	96	132	273	125

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23	269	202	118	39	111	136	160	156	120	160	167	182	160	118	83	70	60	78	75	74	72	56	50	49	115
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	435	310	190	74	152	235	226	193	149	222	330	367	386	265	103	90	84	117	61	57	68	71	67	69	180
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	73	94	91	125	163	136	171	174	188	140	125	128	111	139	134	171	208	166	99	73	134	170	206	187	142
25	95	88	98	66	146	206	195	182	167	126	123	87	126	89	44	49	55	52	77	63	105	106	87	54	104
	-59	-49	-74	-46	-44	-185	-220	-96	-66	-47	-65	-73	-101	-123	-81	-75	-22	-7	-35	-28	-72	-41	-67	-25	-71
	154	137	173	113	191	393	417	279	234	174	190	162	229	213	126	125	78	60	113	93	178	147	155	80	176
26	75	108	61	83	103	224	94	97	167	159	176	150	98	51	38	87	104	109	141	145	144	151	160	221	123
	-29	-73	-35	-84	-100	-149	-95	-36	-96	-263	-235	-250	-184	-50	-5	-31	-84	-257	-299	-124	-112	-110	-101	-160	-124
	105	182	97	167	204	374	190	135	264	423	412	401	283	102	44	120	189	367	440	270	257	262	262	381	247
27	109	52	20	22	15	17	25	112	130	152	190	161	192	119	79	46	50	69	102	98	97	209	254	203	105
	-75	-49	-30	-31	-24	-20	-19	-26	-124	-69	-46	-59	-322	-273	-34	-5	-1	-1	-46	-70	-16	-100	-72	-94	-67
	184	101	51	54	40	38	44	139	255	223	238	221	515	393	114	52	51	71	149	169	113	309	328	298	173
28	132	128	123	224	307	340	211	136	201	149	161	91	80	40	42	39	72	48	53	41	33	26	18	18	113
	-102	-235	-159	-156	-222	-246	-230	-197	-138	-111	-98	-136	-162	-56	-1	-15	-56	-48	-6	1	2	-20	-23	-32	-102
	235	364	283	382	531	588	443	334	340	262	260	229	242	98	43	55	128	97	60	39	30	46	42	51	216
29	19	21	26	41	231	270	151	135	124	103	117	139	119	120	68	78	85	112	218	149	85	78	81	77	110
	-34	-37	-37	-25	-119	-349	-331	-184	-43	-80	-94	-125	-128	-162	-96	-138	-219	-241	-157	-82	-79	-89	-91	-79	-126
	54	60	64	68	352	621	483	320	169	185	213	266	248	284	166	217	304	353	375	231	164	167	172	157	237
30	57	86	93	59	31	17	22	30	30	43	56	101	78	64	56	54	51	30	35	35	47	60	75	65	53
	-36	-35	-141	-75	-26	-19	-23	-27	-29	-34	-31	-42	-54	-58	-54	-122	-150	-105	-28	-25	-33	-37	-58	-47	-54
	94	121	234	136	59	37	46	58	61	79	88	145	133	123	111	176	201	136	64	62	81	97	133	113	108

Provisional Hourly Values (nT) of AU, AL and AE Indices JULY 1990

DAY\UT		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	MEAN
1	AU	63	43	40	90	77	69	130	114	179	174	112	85	109	68	47	36	21	44	78	130	169	209	162	227	103
	AL	-43	-40	-42	-55	-47	-37	-76	-92	-136	-194	-154	-66	-43	-64	-49	-88	-98	-116	-84	-73	-78	-157	-162	-181	-91
	AE	108	84	83	146	124	107	208	208	317	369	266	151	153	132	97	124	120	160	163	204	248	367	325	410	195
2		290	246	214	197	328	291	208	154	136	56	26	32	26	31	56	43	22	33	25	36	42	29	20	18	107
		-204	-142	-224	-204	-229	-207	-264	-192	-79	-23	-24	-26	-30	-30	-75	-93	-132	-59	-27	-32	-27	-27	-29	-26	-100
		496	389	439	403	558	499	473	347	216	79	51	59	57	62	132	137	154	92	54	68	70	56	50	46	208
3		25	64	77	107	339	281	99	61	47	55	71	127	79	48	36	44	45	48	56	60	55	33	18	36	80
		-29	-49	-36	-54	-181	-339	-95	-15	-20	-29	-29	-46	-63	-22	-10	1	-13	-3	4	-24	-32	-32	-21	-30	-48
		55	114	115	162	521	621	195	78	68	85	101	174	142	72	47	42	59	51	51	84	88	65	39	68	129
4		70	71	44	31	40	75	99	72	58	89	43	44	52	46	45	53	92	125	117	174	200	122	161	193	88
		-54	-49	-59	-37	-29	-13	-49	-18	-17	-46	-39	-38	-36	-45	-53	-91	-235	-322	-175	-84	-128	-159	-122	-150	-85
		125	122	104	70	70	89	149	91	76	136	83	83	88	91	99	144	327	448	292	258	329	283	284	344	174
5		147	128	97	254	213	68	74	36	36	92	195	253	223	305	265	237	241	222	235	235	157	62	46	56	162
		-141	-116	-70	-72	-184	-105	-29	-17	-33	-47	-107	-193	-424	-529	-332	-276	-273	-194	-192	-191	-75	-22	-13	-38	-153
		289	245	169	328	399	174	105	55	70	140	303	448	647	835	598	514	515	417	428	427	234	85	59	96	316
6		26	25	33	35	54	80	47	35	29	29	46	49	42	46	36	92	161	195	232	194	141	88	58	44	76
		-40	-29	-30	-26	-21	-59	-29	-26	-35	-43	-48	-49	-44	-90	-83	-76	-135	-284	-272	-185	-67	-40	-46	-61	-76
		67	56	64	62	76	141	77	61	66	73	95	99	87	137	120	168	296	480	505	380	209	129	105	106	153
7		23	20	21	20	80	183	166	133	152	125	101	98	94	71	55	31	34	47	78	96	105	186	178	123	93
		-50	-42	-40	-33	-28	-112	-133	-106	-70	-80	-63	-60	-75	-119	-106	-96	-65	-76	-103	-133	-103	-93	-181	-72	-85
		74	63	62	55	109	297	300	241	223	206	165	158	169	190	161	128	100	123	182	231	209	280	361	196	178
8		51	34	45	109	260	223	227	201	253	203	194	142	88	75	145	147	176	112	139	170	140	61	101	144	143
		-44	-39	-35	-72	-114	-272	-293	-166	-228	-166	-120	-258	-207	-155	-171	-141	-299	-250	-163	-180	-124	-85	-127	-197	-163
		97	74	81	182	376	497	520	368	482	370	315	401	296	231	317	288	476	362	303	351	265	148	229	342	307
9		168	167	173	116	48	10	16	16	21	25	30	30	27	22	21	31	26	23	33	38	31	33	32	38	49
		-124	-77	-80	-43	-32	-30	-20	-25	-29	-29	-32	-36	-37	-41	-39	-39	-40	-44	-59	-54	-72	-57	-48	-61	-48
		293	246	254	160	81	42	37	42	52	56	63	67	65	64	61	70	67	68	93	92	103	90	81	101	98
10		43	49	54	51	75	193	69	61	43	52	48	118	102	59	45	38	29	37	46	43	46	38	34	29	58
		-40	-36	-35	-26	-19	-115	-11	-8	-15	-25	-17	-65	-128	-43	-38	-14	-14	-33	-30	-33	-25	-27	-25	-23	-35
		84	87	90	79	95	310	81	70	59	78	66	184	230	103	83	53	44	71	77	77	71	66	60	53	95
11		22	22	34	51	28	26	85	127	73	53	52	56	56	89	61	70	55	62	84	129	166	121	122	125	74
		-33	-40	-39	-42	-30	-17	-21	-68	-43	-25	-33	-61	-37	-153	-276	-138	-108	-98	-123	-133	-227	-122	-110	-93	-86
		56	63	74	94	60	45	108	196	117	79	86	117	93	242	338	208	163	160	208	262	393	245	233	220	161
12		131	127	180	184	283	233	281	229	167	168	187	133	54	48	79	71	40	57	54	58	39	18	59	142	126
		-62	-84	-123	-164	-169	-367	-402	-383	-243	-212	-253	-258	-66	-39	-42	-42	-73	-106	-131	-71	-79	-51	-66	-157	-152
		194	213	304	349	453	602	684	613	412	381	441	392	121	88	122	113	114	164	186	130	120	70	126	300	279
13		168	212	197	279	231	205	156	135	261	64	28	16	28	25	23	20	34	142	157	281	230	155	108	105	136
		-166	-225	-480	-556	-553	-378	-154	-139	-274	-96	-32	-37	-29	-30	-24	-26	-26	-205	-205	-531	-317	-195	-95	-83	-202
		336	438	678	836	785	584	311	274	536	161	61	53	57	56	48	47	61	348	363	813	547	351	204	189	339
14		129	38	23	17	16	8	9	24	22	28	92	175	178	164	82	42	95	112	207	334	281	225	209	231	114
		-132	-79	-49	-43	-37	-29	-26	-17	-13	-12	-39	-83	-358	-327	-78	-74	-140	-223	-380	-328	-247	-152	-176	-174	-134
		262	118	73	61	54	39	36	43	36	40	131	259	536	492	161	116	235	336	588	662	529	379	386	405	249
15		199	156	255	236	266	217	179	143	99	111	45	67	63	45	62	42	42	77	101	166	176	144	102	66	127
		-116	-67	-243	-298	-262	-317	-231	-144	-77	-55	-41	-67	-89	-65	-98	-83	-106	-140	-144	-151	-183	-193	-150	-70	-141
		316	225	499	536	529	535	411	289	177	167	87	135	153	111	161	126	149	217	245	318	360	338	253	138	270

16	151	114	63	66	80	29	25	11	11	18	22	48	29	32	21	12	16	17	34	32	36	33	28	32	40
	-129	-130	-48	-39	-113	-42	-14	-18	-22	-29	-27	-32	-30	-30	-51	-59	-35	-35	-19	-18	-29	-30	-29	-30	-43
	282	246	112	106	195	72	40	31	34	49	51	81	60	63	72	72	52	53	54	52	66	64	58	62	84
17	23	25	28	41	127	212	172	112	98	52	18	24	26	48	57	31	26	47	65	56	81	137	212	222	81
	-32	-30	-29	-34	-49	-150	-120	-81	-62	-26	-19	-22	-35	-38	-28	-36	-39	-32	-88	-45	-72	-125	-194	-196	-66
	56	55	59	77	177	363	294	195	161	79	39	47	62	86	85	67	65	80	154	102	154	263	408	420	148
18	233	268	176	115	50	27	38	63	130	37	24	16	22	45	31	42	62	107	154	136	106	63	24	23	83
	-192	-224	-109	-62	-48	-32	-28	-61	-139	-39	-20	-22	-24	-47	-32	-45	-112	-216	-255	-143	-73	-51	-43	-36	-86
	426	493	287	178	99	60	68	125	270	77	45	39	47	93	64	88	175	323	410	280	180	115	69	60	170
19	24	40	85	115	183	172	97	75	117	205	207	253	206	179	133	73	60	111	188	196	181	128	132	223	141
	-30	-36	-33	-61	-173	-308	-140	-34	-23	-73	-244	-294	-344	-269	-133	-100	-31	-58	-131	-157	-56	-39	-42	-119	-122
	54	78	120	176	358	482	238	110	141	279	452	549	552	449	267	174	92	170	319	353	238	169	175	343	264
20	155	207	140	177	343	359	182	276	335	204	100	164	127	160	64	47	101	149	267	240	172	146	84	77	178
	-131	-188	-113	-90	-310	-281	-150	-363	-409	-122	-50	-83	-293	-239	-37	-38	-120	-129	-346	-286	-148	-103	-112	-92	-176
	288	397	254	268	654	641	333	640	745	327	150	248	421	400	102	86	221	279	613	528	322	250	198	171	356
21	61	34	15	10	15	15	12	19	63	144	158	146	108	86	82	71	93	118	124	133	108	91	80	60	77
	-93	-102	-87	-54	-32	-23	-36	-30	-79	-79	-148	-251	-196	-124	-228	-208	-251	-285	-162	-43	-35	-34	-84	-106	-115
	155	137	103	64	49	39	49	50	143	224	307	398	304	210	310	280	344	404	286	178	144	127	166	168	193
22	76	89	68	68	33	52	111	103	97	56	20	21	77	90	70	43	41	36	35	39	76	105	86	87	66
	-137	-104	-105	-146	-65	-20	-50	-110	-85	-56	-20	-22	-58	-139	-228	-106	-58	-14	-16	-44	-82	-68	-77	-79	-79
	213	194	174	215	99	74	163	214	184	113	42	44	136	230	299	149	100	52	52	84	159	174	164	168	146
23	34	23	51	80	54	48	7	17	25	31	33	60	66	56	32	35	48	72	89	104	89	71	75	60	52
	-31	-45	-51	-125	-61	-19	-24	-27	-33	-34	-25	-25	-24	-28	-47	-75	-122	-198	-169	-68	-38	-90	-119	-37	-63
	66	69	103	206	116	68	32	45	60	67	59	86	90	85	80	111	170	270	258	173	128	162	195	98	117
24	21	13	15	28	132	151	107	69	50	115	102	60	13	24	28	41	42	38	60	85	52	22	19	16	54
	-38	-44	-44	-39	-73	-207	-129	-118	-79	-77	-111	-76	-38	-35	-42	-40	-49	-28	-44	-97	-47	-57	-56	-49	-67
	60	57	59	68	207	359	237	188	129	193	213	137	52	59	71	82	92	67	105	182	101	80	75	67	123
25	35	51	37	46	71	41	81	133	117	74	34	38	41	37	34	28	25	29	42	45	40	31	35	32	49
	-45	-41	-57	-47	-70	-45	-102	-66	-112	-41	-42	-42	-36	-30	-24	-27	-32	-20	-6	-16	-33	-33	-32	-32	-43
	82	93	95	94	143	88	184	200	231	115	78	81	78	67	59	56	58	51	49	62	74	65	67	65	93
26	25	25	24	21	21	17	18	17	27	22	22	29	34	26	28	40	41	100	51	49	70	121	105	203	47
	-36	-44	-44	-44	-38	-37	-31	-28	-29	-38	-45	-46	-43	-39	-24	-17	-27	-67	-37	-26	-53	-89	-132	-59	-45
	63	70	69	67	61	55	51	46	57	61	69	76	78	66	53	59	68	168	88	76	124	211	238	263	93
27	112	59	32	30	97	136	110	101	191	264	91	35	27	21	36	76	52	56	124	190	135	97	72	38	91
	-68	-60	-30	-40	-46	-136	-107	-66	-78	-146	-126	-45	-26	-22	-47	-195	-117	-126	-159	-183	-125	-73	-35	-34	-87
	181	120	63	71	145	273	219	168	270	411	218	81	54	45	84	272	170	183	284	374	262	171	109	73	179
28	87	120	60	69	128	211	348	358	281	486	359	192	148	415	436	429	553	473	350	303	321	244	154	264	283
	-54	-54	-47	-40	-78	-72	-156	-212	-254	-317	-321	-80	-74	-162	-1021	-1012	-533	-373	-399	-445	-776	-936	-749	-598	-365
	143	176	108	110	207	285	505	570	535	803	681	273	223	578	1458	1441	1087	846	750	749	1098	1181	904	863	649
29	199	277	385	324	678	674	485	189	354	388	245	221	413	155	94	201	226	158	165	154	120	196	89	43	268
	-655	-393	-681	-743	-465	-308	-701	-525	-500	-500	-469	-721	-565	-335	-171	-259	-180	-117	-111	-126	-89	-117	-243	-51	-376
	854	671	1067	1069	1145	983	1188	715	855	888	716	944	979	491	266	461	408	275	277	280	210	314	333	95	645
30	10	8	10	33	36	53	40	114	114	126	94	61	44	47	33	20	18	16	24	40	54	117	125	164	58
	-29	-35	-38	-41	-44	-55	-55	-75	-51	-137	-193	-175	-71	-73	-54	-51	-77	-61	-44	-45	-50	-124	-138	-273	-83
	39	44	49	75	82	109	96	190	166	264	288	237	116	121	87	73	96	77	69	85	105	242	265	439	142
31	178	144	87	20	15	0	104	137	60	24	16	33	28	9	1	-3	-3	0	2	1	19	49	25	29	41
	-263	-205	-107	-64	-38	-42	-77	-282	-170	-44	-40	-41	-50	-41	-76	-45	-37	-33	-36	-37	-46	-56	-48	-48	-80
	442	350	195	85	55	44	183	421	231	69	56	75	79	51	76	41	34	34	38	39	66	105	74	79	122

