

Space Weather Highlights
14 - 20 November 2005

SEC PRF 1577
22 November 2005

Solar activity was at low to moderate levels. Region 822 (S08, L=080, class/area, Eki/810 on 15 November) produced all of the period's significant activity, including five M-class flares. This region produced a total of six M-class flares since its emergence on the visible disk on 12 November. The largest of these flares was an M3.9 at 14/1421 UTC with an associated Type II (528 km/s) radio sweep. A small filament, centered at N12W10, erupted at 16/1436 UTC and appeared to be associated with a slow CME first observed in LASCO imagery at 16/1630 UTC. On 20 November, a new region emerged on the East limb as a simple beta magnetic group and was numbered Region 824 (S12, L=345, class/area, Cao/080 on 21 November).

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 active levels with isolated minor storm periods at high latitudes. Solar wind speed ranged from a high of approximately 470 km/s early on 14 November to a low of near 300 early on 18 November. During the majority of the period, the IMF Bz did not vary much beyond +/- 4 nT. On 14 through 15 November, quiet to minor storm periods were observed at high latitudes with unsettled periods at middle latitudes. Midday on 18 November, ACE SWEPAM data indicated a discontinuity in the wind field due to a solar sector boundary crossing. During this period, the IMF Bz fluctuated between +/-7 nT, wind speed increased weakly to about 370 km/s. Midday on 19 November, ACE observed a rotation of the IMF Bz from + 10nT to -10 nT, a sudden increase in density, a further increase in solar wind speed to around 450 km/s. The geomagnetic field responded to this with isolated active and minor storm levels at high latitudes and several unsettled periods at middle latitudes.

Space Weather Outlook
23 November - 19 December 2005

Solar activity is expected to be at low to moderate levels through 25 November when Region 822 is due to rotate around the west limb. Thereafter, very low to low activity is expected.

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 01 – 08 December.

The geomagnetic field is expected to range from quiet to minor storm levels. Unsettled to active levels are possible on 10 December due to recurrence. Unsettled to minor storm levels are possible on 30 November – 01 December due to recurrent coronal hole high speed wind streams. Otherwise, expect quiet to unsettled conditions.



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
14 November	92	26	610	B3.0	7	3	0	5	1	0	0	0
15 November	100	32	810	B1.6	10	1	0	1	0	0	0	0
16 November	94	58	740	B1.0	1	0	0	0	0	0	0	0
17 November	101	62	720	B1.1	2	0	0	2	0	0	0	0
18 November	101	51	690	B2.2	4	1	0	2	0	0	0	0
19 November	102	52	650	B1.6	1	0	0	2	0	0	0	0
20 November	96	56	700	B1.2	2	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
	14 November	2.1E+5	1.5E+4	3.4E+3		8.3E+6
15 November	2.1E+5	1.5E+4	3.6E+3		2.1E+7	
16 November	2.2E+5	1.5E+4	3.5E+3		3.4E+7	
17 November	2.1E+5	1.6E+4	3.5E+3		2.9E+7	
18 November	3.7E+5	1.5E+4	3.4E+3		1.9E+7	
19 November	6.2E+5	1.4E+4	3.2E+3		7.1E+6	
20 November	8.8E+5	1.4E+4	3.4E+3		2.2E+6	

Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	14 November	7	3-3-2-2-1-1-1-1	16	2-3-3-5-4-2-1-2	10
15 November	5	1-0-3-3-1-0-1-0	10	1-1-4-4-3-1-0-0	4	1-1-2-2-2-0-0-1
16 November	1	0-2-0-0-0-0-0-0	1	0-0-0-1-0-1-1-0	3	0-2-0-0-1-1-1-1
17 November	1	0-0-2-0-0-0-0-0	3	0-0-0-0-0-0-4-0	3	1-0-2-1-0-0-0-0
18 November	2	0-0-2-0-1-1-2-0	3	0-0-1-2-3-0-1-0	4	0-0-1-1-2-1-1-1
19 November	6	1-1-1-0-2-3-2-2	5	0-0-0-0-1-4-2-2	10	1-0-0-0-1-4-4-3
20 November	5	1-2-3-1-1-2-1-1	11	0-2-3-5-2-1-2-0	7	1-2-3-2-1-2-1-2

