

Space Weather Highlights
21 - 27 June 2004

SWO PRF 1504
29 Jun 2004

Solar activity was low. Region 635 (S12, L=056, class/area, Fkc/600 on 20 June) dominated activity and was responsible for all the C-class flares observed this period. A delta magnetic configuration developed in this region on 18 June and persisted for the remainder of its visible disk transit. Activity was limited to isolated low C-class flares from 21 – 25 June. But activity output increased somewhat on 26-27 June as Region 635 rotated around the west limb. The largest flare of the period, a C8/Sf, occurred on 26 June. A CME off the west limb early on 27 June was likely associated with activity in Region 635. Region 634 (N12, L=074, class/area, Eki/420 on 18 June), which produced several C-class and a single M-class flare early in its disk transit, underwent gradual decay this period and was uneventful. The remaining active regions were small and relatively stable.

Solar wind data were available from the NASA Advanced Composition Explorer (ACE) spacecraft during most of the summary period. The period began with solar wind speed near 400 km/s and in gradual decline. Speed generally ranged from 300 to 350 km/s until midday on the 25th. A pronounced solar sector boundary (SSB) crossing occurred at around 1200 UTC on 25 June. Solar wind speed increased to near 400 km/s and B field were slightly enhanced to near 10 nT following the SSB change. Little change was observed during the last two days of the summary period.

There were no greater than 10 MeV proton events at geo-synchronous orbit during the summary period.

The greater than 2 MeV electron flux at geosynchronous orbit remained below the high alert levels through the entire period.

The geomagnetic field ranged from quiet to unsettled levels at all latitudes. The calm field is a result of the mostly benign solar wind plasma and IMF measurements.

Space Weather Outlook
30 June - 26 July 2004

Solar activity is expected to be at very low to low levels. Mostly very low conditions are expected through the early part of the forecast period. Old active regions are expected to return on 10-11 July, which will likely boost activity levels to low.

No greater than 10 MeV proton events are expected.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to reach high levels on 30 June – 03 July and 13 – 14 July due to recurrent coronal hole high speed streams.

The geomagnetic field is expected to range from quiet to active levels. Unsettled to active conditions are possible on 30 June – 01 July, 6 July, 11-12 July, and 25-26 July as generally weak, recurrent coronal high speed streams rotate into a geoeffective position.



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
21 June	116	139	930	B2.1	1	0	0	3	0	0	0	0
22 June	117	113	710	B2.5	1	0	0	2	0	0	0	0
23 June	113	104	640	B2.4	2	0	0	2	0	0	0	0
24 June	108	94	760	B2.3	2	0	0	2	0	0	0	0
25 June	103	83	560	B2.2	1	0	0	1	0	0	0	0
26 June	99	64	390	B3.1	2	0	0	2	0	0	0	0
27 June	97	48	290	B2.9	5	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
	21 June	2.4E+5	1.3E+4	2.7E+3		2.1E+7
22 June	2.5E+5	1.2E+4	2.9E+3		2.2E+7	
23 June	2.8E+5	1.3E+4	2.8E+3		2.0E+7	
24 June	2.9E+5	1.2E+4	2.8E+3		1.1E+7	
25 June	3.3E+5	1.3E+4	2.8E+3		1.0E+7	
26 June	4.3E+5	1.3E+4	2.9E+3		9.2E+6	
27 June	1.7E+5	1.3E+4	3.0E+3		2.6E+6	

