

Solar activity ranged from very low to moderate this summary period. Region 588 (S15, L=315, class/area, Dao/170 on 05 April) produced a majority of this period's activity, 7 C-class and two M-class flares. The largest of the M-class flares was an M2.4/Sf at 06/1328 UTC with an associated full-halo CME (estimated plane-of-sky speed of 1050 km/s). This non Earth-directed CME provided a glancing blow to Earth's geomagnetic field early on 09 April. Region 588 produced a C7.4/Sf at 08/1019 UTC. An associated Earth-directed, full-halo CME was observed on LASCO imagery. Impacts from this CME were felt at the NASA Advanced Composition Explorer (ACE) spacecraft late on 10 April. At 09/2040 UTC, a C2.8/Sf was observed from Region 588 and produced a third CME (Earth-directed). Late in the summary period, Region 588 produced a C9.6/1f at 11/0419 UTC with an associated filament eruption. Moderate radio bursts accompanied this flare including a 920 sfu tenflare. A CME was observed on LASCO imagery with an Earthward directed component. Since the start of the summary period, Region 588 exhibited significant decay, but maintained a reverse polarity magnetic configuration.

Solar wind data were available from the ACE spacecraft during most of the summary period. The period began with wind speeds near 375 km/s. By midday on 05 April, speeds gradually increased as Earth's geomagnetic field came under the influence of a corotating interaction region. Solar wind speeds continued to increase, topping out at 650 km/s midday on 06 April as a recurrent coronal hole moved into geoeffective position. Speeds began decaying early on the 7th and had died down to 450 km/s by early on 09 April. During this period, fluctuations in the IMF were weak, not varying much beyond +/- 5 nT. On 09/0147 UTC, solar wind speed increased again and peaked near 570 km/s by 09/0500 UTC; this in response to the 06 April M2.4 flare and associated CME. The storm was short-lived and ended by 09/0900 UTC. The IMF Bz stayed mostly northward during this period. Wind speed gradually declined to near 400 km/s when at 10/1925 UTC, a sharp discontinuity in solar wind plasma and IMF measurements occurred. This was likely the shock associated with the C7.4 flare and CME on 08 April. Wind speeds following the shock peaked near 540 km/s, but the IMF Bz stayed mostly northward.

On 11 April, the greater than 10 MeV protons reached event threshold at 1135 UTC and hit a maximum flux of 35 pfu at 1845 UTC. Flux levels decayed below event levels at 12/0405 UTC. The most likely source of this event was the C9.6/1f flare on 11 April.

The greater than 2 MeV electron flux at geosynchronous orbit was at high levels on 06 to 09 April and again on 11 April.

The geomagnetic field ranged from quiet to minor storm levels. For the first half of the summary period, mostly quiet to active conditions were observed with one isolated period of minor storming recorded at high latitudes late on 05 April. A high-speed solar wind stream associated with a geoeffective coronal hole was responsible for this period of activity. Active to minor storm levels were recorded on 09 April as a result of the full-halo CME from 06 April. Quiet to unsettled levels rounded out the remainder of the summary period.

Space Weather Outlook

14 April - 10 May 2004

Solar activity levels are expected to range from very low to low throughout the forecast period. Isolated moderate activity are possible from new Region 592 (old Region 574) and returning old Regions 581, 582 and 588.

No greater than 10 MeV proton events are expected during the period.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to reach high levels from 24 – 26 April and 03 – 07 May due to recurrent coronal hole high-speed streams.

The geomagnetic field is expected to range from quiet to minor storm levels. Unsettled to active conditions are expected on 23 – 25 April due to a weak coronal hole high-speed stream.



