

**Space Weather Highlights**  
**31 December – 06 January 2008**

**SEC PRF 1688**  
**08 January 2008**

Solar activity was very low to low. The period began at low levels due to a C8.3 flare observed at 31/0110 UTC off the east limb from Region 980 (S08, L=236, class/area, Cso/030 on 02 January). Accompanying this flare were Type II and Type IV radio sweeps (estimated shock velocity of 682 km/s). An associated CME was observed on the east limb near S09. At 02/1000 UTC, Region 980 produced a long duration C1.2 flare with an associated CME observed on LASCO C3 imagery at 02/1006 UTC. The region slowly decayed to spotless plage by 05 January. The first sunspot region with Solar Cycle 24 polarity was numbered as Region 981 (N30, L=246, class/area, Cso/020 on 04 January). Since emerging on the disk on 04 January, this region has been quiet and stable.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit reached high levels 31 December, 02 January, and 06 January.

The geomagnetic field was at quiet levels through 04 January. For the remainder of the summary period (05 - 06 January), quiet to active levels were observed at middle latitudes, while high latitudes experienced unsettled to minor storm levels with an isolated major storm period. ACE solar wind measurements indicated a recurrent co-rotating interaction region (CIR) late on 04 January followed by the onset of a recurrent high speed stream. The CIR was associated with increased densities, velocities, and interplanetary magnetic field. Densities increased to a peak of 31 p/cc at 05/0610 UTC. CIR-associated IMF changes included increased Bt (peak 18 nT at 05/0645 UTC) and intermittent periods of increased southward Bz (minimum -14 nT at 05/0712 UTC). Velocities increased during 05 - 06 January, and reached a peak of 705 km/sec at 06/0007 UTC.

**Space Weather Outlook**  
**09 January – 04 February 2008**

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 reach high levels during 09 - 11 January, 14 - 27 January, and 02 - 04 February.

The geomagnetic field is expected to be at quiet levels during 09 - 12 January. Activity is expected to increase to unsettled to active levels during 13 - 18 January due to a recurrent coronal hole high speed stream. Activity is expected to decrease to mostly quiet levels during 19 January - 01 February. Activity is expected to increase to unsettled to active levels during 02 - 04 February due to a recurrent coronal hole high-speed stream.



**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	
31 December	77	0	0	A6.2	1	0	0	0	0	0	0	0	0
01 January	79	11	30	A3.8	1	0	0	1	0	0	0	0	0
02 January	80	13	30	A2.7	1	0	0	0	0	0	0	0	0
03 January	79	13	20	A1.3	0	0	0	0	0	0	0	0	0
04 January	79	26	30	A1.2	0	0	0	0	0	0	0	0	0
05 January	80	12	20	A1.0	0	0	0	0	0	0	0	0	0
06 January	79	12	20	<A1.0	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
	31 December	3.4E+6	1.9E+4	4.5E+3		6.1E+7
01 January	2.0E+6	2.0E+4	4.4E+3		2.5E+7	
02 January	2.8E+6	1.9E+4	4.5E+3		4.2E+7	
03 January	1.9E+6	1.9E+4	4.8E+3		4.0E+7	
04 January	2.9E+6	1.8E+4	4.3E+3		4.1E+7	
05 January	3.4E+6	1.9E+4	4.1E+3		4.2E+6	
06 January	5.8E+6	1.7E+4	3.8E+3		2.3E+7	

**Daily Geomagnetic Data**

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	31 December	2	0-1-0-0-1-1-2-1	1	0-0-0-1-0-0-1-1	2
01 January	2	1-1-0-0-0-1-1-0	2	1-0-1-1-1-0-0-0	3	1-1-0-0-1-1-0-1
02 January	1	0-0-0-0-0-1-1-0	0	0-0-0-1-0-0-0-0	1	0-0-0-0-0-0-0-0
03 January	1	0-0-0-0-0-1-1-0	1	0-0-1-1-0-0-0-0	1	0-0-0-0-0-0-0-0
04 January	2	0-0-0-1-1-1-1-2	1	0-0-0-2-0-0-0-1	2	0-0-0-0-0-1-0-2
05 January	13	2-2-3-3-3-2-2-4	29	1-2-3-5-6-5-3-3	18	2-2-4-4-4-4-3-4
06 January	12	2-4-2-2-2-3-3-2	21	3-2-3-4-5-4-3-3	13	2-4-2-2-3-3-3-3

