

Space Weather Highlights 18 - 24 November 2002

**SWO PRF 1421
26 November 2002**

Solar Activity ranged from low to high levels. High activity was observed on 18 November, and moderate activity was observed on 20 November. Low activity was observed for the rest of the summary period. For flare times and magnitudes, please refer to the Energetic Events or Optical Flare lists. Region 198 (S18, L=105, class/area Fki/640 on 18 November) was a frequent source of flare activity, including the largest flare event of the period: an impulsive M7.4/1f event observed at 0208 UTC on 18 November. Region 191 (S18, L=203, class/area Fac/540 on 18 November) remained impressive in white light imagery but produced little notable flare activity during the period, and rotated beyond the west limb on 20 November. A rare spray feature was observed in H-alpha imagery overlying Region 191, as it transited the west limb. A 33-degree filament located near N10E27 erupted late in the summary period, between 1847-1950 UTC on 24 November. This event was accompanied by a C1.8 x-ray enhancement and a sympathetic sub-faint optical flare from Region 198, a Type-II radio sweep (estimated velocity = 800 km/s), and a partial halo CME observed in SOHO/LASCO imagery.

Solar wind data were available from the NASA Advanced Composition Explorer (ACE) spacecraft for most of the summary period. A co-rotating interactive region (CIR) was evident in ACE data on 20-21 November. Solar wind velocity increased from 400 km/s to a peak near 800 km/s, and the Bz component of the interplanetary field reached -27 nT on 21 November. A subsequent high speed stream pattern was evident in the data during 21-23 November from a favorably positioned coronal hole. Velocity averaged near 600 km/s and Bz ranged in values from +/- 6 nT during those dates. Velocity subsided to a value near 500 km/s by the end of the summary period.

The greater than 10 MeV proton flux at geo-synchronous orbit remained near background levels throughout the summary period.

Under the influence of coronal hole effects, the greater than 2 MeV electron flux at geo-synchronous orbit followed an increasing trend throughout the summary period. Flux levels reached moderate levels on 21 November, and reached high levels from 22 November. High flux levels persisted through the end of the summary period.

The geomagnetic field ranged from quiet to severe storm levels. Quiet to unsettled conditions were predominant on 18-19 November. One active period was observed late on 19 November. The evolving CIR effects caused a sustained active period during the latter part of 20 November, and unsettled to severe storm conditions on 21 November. Conditions for 22-24 November were predominantly quiet to active, with isolated periods of minor and major storming observed, due to the influence of coronal hole effects.

Space Weather Outlook 27 November - 23 December 2002

Solar activity is expected to be low to moderate, with Region 198 a possible source of moderate flare activity until it transits the west limb on 29 November. Activity is expected to be mainly low thereafter, until the expected return of Region 191 on 04 December, when moderate flare activity is again possible. Region 198 is expected to return on 12 December, increasing the chance for moderate flare activity for the remainder of the

Energetic proton flux is expected to remain near background levels throughout the period, barring the occurrence of a major flare from Region 198 prior to transiting the west limb.

The greater than 2 MeV electron flux at geo-synchronous orbit is expected to fall to background levels early in the period. Recurrence of high levels may accompany expected coronal hole effects on 03-04 December, 09-11 December, and 19-21

The geomagnetic field may be at active to minor storm levels on 27-28 November, in response to expected shock passage effects from the CME activity of 24 November discussed above. Recurrent coronal hole effects and associated active conditions are possible on 02-03 December, 08-10 December, and 18-20 December. Conditions are expected to be quiet to unsettled for the remainder 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
18 November	179	119	2070	B8.5	8	1	0	4	2	0	0	0
19 November	168	105	1580	B8.6	4	0	0	8	0	0	0	0
20 November	159	108	1360	B7.1	8	1	0	5	0	0	0	0
21 November	151	143	1190	B6.3	9	0	0	10	0	0	0	0
22 November	149	124	1110	B6.4	3	0	0	3	0	1	0	0
23 November	148	126	1120	B5.9	10	0	0	4	0	0	0	0
24 November	146	123	990	B4.1	8	0	0	5	0	0	0	0

