

Space Weather Highlights
23 November – 29 November 2009

SWO PRF 1787
01 December 2009

Solar activity was very low. No flares occurred during the period. The solar disk was spotless during the period.

No proton events were observed at geosynchronous orbit.

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

The geomagnetic field was initially quiet. An increase to quiet to unsettled with some isolated high latitude active periods (as well as a single minor storm period at high latitudes) occurred on 25-26 November. Activity returned to quiet levels for the remainder of the period from 27-29 November. Solar wind observations from the ACE spacecraft showed the onset of a co-rotating interaction region mid-day on 24 November, which was followed by the onset of a high speed stream. The high speed stream continued through 25 November with peak velocities around 470 km/s, and slowly declined on 26 November. The high speed stream was associated with the extension of the southern polar coronal hole as observed in solar EUV imagery.

Space Weather Outlook
02 December 2009 – 28 December 2009

Solar activity is expected to be predominantly very low with just a slight chance for brief periods of 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 background levels through the period.

The geomagnetic field is expected to be quiet for 2-4 December. An increase to quiet to unsettled levels is expected on 5-6 December due to a recurrent high speed stream. Activity levels are expected to be predominantly quiet for 7-17 December, followed by another increase to quiet to unsettled on 18 December, again due to a recurrent high speed stream. Quiet levels are expected to predominate for the remainder of the outlook period.



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
23 November	76	0	0	<A1.0	0	0	0	0	0	0	0	0
24 November	75	0	0	<A1.0	0	0	0	0	0	0	0	0
25 November	74	0	0	<A1.0	0	0	0	0	0	0	0	0
26 November	75	0	0	<A1.0	0	0	0	0	0	0	0	0
27 November	74	0	0	<A1.0	0	0	0	0	0	0	0	0
28 November	73	0	0	<A1.0	0	0	0	0	0	0	0	0
29 November	72	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
	23 November	6.7e+05	1.9e+04	4.3e+03		5.3e+04
24 November	9.9e+05	2.1e+04	4.4e+03		5.1e+04	
25 November	4.9e+05	1.9e+04	3.9e+03		2.1e+05	
26 November	8.2e+05	2.0e+04	4.4e+03		1.1e+06	
27 November	2.6e+05	2.0e+04	4.2e+03		4.4e+05	
28 November	3.2e+05	2.0e+04	4.2e+03		6.3e+05	
29 November	2.9e+05	2.0e+04	4.4e+03		7.6e+05	

Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	23 November	0	0-0-0-0-0-1-0-0	1	0-0-0-1-1-0-0-0	0
24 November	3	0-0-0-0-2-1-2-2	5	0-0-1-1-3-1-2-2	6	0-0-0-1-2-2-2-3
25 November	4	2-2-2-1-1-0-0-1	10	2-1-4-4-3-0-0-0	5	3-2-2-1-1-0-0-1
26 November	3	1-0-1-2-1-1-1-1	14	0-0-4-5-3-3-2-1	6	1-0-1-2-2-2-2-2
27 November	0	0-0-1-0-0-0-0-0	1	0-0-1-1-0-0-0-0	2	0-1-1-1-0-0-0-0
28 November	2	0-0-2-1-0-1-1-0	1	0-0-1-1-0-0-0-0	3	0-0-1-1-1-1-1-1
29 November	1	0-0-1-0-0-1-0-0	0	0-0-0-0-0-0-0-0	1	0-0-0-0-0-1-0-1

