

Space Weather Highlights

14 - 20 June 2010

SWO PRF 1816
22 June 2010

Solar activity ranged from very low to low levels during the period. Activity was at low levels on 14 June, due to a C1/SF flare at 14/0051 UTC from Region 1081 (N25, L=101, class/area Bxo/010, on 14 June). Activity decreased to very low levels for the remainder of the period (15-20 June) with Region 1082 (N27, L=306, class/area Dso/030, on 20 June) producing a B5/SF flare at 17/1033 UTC.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux levels at geosynchronous orbit was at normal to moderate levels during 14-16 June. Flux levels increased to high levels during 17-20 June.

The geomagnetic field ranged from quiet to unsettled levels, with minor and major storms at high latitudes. On 14 June, the geomagnetic field was at quiet levels, with isolated unsettled levels at high latitudes. Activity increased to quiet to active levels, with minor and major storm levels occurring on 15-16 June. Activity decreased on 17 June, with quiet to unsettled levels and an isolated major storm period at high latitudes between 17/06-09 UTC. The disturbances during 15-17 June were associated with a recurrent coronal hole high-speed stream (CH HSS). During this period, solar wind data from the ACE spacecraft indicated elevated wind speeds at 602 km/s at 16/0825 UTC, with increased IMF total field intensity of 12 nT at 15/1228 UTC, with intervals of southward IMF Bz to -9 nT at 16/0126 UTC, and increased density to 22 p/cc at 15/0742 UTC. The geomagnetic field decreased to quiet levels for the remainder of the period, 18-20 June.

Space Weather Outlook

23 June - 19 July 2010

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

No proton events are expected at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to be at high levels for most of the forecast period due to recurrent high speed streams with the exception of 23-25 June and 11-13 July when the background is expected to decrease to normal levels.

Geomagnetic field activity is expected to be at predominantly quiet levels during 23-24 June. Quiet to unsettled levels, with isolated active levels at mid-latitudes and isolated minor storm levels at high latitudes, are expected during 25 June – 01 July, due to a recurrent CH HSS. Activity is expected to decrease to predominantly quiet levels from 02-11 June. Activity is expected to increase to quiet to unsettled levels, with isolated active levels, on 12 -14 July, due to another recurrent CH HSS. Predominantly quiet levels are expected for the remainder of the forecast period, 15-19 July.



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
14 June	73	12	10	A7.7	1	0	0	1	0	0	0 0
15 June	70	0	0	A5.4	0	0	0	0	0	0	0 0
16 June	72	0	0	A4.5	0	0	0	0	0	0	0 0
17 June	70	14	10	A4.2	0	0	0	1	0	0	0 0
18 June	71	16	10	A4.1	0	0	0	0	0	0	0 0
19 June	69	28	20	A4.2	0	0	0	0	0	0	0 0
20 June	70	13	30	A4.4	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
14 June	5.0e+05	1.7e+04	3.9e+03		2.5e+07	
15 June	5.3e+05	1.5e+04	3.8e+03		1.7e+07	
16 June	1.9e+05	1.4e+04	3.7e+03		6.8e+06	
17 June	4.9e+05	1.4e+04	3.5e+03		4.5e+07	
18 June	3.4e+05	1.4e+04	3.4e+03		5.4e+07	
19 June	3.9e+05	1.4e+04	3.6e+03		7.5e+07	
20 June	6.1e+05	1.4e+04	3.8e+03		8.4e+07	

Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
14 June	3	1-1-1-1-1-0-1-1	7	1-2-3-4-0-0-0-2	5	2-2-1-2-1-1-0-2
15 June	9	1-2-2-2-2-2-3-3	13	1-2-2-5-2-3-2-2	10	1-2-2-3-2-3-3-3
16 June	13	2-2-3-2-3-2-3-4	42	4-4-5-5-6-6-2-3	19	3-4-3-3-3-3-4-4
17 June	8	1-2-3-2-1-2-3-1	18	2-3-6-4-0-1-2-1	10	2-3-3-2-1-2-3-2
18 June	4	1-2-1-1-1-2-1-1	5	2-2-1-2-1-1-2-0	5	2-2-1-1-1-1-1-1
19 June	2	1-0-0-1-1-0-1-1	2	1-1-0-1-0-0-2-0	4	2-1-0-1-0-1-1-2
20 June	2	1-0-0-0-1-1-1-1	1	1-0-0-0-0-0-0-1	3	1-0-0-1-1-1-1-2

