

Space Weather Highlights 02 - 08 April 2001

SWO PRF 1336
10 April 2001

Solar activity reached high levels for the third consecutive week! Region 9393 (N17, L = 151, class/area Fkc/2440 on 29 March) produced two X-class flares on 02 April while crossing the west limb. One of these flares, an X20 at 02/2151 UTC (X-ray peak estimated due to GOES SRS saturation), had the largest X-ray magnitude seen to date in Cycle 23. The X20 was associated with a 10,000 SFU Tenflare, a partial-halo CME, and a solar proton event (see the discussion below). Region 9393 also holds the distinction of being the largest sunspot group yet seen during Cycle 23. Region 9415 (S21, L - 001, class/area Eko/880 on 07 April) rotated into view just as Region 9393 was departing the disk. Region 9415 was an able successor to Region 9393: it produced three major flares during the period, the largest of which was an X5/Sf (optical flare designation uncertain) at 1921 UTC on 06 April (see the Energetic Event Summary for flare times). Halo CMEs were associated with each of these major flares. Region 9415 was also responsible for an M5 X-ray flare on 01 April, a day before it rotated into view. It is currently near center disk, classified as a large, magnetically complex (beta-gamma-delta) E-type spot group with a strong persistent delta magnetic configuration in its leader spots. Note: Region 9415 produced additional major flares during 09 - 10 April; details will be provided in next week's issue.

Data were available from the Advanced Composition Explorer (ACE) spacecraft for most of the period. Three CME passages occurred during the period associated with major flare activity in Regions 9393 and 9415. The first CME, likely associated with an X-class flare from Region 9393 on 02 April, reached the ACE spacecraft at 04/1422 UTC and caused abrupt increases in velocity, density, temperature, IMF field intensity, and IMF Bz variability. Solar wind speeds were as high as 800 km/sec with this passage. The second CME, likely associated with an M5 flare from Region 9415 on 05 April, reached ACE at 07/1700 UTC and caused relatively modest changes in velocity, density, temperature, and Bz. The third CME, associated with an X5 flare from Region 9415 on 06 April, reached ACE at 08/1034 UTC causing sudden increases in velocity (peak around 670 km/sec), IMF field intensity, temperature, Bz variability, and density.

Greater than 10 MeV and greater than 100 MeV proton events followed the X20 flare of 02 April. The greater than 10 MeV event began at 02/2340 UTC, reached a peak of 1110 PFU at 03/0740 UTC, and ended at 06/1340 UTC. The greater than 10 MeV proton flux remained at enhanced levels for the rest of the period. The greater than 100 MeV proton event began at 03/0120 UTC, reached a peak of 5.4 PFU at 03/0740 UTC, and ended at 03/2025 UTC.

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

The geomagnetic field was intermittently disturbed during the period due to the CME passages mentioned above. The 04 April passage caused unsettled to minor storm conditions during 04 - 05 April. Active to major storm conditions occurred during the CME passages on 07 - 08 April.

Space Weather Outlook 11 April - 07 May 2001

Solar activity is expected to range from moderate to high levels during the period. Region 9415 is expected to produce more major flares before it rotates to the far side of the Sun on 16 April. Isolated major flares will be possible during the rest of the period due to the expected return of active longitudes associated with old Region 9393 and Region 9415.

A solar proton event at greater than 10 MeV was in progress as the period ended and is expected to continue for the next two days. Additional proton events at greater than 10 and greater than 100 MeV will be possible 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 field activity is expected to be at active to major geomagnetic storm levels during 11 - 12 April in response to recent major flares and accompanying halo-CMEs from Region 9415. Quiet to active conditions are expected during the rest of the period.

Daily Solar Data

Date	Radio Flux 10.7 cm	Sun spot No.	Sunspot Area (10 ⁶ hemi.)	X-ray Background	Flares							
					X-ray Flux			Optical				
					C	M	X	S	1	2	3	4
02 April	228	223	2780	C6.5	2	4	3	12	3	0	0	0
03 April	223	228	2600	M2.0	3	2	1	8	1	1	0	0
04 April	205	217	1950	C2.6	5	3	0	7	3	0	0	0
05 April	210	214	1810	C1.7	1	5	0	8	0	1	0	0
06 April	192	136	1790	C3.3	3	0	1	6	0	0	0	0
07 April	180	153	1640	C1.5	5	0	0	2	0	0	0	0
08 April	169	188	1500	B6.2	0	0	0	1	0	0	0	0

Daily Particle Data

Date	Proton Fluence (protons/cm ² -day-sr)			Electron Fluence (electrons/cm ² -day-sr)		
	>1MeV	>10MeV	>100MeV	>.6MeV	>2MeV	>4Me
02 April	2.4E+6	1.6E+5	3.2E+3		1.3E+7	
03 April	8.2E+7	3.3E+7	2.1E+5		1.0E+7	
04 April	1.5E+8	1.3E+7	2.2E+4		2.2E+7	
05 April	5.5E+7	5.2E+6	4.7E+3		7.8E+6	
06 April	4.1E+7	1.1E+6	3.0E+3		9.8E+6	
07 April	6.9E+7	5.7E+5	2.9E+3		1.6E+7	
08 April	7.7E+7	2.8E+5	2.1E+3		6.2E+6	

Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	02 April	12	4-2-3-1-2-2-3-3	23	4-4-5-3-3-4-3-2	20
03 April	5	2-1-1-1-1-3-1-1	7	2-2-1-1-1-3-2-2	5	2-1-1-1-2-3-2-2
04 April	12	2-1-1-1-4-3-4-2	19	2-2-1-4-5-4-4-1	15	2-2-2-2-3-4-5-2
05 April	11	1-1-3-3-2-3-3-3	27	2-1-5-6-3-4-4-2	19	2-2-4-5-3-4-4-4
06 April	11	2-1-3-2-1-2-4-3	18	2-1-3-4-5-3-3-3	12	1-1-3-3-3-3-3-3
07 April	17	3-4-2-2-2-2-5-3	36	3-5-6-4-3-5-5-2	16	3-4-3-2-2-4-4-3
08 April	33	3-2-4-5-5-4-5-5	*	3-1-3-*.~*~*~*~*	41	3-1-4-6-6-4-5-5



Alerts and Warnings Issued

Date & Time of Issue	Type of Alert or Warning	Date & Time of Event UT
02 Apr 0000	K= 4 Observed	01 Apr 2100 - 0000
02 Apr 0002	ENDED A >= 30 Observed	31 Mar 0600
02 Apr 0049	1- 245 MHz Burst	01 Apr
02 Apr 0049	245 MHz Noise Storm	01 Apr
02 Apr 0904	ENDED A >= 20 Observed	31 Mar 0300
02 Apr 1035	X-Ray event X1.4/1B	02 Apr 1014
02 Apr 1145	Type II Radio Emission	02 Apr 1110
02 Apr 1200	A >=20 Observed	02 Apr 1200
02 Apr 1232	X-Ray event X1.1/0F	02 Apr 1136
02 Apr 1242	Type IV Radio Emission	02 Apr 1119
02 Apr 1256	Proton Event >10MeV >=10pfu Warning	02/1300 - 03/1500 Apr
02 Apr 1301	10cm Radio Burst 670 F.U.	02 Apr 1100
02 Apr 2209	Type II Radio Emission	02 Apr 2151
02 Apr 2255	X-Ray event X17	02 Apr 2150
02 Apr 2344	10cm Radio Burst 11000 F.U.	02 Apr 2248
02 Apr 2353	Protons Event >10 MeV >=10pfu	02 Apr 2340
03 Apr 0019	6 - 245 MHz Bursts	02 Apr
03 Apr 0019	245 MHz Noise Storm	02 Apr
03 Apr 0035	Proton event >100 MeV >1pfu Warning	03 Apr 0045 - 1500
03 Apr 0138	Proton event >100 MeV >1pfu	03 Apr 0120
03 Apr 0204	K= 4 Observed	02 Apr 2100 - 2400
03 Apr 0301	ENDED A >=20 Observed	02 Apr 1200
03 Apr 0353	Type IV Radio Emission	03 Apr 0321
03 Apr 0446	10cm Radio Burst 3300 F.U.	03 Apr 0341
03 Apr 0459	X-Ray event X1	03 Apr 0357
03 Apr 1451	CONTINUED Proton event >100 MeV >1pfu Warning	03 Apr 0045 - 1800
03 Apr 1457	CONTINUED Proton Event >10MeV >=10pfu Warning	02/1300 - 03/1800 Apr
03 Apr 1633	A >=30 Watch	04 Apr
03 Apr 1637	A >=30 Watch	05 Apr
03 Apr 1643	A >=20 Watch	06 Apr
03 Apr 2315	Continued Proton Event >10MeV >=10pfu Warning	02 Apr 1300 to 04/2100
04 Apr 0036	3 - 245 MHz Bursts	03 Apr
04 Apr 0036	245 MHz Noise Storms	03 Apr
04 Apr 0100	CONTINUED Protons Event >10 MeV >=10pfu	02 Apr 2340
04 Apr 0053	ENDED Proton event >100 MeV >1pfu	03 Apr 0120
04 Apr 1020	10cm Radio Burst 360 F.U.	04 Apr 0932
04 Apr 1502	Sudden Impulse observed at Boulder	04 Apr 1455
04 Apr 1506	K= 4 Observed	04 Apr 1200 - 1500
04 Apr 1509	K= 4 Warning	04/1510 - 05/2359 Apr
04 Apr 1534	K= 5 Warning	04 Apr 1535 - 2359
04 Apr 1803	K= 5 Observed	04 Apr 1500 - 1800
05 Apr 0020	4 - 245 MHz Bursts	04 Apr
05 Apr 0020	245 MHz Noise Storm	04 Apr
05 Apr 0111	CONTINUED Protons Event >10 MeV >=10pfu	02 Apr 2340
05 Apr 0856	K= 4 Observed	05 Apr 0600 - 0900

