

**Space Weather Highlights**  
**26 March – 01 April 2007**

**SEC PRF 1648**  
**03 April 2007**

Solar activity was very low. Only a few B-class flares were observed from Region 949 (N06, L=331, class/area, Cso/040 on 29 March).

No proton events were observed at geosynchronous orbit.

No greater than 2 MeV electron events were observed at geosynchronous orbit.

The geomagnetic field ranged from quiet to active at middle latitudes while higher latitudes reached active to major storm conditions. The period began under the influence of a coronal hole high speed stream. Solar wind speed was increasing to around 510 km/s while the IMF Bz was variable between +/- 7 nT. By early on 26 March, solar wind speed was slowly declining until midday on 27 March when the wind speed increased sharply to around 580 km/s. During this time, the geomagnetic field was quiet to unsettled at middle latitudes while high latitudes were quiet to active with an isolated major storm period observed late on 26 March. By midday on 28 March, solar wind speed was decreasing as the high speed stream moved out of a geoeffective position. The geomagnetic field was mostly quiet until another coronal hole high speed stream moved into geoeffective position late on 31 March. Solar wind speed began increasing from a low of approximately 330 km/s to 590 km/s by the end of the period. The IMF Bz began fluctuating between +10/-12 nT before decreasing to +/- 7 nT. The geomagnetic field responded with unsettled to active conditions at middle latitudes with unsettled to major storm periods at high latitudes.

**Space Weather Outlook**  
**04 April – 30 April 2007**

Solar activity is expected to continue 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 04 – 07 April, 10 – 18 April, and again on 29 – 30 April.

Geomagnetic field activity is expected to be at quiet to unsettled levels during 04 – 07 April. Activity is expected to increase to unsettled to minor storm levels during 08 – 09 April with major storm periods possible at high latitudes due to a recurrent coronal hole high-speed stream. Quiet to unsettled conditions are expected 10 – 19 April. Quiet to active conditions are expected during 20 – 23 April with minor to major storm periods possible on 20 April due to a recurrent coronal hole high-speed stream. On 24 – 28 April, activity is expected to decrease to quiet to unsettled conditions. On 29 – 30 April, another recurrent coronal hole high-speed stream is expected to cause unsettled to minor storm conditions with unsettled to major storm periods possible at high latitudes.



### Daily Solar Data

Date	Radio Flux 10.7 cm	Sun spot No.	Sunspot Area (10 <sup>-6</sup> hemi.)	X-ray Background	Flares							
					X-ray Flux			Optical				
					C	M	X	S	1	2	3	4
26 March	74	17	30	<A1.0	0	0	0	0	0	0	0	0
27 March	73	11	20	<A1.0	0	0	0	0	0	0	0	0
28 March	75	23	80	<A1.0	0	0	0	0	0	0	0	0
29 March	74	14	40	<A1.0	0	0	0	0	0	0	0	0
30 March	74	13	10	<A1.0	0	0	0	0	0	0	0	0
31 March	73	15	20	<A1.0	0	0	0	1	0	0	0	0
01 April	72	13	50	<A1.0	0	0	0	0	0	0	0	0

### Daily Particle Data

Date	Proton Fluence (protons/cm <sup>2</sup> -day-sr)			Electron Fluence (electrons/cm <sup>2</sup> -day-sr)		
	>1 MeV	>10 MeV	>100 MeV	>.6 MeV	>2MeV	>4 MeV
26 March	2.3E+6	1.7E+4	3.7E+3		5.4E+6	
27 March	7.5E+5	1.7E+4	3.6E+3		7.6E+6	
28 March	7.8E+5	1.7E+4	3.9E+3		9.9E+6	
29 March	1.9E+6	1.7E+4	4.1E+3		1.6E+7	
30 March	1.4E+6	1.7E+4	3.9E+3		6.3E+6	
31 March	1.6E+6	1.7E+4	3.7E+3		4.8E+6	
01 April	1.3E+6	1.6E+4	3.7E+3		1.5E+6	

### Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
26 March	7	1-2-2-1-2-3-2-2	19	1-1-3-4-3-6-2-1	11	1-1-2-1-2-4-3-3
27 March	9	1-3-3-3-2-1-2-1	13	1-3-3-4-3-2-3-2	12	1-3-3-3-2-2-3-2
28 March	6	2-3-2-1-1-1-1-1	8	2-2-3-3-2-1-1-1	7	3-3-2-1-0-1-0-1
29 March	2	1-1-0-0-0-0-1-2	1	1-0-0-1-1-0-0-0	2	1-1-0-0-1-0-0-1
30 March	3	2-1-1-2-2-0-0-0	7	2-1-1-4-3-0-0-0	4	2-1-0-2-2-0-0-1
31 March	2	0-0-1-1-1-0-1-2	3	0-0-0-3-1-1-0-1	3	1-0-0-1-1-1-0-3
01 April	17	3-3-4-3-3-2-3-4	40	4-4-6-5-6-4-3-3	30	5-4-5-4-4-3-3-4

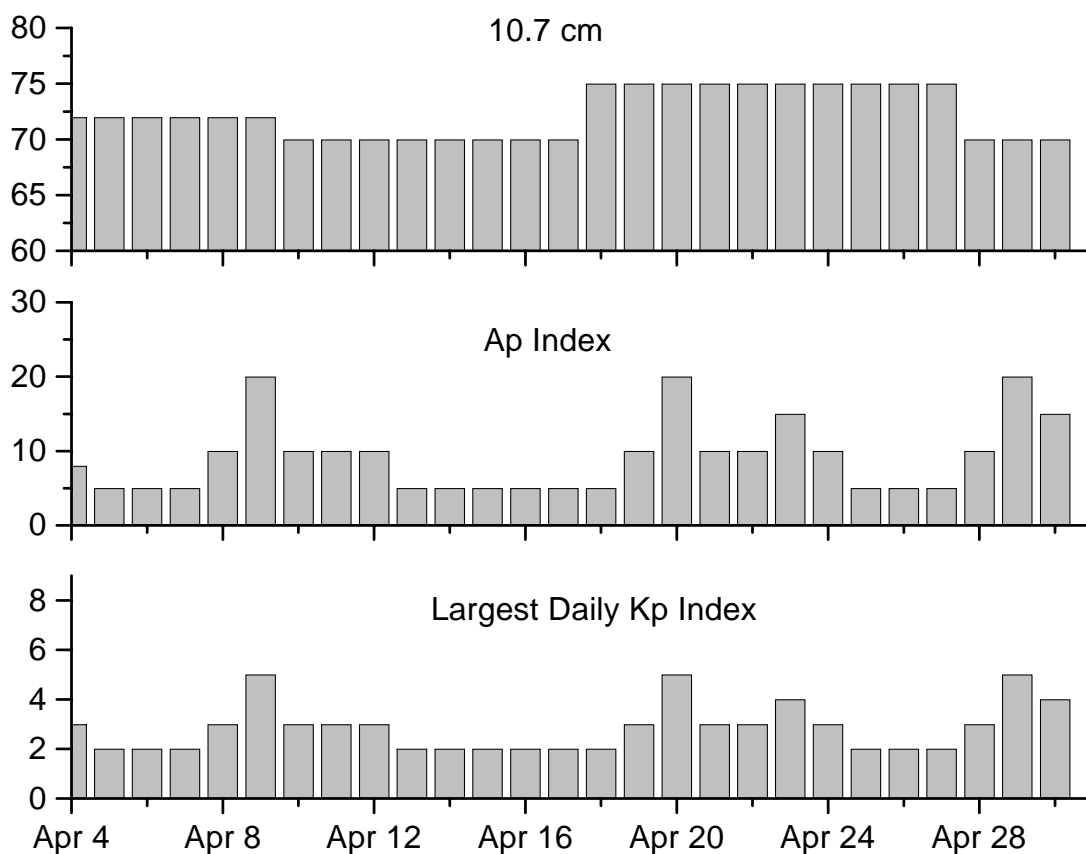


### *Alerts and Warnings Issued*

Date & Time of Issue	Type of Alert or Warning	Date & Time of Event UTC
26 Mar 1554	EXTENDED WARNING: Geomagnetic K = 4	24 Mar 0245 – 27/1600
28 Mar 0555	WARNING: Geomagnetic K = 4	28 Mar 0555 – 1600
28 Mar 0556	ALERT: Geomagnetic K = 4	28 Mar 0556
01 Apr 0041	WARNING: Geomagnetic K = 4	01 Apr 0050 – 1600
01 Apr 0145	ALERT: Geomagnetic K = 4	01 Apr 0142
01 Apr 0206	ALERT: Geomagnetic K = 5	01 Apr 0200
01 Apr 0853	WARNING: Geomagnetic K = 5	01 Apr 0900 – 1600
01 Apr 0857	ALERT: Geomagnetic K = 5	01 Apr 0857
01 Apr 1556	EXTENDED WARNING: Geomagnetic K = 4	01 Apr 0050 – 2000
01 Apr 2239	WARNING: Geomagnetic K = 4	01 Apr 2240 – 02/1600



