

Space Weather Highlights
16 - 22 June 2003

SWO PRF 1451
24 June 2003

Solar activity ranged from very low to high levels. The period began on 16 June with moderate activity from Region 386 (S07, L=187, class/area Ekc/290 on 18 June), which included two M1 flares. Region 386 developed a beta-gamma-delta magnetic configuration on 18 June and maintained it through the end of the period. Activity increased to high levels on 17 June with an M6 flare at 2255 UTC from Region 386. The M6 event was associated with a Type II (1000 km/s) and Type IV radio sweep and a full halo CME. On 18 - 19 June activity was at very low levels. Regions 386 and 388 (S03, L=211 class/area Eai/140 on 21 June) produced low level activity on 20 - 22 June with the largest flare a C2/Sf at 1313 UTC on 21 June from Region 388. Region 388 developed near center disk on 19 June and produced minor C-class flares on 21 - 22 June.

Solar wind data were available from the NASA Advanced Composition Explorer (ACE) spacecraft for most of the summary period. Solar wind speed ranged from 450 - 550 km/s early in the period, 16 - 17 June. The onset of a coronal hole high speed stream on 18 June increased wind speed to near 650 km/s with peaks near 750 km/s. For the remainder of the period solar wind speed remained elevated at around 550 km/s.

A greater than 10 MeV proton event occurred at geosynchronous orbit and was likely associated with the M6 flare on 17 June. The proton event began on 18 June at 2050 UTC, reached a peak value of 24 pfu at 0450 UTC on 19 June, and ended at 1900 UTC on 19 June.

The greater than 2 MeV electron flux at geosynchronous orbit reached high levels on 20 - 22 June.

The geomagnetic field ranged from unsettled to major storm levels. Late on 16 June through 17 June, periods of prolonged southward Bz produced active to major storm levels. On 18 June, a discontinuity was observed starting around 04 UTC and was followed by enhancements in the solar wind plasma and magnetic field data. The geomagnetic response to this disturbance was active to major storm levels with one period of severe storm levels at 18/06 - 09 UTC. From 19 -22 June activity was predominantly at unsettled to active conditions. Isolated periods of minor storm levels were observed on 19 June and again on 21 June.

Space Weather Outlook
25 June - 21 July 2003

Solar activity is expected to range from very low to high levels during the period. Region 391 (N15, L=163, class/area Dao/110 on 24 June) is currently in a growth phase and may produce low to moderate activity early in the period. On 27 June, old Region 375 is due to return and may have major flare potential.

There is a chance of a greater than 10 MeV proton events at geosynchronous orbit in connection with a major flare when old Region 375 returns.

The greater than 2 MeV electron flux is expected to reach high levels on 30 June - 03 July, 06 - 07 July, 13 - 14 July and again on 17 - 19 July due to recurrent coronal hole high speed streams.

The geomagnetic field is expected to range from quiet to major storm levels during the period. Unsettled to major storm levels are possible on 29 - 30 June and again on 10 -16 July due to coronal hole high speed streams. Minor storm levels are possible on 25 - 26 June, 03 - 07 July, and again on 18 - 20 July due to smaller recurrent coronal hole high speed streams.



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
16 June	123	91	460	B3.6	1	2	0	4	0	0	0	0
17 June	122	80	520	B2.8	4	1	0	4	1	0	0	0
18 June	120	99	610	B3.2	0	0	0	6	0	0	0	0
19 June	123	108	540	B2.9	0	0	0	0	0	0	0	0
20 June	117	121	590	B3.0	3	0	0	2	0	0	0	0
21 June	115	118	530	B2.6	4	0	0	3	0	0	0	0
22 June	110	94	570	B1.7	2	0	0	2	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
16 June	0.0E+0	0.0E+0	0.0E+0	0.0E+0	6.9E+6	
17 June	0.0E+0	0.0E+0	0.0E+0	2.9e+09	8.0E+6	
18 June	6.1E+06	2.7e+05	3.1e+03	1.0e+09	2.3E+6	
19 June	3.2E+06	8.2e+05	2.8e+03	1.0e+10	1.6E+7	
20 June	2.0E+07	1.7e+05	2.1e+03	1.8e+10	4.1E+7	
21 June	7.7E+06	4.1e+04	2.1e+03	1.0e+10	2.6E+7	
22 June	5.3E+06	2.4e+04	2.0e+03	1.4e+10	4.9E+7	

Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	16 June	20	3-4-2-4-3-2-3-5	44	3-4-2-6-6-5-5-5	32
17 June	30	5-5-5-4-3-3-4-3	41	5-5-5-6-4-5-2-4	50	5-6-6-6-4-4-4-4
18 June	36	4-6-6-4-3-3-4-3	43	4-5-6-6-4-5-3-3	54	5-6-7-6-4-4-4-4
19 June	16	5-2-3-2-3-3-3-2	21	4-4-4-5-3-3-2-1	18	5-4-4-3-3-3-3-2
20 June	*	2-2-3-2-3-2-3-*	20	2-3-4-5-4-4-2-2	12	3-2-3-3-3-3-3-3
21 June	16	4-3-4-2-3-3-2-3	36	4-4-6-5-3-6-2-2	23	4-4-5-3-3-4-3-3
22 June	11	3-2-3-2-2-2-3-3	24	3-3-5-5-3-3-4-3	16	3-3-4-3-3-3-3-3

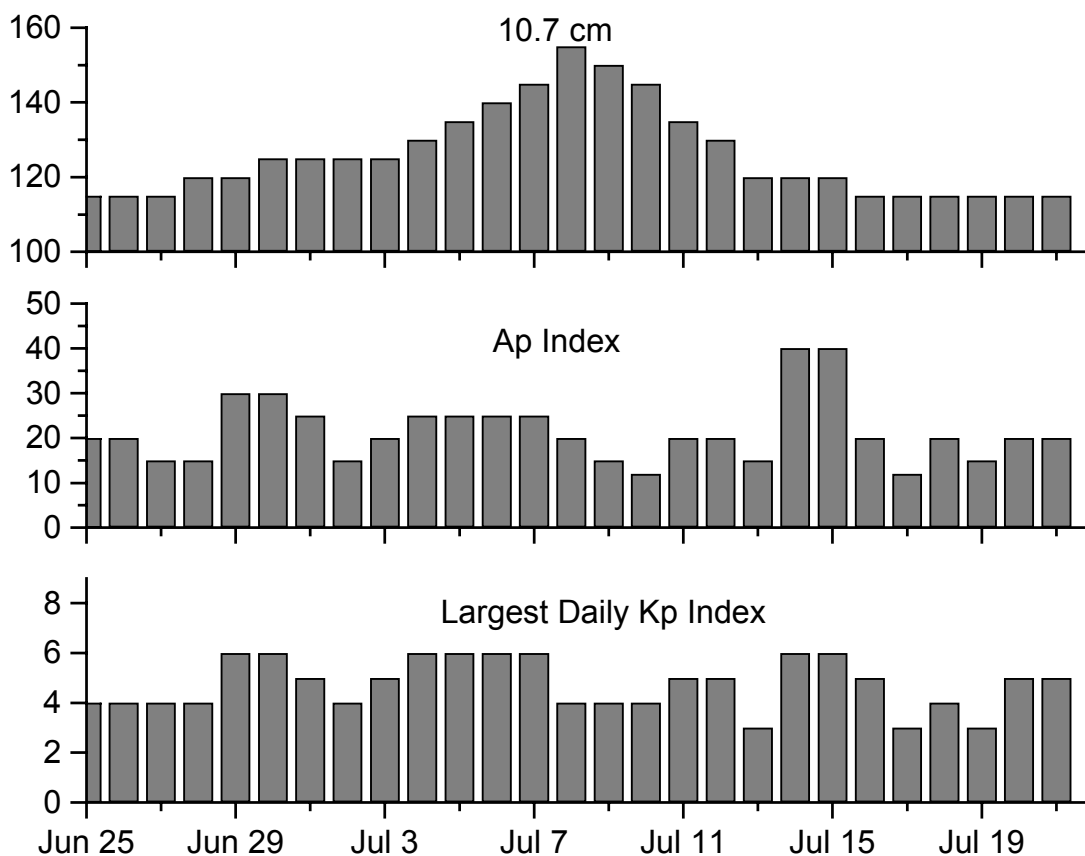


Alerts and Warnings Issued

<u>Date & Time of Issue</u>	<u>Type of Alert or Warning</u>	<u>Date & Time of Event UT</u>
16 Jun 0010	ALERT: Type IV Radio Emission	15 Jun 2346
16 Jun 0027	SUMMARY: X-ray Event exceeded X1	15 Jun 2325
16 Jun 0034	ALERT: Type II Radio Emission	15 Jun 2346
16 Jun 0038	SUMMARY: 10cm Radio Burst	15 Jun 2342
16 Jun 0047	1 - 245 MHz Radio Burst	15 Jun
16 Jun 1442	EXTENDED WARNING: Geomagnetic K= 4	15 Jun 1500 - 17 Jun 1500
16 Jun 2107	WATCH: Geomagnetic A \geq 20	18 Jun
16 Jun 2108	WATCH: Geomagnetic A \geq 20	19 Jun
16 Jun 2310	ALERT: Geomagnetic K = 5	16 Jun 2259
16 Jun 2322	ALERT: Geomagnetic K = 6	16 Jun 2311
16 Jun 2332	WARNING: Geomagnetic K = 5	16 Jun 2335 - 17 Jun 1500
17 Jun 0823	WARNING: Geomagnetic K = 6	17 Jun 0825 - 17 Jun 1500
17 Jun 0825	ALERT: Geomagnetic K = 6	17 Jun 0826
17 Jun 1456	EXTENDED WARNING: Geomagnetic K = 4	15 Jun 1500 - 18 Jun 1500
17 Jun 2156	WATCH: Geomagnetic A \geq 20	20 Jun
17 Jun 2245	SUMMARY: 10cm Radio Burst	17 Jun 2149
17 Jun 2250	ALERT: X-Ray Flux exceeded M5	17 Jun 2250
17 Jun 2309	ALERT: Type II Radio Emission	17 Jun 2240
17 Jun 2313	ALERT: Type IV Radio Emission	17 Jun 2240
