

Space Weather Highlights
16 July – 22 July 2007

SEC PRF 1664
24 July 2007

Solar activity was very low. Regions 963 (S06, L = 056, class/area Ehi/530 on 10 July) and 964 (S04, L = 085, class/area Dso/050 on 14 July) each produced isolated B-class flares.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit reached high levels during 16 – 20 July.

The geomagnetic field was at mostly quiet levels during 16 – 19 July. Activity increased to quiet to minor storm levels during 20 - 21 July. Field activity decreased to quiet levels at all latitudes on 22 July. ACE solar wind data indicated the 20 – 21 July activity was due to a recurrent, negative-polarity coronal hole high-speed stream (HSS). Solar wind densities increased to a peak of 63 p/cc at 20/1033 UTC in advance of the HSS. Solar wind velocities increased to a high of 574 km/sec at 21/0340 UTC, then gradually decreased during the rest of the period. Significant changes in the IMF were associated with the onset of the HSS as Bt increased to a peak of 13 nT at 20/0526 UTC and Bz decreased to a minimum -11 nT at 20/0946 UTC.

Space Weather Outlook
25 July – 20 August 2007

Solar activity is expected to be at very low levels.

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 25 July, 03 August, and 12 – 15 August.

Geomagnetic field activity is expected to at quiet levels on 25 July. Activity is expected to increase to quiet to active levels on 26 July due to a recurrent coronal hole HSS. Quiet to unsettled conditions are expected during 27 – 30 July. Activity is expected to increase to quiet to active levels on 31 July due to a recurrent coronal hole HSS. Activity is expected to decrease to mostly quiet levels during 01 – 06 August. Activity is expected to increase to unsettled to minor storm levels on 31 July due to a recurrent coronal hole HSS. Activity is expected to decrease to quiet to unsettled levels during 08 – 09 August. Another recurrent coronal hole HSS is expected to increase activity to unsettled to minor storm levels on 10 – 11 August. Activity is expected to decrease to quiet to unsettled levels during 12 – 15 August. Activity is expected to increase to quiet to active levels during 16 – 17 August due to a recurrent coronal hole HSS. Activity is expected to decrease to quiet levels during the remainder of the period.



Daily Solar Data

Date	Radio	Sun	Sunspot	X-ray	Flares							
	Flux	spot	Area	Background	X-ray Flux			Optical				
	10.7 cm	No.	(10 ⁻⁶ hemi.)		C	M	X	S	1	2	3	4
16 July	73	30	260	<A1.0	0	0	0	1	0	0	0	0
17 July	72	17	240	<A1.0	0	0	0	0	0	0	0	0
18 July	70	13	210	<A1.0	0	0	0	2	1	0	0	0
19 July	68	12	110	<A1.0	0	0	0	0	0	0	0	0
20 July	67	0	0	<A1.0	0	0	0	0	0	0	0	0
21 July	66	0	0	<A1.0	0	0	0	0	0	0	0	0
22 July	66	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
16 July	8.1E+5	1.6E+4	3.6E+3		8.1E+7	
17 July	7.9E+5	1.7E+4	4.0E+3		1.2E+8	
18 July	1.1E+6	1.6E+4	4.0E+3		1.6E+8	
19 July	1.4E+6	1.8E+4	4.2E+3		1.6E+8	
20 July	6.2E+5	1.7E+4	3.9E+3		2.3E+7	
21 July	3.5E+5	1.7E+4	3.7E+3		2.2E+6	
22 July	4.3E+5	1.7E+4	3.8E+3		7.0E+6	

Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
16 July	4	1-1-1-1-1-2-2-0	7	1-2-2-3-1-1-3-1	6	1-2-2-1-2-1-1-2
17 July	2	1-0-1-1-0-1-1-0	2	1-1-1-2-0-0-0-0	5	1-1-1-1-1-2-2-2
18 July	3	1-1-1-0-1-1-1-1	2	1-1-1-0-0-0-1-0	3	1-1-0-0-1-0-1-1
19 July	3	0-0-0-1-2-2-0-1	0	0-0-1-0-0-0-0-0	3	1-0-0-0-2-1-1-1
20 July	9	0-2-2-3-4-1-2-2	17	0-2-2-5-5-3-2-2	12	0-1-3-3-4-3-2-2
21 July	10	2-4-2-2-3-1-2-1	17	4-4-3-4-4-2-1-1	12	2-5-2-2-2-2-3-2
22 July	3	1-1-1-1-1-1-1-0	3	1-2-2-2-0-0-0-0	4	1-2-1-0-1-1-1-1

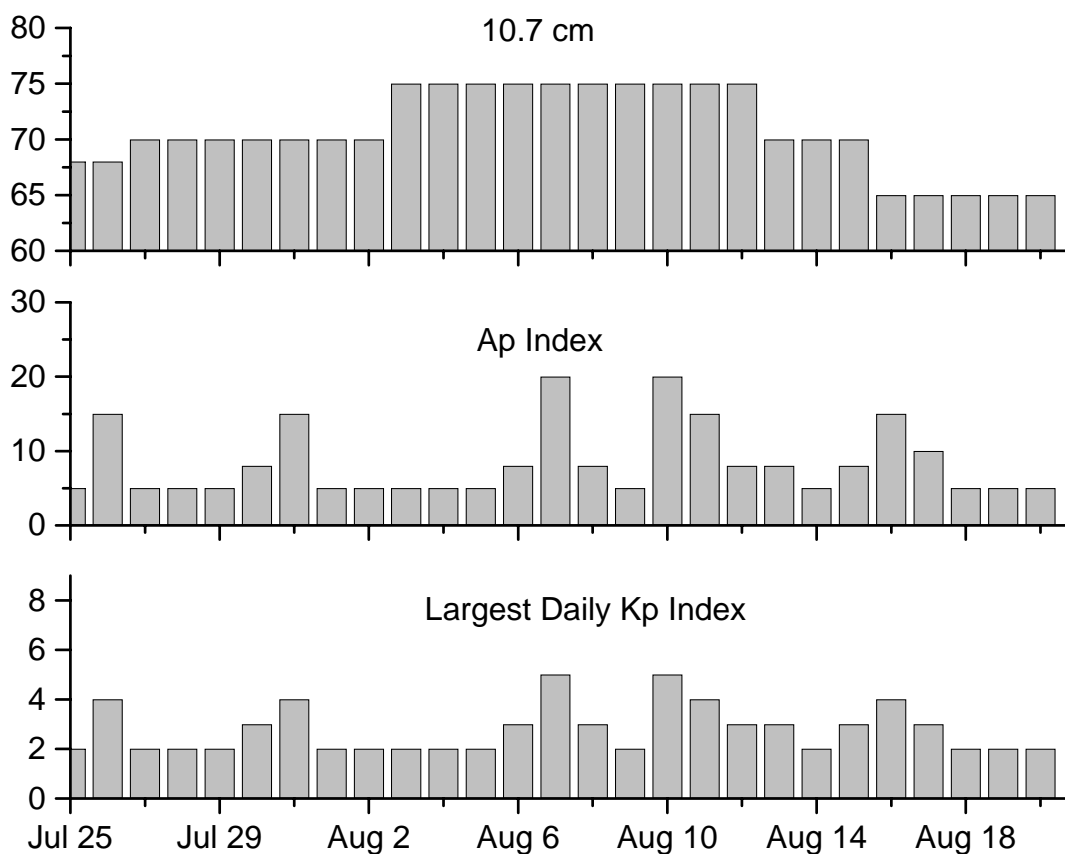


Alerts and Warnings Issued

Date & Time of Issue	Type of Alert or Warning	Date & Time of Event UTC
16 Jul 1211	ALERT: Electron 2MeV Integral Flux ≥ 1000 pfu	16 Jul 1155
17 Jul 0917	ALERT: Electron 2MeV Integral Flux ≥ 1000 pfu	17 Jul 0900
18 Jul 0544	ALERT: Electron 2MeV Integral Flux ≥ 1000 pfu	18 Jul 0505
19 Jul 0502	ALERT: Electron 2MeV Integral Flux ≥ 1000 pfu	19 Jul 0500
20 Jul 0903	ALERT: Geomagnetic K = 4	20 Jul 0900
20 Jul 0904	WARNING: Geomagnetic K = 4	20 Jul 0905 – 1600
21 Jul 0333	ALERT: Geomagnetic K = 4	21 Jul 0330
21 Jul 0334	WARNING: Geomagnetic K = 4	21 Jul 0335 – 1600
21 Jul 0337	ALERT: Geomagnetic K = 5	21 Jul 0335



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
25 Jul	68	5	2	08 Aug	75	8	3
26	68	15	4	09	75	5	2
27	70	5	2	10	75	20	5
28	70	5	2	11	75	15	4
29	70	5	2	12	75	8	3
30	70	8	3	13	70	8	3
31	70	15	4	14	70	5	2
01 Aug	70	5	2	15	70	8	3
02	70	5	2	16	65	15	4
03	75	5	2	17	65	10	3
04	75	5	2	18	65	5	2
05	75	5	2	19	65	5	2
06	75	8	3	20	65	5	2
07	57	20	5				



Energetic 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	

16 July	0052	0100	0131	B2.9	Sf	N05W55	964