Provisional Hourly Values (nT) of AU, AL and AE Indices AUGUST 1990

DAY\UT		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	MEAN
1	AU	33	37	26	14	13	24	70	87	163	137	120	67	156	227	411	184	130	93	311	318	522	470	278	263	173
	AL	-39	-43	-29	-27	-26	-23	-31	-42	-262	-76	-23	-29	-132	-384	-629	-214	-100	-56	-243	-429	-552	-512	-360	-262	-188
	AE	73	81	56	41	41	49	102	131	426	214	144	97	290	612	1041	399	230	150	555	748	1074	982	638	526	363
2		417	309	254	159	86	76	158	148	145	58	72	28	33	60	20	12	18	23	27	31	52	121	121	177	109
		-307	-209	-130	-172	-79	-45	-61	-88	-111	-45	-37	-27	-49	-69	-47	-33	-36	-30	-26	-25	-67	-167	-233	-158	-94
		726	520	386	332	167	122	220	238	258	104	110	56	83	129	68	47	55	54	54	56	120	288	354	335	203
3		178	208	70	84	35	31	63	93	127	179	207	175	97	153	138	48	55	91	153	200	197	174	205	288	135
		-111	-144	-60	-32	-23	-22	-24	-61	-165	-233	-347	-287	-182	-269	-312	-107	-65	-139	-235	-244	-215	-154	-158	-267	-161
		290	354	131	118	60	54	88	155	293	413	555	462	280	423	451	156	120	231	388	444	413	330	363	557	297
4		289	128	124	109	50	64	153	127	79	32	39	40	63	58	34	25	21	22	79	87	52	46	26	19	73
		-292	-173	-78	-58	-25	-25	-176	-144	-52	-24	-29	-31	-47	-31	-54	-87	-101	-36	-49	-70	-42	-46	-42	-43	-73
		583	302	204	168	76	90	331	272	133	57	69	72	112	91	90	112	123	59	128	158	94	92	69	62	148
5		10	43	42	17	15	33	29	28	32	23	45	125	138	117	95	124	116	102	81	67	60	80	100	126	69
		-44	-49	-31	-27	-32	-20	-18	-25	-48	-33	-34	-103	-197	-196	-227	-301	-235	-200	-97	-21	-24	-45	-51	-191	-94
		55	93	74	45	48	54	49	55	81	57	81	230	336	314	322	425	352	303	179	90	84	126	152	319	163
6		87	48	84	89	71	45	116	102	78	118	56	50	66	40	36	58	108	229	202	213	194	140	110	115	102
		-164	-46	-36	-81	-136	-25	-27	-37	-27	-120	-31	-26	-37	-45	-32	-36	-171	-327	-222	-196	-215	-148	-85	-111	-99
		251	96	122	170	208	72	144	140	107	239	89	77	105	86	70	96	280	557	426	410	410	290	197	228	203
7		168	111	46	34	30	46	46	57	40	60	49	50	76	62	53	71	112	134	73	51	39	50	143	138	72
		-86	-75	-44	-9	-18	-15	-23	-18	-24	-28	-28	-38	-43	-71	-77	-150	-140	-141	-78	-34	-43	-43	-136	-163	-63
		255	188	91	43	49	62	71	77	66	90	78	89	120	134	130	221	253	276	152	85	82	93	281	302	137
8		110	50	154	242	111	100	116	95	73	48	31	25	27	39	48	28	42	48	39	21	16	24	59	109	69
		-112	-38	-80	-238	-130	-32	-106	-77	-156	-90	-31	-29	-29	-29	-47	-81	-61	-102	-64	-47	-53	-49	-43	-80	-75
		223	89	235	481	242	134	224	173	230	139	62	55	57	69	96	110	104	151	104	68	69	73	102	189	145
9		176	186	236	156	57	13	19	23	30	24	51	45	43	43	47	58	83	120	139	102	50	44	24	24	75
		-191	-178	-191	-175	-51	-21	-19	-17	-23	-30	-37	-29	-21	-21	-35	-57	-165	-234	-366	-139	-42	-33	-30	-30	-89
		367	364	429	332	109	35	39	41	54	55	90	75	65	65	83	116	248	355	506	242	93	78	55	55	165
10		17	21	29	34	74	48	44	29	27	28	95	109	83	50	37	34	30	78	97	79	91	85	86	128	60
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		47	53	55	51	87	78	57	41	50	55	141	173	157	87	60	55	53	161	301	153	174	136	153	195	107
11		209	96	24	73	94	63	131	218	179	46	30	27	75	95	48	28	42	81	43	61	64	48	124	151	85
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		563	214	61	107	171	115	189	395	331	69	61	63	130	286	128	59	82	155	69	89	98	74	211	327	169
12		173	196	217	271	231	187	53	37	53	114	107	89	53	42	25	30	29	39	48	48	75	80	154	145	104
		-111	-91	-165	-287	-397	-175	-21	-13	-19	-40	-94	-101	-54	-29	-34	-37	-36	-27	-23	-34	-78	-56	-82	-135	-89
		285	287	383	560	629	364	75	51	74	155	201	191	108	72	60	68	67	67	72	82	153	137	236	281	194
13		130	145	128	180	250	218	288	277	176	183	209	162	95	97	150	158	138	172	168	119	86	77	101	141	160
		-82	-65	-33	-138	-404	-352	-227	-194	-51	-161	-283	-104	-39	-76	-201	-274	-158	-164	-271	-173	-17	-17	-86	-166	-156
		212	211	163	320	656	572	517	473	228	346	492	267	136	174	351	433	296	338	440	294	104	95	188	308	317
14		167	141	110	137	201	184	132	280	387	408	296	177	138	102	91	107	116	112	71	79	165	133	78	46	161
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		386	350	217	394	456	377	178	465	829	744	578	296	206	322	179	235	355	233	140	121	303	310	220	118	334
15		65	96	108	114	88	92	69	84	69	131	240	263	128	143	140	244	353	403	429	210	170	122	179	235	174
		-85	-136	-134	-174	-221	-117	-41	-29	-2	-28	-251	-663	-695	-568	-358	-342	-415	-363	-387	-289	-117	-74	-176	-215	-245
		151	234	244	289	311	211	111	114	72	160	492	927	824	711	499	587	769	767	818	500	288	198	356	451	420

16	234	149	123	137	184	205	167	335	273	283	224	197	87	89	86	256	279	127	106	106	58	102	228	168	175
	-257	-139	-68	-129	-146	-232	-206	-379	-325	-377	-161	-355	-368	-587	-453	-432	-297	-212	-158	-76	-29	-36	-121	-188	-239
	492	289	193	267	332	439	375	715	599	662	386	552	456	677	540	689	576	340	265	183	88	140	351	357	415
17	271	170	185	144	221	93	122	119	81	51	49	57	89	79	55	102	192	253	258	187	93	92	192	167	138
	-237	-68	-264	-212	-267	-154	-150	-306	-50	-19	-29	-38	-83	-162	-82	-58	-234	-546	-573	-221	-108	-37	-66	-63	-168
	510	239	450	358	489	248	273	426	132	72	80	97	173	242	138	161	427	799	831	409	203	130	259	231	307
18	225	185	177	285	221	178	123	161	126	129	137	77	70	48	77	78	112	85	94	40	46	36	70	169	123
	-209	-301	-212	-232	-268	-369	-139	-103	-193	-101	-95	-63	-39	-40	-103	-125	-87	-101	-55	-4	-18	-33	-52	-79	-126
	436	487	391	519	491	549	264	265	321	232	234	142	110	89	181	204	200	187	151	45	64	70	122	248	250
19	145	216	248	161	152	152	71	95	147	178	187	151	92	46	64	47	66	118	132	91	55	72	121	188	125
	-334	-374	-561	-481	-219	-151	-19	-54	-203	-142	-102	-141	-139	-235	-160	-102	-100	-138	-91	-21	-14	-21	-68	-299	-174
	480	591	811	643	373	305	92	150	352	321	291	293	232	283	225	151	167	257	225	113	70	94	190	488	300
20	187	82	168	198	292	289	314	204	209	312	269	231	214	103	118	210	186	178	212	141	99	85	178	125	192
	-249	-140	-83	-334	-510	-346	-336	-211	-241	-230	-233	-412	-395	-443	-328	-315	-255	-162	-164	-21	-8	-24	-70	-51	-232
	436	223	252	533	803	636	651	416	451	544	502	644	610	547	447	526	442	341	377	163	108	109	249	177	425
21	97	83	40	18	53	135	302	260	269	232	195	189	89	87	343	550	521	534	477	413	452	452	386	234	267
	-80	-165	-60	-41	-64	-143	-356	-330	-234	-187	-202	-222	-228	-349	-398	-745	-589	-363	-307	-615	-355	-389	-621	-334	-307
	177	249	100	60	119	279	659	591	504	420	399	411	318	436	742	1296	1110	897	785	1029	808	841	1008	569	575
22	284	346	261	333	312	215	321	325	239	345	275	98	174	181	275	335	413	422	370	338	213	280	283	218	286
	-365	-331	-223	-288	-547	-634	-406	-366	-421	-553	-450	-838	-452	-392	-428	-205	-402	-435	-315	-224	-338	-366	-261	-384	-401
	651	679	485	622	861	851	728	692	661	900	726	937	627	575	704	542	815	857	685	563	553	646	545	603	688
23	198	241	244	265	266	367	299	443	310	169	208	305	379	374	519	454	437	513	347	432	286	183	117	224	316
	-528	-419	-483	-539	-577	-505	-425	-463	-433	-439	-931	-253	-378	-415	-388	-492	-438	-493	-396	-479	-254	-140	-72	-220	-423
	727	661	729	806	844	873	725	908	745	609	1139	559	759	790	907	947	876	1006	743	911	541	324	190	445	740
24	184	192	212	342	305	246	270	145	82	39	114	104	148	181	188	107	78	153	132	89	35	29	23	41	143
	-398	-299	-171	-403	-567	-507	-154	-135	-50	-36	-183	-218	-447	-312	-168	-92	-68	-175	-156	-68	-18	-21	-23	-30	-196
	583	492	385	746	874	753	424	281	133	76	298	323	596	494	356	200	148	329	290	159	54	52	48	72	340
25	66	51	30	43	46	56	31	14	24	21	13	18	75	81	42	45	73	135	133	212	233	132	112	60	73
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	210	148	78	84	91	164	86	39	60	63	62	68	140	187	192	202	175	250	233	372	444	205	268	149	165
26	76	38	20	36	76	130	224	356	339	145	199	378	375	200	485	411	331	345	206	143	65	65	206	138	208
	-141	-41	-32	-29	-51	-99	-385	-611	-769	-708	-368	-249	-610	-410	-380	-410	-529	-509	-80	-73	-26	-50	-107	-179	-285
	218	81	53	67	128	231	610	968	1109	853	567	628	986	611	866	821	860	854	286	217	93	117	314	318	494
27	117	82	60	23	20	45	22	28	23	3	16	22	27	23	23	15	14	17	13	19	33	31	30	17	30
	-112	-75	-56	-38	-43	-54	-47	-50	-61	-60	-50	-46	-61	-49	-42	-35	-32	-36	-18	-25	-28	-35	-22	-26	-46
	230	159	117	62	64	101	70	80	85	64	67	69	89	73	66	51	48	55	33	45	62	67	54	44	77
28	9	7	21	21	8	5	7	5	12	17	12	12	22	14	15	11	24	18	17	21	25	35	15	9	15
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	40	45	59	66	114	234	153	140	116	104	218	200	113	81	63	50	68	68	287	638	657	313	77	73	166
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	-41	-61	-33	-28	-217	-339	-153	-52	-96	-294	-274	-591	-649	-527	-198	-258	-332	-378	-263	-23	-20	-15	-70	-188	-212
	102	132	106	121	404	471	255	107	233	471	483	858	896	803	365	527	689	671	464	137	113	77	226	442	381
31	223	204	89	76	50	160	126	147	121	106	126	61	67	59	47	36	36	27	39	56	34	18	23	60	83
	-144	-277	-342	-40	-24	-320	-306	-340	-163	-62	-257	-124	-88	-108	-68	-43	-55	-23	-31	-34	-17	-22	-31	-44	-123
	367	482	432	117	74	481	433	488	285	169	383	186	156	167	116	79	91	52	71	91	51	40	55	105	207

Provisional Hourly Values (nT) of AU, AL and AE Indices SEPTEMBER 1990

DAY\UT		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	MEAN
1	AU	49	28	66	120	63	36	31	23	28	40	151	150	342	242	133	120	65	254	331	303	120	56	57	41	119
	AL	-115	-75	-39	-156	-113	-6	-8	-16	-20	-21	-106	-215	-723	-653	-191	-72	-88	-273	-704	-326	-35	-34	-22	-27	-168
	AE	166	105	106	278	176	44	40	40	49	63	258	365	1067	896	325	193	155	528	1036	629	157	91	81	69	288
2		29	21	11	7	4	3	5	4	6	6	7	7	6	2	-1	-1	0	7	14	25	34	18	10	10	10
		-29	-28	-25	-21	-12	-13	-12	-16	-17	-19	-23	-27	-29	-29	-35	-37	-32	-28	-34	-34	-51	-23	-16	-24	-26
		59	50	38	29	17	18	18	20	23	26	32	35	36	31	33	36	33	36	49	60	86	43	28	36	36
3		9	9	10	8	6	9	31	33	22	20	17	40	26	17	14	9	15	24	24	23	25	22	31	21	19
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		40	39	37	30	25	25	44	46	39	42	38	74	60	45	44	35	35	38	41	42	47	45	56	44	42
4		19	20	28	19	19	19	20	26	19	24	61	63	71	68	65	45	119	210	228	257	263	125	89	168	85
		-18	-19	-12	-6	-6	-7	-6	-5	-12	-20	-32	-65	-81	-107	-87	-70	-102	-425	-475	-296	-173	-52	-91	-220	-99
		39	40	42	27	26	27	26	32	33	46	94	129	153	175	152	116	222	636	703	554	438	178	180	388	186
5		87	151	144	178	125	112	119	142	101	108	159	168	91	31	84	100	120	73	65	48	75	101	67	70	105
		-107	-154	-337	-303	-124	-31	-14	-132	-104	-65	-88	-81	-63	-127	-74	-203	-244	-96	-25	-22	-27	-37	-30	-32	-105
		195	305	482	482	251	144	133	275	206	173	247	250	154	159	160	303	365	170	91	70	103	139	98	103	211
6		132	167	103	62	54	67	57	113	143	176	106	77	83	60	49	36	53	92	67	78	140	140	88	99	93
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		229	372	137	82	68	82	58	142	328	359	154	190	153	100	83	70	116	193	137	137	219	214	140	174	164
7		95	105	160	106	46	118	106	76	142	211	239	139	166	269	276	290	79	76	46	82	68	51	65	99	129
		-50	-41	-173	-76	-9	-48	-165	-140	-215	-324	-241	-200	-283	-426	-486	-465	-151	-26	-25	-48	-38	-35	-38	-70	-157
		146	148	333	182	56	167	272	217	357	535	480	340	450	697	763	757	231	103	72	132	107	86	104	170	288
8		64	50	86	65	45	90	99	91	59	102	110	98	68	51	30	30	85	45	50	121	142	165	67	111	80
		-75	-45	-44	-31	-16	-51	-176	-138	-29	-31	-134	-217	-58	-31	-39	-60	-73	-154	-58	-79	-148	-271	-54	-103	-88
		140	97	131	97	62	142	277	230	89	135	245	316	126	82	71	91	158	200	108	200	291	436	121	214	169
9		103	82	101	77	44	40	51	50	42	91	90	93	103	46	50	89	105	136	66	78	139	81	75	78	79
		-164	-90	-74	-118	-16	0	-2	-12	-19	-30	-110	-176	-143	-55	-41	-62	-198	-264	-119	-43	-89	-113	-62	-39	-85
		268	172	175	196	62	40	54	63	62	122	201	269	246	102	92	152	304	401	186	122	229	196	138	117	165
10		148	151	82	58	57	121	73	69	45	34	30	21	26	17	16	19	20	28	34	58	142	120	314	270	81
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		310	371	107	73	70	207	254	98	57	49	44	43	53	47	54	60	68	63	56	94	259	239	526	540	156
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		-80	-113	-53	-28	-16	-5	-3	-46	-145	-170	-192	-454	-309	-234	-435	-286	-202	-95	-170	-189	-242	-181	-417	-326	-183
		142	208	119	92	75	68	111	165	313	385	325	607	523	522	752	511	426	307	426	348	436	383	641	599	354
12		157	177	226	150	204	176	93	75	90	132	105	86	71	57	96	103	154	154	133	233	221	205	84	44	134
		-344	-249	-259	-207	-390	-279	-123	-29	-51	-447	-376	-148	-167	-277	-227	-123	-168	-185	-152	-247	-346	-176	-22	-39	-210
		502	427	487	358	595	457	217	105	142	579	481	234	239	335	325	228	323	341	287	481	568	382	106	85	345
13		113	189	175	135	101	30	27	27	92	176	175	113	68	108	107	185	179	215	162	142	157	86	209	221	133
		-177	-494	-184	-116	-110	-39	-11	-23	-29	-174	-347	-125	-114	-336	-386	-217	-94	-229	-282	-180	-158	-75	-170	-328	-183
		291	685	360	252	212	71	40	51	122	351	523	238	183	445	494	403	275	446	445	323	316	162	380	550	317
14		217	216	135	90	158	130	117	90	101	82	76	107	49	65	149	98	91	122	123	165	115	85	42	27	111
		-461	-170	-293	-122	-122	-566	-202	-34	-35	-37	-29	-336	-181	-71	-198	-288	-192	-200	-156	-264	-179	-156	-29	-21	-181
		679	386	430	214	281	697	320	126	137	120	106	444	231	138	348	387	284	323	279	431	295	241	72	49	292
15		39	77	133	122	169	180	115	162	73	66	75	108	104	86	97	171	199	131	215	206	201	116	61	34	122
		-26	-60	-406	-345	-310	-253	-159	-131	-49	-68	-41	-467	-445	-115	-137	-329	-446	-235	-331	-318	-284	-124	-58	-13	-214
		66	138	541	468	480	435	275	294	122	134	116	576	549	201	236	502	647	368	546	525	486	241	120	48	338

