

**Space Weather Highlights
16-22 November 1998**

Solar activity ranged from very low to high. Very low to low levels occurred through 21 November with isolated B- and C-class flares reported. One event of note during this period was a C4/SF from Region 8383 (S15, L = 042, class/area Eso/110 on 14 November) with an associated Type II radio sweep. Activity increased to high levels on 22 November when Region 8384 (S27, L = 029, class/area Dkc/610 on 11 November) produced two X-class flares as it crossed the southwest limb. The first was an X3/1N at 22/0642UT with associated Types II and IV radio sweeps, a 340 SFU Tenflare, and moderate discrete radio emission. The second was an X2/2N at 22/1623UT, also with moderate discrete radio emission and a loop prominence system. The sudden increase to high levels was surprising, given the stability exhibited by Region 8384 during the days preceding the X-flares.

Most real-time solar wind data were not available until 20 November due to precautions taken for the Leonids shower. No significant IMF, velocity or density changes were detected during 20 - 22 November.

A solar proton enhancement at geosynchronous altitude followed the X3/1N flare. The greater than 100 MeV flux enhancement began about 22/0700UT then declined to background levels by 22/1200UT. The greater than 10 MeV enhancement began about 22/0800UT and was gradually declining towards background at the end of the period.

The greater than 2 MeV electron flux at geosynchronous altitude was at moderate to high levels during 17 - 18 November. Otherwise, normal to moderate fluxes were detected.

The geomagnetic field was at quiet to unsettled levels with brief, localized active to minor storm periods detected at high latitudes.

**Space Weather Forecast
25 November - 21 December 1998**

Solar activity is expected to be low to moderate. M-class flare activity may increase with the return of old Region 8375 (N19, L = 185) on the first day of the forecast period. Old Region 8384 is due to return to the visible disk on 06 December and may also cause an increase in M-class flare activity. There is also a small chance for isolated major flare activity during the period, given the flare histories of both regions.

Proton flare probabilities may increase with the return of old Regions 8375 and 8384.

The greater than 2 MeV electron flux at geosynchronous altitude is expected to be at normal to moderate levels.

The geomagnetic field is expected to be at quiet to unsettled levels, barring any unexpected, Earth-directed CME occurrences.



Daily Solar Data

Date	Radio Flux 10.7 cm	Sun spot No. (10^6 hemi.)	Sunspot Area	X-ray Background	Flares							
					X-ray Flux			Optical				
					C	M	X	S	1	2	3	4
16 November	125	76	550	B4.0	7	0	0	5	0	0	0	0
17 November	121	92	480	B4.0	1	0	0	0	0	0	0	0
18 November	115	72	410	B2.3	1	0	0	0	0	0	0	0
19 November	117	57	360	B1.8	0	0	0	1	0	0	0	0
20 November	122	58	430	B2.3	2	0	0	11	0	0	0	0
21 November	121	55	510	B4.2	12	0	0	16	1	0	0	0
22 November	126	56	320	B7.2	4	2	2	11	1	1	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
16 November	4.8E+6	7.4E+5	5.1E+3		2.0E+7	
17 November	1.3E+6	1.1E+5	4.6E+3		6.4E+7	
18 November	1.0E+6	3.4E+4	5.0E+3		7.0E+7	
19 November	5.5E+5	2.5E+4	5.1E+3		3.7E+7	
20 November	3.8E+5	1.9E+4	4.7E+3		1.2E+7	
21 November	1.8E+5	1.8E+4	4.6E+3		9.8E+6	
22 November	4.4E+5	8.3E+4	5.4E+3		1.0E+7	

Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	16 November	6	3-2-2-2-1-1-0-2	*	2-1-1-2-2-3-*-1	7
17 November	3	3-1-1-0-1-1-0-0	4	2-1-2-0-1-1-1-2	4	2-1-1-1-1-1-1-1
18 November	5	1-2-2-2-2-1-1-1	6	1-1-2-1-3-2-1-1	7	1-3-3-2-2-1-2-2
19 November	6	3-1-1-2-2-1-1-1	*	*-2-2-3-5-2-1-1	7	2-1-1-3-2-2-2-2
20 November	9	1-3-2-3-1-0-3-3	12	0-1-2-5-4-1-1-2	12	1-3-3-3-3-1-4-3
21 November	4	2-2-1-1-1-1-1-0	15	1-4-2-5-3-3-1-0	7	2-3-2-2-2-2-2-2
22 November	6	2-2-2-2-1-3-1-0	13	1-3-5-3-3-2-1-0	7	2-2-2-3-2-2-2-2

