

**Space Weather Highlights**  
**03 - 09 May 2010**

**SWO PRF 1810**  
11 May 2010

Solar activity ranged from very low to moderate levels during the period. Activity was at very low levels on 03 May with occasional low-level B-class flares. Two faint, slow CME's were observed during 04-05 May from Region 1066 (S26, L=207, class/area Cro/020 on 03 May). Both CME's appeared to be Earth-directed. Activity increased to low levels on 04 May due to a C3/Sf flare at 04/1624 UTC from Region 1069 (N42, L=225, class/area Dai/170 on 05 May). Region 1069 emerged rapidly on 04 May as a beta-gamma magnetic structure. Activity increased to moderate levels on 05 May by virtue of an isolated M1/Sf flare at 05/1719 UTC from Region 1069. Activity decreased to very low levels on 06 May as Region 1069 gradually decreased in area, but maintained its magnetic complexity. Activity then returned to low levels during 07 - 09 May due to isolated B- and C-class flares from Region 1069, the largest of which was a C9/1f at 08/0459 UTC.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit was at high levels throughout the period.

Geomagnetic field activity ranged from quiet to major storm levels during the period. Activity on 03 May reached unsettled to minor storm levels with a brief major storm period at high latitudes as the coronal hole high-speed stream (CH HSS) effects from 02 May continued. Activity continued to gradually decrease during the remainder of the period as the CH HSS gradually subsided. Mostly quiet conditions were observed from 08 to 09 May.

**Space Weather Outlook**  
**12 May – 07 June 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 flux levels on 12 May and at moderate levels from 13-15 May. Normal background levels are expected to prevail through 29 May. On 30 May, electron flux is expected to increase to high levels and remain high for the remainder of the period.

Geomagnetic field activity is expected to be at quiet to unsettled levels with isolated active periods from 12-16 May as effects of several CH HSS's become geoeffective. Quiet conditions are expected from 17-19 May. Quiet to unsettled levels are expected for 20-21 May due to a recurrent CH HSS. Quiet levels are expected to return from 22 -28 May. Unsettled to active with isolated minor storm periods are expected for 29-31 May due to a recurrent CH HSS. Activity is expected to decrease to quiet to unsettled levels from 01-03 June as effects from the CH HSS subside. Quiet levels are expected from 04-06 June. Quiet to unsettled levels are expected on 07 June as another CH HSS becomes geoeffective.



### 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
03 May	80	61	50	A6.8	0	0	0	0	0	0	0 0
04 May	82	70	100	A7.3	1	0	0	1	0	0	0 0
05 May	83	77	220	B1.0	2	1	0	1	0	0	0 0
06 May	79	45	100	A7.1	0	0	0	0	0	0	0 0
07 May	79	24	30	A6.5	1	0	0	2	0	0	0 0
08 May	79	23	30	A7.8	3	0	0	0	1	0	0 0
09 May	75	0	0	A3.8	0	0	0	0	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
03 May	1.2e+06	1.4e+04	3.5e+03		1.4e+08	
04 May	9.2e+05	1.4e+04	3.4e+03		8.8e+08	
05 May	4.9e+05	1.4e+04	3.4e+03		9.1e+08	
06 May	7.0e+05	1.5e+04	3.5e+03		1.1e+09	
07 May	5.4e+05	1.9e+04	7.6e+03		6.3e+08	
08 May	1.7e+05	1.8e+04	7.5e+03		4.1e+08	
09 May	2.2e+05	1.9e+04	8.0e+03		5.6e+08	

### Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
03 May	19	5-4-3-3-3-2-2-3	30	4-4-5-6-4-2-2-3	27	5-5-4-4-3-3-3-4
04 May	7	3-2-2-2-2-1-1-2	16	3-2-3-5-3-3-1-2	10	4-1-3-2-2-3-2-2
05 May	6	3-2-2-0-1-2-2-1	8	3-3-2-2-1-2-2-1	8	3-2-2-1-1-2-3-2
06 May	6	0-3-2-1-1-2-2-2	17	0-2-5-4-4-3-2-2	10	1-3-3-2-2-2-2-3
07 May	10	4-3-2-1-2-1-2-2	13	3-3-3-3-4-2-2-1	9	3-3-2-1-3-1-2-2
08 May	4	2-1-2-1-1-1-1-1	8	1-2-4-3-2-1-0-1	6	2-2-2-1-2-2-2-2
09 May	1	1-0-0-0-0-0-0-1	0	1-0-0-0-0-0-0-0	4	1-0-0-1-1-1-1-1

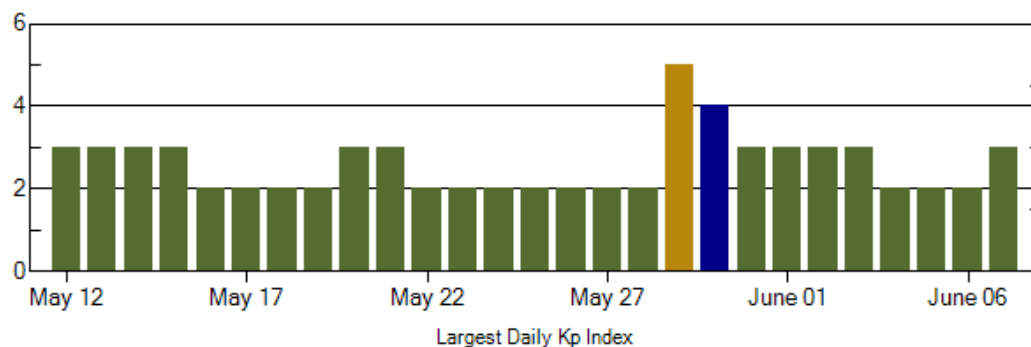
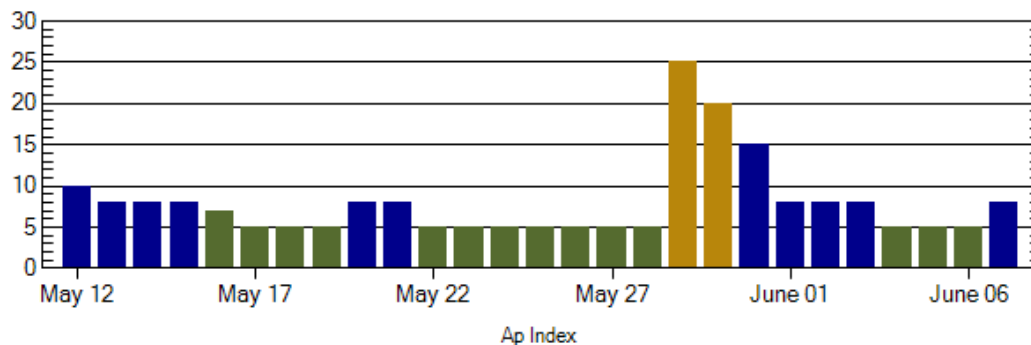
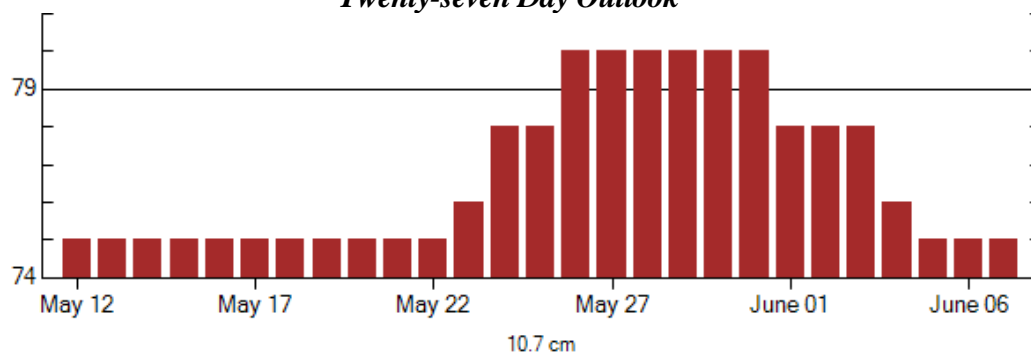


