

**Space Weather Highlights  
16-22 March 1998**

Solar activity ranged from low to moderate. Region 8179 (S22, L = 032, class/area Ekc/800 on 16 March) reached maturity as a moderately complex E-type on 16 March after a period of dramatic growth that began late on 13 March. Thereafter, the region produced C-class subflares while slowly decaying, then crossed the west limb 22 March. Four low-level M-class flares occurred: an M1 at 16/0106UT with no optical association, an M1 at 8/1112UT, also with no optical association; an M1/1N at 19/0127UT from Region 8183 (N22, L = 290, class/area Cro/080 on 19 March); and an M1/1N at 22/0700UT from Region 8185 (S24, L = 233, class/area Fki/350 on 22 March). The last flare was accompanied by a Type II radio sweep and minor centimetric radio bursts. Region 8185 appeared to stabilize as a moderately complex F-type by the end of the period. A number of coronal mass ejections were seen in the SOHO/LASCO images.

Solar wind data were available from the ACE and WIND spacecraft during most of the period (magnetic field data were not available for 18 - 22 March). Velocities varied from 300 - 400 km/sec through 20 March, then increased during 21 March to a peak of 640 km/sec. Velocities gradually declined to 530 km/sec by the end of the period. Solar wind particle densities varied from 02 - 12 p/cc through 20 March then became elevated during 21 March, peaking at 20 p/cc around 21/2000UT. Densities dropped to a range of 02 - 05 p/cc during 22 March. Bz ranged from plus to minus 07 nT (GSM) through 17 March. Solar sector orientation was mostly toward (phi angle near 315 degrees) through 17 March.

There were no significant proton enhancements observed at geosynchronous altitude.

The greater than 2 MeV electron flux at geosynchronous altitude reached high levels during 16 - 20 March, then declined to normal to moderate levels for the balance of the period.

The geomagnetic field was quiet to unsettled through 20 March. A disturbance occurred during 21/0900 - 2100UT with active to minor storm levels detected at middle latitudes and active to isolated severe storm levels at high latitudes. The disturbance peaked around 21/1800UT. Activity declined to mostly quiet to unsettled levels during 22 March.

**Space Weather Forecast  
25 March 1998 -20 April 1998**

Solar activity is expected to range from low to moderate. Region 8185 may produce isolated M-class flares until it crosses the west limb on 02 April. Old Region 8179 is expected to return on 04 April and provides an increased chance for isolated M-class flares through most of the rest of the period.

No significant proton enhancements are expected at geosynchronous altitude.

The greater than 2 MeV electron flux at geosynchronous altitude is expected to be normal during most of the period. However, moderate to high fluxes are possible during 27 - 28 March and again during 07 - 10 April.

The geomagnetic field is expected to be at quiet to unsettled levels during most of the period. However, unsettled to active levels are possible during 26 March, and active to minor storm levels are possible during 06 - 07 April.



### Daily Solar Data

Date	Radio Flux	Sun spot	Sunspot Area	X-ray Background	X-ray Flux			Flares				
	10.7 cm	No. (10 <sup>6</sup> hemi.)			C	M	X	S	1	2	3	4
16 March	124	92	990	B6.1	10	1	0	12	1	0	0	0
17 March	126	81	910	B7.6	8	0	0	9	0	0	0	0
18 March	127	102	930	B3.8	2	1	0	4	0	0	0	0
19 March	125	80	880	B4.0	8	1	0	15	3	0	0	0
20 March	127	100	910	B5.7	8	0	0	0	0	0	0	0
21 March	126	95	810	B5.1	3	0	0	2	0	0	0	0
22 March	128	114	960	B7.5	4	1	0	6	1	0	0	0

### Daily Particle Data

Date	Proton Fluence (protons/cm <sup>2</sup> -day-sr)			Electron Fluence (electrons/cm <sup>2</sup> -day-sr)		
	>1MeV	>10MeV	>100MeV	>.6MeV	>2MeV	>4MeV
16 March	7.4E+5	1.8E+4	4.3E+3		6.1E+7	
17 March	1.3E+6	1.8E+4	4.2E+3		3.7E+7	
18 March	1.9E+6	1.9E+4	4.4E+3		1.0E+8	
19 March	2.0E+6	1.9E+4	4.6E+3		1.4E+8	
20 March	8.5E+5	1.9E+4	4.6E+3		3.8E+7	
21 March	7.5E+5	1.7E+4	4.0E+3		2.1E+6	
22 March	1.6E+6	1.7E+4	3.6E+3		6.6E+6	

### Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
16 March	10	4-2-2-2-3-2-2-2	*	3-3-4-4-4-4-2-*	13	3-3-3-2-3-3-3-1
17 March	6	3-2-2-2-1-0-1-2	16	1-2-1-6-4-0-1-1	7	2-2-2-3-2-2-2-2
18 March	4	2-2-1-0-1-2-1-2	*	*-*-*-*-*-*-*	4	2-2-1-0-1-2-2-2
19 March	3	1-1-0-2-1-1-0-1	*	*-*-*-*-*-*-*	4	1-0-0-2-1-2-2-2
20 March	8	2-0-1-2-2-3-2-3	10	1-0-2-3-3-4-2-1	7	2-0-2-2-2-3-2-2
21 March	20	3-1-3-4-3-5-4-2	46	1-1-4-5-6-7-5-3	33	3-2-3-5-6-6-4-2
22 March	9	2-1-4-2-2-2-2-1	22	3-2-2-6-4-4-2-1	11	2-2-3-4-3-3-2-1

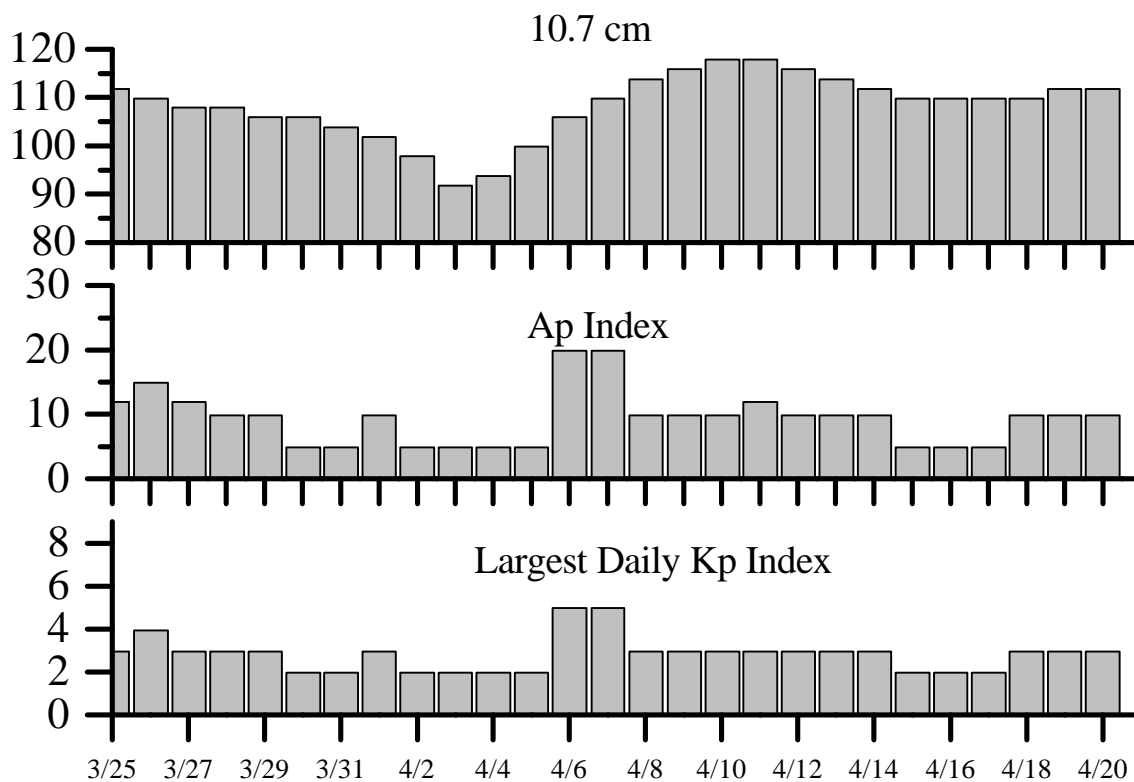


*Alerts and Warnings Issued*

Date and Time of Issue (UT)	Type of Alert or Warning	Date and Time of Event (UT)
16 Mar 000	>2MeV Electron Event in Progress $\geq 1000$ pfu	15 Mar
17 Mar 0010	>2MeV Electron Event in Progress $\geq 1000$ pfu	16 Mar
18 Mar 0009	>2MeV Electron Event in Progress $\geq 1000$ pfu	17 Mar
21 Mar 0012	5- 245 MHz Radio Bursts	20 Mar
21 Mar 0012	245 MHz Radio Noise Storm	20 Mar
19 Mar 0000	>2MeV Electron Event in Progress $\geq 1000$ pfu	18 Mar
19 Mar 0010	3- 245 MHz Radio Bursts	18 Mar
19 Mar 0010	245 MHz Radio Noise Storm	18 Mar
20 Mar 0004	>2MeV Electron Event in Progress $\geq 1000$ pfu	19 Mar
21 Mar 0008	>2MeV Electron Event in Progress $\geq 1000$ pfu	20 Mar
21 Mar 0012	5- 245 MHz Radio Bursts	20 Mar
21 Mar 0012	245 MHz Radio Noise Storm	20 Mar
21 Mar 0905	K = 4 Observed	21 Mar 06-09
21 Mar 1203	K= 5 Observed	21 Mar 09-12
21 Mar 1806	K= 6 Observed	21 Mar 15-18
21 Mar 1812	A $\geq 20$ Observed	21 Mar 1800
21 Mar 0008	>2MeV Electron Event in Progress $\geq 1000$ pfu	20 Mar
22 Mar 0732	Type II Radio Emission	22 Mar 0700
22 Mar 0755	Type II Radio Emission	22 Mar 0718
22 Mar 1203	K= 4 Observed	22 Mar 09-12



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
25 Mar	112	12	3	08	114	10	3
26	110	15	4	09	116	10	3
27	108	12	3	10	118	10	3
28	108	10	3	11	118	12	3
29	106	10	3	12	116	10	3
