

Space Weather Highlights
12 December – 18 December 2005

SEC PRF 1581
20 December 2005

Solar activity ranged from very low to low during the period. Before rotating around the west limb on 17 December, Region 836 (S10, L=152, class/area, Eao/150 on 16 December) produced three low-level C-class flares, one on 14 December and the other two on 16 December. Late on 13 December, a C1.7 X-ray event was detected off the southeast limb near S11. The event was associated with Types II and IV radio sweeps and a limb CME. New Region 837 (S10, L=038, class/area, Dao/060 on 18 December), emerged near center disk on 17 December and grew to approximately 200 millionths in area by 19 December. No other significant activity was observed during the period.

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

No greater than 2 MeV electron events were observed this period.

The geomagnetic field ranged from quiet to unsettled with isolated active periods at high latitudes. Solar wind speed ranged from a high of about 580 km/s early on 12 December to a low of near 300 km/s late on 16 December. The period began with wind speed at about 580 km/s and the IMF Bz fluctuating between +/- 5 nT. These elevated conditions were due to a small coronal hole that became geoeffective during the last reporting period. By early on 13 December, wind speed had decayed to about 400 km/s. The IMF Bz did not vary much beyond +/- 5 nT for the remainder of the reporting period. The geomagnetic field during this time was mostly quiet with isolated active periods at high latitudes late on 12 December and again around midday on 17 December.

Space Weather Outlook
21 December 2005 – 16 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 22 – 24 December, and 29 December – 04 January.

The geomagnetic field is expected to range from quiet to minor storm levels. Isolated active periods are possible on 28 – 29 December, while minor storm periods are possible on 07 January due to effects from recurrent coronal hole wind streams. Otherwise, quiet to unsettled conditions are expected for the majority of the forecast 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
12 December	88	41	270	A7.5	0	0	0	0	0	0	0	0
13 December	88	67	340	A5.7	1	0	0	0	0	0	0	0
14 December	90	55	340	A6.0	1	0	0	0	0	0	0	0
15 December	87	47	360	A4.2	0	0	0	0	0	0	0	0
16 December	86	47	340	A4.7	2	0	0	0	0	0	0	0
17 December	85	45	240	A3.7	0	0	0	0	0	0	0	0
18 December	86	45	270	A4.4	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
	12 December	3.5E+5	1.4E+4	3.4E+3		2.6E+6
13 December	4.4E+5	1.4E+4	3.5E+3		2.0E+7	
14 December	5.7E+5	1.4E+4	3.5E+3		2.4E+7	
15 December	8.0E+5	1.4E+4	3.3E+3		2.7E+7	
16 December	1.2E+6	1.4E+4	3.3E+3		1.2E+7	
17 December	1.1E+6	1.4E+4	3.2E+3		4.8E+6	
18 December	1.6E+6	1.5E+4	3.2E+3		6.0E+6	

Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	12 December	7	2-3-1-1-1-2-2-2	12	2-2-1-1-3-3-4-3	9
13 December	4	0-2-1-1-2-1-1-1	4	1-1-2-1-2-1-1-1	5	0-2-1-0-3-1-1-2
14 December	2	0-0-1-1-1-0-1-0	3	0-1-2-2-1-0-0-0	2	0-1-2-1-0-0-0-1
15 December	2	1-1-1-1-0-1-0-0	1	0-0-1-1-0-0-0-0	2	0-0-1-1-0-0-0-0
16 December	3	0-3-1-0-1-1-1-0	*	*_*_*_*_*_*_*_*	5	1-3-1-1-1-1-1-1
17 December	2	0-1-1-1-1-0-0-1	6	0-0-1-4-3-0-0-0	5	0-1-1-2-2-1-0-1
18 December	2	1-0-0-1-1-1-0-1	1	0-0-0-2-0-0-0-0	3	1-0-0-1-1-0-0-1