Daily Geomagnetic Data

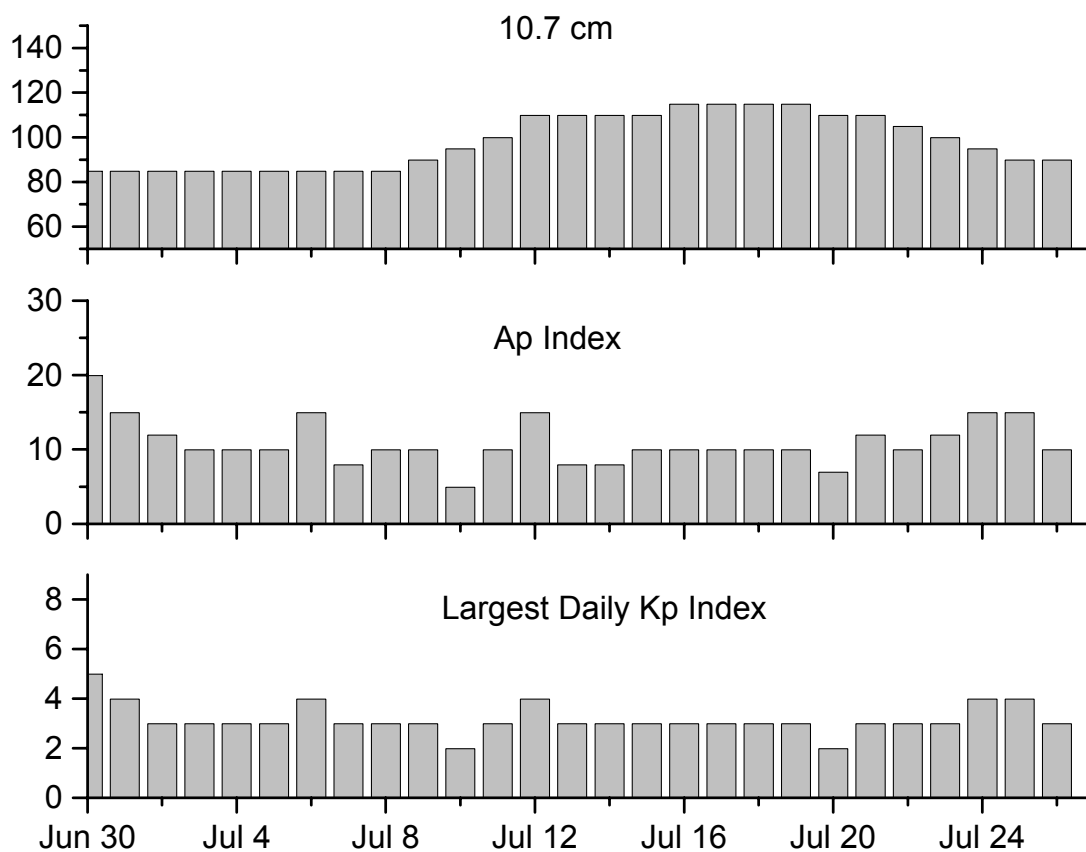
Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	21 June	3	0-1-1-1-1-1-1-1	4	1-2-1-0-0-2-1-2	4
22 June	1	0-0-0-1-0-0-1-1	1	1-1-0-1-0-0-0-0	4	1-0-0-1-2-2-2-1
23 June	2	0-0-1-1-1-1-1-1	1	1-1-0-0-0-0-1-0	5	1-0-1-1-2-3-2-2
24 June	4	0-1-2-1-2-1-1-1	2	1-1-1-0-1-0-0-0	6	2-1-3-1-2-2-2-1
25 June	3	0-1-0-0-2-1-2-1	2	0-1-0-0-1-0-1-1	4	0-0-0-1-2-2-3-1
26 June	8	0-1-1-2-3-3-3-1	4	0-1-1-1-2-1-2-1	7	1-1-0-1-3-3-3-3
27 June	4	1-1-0-2-1-1-1-2	2	1-1-0-1-1-0-0-2	5	2-1-1-2-2-2-2-2