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	
05 April	109	85	520	B1.7	0	1	0	0	1	0	0	0	0
06 April	101	66	280	B1.4	1	1	0	3	0	0	0	0	0
07 April	98	57	210	B1.1	0	0	0	0	0	0	0	0	0
08 April	94	33	160	B1.3	3	0	0	1	0	0	0	0	0
09 April	90	18	120	A6.9	1	0	0	1	0	0	0	0	0
10 April	88	20	150	A7.5	0	0	0	1	0	0	0	0	0
11 April	90	16	90	A6.5	3	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	>4MeV
	05 April	5.9E+5	1.3E+4	2.6E+3		8.5E+5
06 April	8.1E+5	1.2E+4	2.6E+3		3.3E+7	
07 April	6.0E+5	1.2E+4	2.7E+3		3.3E+8	
08 April	5.7E+5	1.4E+4	2.8E+3		2.6E+8	
09 April	1.8E+6	1.4E+4	2.8E+3		1.1E+8	
10 April	1.9E+6	1.5E+4	3.0E+3		1.4E+8	
11 April	1.8E+7	1.0E+6	3.5E+3		2.5E+7	

Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	05 April	9	1-1-0-1-3-2-4-3	38	0-0-0-2-5-6-7-4	14
06 April	17	5-3-3-4-3-1-2-2	39	4-4-6-6-6-2-2-2	21	4-4-4-4-4-2-3-2
07 April	7	2-3-2-1-1-2-2-2	14	2-3-4-4-3-2-2-2	10	3-3-3-2-2-2-2-3
08 April	16	5-3-3-3-3-2-2-1	30	3-3-5-6-5-4-2-1	16	2-4-4-4-3-3-2-2
09 April	11	3-3-4-2-2-1-2-2	25	3-5-5-5-3-3-2-1	16	3-5-4-3-2-2-2-2
10 April	10	3-2-3-1-1-1-3-3	17	1-2-5-4-3-1-3-3	10	3-3-3-2-2-2-3-3
11 April	6	3-2-2-1-1-1-2-1	10	2-1-3-4-2-2-1-2	8	3-2-3-2-2-2-2-2

