Space Weather Highlights **SWO PRF 1386**
18 - 24 March 2002 **26 March 2002**

Solar activity was at low to moderate levels. Region 9866 (S09, L = 191, class/area Eki/900 on 12 March) produced long-duration low-level M-class flares during March 18 – 19 and 22, as well as a long-duration C-class flare on March 20 (for flare specifics, please refer to the Energetic Events or Optical Flares lists). Imagery from the NASA SOHO/LASCO sensor indicated each of these flares was associated with a halo or partial-halo CME. Region 9866 rotated out of view on March 22 following a period of gradual decay. Region 9878 (N09, L = 038, Fao/150 on 23 March) produced isolated C-class subflares late in the period. It had moderate magnetic complexity and was in a gradual growth phase as the period ended.

Solar wind data were available from NASA Advanced Composition Explorer (ACE) spacecraft for most of the summary period. Three CME passages occurred during the period following flare activity in Region 9866. The first shock arrived at ACE at around 18/1237 UTC accompanied by an abrupt increase in velocity (peaks to around 500 km/sec), total IMF field intensity, density, and temperature. IMF Bz was mostly northward during this passage. The second CME arrived at ACE at 20/1307 UTC. Velocities increased from around 430 km/sec to 600 km/sec following the shock. IMF Bz turned briefly southward (peak deflections to minus 10 nT (GSM) following the shock, then turned northward after 20/1600 UTC. The final CME reached ACE at 23/1054 UTC associated with increased velocities (peaks to around 500 km/sec); and relatively minor increases in temperature, density, and IMF total field intensity. IMF Bz was variable at plus 10 nT to minus 05 nT (GSM) following the shock arrival, but turned mostly southward during approximately 23/2000 – 24/1500 UTC with peak southward deflections to minus 12 nT (GSM).

Greater than 10 MeV proton events occurred at geo-synchronous orbit on March 18, 20, and 22 - 23. CME shock-accelerated particles pushed the greater than 10 MeV flux above event threshold during March 18 – 20 and 22 (the greater than 10 MeV flux was already enhanced in the wake of a proton event on March 17 - see PRF #1385). Peak flux during this period was 53 pfu at 19/0650 UTC. Another greater than 10 MeV proton event began at 22/2020 UTC following a long-duration M1 limb-flare from Region 9866. This event reached a peak of 16 pfu at 23/1320 UTC, then ended at 23/2030 UTC.

Greater than 2 MeV electron fluxes were at normal levels through the period.

Geomagnetic field activity increased to unsettled to active periods during March 18 – 20 and 23 with brief minor storm conditions on March 19. Sudden impulses (SI) occurred at 18/1323 UTC (42 nT), and 20/1329 UTC (11 nT). A sudden storm commencement (SSC) was observed at 23/1137 UTC (16 nT) as well, followed by active to (brief) major storm conditions on March 24. This activity followed multiple CME passages associated with the long-duration flare activity in Region 9866 mentioned above.

Space Weather Outlook
27 March - 22 April 2002

Solar activity is expected to be at low to moderate levels. Isolated, low-level M-class flares are likely during the period.

Greater than 2 MeV electron fluxes will be at normal to moderate levels during most of the period. However, high flux levels are possible during April 04 – 05.

There will be a slight chance for a proton event during the latter half of the period.

Geomagnetic field activity is expected to be at quiet to unsettled levels during most of the period. However, active periods are likely during April 02 – 03 due to a high speed solar wind stream associated with a recurrent coronal hole.

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
18 March	178	136	910	B6.0	6	1	0	7	2	0	0	0
19 March	175	119	770	B6.3	2	1	0	2	1	0	0	0
20 March	188	141	950	B5.5	6	0	0	8	0	0	0	0
21 March	174	160	910	C2.1	7	0	0	6	0	0	0	0
22 March	172	194	1040	B7.1	2	1	0	2	0	0	0	0
23 March	170	176	1050	B8.6	12	0	0	8	0	0	0	0
24 March	175	169	670	B6.5	5	0	0	2	0	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	>4MeV
18 March	2.9E+8	9.6E+5	3.5E+3		1.5E+6	
19 March	7.0E+7	1.9E+6	2.4E+3		2.8E+6	
20 March	3.4E+7	5.1E+5	2.0E+3		9.7E+5	
21 March	2.1E+7	1.3E+5	1.8E+3		2.7E+5	
22 March	9.2E+6	2.4E+5	1.8E+3		7.3E+5	
23 March	4.1E+7	6.8E+5	1.9E+3		1.9E+6	
24 March	1.2E+7	5.7E+4	1.8E+3		1.5E+5	

Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg A	K-indices	High Latitude College A	K-indices	Estimated Planetary A	K-indices
18 March	9	1-1-0-1-4-2-3-3	12	1-1-0-3-3-4-2-4	12	2-1-0-2-4-3-4-3
19 March	15	5-4-3-2-1-1-2-2	14	3-5-4-2-1-1-1-2	17	5-5-3-3-1-2-3-2
20 March	7	1-1-0-0-3-4-2-1	15	0-0-0-0-3-5-2-5	7	1-1-0-1-3-4-3-2
21 March	5	1-1-2-1-2-1-2-2	8	2-1-4-3-0-1-2-1	8	2-1-3-3-1-2-3-2
22 March	7	2-3-2-3-2-0-1-0	9	1-2-2-5-0-1-1-1	8	2-3-3-3-1-2-2-1
23 March	8	1-0-0-2-3-2-2-3	16	0-0-0-2-4-5-4-3	9	1-0-0-2-3-3-3-3
24 March	29	4-4-5-5-4-4-3-3	68	4-5-7-6-6-7-3-3	47	5-5-6-6-4-5-3-3

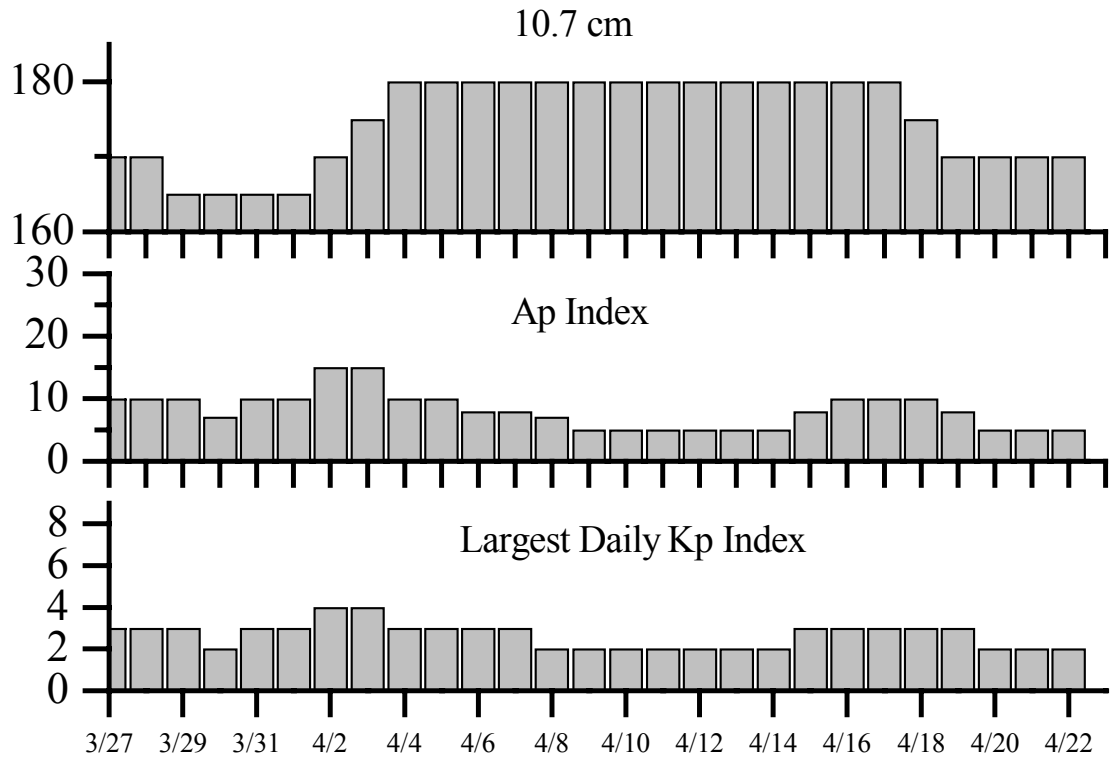
Alerts and Warnings Issued

Date & Time of Issue	Type of Alert or Warning	Date & Time of Event UT
18 Mar 0057	CONTINUED ALERT: Proton Event 10MeV≥ 10pfu	17 Mar 0820
18 Mar 0058	3- 245 MHz Bursts	17 Mar
18 Mar 0058	1- 245 MHz Noise Storm	17 Mar
18 Mar 0328	ALERT: Type IV Radio Emission	18 Mar 0212
18 Mar 0554	SUMMARY: Proton Event 10MeV ≥ 10pfu	17 Mar 1230
18 Mar 0611	CANCEL WARNING: Proton 10MeV≥ 10pfu	17 Mar 0749
18 Mar 1314	WARNING: Proton 10MeV≥ 10pfu expected	18 Mar 1315 - 2400
18 Mar 1323	ALERT: Proton Event 10MeV 10pfu	18 Mar 1300
18 Mar 1337	SUMMARY: Geomagnetic Sudden Impulse	18 Mar 1323
18 Mar 1341	ALERT: Geomagnetic K= 4	18 Mar 1341
18 Mar 1445	WARNING: Geomagnetic K= 5 expected	18/1445 - 19/0600 Mar
18 Mar 2116	WATCH: Geomagnetic A ≥ 20	20 Mar
18 Mar 2311	EXTENDED WARNING: Proton 10MeV ≥ 10pfu	18/1315 - 19/0600 Mar
19 Mar 0058	9- 245 MHz Bursts	18 Mar
19 Mar 0058	1- 245 MHz Noise Storms	18 Mar
19 Mar 0053	CONTINUED ALERT: Proton Event 10MeV ≥ 10pfu	18 Mar 1300
19 Mar 0111	ALERT: Geomagnetic K= 4	19 Mar 0110
19 Mar 0208	ALERT: Geomagnetic K= 5	19 Mar 0207
19 Mar 0506	EXTENDED WARNING: Proton 10MeV ≥10pfu	18/1315 -19/1500 Mar
19 Mar 0514	EXTENDED WARNING: Geomagnetic K= 5	18/1445 - 19/1500 Mar
19 Mar 1144	CANCEL WARNING: Geomagnetic K= 5	191/500 Mar
19 Mar 1457	EXTENDED WARNING: Proton 10MeV ≥10pfu	18/1315 - 19/2400
19 Mar 2358	EXTENDED WARNING: Proton 10MeV ≥10pfu	18/1315 - 20/1500 Mar
20 Mar 0046	CONTINUED ALERT: Proton Event 10MeV ≥10pfu	18/1300 Mar
20 Mar 0124	1- 245 MHz Noise Storm	19 Mar
20 Mar 0805	ALERT: Type II Radio Emission	20 0742
20 Mar 1319	WARNING: Geomagnetic Sudden Impulse	20/1330 - 1630 Mar
