Space Weather Highlights **SWO PRF 1335**
26 March – 01 April 2001 **03 April 2001**

Solar activity was at moderate to high levels. Activity was moderate during 26 - 27 March due to isolated low-level M-class flares from Regions 9393 (N17, L = 151, class/area Fkc/2440 on 29 March) and 9401 (N21, L = 134, class/area Eki/230 on 30 March). Region 9393 exhibited rapid growth through 29 March and became the largest spot group observed during Cycle 23. The region began to gradual decay on 30 March, but remained extremely large and structurally complex through the end of the period. Solar activity rose to high levels on 29 March as Region 9393 produced an X1/1n at 29/1015 UTC associated with a 4700 sfu Tenflare, a solar proton event (see the description below), and a full-halo CME. Region 9393 also produced numerous low-level M-class flares during the period including an M4/Sf at 28/1240 UTC associated with a full-halo CME (please refer to the Energetic Events listing for flare times). Activity decreased to moderate levels during 30 - 31 March with isolated M-class flares from Region 9393. Activity returned to high levels on 01 April due to an M5 X-ray flare at 01/1217 UTC from a source just beyond the southeast limb. Bright post-flare loops were seen at SE25 following this flare as well as a spectacular non-Earth-directed CME. Note: prior to publication of this report, Region 9393 produced the largest X-ray event seen so far this cycle, with an estimated magnitude of X20 at 02/2150 UTC; details will be provided in next week's issue.

Data were available from the Advanced Composition Explorer (ACE) spacecraft for most of the period. Multiple CME passages occurred during the period. There were two passages on 27 March with CME shock fronts observed at 27/0108 UTC and 27/1745 UTC. A third CME shock front was observed at 31/0023 UTC. This, by far, was the most geoeffective of the three CMEs, with the following changes noted in the solar wind flow: increased velocities with "gusts" to 830 km/sec, a strong jump in IMF total field intensity (to 73 nT), increased densities, and prolonged periods of southward IMF Bz with deflections as high as minus 46 nT (GSM).

A greater than 10 MeV proton event followed the X1/1n flare on 29 March. The event began at 29/1635 UTC, reached a peak of 35 PFU at 30/0610 UTC, and ended at 01/0600 UTC. Estimated maximum polar-cap absorption associated with this event was 1.8 dB.

The greater than 2 MeV electron flux at geosynchronous orbit was at normal to moderate levels.

The geomagnetic field was disturbed during most of the period due to a number of CME passages. Field activity increased during 27 - 29 March with unsettled to minor storm periods at all latitudes and major storm periods at high latitudes. Activity decreased to mostly quiet to unsettled levels on 30 March. A severe geomagnetic storm occurred during 31 March beginning with a sudden storm commencement at 31/0051 UTC (114 nT measured by the Boulder USGS magnetometer). Major to severe storm levels occurred at all latitudes during this storm. Several magnetopause crossings were detected by the GOES magnetometer as well. The final planetary A-index for 31 March was 192. The storm began to subside on 01 April with minor to major storm periods detected until 01/0900 UTC followed by quiet to active conditions.

Space Weather Outlook
04 - 30 April 2001

Solar activity is expected to range from moderate to high levels during the period. Region 9393 is expected to produce more major flares before it crosses the west limb around 05 April. New Region 9415 (S22, L = 359, class/area Dko/470 on 03 April), which was the apparent source for the M5 X-ray flare on 01 April, may also produce major flares during the period.

Solar proton events at greater than 10 MeV and greater than 100 MeV were in progress at issue time following the X20 flare of 02 April. The proton event at greater than 100 MeV is expected to end late on 03 April while the greater than 10 MeV event is expected to continue for the next couple days. Region 9393 may produce another proton event before crossing the west limb. Region 9415 could also produce a proton event during the period.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to be at normal to moderate levels during most of the period.

Geomagnetic storm conditions are expected during 04 - 06 April in response to recent major flares and accompanying halo-CMEs. Unsettled conditions are expected during the rest of the period, barring additional Earth-directed CME occurrences.

Daily Solar Data

Date	Radio Flux 10.7 cm	Sun spot No.	Sunspot Area (10^{-6} hemi.)	X-ray Background	Flares: X-ray Flux C	M	X	Flares: Optical S	1	2	3	4
26 March	264	339	2290	C1.4	5	2	0	24	2	0	0	0
27 March	273	291	2830	C2.1	9	1	0	34	1	0	0	0
28 March	274	352	3830	C2.8	6	6	0	18	5	0	0	0
29 March	262	315	3940	C3.8	8	7	1	22	2	0	0	0
30 March	257	349	3620	C3.4	9	2	0	24	2	0	0	0
31 March	246	326	3100	C2.8	7	1	0	17	0	0	0	0
01 April	258	320	2830	C2.4	2	4	0	20	2	0	0	0

Daily Particle Data

Date	Proton Fluence (protons/cm ^{2}-day-sr) >1MeV	>10MeV	>100MeV	Electron Fluence (electrons/cm^2-day-sr) >.6MeV	>2MeV	>4Me
26 March	9.8E+5	3.9E+4	2.5E+3		1.7E+7	
27 March	4.6E+7	1.5E+5	2.4E+3		7.6E+6	
28 March	2.3E+6	1.3E+4	2.0E+3		1.2E+6	
29 March	3.0E+6	5.6E+5	4.7E+3		9.4E+5	
30 March	2.7E+7	2.1E+6	3.8E+3		5.2E+6	
31 March	6.8E+7	6.9E+5	2.2E+3		1.1E+6	
01 April	5.2E+6	7.5E+4	1.9E+3		3.8E+5	

Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg A	K-indices	High Latitude College A	K-indices	Estimated Planetary A	K-indices
26 March	2	0-0-0-1-1-1-0-2	6	0-0-0-3-4-0-0-1	6	0-0-1-1-3-2-3-2
27 March	16	4-2-2-1-2-1-4-5	19	3-3-1-4-2-2-4-5	18	4-2-2-3-2-3-4-5
28 March	19	2-1-4-4-5-3-2-3	40	3-2-5-6-6-5-4-3	31	2-2-4-6-6-4-3-4
29 March	17	4-4-4-2-3-3-2-2	26	3-5-5-4-4-4-2-2	22	4-4-5-3-3-4-2-3
30 March	8	2-2-1-1-2-1-3-3	14	1-2-3-3-4-4-2-2	10	1-2-2-3-3-3-3-3
31 March	115	6-8-7-5-6-5-8-5	93	5-7-6-4-6-8-6-5	155	6-8-9-6-7-7-8-6
01 April	26	5-5-5-1-3-2-3-4	28	3-4-6-4-3-3-3-4	30	4-5-6-3-3-3-4-4