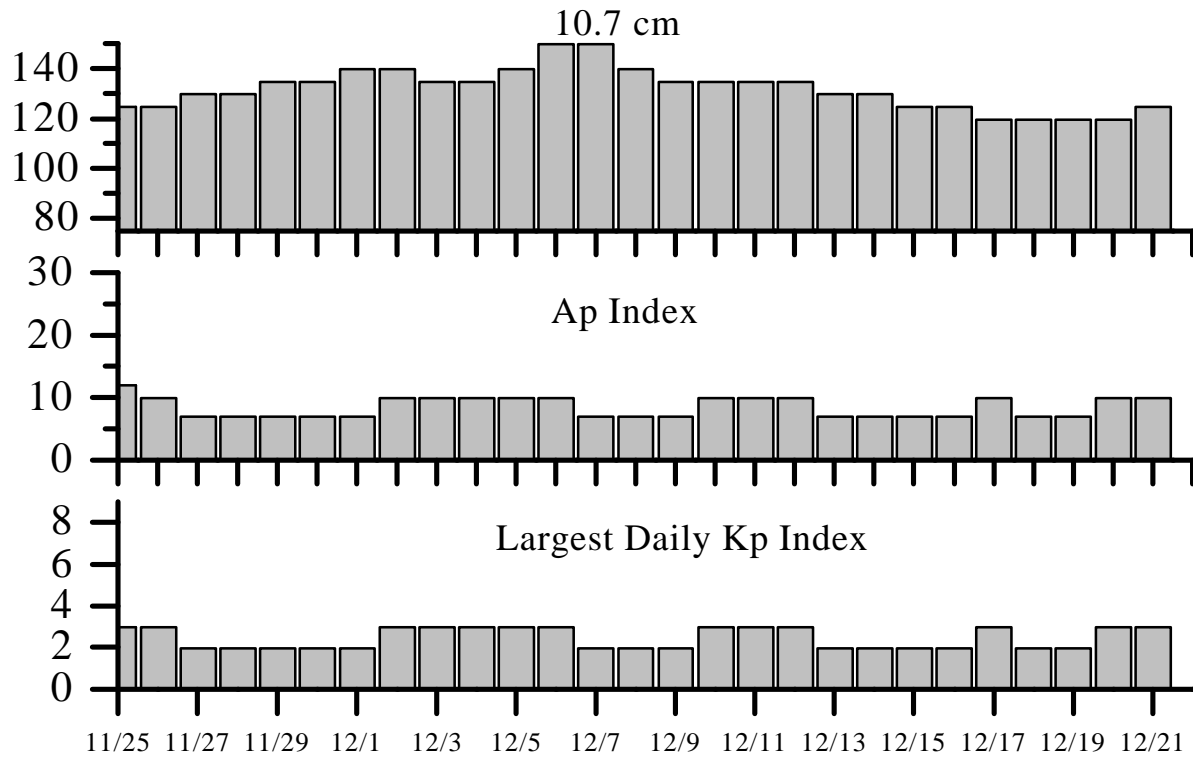


Alerts and Warnings Issued

Date and Time of Issue (UT)	Type of Alert or Warning	Date and Time of Event (UT)
16 Nov 0013	1-245 MHz Burst	15 Nov
16 Nov 0013	245 MHz Radio Noise Storm	15 Nov
16 Nov 1200	CONTINUED >10MeV Proton Event ≥ 10 pfu	14 Nov 0810
16 Nov 1917	ENDED at 16/ 09:55 Nov >10MeV Proton Event ≥ 10 pfu	14 Nov 0810
16 Nov 2308	Type II Radio Emission	16 Nov 2158
17 Nov 0116	2-245 MHz Bursts	16 Nov
17 Nov 0116	245 MHz Radio Noise Storm	16 Nov
17 Nov 1616	A ≥ 20 Watch	18 Nov
17 Nov 1617	A ≥ 20 Watch	19 Nov
17 Nov 1744	>2MeV Electron Event ≥ 1000 pfu	17 Nov 1510
18 Nov 0056	1-245 MHz Burst	17 Nov
18 Nov 0056	245 MHz Radio Noise Storm	17 Nov
18 Nov 1201	CONTINUED >2MeV Electron Event ≥ 1000 pfu	17 Nov 1510
19 Nov 0118	1-245 MHz Burst	18 Nov
19 Nov 0118	245 MHz Radio Noise Storm	18 Nov
19 Nov 1201	CONTINUED >2MeV Electron Event ≥ 1000 pfu	17 Nov 1510
20 Nov 0111	245 MHz Radio Noise Storm	19 Nov
20 Nov 0040	Type II Radio Emission	20 Nov 0039
21 Nov 0118	2-245 MHz Bursts	20 Nov
21 Nov 0118	245 MHz Radio Noise Storm	20 Nov
22 Nov 0212	2-245 MHz Bursts	21 Nov
22 Nov 0701	X-Ray event X3/1N/S27W82	22 Nov 0630
22 Nov 0750	>10MeV Proton Event Warning ≥ 10 pfu	22 Nov 1200
22 Nov 0750	>100MeV Proton Event Expected >1pfu	22 Nov 1100
22 Nov 0800	10cm Radio Burst 340 F.U.	22 Nov 0636
22 Nov 0800	Type II Radio Emission	22 Nov 0642
22 Nov 0800	Type IV Radio Emission	22 Nov 0659
22 Nov 1205	CANCELLED >100MeV Proton Event Expected >1pfu	22 Nov 1100
22 Nov 1452	CANCELLED >10MeV Proton Event Warning ≥ 10 pfu	22 Nov 1200
22 Nov 1641	X-Ray event X2.5	22 Nov 1610



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
25 Nov	125	12	3	08 Dec	140	7	2
26	125	10	3	09	135	7	2
