

Activity alternated between low and high levels. High levels occurred on 22 and 25 November due to two major flares from Region 9704 (S18, L = 270, class/area Eki/610 on 22 November), which was the dominant flare producer of the period. The first was a M9/2n at 22/2330 UTC associated with a 9700 sfu Tenflare, several small filament eruptions, a full-halo coronal mass ejection (CME) and a proton event. The other major flare from Region 9704 was a very impulsive X1 at 25/0951 UTC with no significant radio emission. This region also produced frequent C-class flares throughout the period, most of which were impulsive with little or no significant radio emission; the exception being a long duration C4 X-ray flare at 21/1458 UTC associated with Type II and IV radio sweep events, a filament disappearance, and a full-halo CME. Region 9704 was large and magnetically complex but began to show signs of gradual decay late in the period as it approached the west limb. Another event of note was a M3/2b flare at 22/2036 UTC from Region 9698 (S24, L = 301, class/area Dso/130 on 17 November) associated with Type II and IV radio sweep events, a 630 sfu Tenflare, and a proton flux enhancement.

Solar wind data were available from the NASA Advanced Composition Explorer (ACE) spacecraft for most of the period. Note: SWEPAM (velocity, density, and temperature) data were unreliable during approximately 23/0200 - 24/1800 UTC due to a solar proton event. However, the SOHO/MTOF sensor provided reliable data during this interval. A coronal mass ejection (CME) passed the ACE spacecraft beginning approximately 19/1740 UTC associated with increased velocities (peaks to about 610 km/sec), periods of increased southward IMF Bz (maximum deflections to minus 13 nT (GSM)), as well as modest increases in total IMF field intensity and density. These CME effects subsided early on 20 November. Another CME passage began at about 24/0539 UTC, then subsided on 25 November. This passage was associated with strong increases in velocity (peaks as high as 1000 km/sec) and density (peaks to around 90 p/cc), along with periods of strong southward IMF Bz with maximum deflections to minus 40 nT.

A greater than 10 MeV proton event began at 19/1230 UTC, peaked at 20/0010 UTC (34 pfu), and ended at 20/1420 UTC. This event was likely due to a long-duration M2/1n flare from Region 9704 at 17/0525 UTC. Proton events at greater than 10 MeV and greater than 100 MeV occurred in the wake of the M9 flare of 22 November. The greater than 100 MeV event began at 22/2250 UTC, peaked at 23/0850 UTC (4.0 pfu), then ended at 24/1200 UTC. The greater than 10 MeV event began at 22/2320 UTC, reached a peak of 18,900 pfu at 24/0555 UTC, and was in progress and gradually decreasing as the period ended.

The greater than 2 MeV electron flux at geosynchronous orbit was at normal to moderate levels during most of the period. Note: GOES electron flux data were unreliable during 23 – 24 November due to proton contamination.

A weak geomagnetic field disturbance, due to a CME passage, occurred during 19/1800 – 20/0900 UTC with unsettled to active conditions detected. A severe geomagnetic storm occurred on 24 November due to a CME passage (most likely due to the M9 flare/halo CME on 22 November). The disturbance began with two back-to-back sudden impulses: 20 nT at 24/0500 UTC and 80 nT at 24/0555 UTC (as measured by the Boulder USGS magnetometer). Following the sudden impulses, field activity increased to minor to severe storm levels during 24/0600 - 1800 UTC. This disturbance subsided after 24/1800 UTC.



**Space Weather Outlook**  
**28 November – 24 December 2001**

Solar activity is expected to be at low to moderate levels throughout the period with isolated, low-level M-class expected. Isolated major flare activity will also be possible throughout the period.

There will be a slight chance for a proton event during the forecast period.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to be at normal to moderate levels during most of the period.

The geomagnetic field is expected to be at quiet to unsettled levels during most of the period.



### Daily Solar Data

Date	Radio Flux 10.7 cm	Sun spot No.	Sunspot Area (10 <sup>-6</sup> hemi.)	X-ray Background	Flares							
					X-ray Flux			Optical				
					C	M	X	S	1	2	3	4
19 November	191	168	1280	B8.4	8	0	0	6	0	0	0	0
20 November	185	160	1180	B8.7	9	0	0	4	0	0	0	0
21 November	184	132	1150	B8.7	12	0	0	13	0	0	0	0
22 November	190	143	1310	B8.1	6	3	0	7	1	2	0	0
23 November	177	144	1120	M1.5	4	0	0	1	0	0	0	0
24 November	173	124	865	B9.0	14	0	0	19	3	0	0	0
25 November	170	102	850	B9.6	16	0	1	15	0	0	0	0

### Daily Particle Data

Date	Proton Fluence (protons/cm <sup>2</sup> -day-sr)			Electron Fluence (electrons/cm <sup>2</sup> -day-sr)		
	>1MeV	>10MeV	>100MeV	>.6MeV	>2MeV	>4MeV
	19 November	4.4E+7	1.0E+6	3.0E+3		4.9E+6
20 November	1.2E+8	1.1E+6	2.4E+3		5.0E+6	
21 November	3.2E+7	2.3E+5	2.4E+3		3.3E+6	
22 November	1.1E+7	1.2E+5	1.0E+4		2.2E+6	
23 November	4.6E+8	2.5E+8	2.0E+5		1.4E+8	
24 November	2.3E+9	3.8E+8	1.6E+5		2.9E+8	
25 November	9.5E+7	8.7E+6	2.0E+3		1.7E+7	

### Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	12 November	1	1-0-0-0-2-0-0-0	*	*-*-*-*-*-*-*	2
13 November	4	1-2-1-1-2-2-1-1	*	*-*-*-*-*0-1-0	3	1-0-0-0-1-2-2-2
14 November	3	1-1-1-0-2-1-1-0	0	0-0-1-0-0-0-0-0	3	0-0-1-0-1-1-2-1
15 November	5	0-0-0-0-1-3-3-2	12	0-0-0-3-1-4-5-1	7	0-0-0-1-1-4-4-2
16 November	4	1-2-2-2-2-1-0-0	11	1-1-2-3-4-4-1-0	8	2-2-3-2-3-3-1-1
17 November	9	1-1-1-2-2-2-4-3	*	0-1-3-4-5-3-3-*	11	2-3-3-3-4-3-3-3
18 November	8	1-2-2-1-3-3-2-2	*	*-*-*-*-*-*-*	7	2-2-2-2-2-3-2-2



### *Alerts and Warnings Issued*

Date & Time of Issue	Type of Alert or Warning	Date & Time of Event UT
19 Nov 0543	Proton Event >10MeV $\geq$ 10pfu Warning	19/0800 – 20 Nov 0800
19 Nov 1108	K = 4 Warning	19 Nov 1110 – 1500
19 Nov 1200	K = 4 Observed	19 Nov 0900 – 0900
19 Nov 1245	Protons Event >10 MeV $\geq$ 10pfu	19 Nov 1230
19 Nov 1440	EXTENDED K= 4 Warning	19 Nov 1110 -2359
19 Nov 1825	Sudden Impulse observed at Boulder	19 Nov 1815
19 Nov 2202	EXTENDED K= 4 Warning	19/1110 – 20 Nov1500
20 Nov 0006	245 MHz Radio Burst	19 Nov
20 Nov 0006	245 MHz Noise Storm	19 Nov
20 Nov 0100	CONTINUED Protons Event >10 MeV $\geq$ 10pfu	19 Nov 1230
20 Nov 0801	CONTINUED Proton Event >10MeV $\geq$ 10pfu Warning	19/0800 – 20 Nov 2359
20 Nov 0902	A $\geq$ 20 Observed	20 Nov 0900
20 Nov 1718	ENDED Protons Event >10 MeV $\geq$ 10pfu	19 Nov 1230
20 Nov 1740	CANCELLED Proton Event >10MeV $\geq$ 10pfu Warning	19/0800 – 20 Nov 2359
21 Nov 0025	6 – 245 MHz Radio Bursts	20 Nov
21 Nov 0025	245 MHz Noise Storm	20 Nov
21 Nov 1559	Type IV Radio Emission	21 Nov 1324
21 Nov 0053	245 MHz Radio Burst	20 Nov
22 Nov 2048	10cm Radio Burst 630 F.U.	22 Nov 2023
22 Nov 2053	Type II Radio Emission	22 Nov 2022
22 Nov 2142	Proton Event >10MeV $\geq$ 10pfu Warning	22/2145 – 23 Nov 1800
22 Nov 2144	Proton event >100 MeV $\geq$ 1pfu Warning	22/2145 – 23 Nov 1800
22 Nov 2145	A $\geq$ 20 Watch	25 Nov
22 Nov 2242	Type IV Radio Emission	22 Nov 2159
22 Nov 2307	Proton event >100 MeV $\geq$ 1pfu	22 Nov 2250
22 Nov 2327	Type II Radio Emission	22 Nov 2231
22 Nov 2336	Protons Event >10 MeV $\geq$ 10pfu	22 Nov 2320
23 Nov 0011	X-Ray event M9.9/2N/S15W34	22 Nov 2330
23 Nov 0053	Type IV Radio Emission	22 Nov 2235
23 Nov 0112	CONTINUED Proton event >100 MeV $\geq$ 1pfu	22 Nov 2250
23 Nov 0114	CONTINUED Protons Event >10 MeV $\geq$ 10pfu	22 Nov 2320
23 Nov 0122	10cm Radio Burst 8400 F.U.	22 Nov 2159
23 Nov 0127	3 – 245 MHz Radio Bursts	22 Nov
23 Nov 1502	K= 4 Observed	23 Nov 1200 – 1500
23 Nov 1800	CONTINUED Proton event >100 MeV $\geq$ 1pfu Warning	22/2145 – 23 Nov 2359
23 Nov 1801	CONTINUED Proton Event >10MeV $\geq$ 10pfu Warning	22/2145 – 25 Nov 2359
23 Nov 2008	A $\geq$ 20 Watch	24 Nov
23 Nov 2011	A $\geq$ 30 Watch	25 Nov
23 Nov 2012	A $\geq$ 30 Watch	26 Nov
23 Nov 2333	CONTINUED Proton event >100 MeV $\geq$ 1pfu Warning	22/2145 – 24 Nov 1800
24 Nov 0023	CONTINUED Protons Event >10 MeV $\geq$ 10pfu	22 Nov 2320
24 Nov 0027	CONTINUED Proton event >100 MeV $\geq$ 1pfu	22 Nov 2250
24 Nov 0449	K= 5 Warning	24 Nov 0450 – 1800
24 Nov 0508	Sudden Impulse observed at Boulder	24 Nov 0500