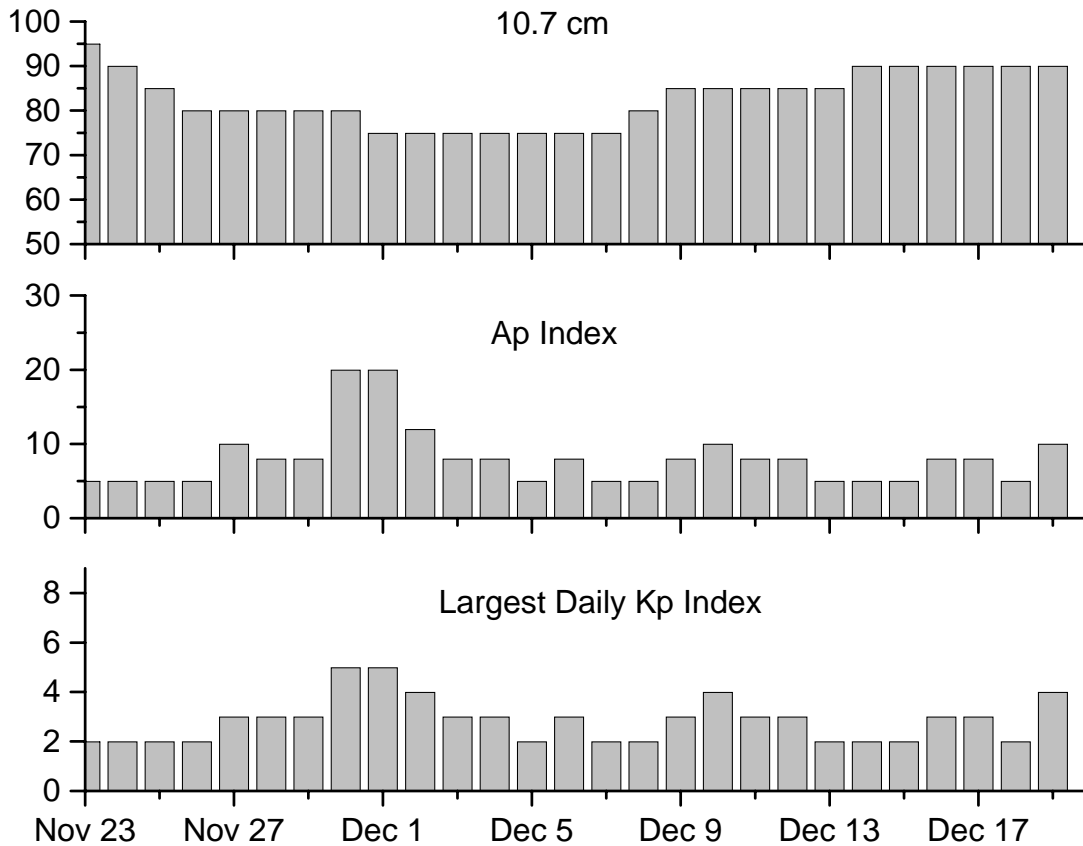


Alerts and Warnings Issued

<u>Date & Time of Issue</u>	<u>Type of Alert or Warning</u>	<u>Date & Time of Event UTC</u>
14 Nov 0006	2 – 245 MHz Radio Bursts	13 Nov
14 Nov 0224	ALERT: Geomagnetic K=4	14 Nov 0220
14 Nov 0451	SUMMARY: 10cm Radio Burst	14 Nov 0419
14 Nov 1448	ALERT: Type II Radio Emission	14 Nov 1423
14 Nov 1605	SUMMARY: 10cm Radio Burst	14 Nov 1422
15 Nov 0014	3 – 245 MHz Radio Bursts	14 Nov
15 Nov 1056	ALERT: Geomagnetic K=4	15 Nov 1055
17 Nov 0016	3 – 245 MHz Radio Bursts	16 Nov
17 Nov 0016	1 – 245 MHz Radio Noise Storm	16 Nov
18 Nov 0448	1 – 245 MHz Radio Burst	17 Nov
19 Nov 0016	4 – 245 MHz Radio Bursts	18 Nov
19 Nov 1704	ALERT: Geomagnetic K=4	19 Nov 1701
19 Nov 1704	WARNING: Geomagnetic K=4	19 Nov 1705 -2359