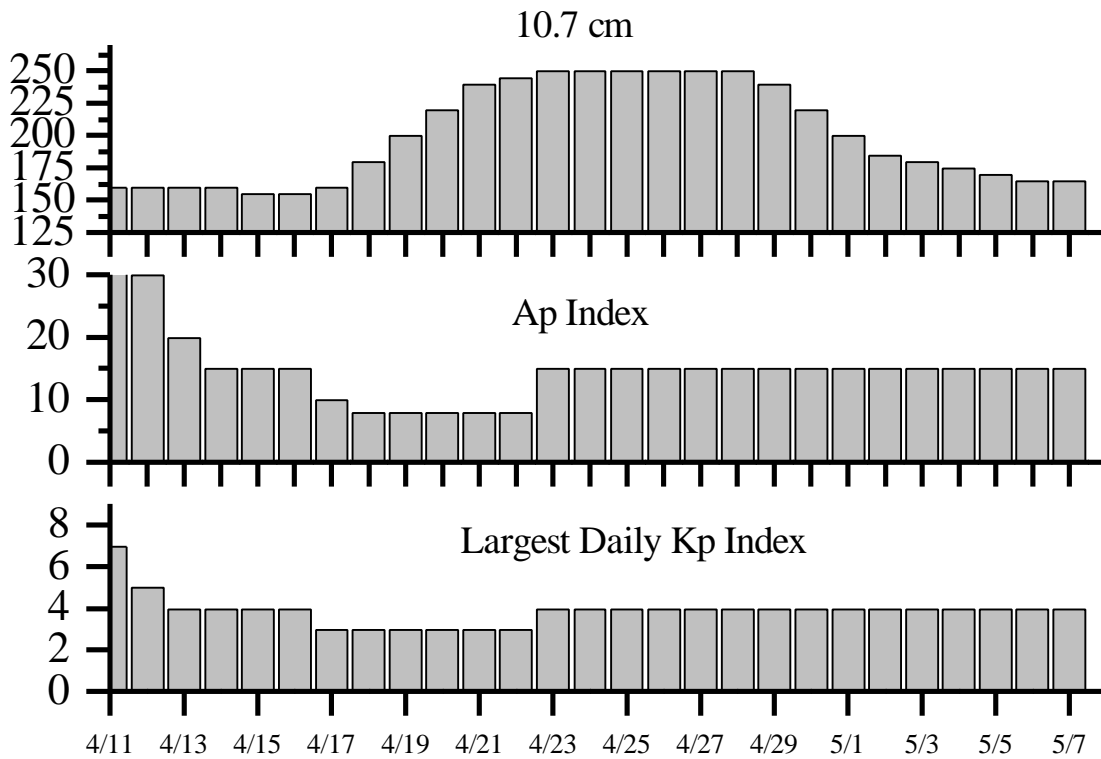


Alerts and Warnings Issued – continued.

Date & Time of Issue	Type of Alert or Warning	Date & Time of Event UT
05 Apr 0857	A ≥ 20 Observed	05 Apr 0900
05 Apr 1003	X-Ray event M8.4	05 Apr 0922
05 Apr 1022	10cm Radio Burst 980 F.U.	05 Apr 0848
05 Apr 1825	X-Ray event M5.1/2f/S22E47	05 Apr 1725
05 Apr 1826	10cm Radio Burst 2800 F.U.	05 Apr 1826
05 Apr 1828	Type IV Radio Emission	05 Apr 1705
05 Apr 2133	ENDED A ≥ 20 Observed	05 Apr 0900
05 Apr 2250	10cm Radio Burst 700 F.U.	05 Apr 2016
06 Apr 0036	2 – 245 MHz Bursts	05 Apr
06 Apr 0036	245 MHz Noise Storm	05 Apr
06 Apr 0100	CONTINUED Protons Event >10 MeV ≥ 10 pfu	02 Apr 2340
06 Apr 1935	X-Ray event X5.6	06 Apr 1921
06 Apr 2036	10cm Radio Burst 3300 F.U.	06 Apr 2034
06 Apr 2201	ENDED Protons Event >10 MeV ≥ 10 pfu	02 Apr 2340
06 Apr 2202	Proton Event >10 MeV ≥ 10 pfu Warning	07 Apr 0000 - 2359
06 Apr 2247	K= 4 Warning	06/2250 - 07/1500 Apr
06 Apr 2350	K= 5 Warning	06/2350 - 07 /1500 Apr
07 Apr 0001	K= 5 Observed	06 Apr 2100 - 0000
07 Apr 0018	8 – 245 MHz Bursts	06 Apr
07 Apr 0018	245 MHz Noise Storm	06 Apr
07 Apr 0600	A ≥ 20 Observed	07 Apr 0600
07 Apr 1706	K= 4 Warning	07 Apr 1710 - 09 Apr 1500
07 Apr 1801	K= 4 Observed	07 Apr 1500 - 1800
07 Apr 1942	K= 5 Warning	07 Apr 1945 - 08 Apr 0000
07 Apr 2018	A ≥ 20 Watch	08 Apr
07 Apr 2021	A ≥ 20 Watch	09 Apr
07 Apr 2059	K= 5 Observed	07 Apr 1800 - 2100
07 Apr 2355	EXTENDED K= 5 Warning	07/1945 - 08/1500 Apr
08 Apr 0125	245 MHz Noise Storm	07 Apr
08 Apr 0601	ENDED A ≥ 20 Observed	07 Apr 0600
08 Apr 0900	A ≥ 20 Observed	08 Apr 0900
08 Apr 1128	Sudden Impulse observed at Boulder	08 Apr 1101
08 Apr 1457	EXTENDED K= 5 Warning	07/1945 - 08/2359 Apr
08 Apr 1746	CANCELLED K= 5 Warning	07/1945 - 08/0000 Apr
08 Apr 2036	K= 5 Warning	08/2040 - 09/0300 Apr
08 Apr 2048	A ≥ 30 Warning	08/2050 - 09/1200 Apr
08 Apr 2059	K= 5 Observed	08 Apr 1800 - 2100
08 Apr 2102	A ≥ 30 Observed	08 Apr 2102
08 Apr 2121	K ≥ 6 Warning	08/2125 - 09/0300 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
11 Apr	160	60	7	25 Apr	250	15	4
12	160	30	5	26	250	15	4
13	160	20	4	27	250	15	4
14	160	15	4	28	250	15	4
15	155	15	4	29	240	15	4
16	155	15	4	30	220	15	4
17	160	10	3	01 May	200	15	4
18	180	8	3	02	185	15	4
19	200	8	3	03	180	15	4
20	220	8	3	04	175	15	4
21	240	8	3	05	170	15	4
22	245	8	3	06	165	15	4
23	250	15	4	07	165	15	4
24	250	15	4				



