Space Weather Highlights **SWO PRF 1418**
28 October - 03 November 2002 **05 November 2002**

Solar activity ranged from low to high levels. Activity was high on 31 October due to an optically uncorrelated X1.2 flare observed at 31/1652 UTC. SOHO/EIT195 imagery indicates two possible source regions: Region 162 (N26, L=121, area/class 1120/Fki on 23 October) on the NW limb or a region beyond the SE limb. Moderate levels were observed on 28 and 29 October due to minor M-class flares from Region 162. For flare times and magnitudes please refer to the Energetic Flare List or Optical Flare List. Region 162 began the period in a slight decay phase and rotated beyond the west limb on 31 October. Activity reached moderate levels again on 03 November due to an M1 flare from Region 177 (N16, L=328, area/class 370/Eki on 02 November). Region 177 rotated onto the visible disk on 30 October and has exhibited steady growth, developing a beta-gamma magnetic configuration on 01 November. Region 180 (S10, L=303, class/area 150/Dao on 03 November) appeared on the disk late in the period and has developed a beta-gamma magnetic configuration.

Solar wind data were available from the NASA Advanced Composition Explorer (ACE) spacecraft for most of the summary period. Solar wind velocity was elevated near 650 km/s at the beginning of the summary period due to continued coronal hole effects. Solar wind velocity decreased to near 450 km/s by 30 October. On 01 November a second coronal hole rotated into a geo-effective position and solar wind velocity increased with peak velocities near 500 km/s by 03 November. The Bz component of the IMF averaged 0 to –5 nT until 01 November when it increased to an average of –5 to –10 nT for the remainder of the period.

There were no greater than 10 MeV proton events at geo-synchronous orbit during the summary period. A proton enhancement to 1.5 pfu began on 31 October and returned to near background levels by 03 November.

The greater than 2 MeV electron flux at geo-synchronous orbit was at moderate to high levels. High levels were observed on 28 October through 01 November.

The geomagnetic field was at quiet to minor storm levels. Activity reached active levels from 28-31 October due to residual coronal hole effects. One three-hour period of isolated minor storm conditions was observed on 30 October due a short period of negative Bz to –10 nT. The arrival of a second coronal hole late on 01 November resulted in unsettled to active conditions on 02-03 November with an isolated period of minor storm conditions on 02 November.

Space Weather Outlook
06 November - 02 December 2002

Solar activity is expected be low to moderate. Region 177 and Region 180 have M-class potential early in the forecast period. Moderate activity is expected to continue with the return of Region 162 on 13 November.

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 22-27 November due to coronal hole effects.

The geomagnetic field is expected to be at quiet to active levels with isolated minor storm conditions are possible. Quiet to unsettled levels are expected early in the forecast period.
Active to minor storm conditions are possible on 20-23 November and again on 29 November - 02 December due to two returning coronal holes.

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
28 October	158	143	1230	B6.9	12	1	0	24	1	0	0	0
29 October	162	168	1220	B9.4	14	1	0	29	0	0	1	0
30 October	168	182	1390	C2.3	14	0	0	11	2	0	0	0
31 October	170	134	920	C1.1	7	1	1	1	0	0	0	0
01 November	162	169	950	B7.0	5	0	0	4	0	0	0	0
02 November	165	177	1050	B6.3	4	0	0	2	1	0	0	0
03 November	169	217	1280	B6.4	4	1	0	7	1	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
28 October	6.2E+5	1.1E+4	2.4E+3		4.1E+7	
29 October	1.1E+6	1.2E+4	2.6E+3		1.1E+8	
30 October	4.9E+5	1.7E+4	2.8E+3		8.0E+7	
31 October	1.4E+6	5.0E+4	2.7E+3		4.4E+7	
01 November	1.7E+6	7.4E+4	2.6E+3		8.5E+7	
02 November	3.4E+6	9.2E+4	2.5E+3		2.0E+7	
03 November	2.6E+6	5.9E+4	2.3E+3		1.8E+7	

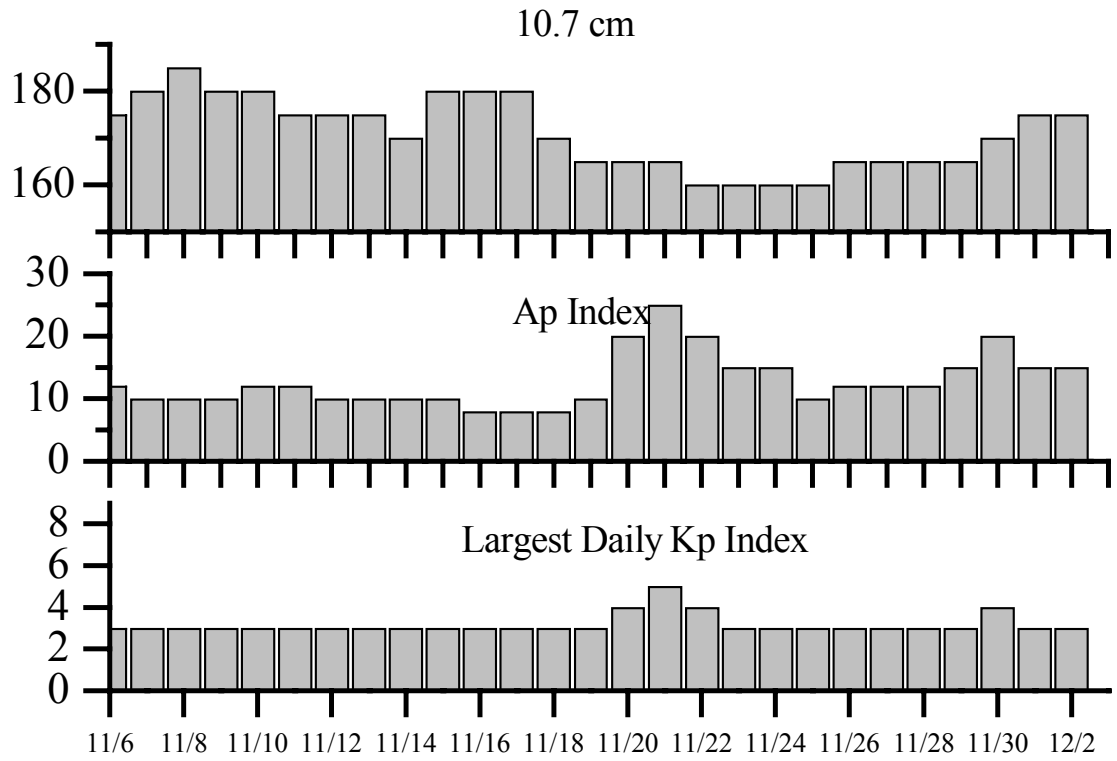
Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg A	K-indices	High Latitude College A	K-indices	Estimated Planetary A	K-indices
28 October	10	3-3-2-2-2-1-3-2	24	4-4-3-5-4-3-3-3	17	4-4-3-3-3-3-3-3
29 October	10	3-3-2-2-2-1-3-2	24	4-4-3-5-4-3-3-3	16	4-3-3-4-3-3-2-3
30 October	11	3-3-3-2-2-2-3-2	25	2-3-6-5-2-3-3-3	19	2-3-5-4-3-3-3-3
31 October	13	3-3-3-3-3-3-2-2	28	3-3-4-5-5-5-3-2	18	4-3-3-3-4-4-3-3
01 November	5	2-1-1-1-1-1-1-3	9	2-1-1-4-3-1-2-1	10	2-3-2-3-3-3-3-2
02 November	13	3-2-3-3-3-2-3-3	42	3-2-5-6-4-6-5-4	21	3-2-4-5-4-4-4-3
03 November	15	3-3-3-3-3-3-3-3	47	3-4-6-6-5-6-4-3	27	4-4-4-4-4-4-3-4