17 Jun 2319	SUMMARY: X-ray Event exceeded M5	17 Jun 2227
18 Jun 0012	SUMMARY: 10cm Radio Burst	17 Jun 2239
28 Jun 0022	1 - 245 MHz Burst	17 Jun
18 Jun 0143	WARNING: Geomagnetic K = 5 expected	18 Jun 0144 - 1500
18 Jun 0158	ALERT: Geomagnetic K = 5	18 Jun 0156
18 Jun 0557	WARNING: Geomagnetic K = 6	18 Jun 0558 - 1500
18 Jun 0722	ALERT: Geomagnetic K = 6	18 Jun 0711
18 Jun 1043	ALERT: Geomagnetic K = 6	18 Jun 1023
18 Jun 1455	EXTENDED WARNING: Geomagnetic K = 6	18 Jun 0558 - 2359
18 Jun 1555	WARNING: Proton 10MeV Integral Flux > 10pfu	18 Jun 1700
18 Jun 2106	ALERT: Proton Event 10MeV Integral Flux exceeded 10pfu	18 Jun 2050
18 Jun 2205	WATCH: Geomagnetic A \geq 20	21 Jun
18 Jun 2324	WARNING: Geomagnetic K = 5	18 Jun 2325 - 19 Jun 1500
19 Jun 1446	EXTENDED WARNING: Proton 10MeV Integral Flux > 10pfu	18 Jun 1700 - 19 Jun 2000
19 Jun 1457	WARNING: Geomagnetic K = 4	19 Jun 1459 - 2359
19 Jun 1948	SUMMARY: Proton Event 10MeV Integral Flux > 10pfu	18 Jun 1850
19 Jun 2355	EXTENDED WARNING: Geomagnetic K = 4	19 Jun 1459 - 20 Jun 1500
20 Jun 1448	ALERT: Electron 2MeV Integral Flux > 1000pfu	20 Jun 1430
20 Jun 1709	ALERT: Geomagnetic K = 4	20 Jun 1706
21 Jun 117	WARNING: Geomagnetic K = 4	20 Jun 0120 - 21 Jun 1500
21 Jun 133	ALERT: Geomagnetic K = 4	21 Jun 0123
21 Jun 721	WARNING: Geomagnetic K = 5	21 Jun 0722 -1500
21 Jun 727	ALERT: Geomagnetic K = 5	21 Jun 0725
21 Jun 1638	ALERT: Geomagnetic K = 4	21 Jun 1635
21 Jun 1706	WARNING: Geomagnetic K = 5	21 Jun 1706 - 22 Jun 1500
21 Jun 1708	ALERT: Geomagnetic K = 5	21 Jun 1707
21 Jun 1723	ALERT: Electron 2MeV Integral Flux > 1000pfu	21 Jun 1705
22 Jun 1311	ALERT: Electron 2MeV Integral Flux > 1000pfu	22 Jun 1250



