

Space Weather Highlights **11 - 17 October 2004**

SWO PRF 1520
19 October 2004

Solar activity was very low to low this period. Region 682 (S14, L=271, class/area, Dai/240 on 15 October), was the only region of note for most of the period. It produced isolated C-class flares on 13 and 14 October. Very low conditions persisted for the remaining days with just occasional B-class activity. Region 682 decayed in both area coverage and magnetic complexity by the end of the period. A CME erupted off the NE limb late on 17 October. The likely source was a new active region, visible on SXI imagery near N10 on the east limb.

Solar wind data were available from the NASA Advanced Composition Explorer (ACE) spacecraft during most of the summary period. Solar wind plasma measurements were generally stable on 11-12 October. Occasional sustained southward periods were noted in the IMF Bz. A co-rotating interaction region (CIR) was detected late on 12 October. The associated high speed coronal hole stream peaked near 550 km/s on 14 October. IMF Bz oscillated north and south, but did undergo some periods of sustained southward Bz to near -10 nT. The elevated solar wind declined to near normal levels by 16 October. Very stable solar wind conditions persisted through the remainder of the period. Solar wind speed declined to near 300 km/s and Bz was near zero.

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 geosynchronous orbit was at high levels from 14 October through 17 October.

The geomagnetic field ranged from quiet to major storm levels. The period began with mostly quiet to unsettled levels with isolated high latitude active periods persisting through 12 October. The most disturbed levels were due to occasional sustained periods of southward Bz. The CIR and associated high speed stream that began on 13 October produced occasional active periods at all latitudes, and major storm periods at high latitudes. By 15 October, the geomagnetic field returned to predominantly quiet to unsettled levels with isolated minor storm periods at high latitudes. The period ended with quiet to unsettled levels at all latitudes on 16 and 17 October.

Space Weather Outlook **20 October - 15 November 2004**

Solar activity is expected to be very low to low with the chance for moderate levels during the first half of the forecast period. A new active region, rotating into view on the NE limb on 20 October, may increase solar activity levels. Several new small sunspot groups were also emerging on the visible disk on 19 October.

A greater than 10 MeV proton event is not expected.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to be at high levels on 20 October, and again on 10 – 13 November.

The geomagnetic field is expected to range from mostly quiet to unsettled with isolated active periods. From 09 – 11 November, a recurrent high speed coronal hole wind stream is expected to produce occasional active to minor storm periods, with major storm periods at high latitudes.



Daily Solar Data

Date	Radio Flux 10.7 cm	Sun spot No.	Sunspot Area (10 ⁻⁶ hemi.)	X-ray Background	Flares							
					X-ray Flux			Optical				
					C	M	X	S	1	2	3	4
11 October	87	0	0	A5.5	0	0	0	0	0	0	0	0
12 October	88	14	10	A5.6	0	0	0	0	0	0	0	0
13 October	87	41	190	A5.5	1	0	0	0	0	0	0	0
14 October	91	38	265	A8.3	1	0	0	0	0	0	0	0
15 October	89	26	240	A7.0	0	0	0	0	0	0	0	0
16 October	92	43	220	A7.1	0	0	0	0	0	0	0	0
17 October	92	51	210	A7.9	0	0	0	0	0	0	0	0

Daily Particle Data

Date	Proton Fluence (protons/cm ² -day-sr)			Electron Fluence (electrons/cm ² -day-sr)		
	>1MeV	>10MeV	>100MeV	>.6MeV	>2MeV	>4MeV
	11 October	4.5E+5	1.5E+4	3.1E+3		1.8E+6
12 October	3.2E+5	1.4E+4	3.3E+3		5.1E+6	
13 October	5.2E+5	1.4E+4	3.1E+3		3.5E+6	
14 October	2.1E+6	1.3E+4	3.0E+3		1.6E+8	
15 October	6.2E+5	1.4E+4	3.0E+3		4.7E+8	
16 October	5.9E+5	1.4E+4	3.2E+3		5.7E+8	
17 October	7.9E+5	1.4E+4	3.2E+3		6.0E+8	

Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	11 October	9	2-4-2-1-1-1-2-3	14	1-3-3-2-5-3-1-1	11
12 October	7	3-2-2-1-1-1-0-3	9	2-3-4-3-0-1-0-2	11	3-3-3-3-2-2-2-3
13 October	17	3-4-4-3-3-2-3-3	52	4-5-6-5-7-5-3-2	35	4-5-5-4-5-4-3-3
14 October	12	3-3-3-3-3-2-2-1	58	3-3-6-7-7-5-3-2	27	3-4-4-5-5-3-3-2
15 October	6	2-2-1-2-2-1-2-1	19	2-2-3-6-4-3-0-1	9	2-3-1-3-2-2-2-2
16 October	3	3-1-0-0-1-0-0-1	3	1-2-0-2-1-0-0-1	5	3-1-1-1-1-1-1-1
17 October	0	0-1-0-0-0-0-0-0	0	0-0-0-1-0-0-0-0	3	0-1-1-1-1-0-1-1

