

**Space Weather Highlights**  
**16 May - 22 May 2011**

**SWPC PRF 1864**  
**24 May 2011**

Solar activity was at very low to low levels, with predominantly B-class flares. A C1 flare occurred at 18/1259 UTC from Region 1218 (N16, L=168, class/area Bxo/010 on 19 May), and a long duration C2 flare occurred at 18/1830 UTC from Region 1208 (N12, L=318, class/area Dso/100 on 09 May). A long duration B3 flare occurred at 19/0436 UTC which was associated with a filament eruption centered near N20W25.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit was at normal to moderate levels.

Geomagnetic field activity was at quiet to active levels, with an isolated minor storm levels at high latitudes during 16-17 May. During this time, wind speeds ranged from 428-610 km/s, while Bt ranged from 11 to 2 nT, and Bz ranged from -6 to 7 nT. The increase in activity was due to a favorably positioned coronal hole high-speed stream. Activity decreased to quiet levels for the rest of the period.

**Space Weather Outlook**  
**25 May - 20 June 2011**

Solar activity is expected to be very low, with a slight chance for low levels between 25-30 May. Activity is expected to increase to very low to low levels during the rest of the period, when old Region 1208 returns during the rest of the period.

No proton events are expected at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to be at normal to moderate levels. High levels are expected during 29 May - 06 June.

Geomagnetic field activity is expected to be at quiet levels on 25 May. Activity is expected to increase to quiet to active levels, with isolated minor storm levels at high latitudes during 26-30 May, due to a recurrent coronal hole high-speed stream. Activity is expected to decrease to predominantly quiet levels during 31 May - 10 June. Activity is expected to increase to during 11 - 12 June due to a recurrent coronal hole high-speed stream. Quiet levels are expected for the rest of the period.



### *Daily Solar Data*

Date	Radio Flux 10.7cm	Sun spot No.	Sunspot Area (10 <sup>-6</sup> hemi.)	X-ray Background Flux	Flares							
					X-ray			Optical				
					C	M	X	S	1	2	3	4
16 May	92	63	210	B1.4	0	0	0	1	0	0	0	0
17 May	92	57	160	B1.4	0	0	0	1	0	0	0	0
18 May	91	65	230	B1.3	2	0	0	0	0	0	0	0
19 May	84	36	220	A9.7	0	0	0	0	0	0	0	0
20 May	84	33	190	A7.5	0	0	0	0	0	0	0	0
21 May	84	44	170	A6.8	0	0	0	0	0	0	0	0
22 May	85	47	130	A7.5	0	0	0	1	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	>0.6 MeV	>2MeV	>4 MeV
	16 May	4.8e+05	1.3e+04	3.0e+03		5.6e+06
17 May	2.7e+05	1.3e+04	3.1e+03		9.0e+06	
18 May	2.8e+05	1.3e+04	3.2e+03		2.5e+07	
19 May	2.7e+05	1.3e+04	3.3e+03		3.5e+07	
20 May	4.0e+05	1.3e+04	3.3e+03		3.6e+07	
21 May	4.9e+05	1.4e+04	3.4e+03		2.5e+07	
22 May	2.0e+05	1.3e+04	3.2e+03		4.9e+06	

### *Daily Geomagnetic Data*

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	16 May	10	2-2-3-3-3-2-2-2	21	3-2-5-4-5-2-2-2	12
17 May	8	1-2-3-2-2-2-2-2	17	1-2-5-5-3-2-1-2	10	2-2-3-3-2-3-3-3
18 May	4	1-2-1-1-1-1-1-1	5	3-2-1-1-1-2-1-0	6	2-2-1-1-1-2-1-2
19 May	2	1-0-1-1-1-1-1-0	1	0-0-1-2-0-0-0-0	4	1-0-1-1-1-1-0-1
20 May	2	1-1-0-0-1-1-0-0	1	1-1-0-0-0-0-0-0	3	1-1-0-0-0-1-1-1
21 May	4	0-0-1-1-2-1-2-2	1	0-0-1-0-0-0-1-1	4	0-1-1-0-1-1-1-3
22 May	3	1-1-1-1-1-1-1-0	3	2-2-0-0-0-1-1-1	4	2-2-0-0-1-1-1-1

