

Space Weather Highlights **25 April – 01 May 2005**

SWO PRF 1548
03 May 2005

Solar activity ranged from very low to low. New Region 756 (S06, L=229, class/area, Ekc/1030 on 28 April) rotated into view on the 25th and was the most active region on the disk. To date, seven C-class flares were observed from the region, the largest was an impulsive C5.3/sf at 26/0441 UTC. Since first rotating onto the disk, Region 756 exhibited rapid growth in both area and spot count and developed a solid delta structure just south of the large central spot. Another new region, Region 758 (S11, L=129, class/area, Dso/210 on 03 May), rotated onto the disk on 01 May and was responsible for two low-level C-class flares. Other activity of note included a partial halo CME detected by SOHO/LASCO C2 imagery at 25/2326 UTC that probably originated from an erupting filament in the southwest solar quadrant. A filament eruption was clearly seen on EIT imagery prior to the CME detection. Two weak halo CME's occurred on 30/1350 UTC and on 01/0050 UTC, both suspected back-sided events. These CME's were not expected to be geoeffective. The remainder of the disk and limb was quiet and stable.

Solar wind data were available from the NASA Advanced Composition Explorer (ACE) spacecraft during most of the summary period. Solar wind speed ranged from a low of near 320 km/s midday on 28 April to a high of about 710 km/s early on 01 May. The period began with solar wind speed elevated at near 550 km/s and the IMF Bz ranging between +/- 5 nT as effects from a weak coronal hole wind stream continued. These conditions persisted through midday on 25 April. Thereafter, through late on the 29th, wind speed gradually declined and the IMF Bz became mostly neutral, not varying much beyond +/- 3 nT. Late on the 29th, solar wind speed, temperature, and density all increased, while the IMF Bz oscillated through +/- 11 nT, all indicative of a co-rotating interactive region and the onset of a high speed coronal hole wind stream. These conditions persisted through the end of the summary period, though the IMF Bz relaxed somewhat midday on the 30th, not varying much beyond +/- 7 nT.

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

The greater than 2 MeV electron flux at geosynchronous orbit reached high levels on 01

The geomagnetic field ranged from quiet to major storm levels. The period began with the field mostly quiet to unsettled, with one isolated active period at middle latitudes early on the 25th, as effects from a weak coronal hole wind stream were still present. These conditions persisted through 25/1500 UTC. Thereafter, through late on the 29th, the field was quiet to unsettled. By 29/2100 UTC, levels increased to active, and by early on the 30th, levels were at active to minor storming, as a large, recurrent coronal hole high speed stream rotated into a geoeffective position. By 01 May, activity levels further increased to minor to major storming, but ended the summary period quiet to unsettled.

Space Weather Outlook **04 May - 30 May 2005**

Solar activity is expected to be at very low to low levels with a chance for M-class activity from Regions 756 and 758.

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 04 – 08 May, 10 – 16 May, and 28 – 30 May.

The geomagnetic field is expected to range from quiet to minor storm levels. Recurrent coronal hole high speed wind streams are expected to produce active to minor storm levels on 09 – 11 May, 17 May, and 27 – 28 May. 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
25 April	86	25	340	B1.0	0	0	0	0	0	0	0	0
26 April	91	20	550	B1.1	4	0	0	4	0	0	0	0
27 April	95	45	770	B1.2	0	0	0	0	0	0	0	0
28 April	98	71	1060	B1.3	1	0	0	4	0	0	0	0
29 April	105	46	930	B1.2	1	0	0	3	0	0	0	0
30 April	106	53	1060	B1.6	1	0	0	2	0	0	0	0
01 May	112	61	910	B2.4	2	0	0	2	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
	25 April	3.6E+5	1.5E+4	3.1E+3		2.2E+7
26 April	4.4E+5	1.4E+4	3.2E+3		3.6E+7	
27 April	4.6E+5	1.5E+4	3.3E+3		4.5E+7	
28 April	5.6E+5	1.5E+4	3.5E+3		4.6E+7	
29 April	3.9E+5	1.4E+4	3.3E+3		5.8E+6	
30 April	8.0E+5	1.4E+4	3.1E+3		1.6E+6	
01 May	1.4E+6	1.4E+4	3.0E+3		8.8E+7	

Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	25 April	9	2-4-3-1-2-0-1-2	9	2-3-3-3-3-1-0-1	11
26 April	2	1-0-0-1-1-0-1-1	1	0-0-0-1-0-0-1-1	5	1-0-1-1-2-2-2-1
27 April	1	0-0-0-1-1-1-0-0	1	0-0-0-1-1-0-0-0	4	1-0-0-1-2-2-2-1
28 April	1	0-0-0-0-1-0-1-0	1	0-0-0-0-1-0-1-0	4	0-0-1-1-2-1-2-1
29 April	8	0-1-2-1-2-1-3-4	12	0-1-3-3-3-3-3-3	12	1-1-3-2-2-2-4-4
30 April	13	3-2-2-3-3-3-3-3	24	4-3-3-4-5-4-3-3	21	5-4-3-3-4-3-3-3
01 May	14	3-4-3-3-3-2-2-2	36	4-4-6-6-4-4-3-2	26	5-6-4-3-3-3-3-2

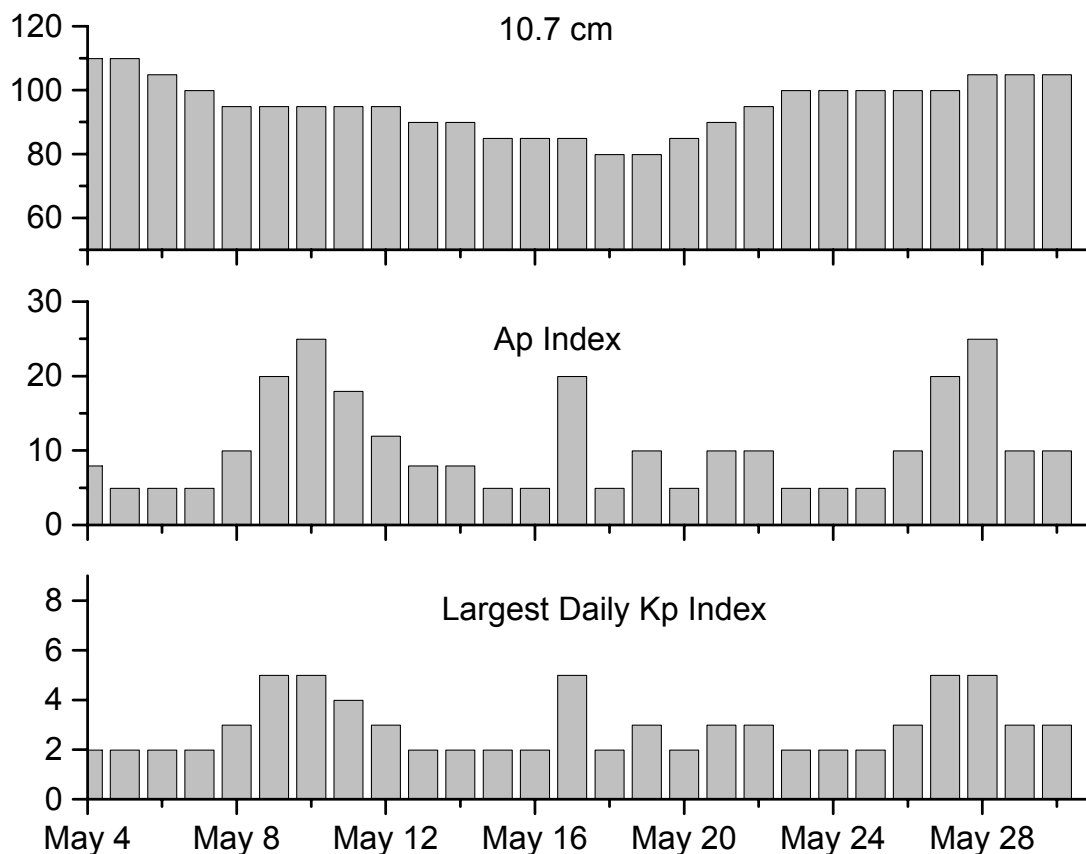


Alerts and Warnings Issued

<u>Date & Time of Issue</u>	<u>Type of Alert or Warning</u>	<u>Date & Time of Event UTC</u>
29 Apr 2058	WARNING: Geomagnetic K = 4	29 Apr 2057 -30 Apr 1600
29 Apr 2100	ALERT: Geomagnetic K = 4	29 Apr 2100
30 Apr 1617	WATCH: Geomagnetic A \geq 20	02 May
30 Apr 1624	WARNING: Geomagnetic K = 4	30 Apr 1625 - 2359
30 Apr 1657	CANCEL WATCH: Geomagnetic A \geq 20	02 May
30 Apr 1700	WATCH: Geomagnetic A \geq 20	01 May
01 May 0138	WARNING: Geomagnetic K = 4	01 May 0138 - 1500
01 May 0142	ALERT: Geomagnetic K = 4	01 May 0142
01 May 0209	WARNING: Geomagnetic K =5	01 May 0209 – 1500
01 May 0213	ALERT: Geomagnetic K = 5	01 May 0212
01 May 1342	ALERT: Electron 2MeV Integral Flux > 1000pfu	01 May 1325



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 May	110	8	2	18 May	80	5	2
05	110	5	2	19	80	10	3
06	105	5	2	20	85	5	2
07	100	5	2	21	90	10	3
08	95	10	3	22	95	10	3
09	95	20	5	23	100	5	2
