

**Space Weather Highlights**  
**20 - 26 April 2009**

**SWO PRF 1756**  
**28 April 2009**

Solar activity was very low. No flares were observed. 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.

Geomagnetic field activity was at quiet levels during most of the period. ACE observations indicated no significant activity in the solar wind during the period.

**Space Weather Outlook**  
**29 April - 25 May 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 increase to high levels during 08 - 11 May. Normal flux levels are expected during the rest of the period.

Geomagnetic field activity is expected to be at mostly quiet levels through 05 May. Activity is expected to increase to quiet to unsettled levels during 06 - 09 May, with active conditions possible on 06 May, due to a recurrent coronal hole high-speed stream. Activity is expected to decrease to predominantly quiet levels during 10 - 25 May.



**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
20 April	70	0	0	<A1.0	0	0	0	0	0	0	0	0
21 April	71	11	10	<A1.0	0	0	0	0	0	0	0	0
22 April	71	0	0	<A1.0	0	0	0	0	0	0	0	0
23 April	71	0	0	<A1.0	0	0	0	0	0	0	0	0
24 April	70	0	0	<A1.0	0	0	0	0	0	0	0	0
25 April	69	0	0	<A1.0	0	0	0	0	0	0	0	0
26 April	69	0	0	<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
20 April	4.0e+05	1.9e+04	4.2e+03		2.0e+06	
21 April	4.1e+05	1.9e+04	4.3e+03		2.5e+06	
22 April	6.1e+05	2.0e+04	4.6e+03		3.2e+06	
23 April	7.6e+05	1.9e+04	4.5e+03		4.0e+06	
24 April	6.2e+05	2.0e+04	4.4e+03		1.7e+06	
25 April	5.9e+05	2.0e+04	4.4e+03		3.7e+05	
26 April	5.7e+05	1.9e+04	4.2e+03		7.6e+05	

**Daily Geomagnetic Data**

Date	Middle Latitude		High Latitude		Estimated	
	Fredericksburg		College		Planetary	
	A	K-indices	A	K-indices	A	K-indices
20 April	3	2-2-1-0-1-1-0-1	3	1-2-2-1-0-0-0-1	4	2-2-1-0-1-2-0-1
21 April	3	1-1-2-1-1-0-1-1	3	1-1-2-2-0-0-0-0	5	1-1-2-1-1-1-1-1
22 April	2	2-1-0-1-1-0-0-1	5	1-1-0-3-3-0-0-0	4	2-1-0-1-1-1-0-2
23 April	0	0-0-0-0-1-0-0-0	1	1-0-0-1-0-0-0-0	3	0-0-0-1-1-1-2-1
24 April	5	2-1-2-1-2-1-1-1	4	2-1-1-1-1-0-2-1	5	2-1-2-1-2-1-2-1
25 April	2	0-1-0-1-1-1-1-1	2	1-1-0-1-1-1-0-1	4	1-1-0-1-1-2-1-2
26 April	3	1-1-1-1-1-1-0-1	2	1-1-0-2-0-0-0-1	5	1-1-1-1-1-2-1-2