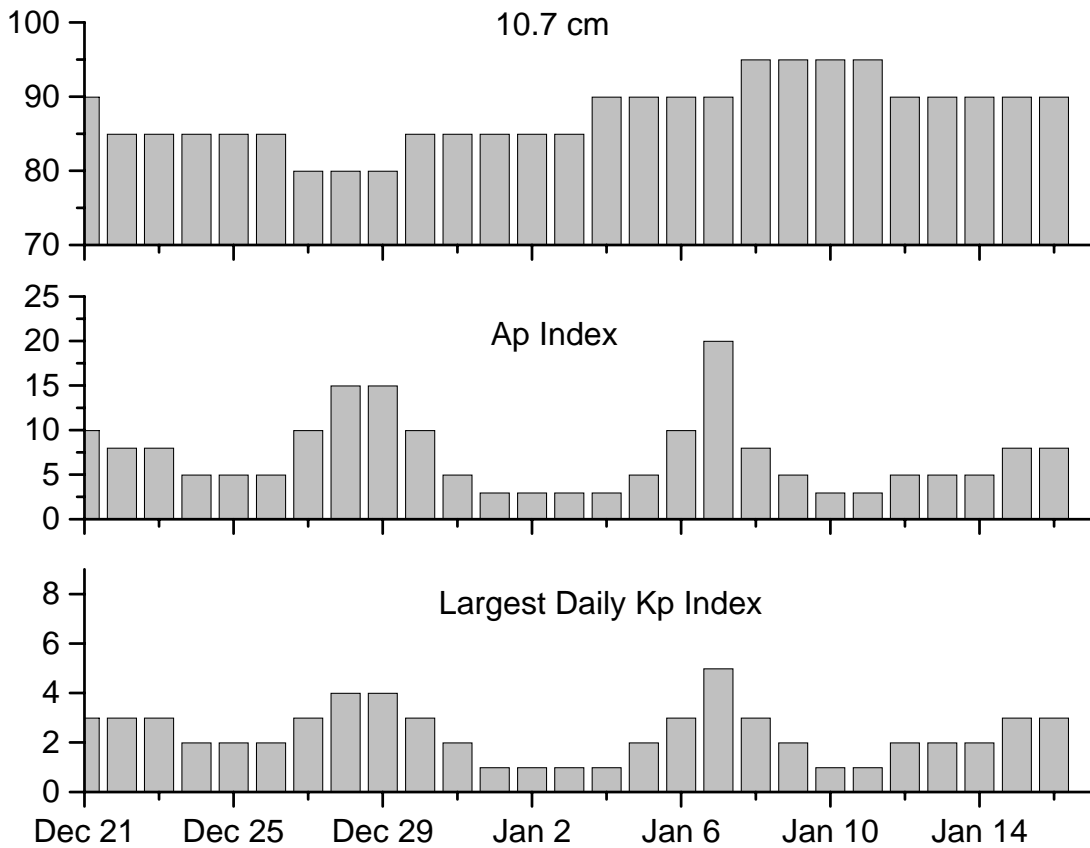


Alerts and Warnings Issued

Date & Time of Issue	Type of Alert or Warning	Date & Time of Event UTC
12 Dec 0007	245 MHz Radio Burst	11 Dec
12 Dec 0338	ALERT: Geomagnetic K = 4	12 Dec 0335
13 Dec 0006	2 – 245 MHz Radio Bursts	12 Dec
13 Dec 2239	ALERT: Type II Radio Emission	13 Dec 2152
14 Dec 0026	ALERT: Type IV Radio Emission	13 Dec 2113
15 Dec 0007	245 MHz Radio Burst	14 Dec



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
21 Dec	90	10	3	04 Jan	90	3	1
22	85	8	3	05	90	5	2
23	85	8	3	06	90	10	3
24	85	5	2	07	90	20	5
25	85	5	2	08	95	8	3
26	85	5	2	09	95	5	2
27	80	10	3	10	95	3	1
28	80	15	4	11	95	3	1
29	80	15	4	12	90	5	2
30	85	10	3	13	90	5	2
31	85	5	2	14	90	5	2
01 Jan	85	3	1	15	90	8	3
02	85	3	1	16	90	8	3
03	85	3	1				



