Space Weather Highlights **SEC PRF 1684**
03 December – 09 December 2007 **11 December 2007**

Solar activity was very low through the period, albeit with a gradual increase in X-ray background and flare activity. The increased activity was due to the emergence of three spot groups during the period including Region 977 (S05, L = 293, class/area Dso/030 on 04 December), Region 978 (S09, L = 225, class/area Dkc/220 on 09 December), and Region 979 (N07, L = 329, class/area Hax/080 on 09 December). Region 977 produced occasional subflares before it declined to plage on 07 December. Region 978 was numbered on 06 December and produced occasional subflares as it gradually developed during the remainder of the period. Region 979 also produced occasional subflares following its emergence on 08 December, then departed the visible disk late on 09 December.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit reached high levels during 03 - 04 December.

The geomagnetic field was quiet throughout the period. ACE solar wind measurements indicated minor IMF, density, and velocity variations during the period. IMF Bt ranged from 0.3 to 9.2 nT while Bz ranged from +9.1 to -5.2 nT. Densities ranged from 1 to 12 p/cc. Velocities ranged from 267 - 396 km/sec during the period.

Space Weather Outlook
12 December – 07 January 2008

Solar activity is expected to be very low to low. Isolated C-class flares are possible during 12 - 18 December and 01 - 07 January.

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 19 - 31 December.

The geomagnetic field is expected to be at quiet to unsettled levels during 12 - 16 December. Activity is expected to increase to unsettled to active levels during 17 – 19 December as a recurrent coronal hole high-speed stream disturbs the field. Minor storm levels are also expected on 17 December. Activity is expected to decrease to quiet to unsettled levels during 20 - 22 December as the high-speed stream gradually subsides. Activity is expected to decrease to mostly quiet levels for the rest 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 C	M	X	Flares: Optical S	1	2	3	4
03 December	73	13	30	<A1.0	0	0	0	0	0	0	0	0
04 December	74	13	30	<A1.0	0	0	0	1	0	0	0	0
05 December	75	13	20	<A1.0	0	0	0	2	0	0	0	0
06 December	78	29	80	A1.3	0	0	0	7	1	1	0	0
07 December	82	24	90	A1.7	0	0	0	16	0	1	0	0
08 December	87	36	210	A3.2	0	0	0	11	0	0	0	0
09 December	89	42	300	A5.7	0	0	0	7	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
03 December	1.2E+6	1.9E+4	4.9E+3		6.7E+7	
04 December	1.3E+6	1.9E+4	5.0E+3		8.6E+7	
05 December	1.0E+6	1.9E+4	4.4E+3		1.4E+7	
06 December	1.1E+6	1.9E+4	4.4E+3			
07 December	9.2E+5	1.8E+4	4.7E+3			
08 December	1.3E+6	1.9E+4	4.6E+3			
09 December	8.8E+5	1.9E+4	4.6E+3			

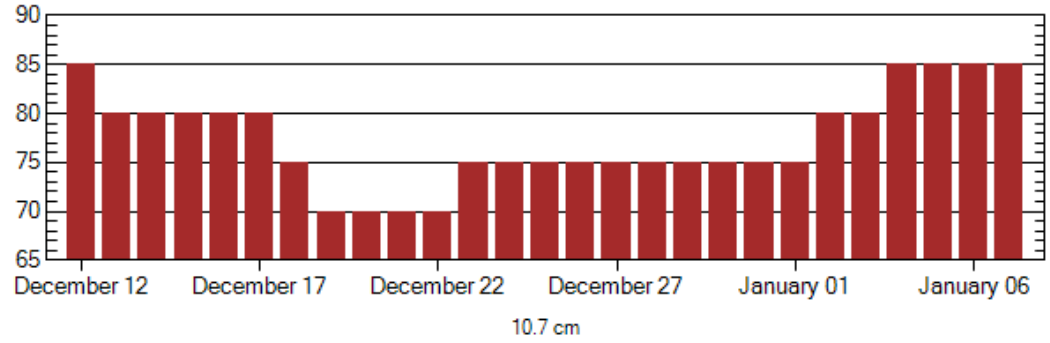
Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg A	K-indices	High Latitude College A	K-indices	Estimated Planetary A	K-indices
03 December	0	0-0-0-0-0-0-0-0	0	0-0-0-0-0-0-0-0	1	0-0-0-0-1-0-0-0
04 December	0	0-0-0-0-0-0-0-1	0	0-0-0-0-1-0-0-0	2	0-0-0-0-1-1-0-1
05 December	1	2-0-1-0-0-0-0-0	0	0-0-0-1-0-0-0-0	2	1-0-0-0-1-1-0-1
06 December	1	0-1-1-0-1-0-0-0	0	0-0-0-0-0-0-0-0	1	0-1-0-0-0-0-0-0
07 December	0	0-1-0-0-0-0-0-0	0	0-0-0-0-0-0-0-0	1	0-1-0-0-0-0-0-0
08 December	1	0-0-1-0-0-1-0-0	0	0-0-0-0-0-0-0-0	0	0-0-0-0-0-0-0-0
09 December	1	0-0-0-0-1-1-1-0	2	0-0-0-0-1-2-1-0	2	0-0-0-0-0-1-1-1

