

Space Weather Highlights
03 April – 29 April 2007

SEC PRF 1652
01 May 2007

Solar activity was very low to low. Activity increased to low levels on 24 April due to a C2 X-ray flare from Region 953 (S10, L=308, class/area Dkc/520 on 28 April). Activity was very low for the remainder of the period due to B-class flares from Region 953.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit reached high levels during 28 – 29 April.

The geomagnetic field was at active to minor storm levels until 23/0900 UTC, then decreased to quiet levels at all latitudes for the remainder of the day. ACE solar wind data indicated the 23 April disturbance was the result of a recurrent coronal hole high-speed stream with a peak velocity of 548 km/sec at 23/1133 UTC, a peak total IMF field intensity of 14 nT at 23/0325 UTC, and a minimum southward IMF Bz of -11 nT at 23/0413 UTC. Quiet to unsettled conditions prevailed during 24 – 26 April. Field activity increased to quiet to active levels on 27 April. A further increase to unsettled to minor storm levels occurred on 28 April with a brief period of major to severe storm levels detected at high latitudes. Activity decreased to quiet to minor storm levels on 29 April. ACE solar wind data indicated the 27 - 29 April disturbance was due to a recurrent coronal hole high-speed stream with a peak velocity of 717 km/sec at 29/2307 UTC, a peak total IMF field intensity of 10 nT at 27/1738 UTC, and a minimum southward IMF Bz of -09 nT at 27/1718 UTC.

Space Weather Outlook
02 May – 28 May 2007

Solar activity is expected to be at very low levels.

No proton events are expected at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to reach high levels during 02 – 07 May.

Geomagnetic field activity is expected to be at quiet to unsettled levels through 19 May. A recurrent coronal hole high-speed stream is expected to disturb the field during 20 May. Unsettled to active levels are expected during the disturbance. Quiet to unsettled conditions are expected during 21 – 24 May. Another round of coronal hole effects is expected during 25 – 26 May with unsettled to minor storm conditions expected. Quiet to unsettled conditions are expected during 27 – 28 May.



Daily Solar Data

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
23 April	69	0	0	<A1.0	0	0	0	0	0	0	0	0
24 April	73	0	0	A2.2	1	0	0	0	0	0	0	0
25 April	77	14	230	A4.4	0	0	0	0	0	0	0	0
26 April	81	17	450	A4.7	0	0	0	0	0	0	0	0
27 April	83	18	500	A4.4	0	0	0	1	0	0	0	0
28 April	85	20	520	A4.1	0	0	0	0	0	0	0	0
29 April	85	18	500	A4.5	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
23 April	5.3E+5	1.7E+4	3.7E+3		9.9E+5	
24 April	1.0E+6	1.6E+4	3.5E+3		1.3E+6	
25 April	6.4E+5	1.6E+4	3.6E+3		1.0E+6	
26 April	8.2E+5	1.7E+4	3.6E+3		1.1E+6	
27 April	1.0E+6	1.7E+4	3.8E+3		1.3E+6	
28 April	5.6E+6	1.7E+4	3.7E+3		7.0E+7	
29 April	4.0E+6	1.7E+4	3.9E+3		5.0E+8	

Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
23 April	10	3-4-4-1-1-1-0-0	11	4-4-4-1-0-2-0-0	18	4-5-4-1-1-2-1-1
24 April	5	1-1-0-0-1-3-2-2	3	2-1-1-1-0-1-1-1	4	2-1-1-0-1-2-2-2
25 April	4	2-2-1-1-2-1-1-0	3	2-1-0-0-1-2-2-0	5	3-1-0-0-2-2-1-1
26 April	4	2-0-0-0-1-3-2-1	3	2-0-0-2-1-1-1-1	6	2-0-0-0-2-3-2-2
27 April	10	2-2-2-2-3-3-2-3	14	1-1-1-4-4-3-2-4	16	3-1-1-3-2-4-4-4
28 April	20	4-4-4-3-3-3-3-3	43	4-4-5-7-5-4-3-3	26	5-5-4-4-3-4-4-3
29 April	16	5-3-3-3-2-1-2-3	20	3-4-4-5-3-3-2-2	23	5-5-5-4-2-2-2-3