10	95	25	5	24	100	5	2
11	95	18	4	25	100	5	2
12	95	12	3	26	100	10	3
13	90	8	2	27	100	20	5
14	90	8	2	28	105	25	5
15	85	5	2	29	105	10	3
16	85	5	2	30	105	10	3
17	85	20	5				



Energetic Events

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

No Events Observed

Flare List

Date	Time			Optical	Imp / Brtns	Location Lat CMD	Rgn
	Begin	Max	End	X-ray Class.			
25 April	0146	0150	0157	B1.5			
	0702	0706	0713	B7.1			
	0901	0905	0907	B1.8			
	2216	2225	2317	B2.3			756
26 April	0008	0011	0014	B1.9			756
	B0223	0229	0240	C1.2	Sf	S04E72	756
	0309	0317	0329	B3.6			
	B0429	0456	0608	C5.3	Sf	S04E70	756
	0528	0533	0544	C1.8			756
	0817	0824	0833	B6.2			756
	1236	1242	1246	B4.4			756
	1400	1404	1409	B1.8			
	1533	1543	1602	B2.2			756
	1811	1816	1821	B5.5	Sf	S05E62	756
27 April	2004	2008	2016	C1.8	Sf	S06E65	756
	2328	2333	2337	B2.0			756
	1004	1008	1012	B1.4			
	1914	1922	1934	B2.9			756
	2002	2005	2008	B2.0			
	2043	2055	2107	B4.3			756
	2215	2219	2222	B4.3			756
28 April	B0141	0145	0148	B2.6	Sf	S04E44	
	0223	0236	0250	C3.0			756
	B0256	0258	0301		Sf	S06E48	
	B0313	0317	0320		Sf	S04E46	
29 April	B0535	0540	0547	B5.9	Sf	S05E46	756
	0015	0022	0032	B4.8			
	B0035	0035	0041		Sf	S10E28	
	B0229	0238	0239		Sf	S10E27	
	0259	0304	0309	B1.8			
	0620	0624	0628	B2.1			756
	0643	0649	0655	B5.2			756
	0956	1000	1014	B2.4			756
	1852	1855	1858	B4.2			756
	2037	2037	2053	C1.7	Sf	S10E17	756
	2219	2223	2225	B3.2			756
	2258	2301	2303	B5.0			756



Flare List – continued.