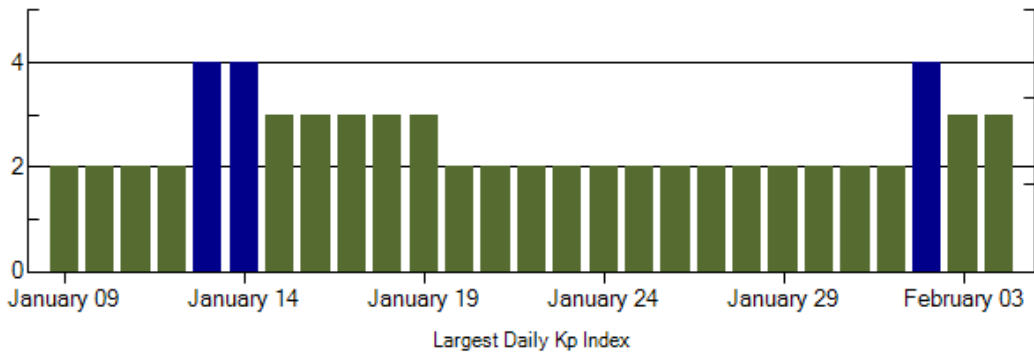
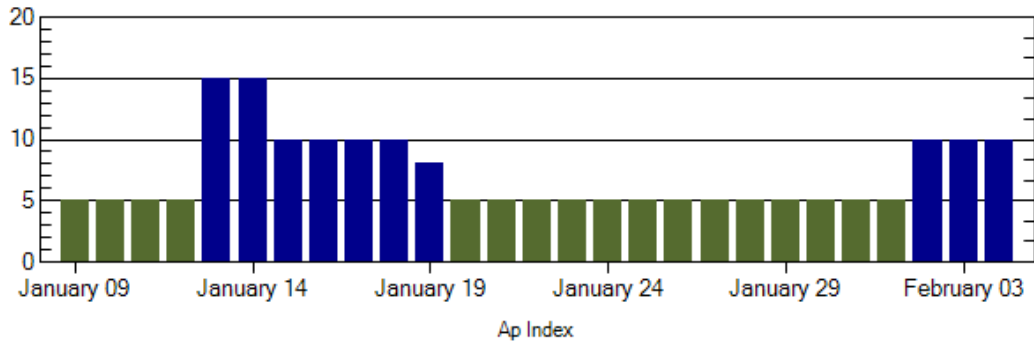
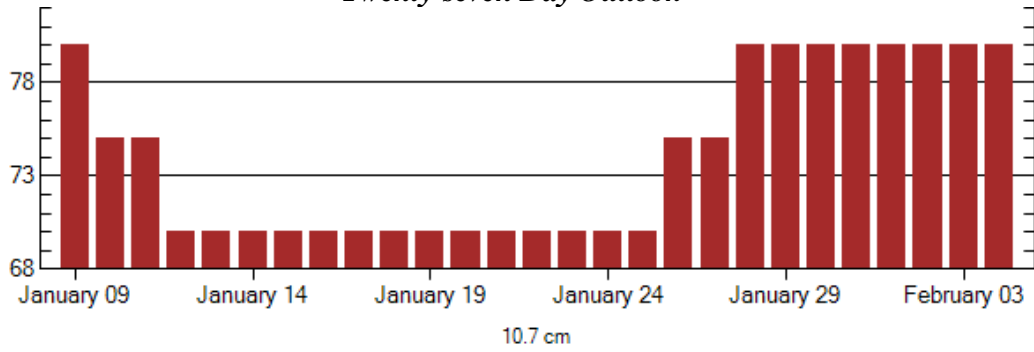