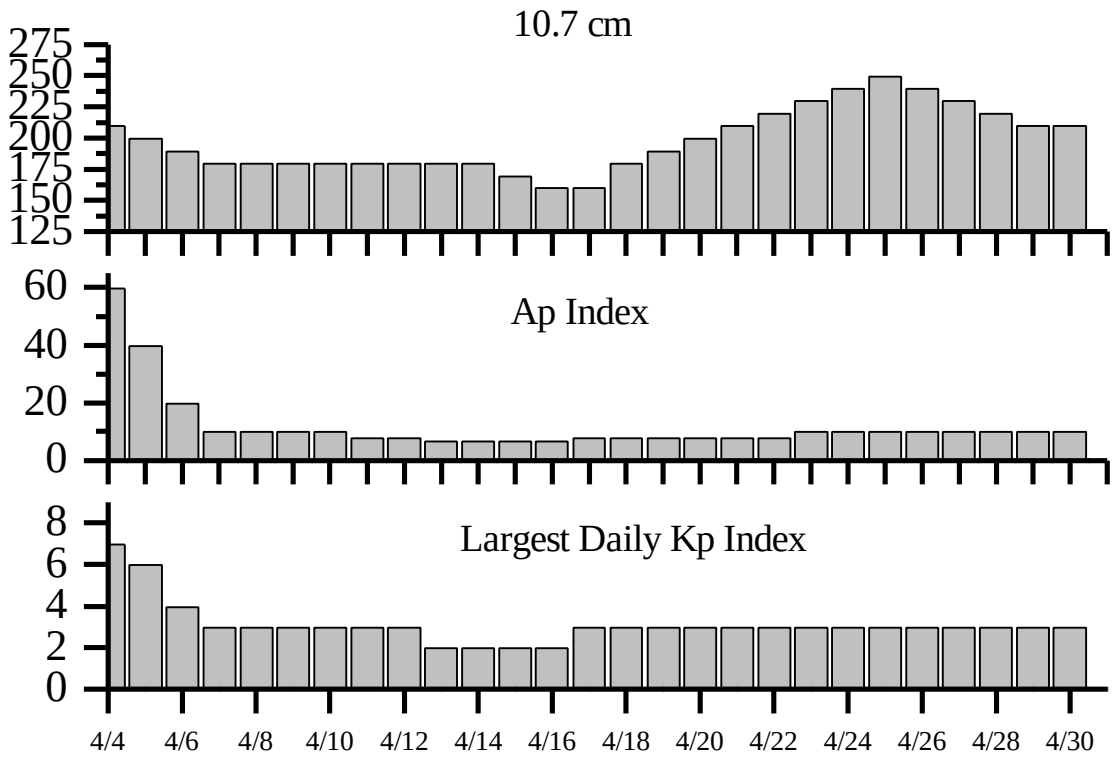
Alerts and Warnings Issued

Date & Time of Issue	Type of Alert or Warning	Date & Time of Event UT
26 Mar 0016	9 – 245 MHz Bursts	25 Mar
26 Mar 0016	245 MHz Noise Storm	25 Mar
27 Mar 0036	3 – 245 MHz Bursts	26 Mar
27 Mar 0036	245 MHz Noise Storm	26 Mar
27 Mar 0157	Sudden Impulse observed at Boulder	27 Mar 0145
27 Mar 1528	Type II Radio Emission	27 Mar 1508
27 Mar 1628	A >=20 Watch	28 Mar
27 Mar 1718	Type II Radio Emission	27 Mar 1633
27 Mar 1801	Sudden Impulse observed at Boulder	27 Mar 1745
27 Mar 1854	K= 5 Warning	27/2100 - 29/0000 Mar
27 Mar 2103	K= 4 Observed	27 Mar 1800 - 2100
28 Mar 0000	K= 5 Observed	27 Mar 2100 - 0000
28 Mar 0017	6 – 245 MHz Bursts	27 Mar
28 Mar 0017	245 MHz Noise Storm	27 Mar
28 Mar 0856	A >= 20 Observed	28 Mar 0900
28 Mar 1352	A >= 30 Warning	28 Mar 1400 - 2359
28 Mar 1445	A >= 30 Observed	28 Mar 1500
28 Mar 1640	A >= 30 Watch	30 Mar
28 Mar 1644	A >= 20 Watch	31 Mar
28 Mar 2103	ENDED A >=30 Observed	28 Mar 1500
29 Mar 0201	K= 4 Warning	29 Mar 0205 - 1500
29 Mar 0206	K= 5 Warning	29 Mar 0210 - 1500
29 Mar 0300	A >= 30 Observed	29 Mar 0300
29 Mar 0304	K= 5 Observed	29 Mar 0000 - 0300
29 Mar 1041	X-Ray event X1.7/1n	29 Mar 1015
29 Mar 1052	Type IV Radio Emission	29 Mar 1015
29 Mar 1146	10cm Radio Burst 4700 F.U.	29 Mar 1011
29 Mar 1200	ENDED A >=30 Observed	29 Mar 0300
29 Mar 1352	Proton Event >10MeV >=10pfu Warning	29/1500 - 30/1500 Mar
29 Mar 1615	A >=30 Watch	31 Mar
29 Mar 1620	A >=20 Watch	01 Apr
29 Mar 1653	Protons Event >10 MeV >=10pfu	29 Mar 1635
29 Mar 1807	K= 4 Observed	29 Mar 1500 - 1800
30 Mar 0034	5 – 245 MHz Bursts	29 Mar
30 Mar 0034	245 MHz Noise Storm	29 Mar
30 Mar 0100	CONTINUED Protons Event >10 MeV >=10pfu	29 Mar 1635
30 Mar 0304	ENDED A >=20	28 Mar 0900
30 Mar 1402	CONTINUED Proton >10MeV >=10pfu Warning	29/1500 - 30/1500 Mar
30 Mar 1441	K= 4 Warning	30/1445 – 31/1500 Mar
30 Mar 1455	K= 4 Observed	30 Mar 1200 - 1500
30 Mar 1643	Type II Radio Emission	30 Mar 1559
30 Mar 1700	Type II Radio Emission	30 Mar 1620
31 Mar 0034	CONTINUED Protons Event >10 MeV >=10pfu	29 Mar 1635
31 Mar 0050	4 – 245 MHz Bursts	30 Mar

Alerts and Warnings Issued – continued.

Date & Time of Issue	Type of Alert or Warning	Date & Time of Event UT
31 Mar 0050	245 MHz Noise Storm	30 Mar
31 Mar 0040	K= 5 Warning	31 Mar 0041 - 1500
31 Mar 0054	K >= 6 Warning	31 Mar 0055 - 1500
31 Mar 0106	Sudden Impulse observed at Boulder	31 Mar 0051
31 Mar 0211	K >= 7 Warning	31 Mar 0212 - 1500
31 Mar 0301	K= 6 Observed	31 Mar 0000 - 0300
31 Mar 0302	A >=20 Observed	31 Mar 0300
31 Mar 0601	A >=30 Warning	31 Mar 0601 - 1500
31 Mar 0601	K >= 7 Observed	31 Mar 0300 - 0600
31 Mar 0602	A >=30 Observed	31 Mar 0600
31 Mar 0624	A >=50 Warning	31 Mar 0625 - 01 Apr 0600
31 Mar 0625	A >=50 Observed	31 Mar 0600
31 Mar 0646	A >=30 Watch	01 Apr
31 Mar 0647	A >=20 Watch	02 Apr
31 Mar 0857	K >= 7 Observed	31 Mar 0600 - 0900
31 Mar 1320	ENDED Protons Event >10 MeV >=10pfu	29 Mar 1635
31 Mar 1328	EXTENDED A >=30 Warning	31 Mar 0601 - 2359
31 Mar 1330	EXTENDED K >= 6 Warning	31 Mar 0055 -2359
31 Mar 1331	EXTENDED K= 5 Warning	31 Mar 0041 - 2359
31 Mar 1332	EXTENDED K= 4 Warning	30/1445 – 31/2359 Mar
31 Mar 2039	K >= 7 Warning	31 Mar 2038 - 01 Apr 1800
31 Mar 2100	K >= 7 Observed	31 Mar 1800 - 2100
31 Mar 2358	EXTENDED A >=50 Warning	31 Mar 0625 - 01 Apr 2359
01 Apr 0043	4 – 245 MHz Bursts	31 Mar
01 Apr 0043	245 MHZ Noise Storm	31 Mar
01 Apr 0438	EXTENDED A >=30 Warning	31 Mar 0601 - 01 Apr 2359
01 Apr 1243	10cm Radio Burst 1200 F.U.	01 Apr 1058
01 Apr 1332	X-Ray event M5.5	01 Apr 1217
01 Apr 1808	ENDED A >=50 Observed	31 Mar 0600
01 Apr 2100	K= 4 Observed	01 Apr 1800 - 2100
01 Apr 2321	K= 4 Warning	01/2330 - 02/1500 Apr

Twenty-seven Day Outlook



Date	Radio Flux 10.7 cm	Planetary A Index	Largest Kp Index	Date	Radio Flux 10.7 cm	Planetary A Index	Largest Kp Index
04 Apr	210	60	7	18 Apr	180	8	3
05	200	40	6	19	190	8	3
06	190	20	3	20	200	8	3
07	180	10	3	21	210	8	3
08	180	10	3	22	220	8	3
09	180	10	3	23	230	10	3
10	180	10	3	24	240	10	3
11	180	8	3	25	250	10	3
12	180	8	3	26	240	10	3
13	180	7	2	27	230	10	3
14	180	7	2	28	220	10	3
15	170	7	2	29	210	10	3
16	160	7	2	30	210	10	3
17	160	8	3				

Energetic Events

Date	Time			X-ray		Optical Information			Peak Radio Flux		Sweep Freq Intensity	
	Begin	Max	½ Max	Class	Integ Flux	Imp/ Brtns	Location Lat	CMD	Rgn #	245	2695	II	IV
26 Mar	0228	0239	0246	M2.7	.016	1n	N20E51		9401				
26 Mar	1303	1326	1344	M2.2	.037	1f	N15E27		9393				
27 Mar	1625	1630	1632	M2.2	.005	1n	N21E33		9401	400	230	2	
28 Mar	0155	0158	0206	M1.1	.006	Sf	N14E05		9393	1000			
28 Mar	0942	0947	0953	M1.3	.006	Sn	N17E05		9393	190			
28 Mar	1121	1240	1306	M4.3	.180	Sf	N18E02		9393	1200	78		
28 Mar	1858	1909	1924	M1.5	.019	1f	N14W05		9393				
28 Mar	2218	2247	2255	M1.6	.023	1n	N17W01		9393	330	130		
28 Mar	2325	2330	2334	M2.2	.009	1f	N14W08		9393	990	70		
29 Mar	0244	0256	0300	M2.1	.010	1n	N17W04		9393				
29 Mar	0957	1015	1032	X1.7	.220	Sf	N20W19		9402	27000			
29 Mar	1129	1135	1139	M2.1	.011	Sf	N15W12		9393	2100			
29 Mar	1409	1418	1422	M1.6	.009	Sf	N16W15		9393				
29 Mar	1428	1434	1441	M1.3	.009								
29 Mar	1452	1458	1505	M1.5	.009	Sf	N16W13		9393				
29 Mar	1520	1525	1533	M1.2	.009	Sf	N14W15		9393				
29 Mar	2043	2101	2109	M1.2	.011								
30 Mar	0511	0515	0520	M2.2	.011	1n	N14W24		9393	1800	91		
30 Mar	0916	0928	0936	M1.0	.010	Sf	N17W20		9393				
31 Mar	1100	1112	1131	M2.1	.028	Sf	N16W34		9393		100		
01 Apr	1055	1217	1324	M5.5	.360								
01 Apr	1944	1949	1956	M4.0	.021	1f	N17W57		9393				
01 Apr	2247	2301	2309	M1.2	.015	1n	N12W61		9393	650			
01 Apr	2348	0003	0007	M1.0	.010								

Flare List

Date	Time			X-ray	Optical		
	Begin	Max	End	Class.	Imp / Brtns	Location Lat CMD	Rgn
26 March	0045	0052	0116	C6.2	Sf	N20E39	9393
	0230	0236	0314	M2.7	1n	N20E51	9401
	0335	0335	0343		Sf	N14W01	9390
	0404	0411	0421		Sf	S12E73	
	0441	0442	0454		Sf	S12E73	
	0758	0845	0859		Sf	N20E34	9393
	0906	0910	0916		Sf	N24E48	9401
	0937	0940	0954		Sf	S11E55	9397
	1004	1010	1024	C7.2			
	1306	1321	1423	M2.2	1f	N15E27	9393
	1317	1322	1349		Sf	N15E18	9402
	1345	1347	1349		Sf	N13E26	9393
	1403	1403	1421		Sf	N13E26	9393
	1434	1437	1440	C4.2			
	1456	1457	1500		Sf	S13E09	9389
	1504	1505	1514		Sf	S13E12	9389

Flare List – continued.