30	106	5	2	13	114	10	3
31	104	5	2	14	112	10	3
01 Apr	102	10	3	15	110	5	2
02	98	5	2	16	110	5	2
03	92	5	2	17	110	5	2
04	94	5	2	18	110	10	3
05	100	5	2	19	112	10	3
06	106	20	5	20	112	10	3
07	110	20	5				



### *Energetic Events*

Date	Time (UT)			X-ray		Optical Information			Peak		Sweep Freq		
	Begin	Max	½	Class	Integ Flux	Imp Brtns	Location		Rgn #	Radio Flux		Intensity	
			Max				Lat	CMD		245	2695	II	IV
16 Mar 98	0102	0106	0112	M1.1	.004								
18 Mar 98	1050	1112	1134	M1.0	.019								
19 Mar 98	0117	0127	0134	M1.2	.007	1N	N18E58	8183		17			
22 Mar 98	0651	0700	0708	M1.1	.007	1N	S28E69	8185	120	29	2		

### *Flare List*

Date	Time			X-ray Class.	Imp / Brtns	Optical Location		Rgn #
	Begin	Max	End			Lat	CMD	
16 March	0102	0106	0112	M1.1				
	0201	0208	0210	C1.9	SF	S25W01	8179	
	0547	0552	0603		SF	S25W03	8179	
	0645	0649	0657		SF	S23W08	8179	
	0739	0815	0842	C3.7	SF	S20W09	8179	
	0925	0926	0929	C1.0	SF	S25W05	8179	
	B1059	1156	1300	C7.9	1N	S23W11	8179	
	1550	1555	1603	B8.7				
	1618	1618	1627	B7.6	SF	S25W09	8179	
	1642	1646	1659	C1.3	SF	S23W14	8179	
	1715	1724	1738	C6.4	SF	S23W13	8179	
	1833	1836	1927	C5.9	SF	S23W13	8179	
	1933	1936	1938		SF	S23W17	8179	
	2006	2025	2057	C2.1	SF	S23W15	8179	
	2126	2131	2153	C2.0	SF	S21W17	8179	
2201	2210	2215	C2.4					
17 March	0028	0041	0101	C2.0				
	0323	0323	0334	C2.0	SF	S22W19	8179	
	0411	0417	0421	C1.2				
	0423	0424	0456		SF	S21W21	8179	
	0546	0618	0629	C1.4				
	0829	0829	0836	C1.1	SF	S23W21	8179	
	1037	1041	1048	C2.3				
	B1059	U1059	1107		SF	S23W23	8179	
	1255	1257	A1303	B8.2	SF	S20W23	8179	
	1311	1311	1325		SF	S21W26	8179	
	B1333	U1333	1346	C3.6	SF	S21W23	8179	
	1413	1417	1422		SF	S25W21	8179	
1629	1716	1730	C1.2					
2316	2316	2320		SF	S25W25	8179		
18 March	0036	0048	0052	C1.9	SF	S21W31	8179	
	0240	0244	0253	B5.2				
	0258	0302	0311	C1.2	SF	S17W35	8179	
	0738	0739	0741		SF	N18E63	8183	
	1050	1112	1134	M1.0				



