

Space Weather Highlights
07 - 13 March 2005

SWO PRF 1541
15 March 2005

Solar activity ranged from very low to low. Region 741 (N12, L=203, class/area, Dao/060 on 13 March) was the main producer of C-class flares this reporting period. All of the C-class flares were low level except for a C7.3 impulsive event, which occurred at 10/1142 UTC from Region 741. Region 742 (S05, L=158, class/area, Eai/340 on 13 March) managed to produce two low level C-flares on 13 March. LASCO imagery showed several CME's over the period, but none were associated with significant geomagnetic activity.

Solar wind data were available from the NASA Advanced Composition Explorer (ACE) spacecraft during most of the summary period. The period began with solar wind speed near 700 km/s while the Bz component of the IMF fluctuated between +/- 7 nT as a large, northern coronal hole wind stream continued to be in a geoeffective position. Early on 08 March, wind speed reached a maximum of 800 km/s and fluctuated around 700 km/s until 10 March. About mid-day on 10 March, solar wind speed began to decrease until 13 March. The period ended with solar wind speed near 340 km/s.

No greater than 10 MeV proton events were observed this period.

The greater than 2 MeV electron flux at geosynchronous orbit was at high levels from 07 – 13 March.

The geomagnetic field ranged from quiet to major storm levels at lower latitudes with minor to severe storming periods observed at the higher latitudes. The period began on 07 March under the influence of a high speed coronal hole stream with levels reaching major storm conditions. An isolated severe storm period was observed at high latitudes along with several periods of major storming. On 08 March, conditions were quiet to minor storm with major storm periods at high latitude. On 09 March, quiet to active conditions with periods of minor storm levels at high latitudes were observed. On 10 March, levels began decreasing to quiet to unsettled with some minor storm levels at high latitude as a coronal hole high speed stream moved out of geoeffective position. Quiet to unsettled conditions were observed on 11-13 March.

Space Weather Outlook
16 March - 11 April 2005

Solar activity is expected to be at very low to low levels the entire forecast period.

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 17 – 19 March, and 03 – 06 April.

The geomagnetic field is expected to range from quiet to minor storm levels. Coronal hole high speed wind streams are expected to produce unsettled to active levels with occasional minor storm periods on 16 – 17 March, and again on 02 – 06 April. Otherwise, expect quiet to unsettled conditions.



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
07 March	87	43	140	A7.8	0	0	0	0	0	0	0	0
08 March	94	52	160	B1.1	0	0	0	1	0	0	0	0
09 March	100	77	560	B1.6	2	0	0	3	0	0	0	0
10 March	102	70	470	B1.4	1	0	0	0	0	0	0	0
11 March	105	59	490	B1.4	1	0	0	0	0	0	0	0
12 March	110	67	530	B1.8	1	0	0	0	0	0	0	0
13 March	114	77	650	B1.7	5	0	0	1	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
	07 March	5.5E+6	1.4E+4	3.1E+3		1.8E+8
08 March	2.4E+6	1.4E+4	3.2E+3		2.6E+8	
09 March	1.6E+6	1.4E+4	3.1E+3		5.6E+8	
10 March	1.0E+6	1.4E+4	3.1E+3		4.8E+8	
11 March	9.6E+5	1.3E+4	3.2E+3		6.9E+8	
12 March	1.2E+6	1.3E+4	3.1E+3		1.0E+9	
13 March	1.7E+6	1.4E+4	3.1E+3		1.3E+9	

Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	07 March	28	5-4-5-3-4-2-4-4	63	5-3-5-7-6-6-6-3	42
08 March	17	4-4-3-2-2-2-3-4	46	4-5-6-6-4-4-4-5	26	4-5-5-3-3-3-3-4
09 March	13	2-4-3-2-2-2-3-3	31	2-4-5-5-5-4-4-3	20	3-4-4-3-3-3-4-4
10 March	10	3-2-3-2-2-3-2-1	28	3-4-5-4-5-5-1-1	13	3-3-3-3-3-3-2-1
11 March	3	2-2-1-0-1-0-0-1	8	3-2-3-3-2-0-0-1	6	2-2-2-1-2-1-1-1
12 March	2	1-1-1-0-1-0-1-1	2	1-1-1-1-1-0-0-0	4	1-1-1-0-1-1-2-1
13 March	4	0-0-0-0-1-1-2-3	5	1-3-0-2-1-0-1-2	6	1-0-0-1-2-2-2-3