27	130	7	2	10	135	10	3
28	130	7	2	11	135	10	3
29	135	7	2	12	135	10	3
30	135	7	2	13	130	7	2
01 Dec	140	7	2	14	130	7	2
02	140	10	3	15	125	7	2
03	135	10	3	16	125	7	2
04	135	10	3	17	120	10	3
05	140	10	3	18	120	7	2
06	150	10	3	19	120	7	2
07	150	7	2	20	120	10	3
				21	125	10	3



Energetic Events

Date	Time (UT)			X-ray		Optical Information			Peak		Sweep Freq	
	Begin	Max	½	Class	Flux	Imp Brtns	Location		Radio Flux		Intensity	
			Max				Lat	CMD	245	2695	II	IV
22 Nov	0630	0642	0649	X3.7	.200	1N	S27W82	8384	29000	340	3	
22 Nov	1610	1623	1632	X2.5	.160	2N	S30W89	8384	4100	95		
22 Nov	1828	1839	1851	M1.0	.011							
22 Nov	2140	2215	2235	M1.8	.031							

Flare List

Date	Time			X-ray Class.	Imp / Brtns	Optical Location Lat CMD	Rgn #
	Begin	Max	End				
16 November	0406	0406	0409	B6.5	SF	S20E29	8386
	0555	0558	0600	B5.7			
	0632	0636	0639	B8.8			
	0927	0928	0933		SF	N19W84	8385
	A1202	1204	A1227	C2.9	SF	S14W25	8383
	1321	1328	1333	C1.0			
	1512	1519	1527	C1.0			
	1639	1643	1657	C2.5	SF	S14W27	8383
	1939	1946	1948	B8.5			
	2009	2015	2018	C7.9			8385
	2120	2123	2126	B5.5			
	2150	2151	2206	C4.9	SF	S14W29	8383
	2246	2250	2254	B6.7			
	2307	2316	2332	C4.5			
17 November	0106	0110	0113	B7.9			
	0351	0456	0523	C2.3			
	2116	2125	2131	B5.8			
18 November	2328	2343	0008	B6.3			
	0719	0723	0727	B4.9			
	0837	0843	0851	B6.2			
	1044	1055	1106	C1.0			
19 November	2146	2149	2151	B4.9			
	0604	0613	0621	B8.5			
	1654	1654	1657		0F	S18E54	8391
20 November	2322	2327	2351	B3.8			
	1058	1102	1105	B4.7			
	1255	1258	1303		SF	S25W58	8384
	1340	1341	1350		SF	S17E40	8391
	1414	1415	1423		SF	S17E39	8391
	1422	1422	1431		SF	N26W59	8384
	1521	1523	1543	C2.5	SF	S17E40	8391
	1635	1639	1642	B8.2			
1651	1651	1658	B5.5	SF	S27W56	8384	