Energetic Events

Date	Time		X-ray		Optical Information			Peak		Sweep Freq		
	Begin	Max	½ Max	Class	Integ Flux	Imp/ Brtns	Location		Radio Flux		Intensity	
							Lat	CMD	245	2695	II	IV
02 Apr	0014	0028	0040	M3.2	.038	SF	N17W57	9393	190			
02 Apr	0525	0528	0532	M1.0	.004	SF	N13W63	9393	42			
02 Apr	0945	0952	0959	M1.9	.013	SF	N15W64	9393				
02 Apr	1004	1014	1020	X1.4	.086	1B	N17W60	9393	140			
02 Apr	1058	1136	1205	X1.1	.300				280	670	1	2
02 Apr	1808	1850	1920	M2.1	.057	1F	N19W72	9393	53			
02 Apr	2132	2151	2203	X20	1.500			9393	45000	10000	3	
03 Apr	0325	0357	0455	X1.2	.400	1N	S21E83	9415	470	3300		1
03 Apr	1229	1234	1238	M2.4	.009	2F	N15W88	9393	31			
03 Apr	2317	2351	0004	M1.1	.028							
04 Apr	0941	1027	1111	M1.6	.059	SF	S21E68	9415	360			
04 Apr	1152	1159	1203	M1.1	.006	SF	N28W67	9401				
04 Apr	1212	1222	1230	M2.0	.017							
05 Apr	0200	0220	0311	M3.1	.096							
05 Apr	0510	0518	0527	M1.1	.009							
05 Apr	0757	0834	0836	M1.2	.016	SN	S08E35	9417	1374			
05 Apr	0837	0922	0954	M8.4	.260				75	980		
05 Apr	1657	1725	1814	M5.1	.200	2N	S24E50	9415	1000	2800	1	
06 Apr	1910	1921	1931	X5.6	.410	SF	S21E31	9415	250000	3300		

Flare List

Date	Time			X-ray Class.	Imp / Brtns	Optical		Rgn
	Begin	Max	End			Location	Lat CMD	
02 April	0017	U0017	A0021	M3.2	SF	N17W57	9393	
	0406	0407	0417	C5.5	SF	N11W63	9393	
	0522	0527	0538	M1.0	SF	N13W63	9393	
	0556	0557	0608		SF	N18W62	9393	
	0645	0649	0733		SF	N18W56	9393	
	0734	0738	0749		SF	N16W58	9393	
	0801	0802	0820		SF	N15W58	9393	
	0858	0926	0940	C8.5	1F	N17W62	9393	
	0946	0950	1000	M1.9	SF	N15W64	9393	
	1005	1007	1625	X1.4	1B	N17W60	9393	
	1058	1136	1205	X1.1				
	1344	1344	1355		SF	N17W61	9393	
	1357	U1423	A1434		SF	N18W60	9393	
	1517	1520	1559		SF	N20W62	9393	
	1815	1841	1917	M2.1	1F	N19W72	9393	
	2132	2151	2203	X20			9393	
03 April	B2312	U2312	2318		SF	N17W78	9393	
	0204	0212	0218		SF	S11W33	9408	
	0314	0346	0516	X1.2	1N	S21E83	9415	
	0455	0500	0505		SF	N13W78	9393	



Flare List – continued.