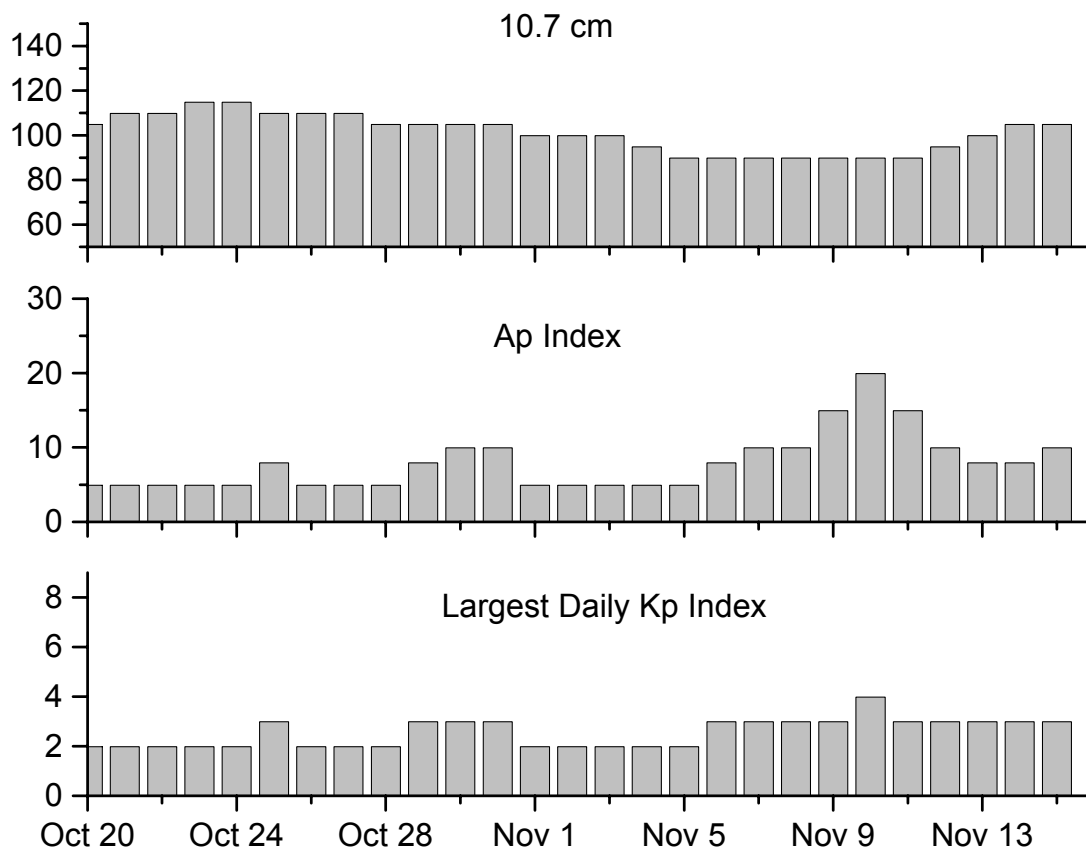


Alerts and Warnings Issued

<u>Date & Time of Issue</u>	<u>Type of Alert or Warning</u>	<u>Date & Time of Event UT</u>
11 Oct 0005	2 – 245 MHz Radio Bursts	10 Oct
11 Oct 0453	ALERT: Geomagnetic K= 4	11 Oct 0447
12 Oct 0007	1 - 245 MHz Radio Burst	11 Oct
13 Oct 0029	2 – 245 MHz Radio Bursts	12 Oct
13 Oct 0215	ALERT: Geomagnetic K= 4	13 Oct 0209
13 Oct 0226	ALERT: Geomagnetic K= 5	13 Oct 0220
13 Oct 0518	ALERT: Geomagnetic K= 4	13 Oct 0510
13 Oct 0522	WARNING: Geomagnetic K= 4	13 Oct 0523 - 1500
13 Oct 0528	ALERT: Geomagnetic K= 5	13 Oct 0524
13 Oct 1241	ALERT: Geomagnetic K= 5	13 Oct 1240
13 Oct 1455	EXTENDED WARNING: Geomagnetic K= 4	13 Oct 0523 - 2359
14 Oct 0014	2 – 245 MHz Radio Bursts	13 Oct
14 Oct 0545	ALERT: Geomagnetic K= 4	14 Oct 0544
14 Oct 0709	WARNING: Geomagnetic K= 4 expected	14 Oct 0710 - 1500
14 Oct 0719	ALERT: Geomagnetic K= 4	14 Oct 0717
14 Oct 1200	ALERT: Geomagnetic K= 5	14 Oct 1159
14 Oct 1252	ALERT: Electron 2MeV Integral Flux > 1000pfu	14 Oct 1235
14 Oct 1311	WARNING: Geomagnetic K= 5	14 Oct 1311 - 1600
14 Oct 1323	ALERT: Geomagnetic K= 5	14 Oct 1320
14 Oct 1457	EXTENDED WARNING: Geomagnetic K= 4	14 Oct 0710 – 2359