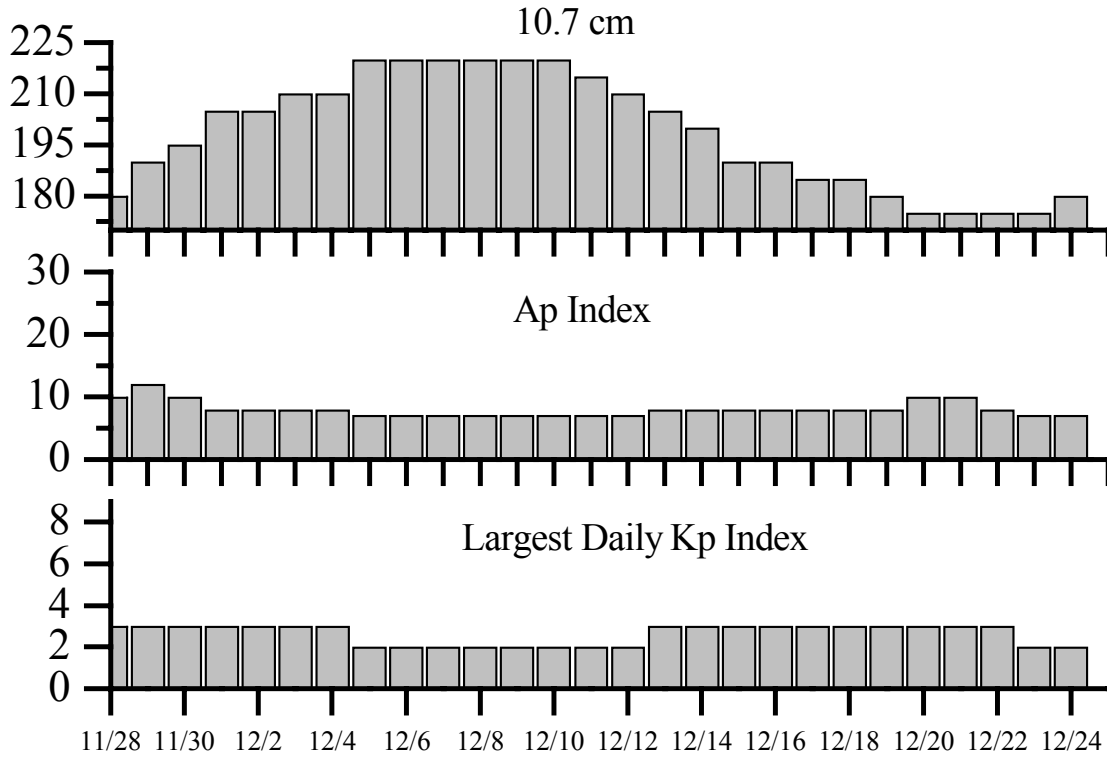


*Alerts and Warnings Issued - continued*

Date & Time of Issue	Type of Alert or Warning	Date & Time of Event UT
24 Nov 0602	Sudden Impulse observed at Boulder	24 Nov 0555
24 Nov 0603	K= 5 Observed	24 Nov 0300 – 0600
24 Nov 0639	K $\geq$ 6 Warning	24 Nov 0640 – 1800
24 Nov 0721	A $\geq$ 30 Warning	24/0900 – 25 Nov 1500
24 Nov 0747	A $\geq$ 50 Warning	24/0900 – 25 Nov 1800
24 Nov 0852	K $\geq$ 7 Observed	24 Nov 0600 – 0900
24 Nov 0853	A $\geq$ 50 Observed	24 Nov 0900
24 Nov 1159	K= 6 Observed	24 Nov 0900 – 1200
24 Nov 1708	EXTENDED K $\geq$ 6 Warning	24 Nov 0640 – 2359
24 Nov 1751	ENDED Proton event >100 MeV $\geq$ 1pfu	24 Nov 1155
24 Nov 2355	K= 4 Warning	25 Nov 0000 – 1800
25 Nov 0100	CONTINUED Protons Event >10 MeV $\geq$ 10pfu	22 Nov 2320
25 Nov 0900	ENDED A $\geq$ 50 Observed	24 Nov 0900
25 Nov 0900	CANCELLED A $\geq$ 50 Warning	24/0900 – 25 Nov 1800
25 Nov 1005	X-Ray event X1.1	25 Nov 0951
25 Nov 2243	CANCELLED A $\geq$ 30 Watch	26 Nov
25 Nov 2257	CONTINUED Proton Event >10MeV $\geq$ 10pfu Warning	22/2145 – 26 Nov 2359
25 Nov 2357	Type II Radio Emission	25 Nov 2258



**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
28 Nov	180	10	3	12 Dec	210	7	2
29	190	12	3	13	205	8	3
30	195	10	3	14	200	8	3
01 Dec	205	8	3	15	190	8	3
02	205	8	3	16	190	8	3
03	210	8	3	17	185	8	3
04	210	8	3	18	185	8	3
05	220	7	2	19	180	8	3
06	220	7	2	20	175	10	3
07	220	7	2	21	175	10	3
08	220	7	2	22	175	8	3
09	220	7	2	23	175	7	2
10	220	7	2	24	180	7	2
11	215	7	2				



