

## **Space Weather Highlights 20 – 26 June 2005**

**SWO PRF 1556  
28 June 2005**

Solar activity ranged from very low to low. Only a few low-level C-class flares were observed from one of the two regions present on the visible disk. During this summary period, Region 779 (S18, L=335, class/area, Eki/460 on 18 June) was the largest sunspot group, but decayed steadily as it approached the west limb. It rotated quietly around the limb on 23 June. The other sunspot group, Region 780 (S07, L=251, class/area, Dai/090 on 21 June) produced occasional low C-class flares. This region was a small, simple Beta group and was in decay by the end of the summary period. There were several disappearing filaments reported late on 25 June. SOHO/LASCO imagery depicted a full halo CME on the 25th; however, much of CME was believed to have originated from the back-side. On 26 June, a C1 flare was observed late in the period from a region near N15 on the east limb.

Solar wind data were available from the NASA Advanced Composition Explorer (ACE) spacecraft during most of the summary period. Solar wind speed ranged from a low of near 300 km/s on 22 June to a high of approximately 700 km/s late on 25 June. Solar wind speed was less than 410 km/s during the beginning of the period until a co-rotating interaction region followed by a coronal hole high speed stream became geoeffective beginning early on the 23rd. Wind speed increased to near 700 km/s early on the 25th, but closed the period near 490 km/s.

No greater than 10 MeV proton events were observed.

The greater than 2 MeV electron flux at geosynchronous orbit reached high levels from 20 - 22 June, and again on 26 June.

The geomagnetic field ranged from mostly quiet to minor storm levels with an isolated period of severe storming early on 23 June. The period began with quiet conditions, and these levels persisted though late on 22 June. The Bz component of the IMF was very quiet, with no variance much beyond +/- 3 nT through early on 23 June. At about 0100 UTC on 23 June, wind speed, density, and temperature all increased, indicating the passage of a strong co-rotating interaction region in advance of a coronal hole high speed wind stream. The IMF Bz turned sharply south to near -20 nT early on the 23rd, and maintained this orientation through about 23/0900 UTC. Thereafter, and through the remainder of the summary period, the Bz did not vary much beyond +/- 5 nT. The geomagnetic field responded with unsettled to active levels through 23/0600 UTC, with an isolated severe storm period at 23/0900 UTC, and was followed by unsettled to minor storm levels through early on the 24th. Thereafter, and through the remainder of the summary period, the field was at quiet to unsettled levels.

## **Space Weather Outlook 29 June 2005 - 25 July 2005**

Solar activity is expected be at very low to low levels.

A greater than 10 MeV proton event is not expected.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to be at high levels on 29 June - 01 July, 03 - 08 July, 12 - 19 July, and 23 - 25 July. Very high levels are expected on 10 - 11 July.

The geomagnetic field is expected to range from quiet to minor storm levels. A recurrent coronal hole high speed wind stream is expected to produce unsettled to minor storm levels on 01 - 04 July, 09 - 10 July, and 12 - 14 July. Isolated major storm levels are possible on 20 July with unsettled to minor storm levels on 21 - 23 July due to a recurrent coronal hole high speed stream. Otherwise, expect quiet to unsettled conditions.



**Daily Solar Data**

Date	Radio Flux 10.7 cm	Sun spot No.	Sunspot Area (10 <sup>6</sup> hemi.)	X-ray Background	Flares							
					X-ray Flux			Optical				
					C	M	X	S	1	2	3	4
20 June	86	47	400	A8.8	0	0	0	0	0	0	0	0
21 June	83	53	340	A7.8	1	0	0	1	0	0	0	0
22 June	80	39	250	A6.1	1	0	0	1	0	0	0	0
23 June	78	19	30	A5.3	0	0	0	0	0	0	0	0
24 June	77	14	20	A3.4	0	0	0	0	0	0	0	0
25 June	77	12	10	A2.7	1	0	0	1	0	0	0	0
26 June	79	0	0	A4.8	1	0	0	0	0	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)		
	>1 MeV	>10 MeV	>100 MeV	>.6 MeV	>2MeV	>4 MeV
	20 June	8.2E+5	1.7E+4	3.5E+3		3.9E+8
21 June	1.5E+6	1.5E+4	3.5E+3		4.8E+8	
22 June	1.8E+6	1.5E+4	3.4E+3		2.4E+8	
23 June	4.5E+5	1.5E+4	3.5E+3		1.1E+6	
24 June	9.2E+5	1.5E+4	3.2E+3		7.7E+6	
25 June	3.8E+5	1.4E+4	3.3E+3		1.1E+7	
26 June	1.3E+6	1.4E+4	3.3E+3		9.7E+7	