Daily Particle Data

Date	Proton Fluence (protons/cm ² -day-sr)			Electron Fluence (electrons/cm ² -day-sr)		
	>1MeV	>10MeV	>100MeV	>6MeV	>2MeV	>4MeV
	18 November	1.6E+5	9.1E+3	1.9E+3		3.0E+6
19 November	1.2E+5	8.6E+3	1.9E+3		4.2E+6	
20 November	2.7E+5	9.2E+3	2.0E+3		2.1E+6	
21 November	1.1E+6	1.1E+4	2.6E+3		1.9E+6	
22 November	2.0E+6	1.1E+4	2.8E+3		4.3E+7	
23 November	1.3E+6	1.1E+4	2.9E+3		1.1E+8	
24 November	1.9E+5	1.2E+4	3.1E+3		9.1E+7	

Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	18 November	11	2-1-1-1-2-1-2-2	18	2-2-4-4-4-3-3-3	12
19 November	12	2-3-3-2-2-1-3-4	29	5-5-6-3-2-1-3-3	14	3-3-3-2-3-3-3-4
20 November	13	3-2-1-2-1-3-4-4	30	3-1-1-4-3-6-6-3	17	3-3-1-3-2-4-4-4
21 November	22	3-4-5-4-3-3-3-3	64	2-4-7-7-6-6-4-3	50	3-5-7-6-5-4-4-4
22 November	17	5-3-2-3-3-3-2-3	37	4-2-5-6-5-5-4-3	24	5-4-3-4-4-4-3-3
23 November	10	3-4-2-2-2-2-1-1	32	3-5-6-5-4-4-2-2	19	4-5-4-3-3-3-3-2
24 November	8	2-3-2-2-2-2-2-2	27	2-2-2-5-6-5-3-2	16	3-4-3-3-4-4-3-3

