Space Weather Highlights **SEC PRF 1583**
26 December 2005 – 01 January 2006 **03 January 2006**

Solar activity ranged from very low to low during the period. Only three low-level C-class flares were observed during the period. Two C1 flares were observed on 28 and 29 December from Region 843 (N12, L=235, class/area, Cao/080 on 27 December). Late on 29 December, LASCO C3 imagery detected a partial halo CME that seemed to originate from an eruptive filament located southeast of center disk. The third C1 flare occurred at 01/2216 UTC from Region 838 (N17, L=321, class/area, Dai/170 on 23 December) on the northwest limb. No other significant activity was observed.

No greater than 10 MeV proton events were observed this period.

The greater than 2 MeV electron flux at geosynchronous orbit reached high levels on 28 December – 01 January.

The geomagnetic field ranged from quiet to minor storm levels during the period. Solar wind speed ranged from a low of near 310 km/s early on 27 December to a high of about 750 km/s early on 29 December. The period began with wind speed at about 380 km/s, the IMF Bz weak, not varying much beyond +/-5 nT, and geomagnetic conditions at quiet to unsettled levels. By midday on 27 December, wind speed began to gradually increase, while the IMF Bz fluctuated between +/-15 nT. These conditions persisted through late on 27 December, and were consistent with a recurrent high speed, coronal hole stream. During this period, the geomagnetic field was at active to minor storm conditions at high latitudes while quiet to active conditions occurred at middle latitudes. By early on 29 December, the IMF Bz relaxed, and did not vary much beyond +/- 5 nT. Wind speed remained elevated at above 600 km/s through 30 December. Thereafter, wind velocity began a slow decrease until midday on 01 January. A sudden increase in speed to 550 km/s along with a spike in the total magnetic field of near 20 nT indicated the arrival of the CME from 29 December. The geomagnetic field at high latitudes responded with an isolated active period. The IMF Bz remained mostly positive while the wind speed gradually declined and ended the summary period at about 450 km/s. During the remainder of the summary period, the geomagnetic field was at quiet levels.

Space Weather Outlook
05 January – 30 January 2006

Solar activity is expected to be at very low to low levels.

No greater than 10 MeV proton events are expected.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to be at high levels on 04 January, and again on 24 – 30 January.

The geomagnetic field is expected to range from quiet to minor storm levels. Unsettled to active periods are expected on 07 January, while unsettled to minor storm periods are possible on 16 and 23 – 24 January due to effects from recurrent coronal hole wind streams. Otherwise, quiet to unsettled conditions are expected.

Daily Solar Data

Date	Radio Flux 10.7 cm	Sun spot No.	Sunspot Area (10^{-6} hemi.)	X-ray Background	Flares: X-ray Flux C	M	X	Flares: Optical S	1	2	3	4
26 December	93	90	440	B1.2	0	0	0	0	0	0	0	0
27 December	92	78	350	B1.0	0	0	0	0	0	0	0	0
28 December	89	61	230	A9.3	1	0	0	1	0	0	0	0
29 December	90	77	340	A9.3	1	0	0	0	0	0	0	0
30 December	90	67	260	A8.8	0	0	0	0	0	0	0	0
31 December	87	62	250	A6.5	0	0	0	0	0	0	0	0
01 January	87	41	200	A5.8	1	0	0	0	0	0	0	0

Daily Particle Data

Date	Proton Fluence (protons/cm ^{2}-day-sr) >1 MeV	>10 MeV	>100 MeV	Electron Fluence (electrons/cm^2-day-sr) >.6 MeV	>2MeV	>4 MeV
26 December	4.1E+5	1.5E+4	3.3E+3		1.3E+6	
27 December	2.1E+6	1.4E+4	3.4E+3		3.9E+6	
28 December	2.0E+6	1.5E+4	3.2E+3		1.7E+7	
29 December	1.4E+6	1.4E+4	3.1E+3		6.3E+7	
30 December	1.4E+6	1.4E+4	3.1E+3		1.6E+8	
31 December	1.3E+6	1.3E+4	2.7E+3		2.6E+8	
01 January	2.0E+6	1.3E+4	2.8E+3		3.0E+8	