### *Alerts and Warnings Issued*

<u>Date &amp; Time of Issue</u>	<u>Type of Alert or Warning</u>	<u>Date &amp; Time of Event UTC</u>
31 Dec 0133	ALERT: Type II Radio Emission	31 Dec 0053
31 Dec 0229	ALERT: Type IV Radio Emission	31 Dec 0059
31 Dec 1242	ALERT: Electron 2MeV Integral Flux >1000pfu	31 Dec 1220
02 Jan 1912	ALERT: Electron 2MeV Integral Flux >1000pfu	02 Jan 1850
05 Jan 0848	WARNING: Geomagnetic K=4	05 Jan 0850 -1600
05 Jan 0853	ALERT: Geomagnetic K=4	05 Jan 0850
05 Jan 0933	ALERT: Geomagnetic K=5	05 Jan 0932
05 Jan 0933	WARNING: Geomagnetic K=5	05 Jan 0932 - 1600
05 Jan 2056	WARNING: Geomagnetic K=4	05 Jan 2100 - 06/1600
06 Jan 0512	ALERT: Geomagnetic K=4	06 Jan 0510
06 Jan 1716	ALERT: Electron 2MeV Integral Flux >1000pfu	06 Jan 1710



### 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
09 Jan	80	5	2	23 Jan	70	5	2
10	75	5	2	24	70	5	2
11	75	5	2	25	70	5	2
12	70	5	2	26	75	5	2
13	70	15	4	27	75	5	2
14	70	15	4	28	80	5	2
15	70	10	3	29	80	5	2
16	70	10	3	30	80	5	2
17	70	10	3	31	80	5	2
18	70	10	3	01 Feb	80	5	2
19	70	8	3	02	80	10	4
20	70	5	2	03	80	10	3
21	70	5	2	04	80	10	3
22	70	5	2				



***Energetic Events***

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

*No Events Observed*

***Flare List***

Date	Time			Optical	Imp / Brtns	Location Lat CMD	Rgn
	Begin	Max	End	X-ray Class.			
31 December	0037	0111	0138	C8.3			
	1158	1202	1207	B1.5			
	1258	1305	1310	B3.8			
	1956	1959	2004	B1.0			
01 January	0007	0026	0037	B7.0			
	0210	0215	0220	B2.4			
	0431	0448	0532	B3.6			
	0627	0634	0645	B4.2			
	0859	0907	0918	B2.8			
	1117	1123	1128	B2.2			
	1248	1257	1309	B1.5			
	1357	1403	1418	B3.5			
	1536	1536	1542	C1.1	Sf	S09E72	980
02 January	0651	1000	1123	C1.2			
03 January	No Flares Observed						
04 January	0305	0312	0319	B1.8			
05 January	No Flares Observed						
06 January	No Flares Observed						



### *Region Summary*

Location		Sunspot Characteristics										
		Flares										
Date	( ° 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

#### *Region 980*

31 Dec	S09E90	231																
01 Jan	S07E69	238	0030	02	Bxo	002	A	1					1					
02 Jan	S08E58	236	0030	04	Cso	003	B											
03 Jan	S06E42	239	0020	02	Hsx	003	A											
04 Jan	S06E29	239	0010	01	Axx	003	A											
05 Jan	S06E16	239																
06 Jan	S06E03	239																
								1	0	0	1	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 239

#### *Region 981*

04 Jan	N30E22	246	0020	03	Cso	003	B											
05 Jan	N29E14	241	0020	01	Bxo	002	B											
06 Jan	N27W04	246	0020	02	Axx	002	A											
								0	0	0	0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 246