*Flare List – continued.*

Date	Time			X-ray Class.	Optical		Rgn #
	Begin	Max	End		Imp / Brtns	Location Lat CMD	
19 March	1517	1517	1526		SF	S24W38	8179
	0117	0125	0145	M1.2	1N	N18E58	8183
	0145	0145	0150		SF	S21W43	8179
	0410	0414	0417	C1.0			
	0509	0510	0515		SF	S21W60	8182
	0510	0516	0533	C7.5	1F	N18E54	8183
	0558	0559	0601		SF	S21W45	8179
	0901	0904	0912	C1.1	SF	N18E52	8183
	0919	0922	0924	C1.0			
	0953	0958	1006	C3.2	1F	N18E52	8183
	1147	1152	1214	C1.7	SF	N21E53	8183
	1228	1228	1232		SF	N21E53	8183
	1642	1645	1703		SF	S21W53	8179
	1824	1827	1841		SF	S20W53	8179
	1843	1851	A1853	C2.8	SF	S20W53	8179
	B2027	2028	2037	C1.0	SF	S21W56	8179
	2041	2043	2052		SF	S20W57	8179
	2108	2108	2113		SF	S19W57	8179
	2128	2147	0013		SF	S19W56	8179
	2222	2234	2302		SF	N21E46	8183
2328	2339	2347		SF	S21W71	8182	
20 March	0305	0310	0314	C2.7			
	0442	0448	0457	C3.8			
	0640	0644	0650	C2.0			
	1203	1208	1211	C4.5			
	1229	1245	1305	C1.7			
	1445	1454	1500	C1.1			
	1628	1633	1642	C1.8			
21 March	1943	1949	1954	C1.8			
	0054	0058	0100	B8.6			
	0248	0252	0254	C1.0			
	0527	0531	0538	C1.4			
	1242	1245	1252	B8.0			
	1826	1827	1832	C1.1	SF	S21W83	8179
22 March	2249	2249	2254		SF	S27E71	8185
	0652	0700	0715	M1.1	1N	S28E69	8185
	0829	0833	0837	C2.1			
	B1107	U1109	A1121	C2.0	SF	N21E12	8183
	1457	1500	1503	C1.1			



Date	Time			X-ray Class.	Imp / Brtns	Optical		Rgn #
	Begin	Max	End			Location Lat CMD		
22 March	1634	1634	1641	C1.9	SF	S28E72	8185	
	1811	1813	1820		SF	S28E63	8185	
	2026	2029	2032		SF	S28E60	8185	
	2134	2136	2143		SF	S26E60	8185	
	2257	2257	2301		SF	S27E59	8185	

**Region Summary**

Date	Location		Sunspot Characteristics				Flares				
	( ° Lat ° CMD)	Helio	Area (10 <sup>-6</sup> hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray		Optical	
		Lon						C	M	X	S

*Region 8174*

06 Mar	S17E50	097	0010	02	BXO	002	B										
07 Mar	S17E37	098	0040	05	CRO	006	B										
08 Mar	S19E25	095	0050	07	CSO	008	B										
09 Mar	S17E11	096	0050	08	DSO	011	B										
10 Mar	S18W01	095	0030	07	CSO	006	B										
11 Mar	S18W16	097	0030	05	CRO	005	B										
12 Mar	S17W31	099	0000	05	BXO	002	B										
13 Mar	S17W44	098	0000	00	AXX	001	A										
14 Mar	S17W58	099	0000	00	AXX	001	A										
15 Mar	S17W71	099															
16 Mar	S17W84	099															

0 0 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 095

*Region 8175*

07 Mar	N44E56	079	0010	01	AXX	002	A										
08 Mar	N45E46	074	0040	02	HAX	001	A										
09 Mar	N47E33	074	0050	03	HAX	001	A										
10 Mar	N47E23	071	0030	01	HSX	001	A										
11 Mar	N47E12	069	0030	01	HRX	001	A										
12 Mar	N47E00	068	0020	01	HRX	001	A										
13 Mar	N47W13	067	0000	00	AXX	001	A										
14 Mar	N48W24	065	0010	01	AXX	001	A										
15 Mar	N47W37	065	0000	00	AXX	001	A										
16 Mar	N47W50	065															
17 Mar	N47W63	065															
18 Mar	N47W76	065															
19 Mar	N47W89	065															

