

Space Weather Highlights
21 May – 27 May 2007

SEC PRF 1656
22 May 2007

Solar activity was very low. Isolated B-class flares occurred during most days including a B3 at 22/1447 UTC and a B5 at 23/0732 UTC, both of which were associated with Type II radio sweeps.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux events at geosynchronous orbit reached high levels during 24 – 27 May.

Geomagnetic field activity was at quiet to unsettled levels on 21 May. Activity increased to quiet to active levels on 22 May with a brief minor storm period detected at high latitudes. A further increase to quiet to major storm levels occurred on 23 May with a brief severe storm period detected at high latitudes. The 22 – 23 May disturbance was due to a coronal mass ejection passage associated with a 19 May filament disappearance from old Region 956 (N03, L =071, class/area Dkc/300 on 17 May). ACE solar wind data indicated the CME passage began late on 21 May with increased IMF total field intensity (which reached a peak of 14.3 nT at 22/0514 UTC) and periods of sustained southward IMF Bz (minimum – 11.3 nT at 23/0932 UTC). A recurrent coronal hole high-speed stream influenced the field during 24 – 27 May. Field activity ranged from quiet to major storm levels during this time. ACE data indicated a peak velocity of 750 km/sec at 26/1123 UTC and minimum IMF Bz of -6.9 nT at 24/1350 UTC associated with the high-speed stream. Proton densities reached a peak of 35.5 p/cc at 22/2340 UTC in advance of the high-speed stream.

Space Weather Outlook
30 May – 25 June 2007

Solar activity is expected to be at very low to low levels. Isolated C-class flares are possible during 08 – 21 June due to the return of old Region 956 to the visible disk.

No proton events are expected at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to reach high levels during 30 May – 03 June, 17 June and 20 – 25 June.

Quiet conditions are expected during 30 May – 02 June. Activity is expected to increase to quiet to active levels during 03 – 04 June due to a recurrent coronal hole high-speed stream. Activity is expected to decrease to mostly quiet levels during 05 – 13 June. An increase to unsettled to active periods is expected during 14 – 15 June due to a recurrent coronal hole high-speed stream. Quiet to unsettled conditions are expected during 16 – 19 June. Another recurrent coronal hole high-speed stream is expected to affect the field during 20 – 23 June. Unsettled to minor storm conditions are expected during this time with major storm periods possible at high latitudes. Activity is expected to decrease to quiet to unsettled levels during 24 – 25 June.



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 May	73	15	90	A2.2	0	0	0	0	0	0	0	0
22 May	72	14	40	<A1.0	0	0	0	1	0	0	0	0
23 May	70	12	20	<A1.0	0	0	0	0	0	0	0	0
24 May	70	0	0	<A1.0	0	0	0	0	0	0	0	0
25 May	68	0	0	<A1.0	0	0	0	0	0	0	0	0
26 May	68	0	0	<A1.0	0	0	0	0	0	0	0	0
27 May	67	0	0	<A1.0	0	0	0	0	0	0	0	0

Daily Particle Data

Date	Proton Fluence (protons/cm ² -day-sr)			Electron Fluence (electrons/cm ² -day-sr)		
	>1 MeV	>10 MeV	>100 MeV	>.6 MeV	>2MeV	>4 MeV
21 May	1.4E+6	1.6E+4	3.8E+3		3.7E+7	
22 May	1.6E+6	1.5E+4	3.3E+3		1.5E+7	
23 May	7.8E+6	1.6E+4	3.1E+3		3.8E+6	
24 May	4.8E+6	1.6E+4	3.4E+3		1.0E+8	
25 May	5.1E+6	1.5E+4	3.3E+3		4.9E+8	
26 May	6.5E+6	1.6E+4	3.5E+3		5.8E+8	
27 May	4.8E+6	1.6E+4	3.6E+3		8.6E+8	

Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
21 May	6	3-1-0-0-1-1-2-3	3	2-1-0-0-0-1-1-2	6	3-1-0-0-1-1-2-3
22 May	10	1-2-2-2-3-2-3-3	15	1-1-1-5-4-2-3-3	11	1-2-1-2-2-3-4-3
23 May	28	4-4-4-5-3-2-5-4	51	4-3-6-7-6-3-4-4	42	4-3-5-6-5-2-6-5
24 May	21	5-4-4-2-3-3-3-3	35	5-4-5-3-5-5-3-4	28	6-5-4-2-3-4-4-4
25 May	9	1-2-3-2-2-2-3-2	31	2-3-5-6-4-5-3-2	16	2-4-4-3-3-3-4-2
26 May	10	3-3-2-2-3-2-2-2	32	3-4-5-5-6-4-2-2	16	4-4-3-3-3-3-3-2
27 May	10	2-3-3-3-2-2-2-2	17	3-3-3-5-3-3-2-2	12	3-3-3-3-2-2-2-2

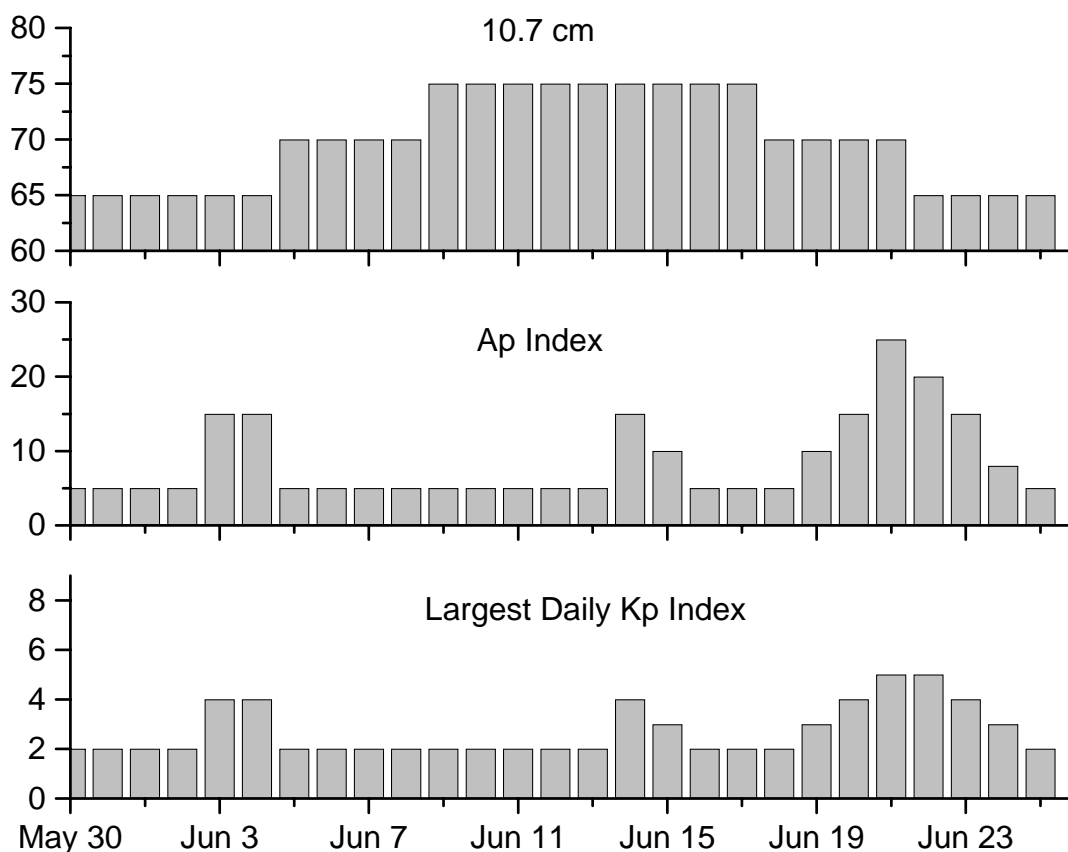


Alerts and Warnings Issued

Date & Time of Issue	Type of Alert or Warning	Date & Time of Event UTC
21 May 1741	ALERT: Electron 2MeV Integral Flux ≥ 1000 pfu	21 May 1725
22 May 1514	ALERT: Type II Radio Emission	22 May 1436
22 May 2108	WATCH: Geomagnetic $A \geq 20$	25 May
23 May 0035	WARNING: Geomagnetic $K = 4$	23 May 0034 – 1600
23 May 0041	ALERT: Geomagnetic $K = 4$	23 May 0040
23 May 0712	WARNING: Geomagnetic $K = 5$	23 May 0712 – 1000
23 May 0857	ALERT: Geomagnetic $K = 5$	23 May 0856
23 May 0925	EXTENDED WARNING: Geomagnetic $K = 5$	23 May 0712 – 1300
23 May 0935	ALERT: Type II Radio Emission	23 May 0722
23 May 1037	ALERT: Geomagnetic $K = 6$	23 May 1036
23 May 1958	WARNING: Geomagnetic $K = 4$	23 May 1959 – 24/1600
23 May 2001	ALERT: Geomagnetic $K = 4$	23 May 2000
23 May 2202	WATCH: Geomagnetic $A \geq 20$	26 May
23 May 2217	WARNING: Geomagnetic $K = 5$	23 May 2217 – 24/1600
23 May 2240	ALERT: Geomagnetic $K = 5$	23 May 2239
24 May 1332	ALERT: Electron 2MeV Integral Flux ≥ 1000 pfu	24 May 1305
24 May 1556	EXTENDED WARNING: Geomagnetic $K = 4$	23 May 1959 – 25/1600