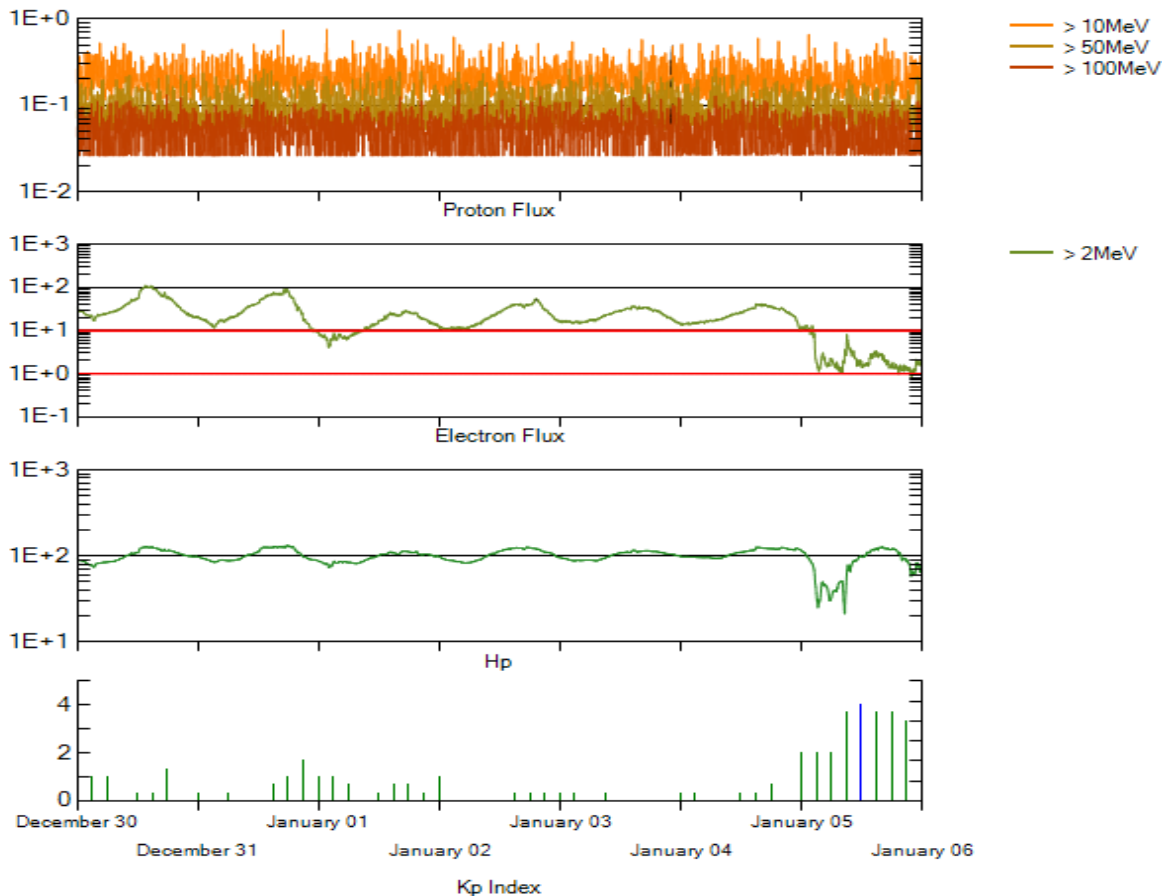
**Recent Solar Indices (preliminary)**  
**Of the observed monthly mean values**

Month	Sunspot Numbers			Radio Flux		Geomagnetic			
	Observed SEC	values RI	Ratio RI/SEC	Smooth SEC	values RI	*Penticton 10.7 cm	Smooth Value	Planetary Ap	Smooth Value
<b>2006</b>									
January	28.0	15.4	0.55	37.2	20.8	83.8	84.0	6	9.9
February	5.3	4.7	0.89	33.4	18.7	76.6	82.6	6	9.2
March	21.3	10.8	0.51	31.0	17.4	75.5	81.6	8	8.4
April	55.2	30.2	0.55	30.6	17.1	89.0	80.9	11	7.9
May	39.6	22.2	0.56	30.7	17.3	81.0	80.8	8	7.9
June	37.7	13.9	0.37	28.9	16.3	80.1	80.6	9	8.3
July	22.6	12.2	0.54	27.2	15.3	75.8	80.3	7	8.7
August	22.8	12.9	0.57	27.6	15.6	79.0	80.3	9	8.7
September	25.2	14.5	0.58	27.7	15.6	77.8	80.2	8	8.7
October	15.7	10.4	0.66	25.2	14.2	74.3	79.4	8	8.6
November	31.5	21.5	0.68	22.3	12.7	86.4	78.5	9	8.5
December	22.2	13.6	0.61	20.7	12.1	84.3	77.9	15	8.5
<b>2007</b>									
January	26.6	16.9	0.64	19.7	12.0	83.5	77.5	6	8.4
February	17.2	10.6	0.62	18.9	11.6	77.8	76.9	6	8.4
March	9.7	4.8	0.49	17.5	10.8	72.3	76.0	8	8.4
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			71.6		8	
August	9.9	6.2	0.63			69.2		7	
September	4.8	2.4	0.50			67.1		8	
October	1.3	0.9	0.70			65.5		9	
November	2.5	1.7	0.68			69.7		5	
December	16.2	10.1	0.62			78.6		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.