Date	Time			Optical	Imp / Brtns	Location Lat CMD	Rgn
	Begin	Max	End	X-ray Class.			
30 April	0040	0043	0046	B4.4			756
	0129	0132	0139	B2.0			
	B0256	0259	0300	B7.9	Sf	S10E14	756
	0529	0535	0546	B2.6			756
	0833	0840	0845	B5.3			756
	1011	1015	1019	B5.0			757
	1823	1827	1836	C1.0	Sf	S10E04	756
	1849	1853	1855	B2.8			756
	2151	2155	2159	B4.1			756
	01 May	0037	0039	0045	B5.3	Sf	S06W26
0103		0118	0129	B7.0			757
0730		0733	0735	B3.4			
0810		0813	0815	B3.4			
1135		1139	1142	B5.9			756
1214		1217	1219	B4.4			
1506		1509	1519	B3.6			
1625		1638	1704	C1.9			
1734		1734	1739		Sf	S10W06	756
2026		2031	2036	B4.5			
2305	0007	0032	C2.2				

Region Summary

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	4	
<i>Region 755</i>																
17 Apr	S11E76	327	0030	02	Hax	001	A	3			1					
18 Apr	S11E67	323	0040	01	Hax	001	A									
19 Apr	S12E49	328	0020	03	Cao	003	B					1				
20 Apr	S12E37	327	0020	01	Hsx	001	A									
21 Apr	S12E21	330	0010	01	Hsx	001	A									
22 Apr	S11E09	329	0010	01	Hsx	001	A									
23 Apr	S12W02	326	0010	01	Axx	003	A									
24 Apr	S12W15	326														
25 Apr	S13W29	327	0010	01	Axx	001	A									
26 Apr	S13W41	327														
27 Apr	S13W54	326	0010	01	Bxo	004	B									
28 Apr	S12W67	326														
29 Apr	S12W80	326														
30 Apr	S12W93	326														
								3	0	0	1	1	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 326



Region Summary – continued.

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			
<i>Region 756</i>																		
25 Apr	S06E68	230	0330	06	Cko	004	B											
26 Apr	S06E55	230	0550	06	Dkc	010	Bd	4				4						
27 Apr	S06E42	230	0760	11	Ekc	021	Bd											
28 Apr	S06E29	229	1030	12	Ekc	044	Bd	1				1						
29 Apr	S06E17	228	0890	11	Ekc	021	Bd	1				1						
30 Apr	S07E01	231	1000	12	Ekc	027	Bd	1				2	1					
01 May	S06W11	230	0810	11	Ekc	033	Bd					1						
								7	0	0	0	9	1	0	0	0	0	0
Still on Disk.																		
Absolute heliographic longitude: 231																		
<i>Region 757</i>																		
28 Apr	S05E03	255	0030	05	Dao	007	B											
29 Apr	S05W10	255	0040	06	Dso	005	B											
30 Apr	S06W23	255	0060	07	Dso	006	B											
01 May	S06W38	257	0100	06	Dao	008	B					1						
								0	0	0	0	1	0	0	0	0	0	0
Still on Disk.																		
Absolute heliographic longitude: 255																		

