

## Space Weather Highlights 06 – 12 June 2005

SWO PRF 1554  
14 June 2005

Solar activity ranged from very low to low. During the summary period, 15 low-level C-class flares were observed from three active regions on the disk; Region 772 (S18, L=133, class/area, Dao/180 on 08 June), Region 775 (N08, L=054, class/area, Dkc/360 on 09 June), and Region 776 (S06, L=042, class/area, Ekc/600 on 09 June). On 08 June, a partial halo CME was observed on LASCO imagery beginning at 0512 UTC. The CME was slow moving and had a weak, Earth-directed component. The source for this activity appeared to be related to a disappearing solar filament just to the northwest of Region 772. Late in the period, two long duration events were observed from Region 775, both with associated CMEs. The first X-ray event was a C3.5/Sf at 12/0236 UTC, while the second was a C3.0/Sf at 12/1609 UTC. The first event was visible on LASCO imagery at 12/0236 UTC as a faint halo CME with a weak Earth-directed component. The plane-of-sky speed of this CME was calculated at about 550 km/s. The second CME associated with the later event appeared to be directed in a narrow angle to the west, but could provide a glancing blow. The remainder of the disk and limb were quiet and stable.

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 high of about 650 km/s early on 06 June to a low of about 295 km/s late on 11 June. The period began with the field at active to minor storm conditions as the solar wind varied between 600 to 650 km/s, while the IMF Bz oscillated between +/- 7 nT due to a geoeffective coronal hole high speed wind stream. By late on the 6th, and through midday on the 7th, wind speeds became steady at about 500 km/s while the IMF Bz turned southward steady at about -5 nT as effects from the full halo CME on 03 June became geoeffective. However, by midday on the 7th, and through early on the 12th, wind speed slowly decayed and the IMF Bz did not vary much beyond +/- 3 nT. At about 12/0650 UTC, ACE wind data measured a weak disturbance which was most likely the arrival of the shock related to the 09 June CME. Solar wind speed jumped from about 340 km/s to near 575 km/s by midday on the 12th, while the IMF Bz responded with north and south oscillations of +/- 20 nT. By the end of the summary period, solar wind speeds were constant at about 500 km/s, while the Bz component of the IMF remained south at between -10 to -20 nT.

No greater than 10 MeV proton events were observed this period.

The greater than 2 MeV electron flux at geosynchronous orbit reached high levels from 06 - 12 June.

The geomagnetic field ranged from predominately quiet to minor storm levels with a couple of isolated periods of major to severe storm conditions at higher latitudes late on 12 June. The period began with quiet to active conditions at both the middle and high latitudes as a recurrent coronal hole high speed wind stream became geoeffective. By midday on 07 June, periods of minor storm conditions were observed at high latitudes. By late on the 7th, effects of the coronal hole waned and the field became quiet. Other than some isolated periods of unsettled levels, these conditions persisted through early on 12 June. By early on the 12th, geomagnetic conditions increased to mostly unsettled to active, and by midday, the higher latitudes observed minor to severe storm levels as effects from the 09 June CME became geoeffective.

## Space Weather Outlook 15 June - 11 July 2005

Solar activity is expected to be at very low to low levels for the entire forecast period.

There is a slight chance for a greater than 10 MeV proton event.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to be at high levels on 15 June, 18 – 19 June, 21 – 24 June, and 27 June – 11 July.

The geomagnetic field is expected to range from quiet to minor storm levels. Effects from a weak halo CME on 12 June, coupled with a small coronal hole wind stream, is expected to produce unsettled to active levels on 15 – 17 June. Recurrent coronal hole high speed wind streams are expected to produce active to minor storm levels on 24 - 27 June, and again on 01 – 04 July. 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
06 June	106	89	760	B1.9	4	0	0	4	3	0	0	0
07 June	109	94	1030	B1.6	2	0	0	3	0	0	0	0
08 June	116	100	1130	B2.2	4	0	0	3	0	0	0	0
09 June	116	99	1130	B2.2	2	0	0	4	0	0	0	0
10 June	114	103	1070	B2.4	1	0	0	1	0	0	0	0
11 June	108	85	920	B1.5	0	0	0	0	0	0	0	0
12 June	103	85	840	B1.6	2	0	0	6	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
	06 June	1.3E+6	1.8E+4	4.3E+3	2.5E+8	
07 June	1.5E+6	1.9E+4	4.0E+3	5.5E+7		
08 June	6.5E+5	1.5E+4	3.5E+3	9.5E+7		
09 June	6.2E+5	1.5E+4	3.7E+3	1.3E+8		
10 June	5.0E+5	1.6E+4	3.7E+3	1.0E+8		
11 June	6.9E+5	1.5E+4	3.6E+3	6.9E+7		
12 June	1.3E+6	1.5E+4	3.2E+3	9.9E+6		