Date	Time Begin	Time Max	Time End	X-ray Class.	Optical Imp / Brtns	Optical Location Lat CMD	Rgn
26 March	1528	1530	1544		Sf	S05W26	9396
	1622	1622	1629	C2.8	Sf	N16E42	9401
	1703	U1706	1719		Sf	S05W29	9396
	1805	1806	1833		Sf	N16E26	9393
	1809	1815	1839	C6.3	Sf	N21E48	9401
	1832	1842	1846		Sf	S05W30	9396
	1834	1842	1847		Sf	N15E25	9393
	1842	1842	1845		Sf	N19E41	9401
	1847	1848	1852		Sf	N15E27	9393
	1918	1920	1931		Sf	N20E33	9393
	2024	2028	2035		Sf	N15E23	9393
	2028	2029	2034		Sf	N19E35	9401
27 March	0047	0049	0120	C4.2	Sf	N16W11	9390
	0225	0227	0402	C7.3	Sf	N14E17	9393
	0357	0410	0443		Sf	S07W34	9396
	0357	0358	0402		Sf	S12E57	9403
	0402	0403	0412		Sf	N19E20	9393
	0413	0413	0422		Sf	N20E34	9401
	0446	0452	0515		Sf	S07W36	9396
	0529	0533	0546		Sf	S07W36	9396
	0611	0615	0625		Sf	N20E34	9401
	0656	0700	0704		Sf	N21E36	9401
	0755	0757	0849	C6.3	Sf	N16E04	9402
	0805	0807	0814		Sf	N15E14	9393
	0805	0811	0817		Sf	N18W12	9390
	0925	0927	0945		Sf	S11W11	9389
	1122	1123	1135		Sf	N14E13	9393
	1153	1205	1217	C4.5	Sf	N19E32	9401
	1217	1219	1233		Sf	N14E13	9393
	1219	1222	1244		Sf	N19E30	9401
	1423	1429	1443		Sf	N21E33	9401
	1448	1449	1538	C5.6	Sf	N15E14	9393
	1453	1454	1458		Sf	S08E37	9397
	1507	1509	1516		Sf	N20E32	9401
	1600	1607	1739		Sf	S11E55	9403
	1623	1631	1638	M2.2	1n	N21E33	9401
	1649	1649	1653		Sf	N21E33	9401
	1744	1746	1751		Sf	S10E56	9403
	1828	1829	1835	C4.2	Sf	N14E11	9393
	1850	1850	1900		Sf	S10E54	9403
	1901	1903	1908		Sf	S08E35	9397
	1912	1913	1923	C5.6	Sf	N16W18	9390

Flare List – continued.

Date	Time Begin	Time Max	Time End	X-ray Class.	Optical Imp / Brtns	Optical Location Lat CMD	Rgn
27 March	2017	2019	2025	C8.2	Sf	S08E35	9397
	2025	2029	2046		Sf	N14E08	9393
	2110	2113	2115	C5.3			
	2112	2114	2124		Sf	S09E52	9403
	2127	2137	2150		Sf	N13E10	9393
	2129	2133	2135		Sf	S10E54	9403
28 March	0048	0050	0056	C7.1	Sf	S08E50	9403
	0127	0129	0137	C5.6	Sf	N20E22	9401
	0156	0157	0237	M1.1	Sf	N14E05	9393
	0358	0358	0405		Sf	S09E50	
	0429	0429	0440	C4.0	Sf	S09E49	
	0554	0555	0601		Sf	S07E28	9397
	0632	0658	0720	C5.7	Sf	N18E10	9393
	0730	0730	0739		Sf	N15E01	9393
	0849	0852	0855	C8.2	Sf	S08E46	9393
	0904	0911	0953		1f	N17W10	9402
28 March	0945	0947	1000	M1.3	Sn	N17E05	9393
	1046	1047	A1131	C9.9	Sn	S07E25	9397
	1121	1214	1306	M4.3	Sf	N18E02	9393
	1149	1150	1201		Sf	N14W04	9402
	1307	1311	1318		Sf	N20E02	9393
	B1341	1341	1353		1f	N17E07	9393
	1834	1834	A1847		Sf	N18E15	9401
	1901	1907	1959	M1.5	1f	N14W05	9393
	1934	1947	2002		Sf	N19E16	9401
	2028	2029	2042		Sf	S10E37	9408
	B2254	U2255	2312	M1.6	1n	N17W01	9393
	2303	2331	0030	M2.2	1f	N14W08	9393
	2351	0002	0015		Sf	N14W17	9402
29 March	B0159	U0201	0204		Sf	N23E12	9401
	0245	0255	0342	M2.1	1n	N17W04	9393
	0304	0305	0312		Sf	S07E15	9397
	0401	0405	0409	C4.4			
	0509	0509	0513		Sf	N12W30	9400
	0510	0510	0521	C5.5	Sf	N16W09	9393
	0946	0946	0950		Sf	N21E09	9401
	0959	1000	1006	X1.7	Sf	N20W19	9402
	B1047	U1047	1125		1f	N14W12	9393
	1131	1132	1154	M2.1	Sf	N15W12	9393
	1206	1206	1212		Sf	N20E07	9401
	1237	1239	1251	C7.6	Sf	N16W13	9393
	1300	1306	1321		Sf	N16W11	9393

Flare List – continued.

Date	Time Begin	Time Max	Time End	X-ray Class.	Optical Imp / Brtns	Optical Location Lat CMD	Rgn
28 March	1331	1332	1345		Sf	N17W12	9393
	B1400	1458	1513	M1.5	Sf	N16W13	9393
	1412	1457	1512		Sf	N16W14	9393
	1415	1415	1422	M1.6	Sf	N16W15	9393
	1428	1434	1441	M1.3			
	1516	1517	1551	M1.2	Sf	N14W15	9393
	1611	1614	1631		Sf	N14W14	9393
	1633	1635	1642	C6.3	Sf	S08E08	9397
	1736	1736	1744	C5.4	Sf	N16W15	9393
	1812	1815	1820	C4.1	Sf	N15W17	9393
	1826	1828	1848	C7.1	Sf	N14W17	9393
29 March	1956	1957	2002		Sf	N19W15	9393
	2013	2015	2131	C6.9	Sf	N14W19	9393
	2043	2101	2109	M1.2			
30 March	0019	0110	0123	C7.9	Sf	N13W22	9393
	0217	0223	0240	C7.5	Sf	N14W22	9393
	0300	0317	0326		Sf	N13W23	9393
	0312	0317	0325		Sf	N20W04	9401
	0336	0336	0344		Sf	N13W24	9393
	0347	0353	0405	C4.4	Sf	N17W16	9393
	0425	0430	0440		Sf	N13W25	9393
	0441	0515	0605	M2.2	1n	N14W24	9393
	0444	0502	0536		1f	N20W04	9401
	0607	0610	0626		Sf	N17W18	9393
	0627	0643	0656		Sf	N14W24	9393
	0629	0630	0642		Sf	S13W52	9389
	0757	0757	0805		Sf	N17W19	9393
	0907	0909	0925		Sf	S07E33	9404
	0931	0945	0953	M1.0	Sf	N17W20	9393
	1036	1040	1043	C7.7			
	1106	1110	1111	C4.5			
	1131	1131	1143		Sf	S11W42	9405
	1509	1511	1556	C4.7	Sf	N16W24	9393
	1512	1513	1519		Sf	S10W05	9397
	1522	1523	1532	C4.9	Sf	S08W04	9397
	1532	1537	1551		Sf	N15W24	9393
	1717	1717	1725	C5.2	Sf	S08E25	9404
	1744	1749	1759		Sf	N17W26	9393
	1804	1807	1812		Sf	N16W26	9393
	1816	1819	1822	C4.7	Sf	N17W26	9393
	2206	2207	2211		Sf	N13W33	9393
	2328	2329	2341		Sf	N11W29	9393

Flare List – continued.

Date	Time Begin	Time Max	Time End	X-ray Class.	Optical Imp / Brtns	Optical Location Lat CMD	Rgn
31 March	0002	0005	0013		Sf	N19W20	9393
	0023	0030	0107	C5.3	Sf	N19W23	9393
	0104	0104	0104	C3.2			
	0223	0228	0240	C3.2	Sf	N17W29	9393
	0306	0307	0310	C4.1	Sf	N17W30	9393
	0552	0553	0557		Sf	S12W67	9389
	0637	0639	0643		Sf	N14W34	9393
	0703	0704	0731	C4.9	Sf	S05E20	9404
	0824	0824	0835		Sf	N15W35	9393
	1106	1110	1141	M2.1	Sf	N16W34	9393
	1319	1321	1327		Sf	S09W75	9389
	1348	1349	1351		Sf	S10W68	9389
	1450	1450	1500		Sf	S11W72	9389
	1532	1533	1538		Sf	N14W36	9393
	1600	1602	1606		Sf	S10W78	9389
	1613	1614	1628		Sf	S09E00	9408
	1949	1953	1959	C3.9			
	2151	2153	2202	C3.4	Sf	N20W26	9401
	2309	2313	2318		Sf	S09W01	9408
01 April	0349	0350	0354		Sf	S12W78	9389
	0404	0408	0415		Sf	N17W67	9400
	0416	0418	0433		Sf	N17W67	9400
	0441	0445	0504		Sf	N18W66	9400
	0529	0529	0538		Sf	S05E05	9404
	0710	0713	0722		Sf	S12W80	9389
	0744	0754	0807		Sf	S05E04	9404
	0747	0750	0754		Sf	S12W81	9389
	0955	1006	1009		Sf	N19W34	9393
	1055	1217	1324	M5.5			
	1117	1121	1201		Sf	N17W50	9393
	1135	1136	1140		Sf	S09W91	9389
	1254	1254	1302		Sf	S08W91	9389
	1358	1401	1406		Sf	N14W58	9393
	1654	1656	1702		Sf	N14W58	9393
	1837	1933	1943		Sf	N17W54	9393
	1905	1907	1915	C9.9	Sf	N17W49	9393
	1945	U1949	A1950	M4.0	1f	N17W57	9393
	2049	2053	2101		Sf	N18W53	9393
	2057	2100	2104		Sf	S09W91	9389
	2107	2108	2114		Sf	N19W55	9393
	2241	2250	2308	C9.0	Sf	N15W60	9393
	B2250	U2255	0104	M1.2	1n	N12W61	9393
	2348	0003	0007	M1.0			

