

## Space Weather Highlights 25 - 31 October 2004

SWO PRF 1522  
02 November 2004

Solar activity ranged from low to high this period. Low levels occurred on 25 - 29 October, but activity quickly rose to high by the 30th. The summary period ended on 31 October with moderate activity levels. Region 691 (N13, L=139, class/area, Dac/270 on 31 October) accounted for a majority of the significant activity with most of that occurring on 30 October. This region grew quickly toward the end of the 29th as new opposite polarity spots emerged around the leader spot and fueled instability that resulted in major flares. Chronologically for the 30th, Region 691 produced: a C9/Sf with type II sweep at 0049 UTC, an M3/Sf with type II sweep at 0333 UTC, an M4/Sf Tenflare with a type II sweep at 0618 UTC, an M3/1N with type II sweep at 0928 UTC, an X1/Sf (partially obscured by clouds) Tenflare with type II and IV sweeps at 1146 UTC, and an M5/Sn Tenflare with type II sweep at 1633 UTC. Numerous large radio bursts occurred throughout the period of major flaring. A scarcity of LASCO observations made it difficult to discern if associated CMEs occurred, but a nearly full halo CME after the M5 event was visible in C2 at 1654 UTC with a plane-of-sky velocity of between 700 – 800 km/s. The CME was not symmetric and most of the material appeared to be moving away from the southwest limb. New Region 693 (S16, L=075, class/area, Fkc/760 on 31 October) rotated onto the disk on the 27th as a bright plage region, but grew rapidly in white light both in spot count and area. The region has shown some magnetic complexity but has produced only low-level C-class activity.

Solar wind data were available from the NASA Advanced Composition Explorer (ACE) spacecraft during most of the summary period. Solar wind speed ranged from a low of near 300 km/s early on 29 October to a high near 525 km/s midday on 25 October. The period began under the influence of a weak, geoeffective coronal hole wind stream as solar wind speed approached 525 km/s and the IMF Bz oscillated between +/- 8 nT throughout much of the 25th. By early on 26 October, wind plasma measurements stabilized and remained stable through 28 October. Early on the 29th, the IMF Bz began to fluctuate between +10 and -8 nT; temperature, density, and solar wind speed increased, indicative of a co-rotating interactive region followed by a weak coronal hole wind stream. Wind speed slowly climbed to 500 km/s by midday on 31 October and ended the period near 450 km/s while the IMF Bz ended the period stable, not varying much beyond +/- 5 nT.

There were no greater than 10 MeV proton events at geo-synchronous orbit during the summary period. However, a greater than 10 MeV proton enhancement was observed following the high solar activity on 30 October. At the time of this writing, a relatively small, but energetic proton event had occurred following a bright CME, originating from behind the west limb early on 01 November.

The greater than 2 MeV electron flux at geosynchronous orbit was at normal levels on 25 -- 30 October and moderate levels on 31 October.

The geomagnetic field was at mostly quiet to unsettled levels with brief periods of active conditions at mid latitudes midday on the 25 October and again during the first half of 30 October. Isolated periods of minor to major storming were observed at high latitudes midday on 25 and 29 – 31 October, all due to effects from geoeffective coronal hole wind streams.

## Space Weather Outlook 03 - 29 November 2004

Solar activity is expected to be low to moderate throughout most of the forecast period due to possible M-class flare activity from Regions 691 and 693.

A greater than 10 MeV proton event is possible with major flare activity from Regions 691 and 693.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to be at high levels on 03 – 04 November and again on 10 – 13 November.

The geomagnetic field is expected to be mostly quiet to unsettled for the majority of the forecast period. On 09 – 11 November, a recurrent coronal hole wind stream is expected to produce occasional active to minor storm periods with isolated major storm periods at high latitudes.



