

**Space Weather Highlights**  
**01 March – 07 March 2010**

**SWO PRF 1801**  
09 March 2010

Solar activity was very low for most of the week with the exception of a single C-flare, a C2.2 at 04/1611 UTC from Region 1052 (S17, L=353, class/area Cro/040 on 04 March). Also of note during the period was a long duration B6.6 event at 01/2306 UTC which was associated with a CME from the East limb, near the location of old Region 1045 (N24, L=242, class/area 420/420 on 09 February). Nonetheless old Region 1045 returned only as spotless plage. Regions 1052 and 1053 (S22, L360, class/area Cro/040 on 04 March), which appeared on the disk on 01 March, showed some growth and increased activity on 04 March and part of 05 March. Early on 05 March a CME was observed on the west limb at about 0054 UTC and was associated with a weak wave visible in STEREO-A EUVI imagery near Region 1052. Later in the week another long-duration B5.2 x-ray event occurred at 06/0900 UTC which was associated with an EIT wave in the old 1045 plage area as well as a filament disappearance and a CME off the East limb.

No proton events were observed at geosynchronous orbit.

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

Geomagnetic field activity was predominantly quiet at mid-latitudes, with isolated unsettled to active periods at high latitudes. Observations from the ACE spacecraft indicated nominal solar wind conditions for most of the week. However, the interplanetary magnetic field showed increases between 01/0600-2300 UTC (Bt peak ~11 nT, Bz between -7 nT and +10 nT), 02/0930-1300 UTC (Bt peak ~7 nT, Bz between -7 nT and +2 nT), and 06/1830 UTC - 07/1030 UTC (Bt peak ~10 nT, Bz between -8 nT and +8 nT).

**Space Weather Outlook**  
**10 March – 05 April 2010**

Solar activity is expected to be predominantly very low with possible isolated periods of low levels for the forecast interval.

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 predominantly quiet throughout the forecast interval.



### *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	
01 March	78	36	50	A2.2	0	0	0	0	0	0	0	0	0
02 March	79	39	60	A2.2	0	0	0	0	0	0	0	0	0
03 March	80	39	30	A3.4	0	0	0	0	0	0	0	0	0
04 March	81	40	90	A6.6	1	0	0	1	0	0	0	0	0
05 March	80	35	30	A4.5	0	0	0	0	0	0	0	0	0
06 March	78	0	0	A5.2	0	0	0	1	0	0	0	0	0
07 March	77	0	0	A1.7	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
01 March	3.7e+05	1.9e+04	4.5e+03		2.9e+05	
02 March	3.6e+05	2.0e+04	4.4e+03		8.3e+04	
03 March	3.3e+05	2.0e+04	4.4e+03		1.1e+05	
04 March	2.2e+05	2.2e+04	6.3e+03		6.9e+04	
05 March	1.6e+05	1.9e+04	4.2e+03		9.6e+04	
06 March	3.2e+05	2.0e+04	4.2e+03		2.6e+05	
07 March	5.1e+05	1.9e+04	4.1e+03		1.0e+05	