0 0 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 068



*Region Summary – continued.*

Date	Location		Sunspot Characteristics				Flares											
	( ° Lat ° CMD)	Helio	Area (10 <sup>6</sup> hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical							
		Lon						C	M	X	S	1	2	3	4			
<i>Region 8176</i>																		
07 Mar	S43E66	069	0000	01	AXX	001	A											
08 Mar	S42E54	066	0030	06	BXO	006	B											1
09 Mar	S40E41	066	0050	09	CSO	007	B											3
10 Mar	S39E29	065	0110	09	DAO	014	B											
11 Mar	S38E17	064	0140	11	EAO	021	B											2
12 Mar	S40E05	063	0140	13	EAO	025	B											
13 Mar	S40W07	061	0210	14	EAI	020	B											
14 Mar	S39W22	063	0150	12	EAO	015	B											
15 Mar	S38W34	062	0100	13	ESO	012	B											
16 Mar	S40W42	060	0060	16	CAO	010	B											
17 Mar	S40W53	055	0030	07	CRO	005	B											
18 Mar	S40W63	052	0000	01	AXX	001	A											
19 Mar	S40W76	052																
20 Mar	S40W89	052																
																		0 0 0 6 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 063

<i>Region 8178</i>																		
10 Mar	S15E72	022	0100	04	HSX	001	A											
11 Mar	S16E59	022	0140	01	HSX	001	A											
12 Mar	S17E47	021	0100	01	HSX	001	A											
13 Mar	S16E34	020	0110	02	HSX	001	A											
14 Mar	S17E20	021	0110	02	HSX	001	A											
15 Mar	S16E07	021	0130	02	HSX	001	A											
16 Mar	S16W06	021	0130	03	HSX	002	A											
17 Mar	S16W19	021	0100	03	HAX	002	A											
18 Mar	S16W32	021	0080	02	HAX	002	A											
19 Mar	S17W45	020	0050	02	HAX	001	A											
20 Mar	S17W54	016	0060	02	HSX	001	A											
21 Mar	S17W71	020	0040	02	HSX	001	A											
22 Mar	S15W83	019	0030	02	HSX	001	A											
																		0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 021





*Region Summary – continued.*

Date	Location		Sunspot Characteristics					Flares															
	( ° Lat ° CMD)	Helio	Area (10 <sup>6</sup> hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical												
		Lon						C	M	X	S	1	2	3	4								
<i>Region 8179</i>																							
10 Mar	S22E60	034	0010	04	BXO	003	B																
11 Mar	S23E50	031	0030	09	CRO	005	B							1									
12 Mar	S24E36	032	0030	10	CRO	008	B																
13 Mar	S22E22	032	0020	07	BXO	013	B							1									
14 Mar	S22E08	033	0140	09	DAC	038	BG	2						7									
15 Mar	S22W04	032	0670	11	EKC	045	BGD	4	2					11	3								
16 Mar	S22W17	032	0800	14	EKC	050	BG	9						12	1								
17 Mar	S22W30	032	0780	14	EKC	044	BG	3						9									
18 Mar	S21W44	033	0790	15	EKC	043	BG	2						3									
19 Mar	S22W56	031	0720	15	EKI	029	BG	2						9									
20 Mar	S22W69	031	0770	17	FKI	019	BG																
21 Mar	S22W82	031	0590	17	FKI	010	B	1						1									
22 Mar	S24W88	024	0290	10	DAO	006	B																
														23	2	0	54	4	0	0	0	0	

Still on Disk.

Absolute heliographic longitude: 032

<i>Region 8180</i>																							
12 Mar	S29E42	026	0010	05	BXO	005	B																
13 Mar	S27E29	025	0010	07	BXO	006	B							1									
14 Mar	S30E19	022	0010	03	BXO	003	B																
15 Mar	S30E07	021	0000	00	AXX	001	A																
16 Mar	S30W06	021																					
17 Mar	S30W19	021																					
18 Mar	S30W32	021																					
19 Mar	S30W45	021																					
20 Mar	S30W58	021																					
21 Mar	S29W71	020	0010	04	BXO	004	B																
22 Mar	S28W85	021	0200	05	CAO	006	B																
														0	0	0	1	0	0	0	0	0	

Still on Disk.

