

**Space Weather Highlights**  
**11 January 2010 – 17 January 2010**

**SWO PRF 1794**  
**19 January 2010**

Solar activity was at very low to low levels during the period. Region 1040 (N29, L=238, class/area Eki/380 on 13 January) produced occasional B-class flares and isolated C-class flares, the largest event was a C2 flare 17/2223 UTC. Region 1040 also produced two long duration flares, a B8 flare at 14/2139 UTC and a C1 flare at 15/0841 UTC. Region 1040 maintained a Beta magnetic configuration during its transit.

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.

Geomagnetic field activity was at predominantly quiet levels during the entire period. There was an isolated unsettled and active period observed at high latitudes on 11 January due to the arrival of a coronal hole high-speed stream. Observations from the ACE spacecraft showed solar wind speed varied between a low of 281 km/s at 11/0233 UTC to a high of 549 km/s at 11/1501 UTC. The density peaked at 10 p/cc at 11/0630 UTC. The southward component of the interplanetary magnetic field (IMF) ranged between +9 nT and -8 nT. A second coronal hole high-speed stream arrived on 13 January with little effect to the geomagnetic field.

**Space Weather Outlook**  
**20 January 2010 – 15 February 2010**

Solar activity is expected to be at very low to low levels for the forecast period. Isolated moderate activity is possible from 20 January – 01 February with the return of old Region 1039 (S29, L052).

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 through the period.

The geomagnetic field is expected to be at predominantly quiet levels for the forecast 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
11 January	91	35	300	B1.0	0	0	0	0	0	0	0 0
12 January	93	35	300	B1.1	1	0	0	0	0	0	0 0
13 January	91	41	380	A9.0	0	0	0	0	0	0	0 0
14 January	90	34	290	B1.0	0	0	0	2	0	0	0 0
15 January	85	26	350	B1.4	1	0	0	0	0	0	0 0
16 January	84	24	290	B1.0	0	0	0	0	0	0	0 0
17 January	83	16	160	B1.1	1	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
11 January	6.3e+05	1.9e+04	4.4e+03		3.3e+04	
12 January	5.6e+05	2.0e+04	4.3e+03		4.0e+04	
13 January	4.1e+05	1.9e+04	4.2e+03		4.2e+04	
14 January	3.6e+05	2.1e+04	4.3e+03		4.9e+04	
15 January	7.0e+05	2.0e+04	4.3e+03		1.9e+05	
16 January	2.7e+06	2.1e+04	4.4e+03		1.4e+05	
17 January	5.0e+06	2.0e+04	4.3e+03		2.1e+05	

