

Space Weather Highlights
21 – 27 April 2008

SEC PRF 1704
29 April 2008

Solar activity was very low. Region 992 (N13W17, L= 275, class/area, Cso/040 on 23 April) formed on the disk on 22 April, but decayed to a spotless plage region by 25 April. On 26 April, a B3/Sf flare was observed at 1408 UTC from an unnumbered area of spotless plage near N08E09. The flare was associated with a wave that was visible in EUV imagery on STEREO and SOHO, a Type II radio sweep (estimated shock velocity of 608 km/s), as well as a slow, faint, asymmetrical, full-halo CME visible in coronagraph imagery. The estimated plane-of-sky speed for the CME was around 430-480 km/s.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit reached high levels during 24 - 27 April.

Geomagnetic field activity was at mostly quiet levels during 21 - 22 April. Activity increased to unsettled to active levels early on 23 April with minor to major storm periods detected at high latitudes. These levels persisted through midday on 24 April. Thereafter, and through the remainder of the summary period, activity decreased to mostly quiet levels at middle latitudes, while high latitudes experienced mostly unsettled to active levels with some isolated minor storm periods. ACE solar wind measurements indicated a solar sector boundary (SSB) crossing from 'away' orientation (positive) to 'towards' orientation (negative) at about 22/1410 UTC. Increases in solar wind velocity, density, and temperature, along with positive and negative fluctuations in IMF Bz followed the SSB. These signatures were consistent with a co-rotating interaction region (CIR) followed by a high speed solar wind stream. Interplanetary magnetic field changes during the CIR included increased Bt (peak 14 nT at 23/0708 UTC) and increased Bz variability (minimum -13 nT at 23/0710 UTC and maximum +10 nT at 23/0919 UTC). The high speed stream commenced during the later half of 23 April. ACE detected a peak velocity of 695 km/s at 23/1849 UTC and a density maximum of 20 p/cc at 23/0413 UTC. Velocities decreased during 17 April, but remained elevated during the remainder of the period (range: 450 - 525 km/sec).

Space Weather Outlook
30 April – 26 May 2008

Solar activity is expected to be very low.

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 April - 12 May and 21 - 26 May.

Geomagnetic field activity is expected to be at unsettled to active levels during 30 April - 07 May with minor storm levels possible on 01 May as a recurrent coronal hole high-speed stream affects the field. Activity is expected to decrease to quiet to unsettled levels during 08 - 18 May as the high-speed stream subsides. Activity is expected to increase to unsettled to active levels on 19 - 21 May with minor storm periods possible on 20 May as another recurrent coronal hole high-speed stream affects the field. Quiet to unsettled levels will return on 22 - 26 May.



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 April	71	0	0	<A1.0	0	0	0	0	0	0	0	0	0
22 April	71	13	40	<A1.0	0	0	0	0	0	0	0	0	0
23 April	71	13	40	<A1.0	0	0	0	0	0	0	0	0	0
24 April	70	11	10	<A1.0	0	0	0	0	0	0	0	0	0
25 April	70	0	0	<A1.0	0	0	0	0	0	0	0	0	0
26 April	69	0	0	<A1.0	0	0	0	1	0	0	0	0	0
27 April	68	0	0	<A1.0	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 April	7.3E+5	1.8E+4	4.6E+3		2.1E+7
22 April	1.1E+6	1.9E+4	4.7E+3		2.5E+7	
23 April	1.1E+7	1.8E+4	3.8E+3		1.3E+7	
24 April	2.8E+6	1.7E+4	3.6E+3		3.0E+8	
25 April	1.3E+6	1.7E+4	3.7E+3		7.8E+8	
26 April	1.5E+6	1.7E+4	3.9E+3		1.1E+9	
27 April	1.1E+6	1.7E+4	3.9E+3		5.0E+8	

Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	21 April	3	1-2-1-1-1-1-0-0	3	2-2-1-2-0-1-0-0	4
22 April	4	0-0-0-0-1-2-2-3	2	0-0-0-1-0-1-1-2	5	0-0-0-1-1-3-2-3
23 April	17	2-3-4-3-3-4-3-3	51	3-4-6-6-6-6-4-3	32	3-4-5-4-4-5-5-4
24 April	13	3-3-4-2-2-2-2-3	30	4-3-5-5-6-2-2-2	18	3-4-4-3-3-2-2-3
25 April	7	3-2-2-2-2-1-2-1	10	2-3-3-3-3-1-1-1	8	3-3-2-2-1-2-2-2
26 April	5	2-1-2-1-1-1-2-2	17	2-2-3-5-3-4-2-2	10	2-2-2-3-2-3-3-2
27 April	7	2-2-3-2-1-1-1-2	12	1-2-3-5-2-3-1-0	10	2-3-3-2-1-3-2-2

