

Space Weather Highlights
22 June - 28 June 2009

SWO PRF 1765
30 June 2009

Solar activity was very low. New cycle polarity Region 1022 (S27, L=045, class/area Bxo/020 on 21 June) was numbered on 21 June. Region 1022 remained inactive and decayed to spotless plage early on 23 June. Region 1023 (S23, L=020, class/area Cso/040 on 24 June) was numbered on 22 June. Region 1023 was most likely the source of A-class x-ray activity occurring during this period. Region 1023 gradually decayed to spotless plage on 25 June.

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 predominantly quiet levels during 22 – 23 June. Field activity increased to quiet to active conditions late on 23 June and persisted through 24 June due to a coronal hole high-speed stream (CH HSS). During this period, an isolated period of minor storm levels was observed at high latitudes. Solar wind densities at ACE began to rise at 22/2333Z, increasing from 1 p/cc to a maximum of approximately 17 p/cc at 23/2045Z. ACE solar wind observations showed a period of sustained southward IMF Bz between 23/1912Z and 24/2234Z (minimum of -20 nT / maximum of +20 nT). Solar wind velocities increased from 247 km/s (at 24/0656Z) to a maximum of 508 km/s (at 24/2112Z). Velocities gradually decreased to 366 km/s at 27/1034Z. Velocities increased again to 450 km/s at 28/2050Z. Bz reached a minimum of -12 nT at 28/1917Z, and the density reached a maximum of 28 p/cc at 28/1603Z. Geomagnetic field activity decreased to predominantly quiet conditions during 25 – 28 June. Isolated unsettled to active periods were observed late on 28 June due to a CH HSS.

Space Weather Outlook
01 July – 27 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 flux levels.

Geomagnetic field activity is expected to be at quiet levels, with isolated unsettled conditions possible during 01 – 02 July due to the continuing effects from the current CH HSS. Predominantly quiet conditions are expected during 03 – 20 July. Quiet to unsettled conditions, with isolated active periods at high latitudes, are expected on 21 July due to a recurrent CH HSS. Predominantly quiet conditions are expected during 22 - 24 July. Activity is expected to increase to quiet to isolated unsettled levels on 25 July. Predominantly quiet conditions are expected during 26-27 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
22 June	68	24	50	<A1.0	0	0	0	0	0	0	0	0
23 June	68	12	30	<A1.0	0	0	0	0	0	0	0	0
24 June	67	14	40	<A1.0	0	0	0	0	0	0	0	0
25 June	68	0	0	<A1.0	0	0	0	0	0	0	0	0
26 June	67	0	0	<A1.0	0	0	0	0	0	0	0	0
27 June	67	0	0	<A1.0	0	0	0	0	0	0	0	0
28 June	67	0	0	<A1.0	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
	22 June	5.9e+05	2.0e+04	4.3e+03		4.2e+04
23 June	1.1e+06	2.0e+04	4.4e+03		4.5e+04	
24 June	9.1e+05	1.9e+04	4.3e+03		3.5e+04	
25 June	5.4e+05	2.0e+04	4.1e+03		4.4e+04	
26 June	4.4e+05	2.0e+04	4.1e+03		4.0e+04	
27 June	6.6e+05	1.9e+04	4.2e+03		5.6e+04	
28 June	1.0e+06	1.9e+04	4.1e+03		5.2e+04	

