

Space Weather Highlights
18 – 24 December 2006

SEC PRF 1634
26 December 2006

Solar activity was very low. A single B1 X-ray flare occurred on 18 December. No flares occurred during the remainder of the period. The visible disk was spotless throughout the period.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit was at high levels throughout the period.

Geomagnetic field activity was elevated during the period due to a recurrent coronal hole high-speed wind stream. Activity varied from quiet to active levels during most days with minor to severe storm periods observed at high latitudes (severe storm periods occurred on 19 and 22 December). ACE data indicated the high-speed stream commenced on 18 December and continued through the period. Maximum interplanetary magnetic field (IMF) variations associated with the high-speed stream occurred during 18 December with a peak total IMF intensity of 12 nT and a minimum southward IMF Bz of – 8 nT. A peak velocity of 757 km/sec was observed on 20 December.

Space Weather Outlook
27 December 2006 – 22 January 2007

Solar activity is expected to be at very low levels until old Region 930 (S05, L=010, class/area Dki/680 on 12 December) returns to the visible disk on 31 December. Moderate level activity is possible until 14 January when old Region 930 departs the visible disk. Very low activity is expected during 15 – 22 January.

A proton event at geosynchronous orbit is possible during 31 December to 14 January with the return of old Region 930. No proton events are expected during the rest of the period.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to be at high levels during 27 - 28 December and 03 – 22 January.

Field activity is expected to be at unsettled to active levels on 27 December due to a recurrent solar sector boundary crossing. Recurrent coronal hole high-speed streams are forecast to disturb the field during 02 – 04, 07 – 09, and 16 - 19 January with active conditions expected. Minor to major storm conditions are also possible during 02 – 04 January. Quiet to unsettled conditions are expected for the remainder of the 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	
18 December	75	0	0	A3.9	0	0	0	0	0	0	0	0	0
19 December	73	0	0	<A1.0	0	0	0	0	0	0	0	0	0
20 December	72	0	0	<A1.0	0	0	0	0	0	0	0	0	0
21 December	72	0	0	<A1.0	0	0	0	0	0	0	0	0	0
22 December	73	0	0	<A1.0	0	0	0	0	0	0	0	0	0
23 December	73	0	0	<A1.0	0	0	0	0	0	0	0	0	0
24 December	74	0	0	<A1.0	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
18 December	1.8E+7	2.3E+4	2.6E+3		1.1E+9	
19 December	1.3E+7	2.2E+4	2.9E+3		2.7E+8	
20 December	1.1E+7	1.8E+4	3.8E+3		3.8E+8	
21 December	1.1E+7	1.6E+4	3.9E+3		4.5E+8	
22 December	1.1E+7	1.7E+4	4.4E+3		5.8E+8	
23 December	5.9E+6	1.6E+4	4.4E+3		5.3E+8	
24 December	3.7E+6	1.7E+4	4.7E+3		5.1E+8	

Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
18 December	7	1-2-1-1-2-2-2-3	8	1-0-1-4-3-2-1-2	8	1-2-1-2-1-2-2-4
19 December	9	2-3-2-3-3-2-1-1	33	2-3-3-7-5-4-2-2	14	3-4-2-4-3-1-2-2
20 December	16	4-3-2-2-3-3-4-3	45	4-3-3-6-6-5-5-5	24	4-4-3-2-4-3-5-4
21 December	9	4-2-3-2-2-2-1-1	29	3-2-6-5-5-3-3-2	14	4-3-4-3-3-2-2-1
22 December	10	3-2-2-3-2-2-2-3	55	2-5-7-7-5-4-3-3	14	3-3-4-4-3-2-2-3
23 December	10	2-2-3-2-3-3-2-2	29	3-1-4-5-6-4-4-2	15	2-2-3-2-3-4-4-2
24 December	7	2-2-2-2-2-2-2-2	14	2-1-4-2-4-3-3-2	10	3-2-3-1-2-3-2-2