20 Mar 1341	SUMMARY: Geomagnetic Sudden Impulse	20/1329 Mar
20 Mar 1450	WARNING: Geomagnetic K=4 expected	20 Mar 1500 - 2400
20 Mar 1537	WARNING: Proton 10MeV ≥ 10pfu	20 Mar 1538 - 2400
20 Mar 1624	ALERT: Geomagnetic K= 4 Mar	20 Mar 1624
21 Mar 0054	10 - 245 MHz Bursts	20 Mar
21 Mar 0054	1- 245 MHz Noise Storms	20 Mar
21 Mar 0113	SUMMARY: Proton Event 10MeV ≥10pfu	20 Mar 1820
22 Mar 0115	3- 245 MHz Bursts	21 Mar
22 Mar 0115	1- 245 MHz Noise Storms	21 Mar
22 Mar 1451	WARNING: Proton 10MeV ≥10pfu	22/1500 - 23/0000 Mar
22 Mar 2036	ALERT: Proton Event 10MeV ≥10pfu	22 Mar 2020
22 Mar 2344	EXTENDED WARNING: Proton 10MeV ≥10pfu	22/1500 - 23/1500 Mar
23 Mar 0130	CONTINUED ALERT: Proton Event 10MeV ≥10pfu	22 Mar 2020
23 Mar 1155	SUMMARY: Geomagnetic Sudden Impulse	23 Mar 1137
23 Mar 1346	WARNING: Geomagnetic K= 4	23/1350 - 24/0000 Mar
23 Mar 1453	EXTENDED WARNING: Proton 10MeV ≥10pfu	22/1500 - 24/0000 Mar
23 Mar 1501	ALERT: Geomagnetic K= 4	23 Mar 1456

Alerts and Warnings Issued - continued.

Date & Time of Issue	Type of Alert or Warning	Date & Time of Event UT
24 Mar 0056	1- 245 MHz Bursts	23 Mar 2002
24 Mar 014	SUMMARY: Proton Event 10MeV 10pfu	24 Mar 2030
24 Mar 253	ALERT: Geomagnetic K= 4	24 Mar 0250
24 Mar 359	WARNING: Geomagnetic K= 4	24/0359 - 24/1500 Mar
24 Mar 427	ALERT: Geomagnetic K= 4	24 Mar 0426
24 Mar 604	ALERT: Geomagnetic K= 5	24 Mar 0558
24 Mar 639	WARNING: Geomagnetic K= 5	24/0640 - 24/1500 Mar
24 Mar 643	ALERT: Geomagnetic K= 5	24 Mar 0642
24 Mar 753	ALERT: Geomagnetic K= 6	24 Mar 0751
24 Mar 1438	EXTENDED WARNING: Geomagnetic K= 4	24/0359 - 24/2100 Mar

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
27 Mar	170	10	3	10 Apr	180	5	2
28	170	10	3	11	180	5	2
29	165	10	3	12	180	5	2
30	165	7	2	13	180	5	2
31	165	10	3	14	180	5	2
01 Apr	165	10	3	15	180	8	3
02	170	15	4	16	180	10	3
03	175	15	4	17	180	10	3
04	180	10	3	18	175	10	3
05	180	10	3	19	170	8	3
06	180	8	3	20	170	5	2
07	180	8	3	21	170	5	2
08	180	7	2	22	170	5	2
09	180	5	2				

Energetic Events

Date	Time			X-ray		Optical Information			Peak Radio Flux		Sweep Freq Intensity	
	Begin	Max	½ Max	Class	Integ Flux	Imp/Location Brtns	Lat CMD	Rgn #	245	2695	II	IV
18 Mar	0216	0231	0400	M1.0	.045				46	110	2	
19 Mar	1106	1144	1231	M1.0	.042	1f	S10W58	9866	76	38		
22 Mar	1012	1114	1152	M1.6	.049			9866		24		

