

Space Weather Highlights
26 June – 02 July 2006

SEC PRF 1609
04 July 2006

Solar activity was at very low levels. Regions 897 (N05, L=005, class/area, Dri/110 on 28 June) and 898 (S06, L=328, class/area, Dso/350 on 30 June) were the only two spot groups of interest. Region 897 developed into a beta gamma magnetic class with up to 110 millionths in area before slowly decaying to a simple alpha spot by 02 July. Region 898 rotated onto the east limb on 28 June and produced the largest event of the period; a B9.8 flare at 01/0736 UTC.

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

The greater than 2 MeV electron flux at geosynchronous orbit was at nominal levels.

The geomagnetic field ranged from quiet to unsettled levels. Solar wind speed ranged from a low of approximately 270 km/s late on 26 June to a high of 600 km/s late on 28 June. The period began with the solar wind speed low around 300 km/s and the IMF Bz not varying much beyond +/- 1 nT. These conditions lasted until early on the 27th when a solar sector boundary crossing followed by a geoeffective coronal hole high speed stream. IMF Bz began to fluctuate between +/- 10 nT while the wind speed increased to a maximum of 600 km/s late on 28 June. The geomagnetic field responded with quiet to unsettled conditions at middle latitudes while high latitudes experienced minor to major storm periods on 28 June. By mid-day on 29 June, the solar wind speed began to decrease as well as the total magnetic field with the IMF Bz not varying much beyond +/- 5 nT. High latitudes observed several active periods during this time with one isolated minor storm period occurring on 30 June. Middle latitudes were mostly quiet. From late on 30 June until the end of the period, the geomagnetic field was quiet. The period ended with a wind speed around 340 km/s.

Space Weather Outlook
05 July – 31 July 2006

Solar activity is expected to be at very low to low levels.

No greater than 10 MeV proton events are expected.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to be at high levels on 05 – 19 July.

The geomagnetic field is expected to be mostly quiet to unsettled for the majority of the forecast period. Recurrent coronal hole high speed wind streams are expected to rotate into geoeffective positions on 05 – 06 July, 12 July, 25 – 26 July, and again on 30 – 31 July. Active to minor storm conditions are possible during these time periods.



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
26 June	76	14	80	A3.4	0	0	0	0	0	0	0	0
27 June	79	33	70	A5.5	0	0	0	0	0	0	0	0
28 June	84	38	260	A6.5	0	0	0	0	0	0	0	0
29 June	86	35	330	A7.8	0	0	0	0	0	0	0	0
30 June	86	38	390	A7.2	0	0	0	0	0	0	0	0
01 July	86	36	240	A5.9	0	0	0	0	0	0	0	0
02 July	87	34	310	A5.8	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)		
	>1 MeV	>10 MeV	>100 MeV	>.6 MeV	>2MeV	>4 MeV
	26 June	2.0E+6	1.7E+4	3.8E+3		6.4E+6
27 June	2.5E+6	1.7E+4	3.8E+3		9.7E+6	
28 June	1.1E+6	1.6E+4	3.6E+3		1.9E+6	
29 June	6.1E+5	1.6E+4	3.6E+3		2.5E+6	
30 June	4.7E+5	1.7E+4	3.7E+3		6.9E+6	
01 July	4.3E+5	1.7E+4	3.7E+3		1.3E+7	
02 July	3.9E+5	1.7E+4	3.8E+3		1.8E+7	