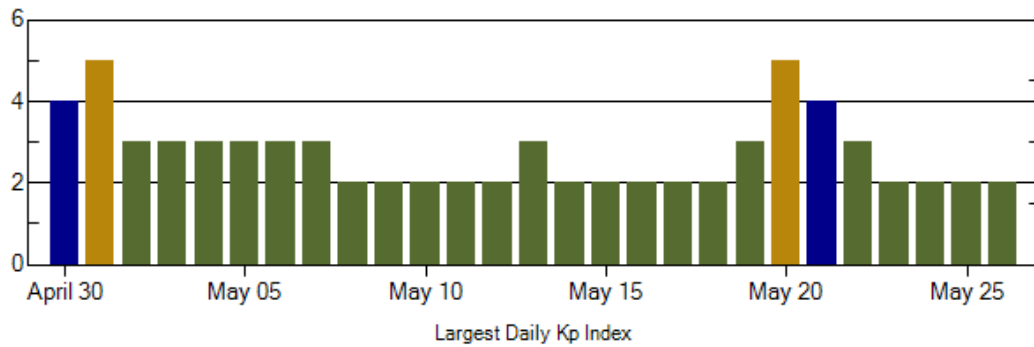
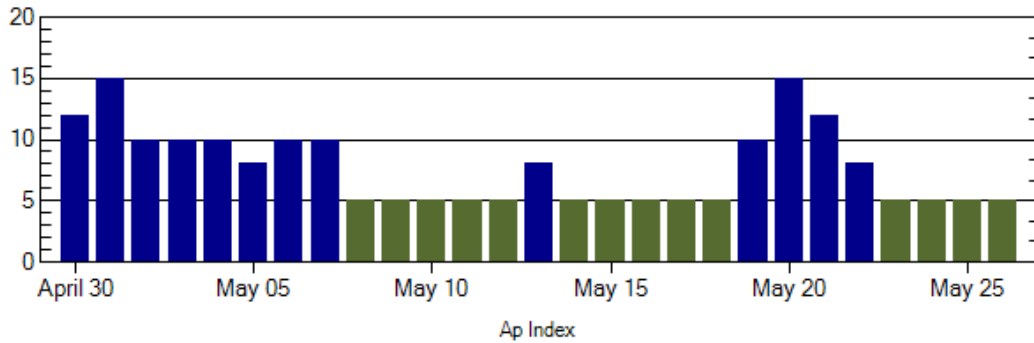
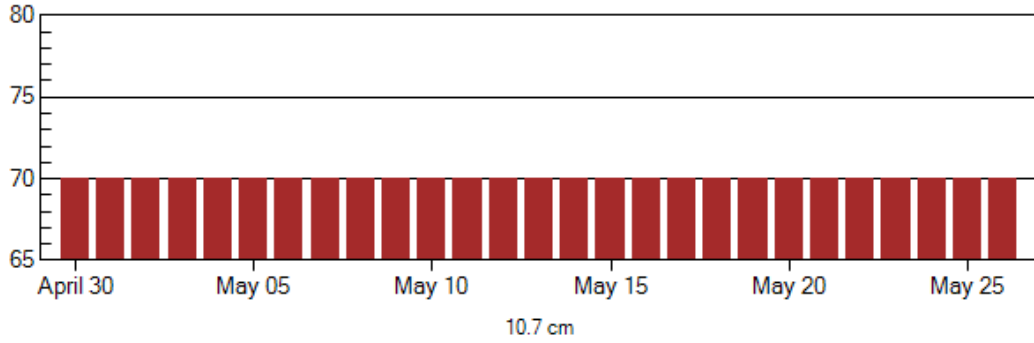