Flare List

Date	Time			X-ray	Optical		Rgn
	Begin	Max	End	Class.	Imp / Brtns	Location Lat CMD	
18 March	0133	0145	0150	C1.1			
	0216	0231	0400	M1.0			
	B0323	U0323	0328		Sf	S15W22	9870
	B1144	U1146	1204	C6.2	1n	S19W28	9870
	1311	1313	1319		Sf	S23W28	9870
	1624	1625	1633	C3.5	Sf	S19E04	9871
	1648	1651	1704	C3.6	Sf	S19W32	9870
	1723	1725	1729		Sf	S18W29	9870
	1910	1917	1928	C8.9	1f	S21E02	9871
	1951	1951	1954		Sf	S21E03	9871
	2156	2156	2202	C2.1	Sf	S19E01	9871
19 March	0122	0124	0135	C1.8	Sf	S11W41	9866
	0520	0522	0532		Sf	S16E09	9871
	1144	1144	1313	M1.0	1f	S10W58	9866
	1859	1934	1945	C1.3			
20 March	0353	0356	0408		Sf	S18E61	9875
	0411	0412	0422		Sf	S18E61	9875
	0441	0504	0513	C1.2			
	0627	0633	0657		Sf	S17E59	9875
	0823	0824	0827		Sf	S19W41	9873
	0833	0834	0836	C1.9	Sf	S18E58	9875
	1152	1156	1200	C1.5			
	1606	1606	1612		Sf	S17W20	9871
	1805	1810	1820	C4.0	Sf	S08W68	9866
	2117	2120	2124	C2.4			
	2359	0019	0055	C5.7	Sf	S19W60	9870
21 March	0136	0141	0150	C3.0	Sf	S19W52	9873
	0215	0230	0243	C2.8			
	0431	0434	0437		Sf	N09E81	9878
	0437	0440	0444		Sf	S20W56	9873
	0629	0630	0632		Sf	N10E82	9878
	0758	0811	0827	C5.9	Sf	S10W76	9866
	1523	1534	1552	C2.6			
	1808	1811	1813	C1.3	Sf	S24W25	9871
	2024	2045	2109	C2.0			

Flare List - continued.

Date	Time Begin	Time Max	Time End	X-ray Class.	Optical Imp / Brtns	Optical Location Lat CMD	Rgn
22 March	2256	2304	2318	C2.2			
	0609	0618	0638	C8.0			9878
	1012	1114	1152	M1.6			9866
	1818	1820	1824	C1.5	Sf	S14E47	9876
	2353	2357	0006		Sf	S18W39	9871
23 March	0147	0148	0155	C1.1	Sf	S14E45	9876
	0322	0330	0342	C2.1	Sf	N08E55	9878
	0407	0408	0417		Sf	S13E43	9876
	0418	0426	0434		Sf	S18E30	9876
	0436	0442	0455	C3.2	Sf	S16E45	9876
	0543	0546	0553	C1.0			
	0711	0723	0733	C1.1			
	0800	0813	0826	C1.1			
	0950	0957	1009	C1.6			
	1009	1012	1016	C1.7			
	1304	1313	1322	C1.2			
	1430	1437	1449	C3.5	Sf	S15E35	9876
	1538	1543	1545	C1.5			
	1549	1551	1555		Sf	S13E36	9876
	1916	1916	1931	C2.6	Sf	S15E34	9876
24 March	0032	0038	0047	C1.3			
	1732	1754	1827	C5.1	Sf	S15E22	9876
	2034	2035	A2048	C4.5	Sf	S04W34	9881
	2120	2125	2131	C1.8			
	2215	2223	2232	C2.0			

Region Summary

Date	Location (° Lat ° CMD)	Helio Lon	Area (10^{-6} hemi)	Extent (helio)	Sunspot Characteristics: 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 9864												
07 Mar	N18E69	221	0050	02	Hsx	001	A								
08 Mar	N18E56	221	0080	02	Hsx	001	A								
09 Mar	N19E43	221	0070	04	Cso	005	B	3			2	1			
10 Mar	N20E29	222	0090	05	Cao	006	B				1				
11 Mar	N19E14	223	0050	05	Cso	004	B								
12 Mar	N18E03	221	0040	06	Dso	003	B								
13 Mar	N19W09	220	0060	06	Cso	006	B								
14 Mar	N18W20	218	0050	07	Cso	005	B				1				
15 Mar	N18W35	220	0040	04	Cso	003	B								
16 Mar	N19W47	218	0050	04	Dso	003	B	1			2				
17 Mar	N17W62	220	0050	06	Cso	003	B								
18 Mar	N18W73	218	0020	01	Hsx	001	A								
19 Mar	N18W84	216	0020	02	Hsx	001	A								
								4	0	0	6	1	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 221