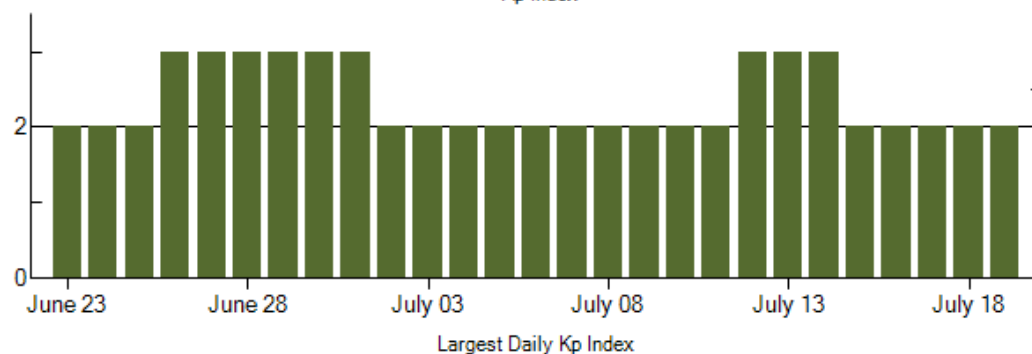
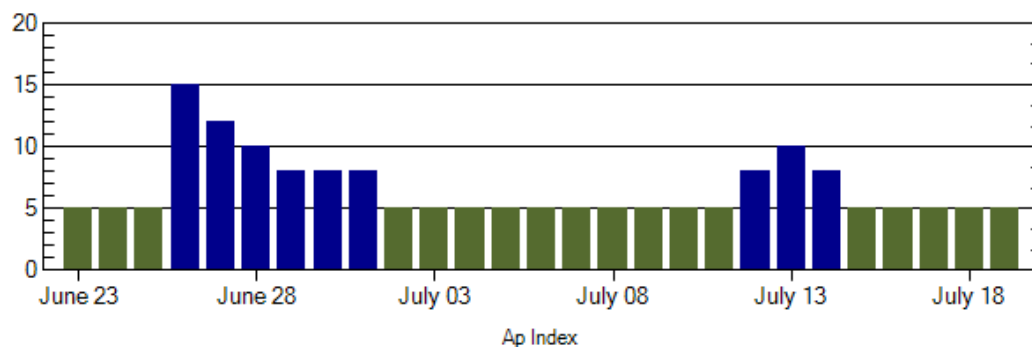
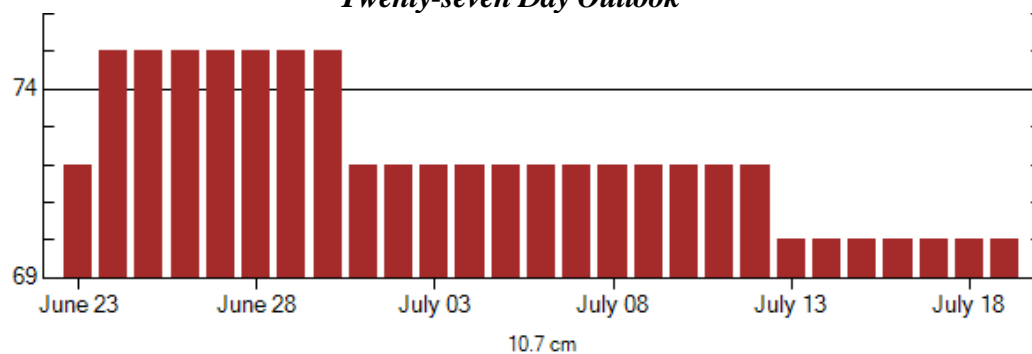


Alerts and Warnings Issued

Date & Time of Issue	Type of Alert or Warning	Date & Time of Event UTC
15 Jun 2237	WARNING: Geomagnetic K = 4	15 Jun 2330 - 16/0900
16 Jun 0259	ALERT: Geomagnetic K = 4	16 Jun 0205
16 Jun 0303	CANCELLATION: Geomagnetic K = 4	
16 Jun 0304	ALERT: Geomagnetic K = 4	16 Jun 0257
16 Jun 0316	CANCELLATION: Geomagnetic K = 4	
16 Jun 0358	ALERT: Geomagnetic K = 4	16 Jun 0356
16 Jun 0848	EXTENDED WARNING: Geomagnetic K = 4	15 Jun 2330 - 16/1500
16 Jun 1455	EXTENDED WARNING: Geomagnetic K = 4	15 Jun 2330 - 17/0600
17 Jun 0556	EXTENDED WARNING: Geomagnetic K = 4	15 Jun 2330 - 17/1200
17 Jun 1454	ALERT: Electron 2MeV Integral Flux ≥ 1000 pfu	17 Jun 1440
18 Jun 1407	CONTINUED ALERT: Electron 2MeV Integral Flux ≥ 1000 pfu	17 Jun 1440
19 Jun 1222	CONTINUED ALERT: Electron 2MeV Integral Flux ≥ 1000 pfu	17 Jun 1440
20 Jun 1138	CONTINUED ALERT: Electron 2MeV Integral Flux ≥ 1000 pfu	17 Jun 1440