Alerts and Warnings Issued

Date & Time of Issue	Type of Alert or Warning	Date & Time of Event UT
28 Oct 0100	2 - 245 MHz Radio Bursts	27 Oct
28 Oct 1639	ALERT: Electron 2MeV Integral Flux exceeded 1000pfu	28 Oct 1615
29 Oct 0042	5 - 245 MHz Radio Bursts	28 Oct
29 Oct 0042	1 - 245 MHz Radio Noise Storm	28 Oct
29 Oct 1009	WARNING: Geomagnetic K= 4 expected	29 Oct 1010 - 1200
29 Oct 1012	ALERT: Geomagnetic K= 4	29 Oct 1012
29 Oct 1126	ALERT: Electron 2MeV Integral Flux exceeded 1000pfu	29 Oct 1105
30 Oct 0041	9- 245 MHz Radio Bursts	29 Oct
30 Oct 0041	1 - 245 MHz Radio Noise Storm	29 Oct
30 Oct 0626	ALERT: Electron 2MeV Integral Flux exceeded 1000pfu	30 Oct 0620
30 Oct 0709	ALERT: Geomagnetic K= 4	30 Oct 0708
30 Oct 0711	WARNING: Geomagnetic K= 4 expected	30 Oct 0712 - 1200
30 Oct 0812	ALERT: Geomagnetic K= 5	30 Oct 0812
30 Oct 1139	ALERT: Geomagnetic K= 4	30 Oct 1139
30 Oct 1141	EXTENDED WARNING: Geomagnetic K= 4 expected	30 Oct 0712 - 1500
31 Oct 0045	1 - 245 MHz Burst	30 Oct
31 Oct 0045	1 - 245 MHz Radio Noise Storm	30 Oct
31 Oct 0835	WARNING: Geomagnetic K= 4 expected	30 Oct 0835 - 31 Oct 1500
31 Oct 0840	ALERT: Geomagnetic K= 4	30 Oct 0840
31 Oct 1506	ALERT: Electron 2MeV Integral Flux exceeded 1000pfu	31 Oct 1445
31 Oct 1628	WARNING: Geomagnetic K= 4 expected	31 Oct 1630 -Oct 31 2359
31 Oct 1641	ALERT: Geomagnetic K= 4	31 Oct 1641
31 Oct 1654	ALERT: X-Ray Flux exceeded M5	31 Oct 1652
31 Oct 1854	SUMMARY: X-ray Event exceeded X1	31 Oct 1652
01 Nov 0045	1 - 245 MHz Burst	31 Oct
01 Nov 1211	ALERT: Electron 2MeV Integral Flux exceeded 1000pfu	01 Nov 1150
02 Nov 0015	2 - 245 MHz Bursts	01 Nov
02 Nov 0840	WARNING: Geomagnetic K= 4 expected	02 Nov 0839 -1500
02 Nov 0843	ALERT: Geomagnetic K= 4	02 Nov 0842
02 Nov 1020	WARNING: Geomagnetic K= 5 expected Nov 02 1021 -	02 Nov 1500
02 Nov 1028	ALERT: Geomagnetic K= 5	02 Nov 1028
02 Nov 1453	EXTENDED WARNING: Geomagnetic K= 4 expected	02 Nov 0839 -2359
02 Nov 2050	WATCH: Geomagnetic A $\geq$ 20	03 Nov
02 Nov 2301	EXTENDED WARNING: Geomagnetic K= 4 expected	02 Nov 0839 -03 Nov 1500
03 Nov 0008	1 - 245 MHz Radio Noise Storm	02 Nov
03 Nov 1450	EXTENDED WARNING: Geomagnetic K= 4 expected	02 Nov 0839 -03 Nov 2359
03 Nov 1727	ALERT: Geomagnetic K= 5	03 Nov 1724
03 Nov 2305	EXTENDED WARNING: Geomagnetic K=4 expected	02 Nov 0839 -04 Nov 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
06 Nov	175	12	3	20	165	20	4
07	180	10	3	21	165	25	5
08	185	10	3	22	160	20	4
09	180	10	3	23	160	15	3
10	180	12	3	24	160	15	3
11	175	12	3	25	160	10	3
12	175	10	3	26	165	12	3
13 Nov	175	10	3	27	165	12	3
14	170	10	3	28	165	12	3
15	180	10	3	29	165	15	3
16	180	8	3	30	170	20	4
17	180	8	3	01 Dec	175	15	3
18	170	8	3	02	175	15	3
19	165	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
28 Oct	1200	1205	1211	M1.7	.007	1n	N23W61	162	68	36		
29 Oct	0301	0320	0338	M1.1	.016	Sf	N31W51	162		47		
31 Oct	0918	0926	0939	M1.1	.010			175		23		
31 Oct	1647	1652	1655	X1.2	.025					150		
03 Nov	1341	1403	1427	M1.3	.024	1f	N14E25	177	420			