16	93	182	219	172	226	141	75	201	133	192	211	170	109	211	182	158	65	80	63	56	42	37	46	124	133
	-72	-287	-443	-223	-201	-111	-57	-309	-178	-175	-567	-393	-199	-301	-326	-281	-45	-57	-41	-19	-16	-19	-30	-134	-187
	166	469	663	396	429	254	133	511	312	367	778	563	309	513	509	441	111	138	105	76	59	57	78	259	321
17	99	47	73	70	44	50	111	99	81	74	124	73	117	66	28	31	49	74	114	88	132	150	152	55	83
	-212	-120	-76	-153	-137	-33	-221	-277	-124	-128	-187	-195	-314	-188	-85	-73	-77	-183	-224	-119	-123	-208	-249	-31	-156
	311	168	151	225	183	84	333	377	205	203	312	268	432	255	114	105	127	257	339	209	256	359	402	86	240
18	28	19	19	24	52	93	106	150	176	278	197	212	150	214	256	303	256	155	62	106	181	103	43	145	139
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	41	41	43	44	103	268	363	374	468	899	577	633	527	562	560	728	596	406	108	173	491	350	74	264	362
19	111	134	154	72	39	93	94	111	107	101	37	41	36	42	7	20	148	217	154	158	146	85	73	171	98
	-427	-526	-347	-58	-37	-67	-249	-231	-172	-108	-59	-42	-48	-53	-74	-58	-199	-518	-320	-231	-161	-130	-44	-455	-192
	539	660	502	130	77	161	343	343	280	210	97	85	85	96	83	79	348	737	474	391	308	216	118	627	291
20	183	199	73	38	40	44	25	25	27	31	35	38	47	29	26	73	123	158	99	145	268	387	216	196	105
	-355	-274	-96	-19	-24	-28	-16	-17	-13	-17	-17	-27	-81	-24	-47	-98	-295	-391	-93	-126	-313	-391	-180	-237	-132
	539	473	170	58	65	73	42	44	40	49	53	66	129	54	75	173	419	550	194	272	582	780	397	434	239
21	130	146	70	45	47	84	52	90	125	119	178	178	157	82	106	131	81	140	143	219	147	117	153	137	120
	-138	-224	-77	-15	-44	-241	-221	-204	-182	-318	-340	-188	-182	-208	-266	-214	-130	-152	-213	-411	-167	-87	-214	-278	-196
	269	371	148	62	92	327	274	295	308	438	518	366	340	291	373	346	212	292	357	630	315	205	367	416	317
22	193	191	189	193	177	205	139	140	81	88	72	77	54	74	156	238	224	71	51	48	120	173	132	157	135
	-254	-290	-185	-149	-196	-252	-325	-165	-76	-49	-172	-121	-49	-99	-283	-469	-291	-42	-16	-14	-154	-256	-180	-168	-177
	448	482	375	343	373	458	465	306	157	137	246	199	104	174	440	708	516	114	69	63	275	431	313	326	313
23	146	195	128	154	78	49	99	118	105	105	142	73	39	27	39	135	84	31	36	65	57	38	28	32	83
	-274	-307	-58	-260	-182	-63	-149	-347	-222	-48	-132	-106	-15	-9	-40	-242	-184	-33	-28	-41	-25	-29	-19	-17	-118
	420	502	186	415	261	113	250	466	328	153	275	179	55	37	80	378	269	64	65	107	83	67	48	50	202
24	35	33	28	59	100	96	154	193	179	293	338	241	129	133	58	116	232	175	54	110	97	47	31	50	124
	-81	-111	-45	-122	-144	-210	-193	-325	-325	-304	-216	-278	-363	-279	-146	-203	-333	-200	-37	-123	-119	-27	-1	-34	-176
	117	145	74	182	246	307	349	519	504	598	554	520	494	413	206	320	566	376	92	234	218	74	32	85	301
25	48	83	82	65	89	79	103	132	82	106	63	38	34	27	15	25	29	50	122	163	158	92	64	29	74
	-27	-59	-385	-157	-134	-32	-51	-134	-44	-41	-20	-28	-23	-26	-32	-36	-60	-86	-146	-231	-277	-145	-51	-76	-96
	76	143	467	224	224	112	154	267	127	147	84	67	58	53	47	61	90	136	268	395	435	237	116	107	171
26	16	22	56	55	31	40	32	33	22	20	78	40	40	57	62	96	122	60	81	243	147	54	46	27	62
	-71	-33	-20	-97	-98	-7	-2	-8	-7	-16	-48	-44	-32	-53	-107	-274	-242	-127	-86	-234	-130	-26	-46	-16	-76
	88	56	77	153	130	48	35	42	30	37	127	85	72	111	170	372	365	188	168	477	278	81	93	44	139
27	81	49	87	85	53	107	77	73	102	65	51	49	76	79	42	37	32	32	32	32	49	78	35	28	60
	-89	-21	-143	-90	-17	-76	-166	-183	-29	-3	-20	-39	-154	-132	-94	-74	-51	-34	-11	-8	-26	-48	-11	-13	-64
	172	70	231	176	72	185	245	257	133	69	72	89	231	211	137	111	84	66	44	41	76	127	46	41	124
28	30	44	52	64	70	44	24	29	31	41	39	79	44	39	20	10	13	27	32	28	30	36	43	51	38
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	36	61	263	214	103	55	26	29	37	60	80	192	272	133	41	30	29	49	56	66	53	51	110	169	92
29	74	107	74	44	30	66	44	28	21	30	39	30	34	29	23	17	15	19	33	58	53	43	68	162	47
	-178	-204	-100	-24	-13	-22	-80	-87	-24	-66	-20	-31	-26	-24	-25	-29	-18	-12	-19	-56	-113	-48	-53	-186	-61
	252	311	175	69	44	90	126	116	46	96	60	62	61	53	48	47	33	32	52	114	167	92	122	350	109
30	50	32	26	20	19	16	16	17	21	32	15	18	16	17	14	14	16	21	20	24	60	38	25	31	24
	-72	-10	-15	-19	-19	-14	-6	-9	-11	-19	-22	-21	-24	-20	-27	-26	-22	-12	-4	-8	-41	-37	-5	-20	-20
	123	43	41	40	39	31	23	26	33	52	38	40	41	38	41	41	39	35	25	33	102	76	31	52	45

Provisional Hourly Values (nT) of AU, AL and AE Indices OCTOBER 1990

DAY\UT		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	MEAN
1	AU	17	14	44	57	60	75	52	36	27	25	26	27	27	26	26	24	22	20	22	22	23	20	20	19	31
	AL	-11	-11	-8	-112	-58	-16	-3	-12	-22	-33	-37	-34	-28	-19	-10	-7	-3	1	3	2	2	0	0	0	-17
	AE	29	26	53	170	118	92	55	49	49	58	63	61	56	46	37	33	27	18	19	18	20	20	20	20	48
2		24	22	27	24	26	27	28	40	59	111	104	50	55	132	89	33	22	36	66	49	37	45	45	32	49
		-8	-11	-11	-9	-6	-9	-11	-8	-18	-89	-81	-31	-30	-53	-83	-23	-18	-78	-209	-61	-2	0	0	-2	-35
		32	33	39	34	33	37	40	48	78	201	186	82	87	186	172	57	42	114	276	111	40	46	45	35	86
3		43	45	59	54	63	89	76	79	58	77	62	64	59	51	34	39	32	29	39	95	78	83	102	66	61
		-6	-7	-15	-22	-66	-17	5	1	-7	-15	-25	-21	-17	-21	-9	-19	-18	-6	-14	-54	-35	-33	-51	-133	-25
		50	54	75	78	130	106	69	78	66	93	89	85	77	73	44	58	51	35	53	149	114	117	154	199	87
4		41	42	40	53	53	118	118	86	74	59	110	55	45	41	68	87	72	114	255	126	63	90	46	34	79
		-39	-25	-28	-32	-19	-152	-166	-21	-19	-24	-112	-37	-30	-32	-180	-366	-314	-335	-379	-177	-23	-112	-135	-100	-119
		81	68	69	86	73	271	286	108	94	84	222	94	76	74	250	453	387	449	635	305	87	203	182	136	199
5		60	67	71	93	72	88	72	110	75	67	96	53	81	51	40	22	16	23	28	27	33	50	89	89	61
		-68	-137	-179	-211	-89	-62	-53	-116	-98	-65	-111	-92	-94	-65	-319	-55	-39	-29	-18	-7	-11	-25	-142	-132	-92
		129	205	251	306	162	152	127	227	175	133	209	146	176	117	359	78	57	54	47	36	46	76	232	222	155
6		37	57	21	66	33	85	51	94	104	213	131	100	107	37	33	35	29	58	92	65	54	80	57	59	71
		-29	-24	-13	-18	-10	-110	-228	-232	-454	-390	-283	-247	-111	-28	-38	-114	-140	-171	-311	-106	-29	-104	-134	-22	-139
		67	82	34	86	44	197	280	327	559	605	415	348	219	67	72	150	170	230	404	172	84	184	192	83	211
7		59	79	72	56	39	50	51	77	67	96	64	39	35	38	26	15	25	30	56	63	48	63	74	66	54
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		92	166	102	80	45	60	85	100	162	193	198	105	64	158	178	159	74	96	123	153	99	133	205	225	127
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		114	35	40	48	38	42	45	105	117	132	92	111	86	62	70	182	83	54	39	29	34	35	40	36	70
9		39	57	57	47	37	40	43	46	49	44	45	47	75	81	60	42	47	100	194	303	221	126	162	198	90
		-11	-10	-9	-4	-3	-2	-1	-1	-10	-12	-17	-18	-28	-150	-148	-58	-32	-94	-315	-429	-253	-107	-130	-340	-91
		51	68	66	52	40	44	45	48	61	57	63	66	104	232	208	100	80	195	509	734	476	234	292	539	182
10		86	61	158	134	239	395	322	31	30	196	186	63	58	142	99	266	100	72	72	46	56	29	18	108	124
		-489	-572	-435	-407	-229	-498	-488	-514	-699	-773	-391	-87	-269	-744	-332	-376	-95	-53	-84	-29	-43	-22	-32	-116	-324
		576	634	593	542	469	894	810	546	730	970	578	151	329	887	432	643	197	125	158	75	100	52	52	224	449
11		78	121	133	160	107	102	123	210	204	85	71	82	79	68	72	181	203	230	297	264	214	163	148	194	150
		-477	-554	-224	-178	-255	-457	-617	-684	-334	-69	-129	-479	-243	-113	-98	-540	-746	-540	-395	-407	-366	-518	-426	-298	-381
		557	677	359	339	363	560	741	895	539	154	201	562	322	183	172	722	950	770	693	672	580	683	575	492	532
12		135	81	168	173	84	220	263	164	148	184	139	72	44	69	39	40	75	152	153	131	143	159	103	149	129
		-228	-242	-375	-302	-388	-387	-456	-215	-291	-442	-519	-396	-286	-96	-69	-48	-265	-391	-572	-583	-458	-362	-187	-273	-326
		364	324	544	477	473	608	720	380	439	627	660	469	332	166	110	89	341	544	726	714	601	521	291	422	456
13		66	101	119	139	90	77	81	97	63	54	49	50	31	27	48	53	25	25	16	94	126	92	67	64	69
		-101	-173	-214	-218	-125	-132	-138	-167	-130	-89	-54	-33	-60	-46	-212	-288	-181	-107	-30	-71	-254	-192	-174	-276	-144
		168	275	334	358	216	210	220	265	195	144	104	84	92	75	261	341	207	133	47	167	381	285	242	340	214
14		59	87	146	97	90	128	119	122	89	39	33	26	25	33	26	68	88	175	133	100	90	72	132	174	90
		-129	-400	-496	-91	-94	-191	-263	-215	-153	-65	-55	-42	-46	-140	-214	-136	-211	-381	-350	-172	-224	-69	-398	-500	-210
		189	488	644	189	185	320	383	338	243	105	90	69	72	174	241	205	300	557	484	274	315	141	531	675	301
15		123	98	106	97	116	59	76	98	117	147	121	167	103	221	262	228	258	166	80	94	131	136	125	51	133
		-424	-426	-208	-254	-126	-122	-112	-143	-128	-383	-331	-353	-345	-804	-640	-434	-534	-379	-158	-146	-373	-272	-125	-60	-303
		547	525	316	352	244	183	189	242	247	531	452	521	449	1027	904	663	793	546	239	242	505	408	252	113	437

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	180	132	215	120	136	260	419	366	209	101	153	144	51	63	41	54	112	171	45	69	166	387	244	166	167
17	73	52	69	48	38	74	81	56	35	52	32	21	19	12	9	15	11	7	5	7	11	11	13	19	32
	-155	-220	-64	-21	-13	-44	-193	-190	-73	-49	-22	-23	-27	-23	-26	-29	-26	-17	-16	-21	-19	-17	-15	-18	-55
	228	273	135	69	52	120	275	248	109	103	55	44	47	36	36	46	38	25	22	29	32	29	29	38	88
18	17	21	26	31	30	26	38	32	43	68	48	57	28	3	37	64	100	142	77	41	51	90	122	125	55
	-22	-22	-17	-13	-11	-9	-25	-25	-137	-227	-160	-76	-48	-157	-222	-231	-301	-347	-109	-14	-13	-58	-95	-132	-103
	40	43	43	44	42	36	65	58	181	296	209	134	77	160	260	296	403	489	187	57	65	149	218	257	159
19	134	118	76	65	110	99	83	85	70	50	109	104	73	80	20	13	16	21	12	21	51	100	75	46	68
	-136	-140	-290	-210	-109	-55	-103	-102	-108	-79	-286	-207	-130	-136	-111	-78	-63	-59	-20	-10	-51	-145	-118	-35	-116
	271	258	367	277	220	155	187	189	179	130	395	312	204	217	131	93	81	82	34	32	103	246	193	82	185
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	72	97	117	192	186	104	94	105	200	593	739	490	361	147	447	778	240	70	265	503	730	695	470	269	332
21	62	100	79	32	71	76	52	71	81	149	232	221	72	59	46	8	11	6	8	14	20	28	29	37	65
	-157	-231	-126	-27	-90	-219	-188	-124	-248	-328	-257	-320	-308	-302	-173	-91	-67	-31	-22	-19	-28	-19	-28	-41	-143
	220	332	206	60	162	296	242	197	330	478	491	541	381	362	219	100	79	38	32	34	48	48	57	78	210
22	51	51	110	111	95	71	81	65	69	28	55	51	50	45	57	23	25	30	32	27	15	15	23	27	50
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	257	199	394	313	216	127	127	84	96	53	91	103	122	107	321	263	175	172	80	39	33	35	42	45	146
23	32	34	38	39	29	25	32	28	30	36	28	34	25	22	23	34	35	20	31	35	96	163	182	210	53
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	48	48	50	53	42	36	38	34	40	63	109	217	81	54	45	64	69	52	57	64	281	580	498	367	125
24	79	106	158	207	167	221	163	172	172	163	134	56	61	127	159	183	46	54	88	88	43	41	36	66	116
	-266	-266	-376	-279	-299	-118	-77	-72	-90	-130	-43	-92	-225	-273	-443	-345	-140	-77	-198	-113	-15	-25	-18	-69	-169
	346	372	535	487	467	340	242	245	263	294	178	149	286	401	603	529	187	131	287	202	59	68	55	136	286
25	72	82	70	80	100	76	46	34	81	40	50	31	28	26	22	8	18	17	18	16	28	28	46	65	45
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	281	305	200	281	255	90	54	47	129	226	95	48	69	61	204	75	50	36	39	29	56	57	105	143	122
26	31	29	24	30	39	27	41	40	38	41	39	29	33	30	63	53	120	106	118	104	80	49	46	67	53
	-30	-13	-21	-21	-18	-14	-8	-6	-9	-16	-21	-25	-14	-64	-28	-19	-119	-329	-254	-129	-107	-80	-19	-26	-58
	61	44	45	53	58	42	49	47	49	58	61	54	49	95	93	73	239	435	373	235	189	130	66	94	112
27	43	39	33	58	70	107	112	95	63	32	61	109	60	31	40	20	31	62	31	28	21	32	37	37	52
	-48	-26	-20	-42	-101	-63	-32	-35	-11	-29	-119	-194	-132	-45	-27	-98	-148	-279	-80	-39	-26	-45	-76	-125	-77
	92	67	55	100	172	171	145	132	76	63	181	304	194	76	68	119	180	341	112	68	48	78	113	163	130
28	45	41	34	33	52	61	77	101	77	30	30	25	11	19	13	19	16	12	8	6	4	8	11	13	31
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	144	67	73	104	165	129	162	306	230	55	43	40	28	42	44	37	33	27	19	28	23	30	35	35	79
29	14	17	20	25	32	40	37	35	39	56	61	103	58	42	23	17	38	95	78	73	133	151	96	129	59
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	38	37	45	48	50	53	49	42	57	128	196	163	67	54	39	35	204	395	256	137	185	299	138	152	119
30	152	66	209	89	55	39	23	23	27	24	12	13	9	9	16	22	12	54	61	46	36	71	57	86	50
	-55	-382	-551	-120	-15	-21	-16	-50	-186	-89	-21	-17	-21	-24	-81	-80	-84	-131	-214	-48	-38	-44	-54	-166	-105
	207	448	761	210	71	62	41	75	214	115	34	31	31	35	98	103	97	185	276	94	75	116	113	252	156
31	59	50	58	84	60	96	79	174	145	129	180	117	57	36	118	116	123	121	165	177	194	140	179	112	115
	-58	-31	-26	-68	-204	-267	-287	-320	-80	-151	-374	-229	-27	-42	-432	-468	-194	-221	-410	-506	-511	-276	-307	-216	-238
	118	81	85	154	266	364	368	494	227	282	554	347	86	79	552	584	318	344	576	683	706	417	487	329	354