**Daily Geomagnetic Data**

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	20 June	2	0-0-1-1-1-1-1-0	4	1-1-1-2-2-1-0-2	5
21 June	1	0-0-0-0-0-1-1-1	1	0-0-0-0-0-0-0-2	4	1-0-0-0-1-1-2-1
22 June	6	2-1-1-1-2-1-1-3	4	2-2-1-1-1-0-1-2	7	2-2-1-2-1-1-2-3
23 June	30	3-4-6-5-4-3-3-3	49	3-5-7-5-6-4-3-3	48	4-4-7-5-5-4-4-3
24 June	7	3-3-2-2-2-1-0-1	16	4-4-2-5-3-0-0-1	17	4-5-3-3-3-1-1-2
25 June	9	2-3-1-1-2-2-3-3	14	3-3-1-4-3-3-2-3	11	3-3-1-2-2-3-2-3
26 June	6	3-2-1-1-2-1-2-1	11	3-3-1-4-3-2-1-0	8	3-3-2-2-2-2-2-1

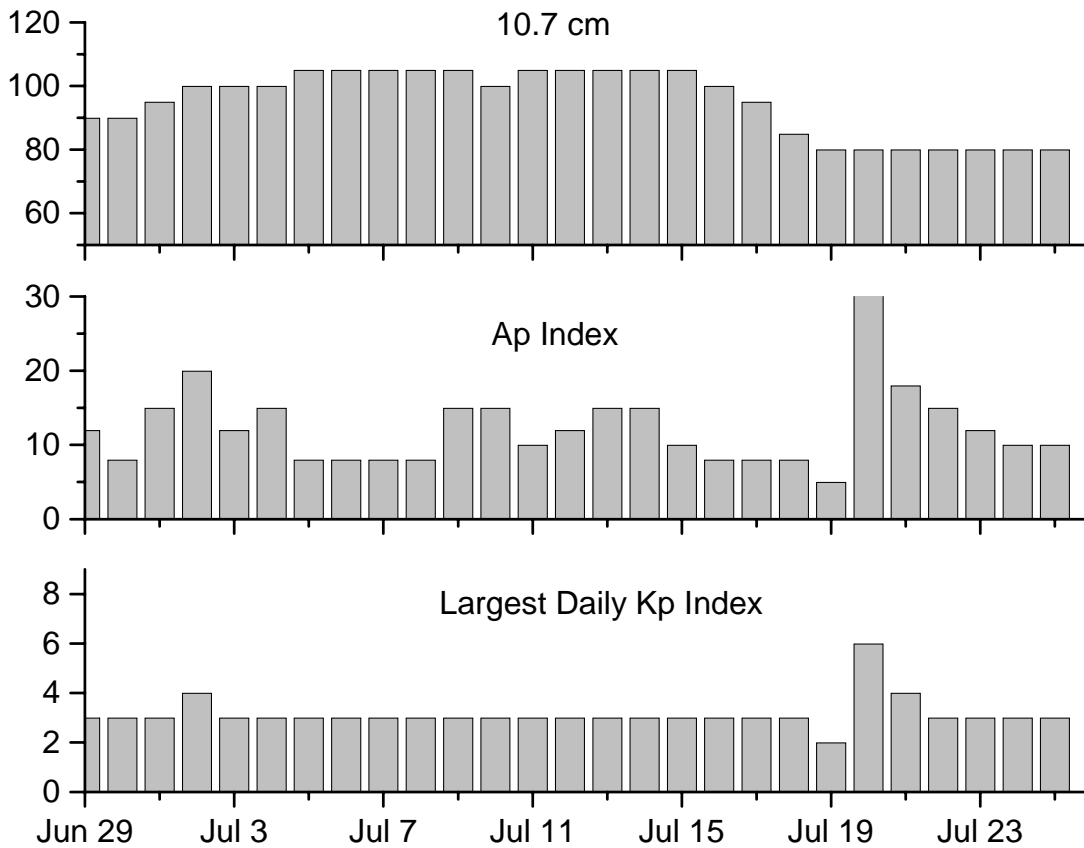


### *Alerts and Warnings Issued*

Date & Time of Issue	Type of Alert or Warning	Date & Time of Event UTC
20 Jun 0515	ALERT: Electron 2MeV Integral Flux > 1000pfu	20 Jun 0500
21 Jun 0004	5 - 245 MHz Radio Bursts	20 Jun
21 Jun 0514	ALERT: Electron 2MeV Integral Flux > 1000pfu	21 Jun 0500
22 Jun 0007	1 - 245 MHz Radio Burst	21 Jun
22 Jun 0626	ALERT: Electron 2MeV Integral Flux > 1000pfu	22 Jun 0605
22 Jun 0642	ALERT: Electron 2MeV Integral Flux > 1000pfu	22 Jun 0605
23 Jun 0002	1 - 245 MHz Radio Burst	22 Jun
23 Jun 0131	WARNING: Geomagnetic K=4	23 Jun 0132 - 1600
23 Jun 0135	ALERT: Geomagnetic K=4	23 Jun 0135
23 Jun 0215	WARNING: Geomagnetic K=5	23 Jun 0215 - 1600
23 Jun 0716	ALERT: Geomagnetic K=5	23 Jun 0717
23 Jun 0719	WARNING: Geomagnetic K=6 expected	23 Jun 0720 -23 Jun 1600
23 Jun 0722	ALERT: Geomagnetic K=6	23 Jun 0723
23 Jun 1558	EXTENDED WARNING: Geomagnetic K=5	23 Jun 0215 -23 Jun 2359
23 Jun 2354	EXTENDED WARNING: Geomagnetic K=5	23 Jun 0215 -24 Jun 1600