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 Jun	115	20	4	09 Jul	150	15	4
26	115	20	4	10	145	12	4
27	115	15	4	11	135	20	5
28	120	15	4	12	130	20	5
29	120	30	6	13	120	15	3
30	125	30	6	14	120	40	6
01 Jul	125	25	5	15	120	40	6
02	125	15	4	16	115	20	5
03	125	20	5	17	115	12	3
04	130	25	6	18	115	20	4
05	135	25	6	19	115	15	3
06	140	25	6	20	115	20	5
07	145	25	6	21	115	20	5
08	155	20	4				



Energetic Events

Date	Time		X-ray		Optical Information			Peak		Sweep Freq		
	Begin	Max	½	Class	Integ Flux	Imp/ Brtns	Location Lat CMD	Rgn #	Radio Flux		Intensity	
			Max						245	2695	II	IV
16 Jun 03	0244	0248	0251	M1.0	.004			386				
16 Jun 03	1152	1200	1204	M1.7	.005	Sf	S12E83	386				
17 Jun 03	2227	2255	2312	M6.8	.096			386	1200	2100	2	1

Flare List

Date	Time			X-ray Class.	Imp / Brtns	Optical		Rgn
	Begin	Max	End			Location Lat CMD		
16 June	0000	0002	0007		Sf	S17W37		380
	0244	0248	0251	M1.0				386
	0337	0337	0345		Sf	S12W48		380
	1159	1200	1205	M1.7	Sf	S12E83		386
	1631	1633	1635	B9.3	Sf	S10E80		386
	1925	1928	1931	B5.1				
	2151	2156	2200	C1.6				380
	2247	2252	2256	B8.2				
17 June	0102	0102	0110	C1.5	Sf	S07E66		386
	0212	0222	0229	C2.4				386
	0600	0602	0610	C1.1	Sf	S07E63		386
	0656	0701	0705	B5.5				380
	1352	1356	1359	B4.8				386
	1618	1627	1629		Sf	N19E83		387
	1751	1756	1800		Sf	N19E82		387
	1830	1835	1851	B7.2				386
18 June	2147	2153	A2209	C5.2	1f	S07E55		386
	2227	2255	2312	M6.8				386
	0010	0013	0017		Sf	S09E60		386
	0519	0522	0540		Sf	N16E78		387
	1642	1643	1648		Sf	N17E65		387
	1711	1721	1735		Sf	N18E64		387
	1909	1909	1918		Sf	N18E66		387
	1941	1942	1945		Sf	N18E63		387
19 June	0025	0028	0032	B4.8				388
	0148	0154	0158	B8.5				386
	1337	1340	1344	B4.9				386
	1917	1933	1946	B8.1				
	2246	2250	2252	B5.2				
20 June	0453	0501	0516	C1.2				386
	0835	0847	0855	B9.0				386
	1154	1210	1216	B5.9				
	1413	1417	1421	B5.5				386
	1435	1441	1457	C1.2				386
	1638	1643	1648	B6.5				388
	2103	2108	2117	B4.3	Sf	S02W07		388



Flare List - continued.