Date	Time			X-ray Class.	Optical		Rgn
	Begin	Max	End		Imp / Brtns	Location Lat CMD	
03 April	0653	0658	0720		SF	N16W72	9393
	0703	0705	0712		SF	S20E86	9415
	0733	0735	0744		SF	N17W11	
	0917	0920	0930		SF	S10W56	9397
	1228	1234	1248	M2.4	2F	N15W88	9393
	1647	1703	1713	C7.1			
	1735	1740	1759	C8.5	SF	N27W54	9401
	1846	1852	1900	C5.5			
	2317	2351	0004	M1.1			
	2323	2326	2333		SF	S22E70	9415
04 April	0210	0210	0215		SF	S20E80	9415
	0327	0330	0333	C3.2			
	0345	0349	0353	C6.4			
	0442	0445	0457		SF	S19E73	9415
	0507	0512	0520	C5.6	1F	S19E71	9415
	0526	0536	0547		SF	N25W61	9401
04 April	0639	0641	0652	C8.7	1F	N15W88	9393
	0719	0720	0723		SF	S22E73	9415
	0750	0754	0757	C3.2			
	0925	0927	0938		SF	S20E67	9415
	0959	1027	1058	M1.6	SF	S21E68	9415
	1154	1156	1207	M1.1	SF	N28W67	9401
	1212	1222	1230	M2.0			
	1930	1935	1948		1F	N29W72	9401
05 April	0129	0134	0143	C4.4			
	0200	0220	0311	M3.1			
	0225	0237	0241		SF	N26E70	9418
	0458	0458	0508		SF	S20E58	9415
	0510	0518	0527	M1.1			
	0524	0526	0528		SF	N22W74	9401
	0542	0542	0547		SF	N26E65	9418
	0556	0557	0603		SF	S19E63	9415
	0733	0734	0746		SF	N22W76	9401
	B0832	U0834	0900	M1.2	SN	S08E35	9417
	0837	0922	0954	M8.4			
	1633	1701	1849	M5.1	2N	S24E50	9415
06 April	2311	2327	2343		SF	N28E61	9418
	0147	0148	0207	C7.7	SN	S24E44	9415
	0842	0852	0900		SF	N22W76	9401
	1724	1730	1818	C5	SF	S19E32	9415
	1812	1813	1850	C7	SF	S12E17	9417



Flare List – continued.

Date	Time			X-ray Class.	Imp / Brtns	Optical	Rgn
	Begin	Max	End			Location Lat CMD	
06 April	2036	2036	2042	X5.6	SF	S21E31	9415
	2229	2231	2237			S19E33	
07 April	0930	0935	0942	C2.0	SF	S08E11	9417
	1034	1039	1049	C2.3			
	1109	1005	1131	C1.2			
	1352	1402	1410	C1.2	SF	S24E20	9415
	1854	1007	1922	C1.2			
08 April	0254	0254	0301		SF	S12W08	9417

Region Summary

Date	Location		Sunspot Characteristics				Flares											
	(° Lat ° CMD)	Helio	Area (10 ⁶ hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical							
		Lon						C	M	X	S	1	2	3	4			
<i>Region 9393</i>																		
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						
02 Apr	N16W70	155	1810	22	FKC	040	BGD	2	4	2	12	3						
03 Apr	N18W82	153	1080	17	FKC	017	BGD		1		2				1			
04 Apr	N18W94	152	0280	05	DSO	003	B	1						1				
								28	24	3	10	1	2	0	0			

Crossed West Limb.

Absolute heliographic longitude: 151



Region Summary - continued.

Date	Location		Sunspot Characteristics				Flares							
	(° Lat ° CMD)	Helio	Area (10 ⁶ hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical			
		Lon						C	M	X	S	1	2	3

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															
02 Apr	N08W72	157															

0 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 156

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										
02 Apr	S13W60	145	0020	01	HSX	001	A										
03 Apr	S12W72	143	0010	00	AXX	001	A										
04 Apr	S13W85	143	0000	00	AXX	001	A										

0 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 143



Region Summary - continued.

Date	Location		Sunspot Characteristics					Flares															
	(° Lat ° CMD)	Helio	Area (10 ⁶ hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical												
		Lon						C	M	X	S	1	2	3	4								
<i>Region 9397</i>																							
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																
02 Apr	S08W48	133	0080	12	CAO	009	B																
03 Apr	S07W65	136	0060	07	DAO	005	B						1										
04 Apr	S07W78	136	0030	01	HSX	001	A																
05 Apr	S09W93	138	0030	01	HSX	001	A																
								4	1	0	20	0	0	0	0	0	0	0	0				

Crossed West Limb.

Absolute heliographic longitude: 131

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												
02 Apr	N21W52	137	0140	18	CAO	013	BG												
03 Apr	N25W58	129	0160	05	CAO	006	B	1				1							
04 Apr	N24W70	128	0100	04	DAO	003	B			1		2	1						
05 Apr	N24W84	129	0100	05	DAO	004	B			1		2							
								7	5	0	29	5	0	0	0	0	0	0	

Crossed West Limb.

Absolute heliographic longitude: 134



Region Summary - continued.