26 Jun 1230	ALERT: Electron 2MeV Integral Flux > 1000pfu	26 Jun 1210
26 Jun 1235	ALERT: Electron 2MeV Integral Flux > 1000pfu	26 Jun 1210
26 Jun 1240	ALERT: Electron 2MeV Integral Flux > 1000pfu	26 Jun 1210



### 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
29 Jun	90	12	3	13 Jul	105	15	3
30	90	8	3	14	105	15	3
01 Jul	95	15	3	15	105	10	3
02	100	20	4	16	100	8	3
03	100	12	3	17	95	8	3
04	100	15	3	18	85	8	3
05	105	8	3	19	80	5	2
06 Jul	105	8	3	20	80	40	6
07	105	8	3	21	80	18	4
08	105	8	3	22	80	15	3
09	105	15	3	23	80	12	3
10	100	15	3	24	80	10	3
11	105	10	3	25	80	10	3
12	105	12	3				



***Energetic Events***

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

***No Events Observed***

***Flare List***

Date	Time			Optical	Imp / Brtns	Location Lat CMD	Rgn
	Begin	Max	End	X-ray Class.			
20 June	0236	0239	0241	B1.2			
	0531	0535	0538	B1.1			780
	0606	0611	0613	B2.6			780
	0806	0809	0812	B1.5			
	1012	1022	1029	B5.4			780
	1215	1218	1223	B1.8			
	1834	1841	1848	B2.8			780
	1916	1923	1930	B3.2			780
	1946	1950	1957	B3.0			780
21 June	2235	2245	2253	B7.1			780
	0227	0232	0241	B2.0			779
	0322	0327	0333	B1.5			780
	1802	1803	1821	C2.1	Sf	S05E15	780
22 June	1914	1919	1924	B2.2			779
	0422	0428	0434	B2.5			780
	1437	1449	1506	B2.0			
23 June	1629	1630	1646	C1.8	Sf	S09E02	780
	1904	1907	1914	B1.0			779
24 June	2220	2230	2238	B1.1			779
	0127	0142	0201	B4.2			779
25 June	0340	0345	0359	C1.3	Sf	S08W38	780
	0400	0404	0406	B4.3			780
26 June	0400	0417	0432	B1.3			
	0706	0737	0759	B5.0			
	1109	1116	1124	B1.5			
	1526	1540	1555	B2.8			
	2017	2035	2055	C1.2			