Daily Geomagnetic Data

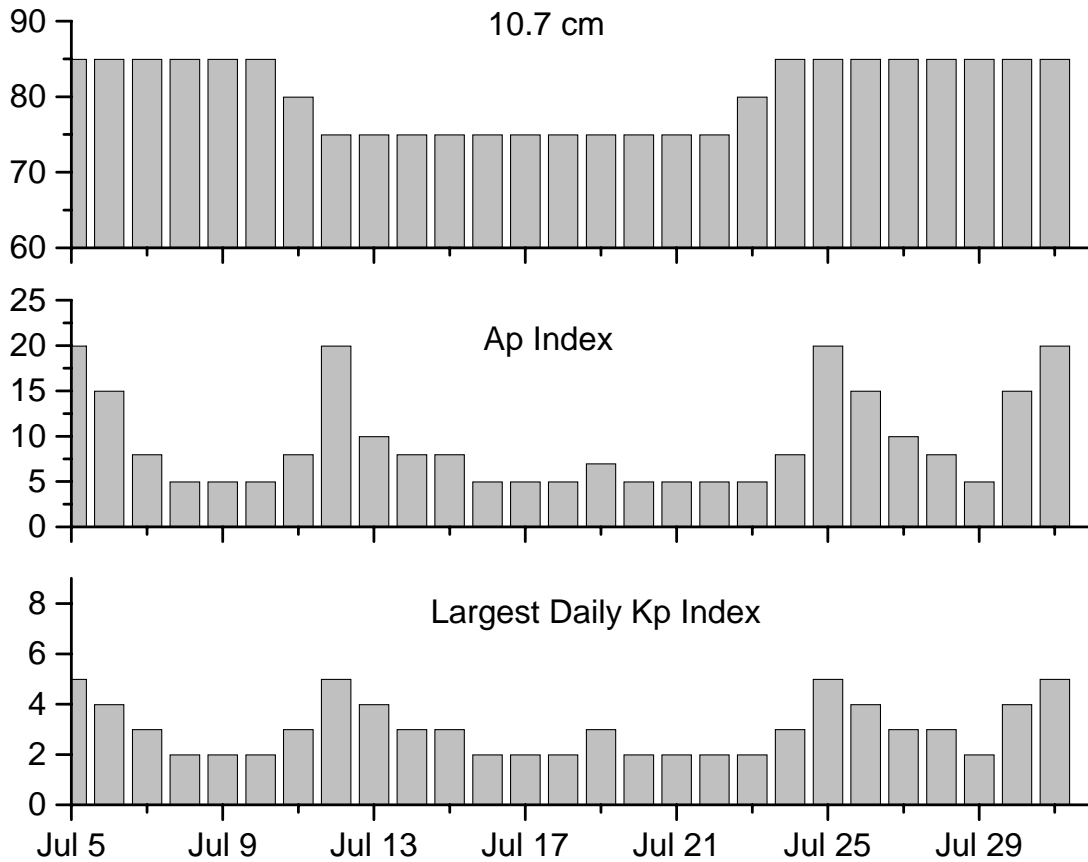
Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	26 June	1	1-0-0-0-1-0-0-0	0	0-0-0-0-0-0-1-0	3
27 June	7	1-1-0-1-4-1-1-3	3	1-0-0-1-2-1-2-1	6	1-1-1-1-2-2-2-3
28 June	12	2-2-3-3-3-2-3-3	32	3-2-6-5-6-2-3-2	18	3-2-4-4-4-2-3-3
29 June	8	2-2-2-2-2-2-2-3	17	3-3-4-3-4-4-1-1	12	3-2-3-3-2-3-3-3
30 June	7	2-2-2-2-2-2-1-2	13	1-2-3-3-5-2-2-1	8	2-2-2-2-3-1-1-2
01 July	3	1-2-1-1-1-1-1-0	2	1-2-1-1-1-0-0-0	5	1-2-1-0-1-2-1-1
02 July	1	0-0-0-0-1-2-0-0	0	1-0-0-0-0-0-0-0	2	1-0-0-0-1-2-0-1

Alerts and Warnings Issued

Date & Time of Issue	Type of Alert or Warning	Date & Time of Event UTC
28 Jun 0019	WARNING: Geomagnetic K = 4	28 Jun 0030 – 1600
28 Jun 0654	ALERT: Geomagnetic K = 4	28 Jun 0653
28 Jun 0824	ALERT: Geomagnetic K = 5	28 Jun 0823
28 Jun 0912	WARNING: Geomagnetic K = 5	28 Jun 0915 – 1215
28 Jun 1555	EXTENDED WARNING: Geomagnetic K = 4	28 Jun 0030 – 2359
28 Jun 2355	EXTENDED WARNING: Geomagnetic K = 4	28 Jun 0030 – 29/1600