**Daily Geomagnetic Data**

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	06 June	7	3-3-2-0-1-1-2-3	12	4-3-4-1-2-1-1-2	13
07 June	11	3-4-3-2-2-1-2-2	23	3-4-5-5-4-2-1-2	18	4-5-4-2-3-2-3-3
08 June	3	2-1-1-0-1-1-1-1	4	2-2-1-3-0-1-0-0	6	2-2-1-2-1-2-1-1
09 June	3	1-0-0-1-2-1-1-1	5	1-1-0-1-3-3-0-0	5	1-1-0-2-2-2-2-1
10 June	2	1-0-0-0-1-0-1-1	2	1-1-0-2-1-0-0-1	5	2-1-1-1-1-1-1-2
11 June	6	2-1-1-1-1-1-2-3	2	1-0-1-1-0-0-1-2	6	2-1-1-1-1-2-2-3
12 June	23	2-2-4-3-4-4-4-5	48	4-2-3-3-6-5-7-5	35	2-2-4-4-4-5-5-6

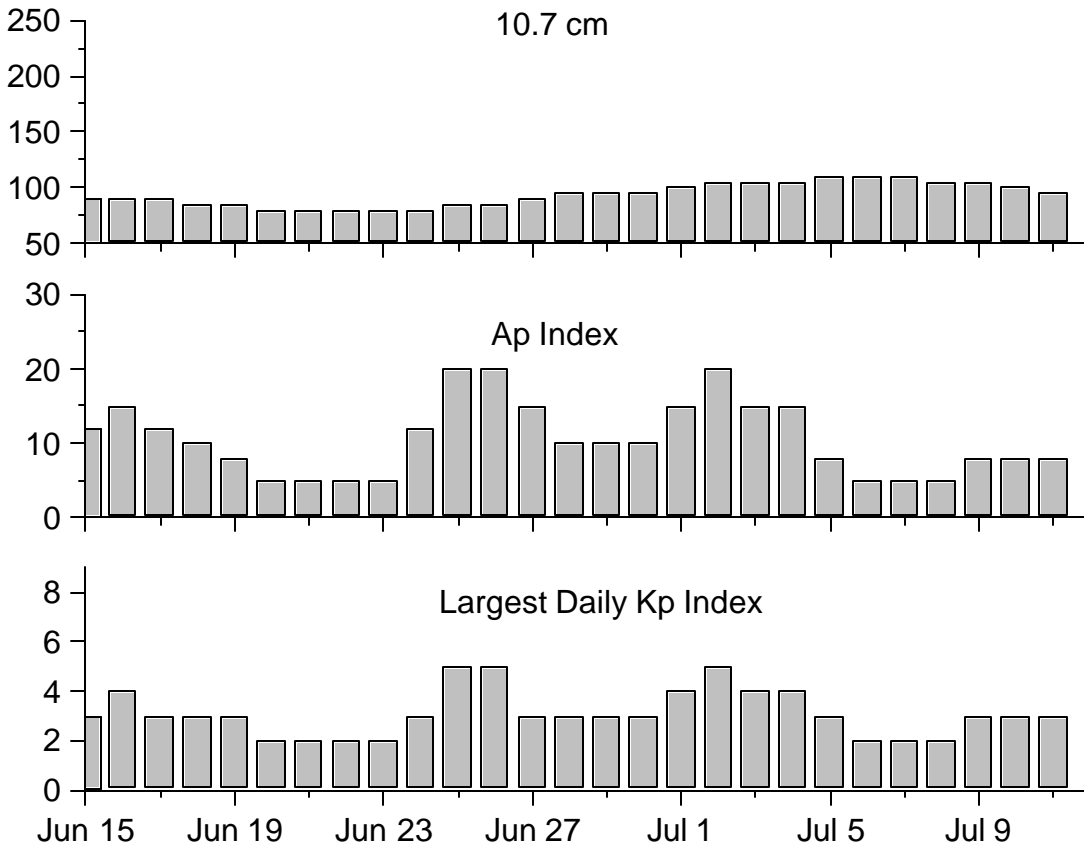


### *Alerts and Warnings Issued*

<u>Date &amp; Time of Issue</u>	<u>Type of Alert or Warning</u>	<u>Date &amp; Time of Event UTC</u>
06 Jun 0007	5 – 245 MHz Radio Bursts	05 Jun
06 Jun 0007	1 – 245 MHz Radio Noise Storm	05 Jun
06 Jun 0249	ALERT: Electron 2MeV Integral Flux > 1000pfu	06 Jun 0230
06 Jun 0514	ALERT: Electron 2MeV Integral Flux > 1000pfu	06 Jun 0500
07 Jun 0007	19 – 245 MHz Radio Bursts	06 Jun
07 Jun 0007	1 – 245 MHz Radio Noise Storm	06 Jun
07 Jun 0334	WARNING: Geomagnetic K=4 expected	07 Jun 0335 - 1500
07 Jun 0340	ALERT: Geomagnetic K=4	07 Jun 0340
07 Jun 0409	ALERT: Geomagnetic K=5	07 Jun 0408
07 Jun 1331	ALERT: Electron 2MeV Integral Flux > 1000pfu	07 Jun 1310
08 Jun 0009	6 – 245 MHz Radio Bursts	07 Jun
08 Jun 0009	1 – 245 MHz Radio Noise Storm	07 Jun
08 Jun 1242	ALERT: Electron 2MeV Integral Flux > 1000pfu	08 Jun 1220