25 May 0554	ALERT: Electron 2MeV Integral Flux ≥ 1000 pfu	25 May 0545
25 May 1559	EXTENDED WARNING: Geomagnetic $K = 4$	29 May 1959 – 25/2359
25 May 2233	EXTENDED WARNING: Geomagnetic $K = 4$	23 May 1959 – 26/1600
26 May 0956	ALERT: Electron 2MeV Integral Flux ≥ 1000 pfu	26 May 0935
27 May 0500	ALERT: Electron 2MeV Integral Flux ≥ 1000 pfu	27 May 0500
27 May 0901	ALERT: Geomagnetic $K = 4$	27 May 0900
27 May 0906	WARNING: Geomagnetic $K = 4$	27 May 0910 – 1600



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 May	65	5	2	13 June	75	5	2
31	65	5	2	14	75	15	4
01 June	65	5	2	15	75	10	3
02	65	5	2	16	75	5	2
03	65	15	4	17	75	5	2
04	65	15	4	18	70	5	2
05	70	5	2	19	70	10	3
06	70	5	2	20	70	15	4
07	70	5	2	21	70	25	5
08	70	5	2	22	65	20	5
09	75	5	2	23	65	15	4
10	75	5	2	24	65	8	3
11	75	5	2	25	65	5	2
12	75	5	2				



Energetic Events

Energy Events											
Date	Time			X-ray		Optical Information			Peak		Sweep Freq
	$\frac{1}{2}$			Integ		Imp/	Location	Rgn	Radio Flux		Intensity
	Begin	Max	Max	Class	Flux	Brtns	Lat CMD	#	245	2695	II IV

No Events Observed

Flare List

Date	Time			Optical	Imp / Brtns	Location		Rgn
	Begin	Max	End	X-ray Class.		Lat	CMD	
21 May	0233	0241	0259	B7.8				
	0846	0903	0920	B2.5				
	1710	1714	1717	B1.3				
	1956	2000	2010	B1.0				
22 May	0637	0640	0642	B1.1				
	0644	0647	0650	B1.0				
	1430	1447	1519	B3.9				
	2322	2326	2332	B2.7	Sf	N02W47		956
23 May	0134	0139	0146	B2.8				
	0715	0732	0750	B5.3				
24 May	<i>No Flares Observed</i>							
25 May	0753	0756	0759	B1.0				
26 May	1634	1644	1651	B1.8				
27 May	<i>No Flares Observed</i>							