### *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
25 October	140	146	860	B3.9	8	0	0	4	0	0	0	0
26 October	137	124	800	B3.4	6	0	0	1	0	0	0	0
27 October	130	150	870	B3.9	3	0	0	1	0	0	0	0
28 October	133	150	1040	B4.4	8	0	0	5	0	0	0	0
29 October	129	130	1080	B4.0	9	0	0	4	0	0	0	0
30 October	136	153	1000	B4.8	14	4	1	6	1	0	0	0
31 October	139	163	1310	B4.5	5	2	0	3	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
	25 October	1.6E+5	1.5E+4	3.4E+3		1.1E+6
26 October	1.3E+5	1.5E+4	3.2E+3		1.1E+6	
27 October	1.6E+5	1.4E+4	3.3E+3		1.4E+6	
28 October	1.4E+5	1.4E+4	3.3E+3		1.3E+6	
29 October	1.8E+5	1.5E+4	3.2E+3		1.1E+6	
30 October	9.9E+5	6.7E+4	3.3E+3		1.9E+6	
31 October	1.7E+6	5.0E+4	3.0E+3		5.2E+6	

### *Daily Geomagnetic Data*

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	25 October	9	2-2-3-3-3-2-1-1	15	1-2-3-5-4-2-2-1	13
26 October	0	1-0-0-0-0-0-0-0	0	0-1-0-0-0-0-0-0	3	1-0-0-0-1-1-1-0
27 October	2	0-0-0-0-2-1-1-1	2	0-0-0-1-1-1-1-0	3	0-0-0-1-1-2-1-2
28 October	2	1-1-0-0-1-1-1-0	1	1-0-0-0-0-0-1-1	3	1-1-0-0-1-1-1-1
29 October	6	0-0-0-2-3-2-3-1	16	0-0-1-5-5-2-3-1	7	0-0-1-3-3-2-3-1
30 October	10	3-3-2-2-2-2-1-3	25	3-3-4-6-4-3-2-3	17	4-3-3-4-3-3-2-3
31 October	7	2-2-0-2-3-2-2-2	18	2-1-1-5-5-4-1-2	10	3-2-1-2-3-2-2-3