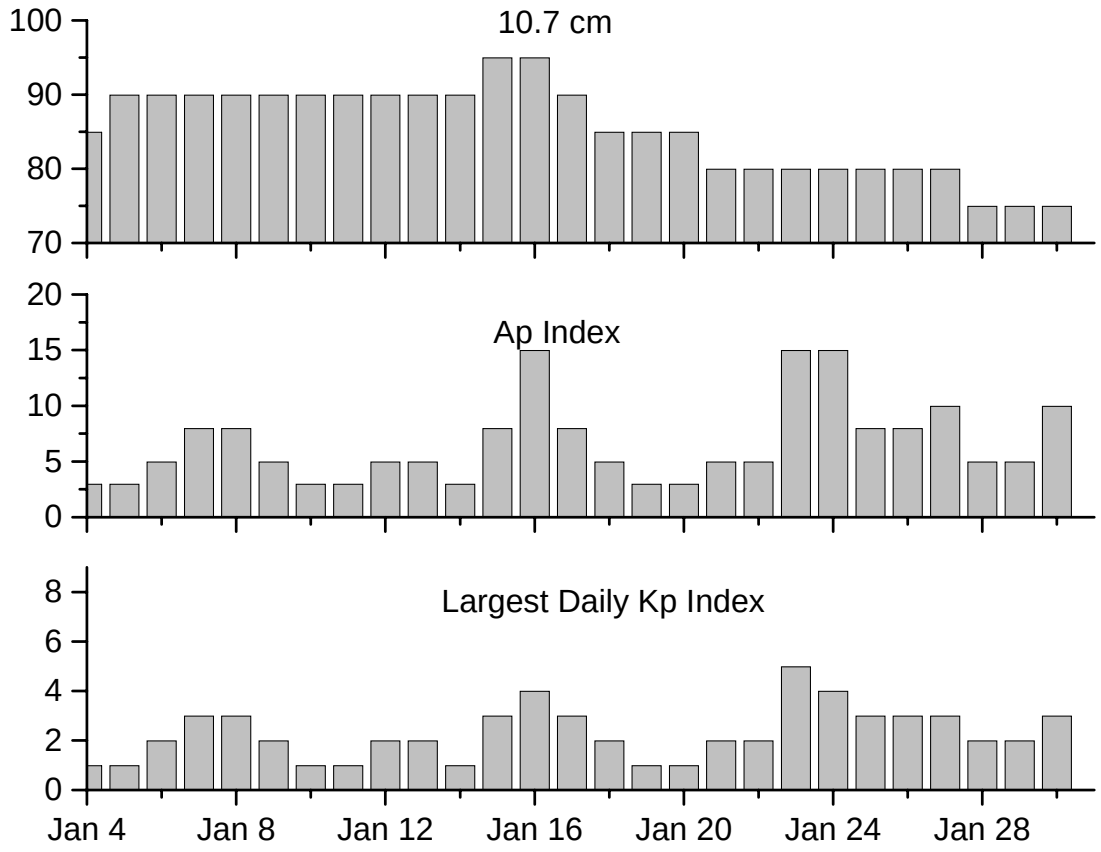
Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg A	K-indices	High Latitude College A	K-indices	Estimated Planetary A	K-indices
26 December	3	0-0-1-0-2-1-2-2	6	0-0-1-0-4-2-2-1	6	1-0-1-0-2-2-3-3
27 December	10	3-0-0-1-3-3-3-3	15	2-1-0-1-2-5-4-4	18	3-0-0-1-2-5-5-4
28 December	13	3-3-2-2-2-2-3-4	26	3-3-3-5-5-4-3-4	14	3-3-3-3-3-3-3-3
29 December	7	2-2-2-2-2-2-2-2	22	3-3-5-5-3-3-3-2	8	3-2-3-2-2-2-1-2
30 December	6	3-2-1-1-1-2-1-1	6	2-1-1-3-1-2-1-1	7	2-3-1-2-1-2-1-2
31 December	9	3-2-3-1-2-3-1-2	8	2-2-1-1-2-4-2-2	9	3-2-3-1-2-3-1-2
01 January	5	2-1-1-1-2-2-1-1	3	2-1-1-0-1-1-1-1	4	2-1-0-0-2-1-1-1