Provisional Hourly Values (nT) of AU, AL and AE Indices NOVEMBER 1990

DAY\UT		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	MEAN
1	AU	69	47	36	51	30	34	48	23	14	16	38	39	22	18	15	5	8	19	16	13	48	70	74	78	35
	AL	-108	-81	-53	-33	-107	-61	-55	-49	-11	-20	-88	-184	-98	-59	-24	-23	-42	-84	-32	-30	-32	-155	-116	-133	-70
	AE	179	129	91	85	139	96	104	73	27	37	126	224	121	78	40	29	51	104	49	43	81	226	191	212	106
2		79	33	75	49	84	67	39	36	20	25	27	25	22	17	11	12	25	19	27	47	88	82	37	36	41
		-147	-65	-99	-67	-264	-35	-7	-14	-12	-32	-44	-25	-36	-20	-32	-44	-195	-119	-71	-56	-59	-75	-90	-41	-69
		227	99	176	117	349	103	47	51	33	58	72	51	59	39	44	57	221	138	98	103	148	158	128	79	111
3		46	42	48	56	54	31	32	41	52	81	72	62	54	85	52	18	16	13	23	44	33	51	66	60	47
		-23	-61	-102	-130	-6	0	2	-2	-10	-67	-73	-32	-19	-90	-66	-76	-43	-31	-28	-29	-46	-83	-54	-29	-46
		70	104	152	187	61	31	29	43	64	149	145	95	74	176	120	95	60	44	51	74	80	136	120	90	94
4		66	60	53	38	56	28	18	18	19	16	7	7	9	8	6	7	6	11	15	12	10	11	10	9	21
		-47	-19	-16	-14	-10	-6	-7	-8	-7	-14	-16	-14	-21	-21	-26	-31	-35	-33	-28	-26	-25	-21	-18	-22	-20
		114	80	71	53	67	35	26	27	28	31	24	22	31	30	33	38	41	44	44	38	36	32	29	32	42
5		8	7	7	7	9	9	9	10	18	10	9	8	8	7	7	8	7	8	9	12	16	17	19	23	10
		-23	-21	-11	-13	-10	-7	-5	-13	-9	-11	-14	-21	-25	-27	-29	-36	-38	-34	-26	-27	-23	-18	-24	-26	-20
		32	29	18	21	19	17	14	24	28	22	23	29	34	35	36	45	46	42	36	40	40	37	44	50	32
6		17	14	11	10	11	16	15	23	17	13	12	10	10	11	11	10	11	12	11	15	14	21	20	16	14
		-13	-9	-9	-11	-11	-6	-5	-4	-5	-10	-15	-17	-23	-29	-28	-35	-36	-34	-34	-28	-29	-23	-22	-16	-19
		31	24	20	21	23	22	22	28	24	24	28	28	34	41	39	46	48	47	45	43	44	45	43	33	34
7		15	13	12	13	14	14	14	14	15	26	39	123	140	35	15	12	58	68	41	18	18	33	56	63	36
		-13	-13	-17	-17	-12	-3	-1	-1	-8	-36	-124	-221	-248	-48	-36	-55	-173	-286	-76	-30	-18	-31	-120	-102	-70
		30	27	29	30	27	17	15	16	24	62	163	345	390	84	52	67	231	355	118	49	38	66	177	166	107
8		38	16	16	25	17	62	82	137	100	97	33	56	64	43	43	15	81	137	147	128	63	71	66	59	67
		-30	-15	-12	-7	-13	-152	-341	-213	-55	-20	-34	-30	-73	-21	-31	-42	-181	-358	-342	-173	-56	-53	-160	-154	-107
		69	33	29	34	31	216	424	351	156	118	68	88	138	65	76	57	263	496	489	301	119	125	228	215	174
9		50	67	131	187	131	59	80	85	72	34	31	59	32	48	19	15	49	87	50	19	18	19	41	43	59
		-130	-173	-342	-236	-190	-134	-78	-144	-288	-105	-48	-87	-147	-168	-93	-134	-159	-360	-213	-23	-18	-31	-62	-185	-148
		182	242	475	424	323	194	159	229	360	140	80	147	180	218	113	150	208	447	263	43	38	51	104	230	208
10		73	127	87	92	61	49	46	48	97	87	87	92	69	40	92	145	133	106	85	158	125	95	57	73	88
		-198	-254	-264	-110	-83	-67	-118	-117	-308	-172	-209	-257	-246	-320	-350	-310	-332	-330	-183	-280	-278	-149	-192	-329	-227
		272	382	351	203	145	117	165	166	406	260	296	350	316	361	443	456	466	436	269	438	403	245	250	403	317
11		99	71	63	36	77	76	179	120	96	76	95	104	102	53	49	34	37	23	31	28	17	17	21	42	64
		-198	-123	-180	-139	-203	-171	-239	-187	-123	-97	-181	-308	-256	-216	-355	-32	-25	-36	-46	-23	-25	-21	-16	-31	-135
		299	195	244	177	282	247	420	308	220	173	276	414	359	270	405	67	63	60	78	52	42	39	37	74	200
12		14	6	6	19	8	9	9	8	9	10	14	12	7	11	16	13	12	12	15	8	11	14	24	21	12
		-23	-28	-18	-35	-11	-7	-12	-26	-10	-15	-22	-37	-21	-23	-54	-40	-58	-46	-38	-24	-32	-25	-24	-24	-27
		39	34	24	55	20	16	22	35	20	26	37	49	28	35	71	54	70	59	53	33	44	40	50	46	40
13		13	12	12	10	17	33	30	29	25	10	22	21	28	15	7	13	10	18	14	13	10	12	12	10	17
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		70	32	27	24	35	42	38	37	39	30	44	44	69	45	28	31	72	54	28	26	28	37	44	42	40
14		8	11	12	13	11	10	13	11	15	15	23	13	8	8	8	8	7	11	12	12	12	14	13	14	12
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		37	39	34	33	29	30	34	30	36	40	55	37	33	33	32	31	29	31	32	32	35	39	39	36	35
15		18	16	23	20	13	17	17	11	8	8	8	16	15	14	10	11	11	18	20	28	21	19	22	25	16
		-15	-16	-14	-13	-12	-8	-3	-1	-8	-9	-14	-15	-14	-15	-19	-17	-19	-19	-22	-17	-14	-9	-8	-6	-13
		34	34	38	34	25	26	21	13	18	19	24	32	30	30	31	30	31	37	42	45	36	30	31	33	30

16	20	12	29	16	20	75	141	243	199	134	88	129	151	130	193	78	90	129	103	45	28	50	61	45	92
	-5	-30	-68	-33	-67	-247	-355	-243	-250	-467	-502	-369	-448	-497	-501	-125	-159	-322	-312	-74	-34	-148	-284	-99	-235
	26	43	98	51	89	323	497	487	451	602	592	499	599	627	694	203	249	451	416	120	63	199	347	146	328
17	29	20	19	34	30	23	35	76	83	111	207	88	35	74	164	133	92	186	130	71	82	57	48	78	79
	-75	-91	-77	-198	-171	-104	-128	-265	-138	-313	-347	-396	-671	-516	-443	-471	-261	-382	-314	-198	-261	-191	-213	-211	-268
	106	112	97	233	202	128	164	342	223	425	555	485	706	591	607	604	354	569	445	269	344	249	262	290	349
18	139	49	33	15	50	44	27	32	35	55	104	155	68	48	125	266	169	165	85	35	21	33	44	63	77
	-187	-33	-23	-59	-195	-195	-54	-113	-202	-338	-301	-232	-188	-568	-620	-422	-303	-318	-96	-16	-21	-60	-72	-254	-203
	328	83	58	75	246	240	83	147	237	393	406	388	257	617	746	689	473	484	181	52	43	94	118	318	282
19	44	93	107	113	101	62	53	45	28	30	23	17	17	13	11	11	18	34	17	21	25	28	23	27	40
	-156	-246	-295	-155	-104	-88	-28	-10	-23	-18	-15	-17	-19	-27	-30	-49	-88	-205	-44	-44	-29	-29	-94	-42	-77
	202	341	404	270	207	151	82	56	51	48	39	35	37	41	42	61	106	239	61	66	55	58	118	70	118
20	30	23	52	68	37	92	53	55	80	46	30	23	18	14	12	7	3	4	5	13	18	23	22	39	32
	-21	-18	-38	-43	-3	-79	-49	-11	-23	-25	-21	-13	-20	-13	-28	-30	-31	-31	-20	-17	-17	-15	-19	-15	-25
	51	41	91	112	41	173	103	67	104	71	52	37	39	28	41	38	35	36	27	31	36	39	42	55	58
21	29	43	59	116	111	119	98	53	25	30	59	43	35	48	22	27	13	31	38	14	18	54	53	21	48
	-14	-24	-32	-228	-245	-205	-16	-11	-7	-28	-102	-36	-54	-200	-210	-57	-47	-86	-78	-32	-26	-28	-51	-28	-77
	44	68	92	345	357	326	115	65	32	59	162	80	89	249	232	85	61	118	117	47	44	84	104	49	126
22	13	13	11	8	12	8	7	7	6	7	8	11	12	11	10	4	7	9	19	23	11	11	12	12	10
	-16	-11	-11	-13	-8	-7	-7	-9	-8	-11	-12	-11	-11	-14	-33	-33	-28	-34	-68	-137	-20	-24	-32	-37	-25
	30	25	23	21	21	17	15	17	16	20	22	23	25	27	43	38	36	43	88	160	32	37	45	51	36
23	10	9	11	13	12	20	18	14	13	13	15	21	53	17	6	28	70	83	23	15	19	38	33	46	25
	-37	-27	-16	-14	-9	-7	-8	-7	-6	-9	-9	-36	-228	-153	-185	-157	-178	-126	-21	-10	-8	-30	-138	-104	-63
	48	38	28	29	22	29	27	23	20	23	25	58	282	171	192	185	249	209	44	26	28	69	173	151	90
24	37	45	69	34	16	12	15	15	16	18	19	19	18	18	18	19	19	20	19	15	11	10	10	15	21
	-89	-93	-111	-24	-9	-6	-5	-8	-12	-19	-20	-17	-21	-50	-20	-14	-21	-18	-14	-13	-14	-11	-12	-19	-27
	127	139	181	59	25	18	21	24	28	37	39	37	40	69	39	33	41	38	33	29	25	22	23	35	48
25	12	16	19	25	24	24	22	19	20	18	26	26	30	22	20	16	13	16	22	39	85	97	87	42	31
	-15	-12	-13	-11	-5	-3	-3	-6	-7	-11	-145	-162	-102	-42	-14	-16	-19	-18	-60	-103	-112	-94	-77	-44	-46
	28	29	33	36	29	28	26	26	28	29	171	189	133	65	34	32	33	35	83	143	199	193	165	87	77
26	23	42	45	60	68	79	70	21	17	31	34	26	45	51	31	23	32	40	28	23	21	19	20	121	40
	-18	-54	-189	-107	-180	-100	-8	-7	-9	-30	-72	-100	-253	-412	-314	-198	-65	-36	-29	-15	-10	-9	-6	-91	-96
	42	98	235	168	250	181	78	29	26	62	106	126	299	464	346	222	97	77	57	39	32	29	28	213	138
27	92	73	25	84	79	101	82	75	40	42	41	73	61	59	94	78	-13	-43	69	129	134	82	48	22	64
	-162	-134	-240	-112	-46	-107	-205	-45	-6	-21	-18	-120	-144	-139	-235	-500	-1092	-1203	-673	-873	-454	-336	-190	-77	-297
	256	208	266	198	127	209	287	121	47	64	59	194	206	200	330	580	1079	1160	742	1002	588	418	239	100	362
28	30	39	95	106	87	129	76	73	31	13	22	3	4	1	-4	5	15	44	80	104	68	20	32	34	46
	-179	-225	-223	-245	-131	-123	-50	-48	-36	-63	-42	-52	-46	-41	-48	-131	-138	-252	-299	-462	-147	-57	-87	-37	-132
	210	266	318	352	219	253	127	122	68	76	65	55	50	42	43	136	153	297	380	567	216	78	120	72	178
29	23	18	42	33	36	33	29	28	26	25	19	7	11	9	6	12	5	9	10	14	39	45	29	32	22
	-24	-30	-44	-52	-18	-19	-14	-16	-36	-37	-27	-26	-29	-30	-24	-52	-78	-52	-31	-20	-41	-86	-72	-77	-39
	49	49	88	86	55	53	44	45	62	62	47	34	40	40	31	65	83	62	42	34	81	132	102	109	62
30	39	58	87	65	27	17	27	37	61	95	56	44	92	61	23	85	141	82	40	51	46	33	66	83	59
	-62	-55	-81	-17	-4	-4	-8	-28	-32	-20	-24	-62	-213	-136	-76	-315	-541	-169	-50	-89	-88	-70	-67	-72	-95
	102	114	169	83	33	23	36	67	94	117	81	106	306	197	100	401	683	252	90	140	134	105	134	156	155