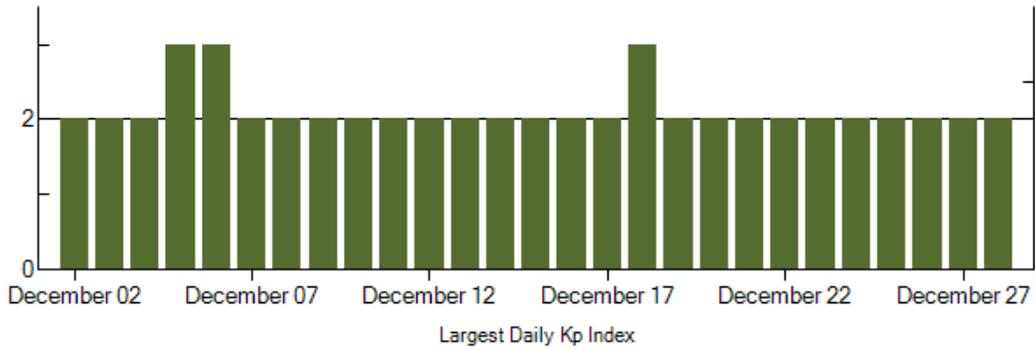
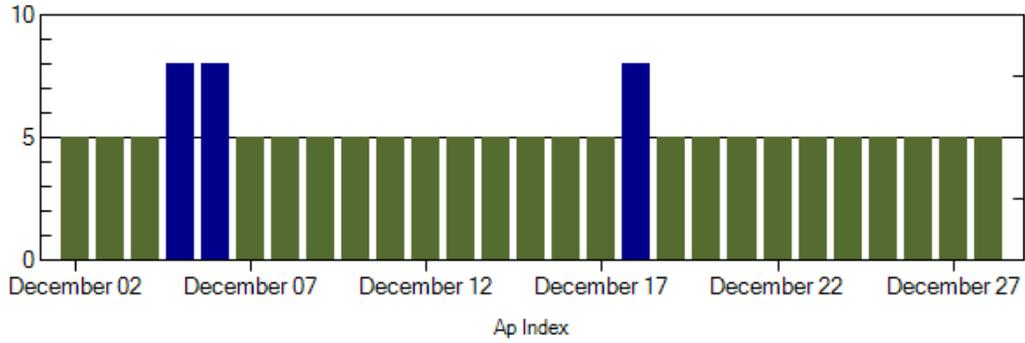
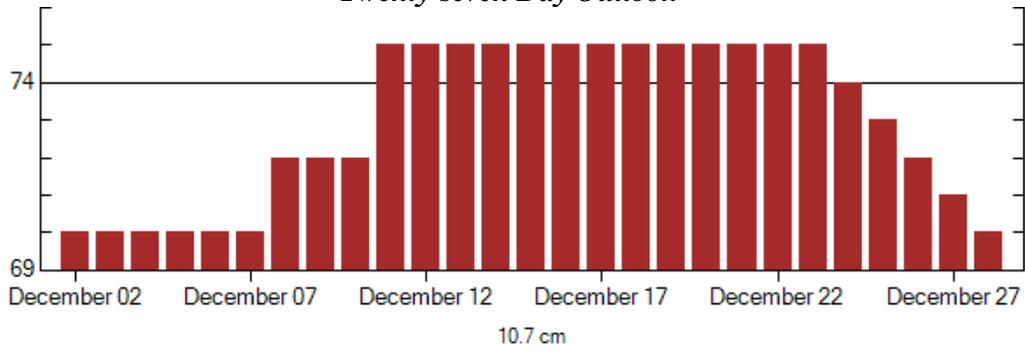
Alerts and Warnings Issued

Date & Time of Issue	Type of Alert or Warning	Date & Time of Event UTC
----------------------	--------------------------	--------------------------

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
02 Dec	70	5	2	16 Dec	75	5	2
03	70	5	2	17	75	5	2
04	70	5	2	18	75	8	3
05	70	8	3	19	75	5	2
06	70	8	3	20	75	5	2
07	70	5	2	21	75	5	2
08	72	5	2	22	75	5	2
09	72	5	2	23	75	5	2
10	72	5	2	24	74	5	2
11	75	5	2	25	73	5	2
12	75	5	2	26	72	5	2
13	75	5	2	27	71	5	2
14	75	5	2	28	70	5	2
15	75	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	Brtns	Lat CMD	#	245	2695	II
<i>No Events Observed</i>										

Flare List

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

Region Summary

Date	Location		Sunspot Characteristics					Flares														
	° Lat	° CMD	Helio Lon	Area (10 ⁻⁶ hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical										
									C	M	X	S	1	2	3	4						
<i>Region 1031</i>																						
15 Nov	N30E20	258	258	10	1	AXX	1	A														
16 Nov	N30E08	257	257	10	3	BXO	2	B														
17 Nov	N30W05	257	257																			
18 Nov	N30W18	257	257																			
19 Nov	N30W31	257	257																			
20 Nov	N30W44	257	257																			
21 Nov	N30W57	257	257																			
22 Nov	N30W70	257	257																			
23 Nov	N30W83	257	257																			
										0	0	0	0	0	0	0	0	0	0	0		

Crossed West Limb.

Absolute heliographic longitude: 257



Region Summary - continued

Date	Location		Sunspot Characteristics					Flares															
	° Lat	° CMD	Area (10 ⁻⁶ hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical												
								C	M	X	S	1	2	3	4								
<i>Region 1032</i>																							
18 Nov	N17E20	218	10	2	BXO	4	B																
19 Nov	N15E07	218	10	2	BXO	3	B																
20 Nov	N16W03	218	10	2	BXO	2	B																
21 Nov	N16W10	209																					
22 Nov	N16W23	209																					
23 Nov	N16W36	209																					
24 Nov	N16W49	209																					
25 Nov	N16W62	209																					
26 Nov	N16W75	209																					
27 Nov	N16W88	209																					