### *Alerts and Warnings Issued*

Date & Time of Issue	Type of Alert or Warning	Date & Time of Event UTC
03 May 1251	ALERT: Electron 2MeV Integral Flux $\geq 1000$ pfu	03 May 1235
03 May 1600	WARNING: Geomagnetic K = 4	03 May 1600 - 04/1600
04 May 0524	CONTINUED ALERT: Electron 2MeV Integral Flux $\geq 1000$ pfu	03 May 1235
05 May 0522	CONTINUED ALERT: Electron 2MeV Integral Flux $\geq 1000$ pfu	03 May 1235
06 May 0519	CONTINUED ALERT: Electron 2MeV Integral Flux $\geq 1000$ pfu	03 May 1235
06 May 0810	WARNING: Geomagnetic K = 4	06 May 0815 - 1200
06 May 0818	ALERT: Geomagnetic K = 4	06 May 0818
07 May 0643	CONTINUED ALERT: Electron 2MeV Integral Flux $\geq 1000$ pfu	03 May 1235
08 May 0710	CONTINUED ALERT: Electron 2MeV Integral Flux $\geq 1000$ pfu	03 May 1235
09 May 0512	CONTINUED ALERT: Electron 2MeV Integral Flux $\geq 1000$ pfu	03 May 1235



### 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
12 May	75	10	3	26 May	80	5	2
13	75	8	3	27	80	5	2
14	75	8	3	28	80	5	2
15	75	8	3	29	80	25	5
16	75	7	2	30	80	20	4
17	75	5	2	31	80	15	3
18	75	5	2	01 Jun	78	8	3
19	75	5	2	02	78	8	3
20	75	8	3	03	78	8	3
21	75	8	3	04	76	5	2
22	75	5	2	05	75	5	2
23	76	5	2	06	75	5	2
24	78	5	2	07	75	8	3
25	78	5	2				



### ***Energetic Events***

Date	Time			X-ray		Optical Information			Peak		Sweep Freq	
			½			Imp/	Location		Radio Flux		Intensity	
	Begin	Max	Max	Class	Flux	Brtns	Lat	CMD	#	245	2695	II IV
05 May	1713	1719	1722	M1.2	0.003	SF	N42W37		1069			

### ***Flare List***

Date	Time			X-ray	Imp /	Optical		Rgn
	Begin	Max	End			Location	Lat CMD	
03 May	1252	1257	1302	B2.0				
	1338	1341	1343	B1.5				
	1500	1504	1507	B1.4				
	2150	2153	2156	B1.0				
04 May	0442	0446	0449	B1.7				
	1100	1118	1132	B2.0				
	1205	1209	1212	B1.3				
	1239	1244	1251	B1.7				
	1413	1420	1425	B2.4				
	1624	1629	1643	C3.6	SF	N41W23		1069
	1911	0023	0034	B1.6				
05 May	0055	0105	0111	B1.6				
	0709	0716	0720	C2.3				
	0835	0839	0841	B2.4				
	1137	1152	1158	C8.8				
	1300	1304	1307	B3.4				
	1611	1618	1629	B4.0				
	1717	1719	1735	M1.2	SF	N42W37		1069
	1838	1843	1848	B7.3				
06 May	1509	1513	1517	B1.4				
07 May	0030	0034	0036	B1.1				
	0558	0559	0604	B1.2	SF	N41W50		1069
	0738	U0749	A0834	C2.0	SF	N40W54		1069
08 May	2249	2257	2303	B4.6				
	0058	0104	0110	B2.6				
	0131	0139	0146	B5.8				
	0318	0323	0327	B4.3				
	0455	0459	0532	C9.3	1F	N38W65		1069
	0837	0852	0857	B2.1				
	0915	0920	0923	B2.1				
	1011	1019	1023	B3.8				
	1140	1150	1155	C1.8				
	1841	1855	1914	B7.2				
	2004	2011	2018	C2.4				
09 May	1523	1541	1614	B1.3				
	2050	2114	2144	B2.1				