Alerts and Warnings Issued

Date & Time of Issue	Type of Alert or Warning	Date & Time of Event UTC
23 Apr 0428	WARNING: Geomagnetic K = 4	23 Apr 0430 – 1600
23 Apr 0801	ALERT: Geomagnetic K = 4	23 Apr 0801
23 Apr 0802	WARNING: Geomagnetic K = 5	23 Apr 0802 – 1600
23 Apr 0815	ALERT: Geomagnetic K = 5	23 Apr 0813
23 Apr 0817	WARNING: Geomagnetic K = 6	23 Apr 0815 – 1600
23 Apr 1609	WARNING: Geomagnetic K = 4	23 Apr 1610 – 2359
23 Apr 1611	WARNING: Geomagnetic K = 5	23 Apr 1612 – 2359
23 Apr 1612	ALERT: Geomagnetic K = 4	23 Apr 1612
23 Apr 1612	ALERT: Geomagnetic K = 5	23 Apr 1613
23 Apr 2348	EXTENDED WARNING: Geomagnetic K = 4	23 Apr 1610 – 24/1600
24 Apr 0008	ALERT: Electron 2MeV Integral Flux ≥ 1000 pfu	23 Apr 2350
24 Apr 0622	ALERT: Electron 2MeV Integral Flux ≥ 1000 pfu	24 Apr 0605
24 Apr 0630	WARNING: Geomagnetic K = 5	24 Apr 0630 – 1600
24 Apr 1555	EXTENDED WARNING: Geomagnetic K = 4	23 Apr 1610 – 25/1400
25 Apr 0500	ALERT: Electron 2MeV Integral Flux ≥ 1000 pfu	25 Apr 0500
26 Apr 0500	ALERT: Electron 2MeV Integral Flux ≥ 1000 pfu	26 Apr 0500
26 Apr 1520	ALERT: Type II Radio Emission	26 Apr 1412
26 Apr 1521	ALERT: Type IV Radio Emission	26 Apr 1404
27 Apr 0416	ALERT: Electron 2MeV Integral Flux ≥ 1000 pfu	27 Apr 0500
27 Apr 1649	ALERT: Geomagnetic K = 4	27 Apr 1649



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 Apr	70	12	4	14 May	70	5	2
01 May	70	15	5	15	70	5	2
02	70	10	3	16	70	5	2
03	70	10	3	17	70	5	2
04	70	10	3	18	70	5	2
05	70	8	3	19	70	10	3
06	70	10	3	20	70	15	5
07	70	10	3	21	70	12	4
08	70	5	2	22	70	8	3
09	70	5	2	23	70	5	2
10	70	5	2	24	70	5	2
11	70	5	2	25	70	5	2
12	70	5	2	26	70	5	2
13	70	8	3				



Energetic Events

Date	Time		X-ray		Optical Information			Peak		Sweep Freq
	Begin	Max	Max	Class	Flux	Imp/	Location	Radio Flux		Intensity
						Brtns	Lat CMD	245	2695	II
<i>No Events Observed</i>										

Flare List

Date	Time			Optical	Imp / Brtns	Location	Rgn
	Begin	Max	End	Class.		Lat CMD	
21 April	<i>No Flares Observed</i>						
22 April	<i>No Flares Observed</i>						
23 April	<i>No Flares Observed</i>						
24 April	<i>No Flares Observed</i>						
25 April	<i>No Flares Observed</i>						
26 April	1358	1400	1425	B3.8	Sf	N08E09	
27 April	<i>No Flares Observed</i>						

Region Summary

Date	Location		Sunspot Characteristics					Flares		X-ray		Optical	
	° Lat	° CMD	Area (10 ⁶ hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	C	M	X	S	1	2
												Helio Lon	1
<i>Region 990</i>													
14 Apr	N26E20	358	0010	01	Axx	001	A						
15 Apr	N27E05	000	0010	03	Bxo	002	B						
16 Apr	N27W08	000											
17 Apr	N27W21	000											
18 Apr	N27W34	000											
19 Apr	N27W47	000											
20 Apr	N27W60	000											
21 Apr	N27W73	358											
22 Apr	N27W86	358											

0 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 000



Region Summary – continued.

Location		Sunspot Characteristics						Flares															
Date	(° Lat ° CMD)	Helio Lon	Area (10 ⁻⁶ hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical												
								C	M	X	S	1	2										
<i>Region 991</i>																							
19 Apr	S09E29	282	0020	02	Bxo	003	B																
20 Apr	S10E15	283	0020	01	Axx	002	A																
21 Apr	S10E02	283																					
22 Apr	S10W11	283																					
23 Apr	S10W24	283																					
24 Apr	S10W37	283																					
25 Apr	S10W50	283																					
26 Apr	S10W63	283																					
27 Apr	S10W76	282																					
																					0 0 0 0 0 0 0 0		
Still on Disk.																							
Absolute heliographic longitude: 283																							
<i>Region 992</i>																							
22 Apr	N13W01	272	0040	03	Cso	003	B																
23 Apr	N13W17	275	0040	04	Cso	003	B																
24 Apr	N13W32	277	0010	01	Axx	001	A																
25 Apr	N13W47	279																					
26 Apr	N13W60	279																					
27 Apr	N13W73	279																					
																					0 0 0 0 0 0 0 0		
Still on Disk.																							
Absolute heliographic longitude: 272																							



