Space Weather Highlights **SWO PRF 1417**
21 - 27 October 2002 **29 October 2002**

Solar activity ranged from low to moderate levels. Moderate levels were observed on 22 October and again on 25 October. The largest event was a long duration M1.5/1f at 25/1747 UTC from Region 162 (N26, L=121, area/class 1120/Fki on 23 October). Associated with this event was a Type II radio sweep, measuring 368 km/s. Region 162 was the most significant spot group on the visible disk during the summary period. On 22 October, the region developed a magnetic beta-gamma-delta configuration in the intermediate spots. Region 162 produced an M1 flare on 22 October and a number of C-class events throughout the period. In the latter half of the period, Region 162 entered a slight decay phase.

Solar wind data were available from the NASA Advanced Composition Explorer (ACE) spacecraft for most of the summary period. The period began with solar wind velocity decreasing from 600 km/s on 21 October to 400 km/s on 23 October. A large positive polarity coronal hole reached a geo-effective position on 24 October resulting in a rapid increase in solar wind velocity to near 800 km/s. Solar wind velocity gradually decreased to 600 km/s by the end of the day on 26 October. The corresponding Bz component of the IMF was at an average value of –5nT on 24 October and –3 nT on 25-27 October.

There were no greater than 10 MeV proton events at geo-synchronous orbit during the summary period.

The greater than 2 MeV electron flux at geo-synchronous orbit was at normal to high levels. High levels were observed on 21-23 October and again on 26-27 October.

The geomagnetic field was at quiet to major storm levels. Activity reached major storm levels on 24-25 October due to the coronal hole effects mentioned above. Minor storm levels were reached on 26 October and active levels reached on 27 October due to the continued, but subsiding coronal hole effects.

Space Weather Outlook
30 October - 25 November 2002

Solar activity is expected be low to moderate. Region 162 is expected to produce occasional M-class flares until it rotates beyond the western limb on 31 October.

There is a slight chance of a greater than 10 MeV proton event during the forecast period.

The greater than 2 MeV electron flux at geo-synchronous orbit is expected to reach event threshold on 30 October, on 05-06 November, and again on 22-25 November due to coronal hole effects.

The geomagnetic field is expected to be at quiet to unsettled levels. Active to minor storm conditions are possible on 03-04 November and again on 20-23 November due to coronal hole effects.

Daily Solar Data

Date	Radio Flux 10.7 cm	Sun spot No.	Sunspot Area (10^{-6} hemi.)	X-ray Background	Flares: X-ray Flux C	M	X	Flares: Optical S	1	2	3	4
21 October	183	139	1420	C1.0	11	0	0	15	0	0	0	0
22 October	169	132	1610	B7.1	4	1	0	6	0	0	0	0
23 October	164	116	1580	B6.7	3	0	0	4	0	0	0	0
24 October	160	149	1480	B4.8	4	0	0	2	1	0	0	0
25 October	173	151	1340	B5.5	3	1	0	4	2	0	0	0
26 October	158	143	1300	B5.4	2	0	0	0	0	0	0	0
27 October	157	120	1020	B6.0	9	0	0	14	0	0	0	0

Daily Particle Data

Date	Proton Fluence (protons/cm^2-day-sr) >1MeV	>10MeV	>100MeV	Electron Fluence (electrons/cm^2-day-sr) > 6MeV	>2MeV	>4MeV
21 October	4.6E+5	1.1E+4	2.2E+3		7.2E+7	
22 October	7.8E+5	1.0E+4	2.2E+3		7.1E+7	
23 October	6.7E+5	1.0E+4	2.3E+3		3.7E+7	
24 October	1.1E+6	1.1E+4	2.2E+3		7.7E+5	
25 October	1.4E+6	1.1E+4	2.2E+3		2.2E+7	
26 October	2.6E+6	1.0E+4	2.3E+3		1.3E+8	
27 October	5.2E+5	1.1E+4	2.5E+3		6.9E+7	