0 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 218

<i>Region 1033</i>																							
18 Nov	N21E47	191	10	3	BXO	5	B																
19 Nov	N19E34	191	10	5	BXO	7	B																
20 Nov	N21E23	189	10	1	BXO	9	B																
21 Nov	N18E07	192	10	4	BXO	4	B																
22 Nov	N18W05	191	10	6	BXO	3	B																
23 Nov	N18W18	191																					
24 Nov	N18W31	191																					
25 Nov	N18W44	191																					
26 Nov	N18W57	191																					
27 Nov	N18W70	191																					
28 Nov	N18W83	191																					

0 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 191



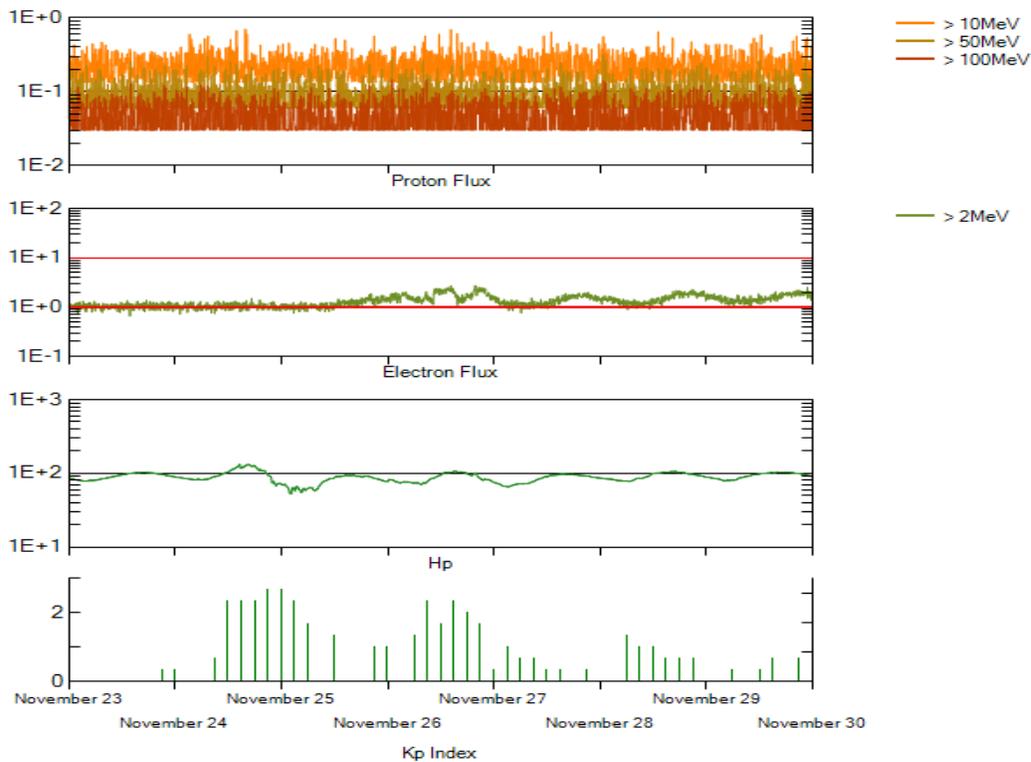
Recent Solar Indices (preliminary)
Of the observed monthly mean values

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
November	2.5	1.7	0.68	9.4	5.7	69.6	71.4	7	7.8
December	16.2	10.1	0.62	8.1	4.9	78.5	70.8	6	7.8
2008									
January	5.1	3.3	0.65	6.9	4.2	74.3	70.3	8	7.8
February	3.8	2.1	0.55	5.9	3.6	71.1	69.9	11	7.6
March	15.9	9.3	0.58	5.3	3.3	72.9	69.8	11	7.5
April	4.9	2.9	0.59	5.3	3.4	70.2	69.8	9	7.3
May	5.7	3.2	0.56	5.7	3.5	68.4	69.8	6	7.2
June	4.2	3.4	0.81	5.2	3.3	65.9	69.4	7	7.0
July	1.0	0.8	0.80	4.5	2.8	65.7	68.8	5	6.8
August	0.0	0.5	**	4.4	2.7	66.3	68.6	5	6.3
September	1.5	1.1	0.73	3.7	2.3	67.1	68.4	6	5.8
October	5.2	2.9	0.56	2.9	1.9	68.3	68.2	7	5.4
November	6.8	4.1	0.60	2.7	1.8	68.6	68.3	4	5.1
December	1.3	0.8	0.62	2.7	1.7	69.2	68.5	4	4.9
2009									
January	2.8	1.3	0.46	3.0	1.8	69.8	68.7	4	4.7
February	2.5	1.4	0.56	3.1	1.9	70.0	68.8	5	4.7
March	0.7	0.7	1.00	3.4	2.0	69.2	69.0	5	4.6
April	1.2	1.2	1.00			69.7		4	
May	3.9	2.9	0.74			70.5		4	
June	6.6	2.6	0.39			68.6		4	
July	5.0	3.5	0.70			68.2		4	
August	0.3	0.0	0.00			67.4		5	
September	6.6	4.2	0.64			70.5		4	
October	7.0	4.6	0.66			72.4		3	

NOTE: Values are final except for the most recent 6 months which are considered preliminary. 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 zero, so a ratio could not be computed.