Energetic Events

Date	Time		X-ray	Optical Information			Peak		Sweep Freq	
	Begin	Max	Integ	Imp/	Location	Rgn	Radio Flux		Intensity	
			Class	Flux	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	
12 December	0011	0014	0016	B3.5			
	0039	0046	0049	B4.5			835
	0122	0126	0129	B2.3			835
	1925	1932	1935	B2.2			835
	2050	2056	2102	B3.7			834
	2133	2138	2140	B1.5			835
	2152	2155	2158	B1.1			835
	2159	2205	2208	B1.6			835
	2305	2308	2310	B1.0			835
13 December	0431	0437	0440	B1.9			835
	0712	0719	0726	B4.9			834
	0928	0931	0933	B1.0			835
	2108	2118	2129	B4.0			
	2133	2147	2158	C1.7			
14 December	0447	0451	0455	B1.4			835
	0516	0520	0524	B1.3			836
	1003	1012	1018	C1.0			836
	1339	1345	1355	B1.9			836
	1812	1828	1835	B3.0			
15 December	0127	0132	0135	B1.5			835
	1328	1332	1336	B1.0			836
	1434	1439	1445	B1.3			835
	1723	1734	1737	B1.9			835
	2309	2312	2315	B1.1			836
16 December	0021	0027	0032	B2.1			836
	0442	0457	0508	B2.2			
	0702	0709	0717	B1.2			836
	0808	0830	0836	B3.6			836
	1216	1222	1228	B1.4			
	1248	1257	1314	C2.4			836
	1959	2003	2005	B1.1			836
	2018	2023	2028	B3.1			836
	2035	2103	2110	C1.3			836
	2132	2136	2139	B2.7			836
	2155	2159	2202	B1.2			836
	2242	2249	2259	B1.5			836
	2326	2347	2354	B2.1			836



Flare List - continued

Date	Time			Optical X-ray Class.	Imp / Brtns	Location Lat CMD	Rgn
	Begin	Max	End				
17 December	0155	0205	0210	B4.1			836
	0252	0255	0258	B1.0			
	0321	0326	0335	B1.2			
	0643	0646	0649	B1.6			
	0831	0835	0839	B1.1			
	1459	1509	1516	B1.7			
	1722	1725	1727	B1.1			
	1940	1951	1957	B3.1			
18 December	0052	0057	0107	B1.2			836
	1628	1639	1656	B1.6			834

Region Summary

Date	Location		Sunspot Characteristics												
	Helio		Flares				X-ray				Optical				
	(° Lat ° CMD)	Lon	Area (10 ⁻⁶ hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	C	M	X	S	1	2	3	4
<i>Region 830</i>															
02 Dec	N14E78	180	0090	02	Hax	002	A								
03 Dec	N14E64	181	0070	06	Cso	002	B	1							
04 Dec	N13E51	181	0100	07	Cao	003	B								
05 Dec	N13E36	183	0090	02	Hsx	001	A								
06 Dec	N12E25	181	0030	04	Cso	004	B								
07 Dec	N13E10	182	0060	02	Hsx	001	A				1				
08 Dec	N12W01	180	0070	05	Cso	002	B								
09 Dec	N11W15	181	0050	02	Hsx	002	A								
10 Dec	N12W28	181	0050	05	Cso	004	B								
11 Dec	N12W41	181	0040	02	Hax	001	A								
12 Dec	N10W55	181	0030	01	Hsx	001	A								
13 Dec	N11W68	181	0020	01	Hax	001	A								
								1	0	0	1	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 180



Region Summary - continued

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

Region 834

09 Dec S07E77	089	0060	01	Hax	001	A									
10 Dec S06E63	090	0070	06	Dso	003	B									
11 Dec S07E51	089	0030	05	Cao	003	B									
12 Dec S06E37	089	0050	02	Hsx	001	A									
13 Dec S06E24	089	0080	03	Hax	004	A									
14 Dec S07E10	090	0070	04	Dho	004	B									
15 Dec S07W04	091	0090	04	Cao	005	B									
16 Dec S07W18	092	0080	04	Dso	004	B									
17 Dec S07W32	092	0110	05	Dai	007	Bg									
18 Dec S06W45	092	0110	03	Cso	004	B									
								0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 091

Region 835

09 Dec N19E78	088	0050	01	Hax	001	A									
10 Dec N19E64	089	0180	07	Dko	003	B									
11 Dec N18E55	085	0220	09	Dao	004	B	1								
12 Dec N20E40	086	0190	10	Dai	009	B									
13 Dec N18E27	086	0200	08	Dai	014	B									
14 Dec N18E15	085	0150	09	Dso	012	B									
15 Dec N18E01	086	0160	08	Dao	007	B									
16 Dec N19W13	087	0110	07	Cso	008	B									
17 Dec N19W27	087	0110	06	Dso	004	B									
18 Dec N20W40	087	0100	04	Cho	003	B									
								1	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 086

Region 836

13 Dec S10W39	152	0040	05	Dso	008	B									
14 Dec S10W52	152	0120	07	Dso	009	B	1								
15 Dec S08W66	153	0110	07	Dao	005	B									
16 Dec S10W78	152	0150	13	Eao	005	B	2								
17 Dec S10W91	152														
								3	0	0	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 152



Region Summary - continued

Location		Sunspot Characteristics							Flares											
Date	(° Lat ° CMD)	Helio	Area (10 ⁻⁶ hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical									
		Lon						C	M	X	S	1	2	3	4					
<i>Region 837</i>																				
17 Dec	S10E22	038	0020	04	Dso	004	B													
18 Dec	S10E09	038	0060	06	Dao	008	B													
										0	0	0	0	0	0	0	0	0		

Still on Disk.