Daily Geomagnetic Data

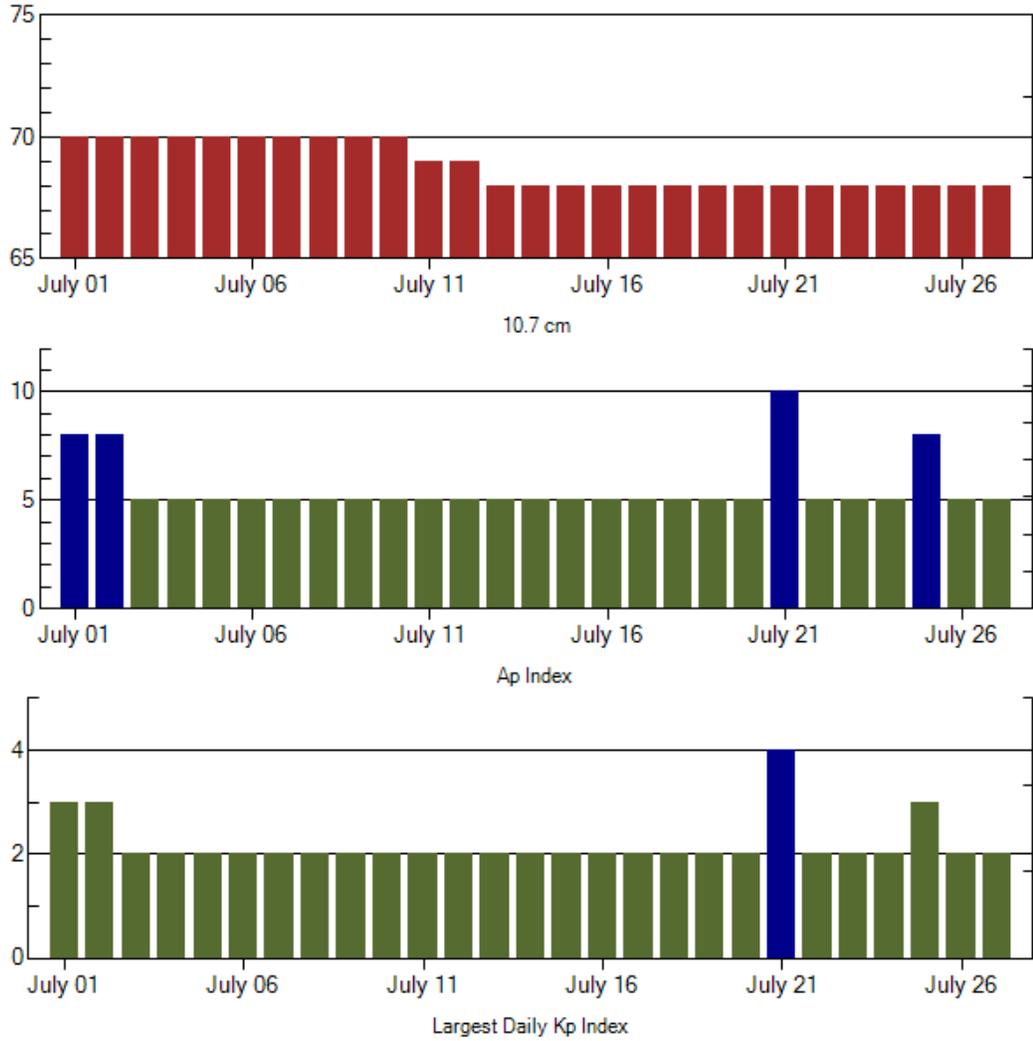
Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	22 June	2	1-1-0-0-1-1-1-0	1	1-2-0-0-0-0-0-0	3
23 June	5	1-0-0-1-0-1-1-4	2	1-0-0-0-0-0-1-2	4	1-0-0-1-0-0-2-3
24 June	16	2-4-4-2-2-2-4-3	11	2-3-4-1-1-1-3-2	19	3-3-4-2-2-2-5-3
25 June	6	2-1-1-1-2-3-1-2	7	2-1-0-2-4-1-0-2	7	2-1-1-1-2-2-2-3
26 June	2	1-1-0-1-1-0-1-1	2	2-1-0-1-0-0-1-0	3	2-1-0-0-1-0-1-1
27 June	4	1-0-0-1-1-2-2-2	2	0-0-1-0-0-1-1-1	3	1-0-0-1-1-2-2-2
28 June	8	2-1-1-1-2-2-3-3	9	2-1-1-0-1-4-3-3	11	2-2-1-0-1-3-4-3

Alerts and Warnings Issued

Date & Time of Issue	Type of Alert or Warning	Date & Time of Event UTC
24 Jun 0512	ALERT: Geomagnetic K = 4	24 Jun 0510
24 Jun 0628	WARNING: Geomagnetic K = 5	24 Jun 0628 - 0930
24 Jun 1912	WARNING: Geomagnetic K = 4	24 Jun 1912 - 25/0000
24 Jun 2016	ALERT: Geomagnetic K = 4	24 Jun 2015
28 Jun 1742	ALERT: Geomagnetic K = 4	28 Jun 1740
28 Jun 1818	WARNING: Geomagnetic K = 4	28 Jun 1820 - 29/0000



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
01 Jul	70	8	3	15 Jul	68	5	2
02	70	8	3	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	21	68	10	4
08	70	5	2	22	68	5	2
09	70	5	2	23	68	5	2
10	70	5	2	24	68	5	2
11	69	5	2	25	68	8	3
12	69	5	2	26	68	5	2
13	68	5	2	27	68	5	2
14	68	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	IV
<i>No Events Observed</i>												

