

**Space Weather Highlights**  
**15 June - 21 June 2009**

**SWO PRF 1764**  
**23 June 2009**

Solar activity was very low. No flares were detected. The visible disk was spotless during most of 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 mostly quiet levels during the period. ACE solar wind measurements indicated nominal conditions with solar wind velocities ranging from approximately 280 to 370 km/sec during the period.

**Space Weather Outlook**  
**24 June – 20 July 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 levels.

Geomagnetic field activity is expected to be at quiet levels during most of the period. However, there will be a chance for unsettled conditions on 01 July.



**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	
15 June	67	0	0	<A1.0	0	0	0	0	0	0	0	0	0
16 June	68	0	0	<A1.0	0	0	0	0	0	0	0	0	0
17 June	68	11	10	<A1.0	0	0	0	0	0	0	0	0	0
18 June	68	0	0	<A1.0	0	0	0	0	0	0	0	0	0
19 June	67	0	0	<A1.0	0	0	0	0	0	0	0	0	0
20 June	67	0	0	<A1.0	0	0	0	0	0	0	0	0	0
21 June	67	12	20	<A1.0	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
	15 June	5.4e+05	2.0e+04	4.5e+03		4.3e+04
16 June	7.7e+05	1.9e+04	4.5e+03		4.6e+04	
17 June	7.7e+05	2.0e+04	4.3e+03		4.7e+04	
18 June	6.8e+05	2.0e+04	4.5e+03		4.6e+04	
19 June	7.4e+05	2.0e+04	4.6e+03		4.4e+04	
20 June	9.3e+05	1.9e+04	4.4e+03		4.5e+04	
21 June	6.1e+05	1.9e+04	4.3e+03		5.2e+04	

**Daily Geomagnetic Data**

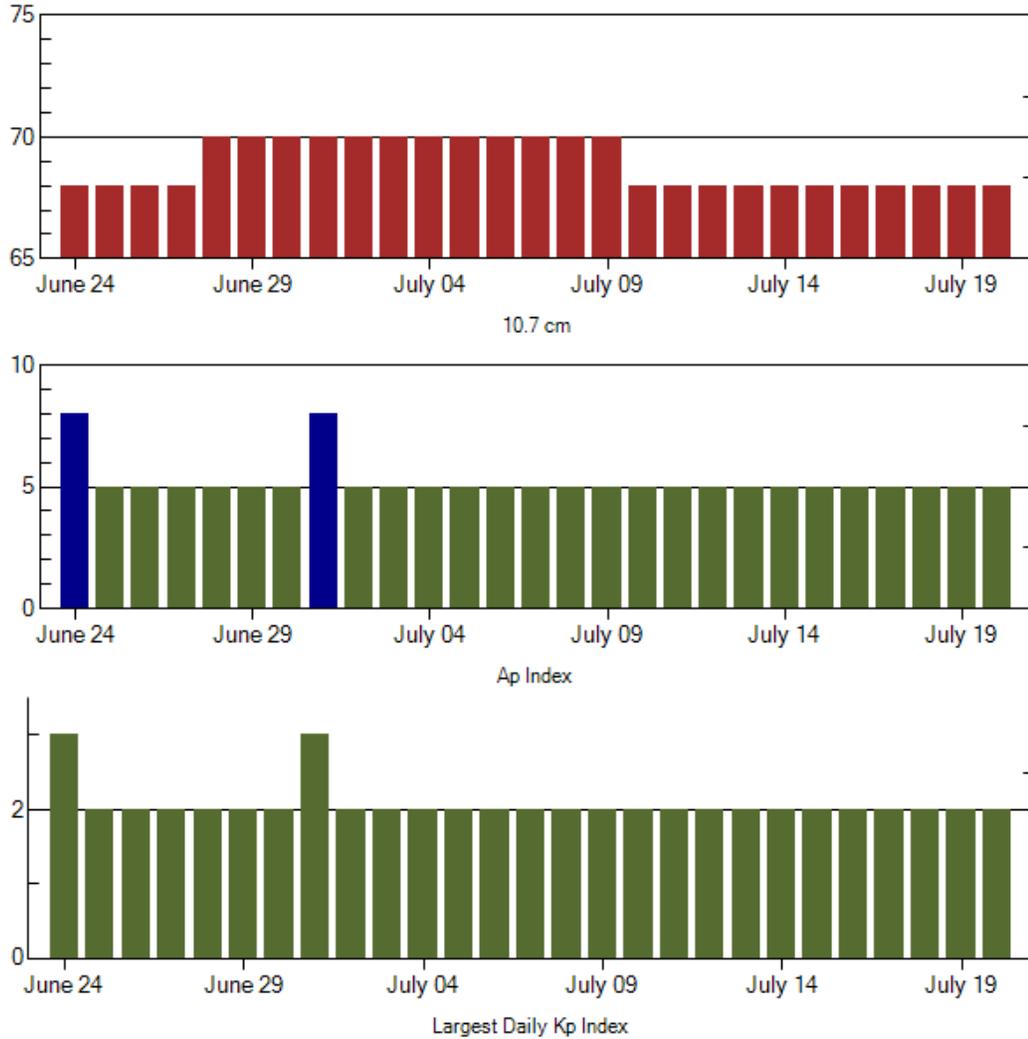
Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	15 June	4	1-2-1-1-1-1-1-1	3	1-3-1-0-0-0-0-0	4
16 June	4	0-0-3-1-2-1-1-0	1	0-0-0-0-1-1-1-0	3	1-0-0-1-2-1-1-1
17 June	1	0-0-1-0-1-1-0-0	0	0-1-0-0-0-0-0-0	3	1-0-0-0-1-2-0-2
18 June	2	0-0-0-1-1-1-1-2	0	0-0-0-0-0-0-0-1	4	1-0-0-1-1-1-1-2
19 June	1	1-0-0-0-1-1-0-0	0	1-0-0-0-0-0-0-0	4	2-0-0-0-1-2-2-2
20 June	5	0-2-2-1-1-1-2-2	4	0-2-2-1-0-1-2-1	6	1-2-2-1-2-2-2-2
21 June	6	2-3-2-1-2-1-1-1	3	2-2-1-1-1-0-0-0	7	2-3-2-1-2-1-0-1