Date	Time			X-ray Class.	Optical		Rgn
	Begin	Max	End		Imp / Brtns	Location Lat CMD	
20 June	2224	2225	2242	C1.0	Sf	S09E17	386
21 June	0009	0014	0018	C1.7			386
	0230	0235	0239	C2.2			388
	0303	0309	0316	B8.3			386
	0644	0649	0653	B7.2			388
	0832	0842	0850	B5.6			388
	1310	1313	1323	C2.5	Sf	S02W16	388
	1725	1730	1739	C1.4	Sf	S07E08	386
	1852	1856	1900	B5.0			
	2122	2126	2128	B7.6			
	2334	2335	2343	B4.9	Sf	N00W22	388
22 June	0205	0211	0219	B4.6			
	0251	0257	0301	B4.7			
	0536	0540	0544	B6.3			
	0900	0905	0908	B3.2			
	0948	0950	0954	C1.0	Sf	N04W28	388
	1003	1014	1024	B6.8			
	2147	2147	2154	C1.2	Sf	N00W34	388

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

Region 378

05 Jun	N16E69	335	0020	06	Cso	003	B								
06 Jun	N16E57	334	0040	05	Cro	002	B	1			1				
07 Jun	N17E44	334	0030	07	Cro	002	B								
08 Jun	N16E28	336	0020	03	Cso	005	B								
09 Jun	N16E14	336	0010	01	Axx	001	A								
10 Jun	N15E00	337	0010	01	Axx	001	A								
11 Jun	N15W13	337													
12 Jun	N15W26	337													
13 Jun	N15W39	337													
14 Jun	N15W52	337													
15 Jun	N14W66	337	0000	01	Axx	001	A								
16 Jun	N14W36	294													
17 Jun	N14W49	294													
18 Jun	N14W62	294													
19 Jun	N14W75	294													

1 0 0 1 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 337



Region Summary - continued.

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	4			
<i>Region 380</i>																		
07 Jun	S16E68	310	0400	13	Eho	010	B	2										
08 Jun	S15E56	308	0550	11	Eki	020	Bg	3	1		10		1					
09 Jun	S14E41	308	0680	13	Eki	036	Bg	2			4							
10 Jun	S15E29	308	0560	14	Eki	049	Bgd				3							
11 Jun	S15E15	309	0640	13	Eki	041	Bg		1				1					
12 Jun	S15E03	308	0570	13	Ekc	031	B	1			5							
13 Jun	S16W11	309	0500	16	Fki	048	Bg				1							
14 Jun	S16W25	310	0250	13	Eki	027	B	2			2							
15 Jun	S17W36	307	0180	10	Dai	018	B											
16 Jun	S16W51	309	0160	08	Dai	016	Bg						2					
17 Jun	S15W64	309	0140	08	Dso	008	B											
18 Jun	S15W77	309	0140	06	Cso	004	B											
19 Jun	S15W90	309	0080	04	Cso	004	B											
								10	2	0	27	1	1	0	0			

Crossed West Limb.

Absolute heliographic longitude: 308

<i>Region 381</i>																		
09 Jun	S18E19	331	0010	03	Bxo	005	B											
10 Jun	S18E07	330	0030	04	Dso	007	B				1							
11 Jun	S19W06	330	0070	06	Dao	007	B				1							
12 Jun	S18W19	330	0110	06	Csi	017	B											
13 Jun	S20W34	332	0110	06	Dai	015	B				1							
14 Jun	S18W48	333	0030	05	Cso	006	B											
15 Jun	S18W61	332	0050	04	Cso	007	B											
16 Jun	S18W75	333	0040	01	Hrx	001	A											
17 Jun	S18W88	333																
								0	0	0	3	0	0	0	0	0	0	

Crossed West Limb.