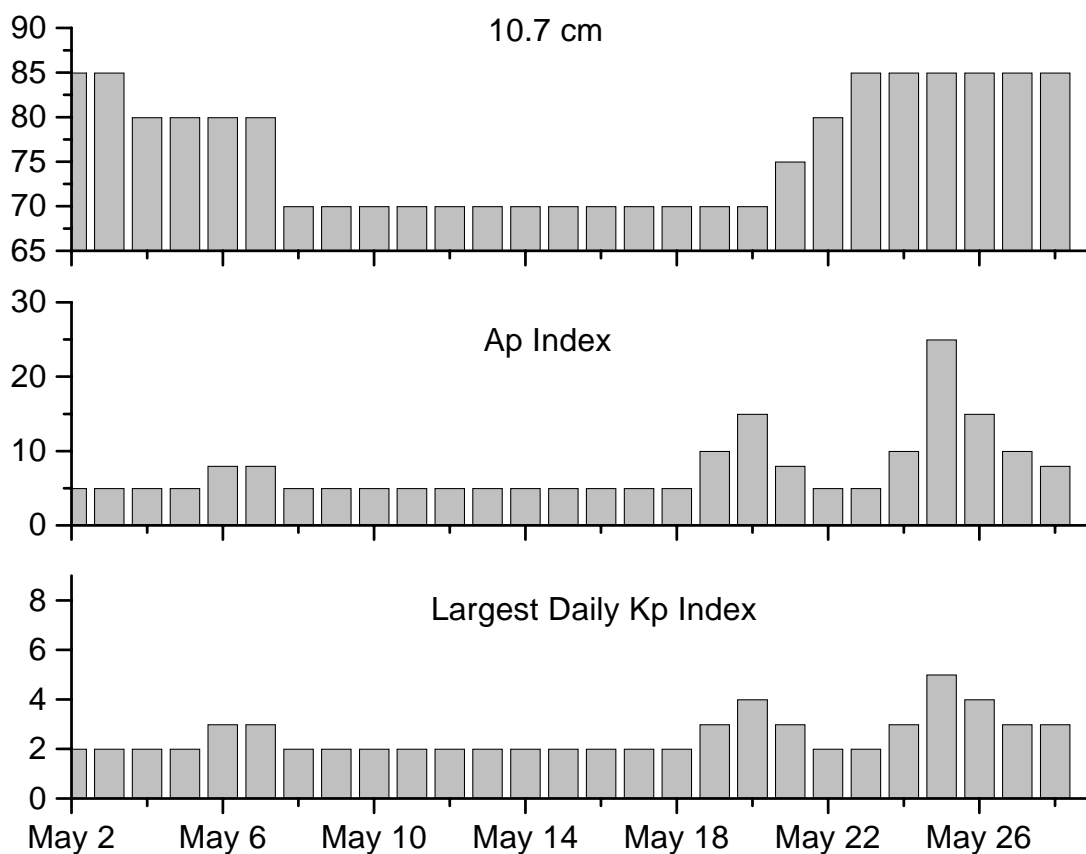


Alerts and Warnings Issued

Date & Time of Issue	Type of Alert or Warning	Date & Time of Event UTC
23 Apr 0222	ALERT: Geomagnetic K = 4	23 Apr 0220
23 Apr 0533	ALERT: Geomagnetic K = 5	23 Apr 0532
27 Apr 1719	WARNING: Geomagnetic K = 4	27 Apr 1719 – 28/1600
27 Apr 1720	ALERT: Geomagnetic K = 4	27 Apr 1720
27 Apr 2004	WATCH: Geomagnetic A \geq 20	28 Apr
27 Apr 2321	WARNING: Geomagnetic K = 5	27 Apr 2321 – 28/1600
28 Apr 0131	ALERT: Geomagnetic K = 5	28 Apr 0131
28 Apr 1513	EXTENDED WARNING: Geomagnetic K = 4	27 Apr 1719 – 28/2359
28 Apr 1532	ALERT: Electron 2MeV Integral Flux \geq 1000pfu	28 Apr 1510
28 Apr 2306	EXTENDED WARNING: Geomagnetic K = 4	27 Apr 1719 – 29/1600
29 Apr 0206	WARNING: Geomagnetic K = 5	29 Apr 0207 – 1600
29 Apr 0212	ALERT: Geomagnetic K = 5	29 Apr 0210
29 Apr 0513	ALERT: Electron 2MeV Integral Flux \geq 1000pfu	29 Apr 0512
29 Apr 1532	EXTENDED WARNING: Geomagnetic K = 4	27 Apr 1719 – 29/2359
29 Apr 2035	WARNING: Geomagnetic K = 5	29 Apr 2035 – 30/0600