09 Jun 0004	4 – 245 MHz Radio Bursts	08 Jun
09 Jun 0004	1 – 245 MHz Radio Noise Storm	08 Jun
09 Jun 0703	ALERT: Electron 2MeV Integral Flux > 1000pfu	09 Jun 0615
10 Jun 0034	14 – 245 MHz Radio Bursts	09 Jun
10 Jun 0034	1 – 245 MHz Radio Noise Storm	09 Jun
10 Jun 0816	ALERT: Electron 2MeV Integral Flux > 1000pfu	10 Jun 0755
11 Jun 0009	5 – 245 MHz Radio Bursts	10 Jun
11 Jun 0009	1 – 245 MHz Radio Noise Storm	10 Jun
11 Jun 1115	ALERT: Electron 2MeV Integral Flux > 1000pfu	11 Jun 1055
12 Jun 0436	1 – 245 MHz Radio Noise Storm	11 Jun
12 Jun 0753	WARNING: Geomagnetic K=4	12 Jun 0753 - 1600
12 Jun 0802	ALERT: Geomagnetic K=4	12 Jun 0803
12 Jun 1456	ALERT: Electron 2MeV Integral Flux > 1000pfu	12 Jun 1435
12 Jun 1551	EXTENDED WARNING: Geomagnetic K=4	12 Jun 0753 - 2359
12 Jun 1642	ALERT: Geomagnetic K=5	12 Jun 1642
12 Jun 1813	WARNING: Geomagnetic K=5 expected	12 Jun 1814 - 2359
12 Jun 1851	WARNING: Geomagnetic K=6	12 Jun 1855 - 2359
12 Jun 2036	ALERT: Geomagnetic K=5	12 Jun 2032
12 Jun 2211	EXTENDED WARNING: Geomagnetic K=5	12 Jun 1814 – 13 Jun 0600



### 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
15 Jun	90	12	3	29 Jun	95	10	3
16	90	15	4	30	95	10	3
17	90	12	3	01 Jul	95	15	4
18	85	10	3	02	95	20	5
19	85	8	3	03	100	15	4
20	80	5	2	04	105	15	4
21	80	5	2	05	110	8	3
22	80	5	2	06	110	5	2
23	80	5	2	07	110	5	2
24	80	12	3	08	105	5	2
25	85	20	5	09	105	8	3
26	85	20	5	10	100	8	3
27	90	15	3	11	95	8	3
28	95	10	3				



