

Solar activity was very low. No flares were observed. The visible disk was spotless.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit was at normal levels during 20 - 22 July. Fluxes rose to moderate levels during 23 - 24 July. Fluxes rose to high levels during 25 - 26 July.

Geomagnetic field activity was at mostly quiet levels during 20 - 21 July. Activity increased to major storm levels from 0300 - 1200 UTC on 22 July. Activity decreased to quiet to unsettled levels for the remainder of the day and continued through 25 July. Activity decreased to quiet levels at all latitudes on 26 July. ACE solar wind measurements indicated the storm conditions on 22 July were associated with the onset of a coronal hole high-speed wind stream. Solar wind velocities began to gradually increase early on 22 July and eventually reached a maximum of 601 km/sec at 24/0158 UTC. Velocities gradually decreased during the rest of the period. Interplanetary magnetic field (IMF) changes associated with the onset of the high-speed stream included an increase in IMF Bt (peak 18 nT at 22/0533 UTC) and a sustained period of southward IMF Bz (minimum -18 nT at 22/0703 UTC).

**Space Weather Outlook**  
**29 July – 24 August 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 high levels during 21 - 22 August. Normal to moderate flux levels are expected during the rest of the period.

Geomagnetic field activity is expected to be at quiet levels during 29 July – 04 August. Quiet levels, with isolated unsettled periods, are expected during 05-06 August due to a recurrent coronal hole. Activity is expected to decrease to quiet levels during 07 - 08 August. Activity is expected to increase to unsettled levels during 09 - 10 August, again due to recurrence. A decrease to quiet levels is expected during 11 - 17 August. A subsequent increase to active to minor storm levels is expected on 18 August due to another recurrent coronal hole high-speed stream. Activity is expected to decrease to unsettled levels on 19 August followed by a further decrease to quiet levels during the rest of the period.



### 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 July	68	0	0	<A1.0	0	0	0	0	0	0	0	0
21 July	68	0	0	<A1.0	0	0	0	0	0	0	0	0
22 July	68	0	0	<A1.0	0	0	0	0	0	0	0	0
23 July	68	0	0	<A1.0	0	0	0	0	0	0	0	0
24 July	68	0	0	<A1.0	0	0	0	0	0	0	0	0
25 July	69	0	0	<A1.0	0	0	0	0	0	0	0	0
26 July	68	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 July	6.4e+05	2.1e+04	4.6e+03		3.0e+06
21 July	7.3e+05	2.1e+04	4.4e+03		1.6e+05	
22 July	7.1e+05	2.0e+04	4.6e+03		8.9e+04	
23 July	9.3e+05	1.9e+04	4.4e+03		1.4e+07	
24 July	8.0e+05	1.9e+04	4.1e+03		3.3e+07	
25 July	1.3e+06	1.9e+04	4.2e+03		6.6e+07	
26 July	1.6e+06	2.0e+04	4.4e+03		5.9e+07	

### Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	20 July	3	1-1-1-1-2-1-0-0	17	0-2-2-4-5-5-0-0	6
21 July	3	1-2-1-1-1-1-1-0	2	1-1-1-2-0-0-0-0	4	2-1-1-1-1-1-2-1
22 July	18	4-5-4-3-3-0-2-1	27	3-5-5-6-2-2-2-1	24	3-6-5-4-2-2-2-2
23 July	8	0-2-3-2-2-2-3-2	8	1-1-3-2-3-2-2-2	8	1-2-3-2-1-2-2-2
24 July	5	2-0-2-2-1-2-1-1	7	2-1-2-2-2-3-1-1	6	2-1-2-2-1-2-2-2
25 July	5	3-3-0-1-1-0-1-1	4	0-0-0-2-3-1-0-1	7	3-3-0-1-1-1-2-2
26 July	1	0-0-1-0-1-1-0-0	1	0-1-0-0-0-0-1-1	3	1-0-0-0-1-1-1-1