Provisional Hourly Values (nT) of AU, AL and AE Indices DECEMBER 1990

DAY\UT		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	MEAN
1	AU	109	115	61	75	91	72	29	19	20	8	13	29	20	21	10	9	12	23	12	13	12	9	11	5	33
	AL	-60	-31	-21	-24	-32	-12	-17	-39	-50	-62	-65	-54	-38	-33	-56	-186	-113	-25	-28	-28	-29	-30	-32	-32	-46
	AE	171	148	84	100	124	85	46	59	71	71	79	85	59	55	67	196	126	50	41	42	42	41	44	39	80
2		6	5	6	9	14	12	17	18	25	27	33	24	23	17	23	23	14	40	76	29	25	13	35	57	24
		-31	-27	-26	-24	-20	-8	-8	-7	-10	-19	-42	-21	-45	-88	-20	-18	-29	-103	-219	-118	-29	-12	-30	-62	-42
		39	34	33	35	35	22	26	25	36	48	77	46	70	105	44	42	44	144	296	148	55	26	66	120	67
3		26	26	30	33	35	39	33	24	28	14	13	9	11	10	11	11	12	66	120	147	79	39	43	83	39
		-56	-19	-14	-23	-18	-9	-24	-20	-10	-17	-16	-19	-17	-24	-50	-132	-295	-152	-241	-202	-23	-17	-12	-66	-61
		83	46	46	57	55	49	59	45	39	32	30	29	29	34	62	144	309	219	361	349	103	57	57	150	102
4		129	167	96	114	79	34	28	23	42	81	113	80	31	44	67	122	74	49	31	36	34	26	87	144	72
		-191	-192	-231	-354	-201	-40	-32	-61	-91	-121	-381	-277	-324	-267	-249	-250	-177	-78	-52	-68	-82	-46	-219	-242	-176
		322	360	327	469	281	75	62	85	133	203	494	357	356	312	317	372	251	128	84	105	117	74	306	388	249
5		95	57	36	48	28	36	67	89	85	120	132	88	95	80	71	77	123	161	83	47	41	26	18	22	72
		-110	-49	-8	-18	-6	-5	-44	-247	-334	-216	-215	-330	-207	-155	-227	-501	-511	-230	-211	-49	-33	-45	-48	-31	-160
		206	107	45	68	36	43	112	337	420	337	347	418	302	236	299	578	634	392	295	97	75	72	68	54	232
6		21	29	56	51	35	32	21	40	41	38	44	93	53	55	7	7	14	27	35	29	28	21	37	29	35
		-30	-58	-123	-75	-19	-10	-12	-11	-24	-37	-221	-271	-178	-189	-197	-148	-186	-203	-198	-109	-42	-23	-51	-84	-104
		52	89	179	126	54	43	35	53	65	76	266	365	231	245	205	157	201	232	234	139	71	46	89	114	140
7		23	20	30	27	42	45	37	21	16	17	16	13	14	17	17	19	12	11	16	12	10	11	10	9	19
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		101	45	67	74	111	84	62	37	33	33	36	40	36	39	40	47	67	134	62	28	24	21	20	22	53
8		8	11	14	18	18	24	19	19	63	95	86	30	14	4	15	30	31	45	69	75	87	99	79	40	41
		-16	-9	-16	-11	-10	-57	-78	-36	-186	-115	-141	-67	-76	-103	-260	-242	-77	-186	-65	-68	-86	-40	-72	-41	-86
		25	21	31	30	29	83	98	56	250	211	228	97	90	107	276	272	108	231	135	144	175	140	152	82	128
9		32	51	35	27	32	34	40	38	60	35	37	40	63	70	47	21	11	17	18	21	18	15	16	9	33
		-17	-54	-41	-20	-79	-49	-21	-26	-29	-49	-55	-94	-142	-184	-214	-101	-108	-54	-19	-20	-21	-28	-34	-36	-62
		51	106	77	48	112	85	62	65	90	85	94	134	206	255	262	123	120	72	37	42	41	45	51	46	96
10		11	10	11	13	9	6	8	9	10	11	17	19	15	13	14	17	16	18	18	11	11	20	29	14	14
		-35	-31	-22	-21	-24	-19	-8	-7	-8	-14	-13	-14	-15	-16	-18	-17	-16	-16	-15	-21	-19	-17	-14	-17	-17
		48	43	34	35	35	26	18	18	19	26	31	33	31	30	33	35	33	36	35	33	31	37	43	32	32
11		13	16	14	12	11	9	10	11	11	11	9	10	10	9	8	10	6	13	12	19	10	6	11	14	11
		-19	-26	-25	-21	-16	-18	-16	-9	-16	-14	-11	-15	-17	-14	-13	-10	-17	-17	-41	-9	-9	-14	-21	-29	-17
		34	43	40	35	28	28	26	21	28	27	22	26	29	24	22	20	23	31	53	30	21	21	33	44	30
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		36	38	32	24	30	27	25	18	20	22	21	43	41	32	37	45	117	375	252	109	118	97	249	245	86
13		70	170	148	150	81	128	93	79	183	109	44	16	18	10	0	-1	11	9	10	3	3	7	17	13	57
		-339	-234	-275	-210	-292	-261	-106	-255	-400	-209	-130	-132	-91	-63	-115	-96	-53	-68	-71	-124	-50	-34	-88	-143	-160
		410	406	425	362	374	390	200	335	584	318	174	149	109	74	116	94	65	78	82	128	54	42	106	158	218
14		14	36	30	79	79	64	28	36	42	23	17	5	9	6	2	1	2	23	11	16	16	8	4	6	23
		-72	-81	-163	-211	-50	-11	-12	-16	-25	-17	-34	-27	-18	-27	-75	-316	-239	-120	-69	-28	-20	-18	-18	-20	-70
		88	119	194	291	130	76	41	53	68	42	51	34	28	34	78	318	241	144	82	45	37	28	23	28	95
15		13	18	17	17	39	49	60	25	62	43	31	12	17	16	7	5	4	15	50	35	20	23	20	17	26
		-22	-31	-33	-77	-110	-53	-73	-199	-156	-78	-91	-33	-25	-22	-26	-41	-73	-246	-233	-55	-22	-30	-34	-31	-75
		36	50	51	95	150	103	134	226	219	122	124	45	43	39	34	46	78	262	283	91	43	54	56	49	101

16	31	30	30	23	28	21	34	39	42	37	47	52	47	48	41	42	114	56	43	30	37	36	31	23	40
	-58	-95	-125	-95	-60	-7	-23	-104	-176	-130	-150	-167	-444	-126	-86	-164	-269	-139	-80	-11	-23	-16	-12	-13	-107
	90	126	155	119	90	29	59	144	219	168	198	219	491	175	128	207	384	197	124	43	61	54	44	37	148
17	27	29	38	45	46	54	35	33	22	18	21	18	14	11	8	4	9	20	29	41	39	22	25	33	27
	-17	-17	-75	-78	-28	1	6	-1	-16	-22	-17	-14	-22	-49	-37	-55	-212	-201	-195	-103	-41	-26	-20	-25	-53
	45	48	114	124	74	52	29	35	39	41	40	34	37	61	45	60	223	223	226	144	81	50	47	59	80
18	36	49	35	30	23	24	15	13	13	32	40	81	129	75	30	18	31	29	24	19	15	11	13	12	33
	-25	-34	-23	-19	-9	-17	-12	0	-2	-13	-129	-245	-206	-87	-19	-75	-79	-5	-3	-5	-12	-8	-11	-13	-44
	62	84	60	51	34	42	28	13	17	46	170	326	335	163	49	94	110	35	28	25	27	20	25	26	78
19	13	12	11	18	18	19	17	16	18	13	11	17	21	27	21	26	15	11	11	13	20	26	25	24	18
	-15	-18	-14	-25	-18	-11	-4	-2	-3	-6	-6	-7	-9	-19	-42	-26	-29	-31	-22	-11	-8	-8	-12	-14	-15
	29	30	27	45	37	31	23	18	22	20	18	24	31	47	64	53	44	42	34	25	28	34	38	39	33
20	18	20	23	58	53	50	96	63	100	64	111	89	34	21	33	53	88	118	170	136	41	32	16	13	62
	-9	-14	-19	-10	-18	-24	-14	-13	-18	-47	-127	-49	-5	-12	-103	-444	-350	-251	-236	-247	-43	-67	-40	-18	-91
	28	34	44	69	72	75	111	76	120	112	239	139	40	34	137	497	439	370	407	385	85	100	57	32	154
21	19	35	20	35	36	47	74	34	17	12	10	7	12	12	6	4	10	14	16	18	19	24	25	22	22
	-16	-12	-6	-6	-8	-37	-19	0	-5	-6	-6	-7	-9	-10	-10	-16	-24	-16	-18	-14	-22	-35	-7	-12	-13
	36	48	27	42	46	86	93	35	23	18	16	15	21	22	17	21	35	31	35	32	42	60	34	34	36
22	14	20	38	34	23	28	30	43	32	18	13	14	11	11	6	6	7	10	10	16	24	22	16	16	19
	-10	-20	-8	-5	-10	-1	-5	-2	-29	-12	-4	-25	-25	-40	-14	-17	-16	-15	-11	-6	-7	-8	-11	-10	-13
	25	41	47	40	35	30	36	45	62	31	17	40	37	52	21	25	25	26	21	22	31	31	28	28	33
23	19	15	13	12	14	15	26	39	43	43	41	29	17	18	14	18	17	15	11	16	18	26	53	103	27
	-11	-16	-4	1	2	3	2	-20	-143	-183	-69	-45	-21	-14	-19	-11	-17	-9	-10	-7	-6	-31	-138	-125	-37
	31	33	18	11	11	11	22	61	187	228	111	74	39	33	33	30	35	25	22	24	25	58	192	230	64
24	28	14	7	53	24	63	106	53	74	118	70	40	78	58	146	95	133	127	64	122	113	130	93	170	82
	-36	-18	-13	-47	-146	-131	-99	-47	-78	-100	-69	-83	-126	-301	-275	-227	-482	-635	-496	-543	-499	-389	-230	-230	-221
	65	34	21	102	172	195	207	101	153	219	139	124	205	360	422	322	616	763	560	666	613	519	324	400	304
25	206	122	97	89	86	104	111	52	31	19	27	69	84	36	14	27	83	95	70	27	70	45	41	42	69
	-99	-126	-88	-88	-122	-185	-26	-4	-14	-14	-51	-243	-155	-30	-27	-88	-262	-393	-235	-70	-84	-67	-40	-86	-108
	306	248	186	178	209	290	138	57	46	34	79	312	239	67	42	116	347	489	306	98	156	113	82	129	178
26	23	12	18	19	19	22	33	26	21	15	16	6	7	5	5	11	13	12	9	8	8	9	8	19	14
	-91	-60	-53	-45	-45	-37	-84	-110	-113	-71	-65	-19	-15	-23	-28	-33	-23	-24	-17	-13	-7	-9	-8	-10	-42
	115	73	72	66	66	60	118	137	134	87	82	26	23	29	34	45	38	37	27	22	17	20	17	29	57
27	7	7	16	20	42	15	31	35	33	52	51	50	50	34	26	30	26	22	15	15	13	13	14	28	27
	-18	-7	-35	-161	-84	-3	-19	-47	-142	-153	-75	-60	-44	-133	-109	-93	-22	-15	-11	-12	-6	-6	-18	-15	-54
	25	16	52	182	126	19	51	83	176	206	127	110	95	167	136	124	49	39	27	29	20	20	33	45	81
28	17	25	28	34	37	61	43	30	26	42	25	40	39	38	30	11	10	12	18	28	17	17	29	25	28
	-10	-14	-4	-27	-66	-14	0	-2	-5	-7	-7	-11	-23	-9	-9	-11	-15	-15	-15	-21	-19	-3	-21	-10	-14
	29	41	34	62	104	75	42	33	32	51	34	53	63	48	39	23	26	28	33	49	37	22	51	36	44
29	28	43	46	32	30	32	20	23	27	21	21	22	15	33	44	27	13	36	39	22	21	23	25	31	28
	-7	-4	-4	-2	-3	2	4	1	0	-3	-6	-35	-64	-66	-52	-23	-38	-134	-146	-39	-17	-15	-6	-20	-28
	36	49	52	35	35	29	15	21	28	25	28	58	80	99	97	50	51	171	186	61	40	39	33	53	57
30	56	94	121	84	74	78	99	60	71	73	85	89	89	89	74	51	31	25	57	62	56	52	35	34	68
	-26	-92	-33	2	1	10	-38	-14	-22	-45	-33	-30	-22	-69	-192	-72	-25	-23	-9	-5	-5	-10	-3	-1	-31
	84	187	155	82	73	68	138	75	94	118	118	120	111	159	267	124	56	49	67	68	61	63	38	36	100
31	16	16	18	20	15	15	13	15	14	25	84	159	80	52	81	184	242	170	87	52	78	156	77	49	72
	-4	0	5	4	0	-1	-18	-11	-12	-16	-154	-263	-154	-163	-390	-361	-304	-136	-88	-60	-160	-174	-144	-140	-114
	20	17	13	15	14	16	31	27	26	42	238	422	235	215	472	547	547	306	177	113	239	332	223	190	187

MONTHLY AND YEARLY **AE** 1957 - 1990

Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Annual mean
1957							158	145	310	155	167	216	
1958	192	255	301	263	231	272	270	200	185	174	131	182	221.7
1959	184	256	205	193	208	205	280	225	270	216	246	235	227.0
1960	170	162	183	322	206	235	225	211	211	324	277	254	232.0
1961	156	168	141	165	154	162	252	145	149	142	128	148	159.7
1962	89	95	100	159	110	130	139	171	197	220	151	155	143.8
1963	132	94	94	108	123	141	137	156	228	153	129	114	134.8
1964	116	122	133	148	123	94	99	88	101	110	88	62	107.3
1965	83	121	112	93	93	177	131	130	142	89	86	100	113.4
1966	107	129	152	145	161	150	182	176	222	151	148	156	157.2
1967	134	139	121	168	278	205	176	171	204	123	161	195	173.5
1968	187	227	256	231	267	302	213	202	205	183	198	163	219.7
1969	132	168	227	254	268	224	171	174	198	161	152	110	187.0
1970	117	104	210	233	199	242	275	221	202	194	191	134	194.6
1971	187	177	194	244	240	229	189	194	213	188	155	92	198.2
1972	192	160	203	202	193	238	176	259	195	201	179	132	194.9
1973	220	261	315	336	241	273	231	223	224	260	192	182	246.9
1974	200	226	323	308	297	278	322	307	305	325	247	244	282.8
1975	198	246	283	227	238	542	240	220	188	197	244	180	250.3
1976													
1977													
1978	191	237	244	292	310	308	214	239	246	192	214	177	238.9
1979	213	196	248	297	253	255	223	255	217	188	152	158	221.8
1980	149	164	122	182	184	262	203	180	165	195	199	151	180.1
1981	148	195	238	324	319	219	279	280	206	253	218	159	237.3
1982	178	387	221	305	290	367	372	319	347	275	255	277	299.0
1983	218	321	318	382	292	283	261	264	230	263	283	237	279.3
1984	214	253	300	330	315	284	279	260	311	302	246	255	279.6
1985	225	235	176	270	183	219	265	223	201	203	199	186	215.7
1986	187	273	208	138	202	188	172	232	217	161	187	138	191.6
1987	122	154	164	114	166	160	195	255	270	253	201	146	184.1
1988	180	215	218	233	196	234							
1989													
1990	181	298	296	363	292	249	215	289	220	204	132	108	237.2

Unit : nT

The definitive AE indices for July 1988 to December 1989 were not available at the date of publication of this Bulletin. The values for 1990 correspond to provisional AE(11) indices (see text p. 21).

SECTION 4

CLASSIFICATION OF DAYS

CLASSIFICATION OF DAYS

QUIET DAYS 1990

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	. .	. .	. .	. . *	. .	. .	C C *	. .	. .	C C *	. .	C K
2	. .	. .	. .	. .	. .	C C	. K	. .	C . *	C C *	. .	C C
3	. .	. .	. .	. .	. .	C C	C C	. .	C C *	. .	C K	. .
4	. .	. .	C . *	. .	. .	C C	. .	. .	. .	. .	C C *	. .
5	. .	. .	. .	. .	. .	C K *	. .	C C *	. .	. .	C C *	. .
6	. . *	. .	. .	. . *	C C *	. .	C .	. .	. .	. .	C C *	C .
7	C C *	. .	. .	. . *	C C	. .	C C	. .	. .	. .	K K	C C
8	. .	. . *	. .	C . *	. .	. .	. .	C C *	. .	C K *	. .	. K
9	. .	. K *	. .	. .	. .	. .	C . *	C C *	. .	. .	. .	C K
10	. .	. . *	. . *	. .	. .	. .	. .	C K *	. .	. .	. .	C C *
11	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	C C *
12	. .	K K *	. .	. .	C .	. .	. .	C .	. .	. .	K K	. .
13	. .	. . *	. .	. .	. K	. .	. .	. .	. .	. .	C C	. .
14	. .	. .	. .	. .	C K *	. .	. .	. .	. .	. .	C C *	. K
15	. .	. .	. .	. .	C C *	. .	. .	. .	. .	. .	C K	C K
16	. .	. .	. . *	. .	C C *	C C *	C C	. .	. .	. .	. .	. .
17	. .	. .	C K *	. .	C . *	C C *	C C	. .	. .	C K	. .	C .
18	. .	. .	. .	. .	. .	. .	. .	. .	. .	C K *	. .	C C
19	C . *	. .	. .	. . *	. .	C K	. .	. .	. .	. .	. .	C C *
20	. .	. .	. .	. .	. .	C C *	. .	. .	. .	. .	C .	. K
21	. .	. .	. .	. .	. .	C C	. .	. .	. .	. .	. .	C K
22	. .	. .	. .	. .	. .	C C	C C	. .	. .	. .	C K	C K *
23	. .	. .	. .	. .	. .	. .	C C *	. .	. .	. .	C C	. .
24	. .	. .	. .	. .	C .	. .	C C *	. .	. .	. .	C C *	. .
25	. .	. .	. .	. .	. .	. .	C C *	C .	. .	. .	C K	. .
26	. .	. .	. .	. .	. .	. C	. .	. .	. .	. .	. .	C . *
27	C K *	. .	. .	. .	. .	. .	. .	. .	. . *	. .	. .	C C
28	. . *	. .	. .	. .	C .	. .	. .	C . *	. .	C K *	. .	C C
29	. .		. .	. .	. .	. K	. .	. .	. K *	. .	C .	C .
30	. .		. .	. .	. .	C C *	. .	. .	C C *	. .	. .	. .
31	. .		C . *		. .		. .	. .		. .		. .

C: indicates very quiet period
K: indicates quiet period
This characterization is deduced from aa values - see text p.13 and p. 22.
The first column is relative to the U.T.day,
the second column to the 48 hour interval centered on U.T.day.