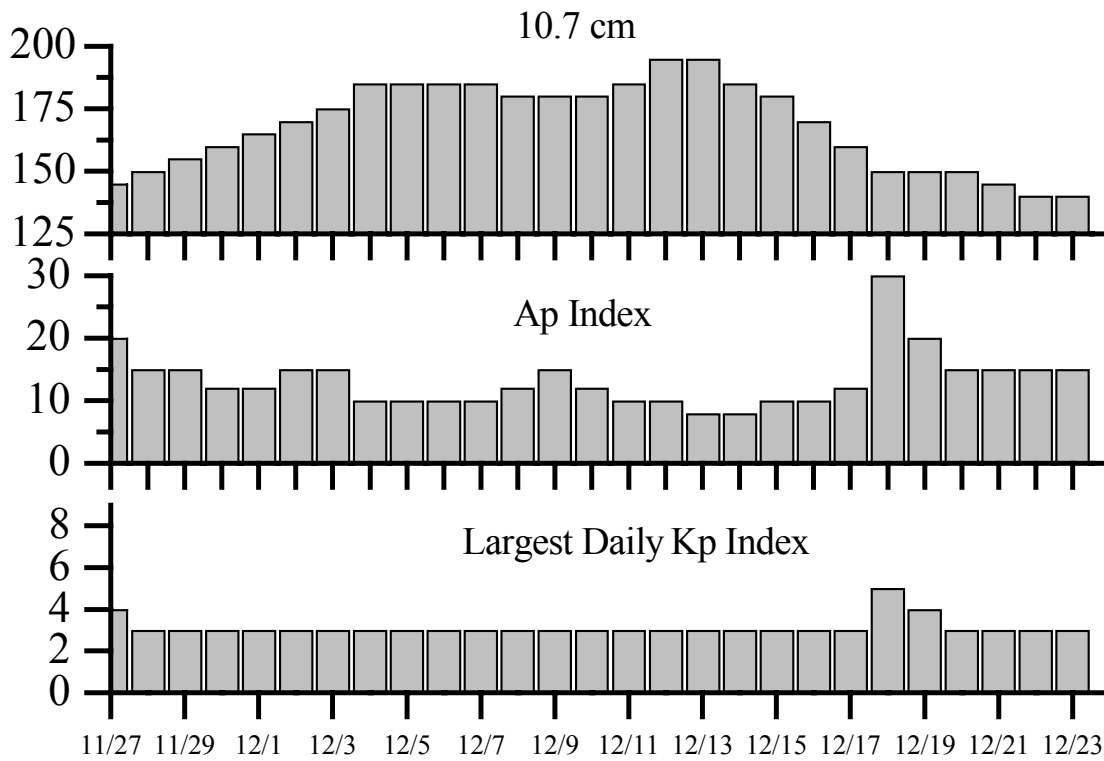


Alerts and Warnings Issued

<u>Date & Time of Issue</u>	<u>Type of Alert or Warning</u>	<u>Date & Time of Event UT</u>
18 Nov 0021	1 - 245 MHz Radio Burst	17 Nov
18 Nov 0021	1 - 245 MHz Radio Noise Storm	17 Nov
18 Nov 0208	ALERT: X-Ray Flux exceeded M5	18 Nov 0207
18 Nov 0219	SUMMARY: X-ray Event exceeded M5	18 Nov 0208
19 Nov 0023	3 - 245 MHz Radio Bursts	18 Nov
19 Nov 0023	1 - 245 MHz Radio Noise Storm	18 Nov
20 Nov 1754	WARNING: Geomagnetic K= 4 expected	20 Nov 1755 - 21 Nov 2359
20 Nov 1755	ALERT: Geomagnetic K= 4	20 Nov 1750
21 Nov 0043	5 - 245 MHz Radio Bursts	20 Nov
21 Nov 0043	1 - 245 MHz Radio Noise Storm	20 Nov
21 Nov 0450	ALERT: Geomagnetic K = 5	21 Nov 0450
21 Nov 0519	WARNING: Geomagnetic K = 5 expected	21 Nov 0525 - 2359
21 Nov 0732	WARNING: Geomagnetic K = 6 expected	21 Nov 0733 - 2359
21 Nov 0734	ALERT: Geomagnetic K = 6	21 Nov 0734
21 Nov 1840	WATCH: Geomagnetic A \geq 20	22 Nov
21 Nov 2353	EXTENDED WARNING: Geomagnetic K= 5 expected	21 Nov 0525 - 22 Nov 2359
22 Nov 0058	3 - 245 MHz Radio Bursts	21 Nov
22 Nov 0058	1 - 245 MHz Radio Noise Storm	21 Nov
22 Nov 1442	ALERT: Electron 2MeV Integral Flux > 1000pfu	22 Nov 1425
23 Nov 0054	4 - 245 MHz Radio Bursts	22 Nov
23 Nov 0340	ALERT: Geomagnetic K= 5	23 Nov 0334
23 Nov 0358	WARNING: Geomagnetic K= 6 expected	23 Nov 0358 - 1500
23 Nov 0400	ALERT: Geomagnetic K= 6	23 Nov 0400
23 Nov 0447	ALERT: Electron 2MeV Integral Flux > 1000pfu	23 Nov 0405
24 Nov 0007	3 - 245 MHz Radio Bursts	23 Nov
24 Nov 0007	1 - 245 MHz Radio Noise Storm	23 Nov
24 Nov 0458	ALERT: Geomagnetic K= 4	24 Nov 0456
24 Nov 0554	ALERT: Electron 2MeV Integral Flux > 1000pfu	24 Nov 0515
24 Nov 1323	ALERT: Geomagnetic K= 4	24 Nov 1323
24 Nov 2138	ALERT: Type II Radio Emission	24 Nov 2006



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 Nov	145	20	4	11 Dec	185	10	3
28	150	15	3	12	195	10	3
29	155	15	3	13	195	8	3
30	160	12	3	14	185	8	3
01 Dec	165	12	3	15	180	10	3
02	170	15	3	16	170	10	3
03	175	15	3	17	160	12	3
04	185	10	3	18	150	30	5
05	185	10	3	19	150	20	4
06	185	10	3	20	150	15	3
07	185	10	3	21	145	15	3
08	180	12	3	22	140	15	3
09	180	15	3	23	140	15	3
10	180	12	3				



Energetic Events

Date	Time		X-ray		Optical Information			Peak		Sweep Freq		
	Begin	Max	$\frac{1}{2}$	Class	Integ Flux	Imp/ Brtns	Location		Radio Flux		Intensity	
			Max				Lat	CMD	245	2695	II	IV
18 Nov	0201	0208	0211	M7.4	.018	1f	S17E56	198	1000	160		
20 Nov	1715	1807	1809	M1.4	.011	Sn	S19E24	198	59			