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
23 Jun	72	5	2	07 Jul	72	5	2
24	75	5	2	08	72	5	2
25	75	5	2	09	72	5	2
26	75	15	3	10	72	5	2
27	75	12	3	11	72	5	2
28	75	10	3	12	72	8	3
29	75	8	3	13	70	10	3
30	75	8	3	14	70	8	3
01 Jul	72	8	3	15	70	5	2
02	72	5	2	16	70	5	2
03	72	5	2	17	70	5	2
04	72	5	2	18	70	5	2
05	72	5	2	19	70	5	2
06	72	5	2				



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			X-ray Class.	Imp / Brtns	Optical		Rgn
	Begin	Max	End			Location	Lat CMD	
14 June	0033	0038	0040	B2.3				
	0049	0050	0103	C1.5	SF	N27W70		1081
	0426	0430	0435	B1.7				
	1249	1254	1258	B2.9				
15 June	No Flares Observed							
16 June	No Flares Observed							
17 June	1029	1029	1037	B5.0	SF	N28E41		1082
	1844	1849	1855	B1.2				
	1733	1742	1758	B1.1				
18 June	1158	1204	1207	B1.8				
	1749	1754	1759	B1.1				
19 June	No Flares Observed							
20 June	No Flares Observed							



Region Summary

Date	Location		Sunspot Characteristics					Flares							
	(° Lat ° CMD)	Helio	Area (10 ⁻⁶ hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical				
		Lon						C	M	X	S	1	2	3	4
Region 1080															
10 Jun	S25W39	107	10	4	BXO	5	B								
11 Jun	S23W54	109	100	6	DAI	4	B								
12 Jun	S23W67	108	50	6	DRO	4	B	1							
13 Jun	S24W77	105	10	5	AXX	4	A	1			1				
								2	0	0	1	0	0	0	0

Died on Disk.

Absolute heliographic longitude: 107

<i>Region 1081</i>															
11 Jun	N22W43	98	50	5	DRO	8	B								
12 Jun	N24W58	99	80	8	DRO	10	B	1	1		2				
13 Jun	N24W71	99	90	8	DAO	8	B	5			8				
14 Jun	N25W86	101	10	5	BXO	2	B	1			1				
								7	1	0	11	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 98

<i>Region 1082</i>															
17 Jun	N28E33	303	10	5	BXO	4	B				1				
18 Jun	N29E22	300	10	4	AXX	6	A								
19 Jun	N29E10	299	10	5	CRO	4	B								
20 Jun	N27W10	305	30	7	DSO	3	B								
								0	0	0	1	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 299

<i>Region 1083</i>															
19 Jun	N19W22	331	10	3	BXO	4	B								
20 Jun	N19W35	331													
								0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 331