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
20 Oct	105	5	2	03 Nov	100	5	2
21	110	5	2	04	95	5	2
22	110	5	2	05	90	5	2
23	115	5	2	06	90	8	3
24	115	5	2	07	90	10	3
25	110	8	3	08	90	10	3
26	110	5	2	09	90	15	3
27	110	5	2	10	90	20	4
28	105	5	2	11	90	15	3
29	105	8	3	12	95	10	3
30	105	10	3	13	100	8	3
31	105	10	3	14	105	8	3
01 Nov	100	5	2	15	105	10	3
02	100	5	2				



Energetic Events

Date	Time		X-ray		Optical Information			Peak		Sweep Freq	
	Begin	Max	1/2 Max	Integ	Imp/ Brtns	Location Lat CMD	Rgn #	Radio Flux		Intensity	
								245	2695	II	IV

No Events Observed

Flare List

Date	Time			X-ray Class.	Imp / Brtns	Optical		Rgn
	Begin	Max	End			Location Lat CMD		
11 October	1152	1156	1200	B2.6				
	2011	2016	2022	B1.1				
	2351	2356	0000	B2.0				
12 October	0503	0507	0518	B1.1				
	1439	1449	1456	B1.3				
	2259	2304	2306	B1.1				681
13 October	0104	0107	0109	B1.0				
	0346	0354	0403	B4.4				
	1347	1359	1411	B5.1				
	1557	1600	1604	B1.0				
	2108	2114	2117	B2.2				682
14 October	2120	2206	2220	C1.0				682
	B0349	0350	0353	C1.7	Sf	S16E61		682
	0744	0749	0753	B3.6				682
	0959	1004	1010	B7.8				682
	1633	1636	1639	B1.4				
	1858	1902	1904	B1.6				682
	1943	1952	2005	B4.1				682
	2318	2323	2328	B4.4				682
15 October	0702	0705	0712	B1.3				
	0908	0914	0922	B1.8				
	1106	1109	1113	B1.3				
	1216	1222	1227	B2.9				
	1523	1532	1543	B2.7				
16 October	0205	0211	0216	B1.1				
	0422	0425	0429	B2.2				
	0613	0618	0621	B2.1				
	0940	0943	0945	B1.3				
	1541	1552	1555	B1.5				
	1842	1849	1857	B1.8				
	1950	1956	2000	B6.6				
17 October	2113	2120	2129	B4.0				
	0030	0033	0035	B1.3				
	0131	0134	0137	B4.7				



Region Summary

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

Region 676

28 Sep	S11E76	097	0060	02	Hax	001	A										
29 Sep	S11E64	095	0060	02	Hax	001	A										
30 Sep	S12E52	094	0060	02	Hax	001	A										
01 Oct	S12E38	095	0050	02	Hsx	001	A										
02 Oct	S12E25	095	0040	02	Hsx	001	A										
03 Oct	S12E11	096	0040	04	Cso	005	B										
04 Oct	S11W02	095	0050	04	Dso	007	B										
05 Oct	S12W15	095	0040	05	Cso	008	B										
06 Oct	S13W28	095	0030	03	Cso	004	B										
07 Oct	S13W41	095	0020	01	Hsx	001	A										
08 Oct	S13W54	095	0020	03	Bxo	003	B										
09 Oct	S13W67	095	0020	01	Axx	001	A										
10 Oct	S13W80	095															
11 Oct	S13W93	095															

0 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude:95

Region 681

12 Oct	N12W09	357	0010	03	Bxo	004	B										
13 Oct	N11W21	356	0020	04	Cso	009	B										
14 Oct	N10W36	358	0020	03	Axx	004	A										
15 Oct	N10W49	358															
16 Oct	N10W62	357	0010	01	Axx	002	A										
17 Oct	N10W75	357															

0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude:357

Region 682

13 Oct	S13E64	271	0170	05	Cao	012	B	1									
14 Oct	S13E50	272	0245	05	Dsi	014	B	1		1							
15 Oct	S14E37	271	0240	04	Dai	016	B										
16 Oct	S14E24	271	0210	07	Dai	021	B										
17 Oct	S14E10	272	0150	07	Dao	014	B										

2 0 0 1 0 0 0 0

Still on Disk.