***Energetic Events***

Date	Time		X-ray	Optical Information			Peak		Sweep Freq	
	Begin	Max	Class	Integ	Imp/	Location	Radio Flux		Intensity	
				Flux	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.				
06 June	0103	0107	0124	B4.0			773	
	B0303	0305	0309		Sf	S04E69		
	B0324	0327	0331		Sf	S04E68		
	0332	0335	0424	C1.1	1f	S16W21	772	
	0410	0426	0446		1f	S05E65	776	
	0420	0428	0432	C1.1			776	
	B0433	0434	0516		1f	S04E66		
	B0556	0557	0600		Sf	S04E63		
	0733	0741	0745	B8.7			776	
	1201	1207	1211	C1.0			776	
	1849	1851	1909	C1.2	Sf	S15W26	772	
	1943	1947	1951	B3.1				
	07 June	0143	0143	0153	B2.9	Sf	S05E53	776
		0151	0151	0200		Sf	N11E46	775
0209		0213	0217	B2.9			776	
1338		1339	1354	C3.0	Sf	S16W37	772	
1714		1729	1733	B7.1			776	
1833		1836	1838	B4.5			776	
1908		1914	1918	C2.5			776	
2348		2352	2358	B5.1			776	
08 June	0128	0129	0154	C1.2	Sf	S05E40	776	
	0306	0317	0323	C1.1			776	
	0408	0419	0425	B3.4			776	
	0616	0624	0656	C2.4	Sf	S05E37	776	
	0636	0640	0645	C1.7			776	
	1231	1237	1239	B8.6			776	
	1253	1258	1308	B7.9			776	
	1440	1446	1453	B7.5			776	
	1642	1649	1657	B5.2			772	
	1714	1718	1731	B6.1			776	
09 June	2119	2119	2122	B7.1	Sf	S05E28	776	
	0022	0023	0025		Sf	N11E20	775	
	B0224	0224	0229		Sf	S04E31		
	0259	0301	0311	B5.2	Sf	N11E19	775	
	0625	0628	0631	B4.7			775	



**Flare List – continued.**

Date	Begin	Time		Class.	Optical	Imp / Lat CMD	Location	Rgn
		Max	End		X-ray Brtns			
09 June		1328	1334	1423	C1.5			775
		1628	1631	1634	C1.0			776
		1657	1657	1705	B8.7	Sf	S06E18	776
		2024	2027	2029	B4.4			775
10 June		0304	0310	0319	C2.0			772
		0839	0839	0842		Sf	S05E08	776
		0843	0846	0848	B6.5			776
11 June		0520	0523	0525	B2.1			
		0546	0550	0552	B2.6			775
		2223	2227	2230	B2.2			776
12 June		0110	0115	0121	B4.9			
		0206	0213	0234	C3.5	Sf	N06W21	775
		0224	0232	0254		Sf	S05W15	776
		0250	0251	0334		Sf	N11W21	775
		0334	0406	0417		Sf	N10W19	775
		1603	1605	1614	C3.0	Sf	N09W32	775
		1615	1615	1624		Sf	N09W32	775

**Region Summary**

Date	Location		Sunspot Characteristics				Flares				
	Helio		Area (10 <sup>-6</sup> )	Extent hemi)	Spot (helio)	Spot Class	Mag Count	X-ray		Optical	
	(° Lat ° CMD)	Lon						Class	C	M	X

*Region 769*

28 May	S07E69	153	0050	01	Hsx	001	A								
29 May	S08E59	150	0010	01	Axx	001	A								
30 May	S08E49	147	0020	04	Bxo	004	B								
31 May	S11E43	139	0010	01	Axx	002	A								
01 Jun	S10E30	139	0020	02	Hax	001	A								
02 Jun	S10E15	141	0010	01	Axx	001	A								
03 Jun	S06E09	134	0000	01	Axx	001	A								
04 Jun	S06W04	134													
05 Jun	S06W17	134													
06 Jun	S06W30	134													
07 Jun	S06W43	134													
08 Jun	S06W56	134													
09 Jun	S06W69	134													
10 Jun	S06W82	134													