An asterisk in the third column indicates that the U.T. day is one of
the five quietest days of the month - according to Kp, see text p.22

CLASSIFICATION OF DAYS **1990**

JANUARY

Five international quitest days (from Kp) : 6 7 19 27 28

24-hours quiet intervals (from aa)	C - very quiet	: 7 19 27
	K - quiet	: NONE
48-hours quiet intervals (from aa)	C - very quiet	: 7
	K - quiet	: 27

FEBRUARY

Five international quitest days (from Kp) : 8 9 10 12 13

24-hours quiet intervals (from aa)	C - very quiet	: NONE
	K - quiet	: 12
48-hours quiet intervals (from aa)	C - very quiet	: NONE
	K - quiet	: 9 12

MARCH

Five international quitest days (from Kp) : 4 10 16 17 31

24-hours quiet intervals (from aa)	C - very quiet	: 4 17 31
	K - quiet	: NONE
48-hours quiet intervals (from aa)	C - very quiet	: NONE
	K - quiet	: 17

APRIL

Five international quitest days (from Kp) : 1 6 7 8 19

24-hours quiet intervals (from aa)	C - very quiet	: 8
	K - quiet	: NONE
48-hours quiet intervals (from aa)	C - very quiet	: NONE
	K - quiet	: NONE

MAY

Five international quitest days (from Kp) : 6 14 15 16 17

24-hours quiet intervals (from aa)	C - very quiet	: 6 7 12 14 15 16 17 24 28
	K - quiet	: NONE
48-hours quiet intervals (from aa)	C - very quiet	: 6 7 15 16
	K - quiet	: 13 14

JUNE

Five international quitest days (from Kp) : 5 16 17 20 30

24-hours quiet intervals (from aa)	C - very quiet	: 2 3 4 5 16 17 19 20 21 22 30
	K - quiet	: NONE
48-hours quiet intervals (from aa)	C - very quiet	: 2 3 4 16 17 20 21 22 26 30
	K - quiet	: 5 19 29

CLASSIFICATION OF DAYS **1990**

JULY

Five international quitest days (from Kp)		: 1 9 23 24 25
24-hours quiet intervals (from aa)	C - very quiet	: 1 3 6 7 9 16 17 22 23 24 25
	K - quiet	: NONE
48-hours quiet intervals (from aa)	C - very quiet	: 1 3 7 16 17 22 23 24 25
	K - quiet	: 2

AUGUST

Five international quitest days (from Kp)		: 5 8 9 10 28
24-hours quiet intervals (from aa)	C - very quiet	: 5 8 9 10 12 25 28
	K - quiet	: NONE
48-hours quiet intervals (from aa)	C - very quiet	: 5 8 9
	K - quiet	: 10

SEPTEMBER

Five international quitest days (from Kp)		: 2 3 27 29 30
24-hours quiet intervals (from aa)	C - very quiet	: 2 3 30
	K - quiet	: NONE
48-hours quiet intervals (from aa)	C - very quiet	: 3 30
	K - quiet	: 29

OCTOBER

Five international quitest days (from Kp)		: 1 2 8 18 28
24-hours quiet intervals (from aa)	C - very quiet	: 1 2 8 17 18 28
	K - quiet	: NONE
48-hours quiet intervals (from aa)	C - very quiet	: 1 2
	K - quiet	: 8 17 18 28

NOVEMBER

Five international quitest days (from Kp)		: 4 5 6 14 24
24-hours quiet intervals (from aa)	C - very quiet	: 3 4 5 6 13 14 15 20 22 23 24 25 29
	K - quiet	: 7 12
48-hours quiet intervals (from aa)	C - very quiet	: 4 5 6 13 14 23 24
	K - quiet	: 3 7 12 15 22 25

DECEMBER

Five international quitest days (from Kp)		: 10 11 19 22 26
24-hours quiet intervals (from aa)	C - very quiet	: 1 2 6 7 9 10 11 15 17 18 19 21 22 26 27 28 29
	K - quiet	: NONE
48-hours quiet intervals (from aa)	C - very quiet	: 2 7 10 11 18 19 27 28
	K - quiet	: 1 8 9 14 15 20 21 22

CLASSIFICATION OF DAYS 1990 (continued)

INTERNATIONAL QUIET AND DISTURBED DAYS 1990

Month	Quietest Days 1 - 5					Quietest Days 6 - 10					Most Disturbed Days 1 - 5				
Jan	27	19	7K	28A	6A	14A	18A	17A	15A	13A	24	29	39	23	22*
Feb	12K	9A	8A	10A	13A	3A	6A	11A	21A	26A	16	20	23	17	19
Mar	17	4	16A	10A	31A	7A	9A	3A	8A	5A	21	30	26	25	12
Apr	1	8	6A	7A	19A	5A	4A	16A	2A	21A	10	12	11	14	17
May	16	14	17	6	15	12A	7A	28A	24A	1A	26	27	10	22	18
Jun	20	17	30	16	5	21	4	22	2	3	12	14	13	9	7
Jul	25	24	23	9	1	17	22	7K	31K	2	28	29	20*	19*	10*
Aug	5	9	8	10	28	25	4K	12A	7A	11A	23	26	22	21	30
Sep	2	3	30	29A	27A	4A	8A	28A	9A	10A	11	16	15	1	22
Oct	1	8	28	18	2	17K	27A	7A	25A	23A	10	11	12	15	31
Nov	6	5	14	4	24	13	15	22	23	25	27	16*	28*	17*	18*
Dec	10	19	11	26	22	29	21	28	7	2	4*	24*	13*	5*	30*

* These days are arranged according to their degree of quietness or disturbance, respectively.

VERY QUIET INTERVALS, 1990

Kp not exceeding 1+ for at least 8 intervals
(= one day) in sucession

First Eighth			last Eighth			Duration Eighths
Jan	07	E4	08	E4		9
	27	E3	28	E4		10
Feb	12	E5	13	E5		9
Mar	17	E2	18	E1		8
May	14	E1	15	E1		9
	15	E8	17	E8		17
Jun	16	E2	18	E1		16
	19	E6	21	E5		16
	29	E8	Jul 01	E7		16
Jul	24	E4	26	E5		18
Sep	01	E8	03	E3		12

First Eighth			last Eighth			Duration Eighths
Oct	01	E3	02	E3		9
	08	E1	09	E3		11
	17	E4	18	E3		8
Nov	04	E2	07	E3		26
	12	E7	15	E6		24
	24	E2	25	E3		10
Dec	09	E7	12	E4		22
	18	E7	20	E3		13
	21	E7	22	E7		9
	26	E1	27	E1		9
	27	E7	29	E6		16

LIST OF MAGNETIC STORMS, 1990

Gives consecutive sequences of three-hour-intervals (Eighths E of the Greenwich day) in which at least one kp reached or surpassed 7+, and no kp was smaller than 5-

Beginning			s.c. d.	GMT	Duration Eighths	Number of 7-	7o	7+	Eighths with 8-	8o	8+	Kp = 9-	9o
Mar	12	E6	12	15.03	4			1					
	20	E8	20	22.43	8	1		1					
	30	E2	30	07.20	5		1			1			
Apr	10	E2		--	14	2	1	2	1	1			
	12	E2	12	03.26	7	2		1	1				
May	26	E7	26	20.36	2			1					
Jun	12	E5	12	08.21	11		1		2		1		
Jun	14	E4	14	03.10	3			1	1				
Jul	28	E2	28	01.08	13	1	2	1	2				
				03.30									

SECTION 5

RAPID VARIATIONS

5.1. List of ssc 1990 143

5.2. List of sfe 1990 149

SECTION 5

5.1. List of ssc 1990

STORM SUDDEN COMMENCEMENTS (ssc) 1990

Sudden commencements followed by a storm or a period of storminess selected from the monthly reports of 45 observatories*:

SOD COL DOB NUR LER ESK WNG NGK VAL HAD DOU BDV CLF HRB NAG GCK MMB AQU EBR COI BJI SPT FRD PEN ALM KAK HTY KNY QUE TEN LNP HYD ETT PMG TAN MPO GNA HER ACS CNB AMS TWA CZT PAF DRV.

Events are checked with the records of HON and EBR. Measuremments of quality, duration and amplitude are from copies of the magnetogrammes provided by the five low-latitude observatories (MBO, FUQ, HON, PMG, ABG) or their five supplementary observatories (TEN, SJG, API, KNY, HYB).

*For explanation of the three.letter symbols see Part. 1.

JANUARY

08/01	14:32	(29-14)	22222	5.3	24	2A	4B	4C	1-	
28/01	21:45	(45-46)	22112	7.6	15	1A	3B	2C		1sfe

FEBRUARY

13/02	17:15	(13-20)	12122	6.1	29	15A	23B	1C	1-	
14/02	03:21	(20-22)	22122	4.9	26	7A	4B		1-	1si
15/02	06:26	(25-06)	11022	3.2	11	1A	2B	9C		

MARCH

12/03	15:03	(58-65)	22122	3.4	43	34A	8B		2-	
14/03	09:49	(48-50)	22022	5.1	20		7B	4C	1-	
20/03	22:43	(40-48)	22322	4.0	33	19A	12B	6C	2-	
30/03	07:20	(15-21)	22333	2.4	40	26A	4B	1C	1-	

APRIL

09/04	08:42	(40-45)	x2222	3.0	29	28A	15B		1-	
12/04	03:26	(23-28)	x3233	5.6	68	29A	7B		1-	
17/04	07:19	(15-21)	22222	5.5	19	9A	18B	5C	1-	
20/04	18:01	(00-03)	12011	3.5	12		2B	6C		
23/04	03:36	(33-36)	11021	3.5	11	1A	3B	7C		1sfe

STORM SUDDEN COMMENCEMENTS (**ssc**) 1990 (continued)

MAY

18/05	07:39	(24-42)	x2222	4.0	22	11A	19B	8C	1-	
21/05	10:21	(15-23)	12212	5.4	16	3A	12B	6C		
25/05	05:10	(07-11)	01112	3.6	18		7B	3C		1si
26/05	20:37	(35-38)	22222	2.4	42	31A	9B		1-	
30/05	09:05	(03-09)	12222	2.0	21	3A	2B	2C		

JUNE

12/06	08:20	(19-22)	22222	2.9	22	16A	19B		1-	
13/06	14:15	(09-17)	22222	3.6	47	25A	3B		2-	1sfe
14/06	03:10	(06-11)	2223x	2.8	47	17A	5B		1-	

JULY

10/07	04:45	(42-48)	12222	2.8	19	8A	13B	4C	1-	
16/07	18:00	(59-03)	1212	2.4	10	1A	6B	6C	1-	1si
21/07	08:01	(07-10)	22221	2.0	15	3A	11B	5C	2-	1si
28/07	03:31	(28-35)	23332	2.6	38	23A	11B		2-	

AUGUST

01/08	07:41	(39-43)	22222	4.4	31	13A	15B	7C	2-	
13/08	10:28	(26-32)	21112	2.5	10	1A	2B	8c		1sfe
26/08	05:43	(41-51)	22222	2.6	23	16A	17B	1c	2-	
29/08	11:22	(20-26)	22122	3.3	20	11A	11B	4C	1-	

SEPTEMBER

01/09	10:24	(22-26)	22212	4.0	33	1A	6B	9C		
01/09	12:39	(35-40)	23322	3.9	64	8A	7B	2C	1-	2si
	1sfe									
11/09	05:37	(35-39)	12221	3.6	13		6B	3C		

STORM SUDDEN COMMENCEMENTS (**ssc**) 1990 (continued)

OCTOBER

09/10	13:16	(15-18)	01111	3.4	12		4B	4C	1-	reversed
26/10	11:34	(30-39)	22222	3.0	24	13A	13B	1C	1-	1sfe
29/10	20:11	(10-13)	22222	3.5	23	11A	8B	5C	1-	

NOVEMBER

26/11	23:32	(31-35)	22222	6.0	27	7A	13B	2C	1-	

DECEMBER

08/12	14:25	(23-27)	121x2	2.9	13	1A	10B	10C	1-	
21/12	17:24	(22-25)	x1112	3.1	6		1B	5C	1-	
22/12	22:41	(40-42)	12122	5.9	15		2B	3C		
30/12	10:16	(15-18)	22222	6.4	27	1A	4B	4C		4sfe

SECTION 5

5.2. List of sfe 1990

Solar-flare effects 1990

Summary list 151

Extended list 153

Doubtful solar-flare effects 1990

Summary list 164

Extended list 166

SOLAR - FLARE EFFECTS (**sfe**) - Summary List 1990

JANUARY

C	18/01	02:22	1A	4B	14C	7D	0E	2X
C	20/01	12:40	7A	18B	14C	2D	4E	0X

FEBRUARY

none

MARCH

C	06/03	11:15	2A	12B	13C	7D	1E	1X
C	24/03	02:52	3A	5B	18C	3D	1E	1X
C	28/03	07:30	4A	2B	13C	14D	7E	1X

APRIL

C	16/04	00:38	3A	8B	13C	3D	0E	0X
C	16/04	06:28	17A	7B	13C	3D	0E	2X
C	18/04	03:54	3A	10B	15C	4D	11E	1X

MAY

C	10/05	10:13	16A	11B	8C	3D	4E	2X
C	11/05	05:41	6A	11B	10C	8D	5E	1X
C	12/05	00:45	4A	9B	18C	2D	0E	1X
C	12/05	11:29	20A	7B	8C	1D	0E	0X
C	14/05	14:53	3A	6B	11C	7D	2E	1X
C	15/05	12:53	6A	6B	16C	10D	0E	0X
C	24/05	20:47	16A	12B	9C	1D	0E	1X

JUNE

C	10/06	07:16	8A	6B	19C	5D	1E	3X
C	11/06	09:42	11A	10B	20C	0D	1E	1X
C	12/06	05:19	2A	2B	17C	17D	1E	0X

JULY

C	12/07	13:42	4A	6B	15C	10D	0E	1X

AUGUST

C	20/08	10:59	5A	15B	13C	2D	0E	9X
C	28/08	09:01	5A	11B	12C	7D	6E	0X
C	28/08	10:16	11A	26B	8C	0D	2E	0X

SEPTEMBER

C	03/09	09:42	5A	8B	20C	7D	1E	0X

OCTOBER

none

NOVEMBER

C	13/11	04:42	1A	2B	21C	3D	0E	1X
C	14/11	11:17	10A	10B	13C	6D	0E	0X

DECEMBER

C	26/12	13:59	13A	8B	9C	0D	0E	1X

SOLAR - FLARE EFFECTS (**sfe**) 1990

Times of commencements of solar-flare effects (sfe) selected from the monthly lists sent by 45 observatories as reported in Table 1:List of SSC 1990 and checked by the following 47 observatories, identified by their IAGA three letter code (pp ---):

DOB YAK NUR LER SV3 ESK WNG NGK HAD KIV DOU CLF HRB THY ODE SUA GCK AAA AQU ISK EBR COI BJI SPT FRD PEN KAK HTY TUC QUE TEN LNP HON ABG SJG HYB MBO GUA ETT AAE FUQ PMG TAN GNA HER CNB EYR

JANUARY **C** **18/01** **02:22**

A	LNP3								
B	[SUA1]	KAK3	ABG2	[FUQ2]					
C	YAK2	[NUR1]	[LER0]	[WNG0]	[NGK0]	[THY1]	[GCK0]	[ISK1]	BJI1
	HTY3	(QUE1)	ETT0	PMG0	EYR2				
D	AAA	HON	HYB	GUA	TAN	GNA	CNB		
E									
X	[TEN]	[MBO]							

JANUARY **C** **20/01** **12:40**

A	[YAK3]	KIV2	DOU1	SUA3	ISK3	ABG3	MBO2		
B	NUR1	LER1	WNG3	NGK0	HAD1	CLF0	THY2	ODE2	PEN2
	[KAK0]	QUE1	TEN2	[GUA0]	AAE2	FUQ3	[PMG0]	(GNA1)	HER0
C	DOB2	(SV32)	GCK0	(AAA1)	AQU1	EBR0	[BJI1]	SPT0	FRD0
	[HTY0]	[TUC0]	SJG1	(ETT0)	[EYR0]				
D	COI	TAN							
E	ESK	HRB	(HYB)	[CNB]					
X									

FEBRUARY

none

MARCH C 06/03 11:15

A	COI2	MBO3							
B	NUR2	LER1	WNG2	HAD0	KIV2	DOU2	CLF0	ODE2	SUA2
	ISK2	EBR1	ABG2						
C	SV30	ESK0	NGK2	GCK0	AQU1	SPT0	(FRD0)	[HTY0]	QUE1
	TEN1	ETT0	AAE2	FUQ2					
D	DOB	AAA	PEN	SJG	HYB	TAN	HER		
E	HRB								
X	THY								

MARCH C 24/03 02:52

A	(SUA2)	LNP3	ABG3						
B	YAK2	(NUR1)	[WNG0]	GUA1	PMG2				
C	(DOB0)	[LER0]	SV30	[NGK0]	(KIV1)	[DOU1]	(GCK0)	AAA0	[AQU0]
	(ISK0)	BJI0	KAK0	HTY0	HON0	ETT0	GNA1	CNB2	EYR2
D	QUE	HYB	TAN						
E	(HRB)								
X	[THY]								

MARCH **C** **28/03** **07:30**

A	YAK2	SV32	LNP3	ABG3					
B	DOU0	THY1							
C	WNG1	NGK1	KIV1	AAA2	AQU0	ISK1	BJI0	SPT0	KAK0
	HTY0	QUE1	ETT0	PMG0					
D	ESK	HAD	CLF	ODE	EBR	COI	TEN	HYB	MBO
	GUA	TAN	GNA	HER	CNB				
E	DOB	NUR	LER	HRB	SUA	GCK	PEN		
X	AAE								

APRIL **C** **16/04** **00:38**

A	YAK2	LNP3	HON2						
B	[WNG0]	[DOU0]	[CLF0]	[GCK0]	[AQU2]	GUA2	PMG2	GNA1	
C	[LER0]	[NGK0]	[THY0]	[ODE2]	[ISK0]	BJI0	[SPT0]	KAK3	HTY3
	TUC1	[TEN0]	(ABG0)	EYR2					
D	AAA	HYB	CNB						
E									
X									