			Region 9865												
08 Mar	N14E72	205	0010	01	Axx	001	A								
09 Mar	N14E58	206	0000	00	Axx	001	A								
10 Mar	N15E43	208	0020	01	Hrx	001	A								
11 Mar	N15E30	207	0020	01	Hrx	001	A								
12 Mar	N14E18	206	0000	00	Axx	001	A								
13 Mar	N13E02	209	0000	00	Axx	001	A								
14 Mar	N13W11	209													
15 Mar	N13W24	209													
16 Mar	N13W37	209													
17 Mar	N13W50	209													
18 Mar	N13W63	209													
19 Mar	N13W76	209													
20 Mar	N13W89	209													
								0	0	0	0	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 209

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 9866												
08 Mar	S10E80	197	0120	02	Hsx	001	A								
09 Mar	S10E73	191	0560	15	Eko	008	Bg	1	2		2	2			
10 Mar	S09E61	190	0840	14	Eki	019	Bg	2			2				
11 Mar	S08E47	190	0870	15	Eki	023	Bgd								
12 Mar	S10E35	189	0900	15	Eki	027	Bgd	3			2	1			
13 Mar	S11E20	191	0820	15	Eki	037	Bd	1			1				
14 Mar	S10E07	191	0820	14	Eki	036	Bd		1				1		
15 Mar	S09W06	191	0690	13	Eki	026	Bd		1		2	1			
16 Mar	S09W19	190	0540	15	Eki	035	Bgd				1				
17 Mar	S09W33	191	0470	14	Eai	024	Bgd	2			2				
18 Mar	S09W46	191	0290	13	Eai	016	Bgd								
19 Mar	S09W59	191	0290	12	Eai	010	Bg	1	1		1	1			
20 Mar	S08W73	192	0270	13	Eao	005	Bg	1			1				
21 Mar	S09W84	190	0190	02	Eao	001	B	1			1				
								12	5	0	15	5	1	0	0

Crossed West Limb.
Absolute heliographic longitude: 191

			Region 9867												
11 Mar	S30E16	221	0010	01	Bxo	003	B								
12 Mar	S31E04	220	0000	01	Axx	001	A								
13 Mar	S31W09	220													
14 Mar	S31W22	220													
15 Mar	S31W35	220													
16 Mar	S31W48	220													
17 Mar	S31W61	220													
18 Mar	S31W74	220													
19 Mar	S31W87	220													
								0	0	0	0	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 220

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 9868														
11 Mar	N19E32	205	0060	06	Dao	011	B								
12 Mar	N19E20	204	0040	07	Dso	008	B								
13 Mar	N19E07	204	0020	06	Cso	007	B								
14 Mar	N19W06	204	0020	06	Cso	011	B				2				
15 Mar	N20W18	203	0020	04	Cso	004	B								
16 Mar	N20W32	203	0010	03	Cso	004	B								
17 Mar	N20W45	203													
18 Mar	N20W58	203													
19 Mar	N20W71	203													
20 Mar	N20W84	203													
								0	0	0	2	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 204

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 9869														
11 Mar	N24E42	195	0000	01	Axx	001	A								
12 Mar	N24E29	195	0010	01	Axx	001	A								
13 Mar	N21E14	197	0010	01	Hsx	002	A								
14 Mar	N23E00	198	0010	01	Axx	001	A								
15 Mar	N23W13	198													
16 Mar	N23W26	198													
17 Mar	N23W39	198													
18 Mar	N23W52	198													
19 Mar	N23W65	198													
20 Mar	N23W78	198													
								0	0	0	0	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 198

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 9870												
11 Mar	S17E62	175	0130	08	Dso	003	B								
12 Mar	S18E51	173	0120	13	Eso	006	B								
13 Mar	S20E37	174	0120	12	Eao	004	B								
14 Mar	S20E24	174	0120	10	Cao	006	B								
15 Mar	S19E06	179	0090	03	Cso	004	B								
16 Mar	S20W07	178	0100	02	Hsx	002	A								
17 Mar	S20W20	178	0120	02	Hax	001	A								
18 Mar	S20W35	180	0090	04	Cao	011	B	2			4	1			
19 Mar	S20W47	179	0080	05	Cao	008	B								
20 Mar	S21W61	180	0080	06	Cso	006	B	1			1				
21 Mar	S20W73	179	0050	02	Cao	003	B								
22 Mar	S20W90	182	0090	02	Hsx	001	A								
								3	0	0	5	1	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 179

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 9871												
13 Mar	S21E70	141	0150	08	Dao	004	B		1		1				
14 Mar	S20E58	140	0210	13	Eao	007	B	1				1			
15 Mar	S20E44	141	0200	14	Eso	006	B				1				
16 Mar	S21E31	140	0280	13	Eao	013	B	1			1				
17 Mar	S18E20	138	0330	13	Eso	015	B	2	1		3				
18 Mar	S19E07	138	0330	12	Eao	018	B	3			3	1			
19 Mar	S19W06	138	0260	12	Eao	014	B				1				
20 Mar	S19W19	138	0240	13	Eao	014	B				1				
21 Mar	S18W32	138	0240	13	Eko	015	Bg	1			1				
22 Mar	S19W47	139	0200	11	Eao	007	Bg				1				
23 Mar	S18W60	139	0170	10	Dso	005	B								
24 Mar	S18W72	138	0100	10	Dao	006	B								
								8	2	0	13	2	0	0	0