### Region Summary

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

#### Region 1063

28 Apr	N16E14	264	10	2	BXO	2	B								
29 Apr	N16E01	264													
30 Apr	N16W12	264													
01 May	N16W25	264													
02 May	N16W38	264													
03 May	N18W52	264	10	3	BXO	2	B								
04 May	N18W66	264	10	3	BXO	3	B								
05 May	N18W80	264	10	1	BXO	2	B								
06 May	N18W93	264													

0 0 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 264

#### Region 1064

30 Apr	N15E28	223	20	2	BXO	2	B								
01 May	N16E15	223	10	3	CRO	3	B								
02 May	N15E02	223		1	AXX	1	A								
03 May	N15W11	223													
04 May	N15W24	222													
05 May	N15W37	222													
06 May	N15W50	222													
07 May	N15W63	222													
08 May	N15W76	222													
09 May	N15W89	222													

0 0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 223



### Region Summary (cont.)

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

#### Region 1065

02 May	S32W16	241		1	AXX	1	A
03 May	S32W29	241		1	AXX	1	A
04 May	S32W42	240					
05 May	S32W55	240					
06 May	S32W68	240					
07 May	S32W81	240					

0 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 241

#### Region 1066

02 May	S27E16	209		1	AXX	1	A
03 May	S27E05	207	20	5	CRO	5	B
04 May	S26W07	205	10	6	BXO	3	B
05 May	S26W22	206	10	1	AXX	1	A
06 May	S26W35	206					
07 May	S21W48	206					
08 May	S21W61	206					
09 May	S21W74	206					

0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 207

#### Region 1067

30 Apr	N23E84	168					
01 May	N23E70	168					
02 May	N23E55	170	20	5	BXO	4	B
03 May	N23E38	174	20	4	CSO	2	B
04 May	N23E24	174	20	6	DRO	3	B
05 May	N23E13	171	10	5	BXO	3	B
06 May	N23E03	168	10	2	BXO	2	B
07 May	N23W10	168					
08 May	N23W23	168					
09 May	N23W36	168					

2 0 0 1 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 168



### Region Summary (cont.)

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

#### Region 1068

03 May	S19E76	135		1	AXX	1	A								
04 May	S19E65	133	10	1	BXO	2	B								
05 May	S21E54	130	10	1	AXX	1	A								
06 May	S20E41	130	10	3	BXO	4	B								
07 May	S19E28	130			AXX	1	A								
08 May	S19E15	130													
09 May	S19E02	130													

0 0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 130

#### Region 1069

04 May	N42W27	225	50	7	DAI	9	BG	1			1				
05 May	N41W40	224	170	9	DAI	7	BG	2	1		1				
06 May	N42W51	222	80	12	ESI	9	BG								
07 May	N42W67	225	30	9	CSO	3	B	1			2				
08 May	N41W78	223	30	3	CSO	2	B	3			1				
09 May	N41W89	221													

7 1 0 4 1 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 225

#### Region 1070

05 May	N21W08	192	10	2	BXO	3	B								
06 May	N21W21	192													
07 May	N21W34	192													
08 May	N21W47	192													
09 May	N21W60	192													

0 0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 192





### *Region Summary (cont.)*

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

#### *Region 1071*

08 May S20W42 187                      1 AXX           1      A

09 May S20W55 187

0 0 0   0 0   0 0 0

Still on Disk.

