

**Space Weather Highlights**  
**14 - 20 October 2002**

**SWO PRF 1416**  
**15 October 2002**

Solar activity ranged from low to moderate levels. Moderate levels were observed on 15 October and again on 20 October. The largest event was an M1.8/1b from Region 160 (S21, L196 class/area Eao/130 on 20 October) at 20/1428 UTC. Associated with this event was a Type II radio sweep (637 km/s). Region 160 developed a beta-gamma magnetic configuration in the leading spots late in the period. Region 149 (N14, L=243, class/area Eai/480 on 16 October) was a moderate size spot group with a beta-gamma magnetic configuration at the beginning of the period and produced an M1 flare on 15 October. On 17 October, Region 149 entered a gradual decay phase, simplifying to a beta magnetic configuration. Region 162 (N26, L=124, class/area Fhi/960 on 20 October) has grown steadily since rotating onto the visible disk on 17 October, and produced two M-class flares on 20 October. Polarity mixing in the intermediate spots developed into a beta-gamma magnetic configuration on 20 October. On 15 October, a line of central meridian filaments, extending from the southern pole region to the western low latitude region, lifted off around 15/1200 UTC.

Solar wind data were available from the NASA Advanced Composition Explorer (ACE) spacecraft for most of the summary period. A high-speed stream persisted for the majority of the period. Solar wind velocity was gradually increasing on 14-17 October before leveling off near 600 km/s. Velocities reached peak values near 700 km/s on 19 October. The Bz component of the Interplanetary Magnetic Field turned northward midday on 14 October, and has averaged between 0 and +10 nT for the rest of the summary period.

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 moderate levels.

The geomagnetic field was at quiet to active levels with one period of isolated major storm conditions on 14 October due to sustained southward Bz. Active conditions were observed on 14 – 15 October and isolated active conditions on 16-18 October.

**Space Weather Outlook**  
**23 October - 18 November 2002**

Solar activity is expected to be low to moderate. Moderate levels are possible early in the forecast period and again late in the period due to Region 162. Low levels are expected during the middle of the forecast period.

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 23-24 October due to persistent high-speed stream effects. Flux levels may reach event threshold on 29-30 October and again on November 05-06 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 27-28 October and 03-04 November due to coronal hole summary 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
14 October	181	175	1490	M1.0	5	0	0	4	1	0	0	0
15 October	177	165	1090	C1.9	7	1	0	3	1	0	0	0
16 October	183	182	1330	B7.9	7	0	0	6	0	0	0	0
17 October	179	215	1210	B9.4	9	0	0	6	0	0	0	0
18 October	173	200	1660	C1.7	16	0	0	13	0	0	0	0
19 October	180	156	1610	B7.6	11	0	0	17	1	0	0	0
20 October	180	179	1770	C2.7	11	4	0	25	5	1	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
14 October	3.5E+5	1.3E+4	2.6E+3		5.4E+6	
15 October	2.3E+5	1.2E+4	2.9E+3		1.1E+6	
16 October	1.0E+5	1.4E+4	3.1E+3		5.2E+5	
17 October	3.3E+5	1.7E+4	2.7E+3		2.7E+6	
18 October	1.2E+6	2.0E+4	2.6E+3		6.9E+6	
19 October	2.1E+6	1.7E+4	2.1E+3		1.6E+7	
20 October	8.3E+5	1.3E+4	2.0E+3		3.8E+7	

### *Daily Geomagnetic Data*

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	14 October	13	2-3-4-3-3-2-3-2	27	1-3-4-4-6-5-2-2	26
15 October	13	2-3-2-3-2-4-3-2	23	3-3-3-4-4-5-4-2	15	3-3-2-4-3-4-4-2
16 October	9	3-0-1-1-2-2-4-2	18	3-1-0-2-2-3-6-3	14	3-2-1-2-3-4-5-3
17 October	8	3-2-1-1-3-2-2-2	15	4-3-2-2-4-3-2-2	11	4-3-2-2-3-3-3-3
18 October	9	2-3-2-1-3-2-2-2	13	3-3-3-1-3-4-2-2	13	3-3-2-1-3-4-3-2
19 October	9	2-2-2-2-2-2-3-3	11	2-3-2-2-3-2-3-3	11	3-3-2-2-2-3-3-3
20 October	8	1-3-1-1-3-1-3-2	10	2-3-0-3-4-2-1-2	10	2-3-1-2-3-3-3-3