# *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
04 Apr	72	8	3	18 Apr	75	5	2
05	72	5	2	19	75	10	3
06	72	5	2	20	75	20	5
07	72	5	2	21	75	10	3
08	72	10	3	22	75	10	3
09	72	20	5	23	75	15	4
10	70	10	3	24	75	10	3
11	70	10	3	25	75	5	2
12	70	10	3	26	75	5	2
13	70	5	2	27	75	5	2
14	70	5	2	28	70	10	3
15	70	5	2	29	70	20	5
16	70	5	2	30	70	15	4
17	70	5	2				



### ***Energetic 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.			
26 March	<i>No Flares Observed</i>						
27 March	<i>No Flares Observed</i>						
28 March	1316	1344	1357	B1.1			
	1925	1928	1932	B1.0			949
29 March	<i>No Flares Observed</i>						
30 March	<i>No Flares Observed</i>						
31 March	0137	0144	0153	B2.2	Sf	N06E33	949
01 April	<i>No Flares Observed</i>						

### ***Region Summary***

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

#### *Region 948*

26 Mar S02W44	103	0030	04	Dao	007	B									
27 Mar S02W56	102	0020	01	Axx	001	A									
28 Mar S02W70	103	0010	01	Axx	001	A									
29 Mar S02W83	103	0000	00		000										
								0	0	0	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 103

#### *Region 949*

28 Mar N07E62	331	0070	03	Hax	002	A									
29 Mar N06E48	331	0040	04	Cso	004	B									
30 Mar N07E34	332	0010	03	Bxo	003	B									
31 Mar N06E21	332	0020	05	Cso	005	B					1				
01 Apr N08E08	332	0050	04	Cro	003	B									
								0	0	0	1	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 332

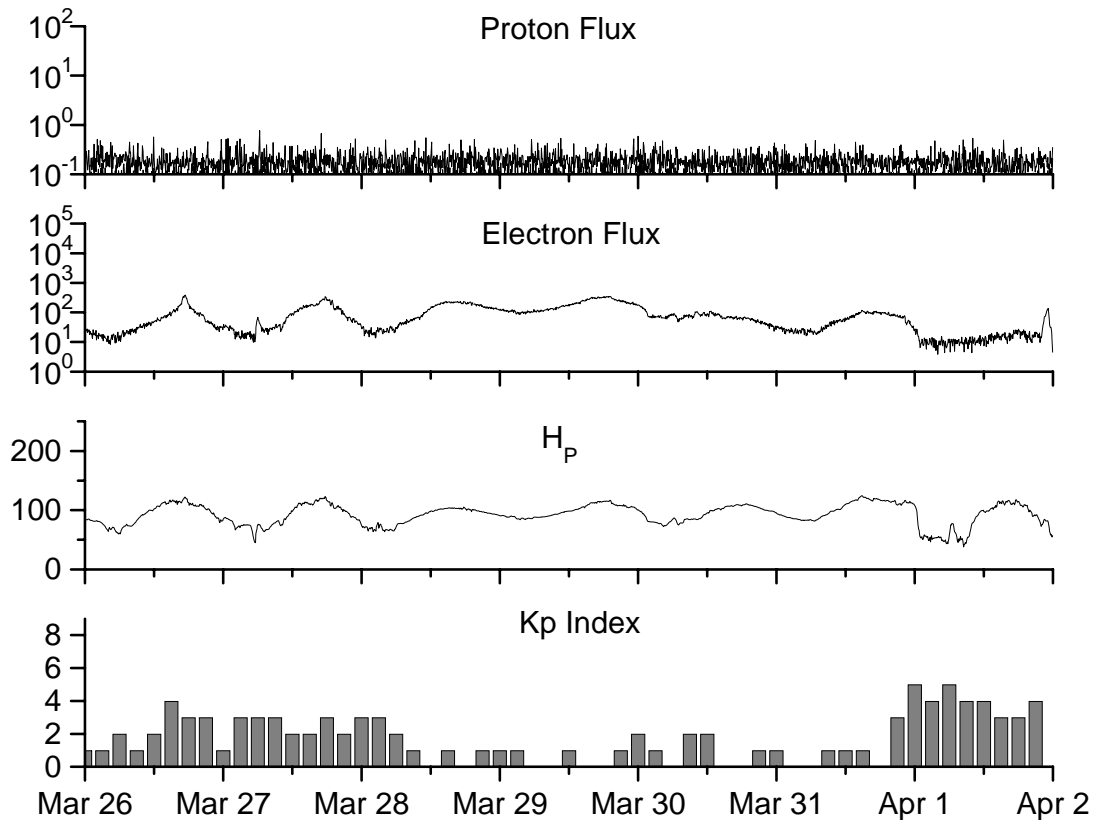


**Recent Solar Indices (preliminary)  
of the observed monthly mean values**

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									
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	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			74.3		8	
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	

