

Solar activity ranged from low to high levels. The period began with moderate level activity on 17 – 19 November. Region 501 (N03, L=002, class/area DhC/410 on 18 November) produced the first of nine M-class flares at 0905 UTC on 17 November, an M4.2/1n flare. This flare was accompanied by a Type II (445 km/s) radio sweep and a CME with an estimated plane of sky speed of 1085 km/s. On 18 November, a pair of M3/2n flares was observed from Region 501 with peak flux times at 0752 and 0831 UTC. Strong radio bursts, a Tenflare, a Type IV, and two separate Type II radio sweeps were associated with the M3s. Simultaneous with the first flare, a fourteen-degree filament to the south and west of Region 501 erupted at 0716 UTC. LASCO imagery depicted a full halo CME as a combined result of these events. An impulsive M1 flare was observed from Region 501 on 19 November. High level activity occurred on 20 November due to an M9.6/2b flare at 0747 UTC and an M5.8 flare at 2353 UTC. The M9 was associated with a Type IV radio sweep, a 9700 sfu Tenflare, and a faint full halo CME. New regions 507 (N10, L=295, class/area Eki/890 on 19 November) and 508 (S20, L=286, class/area Dko/680 on 20 November) rotated onto the east limb on 18 and 19 November respectively. Regions 507 and 508 are thought to be old Region 488 and 486, respectively. Both of these regions appear to have maintained at least some of their complex magnetic structure during their transit on the backside of the Sun; although old Region 486 has decayed considerably. Region 507 has shown some mix polarities and a beta-gamma-delta configuration while Region 508 had a beta-gamma configuration for most of the period. An M4.5 event was observed at 1011 UTC on 18 November and appears to have originated from Region 508 just prior to it rotating onto the disk. Activity on 21 – 23 November decreased to low levels as Regions 501, 507 and 508 exhibited some level of decay and simplification in magnetic complexity. Region 501 simplified to a beta-gamma magnetic configuration on 22 November.

Solar wind data were available from the NASA Advanced Composition Explorer (ACE) spacecraft during most of the summary period. A coronal hole high speed stream was in progress at the beginning of the period with wind speed near 825 km/s. On 19 November, wind speed dropped off to around 450 km/s as the coronal hole rotated beyond a geoeffective position. A shock from the CME on 18 November was observed passing the L1 point at 0740 UTC on 20 November. The MTOF/PM instrument on the SOHO spacecraft recorded a 350 km/s increase in solar wind speed to over 800 km/s. The NASA/ACE satellite data were not available during the shock however, post shock data indicated total IMF measured close to 60 nT and the Bz component decreased to around -60 nT. Towards the end of the period, 22 –23 November, a second coronal hole high speed stream rotated into a geoeffective position producing elevated solar wind speed at around 575 km/s.

The M5 flare late on 20 November was the likely source of a greater than 10 MeV proton event starting at 2355 UTC on 21 November. The small event reached a peak value of 13.9 pfu at 0230 UTC on 22 November, and ended at 0715 UTC on 22 November.

The greater than 2 MeV electron flux at geosynchronous orbit reached high levels on 17 – 20 November and again on 23 November.



Geomagnetic activity ranged from quiet to severe storm levels. The period began with unsettled to minor storm levels on 17 November and unsettled to active levels on 18 – 19 November. This activity was due to the coronal hole high speed stream in progress during the early part of the period. On 20 November, a CME shock from the activity on 18 November produce major to severe geomagnetic storming on 20 November and early on 21 November. This geomagnetic storm began following a 56 nT sudden impulse measured on the Boulder magnetometer at 0804 UTC on 20 November. GOES satellites observed magnetopause crossings on 20 November, GOES 12 at 1301 UTC and GOES 10 at 1628 UTC. Activity on 22 and 23 November was at active to minor storm levels due to another coronal hole high speed stream.

Space Weather Outlook 26 November - 22 December 2003

Solar activity is expected to range from very low to moderate levels with a small chance of high level activity. Activity is expected to be at low to moderate levels with high level activity possible during the first week of the period. Activity after 02 December when Regions 507 and 508 rotate beyond the west limb is expected to be at very low to moderate levels.

Proton producing flares are possible from Region 507, and 508 during the first week of the period. After 02 December, no greater than 10 MeV proton events are expected.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to reach high levels on 09 – 15 December due to a large trans-equatorial coronal hole.