Alerts and Warnings Issued

Date & Time of Issue	Type of Alert or Warning	Date & Time of Event UT
21 Jun 0006	6 - 245 MHz Radio Bursts	20 Jun
21 Jun 0006	1 - 245 MHz Radio Noise Storm	20 Jun
22 Jun 0014	1 - 245 MHz Radio Burst	21 Jun
21 Jun 0014	1 - 245 MHz Radio Noise Storm	21 Jun
23 Jun 0006	4 - 245 MHz Radio Bursts	22 Jun
23 Jun 0006	1 - 245 MHz Radio Noise Storm	22 Jun
24 Jun 0948	ALERT: Type II Radio Emission	24 Jun 0619
26 Jun 0036	3 - 245 MHz Radio Bursts	25 Jun
26 Jun 0036	1 - 245 MHz Radio Noise Storm	25 Jun
26 Jun 1732	WARNING: Geomagnetic K= 4	26 Jun 1732 - 2359
26 Jun 1734	ALERT: Geomagnetic K= 4	26 Jun 1731
26 Jun 2353	EXTENDED WARNING: Geomagnetic K= 4	26 Jun 1732 - 27 Jun 1500



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
30 Jun	85	20	5	14 Jul	110	8	3
01 Jul	85	15	4	15	110	10	3
02	85	12	3	16	115	10	3
03	85	10	3	17	115	10	3
04	85	10	3	18	115	10	3
05	85	10	3	19	115	10	3
06	85	15	4	20	110	7	2
07	85	8	3	21	110	12	3
08	85	10	3	22	105	10	3
09	90	10	3	23	100	12	3
10	95	5	2	24	95	15	4
11	100	10	3	25	90	15	4
12	110	15	4	26	90	10	3
13	110	8	3				



Energetic Events

Date	Time		X-ray	Optical Information			Peak		Sweep Freq	
	Begin	Max	Integ	Imp/	Location	Rgn	Radio Flux		Intensity	
			Class	Flux	Brtns	Lat CMD	#	245	2695	II

No Events Observed

Flare List

Date	Time			X-ray Class.	Imp / Brtns	Optical Location Lat CMD	Rgn	
	Begin	Max	End					
21 June	0716	0719	0721	B3.9				
	1201	1207	1217	B6.4			635	
	1321	1331	1337	B4.9				
	1611	1617	1623	B7.9			635	
	1714	1714	1726	C2.0	Sf	S12W08	635	
	1832	1840	1848	B4.5			635	
	1958	2002	2009	B4.7			635	
	2014	2014	2019	B6.2	Sf	S11W12	635	
	2046	2050	2055	B3.8			635	
	2259	2301	2307	B5.4	Sf	S12W08	635	
	2347	2350	2353	B3.1			634	
	22 June	0048	0052	0055	B4.4			635
		0521	0521	0525	B8.1	Sf	S13W15	635
0619		0700	0729	B8.9				
0807		0811	0813	B4.5			635	
0826		0833	0838	B4.3				
1257		1302	1306	B6.7			635	
1335		1343	1347	B5.0				
1431		1441	1445	B4.8				
1859		1906	1910	B3.9				
2156		2211	2235	C1.7	Sf	S12W24	635	
23 June	0258	0300	0310	C1.2	Sf	S11W27	635	
	0554	0556	0628	C2.5	Sf	S09W21	635	
	1648	1656	1708	B5.9			635	
	2250	2257	2304	B5.7			635	
24 June	0021	0026	0034	B5.3			635	
	0555	0557	0609	C1.4	Sf	S16W39	635	
	0612	0621	0634	C1.7			635	
	0615	0616	0647		Sf	S09W36	635	
25 June	1901	1905	1913	B4.5			635	
	0208	0215	0222	B4.0			637	
	0439	0446	0503	B6.2			635	
	0516	0524	0532	B6.1			635	
	0751	0752	0757	B8.5	Sf	N09E18	637	
	1118	1132	1148	C2.5			635	
	1336	1340	1344	B4.0			635	
	1743	1746	1752	B3.7			635	



Flare List – continued.