Absolute heliographic longitude: 038

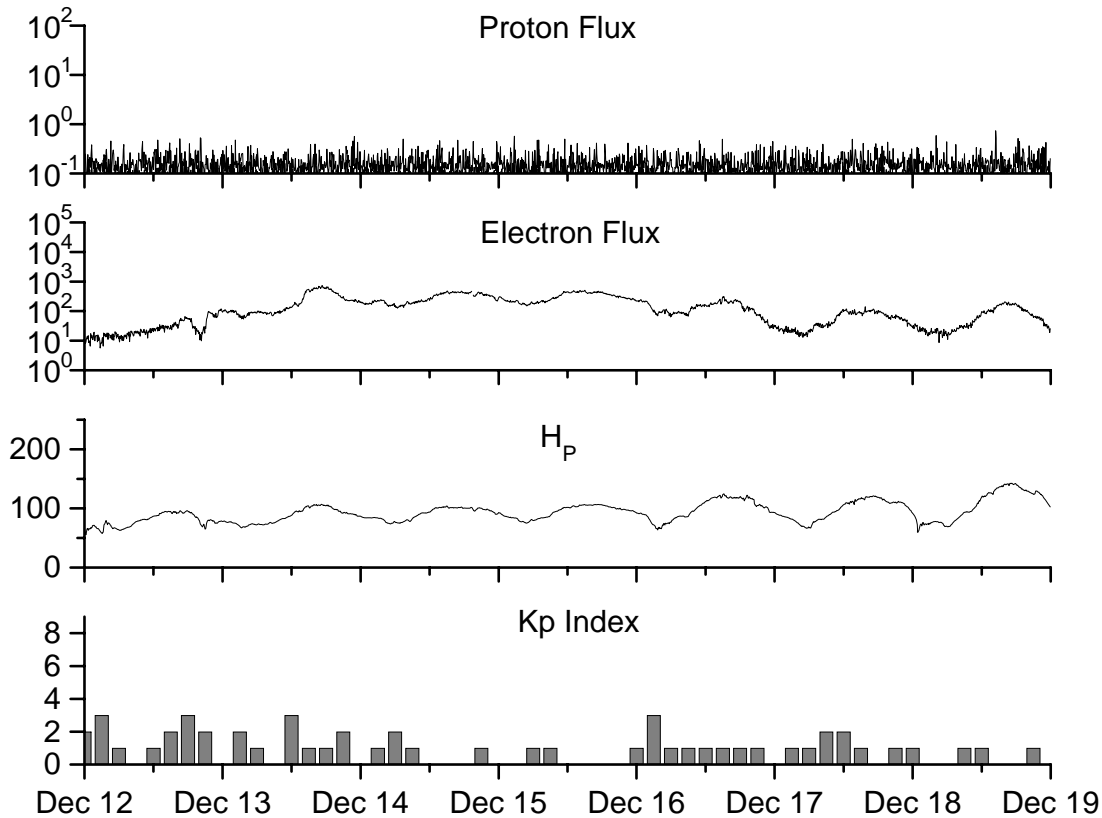


**Recent Solar Indices (preliminary)
of the observed monthly mean values**

Month	Sunspot Numbers			Radio Flux		Geomagnetic			
	Observed values SEC	Ratio RI	Ratio RI/SEC	Smooth values SEC	Smooth values RI	*Penticton 10.7 cm	Smooth Value	Planetary Ap	Smooth 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 12 December 2005

Protons plot contains the five-minute averaged integral proton flux (protons/cm²-sec -sr) as measured by GOES-11 (W110) for each of three energy thresholds: greater than 10, 50, and 100 MeV.