Flare List-continued

Date	Time			X-ray Class.	Optical		Rgn #	
	Begin	Max	End		Imp / Brtns	Location Lat CMD		
20 November	1759	1800	1823	B8.5	SF	S17E37	8391	
	1824	1824	1827		SF	S17E38	8391	
	1832	1833	1840		SF	S20W33	8386	
	1832	1833	1840		SF	S20W33	8386	
	1934	1937	2010		B9.8	SF	S17E37	8391
	2216	2221	2228		C1.3			
21 November	0030	0042	0059	C1.3				
	0142	0144	0146		SF	S27W66	8384	
	0637	0640	0647	C2.2	SF	S17E34	8391	
	0657	0658	0711		SF	S17E34	8391	
	0807	0808	0812	C1.5	SF	S17E33	8391	
	1128	1133	1137	C1.1	SF	S28W70	8384	
	1154	1155	1159		SF	S28W70	8384	
	1223	1227	1230	B9.5				
	1250	1300	1321		SF	S17E29	8391	
	1613	1615	1627	C3.0	SF	S28W77	8384	
	1656	1657	1708	C1.2	SF	S28W77	8384	
	1723	1724	1727		SF	S30W71	8384	
	1855	1900	1907		SF	S29W75	8384	
	1917	1919	1931	C1.3	SF	S30W72	8384	
	1959	2010	2027	C1.7	1F	S28W80	8384	
	2010	2010	2014	C1.3	SF	S14W93	8383	
	2023	2023	2030		SF	S30W72	8384	
	2054	2054	2100	C1.2	SF	S30W72	8384	
	2121	2124	2126	C1.7				
	2248	2248	2301		SF	S30W72	8384	
2328	2358	0010	C3.2					
22 November	0114	0116	0118		SF	S17E24	8391	
	0635	0645	0711	X3.7	1N	S27W82	8384	
	0721	0722	0724		SF	S29W81	8384	
	1004	1005	1010	C1.6	SF	S17E19	8391	
	1215	1231	1247	C8.8				
	1421	1424	1428	C1.6				
	1439	1443	1447	C2.5				
	1506	1507	1509		SF	S28W89	8384	
	1524	1524	1529		SF	S30W89	8384	
	1615	1618	1703	X2.5	2N	S30W89	8384	
	1700	1702	1704		SF	S29W86	8384	
	1757	1757	1803		SF	S17E09	8391	
	1804	1805	1810		SF	S18E10	8391	
1828	1839	1851	M1.0					



Flare List-continued

Date	Time			X-ray Class.	Optical		Rgn #
	Begin	Max	End		Imp / Brtns	Location Lat CMD	
22 November	1922	1923	1930		SF	S20W65	8386
	1923	1924	1928		SF	S18E12	8391
	1959	2003	2006		SF	S28W89	8384
	2140	2215	2235	M1.8			

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 8378

03 Nov	N17E76	113	0090	03	HSX	001	A												
04 Nov	N14E63	113	0120	02	HAX	002	A												2
05 Nov	N14E50	113	0070	02	HSX	001	A												1
06 Nov	N13E36	114	0130	02	HSX	001	A												
07 Nov	N14E23	113	0130	03	HSX	002	A												
08 Nov	N17E11	112	0140	04	HSX	005	A												1
09 Nov	N14W03	113	0170	03	HHX	001	A												
10 Nov	N14W16	113	0130	02	HSX	001	A												
11 Nov	N14W29	113	0130	02	HSX	003	A												
12 Nov	N14W42	112	0120	03	HSX	001	A												
13 Nov	N15W56	113	0120	02	HSX	001	A												
14 Nov	N15W69	113	0120	02	HSX	001	A												
15 Nov	N15W80	111	0050	02	HSX	001	A												
0 0 0 4 0 0 0 0																			

Crossed West Limb.