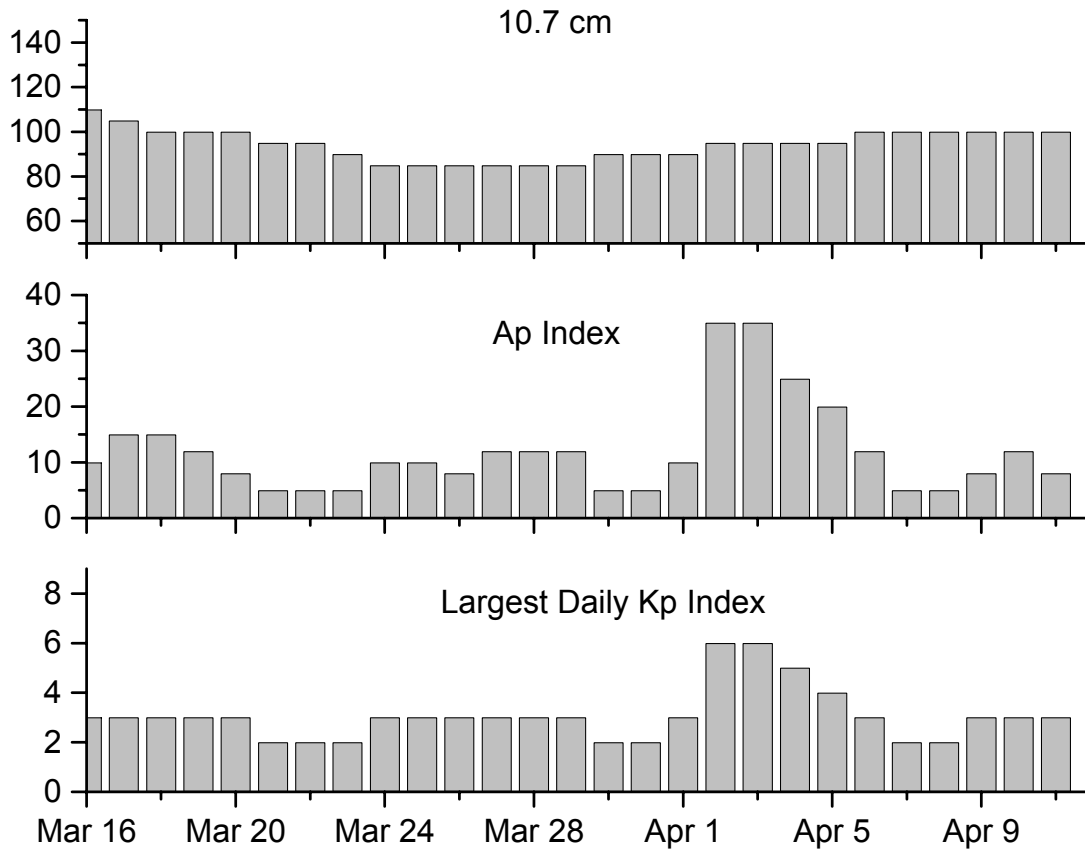


Alerts and Warnings Issued

<u>Date & Time of Issue</u>	<u>Type of Alert or Warning</u>	<u>Date & Time of Event UTC</u>
07 Mar 0641	WARNING: Geomagnetic K = 6	07 Mar 0640 - 1000
07 Mar 0644	ALERT: Geomagnetic K = 6	07 Mar 0644
07 Mar 1131	ALERT: Electron 2MeV Integral Flux > 1000pfu	07 Mar 1130
07 Mar 1556	WARNING: Geomagnetic K = 4	07 Mar 1556 - 2359
07 Mar 2244	EXTENDED WARNING: Geomagnetic K = 4	07 Mar 1556 – 08 Mar 1600
08 Mar 0054	WARNING: Geomagnetic K = 5	08 Mar 0130 - 1500
08 Mar 0351	ALERT: Geomagnetic K = 5	08 Mar 0345
08 Mar 1047	ALERT: Electron 2MeV Integral Flux > 1000pfu	08 Mar 1045
08 Mar 2256	ALERT: Geomagnetic K = 4	08 Mar 2250
09 Mar 0207	ALERT: Type II Radio Emission	09 Mar 0137
09 Mar 0330	WARNING: Geomagnetic K = 4	09 Mar 0330 - 1600
09 Mar 0344	ALERT: Geomagnetic K = 4	09 Mar 0340
09 Mar 0515	ALERT: Electron 2MeV Integral Flux > 1000pfu	09 Mar 0500
09 Mar 1740	WARNING: Geomagnetic K = 4	09 Mar 1741 - 2359
09 Mar 1743	ALERT: Geomagnetic K = 4	09 Mar 1742
09 Mar 2346	EXTENDED WARNING: Geomagnetic K = 4	Mar 09 1741 –10 Mar 1500
10 Mar 0515	ALERT: Electron 2MeV Integral Flux > 1000pfu	10 Mar 0500
11 Mar 0010	4 – 245 MHz Radio Bursts	12 Mar
11 Mar 0545	ALERT: Electron 2MeV Integral Flux > 1000pfu	11 Mar 0500
12 Mar 0616	ALERT: Electron 2MeV Integral Flux > 1000pfu	12 Mar 0500
13 Mar 0515	ALERT: Electron 2MeV Integral Flux > 1000pfu	13 Mar 0500