0 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 134



**Region Summary – continued.**

Date	Location		Sunspot Characteristics				Flares								
	( ° Lat ° CMD)	Helio Lon	Area (10 <sup>-6</sup> )	Extent (hemi)	Spot (helio)	Spot Class	Mag Count	X-ray		Optical					
							Class	C	M	X	S	1	2	3	4
<i>Region 772</i>															
31 May	S18E50	132	0050	05	Cao	006	B								
01 Jun	S18E36	133	0130	07	Dac	017	Bg	8	1	5	1				
02 Jun	S17E23	133	0110	08	Dai	013	Bg	1		1					
03 Jun	S17E09	134	0120	06	Dai	018	B	2	1	2	1				
04 Jun	S17W06	136	0160	10	Dac	020	B	7		5					
05 Jun	S18W18	134	0110	10	Dso	015	B	1		1					
06 Jun	S18W30	132	0130	08	Dao	010	B	2		1	1				
07 Jun	S18W44	133	0130	11	Eao	013	B	1		1					
08 Jun	S18W58	133	0180	10	Dao	010	B								
09 Jun	S18W71	133	0100	08	Dao	009	B								
10 Jun	S18W84	133	0060	04	Dso	002	B	1							
								23	2	0	16	3	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 136

<i>Region 773</i>															
01 Jun	S12E76	093	0110	08	Dso	004	B								
02 Jun	S12E63	093	0140	09	Dao	003	B								
03 Jun	S13E50	093	0140	08	Dao	006	B								
04 Jun	S13E36	094	0190	11	Eso	008	B								
05 Jun	S13E23	093	0120	09	Dao	006	B								
06 Jun	S12E09	093	0110	09	Dao	010	B								
07 Jun	S14W04	093	0130	09	Dao	005	B								
08 Jun	S14W18	093	0090	09	Dso	006	B								
09 Jun	S14W31	093	0070	09	Dao	004	B								
10 Jun	S14W44	093	0070	06	Cso	004	B								
11 Jun	S15W54	089	0060	03	Cso	003	B								
12 Jun	S15W67	089	0040	02	Hsx	002	A								
								0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 093



**Region Summary – continued.**

Date	Location		Sunspot Characteristics				Flares								
	( ° Lat ° CMD)	Helio Lon	Area (10 <sup>-6</sup> )	Extent (hemi)	Spot (helio)	Spot Class	Mag Count	X-ray		Optical					
							Class	C	M	X	S	1	2	3	4

*Region 774*

04 Jun	N05W06	136	0010	04	Cso	004	B									
05 Jun	N04W21	137	0010	01	Hrx	002	A									
06 Jun	N06W31	133	0040	07	Cso	005	B									
07 Jun	N04W45	134	0040	07	Cao	004	B									
08 Jun	N04W65	140	0020	01	Axx	001	A									
09 Jun	N03W78	140														
10 Jun	N03W91	140														
										0	0	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 136

*Region 775*

04 Jun	N12E75	055	0160	03	Hsx	002	A									
05 Jun	N12E61	055	0160	04	Hsx	001	A									
06 Jun	N12E48	054	0180	05	Cao	007	B									
07 Jun	N10E35	054	0240	05	Cao	006	B				1					
08 Jun	N10E21	054	0270	05	Dki	012	Bgd									
09 Jun	N08E08	054	0360	08	Dkc	016	Bgd	1		2						
10 Jun	N08W05	054	0330	08	Dkc	017	Bgd									
11 Jun	N10W19	054	0330	07	Dki	013	Bg									
12 Jun	N10W32	054	0360	06	Dhc	017	Bg	2		5						
								3	0	0	8	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 054

*Region 776*

05 Jun	S05E71	045	0230	07	Dao	003	B	1		1						
06 Jun	S05E61	041	0300	11	Eao	007	B	2			1					
07 Jun	S06E47	042	0490	11	Eko	016	B	1		1						
08 Jun	S06E33	042	0570	10	Dki	021	Bg	4		3						
09 Jun	S06E20	042	0600	11	Ekc	030	Bg	1		1						
10 Jun	S06E07	042	0580	13	Ekc	026	Bg			1						
11 Jun	S06W08	043	0520	12	Eki	028	Bg									
12 Jun	S06W21	043	0440	11	Eki	036	Bg			1						
								9	0	0	8	1	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 042





***Region Summary – continued.***

Date	Location		Sunspot Characteristics				Flares								
	( ° Lat ° CMD)	Helio Lon	Area (10 <sup>-6</sup> )	Extent (hemi)	Spot (helio)	Spot Class	Mag Count	X-ray			Optical				
							Class	C	M	X	S	1	2	3	4