*Weekly Geosynchronous Satellite Environment Summary  
Week Beginning 30 December 2007*

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-12 (W075).

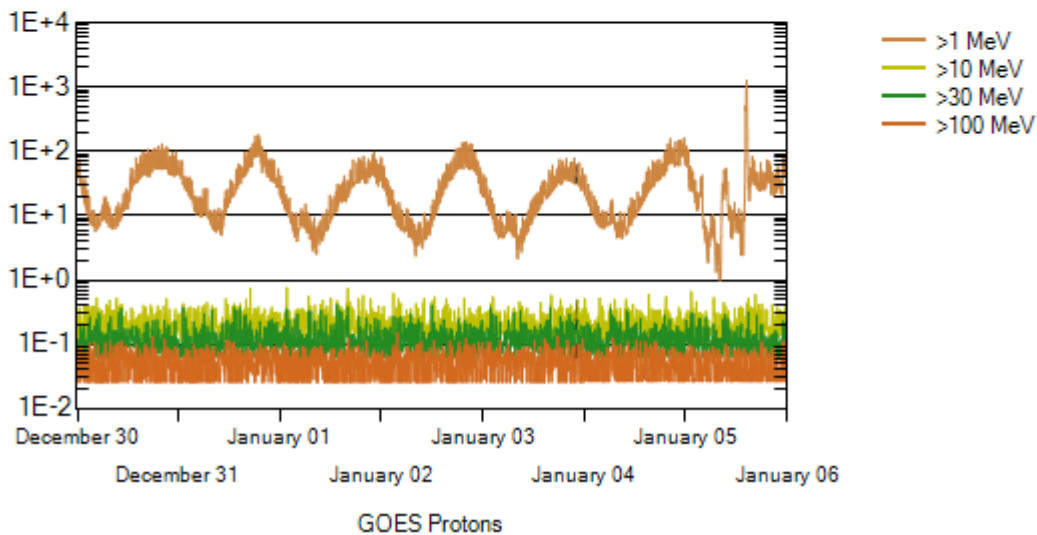
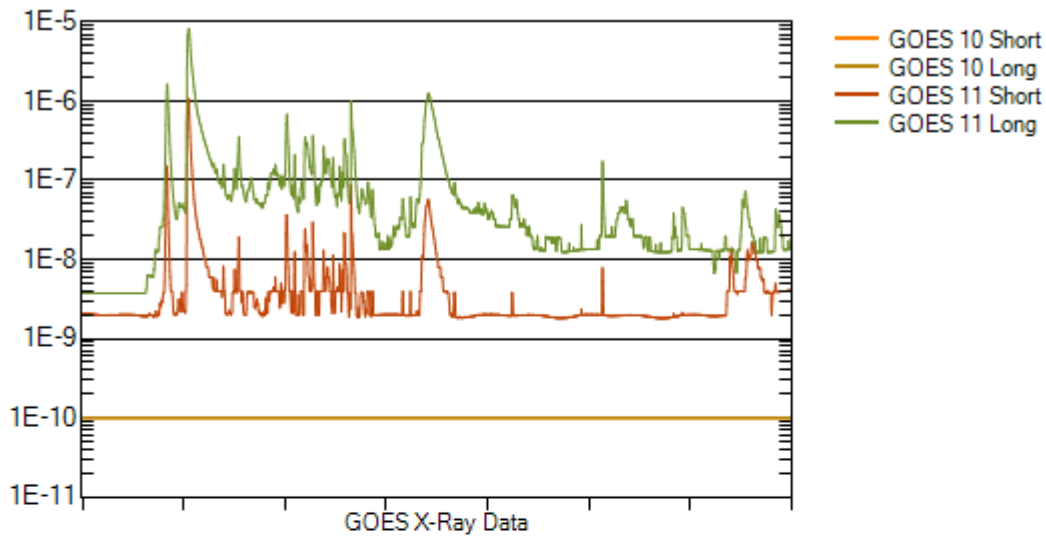
Hp plot contains the five minute averaged magnetic field H - component in nanoteslas (nT) as measured by GOES-12. The H component is parallel to the spin axis of the satellite, which is nearly parallel to the Earth's rotation axis.

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 SEC 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.