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
02 May	85	5	2	16 May	70	5	2
03	85	5	2	17	70	5	2
04	80	5	2	18	70	5	2
05	80	5	2	19	70	10	3
06	80	8	3	20	70	15	4
07	80	8	3	21	75	8	3
08	70	5	2	22	80	5	2
09	70	5	2	23	85	5	2
10	70	5	2	24	85	10	3
11	70	5	2	25	85	25	5
12	70	5	2	26	85	15	4
13	70	5	2	27	85	10	3
14	70	5	2	28	85	8	3
15	70	5	2				



Energetic Events

Energy Events											
Date	Time			X-ray		Optical Information			Peak		Sweep Freq
	$\frac{1}{2}$			Integ		Imp/	Location	Rgn	Radio Flux		Intensity
	Begin	Max	Max	Class	Flux	Brtns	Lat CMD	#	245	2695	II IV

No Events Observed

Flare List

Date	Time			Optical	Imp / Brtns	Location Lat CMD	Rgn
	Begin	Max	End	X-ray Class.			
23 April	<i>No Flares Observed</i>						
24 April	1207	1210	1214	B1.0			953
	2243	2256	2306	C2.8			953
25 April	0410	0414	0417	B1.8			953
	0437	0442	0445	B2.3			953
	0520	0523	0526	B1.0			953
	0535	0545	0547	B4.0			953
	1155	1205	1217	B1.1			953
	1814	1817	1820	B1.0			953
26 April	0130	0138	0150	B1.4			
	2333	2336	2339	B1.1			
27 April	0406	0412	0425	B2.2			
	0440	0444	0450	B8.0	Sf	S13E60	953
	0517	0522	0529	B6.2			
	1426	1439	1449	B6.3			
	1828	1833	1838	B1.3			
	2028	2037	2043	B6.3			
	2057	2100	2103	B1.9			
	2136	2139	2144	B1.1			
	2233	2238	2242	B1.8			
28 April	0046	0056	0100	B1.0			
	0205	0208	0211	B1.0			
	0411	0416	0420	B2.3			
	1106	1109	1113	B1.1			
	1952	2008	2020	B1.7			
	2158	2203	2206	B1.3			
	2216	2223	2231	B1.7			
	2315	2320	2326	B2.0			
29 April	1034	1037	1040	B1.0			
	1047	1051	1055	B1.2			
	1435	1440	1443	B1.2			
	1451	1502	1509	B1.2			
	2027	2030	2034	B1.6			



Region Summary

Location			Sunspot Characteristics												
Date	(° Lat ° CMD)	Helio Lon	Flares												
			Area (10 ⁻⁶ hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical				
								C	M	X	S	1	2	3	4

Region 951

14 Apr S12E31	137	0010	01	Axx	001	A									
15 Apr S12E18	137														
16 Apr S12E05	137														
17 Apr S12W08	137	0000	00		000										
18 Apr S12W18	134	0010	01	Axx	001	A									
19 Apr S12W31	134														
20 Apr S12W44	134	0000	00		000										
21 Apr S12W57	134														
22 Apr S12W70	134														
23 Apr S12W83	134														
24 Apr S12W96	134														