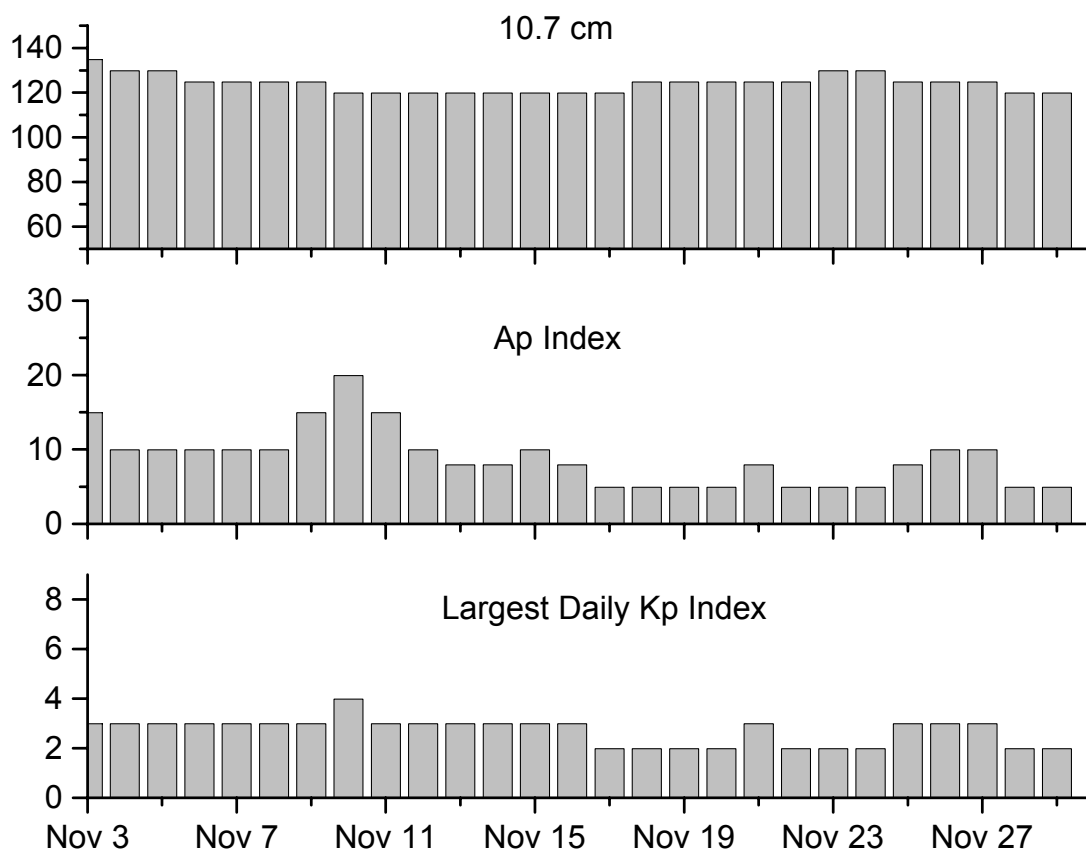


### *Alerts and Warnings Issued*

<u>Date &amp; Time of Issue</u>	<u>Type of Alert or Warning</u>	<u>Date &amp; Time of Event UT</u>
25 Oct 0006	2 – 245 MHz Radio Bursts	24 Oct
25 Oct 0939	ALERT: Geomagnetic K= 4	25 Oct 0938
26 Oct 0018	1 – 245 MHz Radio Burst	25 Oct
27 Oct 0016	7 – 245 MHz Radio Bursts	26 Oct
29 Oct 1419	ALERT: Geomagnetic K= 4	29 Oct 1414
30 Oct 0019	10 – 245 MHz Radio Bursts	29 Oct
30 Oct 0130	ALERT: Type II Radio Emission	30 Oct 0039
30 Oct 0137	WARNING: Geomagnetic K= 4 expected	30 Oct 0137 - 1500
30 Oct 0211	ALERT: Geomagnetic K= 4	30 Oct 0211
30 Oct 0357	ALERT: Type II Radio Emission	30 Oct 0333
30 Oct 0634	SUMMARY: 10cm Radio Burst	30 Oct 0612
30 Oct 0654	ALERT: Type II Radio Emission	30 Oct 0619
30 Oct 0931	SUMMARY: 10cm Radio Burst	30 Oct 0912
30 Oct 1021	ALERT: Type II Radio Emission	30 Oct 0929
30 Oct 1145	ALERT: X-Ray Flux exceeded M5	30 Oct 1144
30 Oct 1206	SUMMARY: X-ray Event > X1	30 Oct 1138
30 Oct 1217	ALERT: Type II Radio Emission	30 Oct 1145
30 Oct 1242	SUMMARY: 10cm Radio Burst	30 Oct 1141
30 Oct 1248	ALERT: Type IV Radio Emission	30 Oct 1141
30 Oct 1304	SUMMARY: 10cm Radio Burst	30 Oct 1249
30 Oct 1458	SUMMARY: 10cm Radio Burst	30 Oct 1436
30 Oct 1634	ALERT: X-Ray Flux > M5	30 Oct 1632
30 Oct 1643	SUMMARY: 10cm Radio Burst	30 Oct 1623
30 Oct 1649	ALERT: Type II Radio Emission	30 Oct 1629
30 Oct 1716	SUMMARY: X-ray Event > M5	30 Oct 1618
30 Oct 2026	WATCH: Geomagnetic A $\geq$ 20	02 Nov
31 Oct 0012	17 – 245 MHz Radio Bursts	30 Oct
31 Oct 0012	1 – 245 MHz Radio Noise Storm	30 Oct
31 Oct 0540	SUMMARY: 10cm Radio Burst	31 Oct 0526
31 Oct 0601	ALERT: Type II Radio Emission	31 Oct 0534
31 Oct 0609	ALERT: Type II Radio Emission	31 Oct 0538 UTC
31 Oct 0618	ALERT: Type IV Radio Emission	31 Oct 0541
31 Oct 2011	WATCH: Geomagnetic A $\geq$ 20	01 Nov



## 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
03 Nov	135	15	3	17 Nov	120	5	2
04	130	10	3	18	125	5	2
05	130	10	3	19	125	5	2
06	125	10	3	20	125	5	2
07	125	10	3	21	125	8	3
08	125	10	3	22	125	5	2
09	125	15	3	23	130	5	2
10	120	20	4	24	130	5	2
11	120	15	3	25	125	8	3
12	120	10	3	26	125	10	3
13	120	8	3	27	125	10	3
14	120	8	3	28	120	5	2
15	120	10	3	29	120	5	2
16	120	8	3				



### *Energetic Events*

Date	Time		X-ray		Optical Information			Peak		Sweep Freq		
	Begin	Max	Max	Class	Flux	Imp/	Location	Rgn	Radio Flux		Intensity	
						Brtns	Lat CMD		245	2695	II	IV
30 Oct	0323	0333	0337	M3.3	.011	Sf	N14W15	691	7700	120	2	
30 Oct	0608	0618	0622	M4.2	.016	Sf	N14W21	691	1100	130	2	
30 Oct	0909	0928	0930	M3.7	.009	ln	N15W23	691	2200	63	1	
30 Oct	1138	1146	1150	X1.2	.037	Sf	N12W18	691	1800	720	1	2
30 Oct	1618	1633	1637	M5.9	.028	Sn	N15W20	691	620	300	1	
31 Oct	0204	0226	0232	M1.1	.007			691	1000			
31 Oct	0523	0532	0539	M2.3	.013	Sf	N13W34	691	470	190	1	1