The geomagnetic field is expected to range from quiet to major storm levels. A large trans-equatorial coronal hole is due to return to a geoeffective position on 06 – 13 December and is expected to produce minor to major storming.



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
17 November	121	72	400	B7.2	6	2	0	0	1	0	0	0
18 November	144	90	900	C1.1	4	4	0	3	0	1	0	0
19 November	155	114	2140	B8.4	8	1	0	1	2	0	0	0
20 November	175	118	2010	B7.3	9	3	0	3	1	2	0	0
21 November	177	131	1700	B6.1	5	0	0	3	0	0	0	0
22 November	176	123	1660	B6.2	6	0	0	3	0	0	0	0
23 November	178	158	1570	B5.9	7	0	0	4	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
17 November	7.9E+6	1.1E+4	1.8E+3		5.7E+8	
18 November	1.2E+7	1.9E+4	1.9E+3		5.8E+8	
19 November	8.0E+6	2.3E+4	1.9E+3		7.7E+8	
20 November	1.6E+7	1.5E+5	2.3E+3		9.6E+7	
21 November	2.3E+7	3.2E+5	1.9E+3		1.7E+6	
22 November	2.8E+7	7.3E+5	2.0E+3		5.8E+6	
23 November	2.0E+7	5.4E+5	1.8E+3		3.3E+7	

Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	17 November	21	4-3-3-3-4-4-3-4	60	4-5-4-7-6-6-5-4	34
18 November	18	5-3-3-2-3-3-3-3	36	4-4-4-6-5-4-5-2	20	4-4-4-4-4-4-3-2
19 November	12	2-2-3-2-2-2-4-3	20	3-2-4-5-4-3-3-1	14	2-3-4-4-3-3-3-2
20 November	67	1-3-5-6-5-7-7-6	161	0-3-9-7-9-8-7-7	117	1-3-6-7-7-8-9-7
21 November	18	4-4-5-3-2-2-2-1	38	4-6-6-4-4-4-4-2	39	7-6-6-4-3-3-3-2
22 November	14	3-2-1-2-3-2-4-4	44	4-3-3-3-5-7-6-3	22	3-3-3-3-3-5-5-4
23 November	13	2-4-3-2-3-2-3-3	37	4-6-4-5-5-4-4-3	21	3-5-4-3-3-3-4-4