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
23 Nov	95	5	2	07 Dec	75	5	2
24	90	5	2	08	80	5	2
25	85	5	2	09	85	8	3
26	80	5	2	10	85	10	3
27	80	10	3	11	85	8	3
28	80	8	3	12	85	8	3
29	80	8	3	13	90	5	2
30	80	20	5	14	90	5	2
01 Dec	75	20	5	15	90	5	2
02	75	12	4	16	90	8	3
03	75	8	3	17	90	8	3
04	75	8	3	18	90	5	2
05	75	5	2	19	90	10	3
06	75	8	3				



Energetic Events

Date	Time			X-ray		Optical Information			Peak		Sweep Freq	
	Begin	Max	Max	Class	Flux	Imp/ Brtns	Location		Radio Flux		Intensity	
							Lat	CMD	245	2695	II	IV
14 Nov	0416	0421	0427	M2.6	.010	Sf	S07E68		180			
14 Nov	1416	1421	1423	M3.9	.006				680	90	1	
14 Nov	2153	2200	2204	M1.0	.004	Sf	S06E52		64			
15 Nov	1722	1751	1804	M1.4	.015	822						
18 Nov	0024	0034	0046	M1.2	.010	Sf	S09E14					

Flare List

Date	Time			Optical X-ray Class.	Imp / Brtns	Location Lat CMD	Rgn
	Begin	Max	End				
14 November	0019	0049	0108	C2.0			822
	0149	0205	0218	C1.4			822
	0358	0401	0406	C7.3	1f	S08E64	822
	0420	0421	0424	M2.6	Sf	S07E68	822
	0547	0553	0559	C1.0			822
	0653	0658	0704	B8.4	Sf	S08E62	822
	0836	0837	0842	C2.8	Sf	S08E60	822
	0900	0903	0909	B4.4			822
	0954	0956	1000	B8.7	Sf	S08E59	822
	1144	1149	1154	C1.0			822
	1217	1234	1313	C1.4			
	1416	1421	1423	M3.9			822
	B2203	2206	2211	M1.0	Sf	S06E52	822
	2231	2235	2243	B9.6			822
15 November	0014	0022	0029	B8.4			822
	0045	0054	0101	C1.4			822
	0134	0138	0142	B6.8			822
	0300	0302	0314	C5.2	Sf	S10E51	822
	0420	0423	0431	B8.0			822
	0540	0545	0550	B7.6			822
	0624	0646	0654	B9.3			822
	0736	0739	0742	B5.7			822
	0748	0754	0801	B8.6			822
	0805	0818	0823	C2.3			822
	0828	0832	0834	C1.3			822
	1042	1045	1051	B4.1			822
	1105	1117	1125	B8.1			822
	1157	1205	1208	C2.3			822
	1237	1243	1248	C1.0			822
	1257	1300	1302	B6.1			822
	1309	1312	1314	B6.8			
	1335	1338	1340	B6.1			822
1519	1523	1525	B4.1			822	
1528	1532	1535	C2.0			822	



Flare List – continued.