Flare List

Date	Time			X-ray	Optical		Rgn
	Begin	Max	End	Class.	Imp / Brtns	Location Lat CMD	
28 October	B0025	U0027	0040	C1.6	Sf	N23W56	162
	0552	0557	0559		Sf	N27W44	162
	0712	0712	0717		Sf	N27W45	162
	0909	0931	0934	C2.1	Sf	N27W42	162
	0950	0953	A1004		Sf	N29W44	162
	1024	1028	1038	C1.4			
	1133	1138	1144		Sf	N30W48	162
	1203	1204	1229	M1.7	1n	N23W61	162
	1233	1236	1245		Sf	N26W49	162
	1252	1252	1303		Sf	N27W49	162
	1338	1416	1435	C1.1	Sf	N27W62	162
	1414	1415	1424	C2.5	Sf	N34W56	162
	1454	1457	1511		Sf	N26W50	162
	1541	1545	1549		Sf	N26W50	162
	1600	1604	1625	C1.2	Sf	N26W50	162
	1629	1639	1656	C1.0	Sf	N26W50	162
	1644	1647	1656		Sf	N26W50	162
	1752	1752	1757		Sf	N26W52	162
	1807	1807	1812		Sf	S14E30	170
	1828	1829	1834	C2.8	Sf	N26W50	162
	1839	1839	1843		Sf	N26W52	162
	1853	1901	1909	C5.0	Sf	N23W65	162
	1944	1947	1952	C2.3			
	2007	2015	A2055		Sf	S18W67	173
	2139	2143	2147	C1.7			
	2150	2151	2154		Sf	N27W51	162
	2335	2339	2342	C1.1	Sf	S18W65	173
	2354	2355	0001		Sf	N29W53	162
29 October	0133	0137	0146	C1.1			
	0309	0312	0333	M1.1	Sf	N31W51	162
	0418	0423	0432	C4.6			
	0549	0552	0555	C2.9			
	0639	0641	0648		Sf	S17W75	173

Flare List - continued.

Date	Time Begin	Time Max	Time End	X-ray Class.	Optical Imp / Brtns	Optical Location Lat CMD	Rgn
29 October	0645	0646	0652		Sf	N31W55	162
	0744	0748	0801		Sf	N31W56	162
	0927	0930	0943		Sf	N29W58	162
	1119	1120	1124		Sf	N28W58	162
	1135	1136	1146		Sf	N16E63	175
	1138	1140	1146		3f	N09E88	176
	1152	1156	1159		Sf	N16E63	175
	1215	1219	1230		Sf	N16E63	175
	1232	1233	1237	C1.4	Sf	N28W58	162
	1335	1336	1339		Sf	S19W83	173
	1338	1339	1342		Sf	N23W75	162
	1344	1346	1358	C2.2	Sf	N28W61	162
	1348	1349	1355		Sf	S20W78	173
	1420	1421	1432	C2.2	Sf	N28W60	162
	1431	1433	1436		Sf	S19W77	173
	1448	1448	1456	C1.6	Sf	S18W76	173
	1503	1513	1518		Sf	S17W77	173
	1537	1537	1546	C8.7	Sf	N15E62	175
	1600	1602	1609		Sf	S19W80	173
	1629	1631	1644	C9.7	Sf	N30W61	162
	1659	1701	1708		Sf	S19W79	173
	1711	1712	1716		Sf	N15E86	176
	1744	1744	1755		Sf	S19W79	173
	1842	1848	1904		Sf	N15E60	175
	1913	1920	1927	C1.9	Sf	N14E60	175
	1930	1934	1954	C2.5	Sf	N14E59	175
	2059	2102	2118		Sf	N15E58	175
	2147	2151	2157	C1.8			
	2303	2311	2313	C5.4	Sf	N30W65	162
	2323	2328	2332	C3.3			
30 October	0059	0118	0136	C3.7	Sf	N30W64	162
	0249	0251	0319	C3.6	1f	N30W66	162
	0334	0341	0345	C1.9			
	0406	0406	0410	C6.0	1f	N29W68	162
	0456	0504	0509	C3.9			
	0633	0633	0636	C1.9	Sf	N27W69	162
	0640	0643	0646	C2.2			
	0830	0836	0843		Sf	N27W70	162
	0940	0943	0945	C1.6			
	B1122	U1122	A1140		Sf	N25W69	162
	1342	1344	1402		Sf	N19E55	175

Flare List - continued.