Absolute heliographic longitude:272

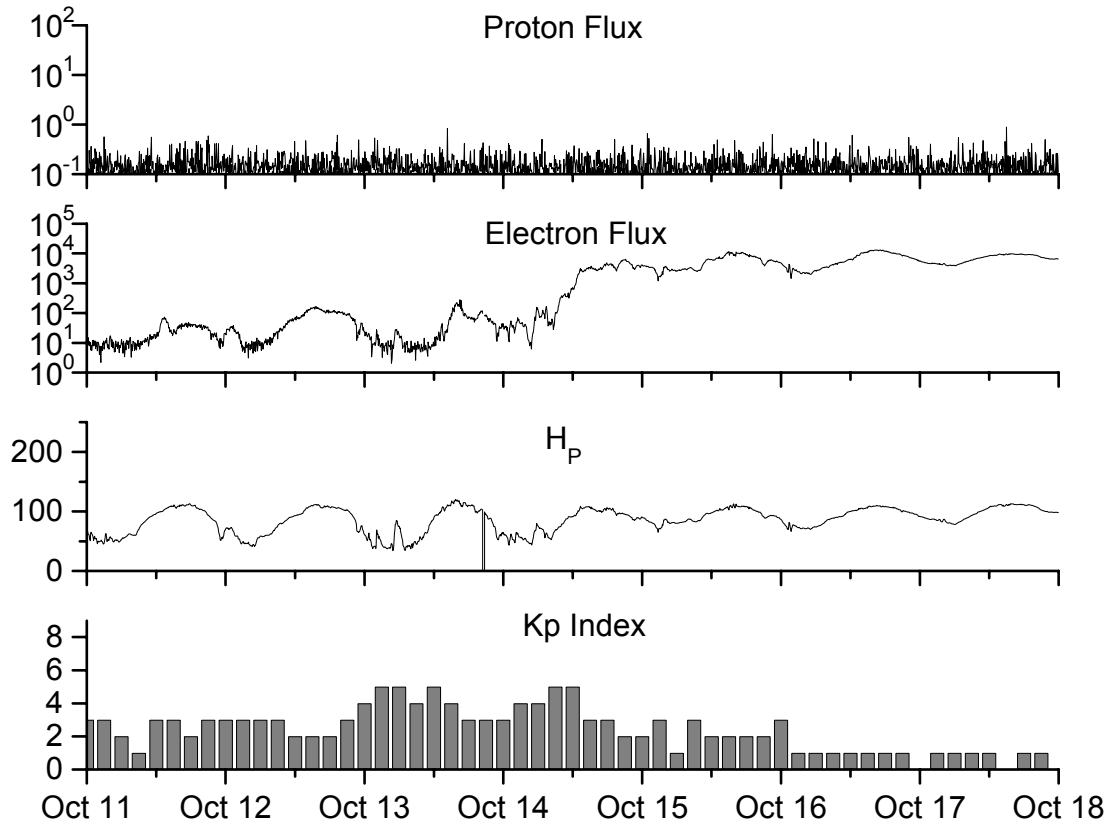


**Recent Solar Indices (preliminary)
of the observed monthly mean values**

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
2002									
October	153.9	97.5	0.63	158.8	90.5	167.0	159.4	23	15.6
November	159.8	95.5	0.60	150.9	85.2	168.7	154.8	16	16.3
December	147.9	80.8	0.55	144.6	82.1	158.6	150.9	13	17.0
2003									
January	149.3	79.7	0.53	141.7	81.0	144.0	149.2	13	18.2
February	87.0	46.0	0.53	136.4	78.5	124.5	144.7	17	18.9
March	119.7	61.1	0.51	128.1	74.2	132.2	139.5	21	19.4
April	119.7	60.0	0.50	121.5	70.3	126.3	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
2004									
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 11 October 2004*

Protons plot contains the five-minute averaged integral proton flux (protons/cm²-sec -sr) as measured by GOES-11 (W100) for each of three energy thresholds: greater than 10, 50, and 100 MeV.