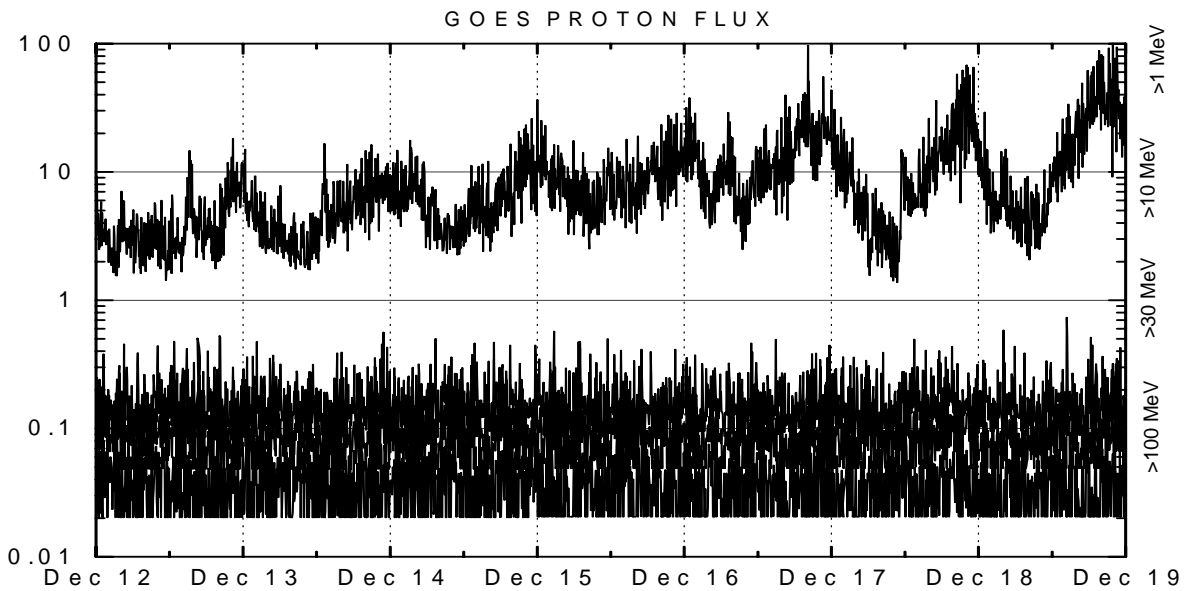
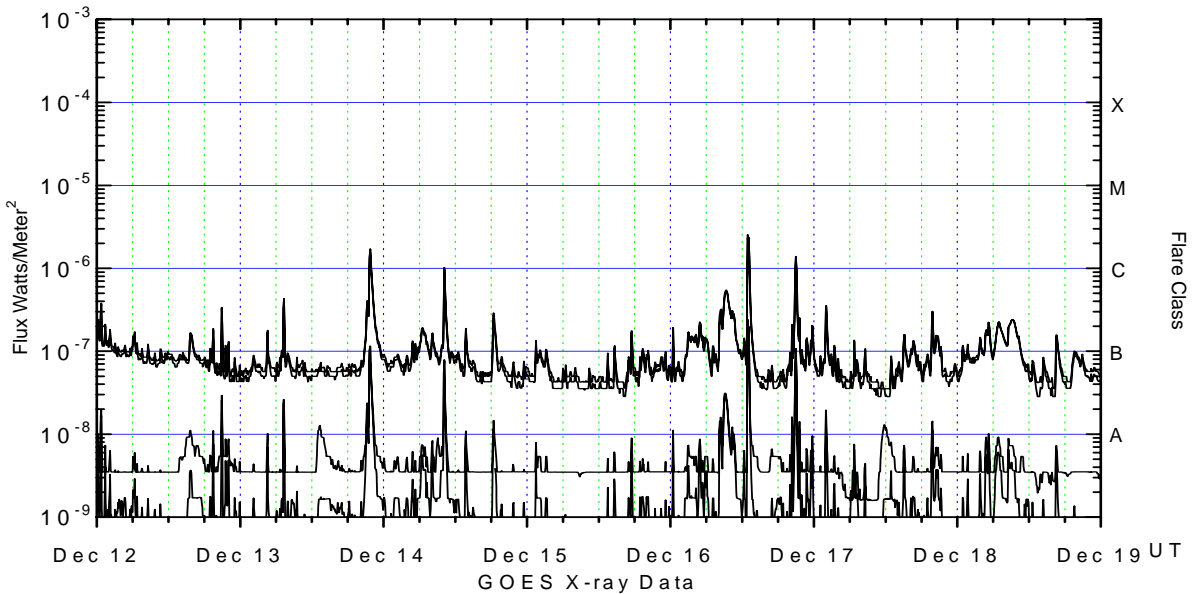
Electrons plot contains the five-minute averaged integral electron flux (electrons/cm²-sec -sr) with energies greater than 2 MeV at GOES-12 (W75).

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 (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/cm²-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/cm²-sec-sr) at greater than 10 MeV.