0 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 137

Region 953

25 Apr S14E73	310	0230	04	Hsx	004	B									
26 Apr S10E61	309	0450	11	Hkx	007	A									
27 Apr S10E49	308	0500	07	Dkc	008	Bd					1				
28 Apr S10E36	308	0520	08	Dkc	010	Bg									
29 Apr S10E23	308	0500	05	Dki	008	Bgd									

0 0 0 1 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 308

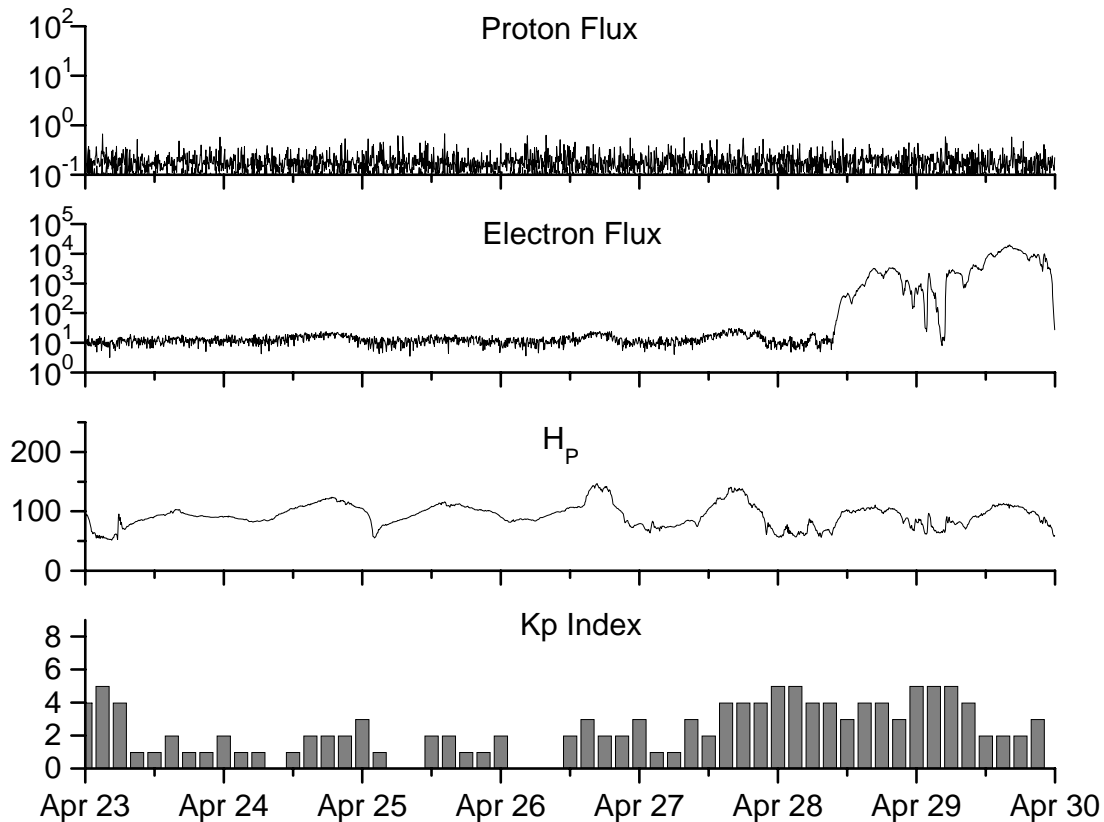


**Recent Solar Indices (preliminary)
of the observed monthly mean values**

Month	Sunspot Numbers			Radio Flux		Geomagnetic			
	Observed values	Ratio	Smooth values	*Penticton	Smooth	Planetary	Smooth		
	SEC	RI	RI/SEC	SEC	RI	10.7 cm	Value	Ap	Value
2005									
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	37.2	20.8	83.8	84.0	6	9.9
February	5.3	4.7	0.89	33.4	18.7	76.6	82.6	6	9.2
March	21.3	10.8	0.51	31.0	17.4	75.5	81.6	8	8.4
April	55.2	30.2	0.55	30.6	17.1	89.0	80.9	11	7.9