### 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	1	2	3

#### Region 779

15 Jun	S17E08	335	0150	07	Dai	014	B										
16 Jun	S17W05	334	0240	08	Dai	019	B										
17 Jun	S18W19	335	0300	11	Eki	025	Bg										
18 Jun	S18W32	335	0460	11	Eki	024	B	2			1						
19 Jun	S17W45	335	0460	12	Eko	016	B	1			1						
20 Jun	S17W58	335	0340	12	Eao	015	Bg										
21 Jun	S16W71	334	0250	11	Eai	013	Bg										
22 Jun	S19W82	332	0180	09	Dao	002	B										
23 Jun	S19W95	332															
								3	0	0	2	0	0	0	0	0	

Crossed West Limb.

Absolute heliographic longitude: 334

#### Region 780

17 Jun	S07E66	250	0040	01	Cso	002	B	2									
18 Jun	S08E52	251	0070	05	Dao	006	B	3			7						
19 Jun	S07E38	252	0040	04	Dso	007	B										
20 Jun	S07E24	253	0060	04	Dao	012	B										
21 Jun	S07E12	251	0090	06	Dai	020	B	1			1						
22 Jun	S08W01	251	0070	06	Dro	017	B	1			1						
23 Jun	S08W14	251	0030	08	Dao	009	B										
24 Jun	S08W30	254	0020	04	Bxo	004	B										
25 Jun	S07W43	254	0010	01	Axx	002	A	1			1						
26 Jun	S07W56	254															
								8	0	0	10	0	0	0	0	0	

Still on Disk.