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
16 Mar	110	10	3	30 Mar	90	5	2
17	105	15	3	31	90	5	2
18	100	15	3	01 Apr	90	10	3
19	100	12	3	02	95	35	6
20	100	8	3	03	95	35	6
21	95	5	2	04	95	25	5
22	95	5	2	05	95	20	4
23	90	5	2	06	100	12	3
24	85	10	3	07	100	5	2
25	85	10	3	08	100	5	2
26	85	8	3	09	100	8	3
27	85	12	3	10	100	12	3
28	85	12	3	11	100	8	3
29	85	12	3				



Energetic Events

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

No Events Observed

Flare List

Date	Time			Optical X-ray Class.	Imp / Brtns	Location Lat CMD	Rgn
	Begin	Max	End				
07 March	1304	1311	1315	B1.1			
	2019	2023	2025	B2.3			742
08 March	B0031	0031	0037		Sf	N13E31	
	0258	0309	0318	B5.4			742
	1613	1619	1629	B2.6			
	1721	1729	1739	B4.7			742
	2029	2043	2052	B3.7			739
09 March	2135	2143	2201	B4.7			739
	0133	0136	0138	C1.0			
	0234	0237	0300	C1.8	Sf	N12E18	741
	0316	0319	0332		Sf	N12E18	741
	0802	0807	0815	B4.2			741
	1207	1210	1213	B2.5			741
	1301	1308	1317	B5.6			741
	1720	1724	1727	B3.1			741
10 March	2148	2152	2156	B8.3	Sf	N02E03	741
	1136	1142	1144	C7.3			741
	1202	1211	1223	B7.0			
	1555	1601	1612	B3.1			
	1837	1842	1848	B6.0			742
	2026	2036	2055	B7.3			742
	2239	2244	2251	B3.1			742
11 March	0012	0018	0020	B4.2			742
	0030	0051	0103	C1.2			741
	1052	1056	1103	B3.5			742
	1650	1654	1659	B5.4			742
	1712	1717	1723	B5.3			742
12 March	2353	2356	2359	B2.3			
	0530	0541	0557	B6.9			
	0607	0610	0613	B7.7			741
	0836	0906	0917	C1.7			741
	1324	1328	1332	B3.7			742
	1648	1655	1659	B8.6			741



Flare List – continued.

Date	Time			Optical	Imp / Brtns	Location Lat CMD	Rgn
	Begin	Max	End	X-ray Class.			
13 March	0251	0256	0300	B6.4			742
	0343	0347	0349	B3.2			742
	0434	0438	0440	B4.5			
	0535	0538	0540	B2.4			

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	4

Region 739

26 Feb S04E52	291	0030	05	Bxo	004	B												
27 Feb S04E38	292	0020	01	Axx	002	A												
28 Feb S04E21	295	0000	01	Axx	001	A												
01 Mar S03E10	293	0010	01	Axx	001	A												
02 Mar S03W03	293																	
03 Mar S03W16	293	0010	03	Bxo	002	B												
04 Mar S03W29	293																	
05 Mar S03W42	293																	
06 Mar S03W55	293																	
07 Mar S04W67	291	0020	05	Bxo	004	B												
08 Mar S07W81	292	0040	06	Axx	003	A												
09 Mar S08W92	290	0090	02	Bxo	002	B												

0 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude:293

Region 740

02 Mar S07W24	314	0020	01	Hsx	001	A												
03 Mar S07W37	314	0010	01	Axx	002	A												
04 Mar S07W50	314																	
05 Mar S07W63	314																	
06 Mar S07W76	314																	
07 Mar S07W89	314																	

0 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude:314



Region Summary – continued.