Absolute heliographic longitude: 113

Region 8380

04 Nov	S20E65	111	0000	00	AXX	001	A												
05 Nov	S20E51	112	0000	00	AXX	001	A												2
06 Nov	S22E38	112	0000	00	AXX	001	A												
07 Nov	S22E30	106	0010	03	BXO	007	B												
08 Nov	S22E17	106																	
09 Nov	S22E04	106																	
10 Nov	S22W09	106																	
11 Nov	S22W22	106																	
12 Nov	S22W35	106																	
13 Nov	S22W48	106																	
14 Nov	S22W61	106																	
15 Nov	S22W74	106																	
0 0 0 2 0 0 0 0																			

Died on Disk.



Absolute heliographic longitude: 106

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	4			
<i>Region 8383</i>																		
08 Nov	S14E76	047	0040	05	BXO	002	B											
09 Nov	S15E62	048	0090	04	CSO	005	B											
10 Nov	S15E52	045	0070	10	CSO	007	B											1
11 Nov	S15E40	044	0070	11	CSO	014	B											1
12 Nov	S16E27	043	0090	11	EAO	016	B	1										2
13 Nov	S16E14	043	0090	12	ESO	010	B	1										1
14 Nov	S15E02	042	0110	12	ESO	014	B	1										2
15 Nov	S15W11	042	0080	13	ESO	010	B											
16 Nov	S14W31	050	0050	05	CRO	007	B											3
17 Nov	S13W43	049	0040	07	CSO	010	B											
18 Nov	S14W58	050	0020	05	BXO	005	B											
19 Nov	S16W66	045	0000	00	AXX	001	A											
20 Nov	S16W73	039	0020	08	BXO	003	B											
21 Nov	S16W86	039						1										1
								4	0	0		11	0	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 042

<i>Region 8384</i>																		
09 Nov	S27E77	033	0150	03	HHX	001	A	1										
10 Nov	S27E64	033	0350	04	HKX	002	A											
11 Nov	S27E53	031	0610	06	DKC	004	BD											
12 Nov	S28E39	031	0470	07	CKO	005	B											
13 Nov	S27E27	030	0470	08	CHO	008	B											
14 Nov	S28E14	030	0520	08	DHO	012	B											1
15 Nov	S28E02	029	0480	09	DHO	008	B											
16 Nov	S28W10	029	0460	08	DKO	009	B											
17 Nov	S27W24	030	0410	08	DKO	008	B											
18 Nov	S28W36	028	0370	09	DKO	012	B											
19 Nov	S27W49	028	0330	06	HKX	006	A											
20 Nov	S28W62	028	0350	09	CHO	007	B											3
21 Nov	S27W75	028	0330	06	CHO	006	B	6				11	1					
22 Nov	S26W88	028	0240	08	CKO	006	B					2	5	1	1			
								7	0	2	20	2	1	0	0			

Still on Disk.

Absolute heliographic longitude: 029



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 8385

11 Nov	N19W30	114	0010	05	BXO	006	B											
12 Nov	N19W44	114	0010	07	BXO	008	B	1	1			3	1					
13 Nov	N20W58	115	0110	11	ESO	014	B	1				2						
14 Nov	N21W69	113	0110	09	DAO	006	B	3				3						
15 Nov	N21W81	112	0090	12	ESO	003	B					1						
								5	1	0		9	1	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 114

