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Part II (Comprehensive Reports)

NO. 514 JUNE 1987

DATA FOR
DECEMBER 1986

Michael A. Chinnery, Director
NATIONAL GEOPHYSICAL DATA CENTER
BOULDER, COLORADO

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NUMBER 514

(Issued in Two Parts)

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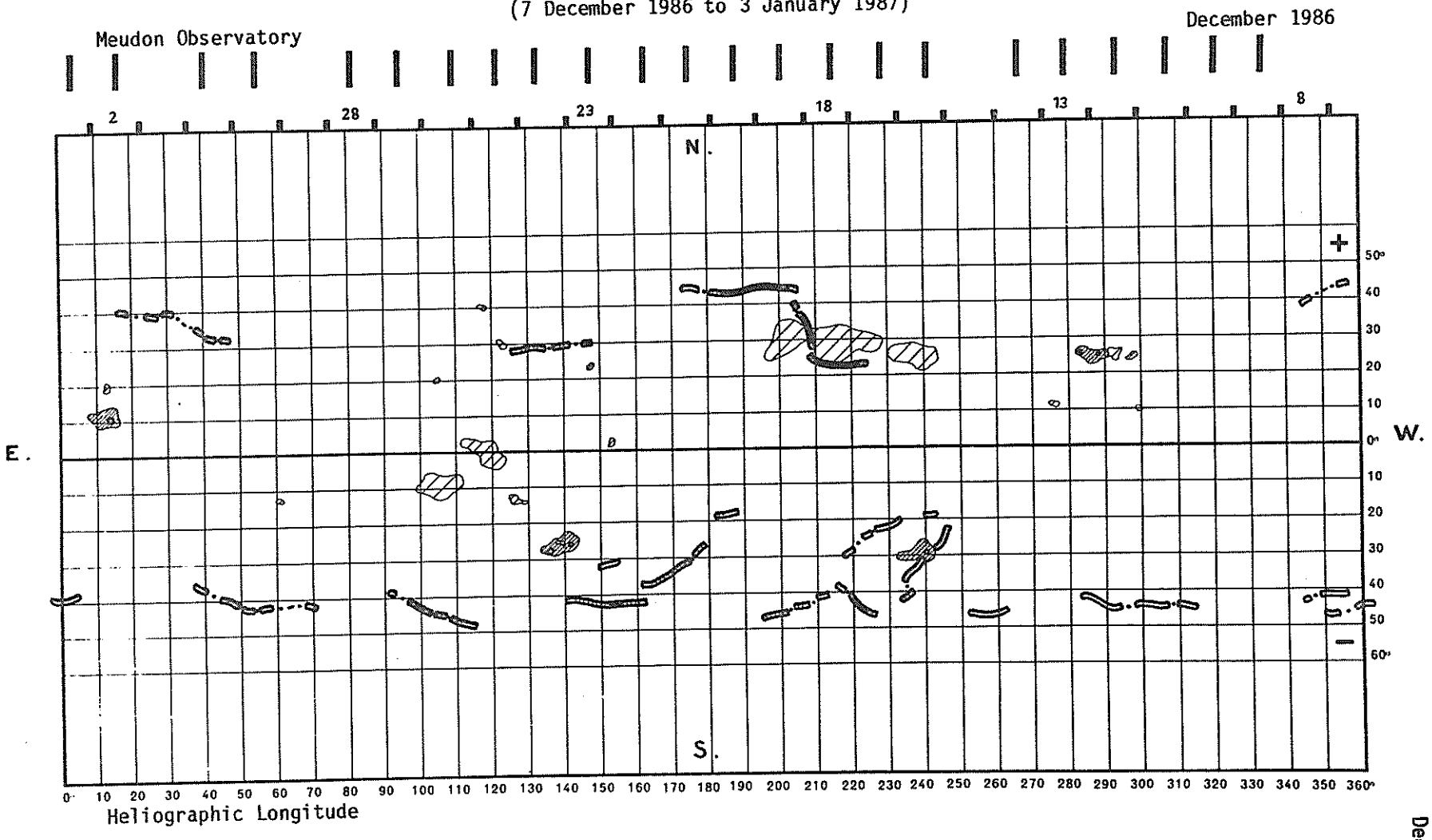
A C T I V E R E G I O N S
CARRINGTON ROTATION 1783

(7 December 1986 to 3 January 1987)

Region No.	Coordinates Lat.	Long.	Imp	Age at CMP (Days)	Spotless Region	Region No. in Rotation 1782	Activity at West Limb
1	25°N	298	1	+3	x		disappeared
2	26°N	293	1	+1	x		disappeared
3	25°N	287	2	+3			decreasing
4	29°S	239	2	>6			decreasing
5	26°S	140	3	+6			decreasing
6	13°S	127	1	0	x		disappeared
7	0	119	1	>6	x		dispersed
8	11°N	13	2	0			decreasing

CARTE SYNOPTIQUE

CARRINGTON ROTATION NUMBER 1783
(7 December 1986 to 3 January 1987)



5
Dec 86

H - ALPHA S O L A R F L A R E S

DECEMBER 1986

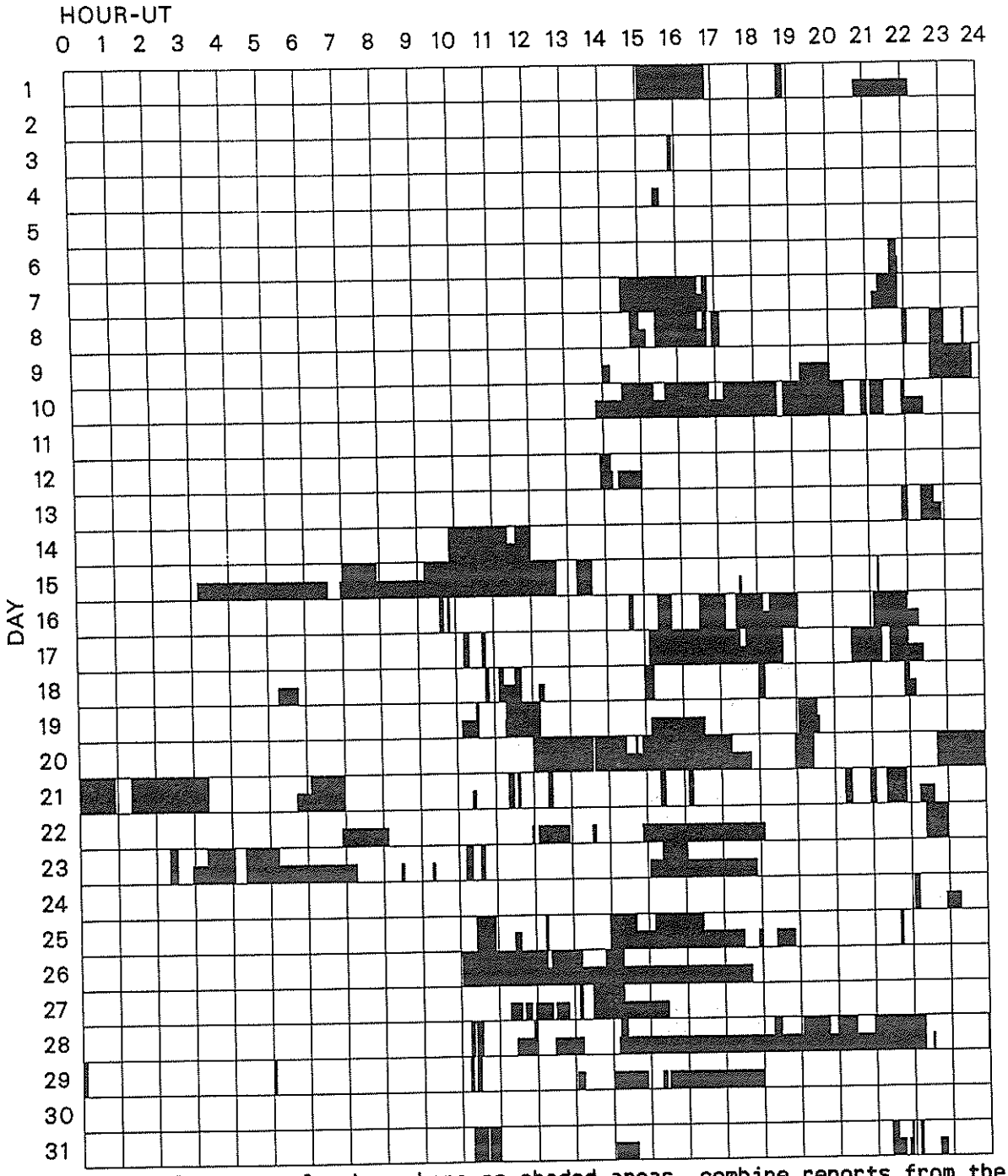
Grp #	Sta	Day	Start (UT)	Max (UT)	End (UT)	Lat	CMD	NOAA/ USAF Region	CMP Mo	CMP Day	Dur (Min)	Imp Opt	Imp Xray	Obs See	Obs Type	Time (UT)	Area Measurement Apparent (10^{-6} Disk)	Area Measurement Corr (Sq Deg)	Remarks
		01	1503		1651	No Flare Patrol													
		01	1844		1854	No Flare Patrol													
		03	1551		1556	No Flare Patrol													
		06	2138		2150	No Flare Patrol													
		07	1431		1633	No Flare Patrol													
		07	1641		1649	No Flare Patrol													
		07	2119		2151	No Flare Patrol													
		08	1445		1458	No Flare Patrol													
		08	1525		1633	No Flare Patrol													
		08	1641		1648	No Flare Patrol													
		08	1655		1708	No Flare Patrol													
		08	2158		2205	No Flare Patrol													
		08	2241		2304	No Flare Patrol													
		08	2333		2336	No Flare Patrol													
		09	2240		2348	No Flare Patrol													
0001	LEAR	10	0256	0258	0303	S27	E75	4761	12	16.0	7	SF		3	C		19		
		10	1431		1521	No Flare Patrol													
		10	1539		1649	No Flare Patrol													
		10	1712		1837	No Flare Patrol													
		10	1846		2024	No Flare Patrol													
		10	2050		2100	No Flare Patrol													
		10	2105		2127	No Flare Patrol													
		10	2155		2159	No Flare Patrol													
		12	1355		1411	No Flare Patrol													
0002	RAMY	12	1904	1906	1920	S30	E48	4761	12	16.6	16	SF		3	C		19		
0003	RAMY	12	1917	1918	1922	N27	E04	4760	12	13.1	5	SF		3	C		26		
0004	HOLL	12	2151	2154	2209	S31	E46	4761	12	16.5	18	SF		3	C		80		H
		13	2153		2203	No Flare Patrol													
		13	2223		2244	No Flare Patrol													
		14	0951		1124	No Flare Patrol													
		14	1137		1201	No Flare Patrol													
		15	0701		0755	No Flare Patrol													
		15	0911		1241	No Flare Patrol													
		15	1314		1338	No Flare Patrol													
		15	2112		2115	No Flare Patrol													
		16	0934		0941	No Flare Patrol													
		16	0947		0951	No Flare Patrol													
0005	HTPR	16	1012	1016	1225	S32	E01	4761	12	16.5	133	SF			C	1016	30		E
		16	1436		1443	No Flare Patrol													
		16	1522		1544	No Flare Patrol													
		16	1628		1710	No Flare Patrol													
		16	1726		1809	No Flare Patrol													
		16	1819		1905	No Flare Patrol													
		16	2105		2159	No Flare Patrol													
		17	1012		1021	No Flare Patrol													
		17	1041		1047	No Flare Patrol													
		17	1507		1733	No Flare Patrol													
		17	1741		1840	No Flare Patrol													
		17	2029		2118	No Flare Patrol													
		17	2130		2159	No Flare Patrol													
		18	1046		1052	No Flare Patrol													
		18	1107		1115	No Flare Patrol													
		18	1133		1143	No Flare Patrol													
		18	1459		1515	No Flare Patrol													
		18	1801		1811	No Flare Patrol													
		18	2153		2201	No Flare Patrol													
		19	1031		1035	No Flare Patrol													
		19	1118		1213	No Flare Patrol													
		19	1903		1933	No Flare Patrol													
		20	1200		1336	No Flare Patrol													
		20	1338		1429	No Flare Patrol													
		20	1444		1447	No Flare Patrol													