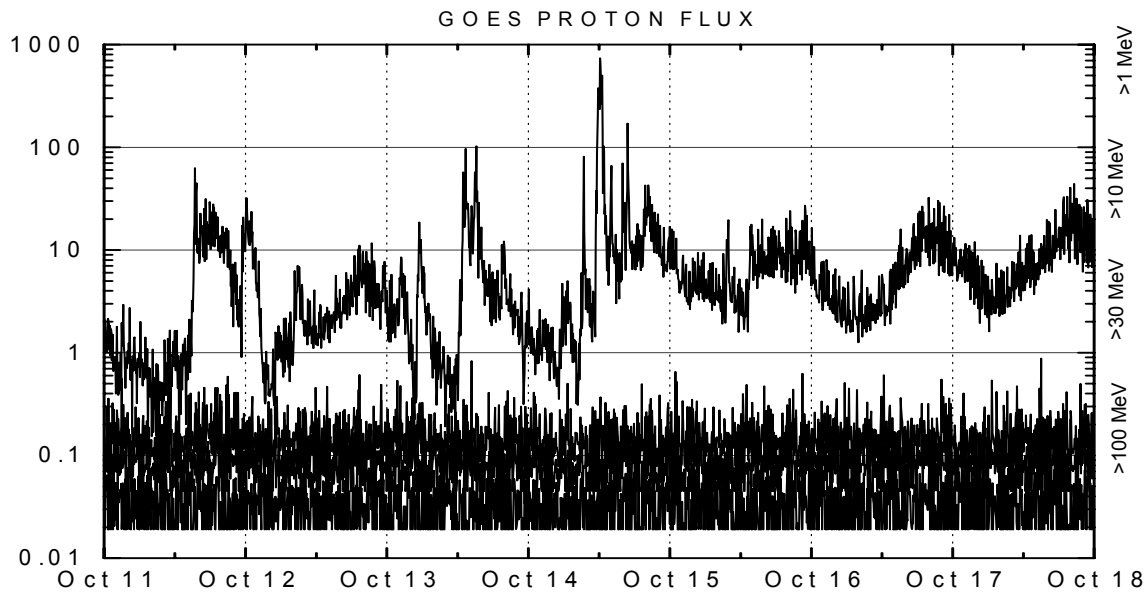
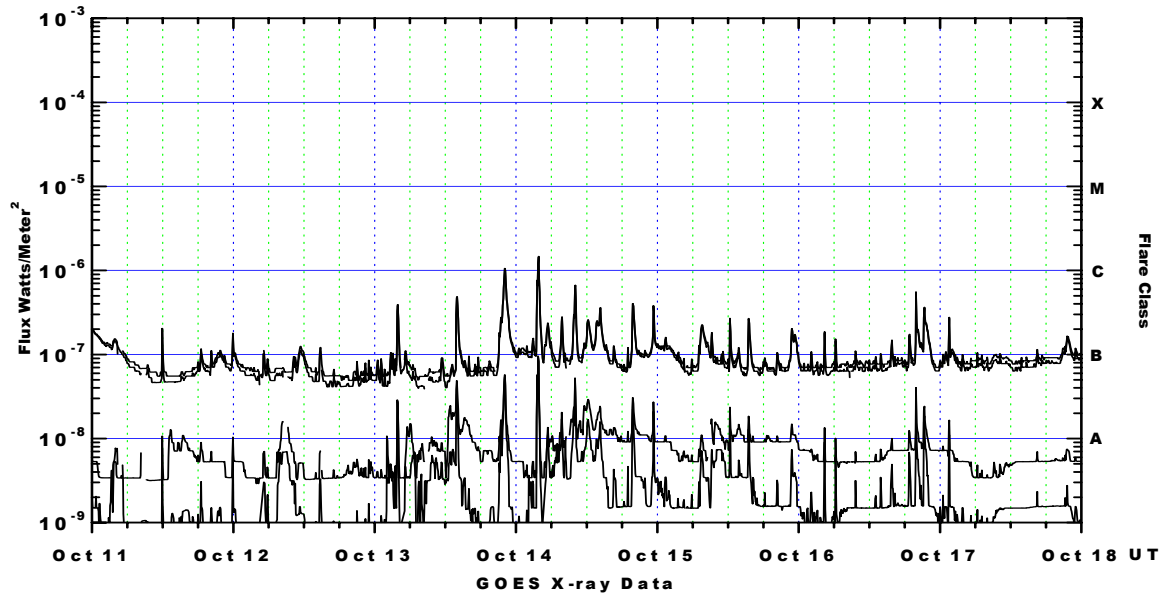
Electrons plot contains the five-minute averaged integral electron flux (electrons/cm²-sec -sr) with energies greater than 2 MeV at GOES-12 (W74).