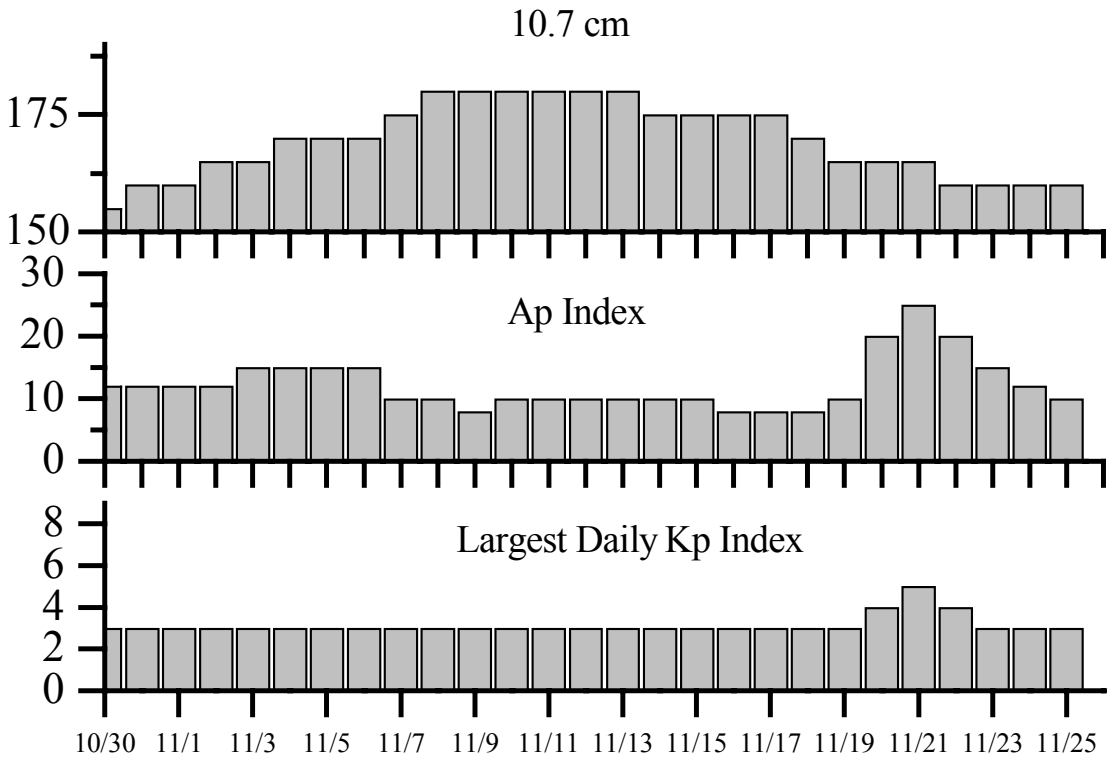
Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg A	K-indices	High Latitude College A	K-indices	Estimated Planetary A	K-indices
21 October	7	1-3-2-2-2-2-1-1	6	1-2-3-2-2-2-1-1	11	2-3-3-2-3-3-3-3
22 October	10	3-1-1-3-2-3-3-1	13	1-2-1-5-4-2-2-0	12	3-2-1-4-3-3-3-3
23 October	6	1-0-1-1-3-2-2-2	14	0-1-2-4-5-3-2-2	10	2-2-2-2-3-3-3-3
24 October	22	3-4-4-4-4-3-4-3	76	3-6-5-6-7-7-6-4	47	4-5-5-6-6-5-5-4
25 October	22	5-4-4-3-4-2-3-3	69	5-4-7-7-7-4-3-3	40	6-5-5-4-5-6-3-3
26 October	16	3-4-4-3-3-2-3-2	48	3-3-5-7-6-5-4-3	27	3-4-4-5-5-4-4-3
27 October	13	1-3-3-2-3-2-3-4	43	3-4-6-4-6-5-5-3	22	2-4-4-3-4-4-4-4