Alerts and Warnings Issued

Date & Time of Issue	Type of Alert or Warning	Date & Time of Event UT
17 Nov 0033	245 MHz Radio Burst	16 Nov
17 Nov 0518	ALERT: Electron 2MeV Integral Flux > 1000pfu	17 Nov 0500
17 Nov 0935	SUMMARY: 10cm Radio Burst	17 Nov 0859
17 Nov 0937	ALERT: Type II Radio Emission	17 Nov 0917
17 Nov 1457	EXTENDED WARNING: Geomagnetic K= 5	15 Nov 0704 – 18/1500
18 Nov 0010	3 – 245 MHz Radio Bursts	17 Nov
18 Nov 0010	245 MHz Noise Storm	17 Nov
18 Nov 0519	ALERT: Electron 2MeV Integral Flux > 1000pfu	18 Nov 0500
18 Nov 0815	ALERT: Type II Radio Emission	18 Nov 0747
18 Nov 0828	ALERT: Type IV Radio Emission	18 Nov 0811
18 Nov 0859	SUMMARY: 10cm Radio Burst	18 Nov 0740
18 Nov 1454	WARNING: Geomagnetic K= 4	18 Nov 1455 – 2359
18 Nov 2203	WATCH: Geomagnetic A ≥ 20	19 Nov
18 Nov 2205	WATCH: Geomagnetic A ≥ 30	20 Nov
18 Nov 2216	WATCH: Geomagnetic A ≥ 30	21 Nov
18 Nov 2312	EXTENDED WARNING: Geomagnetic K= 4	18 Nov 1455 – 19/2359
19 Nov 0040	3 – 245 MHz Radio Bursts	18 Nov
19 Nov 0040	245 MHz Noise Storm	18 Nov
19 Nov 0520	ALERT: Electron 2MeV Integral Flux > 1000pfu	19 Nov 0500
19 Nov 1613	SUMMARY: 10cm Radio Burst	19 Nov 1456
19 Nov 2356	EXTENDED WARNING: Geomagnetic K= 4	18 Nov 1455 – 20/2359
20 Nov 0028	245 MHz Radio Burst	19 Nov
20 Nov 0028	245 MHz Noise Storm	19 Nov
20 Nov 0256	SUMMARY: 10cm Radio Burst	20 Nov 0151
20 Nov 0515	ALERT: Electron 2MeV Integral Flux > 1000pfu	20 Nov 0500
20 Nov 0742	SUMMARY: 10cm Radio Burst	20 Nov 0726
20 Nov 0744	ALERT: X-Ray Flux exceeded M5	20 Nov 0742
20 Nov 0757	WARNING: Geomagnetic Sudden Impulse expected	20 Nov 0810 – 0845
20 Nov 0801	SUMMARY: X-ray Event exceeded M5	20 Nov 0735
20 Nov 0815	SUMMARY: Geomagnetic Sudden Impulse	20 Nov 0840
20 Nov 0818	WARNING: Geomagnetic K= 6	20 Nov 0817 – 21/1500
20 Nov 0824	ALERT: Type IV Radio Emission	20 Nov 0731
20 Nov 0826	SUMMARY: 10cm Radio Burst	20 Nov 0736
20 Nov 0839	ALERT: Geomagnetic K = 5	20 Nov 0839
20 Nov 0909	WARNING: Proton 10MeV Integral Flux above 10pfu expected	20 Nov 1000 – 2359
20 Nov 1026	ALERT: Geomagnetic K = 6	20 Nov 1023
20 Nov 1218	ALERT: Geomagnetic K = 6	20 Nov 1215
20 Nov 1221	WARNING: Geomagnetic K ≥ 7	20 Nov 1220 – 2359
20 Nov 1226	ALERT: Geomagnetic K = 7	20 Nov 1225
20 Nov 1541	ALERT: Geomagnetic K = 6	20 Nov 1540
20 Nov 1636	ALERT: Geomagnetic K = 7	20 Nov 1631
20 Nov 1655	ALERT: Geomagnetic K = 8	20 Nov 1650
20 Nov 1820	CANCEL WARNING: Proton 10MeV Integral Flux above 10pfu expected	20 Nov 0909
20 Nov 1938	ALERT: Geomagnetic K = 7	20 Nov 1932
20 Nov 2020	ALERT: Geomagnetic K = 8	20 Nov 2016
20 Nov 2351	ALERT: X-Ray Flux exceeded M5	20 Nov 2351
21 Nov 0016	SUMMARY: 10cm Radio Burst	21 Nov 2347
21 Nov 0019	SUMMARY: X-ray Event exceeded M5	20 Nov 2342
21 Nov 0101	8 – 245 MHz Radio Bursts	20 Nov
21 Nov 0547	ALERT: Geomagnetic K = 6	21 Nov 0547
21 Nov 1502	WATCH: Geomagnetic A ≥ 20	22 Nov
21 Nov 2011	WARNING: Proton 10MeV Integral Flux above 10pfu expected	Nov 21 2030 – 22/1500
21 Nov 2354	WARNING: Geomagnetic K= 4	22 Nov 0000 – 1500