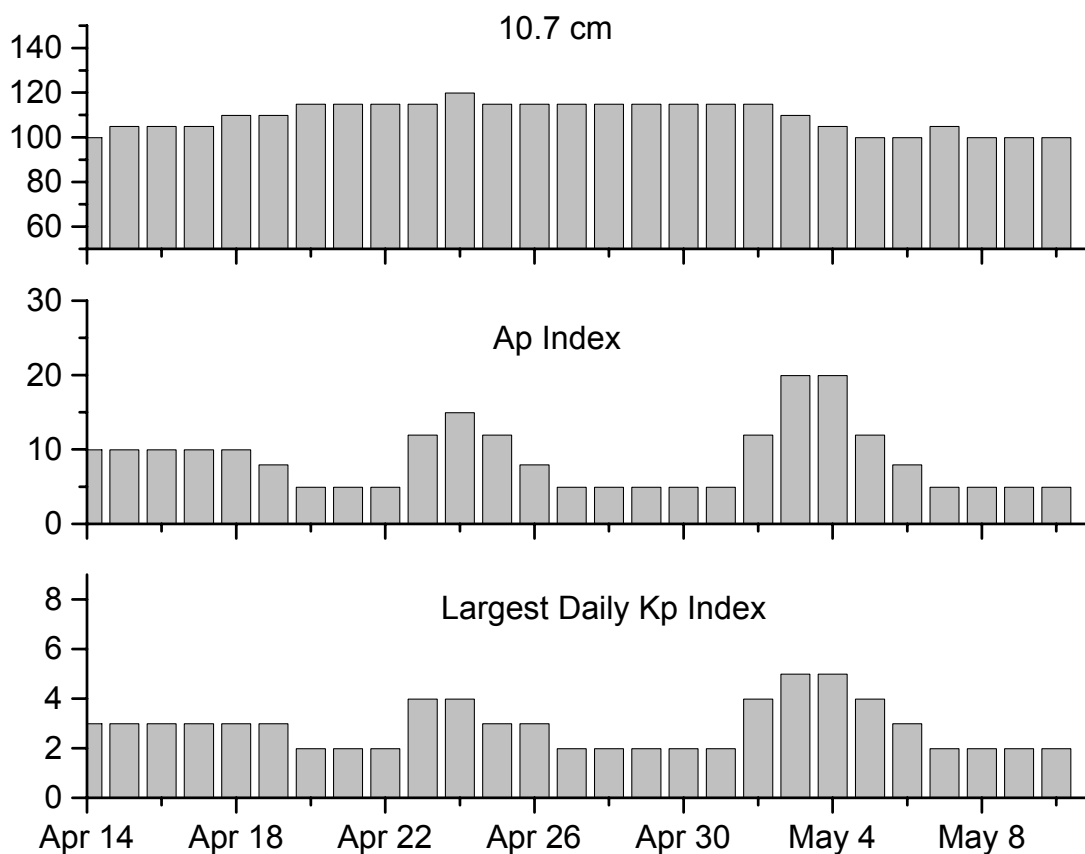


Alerts and Warnings Issued

<u>Date & Time of Issue</u>	<u>Type of Alert or Warning</u>	<u>Date & Time of Event UT</u>
05 Apr 0011	2 – 245 MHz Bursts	04 Apr
05 Apr 0716	SUMMARY: 10cm Radio Burst	05 Apr 0540
05 Apr 0727	ALERT: Type II Radio Emission	05 Apr 0556
05 Apr 1521	WARNING: Geomagnetic K= 4	05 Apr 1521
05 Apr 1604	ALERT: Geomagnetic K= 4	05 Apr 1600
05 Apr 1748	ALERT: Geomagnetic K = 5	05 Apr 1743
05 Apr 1907	WARNING: Geomagnetic K = 5	05 Apr 1910 - 2359
05 Apr 2003	ALERT: Geomagnetic K = 5	05 Apr 1958
06 Apr 0014	WARNING: Geomagnetic K = 4	06 Apr 0020 - 1500
06 Apr 0144	ALERT: Geomagnetic K = 4	06 Apr 0142
06 Apr 0157	ALERT: Geomagnetic K = 5	06 Apr 0155
06 Apr 1456	EXTENDED WARNING: Geomagnetic K = 4	06 Apr 0020 - 2359
06 Apr 2124	WATCH: Geomagnetic A \geq 20	08 Apr
06 Apr 2347	EXTENDED WARNING: Geomagnetic K = 4	06 Apr 0020 - 07 Apr 1500
06 Apr 2355	ALERT: Electron 2MeV Integral Flux > 1000pfu	06 Apr 2340
07 Apr 0011	3 – 245 MHz Bursts	06 Apr
07 Apr 0501	ALERT: Electron 2MeV Integral Flux > 1000pfu	07 Apr 0445
08 Apr 0253	ALERT: Type II Radio Emission	08 Apr 0148
08 Apr 0414	ALERT: Electron 2MeV Integral Flux > 1000pfu	08 Apr 0400
08 Apr 0559	ALERT: Geomagnetic K = 4	08 Apr 0558
08 Apr 0657	ALERT: Geomagnetic K= 4	08 Apr 0656
08 Apr 0922	ALERT: Geomagnetic K= 4	08 Apr 0919
08 Apr 1020	ALERT: Geomagnetic K= 5	08 Apr 1017
08 Apr 1140	SUMMARY: 10cm Radio Burst	08 Apr 0959
08 Apr 2234	WATCH: Geomagnetic A \geq 20	09 Apr
08 Apr 2235	WATCH: Geomagnetic A 20	11 Apr
09 Apr 0016	WARNING: Geomagnetic K= 4	09 Apr 0020 - 1600
09 Apr 0411	ALERT: Geomagnetic K= 4	09 Apr 0410
09 Apr 0536	WARNING: Geomagnetic K= 5	09 Apr 0536 -1600
09 Apr 0542	ALERT: Geomagnetic K= 5	09 Apr 0540
09 Apr 0913	ALERT: Electron 2MeV Integral Flux exceeded 1000pfu	09 Apr 0825
09 Apr 2133	WATCH: Geomagnetic A \geq 20	10 Apr
10 Apr 0845	ALERT: Electron 2MeV Integral Flux > 1000pfu	10 Apr 0830
10 Apr 2008	WARNING: Geomagnetic K= 4	10 Apr 2015 –11 Apr 0600
11 Apr 0434	SUMMARY: 10cm Radio Burst	11 Apr 0407
11 Apr 1110	WARNING: Proton 10MeV Integral Flux > 10pfu	11 Apr 1110 - 2359
11 Apr 1153	ALERT: Proton Event 10MeV Integral Flux > 10pfu	11 Apr 1135