Date	Time			X-ray Class.	Optical		Rgn
	Begin	Max	End		Imp / Brtns	Location Lat CMD	
25 June	2007	2017	2030	B4.8			635
26 June	0417	0424	0430	C1.3			
	0704	0710	0729	C8.6	Sf	S08W77	635
	0730	0731	0743		Sf	S08W77	635
	1112	1127	1155	B8.7			635
	2122	2126	2128	B3.9			635
27 June	2316	2335	2345	B4.5			
	0216	0220	0226	B4.1			
	0307	0312	0316	B5.9			635
	0348	0358	0405	C1.0			635
	0357	0359	0402		Sf	N09W06	637
	0820	0828	0833	B8.1			635
	1220	1249	1311	B9.4			635
	1544	1557	1608	C2.3			635
	1641	1644	1648	B5.2			635
	1924	1931	1938	C1.6			
	2013	2021	2037	C2.5			635
	2057	2101	2105	B7.6			635
	2229	2251	2306	C3.6			635

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
<i>Region 632</i>														
10 Jun	S12E66	121	0100	02	Hax	001	A							
11 Jun	S11E53	121	0080	02	Hax	001	A							
12 Jun	S11E38	122	0070	02	Hsx	002	A							
13 Jun	S11E26	121	0070	02	Hsx	001	A							
14 Jun	S11E13	121	0070	02	Hsx	001	A							
15 Jun	S12E00	121	0090	02	Hsx	001	A							
16 Jun	S12W14	122	0060	02	Hsx	001	A							
17 Jun	S12W27	122	0070	02	Hsx	001	A							
18 Jun	S12W40	121	0060	02	Hsx	001	A							
19 Jun	S12W52	120	0050	02	Hax	001	A							
20 Jun	S12W65	120	0060	02	Hax	001	A							
21 Jun	S12W78	120	0050	02	Hsx	001	A							
22 Jun	S12W91	120	0030	02	Hax	001	A							
								0	0	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 121



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 635</i>																		
14 Jun	S08E70	064	0130	07	Cso	008	B											
15 Jun	S10E65	056	0390	17	Fki	018	Bg											
16 Jun	S10E51	057	0550	18	Fki	026	Bg											
17 Jun	S11E38	057	0440	15	Eki	022	Bg											
18 Jun	S12E25	056	0500	17	Fki	040	Bgd	1										
19 Jun	S12E12	056	0480	20	Fki	042	Bgd	6				5						
20 Jun	S12W01	056	0600	20	Fkc	079	Bgd	2				2						
21 Jun	S12W14	056	0510	21	Fkc	064	Bgd	1				3						
22 Jun	S12W27	056	0460	21	Fkc	047	Bgd	1				2						
23 Jun	S12W40	056	0470	21	Fhc	047	Bgd	2				2						
24 Jun	S11W53	054	0510	21	Fki	036	Bgd	1				2						
25 Jun	S11W67	055	0400	22	Fki	027	Bgd	1										
26 Jun	S11W80	055	0360	17	Fki	010	Bg	1				2						
27 Jun	S10W90	052	0210	03	Cao	003	Bg	4										
									20	0	0	0	18	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 056

<i>Region 636</i>																		
20 Jun	S10E30	025	0050	05	Cao	007	B											
21 Jun	S10E17	025	0050	07	Dso	009	B											
22 Jun	S10E04	025	0010	07	Bxo	005	B											
23 Jun	S10W11	025	0010	05	Bxo	004	B											
24 Jun	S10W24	025	0010	04	Bxo	006	B											
25 Jun	S09W36	024	0010	03	Bxo	003	B											
26 Jun	S16W49	024	0000	00	Axx	001	A											
27 Jun	S16W62	024																
									0	0	0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 025

<i>Region 637</i>																		
21 Jun	N08E63	339	0000	01	Axx	001	A											
22 Jun	N08E50	339	0010	04	Bxo	004	B											
23 Jun	N08E37	337	0010	03	Bxo	004	B											
24 Jun	N08E24	337	0020	05	Bxi	010	B											
25 Jun	N08E11	337	0030	09	Dso	012	B					1						
26 Jun	N09W03	338	0020	08	Bxo	011	B											
27 Jun	N08W16	338	0030	05	Bxo	013	B	1				1						
								1	0	0	0	2	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 338