Region Summary

Location			Sunspot Characteristics												
			Flares					X-ray				Optical			
Date	Helio		Area	Extent	Spot	Spot	Mag								
	(° Lat ° CMD)	Lon	(10 ⁻⁶ hemi)	(helio)	Class	Count	Class	C	M	X	S	1	2	3	4
<i>Region 953</i>															
25 Apr	S14E73	310	0230	04	Hsx	004	B								
26 Apr	S10E61	309	0450	11	Hkx	007	A								
27 Apr	S10E49	308	0500	07	Dkc	008	Bd				1				
28 Apr	S10E36	308	0520	08	Dkc	010	Bg								
29 Apr	S10E23	308	0500	05	Dki	008	Bgd								
30 Apr	S10E09	308	0480	05	Dki	013	Bgd				1				
01 May	S12W04	308	0440	07	Cko	008	Bg								
02 May	S10W17	308	0420	07	Cko	010	B	1				1			
03 May	S11W30	308	0380	07	Cko	010	B				1				
04 May	S10W44	308	0330	06	Cko	009	B								
05 May	S10W57	307	0260	05	Cko	008	B	1				1			
06 May	S10W69	305	0120	05	Cao	004	B								
07 May	S11W82	305	0190	03	Hkx	002	A								
08 May	S11W98	308	0090	03	Axx	002	A								
								2	0	0	3	2	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 308



Region Summary – continued.

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

Region 954

30 Apr S05E29	288	0030	04	Cao	005	B
01 May S06E16	288	0040	03	Bxo	004	B
02 May S06E01	290	0030	03	Bxo	003	B
03 May S07W12	290	0020	02	Bxo	003	B
04 May S07W25	290					
05 May S07W38	290					
06 May S07W51	290					
07 May S07W64	290					
08 May S07W77	290					

0 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 290

Region 955

09 May S10E22	175	0250	05	Dao	008	B
10 May S09E08	176	0080	06	Dso	010	B
11 May S09W06	176	0150	08	Dao	014	B
12 May S09W21	178	0090	08	Dao	011	B
13 May S09W35	179	0050	10	Cao	008	B