Region 8386

13 Nov	S20E57	000	0010	02	AXX	003	A											
14 Nov	S20E43	001	0040	03	BXO	004	B											
15 Nov	S21E31	000	0020	01	HSX	002	B											
16 Nov	S21E18	001										1						
17 Nov	S21E05	001																
18 Nov	S19W15	007	0000	00	AXX	001	A											
19 Nov	S19W28	007																
20 Nov	S19W41	007										2						
21 Nov	S19W54	007																
22 Nov	S19W67	007										1						
								0	0	0		4	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 001

Region 8387

14 Nov	N22E46	358	0020	04	BXO	005	B											
15 Nov	N21E30	001	0030	06	CSO	004	B											
16 Nov	N19E15	004	0000	00	AXX	001	A											
17 Nov	N22E02	004	0010	07	BXO	006	B											
18 Nov	N22W11	004																
19 Nov	N22W24	004																
20 Nov	N22W37	004																
21 Nov	N22W50	004																
22 Nov	N22W63	004																
								0	0	0		0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 004



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 8388

14 Nov	N23E55	354	0020	04	BXO	004	B										
15 Nov	N22E43	348	0020	01	HSX	001	A										
16 Nov	N23E29	350	0020	03	CRO	004	B										
17 Nov	N24E17	349	0010	03	CRO	004	B										
18 Nov	N23E02	350	0000	00	AXX	001	A										
19 Nov	N24W10	349	0000	00	AXX	001	A										
20 Nov	N24W23	349															
21 Nov	N24W36	349															
22 Nov	N24W49	349															

0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 350

Region 8389

15 Nov	S19W44	075															
16 Nov	S20W53	072	0020	05	BXO	005	B										
17 Nov	S20W62	068	0000	00	AXX	001	A										
18 Nov	S20W75	068															

0 0 0 0 0 0 0 0

Died on Disk.

Absolute heliographic longitude: 075

Region 8390

17 Nov	N18W47	053	0010	02	BXO	003	B										
18 Nov	N18W60	053															

0 0 0 0 0 0 0 0

Died on Disk.

Absolute heliographic longitude: 053

Region 8391

18 Nov	S17E61	291	0020	05	BXO	003	B										
19 Nov	S16E48	291	0030	09	CRO	009	B					1					
20 Nov	S17E34	292	0060	10	CAO	018	B	1				6					
21 Nov	S17E21	292	0090	12	EAO	017	B	2				4					
22 Nov	S17E07	293	0050	10	CAO	018	B	1				5					