May	39.6	22.2	0.56	30.7	17.3	81.0	80.8	8	7.9
June	37.7	13.9	0.37	28.9	16.3	80.1	80.6	9	8.3
July	22.6	12.2	0.54	27.2	15.3	75.8	80.3	7	8.7
August	22.8	12.9	0.57	27.6	15.6	79.0	80.3	9	8.7
September	25.2	14.5	0.58	27.7	15.6	77.8	80.2	8	8.7
October	15.7	10.4	0.66	25.2	14.2	74.3	79.4	8	8.6
November	31.5	21.5	0.68			86.4		9	
December	22.2	13.6	0.61			84.3		15	
2007									
January	26.6	16.9	0.64			83.5		6	
February	17.2	10.6	0.62			77.8		6	
March	9.7	4.8	0.49			72.3		7	
April	6.9	3.7	0.54			72.4		9	

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 23 April 2007

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.

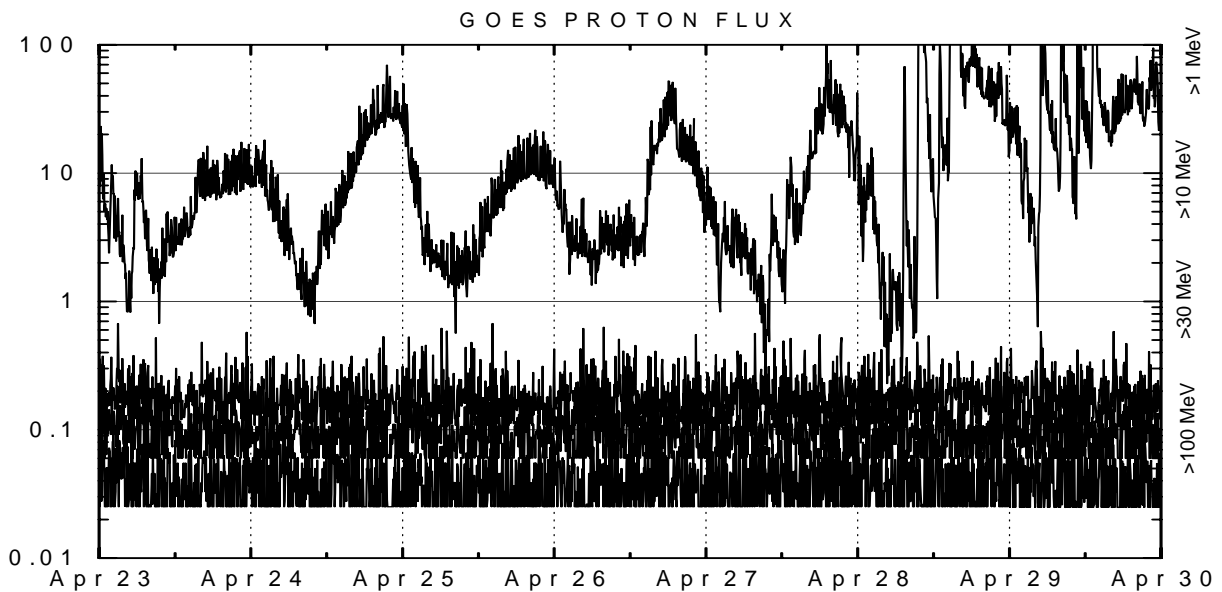
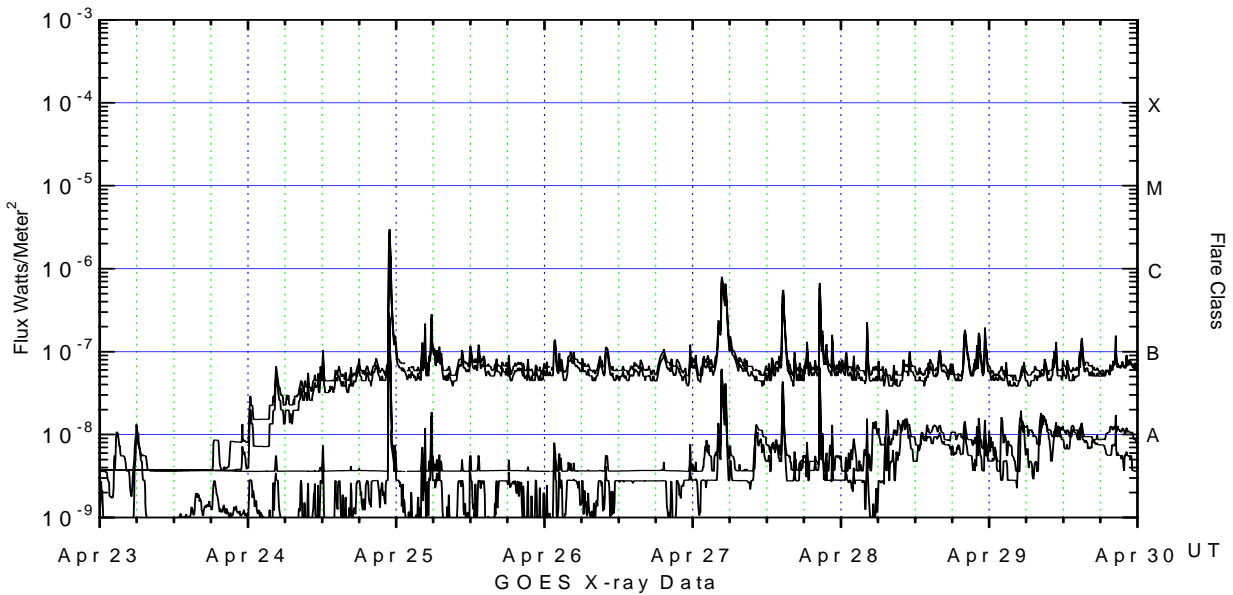
Electrons plot contains the five-minute averaged integral electron flux (electrons/cm²–sec–sr) with energies greater than 2 MeV at GOES-12 (W075).