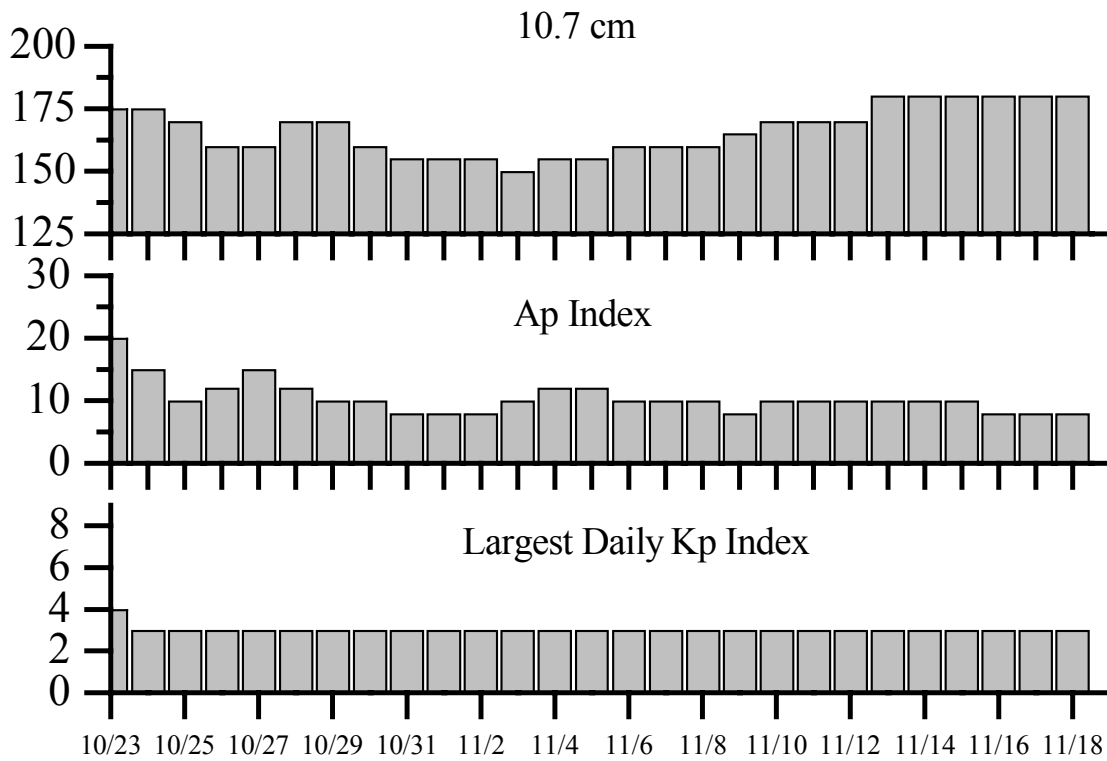


*Alerts and Warnings Issued*

<u>Date &amp; Time of Issue</u>	<u>Type of Alert or Warning</u>	<u>Date &amp; Time of Event UT</u>
14 Oct 0106	1 - 245 MHz Radio Burst	13 Oct
14 Oct 0643	ALERT: Geomagnetic K= 4	14 Oct 0642
14 Oct 1151	ALERT: Geomagnetic K= 4	14 Oct 1150
14 Oct 1153	WARNING: Geomagnetic K= 4 expected	14 Oct 1151 - 1500
14 Oct 1454	EXTENDED WARNING: Geomagnetic K= 4 expected	14 Oct 1151 - 2359
14 Oct 1458	ALERT: Type II Radio Emission	14 Oct 1429
15 Oct 0059	2 - 245 MHz Radio Bursts	14 Oct
15 Oct 1609	WARNING: Geomagnetic K= 4 expected	15 Oct 1610 - 16 Oct 1500
15 Oct 1611	ALERT: Geomagnetic K= 4	15 Oct 1611
16 Oct 1839	WARNING: Geomagnetic K= 4 expected	16 Oct 1840 - 17 Oct 1500
16 Oct 1843	ALERT: Geomagnetic K= 4	16 Oct 1842
17 Oct 0046	1 - 245 MHz Radio Noise Storm	16 Oct
18 Oct 1615	ALERT: Geomagnetic K= 4	18 Oct 1611
20 Oct 0037	8 - 245 MHz Radio Bursts	19 Oct
20 Oct 0037	1- 245 MHz Radio Noise Storm	19 Oct
20 Oct 1522	ALERT: Type II Radio Emission	20 Oct 1432