### *Flare List*

Date	Begin	Time		X-ray Class	Imp / Brtns	Optical	Rgn	
		Max	End			Location Lat CMD		
25 October	B0246	0249	0253	C4.2	Sf	N15E63	691	
		0425	0430	B9.8				
		0715	0716	0723	C2.4	Sf	N09E10	687
		0957	1007	1013	C2.3			687
		1035	1035	1041	C6.8	Sf	N09E07	687
		1402	1417	1425	C2.1			687
		1429	1442	1459	C4.4			687
		1713	1742	1754	C1.1			687
		2053	2056	2058	B5.5			691
		2142	2217	2345	C2.3			687
		2259	2304	2317		Sf	N08E03	687
	26 October	0243	0250	0258	B7.4			687
		0500	0501	0505	C1.6	Sf	N11W06	687
1233		1244	1252	B7.0				
1450		1453	1457	B6.4			691	
1500		1506	1510	C2.2			687	
1541		1544	1547	B5.4				
1600		1606	1610	C1.2				
1833		1839	1848	C1.3			691	
2218		2225	2229	C1.0			685	
2239		2245	2248	C1.3			687	
27 October	0103	0103	0108	B8.0	Sf	N11W17	687	
	0118	0123	0126	B7.7				
	0554	0559	0605	C1.1			687	
	1433	1437	1440	B6.7				
	1525	1529	1531	B9.3				
	1958	2004	2011	B9.1			693	
	2057	2102	2107	C1.7			691	
	2315	2321	2325	C1.3			693	



*Flare List – continued.*

Date	Time			X-ray Class.	Optical		Rgn	
	Begin	Max	End		Imp / Brtns	Location Lat CMD		
28 October	0036	0040	0046	B8.7			693	
	B0114	0117	0119	C1.8	Sf	S13E74	693	
	0244	0249	0254	B5.9			693	
	0306	0316	0323	C3.2			693	
	0349	0352	0354	C1.7			693	
	0420	0424	0434	C2.2	Sf	S19E72	693	
	0501	0505	0512	B6.8			693	
	0602	0606	0609	C3.8			693	
	B0611	0611	0631		Sf	S16E68	693	
	0823	0826	0829	B6.0			693	
	0845	0847	0855	C1.0	Sf	N14E11	691	
	0928	0928	0933		Sf	S12E64	693	
	1006	1021	1030	B9.6			693	
	1211	1214	1216	B8.0			693	
	1242	1249	1306	C1.9			693	
	1802	1805	1808	B9.0			687	
	1933	1936	1938	C1.0			693	
	29 October	0018	0018	0028		Sf	S17E61	693
		0911	0914	0917	B5.7			687
1051		1055	1057	C1.1			693	
1240		1243	1245	C1.4			693	
1434		1435	1445	C2.4	Sf	S12E48	693	
1626		1633	1635	C2.8			693	
1921		1923	1928	C3.4	Sf	S13E50	693	
2116		2116	2122	C1.1	Sf	N12W14	691	
2133		2136	2138	C1.4			693	
2236		2246	2249	C1.0			693	
2345		2349	2352	B9.7			691	
2353	2359	0005	C3.1			691		
30 October	0043	0050	0057	C9.7	Sf	N14W13	691	
	0209	0216	0222	C1.6				
	0330	0333	0344	M3.3	Sf	N14W15	691	
	0411	0416	0421	C1.2				
	0451	0456	0503	B9.2				
	0550	0555	0559	C1.1				
	0612	0617	0629	M4.2	Sf	N14W21	691	
	0659	0703	0709	C5.5	Sf	N16W22	691	
	0853	0858	0901	C1.6				
	0925	0929	A0943	M3.7	ln	N15W23	691	
	1020	1035	1041	C7.2			691	
1117	1122	1127	C1.0			691		