Alerts and Warnings Issued

Date & Time of Issue	Type of Alert or Warning	Date & Time of Event UT
21 Oct 0020	3 - 245 MHz Radio Bursts	20 Oct
21 Oct 0020	1 - 245 MHz Radio Noise Storm	20 Oct
21 Oct 1156	ALERT: Electron 2MeV Integral Flux exceeded 1000pfu	21 Oct 1140
22 Oct 0017	6 - 245 MHz Radio Bursts	21 Oct
22 Oct 0017	1 - 245 MHz Radio Noise Storm	21 Oct
22 Oct 1009	ALERT: Geomagnetic K= 4	22 Oct 1008
22 Oct 1652	ALERT: Electron 2MeV Integral Flux exceeded 1000pfu	22 Oct 1035
23 Oct 0015	3- 245 MHz Radio Bursts	22 Oct
23 Oct 0015	1 - 245 MHz Radio Noise Storm	22 Oct
23 Oct 1158	ALERT: Electron 2MeV Integral Flux exceeded 1000pfu	23 Oct 1155
23 Oct 1759	ALERT: Geomagnetic K = 4	23 Oct 1754
24 Oct 0007	5 - 245 MHz Radio Bursts	23 Oct
24 Oct 0007	1 - 245 MHz Radio Noise Storm	23 Oct
24 Oct 0122	WARNING: Geomagnetic K = 4 expected	24 Oct 0125 - 1500
24 Oct 0222	ALERT: Geomagnetic K = 4	24 Oct 0222
24 Oct 1104	ALERT: Geomagnetic K = 5	24 Oct 1104
24 Oct 1327	ALERT: Geomagnetic K = 5	24 Oct 1127
24 Oct 1458	WARNING: Geomagnetic K = 5 expected	24 Oct 1458 - 2359
24 Oct 1708	ALERT: Geomagnetic K= 5	24 Oct 1701
24 Oct 1911	WATCH: Geomagnetic A $\geq$ 20	25 Oct
24 Oct 2053	ALERT: Type IV Radio Emission	24 Oct 1815
24 Oct 2313	EXTENDED WARNING: Geomagnetic K= 5 expected	24 Oct 1458 - 25 Oct 1500
25 Oct 0009	7 - 245 MHz Radio Bursts	24 Oct
25 Oct 0009	1 - 245 MHz Radio Noise Storm	24 Oct
25 Oct 0231	ALERT: Geomagnetic K= 6	25 Oct 0230
25 Oct 1456	EXTENDED WARNING: Geomagnetic K= 5 expected	24 Oct 1458 - 25 Oct 2359
25 Oct 1818	ALERT: Type IV Radio Emission	25 Oct 1749
25 Oct 1829	ALERT: Type II Radio Emission	25 Oct 1752
25 Oct 2354	EXTENDED WARNING: Geomagnetic K = 5 expected	24 Oct 1458 - 26 Oct 1500
26 Oct 0025	5 - 245 MHz Radio Bursts	25 Oct
26 Oct 0025	1 - 245 MHz Radio Noise Storm	25 Oct
26 Oct 0501	ALERT: Electron 2MeV Integral Flux exceeded 1000pfu	26 Oct 0445
26 Oct 1629	WARNING: Geomagnetic K = 4 expected	26 Oct 1630 - 27 Oct 1500
26 Oct 1741	ALERT: Geomagnetic K = 4	26 Oct 1737
27 Oct 0011	1 - 245 MHz Radio Burst	26 Oct
27 Oct 0858	ALERT: Electron 2MeV Integral Flux exceeded 1000pfu	27 Oct 0835
27 Oct 1458	EXTENDED WARNING: Geomagnetic K = 4 expected	26 Oct 1630 - 27 Oct 2359
27 Oct 2327	EXTENDED WARNING: Geomagnetic K = 4 expected	26 Oct 1630 - 28 Oct 1200
27 Oct 2337	ALERT: Type II Radio Emission	27 Oct 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
30 Oct	155	12	3	13 Nov	180	10	3
31	160	12	3	14	175	10	3
01 Nov	160	12	3	15	175	10	3
02	165	12	3	16	175	8	3
03	165	15	3	17	175	8	3
04	170	15	3	18	170	8	3
05	170	15	3	19	165	10	3
06	170	15	3	20	165	20	4
07	175	10	3	21	165	25	5
08	180	10	3	22	160	20	4
09	180	8	3	23	160	15	3
10	180	10	3	24	160	12	3
11	180	10	3	25	160	10	3
12	180	10	3				

Energetic Events

Date	Time			X-ray		Optical Information			Peak Radio Flux		Sweep Freq Intensity	
	Begin	Max	½ Max	Class	Integ Flux	Imp/ Brtns	Location Lat CMD	Rgn #	245	2695	II	IV
22 Oct	1529	1535	1551	M1.0	.009	Sf	N28E27	162	110			
25 Oct	1723	1747	1822	M1.5	.035	1f	N28W11	162			1	1

Flare List

Date	Time			X-ray	Optical		Rgn
	Begin	Max	End	Class.	Imp / Brtns	Location Lat CMD	
21 October	0000	0023	0040	C2.9			
	0056	0056	0104	C3.3	Sf	S17W30	160
	0214	0224	0253		Sf	S05W32	158
	0418	0419	0424	C3.6	Sf	S14W65	154
	0457	0603	0614	C3.1	Sf	N23E41	162
	0705	0706	0708		Sf	N22E48	162
	0835	0836	0846	C2.3	Sf	N20E46	162
	0856	0857	0901		Sf	S19W31	160
	0943	0943	0950		Sf	S16W32	160
	1130	1204	1215	C2.9			
	1158	1222	1239	C3.7	Sf	N21E42	162
	1510	1510	1514	C1.7	Sf	N23E28	162
	2004	2008	2017	C2.0			
	2049	2102	2131		Sf	N25E38	162
	2103	2105	2128	C6.6	Sf	S19W40	160
	B2105	2105	2114		Sf	S22W47	163
	2259	2259	2302		Sf	S13W82	154
	2342	2353	0006	C4.7	Sf	N23E23	162
22 October	0227	0231	0243		Sf	N20E57	165
	0412	0413	0427	C2.4	Sf	N23E31	162
	0505	0519	0532	C1.8			
	1146	1146	1149		Sf	S07W55	158
	1246	1247	1253	C2.2	Sf	N28E29	162
	1326	1326	1333		Sf	S07W58	158
	1532	1533	1700	M1.0	Sf	N28E27	162
	2209	2228	2239	C1.3			
23 October	0047	0116	0145	C6.6	Sf	S04W62	158
	0101	0101	0104	C3.5	Sf	N25E22	162
	0634	0635	0641		Sf	S16W60	160
	1538	1616	1716	C3.2	Sf	N20E37	165
24 October	0814	0817	0834	C1.0	Sf	N28E09	162
	0949	0953	0955	B8.8			
	1634	1635	1647		Sf	N28E03	162
	1804	1810	1825	C7.4	1n	N23W14	162
	2159	2203	2206	C1.7			
	2210	2213	2215	C1.2			

Flare List - continued.