0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 176

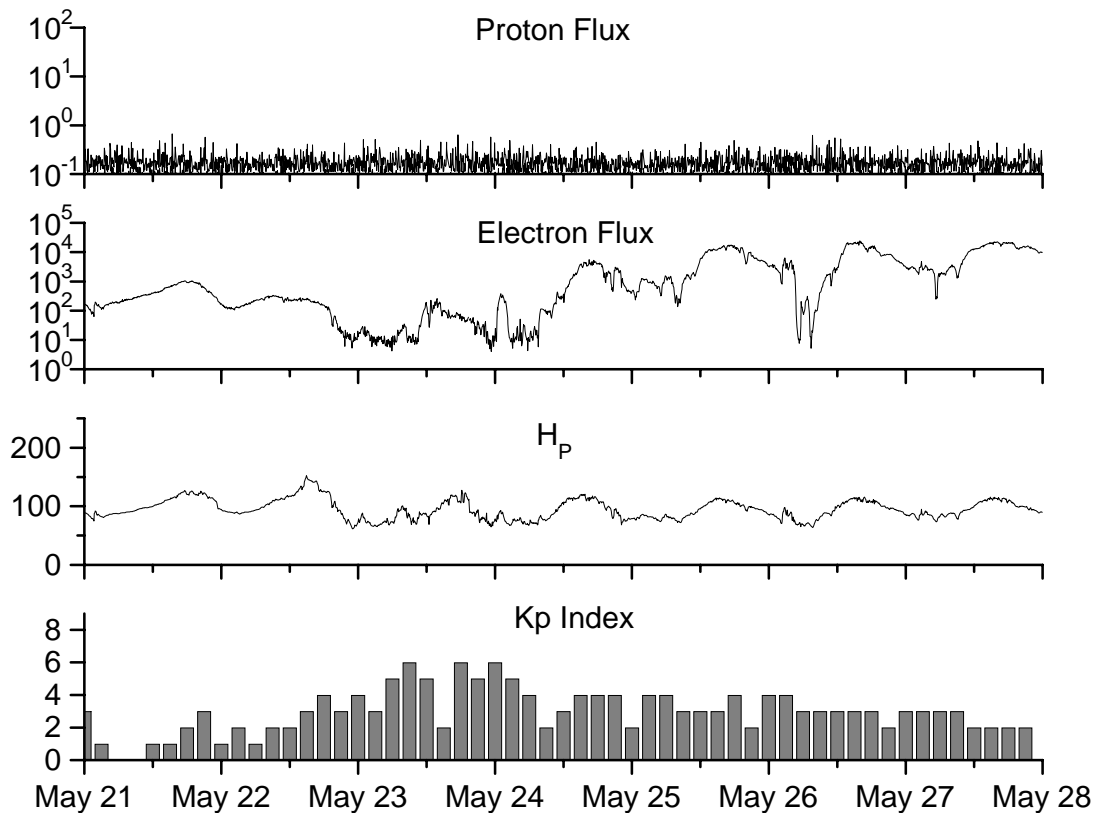


**Recent Solar Indices (preliminary)
of the observed monthly mean values**

Month	Sunspot Numbers			Radio Flux		Geomagnetic			
	Observed values	Ratio	Smooth values	*Penticton	Smooth	Planetary	Smooth		
	SEC	RI	RI/SEC	SEC	RI	10.7 cm	Value	Ap	Value
2005									
May	65.4	42.6	0.65	48.3	29.0	99.5	93.2	20	14.8
June	59.8	39.6	0.66	47.9	28.9	93.7	91.9	13	13.9
July	71.0	39.9	0.56	48.1	29.2	96.6	90.9	16	13.1
August	65.6	36.4	0.55	45.4	27.5	90.7	89.3	16	12.2
September	39.2	22.1	0.56	42.9	25.9	90.8	87.8	21	11.8
October	13.0	8.5	0.65	42.6	25.5	76.7	87.4	7	11.6
November	32.2	18.0	0.56	42.1	24.9	86.3	86.7	8	11.1
December	62.6	41.2	0.66	40.1	23.0	90.8	85.4	7	10.4
2006									
January	28.0	15.4	0.55	37.2	20.8	83.8	84.0	6	9.9
February	5.3	4.7	0.89	33.4	18.7	76.6	82.6	6	9.2
March	21.3	10.8	0.51	31.0	17.4	75.5	81.6	8	8.4
April	55.2	30.2	0.55	30.6	17.1	89.0	80.9	11	7.9
May	39.6	22.2	0.56	30.7	17.3	81.0	80.8	8	7.9
June	37.7	13.9	0.37	28.9	16.3	80.1	80.6	9	8.3
July	22.6	12.2	0.54	27.2	15.3	75.8	80.3	7	8.7
August	22.8	12.9	0.57	27.6	15.6	79.0	80.3	9	8.7
September	25.2	14.5	0.58	27.7	15.6	77.8	80.2	8	8.7
October	15.7	10.4	0.66	25.2	14.2	74.3	79.4	8	8.6
November	31.5	21.5	0.68			86.4		9	
December	22.2	13.6	0.61			84.3		15	
2007									
January	26.6	16.9	0.64			83.5		6	
February	17.2	10.6	0.62			77.8		6	
March	9.7	4.8	0.49			72.3		7	
April	6.9	3.7	0.54			72.4		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 May 2007

Protons plot contains the five-minute averaged integral proton flux (protons/cm²-sec-sr) as measured by GOES-11 (W135) for each of three energy thresholds: greater than 10, 50, and 100 MeV.