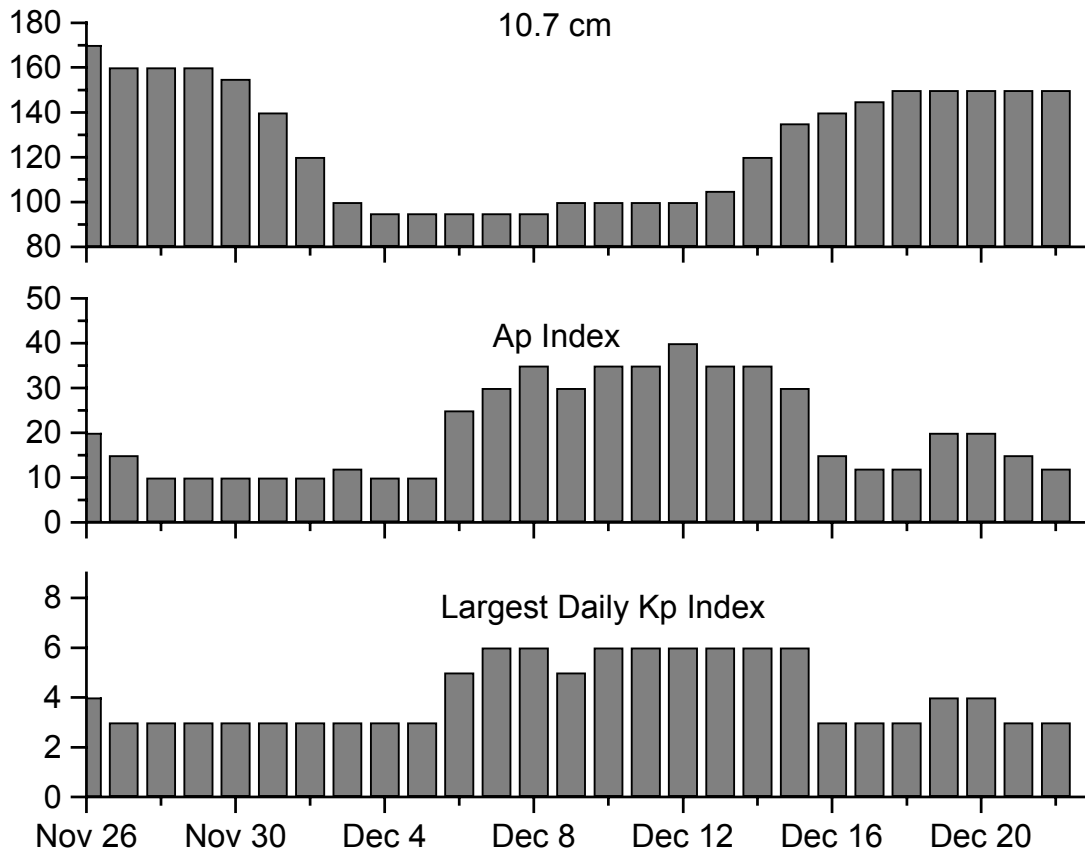


Alerts and Warnings Issued - continued.

<u>Date & Time of Issue</u>	<u>Type of Alert or Warning</u>	<u>Date & Time of Event UT</u>
22 Nov 0013	ALERT: Proton Event 10MeV Integral Flux exceeded 10pfu	21 Nov 2355
22 Nov 0024	5 – 245 MHz Radio Bursts	21 Nov
22 Nov 1624	WARNING: Geomagnetic K= 4	22 Nov 1630 – 2359
22 Nov 1649	ALERT: Geomagnetic K = 4	22 Nov 1646
22 Nov 2217	WATCH: Geomagnetic A \geq 20	23 Nov
22 Nov 2326	EXTENDED WARNING: Geomagnetic K= 4	22 Nov 1630 – 23/1500
23 Nov 0013	5 – 245 MHz Radio Bursts	22 Nov
23 Nov 0053	SUMMARY: Proton Event 10MeV Integral Flux exceeded 10pfu	21 Nov 2355
23 Nov 0522	ALERT: Geomagnetic K = 5	23 Nov 0520
23 Nov 1541	ALERT: Electron 2MeV Integral Flux > 1000pfu	23 Nov 1520
23 Nov 2340	WARNING: Geomagnetic K= 4	23 Nov 2359 – 24/1500



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
26 Nov	170	20	4	10 Dec	100	35	6
27	160	15	3	11	100	35	6
28	160	10	3	12	100	40	6
29	160	10	3	13	105	35	6
30	155	10	3	14	120	35	6
01 Dec	140	10	3	15	135	30	6
02	120	10	3	16	140	15	3
03	100	12	3	17	145	12	3
04	95	10	3	18	150	12	3
05	95	10	3	19	150	20	4
06	95	25	5	20	150	20	4
07	95	30	6	21	150	15	3
08	95	35	6	22	150	12	3
09	100	30	5				



Energetic Events

Date	Time		X-ray		Optical Information			Peak		Sweep Freq			
	Begin	Max	½ Max	Class	Integ Flux	Imp/ Brtns	Location		Rgn #	Radio Flux		Intensity	
							Lat	CMD		245	2695	II	IV
17 Nov	0128	0134	0139	M1.2	.005				501	64			
17 Nov	0855	0905	0919	M4.2	.037	1n	S01E33		501	6900	700	1	
18 Nov	0134	0139	0142	M1.8	.006				501	720	100		
18 Nov	0723	0752	0806	M3.2	.051	2n	N00E18		501	1400	1900	3	
18 Nov	0812	0831	0859	M3.9	.084				501			2	
18 Nov	0923	1011	1101	M4.5	.190					220	98		
19 Nov	0355	0401	0406	M1.7	.006	1n	N01E06		501		130		
20 Nov	0147	0212	0228	M1.4	.024	1n	N03W08		501		190		
20 Nov	0735	0747	0753	M9.6	.060	2b	N01W08		501	230	9700	1	
20 Nov	2342	2353	2358	M5.8	.028	2b	N02W17		501	340	740		