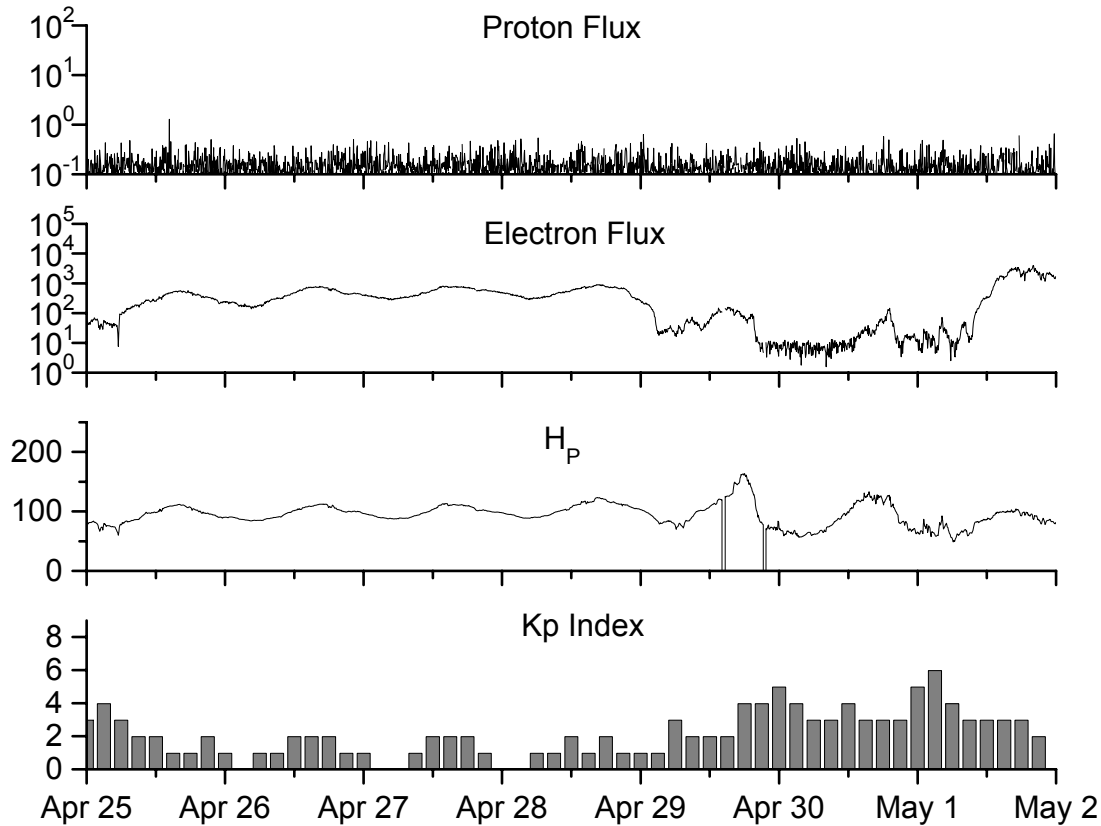


**Recent Solar Indices (preliminary)
of the observed monthly mean values**

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									
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	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			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	
March	41.0	24.8	0.60			90.0		12	
April	41.5	24.4	0.59			85.9		12	

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 25 April 2005

Protons plot contains the five-minute averaged integral proton flux (protons/cm²-sec-sr) as measured by GOES-11 (W113) for each of three energy thresholds: greater than 10, 50, and 100 MeV.