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

Region 741

04 Mar	N12E70	194	0110	05	Cao	003	B											
05 Mar	N12E57	193	0110	08	Cao	012	B	1										
06 Mar	N12E44	193	0080	07	Dao	012	B				1							
07 Mar	N13E30	194	0060	05	Cao	007	B											
08 Mar	N14E17	194	0040	06	Cao	008	B											
09 Mar	N12E03	195	0060	06	Dsi	017	B	1			3							
10 Mar	N13W11	195	0100	05	Cai	015	B	1										
11 Mar	N12W26	197	0110	07	Cai	008	B	1										
12 Mar	N12W41	200	0030	06	Cso	005	Bg	1										
13 Mar	N12W57	203	0060	06	Dao	007	B	3										
								8	0	0	4	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude:195

Region 742

07 Mar	S05E67	157	0060	03	Hax	002	A											
08 Mar	S06E56	155	0080	12	Bxo	011	B											
09 Mar	S06E43	155	0170	11	Eai	017	B											
10 Mar	S05E31	153	0190	11	Eai	024	B											
11 Mar	S05E17	154	0190	12	Eai	020	B											
12 Mar	S06E03	156	0240	10	Dac	030	B											
13 Mar	S05W12	158	0340	12	Eai	037	B	2			1							
								2	0	0	1	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude:156

Region 743

09 Mar	S09E76	122	0240	03	Hkx	001	A											
10 Mar	S07E63	121	0180	03	Hax	001	A											
11 Mar	S07E50	121	0190	04	Hsx	001	A											
12 Mar	S08E36	123	0260	04	Hhx	002	A											
13 Mar	S07E24	122	0250	05	Hkx	003	A											
								0	0	0	0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude:122