DECEMBER 1986

Grp #	Sta	Day	Start (UT)	Max (UT)	End (UT)	Lat	CMD	NOAA/ USAF Region	CMP Mo	CMP Day	Dur (Min)	Imp Opt	Imp Xray	Imp See	Obs Type	Area Measurement Time (UT)	Area Measurement Apparent (10^{-6} Disk)	Area Measurement Corr (Sq Deg)	Remarks
		20	1454		1716	No Flare Patrol													
		20	1857		1927	No Flare Patrol													
		20	2243		2400	No Flare Patrol													
		21	0000		0056	No Flare Patrol													
		21	0121		0324	No Flare Patrol													
		21	0605		0659	No Flare Patrol													
		21	1120		1129	No Flare Patrol													
		21	1135		1139	No Flare Patrol													
		21	1223		1231	No Flare Patrol													
0006	RAMY	21	1339	1342	1416	S26	E35	4762	12	24.3	37	SF		3	C		22		
		21	1522		1530	No Flare Patrol													
		21	1607		1614	No Flare Patrol													
0007	RAMY	21	1755	1801	1824	S26	E34	4762	12	24.4	29	SN		3	C		35		
0008	RAMY	21	1912	1918	1928	S27	E33	4762	12	24.4	16	SN		3	C		44		
0009	HOLL	21	1950	1951	2001	S28	E31	4762	12	24.2	11	SF		2	C		19		
		21	2016		2027	No Flare Patrol													
0010	HOLL	21	2025	2043	2048	S28	E31	4762	12	24.3	23	SF		3	C		28		
		21	2056		2106	No Flare Patrol													
		21	2122		2154	No Flare Patrol													
		22	2224		2300	No Flare Patrol													
		23	0221		0233	No Flare Patrol													
		23	0320		0404	No Flare Patrol													
		23	0421		0514	No Flare Patrol													
		23	1011		1022	No Flare Patrol													
		23	1035		1041	No Flare Patrol													
0011	HTPR	23	1113	1114	1116	S26	E12	4762	12	24.4	3	SF			C	1114	10		
		23	1524		1604	No Flare Patrol													
0012	HTPR	24	1103	1107	1111	N22	E30		12	26.8	8	SF			C	1107	10	.1	
		24	2204		2213	No Flare Patrol													
		25	1026		1057	No Flare Patrol													
		25	1216		1220	No Flare Patrol													
		25	1358		1440	No Flare Patrol													
		25	1510		1627	No Flare Patrol													
		25	2141		2145	No Flare Patrol													
		26	1002		1218	No Flare Patrol													
		26	1224		1313	No Flare Patrol													
		26	1350		1419	No Flare Patrol													
		27	1308		1313	No Flare Patrol													
		27	1329		1419	No Flare Patrol													
		28	1014		1021	No Flare Patrol													
		28	1023		1034	No Flare Patrol													
		28	1155		1158	No Flare Patrol													
		28	1413		1424	No Flare Patrol													
		28	1817		1829	No Flare Patrol													
		28	1903		1946	No Flare Patrol													
		28	1958		2029	No Flare Patrol													
		28	2057		2218	No Flare Patrol													
		28	2358		2400	No Flare Patrol													
		29	0000		0006	No Flare Patrol													
		29	0501		0505	No Flare Patrol													
		29	1013		1018	No Flare Patrol													
		29	1023		1031	No Flare Patrol													
		31	1017		1040	No Flare Patrol													
		31	1042		1058	No Flare Patrol													
		31	2122		2133	No Flare Patrol													
		31	2154		2156	No Flare Patrol													
		31	2207		2212	No Flare Patrol													

INTERVALS OF NO FLARE PATROL OBSERVATION
FOR PRECEDING SOLAR FLARE TABLE

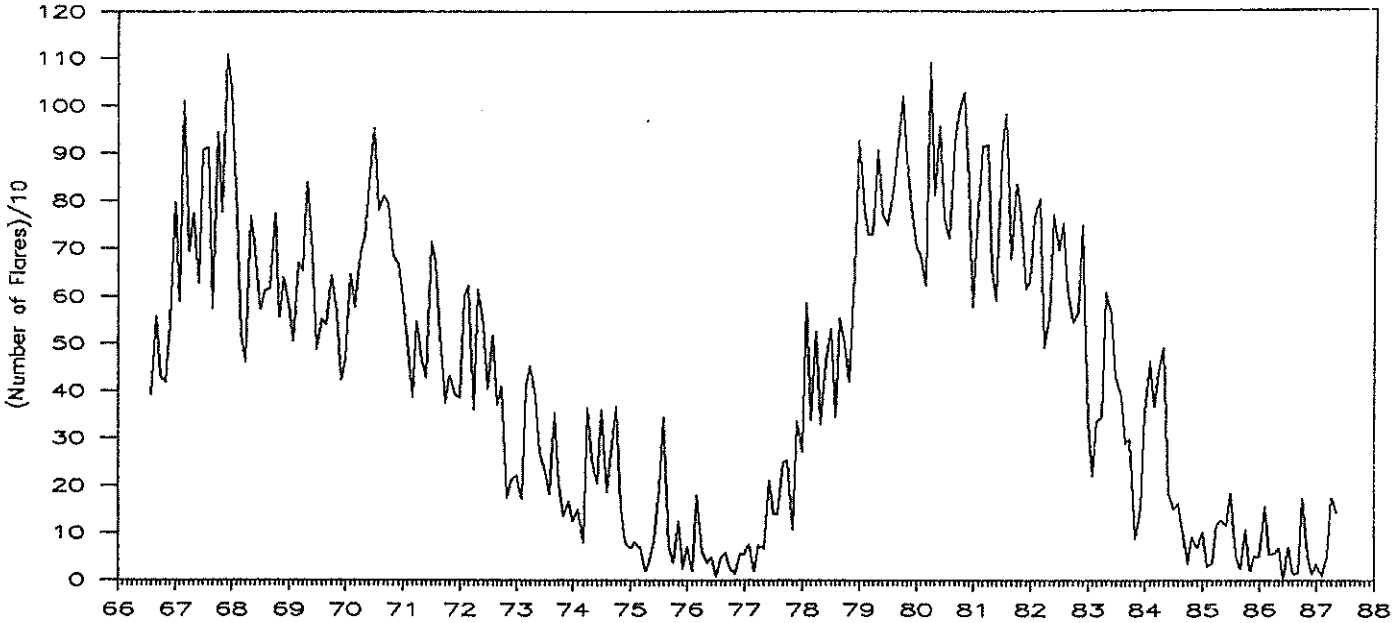
DECEMBER 1986



Times of no flare patrol, shown here as shaded areas, combine reports from the observatories listed below. Portions of a panel completely shaded mark dates and times of no patrol of any kind, that is, of neither visual nor cinematographic; portions of a panel with only the bottom half shaded mark times of strictly visual patrol.

Abastumani	Istanbul	Lvov	Purple Mt.	Urumqi
Bucharest	Kanzelhoehe	Manila	Ramey	Voroshilov
Holloman	Kharkov	Mitaka	San Vito	Wendelstein
Haute-Provence	Learmonth	Palehua	Tashkent	Yunnan

MONTHLY COUNTS OF GROUPED SOLAR FLARES*



Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1966								391	558	432	417	543	2341
1967	796	589	1009	694	771	629	907	911	573	946	775	1109	9709
1968	1037	773	519	460	768	697	573	611	616	772	556	640	8022
1969	581	504	669	655	839	694	489	551	540	643	566	422	7153
1970	466	646	578	688	722	836	954	780	811	797	687	667	8632
1971	598	505	387	546	461	430	713	673	518	375	431	394	6031
1972	384	599	621	361	614	541	404	515	371	408	175	210	5203
1973	221	171	410	453	388	270	232	182	353	201	136	163	3180
1974	127	148	79	364	255	204	360	187	270	366	153	81	2594
1975	68	82	69	19	42	85	196	346	68	38	127	25	1165
1976	69	18	180	60	38	48	6	47	57	23	13	55	614
1977	54	77	18	76	64	210	140	140	250	252	107	336	1724
1978	274	588	338	526	330	460	533	346	554	499	418	648	5514
1979	926	781	731	731	907	772	750	821	901	1018	888	786	10012
1980	703	689	621	1092	811	956	763	720	924	988	1027	838	10132
1981	578	782	914	915	658	592	893	982	680	836	773	615	9218
1982	631	766	803	490	553	769	696	753	615	544	564	748	7932
1983	332	220	337	346	609	561	427	389	289	298	88	152	4048
1984	353	461	366	440	492	185	151	161	95	36	92	69	2901
1985	104	29	38	119	129	116	185	53	25	108	19	50	975
1986	51	158	54	56	68	3	71	12	14	174	53	12	726
1987	35	8	49	176	142								410

*Flare counts are preliminary from July 1982 to present. In particular, the monthly totals for the last 6 months may change significantly, as more sites submit their reports. The term "grouped" means that observations of the same event by different stations have been lumped together and counted as one.