### *Energetic Events*

Date	Time		X-ray		Optical Information			Peak		Sweep Freq		
	Begin	Max	½	Class	Integ Flux	Imp/Location		Rgn #	Radio Flux		Intensity	
			Max			Brtns	Lat		CMD	245	2695	II
22 Nov	1700	1708	1725	M1.2	.012	1F	S18W33	9704				
22 Nov	2018	2036	2052	M3.8	.051	2B	S25W67	9698	260	630	3	2
22 Nov	2232	2330	0006	M9.9	.310	2N	S15W34	9704			1	1
25 Nov	0945	0951	0954	X1.1	.031			9704				

### *Flare List*

Date	Time			X-ray Class.	Optical		Rgn
	Begin	Max	End		Imp / Brtns	Location Lat CMD	
19 November	0234	0234	0238		SF	S14E15	9704
	0530	0538	0558	C1.6			
	0650	0701	0742	C4.5	SF	S18E11	9704
	0802	0805	0807	C1.5			
	1157	1204	1207	C2.7			
	1854	1854	1900	C1.6	SF	N14W29	9697
	1938	1938	1944		SF	S17E03	9704
	2002	2010	2030	C3.6	SF	S19E04	9704
	2126	2134	2148	C1.7			
	2323	2325	2339	C1.7	SF	S16E01	9704
20 November	0048	0056	0106	C2.1			
	0147	0204	0241	C3.4	SF	S16E01	9704
	0745	0752	0803	C1.4			
	B1125	U1125	A1239	C2.2	SF	S17W03	9704
	1335	1340	1349	C1.8			
	B1440	U1440	1510	C5.1	SF	S20W04	9704
	1802	1813	1828	C1.2			
	2124	2129	2134	C1.7			
	2227	2228	2241	C2.9	SF	S15W09	9704
	21 November	0126	0127	0129	C1.6	SF	S18W12
	0414	0418	0502	C2.4	SF	S14W12	9704
	0729	0734	0747	C3.5			
	B0833	U0837	0842	C3.7	SF	S18W15	9704
	0850	0900	0904	C2.7			
	0949	0951	0954	C1.4	SF	S21W15	9704
	1007	1007	1013	C1.8	SF	S18W17	9704
	1106	U1111	1130	C4.4	SF	S20W17	9704
	1239	1520	1602	C4.7	SF	S14W19	9704
	1308	1308	1311		SF	S20W17	9704
	1314	1316	1320		SF	S13W18	9704
	1504	1505	1516		SF	S20W18	9704
	1517	1527	1611		SF	S15W20	9704
	1751	1752	1755	C2.8	SF	S20W21	9704
	1808	1818	1838	C6.3	SF	S20W21	9704
	2035	2040	2048	C1.4			



*Flare List - continued.*

Date	Time			X-ray Class.	Optical		Rgn
	Begin	Max	End		Imp / Brtns	Location Lat CMD	
22 November	0006	0012	0017	C1.8			
	0157	0202	0208	C1.3			
	0805	0806	0816	C1.8	SF	S19W29	9704
	1124	1129	1134		SF	S15W33	9704
	1128	1129	1133		SF	N13W63	9697
	1154	1201	1211	C1.9	SF	S21W30	9704
	1453	1454	1507		SF	S12W02	9710
	1534	1541	1550	C1.5			
	1655	1708	1803	M1.2	1F	S18W33	9704
	1829	1835	1837		SF	S16W32	9704
	1845	1845	1854		SF	S14W37	9704
	2022	2026	A2126	M3.8	2B	S25W67	9698
	2158	2215	2228	C5.9			9704
	B2209	2308	0401	M9.9	2N	S15W34	9704
	23 November	0706	0710	0716	C3.6		
0800		0803	0820	C3.1	SF	S16W45	9704
0828		0832	0836	C6.3			9704
2334		2338	2346	C1.7			
24 November	0016	0017	0022	C3.7	SF	S17W52	9704
	0150	0150	0153	C1.4	SF	S17W53	9704
	0449	0456	0509	C7.3	1N	S17W55	9704
	0550	0551	0602	C7.5	SF	S19W50	9704
	0726	0728	0747	C5.6	1N	S18W56	9704
	1252	1257	1331	C1.6	SF	S18W59	9704
	1345	1421	1436		SF	S18W59	9704
	1449	1458	1530	C2.4	1F	S17W60	9704
	1539	1540	1543		SF	S18W60	9704
	1602	1623	1642	C3.8	SF	S19W60	9704
	1650	1652	1701		SF	S18W59	9704
	1709	1714	1726	C5.2	SF	S17W60	9704
	1742	1750	1814	C7.1	SF	S18W60	9704
	1817	1832	1843		SF	S17W63	9704
	1839	1840	1843		SF	N07E71	9715
	1918	1920	1934		SF	S18W61	9704
	1946	1949	1955	C1.4			
	2003	2004	2008		SF	S10W32	9710
	2048	2050	2100		SF	S20W61	9704
	2107	2107	2111	C1.9	SF	S17W64	9704
2115	2117	2123		SF	S18W58	9704	
2125	2129	2132		SF	S19W57	9704	
2144	2145	2151		SF	N03E70	9715	