*Region 777*

10 Jun	N05E57	352	0030	04	Bxo	004	B									
11 Jun	N05E41	354	0010	00	Axx	001	A									
12 Jun	N05E28	354														
										0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude:354

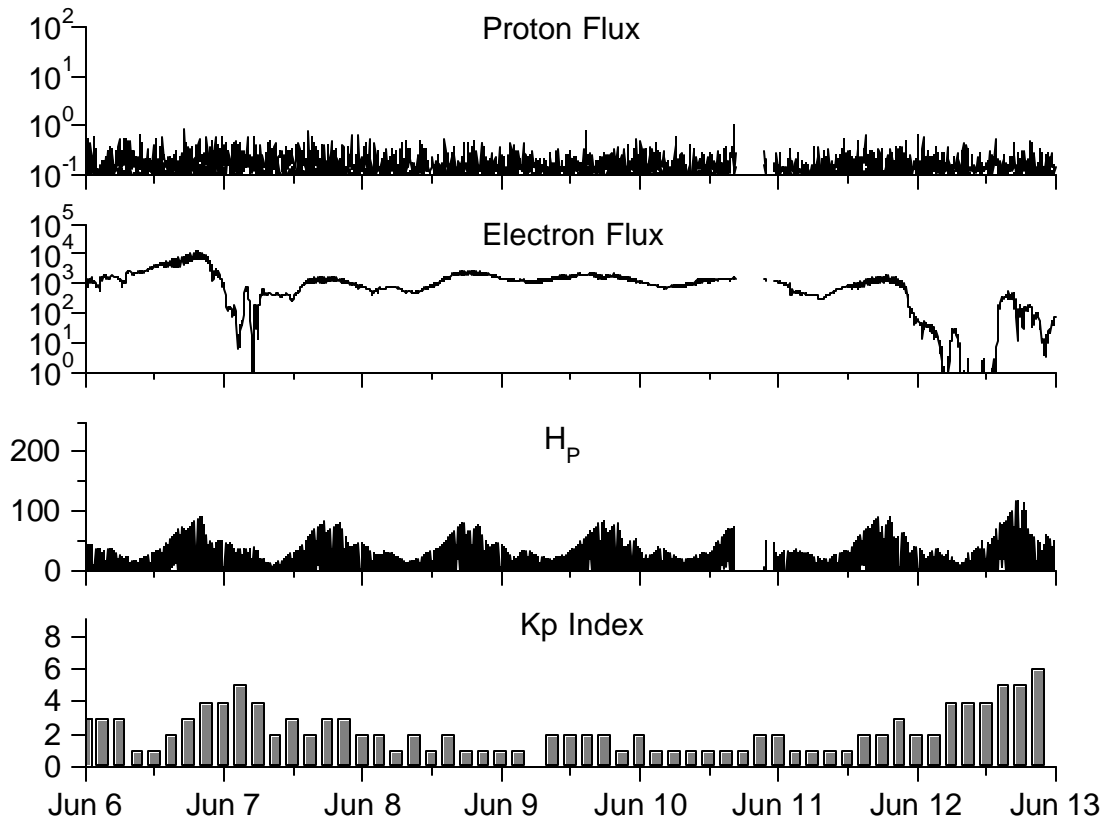


**Recent Solar Indices (preliminary)  
of the observed monthly mean values**

Month	Sunspot Numbers			Radio Flux		Geomagnetic			
	Observed values SWO	Ratio RI	Ratio RI/SWO	Smooth values SWO	Smooth RI	*Penticton 10.7 cm Value	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 06 June 2005*

*Protons* plot contains the five-minute averaged integral proton flux (protons/cm<sup>2</sup>–sec –sr) as measured by GOES-11 (W114) for each of three energy thresholds: greater than 10, 50, and 100 MeV.