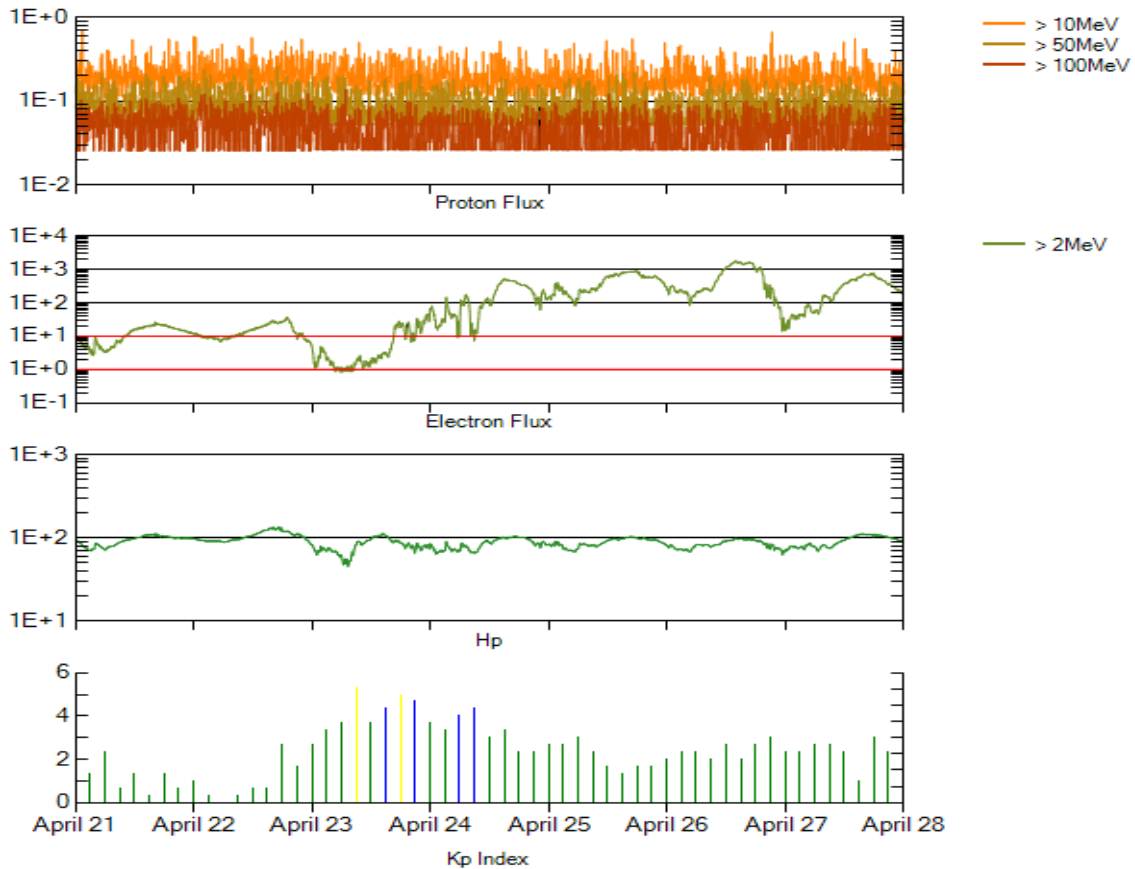
Recent Solar Indices (preliminary)
Of the observed monthly mean values

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
2006									
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	22.3	12.7	86.4	78.5	9	8.5
December	22.2	13.6	0.61	20.7	12.1	84.3	77.9	15	8.5
2007									
January	26.6	16.9	0.64	19.7	12.0	83.5	77.5	6	8.4
February	17.2	10.6	0.62	18.9	11.6	77.8	76.9	6	8.4
March	9.7	4.8	0.49	17.5	10.8	72.3	76.0	8	8.4
April	6.9	3.7	0.54	16.0	9.9	72.4	75.2	9	8.5
May	19.4	11.7	0.60	14.2	8.7	74.5	74.2	9	8.4
June	20.0	12.0	0.60	12.8	7.7	73.7	73.2	7	7.8
July	15.6	10.0	0.64	11.6	7.0	71.6	72.5	8	7.4
August	9.9	6.2	0.63	10.2	6.1	69.2	71.8	7	7.6
September	4.8	2.4	0.50	9.9	5.9	67.1	71.5	9	7.8
October	1.3	0.9	0.70			65.5		9	
November	2.5	1.7	0.68			69.7		5	
December	16.2	10.1	0.62			78.6		4	
2008									
January	5.1	3.4	0.67			72.1		6	
February	3.8	2.1	0.55			71.2		9	
March	15.9	9.3	0.58			72.9		10	

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 April 2008*

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.