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
14 Apr	100	10	3	28 Apr	115	5	2
15	105	10	3	29	115	5	2
16	105	10	3	30	115	5	2
17	105	10	3	01 May	115	5	2
18	110	10	3	02	115	12	4
19	110	8	3	03	110	20	5
20	115	5	2	04	105	20	5
21	115	5	2	05	100	12	4
22	115	5	2	06	100	8	3
23	115	12	3	07	105	5	2
24	120	15	3	08	100	5	2
25	115	12	3	09	100	5	2
26	115	8	3	10	100	5	2
27	115	5	2				



Energetic Events

Date	Time		X-ray		Optical Information			Peak		Sweep Freq		
	Begin	Max	½ Max	Class	Flux	Imp/	Location	Rgn	Radio Flux		Intensity	
						Brtns	Lat CMD		245	2695	II	IV
05 Apr	0537	0555	0613	M1.7	.026	1f	S18E35	588	180	110	2	
06 Apr	1230	1328	1346	M2.4	.032	Sf	S18E15	588	300	690		

Flare List

Date	Time			X-ray Class.	Imp / Brtns	Optical		Rgn
	Begin	Max	End			Location	Lat CMD	
05 April	0225	0230	0237	B6.3				588
	0314	0318	0322	B4.0				
	0535	0545	A0642	M1.7	1f	S18E35		588
	1531	1535	1538	B3.1				
	1847	1852	1854	B7.3				588
	1950	1954	1957	B4.7				
	1958	2004	2010	B8.4				588
	2238	2242	2244	B7.9				
	2321	2324	2326	B2.7				
06 April	0258	0301	0304	B3.2				
	0535	0535	0547	C1.0	Sf	S19E24		588
	0723	0724	0729	B7.1	Sf	S18E21		588
	0853	0856	0859	B2.9				
	0901	0904	0911	B4.2				
	1318	1324	1405	M2.4	Sf	S18E15		588
	1636	1640	1642	B2.0				
	2027	2030	2032	B2.2				
	2121	2124	2127	B2.3				
07 April	No Flares Observed							
08 April	0034	0038	0043	B2.4				
	0141	0151	0159	C1.2				
	0440	0444	0449	B3.5				
	0556	0601	0604	B3.2				
	0816	0821	0832	B2.9				
	1003	1005	1024	C7.4	Sf	S15W11		588
	1305	1320	1335	C1.3				588
	2257	2301	2307	B2.5				590
09 April	2019	2028	2101	C2.8	Sf	S17W29		588
10 April	0128	0128	0146	B4.5	Sf	N10E01		589
	1546	1551	1556	B2.5				587
	1711	1715	1717	B2.5				588
	2128	2134	2139	B1.8				



Flare List – continued.