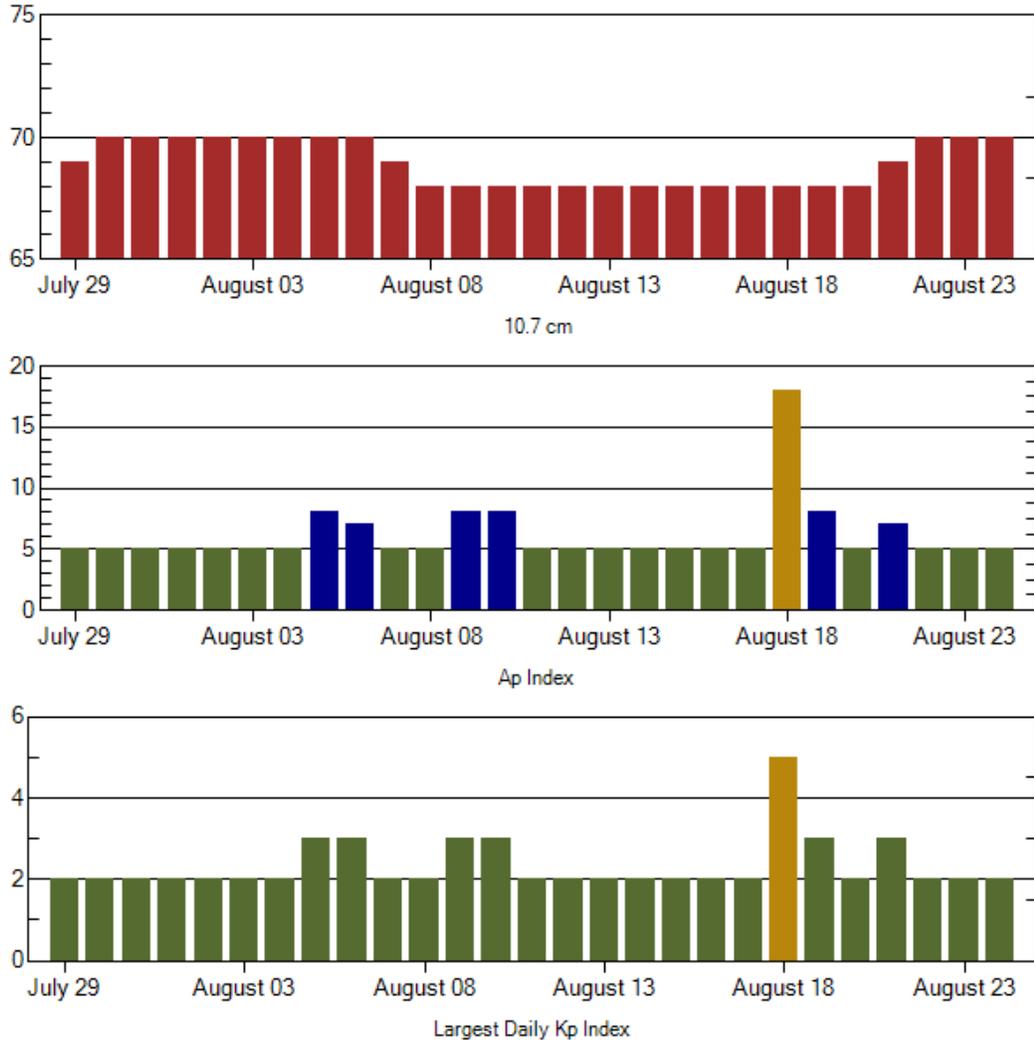


### *Alerts and Warnings Issued*

Date & Time of Issue	Type of Alert or Warning	Date & Time of Event UTC
22 Jul 0305	WARNING: Geomagnetic K = 4	22 Jul 0310 - 1600
22 Jul 0310	WARNING: Geomagnetic K = 5	22 Jul 0315 - 0600
22 Jul 0315	ALERT: Geomagnetic K = 4	22 Jul 0315
22 Jul 0346	ALERT: Geomagnetic K = 5	22 Jul 0345
22 Jul 0840	ALERT: Geomagnetic K = 5	22 Jul 0840
22 Jul 0911	WARNING: Geomagnetic K = 5	22 Jul 0912 - 1600
22 Jul 0922	ALERT: Geomagnetic K = 5	22 Jul 0918
25 Jul 1743	ALERT: Electron 2MeV Integral Flux $\geq$ 1000pfu	25 Jul 1725
26 Jul 2228	ALERT: Electron 2MeV Integral Flux $\geq$ 1000pfu	26 Jul 2225