**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 March 2007*

*Protons* plot contains the five-minute averaged integral proton flux (protons/cm<sup>2</sup>-sec-sr) as measured by GOES-11 (W135) for each of three energy thresholds: greater than 10, 50, and 100 MeV.

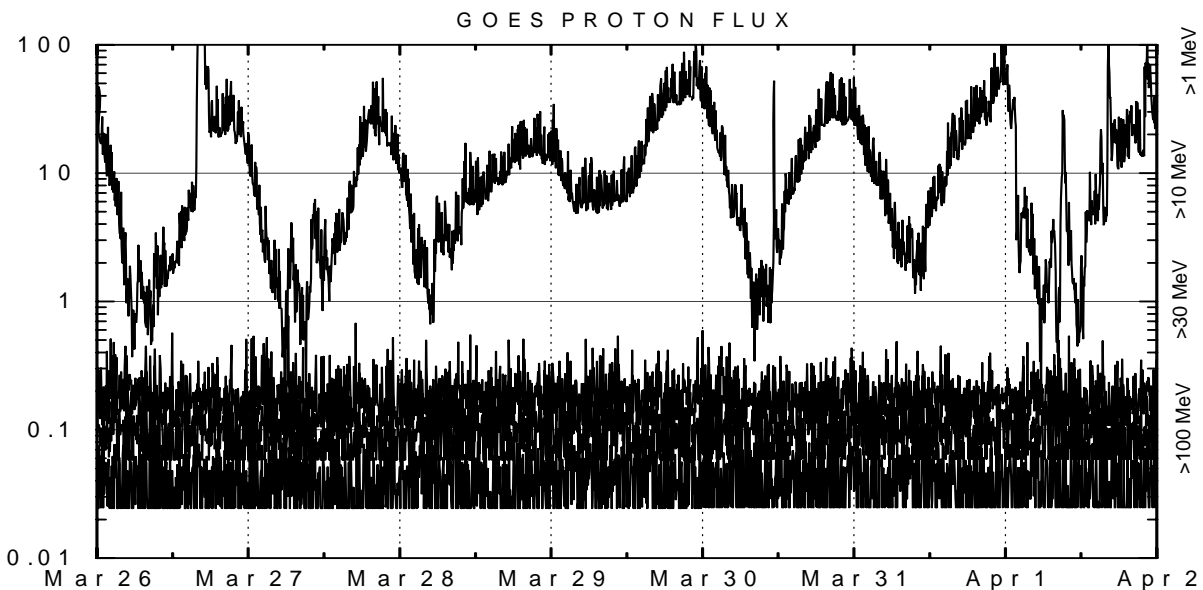
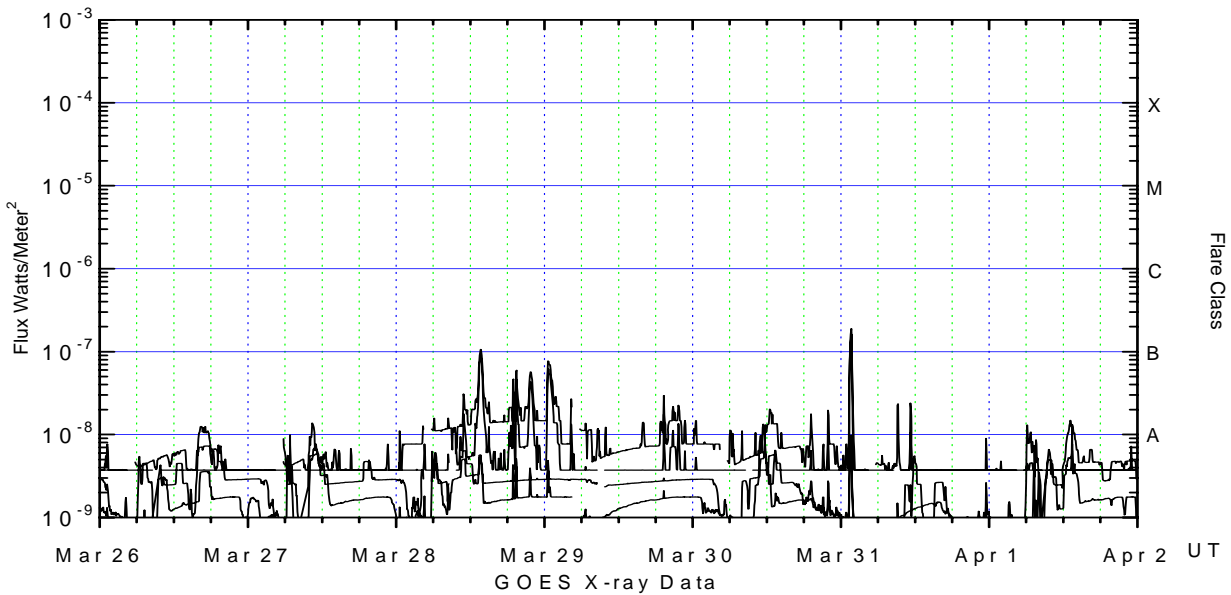
*Electrons* plot contains the five-minute averaged integral electron flux (electrons/cm<sup>2</sup>-sec-sr) with energies greater than 2 MeV at GOES-12 (W075).

