

**Space Weather Highlights**  
**11 May - 17 May 2009**

**SWO PRF 1759**  
**19 May 2009**

Solar activity was very low. No flares were observed. New-cycle polarity Region 1017 (N18, L=184, class/area Bxo/020 on 14 May) was numbered on 13 May. It was inactive and simply-structured during the period.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit was at normal levels during the period.

Geomagnetic field activity was at quiet levels at all latitudes during most of the period. However, activity briefly increased to active levels late on 14 May. ACE observations indicated the active period (14/1800 – 14/2100 UTC) was due to solar wind changes associated with a solar sector boundary crossing (SSBC). Solar wind changes included a period of sustained southward IMF Bz (minimum – 8 nT), increased IMF Bt (maximum +8 nT), and a modest increase in velocities (approximately 340 to 400 km/sec).

**Space Weather Outlook**  
**20 May – 15 June 2009**

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 be at normal flux levels.

Geomagnetic field activity is expected to be at quiet levels through 02 June. Activity is expected to increase to unsettled to active levels during 03 – 05 June with a chance for minor storm levels at high latitudes due to a recurrent coronal hole high-speed stream. Mostly quiet conditions are expected during 06 – 15 June.

**Notice: On May 8, 2009** the Solar Cycle 24 Prediction Panel released a consensus decision on the prediction of the next solar cycle (Cycle 24). See <http://www.swpc.noaa.gov/SolarCycle/> for more details.



**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
11 May	72	0	0	<A1.0	0	0	0	0	0	0	0	0
12 May	74	0	0	<A1.0	0	0	0	0	0	0	0	0
13 May	74	12	10	<A1.0	0	0	0	0	0	0	0	0
14 May	74	18	20	<A1.0	0	0	0	0	0	0	0	0
15 May	74	12	10	<A1.0	0	0	0	0	0	0	0	0
16 May	74	15	20	<A1.0	0	0	0	0	0	0	0	0
17 May	74	13	10	<A1.0	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
11 May	4.9e+05	1.9e+04	4.2e+03		1.4e+07	
12 May	6.3e+05	2.0e+04	4.6e+03		1.8e+07	
13 May	6.8e+05	2.0e+04	4.5e+03		2.1e+07	
14 May	7.0e+05	1.9e+04	4.3e+03		8.3e+06	
15 May	7.4e+05	2.0e+04	4.5e+03		4.0e+05	
16 May	8.3e+05	2.0e+04	4.2e+03		5.2e+05	
17 May	6.8e+05	2.0e+04	4.4e+03		5.8e+05	