### Flare List

Date	Time			X-ray Class.	Imp / Brtns	Optical		Rgn
	Begin	Max	End			Location Lat CMD		
30 October	B1148	U1149	A1155	X1.2	Sf	N12W18		691
	1245	1251	1303	C3.7				687
	1344	1350	1354	C1.5				
	1359	1406	1410	C2.6				691
	1431	1435	1437	B9.8				
	1441	1448	1453	C2.6				
	1551	1554	1557	C1.4				
31 October	1623	1633	1645	M5.9	Sn	N15W20		691
	2151	2159	2204	C2.4				691
	0042	0055	0101	C1.7				691
	0204	0226	0232	M1.1				691
	0536	0539	0546	M2.3	Sf	N13W34		691
	0711	0721	0730	C1.0				693
	1100	1103	1109	B6.8				691
	1233	1244	1249	B9.1				
	1311	1321	1335	C1.3				
	1420	1425	1433	B6.5				
	1600	1604	1606	B7.5				
	1958	1959	2003	C1.5	Sf	N12W44		691
	2113	2125	2143	C7.0				Sf

### Region Summary

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

#### Region 684

17 Oct	S04E65	217	0030	01	Hsx	001	A											
18 Oct	S05E53	216	0020	01	Hax	001	A											
19 Oct	S04E41	215	0040	06	Cso	002	B											
20 Oct	S05E27	215	0030	02	Hax	002	A											
21 Oct	S05E14	215	0010	01	Hrx	001	A											
22 Oct	S05E01	215	0200	07	Dai	012	B											
23 Oct	S03W12	215	0180	07	Dai	017	B					1						
24 Oct	S04W27	217	0150	07	Dai	024	B											
25 Oct	S04W39	216	0100	07	Dao	010	B											
26 Oct	S05W54	217	0090	02	Hax	001	A											
27 Oct	S04W69	219	0090	03	Hsx	003	A											
28 Oct	S05W83	220	0120	03	Hsx	001	A											
29 Oct	S04W94	218	0060	01	Hax	001	A											

0 0 0 1 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 215



**Region Summary - continued.**

Date	Location		Sunspot Characteristics				Flares											
	( ° Lat ° CMD)	Helio Lon	Area (10 <sup>-6</sup> hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical							
								C	M	X	S	1	2	3	4			
<i>Region 685</i>																		
18 Oct	S05E26	243	0020	03	Cao	009	B											
19 Oct	S06E12	244	0030	06	Cso	007	B											
20 Oct	S06W02	244	0030	06	Dao	013	B											
21 Oct	S06W15	244	0050	08	Dso	010	B											
22 Oct	S06W28	244	0050	08	Dso	009	B											
23 Oct	S06W45	248	0010	05	Bxo	006	B											
24 Oct	S07W56	246	0020	03	Axx	003	A											
25 Oct	S07W69	246																
26 Oct	S07W82	246									1							
								1	0	0	0	0	0	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 244

<i>Region 687</i>																		
19 Oct	N10E79	177	0120	04	Dao	002	B											
20 Oct	N10E65	177	0160	06	Dac	007	Bg			1								
21 Oct	N10E52	177	0210	06	Cko	007	Bg	5			7	1						
22 Oct	N10E39	177	0280	11	Eki	016	Bg	1	1		2	1						
23 Oct	N11E28	175	0270	12	Eai	027	Bg	2			3							
24 Oct	N12E15	175	0280	12	Eki	044	Bd	4	1		4	1						
25 Oct	N12E03	174	0370	13	Eai	048	Bg	7			3							
26 Oct	N12W11	174	0330	13	Eai	046	Bg	3			1							
27 Oct	N12W24	174	0360	13	Eai	050	Bg	1			1							
28 Oct	N12W37	174	0250	13	Eai	037	Bg											
29 Oct	N12W50	174	0160	09	Dai	013	Bg											
30 Oct	N12W66	177	0090	03	Hax	004	A	1										
31 Oct	N12W80	177	0060	03	Cao	004	B											
								24	3	0	21	3	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 174





### Region Summary - continued.

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

#### Region 689

21 Oct	N12E74	155	0060	01	Hsx	001	A											
22 Oct	N12E61	155	0060	01	Hsx	001	A											
23 Oct	N12E48	155	0040	02	Hax	001	A											
24 Oct	N11E34	156	0050	02	Hsx	001	A											
25 Oct	N12E22	155	0060	03	Hax	003	A											
26 Oct	N12E10	153	0050	02	Hax	001	A											
27 Oct	N12W03	153	0060	02	Hsx	002	A											
28 Oct	N12W17	154	0060	02	Hsx	001	A											
29 Oct	N12W30	154	0050	02	Hsx	001	A											
30 Oct	N12W43	154	0020	01	Hsx	001	A											
31 Oct	N11W57	154	0040	02	Hax	001	A											
										0	0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 153