Alerts and Warnings Issued

Date & Time of Issue	Type of Alert or Warning	Date & Time of Event UTC
26 Dec 0005	245 MHz Radio Burst	25 Dec
27 Dec 0006	245 MHz Radio Burst	26 Dec
27 Dec 1514	WARNING: Geomagnetic K = 4	27 Dec 1514 – 2359
27 Dec 1656	ALERT: Geomagnetic K = 4	27 Dec 1554
27 Dec 2306	EXTENDED WARNING: Geomagnetic K = 4	27 Dec 1514 – 28/1600
28 Dec 2004	ALERT: Electron 2MeV Integral Flux ≥1000pfu	28 Dec 1945
29 Dec 0644	WARNING: Geomagnetic K = 4	29 Dec 0645 – 1600
29 Dec 1348	ALERT: Electron 2MeV Integral Flux ≥ 1000pfu	29 Dec 1320
30 Dec 0515	ALERT: Electron 2MeV Integral Flux ≥ 1000pfu	30 Dec 0500
31 Dec 1405	Electron 2MeV Integral Flux ≥ 1000pfu	31 Dec 0500
01 Jan 0843	Electron 2MeV Integral Flux ≥ 1000pfu	01 Jan 0820
01 Jan 1415	SUMMARY: Geomagnetic Sudden Impulse	01 Jan 1406

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
04 Jan	85	3	1	18 Jan	85	5	2
05	90	3	1	19	85	3	1
06	90	5	2	20	85	3	1
07	90	8	3	21	80	5	2
08	90	8	3	22	80	5	2
09	90	5	2	23	80	15	5
10	90	3	1	24	80	15	4
11	90	3	1	25	80	8	3
12	90	5	2	26	80	8	3
13	90	5	2	27	80	10	3
14	90	3	1	28	75	5	2
15	95	8	3	29	75	5	2
16	95	15	4	30	75	10	3
17	90	8	3				

Energetic Events

Date	Time Begin	Time Max	Time ½ Max	X-ray Class	X-ray Integ Flux	Optical Information Imp/ Brtns	Optical Information Location Lat	Optical Information Location CMD	Optical Information Rgn #	Peak Radio Flux 245	Peak Radio Flux 2695	Sweep Freq Intensity II	Sweep Freq Intensity IV
No Events Observed													

Flare List

Date	Time Begin	Time Max	Time End	Optical X-ray Class.	Imp / Brtns	Location Lat CMD	Rgn
26 December	0635	0638	0641	B2.0			
	0752	0802	0807	B2.6			
27 December	1216	1219	1222	B3.7			843
	1837	1840	1844	B2.5			843
28 December	1113	1125	1142	B9.2			843
	2232	2238	2250	C1.2	Sf	N10E40	843
29 December	1114	1119	1126	B1.8			
	1246	1252	1258	B4.9			
	2036	2106	2128	C1.1			843
30 December	1641	1650	1701	B2.7			843
	2018	2022	2027	B1.2			
31 December	1053	1057	1101	B4.9			843
01 January	2141	2216	2300	C1.5			838

Region Summary

Date	Location (° Lat ° CMD)	Helio Lon	Sunspot Characteristics Area (10^{-6} hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	Flares X-ray C	X-ray M	X-ray X	Optical S	Optical 1	Optical 2	Optical 3	Optical 4
	Region 838														
22 Dec	N17E34	321	0070	05	Cro	018	B	2							
23 Dec	N17E20	321	0170	08	Dai	012	Bg								
24 Dec	N16E07	321	0130	09	Dai	011	B								
25 Dec	N16W05	320	0090	09	Dso	009	B								
26 Dec	N16W18	320	0090	09	Cso	009	B								
27 Dec	N16W34	323	0050	01	Hsx	001	A								
28 Dec	N16W49	324	0040	01	Hax	001	A								
29 Dec	N16W62	324	0040	02	Hax	002	A								
30 Dec	N15W73	322	0030	03	Hsx	002	A								
31 Dec	N15W88	324	0030	01	Hax	001	A								
								2	0	0	0	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 320

Region Summary – continued.