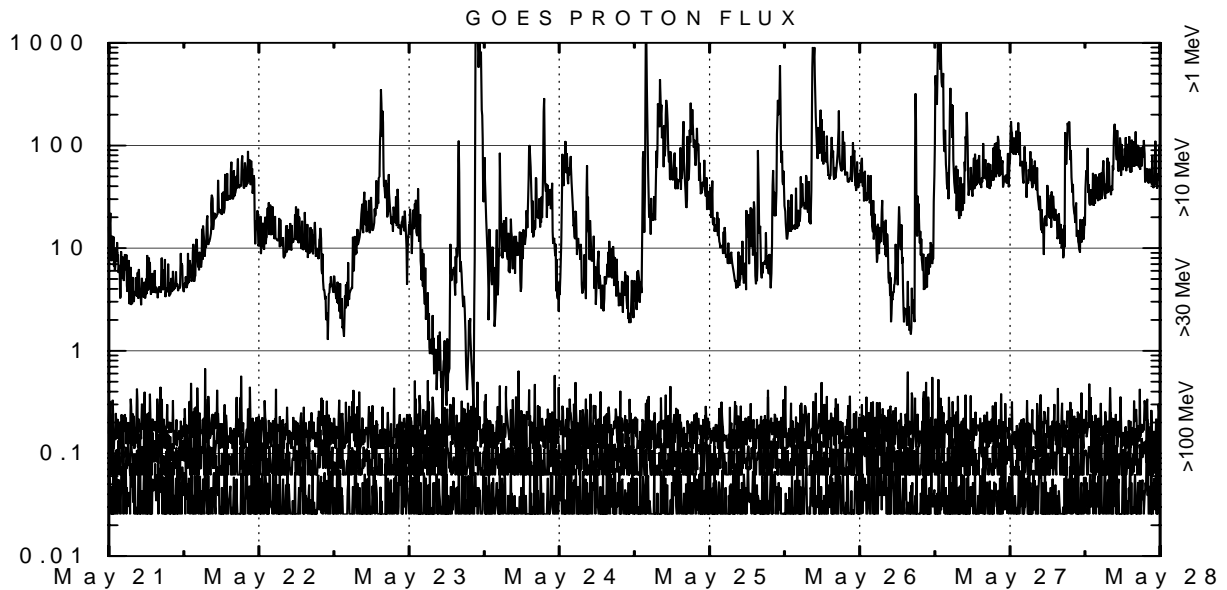
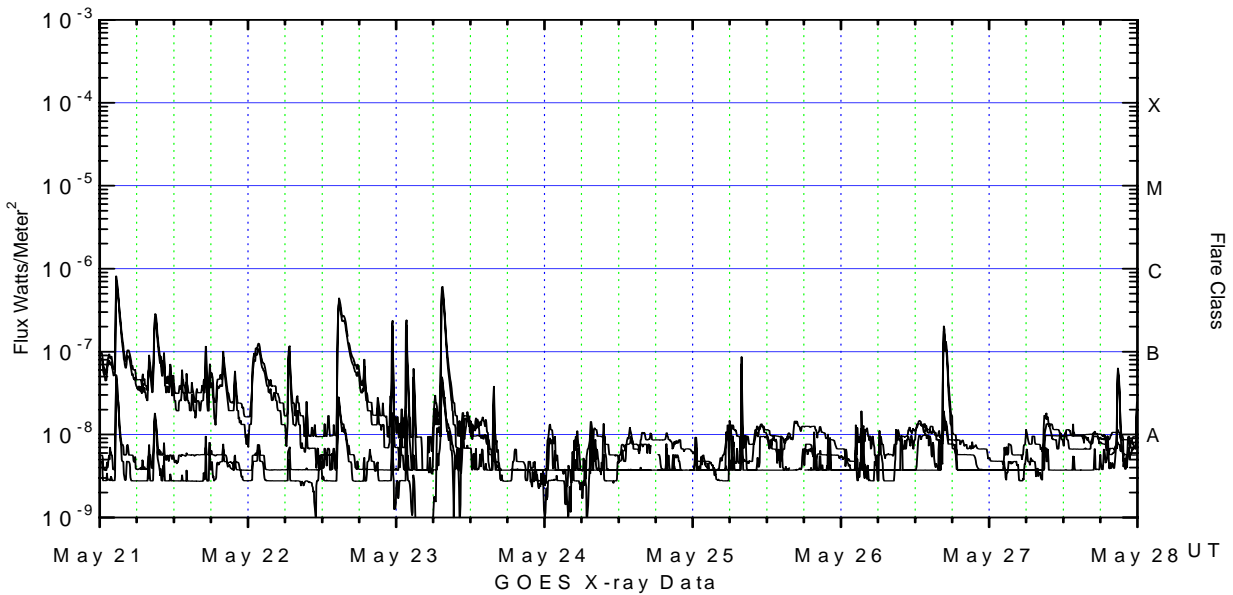
Electrons plot contains the five-minute averaged integral electron flux (electrons/cm²-sec-sr) with energies greater than 2 MeV at GOES-12 (W075).

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.

Kp 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 Kp values derived from a more extensive network of magnetometers.

The data included here are those now available in real time at the SEC 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 Kp 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^2) as measured by GOES 10 (W060) and GOES 11 (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 (W135) 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.