*Flare List - continued.*

Date	Time			X-ray Class.	Optical		Rgn
	Begin	Max	End		Imp / Brtns	Location Lat CMD	
24 November	2219	2227	2232	C1.9			
	2330	2335	2339	C2.8			
25 November	0103	0114	0124	C4.5	SF	S19W60	9704
	0342	0343	0347		SF	S17W70	9704
	0401	0403	0409	C2.3	SF	S18W69	9704
	0456	0501	0506	C2.3			
	0541	0603	0609	C2.4			
	0624	0630	0636		SF	S12E03	9714
	0842	0843	0846	C3.1	SF	S18W71	9704
	0858	0904	0912	C2.3			
	0924	0927	0930	C7.6			
	0945	0951	0954	X1.1			9704
	1114	1119	1132	C3.6			
	1137	1147	1155	C7.5			
	1300	1313	1328	C1.4			
	1446	1446	1507		SF	N06E65	9715
	1451	1510	1513		SF	N06E64	9715
	1525	1526	1548		SF	N04E64	9715
	1531	1531	1536	C2.3	SF	S18W75	9704
	1546	1548	1556	C7.8	SF	S18W74	9704
	1651	1701	1704	C2.8	SF	S18W72	9704
	1711	1712	1717		SF	S17W73	9704
	1745	1810	1836	C3.1	SF	S18W77	9704
	1835	1835	1843		SF	N03E62	9715
1856	1900	1904	C1.9	SF	S17W70	9704	
2245	2317	2358	C9.0				



### Region Summary

Date	Location		Sunspot Characteristics					Flares																
	Helio		Area (10 <sup>-6</sup> hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical													
	(° Lat ° CMD)	Lon						C	M	X	S	1	2	3	4									
<i>Region 9691</i>																								
07 Nov	N07E64	006	0070	02	HAX	001	A																	
08 Nov	N07E49	008	0090	02	HSX	001	A																	
09 Nov	N07E36	008	0100	02	HSX	001	A																	
10 Nov	N07E24	007	0110	02	HSX	001	A																	
11 Nov	N08E10	008	0100	02	HSX	001	A																	
12 Nov	N08W04	008	0100	02	HSX	001	A																	
13 Nov	N08W17	008	0090	02	HSX	001	A																	
14 Nov	N09W30	008	0060	01	HSX	001	A																	
15 Nov	N09W43	008	0070	04	CSO	003	B																	
16 Nov	N09W56	008	0050	02	CSO	003	B																	
17 Nov	N09W70	008	0070	02	HSX	001	A																	
18 Nov	N08W84	009	0050	01	HSX	001	A																	
19 Nov	N10W95	007	0030	02	HAX	001	A																	

0 0 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 008

<i>Region 9694</i>																						
07 Nov	N14E79	351	0050	02	HSX	001	A															
08 Nov	N14E65	352	0100	02	HSX	001	A															
09 Nov	N13E51	353	0070	02	HSX	001	A															
10 Nov	N13E39	352	0080	02	HSX	001	A															
11 Nov	N13E27	351	0070	03	HSX	003	A															
12 Nov	N13E13	351	0070	02	HSX	001	A															
13 Nov	N14E00	351	0070	02	CSO	002	B															
14 Nov	N14W10	348	0050	01	HSX	001	A															
15 Nov	N14W27	352	0050	02	HSX	001	A															
16 Nov	N14W40	352	0050	05	CSO	003	B															
17 Nov	N14W54	352	0040	01	HSX	001	A															
18 Nov	N13W67	352	0030	02	HSX	001	A															
19 Nov	N14W80	352	0030	01	HSX	001	A															
20 Nov	N15W92	352	0030	02	HAX	001	A															

0 0 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 351



**Region Summary - continued.**

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

*Region 9695*

10 Nov	N11E68	323	0080	03	CSO	002	B											
11 Nov	N11E57	321	0090	02	CAO	002	B											
12 Nov	N10E44	320	0120	04	CAO	005	B											
13 Nov	N11E31	320	0100	04	CAO	004	B											
14 Nov	N11E17	321	0080	02	HSX	002	A											
15 Nov	N11E05	320	0050	02	HSX	003	A											
16 Nov	N12W09	321	0090	03	HSX	002	A											
17 Nov	N12W23	321	0070	02	HSX	001	A											
18 Nov	N11W36	321	0060	02	HSX	001	A											
19 Nov	N12W49	321	0080	02	HSX	001	A											
20 Nov	N12W62	322	0040	02	HSX	001	A											
21 Nov	N12W76	323	0060	02	HSX	001	A											
22 Nov	N12W90	323	0050	03	HSX	001	A											

0 0 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 320

*Region 9696*

10 Nov	S05E68	323	0060	06	DSO	003	B											
11 Nov	S02E57	321	0070	05	DAO	007	B											
12 Nov	S05E44	320	0050	05	DSO	011	B											
13 Nov	S06E31	320	0050	07	DAO	013	B											
14 Nov	S04E16	322	0010	08	CRO	009	B											
15 Nov	S04E04	321	0020	07	CRO	008	B											
16 Nov	S04W09	321	0010	04	BXO	005	B											
17 Nov	S04W22	321																
18 Nov	S04W35	321																
19 Nov	S04W48	321																
20 Nov	S04W61	321																
21 Nov	S04W74	321																