### 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 Jul	69	5	2	12 Aug	68	5	2
30	70	5	2	13	68	5	2
31	70	5	2	14	68	5	2
01 Aug	70	5	2	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	18	5
05	70	8	3	19	68	8	3
06	70	7	3	20	68	5	2
07	69	5	2	21	69	7	3
08	68	5	2	22	70	5	2
09	68	8	3	23	70	5	2
10	68	8	3	24	70	5	2
11	68	5	2				



### ***Energetic Events***

Date	Time		X-ray		Optical Information			Peak		Sweep Freq	
	Begin	Max	Max	Class	Flux	Imp/	Location	Rgn	Radio Flux		Intensity
						Brtns	Lat CMD	#	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	
20 July	No Flares Observed							
21 July	No Flares Observed							
22 July	No Flares Observed							
23 July	No Flares Observed							
24 July	No Flares Observed							
25 July	No Flares Observed							
26 July	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
<i>No Active Regions</i>															



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

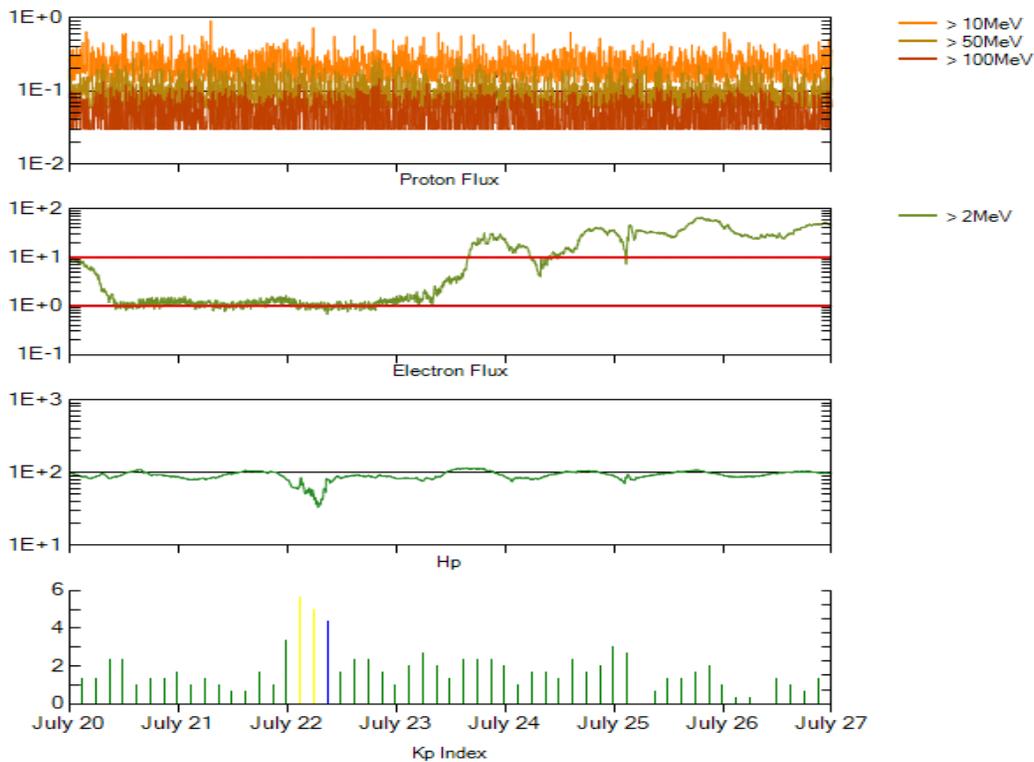
Month	Sunspot Numbers			Radio Flux		Geomagnetic			
	Observed values SEC	Ratio RI	Ratio RI/SEC	Smooth values SEC	Smooth values RI	*Penticton 10.7 cm	Smooth Value	Planetary Ap	Smooth Value
<b>2007</b>									
July	15.6	10.0	0.64	11.6	7.0	71.6	72.5	8	7.4
August	9.9	6.2	0.63	10.2	6.1	69.2	71.8	7	7.6
September	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	2.7	1.7	69.2	68.5	2	4.9
<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	
June	6.6	2.6	0.39			68.6		5	