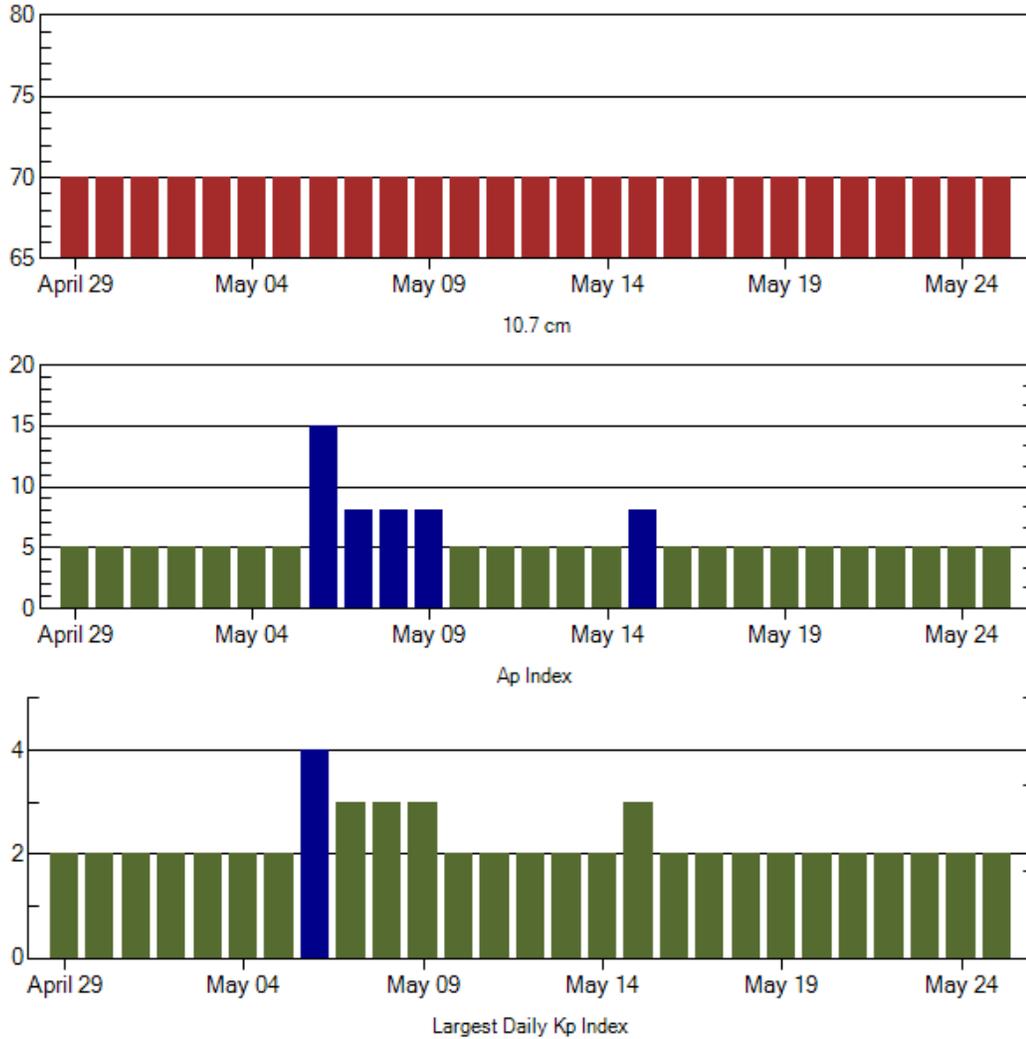
**Alerts and Warnings Issued**

Date & Time of Issue	Type of Alert or Warning	Date & Time of Event UTC
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**No Alerts Issued**



### 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
29 Apr	70	5	2	13 May	70	5	2
30	70	5	2	14	70	5	2
01 May	70	5	2	15	70	8	3
02	70	5	2	16	70	5	2
03	70	5	2	17	70	5	2
04	70	5	2	18	70	5	2
05	70	5	2	19	70	5	2
06	70	15	4	20	70	5	2
07	70	8	3	21	70	5	2
08	70	8	3	22	70	5	2
09	70	8	3	23	70	5	2
10	70	5	2	24	70	5	2
11	70	5	2	25	70	5	2
12	70	5	2				



***Energetic Events***

Date	Time			X-ray	Optical Information			Peak		Sweep Freq	
			½	Integ	Imp/	Location	Rgn	Radio Flux		Intensity	
	Begin	Max	Max	Class	Flux	Brtns	Lat CMD	#	245	2695	II

***No Events Observed***

***Flare List***

Date	Time			X-ray	Imp/	Optical	Rgn
	Begin	Max	End	Class.	Brtns	Location Lat CMD	
20 April	No Flares Observed						
21 April	No Flares Observed						
22 April	No Flares Observed						
23 April	No Flares Observed						
24 April	No Flares Observed						
25 April	No Flares Observed						
26 April	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	
<b><i>Region 1015</i></b>															
21 Apr	N22W65	213	0010	00	Axx	001	A								
22 Apr	N23W78	212													
23 Apr	N23W91	212													
								0	0	0	0	0	0	0	0