Absolute heliographic longitude: 251

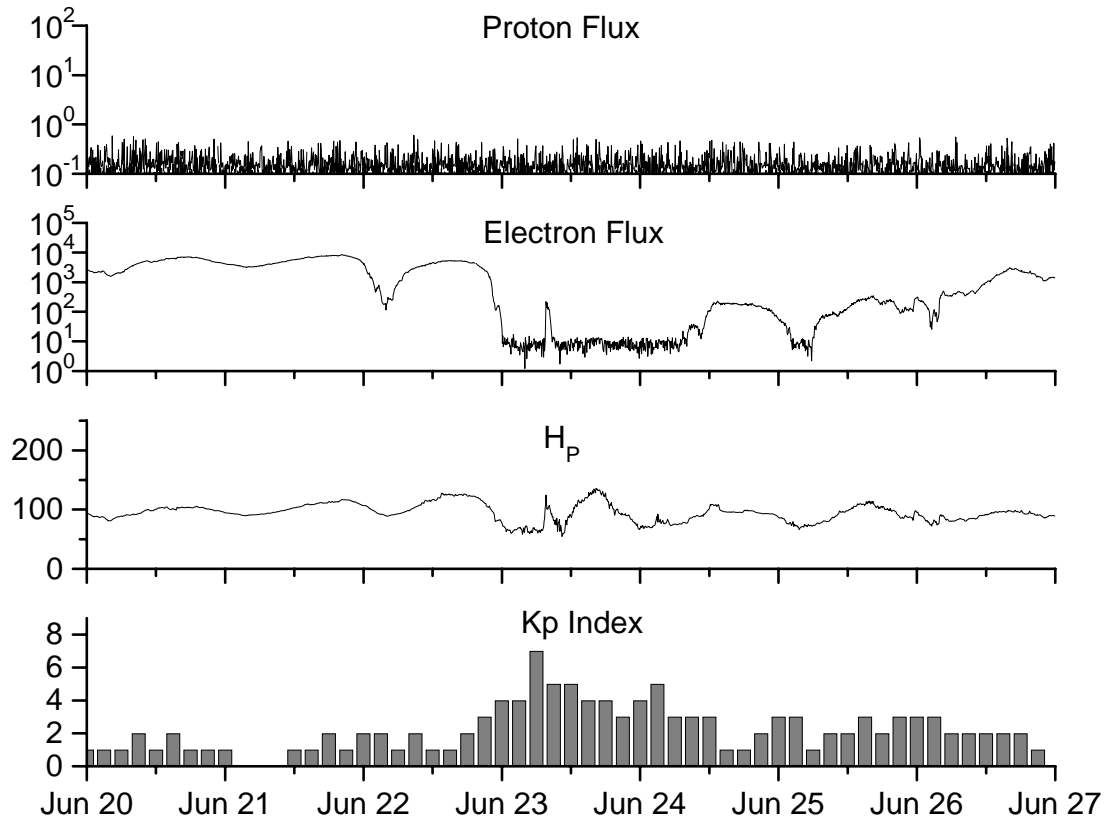


**Recent Solar Indices (preliminary)  
of the observed monthly mean values**

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>2003</b>									
June	118.4	77.4	0.65	113.6	65.2	129.4	130.2	24	21.5
July	132.8	85.0	0.64	106.9	62.0	127.8	127.2	19	22.0
August	114.3	72.7	0.64	102.8	60.3	122.1	125.2	23	22.2
September	82.6	48.8	0.59	100.7	59.8	112.3	123.7	18	21.8
October	118.9	65.5	0.55	96.6	58.4	153.1	121.8	35	21.1
November	118.9	67.3	0.57	93.6	57.0	153.1	120.1	28	20.0
December	75.4	46.5	0.62	91.4	55.0	115.1	118.0	16	18.6
<b>2004</b>									
January	62.3	37.7	0.61	87.9	52.0	114.1	116.3	22	18.1
February	75.6	45.8	0.61	84.2	49.4	107.0	115.5	13	17.7
March	81.0	49.1	0.61	80.9	47.2	112.2	114.6	14	16.9
April	59.3	39.3	0.66	77.9	45.6	101.2	112.3	11	15.5
May	77.3	41.5	0.54	74.1	43.9	99.8	109.2	8	14.3
June	78.9	43.2	0.55	70.4	41.7	97.4	107.2	8	14.0
July	87.8	51.0	0.58	68.3	40.2	118.5	105.9	23	13.8
August	69.5	40.9	0.59	66.6	39.3	110.1	105.0	11	13.8
September	50.0	27.7	0.55	63.7	37.6	103.1	103.7	10	13.6
October	77.9	48.4	0.62	61.3	35.9	105.7	102.1	9	13.5
November	70.5	43.7	0.62	60.0	35.4	113.2	101.5	26	14.1
December	34.7	17.9	0.52			94.6		11	
<b>2005</b>									
January	52.0	31.3	0.60			102.4		22	
February	45.4	29.1	0.64			97.3		11	
March	41.0	24.8	0.60			90.0		12	
April	41.5	24.4	0.59			85.9		12	
May	65.4	42.6	0.65			99.5		20	

**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 20 June 2005*

*Protons* plot contains the five-minute averaged integral proton flux (protons/cm<sup>2</sup>-sec -sr) as measured by GOES-11 (W115) 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-12 (W75).