Date	Time			Optical	Imp / Brtns	Location Lat CMD	Rgn
	Begin	Max	End	X-ray Class.			
15 November	1537	1540	1542	C2.1			
	1553	1557	1559	C1.2			822
	1618	1622	1624	B8.8			822
	1722	1751	1804	M1.4	822		
	2050	2110	2112	C2.3			822
	2307	2310	2314	B1.9			822
	2319	2325	2327	B3.2			822
	16 November	0005	0011	0020	B5.1		
0109		0113	0116	B4.5			822
0455		0458	0501	B2.7			822
0932		0937	0941	B7.2			822
1141		1213	1248	C5.9			822
1401		1405	1407	B6.3			822
2031		2034	2036	B2.1			822
2202		2211	2219	B3.4			822
2251		2254	2256	B2.0			822
17 November		0016	0022	0031	B2.2		
	0135	0136	0143	B5.8	Sf	S09E27	822
	0311	0314	0316	B6.6			822
	0324	0327	0334	B2.7			
	0414	0417	0419	B2.0			822
	0545	0554	0602	B2.4			822
	0651	0713	0746	B3.4			822
	1350	1408	1424	B2.5			
	2045	2149	2157	C1.8			822
	2334	2334	2350	C4.1	Sf	S09E15	822
18 November	0028	0032	0050	M1.2	Sf	S09E14	822
	0631	0649	0736	B8.0			
	0739	0744	0752	B7.3			
	0802	0808	0817	C1.6			
	0919	0922	0925	B7.0			
	1030	1035	1041	B7.4			
	1119	1126	1133	B7.2			
	1217	1221	1230	B6.4			822
	1308	1311	1314	C1.1			
	1320	1324	1335	B8.0			
	1442	1453	1501	B9.8			
	1515	1527	1534	C1.2			822
	1902	1906	1911	B6.4			
	2036	2039	2043	B8.7			
	2354	2357	0007	C5.8	Sf	S09E01822	



Flare List – continued.

Date	Time			Optical	Imp / Brtns	Location Lat CMD	Rgn
	Begin	Max	End	X-ray Class.			
19 November	B0014	0015	0022		Sf	S06E03	
	0409	0416	0424	B6.0			822
	0927	0947	1008	B8.2			822
20 November	2015	2016	2029	C1.5	Sf	S07W08	822
	0009	0013	0016	B3.4			822
	0723	0736	0749	C2.5			822
	1059	1104	1108	B1.9			
	1506	1520	1530	C1.5			822
	2151	2155	2201	B2.8			822
	2347	2355	0001	B7.5			822

Region Summary

Date	Location		Sunspot Characteristics				Flares							
	(° 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

Region 822

12 Nov S04E81	080	0120	02	Hsx	001	A	2										
13 Nov S06E66	082	0120	08	Cao	006	B	6	1		3							
14 Nov S06E55	080	0610	14	Ehi	016	Bg	6	3		5	1						
15 Nov S08E41	080	0810	14	Eki	022	Bg	9	1		1							
16 Nov S08E28	080	0740	16	Fki	048	Bg	1										
17 Nov S07E15	080	0720	17	Fki	052	Bg	2			2							
18 Nov S07E02	080	0690	18	Fkc	041	Bg	2	1		2							
19 Nov S08W12	081	0610	16	Fkc	026	Bg	1			1							
20 Nov S08W25	080	0570	16	Fki	022	Bg	2										
							31	6	0	14	1	0	0	0	0		

Still on Disk.

Absolute heliographic longitude: 080

Region823

19 Nov S18W37	106	0040	04	Dso	006	B											
20 Nov S17W50	105	0040	04	Dso	003	B											
							0	0	0	0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 106