Absolute heliographic longitude: 021



*Region Summary – continued.*

Date	Location		Sunspot Characteristics				Flares														
	( ° Lat ° CMD)	Helio	Area (10 <sup>6</sup> hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical										
		Lon						C	M	X	S	1	2	3	4						
<i>Region 8181</i>																					
12 Mar	S20E48	020	0000	04	BXO	002	B														
13 Mar	S20E35	020																			
15 Mar	S20E09	020																			
16 Mar	S20W04	020																			
17 Mar	S20W17	020																			
18 Mar	S20W30	020																			
19 Mar	S20W43	020																			
20 Mar	S20W56	020																			
21 Mar	S20W69	020																			
												0	0	0	0	0	0	0	0	0	
Died on Disk.																					
Absolute heliographic longitude: 020																					
<i>Region 8182</i>																					
18 Mar	S22W58	047	0010	05	BXO	003	B														
19 Mar	S24W70	045	0030	06	CRO	004	B													2	
20 Mar	S25W82	044	0010	07	BXO	003	B														
												0	0	0	2	0	0	0	0	0	
Crossed West Limb.																					
Absolute heliographic longitude: 047																					
<i>Region 8183</i>																					
18 Mar	N22E58	291	0050	03	CRO	003	B													1	
19 Mar	N22E44	291	0080	08	CRO	006	B	4	1			4	3								
20 Mar	N23E30	292	0020	08	BXO	013	B														
21 Mar	N23E18	291	0050	09	BXO	011	B														
22 Mar	N22E06	290	0040	08	DRO	010	B	1				1									
												5	1	0	6	3	0	0	0	0	
Still on Disk.																					
Absolute heliographic longitude: 290																					
<i>Region 8184</i>																					
20 Mar	S18E46	276	0050	04	CSO	003	B														
21 Mar	S19E33	276	0040	06	DSO	003	B														
22 Mar	S20E20	276	0040	07	DSO	004	B														
												0	0	0	0	0	0	0	0	0	
Still on Disk.																					
Absolute heliographic longitude: 276																					



*Region Summary – continued.*

Date	Location		Sunspot Characteristics					Flares															
	( ° Lat ° CMD)	Helio	Area (10 <sup>6</sup> hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical												
		Lon						C	M	X	S	1	2	3	4								
<i>Region 8185</i>																							
20 Mar	S24E64	258	0000	00	AXX	001	A																
21 Mar	S24E71	238	0080	12	CSO	006	B						1										
22 Mar	S24E63	233	0350	16	FKI	015	B	1	1			5	1										
								1	1	0		6	1	0	0	0	0						
Still on Disk.																							
Absolute heliographic longitude: 233																							
<i>Region 8186</i>																							
22 Mar	N09W24	320	0010	01	BXO	002	B																
								0	0	0		0	0	0	0	0	0						
Still on Disk.																							
Absolute heliographic longitude: 320																							