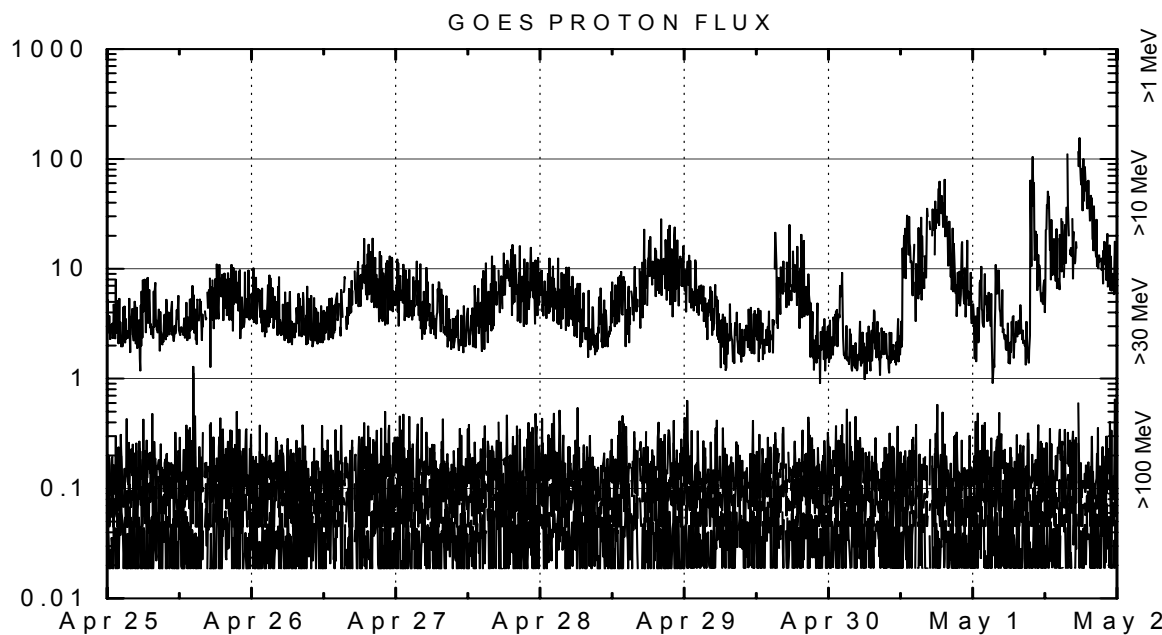
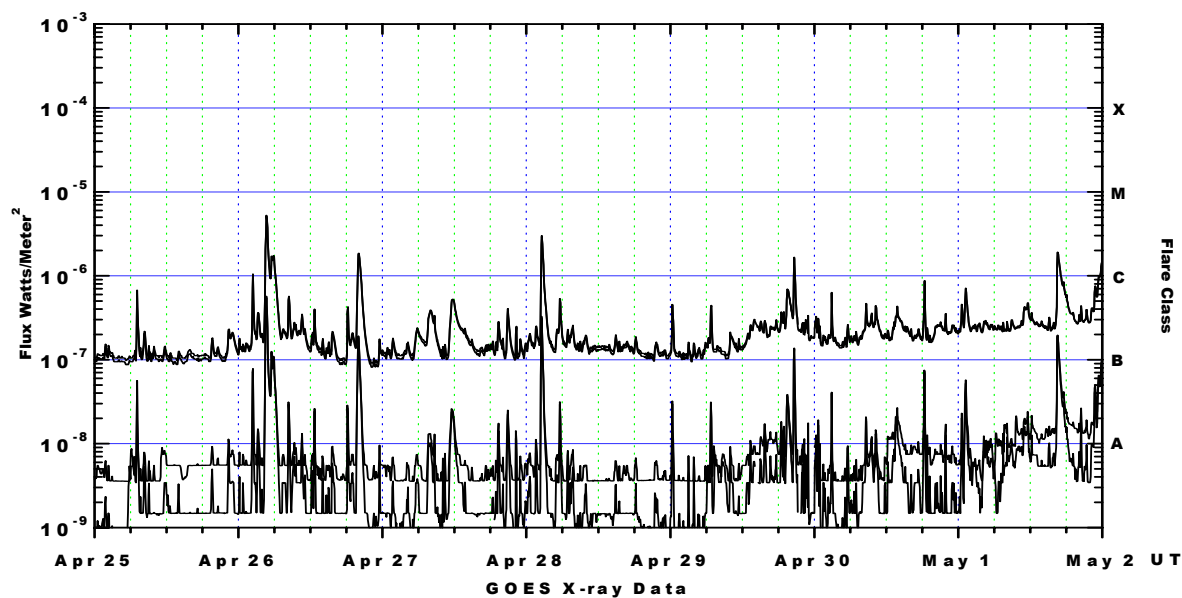
Electrons plot contains the five-minute averaged integral electron flux (electrons/cm²-sec-sr) with energies greater than 2 MeV at GOES-12 (W75).