Date	Time Begin	Time Max	Time End	X-ray Class.	Optical Imp / Brtns	Optical Location Lat CMD	Rgn
25 October	0608	0611	0613	C1.0			
	0702	0703	0705		Sf	N28W02	162
	0915	0919	0921	B9.4			
	1320	1321	1335	C1.1	Sf	N24W16	162
	1409	1411	1418		Sf	N24W28	162
	1521	1521	1526		Sf	N25W14	162
	1620	1643	1703	C1.6	1f	N27W10	162
	1726	1737	1907	M1.5	1f	N28W11	162
26 October	0319	0327	0330	C2.8			
	1429	1433	1438	B8.7			
	1828	1838	1850	C2.3			
27 October	0259	0300	0305		Sf	N26W31	162
	0353	0353	0400	C1.6	Sf	N26W31	162
	0652	0656	0658	C1.3			
	0820	0826	0832	C1.2	Sf	N26W34	162
	B0908	0912	A0944	C1.3	Sf	N26W34	162
	0956	1001	1040	C1.6	Sf	N27W37	162
	1221	1221	1230		Sf	N25W37	162
	1345	1345	1352	B8.2	Sf	N24W37	162
	B1400	U1400	1409		Sf	N25W37	162
	1401	1401	1422		Sf	N24W38	162
	1447	1447	1450		Sf	N27W37	162
	1726	1729	1737	C1.6			
	1746	1757	1822	C1.9	Sf	N24W40	162
	1917	1918	1922		Sf	N25W40	162
	1924	1925	1936		Sf	N24W40	162
	2030	2038	A2108	C2.9	Sf	N24W42	162
	2153	2204	2215	C4.3			

Region Summary

Date	Location (° Lat ° CMD)	Helio Lon	Sunspot Characteristics Area (10^{-6} hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	Flares X-ray C	M	X	Optical S	1	2	3	4
			Region 148												
09 Oct	S21E70	245	0050	01	Hax	001	A								
10 Oct	S21E57	245	0070	02	Hax	002	A								
11 Oct	S20E43	246	0040	02	Hsx	001	A								
12 Oct	S20E31	245	0060	02	Hsx	001	A								
13 Oct	S20E17	246	0030	02	Hsx	002	A								
14 Oct	S20E04	245	0030	01	Hsx	001	A								
15 Oct	S20W09	245	0020	01	Hrx	001	A								
16 Oct	S20W22	245	0020	01	Hsx	001	A								
17 Oct	S20W35	245	0020	01	Hsx	001	A								
18 Oct	S20W48	245	0010	01	Axx	001	A								
19 Oct	S21W61	244	0010	01	Axx	001	A								
20 Oct	S21W74	244													
21 Oct	S21W87	244													
								0	0	0	0	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 245

Date	Location (° Lat ° CMD)	Helio Lon	Sunspot Characteristics Area (10^{-6} hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	Flares X-ray C	M	X	Optical S	1	2	3	4
			Region 149												
09 Oct	N16E72	243	0140	03	Hax	001	A								
10 Oct	N16E61	241	0170	08	Dao	007	B	1			1				
11 Oct	N15E48	241	0220	08	Dsi	012	B	1			1				
12 Oct	N16E34	242	0400	09	Dai	012	B								
13 Oct	N16E20	243	0410	10	Dhi	024	B	1			1				
14 Oct	N14E06	243	0440	11	Ehi	031	Bg	1			1				
15 Oct	N14W07	243	0450	12	Eai	031	Bg	1	1		1	1			
16 Oct	N14W20	243	0480	12	Eai	033	Bg	1			2				
17 Oct	N14W33	243	0400	13	Eai	029	B	1			1				
18 Oct	N14W46	243	0380	09	Dki	016	Bg	1			3				
19 Oct	N14W62	245	0290	09	Dao	014	Bg				1	1			
20 Oct	N14W75	245	0250	09	Dso	009	Bg								
21 Oct	N14W88	245	0080	07	Dao	003	B								
								8	1	0	12	2	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 243

Region Summary- continued.

Date	Location (° Lat ° CMD)	Helio Lon	Sunspot Characteristics Area (10^{-6} hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	Flares X-ray C	X-ray M	X-ray X	Optical S	Optical 1	Optical 2	Optical 3	Optical 4
			Region 154												
10 Oct	S12E68	234	0050	02	Hax	002	A								
11 Oct	S13E55	234	0030	02	Cso	002	B								
12 Oct	S12E44	232	0050	07	Cso	003	B								
13 Oct	S11E33	230	0060	10	Dso	005	B								
14 Oct	S12E21	228	0040	11	Eao	009	B								
15 Oct	S12E08	228	0030	11	Cso	010	B								
16 Oct	S12W05	228	0050	10	Cso	012	B								
17 Oct	S12W18	228	0020	09	Cso	010	B								
18 Oct	S12W31	228	0040	07	Dso	007	B								
19 Oct	S14W48	231	0020	01	Hsx	001	A	1			1				
20 Oct	S14W62	232	0010	01	Axx	001	A	3			4				
21 Oct	S14W75	232						1			2				
22 Oct	S14W88	232													
								5	0	0	7	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 228

			Region 157												
12 Oct	N17E49	227	0010	01	Hrx	002	A								
13 Oct	N16E34	229	0010	01	Hsx	003	A								
14 Oct	N15E20	229	0010	01	Cro	002	B								
15 Oct	N15E07	229													
16 Oct	N15W06	229													
17 Oct	N15W19	229	0010	03	Cro	002	B								
18 Oct	N15W32	229													
19 Oct	N15W45	229													
20 Oct	N15W58	229													
21 Oct	N15W71	229													
22 Oct	N15W84	229													
								0	0	0	0	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 229

Region Summary- continued.