Flare List

Date	Time			X-ray Class.	Imp / Brtns	Optical		Rgn
	Begin	Max	End			Location Lat CMD		
22 June	No Flares Observed							
23 June	No Flares Observed							
24 June	No Flares Observed							
25 June	No Flares Observed							
26 June	No Flares Observed							
27 June	No Flares Observed							
28 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

Region 1022

21 Jun	S27E15	45	20	3	BXO	2	B											
22 Jun	S26E01	46	10	1	AXX	1	A											
23 Jun	S26W12	46																
24 Jun	S26W25	46																
25 Jun	S26W38	46																
26 Jun	S26W51	46																
27 Jun	S26W64	46																

Died on Disk.

Absolute heliographic longitude: 46

Region 1023

22 Jun	S22E29	18	40	5	CSO	3	B											
23 Jun	S25E15	19	30	7	CSO	2	B											
24 Jun	S23E01	20	40	7	CSO	4	B											
25 Jun	S23W14	22																
26 Jun	S23W27	22																
27 Jun	S23W40	22																
28 Jun	S23W53	22																

Still on Disk.

Absolute heliographic longitude: 20



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

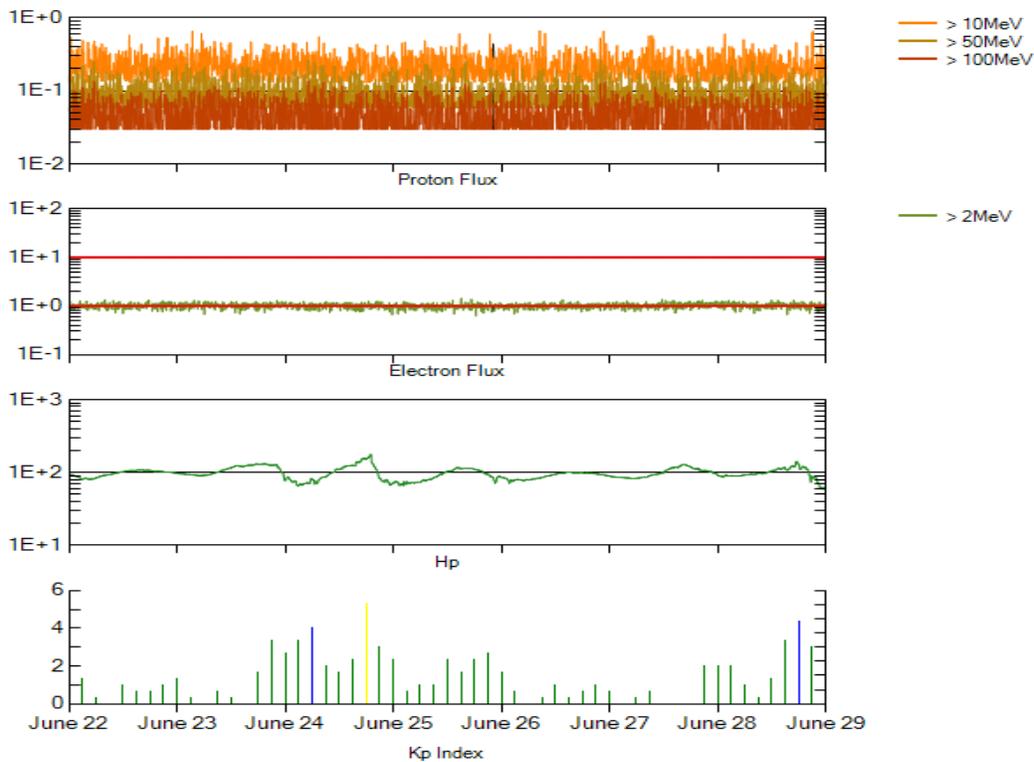
Month	Sunspot Numbers			Smooth values		Radio Flux		Geomagnetic	
	Observed SEC	values RI	Ratio RI/SEC	SEC	RI	*Penticton 10.7 cm	Smooth Value	Planetary Ap	Smooth Value
2007									
June	20.0	12.0	0.60	12.8	7.7	73.7	73.2	7	7.8
July	15.6	10.0	0.64	11.6	7.0	71.6	72.5	8	7.4
August	9.9	6.2	0.63	10.2	6.1	69.2	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
2008									
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	
2009									
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 22 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/cm²-sec -sr) as measured by GOES-11 (W135) for each of three energy thresholds: greater than 10, 50, and 100 MeV.