Absolute heliographic longitude: 187



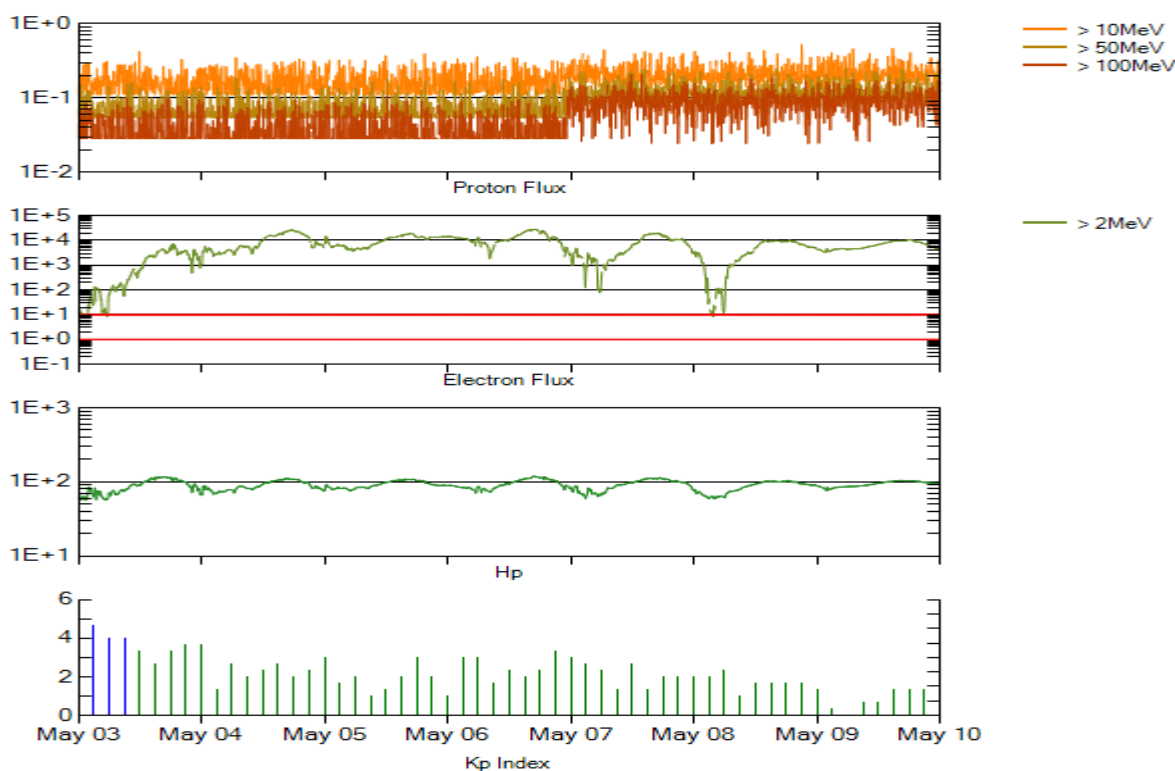
**Recent Solar Indices (preliminary)**  
**Of the observed monthly mean values**

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
2008									
May	5.7	3.2	0.56	5.7	3.5	68.4	69.8	6	7.2
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	4.6	0.66	11.3	7.0	72.3	74.1	3	4.0
November	7.7	4.2	0.55			73.6		3	
December	15.7	10.6	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		4	
April	11.2	7.9	0.71			75.9		10	

**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 less than RI value, so a ratio could not be computed.





*Weekly Geosynchronous Satellite Environment Summary*  
*Week Beginning 03 May 2010*

GOES-13 replaced GOES-11 as primary proton and electron satellite and primary magnetometer satellite on 14 April 2010.