*Weekly Geosynchronous Satellite Environment Summary
Week Beginning 23 November 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.

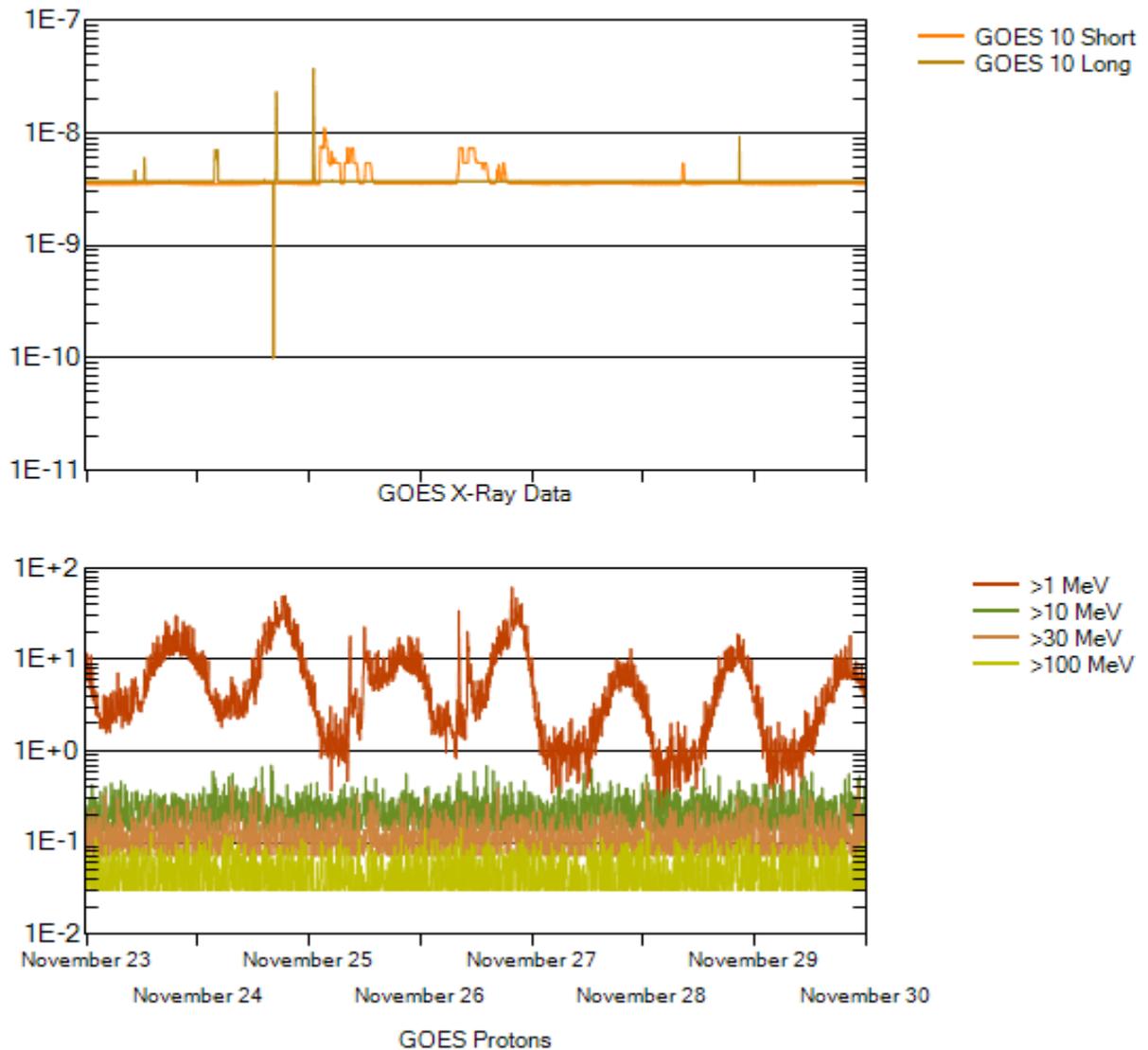
Electrons plot contains the five-minute averaged integral electron flux (electrons/cm²-sec -sr) with energies greater than 2 MeV at GOES-11.

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/m²) as measured by GOES 10 (W060) in two wavelength bands, 0.05 - 0.4 and 0.1 - 0.8 nm. The letters A, B, C, M and X refer to x-ray event levels for the 0.1 - 0.8 nm band.

Proton plot contains the five-minute averaged integral proton flux (protons/cm²-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/cm²-sec-sr) at greater than 10 MeV.