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

K_p plot contains the estimated planetary 3-hour K-index (derived by the Air Force Weather Agency) in real time from magnetometers at Meanook, Canada; Sitka, AK; Glenlea, Canada; St. Johns, Canada; Ottawa, Canada; Newport, WA; Fredericksburg, VA; Boulder, CO; Fresno, CA and 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_p values derived from a more extensive network of magnetometers.

The data included here are those now available in real time at the SWO and are incomplete in that they do not include the full set of parameters and energy ranges known to cause satellite operating anomalies. The proton and electron fluxes and K_p are "global" parameters that are applicable to a first order approximation over large areas. H_p is subject to more localized phenomena and the measurements generally are applicable to within a few degrees of longitude of the measuring satellite.





Weekly GOES Satellite X-ray and Proton Plots

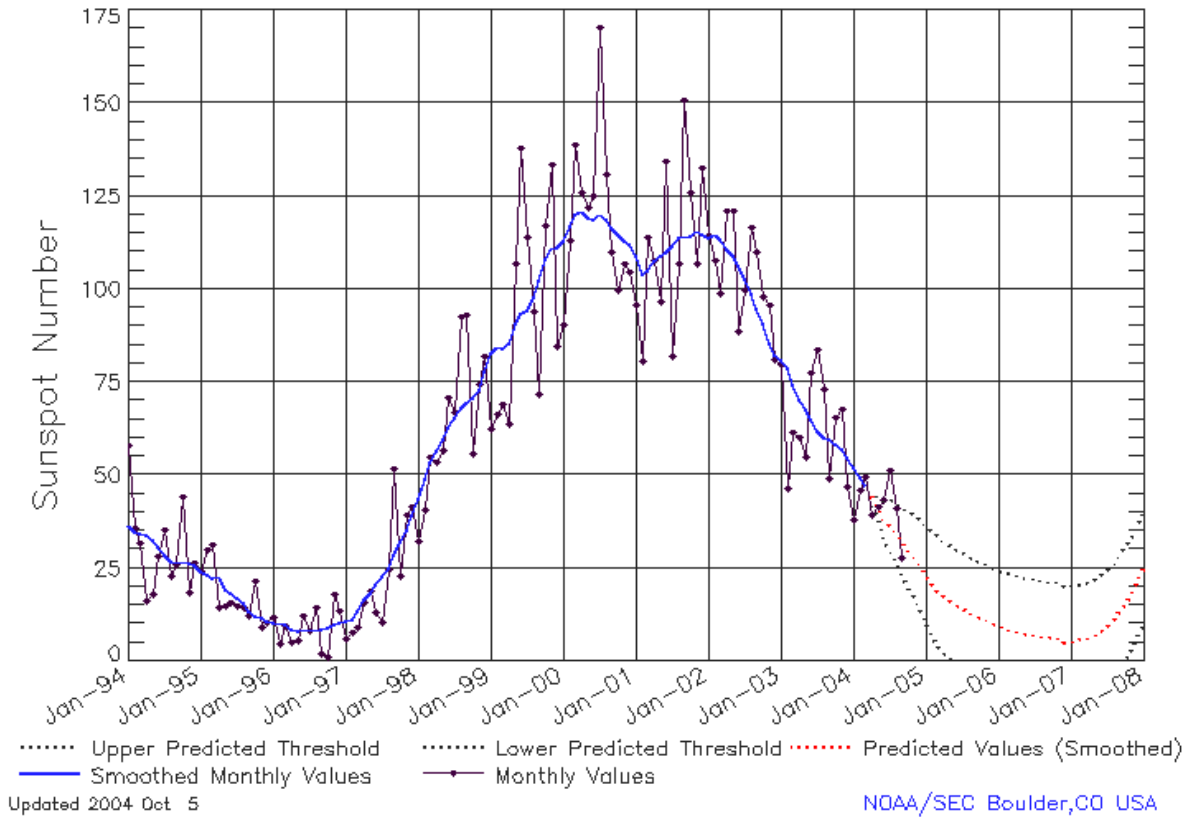
X-ray plot contains five-minute averaged x-ray flux (watts/m²) as measured by GOES 12 (W75) and GOES 10 (W136) in two wavelength bands, .05 - .4 and .1 - .8 nm. The letters A, B, C, M and X refer to x-ray event levels for the .1 - .8 nm band.

Proton plot contains the five-minute averaged integral proton flux (protons/cm²-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/cm²-sec-sr) at greater than 10 MeV.