**Daily Geomagnetic Data**

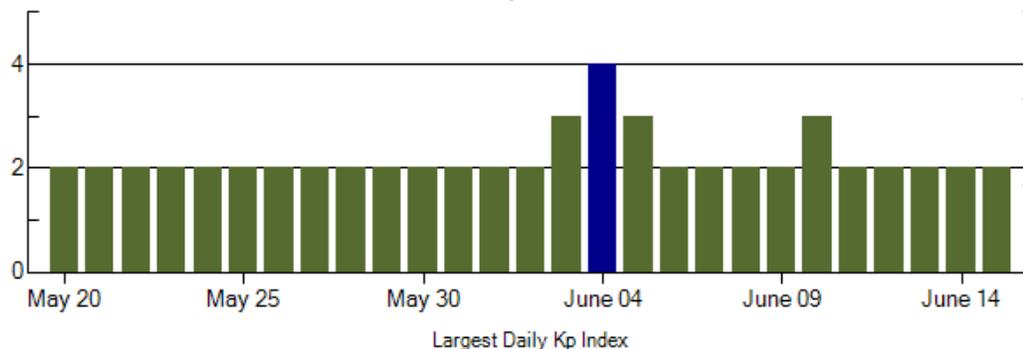
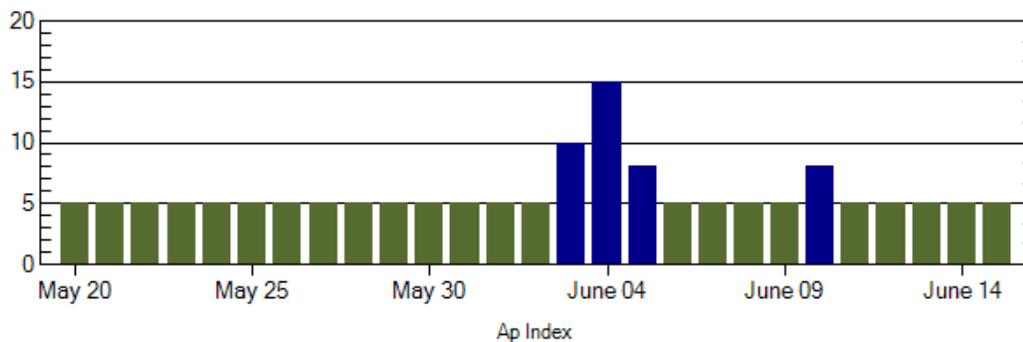
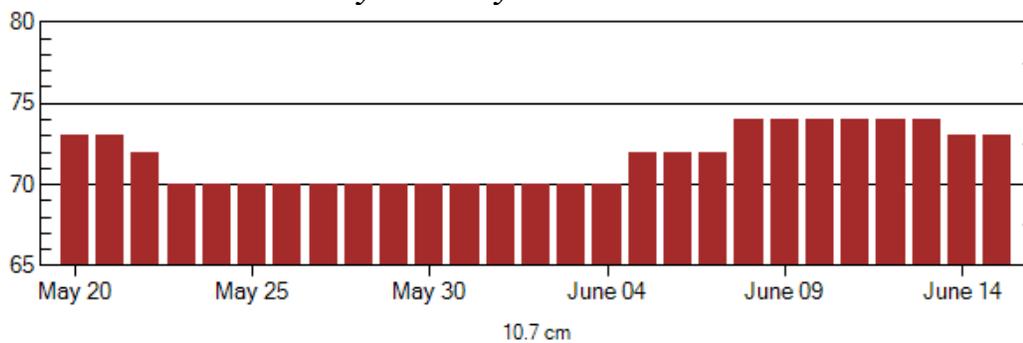
Date	Middle Latitude		High Latitude		Estimated	
	Fredericksburg		College		Planetary	
	A	K-indices	A	K-indices	A	K-indices
11 May	2	1-1-0-1-1-1-1-0	3	1-1-1-2-2-1-0-0	4	2-1-1-1-1-1-1-1
12 May	0	0-0-0-0-0-0-0-0	0	0-0-0-0-0-0-0-0	2	0-0-0-0-0-1-1-1
13 May	2	1-0-0-0-1-1-0-1	1	1-0-0-0-1-0-0-0	3	1-0-0-0-1-1-1-1
14 May	8	1-1-1-2-3-2-3-2	4	0-2-1-2-1-1-2-1	8	1-2-1-2-2-2-4-2
15 May	2	1-0-0-1-1-1-0-1	1	1-1-0-0-0-0-0-1	2	1-0-0-0-1-1-0-2
16 May	3	1-1-0-1-1-1-1-1	2	1-1-0-0-1-0-1-1	5	1-1-0-2-1-2-2-2
17 May	2	1-1-0-0-1-0-0-1	1	1-0-0-0-0-0-1-1	3	1-1-0-0-0-1-1-2

**Alerts and Warnings Issued**

Date & Time of Issue	Type of Alert or Warning	Date & Time of Event UTC
14 May 1223	SUMMARY: Geomagnetic Sudden Impulse	14 May 1155