Region824

20 Nov S13E68	347	0090	02	Hax	001	A											
							0	0	0	0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 347

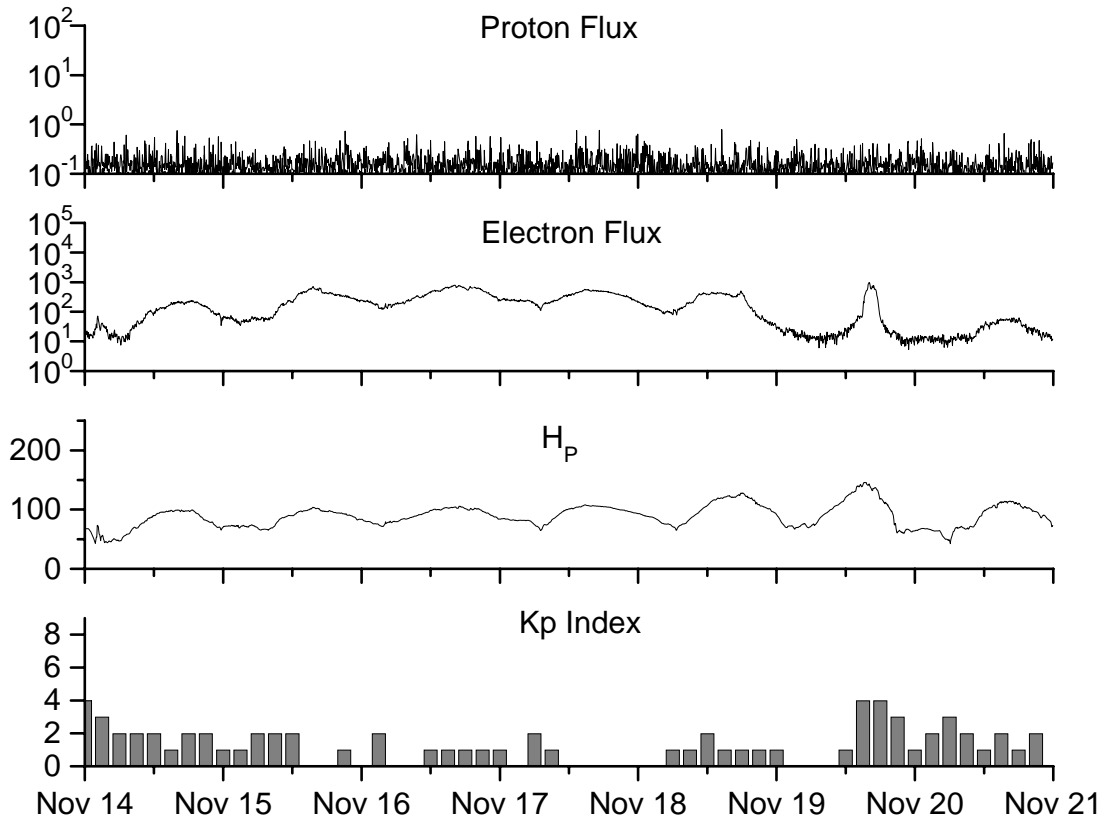


**Recent Solar Indices (preliminary)
of the observed monthly mean values**

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
2003									
November	118.9	67.3	0.57	93.6	57.0	153.1	120.1	28	20.0
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			99.5		20	
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	

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 14 November 2005

Protons plot contains the five-minute averaged integral proton flux (protons/cm²-sec-sr) as measured by GOES-11 (W112) for each of three energy thresholds: greater than 10, 50, and 100 MeV.