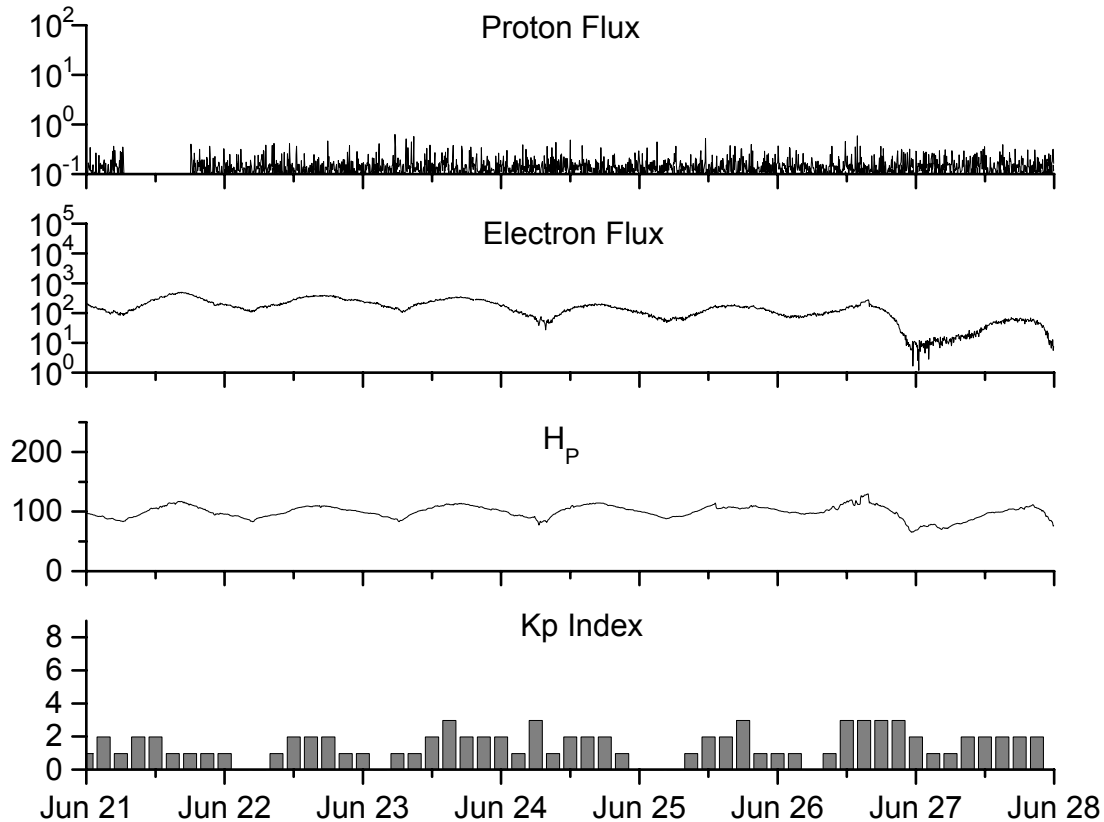


**Recent Solar Indices (preliminary)
of the observed monthly mean values**

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
2002									
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	96.6	58.4	153.1	124.1	32	21.1
November	118.9	67.2	0.57	93.6	57.0	153.1	121.8	31	20.0
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	
April	59.3	39.3	0.66			101.3		10	
May	77.3	41.5	0.54			99.7		9	