Region Summary

Date	Location (° Lat ° CMD)	Helio Lon	Sunspot Characteristics Area (10^{-6} hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	Flares X-ray C	M	X	Optical S	1	2	3	4
		Region 9385													
17 Mar	S13E42	255	0030	05	DRO	004	B								
18 Mar	S11E27	256	0000	00	AXX	001	A								
19 Mar	S11E14	256													
20 Mar	S11E01	256													
21 Mar	S11W12	256													
22 Mar	S11W25	256													
23 Mar	S12W39	256	0000	01	AXX	001	A								
24 Mar	S12W52	256													
25 Mar	S12W65	256													
26 Mar	S12W78	256													
								0	0	0	0	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 256

Date	Location (° Lat ° CMD)	Helio Lon	Sunspot Characteristics Area (10^{-6} hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	Flares X-ray C	M	X	Optical S	1	2	3	4
		Region 9387													
19 Mar	N09E59	211	0030	02	CSO	003	B								
20 Mar	N10E47	210	0090	06	DAO	005	B								
21 Mar	N09E34	210	0110	08	DAO	013	B								
22 Mar	N08E21	210	0140	09	CAO	018	B								
23 Mar	N09E07	210	0140	09	DSO	011	B				1				
24 Mar	N08W07	211	0150	09	DSO	011	B								
25 Mar	N08W23	214	0110	05	CSO	007	B								
26 Mar	N09W38	216	0160	04	CSO	002	B								
27 Mar	N09W52	216	0130	02	HSX	001	A								
28 Mar	N08W66	217	0150	07	CSO	004	B								
29 Mar	N08W80	217	0110	03	HSX	001	A								
30 Mar	N08W92	216	0060	02	HSX	001	A								
								0	0	0	1	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 210

Region Summary - continued.

Date	Location (° Lat ° CMD)	Helio Lon	Sunspot Characteristics: Area (10^{-6} hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	Flares: X-ray C	X-ray M	X-ray X	Optical S	Optical 1	Optical 2	Optical 3	Optical 4
	Region 9389														
20 Mar	S12E75	182	0030	01	HAX	001	A								
21 Mar	S13E66	178	0110	13	EAO	003	B	1			1				
22 Mar	S13E54	177	0180	14	EAO	008	B								
23 Mar	S13E39	178	0130	15	EAO	011	B	1			1				
24 Mar	S13E26	178	0150	18	FAO	013	B	1			3				
25 Mar	S12E13	178	0100	20	FAI	025	B								
26 Mar	S13W02	180	0090	19	FAI	030	B				2				
27 Mar	S12W11	175	0080	13	EAO	013	B				1				
28 Mar	S12W34	185	0050	11	CRO	013	B								
29 Mar	S12W50	187	0050	07	DSO	012	BG								
30 Mar	S10W63	187	0050	06	BXO	008	B				1				
31 Mar	S11W75	186	0050	07	CAO	006	B				5				
01 Apr	S12W86	184	0050	01	HSX	001	A				6				
								3	0	0	20	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 180

Date	Location (° Lat ° CMD)	Helio Lon	Sunspot Characteristics: Area (10^{-6} hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	Flares: X-ray C	X-ray M	X-ray X	Optical S	Optical 1	Optical 2	Optical 3	Optical 4
	Region 9390														
20 Mar	N14E73	184	0040	08	CAO	002	B	1	1		1				
21 Mar	N14E60	184	0280	15	EAO	009	B				1				
22 Mar	N15E46	185	0300	17	FAO	016	B		1		3				
23 Mar	N16E34	183	0130	17	FAI	017	B	2			3				
24 Mar	N15E19	185	0100	17	FAI	019	B		1		2		1		
25 Mar	N14E06	185	0080	13	ESI	025	B	2			6				
26 Mar	N15W08	186	0090	12	ESI	018	B				1				
27 Mar	N14W22	186	0110	11	ESO	009	B	2			3				
28 Mar	N13W38	189	0080	09	CSO	008	B								
29 Mar	N14W50	187	0050	11	CSO	003	B								
30 Mar	N13W65	189	0050	02	HSX	001	A								
31 Mar	N14W77	188	0040	02	HAX	001	A								
01 Apr	N11W91	189	0030	02	HSX	001	A								
								7	3	0	20	0	1	0	0

Still on Disk.
Absolute heliographic longitude: 185

Region Summary - continued.

Date	Location (° Lat ° CMD)	Helio Lon	Sunspot Characteristics Area (10^{-6} hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	Flares X-ray C	M	X	Optical S	1	2	3	4
			Region 9392												
21 Mar	N20W17	261	0070	04	DAO	004	B								
22 Mar	N19W29	260	0030	06	DAO	007	B								
23 Mar	N20W45	262	0040	09	DSO	008	B								
24 Mar	N18W58	262	0040	08	DSO	006	B								
25 Mar	N18W68	259	0040	06	CSO	004	B								
26 Mar	N18W80	258	0060	03	HSX	001	A								
								0	0	0	0	0	0	0	0
Crossed West Limb.															
Absolute heliographic longitude:		261													
			Region 9393												
23 Mar	N20E65	152	0700	09	DKO	003	B								
24 Mar	N20E54	150	0820	14	EKC	012	BGD	2	1		11	1			
25 Mar	N20E39	152	1040	11	EKC	021	BG	1	1		2		1		
26 Mar	N18E27	151	1100	16	FKC	061	BGD	1	1		9	1			
27 Mar	N17E11	153	1590	16	FKC	055	BGD	3			9				
28 Mar	N13E00	151	2240	19	FKC	051	BGD	2	6		7	4			
29 Mar	N17W18	155	2440	19	FKI	051	BGD	6	5	1	15	2			
30 Mar	N17W30	154	2240	19	FKC	063	BGD	5	2		17	1			
31 Mar	N17W43	154	2000	19	FKC	062	BGD	3	1		8				
01 Apr	N16W56	154	1700	21	FKC	053	BGD	2	2		9	2			
								25	19	1	87	1	1	0	0
Still on Disk.															
Absolute heliographic longitude:		151													
			Region 9394												
23 Mar	N10E61	156	0010	01	AXX	001	A								
24 Mar	N09E48	156	0010	01	HSX	001	A								
25 Mar	N09E35	156	0000	00	AXX	001	A								
26 Mar	N09E22	156	0010	01	HSX	001	A								
27 Mar	N09E09	155	0010	01	AXX	001	A								
28 Mar	N09W05	156	0010	01	AXX	001	A								
29 Mar	N08W20	157	0000	00	HRX	001	A								
30 Mar	N08W33	157													
31 Mar	N08W46	157													
01 Apr	N08W59	157													
								0	0	0	0	0	0	0	0
Still on Disk.															
Absolute heliographic longitude:		156													

Region Summary - continued.

Date	Location (° Lat ° CMD)	Helio Lon	Sunspot Characteristics: Area (10^{-6} hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	Flares: X-ray C	X-ray M	X-ray X	Optical S	Optical 1	Optical 2	Optical 3	Optical 4
	Region 9395														
23 Mar	S12E72	145	0030	01	HSX	001	A								
24 Mar	S12E63	141	0150	01	HSX	001	A								
25 Mar	S12E49	142	0050	07	CAO	003	B								
26 Mar	S12E35	143	0060	06	CSO	004	B								
27 Mar	S12E21	143	0050	02	CSO	002	B								
28 Mar	S13E08	143	0060	04	CSO	004	B								
29 Mar	S13W06	143	0050	01	HAX	001	A								
30 Mar	S13W17	141	0050	02	HSX	002	A								
31 Mar	S12W32	143	0030	02	HSX	002	A								
01 Apr	S13W46	144	0020	01	HSX	001	A								
								0	0	0	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 143

Date	Location (° Lat ° CMD)	Helio Lon	Sunspot Characteristics: Area (10^{-6} hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	Flares: X-ray C	X-ray M	X-ray X	Optical S	Optical 1	Optical 2	Optical 3	Optical 4
	Region 9396														
24 Mar	S06W04	208	0020	03	BXO	005	B								
25 Mar	S06W17	208	0040	05	CSO	015	B								
26 Mar	S06W32	210	0110	06	DAI	022	B				3				
27 Mar	S06W44	208	0290	08	DAO	015	BG				3				
28 Mar	S06W59	210	0330	10	DSO	012	BG								
29 Mar	S06W72	209	0240	10	DAO	007	B								
30 Mar	S06W85	209	0140	10	DAO	005	B								
								0	0	0	6	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 208

Date	Location (° Lat ° CMD)	Helio Lon	Sunspot Characteristics: Area (10^{-6} hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	Flares: X-ray C	X-ray M	X-ray X	Optical S	Optical 1	Optical 2	Optical 3	Optical 4
	Region 9397														
24 Mar	S09E76	128	0290	07	DSO	003	B		1		7				
25 Mar	S12E61	130	0190	10	DAO	009	B				2				
26 Mar	S10E47	131	0260	12	EAO	011	B				1				
27 Mar	S09E35	129	0200	13	ESO	017	B	1			3				
28 Mar	S09E19	132	0260	15	EAI	017	BG	1			2				
29 Mar	S09E06	131	0220	15	EAO	013	BG	1			2				
30 Mar	S09W06	130	0180	15	EAO	023	BG	1			2				
31 Mar	S09W22	133	0120	11	EAO	017	B								
01 Apr	S08W36	134	0090	13	EAO	016	B								
								4	1	0	19	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 131

Region Summary - continued.