### *Daily Geomagnetic Data*

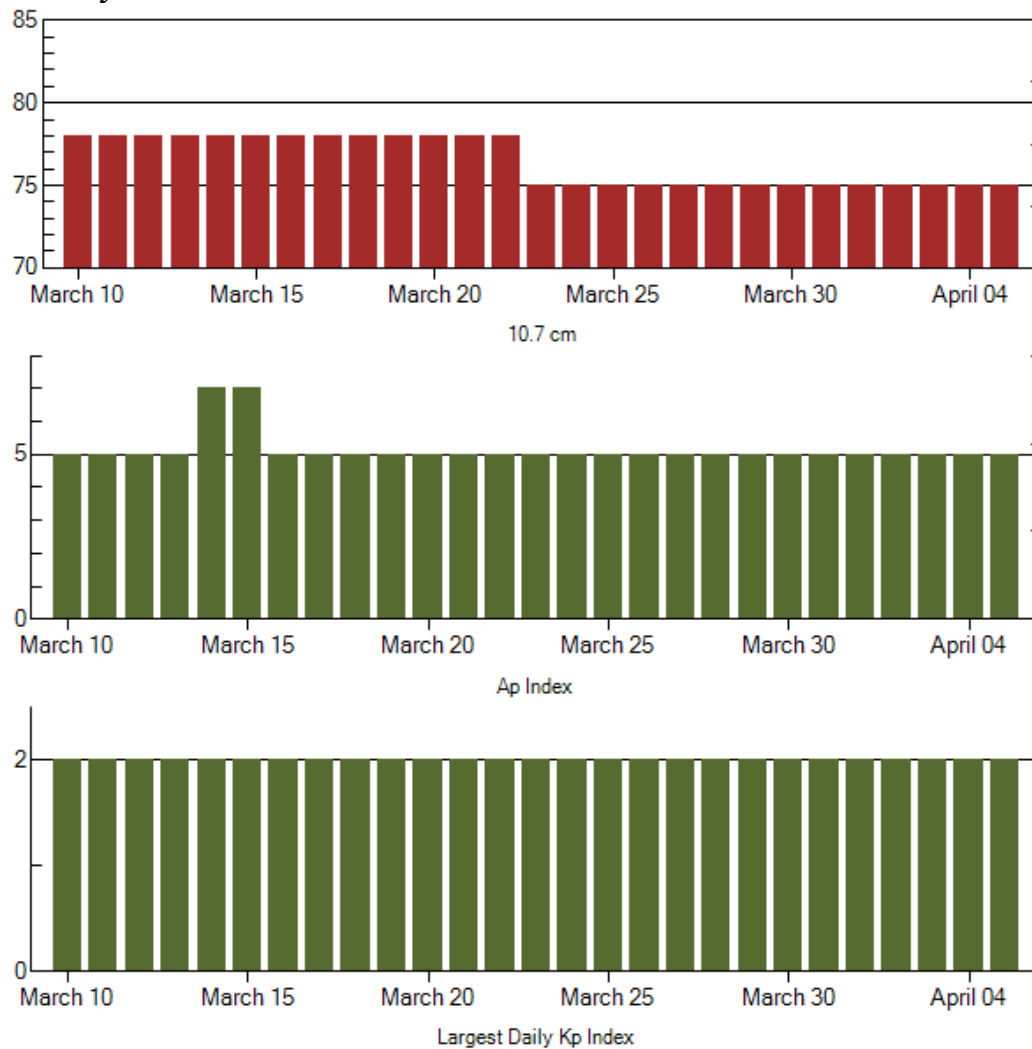
Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
01 March	4	1-1-1-1-2-1-1-1	5	2-1-1-1-3-1-1-1	5	1-1-1-1-2-2-1-2
02 March	3	0-0-0-2-2-1-1-1	8	0-0-0-4-4-2-0-0	4	0-0-0-2-2-2-1-2
03 March	5	1-2-0-1-2-2-2-2	*	0-1-0-3-**-**	6	1-2-0-2-2-2-2-2
04 March	4	1-2-1-0-2-1-1-1	7	0-2-1-0-4-3-1-0	6	2-3-2-0-2-1-1-1
05 March	1	0-0-1-1-1-0-0-0	7	0-0-3-4-3-0-0-0	2	0-0-1-1-1-1-0-1
06 March	3	2-0-0-0-0-1-1-2	1	1-0-0-0-0-0-0-1	3	2-0-0-0-1-1-1-1
07 March	3	1-2-2-0-1-0-0-0	6	1-3-4-1-1-0-0-0	4	2-3-2-0-0-0-0-1

### *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
10 Mar	78	5	2	24 Mar	75	5	2
11	78	5	2	25	75	5	2
12	78	5	2	26	75	5	2
13	78	5	2	27	75	5	2
14	78	7	2	28	75	5	2
15	78	7	2	29	75	5	2
16	78	5	2	30	75	5	2
17	78	5	2	31	75	5	2
18	78	5	2	01 Apr	75	5	2
19	78	5	2	02	75	5	2
20	78	5	2	03	75	5	2
21	78	5	2	04	75	5	2
22	78	5	2	05	75	5	2
23	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	Max	Class	Brtns	Lat CMD	#	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	
01 March	2216	2306	0052	B6.6				
02 March	No Flares Observed							
03 March	No Flares Observed							
04 March	0328	0336	0342	B2.0				
	0501	0515	0523	B2.6				
	0557	0602	0606	B3.9				
	0800	0808	0814	B2.0				
	1203	1211	1223	B4.1				
	1328	1331	1333	B6.0				
	1603	1611	1616	C2.2				
	1744	1756	1807	B4.3				
	2059	2106	2113	B2.0				
	2134	2135	2138	B2.2	SF	S16W67		1052
	0410	0417	0422	B1.7				
	2329	2353	0040	B2.3				
05 March	1250	1257	1303	B2.8				
06 March	0107	0107	0109	B1.2		S22W93		1053
	0736	0900	0930	B5.2				
	1434	1439	1443	B1.3				
	1457	1502	1510	B2.5				
	2107	2113	2120	B1.7				
07 March	0046	0054	0102	B1.1				
	0222	0227	0232	B1.9				
	0433	0443	0454	B2.2				