APRIL **C** **16/04** **06:28**

A	YAK3	SV33	KIV2	DOU2	ODE2	SUA2	AAA3	ISK3	BJI3
	PEN3	KAK3	HTY3	LNP3	ABG3	HYB3	ETT3	GNA1	
B	WNG2	NGK1	HRB2	GCK2	EBR2	COI1	[FUQ2]		
C	DOB2	NUR1	LER0	HAD0	AQU1	SPT0	[FRD0]	QUE1	(TEN0)
	GUA1	PMG0	HER2	CNB2					
D	ESK	CLF	TAN						
E									
X	THY	AAE							

APRIL **C** **18/04** **03:54**

A	(EBR0)	LNP3	ABG3						
B	(LER0)	SV32	(WNG0)	(NGK1)	(DOU0)	(CLF0)	(THY1)	SUA2	(AQU1)
	EYR1								
C	YAK1	NUR1	(ESK0)	(HAD0)	KIV1	ODE1	AAA0	ISK0	BJI1
	[SPT0]	KAK0	HTY0	QUE1	HON0	PMG0			
D	PEN	HYB	TAN	GNA					
E	(DOB)	(HRB)	GCK	[FRD]	[TUC]	[SJG]	[MBO]	GUA	AAE
	[FUQ]	CNB							
X	ETT								

MAY **C** **10/05** **10:13**

A	YAK1	NUR2	SV32	WNG2	NGK3	THY3	ODE2	SUA3	EBR2
	COI1	PEN3	ABG3	MBO3	(FUQ3)	[PMG0]	HER1		
B	DOB0	HAD0	DOU0	CLF0	GCK1	AQU2	(KAK0)	(HTY0)	TEN3
	SJG0	TAN0							
C	LER0	ESK1	ISK1	BJI0	SPT0	FRD0	[TUC0]	(GNA1)	
D	AAA	LNP	ETT						
E	HRB	HYB	AAE	[CNB]					
X	KIV	QUE							

MAY **C** **11/05** **05:41**

A	YAK2	SUA3	KAK3	LNP3	ABG3	ETT3			
B	WNG2	NGK0	DOU0	ODE1	ISK2	BJI1	PEN3	HTY3	HYB0
	AAE2	PMG0							
C	NUR1	THY0	GCK2	AAA1	AQU1	QUE1	[FUQ2]	GNA1	CNB2
	(EYR1)								
D	DOB	CLF	EBR	COI	SPT	GUA	TAN	HER	
E	LER	SV3	ESK	HAD	HRB				
X	KIV								

MAY **C** **12/05** **00:45**

A	SV33	[CLF0]	LNP3	ABG2					
B	(LER0)	(WNG0)	[DOU0]	(ODE2)	[ISK2]	HON2	GUA2	PMG1	EYR2
C	YAK1	(NUR1)	(NGK0)	(KIV2)	[THY1]	[SUA2]	[GCK0]	AAA0	[EBR0]
	BJI1	[SPT1]	KAK0	HTY0	TUC0	(QUE1)	ETT0	[AAE2]	GNA1
D	HYB	CNB							
E									
X	[SJG]								

MAY **C** **12/05** **11:29**

A	YAK2	LER1	SV31	ESK1	WNG3	NGK2	KIV2	CLF0	HRB3
	THY2	ODE2	SUA3	GCK3	AAA2	AQU1	ISK3	EBR3	COI3
	PEN3	MBO3							
B	NUR2	HAD1	DOU0	TEN2	AAE2	FUQ2	TAN3		
C	DOB2	SPT2	FRD0	QUE1	ABG0	SJG0	HYB0	HER2	
D	ETT								
E									
X									

MAY **C** **14/05** **14:53**

A	ODE2	COI2	TEN3						
B	WNG2	HAD1	SUA1	GCK1	ISK2	FUQ2			
C	LER0	NGK0	KIV1	AQU0	EBR1	SPT1	FRD1	PEN2	TUC0
	SJG0	AAE1							
D	DOB	NUR	DOU	CLF	HRB	THY	HER		
E	SV3	ESK							
X	MBO								

MAY **C** **15/05** **12:53**

A	NGK1	HRB0	THY2	EBR3	PEN2	TEN3			
B	WNG3	CLF0	ODE2	SUA2	GCK2	AQU2			
C	(YAK1)	NUR1	LER0	SV32	ESK0	HAD0	KIV2	ISK1	SPT2
	FRD0	TUC1	QUE1	MBO2	FUQ2	[GNA1]	HER0		
D	DOB	DOU	AAA	COI	ABG	SJG	HYB	ETT	AAE
	TAN								
E									
X									

MAY **C** **24/05** **20:47**

A	YAK3	(SV33)	(WNG2)	(NGK1)	(DOU2)	(THY1)	[SUA2]	(BJI2)	FRD3
	KAK3	TUC3	HON3	SJG3	GUA2	FUQ3	PMG1		
B	(DOB2)	(NUR2)	(HAD1)	(KIV2)	(CLF0)	(HRB0)	[ODE2]	[GCK0]	(EBR2)
	HTY3	(LNP2)	[ABG1]						
C	[AQU0]	[ISK1]	(SPT1)	[PEN1]	[QUE1]	[HYB1]	(MBO3)	[ETT0]	(CNB2)
D	EYR								
E									
X	LER								

JUNE **C** **10/06** **07:16**

A	SV33	THY1	ODE2	SUA2	ISK3	QUE1	LNP3		ABG3
B	YAK1	KIV2	COI1	PEN2	ETT0	AAE2			
C	DOB0	NUR1	LER0	ESK0	WNG2	NGK0	HAD0	GCK0	AAA-
	AQU0	BJI1	SPT1	[FRD0]	KAK3	HTY3	TEN2	[SJG0]	HYB2
	GNA1								
D	CLF	EBR	MBO	GUA	HER				
E	HRB								
X	DOU	PMG	TAN						

JUNE **C** **11/06** **09:42**

A	SV33	DOU2	CLF3	THY2	AAA3	ISK3	COI3	QUE1	LNP3
	ABG3	AAE2							
B	DOB0	YAK0	NUR1	WNG3	KIV2	ODE2	SUA2	HYB3	ETT3
	TAN1								
C	LER0	ESK0	NGK1	HAD0	GCK0	AQU1	EBR0	BJI1	SPT1
	(FRD0)								
	PEN2	KAK0	HTY0	TEN2	[HON0]	(SJG0)	MBO2	(GUA0)	(GNA1)
	HER0	D							
E	HRB								
X	[PMG]								

JUNE **C** **12/06** **05:19**

A	LNP3	ABG3							
B	WNG1	HTY0							
C	YAK1	NGK0	KIV1	THY1	ODE1	SUA1	GCK0	AAA0	AQU0
	ISK1	BJI1	SPT0	KAK3	QUE1	ETT0	AAE1	[FUQ2]	
D	DOB	NUR	LER	SV3	ESK	HAD	DOU	CLF	EBR
	COI	PEN	HYB	GUA	PMG	TAN	GNA	CNB	
E	HRB								
X									

JULY **C** **12/07** **13:42**

A	THY2	SUA2	ISK3	COI2					
B	WNG3	DOU2	ODE2	GCK2	(ABG1)	FUQ2			
C	NUR1	LER0	ESK0	NGK1	HAD0	KIV2	HRB1	AQU1	EBR1
	[BJI0]	SPT0	TEN2	SJG1	MBO2	AAE2			
D	DOB	SV3	CLF	AAA	FRD	PEN	TUC	QUE	TAN
	HER								
E									
X	[PMG]								

AUGUST						**C**	**20/08**	**10:59**	
A	THY2	SUA3	COI1	(BJI1)	AAE2				
B	DOB2	WNG2	NGK2	DOU0	GCK0	AQU1	ISK0	PEN2	[KAK0]
	(LNP2)								
	ABG2	FUQ2	[PMG1]	TAN3	(GNA2)				
C	LER1	ESK1	HAD1	CLF0	SPT1	FRD1	[HTY0]	QUE2	SJG0
	HYB3	[GUA1]	ETT1	HER0					
D	EBR	TEN							
E									
X	YAK	NUR	SV3	KIV	HRB	ODE	AAA	[TUC]	MBO

AUGUST						**C**	**28/08**	**09:01**	
A	YAK2	SUA2	AAA3	COI2	ABG3				
B	DOB3	SV32	ESK0	WNG2	NGK1	HAD0	KIV2	DOU1	CLF0
	THY0	ETT0							
C	NUR2	ODE-	AQU1	ISK1	BJI0	SPT1	(FRD0)	KAK0	[TUC0]
	QUE1	HYB1	MBO1						
D	PEN	HTY	TEN	LNP	TAN	GNA	HER		
E	LER	HRB	GCK	EBR	AAE	[FUQ]			
X									

AUGUST — C — 28/08 — 10:16

A	YAK3	SV33	WNG2	HAD0	THY2	SUA3	AAA2	ISK0	COI1
	ABG3	MBO3							
B	DOB2	NUR1	ESK0	NGK1	KIV2	DOU1	CLF0	ODE-	GCK2
	AQU1	EBR2	BJI1	PEN2	(KAK1)	[TUC0]	QUE1	(LNP2)	[HON1]
	SJG1	[GUA0]	ETT0	AAE2	(FUQ3)	TAN3	(GNA1)	[EYR0]	
C	SPT1	(FRD1)	(HTY0)	TEN1	HYB0	[PMG0]	HER0	[CNB1]	
D									
E	LER	HRB							
X									

SEPTEMBER — C — 03/09 — 09:42

A	LER0	ESK0	THY1	ISK3	COI3				
B	SV32	WNG3	HAD1	KIV2	SUA2	LNP2	AAE1	(FUQ2)	
C	YAK2	NUR1	NGK0	DOU1	ODE1	GCK0	AQU1	EBR2	BJI0
	SPT1	(KAK0)	(HTY0)	QUE1	TEN2	ABG1	(SJG0)	MBO2	ETT0
	[PMG0]	GNA1							
D	DOB	CLF	AAA	PEN	HYB	TAN	HER		
E	HRB								
X									

OCTOBER

none

NOVEMBER **C** **13/11** **04:42**

A	LNP3								
B	KAK3	ABG2							
C	[DOB3]	YAK1	[LER0]	[WNG0]	[NGK0]	[HAD0]	(SUA1)	AAA1	(ISK1)
	BJI1	HTY3	QUE1	[TEN0]	GUA1	ETT3	AAE1	[FUQ2]	PMG1
	GNA1	CNB2	EYR1						
D	SV3	TAN	HER						
E									
X	HYB								

NOVEMBER **C** **14/11** **11:17**

A	[YAK2]	ESK1	NGK2	KIV2	DOU2	CLF2	HRB2		THY2
	ODE2	TEN3							
B	NUR2	LER1	SV30	WNG2	HAD1	SUA2	GCK2	ISK2	SPT1
	PEN2								
C	AAA1	[BJI0]	[KAK0]	QUE1	ABG1	HYB1	MBO2	ETT0	AAE1
	FUQ2	[PMG0]	(GNA1)	HER0					
D	DOB	AQU	EBR	COI	SJG	TAN			
E									
X									

DECEMBER **C** **26/12** **13:59**

A	HAD2	DOU2	CLF1	THY1	SUA2	ISK3	EBR3	COI3	FRD2
	SJG2	MBO3	AAE2	HER3					
B	ESK2	WNG3	NGK1	HRB2	GCK1	PEN3	TEN1	FUQ3	
C	[YAK0]	LER1	ODE1	AQU0	SPT0	[KAK0]	(TUC1)	[ABG1]	[GUA0]
D									
E									
X	TAN								

DOUBTFUL SOLAR - FLARE EFFECTS (**sfe**) - Summary list 1990

JANUARY

C	05/01	11:49	2A	6B	20C	6D	4E	0X
C	10/01	02:45	1A	6B	16C	5D	2E	0X
C	21/01	04:40	3A	7B	22C	6D	1E	1X

FEBRUARY

C	03/02	01:08	4A	9B	20C	1D	2E	1X
C	08/02	18:30	2A	4B	21C	2D	0E	1X
C	19/02	12:34	4A	8B	9C	2D	20E	1X

MARCH

C	19/03	13:48	3A	5B	15C	10D	0E	3X

APRIL

none

MAY

C	09/05	04:05	1A	1B	17C	14D	0E	2X
C	13/05	03:27	1A	2B	13C	15D	0E	1X
C	15/05	00:28	1A	0B	10C	5D	1E	1X
C	19/05	12:49	3A	14B	17C	6D	2E	0X
C	23/05	04:10	2A	5B	12C	20D	0E	0X

JUNE

C	09/06	16:47	5A	12B	16C	2D	3E	1X
C	12/06	00:50	1A	5B	16C	6D	0E	1X

JULY

C	05/07	03:48	2A	5B	24C	7D	2E	1X
C	06/07	05:09	5A	12B	13C	10D	0E	2X
C	09/07	12:42	3A	12B	13C	10D	0E	3X

AUGUST

C	25/08	08:25	10A	10B	11C	11D	0E	1X
C	29/08	04:29	2A	1B	17C	13D	0E	1X
C	31/08	04:09	3A	1B	15C	12D	4E	1X

SEPTEMBER

C	01/09	07:08	1A	3B	18C	18D	0E	1X
C	03/09	02:17	1A	0B	7C	9D	0E	0X
C	15/09	04:29	2A	5B	17C	7D	8E	0X
C	17/09	05:58	1A	7B	14C	11D	5E	9X
C	17/09	21:53	6A	13B	15C	1D	2E	1X

OCTOBER

none

NOVEMBER

none

DECEMBER

C	05/12	07:23	1A	7B	18C	9D	0E	2X
C	15/12	05:41	1A	4B	14C	8D	0E	2X
C	16/12	04:44	1A	2B	13C	9D	0E	2X
C	23/12	00:38	1A	2B	8C	4D	0E	1X

DOUBTFUL SOLAR - FLARE EFFECTS (**sfe**) 1990

JANUARY **C** **05/01** **11:49**

A	SUA2	ABG2							
B	DOB2	WNG1	KIV2	DOU2	CLF0	MBO2			
C	[YAK1]	NUR1	ESK0	NGK0	HAD0	THY1	ODE1	AQU1	ISK1
	[BJI0]	SPT0	(FRD0)	[KAK0]	[HTY0]	[TUC0]	QUE1	SJG0	[GUA0]
	ETT0	AAE1	HER0						
D	EBR	COI	PEN	TEN	HYB	TAN			
E	LER	HRB	GCK	FUQ					
X									

JANUARY **C** **10/01** **02:45**

A	LNP3								
B	[LER0]	[DOU1]	[SUA2]	ABG2	[MBO2]	GNA1			
C	YAK1	[NUR1]	[ESK0]	[WNG0]	[NGK0]	[HAD0]	[THY1]	[ISK1]	BJI0
	[SPT0]	KAK0	HTY0	HON1	GUA1	ETT0	EYR1		
D	AAA	QUE	HYB	PMG	TAN				
E	[HRB]	CNB							
X									

JANUARY **C** **21/01** **04:40**

A	(SUA2)	LNP3	ABG3						
B	YAK2	[DOU2]	[CLF0]	KAK0	[MBO2]	ETT1	GNA1		
C	[DOB1]	(NUR1)	[LER0]	[ESK0]	[WNG0]	[NGK0]	[HAD0]	(KIV2)	(THY1)
	(GCK0)	[AQU0]	(ISK1)	[SPT0]	HTY0	QUE1	[TEN0]	(HON0)	GUA0
	AAE2	[FUQ2]	PMG1	CNB1					
D	SV3	AAA	BJI	TAN	HER	EYR			
E	(ODE)								
X	HYB								

DOUBTFUL SOLAR - FLARE EFFECTS (sfe) 1990

JANUARY **C** **05/01** **11:49**

A	SUA2	ABG2							
B	DOB2	WNG1	KIV2	DOU2	CLF0	MBO2			
C	[YAK1]	NUR1	ESK0	NGK0	HAD0	THY1	ODE1	AQU1	ISK1
	[BJI0]	SPT0	(FRD0)	[KAK0]	[HTY0]	[TUC0]	QUE1	SJG0	[GUA0]
	ETT0	AAE1	HER0						
D	EBR	COI	PEN	TEN	HYB	TAN			
E	LER	HRB	GCK	FUQ					
X									

JANUARY **C** **10/01** **02:45**

A	LNP3								
B	[LER0]	[DOU1]	[SUA2]	ABG2	[MBO2]	GNA1			
C	YAK1	[NUR1]	[ESK0]	[WNG0]	[NGK0]	[HAD0]	[THY1]	[ISK1]	BJI0
	[SPT0]	KAK0	HTY0	HON1	GUA1	ETT0	EYR1		
D	AAA	QUE	HYB	PMG	TAN				
E	[HRB]	CNB							
X									

JANUARY **C** **21/01** **04:40**

A	(SUA2)	LNP3	ABG3						
B	YAK2	[DOU2]	[CLF0]	KAK0	[MBO2]	ETT1	GNA1		
C	[DOB1]	(NUR1)	[LER0]	[ESK0]	[WNG0]	[NGK0]	[HAD0]	(KIV2)	(THY1)
	(GCK0)	[AQU0]	(ISK1)	[SPT0]	HTY0	QUE1	[TEN0]	(HON0)	GUA0
	AAE2	[FUQ2]	PMG1	CNB1					
D	SV3	AAA	BJI	TAN	HER	EYR			
E	(ODE)								
X	HYB								