Date	Location (° Lat ° CMD)	Helio Lon	Sunspot Characteristics: Area (10^{-6} hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	Flares: X-ray C	X-ray M	X-ray X	Optical S	Optical 1	Optical 2	Optical 3	Optical 4
	Region 9398														
24 Mar	N21E02	202	0010	03	BXO	006	B								
25 Mar	N20W10	201	0030	05	CSO	007	B								
26 Mar	N21W26	204	0010	01	HSX	001	A								
27 Mar	N21W39	204													
28 Mar	N21W52	204													
								0	0	0	0	0	0	0	0
Crossed West Limb.															
Absolute heliographic longitude:		202													
	Region 9399														
24 Mar	S29E03	201	0010	04	BXO	005	B								
25 Mar	S30W09	200	0030	05	DSO	007	B								
26 Mar	S29W22	200	0030	05	DSO	009	B								
27 Mar	S29W35	199	0040	06	DSO	005	B								
28 Mar	S30W49	200	0030	07	CRO	003	B								
29 Mar	S31W60	197	0000	00	AXX	001	A								
30 Mar	S31W73	197													
								0	0	0	0	0	0	0	0
Crossed West Limb.															
Absolute heliographic longitude:		201													
	Region 9400														
24 Mar	N09E35	169	0010	02	HRX	002	A								
25 Mar	N11E20	171	0000	00	AXX	001	A								
26 Mar	N10E05	173	0010	04	CRO	004	B								
27 Mar	N10W10	174	0020	03	BXO	003	B								
28 Mar	N10W29	180	0000	00	AXX	001	A								
29 Mar	N10W44	181	0000	00	AXX	001	A				1				
30 Mar	N10W57	181													
31 Mar	N10W70	181													
01 Apr	N10W83	181									3				
								0	0	0	4	0	0	0	0
Still on Disk.															
Absolute heliographic longitude:		173													

Region Summary - continued.

Date	Location (° Lat ° CMD)	Helio Lon	Sunspot Characteristics Area (10^{-6} hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	Flares X-ray C	M	X	Optical S	1	2	3	4
			Region 9401												
25 Mar	N22E55	136	0150	07	DAO	008	B	1	1		3	1			
26 Mar	N22E43	135	0270	08	DKO	021	B	2	1		5	1			
27 Mar	N22E30	134	0200	10	DAO	019	B	1	1		8	1			
28 Mar	N22E17	134	0160	11	CAO	020	B	1			3				
29 Mar	N21E03	134	0210	10	DAI	018	B				3				
30 Mar	N21W11	135	0230	13	EKI	037	BG				1	1			
31 Mar	N20W25	136	0190	15	EAI	032	B	1			1				
01 Apr	N20W39	137	0180	15	EAO	019	B								
								6	3	0	24	4	0	0	0

Still on Disk.
Absolute heliographic longitude: 134

Date	Location (° Lat ° CMD)	Helio Lon	Sunspot Characteristics Area (10^{-6} hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	Flares X-ray C	M	X	Optical S	1	2	3	4
			Region 9402												
25 Mar	N17E16	175	0010	04	BXO	003	B	1				1			
26 Mar	N16E02	176	0010	03	CRO	003	B				1				
27 Mar	N14W11	175	0010	03	CRO	004	B	1			1				
28 Mar	N18W25	176	0010	01	AXX	003	A				2	1			
29 Mar	N18W47	184	0010	00	HRX	001	A				1				
30 Mar	N18W60	184													
31 Mar	N20W57	168	0020	04	CRO	003	B								
01 Apr	N20W70	168													
								2	0	0	5	2	0	0	0

Still on Disk.
Absolute heliographic longitude: 176

Date	Location (° Lat ° CMD)	Helio Lon	Sunspot Characteristics Area (10^{-6} hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	Flares X-ray C	M	X	Optical S	1	2	3	4
			Region 9403												
26 Mar	S13E62	116	0020	01	HRX	001	A								
27 Mar	S12E48	116	0030	07	DRO	004	B				6				
28 Mar	S13E36	115	0020	09	BXO	005	B	1			1				
29 Mar	S13E20	117	0010	09	BXO	003	B								
30 Mar	S13E06	118	0010	05	BXO	002	B								
31 Mar	S15W06	117	0010	08	BXO	005	B								
01 Apr	S15W22	120	0010	01	BXO	003	B								
								1	0	0	7	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 118

Region Summary - continued.

Date	Location (° Lat ° CMD)	Helio Lon	Sunspot Characteristics Area (10^{-6} hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	Flares X-ray C	M	X	Optical S	1	2	3	4
			Region 9404												
27 Mar	S06E66	098	0070	08	CSO	003	B								
28 Mar	S05E50	101	0070	02	HAX	001	A								
29 Mar	S05E36	101	0070	02	HAX	001	A								
30 Mar	S05E23	101	0080	04	CAO	007	B	1			2				
31 Mar	S06E09	102	0090	05	DAO	014	B	1			1				
01 Apr	S06W04	102	0080	06	DAI	022	B				2				
								2	0	0	5	0	0	0	0
Still on Disk.															
Absolute heliographic longitude:		102													
			Region 9405												
28 Mar	S13W20	171	0040	11	BXO	014	B								
29 Mar	S13W34	171	0010	02	AXX	003	A								
30 Mar	S13W47	171									1				
31 Mar	S13W60	171													
01 Apr	S13W73	171													
								0	0	0	1	0	0	0	0
Still on Disk.															
Absolute heliographic longitude:		171													
			Region 9406												
28 Mar	N25E67	084	0150	04	HAX	001	A								
29 Mar	N26E52	085	0160	02	HSX	001	A								
30 Mar	N26E41	083	0170	03	HAX	001	A								
31 Mar	N25E28	083	0150	03	HAX	002	A								
01 Apr	N25E16	082	0160	03	HAX	003	A								
								0	0	0	0	0	0	0	0
Still on Disk.															
Absolute heliographic longitude:		082													
			Region 9407												
28 Mar	N11E64	087	0080	02	HSX	001	A								
29 Mar	N13E54	083	0110	06	CSO	002	B								
30 Mar	N11E41	083	0100	09	CSO	005	B								
31 Mar	N11E26	085	0100	07	CSO	003	B								
01 Apr	N11E13	085	0110	07	CSO	007	B								
								0	0	0	0	0	0	0	0
Still on Disk.															
Absolute heliographic longitude:		085													

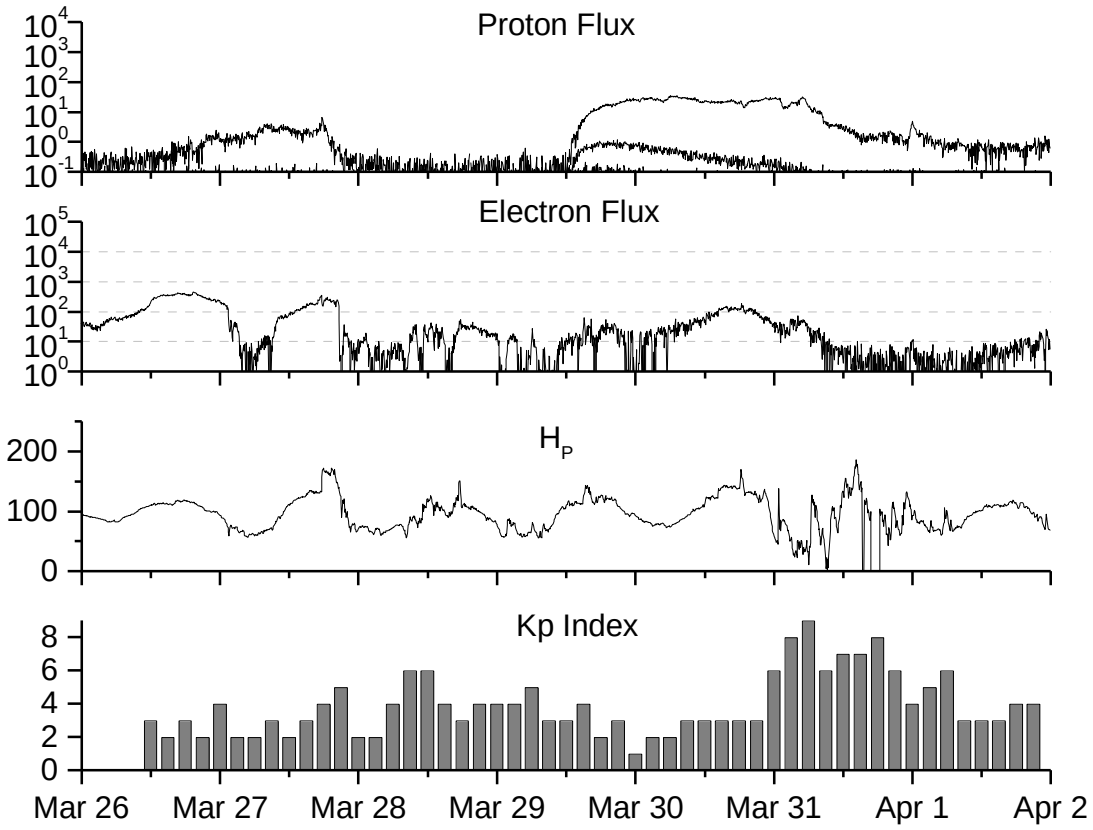
Region Summary - continued.