Date	Location (° Lat ° CMD)	Helio Lon	Sunspot Characteristics Area (10^{-6} hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	Flares X-ray C	X-ray M	X-ray X	Optical S	Optical 1	Optical 2	Optical 3	Optical 4
	Region 839														
22 Dec	N19W08	003	0010	02	Bxo	003	B								
23 Dec	N18W24	005	0030	05	Dao	004	B								
24 Dec	N20W37	005	0020	06	Cao	006	B								
25 Dec	N19W52	007	0010	01	Axx	001	A								
26 Dec	N19W65	007	0030	06	Cso	003	B								
27 Dec	N19W78	007	0030	01	Axx	001	A								
								0	0	0	0	0	0	0	0
Crossed West Limb.															
Absolute heliographic longitude: 003															
	Region 840														
24 Dec	S03E66	262	0050	02	Hsx	001	A								
25 Dec	S03E53	262	0040	02	Hax	001	A								
26 Dec	S03E40	262	0050	03	Cso	003	B								
27 Dec	S03E27	262	0030	01	Hsx	001	A								
28 Dec	S03E14	261	0020	02	Hsx	002	A								
29 Dec	S03E01	261	0030	04	Cso	006	B								
30 Dec	S02W13	262	0020	02	Hsx	002	A								
31 Dec	S03W26	262	0020	01	Hsx	001	A								
01 Jan	S03W40	262	0010	01	Hax	001	A								
								0	0	0	0	0	0	0	0
Still on Disk.															
Absolute heliographic longitude: 261															
	Region 841														
24 Dec	N04E74	254	0090	02	Hsx	001	A								
25 Dec	N12E60	255	0120	07	Cso	004	B	1			1				
26 Dec	N12E47	255	0170	09	Dso	008	B								
27 Dec	N12E34	255	0140	09	Cso	004	B								
28 Dec	N12E21	254	0130	06	Cso	003	B								
29 Dec	N12E08	254	0130	09	Cao	004	B								
30 Dec	N12W07	256	0110	04	Cao	005	B								
31 Dec	N12W16	252	0150	09	Cao	004	B								
01 Jan	N12W31	253	0170	08	Cso	003	B								
								1	0	0	1	0	0	0	0
Still on Disk.															
Absolute heliographic longitude: 256															

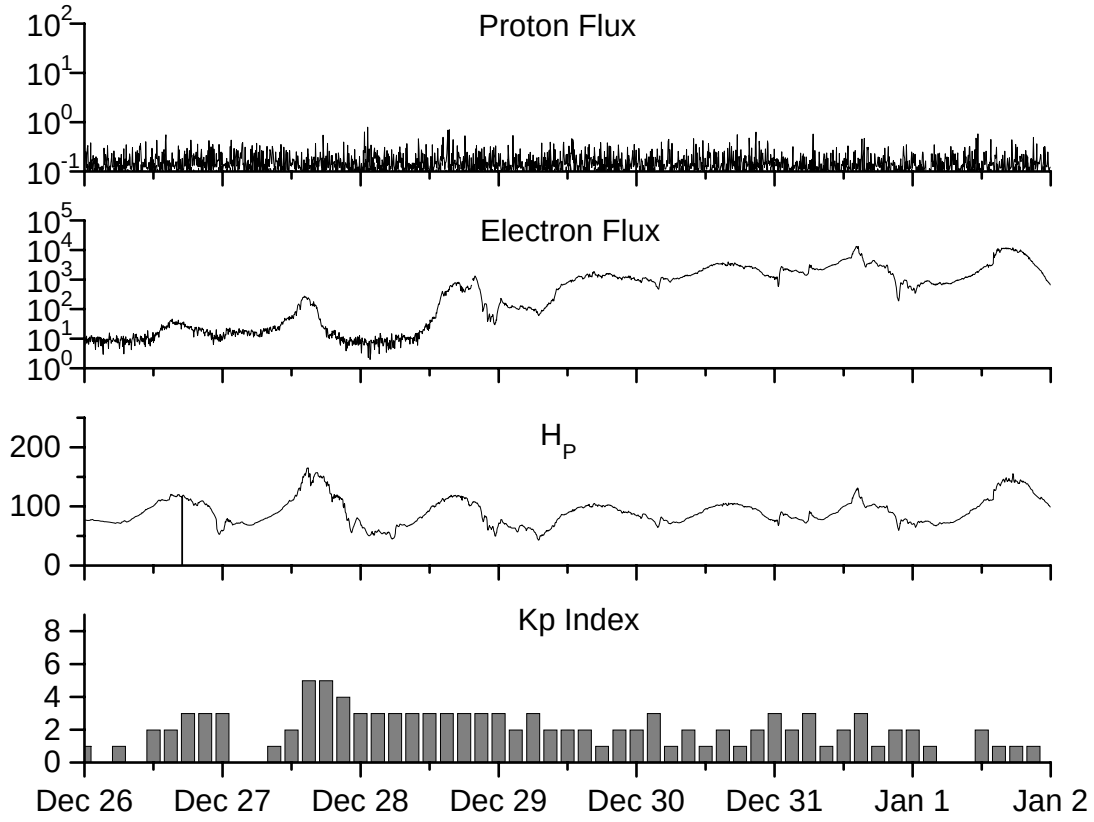
Region Summary – continued.