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 21 June 2004*

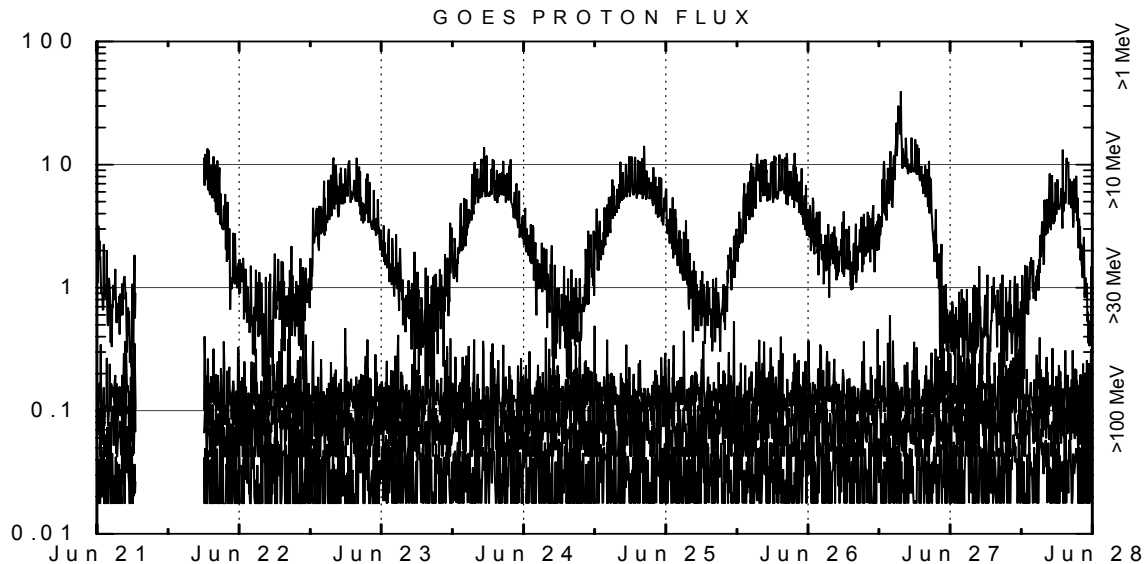
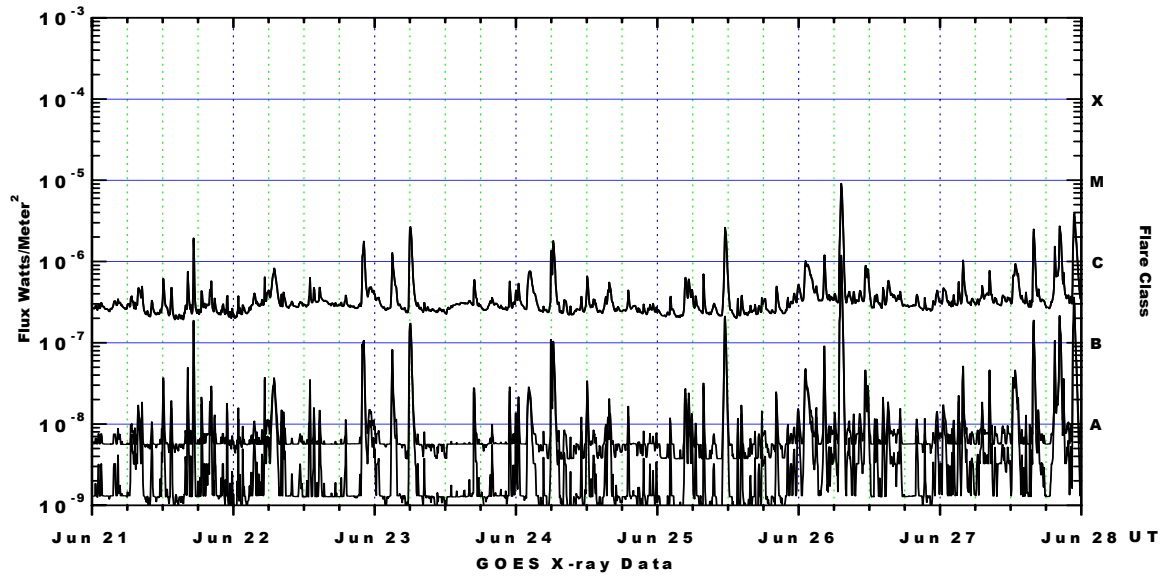
Protons plot contains the five-minute averaged integral proton flux (protons/cm²-sec-sr) as measured by GOES-11 (W98) for each of three energy thresholds: greater than 10, 50, and 100 MeV. *Electrons* plot contains the five-minute averaged integral electron flux (electrons/cm²-sec-sr) with energies greater 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.