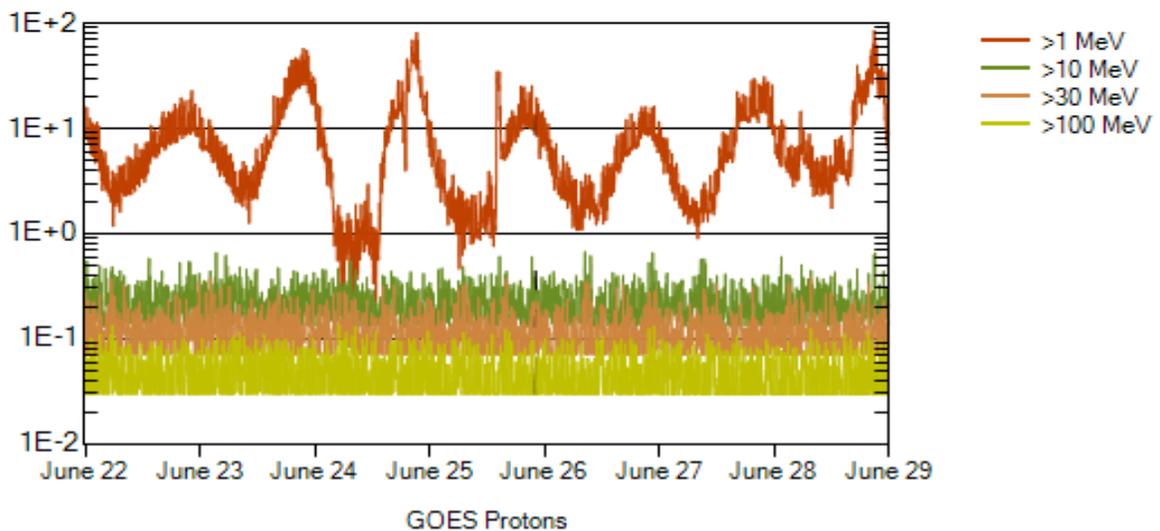
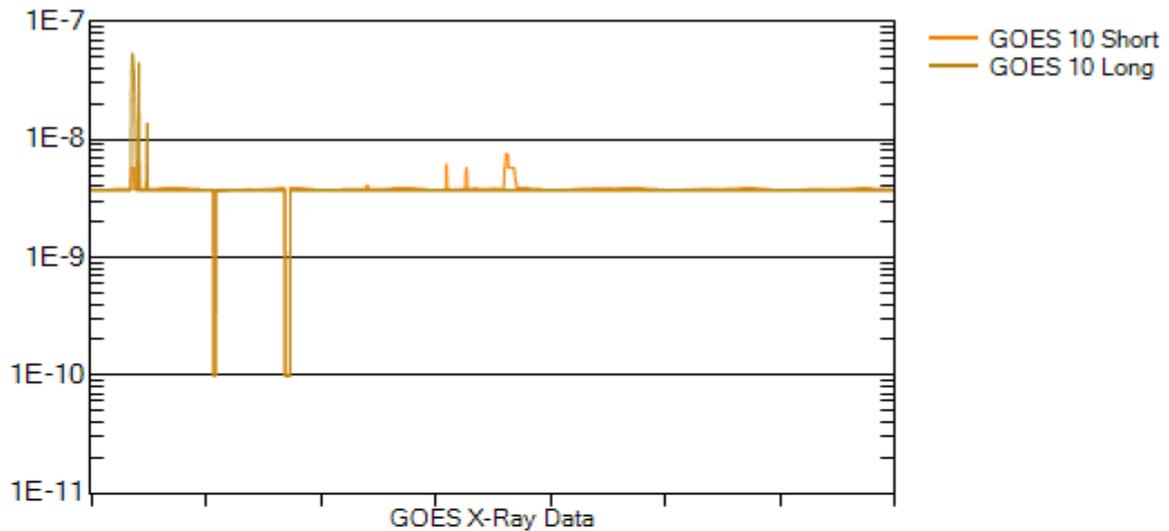
Electrons plot contains the five-minute averaged integral electron flux (electrons/cm²-sec -sr) with energies greater than 2 MeV at GOES-11.

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^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 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.