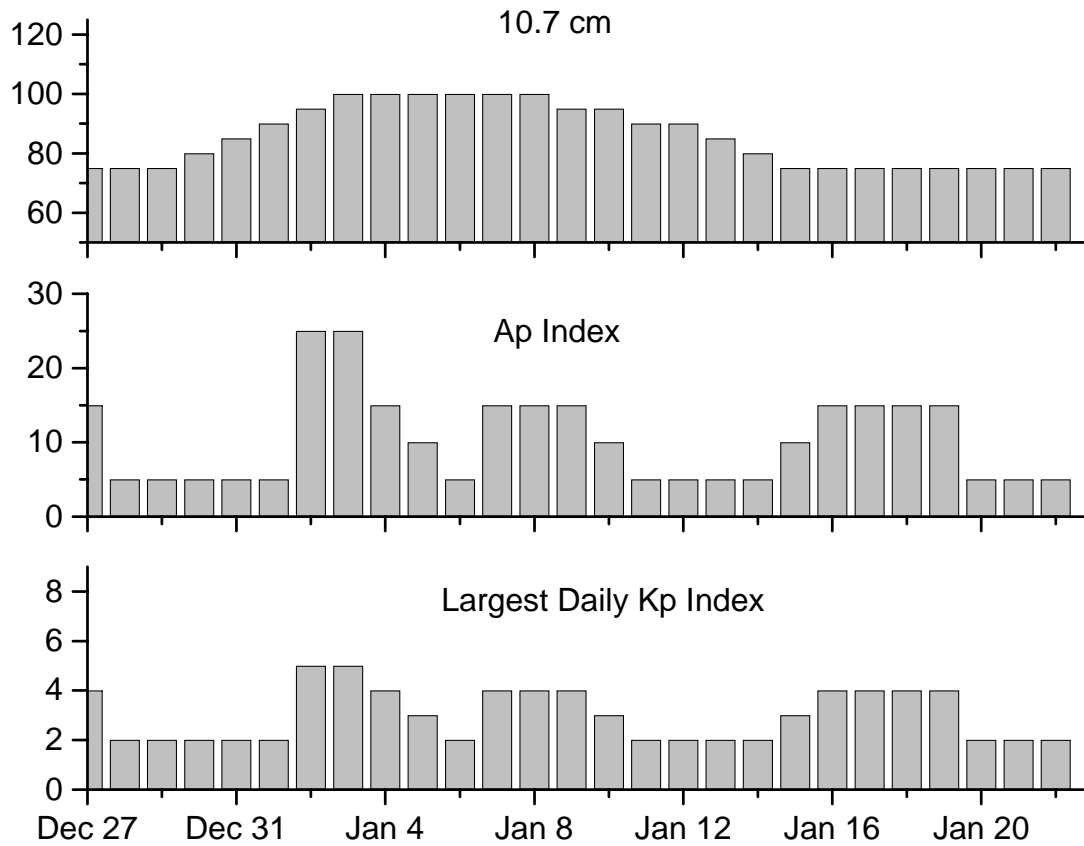


Alerts and Warnings Issued

Date & Time of Issue	Type of Alert or Warning	Date & Time of Event UTC
18 Dec 0504	ALERT: Electron 2MeV Integral Flux >1000pfu	18 Dec 0500
18 Dec 1655	SUMMARY: Geomagnetic Sudden Impulse	18 Dec 1648
19 Dec 0517	ALERT: Electron 2MeV Integral Flux >1000pfu	19 Dec 0515
19 Dec 0942	WARNING: Geomagnetic K=4	19 Dec 0945 - 1600
19 Dec 1016	ALERT: Geomagnetic K=4	19 Dec 1015
19 Dec 1030	WARNING: Geomagnetic K=5	19 Dec 1030 - 1600
20 Dec 0037	WARNING: Geomagnetic K=4	20 Dec 0040 - 2359
20 Dec 0048	ALERT: Geomagnetic K=4	20 Dec 0046
20 Dec 0104	WARNING: Geomagnetic K=5	20 Dec 0105 - 21/1600
20 Dec 0501	ALERT: Electron 2MeV Integral Flux >1000pfu	20 Dec 0500
21 Dec 0501	ALERT: Electron 2MeV Integral Flux >1000pfu	21 Dec 0500
21 Dec 1555	WARNING: Geomagnetic K=4	21 Dec 1559 - 2359
21 Dec 2355	EXTENDED WARNING: Geomagnetic K=4	21 Dec 1559 - 22/1600
22 Dec 0533	ALERT: Electron 2MeV Integral Flux >1000pfu	22 Dec 0500
22 Dec 1555	EXTENDED WARNING: Geomagnetic K=4	21 Dec 1559 - 22/2359
22 Dec 2358	EXTENDED WARNING: Geomagnetic K=4	21 Dec 1559 - 23/1600
23 Dec 0505	ALERT: Electron 2MeV Integral Flux >1000pfu	23 Dec 0500
23 Dec 1712	WARNING: Geomagnetic K=4	23 Dec 1712 - 2359
23 Dec 1723	ALERT: Geomagnetic K=4	23 Dec 1722
23 Dec 2334	EXTENDED WARNING: Geomagnetic K=4	23 Dec 1712 - 24/1600
24 Dec 0502	ALERT: Electron 2MeV Integral Flux >1000pfu	24 Dec 0500
24 Dec 1555	EXTENDED WARNING: Geomagnetic K=4	23 Dec 1712 - 24/2359
24 Dec 2353	EXTENDED WARNING: Geomagnetic K=4	23 Dec 1712 - 25/1600