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
05 July	85	20	5	19 July	75	7	3
06	85	15	4	20	75	5	2
07	85	8	3	21	75	5	2
08	85	5	2	22	75	5	2
09	85	5	2	23	80	5	2
10	85	5	2	24	85	8	3
11	80	8	3	25	85	20	5
12	75	20	5	26	85	15	4
13	75	10	4	27	85	10	3
14	75	8	3	28	85	8	3
15	75	8	3	29	85	5	2
16	75	5	2	30	85	15	4
17	75	5	2	31	85	20	5
18	75	5	2				



Energetic Events

Date	Time		X-ray		Optical Information			Peak		Sweep Freq	
	Begin	Max	½	Integ	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				
26 June	1101	1106	1109	B1.7			897
	1157	1203	1207	B1.0			897
27 June	0437	0442	0446	B2.2			
28 June	1222	1226	1231	B1.4			
	1503	1506	1509	B1.0			
	1921	1932	1941	B5.1			898
	2038	2043	2047	B1.7			897
29 June	0410	0418	0423	B2.7			898
	1410	1415	1420	B1.2			
	1506	1525	1540	B2.5			897
	2310	2314	2317	B2.8			898
30 June	2325	2328	2330	B1.2			
	0243	0251	0256	B2.6			897
	0327	0330	0332	B2.4			898
	0534	0537	0539	B1.0			
	0856	0901	0905	B2.1			
	0923	0928	0932	B2.1			898
	1019	1025	1031	B2.3			898
01 July	1355	1400	1405	B1.7			897
	1634	1637	1641	B1.6			898
	2034	2040	2048	B1.7			
	0227	0236	0257	B2.8			
	0657	0736	0756	B9.8			898
02 July	0711	0714	0717	B1.0			
	0753	0832	0856	B9.3			898
	1239	1245	1251	B1.5			
	1439	1453	1523	B1.6			



Region Summary

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

Region 896

17 Jun	S12E28	151	0020	01	Cso	007	B										
18 Jun	S11E16	150	0020	06	Cao	013	B										
19 Jun	S11E03	150	0040	06	Dro	011	B										
20 Jun	S10W11	150	0050	06	Dro	010	B										
21 Jun	S10W25	151	0110	06	Bxo	009	B										
22 Jun	S10W38	151															
23 Jun	S10W51	151															
24 Jun	S10W64	151															
25 Jun	S10W77	151															
26 Jun	S10W90	151															

0 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 150

Region 897

25 Jun	N06E75	358	0060	07	Bxo	003	B										
26 Jun	N06E57	003	0080	06	Dao	004	B										
27 Jun	N06E44	003	0070	08	Cai	023	Bg										
28 Jun	N05E29	005	0110	09	Dri	017	Bg										
29 Jun	N06E15	006	0070	11	Ero	012	Bg										
30 Jun	N07E02	006	0040	10	Dro	010	B										
01 Jul	N06W12	006	0030	09	Bxo	006	B										
02 Jul	N06W23	004	0020	01	Bxo	001	A										

0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 006

Region 898

28 Jun	S06E66	328	0150	03	Hsx	001	A										
29 Jun	S05E54	327	0260	05	Dso	003	B										
30 Jun	S06E40	328	0350	06	Dso	008	B										
01 Jul	S06E26	328	0210	06	Cho	010	B										
02 Jul	S06E14	327	0290	05	Cho	013	B										