ISES Solar Cycle Sunspot Number Progression

Data Through 30 Sep 04



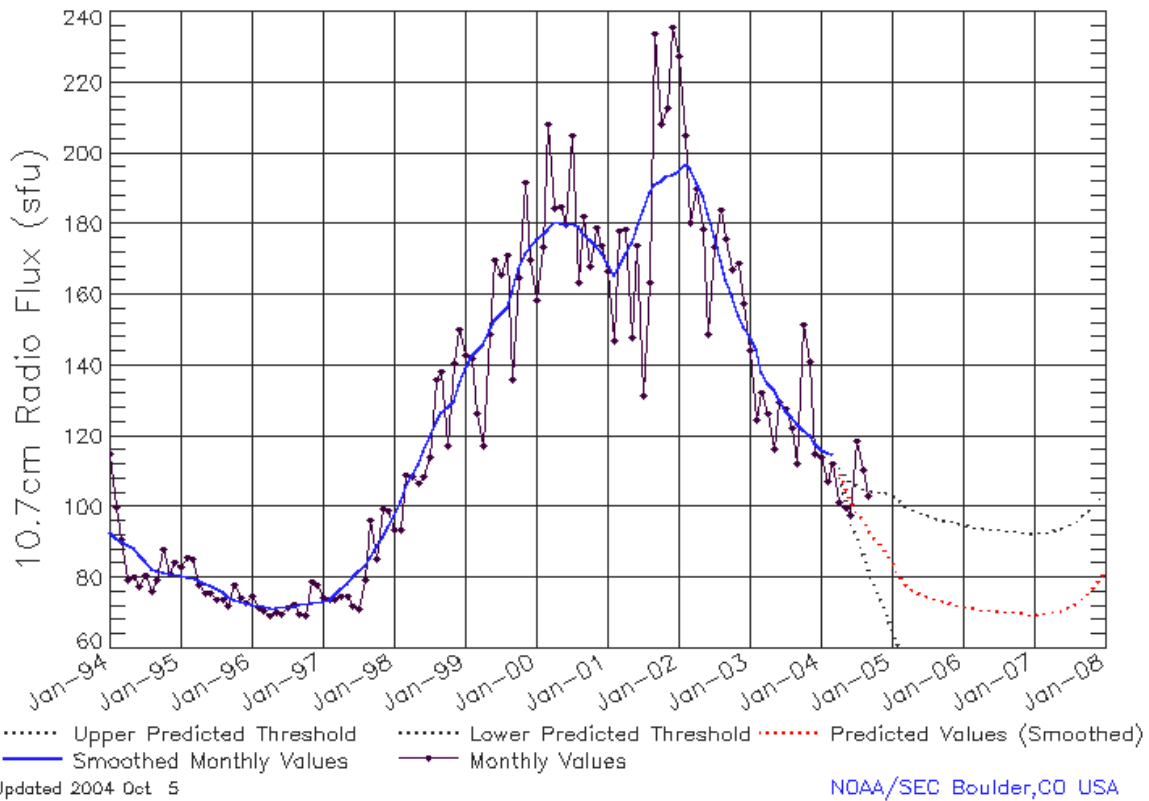
SEC Prediction of Smoothed Sunspot Number

	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 (***)	98 (***)	102 (***)	108 (***)	111 (***)	111 (***)
2000	113 (***)	117 (***)	120 (***)	121 (***)	119 (***)	119 (***)	120 (***)	119 (***)	116 (***)	115 (***)	113 (***)	112 (***)
2001	109 (***)	104 (***)	105 (***)	108 (***)	109 (***)	110 (***)	112 (***)	114 (***)	114 (***)	114 (***)	116 (***)	115 (***)
2002	114 (***)	115 (***)	113 (***)	111 (***)	109 (***)	106 (***)	103 (***)	99 (***)	95 (***)	91 (***)	85 (***)	82 (***)
2003	81 (***)	79 (***)	74 (***)	70 (***)	68 (***)	65 (***)	62 (***)	60 (***)	60 (***)	58 (***)	57 (***)	55 (***)
2004	52 (***)	49 (***)	47 (***)	45 (1)	41 (3)	38 (5)	37 (7)	35 (8)	32 (9)	30 (10)	28 (11)	26 (12)
2005	23 (13)	21 (14)	19 (15)	17 (15)	16 (15)	15 (15)	14 (15)	13 (15)	12 (15)	12 (15)	11 (15)	10 (15)
2006	10 (15)	9 (15)	8 (15)	8 (15)	8 (15)	7 (15)	7 (15)	7 (15)	7 (15)	6 (15)	6 (15)	5 (15)
2007	5 (15)	6 (15)	6 (15)	6 (15)	7 (15)	8 (15)	10 (15)	11 (15)	13 (15)	16 (15)	18 (15)	21 (15)