*H<sub>p</sub>* 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<sub>p</sub>* 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<sub>p</sub> 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<sub>p</sub> 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<sup>2</sup>) as measured by GOES 12 (W075) 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.

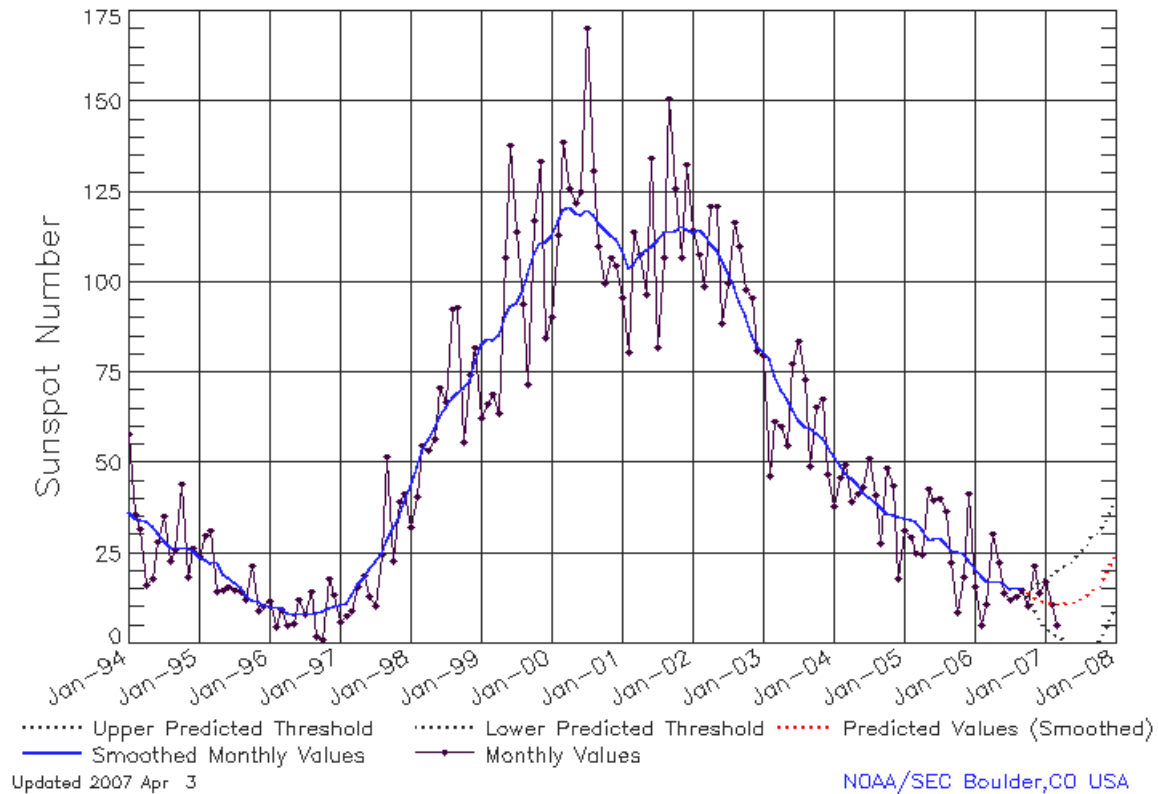
Proton plot contains the five-minute averaged integral proton flux (protons/cm<sup>2</sup>-sec-sr) as measured by GOES-11 (W135) for each of the energy thresholds: >1, >10, >30 and >100 MeV. P10 event threshold is 10 pfu (protons/cm<sup>2</sup>-sec-sr) at greater than 10 MeV.