Date	Time			X-ray Class.	Optical		Rgn
	Begin	Max	End		Imp / Brtns	Location Lat CMD	
11 April	0119	0124	0133	B1.6			
	0400	0421	0451	C9.6	1f	S14W47	588
	1851	1859	1912	B3.3			
	1933	1941	1945	B5.8			588
	2015	2019	2024	B2.4			588
	2216	2224	2227	C1.2			588
	2300	2308	2314	C1.5			588

Region Summary

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

Region 581

24 Mar	S03E81	057	0060	03	Hax	001	A										
25 Mar	S03E66	059	0100	02	Hsx	001	A										
26 Mar	S03E53	059	0140	05	Cso	004	B										
27 Mar	S04E39	060	0120	03	Hsx	001	A										
28 Mar	S03E24	061	0140	03	Hax	001	A										
29 Mar	S04E11	061	0160	03	Hsx	001	A										
30 Mar	S05W02	061	0110	03	Hsx	002	A	1			1						
31 Mar	S05W15	061	0100	02	Hsx	002	A										
01 Apr	S05W28	061	0090	02	Hsx	001	A										
02 Apr	S05W41	061	0100	02	Hsx	002	A										
03 Apr	S05W55	061	0100	02	Hsx	001	A										
04 Apr	S04W68	061	0090	02	Hsx	001	A										
05 Apr	S04W83	063	0040	02	Hsx	001	A										
06 Apr	S04W96	063															
									1	0	0	1	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 061



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 582</i>																	
25 Mar	N16E72	053	0170	09	Dsi	008	B	4	1		2						
26 Mar	N16E59	053	0250	09	Dai	009	Bg										
27 Mar	N14E45	054	0380	11	Eko	012	B				1						
28 Mar	N15E30	055	0390	09	Dki	023	B	2									
29 Mar	N14E18	054	0420	11	Eki	054	Bg	8			6						
30 Mar	N14E04	055	0300	12	Eki	059	Bg	7			8						
31 Mar	N14W09	055	0250	12	Eki	028	Bg	6			5	1					
01 Apr	N14W22	055	0220	12	Eso	024	Bg	1									
02 Apr	N14W35	055	0140	12	Eso	015	B										
03 Apr	N14W51	057	0140	11	Cso	007	B										
04 Apr	N14W66	059	0130	03	Hsx	001	A										
05 Apr	N14W81	061	0120	03	Hsx	001	A										
06 Apr	N14W96	063	0060	03	Hsx	001	A										
								28	1	0	22	1	0	0	0		

Crossed West Limb.

Absolute heliographic longitude: 055

<i>Region 585</i>																	
27 Mar	S15E50	049	0050	07	Dso	005	B										
28 Mar	S14E40	045	0050	05	Dai	007	B	1			1						
29 Mar	S14E25	047	0050	05	Dro	019	B										
30 Mar	S15E12	047	0010	01	Axx	002	A										
31 Mar	S15W01	047	0010	03	Bxo	003	B										
01 Apr	S15W14	047	0000	01	Axx	001	A										
02 Apr	S15W27	047	0010	01	Axx	001	A										
03 Apr	S15W40	047															
04 Apr	S15W53	047															
05 Apr	S15W66	047															
06 Apr	S15W79	047															
07 Apr	S15W92	047															
								1	0	0	1	0	0	0	0		

Crossed West Limb.

Absolute heliographic longitude:047



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 587

28 Mar	S13E73	012	0110	08	Dai	004	B											
29 Mar	S12E63	009	0080	11	Cao	018	B											
30 Mar	S13E50	009	0120	11	Eao	018	B											
31 Mar	S13E37	009	0200	11	Eao	022	B											
01 Apr	S13E24	009	0170	09	Cao	023	B											
02 Apr	S13E11	009	0160	11	Eao	030	B											
03 Apr	S13W03	009	0130	11	Eao	016	B											
04 Apr	S14W17	010	0150	07	Dao	016	B											
05 Apr	S14W31	011	0140	09	Cai	017	B											
06 Apr	S13W45	012	0070	05	Cao	007	B											
07 Apr	S13W59	013	0030	06	Cao	005	B											
08 Apr	S13W72	012	0020	01	Axx	002	A											
09 Apr	S13W85	012																
10 Apr	S13W98	012																
									0	0	0	0	0	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 009