Date	Location (° Lat ° CMD)	Helio Lon	Sunspot Characteristics: Area (10^{-6} hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	Flares: X-ray C	X-ray M	X-ray X	Optical S	Optical 1	Optical 2	Optical 3	Optical 4
			Region 9408												
28 Mar	S08E38	113	0090	07	CAO	013	B				1				
29 Mar	S10E24	113	0200	11	EAI	015	B								
30 Mar	S09E11	113	0200	12	EKI	028	B								
31 Mar	S10W05	116	0250	15	FKI	025	B				2				
01 Apr	S10W18	116	0340	14	EKI	034	BG								
								0	0	0	3	0	0	0	0
Still on Disk.															
Absolute heliographic longitude:		116													
			Region 9410												
30 Mar	S36E38	086	0010	01	AXX	002	A								
31 Mar	S36E26	085	0000	00	AXX	001	A								
01 Apr	S36E18	080	0000	00	AXX	001	A								
								0	0	0	0	0	0	0	0
Still on Disk.															
Absolute heliographic longitude:		080													
			Region 9411												
30 Mar	N07E49	075	0020	02	AXX	002	A								
31 Mar	N08E35	076	0000	00	AXX	001	A								
01 Apr	N08E21	077	0000	02	BXO	002	B								
								0	0	0	0	0	0	0	0
Still on Disk.															
Absolute heliographic longitude:		077													
			Region 9412												
30 Mar	S14E79	045	0030	02	BXO	002	B								
31 Mar	S14E65	046	0050	02	HSX	002	A								
01 Apr	S14E51	047	0040	02	DSO	003	B								
								0	0	0	0	0	0	0	0
Still on Disk.															
Absolute heliographic longitude:		047													
			Region 9413												
01 Apr	N09W17	115	0020	04	CAO	004	B								
								0	0	0	0	0	0	0	0
Still on Disk.															
Absolute heliographic longitude:		115													

Recent Solar Indices (preliminary)
of the observed monthly mean values

	Sunspot Numbers					Radio Flux		Geomagnetic	
	Observed values		Ratio	Smooth values		*Penticton	Smooth	Planetary	Smooth
Month	SWO	RI	RI/SWO	SWO	RI	10.7 cm	Value	Ap	Value
					1999				
April	92.9	63.7	0.69	123.8	85.5	117.2	145.8	12	12.2
May	140.5	106.4	0.76	131.7	90.5	148.6	149.9	08	12.4
June	208.3	137.7	0.66	136.0	93.1	169.8	152.9	07	12.4
July	169.2	113.5	0.67	138.0	94.3	165.6	154.4	10	12.6
August	136.1	93.7	0.69	142.8	97.5	170.8	156.3	15	12.9
September	107.4	71.5	0.67	150.0	102.3	135.7	161.0	19	12.8
October	167.7	116.7	0.70	158.5	107.8	164.8	167.2	19	12.7
November	199.3	133.2	0.67	164.7	110.0	191.5	171.5	14	13.1
December	123.5	86.4	0.69	165.9	111.1	169.8	173.4	10	13.8
					2000				
January	140.8	90.1	0.64	168.0	112.9	158.1	175.5	13	14.5
February	161.9	112.9	0.70	172.1	116.7	173.2	176.8	15	15.0
March	203.6	138.5	0.68	175.4	119.9	208.2	178.4	09	15.0
April	193.4	125.5	0.65	176.3	120.8	184.2	180.5	15	15.0
May	188.8	121.6	0.64	173.1	119.0	184.5	180.0	15	15.0
June	190.3	124.9	0.66	172.0	118.7	179.8	179.7	15	15.1
July	236.7	169.1	0.71	173.0	119.7	204.7	180.2	21	14.8
August	166.6	130.5	0.78	171.8	118.6	163.1	179.5	16	14.2
September	157.9	109.9	0.70	169.0	116.2	182.1	177.1	18	14.2
October	138.9	100.1	0.72			167.7		18	
November	149.9	106.5	0.71			178.8		17	
December	146.4	104.5	0.71			173.6		08	
					2001				
January	142.7	95.1	0.67			166.7		08	
February	131.0	80.1	0.61			147.3		06	
March	166.7	114.2	0.69			177.7		17	

NOTE: All smoothed values after December 1999 and monthly values after June 2000 are preliminary estimates. The lowest smoothed sunspot index number for Cycle 22, RI = 8.0, occurred in May 1996. The highest smoothed sunspot number for Cycle 22, RI= 158.5, occurred July 1989. *After June 1991, the 10.7 cm radio flux data source is Penticton, B.C. Canada. Prior to that, it was Ottawa.



Weekly Geosynchronous Satellite Environment Summary
Week Beginning 26 March 2001

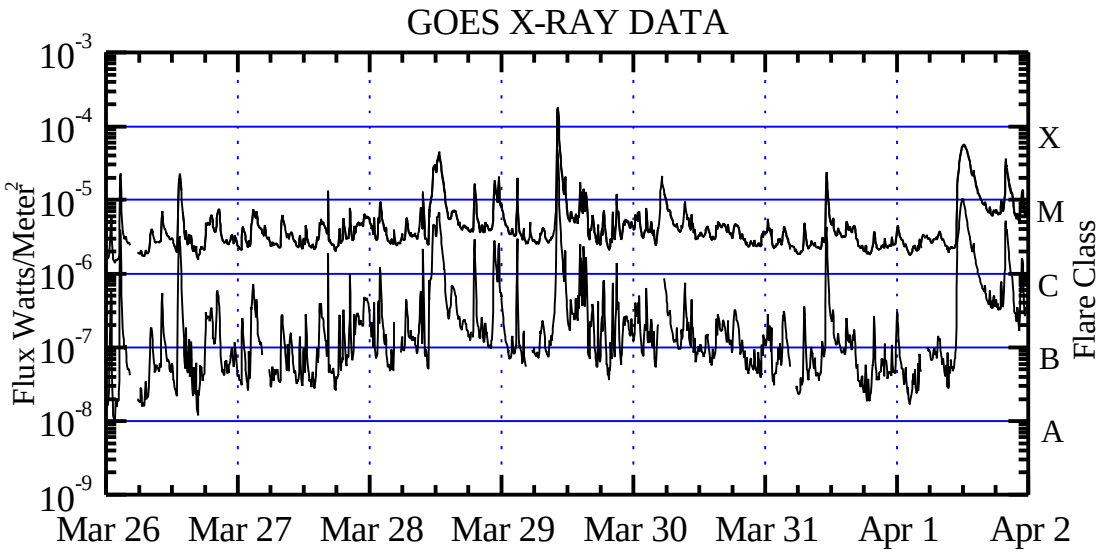
Protons plot contains the five-minute averaged integral proton flux (protons/cm^2–sec –sr) as measured by GOES-8 (W75) for each of three energy thresholds: greater than 10, 50, and 100 MeV.

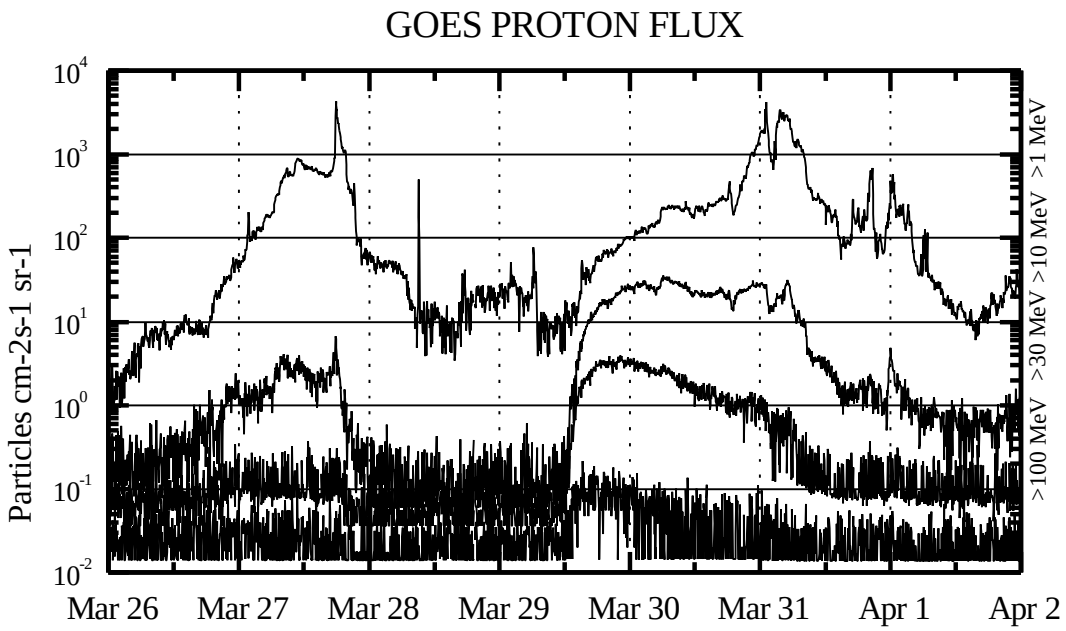
Electrons plot contains the five-minute averaged integral electron flux (electrons/cm^2 –sec –sr) with energies greater than 2 MeV at GOES-8.

Hp plot contains the five minute averaged magnetic field H - component in nanoteslas (nT) as measured by GOES-8. The H component is parallel to the spin axis of the satellite, which is nearly parallel to the Earth's rotation axis.