Date	Time Begin	Time Max	Time End	X-ray Class.	Optical Imp / Brtns	Optical Location Lat CMD	Rgn
30 October	1616	1616	1618	Sf	N28W74	162	
	1627	1638	1654	C5.5			
	1714	1718	1720	C5.2			
	1734	1735	1738	C5.4	Sf	N27W76	162
	1919	1925	1929	C2.8			
	2014	2017	2020	C2.1			
	2117	2123	2132		Sf	N15E74	177
	2120	2121	2125	C3.4	Sf	N26W80	162
	2156	2156	2201		Sf	N27W78	162
	2231	2239	2246		Sf	N15E73	177
31 October	0211	0217	0221	C5.7			
	0430	0433	0437	C2.1			
	0918	0926	0939	M1.1			175
	1025	1033	A1052	C9.5	Sf	N15E59	177
	1440	1444	1450	C1.7			175
	1617	1627	1637	C3.9			
	1647	1652	1655	X1.2			
	1802	1833	1846	C8.0			162
	2319	2327	2352	C2.6			175
01 November	0123	0132	0140	C3.5			
	0212	0215	0217	C2.6			
	0806	0821	0825	C1.7			175
	1031	1039	1043	C7.1			175
	1053	1057	1101		Sf	N16E24	175
	1221	1221	1230		Sf	S15E89	
	1614	1620	1640	C1.8	Sf	N18E41	177
	1931	1931	1935		Sf	N10W76	
	1950	1953	2005	B9.5			
02 November	0528	0607	0704	C3.9			
	0811	0813	0816	C2.3	Sf	S09E62	180
	1355	1355	1359	C1.4	Sf	N12E37	177
	2208	2219	2250	C4.5	1f	S09E52	180
03 November	0554	0605	0641	C6.3	Sf	N15E25	177
	0951	0957	1005	C2.4	Sf	N17E24	177
	1257	1258	1312		Sf	S07E45	180
	1400	1401	1438	M1.3	1f	N14E25	177
	1445	1446	1454		Sf	S08E43	180
03 November	1734	1801	1817	C1.7	Sf	S06E43	180
	1914	1922	1930	C1.2	Sf	S09E41	180
	1952	1953	1958		Sf	S08E40	180

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 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				
28 Oct	N25W59	124	0840	22	Fkc	039	Bgd	7	1		21	1			
29 Oct	N26W73	125	0600	21	Fki	023	Bg	5	1		11				
30 Oct	N25W84	122	0680	24	Fki	020	Bg	6			8	2			
31 Oct	N26W88	113	0200	07	Hax	002	B	1							
								50	6	0	10	8	1	0	0

Crossed West Limb.
Absolute heliographic longitude: 122

			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													
28 Oct	N11W51	116													
29 Oct	N11W64	116													
30 Oct	N11W77	116													
31 Oct	N11W90	116													
								0	0	0	0	0	0	0	0

Crossed West Limb.
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								
28 Oct	N21W34	099	0130	03	Hax	002	A								
29 Oct	N20W47	099	0100	03	Cao	003	B								
30 Oct	N20W60	098	0100	04	Cao	005	B								
31 Oct	N19W74	099	0080	02	Hsx	001	A								
01 Nov	N19W87	099	0080	02	Hax	001	A								
								1	0	0	2	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 100

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 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													
28 Oct	S06W57	123													
29 Oct	S06W70	123													
30 Oct	S06W83	123													
								0	0	0	0	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 123

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 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								
28 Oct	N17E10	055	0040	01	Hsx	002	A								
29 Oct	N17W03	055	0060	04	Cso	007	B								
30 Oct	N16W17	055	0050	04	Cso	004	B								
31 Oct	N16W30	055	0030	03	Cso	002	B								
01 Nov	N17W42	054	0020	02	Hsx	002	A								
02 Nov	N17W57	056	0020	01	Hsx	001	A								
03 Nov	N18W70	056	0010	01	Axx	001	A								
								0	0	0	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 055

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 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								
28 Oct	S20E21	044	0050	07	Dao	009	B								
29 Oct	S20E07	045	0060	07	Dao	009	B								
30 Oct	S20W05	043	0060	07	Dso	007	B								
31 Oct	S19W20	045	0030	04	Dso	003	B								
01 Nov	S19W32	044	0010	01	Axx	002	A								
02 Nov	S19W45	044													
03 Nov	S19W58	044													
								0	0	0	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 043

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 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								
28 Oct	S12E24	041	0030	03	Cao	003	B				1				
29 Oct	S12E10	042	0010	00	Axx	001	A								
30 Oct	S12W03	041	0010	03	Cso	004	B								
31 Oct	S12W16	041													
01 Nov	S12W29	041													
02 Nov	S12W42	041													
03 Nov	S12W55	041													
								0	0	0	1	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 041

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 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								
28 Oct	N10E39	026	0070	02	Hax	003	A								
29 Oct	N11E25	027	0070	02	Hax	002	A								
30 Oct	N11E12	026	0050	02	Hax	002	A								
31 Oct	N10W01	026	0040	01	Hsx	001	A								
01 Nov	N10W14	026	0020	01	Hsx	001	A								
02 Nov	N11W28	027	0010	01	Hsx	002	A								
03 Nov	N11W41	027													
								0	0	0	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 026

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 172												
27 Oct	S16E56	022	0030	02	Hsx	001	A								
28 Oct	S17E44	021	0020	01	Hsx	002	A								
29 Oct	S16E30	022	0010	01	Axx	001	A								
30 Oct	S16E16	022	0020	01	Hrx	001	A								
31 Oct	S16E03	022													
01 Nov	S16W10	022													
02 Nov	S16W23	022													
03 Nov	S16W36	022													
								0	0	0	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 022

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 173												
28 Oct	S17W69	134	0050	05	Cso	003	B	1			2				
29 Oct	S18W82	134	0100	05	Cso	004	B	1			9				
30 Oct	S15W92	130	0030	04	Dao	002	B								
								2	0	0	11	0	0	0	0
Crossed West Limb.															
Absolute heliographic longitude:		134													
			Region 174												
29 Oct	S25E55	357	0070	03	Cao	002	B								
30 Oct	S24E42	356	0080	07	Cso	005	B								
31 Oct	S25E32	353	0060	10	Cso	006	B								
01 Nov	S26E18	354	0040	08	Dao	008	B								
02 Nov	S26E02	357	0030	05	Dso	006	B								
03 Nov	S26W08	354	0020	03	Bxo	004	B								
								0	0	0	0	0	0	0	0
Still on Disk.															
Absolute heliographic longitude:		357													
			Region 175												
29 Oct	N15E57	355	0050	06	Cso	005	B	3			8				
30 Oct	N16E44	354	0120	07	Dao	010	B				1				
31 Oct	N16E29	356	0170	07	Dso	006	B	2	1						
01 Nov	N15E18	354	0160	15	Eao	015	B	2			1				
02 Nov	N14E04	355	0120	14	Eso	014	B								
03 Nov	N15W09	355	0110	13	Eao	016	B								
								7	1	0	10	0	0	0	0
Still on Disk.															
Absolute heliographic longitude:		355													
			Region 176												
29 Oct	N12E75	337	0090	02	Hsx	001	A				1			1	
30 Oct	N12E64	334	0130	02	Hax	001	A								
31 Oct	N11E50	335	0110	02	Hsx	001	A								
01 Nov	N10E37	335	0120	02	Hsx	002	A								
02 Nov	N10E24	335	0090	02	Cso	002	B								
03 Nov	N10E11	335	0110	03	Cso	003	B								
								0	0	0	1	0	0	1	0
Still on Disk.															
Absolute heliographic longitude:		335													