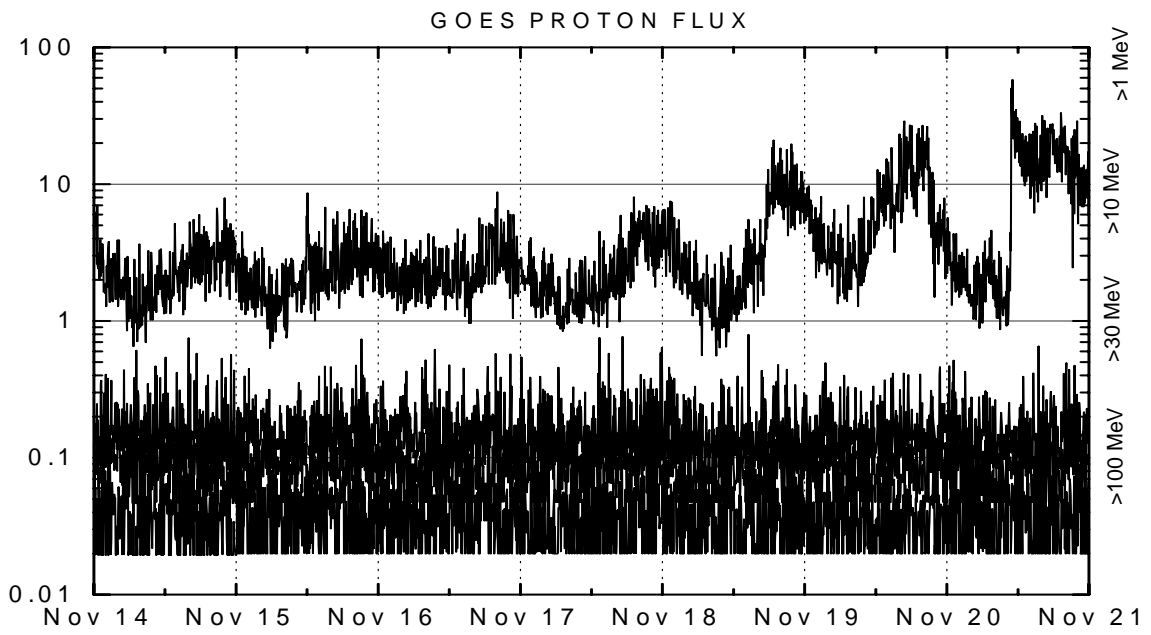
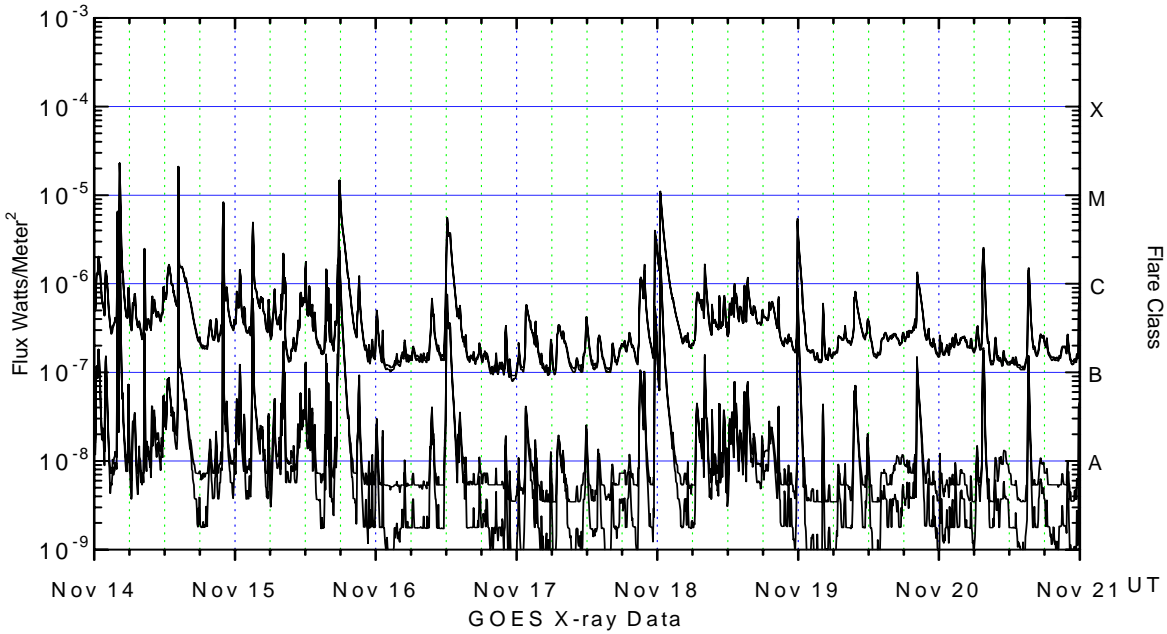
Electrons plot contains the five-minute averaged integral electron flux (electrons/cm²-sec-sr) with energies greater than 2 MeV at GOES-12 (W76).

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 (W76) 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 (W112) 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.