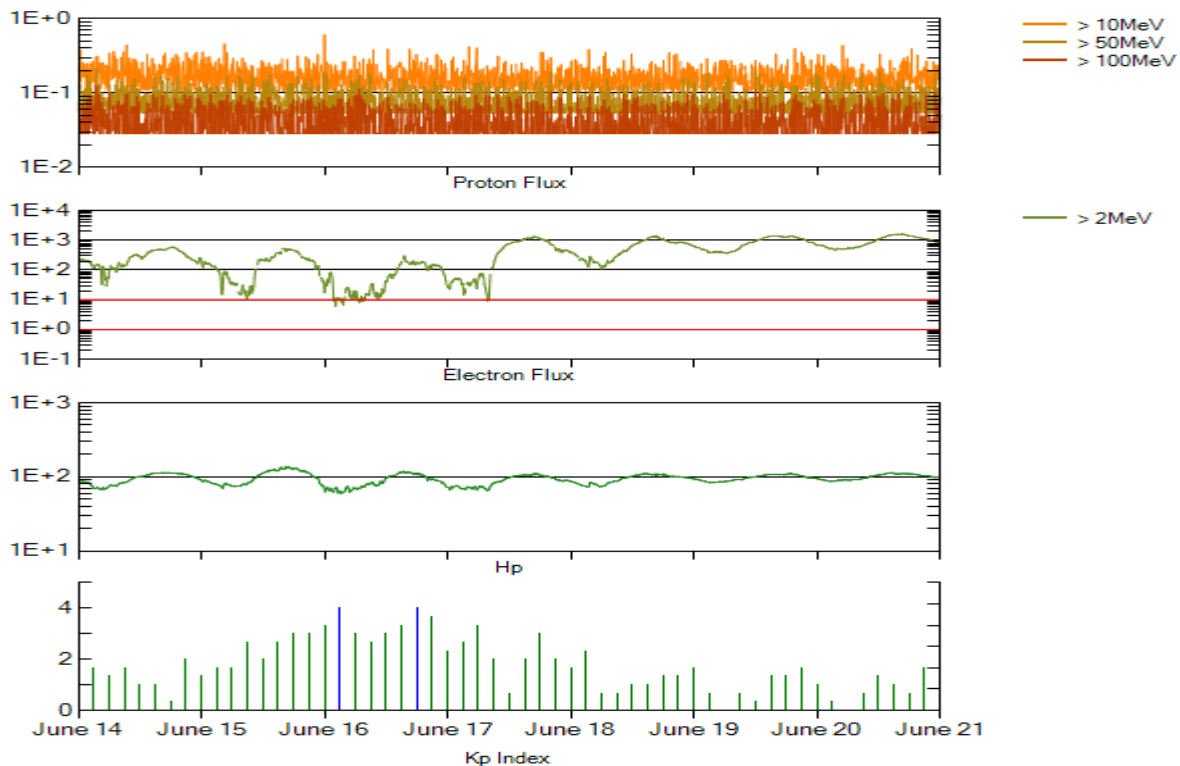
Recent Solar Indices (preliminary)
Of the observed monthly mean values

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
June	4.2	3.4	0.81	5.2	3.3	65.9	69.4	7	7.0
July	1.0	0.8	0.80	4.5	2.8	65.7	68.8	5	6.8
August	0.0	0.5	**	4.4	2.7	66.3	68.6	5	6.3
September	1.5	1.1	0.73	3.7	2.3	67.1	68.4	6	5.8
October	5.2	2.9	0.56	2.9	1.8	68.3	68.2	7	5.4
November	6.8	4.1	0.60	2.7	1.7	68.6	68.3	4	5.1
December	1.3	0.8	0.62	2.7	1.7	69.2	68.5	4	4.9
2009									
January	2.8	1.3	0.46	3.0	1.8	69.8	68.7	4	4.7
February	2.5	1.4	0.56	3.1	1.9	70.0	68.8	5	4.7
March	0.7	0.7	1.00	3.4	2.0	69.2	69.0	5	4.6
April	1.2	0.8	1.00	3.7	2.2	69.7	69.3	4	4.3
May	3.9	2.9	0.74	3.8	2.3	70.5	69.7	4	4.1
June	6.6	2.9	0.39	4.4	2.7	68.6	70.2	4	4.0
July	5.0	3.2	0.70	5.8	3.6	68.2	71.0	4	3.9
August	0.3	0.0	0.00	7.7	4.8	67.4	72.1	5	3.8
September	6.6	4.3	0.64	9.9	6.1	70.5	73.3	4	3.8
October	7.0	4.8	0.66	11.3	7.0	72.3	74.1	3	4.1
November	7.7	4.1	0.55	12.4	7.6	73.6	74.5	3	4.5
December	15.7	10.8	0.68			76.8		2	
2010									
January	21.3	13.1	0.62			81.1		3	
February	31.0	18.6	0.60			84.7		5	
March	24.7	15.4	0.62			83.3		5	
April	11.2	7.9	0.71			75.9		10	
May	19.9	8.8	0.44			73.8		8	

NOTE: Values are final except for the most recent 6 months which are considered preliminary.
Cycle 23 started in May 1996 with an RI=8.0. Cycle 23 maximum was April 2000 with an RI=120.8.