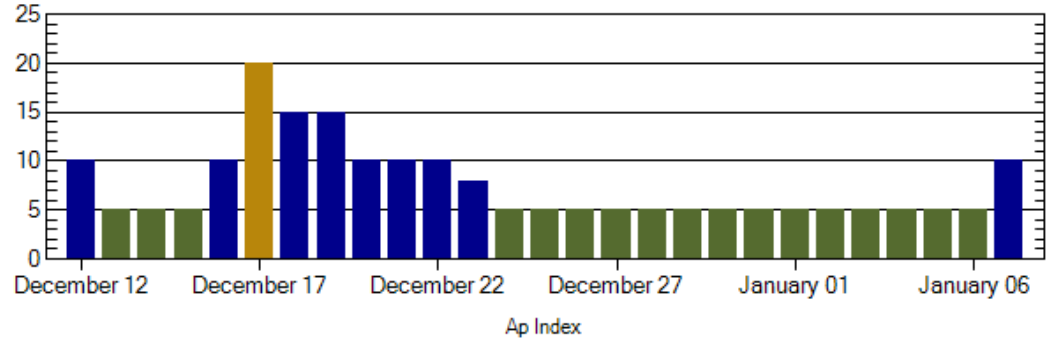
Alerts and Warnings Issued

Date & Time of Issue	Type of Alert or Warning	Date & Time of Event UTC
03 Dec 1312	ALERT: Electron 2MeV Integral Flux >1000pfu	03 Dec 1255
04 Dec 0911	ALERT: Electron 2MeV Integral Flux >1000pfu	04 Dec 0855

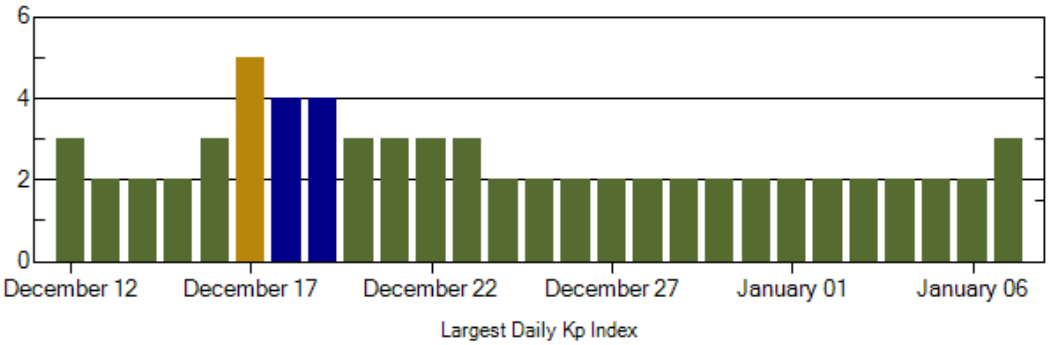
Twenty-seven Day Outlook



10.7 cm



Ap Index



Largest Daily Kp Index

Date	Radio Flux 10.7 cm	Planetary A Index	Largest Kp Index	Date	Radio Flux 10.7 cm	Planetary A Index	Largest Kp Index
12 Dec	85	10	3	26 Dec	75	5	2
13	80	5	2	27	75	5	2
14	80	5	2	28	75	5	2
15	80	5	2	29	75	5	2
16	80	10	3	30	75	5	2
17	80	20	5	31	75	5	2
18	75	15	4	01 Jan	75	5	2
19	70	15	4	02	80	5	2
20	70	10	3	03	80	5	2
21	70	10	3	04	85	5	2
22	70	10	3	05	85	5	2
23	75	8	3	06	85	5	2
24	75	5	2	07	85	10	3
25	75	5	2				