17 July	<i>No Flares Observed</i>						
18 July	0139	0141	0149		1f	S02W63	963
	0318	0325	0331		Sf	S04W60	963
	1353	1353	1357	B1.9	Sf	S03W64	963
19 July	<i>No Flares Observed</i>						
20 July	<i>No Flares Observed</i>						
21 July	<i>No Flares Observed</i>						
22 July	<i>No Flares Observed</i>						

Region Summary

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

Region 963

07 Jul	S09E83	054	0050	05	Axx	001	A								
08 Jul	S07E66	058	0150	04	Dao	006	B				10				
09 Jul	S07E54	057	0260	10	Dai	010	Bg	1			11				
10 Jul	S06E40	057	0530	13	Ehi	015	Bg	9			12	3			
11 Jul	S06E28	056	0370	13	Ekc	018	B				1				
12 Jul	S05E15	056	0430	13	Ekc	015	B								
13 Jul	S06E01	056	0310	12	Ekc	011	B								
14 Jul	S06W14	058	0200	13	Eac	014	B								
15 Jul	S06W27	057	0270	13	Eai	016	B								
16 Jul	S05W40	057	0240	13	Eao	009	B								
17 Jul	S06W53	057	0240	12	Eao	007	B								
18 Jul	S05W67	058	0210	13	Cao	003	B				2	1			
19 Jul	S04W86	064	0110	04	Hsx	002	A								

10 0 0 36 4 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 056



Region Summary

Location			Sunspot Characteristics															
			Flares								X-ray			Optical				
	Helio		Area	Extent	Spot	Spot	Mag											
Date	(° Lat ° CMD)	Lon	(10 ⁻⁶ hemi)	(helio)	Class	Count	Class				C	M	X	S	1	2	3	4
<i>Region 964</i>																		
12 Jul	N05W14	084	0000	00		000												
13 Jul	N04W30	087	0040	05	Cao	007	B											
14 Jul	N03W40	084	0050	06	Dso	007	B											
15 Jul	N02W54	084	0050	07	Cso	005	B							1				
16 Jul	N03W71	088	0020	01	Axx	001	A											
17 Jul	N03W84	088	0000	00		000												
											0	0	0	1	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 084