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
27 Dec	75	15	4	10 Jan	95	10	3
28	75	5	2	11	90	5	2
29	75	5	2	12	90	5	2
30	80	5	2	13	85	5	2
31	85	5	2	14	80	5	2
01 Jan	90	5	2	15	75	10	3
02	95	25	5	16	75	15	4
03	100	25	5	17	75	15	4
04	100	15	4	18	75	15	4
05	100	10	3	19	75	15	4
06	100	5	2	20	75	5	2
07	100	15	4	21	75	5	2
08	100	15	4	22	75	5	2
09	95	15	4				



Energetic Events

Date	Time		X-ray		Optical Information			Peak		Sweep Freq		
	½		Integ		Imp/	Location		Radio Flux		Intensity		
	Begin	Max	Max	Class	Flux	Brtns	Lat	CMD	#	245	2695	II

No Events Observed

Flare List

Date	Time			Optical	Imp / Brtns	Location	Rgn
	Begin	Max	End	X-ray Class.		Lat CMD	
18 December	1026	1032	1037	B1.4			930
19 December	No Flares Observed						
20 December	No Flares Observed						
21 December	No Flares Observed						
22 December	No Flares Observed						
23 December	No Flares Observed						
24 December	No Flares Observed						

Region Summary

Date	Location		Sunspot Characteristics											
	Helio		Flares				Mag							
	(° Lat ° CMD)	Lon	Area (10 ⁻⁶ hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray		Optical				
							C	M	X	S	1	2	3	4

No active regions.