Energetc Events

Date	Time Begin	Time Max	Time ½ Max	X-ray Class	X-ray Integ Flux	Optical Information Imp/ Brtns	Optical Information Location Lat 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
03 December	No Flares Observed						
04 December	0018	0019	0022		Sf	S06E39	977
05 December	0414	0416	0423	B1.1	Sf	S04E22	977
	2342	2344	2347		Sf	S10E76	
06 December	0009	0010	0019		Sf	S11E76	
	0157	0157	0159		Sf	S12E80	
	0313	0313	0320		Sf	S11E78	
	0433	0437	0439		Sf	S12E79	
	0442	0447	0450		Sf	S10E76	
	0735	0738	0740		Sf	S12E76	
	2247	2249	2251		Sf	S10E67	978
	2252	2253	2257		1f	S10E67	978
	2300	0050	0234		2f	S10E66	978
07 December	0246	0259	0458		2f	S11E66	978
	0436	0439	0501	B1.4	Sf	S05W06	977
	0541	0549	0555		Sf	S10E63	978
	0605	0608	0611		Sf	S10E63	978
	0612	0612	0615		Sf	S10E63	978
	0620	0621	0634		Sf	S10E63	978
	0635	0650	0655		Sf	S10E63	978
	0706	0708	0710		Sf	S10E63	978
	0745	0745	0749		Sf	S10E62	978
	0757	0759	0801		Sf	S10E62	978
	0841	0843	0848		Sf	S10E62	978
	0848	0918	0939		Sf	S11E62	978
	0941	0945	1004		Sf	S10E61	978
	1426	1450	1504	B1.8			
	2220	2225	2230		Sf	S11E55	978
	2243	2244	2249		Sf	S11E52	978
	2349	2349	2353		Sf	S11E52	978
	2356	2358	0002		Sf	S11E52	978

Flare List-Continued

Date	Time Begin	Time Max	Time End	Optical X-ray Class.	Imp / Brtns	Location Lat CMD	Rgn
08 December	0012	0012	0016		Sf	S11E51	978
	0035	0039	0042		Sf	S11E51	978
	0044	0058	0100		Sf	S11E51	978
	0108	0117	0128		Sf	S11E51	978
	0129	0133	0135		Sf	S11E51	978
	0325	0330	0338	B1.0			978
08 December	0359	0403	0414		Sf	N07W55	
	0431	0433	0434		Sf	N07W56	
	0506	0521	0540	B2.3			
	0615	0615	0618		Sf	N08W58	
	0637	0638	0642		Sf	N07W58	
	0740	0740	0744		Sf	N07W58	
	0802	0819	0823		Sf	N07W59	
	1231	1238	1241	B1.4			
09 December	0145	0148	0158		Sf	S10E40	978
	0229	0235	0245	B4.5	Sf	S11E33	978
	0937	0938	0949		Sf	S11E34	978
	0954	1002	1008		Sf	S11E35	978
	1132	1139	1141	B1.2			
	1603	U1607	A1621	B9.4	Sf	S10E25	978
	B1646	U1646	A1714	B8.4	Sf	S10E25	978
	1833	1838	1854	B2.3			
	1954	2003	2009	B1.5			
	2017	2017	2034	B4.8	Sf	S10E23	978

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
			Region 976										
01 Dec	S08E27	329	0030	03	Bxo	003	B						
02 Dec	S09E10	333	0010	02	Bxo	002	B						
03 Dec	S09W03	333											
04 Dec	S09W16	333											
05 Dec	S09W29	333											
06 Dec	S09W42	333											
07 Dec	S09W55	333											
08 Dec	S09W68	333											
09 Dec	S09W81	333											
								0	0	0	0	0	0
			Region 977										
02 Dec	S05E53	290	0030	04	Bxo	004	B				11		
03 Dec	S06E40	289	0030	03	Cso	003	B						
04 Dec	S05E26	290	0030	04	Dso	003	B						
05 Dec	S06E13	290	0020	03	Dso	003	B				1		
06 Dec	S05W03	293	0010	03	Bxo	004	B						
07 Dec	S05W16	293									1		
08 Dec	S05W29	330											
09 Dec	S05W42	330											
								0	0	0	13	0	0