Date	Location		Sunspot Characteristics				Flares							
	(° Lat ° CMD)	Helio	Area (10 ⁶ hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical			
		Lon						C	M	X	S	1	2	3

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										
02 Apr	N27E04	081	0200	03	HAX	002	A										
03 Apr	N26W09	080	0160	03	HSX	002	A										
04 Apr	N27W22	080	0190	03	HAX	002	A										
05 Apr	N29W35	080	0140	04	CAO	003	B										
06 Apr	N28W50	082	0160	07	CSO	004	B										
07 Apr	N27W60	079	0150	03	HAX	001	A										
08 Apr	N27W73	079	0120	02	HAX	002	A										

0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 081

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										
02 Apr	N12W01	086	0080	02	HSX	002	A										
03 Apr	N13W15	086	0100	04	CSO	004	B										
04 Apr	N11W28	086	0060	02	HSX	001	A										
05 Apr	N11W41	086	0090	06	CSO	002	B										
06 Apr	N11W54	086	0050	07	CSO	003	B										
07 Apr	N11W68	087	0100	02	HSX	001	A										
08 Apr	N11W81	087	0070	02	HSX	001	A										

0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 086



Region Summary - continued.

Date	Location		Sunspot Characteristics				Flares							
	° Lat ° CMD	Helio	Area (10 ⁶ hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical			
		Lon						C	M	X	S	1	2	3

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											
02 Apr	S09W31	116	0310	14	EKI	024	BG											
03 Apr	S08W46	117	0360	12	EKI	020	BG					1						
04 Apr	S08W59	117	0300	11	EAO	013	B											
05 Apr	S09W74	119	0260	11	EAO	010	B											
06 Apr	S09W88	120	0160	03	HAX	002	A											
										0	0	0	4	0	0	0	0	0

Crossed West Limb.

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											
02 Apr	S36E05	080																
03 Apr	S36W08	080																
04 Apr	S36W21	080																
05 Apr	S36W34	080																
06 Apr	S36W47	080																
07 Apr	S36W60	080																
08 Apr	S36W73	080																
										0	0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 080



Region Summary - continued.

Date	Location		Sunspot Characteristics				Flares							
	(° Lat ° CMD)	Helio	Area (10 ⁶ hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical			
		Lon						C	M	X	S	1	2	3

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											
02 Apr	N08E08	077																
03 Apr	N08W05	077																
04 Apr	N08W18	077																
05 Apr	N08W31	077																
06 Apr	N08W44	077																
07 Apr	N08W57	077																
08 Apr	N08W70	077																

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											
02 Apr	S13E38	047	0040	01	HAX	002	A											
03 Apr	S15E25	046	0010	01	AXX	002	A											
04 Apr	S14E12	046	0010	00	AXX	001	A											
05 Apr	S14W01	046	0000	00	AXX	001	A											
06 Apr	S16W13	045	0010	03	BXO	002	B											
07 Apr	S16W26	045																
08 Apr	S16W39	045																

Still on Disk.

Absolute heliographic longitude: 046

Region 9413

01 Apr	N09W17	115	0020	04	CAO	004	B											
02 Apr	N10W30	115	0030	05	DSO	007	B											
03 Apr	N11W44	115	0110	06	CAO	009	B											
04 Apr	N11W57	115	0110	06	CAO	007	B											
05 Apr	N10W71	116	0130	07	DAO	006	B											
06 Apr	N10W86	118	0100	03	HAX	001	A											

Crossed West Limb.

Absolute heliographic longitude: 115



Region Summary - continued.

Date	Location		Sunspot Characteristics				Flares							
	(° Lat ° CMD)	Helio	Area (10 ⁶ hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical			
		Lon						C	M	X	S	1	2	3

Region 9414

02 Apr	S21E58	027	0020	01	HSX	001	A												
03 Apr	S23E44	027	0010	01	AXX	001	A												
04 Apr	S22E31	027	0010	00	AXX	001	A												
05 Apr	S23E20	025	0000	00	AXX	001	A												
06 Apr	S23E07	025																	
07 Apr	S23W06	025																	
08 Apr	S23W19	025																	

0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 025

Region 9415

03 Apr	S22E72	359	0470	10	DKO	005	B				1	2	1						
04 Apr	S21E60	358	0680	10	DKO	009	B	1	1			5	1						
05 Apr	S21E47	358	0710	10	DKI	019	BG		1			2		1					
06 Apr	S21E33	359	0860	10	DKO	011	BG	2			1	4							
07 Apr	S21E21	358	0880	11	EKO	023	BG	1				1							
08 Apr	S21E05	001	0790	12	EKO	034	BGD												

4 2 2 14 2 1 0 0

Still on Disk.

Absolute heliographic longitude: 001

Region 9416

03 Apr	N17W18	089	0040	06	DSO	006	B												
04 Apr	N17W32	090	0040	07	DSO	006	B												
05 Apr	N17W46	091	0030	07	CRO	004	B												
06 Apr	N17W59	091																	
07 Apr	N17W72	091																	
08 Apr	N17W85	091																	

0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 089

Region 9417

03 Apr	S10E43	028	0000	00	AXX	001	A												
04 Apr	S09E33	025	0000	00	AXX	001	A												
05 Apr	S08E27	018	0050	06	DSO	013	B		1			1							
06 Apr	S08E14	018	0180	07	DAO	013	B	1				1							
07 Apr	S08E01	018	0160	09	DAO	020	B	1				1							
08 Apr	S09W12	018	0140	09	DAO	021	B					1							

2 1 0 4 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 018



Region Summary - continued.