**Alerts and Warnings Issued**

Date & Time of Issue	Type of Alert or Warning	Date & Time of Event UTC
<i>No Alerts Issued</i>		



### 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
24 Jun	68	8	3	08 Jul	70	5	2
25	68	5	2	09	70	5	2
26	68	5	2	10	68	5	2
27	68	5	2	11	68	5	2
28	70	5	2	12	68	5	2
29	70	5	2	13	68	5	2
30	70	5	2	14	68	5	2
01 Jul	70	8	3	15	68	5	2
02	70	5	2	16	68	5	2
03	70	5	2	17	68	5	2
04	70	5	2	18	68	5	2
05	70	5	2	19	68	5	2
06	70	5	2	20	68	5	2
07	70	5	2				



***Energetic Events***

Date	Time		X-ray		Optical Information			Peak		Sweep Freq	
	Begin	Max	Max	Class	Flux	Imp/ Brtns	Location Lat CMD	#	Radio Flux		Intensity
									245	2695	II
<i>No Events Observed</i>											

***Flare List***

Date	Time			X-ray Class.	Imp / Brtns	Optical	Rgn
	Begin	Max	End			Location Lat CMD	
15 June	No Flares Observed						
16 June	No Flares Observed						
17 June	No Flares Observed						
18 June	No Flares Observed						
19 June	No Flares Observed						
20 June	No Flares Observed						
21 June	No Flares Observed						



## 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		
<i>Region 1020</i>																	
08 Jun	N22E07	225	20	3	BXO	2	B										
09 Jun	N24W05	223	20	3	BXO	2	B										
10 Jun	N24W18	223															
11 Jun	N24W31	224															
12 Jun	N25W46	226	10	2	HRX	2	A										
13 Jun	N25W59	226															
14 Jun	N25W72	226															
15 Jun	N25W85	226															
16 Jun	N25W98	226															
								0	0	0	0	0	0	0	0		
Crossed West Limb.																	
Absolute heliographic longitude: 223																	
<i>Region 1021</i>																	
17 Jun	S16W71	184	10	1	AXX	1	A										
18 Jun	S16W84	184															
								0	0	0	0	0	0	0	0		
Crossed West Limb.																	
Absolute heliographic longitude: 184																	
<i>Region 1022</i>																	
21 Jun	S27E15	45	20	3	BXO	2	B										
								0	0	0	0	0	0	0	0		
Still on Disk.																	
Absolute heliographic longitude: 45																	