SOLAR RADIO EMISSION
OUTSTANDING OCCURRENCES

DECEMBER 1986

Day	Freq Sta	Type	Start (UT)	Time of Maximum (UT)	Duration (Min)	Flux Density Peak (10 -22 W/m 2 Hz)	Flux Density Mean (10 -22 W/m 2 Hz)	Int	Remarks
01	930 BORD	8 S	1539.1	1539.2	.2	46.0	2.0		
02	930 BORD	8 S	1247.9	1248.0	.3	12.0	2.0		
05	260 ONDR	42 SER	1122.0	1130.0	10.0	5.0			
	260 ONDR	42 SER	1242.5	1242.5	8.0	7.0			
08	930 BORD	8 S	0822.6	0822.8	.2	60.0	2.0		
09	1470 POTS	23 GRF	0836.0	0845.8	12.0	4.0			
	1470 POTS	21 GRF	0857.5	0902.4	27.0	7.0			
	930 BORD	8 S	1110.6	1110.7	.2	17.0	2.0		
10	2000 TYKW		0653.0	0654.2		30.0			
	2000 TYKW	45 C	0653.0	0655.1	5.0	31.0	4.0		
	930 BORD	8 S	1134.5	1134.7	.3	38.0	2.0		
17	808 ONDR	8 S	1203.0	1203.1	.2				
	808 ONDR	2 S/F	1337.5	1338.0	1.5				
18	930 BORD	46 C	1110.4	1110.9	.8	220.0	4.0		
19	930 BORD	8 S	1107.1	1107.2	.4	12.0	2.0		
20	260 ONDR	44 NS	0926.0E	1100.0	276.0D	7.0			
	808 ONDR	40 F	1203.0		100.0D				
22	260 ONDR	43 NS	0905.0		243.0D	4.0			
	2840 PEKG	20 GRF	0117.0	0155.2	51.0	3.2	1.3		
	245 LEAR	8 S	0711.0E	0711.0	1.0D	41.0			QL=3 ST=2 TYP=3
23	930 BORD	41 F	1254.0	1254.2	4.0	51.0	2.0		
24	930 BORD	46 C	1416.3	1416.4	.4	70.0	3.0		
28	260 ONDR	43 NS	1158.2		91.8D	10.0			
	260 ONDR	46 C	1125.9	1126.0	.5	4.0			
29	536 ONDR	44 NS	0802.0E		341.0D	25.0			
	260 ONDR	43 NS	0847.5		295.5D	60.0			

Reports are received routinely from the following observatories:

ATHN = Athens
BERN = Berne
BORD = Bordeaux
CRIM = Crimea
GORK = Gorky
HIRA = Hiraiso
HUAN = Huancayo
IZMI = IZMIRAN
KISV = Kisiovodsk
KRAK = Krakow
LEAR = Learmonth
MANI = Manila
NOBE = Nobeyama
ONDR = Ondrejov
OTTA = Ottawa
PALE = Palehua
PEKG = Peking
PENT = Penticton
POTS = Potsdam
SAOP = Sao Paulo
SGMR = Sagamore Hill
SVTO = San Vito
SYDN = Sydney
TORN = Torun
TYKW = Toyokawa
TRST = Trieste
UPIC = Upice
VORO = Voroshilov

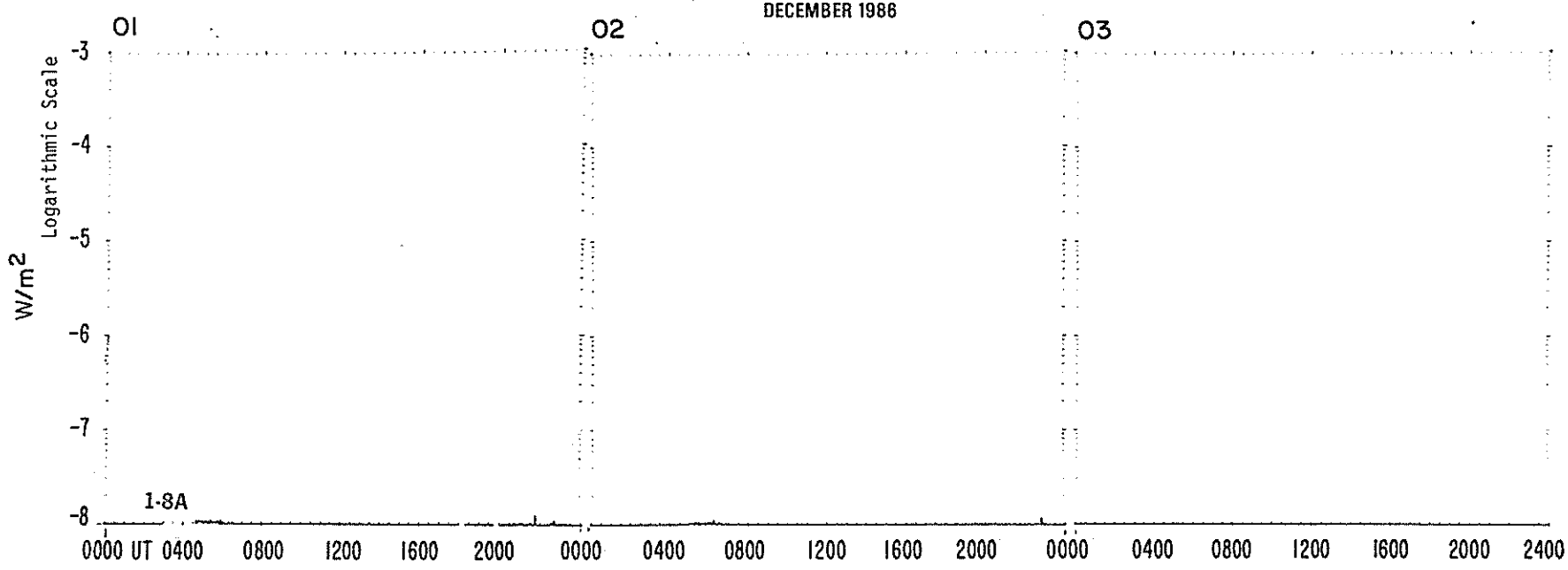
Explanation of Type Code:

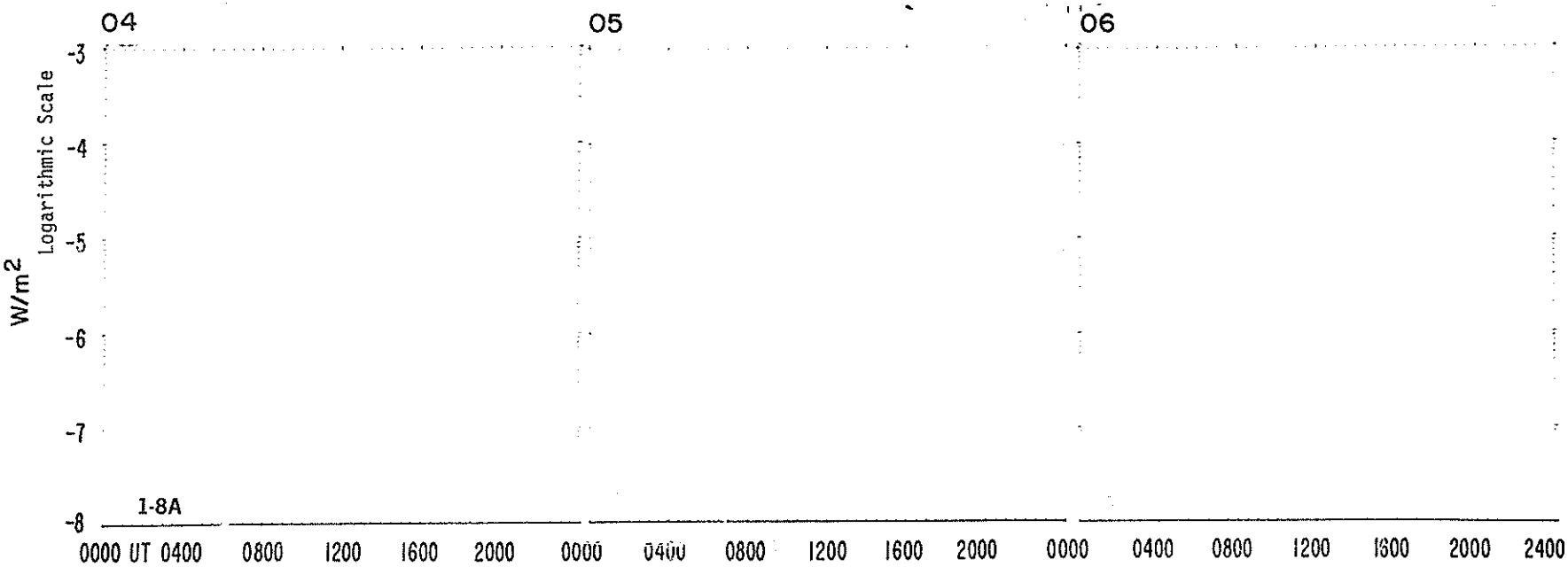
1 Simple 1
2 Simple 1F
3 Simple 2
4 Simple 2F
5 Simple
6 Minor
7 Minor +
8 Spike
20 Simple 3
21 Simple 3A
22 Simple 3F
23 Simple 3AF
24 Rise
25 Rise A
26 Fall
27 Rise and Fall
28 Precursor
29 Post Burst Increase
30 Post Burst Increase A
31 Post Burst Decrease
33 Absorption
40 Fluctuation
41 Group of Bursts
42 Series of Bursts
43 Onset of Noise Storm
44 Noise Storm In Progress
45 Complex
46 Complex F
47 Great Burst
48 Major

1A Simple 1A
3A Simple 2A
21A Simple 3A GRF
2A Simple 1AF
4A Simple 2AF
240 Rise only
240F Rise only F
24P Post Rise
24PF Post Rise F
16A Fall A
260 Fall Only
26F Fall F
27F Rise and Fall F
27AF Rise and Fall AF
31A Post Burst Decrease A
32A Absorption A
46F Complex F