## 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	4
<i>Region 1051</i>															
24 Feb	N17E66	322	100	9	CAO	3	B								
25 Feb	N16E54	321	10	6	BXO	3	B								
26 Feb	N15E41	321	40	2	CSO	3	B								
27 Feb	N15E27	322	30	6	CAO	4	B								
28 Feb	N15E12	324	10	1	HSX	3	A								
01 Mar	N16W01	323	10	1	HSX	1	A								
02 Mar	N16W14	323	10	1	HSX	1	A								
03 Mar	N15W28	324	10	2	AXX	2	A								
04 Mar	N16W41	324	10	1	AXX	1	A								
05 Mar	N16W53	323	10	1	AXX	1	A								
06 Mar	N16W66	323													
07 Mar	N16W79	323													

0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 323

<i>Region 1052</i>															
01 Mar	S18W26	348	20	4	BXO	3	B								
02 Mar	S18W41	350	20	5	CSO	4	B								
03 Mar	S17W56	352	10	3	BXO	3	B								
04 Mar	S17W70	353	40	7	CRO	5	B	1			1				
05 Mar	S16W82	352	10	8	BXO	3	B								
								1	0	0	1	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 352

<i>Region 1053</i>															
01 Mar	S22W38	360	20	4	BXO	2	B								
02 Mar	S23W51	360	30	5	CSO	4	B								
03 Mar	S22W62	358	10	4	BXO	4	B								
04 Mar	S22W77	360	40	8	CRO	4	B								
05 Mar	S22W89	359	10	1	AXX	1	A								
								0	0	0	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 360



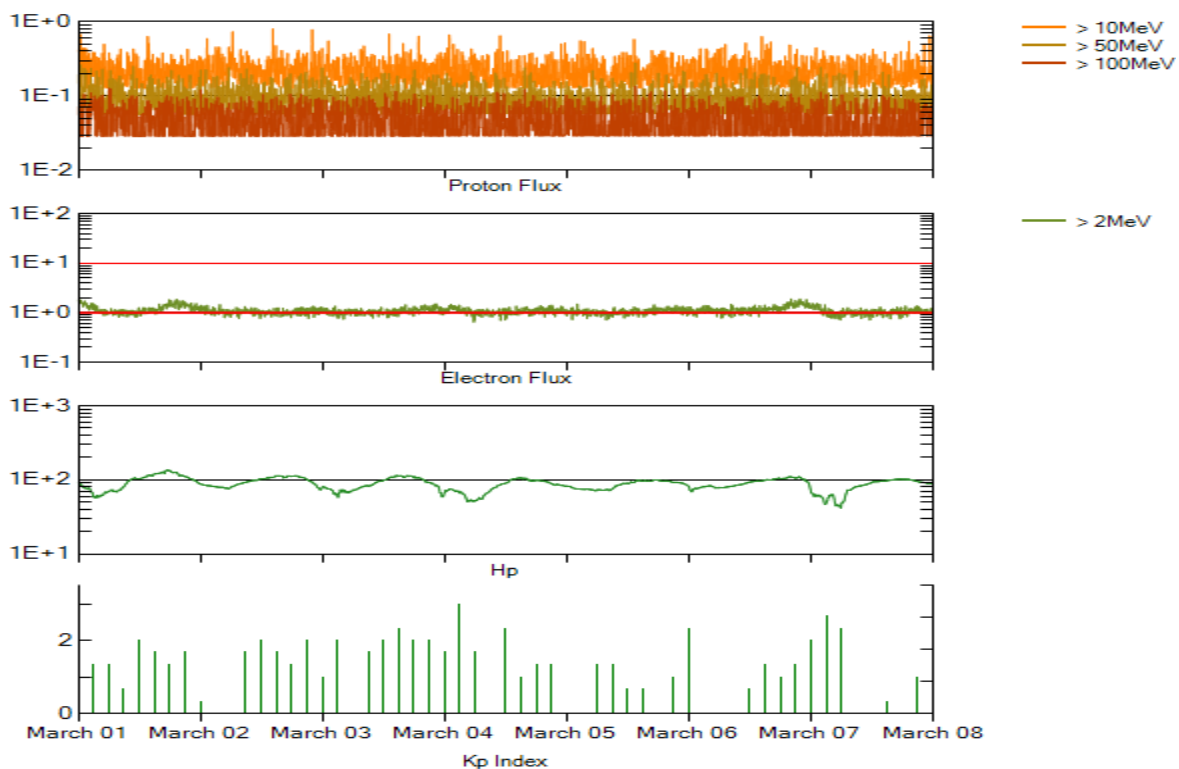
**Recent Solar Indices (preliminary)**  
**Of the observed monthly mean values**