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

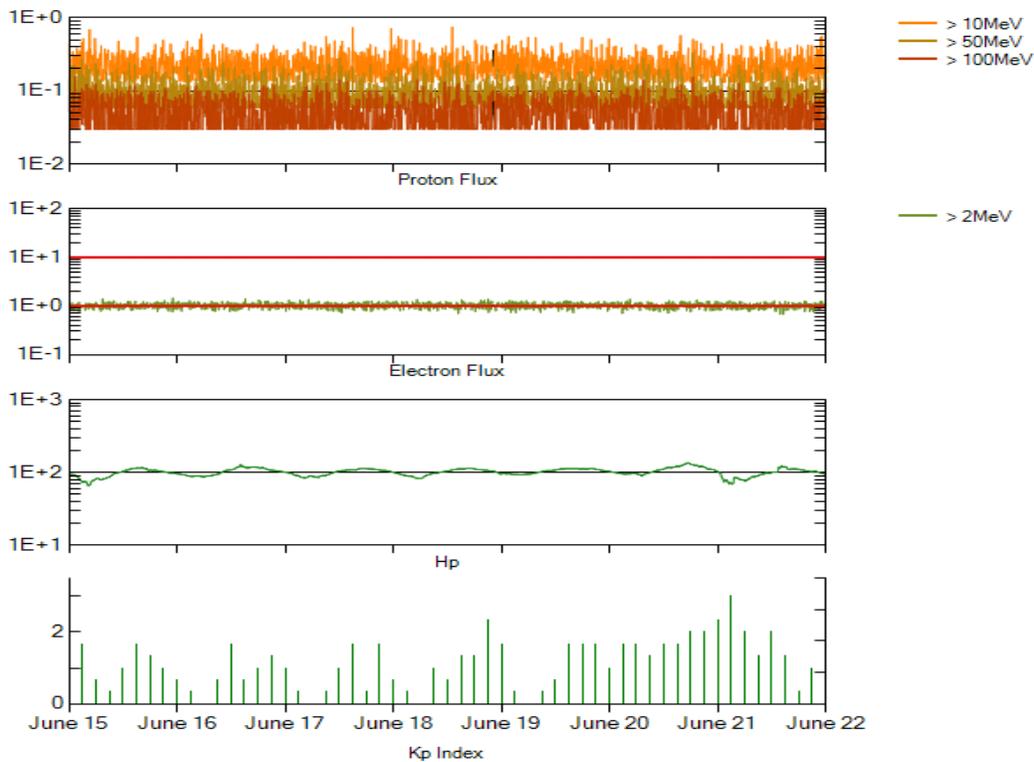
Month	Sunspot Numbers			Smooth values		Radio Flux		Geomagnetic	
	Observed SEC	values RI	Ratio RI/SEC	SEC	RI	*Penticton 10.7 cm	Smooth Value	Planetary Ap	Smooth Value
<b>2007</b>									
June	20.0	12.0	0.60	12.8	7.7	73.7	73.2	7	7.8
July	15.6	10.0	0.64	11.6	7.0	71.6	72.5	8	7.4
August	9.9	6.2	0.63	10.2	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	2.7	1.7	68.6	68.3	3	5.1
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	
May	3.9	2.9	0.74			70.6		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 15 June 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.