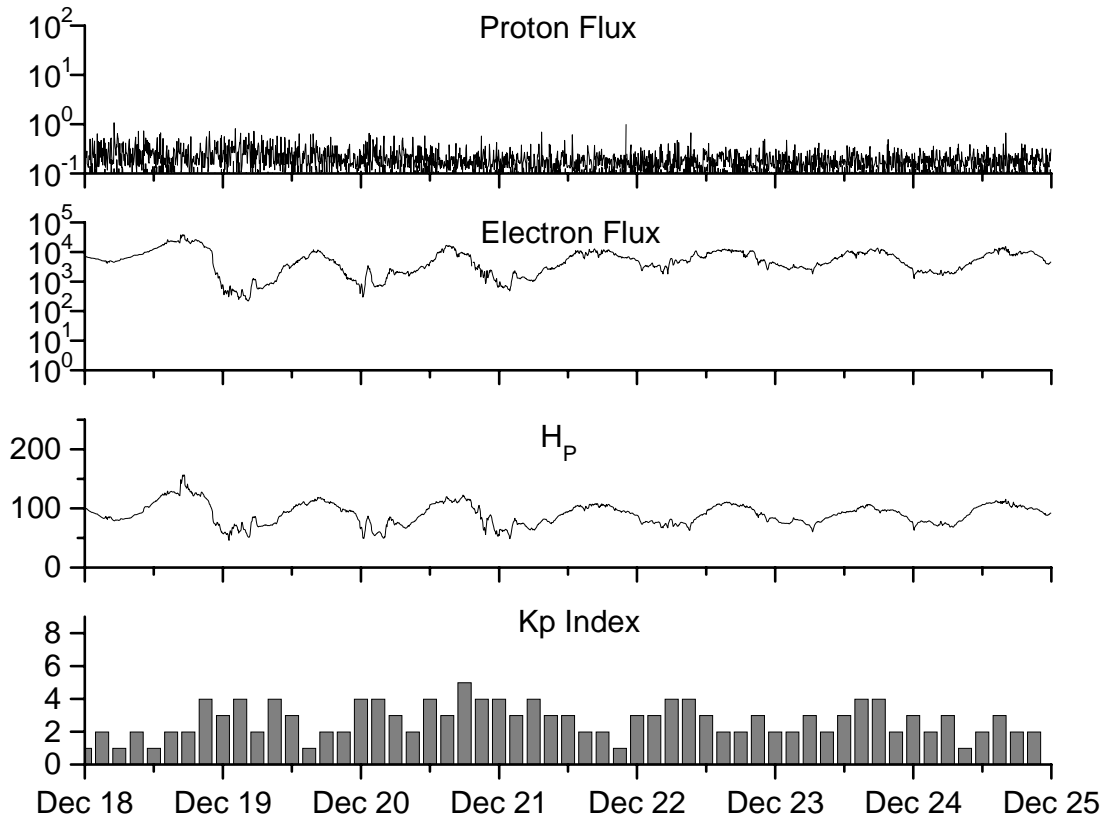


**Recent Solar Indices (preliminary)
of the observed monthly mean values**

Month	Sunspot Numbers			Radio Flux		Geomagnetic			
	Observed values SEC	Ratio RI	Ratio RI/SEC	Smooth values SEC	Smooth RI	*Penticton 10.7 cm Value	Smooth Value	Planetary Ap	Smooth Value
2004									
December	34.7	17.9	0.52	58.8	35.3	94.6	101.3	11	14.8
2005									
January	52.0	31.3	0.60	57.3	34.7	102.4	100.3	22	14.7
February	45.4	29.1	0.64	56.4	34.0	97.3	98.5	11	14.6
March	41.0	24.8	0.60	55.8	33.6	90.0	97.2	12	15.3
April	41.5	24.4	0.59	52.6	31.7	85.9	95.5	12	15.7
May	65.4	42.6	0.65	48.3	29.0	99.5	93.2	20	14.8
June	59.8	39.6	0.66	47.9	28.9	93.7	91.9	13	13.9
July	71.0	39.9	0.56	48.1	29.2	96.6	90.9	16	13.1
August	65.6	36.4	0.55	45.4	27.5	90.7	89.3	16	12.2
September	39.2	22.1	0.56	42.9	25.9	90.8	87.8	21	11.8
October	13.0	8.5	0.65	42.6	25.5	76.7	87.4	7	11.6
November	32.2	18.0	0.56	42.1	24.9	86.3	86.7	8	11.1
December	62.6	41.2	0.66	40.1	23.0	90.8	85.4	7	10.4
2006									
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			80.1		8	
July	22.6	12.2	0.54			75.8		7	
August	22.8	12.9	0.57			79.0		9	
September	25.2	14.5	0.58			77.8		8	
October	15.7	10.4	0.66			74.3		7	
November	31.5	21.5	0.68			86.4		8	

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 18 December 2006

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.