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 177												
30 Oct	N16E69	329	0060	02	Hsx	001	A				2				
31 Oct	N16E57	328	0160	10	Dao	008	B	1			1				
01 Nov	N15E43	329	0310	10	Dki	015	Bg	1			1				
02 Nov	N16E31	328	0370	11	Eki	018	Bg	1			1				
03 Nov	N16E18	328	0360	10	Dki	023	Bg	2	1		2	1			
								5	1	0	7	1	0	0	0
Still on Disk.															
Absolute heliographic longitude:		328													
			Region 178												
31 Oct	N00W15	040	0040	04	Dao	004	B								
01 Nov	N01W30	042	0070	06	Dao	010	B								
02 Nov	N01W45	044	0100	07	Dao	010	B								
03 Nov	N02W58	044	0110	07	Dao	007	B								
								0	0	0	0	0	0	0	0
Still on Disk.															
Absolute heliographic longitude:		040													
			Region 179												
01 Nov	N02E72	300	0030	02	Cso	002	B								
02 Nov	N02E56	303	0030	01	Hsx	001	A								
03 Nov	N02E43	303	0020	01	Hsx	001	A								
								0	0	0	0	0	0	0	0
Still on Disk.															
Absolute heliographic longitude:		303													
			Region 180												
01 Nov	S11E70	302	0090	03	Hsx	001	A								
02 Nov	S10E57	302	0170	05	Dso	003	B	2			1	1			
03 Nov	S10E43	303	0150	08	Dao	012	Bg	2			5				
								4	0	0	6	1	0	0	0
Still on Disk.															
Absolute heliographic longitude:		303													
			Region 181												
02 Nov	S06E42	317	0030	08	Dso	008	B								
03 Nov	S07E31	315	0040	07	Dso	009	B								
								0	0	0	0	0	0	0	0
Still on Disk.															
Absolute heliographic longitude:		315													

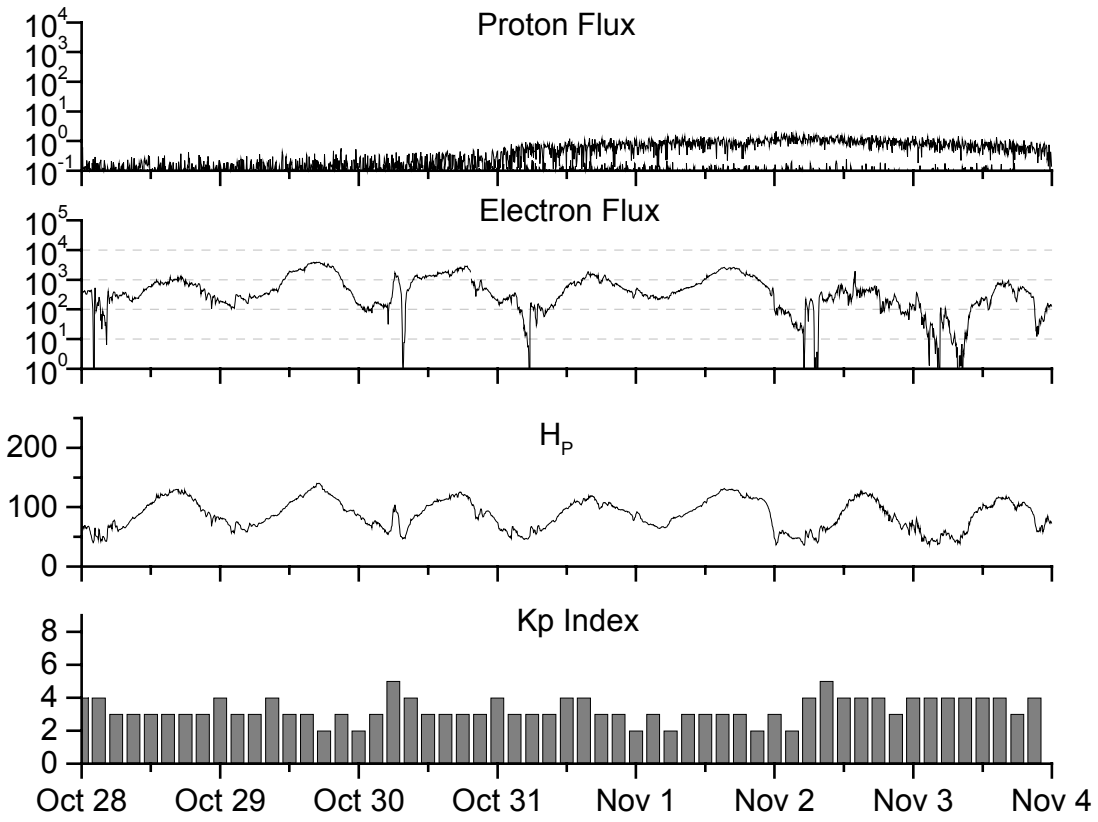
Region Summary - continued.