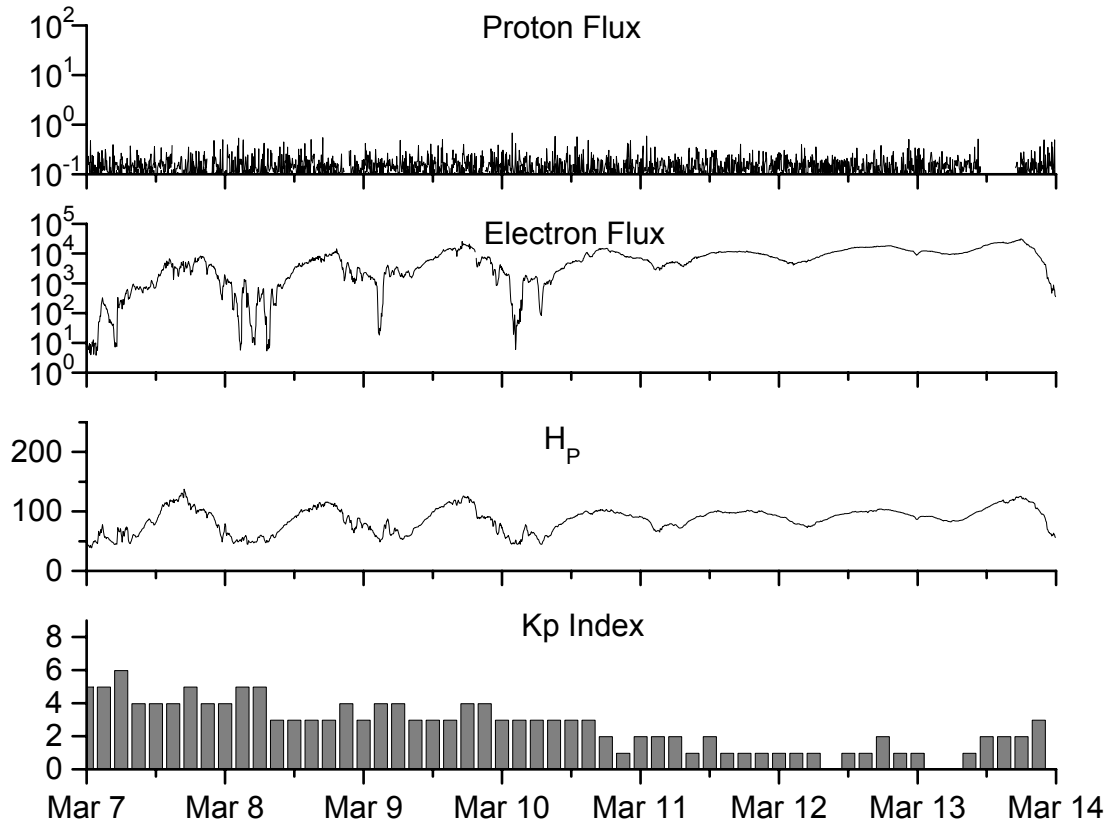


**Recent Solar Indices (preliminary)
of the observed monthly mean values**

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
2003									
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	65.5	0.55	96.6	58.4	153.1	121.8	35	21.1
November	118.9	67.3	0.57	93.6	57.0	153.1	120.1	28	20.0
December	75.4	46.5	0.62	91.4	55.0	115.1	118.0	16	18.6
2004									
January	62.3	37.7	0.61	87.9	52.0	114.1	116.3	22	18.1
February	75.6	45.8	0.61	84.2	49.4	107.0	115.5	13	17.7
March	81.0	49.1	0.61	80.9	47.2	112.2	114.6	14	16.9
April	59.3	39.3	0.66	77.9	45.6	101.2	112.3	11	15.5
May	77.3	41.5	0.54	74.1	43.9	99.8	109.2	8	14.3
June	78.9	43.2	0.55	70.4	41.7	97.4	107.2	8	14.0
July	87.8	51.0	0.58	68.3	40.2	118.5	105.9	23	13.8
August	69.5	40.9	0.59	66.6	39.3	110.1	105.0	11	13.8
September	50.0	27.7	0.55			103.1		10	
October	77.9	48.4	0.62			105.7		9	
November	70.5	43.7	0.62			113.2		26	
December	34.7	17.9	0.52			94.6		11	
2005									
January	52.0	31.3	0.60			102.4		22	
February	45.4	29.1	0.64			97.3		11	

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 07 March 2005

Protons plot contains the five-minute averaged integral proton flux (protons/cm²-sec-sr) as measured by GOES-11 (W110) for each of three energy thresholds: greater than 10, 50, and 100 MeV.

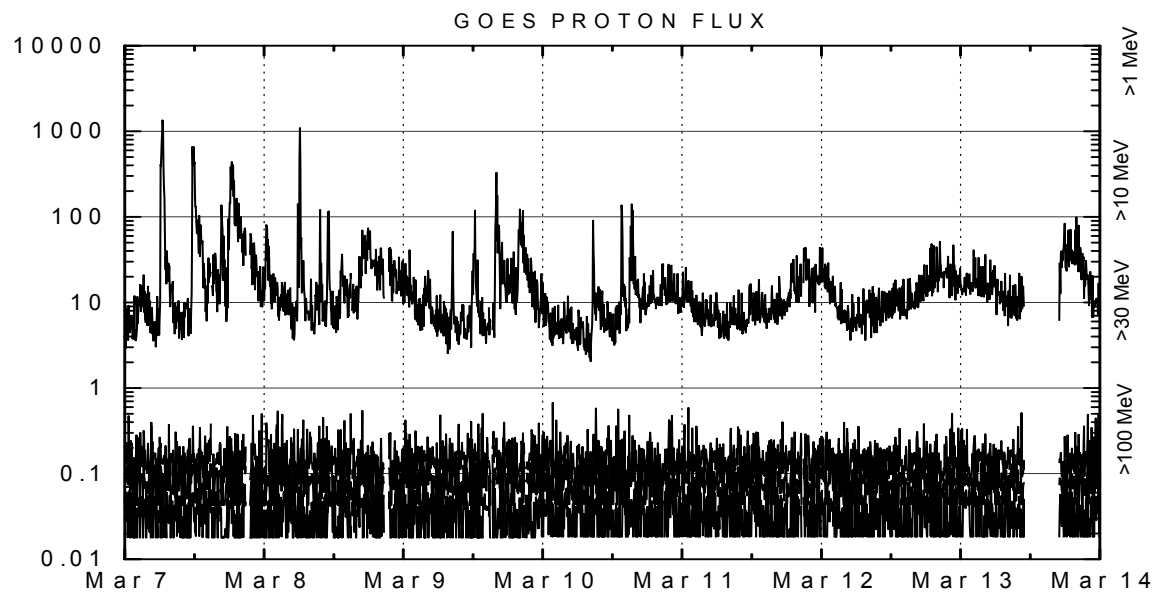
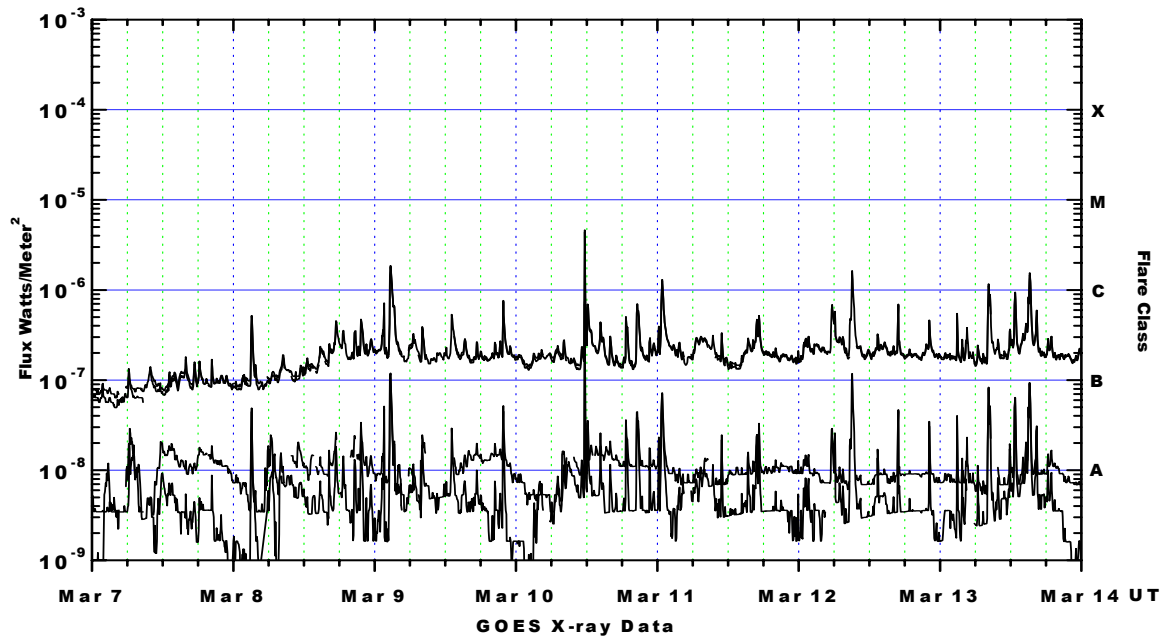
Electrons plot contains the five-minute averaged integral electron flux (electrons/cm²-sec-sr) with energies greater than 2 MeV at GOES-12 (W75).