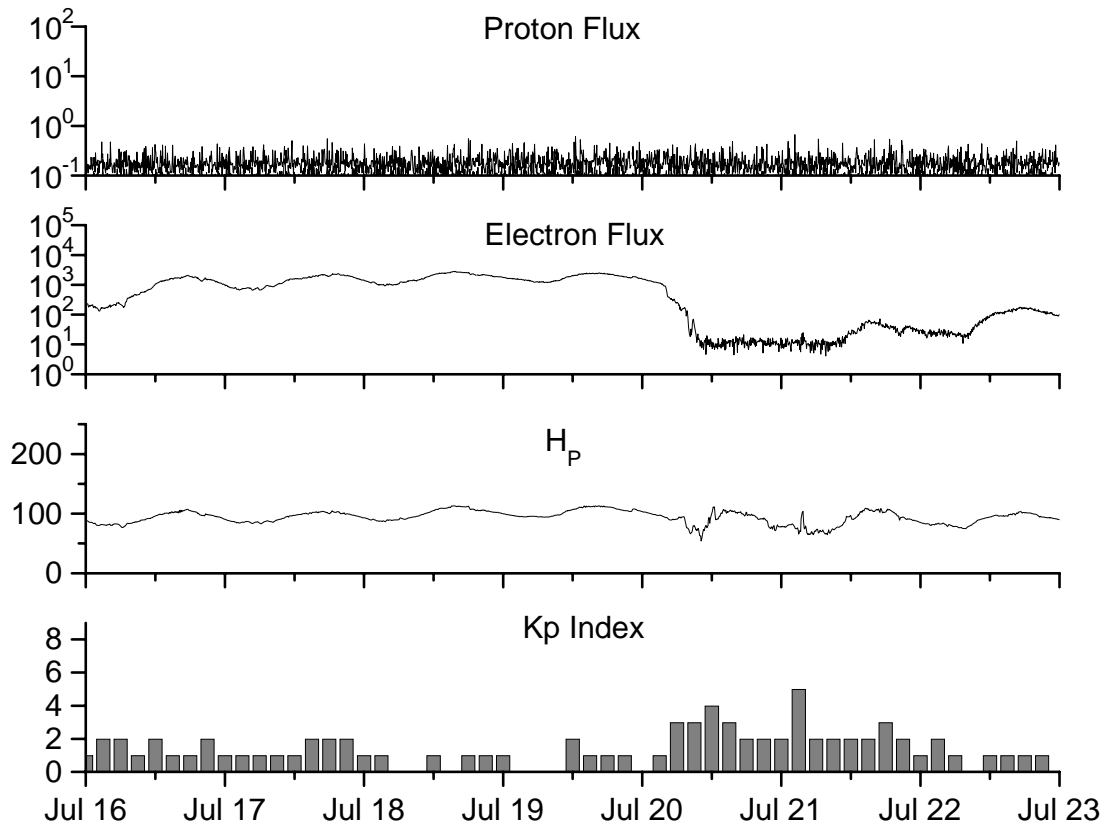


**Recent Solar Indices (preliminary)
of the observed monthly mean values**

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									
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	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			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	
May	19.4	11.7	0.60			74.5		8	
June	20.0	12.0	0.60			73.7		7	

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 16 July 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.