Crossed West Limb.  
Absolute heliographic longitude: 213



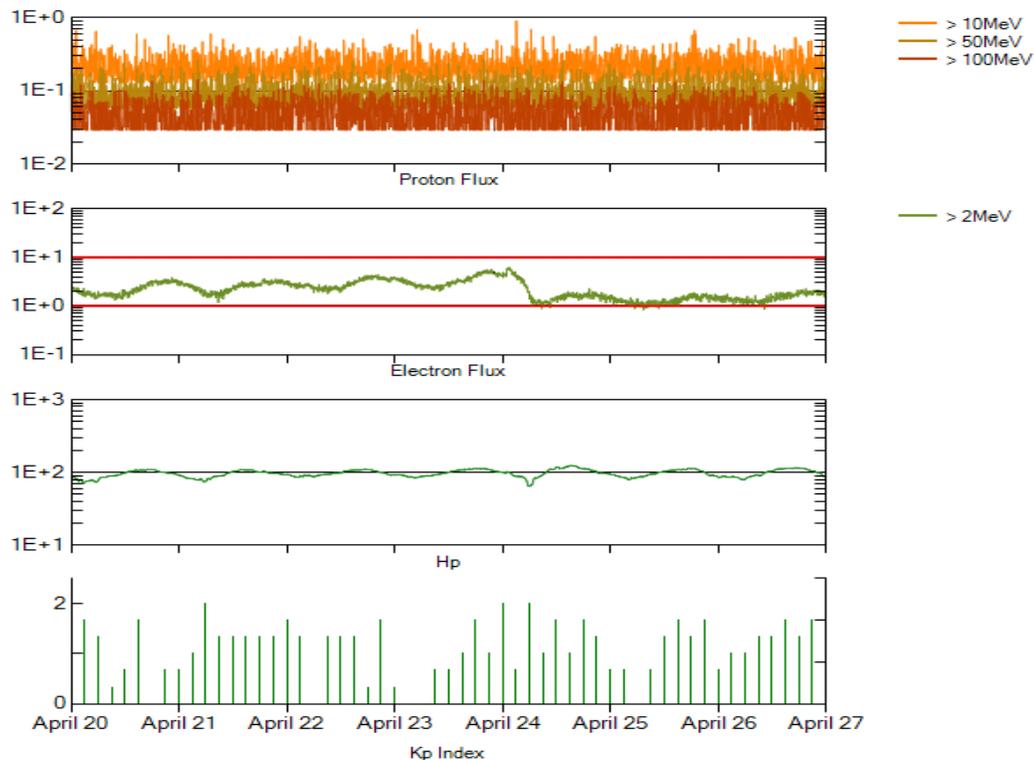
**Recent Solar Indices (preliminary)**  
**Of the observed monthly mean values**

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
<b>2007</b>									
April	6.9	3.7	0.54	16.0	9.9	72.4	75.2	9	8.5
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			68.3		6	
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	

**NOTE:** All smoothed values after September 2002 and monthly values after March 2003 are preliminary estimates. The lowest smoothed sunspot index number for Cycle 22, RI = 8.0, occurred in May 1996. The highest smoothed sunspot number for Cycle 23, RI = 120.8, occurred April 2000. \*After June 1991, the 10.7 cm radio flux data source is Penticton, B.C. Canada. Prior to that, it was Ottawa.

\*\*SWPC sunspot number was less than RI value, so a ratio could not be done.





*Weekly Geosynchronous Satellite Environment Summary*  
*Week Beginning 20 April 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.