Date	Location (° Lat ° CMD)	Helio Lon	Sunspot Characteristics Area (10^{-6} hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	Flares X-ray C	X-ray M	X-ray X	Optical S	Optical 1	Optical 2	Optical 3	Optical 4
			Region 842												
25 Dec	S06E30	285	0010	01	Hsx	001	A	1			1				
26 Dec	S06E17	285	0020	03	Cso	003	B								
27 Dec	S06E04	285	0020	07	Cso	003	B								
28 Dec	S06W10	285	0010	01	Hsx	001	A								
29 Dec	S06W23	285													
								1	0	0	1	0	0	0	0
Still on Disk.															
Absolute heliographic longitude: 285															
			Region 843												
26 Dec	N12E67	235	0080	09	Cao	004	B								
27 Dec	N12E54	235	0080	05	Cao	008	B								
28 Dec	N12E40	235	0030	05	Cso	004	B	1			1				
29 Dec	N12E27	235	0030	05	Cso	007	B	1							
30 Dec	N12E15	234	0030	04	Cao	004	B								
31 Dec	N12E02	234	0030	04	Cso	005	B								
01 Jan	N11W12	234	0020	05	Dsi	007	B								
								2	0	0	1	0	0	0	0
Still on Disk.															
Absolute heliographic longitude: 234															
			Region 844												
29 Dec	S15W59	321	0110	08	Cao	008	B								
30 Dec	S14W70	319	0070	07	Dso	004	B								
31 Dec	S14W81	317	0020	01	Axx	001	A								
								0	0	0	0	0	0	0	0
Still on Disk.															
Absolute heliographic longitude: 321															

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

	Sunspot Numbers					Radio Flux		Geomagnetic	
	Observed values		Ratio	Smooth values		*Penticton	Smooth	Planetary	Smooth
Month	SEC	RI	RI/SEC	SEC	RI	10.7 cm	Value	Ap	Value
					2003				
December	75.4	46.5	0.62	91.4	55.0	115.1	118.0	16	18.6
					2004				
January	62.3	37.7	0.61	87.9	52.0	114.1	116.3	22	18.1
February	75.6	45.8	0.61	84.2	49.4	107.0	115.5	13	17.7
March	81.0	49.1	0.61	80.9	47.2	112.2	114.6	14	16.9
April	59.3	39.3	0.66	77.9	45.6	101.2	112.3	11	15.5
May	77.3	41.5	0.54	74.1	43.9	99.8	109.2	8	14.3
June	78.9	43.2	0.55	70.4	41.7	97.4	107.2	8	14.0
July	87.8	51.0	0.58	68.3	40.2	118.5	105.9	23	13.8
August	69.5	40.9	0.59	66.6	39.3	110.1	105.0	11	13.8
September	50.0	27.7	0.55	63.7	37.6	103.1	103.7	10	13.6
October	77.9	48.4	0.62	61.3	35.9	105.7	102.1	9	13.5
November	70.5	43.7	0.62	60.0	35.4	113.2	101.5	26	14.1
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			93.7		13	
July	71.0	39.9	0.56			96.6		16	
August	65.6	36.4	0.55			90.7		16	
September	39.2	22.1	0.56			90.8		21	
October	13.0	8.5	0.65			76.7		7	
November	32.2	18.0	0.56			86.3		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 26 December 2005