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 parallel 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

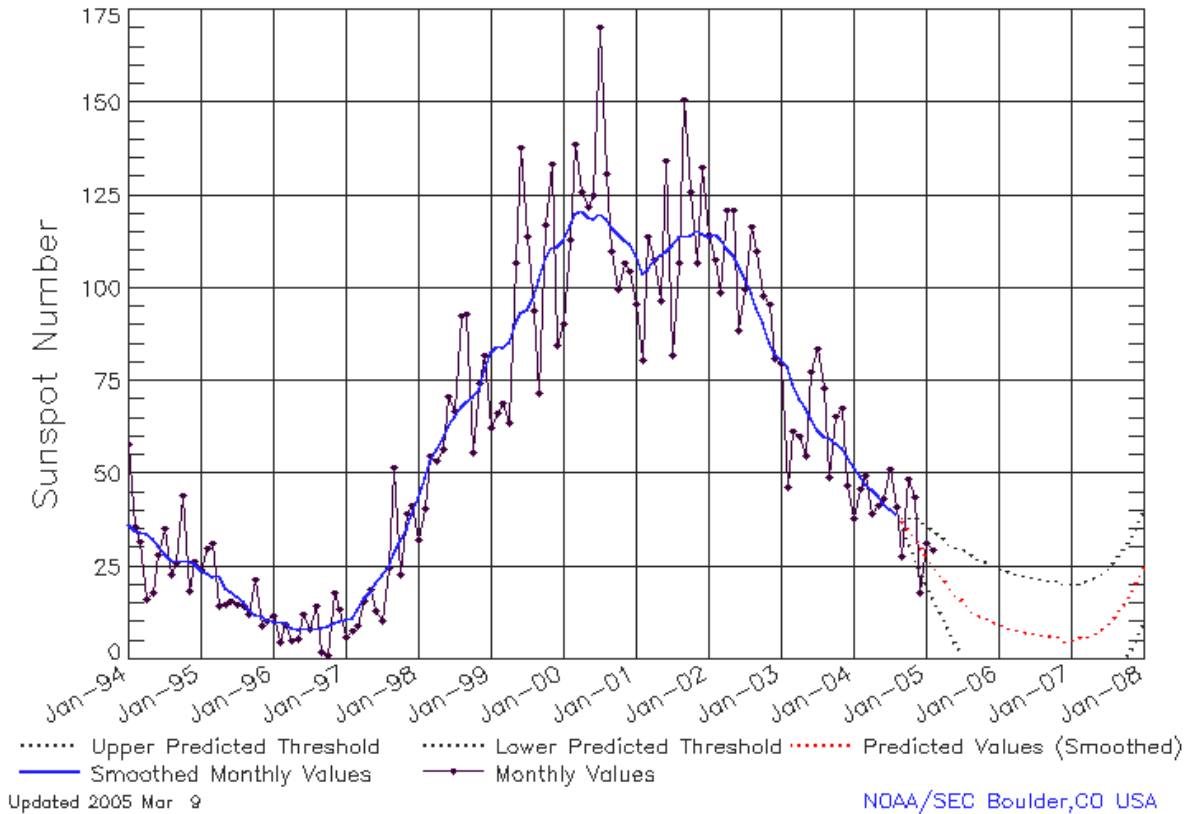
X-ray plot contains five-minute averaged x-ray flux (watts/m^2) as measured by GOES 12 (W76) and GOES 10 (W135) in two wavelength bands, .05 - .4 and .1 - .8 nm. The letters A, B, C, M and X refer to x-ray event levels for the .1 - .8 nm band.