Date	Location		Sunspot Characteristics				Flares							
	(° Lat ° CMD)	Helio Lon	Area (10 ⁶ hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical			
								C	M	X	S	1	2	3

Region 9418

04 Apr	N23E69	349	0130	02	HSX	001	A											
05 Apr	N27E58	347	0230	11	EAO	008	B		1			3						
06 Apr	N27E45	347	0200	10	DAO	008	B											
07 Apr	N26E32	347	0210	11	EAO	011	B											
08 Apr	N27E19	347	0230	12	EAO	019	B											
									0	1	0	3	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 347

Region 9419

04 Apr	N08W08	066	0010	04	CSO	005	B											
05 Apr	N10W33	078	0000	00	AXX	001	A											
06 Apr	N10W46	078	0000	00		000												
07 Apr	N08W51	070	0010	01	AXX	002	A											
08 Apr	N08W64	070																
									0	0	0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 066

Region 9420

05 Apr	S08E76	329	0040	03	HSX	001	A											
06 Apr	S06E62	330	0070	02	HSX	002	A											
07 Apr	S07E49	330	0070	01	HSX	002	A											
08 Apr	S06E36	330	0080	02	HSX	001	A											
									0	0	0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 330

Region 9421

07 Apr	S15W42	061	0010	04	CSO	002	B											
08 Apr	S16W57	063	0020	01	HSX	001	A											
									0	0	0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 061

Region 9422

07 Apr	S13E78	301	0050	02	HAX	001	A											
08 Apr	S12E64	302	0050	02	HSX	001	A											
									0	0	0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 302



Region Summary - continued.

Location		Sunspot Characteristics					Flares							
Date	(° Lat ° CMD)	Helio Lon	Area (10 ⁶ hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical			
							C	M	X	S	1	2	3	4
<i>Region 9423</i>														
08 Apr	N21E03	003	0000	01	BXO	003	B							
								0	0	0	0	0	0	0
Still on Disk.														
Absolute heliographic longitude: 003														
<i>Region 9424</i>														
08 Apr	S16E34	332	0000	04	BXO	005	B							
								0	0	0	0	0	0	0
Still on Disk.														
Absolute heliographic longitude: 332														

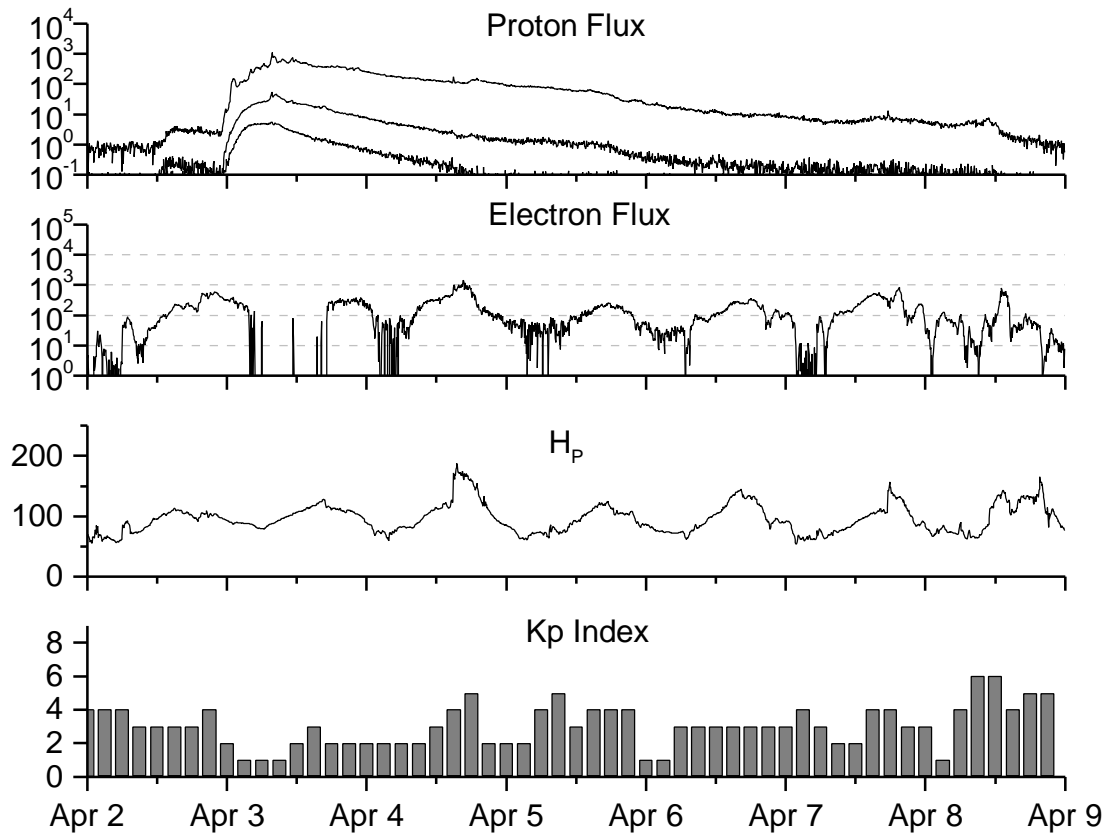


**Recent Solar Indices (preliminary)
of the observed monthly mean values**

Month	Sunspot Numbers			Radio Flux		Geomagnetic			
	Observed values SWO	Ratio RI	Ratio RI/SWO	Smooth values SWO	Smooth values RI	*Penticton 10.7 cm	Smooth Value	Planetary Ap	Smooth 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 02 April 2001*

Protons plot contains the five-minute averaged integral proton flux (protons/cm²-sec -sr) as measured by GOES-8 (W75) for each of three energy thresholds: greater than 10, 50, and 100 MeV.