# ISES Solar Cycle Sunspot Number Progression

Data Through 31 Mar 07



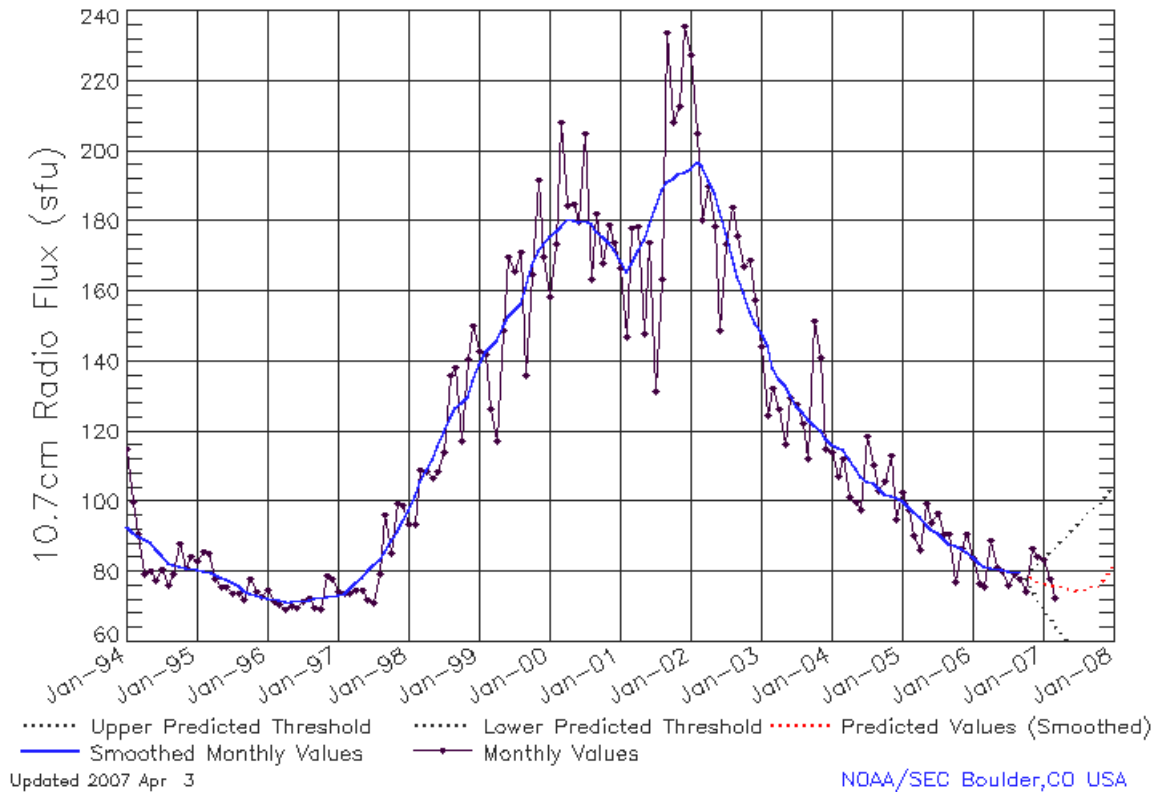
## SEC Prediction of Smoothed Sunspot Number

	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	<b>14</b>	<b>13</b>	<b>12</b>
	(**)	(**)	(**)	(**)	(**)	(**)	(**)	(**)	(**)	(1)	(3)	(5)
2007	<b>12</b>	<b>11</b>	<b>11</b>	<b>11</b>	<b>11</b>	<b>12</b>	<b>12</b>	<b>13</b>	<b>15</b>	<b>16</b>	<b>18</b>	<b>21</b>
	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(15)	(15)	(15)