GOES 6 X-RAYS

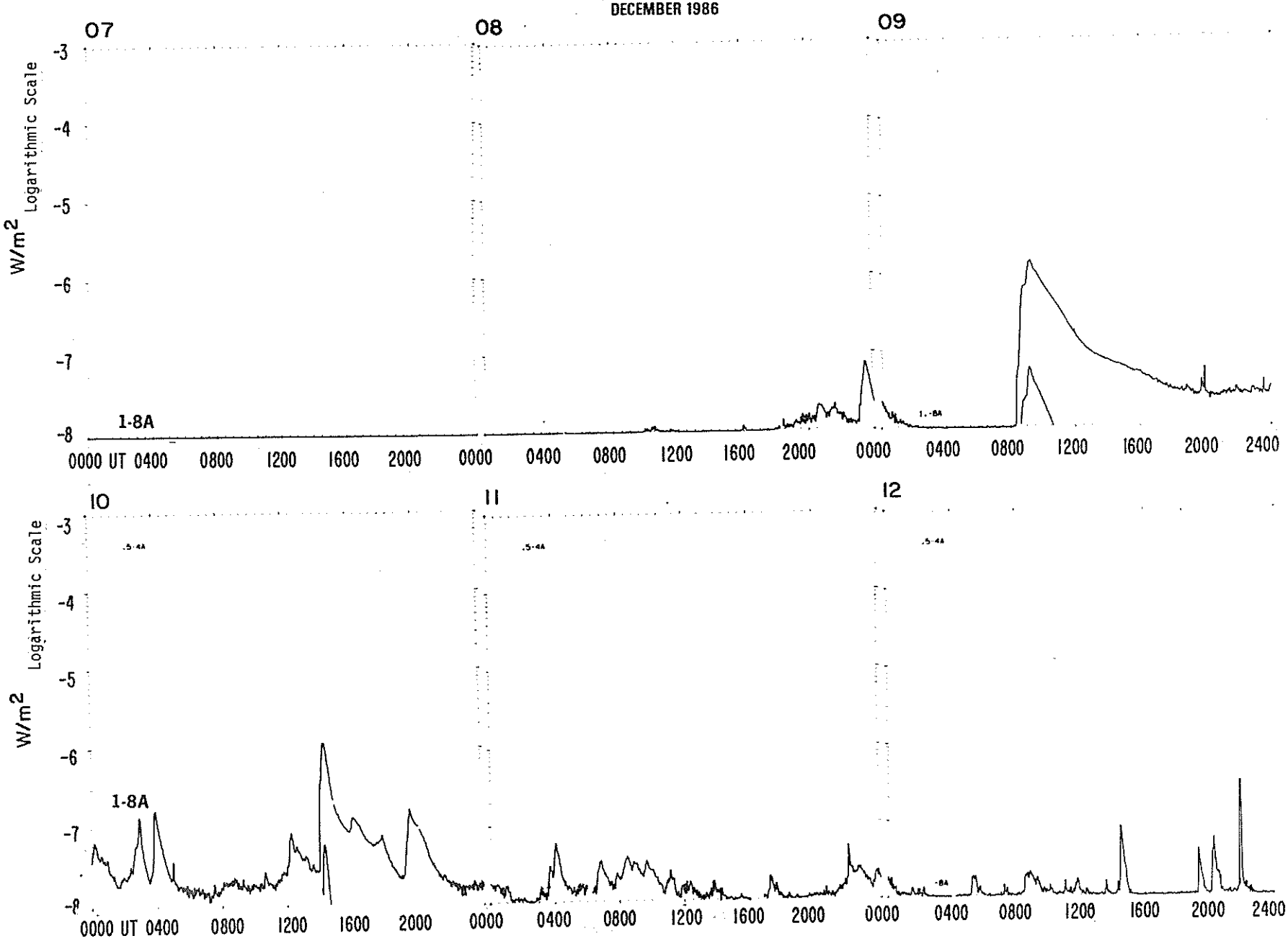
DECEMBER 1986





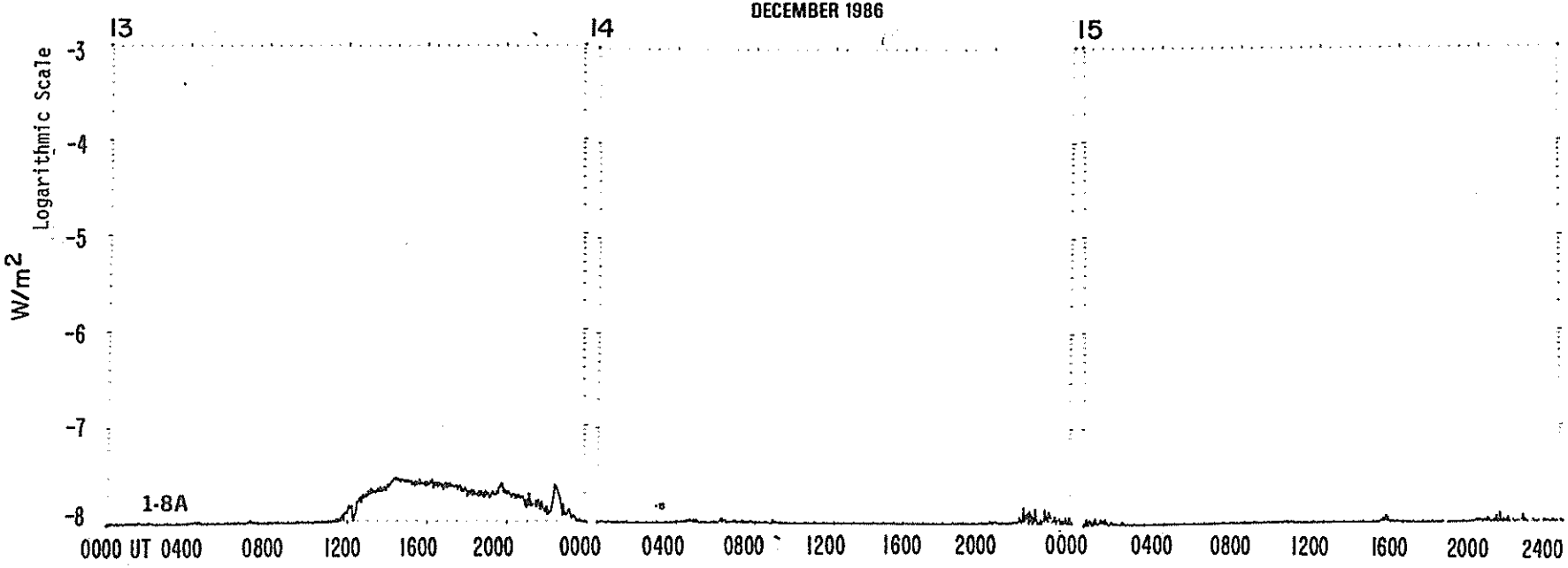
GOES 6 X-RAYS

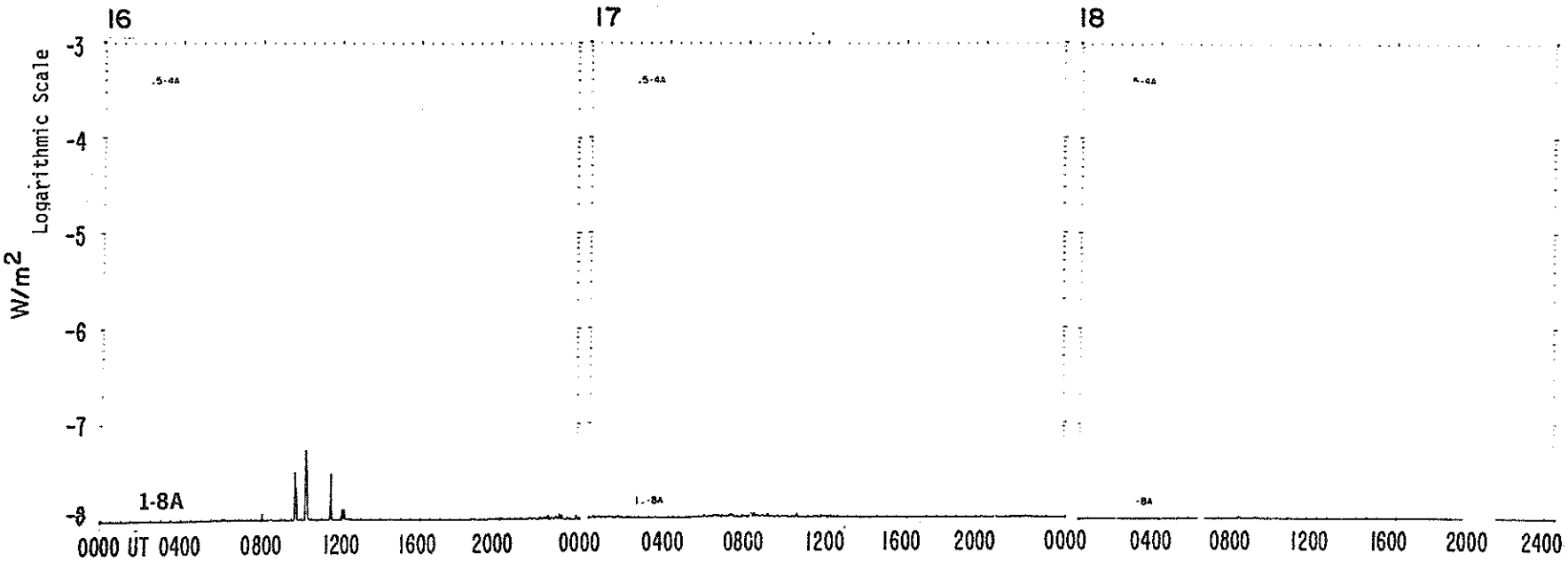
DECEMBER 1986



GOES 6 X-RAYS

DECEMBER 1986

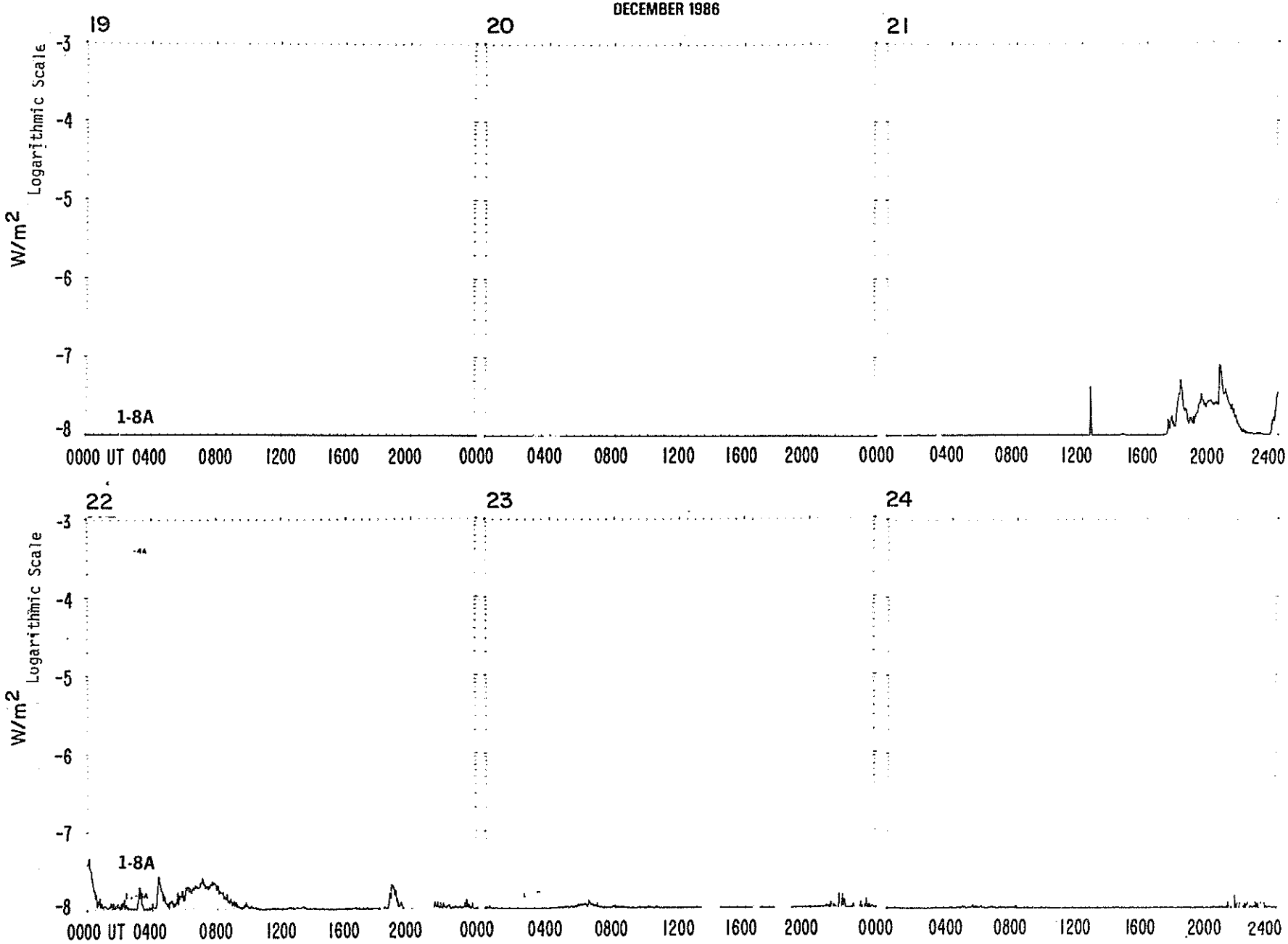




13
Dec 86

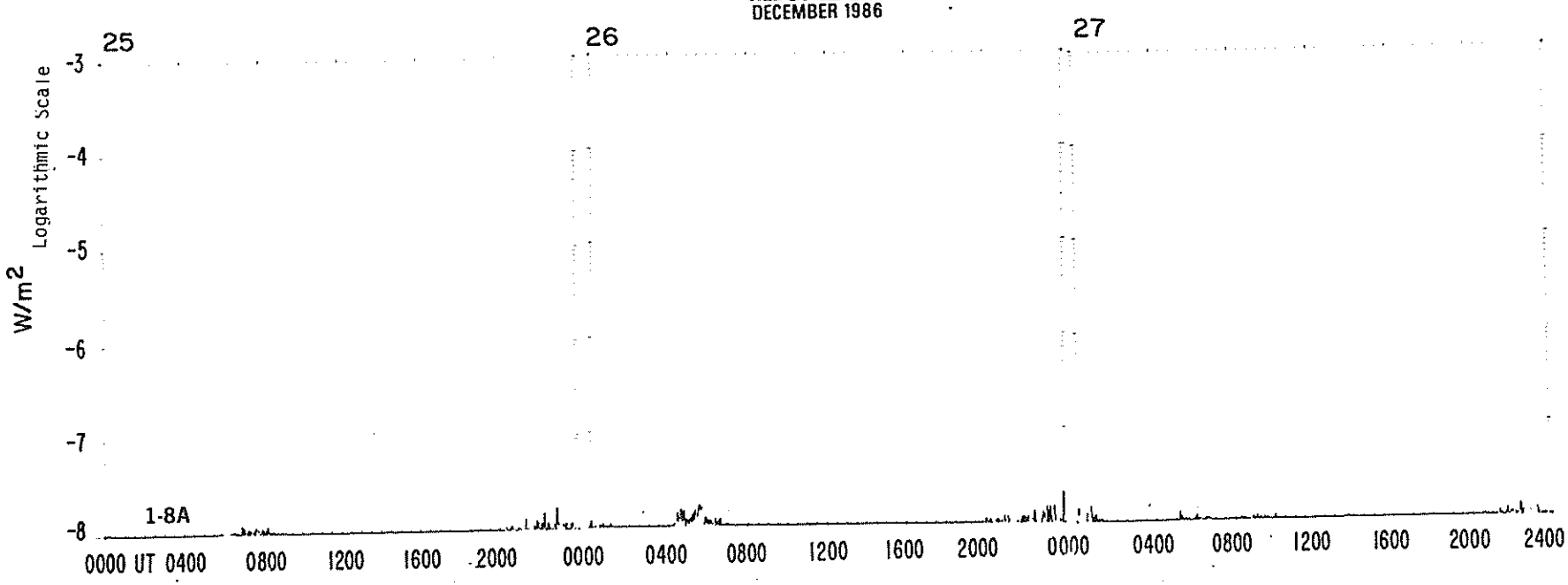
GOES 6 X-RAYS

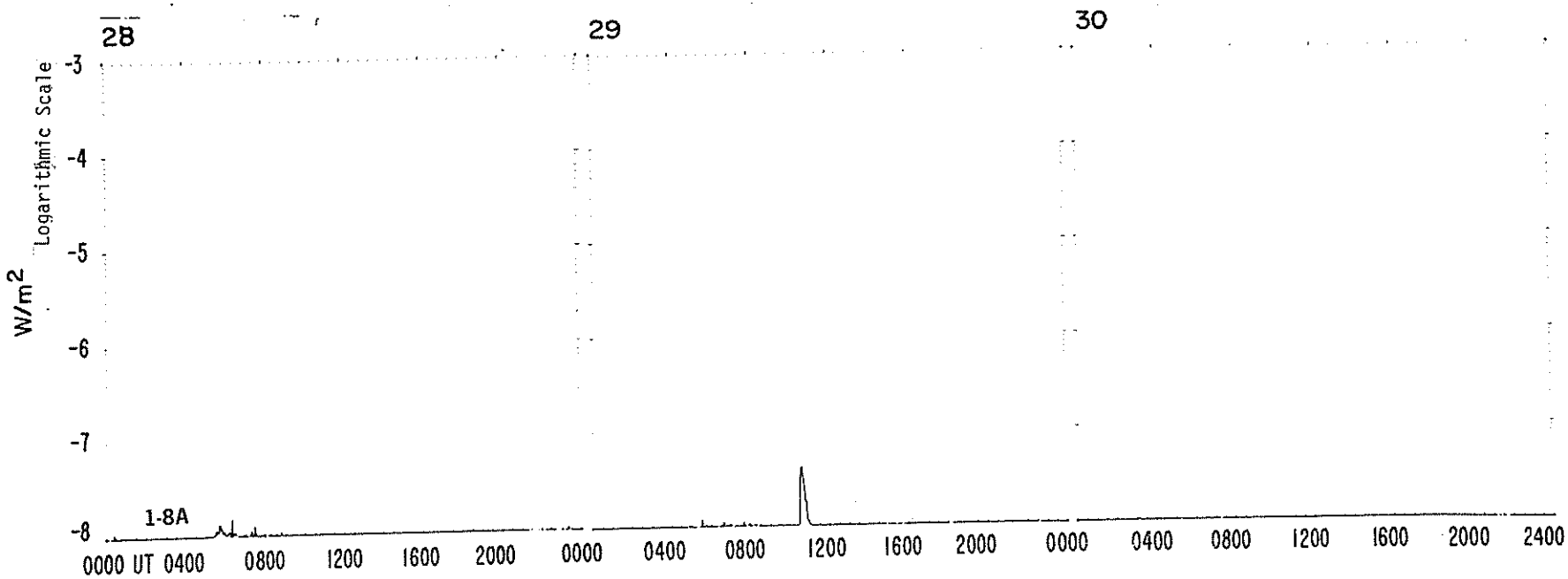
DECEMBER 1986



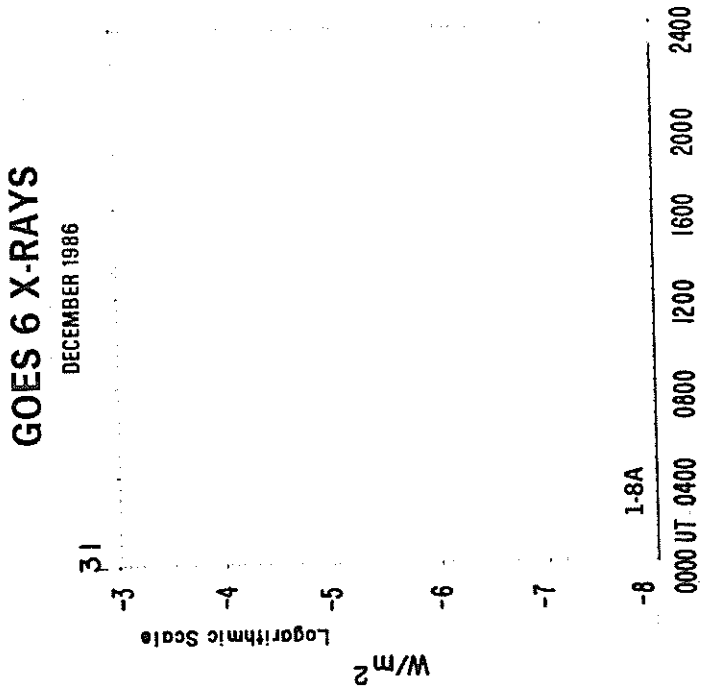
GOES 6 X-RAYS

DECEMBER 1986





15 Dec 86


GOES 6 X-RAYS
DECEMBER 1986
31
-3
-4
-5
-6
-7
-8
Logarithmic Scale
W/m2
1-8A
0000 UT 0400 0800 1200 1600 2000 2400

GOES S O L A R X-RAY F L A R E S

Preliminary Listing

December 1986

Day	Start (UT)	Max (UT)	End (UT)	Lat	CMD	NOAA/ USAF Region	Opt	Imp Xray
09	0835	0917	0957					C1.3
10	0256	0258	0303	S27	E75	4761	SF	B1.3
10	0352	0403	0404					B1.7
10	1406	1425	1437					C1.1
12	2151	2154	2209	S31	E46	4761	SF	B3.2

Please note that this table and the Grouped H-alpha Solar Flare table have not been totally integrated. All of these X-ray flares do not appear in the Grouped H-alpha Solar Flare table. And all matches of these X-ray flares with the H-alpha flares are not indicated here.