Absolute heliographic longitude: 330

<i>Region 382</i>																		
10 Jun	S18W16	353	0020	03	Cao	007	B											
11 Jun	S17W30	354	0020	05	Bxo	009	B											
12 Jun	S18W45	356	0070	06	Dso	007	B											
13 Jun	S18W60	358	0040	07	Dro	003	B											
14 Jun	S17W76	001	0010	07	Bxo	002	B											
15 Jun	S17W84	355	0020	07	Bxo	002	B											
16 Jun	S17W97	355																
								0	0	0	0	0	0	0	0	0	0	

Crossed West Limb.

Absolute heliographic longitude: 353



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 387</i>																	
18 Jun	N18E62	170	0100	08	Cso	007	B					5					
19 Jun	N18E49	170	0200	10	Dko	007	Bg										
20 Jun	N18E36	169	0250	09	Dai	019	Bg										
21 Jun	N18E23	169	0260	11	Eso	021	Bg										
22 Jun	N18E10	169	0270	11	Eao	021	Bg										
										0	0	0	5	0	0	0	0
Still on Disk.																	
Absolute heliographic longitude: 169																	
<i>Region 388</i>																	
19 Jun	S03E08	211	0030	09	Cso	008	B										
20 Jun	S03W06	211	0060	08	Dai	020	B						1				
21 Jun	S03W19	211	0140	11	Eai	022	B	2					2				
22 Jun	S02W32	211	0130	07	Dao	017	B	2					2				
								4	0	0	0	5	0	0	0	0	0
Still on Disk.																	
Absolute heliographic longitude: 211																	
<i>Region 389</i>																	
20 Jun	S12E14	191	0020	04	Cao	003	B										
21 Jun	S12E01	191	0010	02	Axx	002	A										
22 Jun	S12W12	191															
										0	0	0	0	0	0	0	0
Still on Disk.																	
Absolute heliographic longitude: 191																	
<i>Region 390</i>																	
22 Jun	N15E76	103	0080	08	Dai	002	B										
										0	0	0	0	0	0	0	0
Still on Disk.																	
Absolute heliographic longitude: 103																	