ISES Solar Cycle F10.7cm Radio Flux Progression

Data Through 30 Sep 04



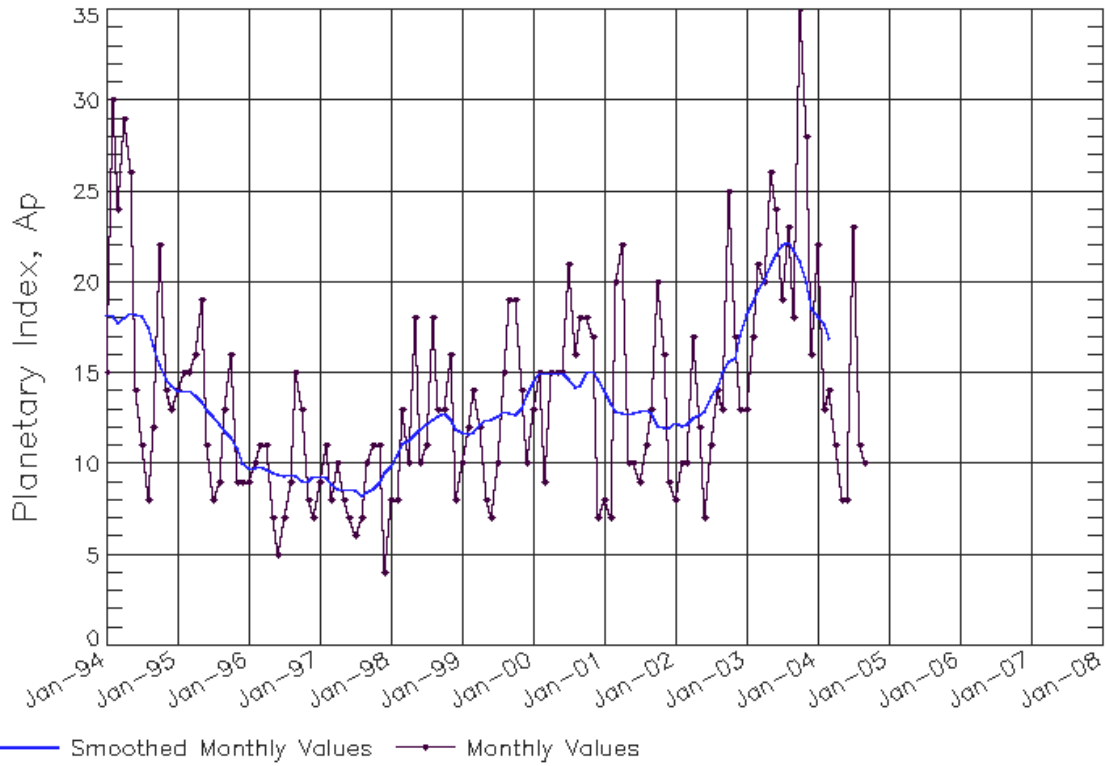
SEC Prediction of Smoothed F10.7cm Radio Flux

	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	176 (***)	177 (***)	178 (***)	181 (***)	180 (***)	180 (***)	180 (***)	179 (***)	177 (***)	176 (***)	174 (***)	172 (***)
2001	169 (***)	166 (***)	168 (***)	172 (***)	175 (***)	179 (***)	184 (***)	189 (***)	191 (***)	192 (***)	194 (***)	194 (***)
2002	195 (***)	197 (***)	196 (***)	192 (***)	188 (***)	183 (***)	176 (***)	170 (***)	164 (***)	159 (***)	154 (***)	151 (***)
2003	148 (***)	145 (***)	138 (***)	135 (***)	133 (***)	130 (***)	127 (***)	125 (***)	124 (***)	122 (***)	120 (***)	118 (***)
2004	116 (***)	116 (***)	115 (***)	111 (1)	106 (3)	102 (5)	99 (7)	96 (9)	94 (11)	91 (13)	89 (15)	87 (17)
2005	85 (19)	81 (21)	79 (22)	77 (23)	76 (23)	75 (23)	75 (23)	74 (23)	74 (23)	73 (23)	73 (23)	73 (23)
2006	72 (23)	72 (23)	71 (23)	71 (23)	71 (23)	71 (23)	71 (23)	71 (23)	70 (23)	70 (23)	70 (23)	70 (23)
2007	70 (23)	70 (23)	70 (23)	70 (23)	71 (23)	71 (23)	72 (23)	73 (23)	74 (23)	76 (23)	77 (23)	79 (23)



ISES Solar Cycle Ap Progression

Data Through 30 Sep 04



Updated 2004 Oct 5

NOAA/SEC Boulder, CO USA