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

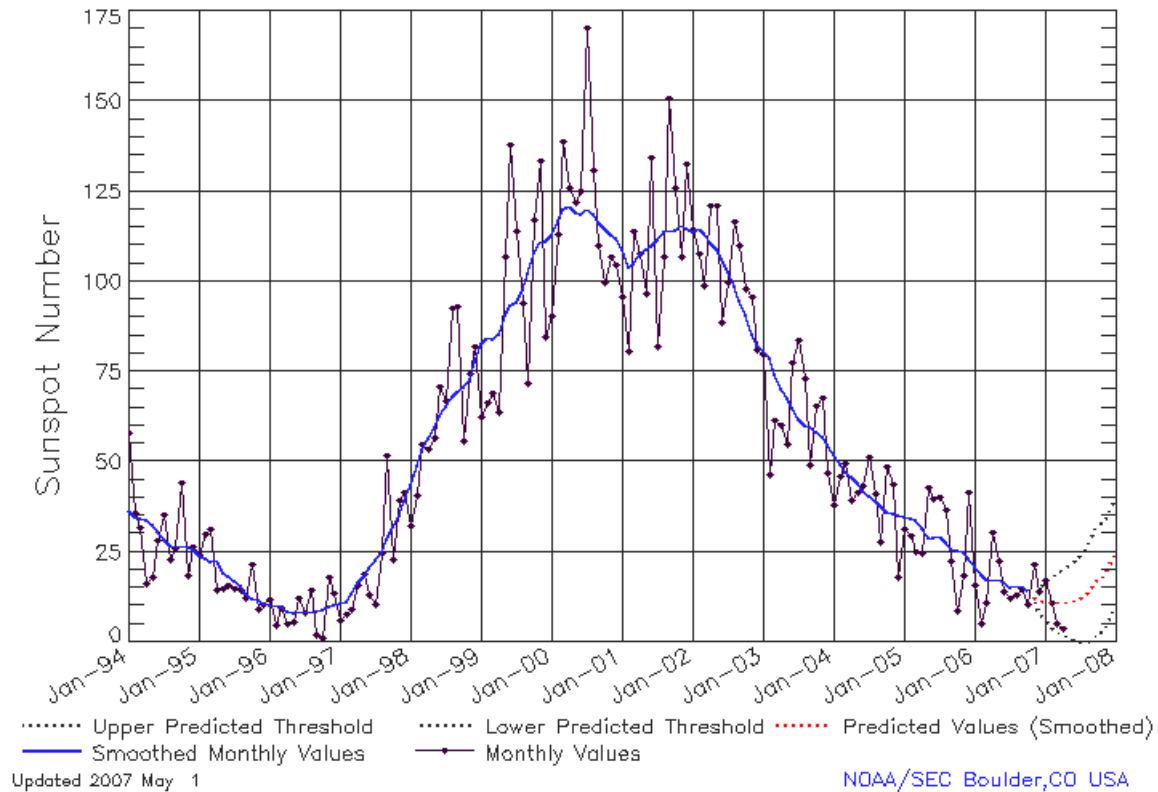
X-ray plot contains five-minute averaged x-ray flux (watts/m²) as measured by GOES 10 (W060) and GOES 11 (W135) in two wavelength bands, .05 -. 4 and .1 - .8 nm. The letters A, B, C, M and X refer to x-ray event levels for the .1 - .8 nm band.