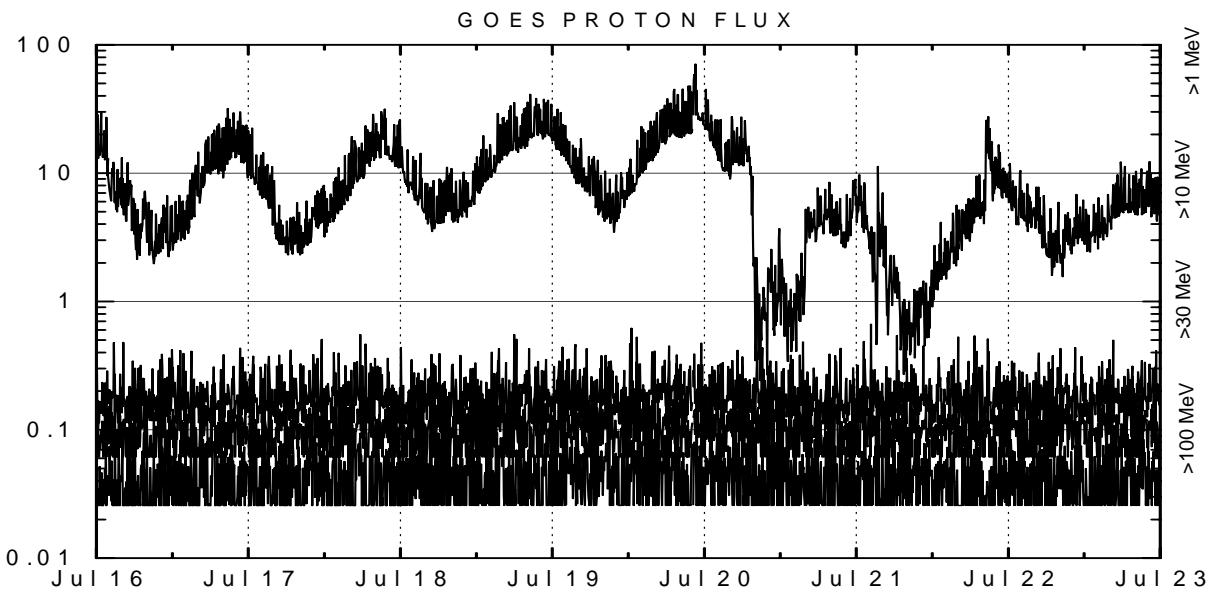
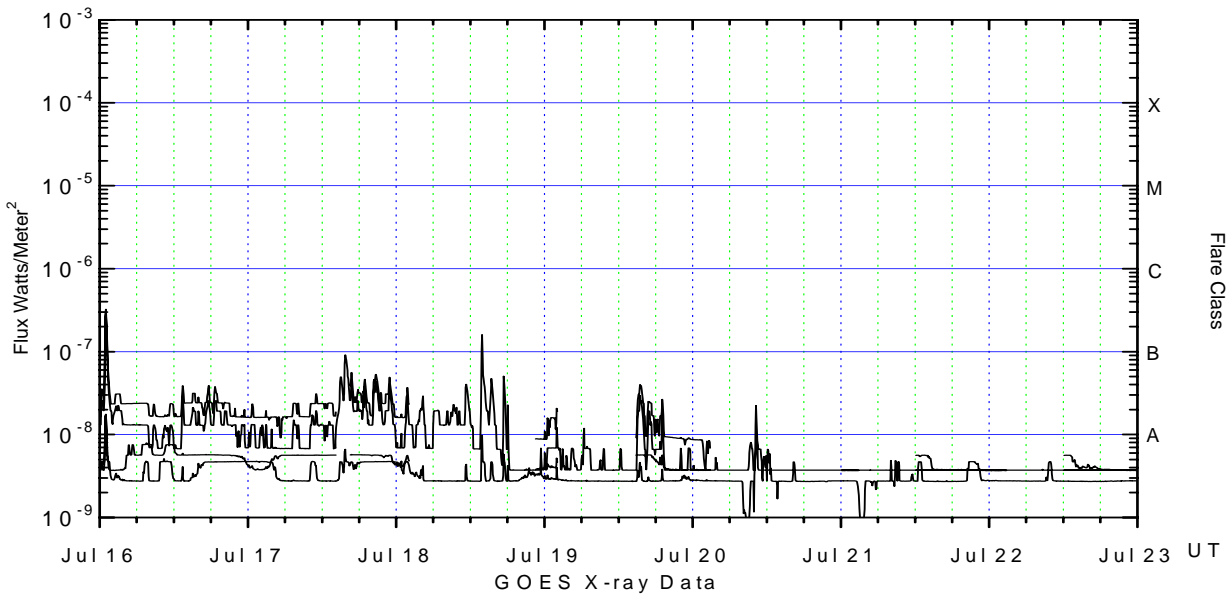
Electrons plot contains the five-minute averaged integral electron flux (electrons/cm²-sec-sr) with energies greater than 2 MeV at GOES-12 (W075).

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.