0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 327

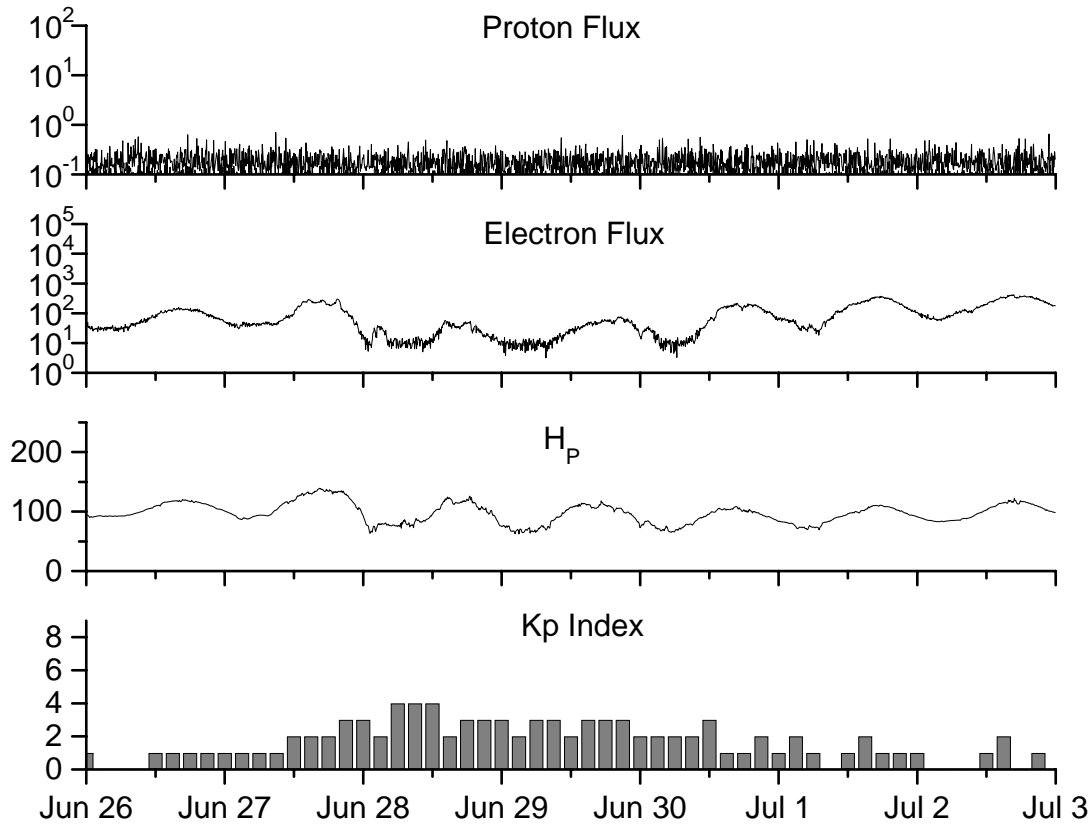


**Recent Solar Indices (preliminary)
of the observed monthly mean values**

Month	Sunspot Numbers			Radio Flux		Geomagnetic			
	Observed values SEC	Ratio RI	Ratio RI/SEC	Smooth values SEC	Smooth values RI	*Penticton 10.7 cm	Smooth Value	Planetary Ap	Smooth Value
2004									
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	63.7	37.6	103.1	103.7	10	13.6
October	77.9	48.4	0.62	61.3	35.9	105.7	102.1	9	13.5
November	70.5	43.7	0.62	60.0	35.4	113.2	101.5	26	14.1
December	34.7	17.9	0.52	58.8	35.3	94.6	101.3	11	14.8
2005									
January	52.0	31.3	0.60	57.3	34.7	102.4	100.3	22	14.7
February	45.4	29.1	0.64	56.4	34.0	97.3	98.5	11	14.6
March	41.0	24.8	0.60	55.8	33.6	90.0	97.2	12	15.3
April	41.5	24.4	0.59	52.6	31.7	85.9	95.5	12	15.7
May	65.4	42.6	0.65	48.3	29.0	99.5	93.2	20	14.8
June	59.8	39.6	0.66	47.9	28.9	93.7	91.9	13	13.9
July	71.0	39.9	0.56	48.1	29.2	96.6	90.9	16	13.1
August	65.6	36.4	0.55	45.4	27.5	90.7	89.3	16	12.2
September	39.2	22.1	0.56	42.9	25.9	90.8	87.8	21	11.8
October	13.0	8.5	0.65	42.6	25.5	76.7	87.4	7	11.6
November	32.2	18.0	0.56	42.1	24.9	86.3	86.7	8	11.1
December	62.6	41.2	0.66	40.1	23.0	90.8	85.4	7	10.4
2006									
January	28.0	15.4	0.55			83.8		6	
February	5.3	4.7	0.89			76.6		6	
March	21.3	10.8	0.51			75.5		8	
April	55.2	30.2	0.55			89.0		11	
May	39.6	22.2	0.56			81.0		8	
June	37.7	13.9	0.37			80.1		8	

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 26 June 2006

Protons plot contains the five-minute averaged integral proton flux (protons/cm²-sec -sr) as measured by GOES-11 (W135) for each of three energy thresholds: greater than 10, 50, and 100 MeV.