Flare List

Date	Time			X-ray Class.	Optical Imp / Brtns	Location Lat CMD	Rgn
	Begin	Max	End				
17 November	0128	0134	0139	M1.2			501
	0210	0213	0217	C2.2			501
	0518	0527	0537	C2.2			507
	0859	0903	A1004	M4.2	1n	S01E33	501
	1247	1252	1257	C2.5			501
	1341	1349	1401	C2.5			507
	2001	2008	2016	C3.1			507
	2130	2145	2154	C1.7			501
18 November	0053	0102	0110	C4.1			
	0134	0139	0142	M1.8			501
	B0533	0533	0538	C3.8	Sf	S01E20	501
	0716	0754	0955	M3.2	2n	N00E18	501
	0812	0831	0859	M3.9			501
	0923	1011	1101	M4.5			
	2148	2148	2151	C2.2	Sf	N10E90	507
	2215	2222	2237	C6.1			
2311	2313	2320		Sf	S02E10	501	
19 November	0106	0116	0123	C2.4			501
	0358	0402	0419	M1.7	1n	N01E06	501
	B0819	U0819	0902	C8.8	1f	N03E01	501
	0926	0933	0938	C4.9			501
	1146	1158	1243	C2.8			506
	1414	1419	1428	C3.9			
	1447	U1449	1449		Sf	N03W03	501
	1455	1519	1553	C9.1			506
2122	2126	2128	C1.1			506	
2205	2210	2219	C2.3			506	
20 November	0115	0119	0128	C2.1			
	0148	0152	0238	M1.4	1n	N03W08	501



Flare List - continued.

Date	Time			X-ray Class.	Optical		Rgn
	Begin	Max	End		Imp / Brtns	Location Lat CMD	
20 November	B0448	U0449	0452	C4.3	Sf	S17E73	508
	0727	0728	0735	C3.8	Sf	N03W12	501
	0738	0740	0836	M9.6	2b	N01W08	501
	1013	1018	1023	C4.1			
	1231	1237	1241	C3.5			
	1437	1440	1457	C1.7	Sf	N09E59	507
	1654	1658	1702	C1.7			
	1908	1929	1937	C8.6			
	2242	2258	2303	C1.3			
	2346	2354	0031	M5.8	2b	N02W17	501
21 November	0230	0233	0237	C1.0			
	0436	0436	0446		Sf	N12E46	507
	0521	0528	0548		Sf	N13E45	507
	0940	0944	0948	C4.3	Sf	S23E36	506
	1249	1253	1257	C1.0			
	1651	1655	1710	B9.2			
	1908	1916	1921	C3.4			
22 November	2039	2043	2047	C1.1			508
	0145	0150	0156		Sf	N05W31	501
	0249	0253	0256	C2.1			
	0314	0342	0354	C2.0			
	0526	0526	0528	C1.1	Sf	N03W37	501
	1422	1428	1432	C1.7			507
	1836	1837	1839	C1.2	Sf	N07E26	507
	2058	2113	2131	C3.9			
23 November	0010	0014	0016	C1.0			
	0124	0128	0133	C1.0			
	0352	0356	0404	B8.8			
	0716	0717	0721		Sf	S15E26	508
	B0856	U0857	0908		Sf	N00W51	501
	1158	1209	1221	C1.2			
	1602	1602	1610	C1.5	Sf	S21E12	506
	1745	1750	1755	C1.2			507
	2210	2215	2220	C1.0			
2341	2342	2357	C2.8	Sf	S13E12	508	



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	4			
<i>Region 501</i>																		
13 Nov	N05E65	012	0340	20	Fso	003	B	2										
14 Nov	N04E61	002	0340	08	Dki	011	Bg	4										
15 Nov	N03E48	002	0340	06	Dki	014	Bg	3			1							
16 Nov	N03E35	002	0380	05	Dki	020	Bg	3			2							
17 Nov	N03E22	002	0370	08	Dki	025	Bg	3	2			1						
18 Nov	N03E09	002	0410	10	Dhc	026	Bgd	1	3		2		1					
19 Nov	N03W05	002	0380	09	Dko	022	Bg	3	1		1	2						
20 Nov	N02W18	002	0340	05	Dki	015	Bgd	1	3		1	1	2					
21 Nov	N04W32	004	0310	06	Dki	014	Bgd											
22 Nov	N03W44	003	0250	06	Dki	008	Bg	1			2							
23 Nov	N03W57	003	0250	08	Dki	006	Bg				1							
								19	11	0	10	4	3	0	0			

Still on Disk.