### *Daily Geomagnetic Data*

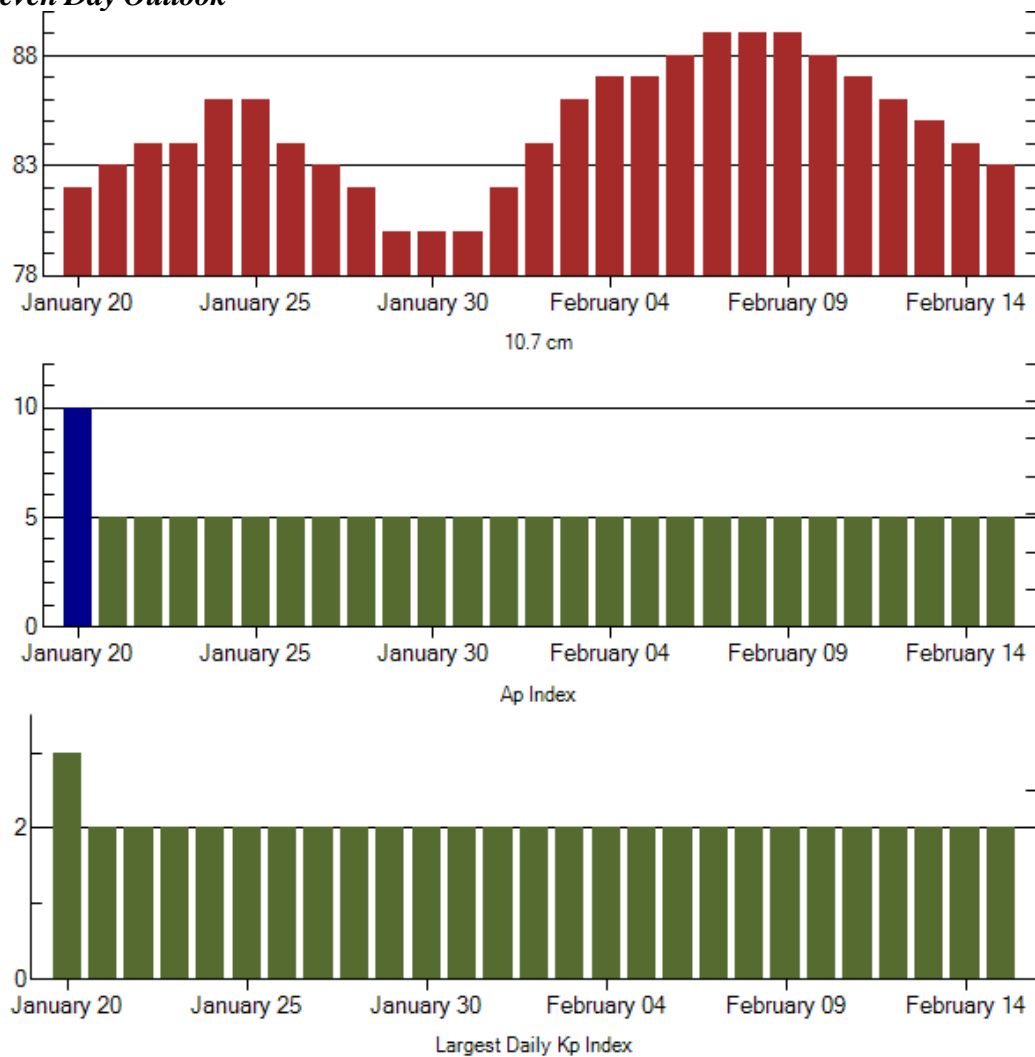
Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
11 January	4	0-2-2-1-2-2-1-0	7	0-0-2-4-3-1-1-0	6	0-2-2-2-2-2-1-1
12 January	2	0-2-0-0-0-0-2-1	0	0-0-0-0-0-0-0-0	3	1-2-0-0-0-0-1-2
13 January	4	2-2-1-0-1-1-1-2	5	1-2-1-1-2-3-0-0	6	3-2-1-1-1-2-0-2
14 January	3	2-2-0-1-1-1-1-0	2	1-0-0-2-2-0-0-0	4	2-1-0-1-1-1-1-1
15 January	2	0-1-1-0-0-1-2-1	1	0-0-1-0-0-0-0-1	3	1-0-1-0-0-1-2-2
16 January	1	0-0-0-0-0-2-0-0	0	0-0-0-1-0-0-0-0	1	0-0-0-0-0-0-0-0
17 January	1	0-1-0-0-1-1-0-0	0	0-0-0-0-0-0-0-0	1	0-1-0-0-0-0-0-1

### *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
20 Jan	82	10	3	03 Feb	86	5	2
21	83	5	2	04	87	5	2
22	84	5	2	05	87	5	2
23	84	5	2	06	88	5	2
24	86	5	2	07	89	5	2
25	86	5	2	08	89	5	2
26	84	5	2	09	89	5	2
27	83	5	2	10	88	5	2
28	82	5	2	11	87	5	2
29	80	5	2	12	86	5	2
30	80	5	2	13	85	5	2
31	80	5	2	14	84	5	2
01 Feb	82	5	2	15	83	5	2
02	84	5	2				



### ***Energetic Events***

Date	Time		X-ray		Optical Information			Peak		Sweep Freq	
	$\frac{1}{2}$		Integ		Imp/	Location		Radio Flux		Intensity	
	Begin	Max	Max	Class	Flux	Brtns	Lat CMD	#	245 2695	II IV	

*No Events Observed*

### ***Flare List***

Date	Time			Optical			Rgn
	Begin	Max	End	X-ray Class.	Imp / Brtns	Location Lat CMD	

11 January	0141	0150	0153	B2.7			
	0155	0158	0202	B3.9			
	0448	0454	0505	B2.7			
	0605	0619	0634	B6.8			
	0800	0805	0811	B1.9			
	0908	0911	0913	B1.3			
	1116	1201	1216	B6.1			
	1350	1356	1401	B9.1			
	1427	1436	1448	B5.4			
	1621	1627	1645	B3.9			
12 January	1233	1320	1334	C1.1			
	1733	1736	1739	B2.7			
	1907	0046	0214	B1.7			
13 January	1459	1504	1509	B2.5			
	1934	1938	1940	B2.1			
14 January	0115	0119	0144	B3.0	SF	N26W18	1040
	B0338	0338	0354	B1.8	SF	N26W19	1040
	0428	0436	0447	B2.2			
	1857	2139	2223	B8.1			
15 January	0722	0841	1022	C1.3			
16 January	1228	1240	1300	B3.9			
	1716	1723	1726	B1.9			
	1827	1830	1832	B3.5			
	2052	2057	2100	B1.5			
17 January	1938	1943	1950	B4.2			
	2020	2025	2030	B6.1			
	2212	2233	2241	C2.1			