Still on Disk.
Absolute heliographic longitude: 138

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 9872												
15 Mar	S31E09	176	0030	06	Dao	006	B								
16 Mar	S31W05	176	0040	07	Dso	007	B								
17 Mar	S32W18	176	0030	08	Dso	004	B								
18 Mar	S32W30	175	0070	08	Dro	005	B								
19 Mar	S32W43	175													
20 Mar	S32W56	175													
21 Mar	S32W69	175													
22 Mar	S32W82	175													
								0	0	0	0	0	0	0	0
Crossed West Limb.															
Absolute heliographic longitude:		176													
			Region 9873												
17 Mar	S17W09	167	0120	07	Dao	017	B								
18 Mar	S18W21	166	0110	08	Dai	025	B								
19 Mar	S18W35	167	0090	08	Dao	012	B								
20 Mar	S17W49	168	0050	09	Dao	005	B				1				
21 Mar	S18W67	173	0060	08	Hsx	001	A	1			2				
22 Mar	S18W82	174	0060	02	Hax	001	A								
23 Mar	S17W93	172	0050	02	Hsx	001	A								
								1	0	0	3	0	0	0	0
Crossed West Limb.															
Absolute heliographic longitude:		167													
			Region 9874												
19 Mar	N17E21	111	0020	03	Cso	003	B								
20 Mar	N18E08	111	0030	04	Cso	009	B								
21 Mar	N17W05	111	0010	02	Axx	003	A								
22 Mar	N18W17	109	0000	01	Axx	001	A								
23 Mar	N18W30	109													
24 Mar	N18W43	109													
								0	0	0	0	0	0	0	0
Still on Disk.															
Absolute heliographic longitude:		111													

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 9875												
19 Mar	S19E62	070	0010	01	Hsx	001	A								
20 Mar	S18E48	071	0140	07	Dao	006	B	1			4				
21 Mar	S19E35	071	0140	09	Dao	009	B								
22 Mar	S20E22	070	0120	11	Esi	015	B								
23 Mar	S20E08	071	0110	10	Dao	012	B								
24 Mar	S20W06	072	0090	06	Dao	005	B								
								1	0	0	4	0	0	0	0
Still on Disk.															
Absolute heliographic longitude:		072													
			Region 9876												
20 Mar	S16E65	054	0050	04	Cao	003	B								
21 Mar	S15E54	052	0050	06	Cao	003	B								
22 Mar	S16E44	048	0080	10	Dso	007	B	1			1				
23 Mar	S16E30	049	0160	12	Eao	018	B	4			7				
24 Mar	S15E18	048	0140	13	Eai	023	B	1			1				
								6	0	0	9	0	0	0	0
Still on Disk.															
Absolute heliographic longitude:		048													
			Region 9877												
20 Mar	N18W29	148	0030	03	Cso	002	B								
21 Mar	N16W44	150	0040	08	Cro	003	B								
22 Mar	N15W57	150	0070	08	Dao	008	B								
23 Mar	N15W70	150													
24 Mar	N15W83	150													
								0	0	0	0	0	0	0	0
Still on Disk.															
Absolute heliographic longitude:		148													
			Region 9878												
20 Mar	N08E75	044	0060	03	Hsx	001	A								
21 Mar	N09E64	042	0110	11	Cao	005	B				2				
22 Mar	N08E53	039	0150	10	Dao	009	B	1							
23 Mar	N10E43	036	0150	16	Fao	015	B	1			1				
24 Mar	N09E28	038	0100	13	Esi	016	Bg								
								2	0	0	3	0	0	0	0
Still on Disk.															
Absolute heliographic longitude:		038													