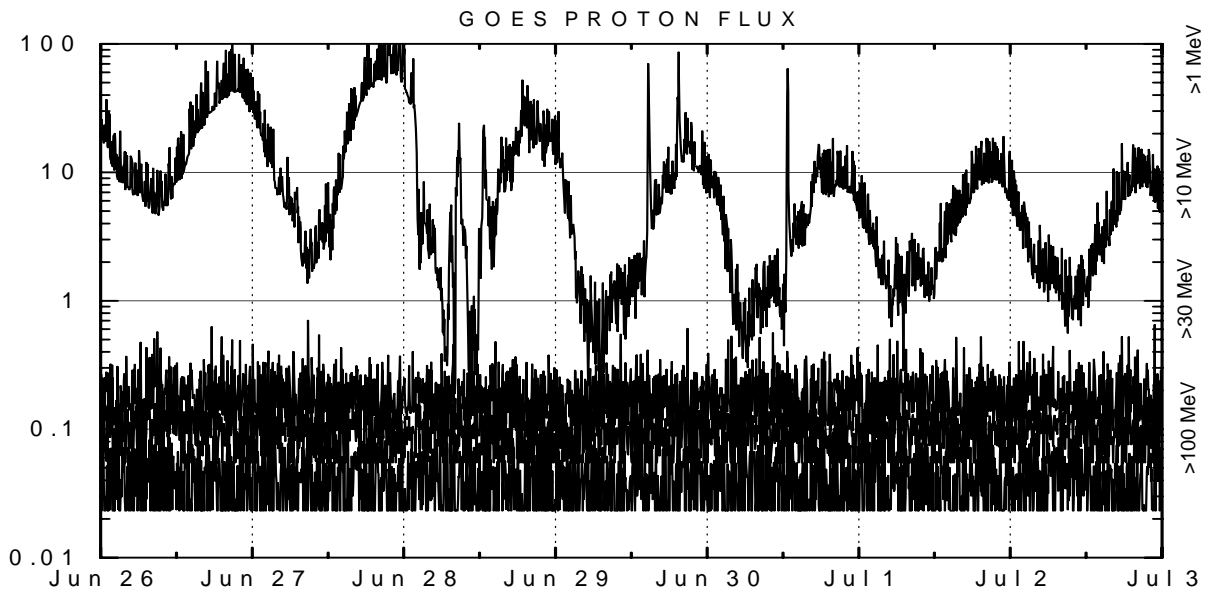
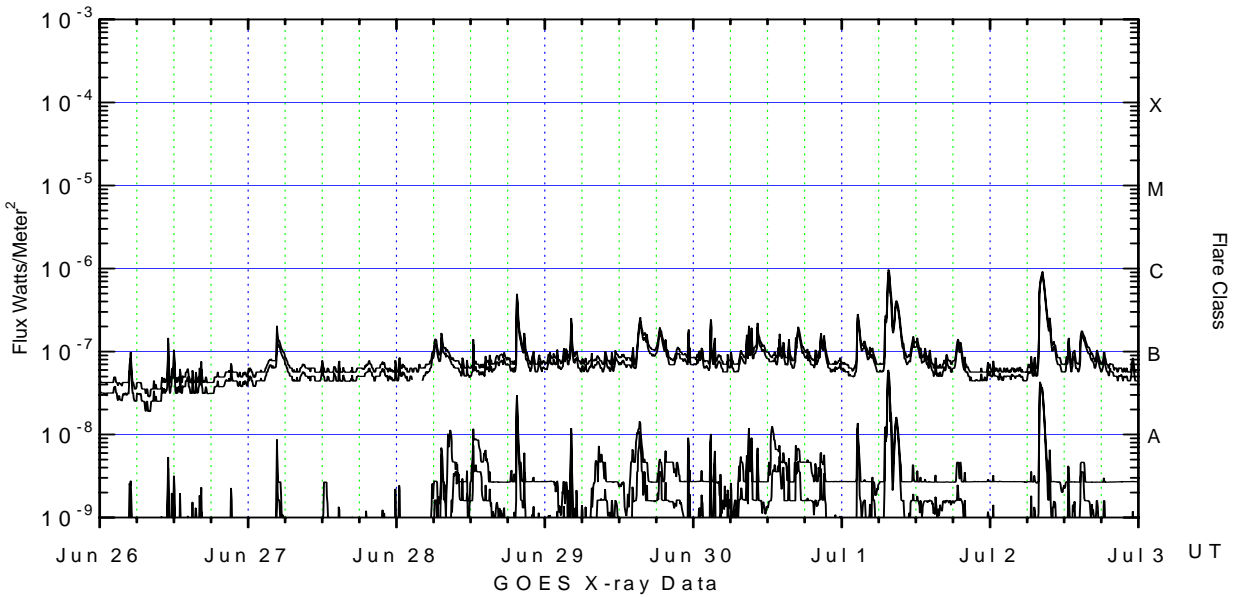
Electrons plot contains the five-minute averaged integral electron flux (electrons/cm²-sec -sr) with energies greater than 2 MeV at GOES-12 (W075).