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 182												
02 Nov	S17E68	291	0080	07	Dso	002	B								
03 Nov	S17E56	290	0130	07	Dso	003	B								
								0	0	0	0	0	0	0	0
Still on Disk.															
Absolute heliographic longitude:		290													
			Region 183												
03 Nov	N19W24	010	0010	03	Bxo	003	B								
								0	0	0	0	0	0	0	0
Still on Disk.															
Absolute heliographic longitude:		10													
			Region 184												
03 Nov	S06E51	295	0010	01	Axx	001	A								
								0	0	0	0	0	0	0	0
Still on Disk.															
Absolute heliographic longitude:		295													
			Region 185												
03 Nov	S12E77	269	0200	03	Hsx	004	A								
								0	0	0	0	0	0	0	0
Still on Disk.															
Absolute heliographic longitude:		269													

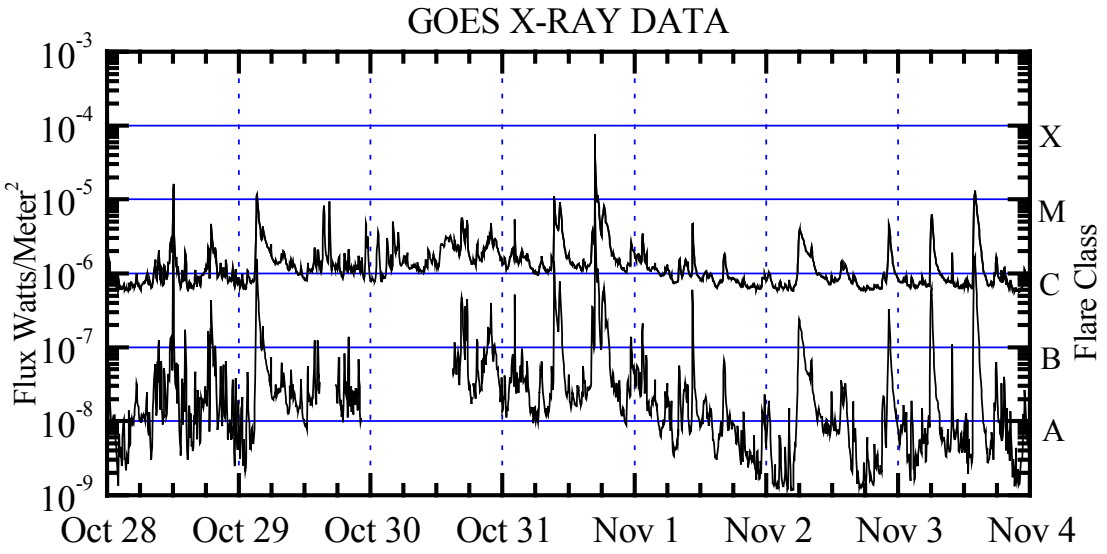
Recent Solar Indices (preliminary)
of the observed monthly mean values

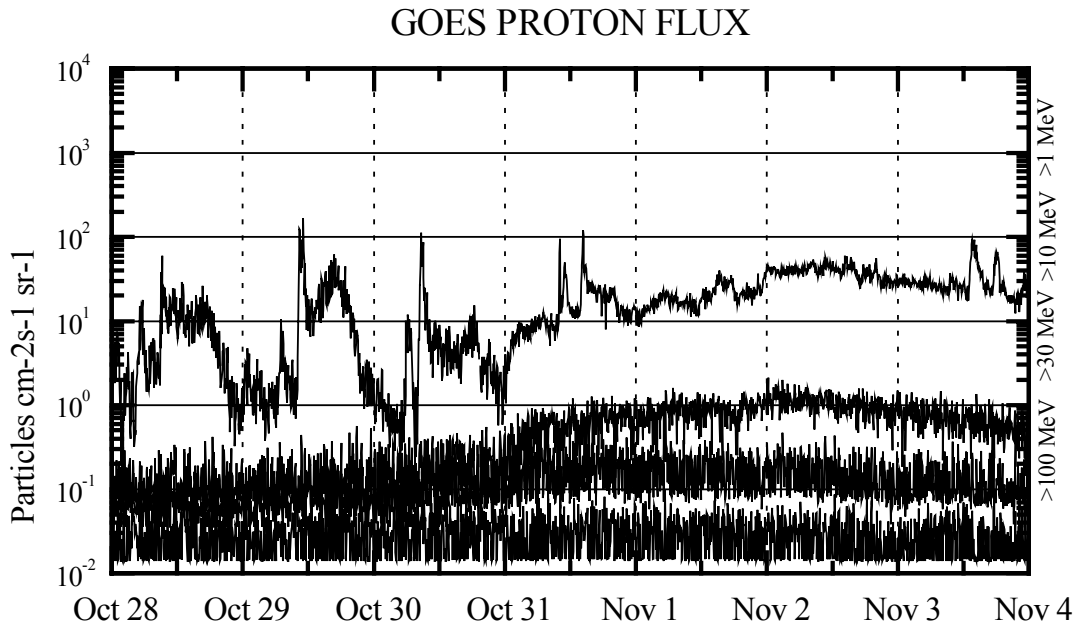
	Sunspot Numbers					Radio Flux		Geomagnetic	
	Observed values		Ratio	Smooth values		*Penticton	Smooth	Planetary	Smooth
Month	SWO	RI	RI/SWO	SWO	RI	10.7 cm	Value	Ap	Value
				2000					
October	138.9	100.1	0.72	166.2	114.4	167.7	175.6	18	14.6
November	149.9	106.5	0.71	162.7	112.7	178.8	173.9	17	14.6
December	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.