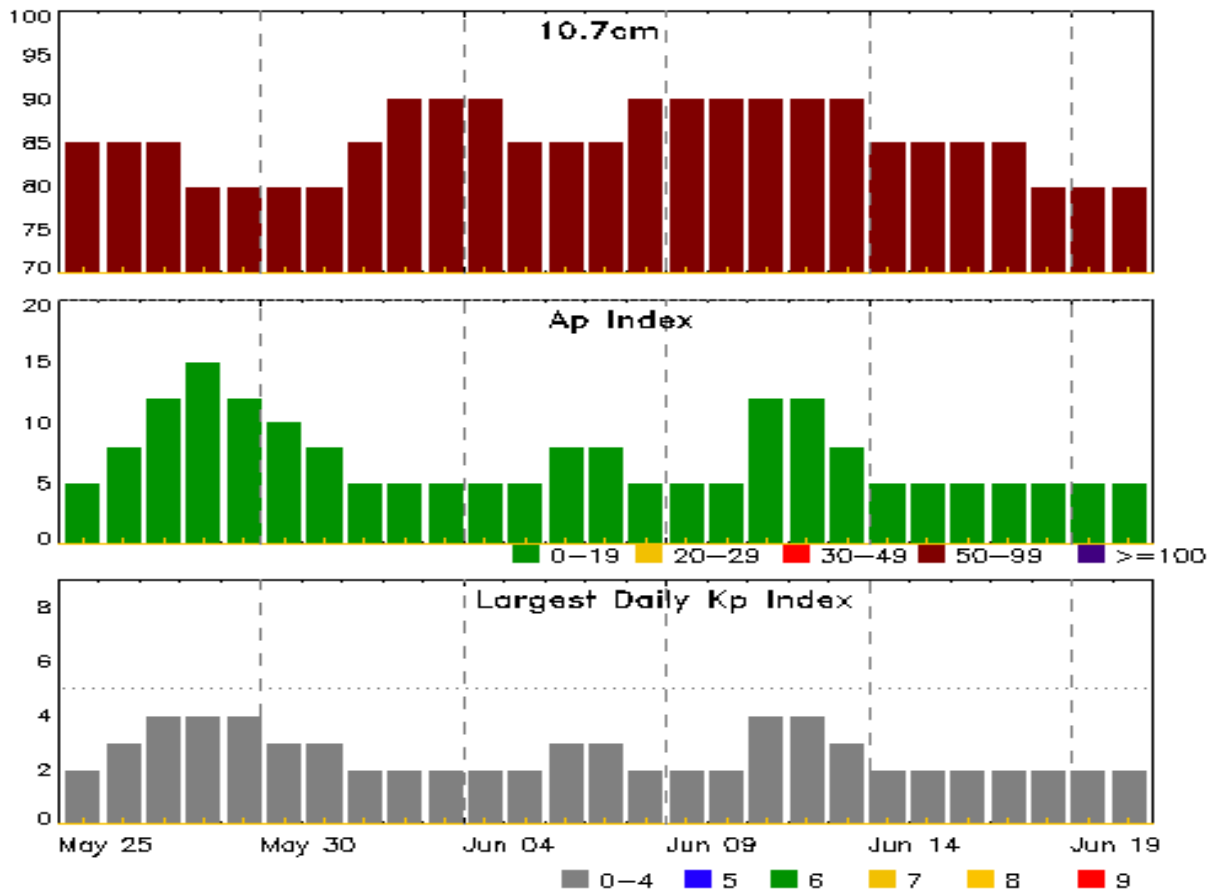


### *Alerts and Warnings Issued*

<b>Date &amp; Time of Issue UTC</b>	<b>Type of Alert or Warning</b>	<b>Date &amp; Time of Event UTC</b>
17 May 0744	WARNING: Geomagnetic K = 4	17/0750 - 1600
20 May 0430	SUMMARY: Geomagnetic Sudden Impulse	20/0415