Region 588

01 Apr	S12E74	319	0060	01	Hsx	001	A											
02 Apr	S12E64	316	0060	02	Hsx	001	A											
03 Apr	S12E51	316	0070	03	Dso	004	B											
04 Apr	S16E40	313	0120	08	Cso	011	B	1			1							
05 Apr	S15E25	315	0170	07	Dao	012	Bg		1				1					
06 Apr	S15E14	313	0130	09	Dai	015	B	1	1			3						
07 Apr	S17E01	313	0150	08	Dao	009	Bg											
08 Apr	S16W13	313	0140	09	Dao	011	B	2			1							
09 Apr	S15W26	313	0120	06	Cso	008	B	1			1							
10 Apr	S15W38	312	0150	08	Cso	010	B											
11 Apr	S15W55	316	0090	05	Cso	006	B	3					1					
								8	2	0	6	2	0	0	0	0		

Still on Disk.

Absolute heliographic longitude: 313



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 589

05 Apr	N10E54	286	0050	04	Bxo	004	B											
06 Apr	N10E43	284	0020	02	Axx	003	A											
07 Apr	N11E29	285	0010	01	Axx	001	A											
08 Apr	N11E16	285																
09 Apr	N11E03	285																
10 Apr	N11W10	285										1						
11 Apr	N11W23	285																
									0	0	0	1	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 285

Region 590

07 Apr	S09W71	025	0020	04	Bxo	002	B											
08 Apr	S09W84	025																
09 Apr	S09W97	025																
									0	0	0	0	0	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 025