Proton plot contains the five-minute averaged integral proton flux ($\text{protons/cm}^2\text{-sec-sr}$) as measured by GOES-11 (W110) for each of the energy thresholds: >1, >10, >30 and >100 MeV. P10 event threshold is 10 pfu ($\text{protons/cm}^2\text{-sec-sr}$) at greater than 10 MeV.



ISES Solar Cycle Sunspot Number Progression

Data Through 28 Feb 05



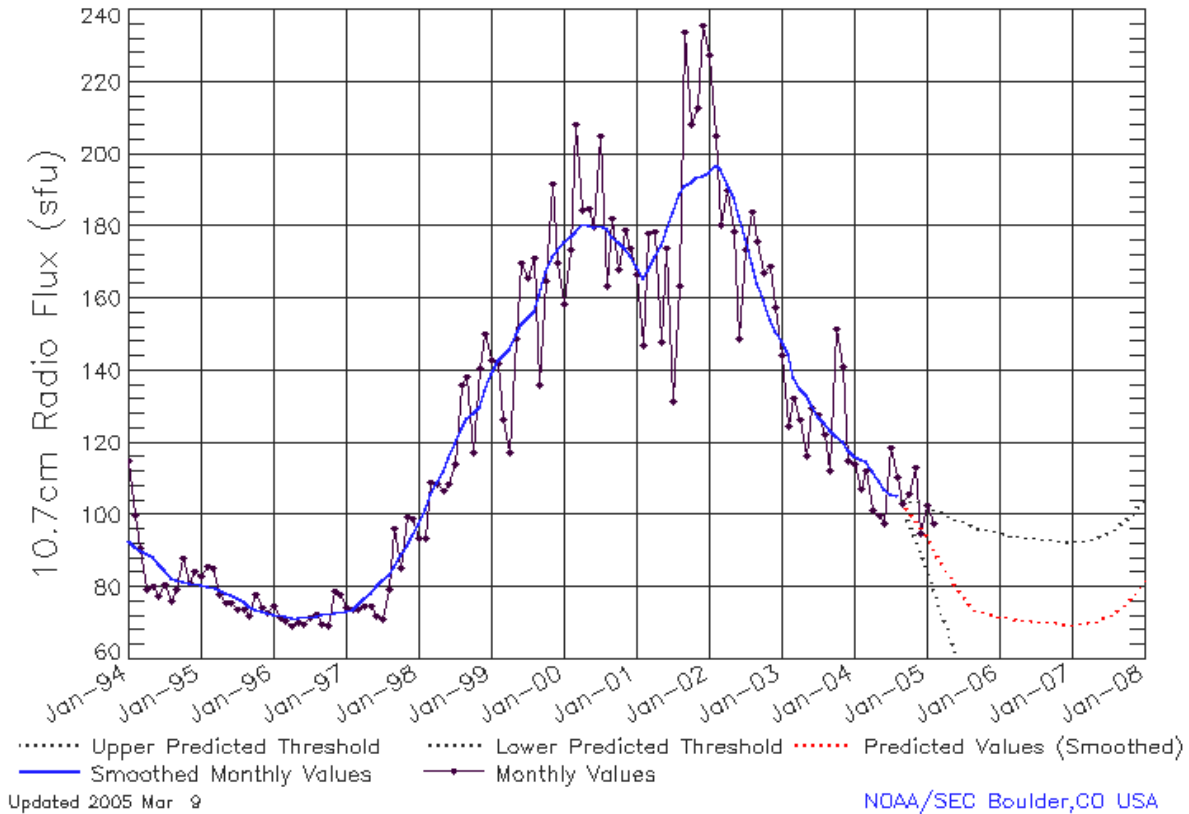
SEC Prediction of Smoothed Sunspot Number