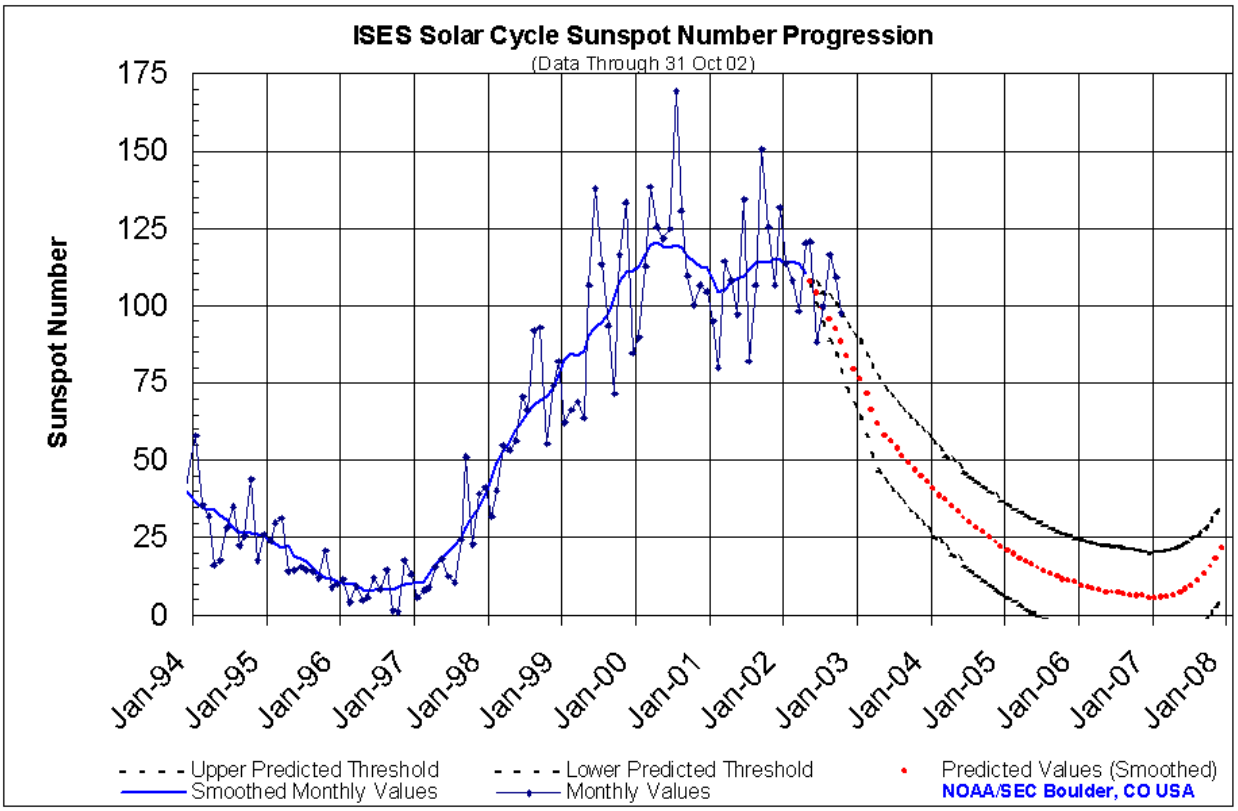




Weekly GOES Satellite X-ray and Proton Plots

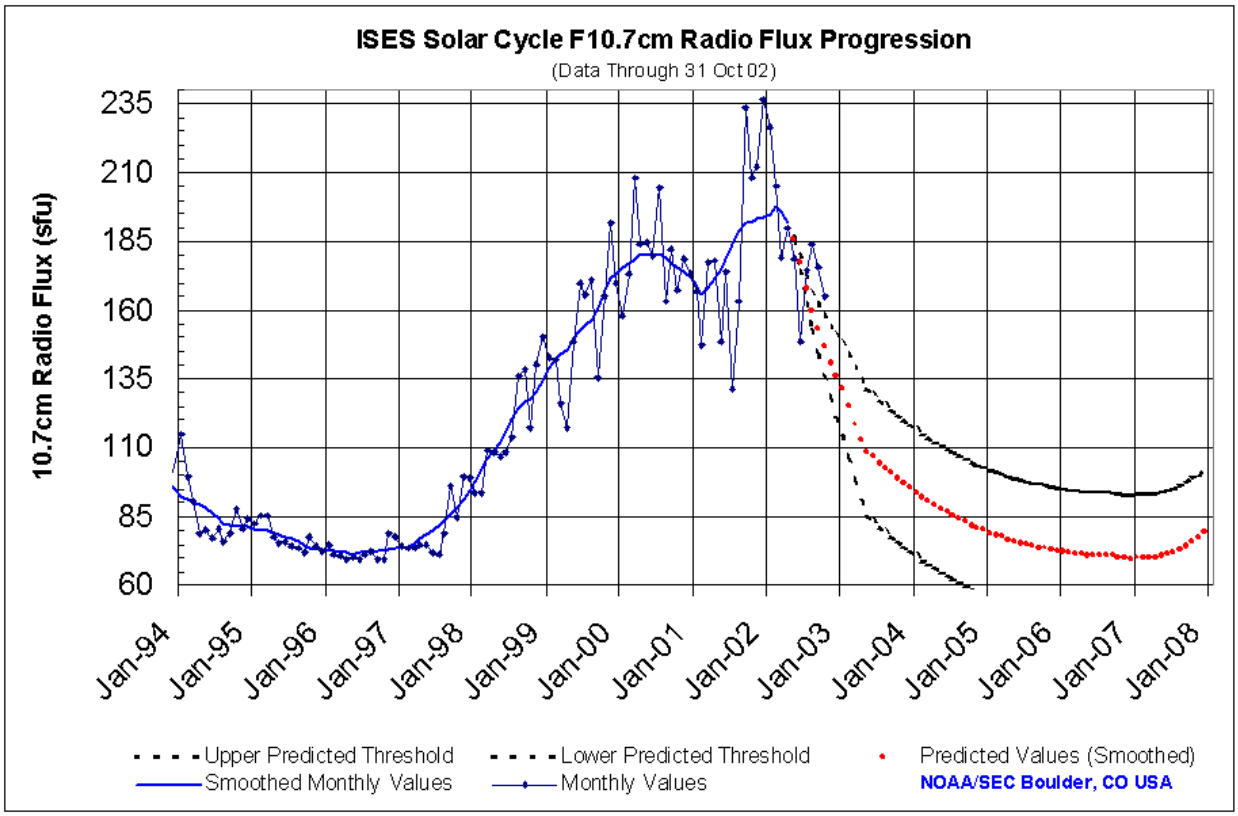
X-ray plot contains five-minute averaged x-ray flux (watts/m$^{2)}$ as measured by GOES 8 and 10 in two wavelength bands, .05 -. 4 and .1 - .8 nm. The letters A, B, C, M and X refer to x-ray event levels for the .1 - .8 nm band.

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.