Absolute heliographic longitude: 002

Region 502

14 Nov	N05E41	022	0010	03	Bxo	003	B											
15 Nov	N04E27	023	0000	01	Axx	001	A											
16 Nov	N04E24	013									1							
17 Nov	N07E04	020	0000	01	Axx	001	A											
18 Nov	N07W09	020																
								0	0	0	1	0	0	0	0	0		

Still on Disk.

Absolute heliographic longitude: 020

Region 503

15 Nov	N17E09	041	0020	03	Dao	007	B											
16 Nov	N17W05	042	0010	05	Cso	003	B											
17 Nov	N17W18	042	0010	05	Bxo	003	B											
18 Nov	N18W32	043																
								0	0	0	0	0	0	0	0	0		

Still on Disk.

Absolute heliographic longitude: 042



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 504

16 Nov	N04W51	088	0000	01	Axx	001	A										
17 Nov	N04W64	088															
18 Nov	N04W73	084	0010	03	Bxo	004	B										
19 Nov	N05W85	082	0030	02	Cro	003	B										
20 Nov	N05W98	082															
								0	0	0	0	0	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 88

Region 505

17 Nov	S22E58	326	0020	03	Cso	003	B										
18 Nov	S22E45	326	0030	03	Cro	003	B										
19 Nov	S22E32	325	0030	02	Cro	003	B										
20 Nov	S23E19	325	0030	02	Cro	003	B										
21 Nov	S22E07	325	0020	01	Axx	002	A										
22 Nov	S22W06	325	0010	03	Bxo	003	B										
23 Nov	S22W21	327	0010	03	Bxo	002	B										
								0	0	0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 325

Region 506

18 Nov	S23E72	299	0090	06	Dao	003	B										
19 Nov	S21E59	298	0110	10	Dso	010	B	4									
20 Nov	S23E44	300	0120	06	Dso	010	B										
21 Nov	S21E32	300	0060	05	Cao	010	B	1			1						
22 Nov	S21E18	301	0070	04	Cao	008	B										
23 Nov	S22E05	301	0020	05	Bxo	011	B	1			1						
								6	0	0	2	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 301

Region 507

18 Nov	N10E78	293	0360	05	Eko	004	Bd	1			1						
19 Nov	N10E62	295	0890	11	Eki	011	Bgd										
20 Nov	N07E49	295	0840	10	Dki	022	Bgd	1			1						
21 Nov	N09E36	296	0800	11	Eki	028	Bg	2									
22 Nov	N09E22	297	0810	12	Eki	029	Bg	2			1						
23 Nov	N09E10	296	0810	12	Ekc	042	Bgd	1									
								5	0	0	5	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 296



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 508</i>																						
19 Nov	S17E75	282	0700	11	Eko	005	B															
20 Nov	S20E58	286	0680	10	Dko	018	Bg	1				1										
21 Nov	S18E47	285	0510	16	Fai	027	Bg	1														
22 Nov	S17E34	285	0520	12	Eki	025	Bg															
23 Nov	S17E20	286	0480	12	Ekc	047	Bg	1				2										
								3	0	0	3	0	0	0	0	0						

Still on Disk.