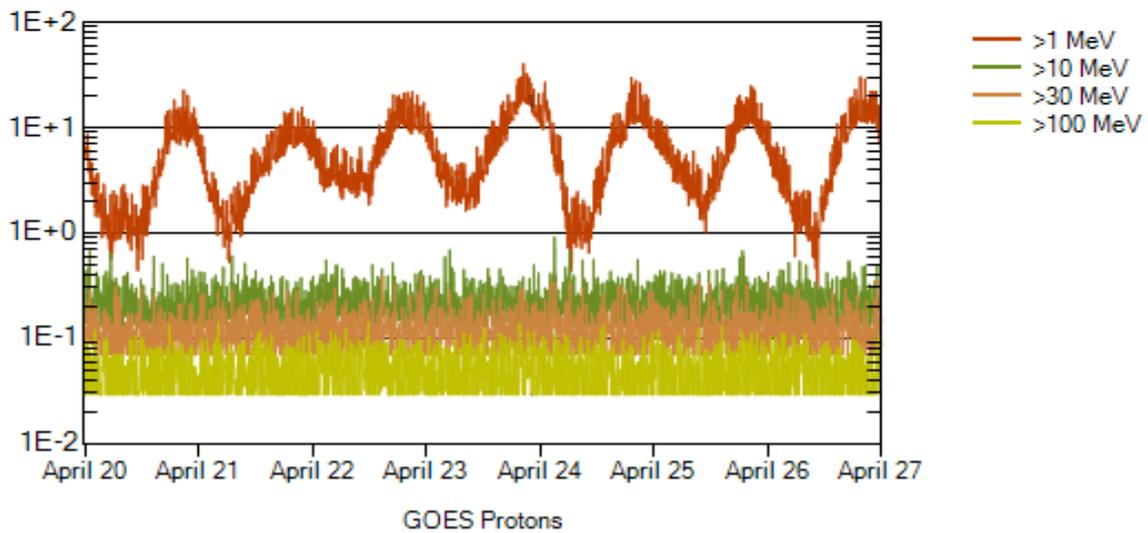
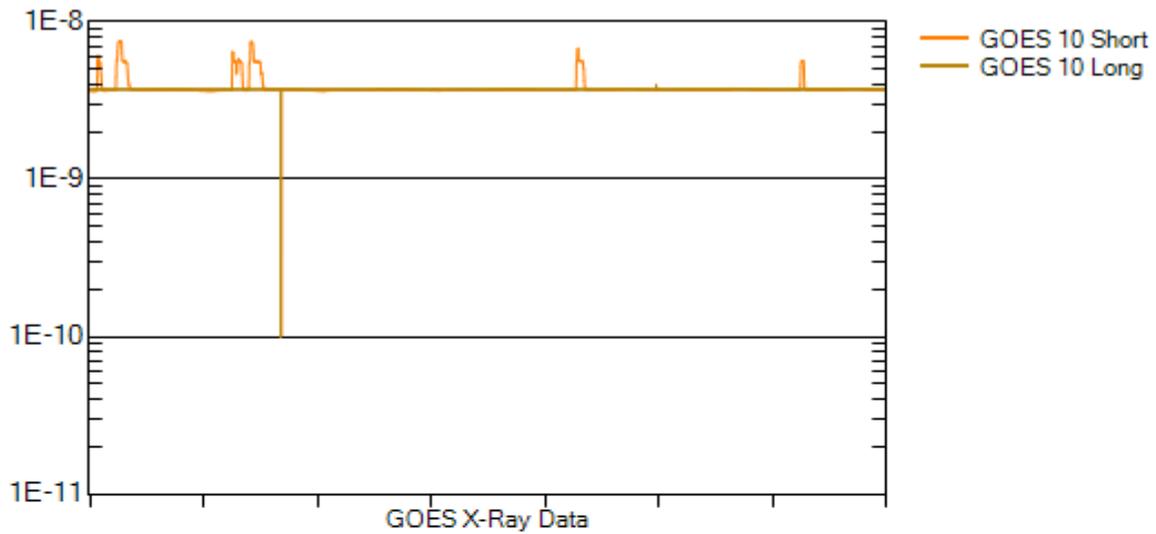
Electrons plot contains the five-minute averaged integral electron flux (electrons/cm<sup>2</sup>-sec -sr) with energies greater than 2 MeV at GOES-11 (W135).

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.