### 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
20 May	74	5	2	03 Jun	70	10	3
21	73	5	2	04	70	15	4
22	73	5	2	05	72	8	3
23	72	5	2	06	72	5	2
24	72	5	2	07	72	5	2
25	71	5	2	08	74	5	2
26	71	5	2	09	74	5	2
27	70	5	2	10	74	8	3
28	70	5	2	11	74	5	2
29	70	5	2	12	74	5	2
30	70	5	2	13	74	5	2
31	70	5	2	14	73	5	2
01 Jun	70	5	2	15	73	5	2
02	70	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	Class	Flux	Lat	CMD	#	245	2695	II

**No Events Observed**

***Flare List***

Date	Time			X-ray	Imp/	Location	Rgn
	Begin	Max	End	Class.	Brtns	Lat	CMD
11 May	No Flares Observed						
12 May	No Flares Observed						
13 May	No Flares Observed						
14 May	No Flares Observed						
15 May	No Flares Observed						
16 May	No Flares Observed						
17 May	No Flares Observed						

***Region Summary***

Date	Location		Sunspot Characteristics				Flares								
	(° Lat ° CMD)	Helio 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	
<i>Region 1017</i>															
13 May	N18E27	190	0010	06	BXO	002	B								
14 May	N18E17	186	0020	07	BXO	008	B								
15 May	N18E06	184	0010	01	AXX	002	A								
16 May	N18W09	186	0020	03	BXO	005	B								
17 May	N18W21	185	0010	03	BXO	003	B								