**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 20 July 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.

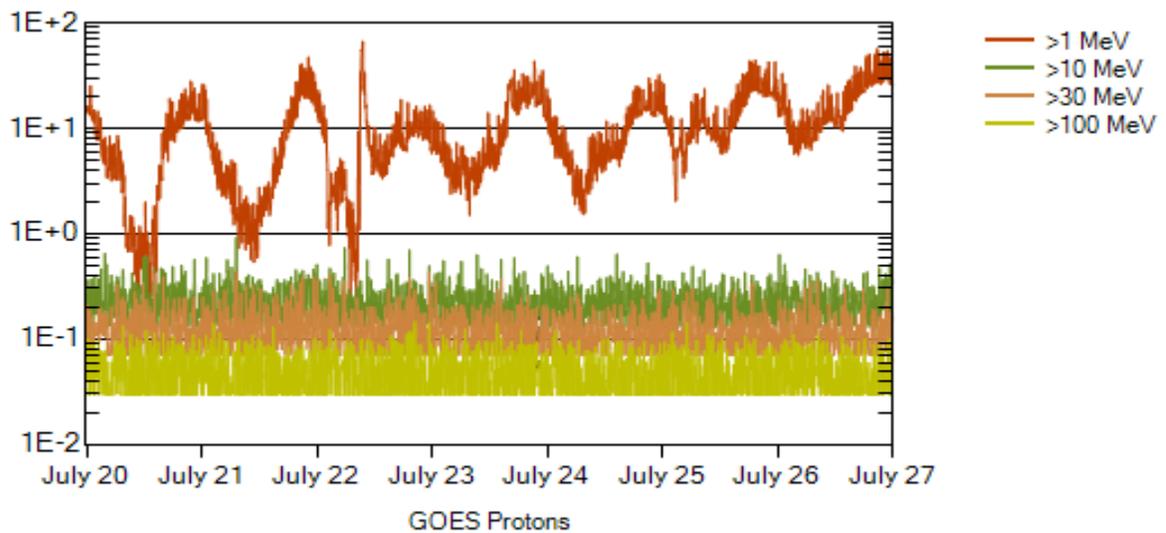
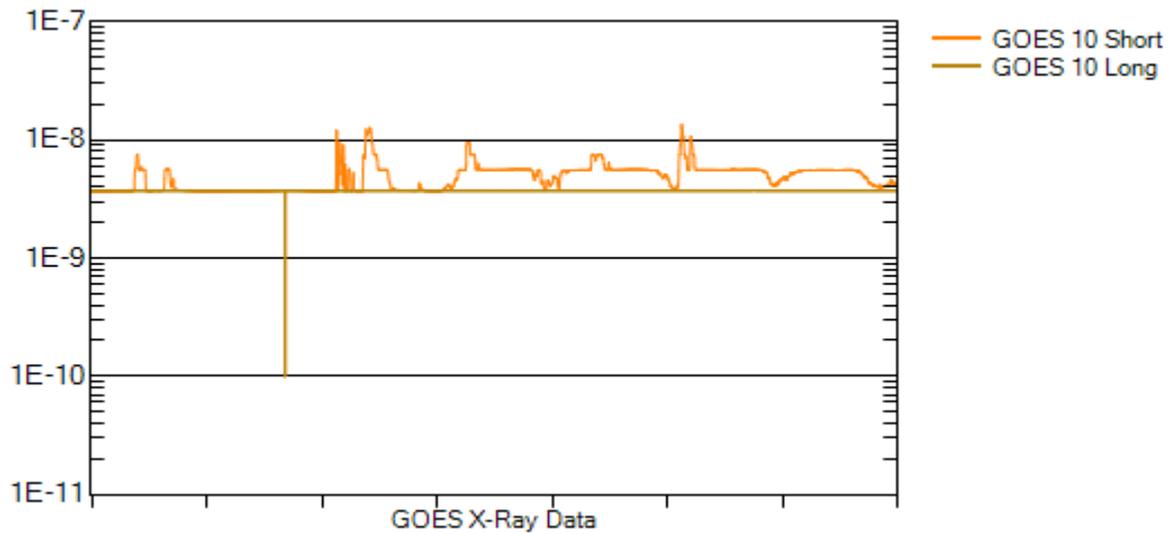
Electrons plot contains the five-minute averaged integral electron flux (electrons/cm<sup>2</sup>-sec -sr) with energies greater than 2 MeV at GOES-11.

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 ( $\text{watts/m}^2$ ) 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 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.