#### Region 690

22 Oct	N00E78	138	0060	01	Hax	001	A											
23 Oct	N00E66	137	0070	02	Hsx	001	A											
24 Oct	N00E53	137	0070	02	Hax	003	A											
25 Oct	S01E40	137	0070	02	Hax	002	A											
26 Oct	N00E26	137	0130	03	Hsx	003	A											
27 Oct	N00E15	135	0100	07	Cso	007	B											
28 Oct	S01W01	138	0080	04	Dso	006	B											
29 Oct	N00W14	138	0070	02	Hax	003	A											
30 Oct	N01W27	138	0040	03	Cso	006	B											
31 Oct	S02W41	138	0040	04	Dao	007	B											
										0	0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 138

#### Region 691

23 Oct	N16E69	134	0050	02	Hsx	001	A											
24 Oct	N15E59	131	0150	13	Eai	011	Bgd	1										
25 Oct	N15E48	129	0150	13	Eai	017	Bgd	1			1							
26 Oct	N15E32	131	0110	11	Eao	009	Bgd	1										
27 Oct	N16E20	130	0140	14	Cao	012	B	1										
28 Oct	N15E04	133	0140	10	Dao	011	Bg	1			1							
29 Oct	N13W13	137	0120	06	Dao	012	B	2			1							
30 Oct	N14W25	136	0200	16	Fao	024	Bg	6	4	1	6	1						
31 Oct	N13W42	139	0270	09	Dac	023	Bg	3	2		3							
								16	6	1	12	1	0	0	0			

Still on Disk.

Absolute heliographic longitude: 133



**Region Summary - continued.**

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

*Region 692*

24 Oct	S17E30	160	0070	04	Dao	008	B											
25 Oct	S18E16	161	0110	05	Dao	006	B											
26 Oct	S18E03	160	0090	09	Dao	004	B											
27 Oct	S18W11	161	0060	10	Dso	005	B											
28 Oct	S18W27	164	0040	01	Hax	002	A											
29 Oct	S18W42	166	0020	01	Hsx	001	A											
30 Oct	S19W54	165	0000	02	Axx	002	A											
31 Oct	S19W67	165																
										0	0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 160

*Region 693*

27 Oct	S13E72	078	0060	02	Hsx	001	A	1										
28 Oct	S14E61	076	0330	11	Eho	008	Bg	7		4								
29 Oct	S14E46	078	0590	11	Ehi	012	Bg	7		3								
30 Oct	S16E34	077	0530	13	Ehi	029	Bg											
31 Oct	S16E22	075	0760	16	Fkc	050	Bg	1										
								16	0	0	0	7	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 075

*Region 694*

28 Oct	N16E22	115	0020	04	Cso	004	B											
29 Oct	N17E07	117	0010	09	Bxo	007	B											
30 Oct	N15W06	117	0020	03	Cso	005	B											
31 Oct	N14W16	113	0010	02	Axx	004	A											
										0	0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 117

*Region 695*

30 Oct	S15E68	043	0100	06	Dao	002	B											
31 Oct	S15E55	042	0130	05	Dao	004	B											
										0	0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 042