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
2008									
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	1.8	68.3	68.2	7	5.4
November	6.8	4.1	0.60	2.7	1.7	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	0.8	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	2.9	0.39	4.4	2.7	68.6	70.2	4	4.0
July	5.0	3.2	0.70	5.8	3.6	68.2	71.0	4	3.9
August	0.3	0.0	0.00	7.7	4.8	67.4	72.1	5	3.8
September	6.6	4.3	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		2	
2010									
January	21.3	13.1	0.62			81.1		3	
February	31.0	18.6	0.60			84.7		4	

**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 01 March 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.

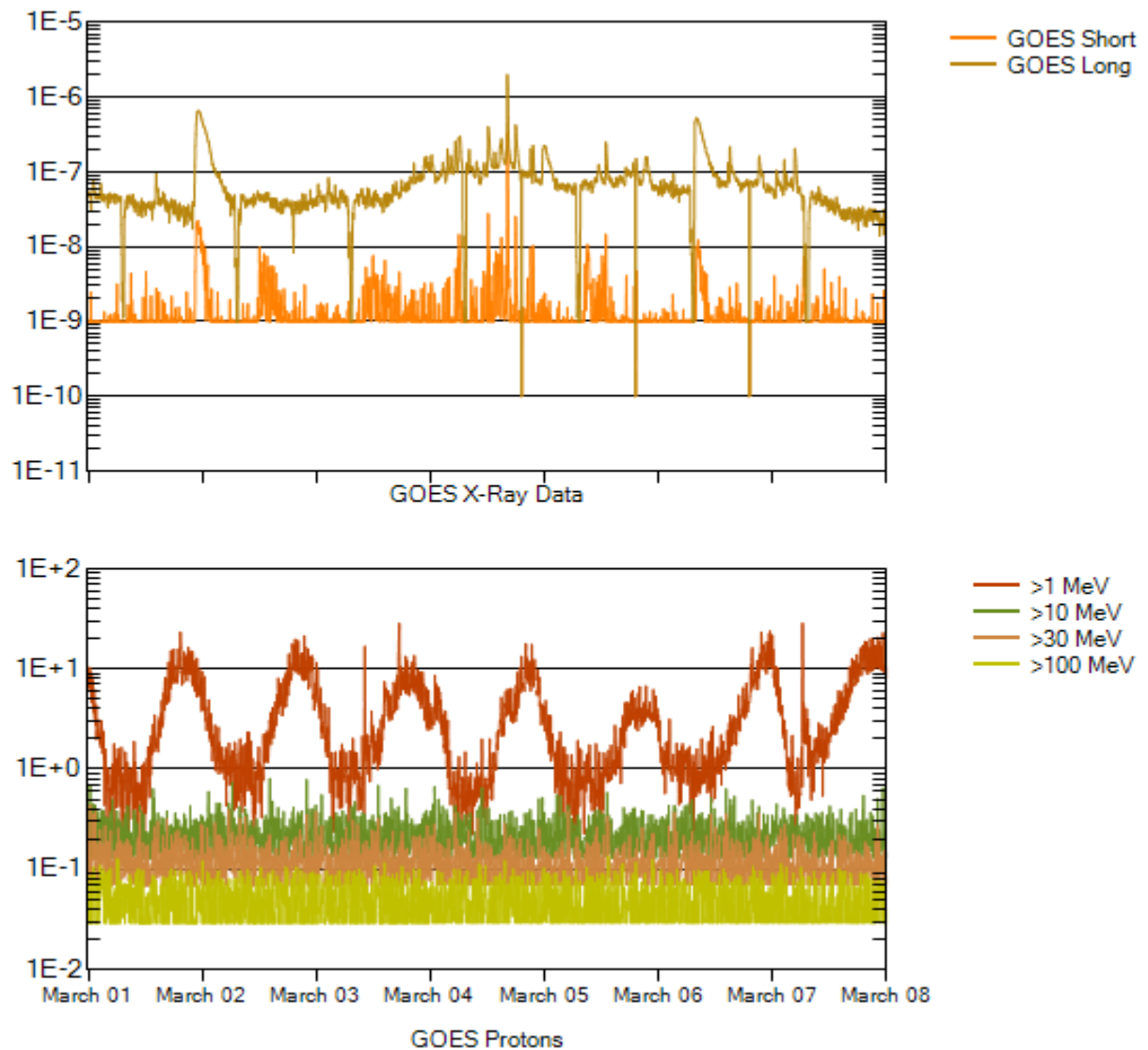
Electrons plot contains the five-minute averaged integral electron flux (electrons/cm<sup>2</sup>–sec–sr) with energies greater than 2 MeV at GOES-11.

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 (Watts/m<sup>2</sup>) 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 (protons/cm<sup>2</sup>-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/cm<sup>2</sup>-sec-sr) at greater than 10 MeV.