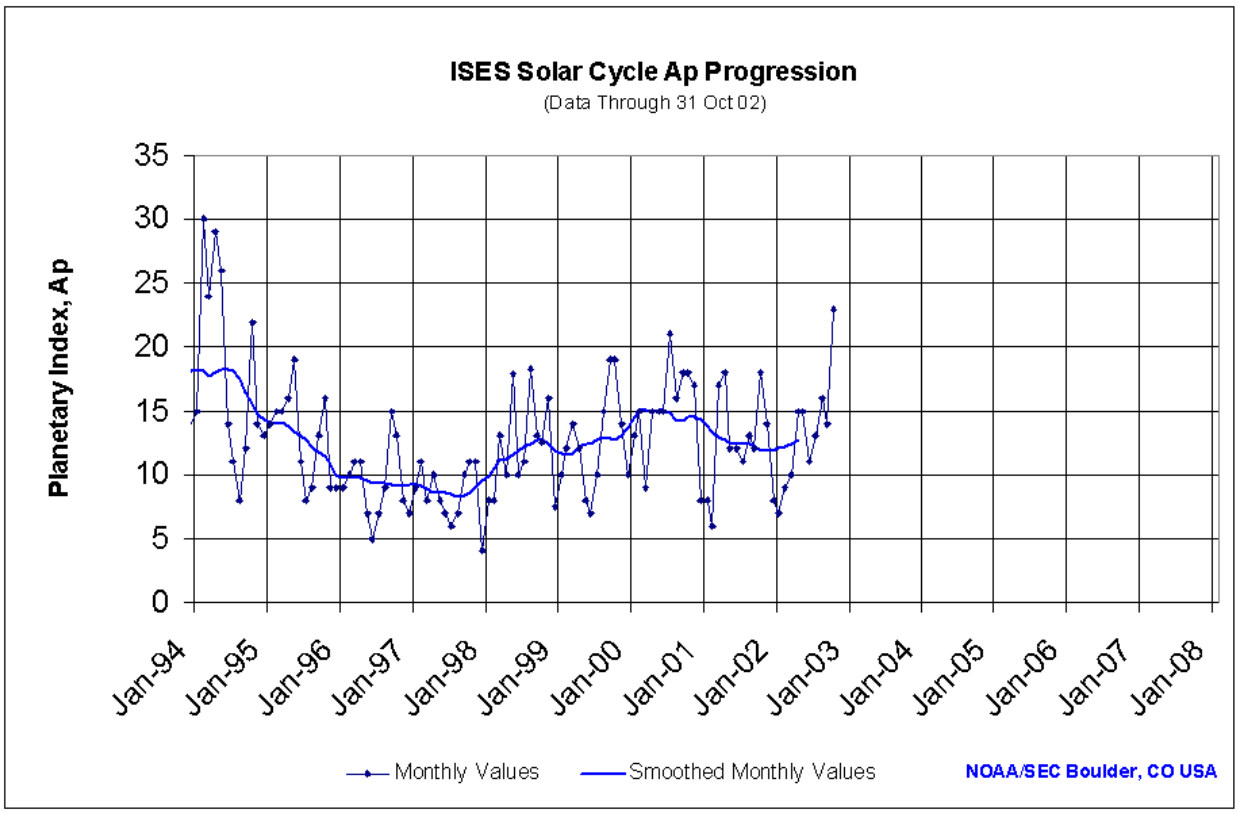
SEC Prediction of Smoothed Sunspot Number

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1998	44	49	53	57	59	63	66	68	70	71	73	78
	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)
1999	83	85	84	86	91	93	94	97	102	108	111	111
	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)
2000	113	117	120	121	119	119	120	119	116	114	113	112
	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)
2001	109	104	105	108	109	110	112	114	114	114	116	115
	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)
2002	114	115	113	110	**108**	**104**	**99**	**96**	**92**	**89**	**83**	**79**
	(***)	(***)	(***)	(***)	(1)	(3)	(5)	(7)	(8)	(9)	(10)	(11)
2003	**76**	**72**	**66**	**62**	**58**	**56**	**54**	**51**	**49**	**47**	**45**	**43**
	(12)	(13)	(14)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)
2004	**41**	**39**	**37**	**35**	**33**	**31**	**30**	**28**	**27**	**25**	**24**	**22**
	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)
2005	**21**	**20**	**18**	**17**	**16**	**15**	**14**	**13**	**12**	**12**	**11**	**10**
	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)
2006	**10**	**9**	**8**	**8**	**8**	**7**	**7**	**7**	**7**	**6**	**6**	**5**
	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)
2007	**5**	**6**	**6**	**6**	**7**	**8**	**10**	**11**	**13**	**16**	**18**	**21**
	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)



SEC Prediction of Smoothed F10.7cm Radio Flux

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1998	98	102	106	109	112	116	120	124	127	128	130	134
	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)
1999	139	143	144	146	150	153	154	156	161	167	172	173
	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)
2000	175	176	178	181	180	180	180	180	177	176	174	172
	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)
2001	169	166	168	172	175	179	184	189	191	192	194	194
	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)
2002	195	197	196	192	**186**	**177**	**168**	**160**	**153**	**147**	**141**	**136**
	(***)	(***)	(***)	(***)	(1)	(3)	(5)	(7)	(9)	(11)	(13)	(15)
2003	**131**	**125**	**119**	**113**	**109**	**107**	**104**	**103**	**101**	**99**	**97**	**95**
	(17)	(19)	(21)	(22)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)
2004	**94**	**92**	**91**	**89**	**88**	**87**	**85**	**84**	**83**	**82**	**81**	**80**
	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)
2005	**79**	**78**	**78**	**77**	**76**	**75**	**75**	**74**	**74**	**73**	**73**	**73**
	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)
2006	**72**	**72**	**71**	**71**	**71**	**71**	**71**	**71**	**70**	**70**	**70**	**70**
	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)
2007	**70**	**70**	**70**	**70**	**71**	**71**	**72**	**73**	**74**	**76**	**77**	**79**
	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)


ISES Solar Cycle Ap Progression
(Data Through 31 Oct 02)
Planetary Index, Ap
35
30
25
20
15
10
5
0
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Monthly Values
Smoothed Monthly Values
NOAA/SEC Boulder, CO USA