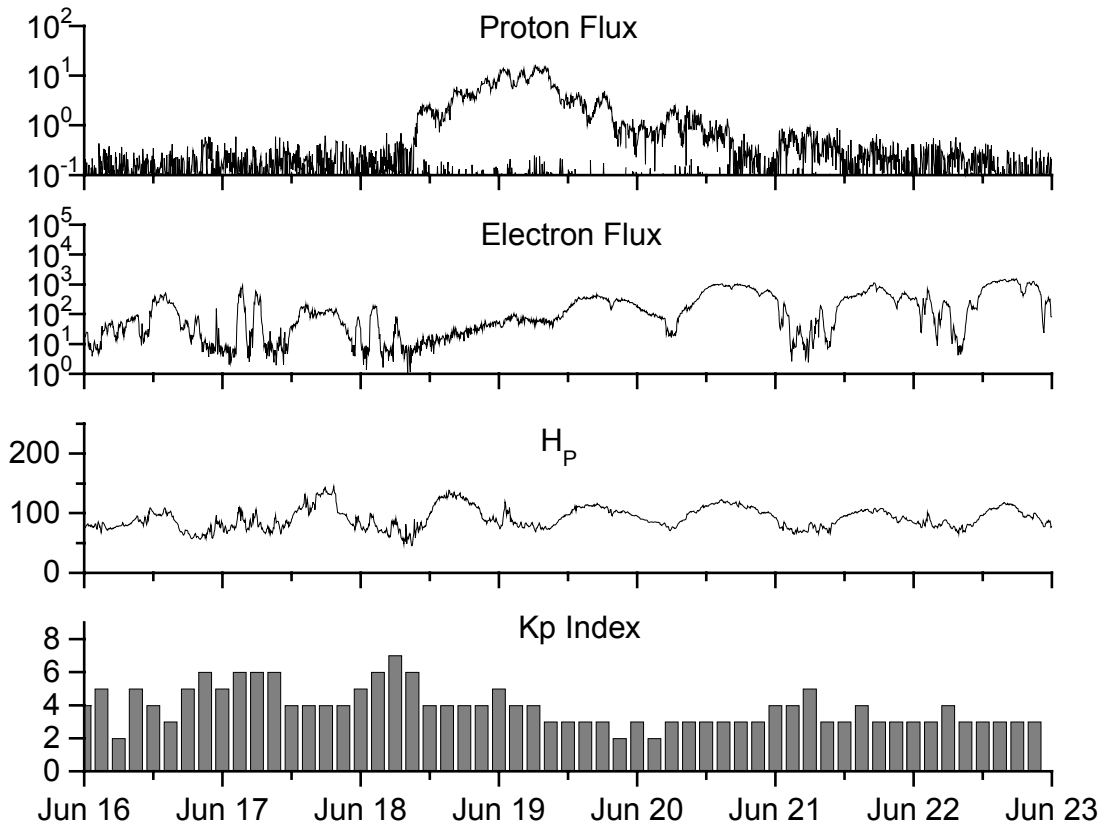


**Recent Solar Indices (preliminary)
of the observed monthly mean values**

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
2001									
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	163.1	188.8	13	12.5
September	229.1	150.7	0.66	178.8	114.3	233.8	191.3	13	12.8
October	197.4	125.6	0.64	179.5	114.1	208.1	191.9	20	12.0
November	178.6	106.5	0.60	183.7	115.6	212.7	193.7	16	12.0
December	217.5	132.2	0.61	184.5	114.6	235.6	193.9	09	12.2
2002									
January	189.0	114.1	0.60	184.8	113.5	227.3	194.6	08	12.4
February	194.5	107.4	0.55	188.6	114.7	205.0	197.2	10	12.8
March	153.1	98.4	0.64	188.9	113.4	180.3	195.7	10	13.0
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	99.9	0.54	175.4	102.7	173.5	173.5	13	13.9
August	191.0	116.4	0.61	169.3	98.7	183.9	169.5	16	14.3
September	206.4	109.6	0.53	163.4	94.6	175.8	164.2	14	14.9
October	153.9	97.5	0.63	158.7	90.5	167.0	159.5	23	15.5
November	159.8	95.5	0.60	150.5	85.3	168.7	154.3	16	16.1
December	147.9	80.8	0.55			158.6		13	
2003									
January	149.3	79.5	0.53			144.6		13	
February	87.9	46.2	0.53			124.6		15	
March	119.7	61.5	0.51			132.3		19	
April	114.3	60.0	0.52			126.5		20	
May	89.6	55.2	0.62			116.2		25	