**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
23 Oct	175	20	4	06 Nov	160	10	3
24	175	15	3	07	160	10	3
25	170	10	3	08	160	10	3
26	160	12	3	09	165	8	3
27	160	15	3	10	170	10	3
28	170	12	3	11	170	10	3
29	170	10	3	12	170	10	3
30	160	10	3	13	180	10	3
31	155	8	3	14	180	10	3
01 Nov	155	8	3	15	180	10	3
02	155	8	3	16	180	8	3
03	150	10	3	17	180	8	3
04	155	12	3	18	180	8	3
05	155	12	3				



### *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
15 Oct	1408	1422	1437	M1.0	.013	1f	N20W04		0149	55			
20 Oct	0032	0045	0111	M1.8	.029	1f	N27E61		0162	260	42		
20 Oct	0331	0339	0400	M1.5	.020	2n	N26E58		0162				
20 Oct	0501	0514	0519	M1.2	.009	1n	S18W18		0160	230			
20 Oct	1421	1428	1435	M1.8	.011	1b	S19W23		0160	24	26		1

### *Flare List*

Date	Time			X-ray Class.	Imp / Brtns	Optical Location Lat CMD	Rgn
	Begin	Max	End				
14 October	0000	0020	0052		Sf	S13E75	0159
	0246	0248	0315	C5.8	Sf	N10E11	0145
	0931	0935	0958	C4.7	1f	S13E60	0159
	1419	1423	1426	C1.3			
	1958	2002	2026	C4.9	Sf	S10W55	0140
	2319	2328	2338	C3.5	Sf	N13E05	0149
15 October	0516	0516	0520	C2.2	Sf	N14E05	0149
	0639	0642	0646	C1.6			
	0913	0917	0921	C1.6			
	1325	1326	1337	C2.0	Sf	S11W64	0140
	1350	1353	1356	C1.7			
	1411	1417	1444	M1.0	1f	N20W04	0149
	1713	1714	1721	C1.0	Sf	S10W64	0140
	2226	2234	2238	C1.1			
16 October	0313	0314	0322	C7.1	Sf	S20E37	0160
	0422	0427	0433	C2.9	Sf	S12W87	0150
	1149	1149	1153	C1.8	Sf	S20E32	0160
	1231	1239	1251	C1.8			
	1445	1446	1451	C1.2	Sf	N13W14	0149
	1522	U1527	1534		Sf	N14W13	0149
	1551	1627	1658	C6.5			
	1842	1842	A1846		Sf	S21E21	0160
17 October	1931	1933	1934	C1.0			
	0358	0400	0422	C2.6	Sf	S05E21	0158
	1123	1127	1132	C1.4			
	1143	1144	1221	C2.3	Sf	S04E16	0158
	1158	1207	1226	C3.5	Sf	S04E16	0158
	1400	1404	1410	C1.5			
	1436	1440	1447	C2.0	Sf	S10E23	0159
	1540	1543	1546	C1.2			
	1855	1858	1913	C3.0	Sf	N14W28	0149
	2218	U2219	2227	C2.2	Sf	N23E75	0162
18 October	0002	0008	0012	C3.1			
	0059	0107	0112	C2.5			