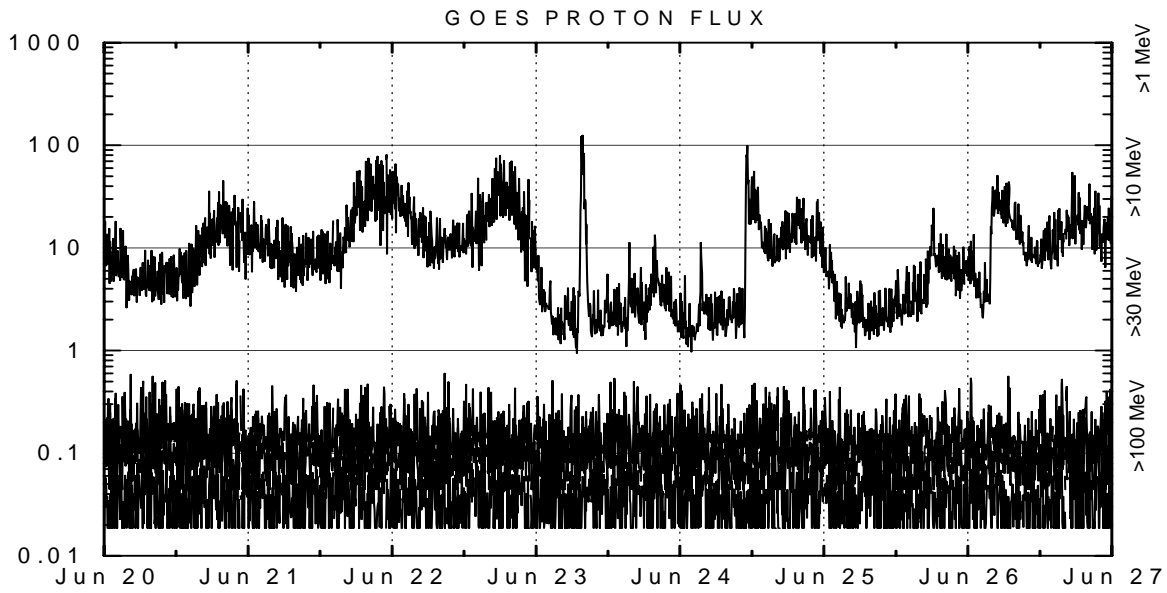
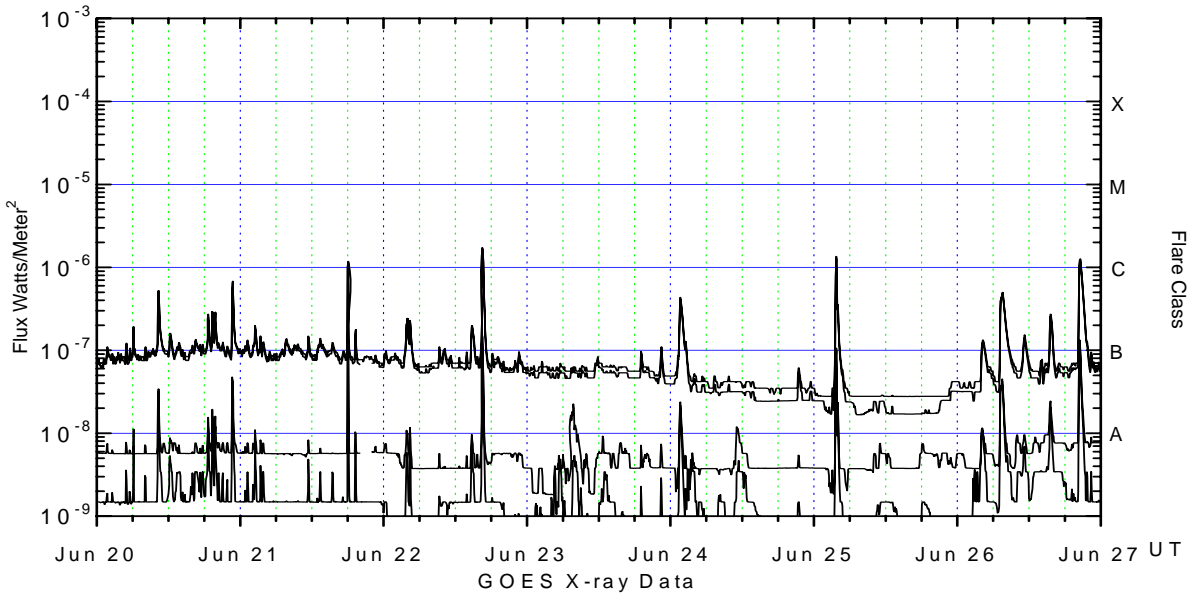
*H<sub>p</sub>* plot contains the five minute averaged magnetic field H - component in nanoteslas (nT) as measured by GOES-12. The H component is parallel to the spin axis of the satellite, which is nearly parallel to the Earth's rotation axis.

*K<sub>p</sub>* 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 Hartland, UK. These data are made available through cooperation from the Geological Survey of Canada (GSC), British Geological Survey (BGS) 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 parallel 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 ( $\text{watts/m}^2$ ) 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 ( $\text{protons/cm}^2\text{-sec-sr}$ ) as measured by GOES-11 (W115) for each of the energy thresholds: >1, >10, >30 and >100 MeV. P10 event threshold is 10 pfu ( $\text{protons/cm}^2\text{-sec-sr}$ ) at greater than 10 MeV.