Still on Disk.
Absolute heliographic longitude: 333

Still on Disk.
Absolute heliographic longitude: 293

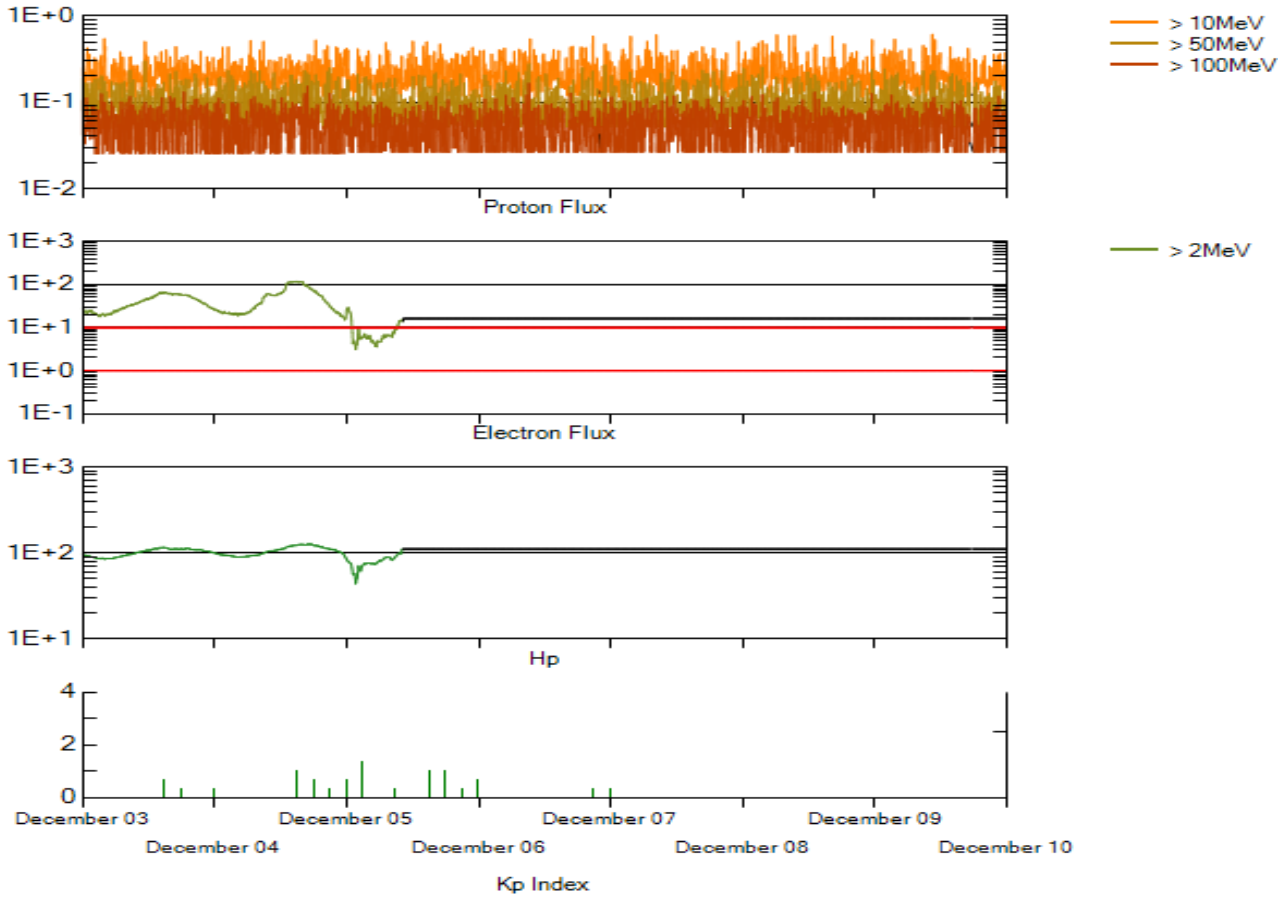
Region Summary-Continued

Date	Location (° Lat ° CMD)	Helio Lon	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		
					Region 978										
06 Dec	S09E68	222	0070	06	Dso	005	B				1	1	1		
07 Dec	S09E54	223	0090	08	Dao	014	B				15		1		
08 Dec	S10E39	225	0160	10	Dkc	012	B				5				
09 Dec	S09E26	225	0220	10	Dkc	020	B				7				
								0	0	0	28	1	2	0	0
Still on Disk.															
Absolute heliographic longitude: 225															
					Region 979										
08 Dec	N07W65	329	0050	07	Dso	004	B								
09 Dec	N08W78	329	0080	04	Hax	002	A								
								0	0	0	0	0	0	0	0
Still on Disk.															
Absolute heliographic longitude: 329															