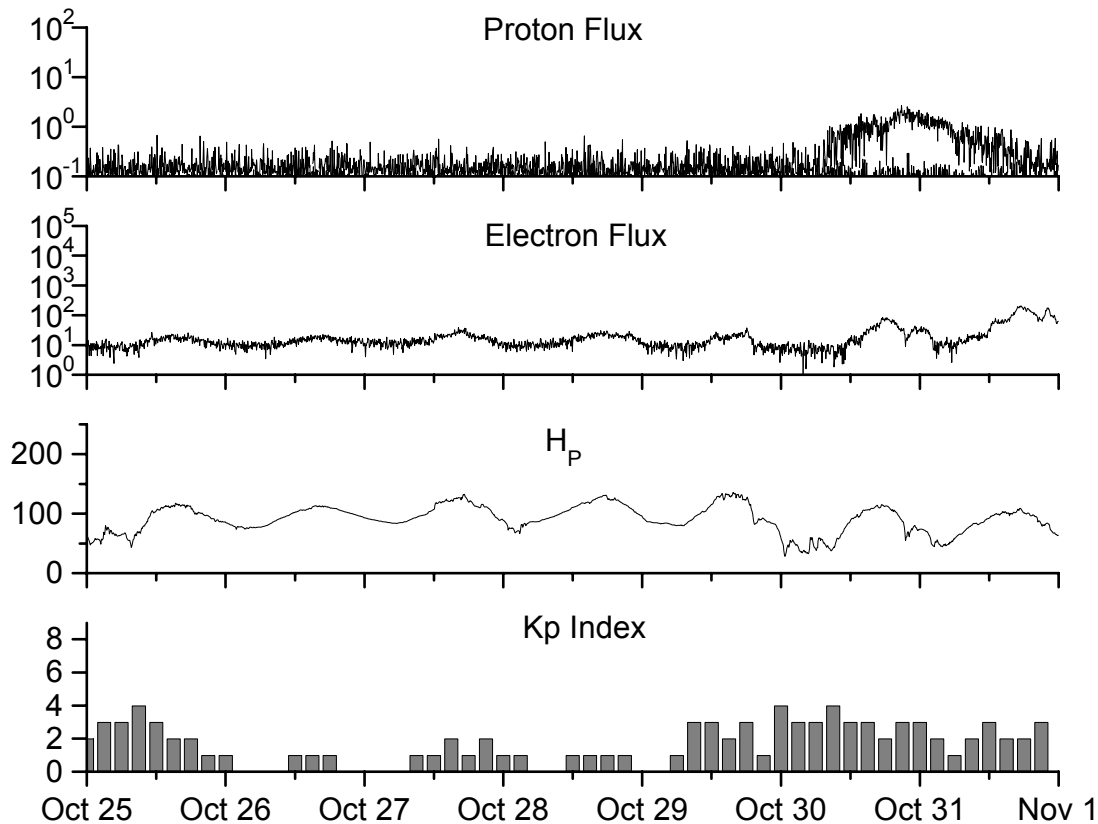


**Recent Solar Indices (preliminary)  
of the observed monthly mean values**

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>2002</b>									
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
<b>2003</b>									
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	135.0	20	20.1
May	89.6	55.2	0.62	118.3	67.8	129.3	133.1	26	21.0
June	118.4	77.4	0.65	113.6	65.2	129.4	130.2	24	21.5
July	132.8	85.0	0.64	106.9	62.0	127.8	127.2	19	22.0
August	114.3	72.7	0.64	102.8	60.3	122.1	125.2	23	22.2
September	82.6	48.8	0.59	100.7	59.8	112.3	123.7	18	21.8
October	118.9	65.6	0.55	96.6	58.4	153.1	121.8	35	21.1
November	118.9	67.2	0.57	93.6	57.0	153.1	120.1	28	20.0
December	75.4	47.0	0.62	91.4	55.0	115.1	118.0	16	18.6
<b>2004</b>									
January	62.3	37.2	0.60	87.9	52.0	114.1	116.3	22	18.1
February	75.6	46.0	0.61	84.2	49.4	107.0	115.5	13	17.7
March	81.0	48.9	0.60	80.9	47.2	112.2	114.6	14	16.9
April	59.3	39.3	0.66			101.2		11	
May	77.3	41.5	0.54			99.8		8	
June	78.9	43.2	0.55			97.4		8	
July	87.8	51.0	0.58			118.5		23	
August	69.5	40.9	0.59			110.1		10	
September	50.0	27.7	0.55			103.1		10	

**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 25 October 2004*

*Protons* plot contains the five-minute averaged integral proton flux (protons/cm<sup>2</sup>-sec -sr) as measured by GOES-11 (W100) 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-12 (W74).