# ISES Solar Cycle F10.7cm Radio Flux Progression

Data Through 31 Mar 07



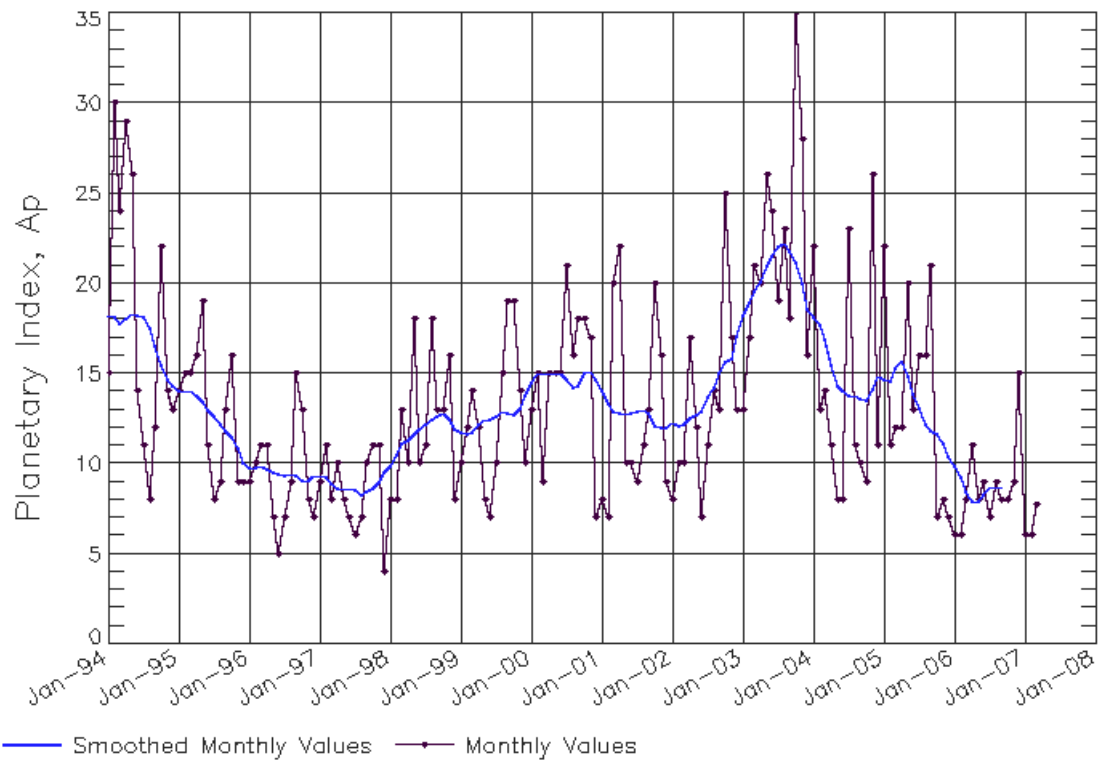
## SEC Prediction of Smoothed F10.7cm Radio Flux

	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	<b>79</b>	<b>78</b>	<b>77</b>
	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(1)	(3)	(5)
2007	<b>77</b>	<b>76</b>	<b>76</b>	<b>76</b>	<b>76</b>	<b>75</b>	<b>75</b>	<b>75</b>	<b>76</b>	<b>76</b>	<b>77</b>	<b>79</b>
	(7)	(9)	(13)	(13)	(14)	(14)	(13)	(12)	(11)	(10)	(10)	(10)



# ISES Solar Cycle Ap Progression

Data Through 31 Mar 07



Updated 2007 Apr 3

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



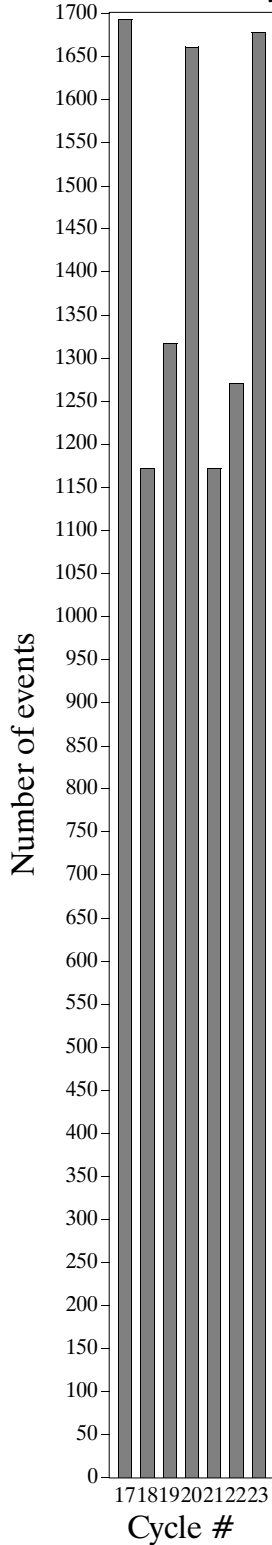
# Quiet ( $A_p \leq 7$ ) Geomagnetic Conditions