*Flare List - continued.*

Date	Time			X-ray Class.	Optical		Rgn
	Begin	Max	End		Imp / Brtns	Location Lat CMD	
18 October	0237	0238	0242	C2.5	Sf	N25E86	0162
	0528	0534	0542	C2.0			
	0559	0559	0607	B9.2	Sf	N14W39	0149
	0657	0703	0734	C1.2	Sf	S06W01	0158
	0932	0936	0942	C2.7			
	1002	1007	1010	C3.0			
	1015	1027	1031	C2.4			
	1124	1128	1137	C1.6			
	1208	1211	1216	C2.3	Sf	N27E82	0162
	1317	1317	1325	C1.6	Sf	N13W43	0149
	1343	1347	1353	C1.7			
	1523	1525	1543	C2.1	Sf	N25E84	0162
	1617	1618	1621	B8.6	Sf	N25E81	0162
	1933	1936	1941	C4.1	Sf	N28E79	0162
	1955	1956	A2219		Sf	N27E75	0162
	2000	2000	2044	C2.9	Sf	N26E76	0162
	2126	U2129	A2129		Sf	S05W04	0158
	2300	2306	2312	C1.6			
	2332	2333	2335		Sf	N14W47	0149
	2336	2338	2343		Sf	S04W05	0158
19 October	0001	0003	0010		Sf	S05W06	0158
	0113	0118	0151	C7.2	1f	S05W06	0158
	0214	0220	0223	C2.9	Sf	N25E71	0162
	0409	0425	0432	C2.3			
	1009	1013	1018	C1.7			
	1028	1055	1103	C2.7			
	1114	1115	1119		Sf	S03W12	0158
	1344	1349	1355	C1.7	Sf	S18W10	0160
	1348	1350	1355		Sf	N11W56	0145
	1418	1419	1424		Sf	N25E66	0162
	1451	1459	1503		Sf	S06W13	0158
	1756	1822	1846	C1.5	Sf	S18W13	0160
	1819	1834	1844		Sf	S18W11	0159
	1827	1827	1835	C5.0	Sf	N25E67	0162
	1907	2009	2121	C5.9	Sf	N25E63	0162
	1923	1930	1945		Sf	N26E67	0162
	2114	2116	2124	C5.0	Sf	S13W48	0154
	2154	2200	2204		Sf	N27E65	0162
	2233	2235	2238		Sf	N26E64	0162
	2306	2307	2315		Sf	N27E64	0162
B2307	U2307	2339	C7.9	Sf	N15W64	0149	



*Flare List - continued.*

Date	Time			X-ray Class.	Optical		Rgn
	Begin	Max	End		Imp / Brtns	Location Lat CMD	
20 October	0037	0044	0117	M1.8	1f	N27E61	0162
	0039	0045	0103		Sf	S18W17	0160
	0209	0222	0252	C7.5	1n	S18W17	0160
	0242	0259	0315		Sf	S05W22	0158
	0319	0319	0324		Sf	S05W22	0158
	0333	0337	0423	M1.5	2n	N26E58	0162
	0501	0514	0537	M1.2	1n	S18W18	0160
	0527	0529	0541	C6.9	Sf	S14W53	0154
	0539	0542	0548		Sf	S20W17	0160
	0544	0545	0549		Sf	N23E58	0162
	0612	0614	0622	C3.6	Sf	N25E44	0162
	0900	0902	0910	C2.0	1f	N25E42	0162
	0911	0913	0929	C2.4	Sf	S04W23	0158
	0952	0952	1000		Sf	N21E58	0162
	1025	1037	1044	C2.8			
	1125	1132	1137		Sf	N25E55	0162
	1353	1354	1357		Sf	S14W56	0154
	1357	1359	1416	C5.9	Sf	N21E50	0162
	1411	1415	1442	C6.6	Sf	S13W63	0154
	1422	1424	1503	M1.8	1b	S19W23	0160
	1424	1425	1436		Sf	S10W18	0159
	1444	1502	1509		Sf	N26E56	0162
	1602	1602	1611		Sf	S05W27	0158
	1603	1603	1609		Sf	N23E39	0162
	1755	1756	1811		Sf	N25E52	0162
	1803	1804	1807	C2.6	Sf	S12W52	0154
	1846	1846	1853		Sf	N25E51	0162
	1846	1859	1918		Sf	S18W26	0160
	1914	1922	1926	C3.1	Sf	N25E51	0162
	2032	2032	2045		Sf	N25E53	0162
	2126	2137	2148	C6.3			
	2241	2245	2300		Sf	N25E47	0162
2306	2308	2330		Sf	N25E49	0162	