Flare List

Date	Time			X-ray Class.	Optical Imp / Brtns	Location Lat CMD	Rgn
	Begin	Max	End				
18 November	0024	0025	0029	C4.5	Sf	S20W33	191
	0204	0206	0222	M7.4	1f	S17E56	198
	0437	0440	0445		Sf	N13W80	192
	0707	0710	0715	C2.2	1f	N15W75	192
	1005	1101	1131	C2.4			
	1200	1204	1208	C1.9			
	1304	1308	1312	C1.4			
	1616	1616	1621	C2.2	Sf	N15W79	192
	1656	1657	1702	C6.3	Sf	N15W81	192
	2130	2213	2231	C2.1			
19 November	0207	0208	0211		Sf	N32E43	
	0216	0217	0220		Sf	N31E41	
	0351	0351	0406		Sf	S21E37	198
	0728	0737	0753	C4.9			
	1205	1208	1210	C1.8			
	1205	1214	1216	C2.5			
	1344	U1348	1351		Sf	S20W66	191
	1438	U1445	A1454		Sf	S18W64	191
	B1528	U1528	1532		Sf	S20E32	198
	1950	1951	1957	C1.7	Sf	S19E36	198
B2050	2052	2101		Sf	S19E30	198	
20 November	0141	0146	0206	C1.7			
	0302	0312	0316	C1.4			
	0442	0450	0457	C1.1			
	B1110	U1122	A1141	C1.3	Sf	S19E22	198
	B1522	U1522	1529	C1.0	Sf	S16E20	198
	1625	1633	1636	C3.8			
	1800	1806	1819	M1.4	Sn	S19E24	198
	1927	1929	1934	C1.6	Sf	S19E21	198
	2356	2356	2359	C5.2	Sf	S19E12	198
	21 November	0134	0134	0147		Sf	S17E15
0305		0310	0316	C2.1	Sf	S17E16	198
0639		U0642	A0735	C4.0	Sf	S18E13	198
0809		0809	0821	C2.4	Sf	S20E11	198
1102		1105	1111	C6.6	Sf	S19E11	198
1252		1252	1256		Sf	S17E06	198



Flare List - continued.

Date	Time			X-ray Class.	Optical		Rgn
	Begin	Max	End		Imp / Brtns	Location Lat CMD	
21 November	1338	1341	1344	C1.2			
	1644	1646	1655	C3.8	Sf	S17E10	198
	1902	1902	1907	C1.8	Sf	S18E08	198
	1953	1954	2004	C3.8	Sf	S17E08	198
	2025	2033	2042	C2.2	Sf	S15E00	198
22 November	0217	0217	0222	C1.0	Sf	S15W03	198
	1157	1158	1204	B6.5	Sf	S15W09	198
	1540	1540	1546	C3.4	Sf	S17W07	198
	2008	2027	A2049		2f	S19W12	198
	2228	2233	2259	C3.9			
23 November	0108	0112	0114	C1.3			
	0119	0125	0138	C2.1			
	0755	0804	0806	C4.6			
	0840	0842	0846	C1.9	Sf	S17W15	198
	1051	1051	1058	C1.6	Sf	S17W13	198
	B1138	U1148	A1200		Sf	S14W18	198
	1310	1313	1315	C1.0			
	1353	1407	1424	C1.6			
	1356	1402	1408		Sf	S19W18	198
	1739	1745	1749	C1.0			
24 November	1801	1810	1813	C2.7			
	2101	2106	2112	C1.4			
	0208	0213	0217	C1.0			
	0219	0223	0226	C3.7			
	0228	0231	0235	C2.8			
	0338	0347	0359	C1.8			
	0445	0449	0453	C1.2			
	0815	0819	0822	C4.8			
	B1127	U1127	1145		Sf	N26W42	197
	B1432	U1432	1436		Sf	N14E75	202
	1625	1625	A1630		Sf	N13E73	202
B1728	U1728	1832	C1.8	Sf	S19W37	198	
B2035	U2035	A2035	C6.4	Sf	S17W37	198	