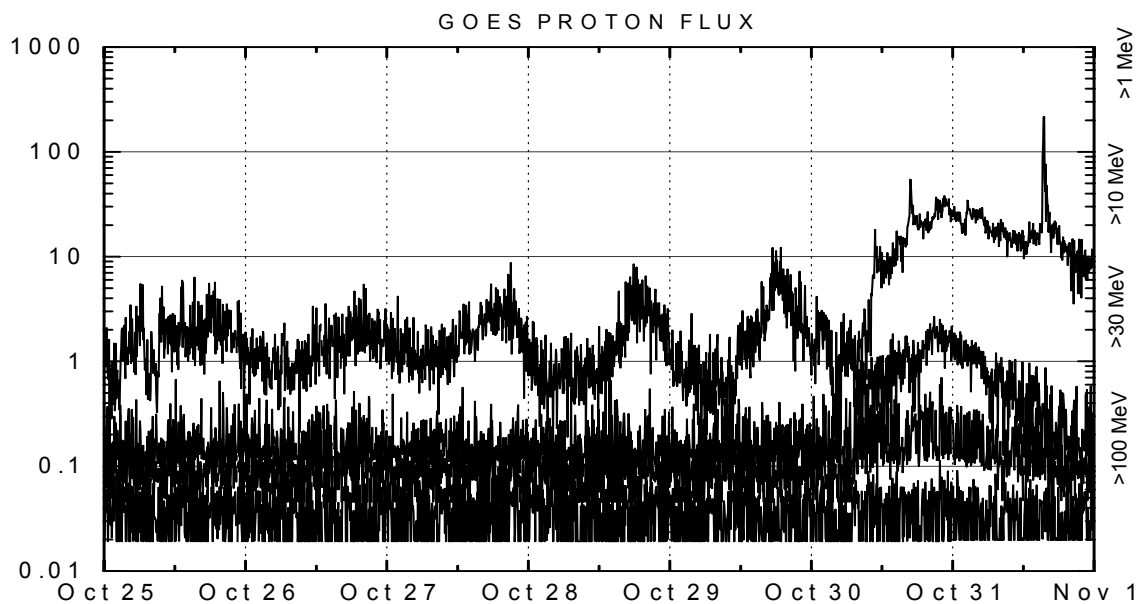
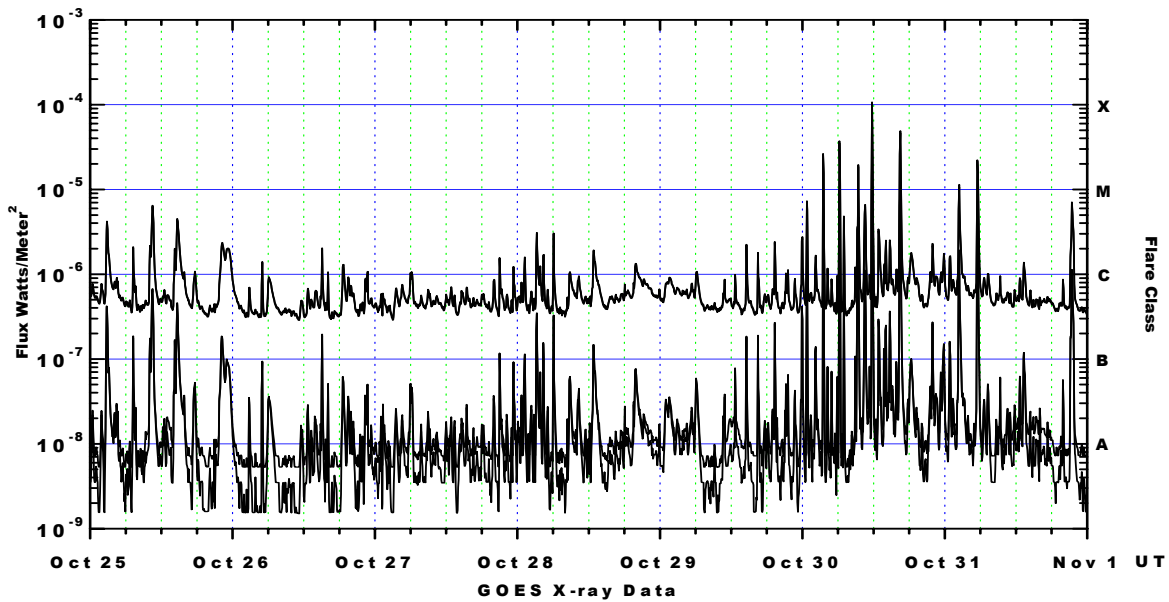
*H<sub>p</sub>* plot contains the five minute averaged magnetic field H - component in nanoteslas (nT) as measured by GOES-12. The H component is parallel to the spin axis of the satellite, which is nearly parallel to the Earth's rotation axis.

*K<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 Hartland, UK. These data are made available through cooperation from the Geological Survey of Canada (GSC), British Geological Survey (BGS) and the US Geological Survey. These may differ from the final K<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 12 (W75) and GOES 10 (W136) 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-11 (W100) 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.