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 16 Jun 2003

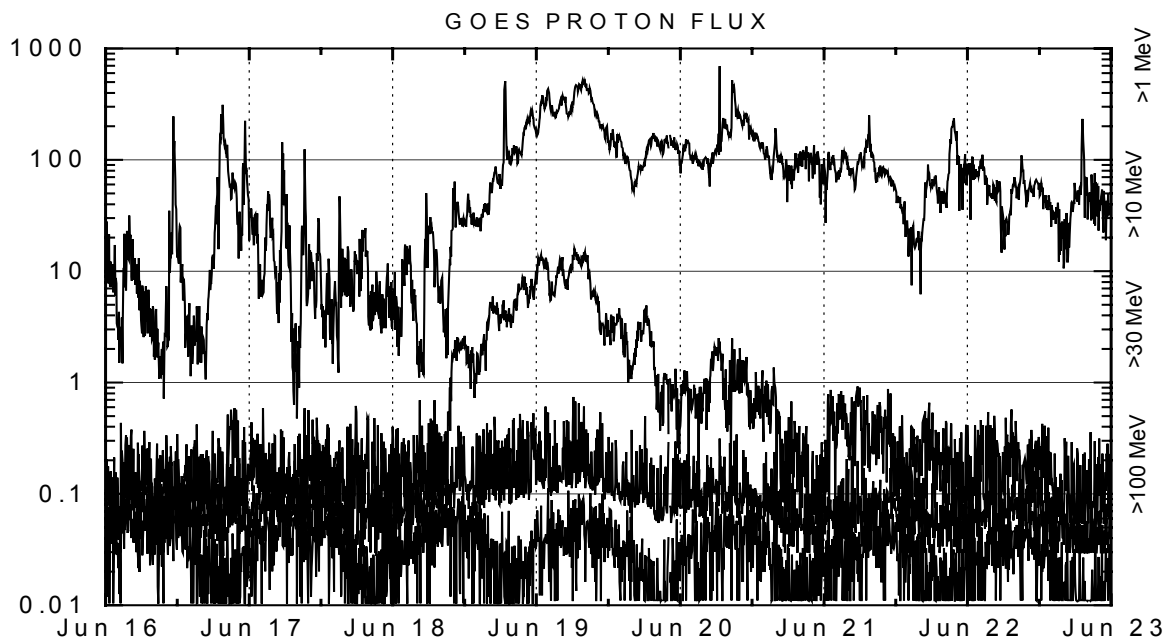
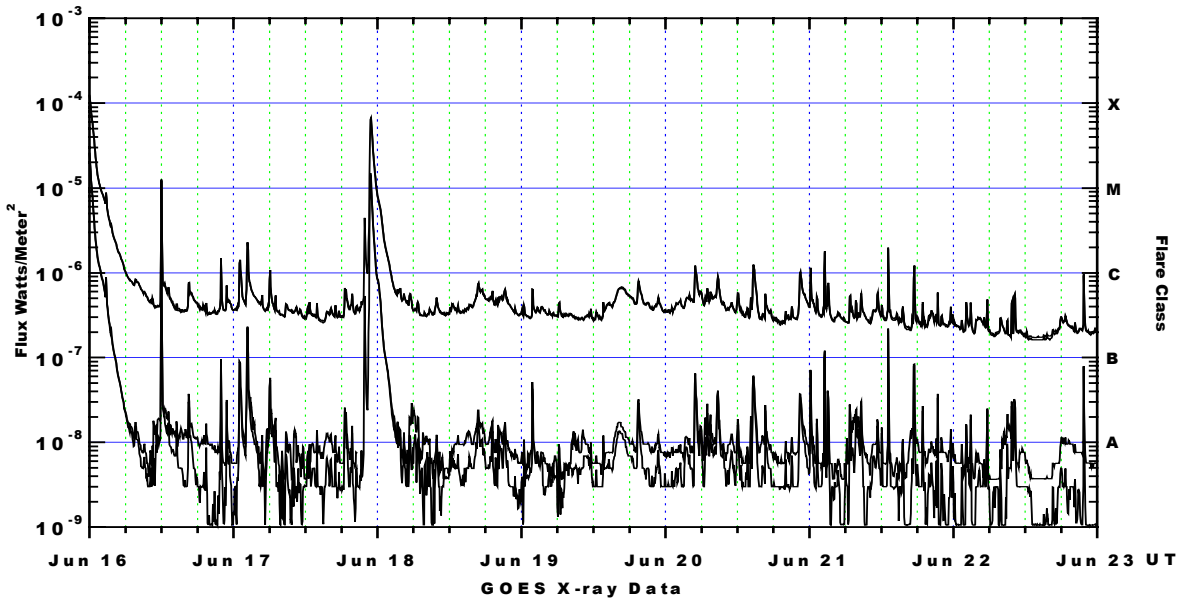
Protons plot contains the five-minute averaged integral proton flux (protons/cm²-sec-sr) as measured by GOES-8 (W75)/GOES-11 (W113) for each of three energy thresholds: greater than 10, 50, and 100 MeV. The primary proton instrument was switched from GOES-8 to GOES-11 on 19 June 2003 (See details at <http://www.sec.noaa.gov/GOES.html>).

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

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 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)/GOES-11 (W113) 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. The primary proton instrument was switched from GOES-8 to GOES-11 on 19 June 2003 (See details at <http://www.sec.noaa.gov/GOES.html>).