** SWPC sunspot number was zero, so a ratio could not be computed.





Weekly Geosynchronous Satellite Environment Summary
Week Beginning 14 June 2010

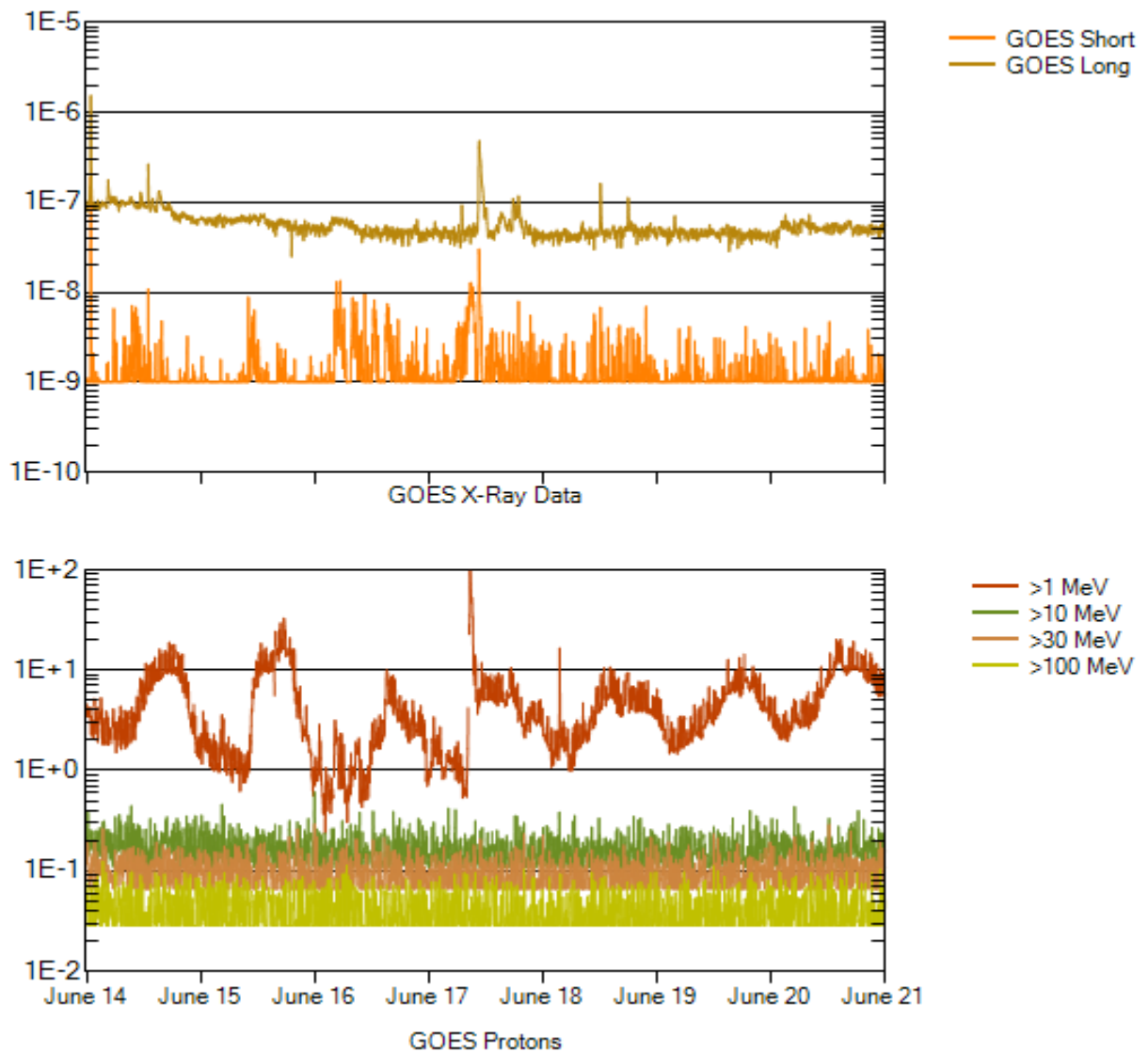
The proton flux plot contains the five-minute averaged integral proton flux (protons/cm²–sec–sr) as measured by GOES-13 (W75) for each of three energy thresholds: greater than 10, 50, and 100 MeV. The electron flux plot contains the five-minute averaged integral electron flux (electrons/cm²–sec–sr) with energies greater than 2 MeV at GOES-13.

The Hp plot contains the five minute averaged Hp magnetic field component in nanoteslas (nT) as measured by GOES-13. The Hp 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 SWPC 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

The x-ray plot contains five-minute averaged x-ray flux (Watts/m^2) as measured by GOES 14 (W105) in two wavelength bands, 0.05 - 0.4 and 0.1 - 0.8 nm. The letters A, B, C, M and X refer to x-ray event levels for the 0.1 - 0.8 nm band.

The proton plot contains the five-minute averaged integral proton flux ($\text{protons/cm}^2\text{-sec-sr}$) as measured by GOES-13 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.