Preliminary GOES Satellite Data
Daily Average X-ray Background

January 1986 - December 1986

Day	1986 Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	B0.0	B0.2	B2.0	<B0.1	B0.5	B0.2	<B0.1	<B0.1	<B0.1	<A1.0	B2.7	<A1.0
2	B0.0	B0.3	B1.5	<B0.1	B1.0	<B0.1	<B0.1	<B0.1	<B0.1	<A1.0	A9.0	<A1.0
3	B0.0	**	B1.9	<B0.1	B1.4	<B0.1	<B0.1	B0.3	<B0.1	<A1.0	A5.1>	<A1.0
4	B0.0	**	B1.4	<B0.1	B0.5	<B0.1	<B0.1	B0.2	<B0.1	<A1.0	A8.6	<A1.0
5	B0.0	**	B1.6	<B0.1	B0.2	<B0.1	B0.2	<B0.1	<B0.1	<A1.0	A6.1	<A1.0
6	B0.0	**	B1.5	<B0.1	<B0.1	<B0.1	B0.4	<B0.1	<B0.1	A1.5	A7.0	<A1.0
7	B0.0	B7.2	B1.0	B0.2	<B0.1	<B0.1	B0.6	<B0.1	<B0.1	A2.2	A3.6	<A1.0
8	B0.0	B2.5	B0.8	<B0.1	<B0.1	<B0.1	<B0.1	B0.4	<B0.1	A2.0	A2.5	<A1.0
9	B0.0	B2.0	B0.9	<B0.1	<B0.1	<B0.1	B0.2	B0.4	<B0.1	A2.4	A2.1	A1.6
10	B0.0	B2.5	B0.9	<B0.1	<B0.1	<B0.1	B0.9	<B0.1	<B0.1	A2.2	<A1.0	A1.6
11	B0.0	B9.8	B0.8	<B0.1	<B0.1	<B0.1	B0.5	<B0.1	<B0.1	A1.8	<A1.0	<A1.0
12	B0.0	B5.7	B0.7	B0.2	<B0.1	<B0.1	B0.4	<B0.1	<B0.1	A4.3	A2.3	<A1.0
13	B0.3	B6.1	B0.5	<B0.1	<B0.1	<B0.1	B0.7	<B0.1	<B0.1	B1.6	A6.2	<A1.0
14	B0.4	B0.1	B0.3	<B0.1	<B0.1	<B0.1	B1.0	<B0.1	<B0.1	B2.5	A4.0	<A1.0
15	B0.4	B5.7	B0.0	B0.4	<B0.1	<B0.1	B0.5	<B0.1	B0.3	B1.5	A4.1	<A1.0
16	B0.5	B2.1	B0.0	B0.3	B0.2	<B0.1	B0.3	<B0.1	B0.5	B4.0	A3.9	<A1.0
17	B1.0	B2.3	B0.0	B0.3	B0.3	<B0.1	B0.3	<B0.1	<B0.1	B3.7	A3.2	<A1.0
18	B0.7	B0.0	B0.0	B0.2	B0.8	<B0.1	B0.3	<B0.1	<B0.1	B2.5	A3.4	<A1.0
19	B0.6	B0.0	B0.0	B0.2	B0.6	<B0.1	B0.2	<B0.1	<B0.1	B3.8	A3.0	<A1.0
20	B4.7	B0.0	B0.0	B0.2	B0.6	<B0.1	B0.2	<B0.1	<B0.1	B2.2	A3.3	<A1.0
21	B9.5	B0.0	B1.9	B0.2	B0.6	<B0.1	B0.1	<B0.1	<B0.1	B1.5	A2.1	<A1.0
22	B2.9	B0.0	B0.0	B0.2	B0.5	<B0.1	B0.1	<B0.1	<A1.0	B1.6	A2.3	<A1.0
23	B2.7	B0.0	B0.1	B1.2	B0.4	<B0.1	B0.1	<B0.1	<A1.0	B2.1	A2.1	<A1.0
24	B1.3	B0.0	B0.1	B2.8	B0.5	<B0.1	B0.1	<B0.1	<A1.0	B2.1	A4.4	<A1.0
25	B0.8	B0.1	B0.0	B0.9	B0.8	<B0.1	B0.2	<B0.1	<A1.0	B1.7	A2.9	<A1.0
26	B0.6	B0.8	B0.1	B1.1	B0.5	<B0.1	B0.2	<B0.1	<A1.0	B1.9	A1.3	<A1.0
27	B0.2	B1.0	B0.1	B1.5	B0.3	<B0.1	B0.1	<B0.1	<A1.0	B1.9	A1.2	<A1.0
28	B0.0	B1.3	B0.1	B1.0	B0.3	<B0.1	B0.2	<B0.1	<A1.0	B1.8	<A1.0	<A1.0
29	B0.0		B0.1	B0.5	B0.2	<B0.1	B0.3	<B0.1	<A1.0	B1.6	<A1.0	<A1.0
30	B0.0		B0.1	B0.6	B0.2	B0.7	<B0.1	<B0.1	<A1.0	B1.8	<A1.0	<A1.0
31	B0.0		<B0.1		B0.2		<B0.1	<B0.1		B2.1		<A1.0

MASS EJECTIONS FROM THE SUN

DECEMBER 1986

Sta	Day	Observed UT Start	Max	End	Location RA°	R/R$_0$	Freq or Wavelength	Kind of Event
KHAR	Dec 09	0858	E 0913	0920	117	1.00	H-alpha	SP
KHAR	Dec 09	0858	E	0915	D 134	1.00	H-alpha	S
KHAR	Dec 09	0953	E	1016	D 121	1.00	H-alpha	S
KHAR	Dec 09	1019	E	1044	D 134	1.00	H-alpha	S
KHAR	Dec 09	1028	E	1048	D 053	0.65	H-alpha	S
KHAR	Dec 13	0855	E 0925	U 1010	D 060	1.00-1.25	H-alpha	SP

QUALIFIERS ON START, MAX AND END TIMES
- D = event ended after tabulated time
- E = event began before the tabulated time
- U = uncertain time

REPORTING STATIONS
- KHAR = Kharkov

TYPE OF EVENT
- A = eruptive active region prominence
- CB = coronal cloud bubble
- D = coronal depletions
- E = coronal enhancement
- EL = coronal expanding loop
- II = Type II radio burst
- IVm = moving Type IV radio burst
- Q = eruptive quiescent prominence
- R = coronal ray or streamer
- S = flare-surge if there is a known flare association
- SP = flare-spray if there is a known flare association
- * = movement may be caused by ionospheric refraction

ACTIVE PROMINENCES AND FILAMENTS

DECEMBER 1986

Day	Event Type	Start (UT)	End (UT)	Lat	CMD	CMP Mo	CMP Day	Imp	Extent	Blue Shift (.1 A)	Red Shift (.1 A)	Obs Type	Sta	NOAA/ USAF Reg#	Remarks
01	APR	0006	0300D	S32	W90	11	24.0	1				C	VORO		
01	APR	0006	0300D	S39	W90	11	23.8	1				C	VORO		
01	ADF	0230E	0433D	N24	W07	11	30.6	1	04	8	8	E	LEAR		
01	DSD	1615E	1636	S02	W35	11	29.2		02	9	9	E	HOLL		
01	ADF	2214E	1007D	N42	E25	12	4.0	1	12	9	9	E	LEAR		
01	APR	2359	0300D	S39	W90	11	24.8	1				C	VORO		
02	SDF	1241E	1249D	N45	E21	12	4.3		06	0	0	E	RAMY		
02	ADF	2330E	1007D	N47	E33	12	5.7	1	32	8	5	E	LEAR		
03	ADF	1337E	2104D	S42	W54	11	29.2	2	06	7	6	E	RAMY		
04	APR	0202E	0949D	S36	W90	11	27.0	2		7	7	E	LEAR		
04	ADF	0204E	0949D	N30	W13	12	3.1	1	32	7	6	E	LEAR		
04	APR	1250E	1928D	S40	W87	11	27.5	2		4	6	E	RAMY		
04	SDF	1541E	1605D	N16	W24	12	2.8		03	0	0	E	RAMY		
07	AFS	0429E	0950D	N26	E63	12	12.1		02	9	9	E	LEAR		
08	ADF	0004	0300D	N47	W50	12	3.8	1				C	VORO		
08	ADF	0155	0300D	S43	E66	12	13.5	1				C	VORO		
09	ADF	0130E	0300D	S43	E57	12	13.7	1				C	VORO		
09	BSL	0626	0716	S22	E90	12	16.2	1				C	ABST		
09	ASR	0740E	1010D	S21	E90	12	16.2			9	9	E	LEAR		
09	BSL	0858E	0915	S44	E90	12	16.8	1				V	KHAR		
09	BSL	0858E	0920	S27	E90	12	16.4	2				V	KHAR		
09	APR	0900E	1422D	S23	E90	12	16.3	1		9	9	E	SVTO		
09	BSL	0935	1016	S31	E90	12	16.5	1				V	KHAR		
09	BSL	1019	1044	S44	E90	12	16.9	1				V	KHAR		
09	DSD	1028	1048D	N24	E45	12	12.9	1				V	KHAR		
09	AFS	1250E	2135D	N26	E48	12	13.3	1	02	9	9	E	RAMY		
09	DSD	1253E	1328D	N25	E50	12	13.4	2	05	9	7	E	RAMY		
09	ADF	1315E	1422D	N15	E53	12	13.6	3	05	9	9	E	SVTO		
09	DSD	1315E	1422D	N17	E47	12	13.1		03	9	9	E	SVTO		
09	AFS	1440E	2239D	N26	E43	12	12.9		02	9	9	E	HOLL	4760	
10	AFS	0011E	1020D	N25	E37	12	12.9		03	9	9	E	LEAR	4760	
10	DSD	0011E	1020D	N26	E37	12	12.9		02	9	9	E	LEAR	4760	
10	AFS	0112E	0311D	N26	E37	12	12.9		02	9	9	E	PALE	4760	
10	APR	0215E	0505D	S23	E90	12	17.0			9	6	E	LEAR		
10	BSL	0623	0852	N41	E90	12	17.6	1				C	ABST		
10	AFS	0844E	1432D	N28	E30	12	12.7		02	9	9	E	SVTO	4760	
10	AFS	1205E	2135D	N31	E27	12	12.6		03	9	9	E	RAMY	4760	
10	DSD	2102E	0248D	N26	E27	12	13.0		01	9	9	E	PALE	4760	
10	AFS	2102E	0248D	N27	E28	12	13.0	1	01	8	8	E	PALE	4760	
11	AFS	0220E	1017D	N25	E24	12	12.9		02	8	7	E	LEAR	4760	
11	APR	0700	0810	N31	E90	12	18.4	1				C	ABST		
11	AFS	1205E	2135D	N29	E29	12	13.8	1	03	8	8	E	RAMY	4760	
11	ADF	1205E	2135D	S28	E60	12	16.2	2	07	9	9	E	RAMY	4761	
11	ADF	1338E	1355D	S28	E62	12	16.4	1	08	9	9	E	SVTO	4761	
11	APR	1606E	2348D	N38	E90	12	18.9			9	8	E	HOLL		
11	APR	1730E	0343D	N22	E90	12	18.6	1		9	9	E	PALE		
11	ADF	1732E	0343D	S27	E59	12	16.3	1	12	9	9	E	PALE	4761	
11	APR	1900E	2135D	N44	E90	12	19.2	2		9	9	E	RAMY		
11	DSD	2240E	0540D	N25	E27	12	14.0		02	8	8	E	LEAR	4760	
11	APR	2254E	1007D	N44	E90	12	19.4	1		9	8	E	LEAR		
12	ADF	0055E	1007D	S20	E57	12	16.4	1	15	9	9	E	LEAR	4761	
12	APR	0617	0903	N46	E90	12	19.8	1				C	ABST		
12	AFS	1158E	2036D	N28	E09	12	13.2	1	02	9	9	E	RAMY	4760	
12	ADF	1158E	2036D	S30	E54	12	16.7	2	09	9	9	E	RAMY	4761	
12	SDF	1830E	1830D	S44	E45	12	16.5		10	9	9	E	PALE		
12	DSD	1907E	2036D	S32	E48	12	16.6	2	03	9	9	E	RAMY	4761	
12	DSD	1924E	1926D	S31	E49	12	16.7		04	9	9	E	PALE	4761	
12	DSD	2155	2235D	S34	E46	12	16.6		11	9	9	E	HOLL	4761	
12	APR	2227E	0206D	N43	E90	12	20.3	1		8	9	E	LEAR		
12	DSD	2227E	2254D	S31	E46	12	16.6		08	6	9	E	LEAR	4761	
13	APR	0642	0840	N48	E90	12	20.8	1				C	ABST		