Date	Location (° Lat ° CMD)	Helio Lon	Sunspot Characteristics Area (10^{-6} hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	Flares X-ray C	M	X	Optical S	1	2	3	4
			Region 158												
12 Oct	S08E80	196	0090	04	Hsx	001	A								
13 Oct	S09E62	199	0120	02	Hsx	001	A								
14 Oct	S08E47	202	0110	02	Hsx	001	A								
15 Oct	S08E34	202	0120	08	Cso	003	B								
16 Oct	S08E21	202	0120	07	Cso	004	B								
17 Oct	S08E11	199	0140	09	Dao	016	Bg	2			3				
18 Oct	S08W02	199	0140	08	Dai	018	Bg	1			3				
19 Oct	S07W18	201	0120	06	Dso	017	Bg	1			3	1			
20 Oct	S07W32	202	0100	07	Dso	010	B	1			4				
21 Oct	S08W47	204	0060	05	Cso	004	B				1				
22 Oct	S08W61	205	0120	09	Dso	007	B				2				
23 Oct	S08W75	206	0110	09	Dao	004	B	1			1				
24 Oct	S06W88	206	0080	08	Dao	003	B								
								6	0	0	17	1	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 199

Date	Location (° Lat ° CMD)	Helio Lon	Sunspot Characteristics Area (10^{-6} hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	Flares X-ray C	M	X	Optical S	1	2	3	4
			Region 159												
13 Oct	S12E73	190	0080	02	Hsx	001	A		1						
14 Oct	S11E57	192	0140	03	Hax	001	A	1			1	1			
15 Oct	S11E44	192	0160	03	Hsx	001	A								
16 Oct	S11E31	192	0190	05	Cao	005	B								
17 Oct	S11E18	192	0160	07	Cao	008	B	1			1				
18 Oct	S11E05	192	0150	08	Cao	010	B								
19 Oct	S12W08	191	0100	08	Dao	008	B				1				
20 Oct	S12W22	192	0060	06	Dso	006	B		1		1	1			
21 Oct	S13W35	192	0030	08	Dso	007	B								
22 Oct	S15W46	190	0010	02	Bxo	003	B								
23 Oct	S15W59	190													
24 Oct	S15W72	190													
25 Oct	S15W85	190													
								2	2	0	4	2	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 192

Region Summary- continued.

Date	Location (° Lat ° CMD)	Helio Lon	Sunspot Characteristics Area (10^{-6} hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	Flares X-ray C	M	X	Optical S	1	2	3	4
		Region 160													
14 Oct	S20E54	195	0030	04	Cro	003	B								
15 Oct	S20E41	195	0030	06	Cso	005	B								
16 Oct	S20E28	195	0160	08	Dai	017	B	2			3				
17 Oct	S20E15	195	0140	09	Dai	018	B								
18 Oct	S20E02	195	0140	10	Dai	022	B								
19 Oct	S22W12	195	0110	11	Eao	018	B	2			2				
20 Oct	S21W26	196	0130	13	Eao	028	Bg	1	2		3	3			
21 Oct	S22W40	197	0080	13	Eao	016	Bg	2			4				
22 Oct	S20W56	200	0110	09	Dao	013	Bg								
23 Oct	S19W72	203	0060	04	Dso	005	B				1				
24 Oct	S18W83	201	0010	06	Bxo	004	B								
25 Oct	S18W96	201													
								7	2	0	13	3	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 195

Date	Location (° Lat ° CMD)	Helio Lon	Sunspot Characteristics Area (10^{-6} hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	Flares X-ray C	M	X	Optical S	1	2	3	4
		Region 161													
15 Oct	N06E00	236	0020	03	Cro	003	B								
16 Oct	N06W13	236	0030	03	Cso	005	B								
17 Oct	N06W26	236	0020	04	Cso	007	B								
18 Oct	N06W39	236	0010	03	Bxo	002	B								
19 Oct	N08W54	238													
20 Oct	N08W67	238													
21 Oct	N08W80	238													
22 Oct	N08W93	238													
								0	0	0	0	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 236

Region Summary- continued.