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

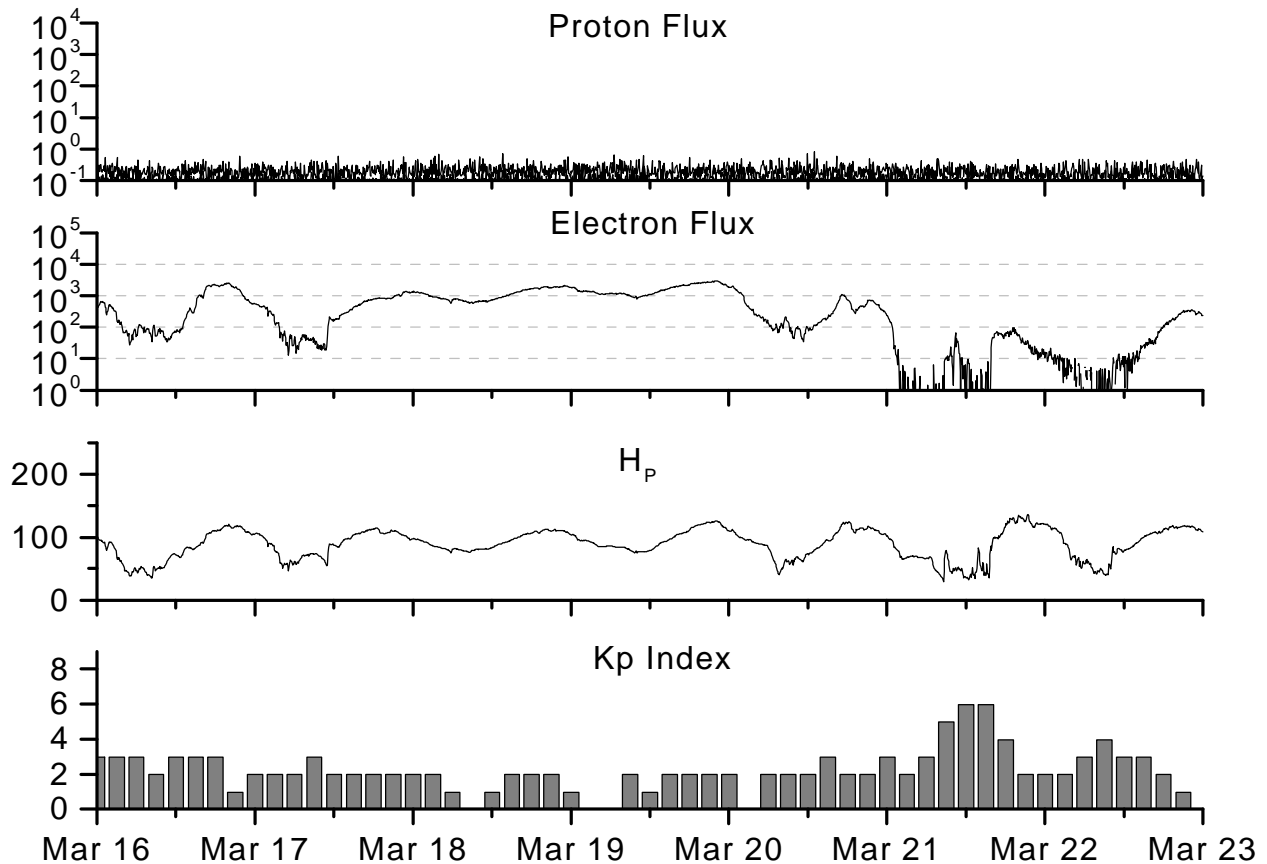
Month	Sunspot Numbers					Radio Flux		Geomagnetic	
	Observed SWO	values RI	Ratio RI/SWO	Smooth SWO	values RI	**Penticton 10.7 cm	Smooth Value	Planetary Ap	Smooth Value
<b>1996</b>									
March	12.1	09.2	0.76	15.4	09.7	72.7	72.1	11	09.9
April	08.5	04.8	0.56	13.6	08.5	69.3	71.6	11	09.7
May	11.8	05.5	0.47	12.9	08.0	72.1	71.4	07	09.5
June	18.8	11.8	0.63	13.5	08.5	69.6	71.8	05	09.4
July	13.2	08.2	0.62	13.4	08.4	71.2	72.0	07	09.3
August	20.5	14.4	0.70	13.1	08.3	72.4	72.1	09	09.4
September	02.9	01.6	0.55	13.3	08.4	69.4	72.3	15	09.3
October	02.3	00.9	0.39	14.0	08.8	69.2	72.6	13	09.1
November	26.7	17.9	0.67	15.4	09.8	78.7	73.0	08	09.1
December	21.1	13.3	0.63	16.2	10.4	77.8	73.3	07	09.3
<b>1997</b>									
January	09.0	05.7	0.63	16.5	10.5*	74.0	73.4	09	09.3*
February	11.3	07.6	0.67	17.4	11.0*	73.8	73.7	11	09.2*
March	14.4	08.7	0.60	20.4	13.5*	73.5	75.1*	08	09.0*
April	24.5	15.5	0.63	24.0	16.5*	74.5	76.8*	10	08.6*
May	28.6	18.5	0.65	26.4	18.4*	74.6	78.4*	08	08.6*
June	22.1	12.7	0.57	29.0	20.4*	71.7	80.1*	07	08.6*
July	17.0	10.5*	0.62*	32.4	22.7*	71.1	81.8*	06*	08.4*
August	36.7	24.7*	0.67*	35.9	25.2*	79.0	83.4*	08*	08.2*
September	52.8	51.3*	0.88*			96.2*		10*	
October	33.6	23.3*	0.69*			85.0*		10*	
November	53.5	39.3*	0.73*			99.5*		10*	
December	57.9	41.5*	0.72*			98.8*		05*	
<b>1998</b>									
January	51.8	32.3*	0.62*			93.5*		07*	
February	54.4	40.7*	0.75*			93.6*		07*	

\*Preliminary estimates.

The lowest smoothed sunspot indices 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.

\*\* From June 1991 onward, 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 16 March 1998*

*Protons* plot contains the five-minute averaged integral proton flux (protons/ cm<sup>2</sup>-sec-sr) as measured by GOES-9 (W135) for each of three energy thresholds: greater than 10, 50, and 100 MeV.