ACTIVE PROMINENCES AND FILAMENTS

DECEMBER 1986

Day	Event Type	Start (UT)	End (UT)	Lat	CMD	CMP Mo	CMP Day	Imp	Extent	Blue Shift (.1 A)	Red Shift (.1 A)	Obs Type	Sta	NOAA/ USAF 'Reg#	Remarks
13	BSL	0855E	1010	N30	E90	12	20.4	3				V	KHAR		
13	SDF	1430E	1434D	N41	E90	12	21.0		18	0	0	E	HOLL		
13	AFS	1438E	1440D	N25	W09	12	12.9		02	8	7	E	RAMY	4760	
13	SDF	1450E	1450D	N38	E90	12	20.9		16	0	0	E	RAMY		
15	ADF	1405E	2111D	S25	E02	12	15.7	2	02	6	5	E	RAMY	4761	
15	ADF	1435E	1600D	S36	W15	12	14.4		06	8	9	E	HOLL	4761	
20	DSD	1820	2107D	N29	W28	12	18.6		05	9	9	E	PALE		
21	DSD	1232E	1257D	S25	E36	12	24.3	2	03	9	9	E	RAMY		
21	AFS	1305E	1955D	S25	E35	12	24.2		01	9	9	E	RAMY		
21	AFS	1437E	1955D	S26	E35	12	24.3		01	9	8	E	RAMY		
21	DSD	1759E	1955D	S26	E34	12	24.4	2	03	9	9	E	RAMY		
21	DSD	1942E	2254D	S27	E33	12	24.4		05	9	9	E	HOLL	4762	
21	AFS	2125E	0259D	S27	E35	12	24.6	1	02	9	9	E	PALE	4762	
22	AFS	0520E	0955D	S28	E29	12	24.5		02	9	9	E	LEAR	4762	
22	AFS	0818E	1452D	S28	E24	12	24.2		02	9	8	E	SVTO	4762	
22	AFS	1820E	0319D	S28	E20	12	24.3	1	01	8	8	E	PALE	4762	
23	AFS	1426E	2006D	S27	E09	12	24.3		02	8	8	E	RAMY	4762	
23	SDF	1915	0010	S42	W71	12	18.0		02	0	0	E	PALE		
24	SDF	0234E	0319D	S43	W68	12	18.5	3	08	0	0	E	LEAR		
24	SDF	0234E	0319D	S47	W50	12	19.9	3	12	0	0	E	LEAR		
24	DSD	1440E	1750D	S26	W09	12	23.9	2	02	9	9	E	RAMY	4762	
24	DSD	1600E	1630D	S26	W09	12	24.0		01	9	9	E	HOLL	4762	
24	DSD	1754E	1759D	S27	W06	12	24.3		03	9	9	E	PALE	4762	
25	AFS	1455E	1647D	S26	W18	12	24.2		03	9	9	E	RAMY	4762	
26	SDF	2337E	2337D	S28	W49	12	23.1		10	0	0	E	HOLL		
28	AFS	0508E	0751D	S13	W42	12	25.0		02	9	9	E	LEAR		
29	EPL	1805E	1938	S29	W90	12	22.7	2		7	9	E	PALE		
29	EPL	1914E	1940D	S27	W90	12	22.8	2		8	5	E	HOLL		
29	EPL	1918E	2008D	S27	W90	12	22.8	2		7	7	E	RAMY		
30	ASR	2345E	0846D	S29	W90	12	23.9			9	9	E	LEAR	4762	
31	AFS	0942E	1012D	S10	W15	12	30.3		02	9	9	E	LEAR		
31	ADF	0945E	1016D	S39	W53	12	27.1	2	10	7	8	E	LEAR		
31	AFS	1805E	2048D	N06	E28	01	2.8		01	9	9	E	HOLL		
31	AFS	1816E	0341D	N06	E28	01	2.8	1	02	9	9	E	PALE		
31	SDF	1835E	1958D	S36	W55	12	27.3		13	0	0	E	HOLL		
31	SDF	1835E	1958D	S42	W61	12	26.8		13	0	0	E	HOLL		
31	SDF	1840E	1927D	S36	W54	12	27.4		14	0	0	E	RAMY		
31	SDF	1840E	1927D	S41	W61	12	26.8		14	0	0	E	RAMY		
31	AFS	2134E	2229D	N06	E26	01	2.8		02	9	9	E	HOLL		
31	AFS	2235E	1004D	N12	E26	01	2.9		03	9	9	E	LEAR	4763	
31	DSD	2255E	2256D	N05	E24	01	2.8		03	9	9	E	PALE	4763	
31	DSD	2255E	2256D	N05	E24	01	2.8		03	9	9	E	PALE	4763	
31	SDF	2300E	0540D	S42	W67	12	26.4	3	13	4	4	E	LEAR		
31	SDF	2300E	0540D	S44	W76	12	25.7	3	13	4	4	E	LEAR		

ADF = Active Dark Filament
AFS = Arch Filament System
APR = Active Prominence
ASR = Active Surge Region
BSD = Bright Surge on Disk
BSL = Bright Surge on Limb
CAP = CAP Prominence (Tandberg-Hanssen)
CRN = Coronal Rain
DSD = Dark Surge on Disk
EPL = Eruptive Prominence on Limb
LPS = Loops
MDP = Mound Prominence
SDF = Sudden Disappearing Filament
SPY = Spray
SSB = Solar Sector Boundary

For SOLAR SECTOR BOUNDARY REPORTS, the latitude field contains the Carrington longitude of the point where a neutral line crosses the solar equator. The comments field may contain the Carrington longitude and central meridian distance of two more intersection points.

The EXTENT field for limb events is the radial extent above the limb in hundredths of solar radius. For disk events this field contains the heliographic extent in whole degrees.

The remark "Bright Emission 1/3" indicates that bright emission was observed 1/3 of time.
The remark "Normal Emission 1/3" indicates that normal emission was observed 1/3 of time.

Observation Type: C= Cinematographic, E= Electronic, P= Photographic, V= Visual.

C O N T E N T S

Comprehensive Reports MISCELLANEOUS DATA Number 514 Part II

Page

Chinese Solar-Geophysical Data (CSGD)
Explanation of Data Reports 25-32

EDITOR'S NOTE: In a previous issue (SGD 501B) we presented the descriptive text and inventory of data for the IAU Quarterly Bulletin on Solar Activity (QBSA) [1917-present] and the Cartes Synoptiques [1919 to present]. Here we present the Explanation of Data Reports for the Chinese Solar-Geophysical Data (CSGD) which began in 1980.

CHINESE SOLAR-GEOPHYSICAL DATA (CSGD)
EXPLANATION OF DATA REPORTS

(from CSGD 1986 Vol. 1-2, CSGD Editorial Group,
Academia Sinica, Beijing, People's Republic of China)

INTRODUCTION

The solar-geophysical data contained in "Chinese Solar-Geophysical Data" are collected by Beijing Astronomical Observatory (BEIJ), Beijing Geomagnetic Observatory (BGMO), Beijing Planetarium (PLAT), Nanjing University (NAUN), Purple Mountain Observatory (PURP), Shaanxi Observatory (LINT), Wulumuqi Astronomical Station (WLMQ), and Yunnan Observatory (YUNN). The data are divided into the following seven parts:

1. Daily Relative Sunspot Numbers and Sunspot Areas, Daily Sunspot Observations and Sunspot Groups compiled by Purple Mountain Observatory.

2. Daily charts of Sunspot Magnetic Field made by Yunnan Observatory.

3. H-Alpha Solar Flares and Intervals of H-Alpha Solar Flare Patrol Observation compiled by the CSGD Editorial Group (EG) in Beijing.

4. Solar Radio Emission Flux and Solar Radio Emission Outstanding Occurrences, Intervals of Solar Radio Emission Patrol Observations and Solar Radio Emision Burst Profiles compiled by the EG.

5. Sudden Ionospheric Disturbances (D-Region) (SID) compiled by the EG.

6. Geomagnetic Indices K and A_K compiled by the EG.

7. Magnetic Storms compiled by Beijing Geomagnetic Obserrvatory.

All the above data are stored in a VAX 11/780 computer, some calculations are made, and the data are checked before final data reports are photoprinted.

Brief Explanation of the main contents

1. The results contained in the tables of sunspots come mainly from the observations of Yunnan Observatory. When there are gaps in these observations, they are filled by observations made on the same day by other observatories whose corresponding names appear in the remarks column of the table. The table of "Daily Sunspot Observations" and the table of "Sunspot Groups" have the same contents but are arranged according to different parameters. The former is arranged according to observation dates and the latter according to sunspot group numbers. Sunspot group numbers are standardized after collecting all sunspot observations from different observatories.

2. In the table of "Daily Sunspot Observations" and the table of "H-Alpha Solar Flares" Carrington coordinates are used for the positions of sunspot groups or solar flares. Central Meridian Distance shows the distance in degrees between the central meridian and the meridian where a sunspot group or flare is located. E and W indicate that the sunspot group or flare lies to the east or to the west of the central meridian respectively. Heliocentric Distance measured in units of disk radius represents the distance from the center of gravity of the sunspot group or flare on the disk to the centre of the disk. Apparent Areas Sd is the area projected on the disk in millionths of the disk and the Corrected Area Sp is the real area of the sunspot group or flare occupied on the sun surface in millionths of the hemisphere after the projecting correction of Apparent Area Sd

is considered. Zurich classification is used for sunspot classification.

3. Daily Charts of Sunspot Magnetic Field mainly give the polarities and the maximum values of magnetic fields of sunspots but not the exact features and areas of sunspots. The observing time of sunspot magnetic fields is given for each chart, N-S and E-W represent the direction of the solar rotation axis and the equator of the sun respectively. The upper case letters N and S near sunspot groups indicate the polarities of the spots and the Arabic numbers show the measured values of the magnetic fields in 100 gauss.

4. The table of " H-Alpha Solar Flares " gives H-Alpha flare patrol observations including subflares made by Beijing Astronomical Observatory, Purple Mountain Observatory, Wulumuqi Astronomical Station, and Yunnan Observatory. For each flare, start time, end time and the time of maximum phase which shows the maximum of flare brightness are given, and the area is that measured at the time of maximum phase. For flares less than 65° from the centre of the disk the formula relating apparent area Sd and corrected area Sp is the so called Sec θ law. Two figures are assigned to each flare to show the importance of the flare. The first figure is defined by the area of the flare at the maximum phase and the second one is only a qualitative scale where each Observatory uses its experience to decide if a flare is rather faint (F), normal (N),or rather bright (B). For flares less than 65° from the centre of the disk, i.e. the heliocentric distance is less than 0.906, the first figure assigned to the flare importance is defined by the corrected area Sp according to the following table where areas are given in millionths of solar hemisphere.

Corrected Area Sp in Millionths of Hemisphere	Relative Intensity Evaluation		
	Faint(F)	normal(N)	Brilliant(B)
≤ 100	-F	-N	-B
101 -- 250	1F	1N	1B
251 -- 600	2F	2N	2B
601 -- 1200	3F	3N	3B
≥ 1201	4F	4N	4B

For flares equal to or greater than 65° from the centre of the disk, i. e. the heliocentric distance is equal to or greater than 0.906, the first figure assi gned to the flare importance can be estimated by the apparent area Sd according to the following table where the areas are given in millionths of the disk.