Date	Location (° Lat ° CMD)	Helio Lon	Sunspot Characteristics Area (10^{-6} hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	Flares X-ray C	M	X	Optical S	1	2	3	4
			Region 162												
17 Oct	N25E76	134	0160	03	Hhx	001	A	1			1				
18 Oct	N25E71	126	0700	18	Fkc	008	B	5			7				
19 Oct	N26E59	124	0890	22	Fki	016	Bg	3			8				
20 Oct	N26E46	124	0960	22	Fhi	032	Bg	4	2		13	2	1		
21 Oct	N26E34	123	0920	23	Fki	032	Bg	5			7				
22 Oct	N27E22	122	1100	15	Eki	034	Bgd	2	1		3				
23 Oct	N26E10	121	1120	26	Fki	041	Bgd	1			1				
24 Oct	N26W04	122	0990	27	Fkc	044	Bgd	2			2	1			
25 Oct	N26W18	122	0870	25	Fkc	049	Bgd	2	1		4	2			
26 Oct	N26W27	118	0920	27	Fkc	064	Bg								
27 Oct	N26W43	121	0680	24	Fkc	039	Bgd	6			14				
								31	4	0	60	5	1	0	0
Still on Disk.															
Absolute heliographic longitude:		122													
			Region 163												
18 Oct	S21W10	207	0010	04	Bxo	004	B								
19 Oct	S21W23	207													
20 Oct	S21W36	207													
21 Oct	S21W49	207									1				
22 Oct	S21W62	207													
23 Oct	S21W75	207													
24 Oct	S21W88	207													
								0	0	0	1	0	0	0	0
Crossed West Limb.															
Absolute heliographic longitude:		207													
			Region 164												
20 Oct	N11E54	116	0020	01	Axx	001	A								
21 Oct	N11E40	117	0010	04	Bxo	003	B								
22 Oct	N11E25	119	0010	04	Bxo	003	B								
23 Oct	N11E12	119													
24 Oct	N11E01	117	0020	05	Bxo	008	B								
25 Oct	N11W13	117	0020	05	Cro	006	B								
26 Oct	N11W25	116													
27 Oct	N11W38	116													
								0	0	0	0	0	0	0	0
Still on Disk.															
Absolute heliographic longitude:		117													

Region Summary- continued.

Date	Location (° Lat ° CMD)	Helio Lon	Sunspot Characteristics Area (10^{-6} hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	Flares X-ray C	M	X	Optical S	1	2	3	4
			Region 165												
20 Oct	N20E71	099	0180	02	Hsx	001	A								
21 Oct	N21E58	099	0240	07	Cao	004	B								
22 Oct	N21E46	098	0260	10	Cko	012	B				1				
23 Oct	N20E31	100	0230	05	Cao	004	B	1			1				
24 Oct	N20E18	100	0210	06	Cao	006	B								
25 Oct	N20E05	100	0210	06	Cao	010	B								
26 Oct	N21W09	100	0150	04	Dao	008	B								
27 Oct	N21W22	100	0150	04	Cao	004	B								
								1	0	0	2	0	0	0	0
Still on Disk.															
Absolute heliographic longitude:		100													
			Region 166												
23 Oct	S06E08	123	0000	00	Axx	001	A								
24 Oct	S06W05	123													
25 Oct	S06W18	123													
26 Oct	S06W31	123													
27 Oct	S06W44	123													
								0	0	0	0	0	0	0	0
Still on Disk.															
Absolute heliographic longitude:		123													
			Region 167												
23 Oct	N18E75	056	0060	01	Hax	001	A								
24 Oct	N17E64	054	0040	02	Hsx	001	A								
25 Oct	N17E50	054	0040	02	Hax	001	A								
26 Oct	N18E36	055	0040	03	Cso	002	B								
27 Oct	N18E24	054	0020	01	Hsx	001	A								
								0	0	0	0	0	0	0	0
Still on Disk.															
Absolute heliographic longitude:		054													
			Region 168												
24 Oct	N24W66	184	0020	01	Hrx	001	A								
25 Oct	N24W80	184	0020	01	Hsx	001	A								
								0	0	0	0	0	0	0	0
Crossed West Limb.															
Absolute heliographic longitude:		184													