0 0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 184



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

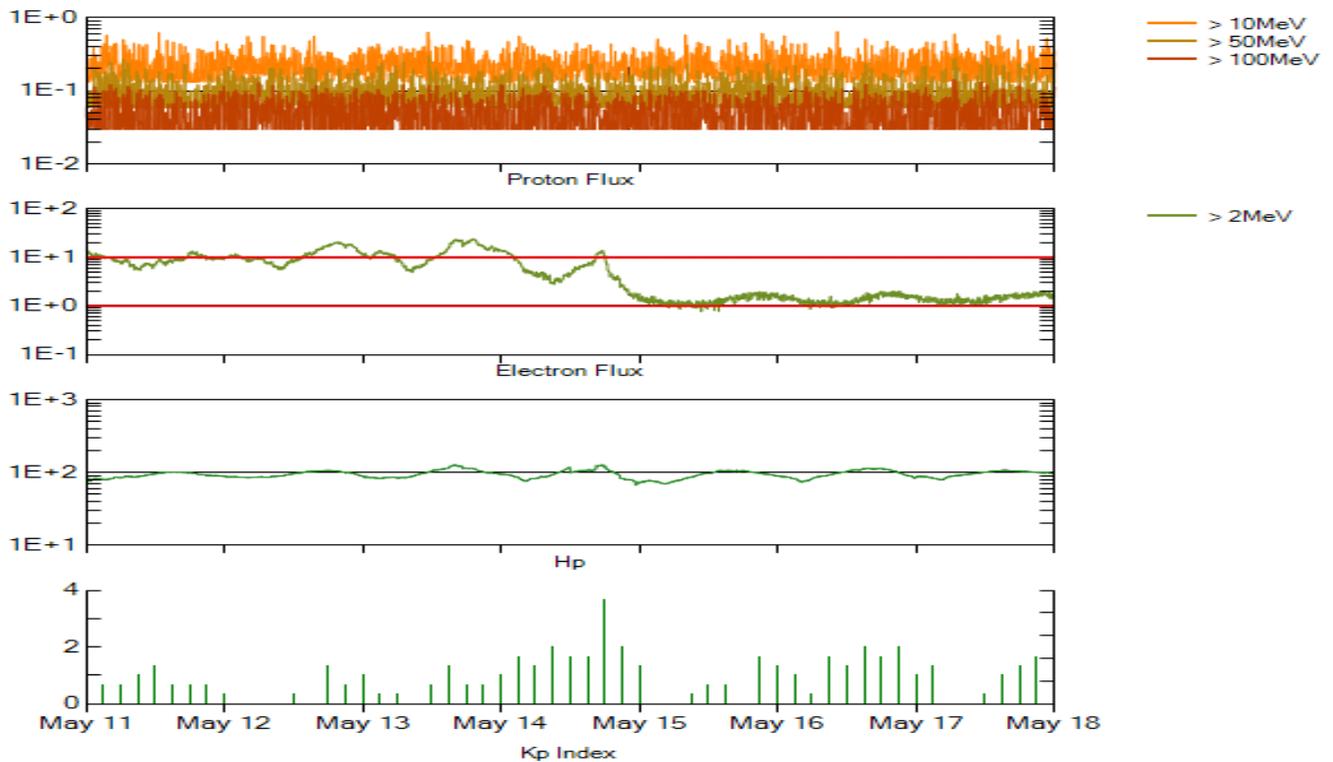
Month	Sunspot Numbers			Radio Flux		Geomagnetic			
	Observed values SEC	Ratio RI	Ratio RI/SEC	Smooth values SEC	Smooth values RI	*Penticton 10.7 cm	Smooth Value	Planetary Ap	Smooth Value
<b>2007</b>									
May	19.4	11.7	0.60	14.2	8.7	74.5	74.2	9	8.4
June	20.0	12.0	0.60	12.8	7.7	73.7	73.2	7	7.8
July	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	10.0	6.1	65.5	71.5	9	7.9
November	2.5	1.7	0.68	9.4	5.7	69.7	71.1	5	7.8
December	16.2	10.1	0.62	8.1	5.0	78.6	70.5	4	7.8
<b>2008</b>									
January	5.1	3.4	0.67	6.9	4.2	72.1	70.0	6	7.7
February	3.8	2.1	0.55	5.9	3.6	71.2	69.6	9	7.6
March	15.9	9.3	0.58	5.3	3.3	72.9	69.5	10	7.4
April	4.9	2.9	0.59	5.3	3.3	70.3	69.6	9	7.1
May	5.7	2.9	0.51	5.7	3.5	68.4	69.7	6	6.9
June	4.2	3.1	0.74	5.2	3.2	65.9	69.2	7	6.8
July	1.0	0.5	0.50	4.5	2.7	65.8	68.8	6	6.6
August	0.0	0.5	**	4.4	2.6	66.4	68.6	5	6.2
September	1.5	1.1	0.73	3.7	2.2	67.1	68.4	5	5.8
October	5.2	2.9	0.56	2.9	1.8	68.3	68.2	6	5.4
November	6.8	4.1	0.60			68.6		3	
December	1.3	0.8	0.62			69.2		2	
<b>2009</b>									
January	2.8	1.5	0.54			69.8		3	
February	2.5	1.4	0.56			70.0		4	
March	0.7	0.7	1.00			69.2		4	
April	1.2	1.2	1.00			69.7		4	

**NOTE:** All smoothed and monthly values are preliminary estimates.

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 11 May 2009*

**GOES-11 designated Primary Electron Satellite and GOES-10 Secondary: December 1, 2008 the GOES-12 Electron sensor began experiencing periods of noise and sensor is unreliable.**

Protons plot contains the five-minute averaged integral proton flux (protons/cm<sup>2</sup>-sec-sr) as measured by GOES-11 (W135) for each of three energy thresholds: greater than 10, 50, and 100 MeV.