## Twenty-seven Day Outlook



Date	Radio Flux 10.7cm	Planetary A Index	Largest Kp Index	Date	Radio Flux 10.7cm	Planetary A Index	Largest Kp Index
25 May	85	5	2	08 Jun	90	5	2
26	85	8	3	09	90	5	2
27	85	12	4	10	90	5	2
28	80	15	4	11	90	12	4
29	80	12	4	12	90	12	4
30	80	10	3	13	90	8	3
31	80	8	3	14	85	5	2
01 Jun	85	5	2	15	85	5	2
02	90	5	2	16	85	5	2
03	90	5	2	17	85	5	2
04	90	5	2	18	80	5	2
05	85	5	2	19	80	5	2
06	85	8	3	20	80	5	2
07	85	8	3				



### *Energetic Events*

Date	Time			X-ray	Optical Information			Peak		Sweep Freq	
	Begin	Max	Half Max	Class	Integ Flux	Imp/ Brtns	Location Lat CMD	Rgn #	Radio Flux 245	Radio Flux 2695	Intensity II

**No Events Observed**

### *Flare List*

Date	Time			X-ray Class	Imp/ Brtns	Optical Location Lat CMD	Optical Rgn #
	Begin	Max	End				
16 May	1031	1040	1049	B5.7			1208
16 May	2211	2219	2227	B3.5	SF	S23W16	1214
16 May	2319	2323	2327	B3.0			1214
17 May	0104	0109	0112	B3.5	SF	S23W17	1214
17 May	0140	0143	0148	B2.6			1208
17 May	0235	0243	0248	B4.1			1214
17 May	0858	0905	0909	B2.2			
17 May	1127	1144	1202	B2.7			
17 May	2015	2023	2038	B5.3			1217
18 May	0056	0100	0105	B2.4			1208
18 May	0525	0533	0544	B2.7			1218
18 May	1157	1201	1203	B2.3			1218
18 May	1248	1259	1307	C1.2			1218
18 May	1633	1637	1641	B2.0			1208
18 May	1802	1830	1950	C2.0			
19 May	0159	0203	0205	B2.0			
19 May	0209	0213	0215	B3.5			1208
19 May	0349	0436	0540	B3.0			
19 May	0938	0939	0940	B2.2			1218
21 May	0735	0742	0749	B1.6			1214
21 May	1606	1621	1630	B1.1			
21 May	1925	1930	1933	B2.7			1214
21 May	2256	2300	2302	B1.5			
22 May	0941	1028	1108	B1.3			
22 May	2004	2007	2009	B1.2			
22 May	2345	2347	2355		SF	N14W64	1220



## Region Summary

Date	Location		Sunspot Characteristics				Flares											
	Lat CMD	Lon	Helio 10 <sup>-6</sup> hemi.	Area	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical						
									C	M	X	S	1	2	3	4		
<b>Region 1208</b>																		
08 May	N13E49	318	30	5	Cro	6	B											
09 May	N12E36	318	100	6	Dso	9	B											
10 May	N12E22	319	70	7	Dso	8	B											
11 May	N12E08	319	50	7	Dso	8	B											
12 May	N12W06	321	50	11	Eso	8	B											
13 May	N12W19	321	20	10	Bxo	8	B											
14 May	N11W33	321	30	12	Bxo	3	B											
15 May	N11W48	323	50	12	Eso	7	B	2				4						
16 May	N08W64	326	50	7	Cso	9	B											
17 May	N09W78	326	10	6	Bxo	2	B											
18 May	N09W90	325	30	1	Hsx	2	A											
								2	0	0	4	0	0	0	0	0		

Crossed West Limb.