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 SEC 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

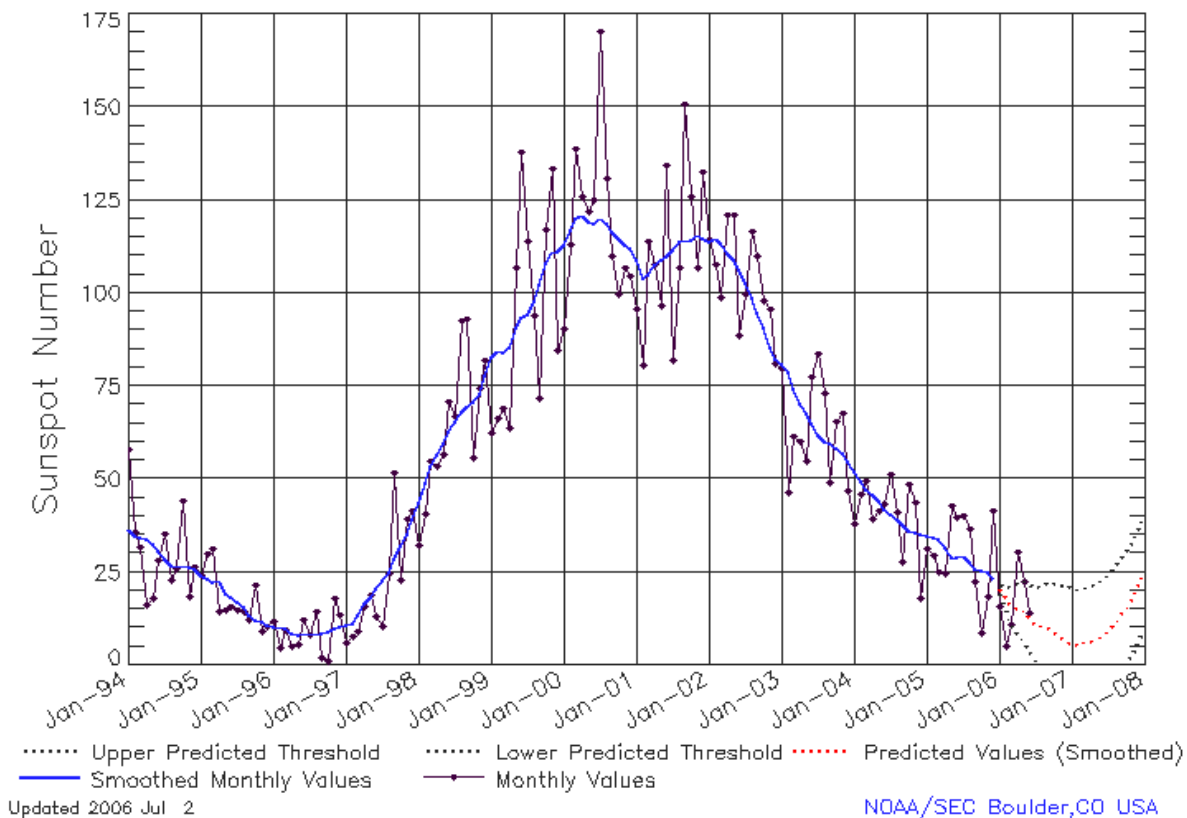
X-ray plot contains five-minute averaged x-ray flux (watts/m²) as measured by GOES 12 (W75) and GOES 10 (W135) in two wavelength bands, .05 - .4 and .1 - .8 nm. The letters A, B, C, M and X refer to x-ray event levels for the .1 - .8 nm band.