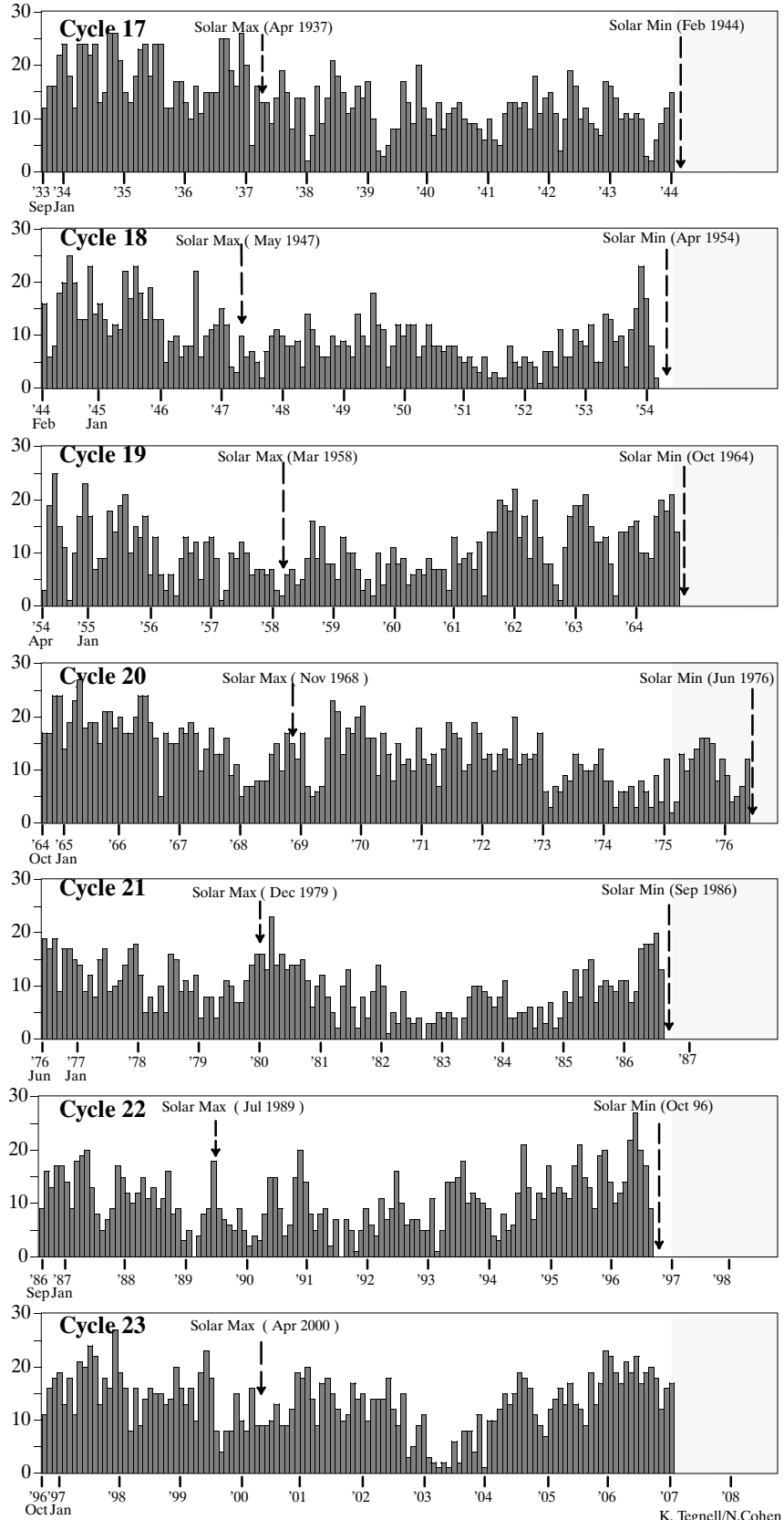
Space  
Environment  
Center

February 2007  
(Month 125)

Comparison of Cycles  
at current month in cycle



Number of events per month



K. Tegnell/N.Cohen