Proton plot contains the five-minute averaged integral proton flux (protons/cm² –sec-sr) as measured by GOES-11 (W135) 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 Apr 07



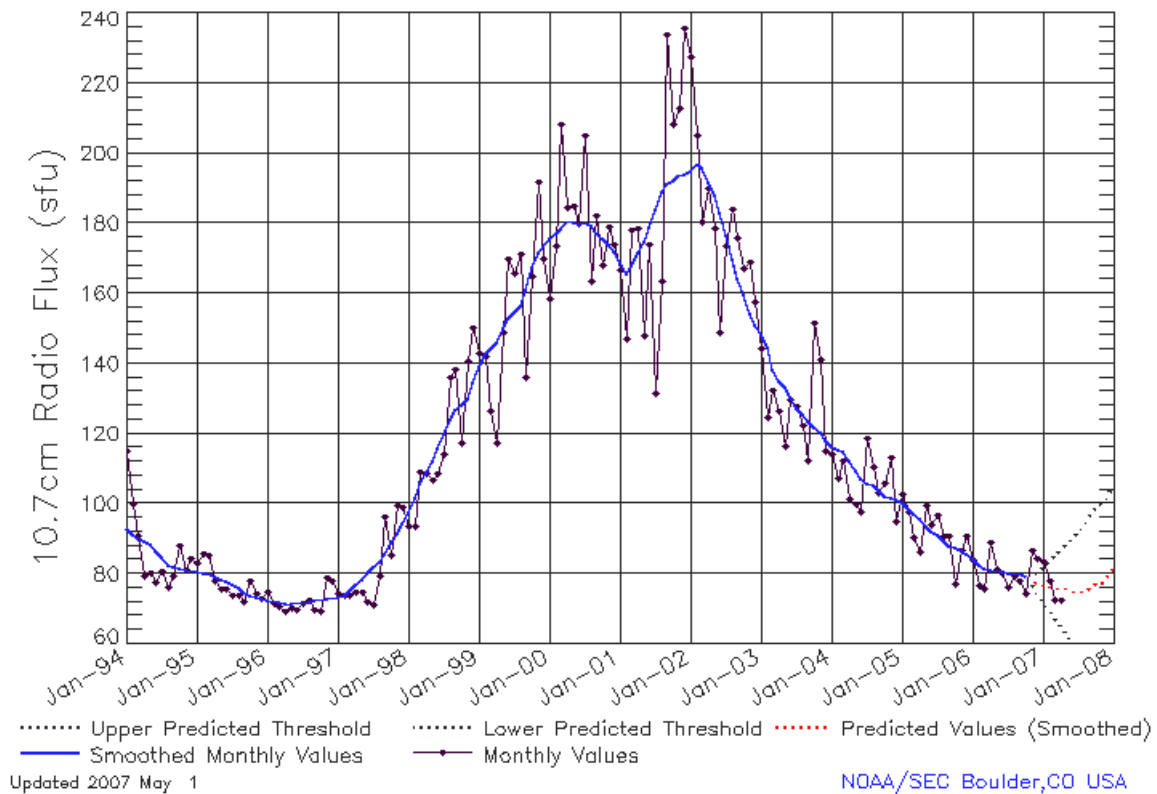
SEC Prediction of Smoothed Sunspot Number