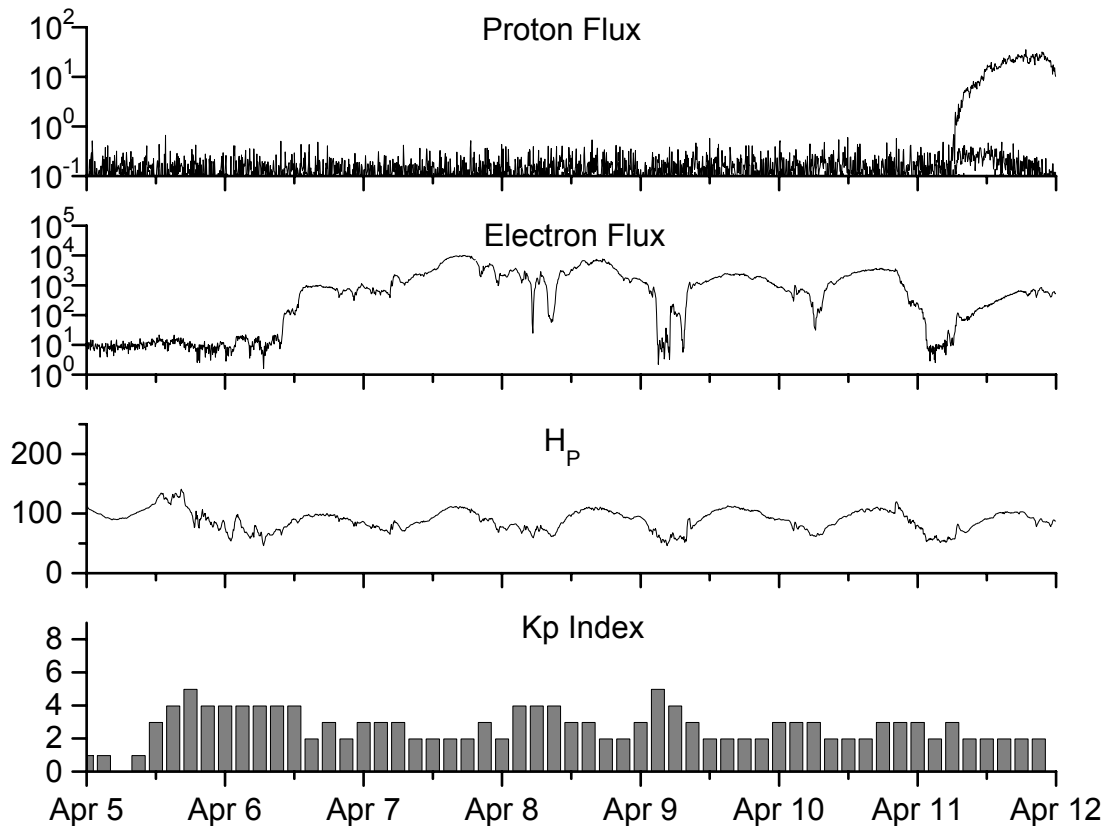


**Recent Solar Indices (preliminary)
of the observed monthly mean values**

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
2002									
April	194.9	120.7	0.62	186.2	110.5	189.8	191.5	15	13.2
May	204.1	120.8	0.59	183.6	108.9	178.4	188.0	15	13.3
June	146.0	88.3	0.60	179.9	106.3	148.7	183.0	11	13.5
July	183.5	99.6	0.54	175.4	102.7	173.5	176.3	11	13.7
August	191.0	116.4	0.61	169.2	98.7	183.9	169.5	16	14.2
September	206.4	109.6	0.53	163.4	94.6	175.8	164.1	14	15.0
October	153.9	97.5	0.63	158.8	90.5	167.0	159.4	23	15.6
November	159.8	95.5	0.60	150.9	85.2	168.7	154.8	16	16.3
December	147.9	80.8	0.55	144.6	82.1	158.6	150.9	13	17.0
2003									
January	149.3	79.7	0.53	141.7	81.0	144.0	149.2	13	18.2
February	87.0	46.0	0.53	136.4	78.5	124.5	144.7	17	18.9
March	119.7	61.1	0.51	128.1	74.2	132.2	139.5	21	19.4
April	119.7	60.0	0.50	121.5	70.3	126.3	136.3	20	20.0
May	89.6	55.2	0.62	118.3	67.8	129.3	135.0	26	21.0
June	118.4	77.4	0.65	113.6	65.2	129.4	132.6	24	21.8
July	132.8	85.0	0.64	106.9	62.0	127.8	129.5	20	22.3
August	114.3	72.7	0.64	102.8	60.3	122.1	127.5	23	22.4
September	82.6	48.8	0.59	100.7	59.8	112.3	126.0	19	21.9
October	118.9	65.6	0.55			153.1		32	
November	118.9	67.2	0.57			153.1		31	
December	75.4	47.0	0.62			115.1		18	
2004									
January	62.3	37.2	0.60			114.1		20	
February	75.6	46.0	0.61			107.0		13	
March	81.0	48.9	0.60			112.2		12	

NOTE: All smoothed values after September 2002 and monthly values after March 2003 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 23, RI= 120.8, occurred April 2000. *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 05 April 2004

Protons plot contains the five-minute averaged integral proton flux (protons/cm²-sec -sr) as measured by

GOES-11 (W98) for each of three energy thresholds: greater than 10, 50, and 100 MeV.