Proton plot contains the five-minute averaged integral proton flux (protons/cm²-sec-sr) as measured by GOES-11 (W101) 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 Jun 06



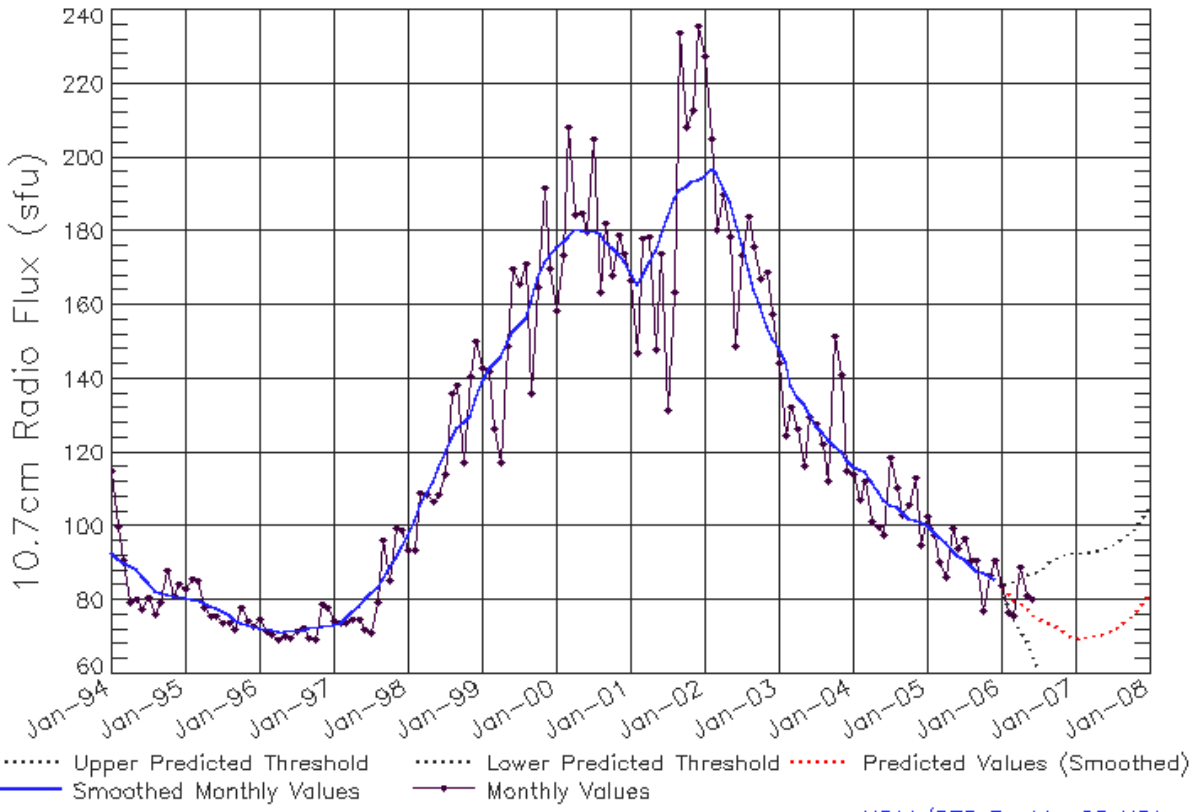
SEC Prediction of Smoothed Sunspot Number

	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 (***)	38 (***)	36 (***)	35 (***)	35 (***)
2005	35 (***)	34 (***)	34 (***)	32 (***)	29 (***)	29 (***)	29 (***)	28 (***)	26 (***)	26 (***)	25 (***)	23 (***)
2006	21 (1)	18 (3)	16 (5)	15 (7)	15 (8)	13 (9)	11 (10)	11 (11)	10 (12)	9 (13)	8 (14)	7 (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 Jun 06