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 190

07 Nov S22E54	239	0030	04	Bxo	007	B												
08 Nov S22E42	238	0040	06	Cao	004	B												
09 Nov S22E28	239	0040	06	Dao	004	B												
10 Nov S20E14	239	0030	06	Cso	006	B												
11 Nov S22E00	240	0020	01	Hsx	001	A												
12 Nov S21W14	241	0020	01	Hsx	002	A							1					
13 Nov S21W27	241	0020	01	Hsx	001	A												
14 Nov S22W40	241	0020	01	Hsx	001	A												
15 Nov S22W55	242	0010	05	Bxo	002	B												
16 Nov S22W68	242																	
17 Nov S22W81	242																	
18 Nov S22W94	242																	
0 0 0 1 0 0 0 0																		

Crossed West Limb.

Absolute heliographic longitude: 240

Region 191

08 Nov S17E74	206	0060	02	Hsx	001	A												
09 Nov S17E63	204	0310	13	Eai	011	B	1						4					
10 Nov S18E51	202	0590	14	Ekc	035	B	1						4					
11 Nov S18E39	201	0550	17	Fac	052	Bg	1						1					
12 Nov S18E25	202	0630	16	Fkc	062	Bg							1					
13 Nov S18E12	202	0800	16	Fkc	063	Bg	2						4					
14 Nov S18W01	202	0630	16	Fkc	062	Bgd												
15 Nov S18W16	203	0580	16	Fkc	048	Bgd							1					
16 Nov S18W28	202	0650	17	Fki	050	Bgd	2						3					
17 Nov S18W41	202	0580	20	Fki	041	Bg							5					
18 Nov S18W55	203	0540	19	Fac	028	Bg	1						1					
19 Nov S18W68	203	0420	18	Fai	016	Bg							2					
20 Nov S18W81	203	0200	16	Fao	007	Bg												
21 Nov S18W94	203	0030	04	Hsx	001	A												
8 0 0 26 0 0 0 0																		

Crossed West Limb.

Absolute heliographic longitude: 202



Region Summary - continued.

Date	Location		Sunspot Characteristics				Flares											
	(° Lat ° CMD)	Helio Lon	Area (10 ⁻⁶ hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical							
								C	M	X	S	1	2	3	4			
<i>Region 192</i>																		
11 Nov	N13E08	232	0010	04	Bxo	004	B											
12 Nov	N14W07	234	0010	03	Bxo	002	B											
13 Nov	N14W22	236	0010	01	Axx	002	A											
14 Nov	N13W34	235	0070	06	Dsi	014	B	2			2							
15 Nov	N13W47	234	0350	09	Dai	022	Bg	4			9	1						
16 Nov	N12W61	235	0480	12	Eai	018	B	1			6							
17 Nov	N12W74	235	0550	14	Eho	015	B	1			6							
18 Nov	N12W86	234	0280	09	Dao	008	B	3			3	1						
								11	0	0	26	2	0	0	0	0		

Crossed West Limb.

Absolute heliographic longitude: 234

<i>Region 193</i>																		
12 Nov	S02E21	206	0010	01	Hsx	001	A											
13 Nov	S03E07	207	0010	00	Hsx	001	A											
14 Nov	S03W06	207																
15 Nov	S03W19	207																
16 Nov	S02W32	206	0000	00	Axx	001	A											
17 Nov	S02W45	206																
18 Nov	S02W58	206																
19 Nov	S02W71	206																
20 Nov	S02W84	206																
21 Nov	S02W97	206																
								0	0	0	0	0	0	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 207

<i>Region 194</i>																		
13 Nov	S16E43	171	0010	01	Axx	002	A											
14 Nov	S16E28	173	0030	04	Cso	005	B											
15 Nov	S16E15	172	0020	04	Cso	004	B											
16 Nov	S16E02	172	0020	03	Cso	004	B											
17 Nov	S17W12	173	0020	03	Cso	003	B											
18 Nov	S17W25	173	0000	00		000												
19 Nov	S17W38	173	0000	00		000												
20 Nov	S17W51	173	0000	00		000												
21 Nov	S17W64	173	0030	01	Hsx	001	A											
22 Nov	S17W77	173	0000	00		000												
23 Nov	S17W90	173	0000	00		000												
								0	0	0	0	0	0	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 172



Region Summary - continued.