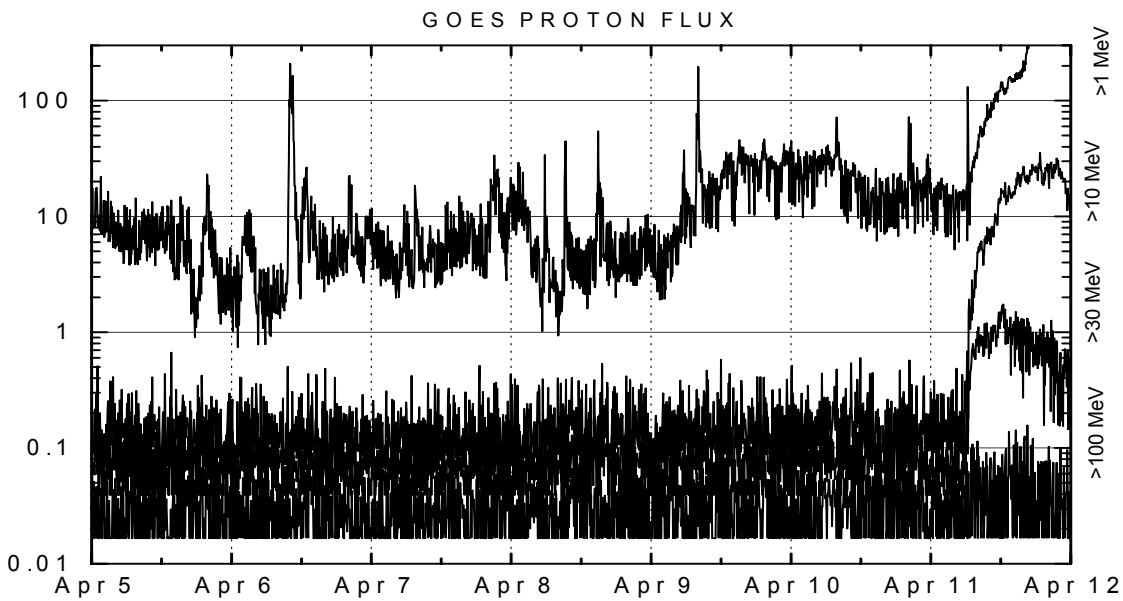
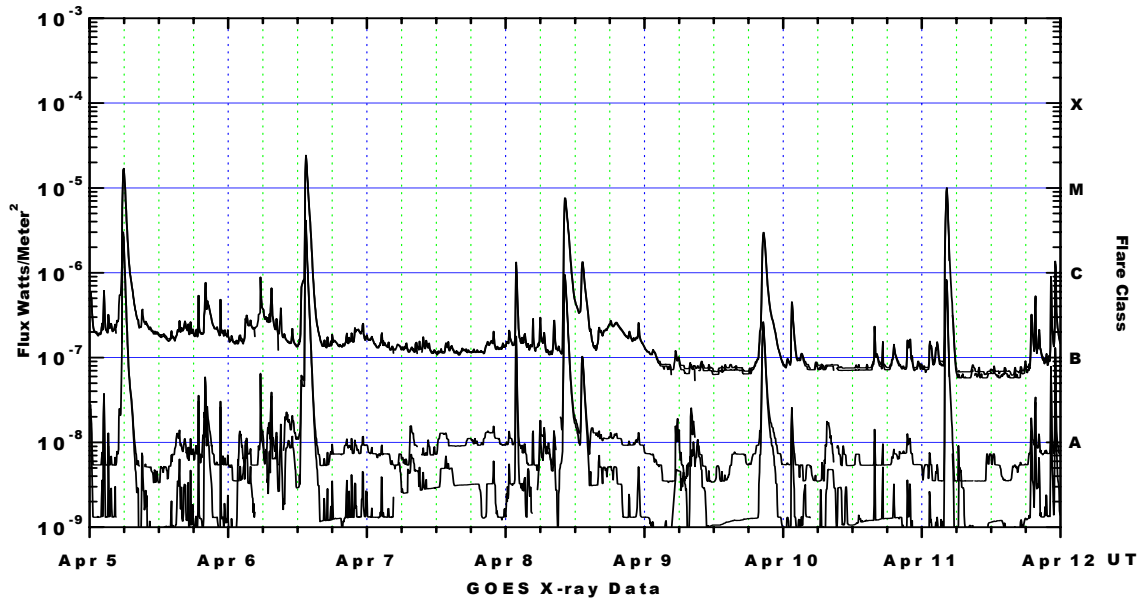
Electrons plot contains the five-minute averaged integral electron flux (electrons/cm²-sec -sr) with energies greater than 2 MeV at GOES-12 (W75).

H_p plot contains the five minute averaged magnetic field H - component in nanoteslas (nT) as measured by GOES-12. 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 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 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 12 (W75) and GOES 10 (W135) 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-11 (W98) 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.



Quiet ($A_p \leq 7$) Geomagnetic Conditions



Space Environment Center

Comparison of Cycles at current month in cycle