Absolute heliographic longitude: 286

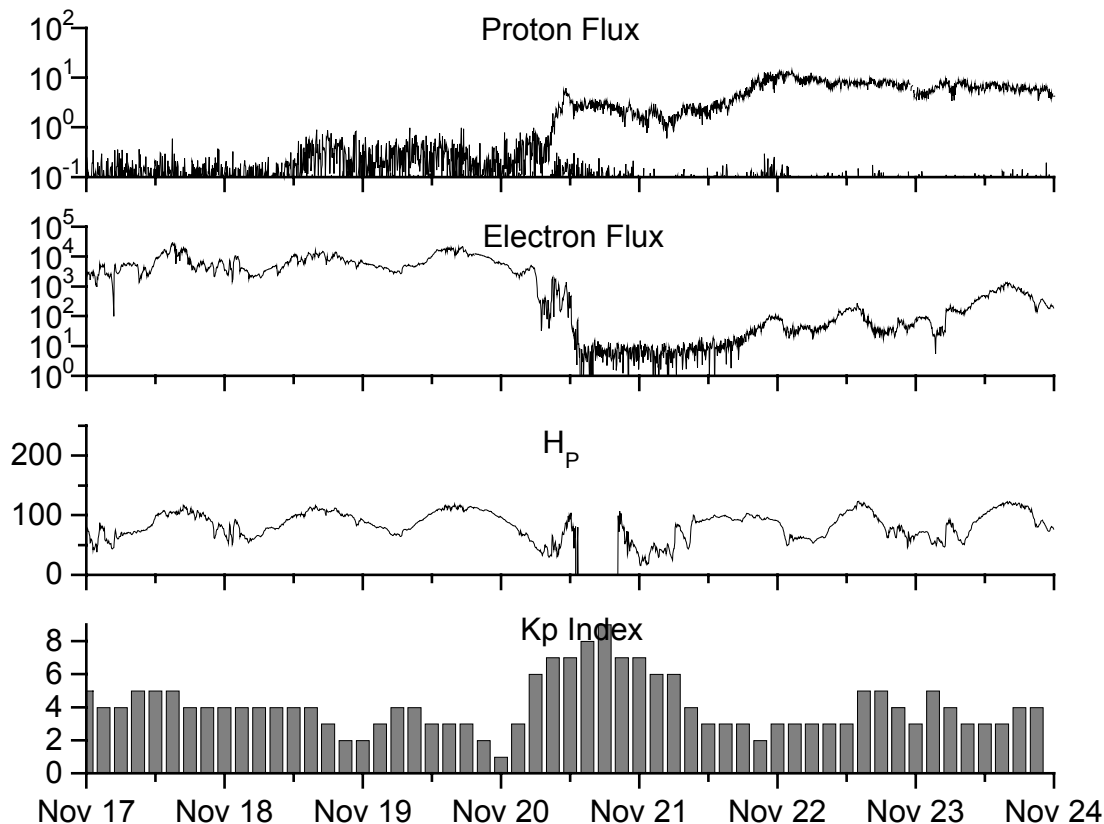


**Recent Solar Indices (preliminary)
of the observed monthly mean values**

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
2001									
November	178.6	106.5	0.60	183.7	115.5	212.7	193.7	16	12.0
December	217.5	132.2	0.61	184.5	114.6	235.6	193.9	09	12.2
2002									
January	189.0	114.1	0.60	184.8	113.5	227.3	194.6	08	12.3
February	194.5	107.4	0.55	188.6	114.7	205.0	197.2	10	12.8
March	153.1	98.4	0.64	188.9	113.3	180.3	195.7	10	12.9
April	194.9	120.7	0.62	186.2	110.5	189.8	191.5	15	13.2
May	204.1	120.8	0.59	183.6	108.9	178.4	188.0	15	13.3
June	146.0	88.3	0.60	179.9	106.3	148.7	183.0	11	13.5
July	183.5	99.6	0.54	175.4	102.7	173.5	176.3	11	13.7
August	191.0	116.4	0.61	169.2	98.7	183.9	169.5	16	14.2
September	206.4	109.6	0.53	163.4	94.6	175.8	164.1	14	15.0
October	153.9	97.5	0.63	158.8	90.5	167.0	159.4	23	15.6
November	159.8	95.5	0.60	150.9	85.2	168.7	154.8	16	16.3
December	147.9	80.8	0.55	144.6	82.1	158.6	150.9	13	17.0
2003									
January	149.3	79.7	0.53	141.7	81.0	144.0	149.2	13	18.2
February	87.0	46.0	0.53	136.4	78.5	124.5	144.7	17	18.9
March	119.7	61.1	0.51	128.1	74.2	132.2	139.5	21	19.4
April	119.7	60.0	0.50	121.5	70.3	126.3	136.3	20	20.0
May	89.6	55.2	0.62			129.3		26	
June	118.4	77.4	0.65			129.4		24	
July	132.8	85.0	0.64			127.8		20	
August	114.3	72.7	0.64			122.1		23	
September	82.6	48.8	0.59			112.3		19	
October	118.9	65.6	0.55			153.1		32	