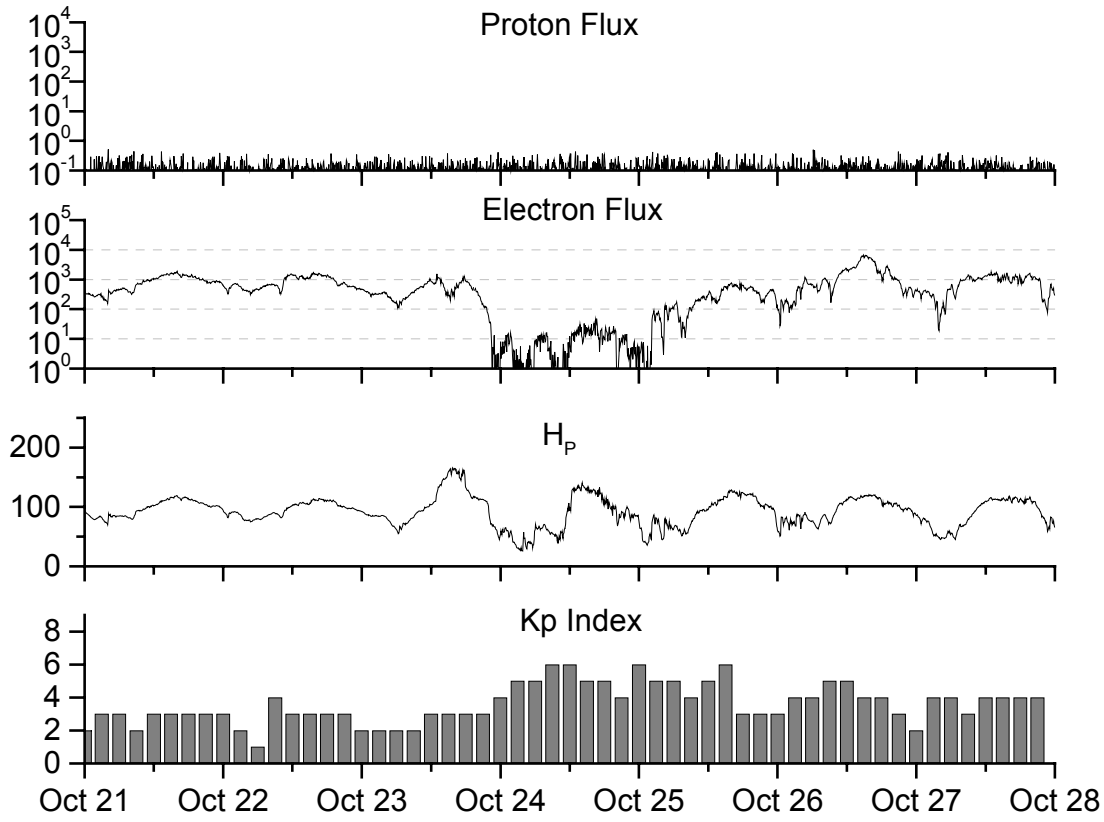
Region Summary- continued.

Date	Location (° Lat ° CMD)	Helio Lon	Area (10^{-6} hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	Flares X-ray C	M	X	Optical S	1	2	3	4
				Region 169											
24 Oct	S19E75	043	0110	04	Dso	002	B								
25 Oct	S19E59	043	0090	05	Dao	002	B								
26 Oct	S19E47	044	0100	04	Dso	002	B								
27 Oct	S18E33	045	0050	03	Dso	002	B								
								0	0	0	0	0	0	0	0
Still on Disk.															
Absolute heliographic longitude:		045													
				Region 170											
25 Oct	S12E65	039	0030	01	Hsx	001	A								
26 Oct	S12E53	038	0030	05	Cso	006	B								
27 Oct	S12E38	040	0030	03	Cso	002	B								
								0	0	0	0	0	0	0	0
Still on Disk.															
Absolute heliographic longitude:		040													
				Region 171											
25 Oct	N10E76	028	0060	02	Hax	001	A								
26 Oct	N10E64	027	0060	02	Hsx	001	A								
27 Oct	N11E52	026	0060	02	Hsx	001	A								
								0	0	0	0	0	0	0	0
Still on Disk.															
Absolute heliographic longitude:		026													
				Region 172											
27 Oct	S16E56	022	0030	02	Hsx	001	A								
								0	0	0	0	0	0	0	0
Still on Disk.															
Absolute heliographic longitude:		022													

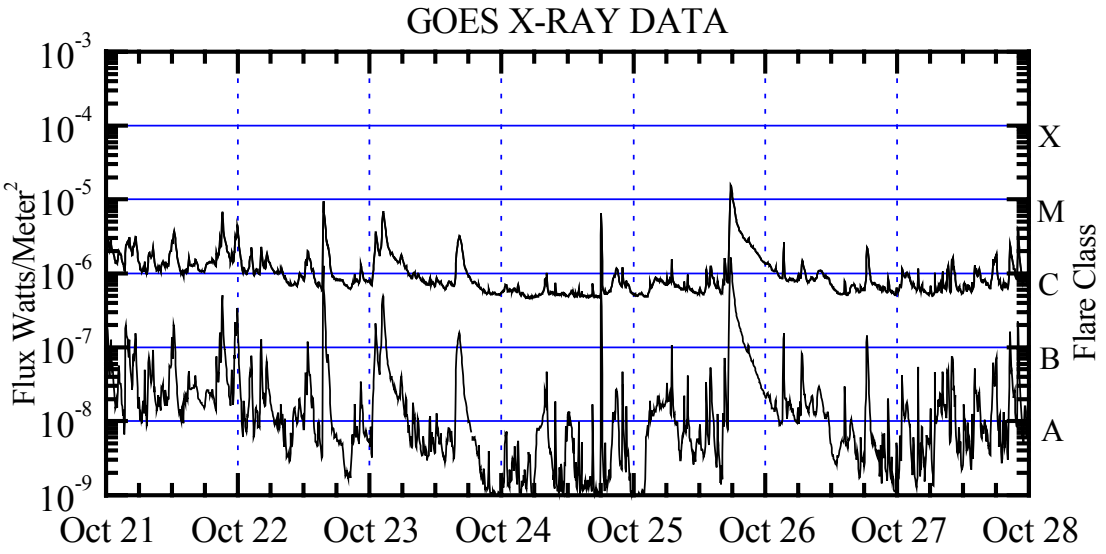
Recent Solar Indices (preliminary)
of the observed monthly mean values