4 0 0 16 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 293

Region 8392

21 Nov	S22E74	239	0090	03	HSX	002	A										
22 Nov	S23E59	241	0030	05	CSO	002	B										

0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 241



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

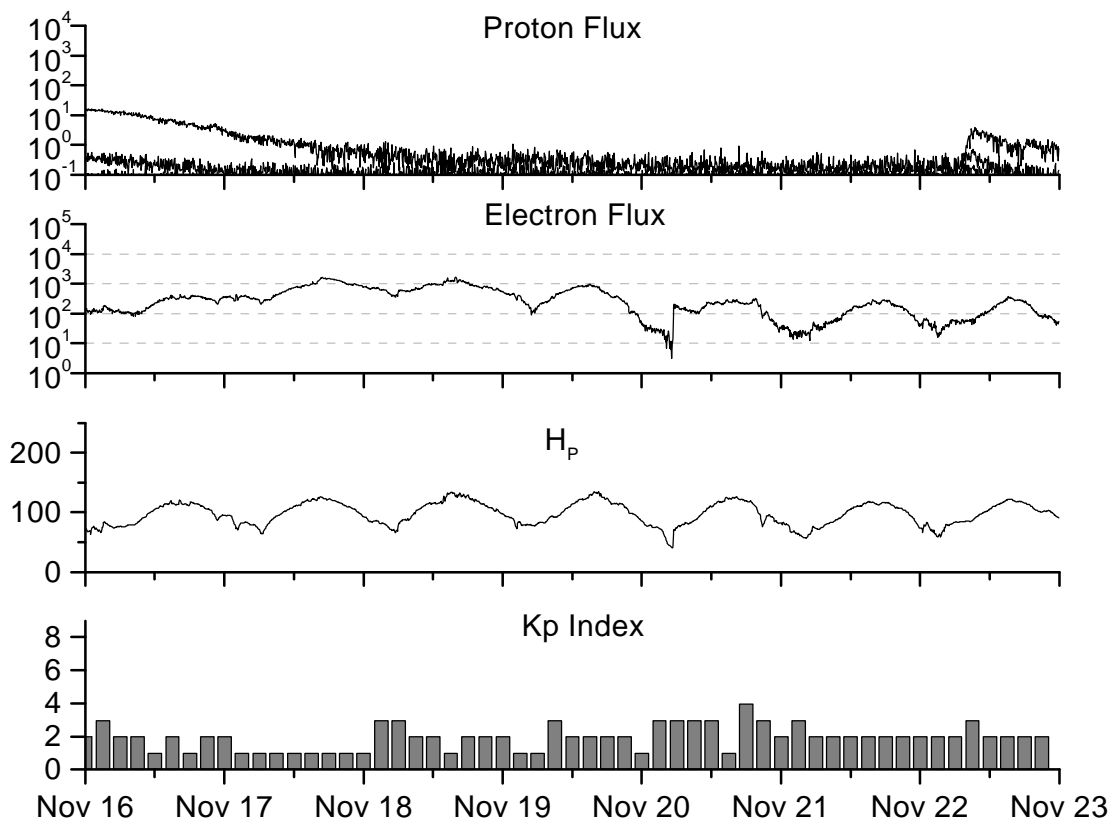
Month	Sunspot Numbers			Radio Flux		Geomagnetic			
	Observed values SWO	Ratio RI	Smooth values RI/SWO	Smooth values SWO	Ratio RI	**Penticton 10.7 cm	Smooth Value	Planetary Ap	Smooth Value
1996									
November	26.7	17.9	0.67	15.4	09.8	78.7	73.0	08	09.1
December	21.1	13.3	0.63	16.2	10.4	77.8	73.3	07	09.3
1997									
January	09.0	05.7	0.63	16.5	10.5	74.0	73.4	09	09.3
February	11.3	07.6	0.67	17.4	11.0	73.8	73.7	11	09.2
March	14.4	08.7	0.60	20.4	13.5	73.5	75.1	08	08.9
April	24.5	15.5	0.63	24.0	16.5	74.5	76.8	10	08.6
May	28.6	18.5	0.65	26.4	18.3	74.6	78.4	08	08.6
June	22.1	12.7	0.57	29.0	20.3	71.7	80.1	07	08.6
July	17.0	10.4	0.61	32.4	22.6	71.1	81.8	06	08.5
August	36.7	24.4	0.66	35.9	25.0	79.0	83.4	07	08.3
September	52.8	51.3	0.88	40.5	28.3	96.2	85.7	10	08.4
October	33.6	22.8	0.68	45.4	31.8	84.9	88.6	11	08.6
November	53.5	39.0	0.73	49.3	35.0	99.5	91.3	11	09.0
December	57.9	41.2	0.71	54.2	39.0*	98.8	94.2*	05	09.5
1998									
January	51.8	31.9	0.62	60.6	43.7*	93.4	97.5*	08	09.9*
February	54.4	40.3	0.74	67.4	48.8*	93.4	101.7*	08	10.5*
March	81.8	54.8	0.67	73.3	53.4*	109.1	105.8*	13	11.2*
April	73.6	53.4	0.73	77.7	56.5*	108.3	109.1*	10	11.4*
May	74.3	56.3	0.76			106.7		18	
June	93.6	70.7*	0.76*			108.4*		10	
July	98.3	66.2*	0.67*			114.0*		11*	
August	118.6	91.7*	0.77*			136.0*		18*	
September	119.0	92.9*	0.78*			138.4*		14*	
October	77.0	55.6*	0.72*			121.9*		13*	

*Preliminary estimates.

The lowest smoothed sunspot indices 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.

** From June 1991 onward, 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 16 November 1998

Protons plot contains the five-minute averaged integral proton flux (protons/ cm^2 -sec-sr) as measured by GOES-8 (W75) for each of three energy thresholds: greater than 10, 50, and 100 MeV.