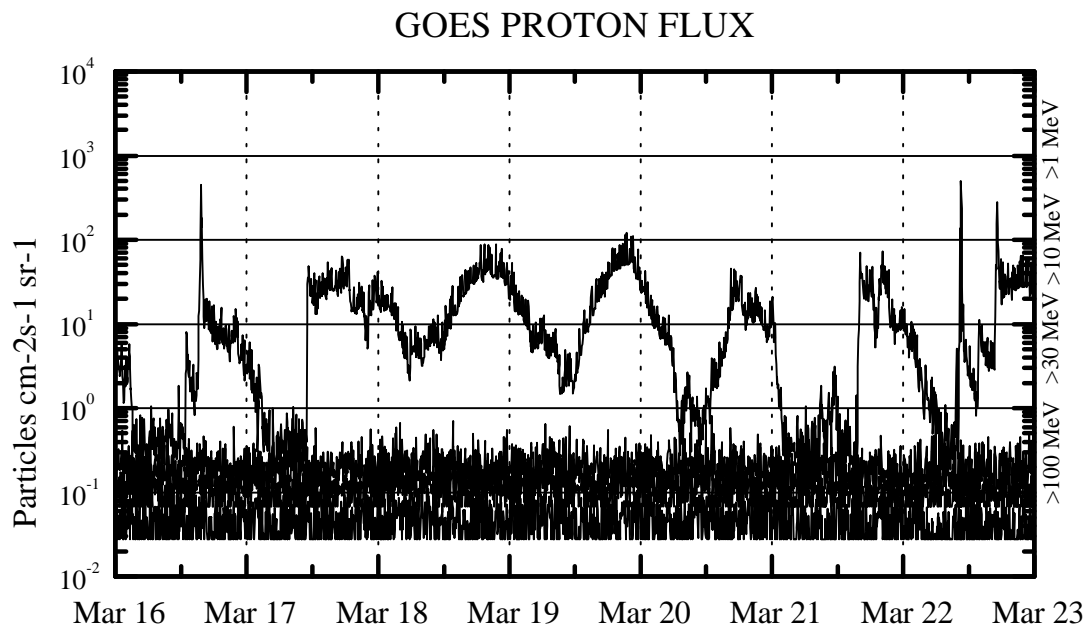
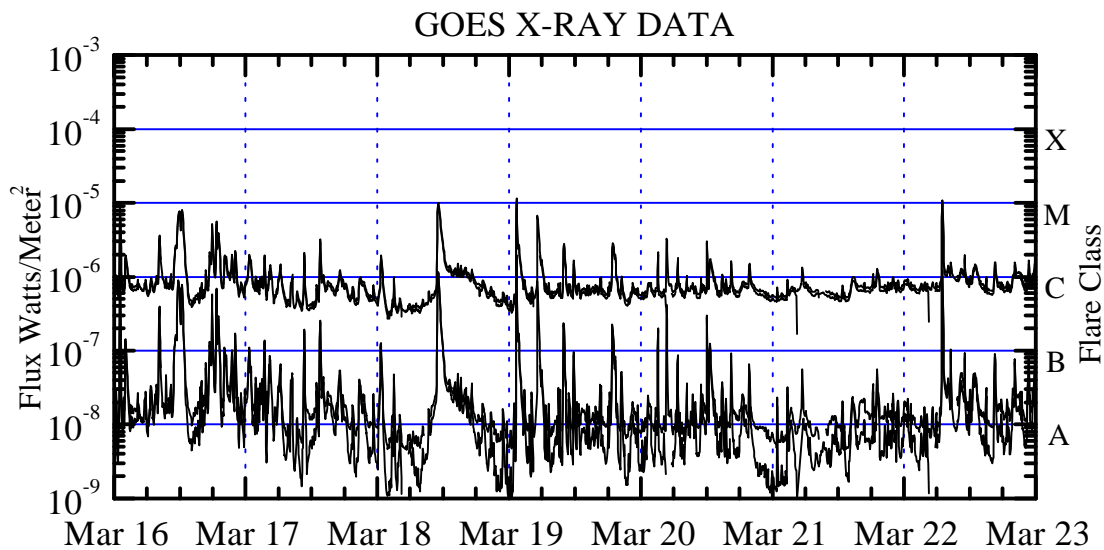
*Electrons* plot contains the five-minute averaged integral electron flux (electrons/ cm<sup>2</sup>-sec-sr) with energies greater than 2 MeV at GOES-9.

*H<sub>p</sub>* plot contains the five minute averaged magnetic field H component in nanoteslas (nT) as measured by GOES-9. The H component is parallel to the spin axis of the satellite, which is nearly parallel to the Earth's rotation axis.

*K<sub>p</sub>* plot contains the estimated planetary 3-hour K-index (derived by the USAF 55<sup>th</sup> 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 K<sub>p</sub> 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 K<sub>p</sub> are "global" parameters that are applicable to a first order approximation over large areas. H<sub>p</sub>parallel is subject to a more localized phenomena and the measurements generally are applicable to within a few degrees of longitude of the measuring satellite.





#### *Weekly GOES Satellite X-ray and Proton Plots*

Proton plot contains the five minute averaged integral proton flux (protons/cm<sup>2</sup>-sec-sr) as measured by GOES-9 (W135) for each of the energy thresholds: >1, >10, >30 and >100 MeV. P10 event threshold is 10 pfu (protons/cm<sup>2</sup>-sec-sr) at greater than 10 MeV.

X-ray plot contains five minute averaged x-ray flux (watts/m<sup>2</sup>) as measured by GOES 8 and 9 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.