### *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
Region 1040														
07 Jan	N28E59	241	80	5	BXO	5	B							
08 Jan	N29E47	240	40	3	BXO	4	B							
09 Jan	N30E35	239	70	10	CRI	10	B	1						
10 Jan	N30E18	243	130	15	EAO	15	B					5		
11 Jan	N29E10	237	300	9	DHC	25	B							
12 Jan	N28W04	238	300	12	EAO	25	B	1						
13 Jan	N28W11	236	380	13	EKI	31	B							
14 Jan	N28W30	238	290	13	EKI	24	B					2		
15 Jan	N29W41	236	350	13	EKI	16	B	1						
16 Jan	N29W57	239	290	12	CKI	14	B							
17 Jan	N30W74	242	160	8	DSO	6	B	1						



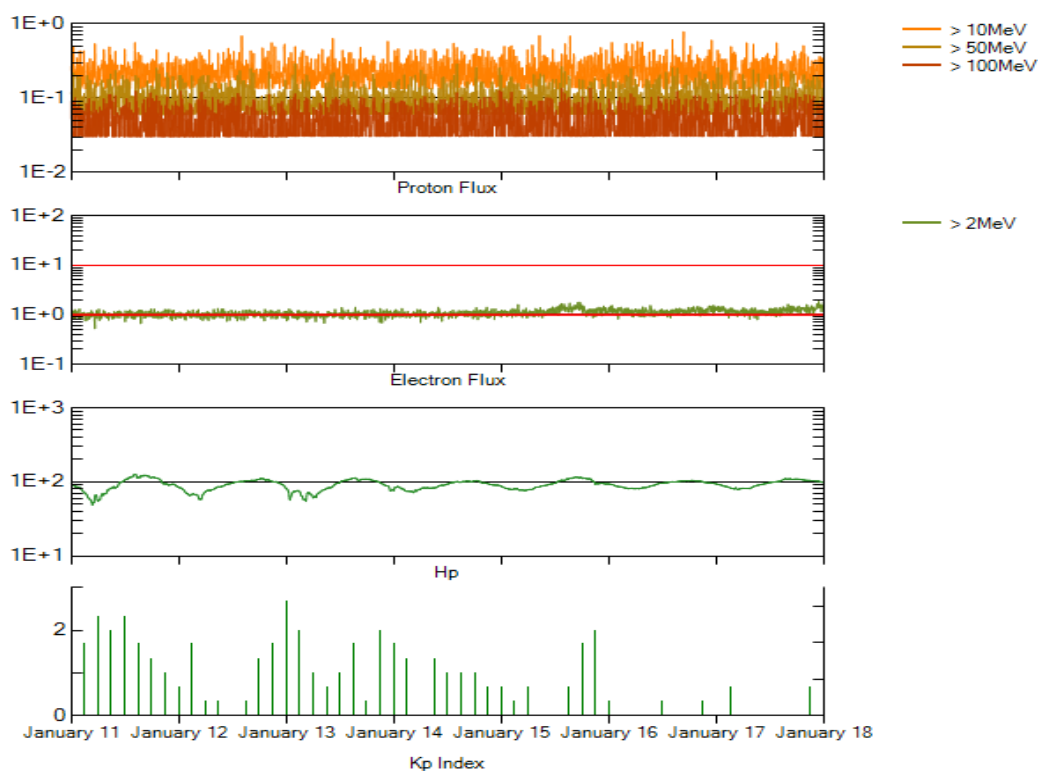
**Recent Solar Indices (preliminary)**  
**Of the observed monthly mean values**

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
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
<b>2009</b>									
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	3.7	2.2	69.7	69.3	4	4.3
May	3.9	2.9	0.74	3.8	2.3	70.5	69.7	4	4.1
June	6.6	2.6	0.39	4.4	2.7	68.6	70.2	4	4.0
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			72.3		3	
November	7.7	4.2	0.55			73.6		3	
December	15.7	10.6	0.68			76.8		1	

**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 less than RI value, so a ratio could not be computed.





*Weekly Geosynchronous Satellite Environment Summary*  
*Week Beginning 11 January 2010*

**GOES-11 designated Primary Proton and Electron Satellite.**

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.