JULY

C	05/07	03:48	2A	5B	24C	7D	2E	1X
C	06/07	05:09	5A	12B	13C	10D	0E	2X
C	09/07	12:42	3A	12B	13C	10D	0E	3X

AUGUST

C	25/08	08:25	10A	10B	11C	11D	0E	1X
C	29/08	04:29	2A	1B	17C	13D	0E	1X
C	31/08	04:09	3A	1B	15C	12D	4E	1X

SEPTEMBER

C	01/09	07:08	1A	3B	18C	18D	0E	1X
C	03/09	02:17	1A	0B	7C	9D	0E	0X
C	15/09	04:29	2A	5B	17C	7D	8E	0X
C	17/09	05:58	1A	7B	14C	11D	5E	9X
C	17/09	21:53	6A	13B	15C	1D	2E	1X

OCTOBER

none

NOVEMBER

none

DECEMBER

C	05/12	07:23	1A	7B	18C	9D	0E	2X
C	15/12	05:41	1A	4B	14C	8D	0E	2X
C	16/12	04:44	1A	2B	13C	9D	0E	2X
C	23/12	00:38	1A	2B	8C	4D	0E	1X

MAY **C** **13/05** **03:27**

A	LNP3								
B	KAK1	ABG1							
C	YAK1	(WNG0)	(NGK0)	KIV1	SUA2	GCK0	ISK1	BJI0	HTY0
	QUE1	GUA0	ETT0	[FUQ1]					
D	DOB	NUR	SV3	HRB	ODE	AAA	PEN	HON	HYB
	AAE	PMG	TAN	GNA	CNB	EYR			
E									
X	THY								

MAY **C** **15/05** **00:28**

A	LNP3								
B									
C	YAK2	(NGK0)	[AQU0]	KAK0	HTY0	TUC1	HON1	GUA1	[FUQ2]
	PMG1	EYR1							
D	AAA	BJI	HYB	GNA	CNB				
E	SV3								
X	[MBO]								

MAY **C** **19/05** **12:49**

A	(YAK1)	SV31	SUA3						
B	WNG3	NGK0	KIV2	DOU0	CLF0	ODE2	AQU1	ISK2	EBR2
	[KAK0]	TEN2	ABG1	FUQ3	[GNA1]				
C	DOB1	NUR1	LER0	ESK0	HAD0	THY1	GCK0	AAA0	(BJI0)
	SPT1	FRD0	[HTY0]	TUC0	QUE1	ETT0	[PMG0]	HER0	
D	COI	SJG	HYB	MBO	AAE	TAN			
E	HRB	PEN							
X									

MAY **C** **23/05** **04:10**

A	LER0	LNP3							
B	WNG1	KAK3	HTY3	ABG1	ETT0				
C	YAK1	(HAD0)	KIV1	GCK0	ISK1	BJI1	[FRD0]	[TUC0]	QUE1
	[FUQ1]	PMG0	GNA1						
D	DOB	NUR	SV3	ESK	NGK	DOU	HRB	THY	ODE
	SUA	AAA	AQU	PEN	HON	HYB	GUA	AAE	TAN
	CNB	EYR							
E									
X									

JUNE **C** **09/06** **16:47**

A	(YAK1)	SUA2	ISK3	COI2	[ABG3]				
B	NUR2	WNG3	HAD1	KIV2	DOU1	CLF0	THY1	AQU1	EBR1
	[KAK0]	TUC1	FUQ3						
C	LER0	ESK0	NGK0	ODE1	GCK0	[BJI1]	SPT0	FRD0	[HTY0]
	[QUE1]	HON0	SJG1	MBO2	[GUA0]	[ETT0]	[PMG0]		
D	DOB	TEN							
E	HRB	PEN	[HYB]						
X	[TAN]								

JUNE **C** **12/06** **00:50**

A	LNP3								
B	(WNG0)	(SUA2)	HON3	ABG2	GUA1				
C	YAK1	SV31	(NGK0)	(KIV1)	(THY0)	(GCK0)	[AQU0]	(ISK0)	BJI1
	(FRD0)	KAK0	TUC0	[SJG0]	[FUQ2]	GNA1	EYR1		
D	AAA	HTY	QUE	HYB	ETT	CNB			
E									
X	PMG								

JULY **C** **05/07** **03:48**

A	LNP3	ABG3							
B	DOB2	YAK1	WNG1	SUA2	[FUQ2]				
C	NUR1	LER0	NGK0	(HAD0)	KIV2	DOU1	THY1	ODE1	GCK0
	AAA0	ISK1	(EBR0)	BJI1	KAK0	HTY0	(TUC0)	[TEN0]	HON0
	[SJG0]	GUA0	ETT0	AAE1	CNB1	EYR1			
D	ESK	AQU	QUE	HYB	PMG	TAN	GNA		
E	SV3	HRB							
X	PEN								

JULY **C** **06/07** **05:09**

A	YAK3	ODE2	SUA2	ISK2	LNP3				
B	DOB3	SV30	ESK0	WNG2	HAD2	DOU1	CLF0	HRB1	GCK0
	BJI2	ABG2	[FUQ2]						
C	NUR1	LER0	NGK0	AQU1	SPT0	KAK0	HTY0	(TEN0)	HON0
	[SJG0]	AAE1	PMG0	(EYR1)					
D	KIV	THY	EBR	QUE	HYB	GUA	ETT	TAN	GNA
	CNB								
E									
X	AAA	PEN							

JULY **C** **09/07** **12:42**

A	YAK2	SV32	ISK3						
B	NUR1	WNG3	KIV2	DOU0	CLF0	HRB1	ODE2	SUA2	EBR1
	PEN1	[KAK0]	ABG1						
C	LER0	ESK0	NGK1	HAD0	GCK0	AQU1	(BJI1)	SPT0	TEN2
	HYB0	MBO2	[PMG0]	[EYR0]					
D	DOB	AAA	COI	FRD	TUC	SJG	ETT	AAE	TAN
	HER								
E									
X	THY	QUE	FUQ						

AUGUST **C** **25/08** **08:25**

A	DOB3	YAK3	SV32	ESK1	WNG3	KIV2	DOU3	ODE-	SUA3
	ISK3								
B	NUR2	LER2	NGK1	HAD1	HRB2	THY0	[FRD0]	PEN2	AAE2
	[FUQ2]								
C	CLF2	GCK0	AQU1	BJI0	SPT1	HTY0	QUE1	TEN2	ABG1
	(PMG0)	GNA1							
D	AAA	EBR	COI	KAK	LNP	HYB	MBO	GUA	ETT
	TAN	HER							
E									
X	[SJG]								

AUGUST							**C**	**29/08**	**04:29**
A	LNP3	ABG2							
B	SUA1								
C	YAK1	SV30	(WNG0)	NGK0	THY0	GCK0	ISK1	BJI0	[FRD0]
	KAK1	HTY0	QUE1	[SJG0]	GUA1	AAE1	[FUQ2]	TAN1	
D	DOB	NUR	KIV	HRB	ODE	AAA	PEN	HON	HYB
	PMG	GNA	CNB	EYR					
E									
X	ETT								

AUGUST							**C**	**31/08**	**04:09**
A	AAA3	LNP3	ABG3						
B	(WNG0)								
C	(DOB2)	YAK1	NUR1	(LER0)	(NGK0)	KIV1	SUA1	GCK0	(SPT0)
	[FRD0]	KAK0	HTY0	QUE1	ETT0	EYR1			
D	SV3	ODE	BJI	PEN	HON	HYB	GUA	AAE	PMG
	TAN	GNA	CNB						
E	(ESK)	(CLF)	HRB	ISK					
X	(THY)								

SEPTEMBER **C** **01/09** **07:08**

A	LNP3								
B	THY0	ABG2	ETT2						
C	YAK1	NUR1	SV30	WNG1	NGK0	HAD0	KIV1	ODE-	GCK0
	AAA0	AQU1	ISK1	BJI0	QUE1	HYB2	AAE1	GNA1	CNB1
D	DOB	LER	ESK	CLF	HRB	SUA	EBR	COI	SPTPEN
	KAK	HTY	TEN	MBO	GUA	PMG	TAN	HER	
E									
X	DOU								

SEPTEMBER **C** **03/09** **02:17**

A	LNP3								
B									
C	KAK1	HTY0	ABG0	HYB1	GUA1	PMG0	GNA2		
D	YAK	SV3	AAA	BJI	QUE	HON	ETT	CNB	EYR
E									
X									

SEPTEMBER **C** **15/09** **04:29**

A	LNP3	ABG3							
B	YAK2	(WNG0)	(DOU0)	(THY1)	SUA2				
C	NUR1	(ESK0)	(NGK0)	(HAD0)	KIV1	ODE1	(AQU1)	(EBR0)	BJI1
	[SPT0]	KAK0	QUE1	GUA0	ETT0	AAE2	[FUQ2]	PMG0	
D	HTY	HON	HYB	TAN	GNA	CNB	EYR		
E	(DOB)	(LER)	SV3	(HRB)	GCK	AAA	ISK	PEN	
X									

SEPTEMBER **C** **17/09** **05:58**

A	LNP3								
B	WNG2	NGK0	(COI1)	BJI0	ABG2	AAE1	PMG1		
C	CLF0	THY0	AQU1	(SPT0)	[FRD0]	PEN0	KAK0	HTY0	[TUC0]
	(TEN0)	[HON1]	[SJG0]	GUA0	HER0				
D	DOU	SUA	ISK	EBR	QUE	HYB	ETT	TAN	GNA
	CNB	EYR							
E	DOB	LER	(ESK)	(HAD)	GCK				
X	YAK	NUR	SV3	KIV	HRB	ODE	AAA	(MBO)	[FUQ]

SEPTEMBER **C** **17/09** **21:53**

A	YAK2	[LER0]	[ESK0]	TUC3	LNP2	FUQ3			
B	[WNG0]	[NGK0]	[HAD0]	[KIV2]	[DOU0]	[CLF0]	[THY1]	[SUA2]	KAK1
	HTY3	HON1	[ABG2]	GUA2					
C	[DOB0]	[NUR1]	[ODE1]	[GCK0]	[AQU1]	[ISK1]	[EBR1]	[SPT0]	FRD0
	[QUE1]	[TEN1]	PMG0	[TAN2]	(GNA1)	EYR1			
D	CNB								
E	[HRB]	[PEN]							
X	SJG								

OCTOBER

none

NOVEMBER

none

DECEMBER **C** **05/12** **07:23**

A	LNP3								
B	THY0	[FRD0]	[TUC0]	[HON0]	ABG2	ETT3	AAE2		
C	(LER0)	SV31	(ESK0)	(WNG1)	NGK0	(HAD0)	KIV2	GCK0	AAA0
	AQU0	ISK1	BJI0	KAK0	[SJG0]	HYB2	GUA0	PMG0	EYR0
D	HRB	ODE	SUA	EBR	PEN	HTY	QUE	HER	CNB
E									
X	TAN	GNA							

DECEMBER **C** **15/12** **05:41**

A	LNP3								
B	(SUA1)	ABG1	[FUQ2]	GNA1					
C	YAK1	[LER0]	[ESK0]	(WNG0)	(NGK0)	[HAD0]	ISK1	KAK0	QUE1
	HYB1	ETT0	AAE1	HER0	CNB1				
D	SV3	AAA	BJI	HTY	GUA	PMG	TAN	EYR	
E									
X	[TEN]	[MBO]							

DECEMBER **C** **16/12** **04:44**

A	LNP2								
B	(THY0)	GNA2							
C	(NUR1)	[LER0]	(SV32)	[ESK0]	[WNG0]	[HAD0]	KAK0	ABG1	ETT0
	PMG1	TAN1	CNB1	EYR1					
D	YAK	AAA	BJI	HTY	QUE	HYB	GUA	AAE	HER
E									
X	(ODE)	[TEN]							

DECEMBER							**C**	**23/12**	**00:38**
A	LNP3								
B	(ABG1)	[FUQ3]							
C	[SV30]	[NGK0]	[EBR0]	KAK0	HTY0	HON1	GUA1	PMG1	
D	BJI	GNA	CNB	EYR					
E									
X	[TAN]								

TRANSACTIONS OF IAGA MEETINGS

	Bulletin
Transactions of the Rome Meeting, 1922	No. 3
Transactions of the Madrid Meeting, 1924	No. 5
Comptes rendus de l'Assemblée de Stockholm, 1930	No. 8
Transactions of the Oslo Meeting, 1948	No. 13
Transactions of the Brussels Meeting, 1951	No. 14
Le Noyau Terrestre, Rome, 1954	No. 15a
Problèmes de la Physique de la haute atmosphère, 1954	No. 15b
Transactions of the Toronto Meeting, 1957	No. 16
Paléomagnétisme et Variation Séculaire, Toronto, 1957	No. 16a
Aéronomie, Toronto, 1957	No. 16b
Rapid Magnetic Variations, Utrecht, 1959	No. 16c
Transactions of the Helsinki and Berkeley Meetings 1960/1963	No. 19
Atlas of Indices K (Vol. 1 : Text ; Vol. 2 : Figures)	No. 21
Programme and Abstracts of the St Gall Meeting, 1957	No. 24
Transactions of the St Gall Meeting, 1967	No. 25
Programme and abstracts of the General Scientific Assembly, Madrid, 1969	No. 26
Transactions of the General Scientific Assembly, Madrid, 1969	No. 27
The World Magnetic Survey, 1957-1969	No. 28
Grid values for the IGRF 1965	No. 29
Transactions of the XV General Assembly, Moscow, 1971	No. 31
Programme and abstracts for the Second General Scientific Assembly, Kyoto, 1973 No. 34	
Transactions of the Second General Scientific Assembly, Kyoto, 1973	No. 35
Programme and Abstracts of the XVI General Assembly, Grenoble, 1975	No. 36
Transactions of the XVI General Assembly, Grenoble, 1975	No. 37
Grid values and charts of the IGRF 1975	No. 38
Transactions of the III General Scientific Assembly, Seattle, 1977	No. 41
Transactions of the XVII General Assembly, Canberra, 1979	No. 44
Program and abstracts of the IV General Scientific Assembly, Edimbourg, 1981	No. 45
Transactions of the IV General Scientific Assembly, Edimbourg, 1981	No. 46
Program and abstracts of the XVIII General Assembly, Hambourg, 1983	No. 48a
Program and abstracts of the IAGA/IAMAT Joint symposium on middle atmospheric sciences Hambourg, 1983	No. 48b
Transactions of the XVIII General Assembly, Hambourg, (1983-1985)	No. 49
Program and abstracts of the V Scientific Assembly, Prague, 1985	No. 50
Transactions of the V Scientific Assembly, Prague, 1985	No. 51
Grid-Point Values and Charts for the IGRF 1985	No. 52
Program and abstracts of the VI Scientific Assembly, Exeter, 1989	No. 53
Tables and Maps of the DGRF 1985 and IGRF 1990	No. 54

PROCEEDINGS OF IAGA SYMPOSIA

IAGA Symposium No. 2, Communications présentées à la Réunion de Berkeley, 1963
IAGA Symposium No. 3, Symposium on Magnetism of the Earth's Interior, Pittsburgh, 1964
IAGA Symposium No. 4, Communications présentées à la Réunion de Cambridge (Mass.),1965
IAGA Symposium No. 5, Communications présentées à la Réunion de Sao José dos Campos (Brésil),
IAGA Symposium No. 6, Symposium on Aurora and Magnetic Storms, Birkeland, 1967
IAGA Symposium No. 7, Symposium on Upper Atmospheric Winds, Waves and Ionospheric Drifts, St Gall, 1967
IAGA Symposium No. 8, Symposium on Laboratory Measurements of Aeronomic Interest, Toronto, 1963
IAGA Symposium No. 9, Symposium on Multidisciplinary Studies of Unusual Regions of the Upper Mantle, Madrid, 1969

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Users Information **Indices 1990 on Diskette** **("README")**

The included diskette contains files of IAGA indices presented following the same formats as those of the tables published in the IAGA Bulletin n°32u for 1990, and a software for visualizing the tables. The software (interaa.exe) is installed at the root level on a: , and the data files used are in the directory a:\ind90.

The names of the files for indices aa, an(3Kn), as(3Ks), am(3Km), Kp(ap), Dst and AE are:

- ...90.dat for hourly or three hourly, and daily values
- ...90.mya for monthly and yearly values since the inception of the series
- ...90.dmv for daily and monthly values (only Dst)

You can use the visualization software in two ways :

1 - Directly from the diskette :
Hit the command : INTERAA, then give the current year : 1990

2 - Installation on a drive of your computer
Hit INSTAL <drive>: , then ENTER (Example : INSTAL C:)
Hit the command : INTERAA, then give the current year : 1990

If you have diskettes for previous years (1982 to 1989 are available), you can use the same software (interaa.exe), provided that the data files for the corresponding years are on the directories <drive>:\indAA (AA for 82 to 89 years, respectively)

INTERNATIONAL ASSOCIATION OF GEOMAGNETISM AND AERONOMY

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