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 198

15 Nov S16E78	109	0090	03	Dso	003	B												
16 Nov S17E66	108	0380	09	Dho	008	B							2					
17 Nov S18E55	106	0590	17	Fko	011	B	1	1			3							
18 Nov S18E43	105	0640	17	Fki	021	Bg		1				1						
19 Nov S18E28	107	0580	20	Fki	033	Bg	1				4							
20 Nov S18E15	108	0570	22	Fkc	028	Bg	4	1			5							
21 Nov S18E02	108	0570	22	Fki	039	Bg	8				10							
22 Nov S18W12	108	0500	16	Fki	035	Bg	2				3			1				
23 Nov S18W25	108	0520	15	Eki	033	Bg	2				4							
24 Nov S18W36	106	0500	20	Fkc	036	Bg	2				2							
							20	3	0	33	1	1	0	0				

Still on Disk.

Absolute heliographic longitude: 108

Region 199

20 Nov N27E13	110	0030	03	Axx	003	A												
21 Nov N27W00	110	0020	05	Cso	008	B												
22 Nov N27W14	110	0030	05	Bxo	007	B												
23 Nov N27W27	110	0040	09	Bxo	016	B												
24 Nov N27W42	112	0010	02	Bxo	002	B												
							0	0	0	0	0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 110

Region 200

20 Nov N00E71	052	0060	02	Hsx	001	A												
21 Nov N00E57	052	0070	02	Hax	001	A												
22 Nov N00E44	052	0060	02	Hsx	001	A												
23 Nov N00E31	052	0050	01	Hsx	001	A												
24 Nov S01E17	053	0020	01	Hsx	001	A												
							0	0	0	0	0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 053

Region 201

21 Nov S16W09	118	0010	04	Cso	004	B												
22 Nov S16W22	118	0040	06	Bxo	011	B												
23 Nov S16W35	118	0030	06	Cro	006	B												
24 Nov S15W54	124	0020	05	Bxo	003	B												
							0	0	0	0	0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 118



Region Summary - continued.

Date	Location		Sunspot Characteristics				Flares							
	(° Lat ° CMD)	Helio Lon	Area (10 ⁻⁶ hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical			
							C	M	X	S	1	2	3	4
<i>Region 202</i>														
24 Nov	N14E66	004	0050	07	Cso	002	B				2			
							0	0	0	2	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 004