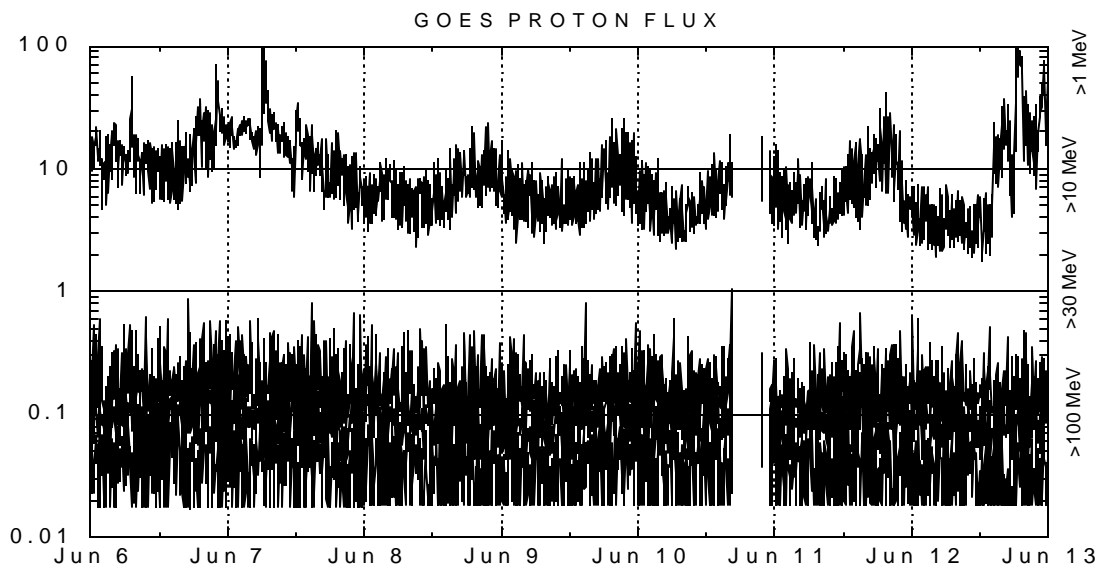
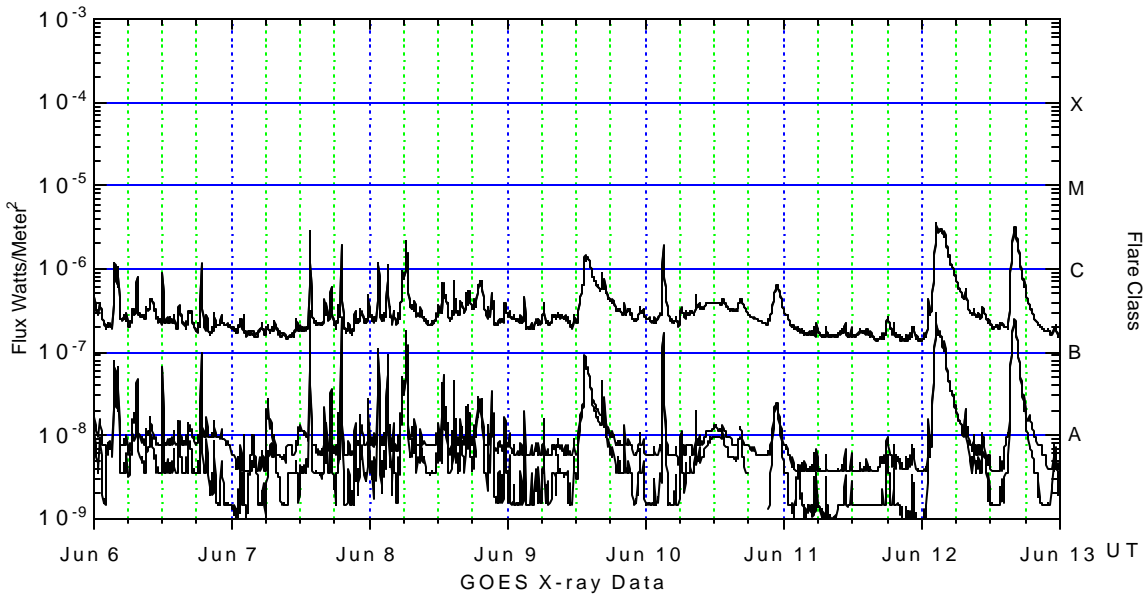
*Electrons* plot contains the five-minute averaged integral electron flux (electrons/cm<sup>2</sup>–sec –sr) with energies greater than 2 MeV at GOES-12 (W75).

*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 (watts/m<sup>2</sup>) 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/cm<sup>2</sup>-sec-sr) as measured by GOES-11 (W114) for each of the energy thresholds: >1, >10, >30 and >100 MeV. P10 event threshold is 10 pfu (protons/cm<sup>2</sup>-sec-sr) at greater than 10 MeV.