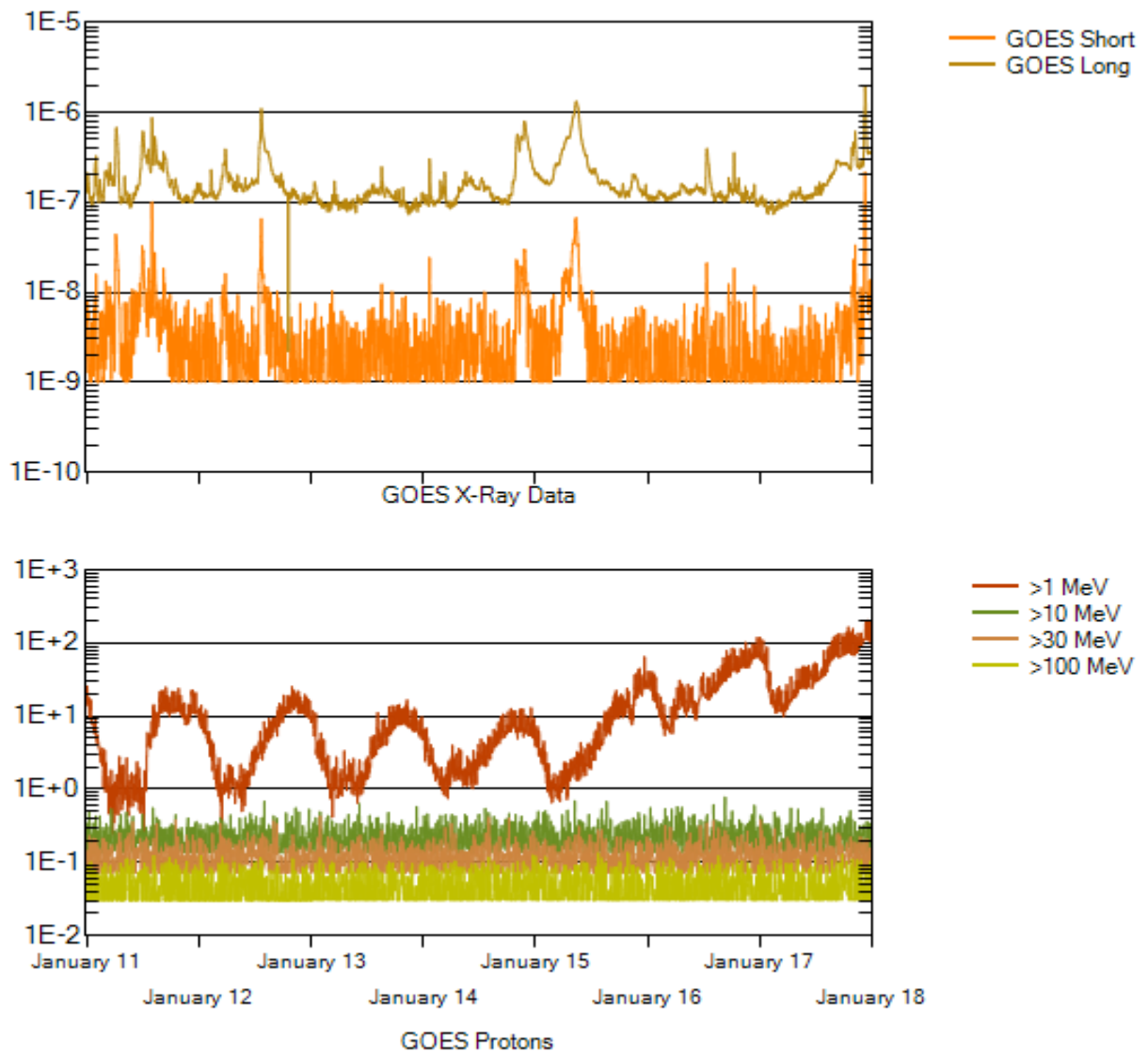
Electrons plot contains the five-minute averaged integral electron flux (electrons/cm<sup>2</sup>–sec–sr) with energies greater than 2 MeV at GOES-11.

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 14 (W105) 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 ( $\text{protons/cm}^2\text{-sec-sr}$ ) 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.