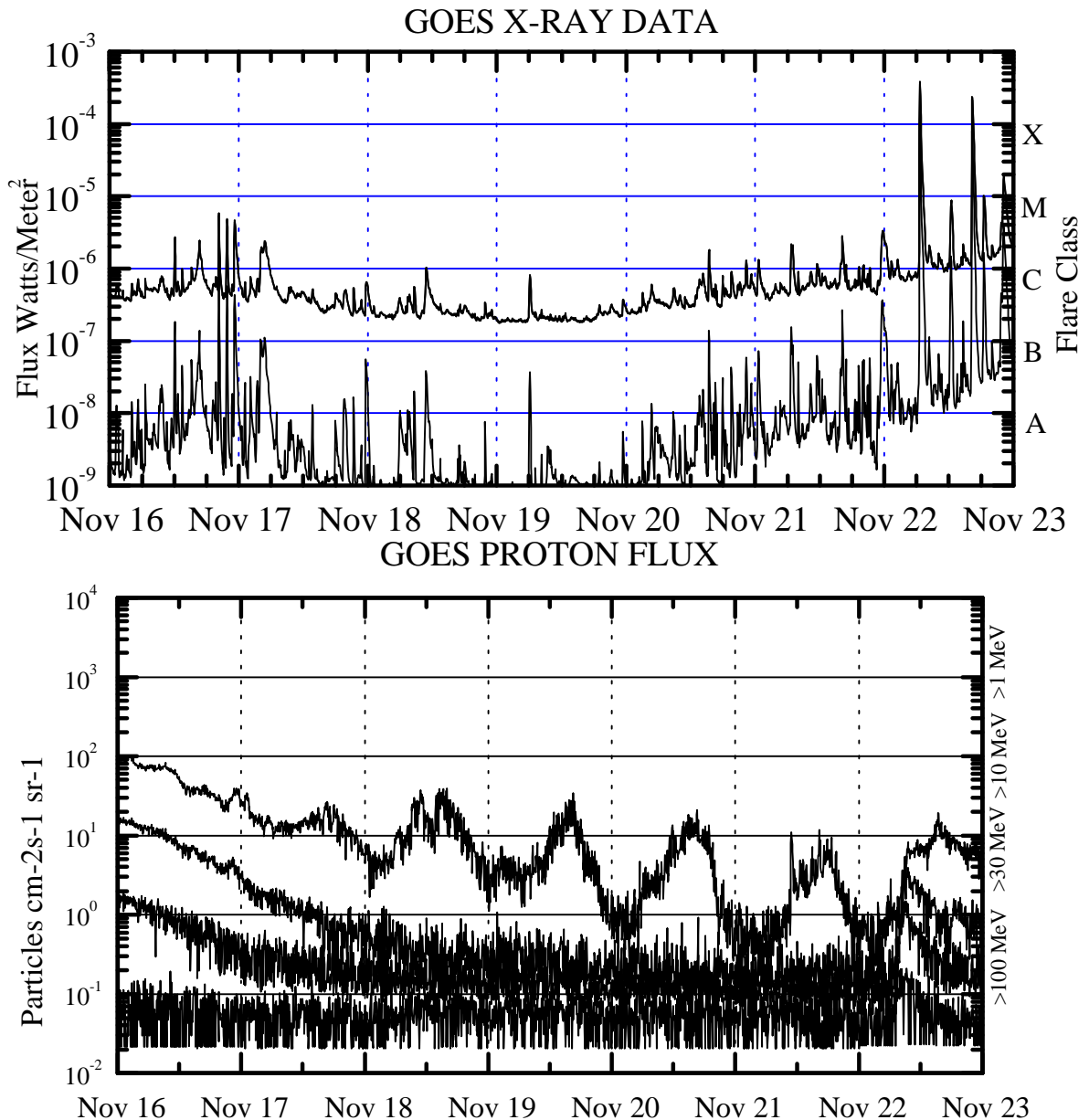
Electrons plot contains the five-minute averaged integral electron flux (electrons/ cm^2 -sec-sr) with energies greater than 2 MeV at GOES-8.

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 USAF 55th Space Weather Squadron) 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 a 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.