Absolute heliographic longitude: 321

<b>Region 1210</b>																		
09 May	N20E08	347	30	4	Dsi	13	B	2				3						
10 May	N20W06	347	70	7	Csi	16	B											
11 May	N19W21	348	50	5	Cso	11	B											
12 May	N19W34	349	20	5	Hrx	1	A											
13 May	N19W48	350	20	5	Bxo	1	B					1						
14 May	N18W61	350	20	5	Hrx	1	A											
15 May	N18W75	350	10	1	Axx	1	A											
16 May	N18W91	352	10	1	Axx	1	A											
								2	0	0	4	0	0	0	0	0		

Crossed West Limb.

Absolute heliographic longitude: 347



### *Region Summary - continued*

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

#### ***Region 1212***

11 May	S13E46	281	10		Axx	1	A											
12 May	S13E32	283	plage															
13 May	S13E18	284	plage															
14 May	S13E04	285	plage															
15 May	S13W10	285	plage															
16 May	S13W23	285	plage															
17 May	S13W37	286	plage															
18 May	S13W51	287	plage															
19 May	S13W65	287	plage															
20 May	S13W79	288	plage															
										0	0	0	0	0	0	0	0	0

Crossed West Limb.  
 Absolute heliographic longitude: 285

#### ***Region 1214***

14 May	S20E17	270	50	6	Bxo	7	B											
15 May	S25E01	270	70	6	Dao	16	B											
16 May	S24W10	272	60	9	Dao	12	B				1							
17 May	S24W24	273	60	9	Cso	12	B				1							
18 May	S24W42	277	80	7	Cso	9	B											
19 May	S24W56	277	100	5	Cso	3	B											
20 May	S24W70	279	90	2	Hsx	1	A											
21 May	S23W82	278	70	3	Hax	1	A											
22 May	S23W94	278	30	2	Hsx	1	A											
										0	0	0	2	0	0	0	0	0

Still on Disk.  
 Absolute heliographic longitude: 270

#### ***Region 1215***

14 May	S23W30	318	20	3	Bxo	2	B											
15 May	S23W43	318	plage															
16 May	S23W57	319	plage															
17 May	S23W71	320	plage															
18 May	S23W85	321	plage															
										0	0	0	0	0	0	0	0	0

Crossed West Limb.  
 Absolute heliographic longitude: 318



### *Region Summary - continued*

Date	Location		Sunspot Characteristics				Flares										
	Lat CMD	Lon	Area 10 <sup>6</sup> hemi.	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical						
								C	M	X	S	1	2	3	4		
<b>Region 1216</b>																	
16 May	S14E66	195	90	2	Hsx	1	A										
17 May	S15E54	194	80	2	Hsx	1	A										
18 May	S14E41	194	110	1	Hsx	1	A										
19 May	S14E27	194	110	2	Hsx	1	A										
20 May	S16E19	188	90	2	Hsx	1	A										
21 May	S15E01	193	90	2	Hax	1	A										
22 May	S15W11	194	80	2	Hsx	1	A										
								0	0	0	0	0	0	0	0	0	0
Still on Disk. Absolute heliographic longitude: 193																	
<b>Region 1217</b>																	
17 May	S23W19	267	10	4	Bxo	2	B										
18 May	S23W36	271	10	1	Bxo	2	B										
19 May	S23W50	272	plage														
20 May	S23W64	273	plage														
21 May	S23W78	274	plage														
								0	0	0	0	0	0	0	0	0	0
Crossed West Limb. Absolute heliographic longitude: 267																	
<b>Region 1218</b>																	
18 May	S16E66	169	0		Axx	1	A	1									
19 May	S15E54	166	10	4	Bxo	2	B										
20 May	S16E40	167	10		Axx	1	A										
21 May	S15E28	167	10	1	Axx	1	A										
22 May	S16E14	168	10	1	Axx	1	A										
								1	0	0	0	0	0	0	0	0	0
Still on Disk. Absolute heliographic longitude: 168																	
<b>Region 1219</b>																	
21 May	N15E71	125	0	1	Axx	1	A										
22 May	N15E57	126	plage														
								0	0	0	0	0	0	0	0	0	0
Still on Disk. Absolute heliographic longitude: 126																	