Kp plot contains the estimated planetary 3-hour K-index (derived by the USAF 55th Space Weather Squadron) in real time from magnetometers at Meanook, Canada; Sitka, AK; Glenlea, Canada; St. Johns, Canada; Ottawa, Canada; Newport, WA; Fredericksburg, VA; Boulder, CO; Fresno, CA and Heartland, UK. These data are made available through cooperation from the Geological Survey of Canada (GSC) and the US Geological Survey. These may differ from the final Kp values derived from a more extensive network of magnetometers.

The data included here are those now available in real time at the SWO and are incomplete in that they do not include the full set of parameters and energy ranges known to cause satellite operating anomalies. The proton and electron fluxes and Kp are " global " parameters that are applicable to a first order approximation over large areas. Hparallel is subject to more localized phenomena and the measurements generally are applicable to within a few degrees of longitude of the measuring satellite.

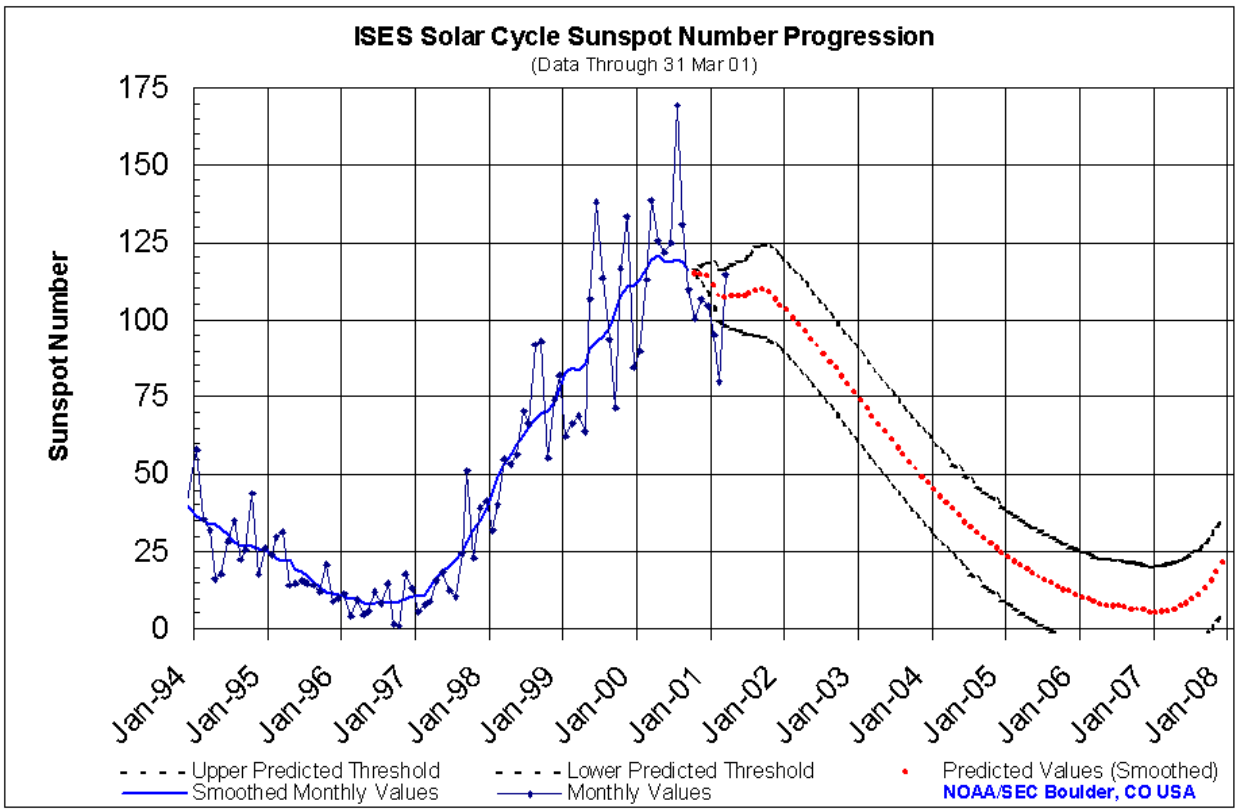




W*eekly GOES Satellite X-ray and Proton Plots*

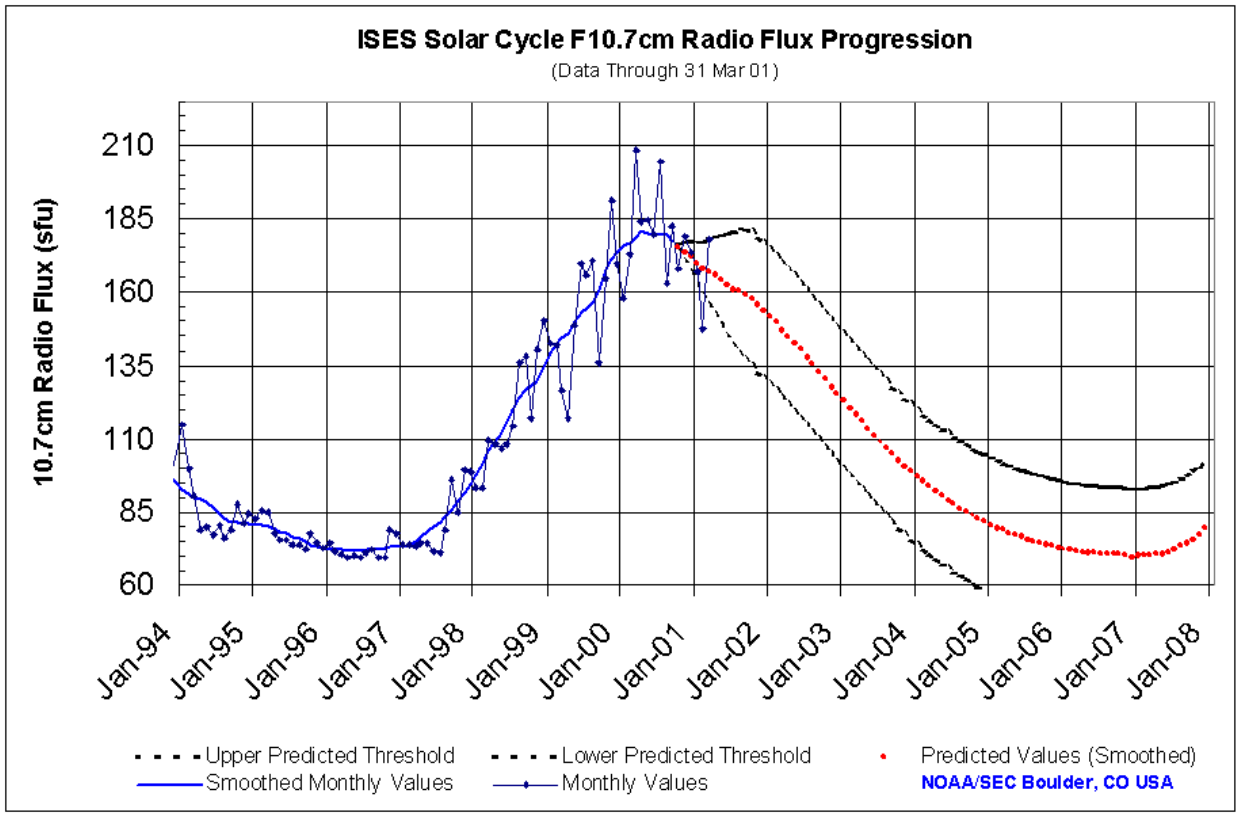
X-ray plot contains five-minute averaged x-ray flux (watts/m$^{2)}$ as measured by GOES 8 and 10 in two wavelength bands, .05 -. 4 and .1 - .8 nm. The letters A, B, C, M and X refer to x-ray event levels for the .1 - .8 nm band.

Proton plot contains the five-minute averaged integral proton flux (protons/cm^2 –sec-sr) as measured by GOES-8 (W75) for each of the energy thresholds: >1, >10, >30 and >100 MeV. P10 event threshold is 10 pfu (protons/cm^2-sec-sr) at greater than 10 MeV.



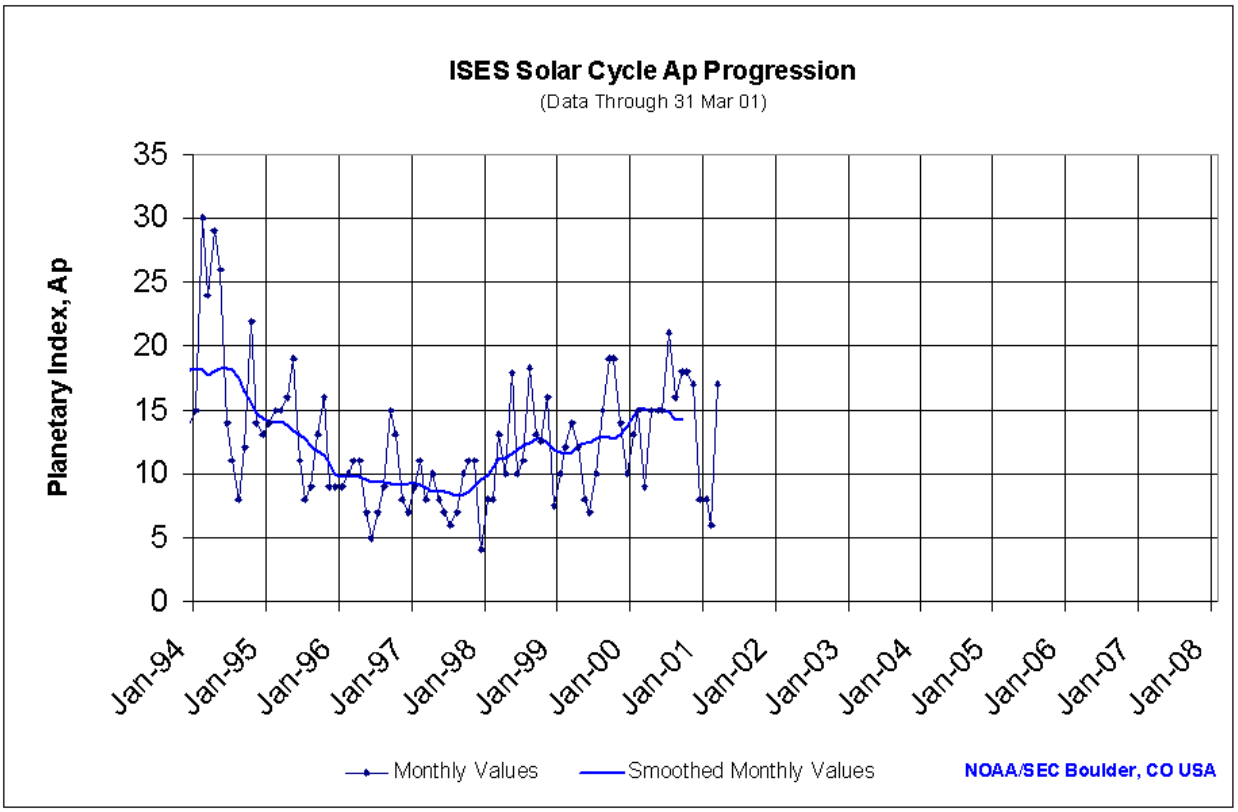
SEC Prediction of Smoothed Sunspot Number