### 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	3

#### Region 139

02 Oct	N14E72	337	0120	06	Dso	004	B												
03 Oct	N14E59	336	0160	05	Cso	005	B												
04 Oct	N14E47	335	0410	10	Dki	018	Bgd	4	2		9	1							
05 Oct	N12E32	336	0680	10	Dkc	044	Bg	1	1		5	1							
06 Oct	N11E19	336	0570	11	Eki	032	Bg		2		1	1							
07 Oct	N11E06	336	0600	11	Eki	040	Bg												
08 Oct	N11W07	335	0560	12	Eki	028	Bg	3			4								
09 Oct	N11W19	334	0570	10	Dkc	031	Bgd												
10 Oct	N11W33	335	0520	09	Dkc	026	Bgd	1			1								
11 Oct	N09W46	335	0590	08	Dki	017	Bgd	5			5								
12 Oct	N08W59	335	0640	08	Dko	012	Bgd												
13 Oct	N08W72	335	0500	09	Dko	012	Bgd												
14 Oct	N08W85	334	0330	11	Dko	007	Bg												
								14	5	0	25	3	0	0	0				

Crossed West Limb.

Absolute heliographic longitude: 336

#### Region 140

04 Oct	S07E76	306	0090	02	Hax	001	A												
05 Oct	S07E62	306	0230	09	Cao	005	B												
06 Oct	S07E50	305	0160	11	Cao	006	B												
07 Oct	S08E36	306	0200	10	Dso	006	B	1			1								
08 Oct	S08E25	303	0160	02	Hsx	001	A	1			1								
09 Oct	S09E13	302	0190	08	Cao	010	B	1			1								
10 Oct	S10E00	302	0200	09	Cho	017	B												
11 Oct	S08W11	300	0180	05	Cso	004	B												
12 Oct	S08W25	301	0190	03	Hsx	002	A												
13 Oct	S08W39	302	0200	03	Hsx	001	A												
14 Oct	S08W52	301	0170	04	Cso	004	B	1			1								
15 Oct	S08W65	301	0130	02	Hsx	001	A	2			2								
16 Oct	S08W78	301	0140	02	Hax	002	A												
17 Oct	S08W91	301	0040	02	Hax	001	A												
								6	0	0	6	0	0	0	0				

Crossed West Limb.

Absolute heliographic longitude: 302





**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 142*

05 Oct	N07E64	304	0010	01	Axx	001	A											
06 Oct	N06E50	305	0020	01	Hsx	001	A											
07 Oct	N05E36	306	0020	01	Hsx	001	A											
08 Oct	N05E22	306	0020	01	Hsx	001	A											
09 Oct	N04E09	306	0020	01	Hsx	001	A											
10 Oct	N04W06	308	0010	01	Axx	001	A											
11 Oct	N05W17	306	0000	00	Axx	001	A											
12 Oct	N09W30	306																
13 Oct	N09W43	306																
14 Oct	N09W56	306																
15 Oct	N09W69	306																

0 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 308

*Region 144*

07 Oct	N12E44	298	0020	04	Cro	008	B											
08 Oct	N12E30	298	0060	05	Dso	007	B											
09 Oct	N12E17	298	0110	07	Dao	011	B											
10 Oct	N12E04	298	0130	07	Dai	021	B											
11 Oct	N12W10	299	0110	07	Dso	012	B											
12 Oct	N12W24	300	0110	08	Dso	009	B											
13 Oct	N11W37	300	0090	08	Dso	004	B											
14 Oct	N11W52	301	0100	04	Cso	003	B											
15 Oct	N11W65	301	0060	06	Cso	002	B											
16 Oct	N11W78	301	0060	01	Hsx	001	A											
17 Oct	N11W91	301	0030	02	Hsx	001	A											