0 0 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 321



**Region Summary - continued.**

Date	Location		Sunspot Characteristics					Flares																
	( ° Lat ° CMD)	Helio	Area (10 <sup>-6</sup> hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical													
		Lon						C	M	X	S	1	2	3	4									
<i>Region 9697</i>																								
11 Nov	N11E76	302	0120	03	HAX	001	A																	
12 Nov	N10E61	303	0200	03	HAX	002	A							1										
13 Nov	N11E47	304	0210	03	CSO	003	B																	
14 Nov	N12E34	304	0220	07	DHO	014	B	1				1	1											
15 Nov	N13E20	305	0330	10	DKI	022	BG																	
16 Nov	N13E07	305	0290	11	EKI	024	BG	1					1											
17 Nov	N13W06	304	0340	09	DKO	019	BG	1				2												
18 Nov	N12W19	304	0330	07	DKI	017	BG					2												
19 Nov	N12W31	303	0330	06	DKO	016	BG	1				1												
20 Nov	N12W45	305	0350	06	DKO	010	BG																	
21 Nov	N13W60	307	0260	05	CKO	006	B																	
22 Nov	N12W73	306	0260	03	HSX	001	A							1										
23 Nov	N11W88	308	0170	04	HSX	001	A																	
								4	0	0	0	8	2	0	0	0	0							

Crossed West Limb.

Absolute heliographic longitude: 304

<i>Region 9698</i>																								
12 Nov	S08W67	071	0050	04	CAO	005	B																	
13 Nov	S24E49	302	0070	04	DSO	003	B																	
14 Nov	S24E35	303	0090	03	DSO	002	B																	
15 Nov	S23E23	302	0090	04	DAO	005	B																	
16 Nov	S23E08	304	0100	04	DAO	004	B																	
17 Nov	S23W03	301	0130	05	DSO	009	B																	
18 Nov	S26W16	301	0110	04	DAO	004	B																	
19 Nov	S24W28	300	0120	05	DAO	008	B																	
20 Nov	S25W41	301	0100	06	DAO	008	B																	
21 Nov	S24W55	302	0110	03	CAO	002	B																	
22 Nov	S25W68	301	0110	02	HSX	001	A			1											1			
23 Nov	S24W82	302	0080	02	HSX	001	A																	
24 Nov	S23W91	298	0060	04	HSX	001	A																	
								0	1	0	0	0	0	1	0	0								

Crossed West Limb.

Absolute heliographic longitude: 301



**Region Summary - continued.**

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

*Region 9703*

14 Nov	N22E12	326	0010	01	A	002	A	1			1						
15 Nov	N23W01	326	0020	04	B	005	B					1					
16 Nov	N23W15	327	0020	05	B	004	B										
17 Nov	N23W28	327															
18 Nov	N23W41	327															
19 Nov	N23W54	327															
20 Nov	N23W67	327															
									1	0	0	2	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 326

*Region 9704*

14 Nov	S18E70	268	0150	02	H	003	A					1					
15 Nov	S18E56	269	0270	05	C	006	B	1				1					
16 Nov	S18E41	271	0430	07	C	014	B										
17 Nov	S18E28	270	0500	09	D	024	B		1		4	1					
18 Nov	S18E16	269	0570	08	D	027	B	2			4						
19 Nov	S16E02	270	0610	07	D	028	B	3			5						
20 Nov	S18W10	270	0540	09	D	030	B	4			4						
21 Nov	S17W24	271	0560	10	D	030	B	9			13						
22 Nov	S18W38	271	0610	14	E	024	B	3	2		5	1	1				
23 Nov	S17W51	271	0620	10	D	026	B	2			1						
24 Nov	S17W63	270	0550	12	E	018	B	11			16	3					
25 Nov	S18W74	268	0430	10	D	008	B	8		1	10						
								43	3	1	64	5	1	0	0		

Still on Disk.

Absolute heliographic longitude: 270



**Region Summary - continued.**

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

*Region 9705*

14 Nov	N14E49	289	0030	07	DRO	002	B											
15 Nov	N12E38	287	0010	01	AXX	001	A											
16 Nov	N12E25	287																
17 Nov	N12E12	287																
18 Nov	N12W05	290	0020	03	BXO	006	B											
19 Nov	N15W17	289	0010	03	BXO	006	B											
20 Nov	N12W31	291	0000	01	AXX	001	A											
21 Nov	N12W44	291																
22 Nov	N12W57	291																
23 Nov	N12W70	291																

0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 290

*Region 9708*

16 Nov	N01E05	307	0010	02	AXX	003	A											
17 Nov	N04W12	310	0010	02	AXX	003	A											
18 Nov	N03W25	310	0030	04	DSO	006	B											
19 Nov	N03W39	311	0020	07	DSO	005	B											
20 Nov	N04W52	312	0020	07	BXO	006	B											
21 Nov	N04W65	312																
22 Nov	N04W78	312																
23 Nov	N04W91	312																

0 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 307

*Region 9709*

16 Nov	N20E39	273	0010	03	BXO	003	B											
17 Nov	N21E25	273	0020	05	BXO	006	B											
18 Nov	N20E11	274	0020	04	BXO	003	B											
19 Nov	N20W02	274																
20 Nov	N20W15	274																
21 Nov	N20W28	274																

0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 274



**Region Summary - continued.**

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

*Region 9710*

18 Nov	S10E46	239	0050	02	CAO	004	B												
19 Nov	S12E32	240	0050	06	DAO	012	B												
20 Nov	S11E18	242	0090	07	DAO	012	B												
21 Nov	S11E05	242	0090	10	DSO	018	B												
22 Nov	S11W08	241	0100	11	EAO	015	B					1							
23 Nov	S11W22	242	0070	12	CAO	010	B												
24 Nov	S11W37	244	0040	06	CSO	006	B					1							
25 Nov	S09W53	247	0030	05	CSO	003	B												
												0	0	0	2	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 242