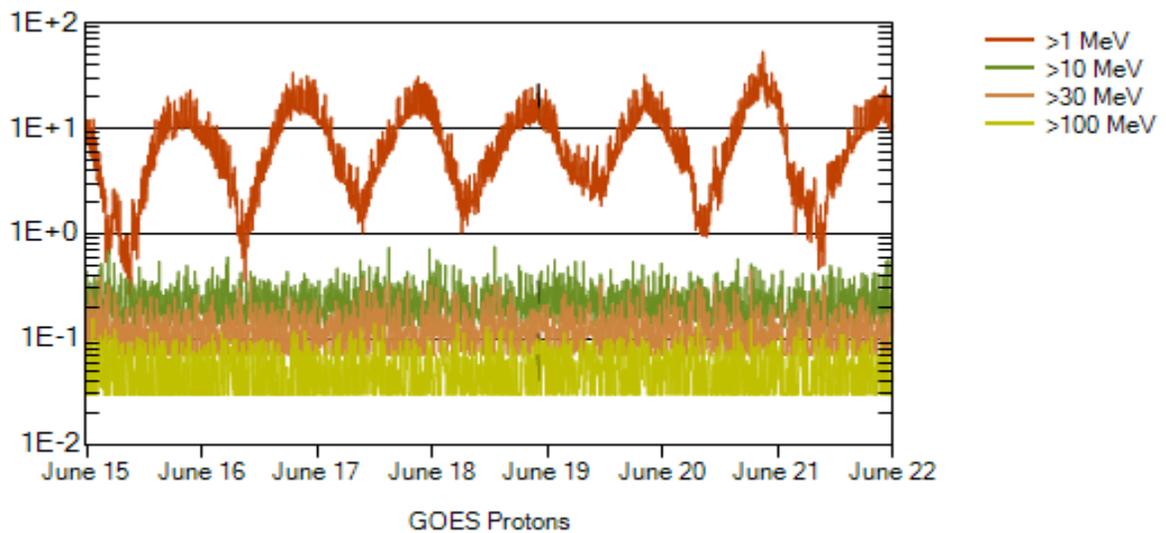
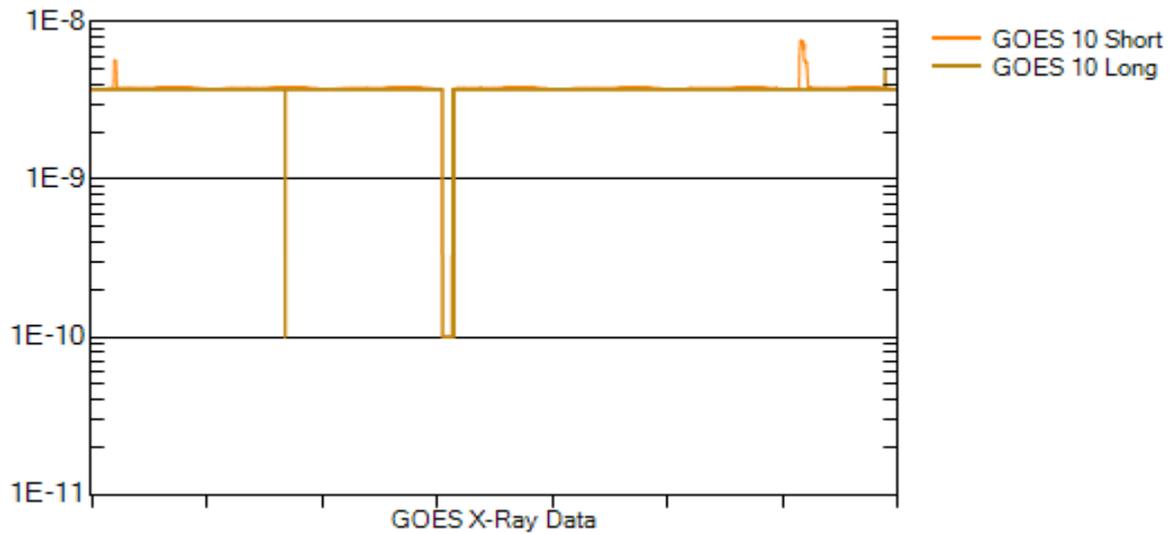
Electrons plot contains the five-minute averaged integral electron flux (electrons/cm<sup>2</sup>-sec-sr) with energies greater than 2 MeV at GOES-11.

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 (watts/m<sup>2</sup>) 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 (protons/cm<sup>2</sup>-sec-sr) as measured by GOES-11 for each of the energy thresholds: >1, >10, >30 and >100 MeV. P10 event threshold is 10 pfu (protons/cm<sup>2</sup>-sec-sr) at greater than 10 MeV.