0 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 298



**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 145</i>																		
08 Oct	N12E76	252	0010	01	Hsx	001	A											
09 Oct	N11E62	253	0090	02	Hax	001	A											
10 Oct	N12E49	253	0070	02	Hsx	001	A						1					
11 Oct	N13E36	253	0070	02	Hsx	001	A											
12 Oct	N13E21	255	0090	04	Cso	003	B											
13 Oct	N12E08	255	0070	06	Dso	003	B											
14 Oct	N12W05	254	0090	03	Cso	003	B	1					1					
15 Oct	N12W18	254	0070	04	Cso	008	B											
16 Oct	N12W31	254	0080	02	Hsx	002	A											
17 Oct	N12W44	254	0070	02	Hsx	001	A											
18 Oct	N12W57	254	0070	02	Hsx	001	A											
19 Oct	N12W72	255	0070	02	Hsx	001	A							1				
20 Oct	N11W85	255	0060	01	Hsx	001	A											
								1	0	0	0	3	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 254

<i>Region 146</i>																		
09 Oct	S10E25	290	0050	04	Cao	007	B											
10 Oct	S10E11	291	0040	05	Dao	006	B											
11 Oct	S09W05	294	0020	01	Hsx	001	A											
12 Oct	S09W18	294	0000	00	Axx	001	A											
13 Oct	S09W31	294																
14 Oct	S09W44	294																
15 Oct	S09W57	294																
16 Oct	S09W70	294																
17 Oct	S09W83	294																
								0	0	0	0	0	0	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 294



**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

*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													
									0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 245

*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								
								8	1	0	12	2	0	0	0

Still on Disk.

Absolute heliographic longitude: 243

*Region 150*

09 Oct	S09W05	320	0010	02	Axx	002	A								
10 Oct	S09W19	321	0020	02	Axx	002	A								
11 Oct	S09W32	321													
12 Oct	S09W45	321													
13 Oct	S09W58	321						1			1				
14 Oct	S09W71	321								1					
								1	0	0	1	1	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 320



**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 151*

09 Oct	S14E50	265	0010	01	Axx	001	A										
10 Oct	S14E37	265															
11 Oct	S14E24	265															
12 Oct	S14E11	265															
18 Oct	S14W67	265	0010	01	Axx	001	A										
19 Oct	S13W84	268															

0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 265

*Region 152*

10 Oct	N20W16	318	0020	04	Cao	003	B										
11 Oct	N20W29	318	0010	06	Dro	002	B										
12 Oct	N20W42	318															
13 Oct	N20W55	318															
14 Oct	N20W68	318															
15 Oct	N20W81	318															

0 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 318

*Region 153*

10 Oct	S05E47	255	0010	01	Axx	001	A										
11 Oct	S05E34	255															
12 Oct	S05E21	255															
19 Oct	S05W70	255															
20 Oct	S05W83	255															

0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 255



**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 154</i>																		
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							
								4	0	0	5	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 228

*Region 155*

11 Oct	S09W53	342	0030	03	Cro	003	B											
12 Oct	S09W66	342	0040	03	Cro	004	B											
13 Oct	S09W79	342																
14 Oct	S09W92	342																
								0	0	0	0	0	0	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 342

*Region 156*

11 Oct	N09E10	279	0010	03	Bxo	002	B											
12 Oct	N09W05	281	0000	00	Axx	001	A											
13 Oct	N09W17	280	0000	00	Axx	001	A											
14 Oct	N09W30	280																
15 Oct	N09W43	280																
16 Oct	N09W56	280																
17 Oct	N09W69	280																
18 Oct	N09W82	280																
								0	0	0	0	0	0	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 281



**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

*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														
0 0 0 0 0 0 0 0																

Still on Disk.  
Absolute heliographic longitude: 229

*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						
5 0 0 13 1 0 0 0																

Still on Disk.  
Absolute heliographic longitude: 199

*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					
2 2 0 4 2 0 0 0																

Still on Disk.  
Absolute heliographic longitude: 192



**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 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				
								5	2	0	8	3	0	0	0	0	

Still on Disk.

Absolute heliographic longitude: 195

*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															
										0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 236

*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			
								13	2	0	29	2	1	0	0		

Still on Disk.