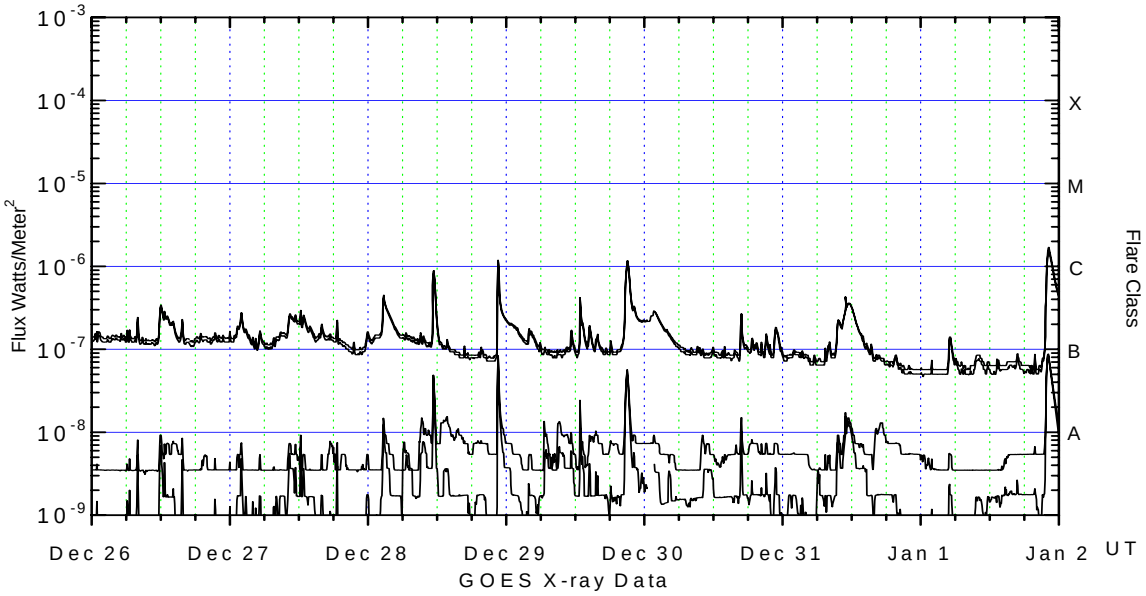
Protons plot contains the five-minute averaged integral proton flux (protons/cm^2 –sec –sr) as measured by GOES-11 (W109) for each of three energy thresholds: greater than 10, 50, and 100 MeV.

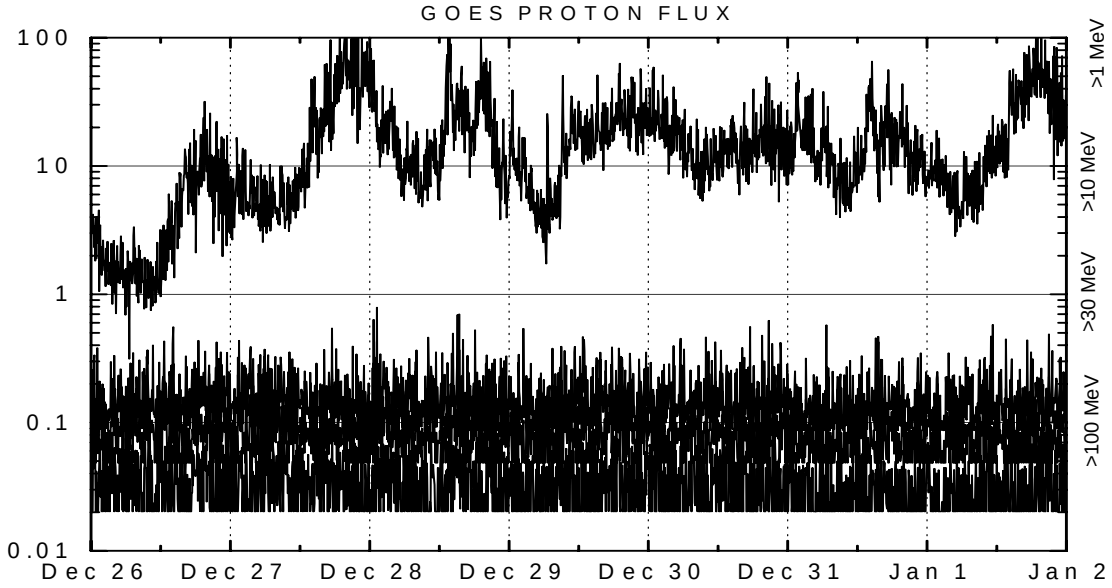
Electrons plot contains the five-minute averaged integral electron flux (electrons/cm^2 –sec –sr) with energies greater than 2 MeV at GOES-12 (W75).

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 (watts/m$^{2)}$ as measured by GOES 12 (W75) and GOES 10 (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/cm^2 –sec-sr) as measured by GOES-11 (W110) for each of the energy thresholds: >1, >10, >30 and >100 MeV. P10 event threshold is 10 pfu (protons/cm^2-sec-sr) at greater than 10 MeV.