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1998	44	49	53	57	59	63	66	68	70	71	73	78
	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)
1999	83	85	84	86	91	93	94	97	102	108	111	111
	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)
2000	113	117	120	121	119	119	120	119	116	**115**	**114**	**114**
	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(1)	(3)	(5)
2001	**111**	**108**	**107**	**107**	**108**	**108**	**108**	**109**	**110**	**109**	**107**	**105**
	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(15)	(15)	(15)
2002	**103**	**101**	**98**	**96**	**94**	**91**	**89**	**86**	**84**	**81**	**79**	**76**
	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)
2003	**74**	**71**	**69**	**66**	**64**	**61**	**59**	**56**	**54**	**52**	**49**	**47**
	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)
2004	**45**	**43**	**41**	**39**	**37**	**35**	**33**	**31**	**29**	**28**	**26**	**25**
	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)
2005	**23**	**22**	**20**	**19**	**18**	**17**	**16**	**15**	**14**	**13**	**12**	**11**
	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)
2006	**10**	**9**	**9**	**8**	**8**	**7**	**7**	**7**	**7**	**6**	**6**	**5**
	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)
2007	**5**	**6**	**6**	**6**	**7**	**8**	**10**	**11**	**13**	**16**	**18**	**21**
	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)



SEC Prediction of Smoothed F10.7cm Radio Flux

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1998	98	102	106	109	112	116	120	124	127	128	130	134
	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)
1999	139	143	144	146	150	153	154	156	161	167	172	173
	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)
2000	175	176	178	181	180	180	180	180	177	**175**	**174**	**172**
	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(1)	(3)	(5)
2001	**170**	**168**	**167**	**166**	**164**	**162**	**161**	**160**	**159**	**158**	**156**	**154**
	(7)	(9)	(11)	(13)	(15)	(17)	(19)	(21)	(22)	(23)	(23)	(23)
2002	**152**	**149**	**147**	**145**	**143**	**140**	**138**	**135**	**133**	**130**	**128**	**125**
	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)
2003	**123**	**120**	**118**	**116**	**113**	**111**	**109**	**107**	**105**	**103**	**101**	**99**
	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)
2004	**97**	**95**	**94**	**92**	**90**	**89**	**88**	**86**	**85**	**84**	**83**	**82**
	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)
2005	**81**	**80**	**79**	**78**	**77**	**76**	**76**	**75**	**75**	**74**	**73**	**73**
	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)
2006	**72**	**72**	**72**	**71**	**71**	**71**	**71**	**71**	**70**	**70**	**70**	**70**
	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)
2007	**70**	**70**	**70**	**70**	**71**	**71**	**72**	**73**	**74**	**76**	**77**	**79**
	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)


ISES Solar Cycle Ap Progression
(Data Through 31 Mar 01)
Planetary Index, Ap
35
30
25
20
15
10
5
0
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Monthly Values
Smoothed Monthly Values
NOAA/SEC Boulder, CO USA

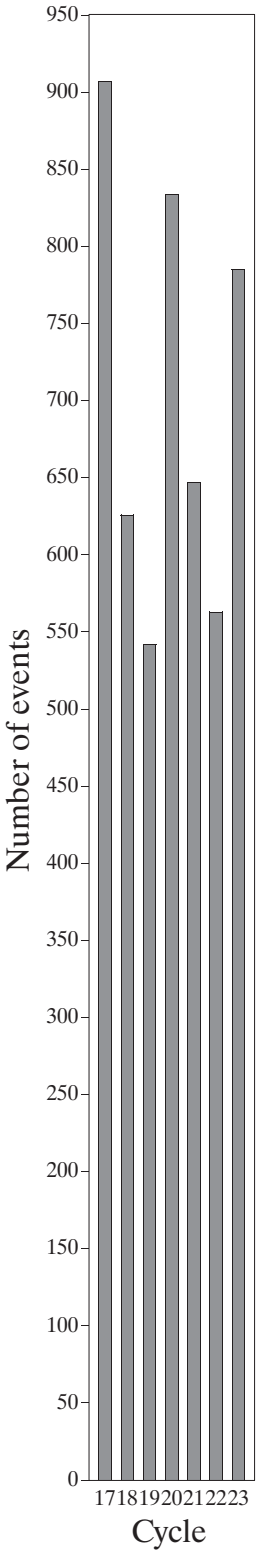
Quiet (Ap≤7) Geomagnetic Conditions

Space Environment Center

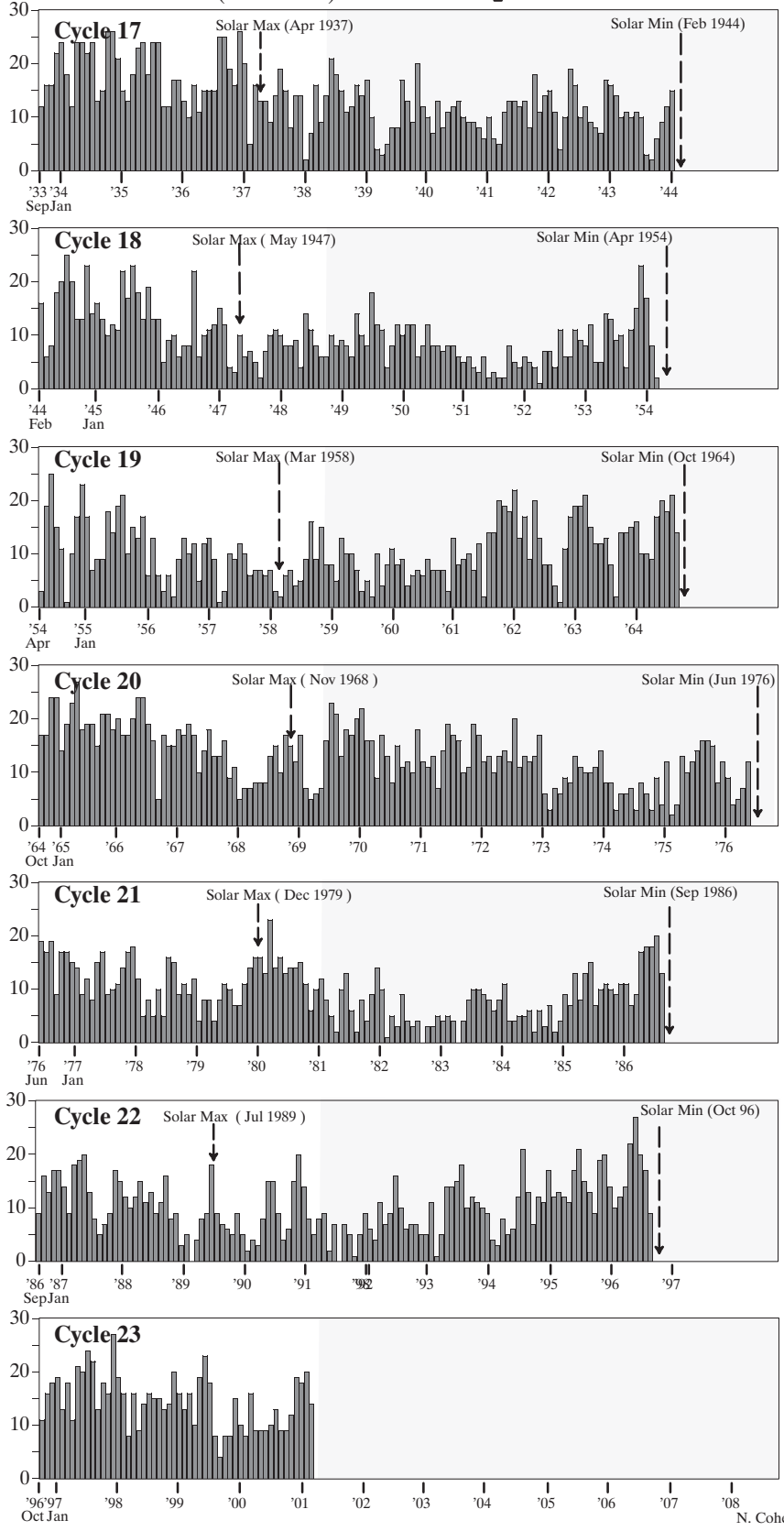
March 2001
(Month 54)

Preliminary data

Comparison of Cycles at current month in cycle



Number of events per month



N. Cohen