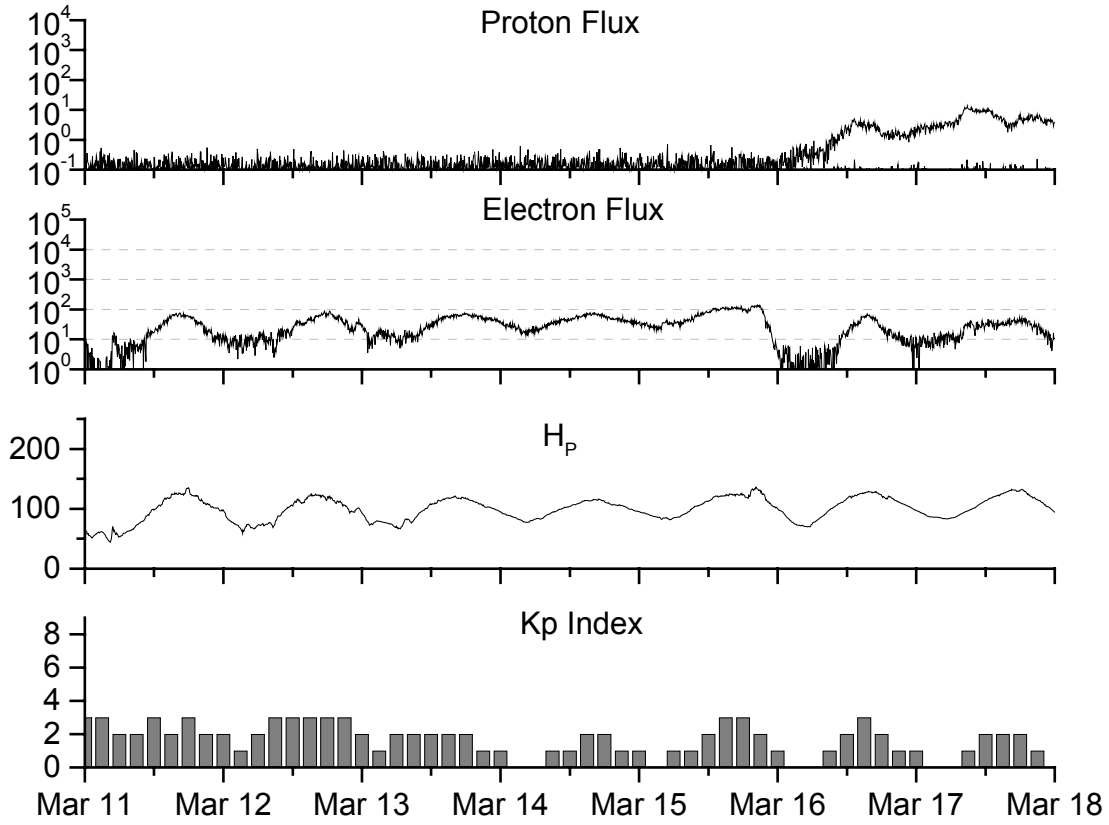
Region Summary - continued.

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 9879												
21 Mar	N15W50	156	0010	03	Cro	002	B								
22 Mar	N15W63	156	0130	06	Dso	006	B								
23 Mar	N14W76	155	0210	09	Dao	009	B								
24 Mar	N14W88	154	0060	09	Dao	005	B								
								0	0	0	0	0	0	0	0
Still on Disk.															
Absolute heliographic longitude:		156													
			Region 9880												
21 Mar	N08E35	071	0010	04	Bxo	005	B								
22 Mar	N06E20	072	0010	03	Bxo	003	B								
23 Mar	N06E07	072	0020	04	Cro	005	B								
24 Mar	N07W08	074	0020	06	Cso	010	B								
								0	0	0	0	0	0	0	0
Still on Disk.															
Absolute heliographic longitude:		072													
			Region 9881												
22 Mar	S05W09	101	0020	07	Cro	003	B								
23 Mar	S04W20	099	0020	06	Bxo	004	B								
24 Mar	S03W34	100	0020	05	Cso	007	B	1			1				
								1	0	0	1	0	0	0	0
Still on Disk.															
Absolute heliographic longitude:		101													
			Region 9882												
22 Mar	N14E72	020	0040	04	Bxo	002	B								
23 Mar	N14E54	025	0130	06	Dao	006	B								
24 Mar	N16E41	025	0090	06	Dao	006	B								
								0	0	0	0	0	0	0	0
Still on Disk.															
Absolute heliographic longitude:		025													
			Region 9883												
23 Mar	N06E67	012	0030	02	Hsx	001	A								
24 Mar	N06E58	008	0050	02	Hsx	001	A								
								0	0	0	0	0	0	0	0
Still on Disk.															
Absolute heliographic longitude:		008													

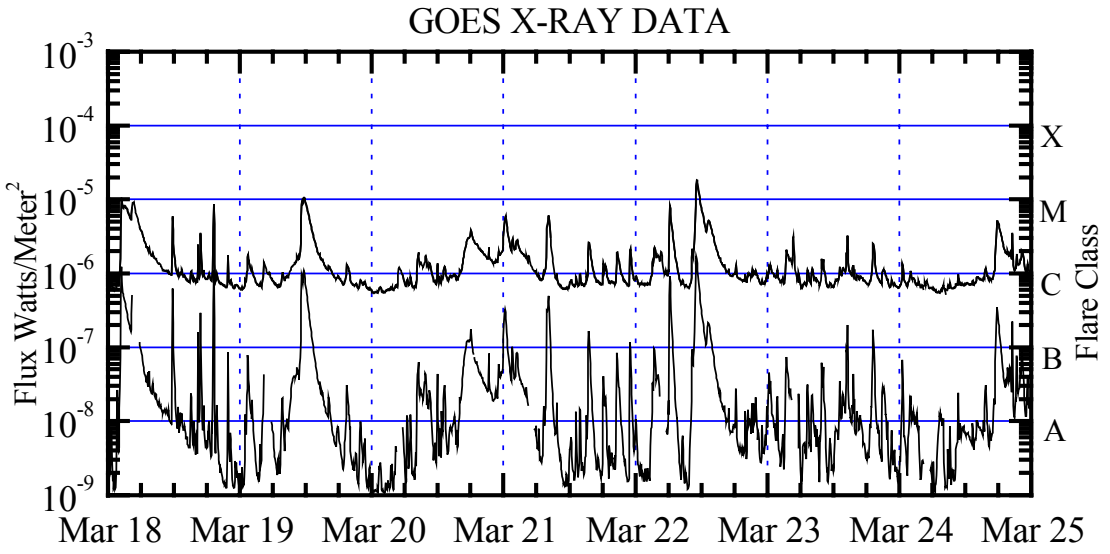
Recent Solar Indices (preliminary)
of the observed monthly mean values