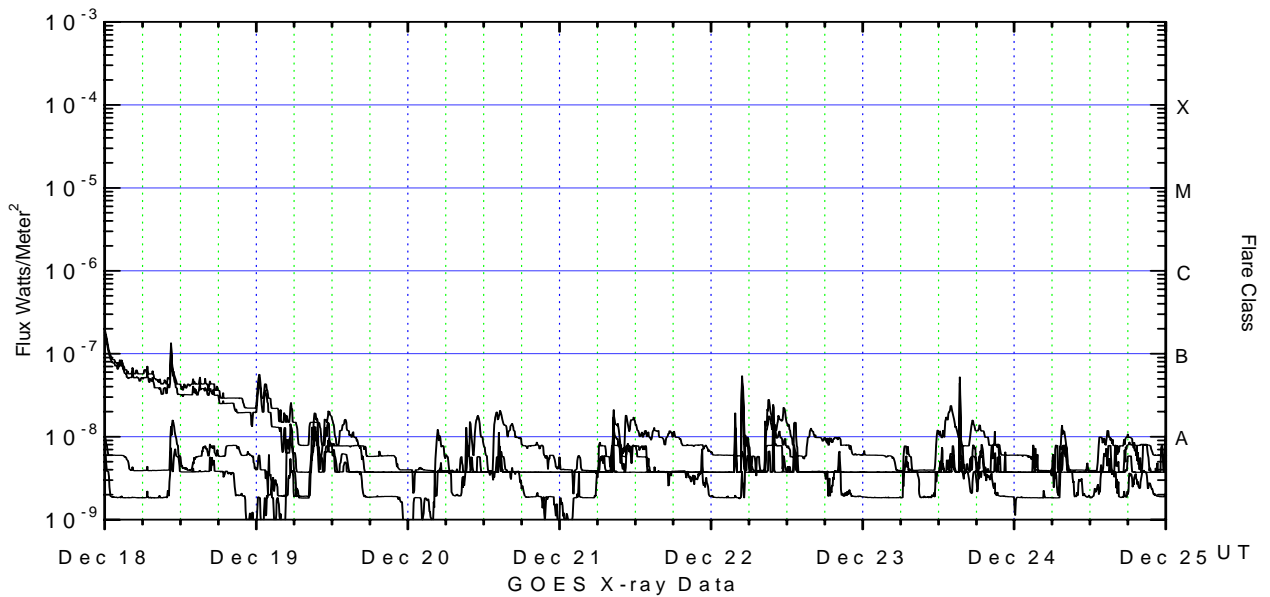
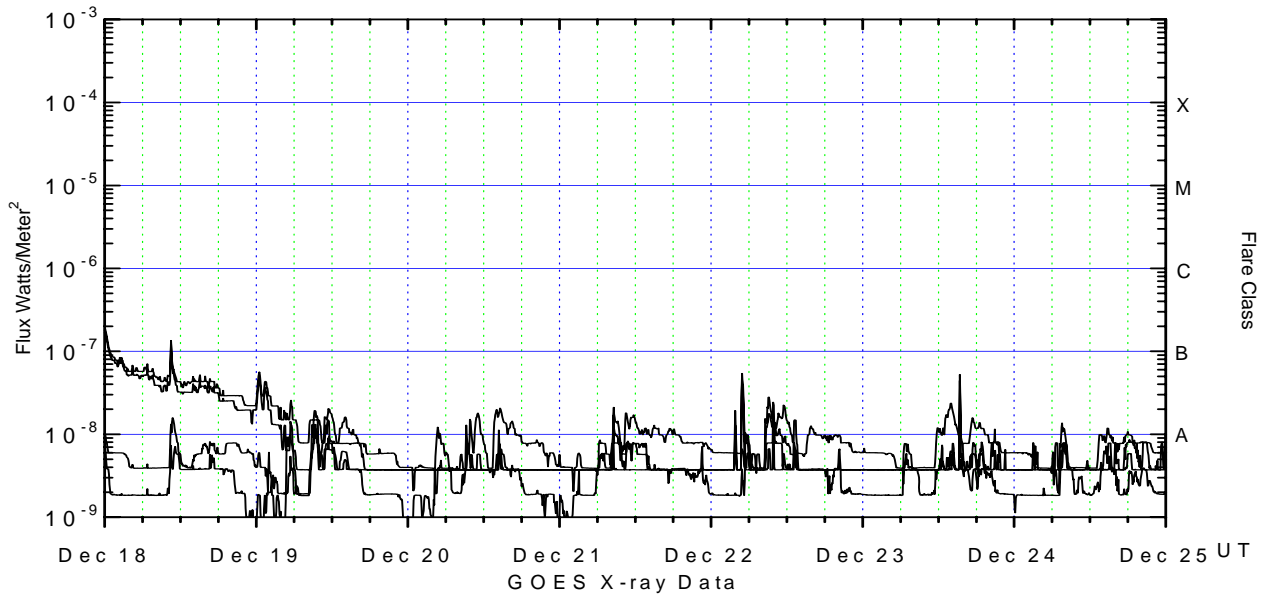
Electrons plot contains the five-minute averaged integral electron flux (electrons/cm²-sec -sr) with energies greater than 2 MeV at GOES-12 (W075).

H_p 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.

K_p 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 K_p 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 K_p 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 12 (W075) 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 (protons/cm²-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 (protons/cm²-sec-sr) at greater than 10 MeV.