Absolute heliographic longitude: 124



**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 163</i>																						
18 Oct	S21W10	207	0010	04	Bxo	004	B															
19 Oct	S21W23	207																				
20 Oct	S21W36	207																				
												0	0	0	0	0	0	0	0	0	0	0
Still on Disk.																						
Absolute heliographic longitude: 207																						
<i>Region 164</i>																						
20 Oct	N11E54	116	0020	01	Axx	001	A															
												0	0	0	0	0	0	0	0	0	0	0
Still on Disk.																						
Absolute heliographic longitude: 116																						
<i>Region 165</i>																						
20 Oct	N20E71	099	0180	02	Hsx	001	A															
												0	0	0	0	0	0	0	0	0	0	0
Still on Disk.																						
Absolute heliographic longitude: 099																						



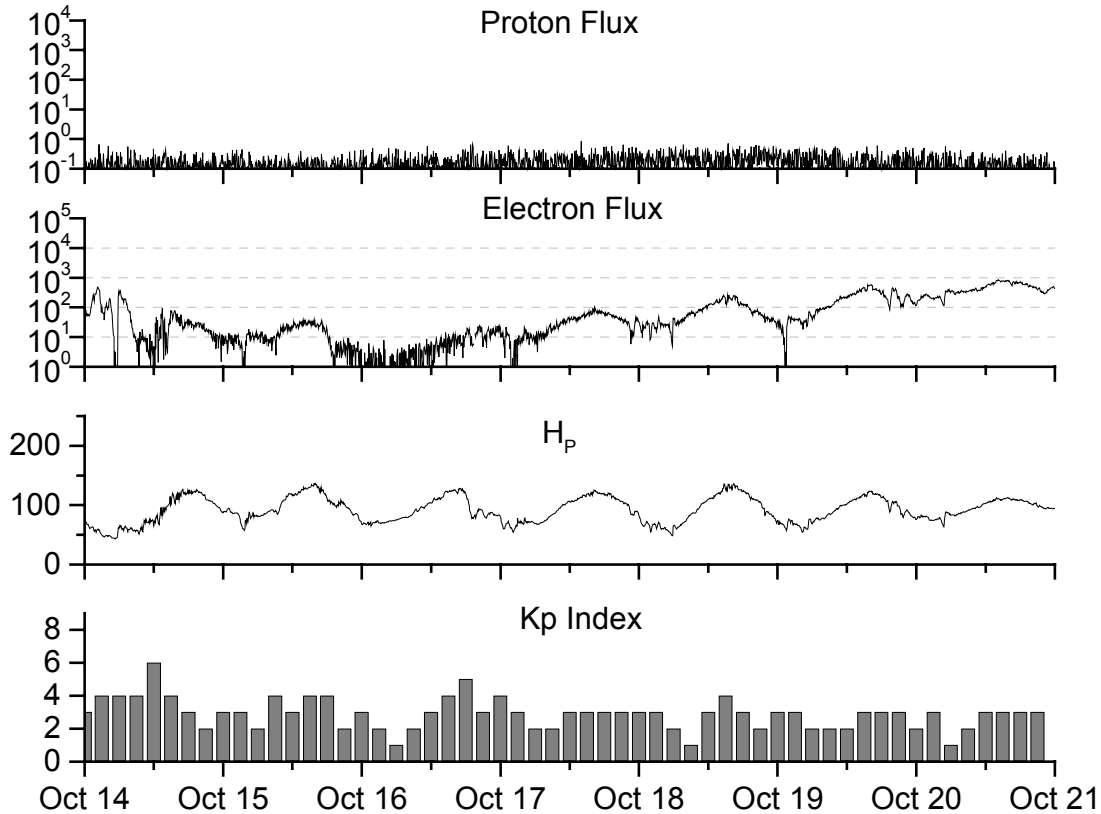


**Recent Solar Indices (preliminary)  
of the observed monthly mean values**

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>2000</b>									
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
<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	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
<b>2002</b>									
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 14 October 2002*