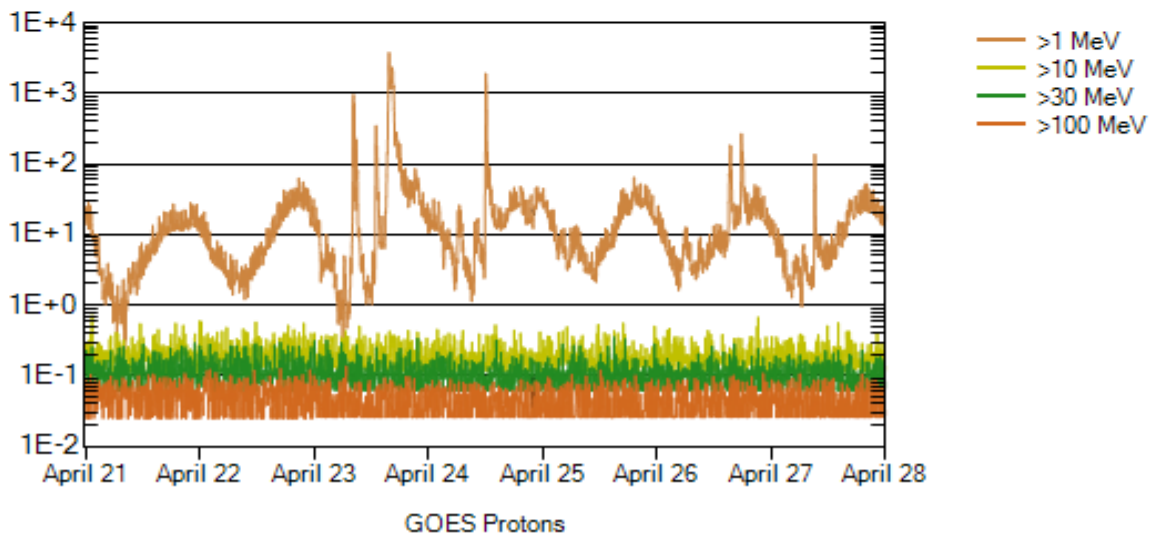
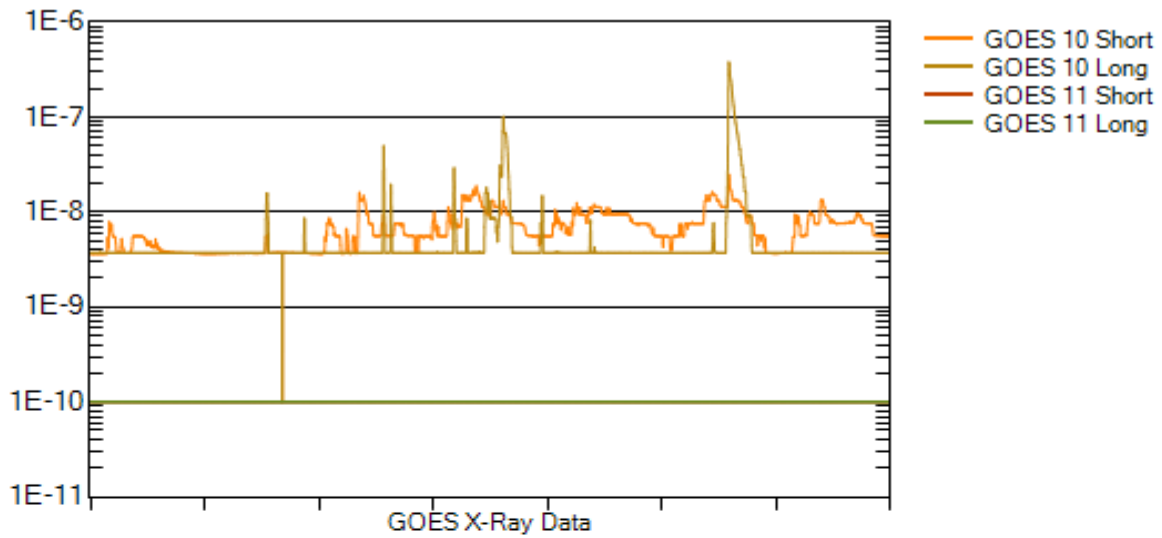
Electrons plot contains the five-minute averaged integral electron flux (electrons/cm²-sec -sr) with energies greater than 2 MeV at GOES-12 (W075).

Hp 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.