	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	19	17	17	17	16	15	16	16	14	13	12
	(**)	(**)	(**)	(**)	(**)	(**)	(**)	(**)	(**)	(**)	(1)	(3)
2007	11	11	11	11	11	11	12	13	15	18	18	21
	(5)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(15)	(15)



ISES Solar Cycle F10.7cm Radio Flux Progression

Data Through 30 Apr 07



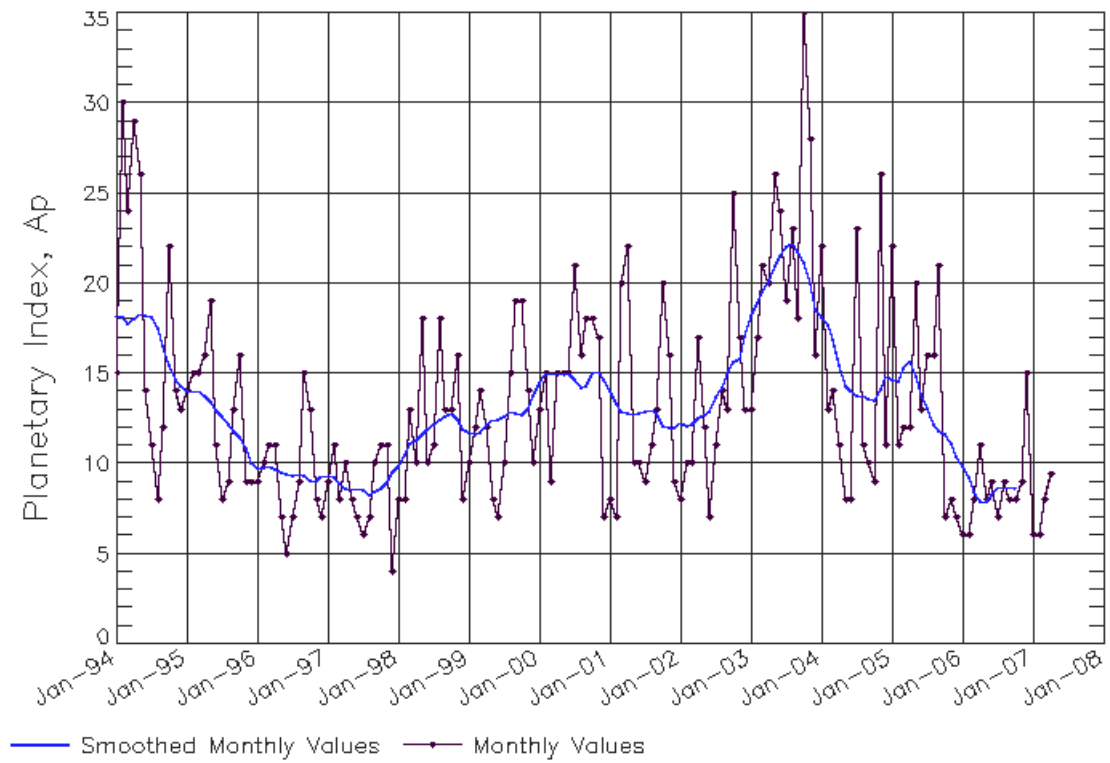
SEC Prediction of Smoothed F10.7cm Radio Flux

	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	83	82	81	81	81	80	80	80	79	78	78
	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(1)	(3)
2007	77	77	76	76	76	75	75	75	76	78	77	79
	(5)	(7)	(9)	(13)	(13)	(14)	(14)	(13)	(12)	(11)	(10)	(10)



ISES Solar Cycle Ap Progression

Data Through 30 Apr 07




Cosmic-Ray Ground-Level Events



Space
Environment
Center

April 2007
(Month 127)

 Preliminary data

Comparison of Cycles
at current month in cycle