Heliocentric Distance r/R	Importance			
	-	1	2	3
.906 -- .939	Sd< 90	90 -- 279	280 -- 599	Sd≥ 600
.940 -- .984	75	75 -- 239	240 -- 499	500
.985 -- .999	50	50 -- 179	180 -- 349	350
1.	45	45 -- 169	170 -- 299	300

The upper case letters C, P, V and S in the column of Data marked " Observation Type " represent the nature and completeness of available observations, i.e.

C --- a complete or quasi-complete sequence of photographs was obtained.

P --- one or a few photographs of the event were obtained resulting in incomplete time coverage.

V --- all (or most of) the development of the flare was visually observed.

S --- flare was seen visually for a small part of its probable duration.

One or more than one upper case letter from A to Z appear in the column marked "remarks" which follows an International Astronomical Union notation, in which each letter of the Alphabet stands for a particular noteworthy condition, as shown in Appendix 1.

5. The table of " Intervals of H-Alpha Flare Patrol Observations " contains intervals of both visual and photographic observation. Flare patrol observations are considered to be continuous if the intervals of no flare patrol observations are less than five minutes.

6. The table of " Daily Solar Radio Emission Flux " gives the flux values of the sun at the time around meridian transit every day at different radio frequencies. All solar flux values are in units of $10^{-22}\ W \cdot M^{-2} \cdot Hz^{-1}$ except the flux values measured at Purple Mountain Observatory where antenna temperature is used as flux unit. All flux values are adjusted to the mean Sun-Earth distance.

7. In the table of " Solar Radio Emission Outstanding Occurrences " the relative value $\Delta S/S$ is the ratio of the increment ΔS and the flux value S before the burst.

Mean flux increment is the averaged value of the increment ΔS over the period of the burst. For the classification of event type see Appendix 2. The burst profiles are given for the events with large increment of flux value and higher observation quality only.

8. In the " Profiles Figure Of Solar Radio Emission Outstanding Occurrences ", the dates, peak fluxes and frequencies of events are given on the right corner. The time is denoted on the abscissa axis for every ten minutes, and the normalized amplitude is denoted on the ordinate axis.

9. The table of "Intervals of Solar Radio Emission Patrol Observations" gives the time coverage of the observations made by those observatories that contribute the data reports.

10. The table of " Sudden Ionospheric Disturbances (D-Region) " (SID) gives the measured values of the Sudden Phase Anomalies (SPA) and Sudden Field Strength Anomalies (SFA) by the single hop inospheric propagation of Loran-C sky waves at 100 KHz (LF) and 10.2 KHz (VLF) caused by the sudden changes of condition in the D-Region. Sudden Phase Anomalies at low frequency (LF-SPA) are given by both Yunnan Observatory and Shaanxi Observatory. Records of Sudden Phase Anomalies at very low frequency (VLF- SPA) and Sudden Field Strength Anomalies of the type known as SFA at low frequency (LF-SFA) are given by Shaanxi Observatory only. The following equation is adopted for the solar zenith correction of SPA values at low frequency.

$$\Delta\phi_0 = \frac{\Delta\phi' + 10.5\ (\cos Zs - \cos Zm)}{(\cos Zs)^{0.5}}$$

where $\Delta\phi'$ is a measured value of SPA phase change while $\Delta\phi_0$ is a corrected value of $\Delta\phi'$, i.e. a value normalized to the solar zenith angle equal to zero. Zs and Zm are the solar zenith angles at the reflecting point at the time of SPA start and maximum respectively. The VLF-SPA data $\Delta\phi$ (in μs), the measured values of VLF-SPA phase changes without any correction, are also listed in the table. The LF-SPA data ΔA (in db) contain information of amplitude variation. The four signs +, -, 0 and - — + prefixed by ΔA

correspond respectively to amplitude increase, decrease, constand amplitude, and amplitude decrease before increase. The SID importance rating is based on a scale of 1-, the least, to 3+, the most important, shown in the table as follows :

$\Delta\phi_o$	(0,-1]	(-1,-2]	(-2,-3]	(-3,-4]	(-4,-5]
IMP	1 -	1	1 +	2 -	2 +
$\Delta\phi_o$	(-5,-6]	(-6,-7]	(-7,-8]	(-8,-∞]	
IMP	2 +	3 -	3	3 +	

SID phenomena have close correlation with solar X-ray flares. The SID data in this data report are very important for prediction of reliability of short wave communication and for studies of the correlation between solar activities and ionospheric condition since almost every SPA or SFA is caused by solar X-ray bursts.

11. The data included in the table of " The Geomagnetic Activity Indices K and A_K" are: three-hourly K index, five quietest days of the month (Q) and five most disturbed days of the month (D). Three-hourly K index is determined by the H components measured in γ in each corresponding three-hourly period and subtracted by the diurnal normal changes of geomagnetic field. For mid and low latitude areas, the corresponding relation of H and K is as follows :

H = 3, 6, 12, 24, 40, 70, 120, 200, 300 (in γ)

K = 0, 1, 2, 3, 4, 5, 6, 7, 8, 9

Daily effective A_K is the average of eight values of three-hourly index a , the corresponding relation of K and a_K is as follow :

K = 0, 1, 2, 3, 4, 5, 6, 7, 8, 9

a_K = 0, 3, 7, 15, 27, 48, 80, 140, 240, 400 (in 1.2γ)

Three kinds of geomagnetic storm are listed in the table of " The Magnetic Storms " : sudden commencement (SC), a small negative initial impulse followed by a main impulse (SC*) and gradual commencement (GC).Three degrees are used for the rating of geomagnetic storms, i.e. moderate (m) moderate severe (ms) and severe (s) corresponding to K=5, K=6 or 7 and K=8 or 9 respectively.

Beijing Geomagnetic Observatory is located at 40°02′ N, 116°10′ E geographic coordinates, 28°.9 N, 186°.1 E geomagnetic coordinates and 43 meters above sea level.

The time used in all these data reports is Universal Time (UT). To transform UT to Beijing Standard Time (120 E) simply add 8 hours to Universal Time. For instance, for a flare observed at 2230—2400 UT, the equivalent Beijing Standard Time is 0630—0800 next day.

Address your inquires to the CSGD Editorial Group, Beijing Astronomical Observatory, Beijing, China. Telephone number 281698. Telegram code: 9053. Telex: 22040 BAOAS CN.

Appendix 1

The International Astronomical Union Notation for H-Alpha Solar Flares

A = Eruptive prominence whose base is less than 90° from the central meridian.

B = Probably the end of a more important flare.

C = Invisible 10 minutes before.

D = Brilliant Point.

E = Two or more brilliant points.

F = Several eruptive centers.

G = No visible spots in the neighborhood.

H = Flare accompanied by a high speed dark filament.

I = Active region very extended.

J = Distinct variations of plage intensity before or after the flare.

K = Several intensity maxima.

L = Existing filaments show signs of sudden activity.

M = White-light flare.

N = Continuous spectrum shows effects of polarization.

O = Observations have been made in the calcium II lines H or K.

P = Flare shows helium D_3 in emission.

Q = Flare shows the Balmer continuum in emission.

R = Marked asymmetry in H-alpha line suggests ejection of high velocity material.

S = Brightness follows disappearance of filament (same position).

T = Region active all day.

U = Two bright branches, parallel (//) or converging (Y).

V = Occurrence of an explosive phase: important and abrupt expansion in about a minute with or without important intensity increase.

W = Great increase in area after time of maximum intensity.

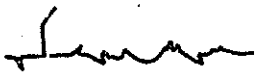
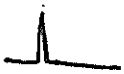
X = Unusually wide H-alpha line.

Y = System of loop-type prominences.

Z = Major sunspot umbra covered by flare.

Appendix 2

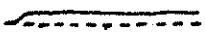
Classification of Solar Radio Bursts

Type	Definition	Figure
1S	Peak flux density (fu) and duration (min) both less than 10.0.	
2S/F	1S with fluctuations.	
3S	Peak flux density (fu) greater than both the duration (min) and 10.0.	
4S/F	3S with fluctuations.	
5S	Different from the simple events defined above, also peak flux density (fu) greater than duration (min) of the burst.	
6S	Simple rise and fall of minor burst with duration 1 or 2 min .	
7C	Complex events with duration of several seconds and flux density (fu) less than 10.0.	
8S	An event which shows a rapid rise to a single peak,followed by a rapid fall to the pre-event level with a duration about one minute or less and flux density (fu) greater than 10.0.	
20GRF	Bursts have duration in the range from 10 minutes to several hours and flux density (fu) less than both the duration (min) and 50.0.	
21GRF	20GRF type burst with superimposed distinct bursts.	

22GRF 20GRF type burst with fluctuations.

23GRF 20GRF type burst with fluctuations and superimposed bursts.

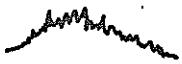
24R A moderate rise of flux from 5 to 30 minutes duration with no accompanying decline during the following hours.



25R 24R type bursts with superimposed bursts.

26FAL A moderate decline of flux from 5 to 30 minutes duration with no rise of flux during the foregoing hours.

27RF The rise and fall of continuous spectrum more or less regularly with duration in the range from minutes to hours.



28PRE A precursive enhancement of the flux density level with duration greater than 10 min preceding the main burst if it is a gradual rise; the end of the precursor is taken at the time when the slope suddenly changes.

29PBI A post-burst enhancement of flux density level with duration greater than 10 min if it decreases gradually; the start of the enhancement is taken at the time when the slope suddenly changes.

30PBI 29PBI type events with superimposed bursts.

31ABS After the burst a gradual decrease of the flux density with a subsequent return to the pre-event level.

32ABS A gradual decrease of the flux density with a subsequent return to the pre-event level.

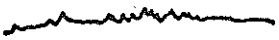
40F A series of rapid irregular changes in the flux density level, with no distinct peak grouping into individual events; the intensity of each component is less than 15% of the main peak.

41F A number of single bursts occur in succession and the flux level returns to the pre-event level; the interval between each two bursts is equal to or less than 5 min.

42SER A series of bursts occur with considerable time intervals between bursts; the flux level of each burst returns to the pre-burst.

43NS Onset of Noise Storm.

44NS Noise Storm in progress.



45C Combination of a few or many simple bursts.

46C 45C burst with fluctuations.

47GB Peak flux density of 500 fu or more.

48C A complex event with complex and large variation of amplitude.

49GB Major increase of flux density, duration greater than 10 min.

WORLD DATA CENTER A
FOR
SOLAR-TERRESTRIAL PHYSICS

The ICSU Panel on WDCs has recommended that it would be appropriate courtesy to acknowledge in publications that data were obtained from the originating station or investigator through the intermediary of the WDCs. The following statement is suggested:

"Data used in this study were provided by WDC-A for Solar-Terrestrial Physics, NOAA E/GC2, 325 Broadway, Boulder Colorado 80303, USA."