*Region 9711*

20 Nov	S16W23	283	0010	01	HRX	001	A												
21 Nov	S12W38	285	0020	01	HSX	001	A												
22 Nov	S12W51	285																	
23 Nov	S15W64	284																	
24 Nov	S15W77	284																	
25 Nov	S15W90	284																	
												0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 283

*Region 9712*

21 Nov	N13E71	176	0050	06	CSO	004	B												
22 Nov	N12E58	175	0090	05	DSO	007	B												
23 Nov	N11E43	177	0080	05	DAO	011	B												
24 Nov	N11E30	177	0090	07	DAO	015	B												
25 Nov	N12E16	178	0080	08	DAO	018	B												
												0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 178

*Region 9713*

22 Nov	N08E03	230	0040	05	DSO	010	B												
23 Nov	N08W11	231	0040	07	DSO	009	B												
24 Nov	N08W25	232	0005	04	BXO	005	B												
25 Nov	N08W38	232																	
												0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 230





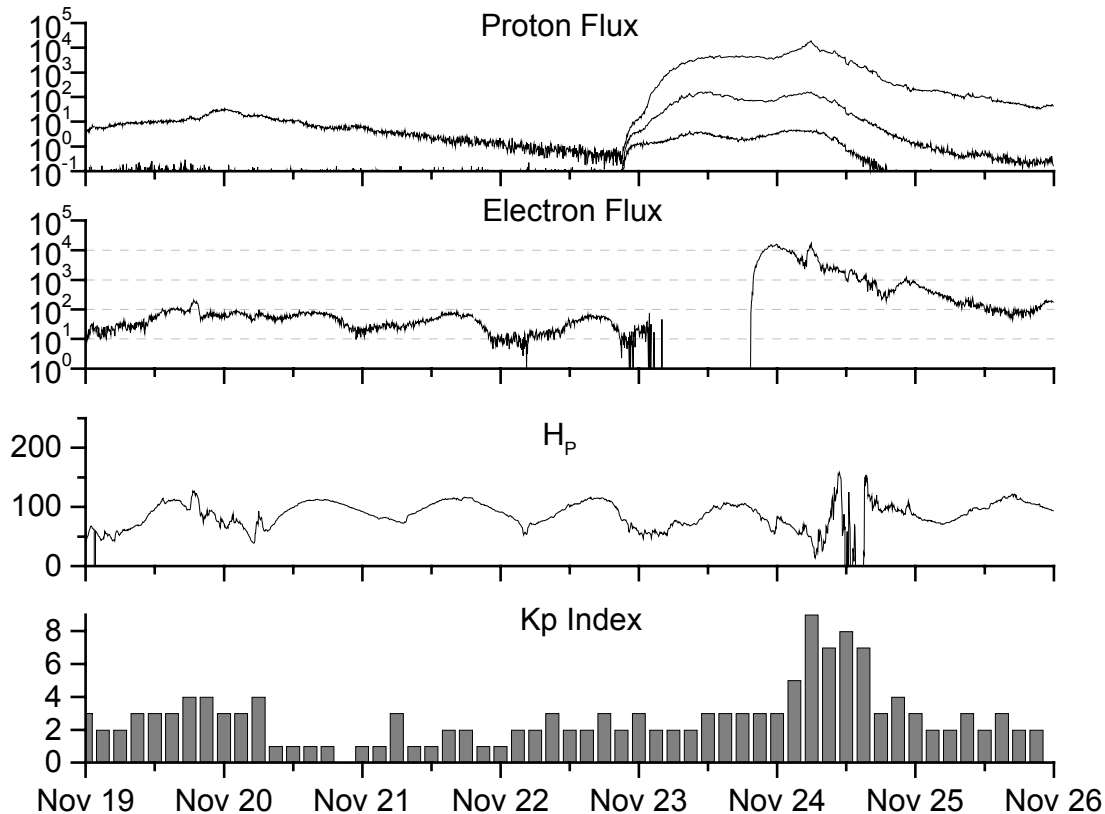


**Recent Solar Indices (preliminary)  
of the observed monthly mean values**

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
<b>1999</b>									
November	199.3	133.2	0.67	164.7	110.0	191.5	171.5	14	13.1
December	123.5	86.4	0.69	165.9	111.1	169.8	173.4	10	13.8
<b>2000</b>									
January	140.8	90.1	0.64	168.0	112.9	158.1	175.5	13	14.5
February	161.9	112.9	0.70	172.1	116.7	173.2	176.8	15	15.0
March	203.6	138.5	0.68	175.4	119.9	208.2	178.4	09	15.0
April	193.4	125.5	0.65	176.3	120.8	184.2	180.5	15	15.0
May	188.8	121.6	0.64	173.1	119.0	184.5	180.0	15	15.0
June	190.3	124.9	0.66	172.0	118.7	179.8	179.7	15	15.1
July	236.7	169.1	0.71	173.0	119.7	204.7	180.2	21	14.8
August	166.6	130.5	0.78	171.8	118.6	163.1	179.5	16	14.2
September	157.9	109.9	0.70	169.0	116.2	182.1	177.1	18	14.2
October	138.9	100.1	0.72	166.2	114.4	167.7	175.6	18	14.6
November	149.9	106.5	0.71	162.7	112.7	178.8	173.6	17	14.6
December	146.4	104.5	0.71	160.8	112.1	173.6	172.0	08	14.4
<b>2001</b>									
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			148.7		12	
June	196.7	134.0	0.68			173.7		12	
July	124.6	82.2	0.66			131.3		11	
August	159.4	106.8	0.67			163.2		13	
September	229.1	150.7	0.66			233.3		12	
October	197.4	125.6	0.64			208.2		18	