***Region Summary - continued***

Date	Location		Sunspot Characteristics				Flares								
	Lat CMD	Lon	Heli 10 <sup>-6</sup> hemi.	Area	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical			
									C	M	X	S	1	2	3
<b><i>Region 1220</i></b>															
22 May	N14W65	248	10	2	Bxo	4	B	0	0	0	1	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 248

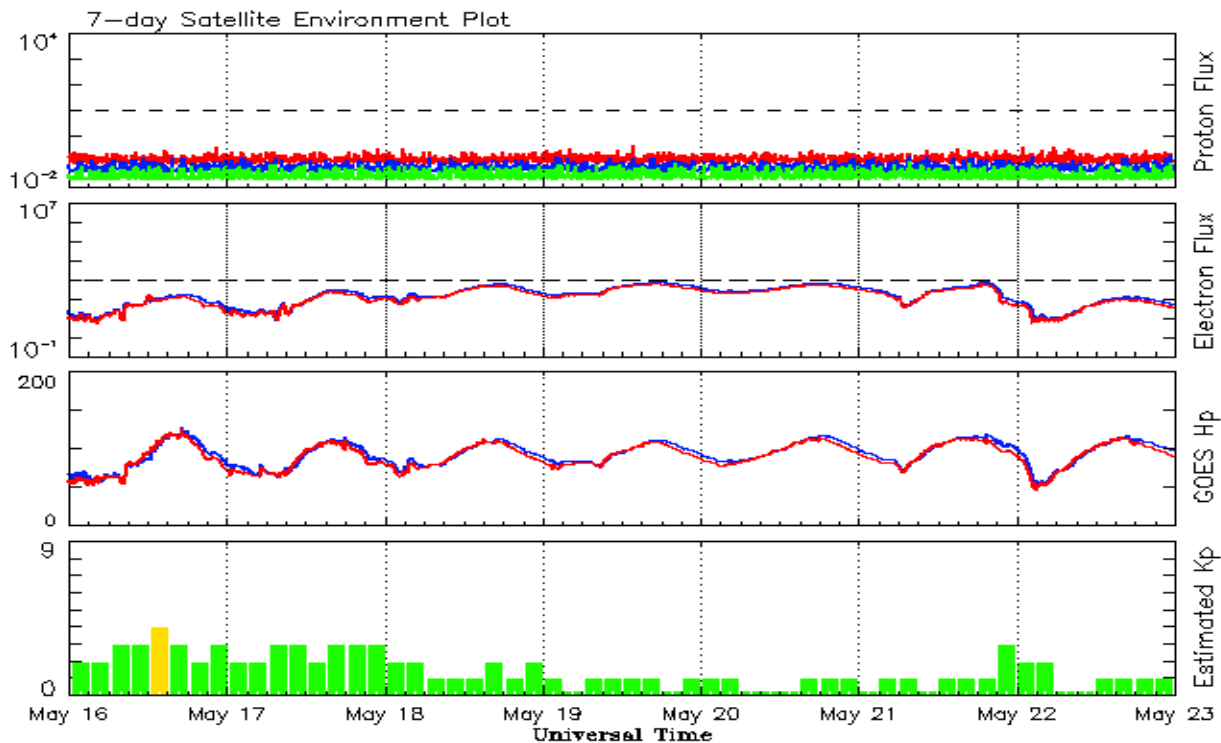


**Recent Solar Indices (preliminary)**  
**Observed monthly mean values**

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
<b>2009</b>									
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	6.2	70.5	73.3	4	3.8
October	7.0	4.8	0.66	11.3	7.1	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	13.6	8.3	76.8	74.9	2	4.8
<b>2010</b>									
January	21.3	13.2	0.62	14.8	9.3	81.1	75.5	3	5.0
February	31.0	18.8	0.60	16.7	10.6	84.7	76.5	5	5.1
March	24.7	15.4	0.62	19.1	12.3	83.3	77.5	5	5.3
April	11.2	8.0	0.71	21.4	14.0	75.9	78.3	10	5.5
May	19.9	8.7	0.44	23.8	15.5	73.8	79.0	8	5.7
June	17.9	13.6	0.75	25.2	16.4	72.6	79.7	7	5.8
July	23.1	16.1	0.70	25.9	16.7	79.9	80.1	5	6.0
August	28.2	19.6	0.70	27.3	17.4	79.7	80.7	8	6.2
September	35.6	25.2	0.71	30.6	19.6	81.1	82.4	5	6.3
October	35.0	23.5	0.67	35.9	23.2	81.6	85.3	6	6.4
November	36.1	21.5	0.60			82.5		5	
December	22.0	14.4	0.66			84.3		4	
<b>2011</b>									
January	32.1	19.0	0.59			83.7		6	
February	53.2	29.4	0.55			94.5		6	
March	81.0	56.2	0.69			115.3		7	
April	81.7	54.4	0.67			112.6		9	

**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. Solar minimum for Cycle 23 was December 2008.





*Weekly Geosynchronous Satellite Environment Summary  
Week Beginning 16 May 2011*

The proton flux plot contains the five-minute averaged integral proton flux (protons/cm<sup>2</sup>-sec -sr) as measured by the SWPC Primary GOES satellite, near West 75, for each of three energy thresholds: greater than 10, 50, and 100 MeV.