Updated 2006 Jul 2

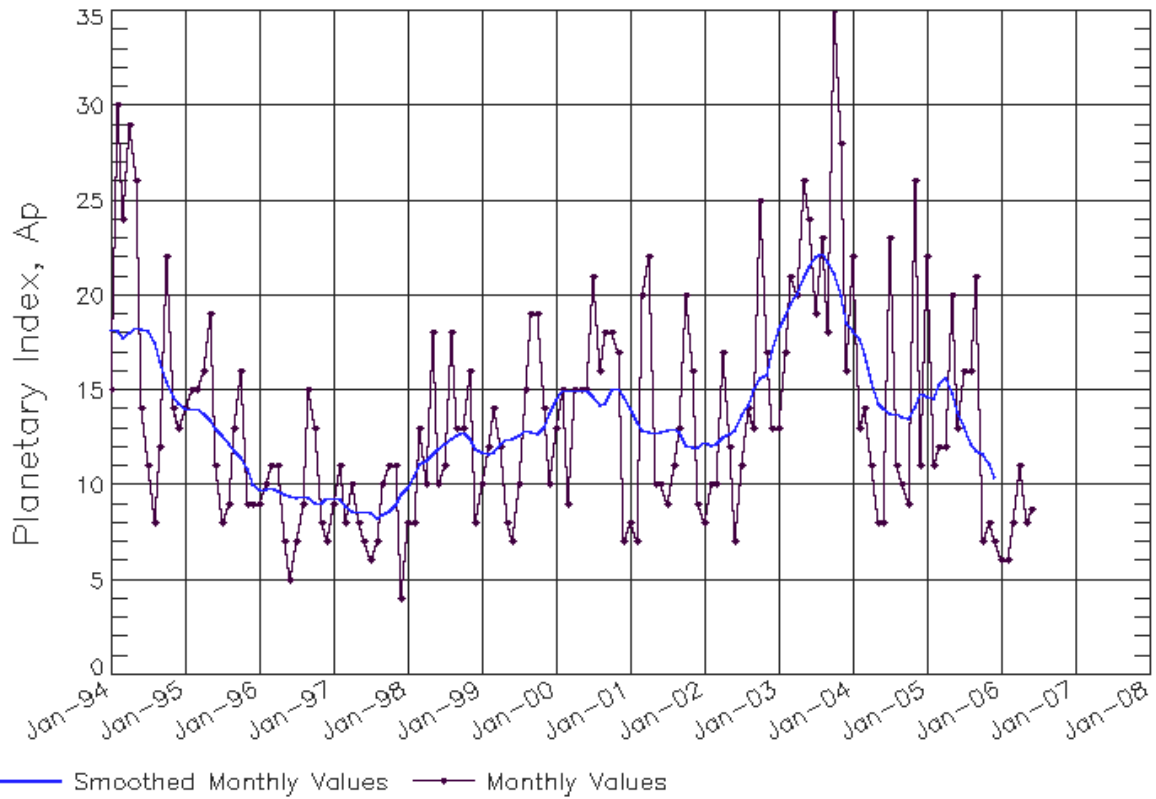
SEC Prediction of Smoothed F10.7cm Radio Flux

	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 (***)	104 (***)	102 (***)	102 (***)	101 (***)
2005	100 (***)	99 (***)	97 (***)	96 (***)	93 (***)	92 (***)	91 (***)	89 (***)	88 (***)	87 (***)	87 (***)	85 (***)
2006	84 (1)	82 (3)	80 (5)	79 (7)	78 (9)	77 (11)	75 (13)	74 (14)	74 (14)	73 (13)	72 (12)	71 (11)
2007	70 (10)	70 (10)	70 (10)	70 (10)	71 (10)	71 (10)	72 (11)	73 (11)	74 (12)	76 (13)	77 (14)	79 (16)



ISES Solar Cycle Ap Progression

Data Through 30 Jun 06



Updated 2006 Jul 2

[NOAA/SEC Boulder, CO USA](#)