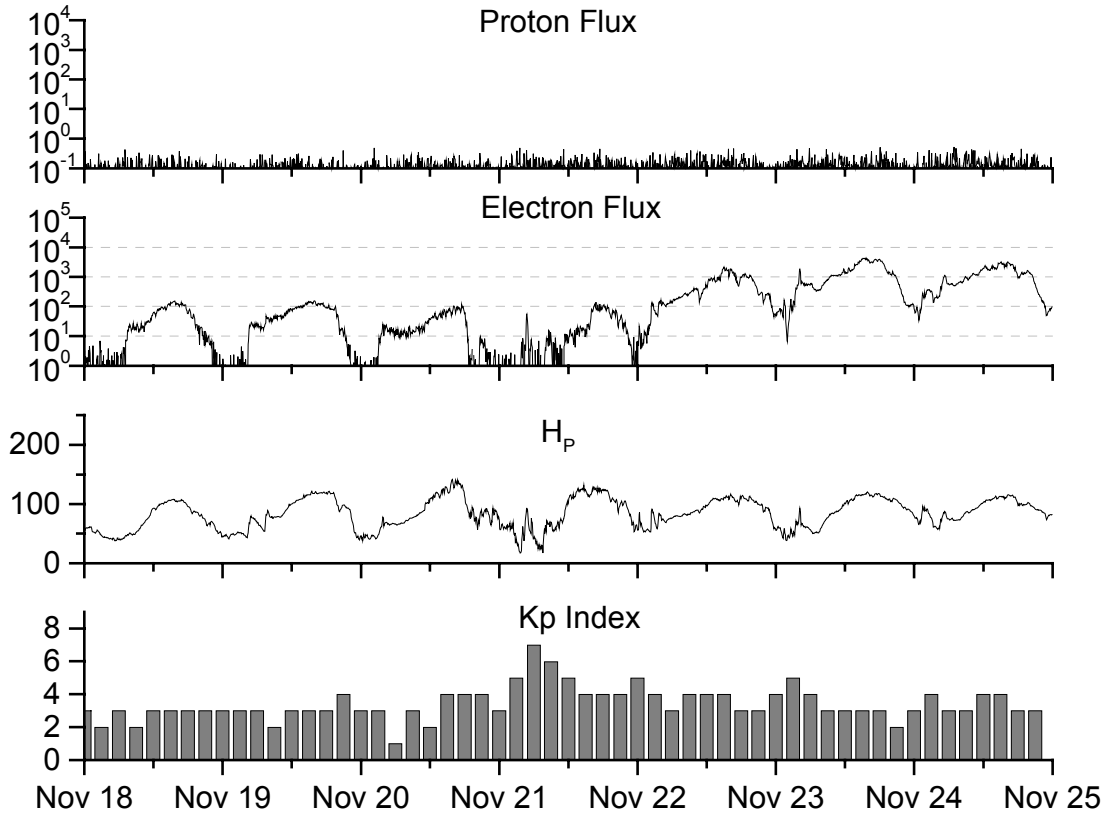


**Recent Solar Indices (preliminary)
of the observed monthly mean values**

Month	Sunspot Numbers			Radio Flux		Geomagnetic			
	Observed values SWO	Ratio RI	Ratio RI/SWO	Smooth values SWO	Smooth values RI	*Penticton 10.7 cm	Smooth Value	Planetary Ap	Smooth Value
2000									
November	149.9	106.5	0.71	162.7	112.7	178.8	173.9	17	14.6
December	146.4	104.5	0.71	160.8	112.1	173.6	172.1	08	14.4
2001									
January	142.7	95.1	0.67	156.3	108.8	166.7	168.8	08	13.8
February	131.0	80.1	0.61	151.4	104.2	147.3	165.8	06	13.3
March	166.7	114.2	0.69	154.0	104.9	177.7	167.9	17	12.9
April	163.6	108.2	0.66	159.4	107.7	178.3	171.7	18	12.7
May	135.1	97.3	0.72	163.1	108.8	148.7	174.8	12	12.5
June	196.7	134.0	0.68	167.2	109.9	173.7	178.8	12	12.4
July	124.6	82.2	0.66	172.1	111.8	131.3	183.9	11	12.4
August	159.4	106.8	0.67	176.7	113.8	163.2	188.8	13	12.5
September	229.1	150.7	0.66	178.8	114.3	233.3	191.3	12	12.3
October	197.4	125.6	0.64	179.5	114.1	208.2	191.9	18	11.9
November	178.6	106.5	0.60	183.7	115.6	212.5	193.6	14	11.9
December	217.5	131.8	0.61	184.5	114.7	236.6	193.8	08	12.0
2002									
January	189.0	113.9	0.60	184.8	113.5	226.4	194.6	07	12.0
February	194.5	108.0	0.56	188.6	114.7	205.1	197.2	09	12.2
March	153.1	98.1	0.64	188.9	113.3	179.5	195.7	10	12.4
April	194.9	120.4	0.62	186.2	110.4	189.7	191.5	15	12.7
May	204.1	120.8	0.59			178.4		15	
June	146.0	88.5	0.61			148.8		11	
July	183.5	99.9	0.54			174.5		13	
August	191.0	116.4	0.61			184.0		16	
September	206.4	109.3	0.53			175.9		14	
October	153.9	97.5	0.63			165.1		23	

NOTE: All smoothed values after June 1999 and monthly values after December 2000 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 22, RI= 158.5, occurred July 1989. *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 November 2002