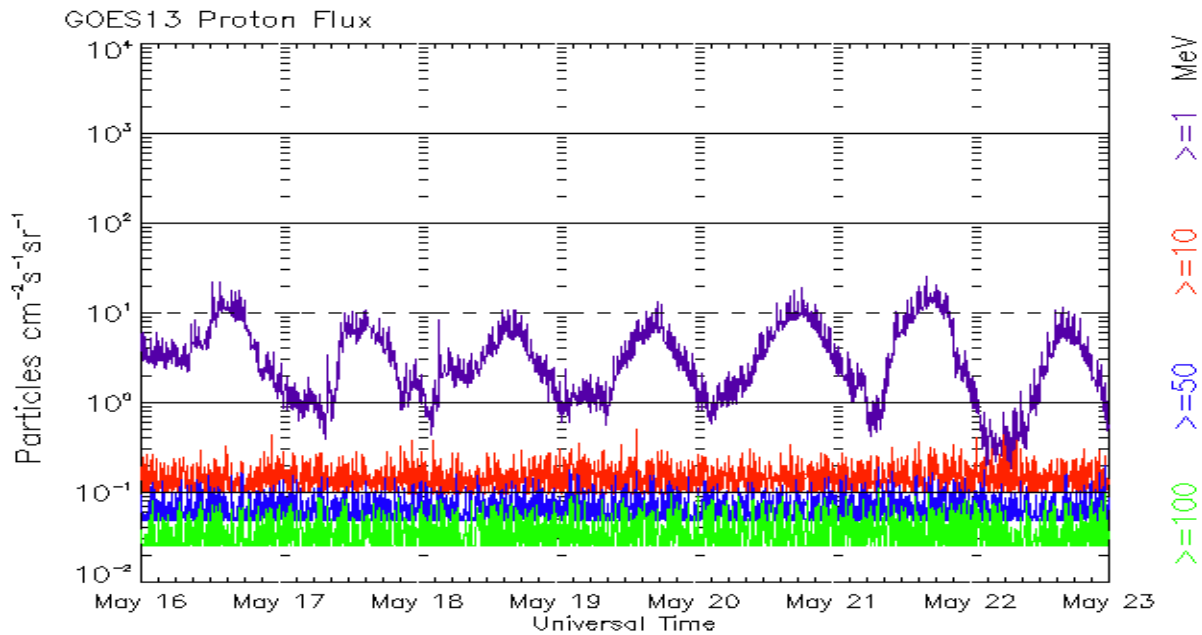
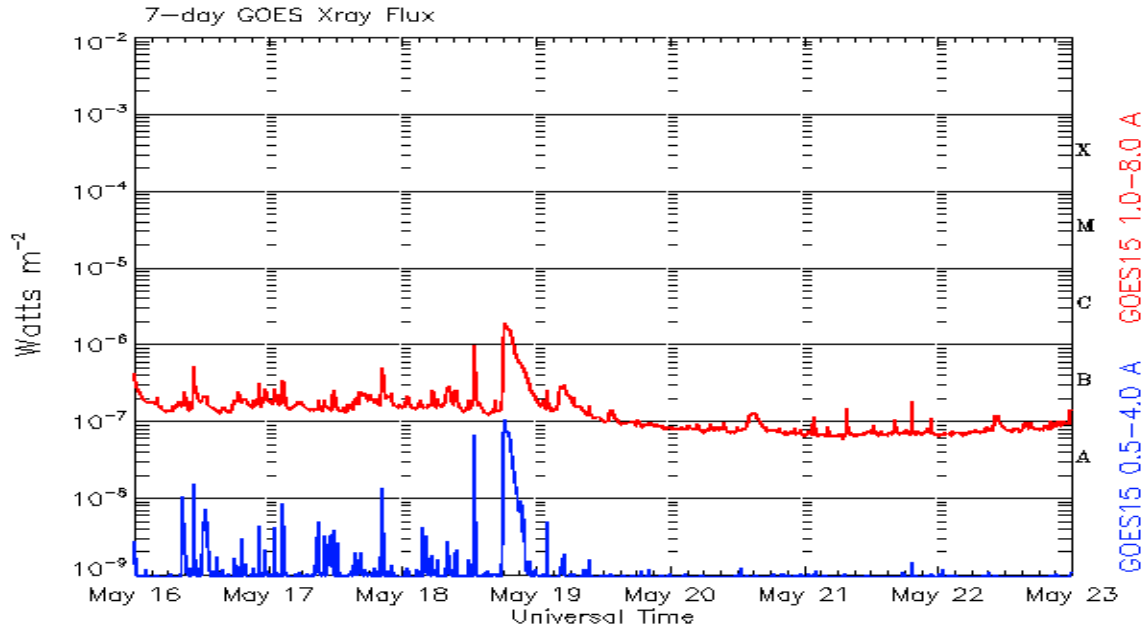
The electron flux plot contains the five-minute averaged integral electron flux (electrons/cm<sup>2</sup>-sec -sr) with energies greater than 2 MeV by the SWPC Primary GOES satellite.

The Hp plot contains the five minute averaged Hp magnetic field component in nanoteslas (nT) as by the SWPC Primary GOES satellite. 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  
Week Beginning 16 May 2011*

The x-ray plots contains five-minute averages x-ray flux ( $Watt/m^2$ ) as measure by the SWPC primary GOES X-ray satellite, usually at West 105 longitude, 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 intergral flux units (pfu = protons/ $cm^2$  -sec -sr) as measured by the primary SWPC GOES Proton satellite for each of the energy thresholds: >1, >10, >30, and >100 MeV. The P10 event threshold is 10 pfu at greater than 10 MeV.



## ***Preliminary Report and Forecast of Solar Geophysical Data (The Weekly)***

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**Notice:** The 27-day Outlook, Satellite Environment, X-ray and Proton plots have been redesigned. Comments and suggestions are welcome SWPC.Webmaster@noaa.gov

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