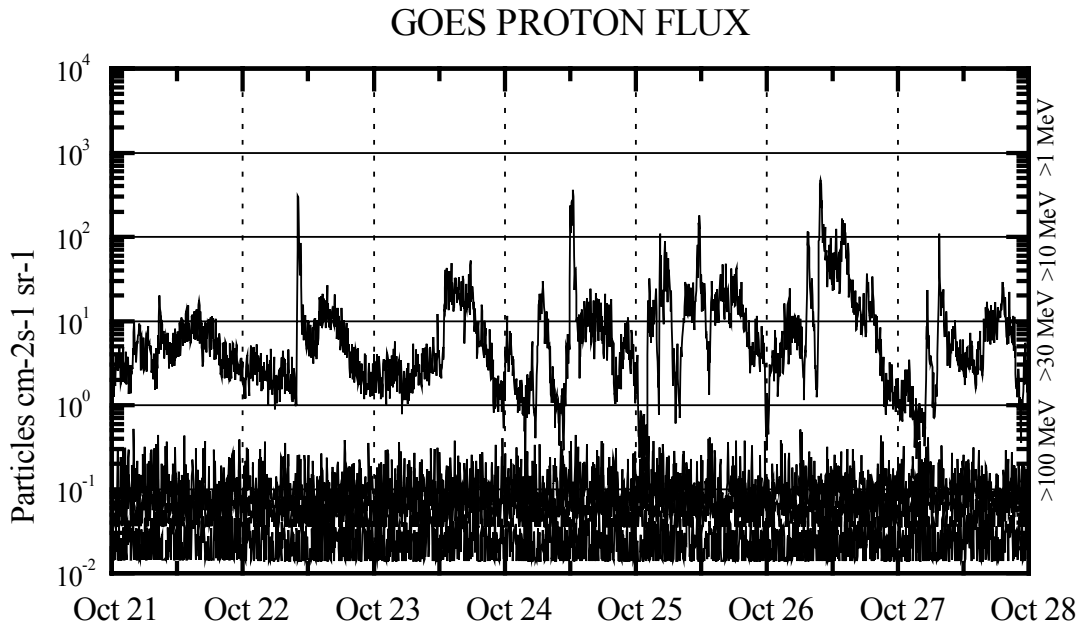
	Sunspot Numbers					Radio Flux		Geomagnetic	
	Observed values		Ratio	Smooth values		*Penticton	Smooth	Planetary	Smooth
Month	SWO	RI	RI/SWO	SWO	RI	10.7 cm	Value	Ap	Value
					2000				
October	138.9	100.1	0.72	166.2	114.4	167.7	175.6	18	14.6
November	149.9	106.5	0.71	162.7	112.7	178.8	173.9	17	14.6
December	146.4	104.5	0.71	160.8	112.1	173.6	172.1	08	14.4
					2001				
January	142.7	95.1	0.67	156.3	108.8	166.7	168.8	08	13.8
February	131.0	80.1	0.61	151.4	104.2	147.3	165.8	06	13.3
March	166.7	114.2	0.69	154.0	104.9	177.7	167.9	17	12.9
April	163.6	108.2	0.66	159.4	107.7	178.3	171.7	18	12.7
May	135.1	97.3	0.72	163.1	108.8	148.7	174.8	12	12.5
June	196.7	134.0	0.68	167.2	109.9	173.7	178.8	12	12.4
July	124.6	82.2	0.66	172.1	111.8	131.3	183.9	11	12.4
August	159.4	106.8	0.67	176.7	113.8	163.2	188.8	13	12.5
September	229.1	150.7	0.66	178.8	114.3	233.3	191.3	12	12.3
October	197.4	125.6	0.64	179.5	114.1	208.2	191.9	18	11.9
November	178.6	106.5	0.60	183.7	115.6	212.5	193.6	14	11.9
December	217.5	131.8	0.61	184.5	114.7	236.6	193.8	08	12.0
					2002				
January	189.0	113.9	0.60	184.8	113.5	226.4	194.6	07	12.0
February	194.5	108.0	0.56	188.6	114.7	205.1	197.2	09	12.2
March	153.1	98.1	0.64	188.9	113.3	179.5	195.7	10	12.4
April	194.9	120.4	0.62			189.7		15	
May	204.1	120.8	0.59			178.4		15	
June	146.0	88.5	0.61			148.8		11	
July	183.5	99.9	0.54			174.5		13	
August	191.0	116.4	0.61			184.0		16	
September	206.4	109.3	0.53			175.9		14	

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 21 October 2002
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.
Hp 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.
Kp 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 Kp 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 Kp are " global " parameters that are applicable to a first order approximation over large areas. Hparallel 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/$m^{2)}$ 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^2 –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^2-sec-sr) at greater than 10 MeV.