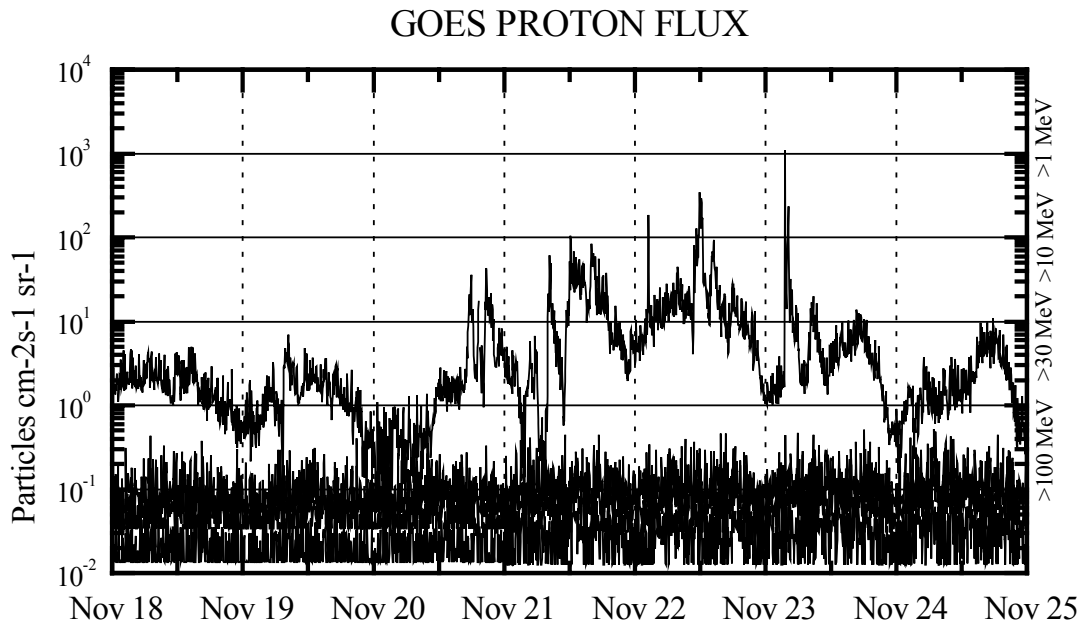
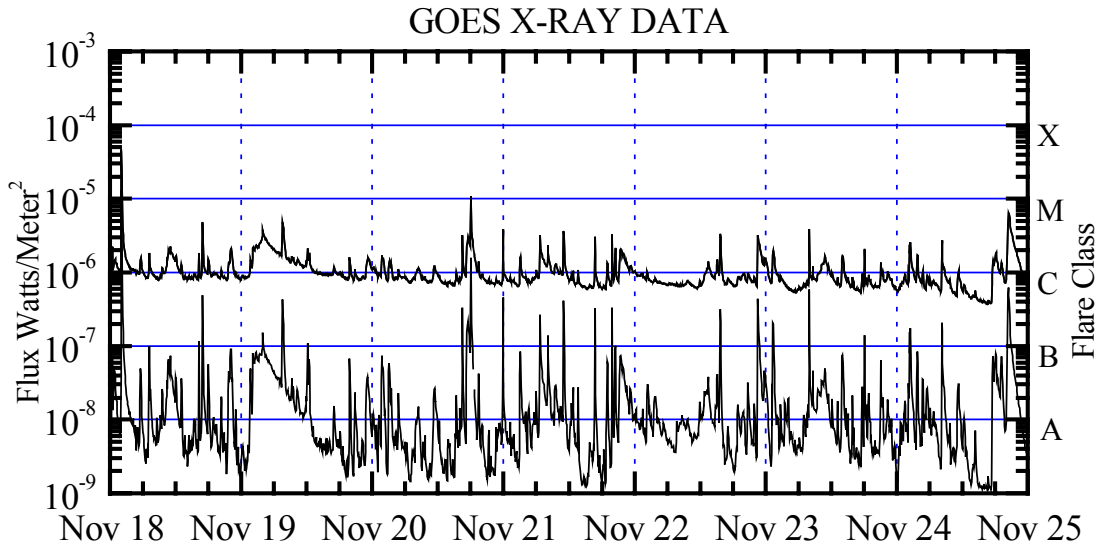
Protons plot contains the five-minute averaged integral proton flux (protons/cm²-sec -sr) as measured by GOES-8 (W75) for each of three energy thresholds: greater than 10, 50, and 100 MeV.

Electrons plot contains the five-minute averaged integral electron flux (electrons/cm²-sec -sr) with energies greater than 2 MeV at GOES-8.

H_p plot contains the five minute averaged magnetic field H - component in nanoteslas (nT) as measured by GOES-8. 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 Heartland, UK. These data are made available through cooperation from the Geological Survey of Canada (GSC) 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 SWO 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_p 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 8 and 10 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-8 (W75) 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.