	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 (***)	46 (***)	44 (***)	42 (***)	40 (***)	39 (***)	37 (1)	35 (3)	33 (5)	31 (7)
2005	28 (8)	26 (9)	24 (10)	22 (11)	19 (12)	17 (13)	16 (14)	14 (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 28 Feb 05



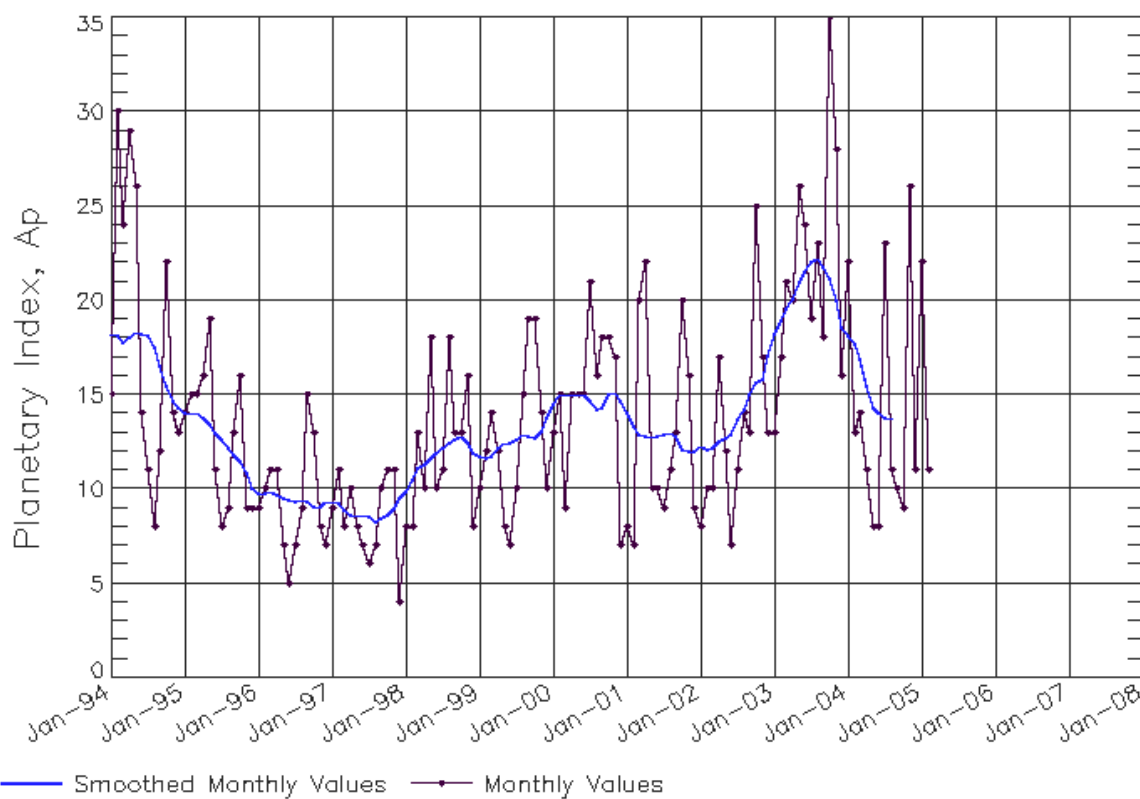
SEC Prediction of Smoothed F10.7cm Radio Flux

	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 (***)	112 (***)	109 (***)	107 (***)	106 (***)	105 (***)	103 (1)	101 (3)	99 (5)	97 (7)
2005	94 (9)	91 (11)	88 (13)	85 (15)	82 (17)	80 (19)	78 (21)	75 (22)	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 28 Feb 05



Updated 2005 Mar 9

NOAA/SEC Boulder, CO USA