**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 19 November 2001*

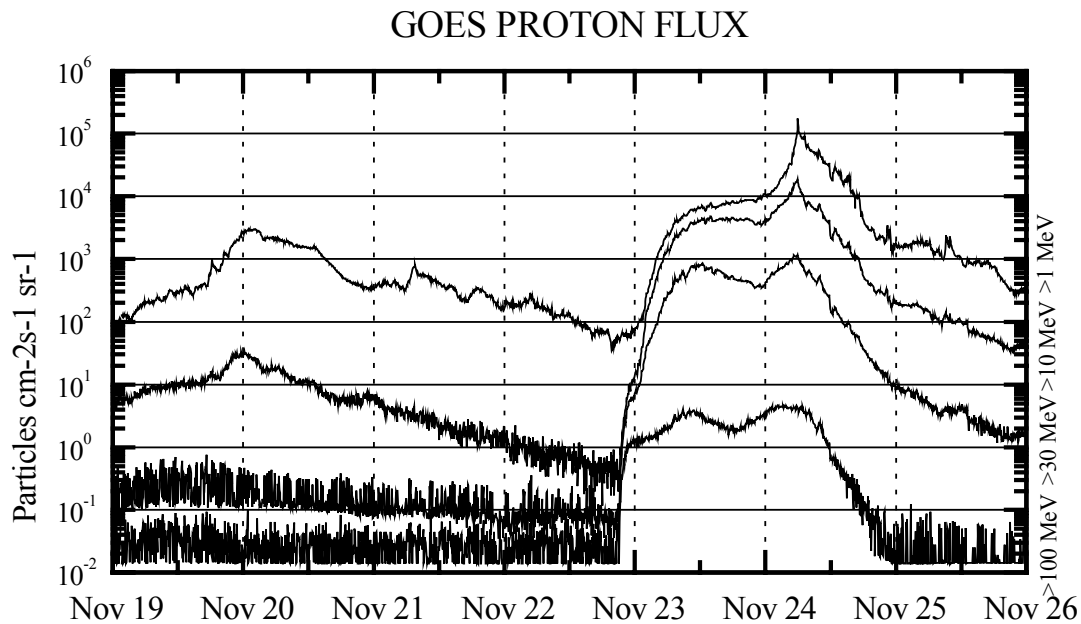
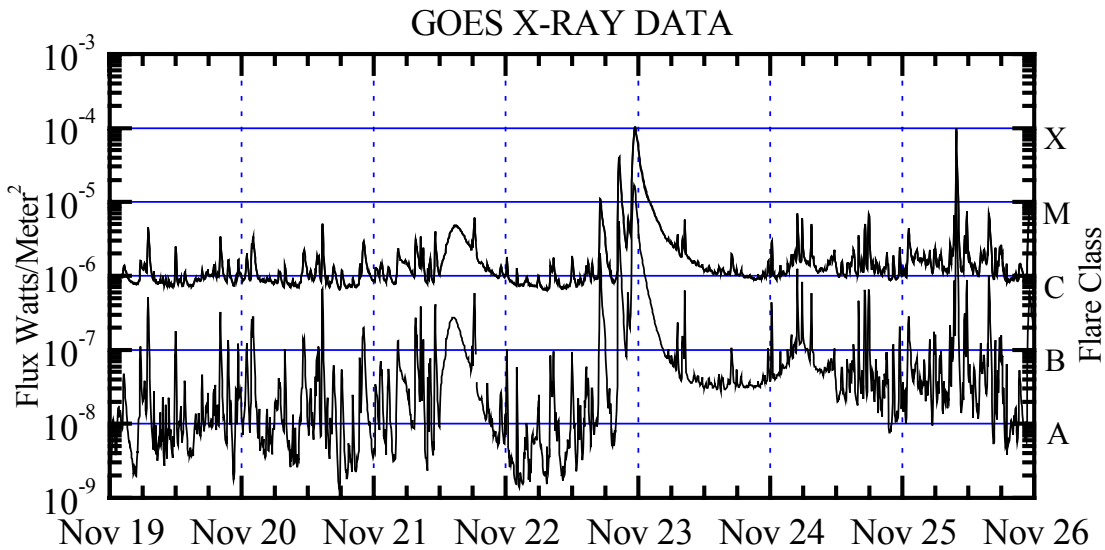
*Protons* plot contains the five-minute averaged integral proton flux (protons/cm<sup>2</sup>-sec -sr ) as measured by GOES-8 (W75) for each of three energy thresholds: greater than 10, 50, and 100 MeV.

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

*H<sub>p</sub>* 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<sub>p</sub>* 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<sub>p</sub> 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<sub>p</sub> are “ global ” parameters that are applicable to a first order approximation over large areas. H<sub>p</sub> 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<sup>2</sup>) 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/cm<sup>2</sup>-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/cm<sup>2</sup>-sec-sr) at greater than 10 MeV.