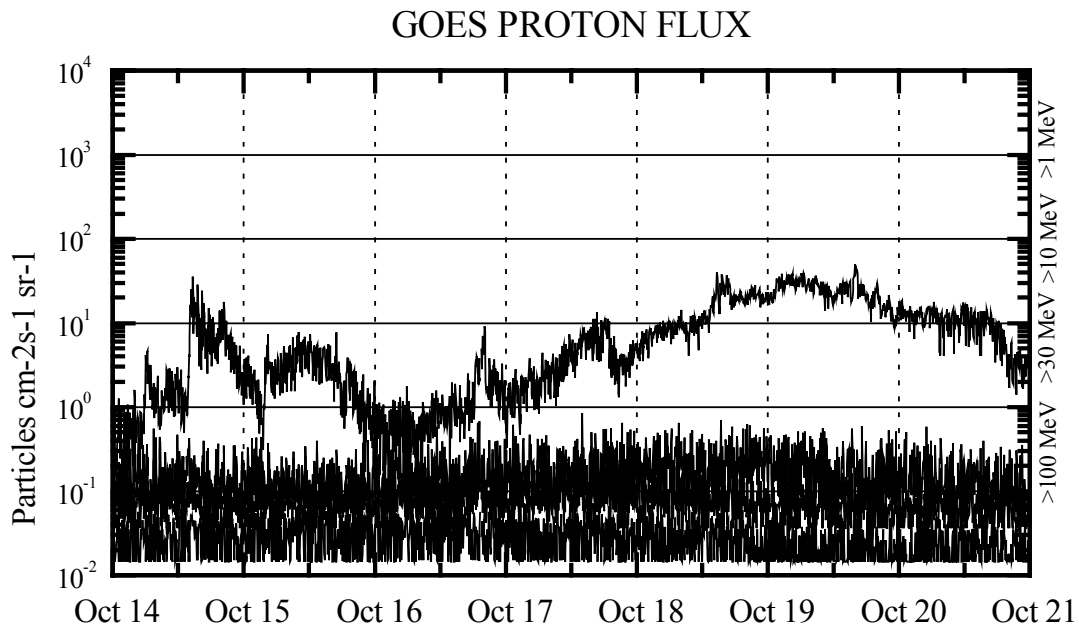
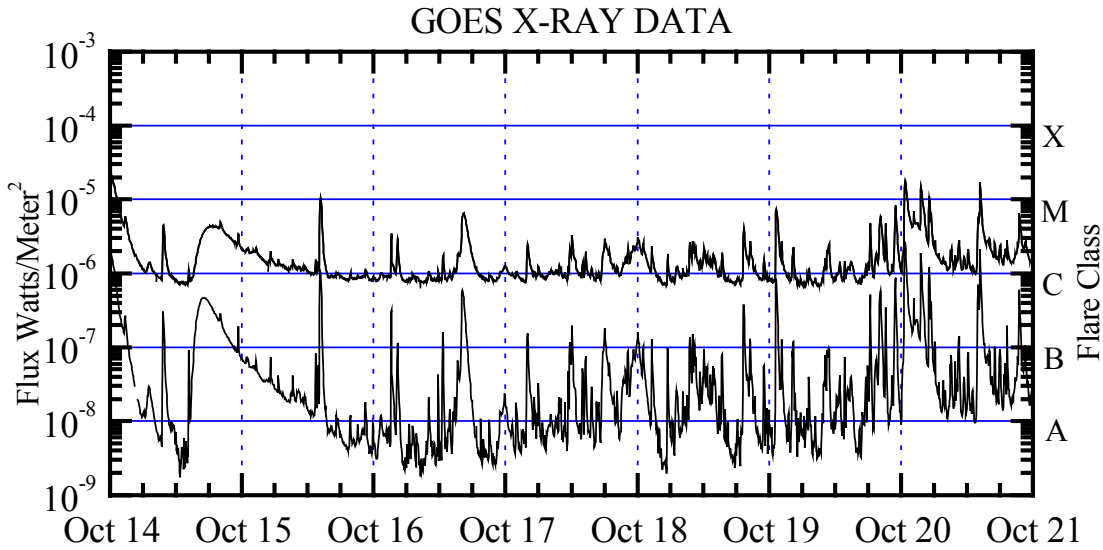
*Protons* plot contains the five-minute averaged integral proton flux (protons/cm<sup>2</sup>-sec-sr) as measured by GOES-8 (W75) for each of three energy thresholds: greater than 10, 50, and 100 MeV.

*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.