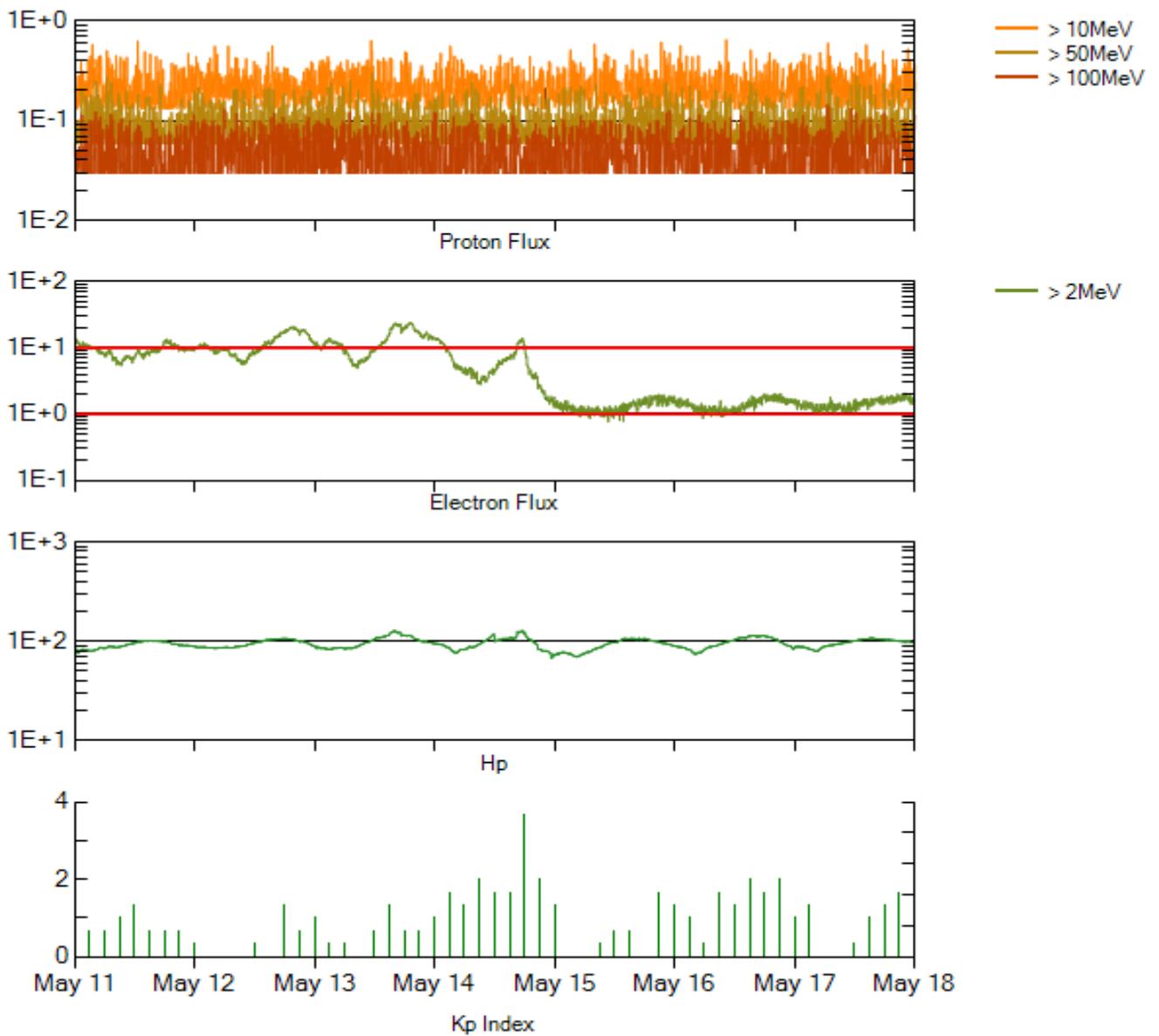
Electrons plot contains the five-minute averaged integral electron flux (electrons/cm<sup>2</sup>-sec-sr) with energies greater than 2 MeV at GOES-11 (W135).

Hp plot contains the five minute averaged magnetic field H - component in nanoteslas (nT) as measured by GOES-11. 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 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

X-ray plot contains five-minute averaged x-ray flux ( $\text{watts/m}^2$ ) 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.