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
				2005					
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	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
				2007					
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			74.5		9	
June	20.0	12.0	0.60			73.7		7	
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	

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 03 December 2007

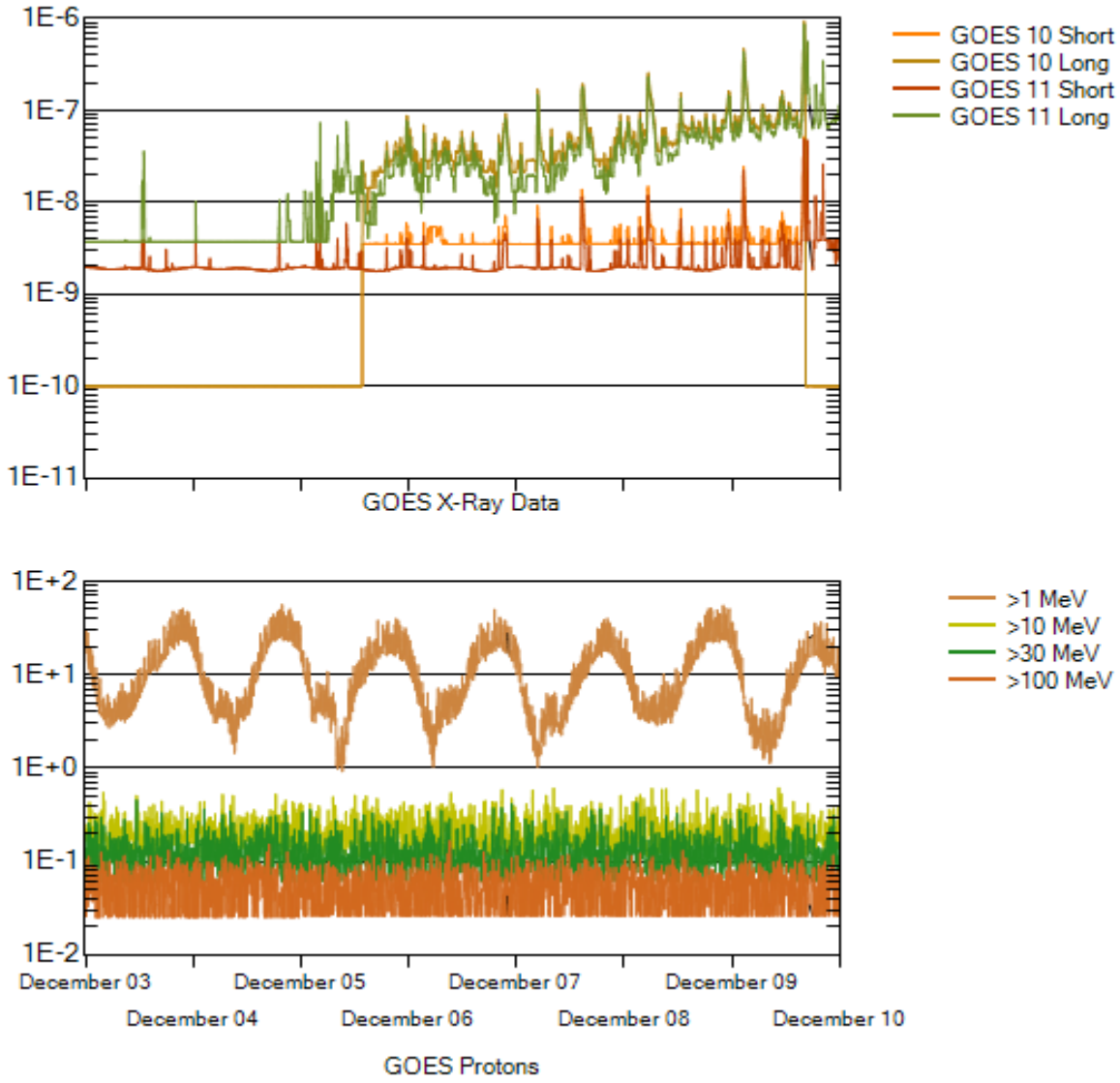
Protons plot contains the five-minute averaged integral proton flux (protons/cm^2 –sec –sr) as measured by GOES-11 (W135) for each of three energy thresholds: greater than 10, 50, and 100 MeV.

Electrons plot contains the five-minute averaged integral electron flux (electrons/cm^2 –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 (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 (protons/cm^2 –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/cm^2-sec-sr) at greater than 10 MeV.