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

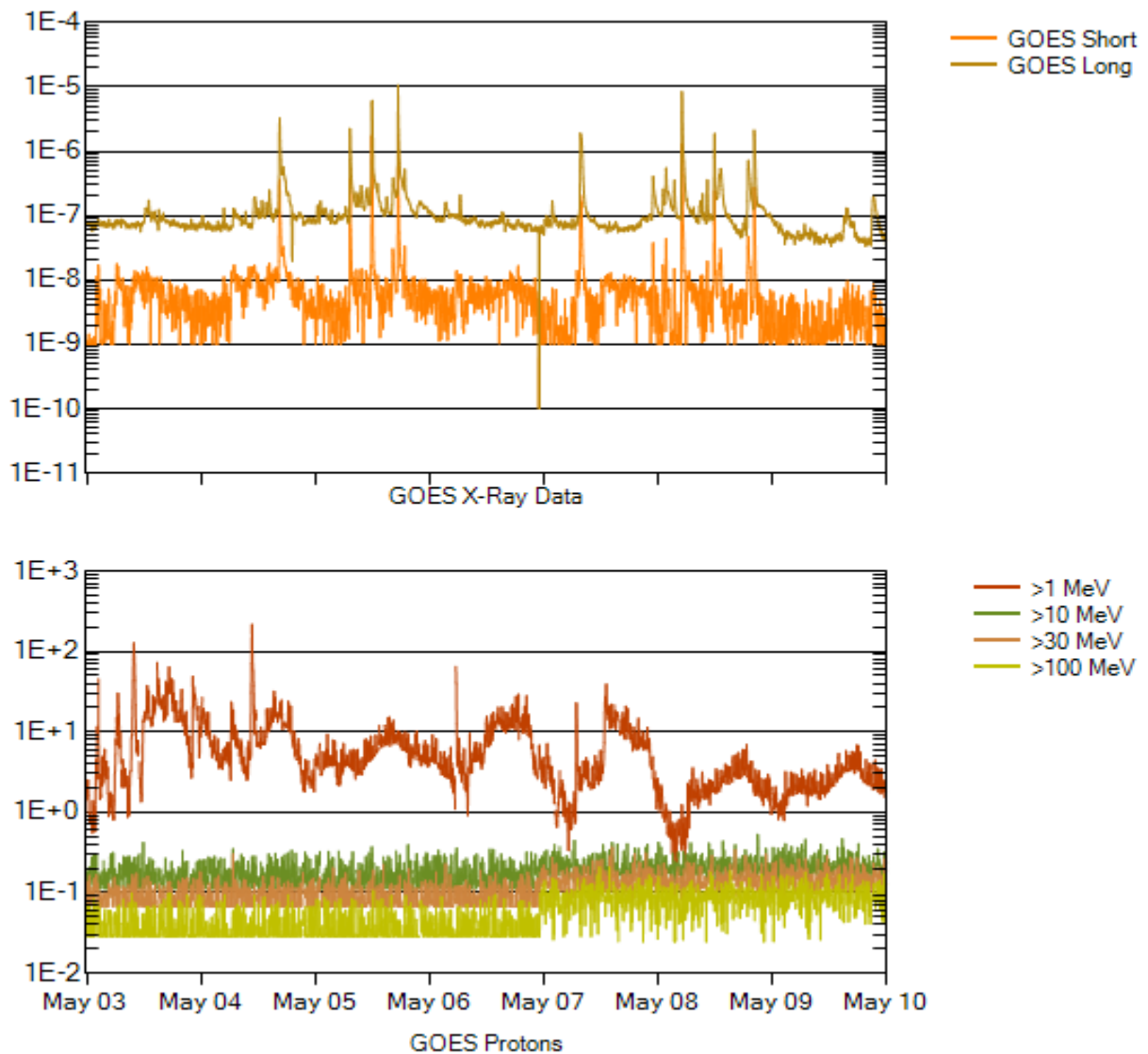
The electron flux plot contains the five-minute averaged integral electron flux (electrons/cm<sup>2</sup>–sec–sr) with energies greater than 2 MeV at GOES-13.

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 ( $\text{Watts/m}^2$ ) 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. (GOES-13 replaced GOES-11 as primary for protons on 14 April 2010).