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 17 November 2003

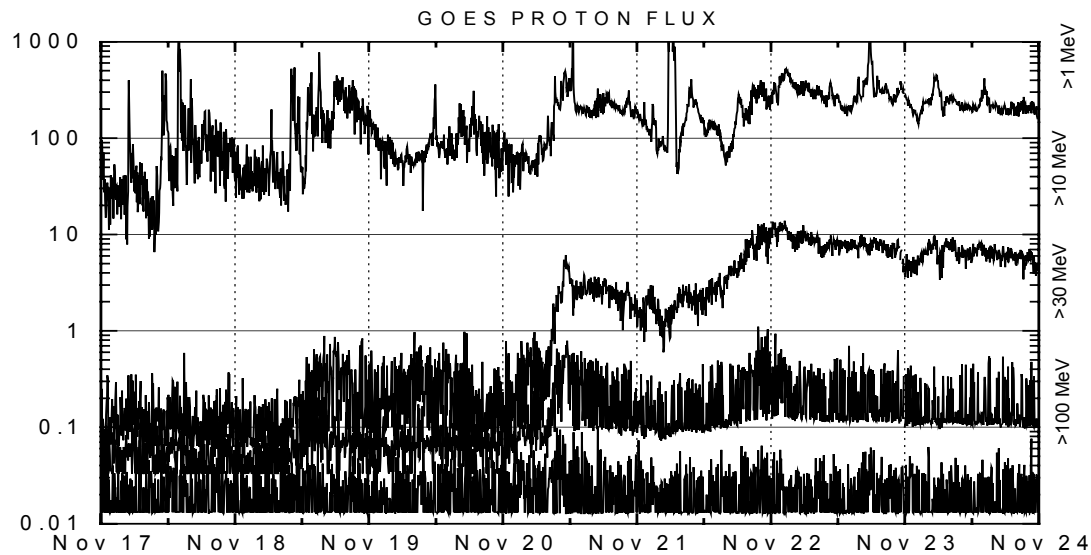
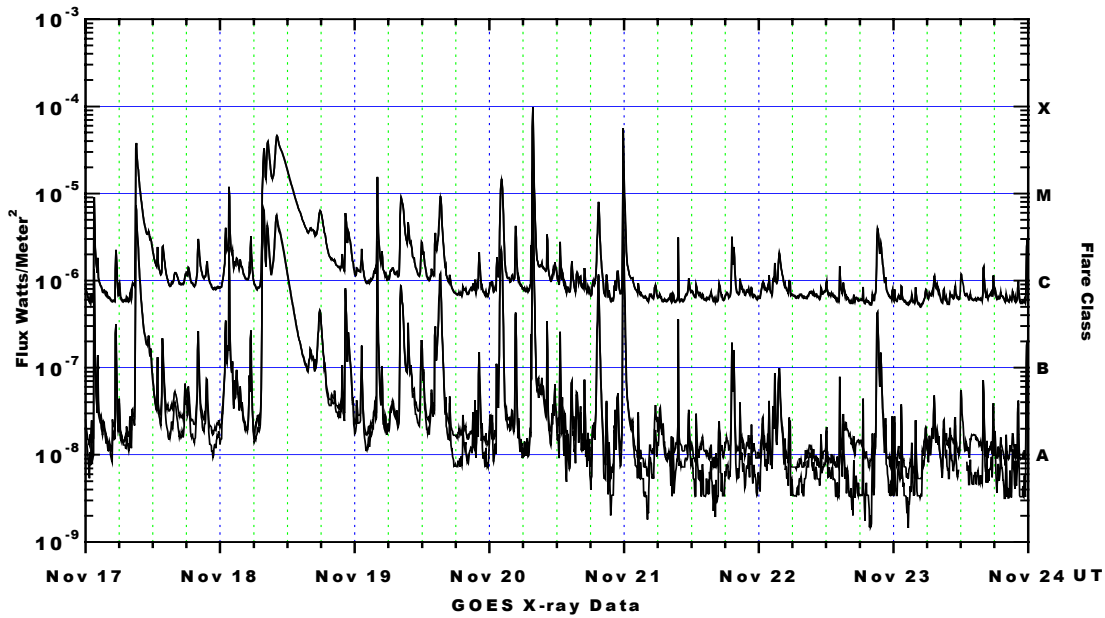
Protons plot contains the five-minute averaged integral proton flux (protons/cm²-sec -sr) as measured by GOES-11 (W113) for each of three energy thresholds: greater than 10, 50, and 100 MeV.

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

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 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 12 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-11 (W113) 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.