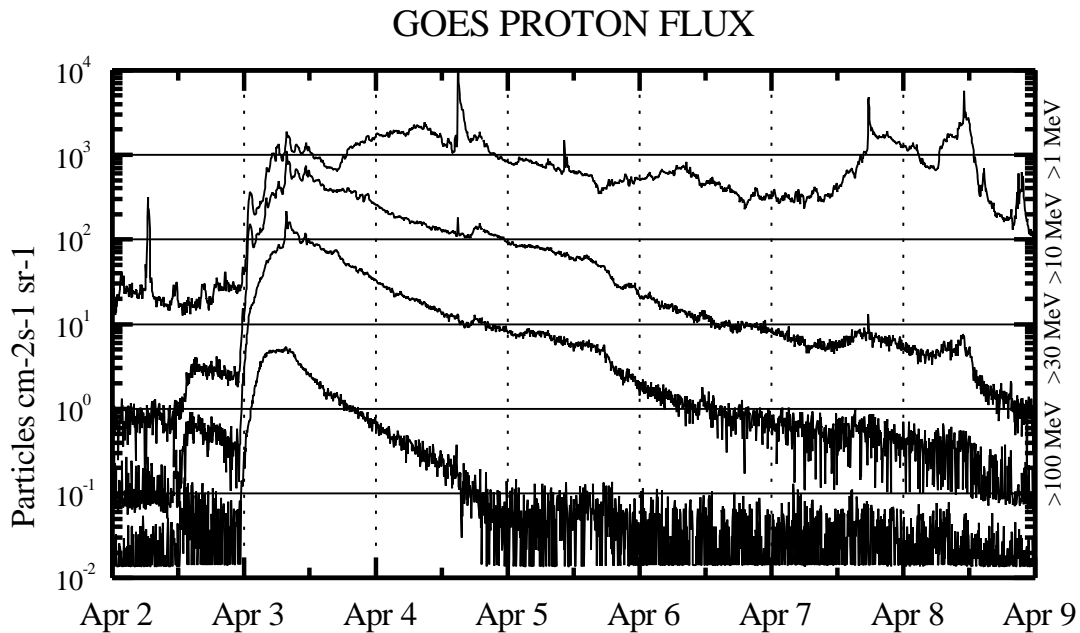
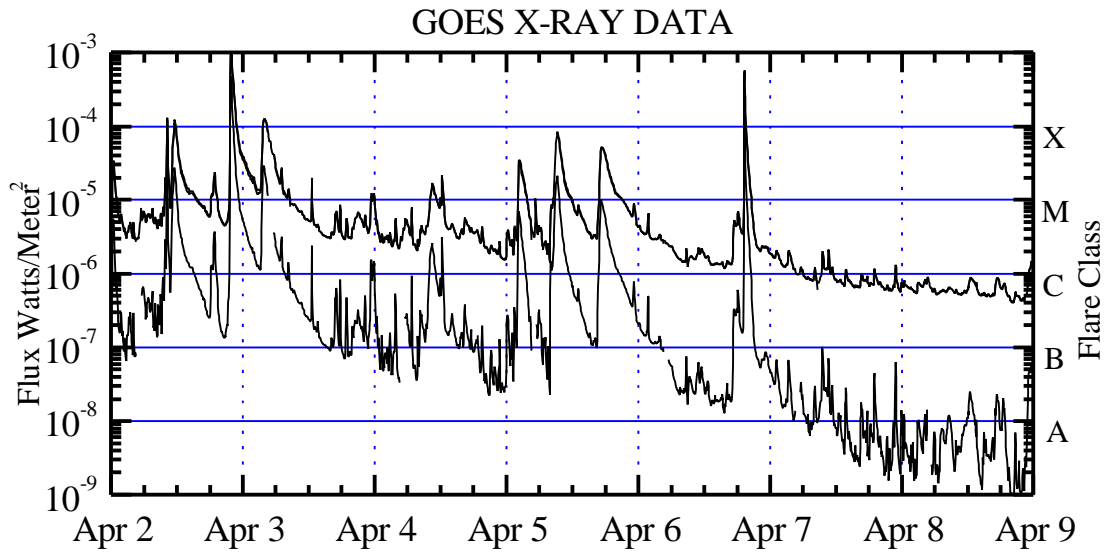
Electrons plot contains the five-minute averaged integral electron flux (electrons/cm²-sec -sr) with energies greater than 2 MeV at GOES-8.

H_p 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.

K_p 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 K_p 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_p are “ global ” parameters that are applicable to a first order approximation over large areas. H_p is subject to 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

X-ray plot contains five-minute averaged x-ray flux (watts/m²) 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/cm²-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/cm²-sec-sr) at greater than 10 MeV.