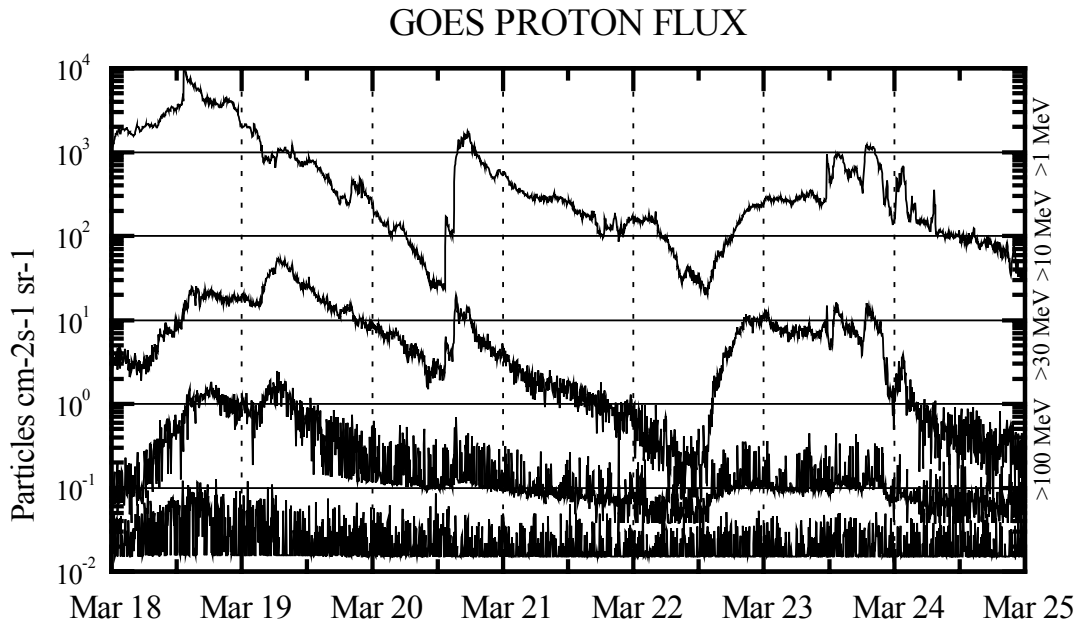
	Sunspot Numbers					Radio Flux		Geomagnetic	
	Observed values		Ratio	Smooth values		*Penticton	Smooth	Planetary	Smooth
Month	SWO	RI	RI/SWO	SWO	RI	10.7 cm	Value	Ap	Value
					2000				
March	203.6	138.5	0.68	175.4	119.9	208.2	178.4	09	15.0
April	193.4	125.5	0.65	176.3	120.8	184.2	180.5	15	15.0
May	188.8	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	166.2	114.4	167.7	175.6	18	14.6
November	149.9	106.5	0.71	162.7	112.7	178.8	173.6	17	14.6
December	146.4	104.5	0.71	160.8	112.1	173.6	172.0	08	14.4
					2001				
January	142.7	95.1	0.67	156.3	108.8	166.7	168.8	08	13.8
February	131.0	80.1	0.61	151.4	104.2	147.3	165.8	06	13.3
March	166.7	114.2	0.69	154.0	104.9	177.7	167.9	17	12.9
April	163.6	108.2	0.66	159.4	107.7	178.3	171.7	18	12.7
May	135.1	97.3	0.72	163.1	108.8	148.7	174.8	12	12.5
June	196.7	134.0	0.68	167.2	109.9	173.7	178.8	12	12.4
July	124.6	82.2	0.66	172.1	111.8	131.3	183.9	11	12.4
August	159.4	106.8	0.67	176.7	113.8	163.2	188.8	13	12.5
September	229.1	150.7	0.66			233.3		12	
October	197.4	125.6	0.64			208.2		18	
November	178.6	106.5	0.60			212.5		14	
December	217.5	131.8	0.61			236.6		08	
					2002				
January	189.0	113.9	0.60			226.4		07	
February	194.5	108.0	0.56			205.1		09	

NOTE: All smoothed values after June 1999 and monthly values after December 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 11 March 2002
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 Air Force Weather Agency) 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.