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

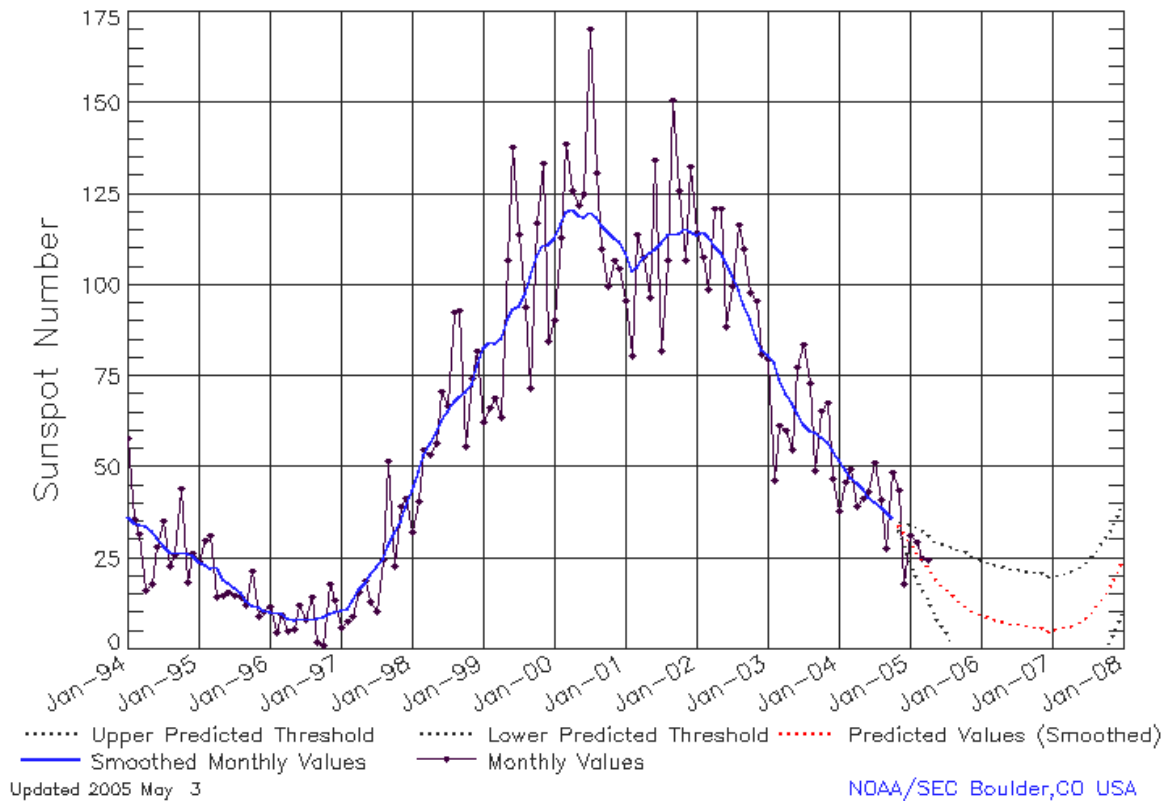
X-ray plot contains five-minute averaged x-ray flux (watts/m²) as measured by GOES 12 (W75) and GOES 10 (W135) in two wavelength bands, .05 - .4 and .1 - .8 nm. The letters A, B, C, M and X refer to x-ray event levels for the .1 - .8 nm band.

Proton plot contains the five-minute averaged integral proton flux (protons/cm²-sec-sr) as measured by GOES-11 (W113) 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 05



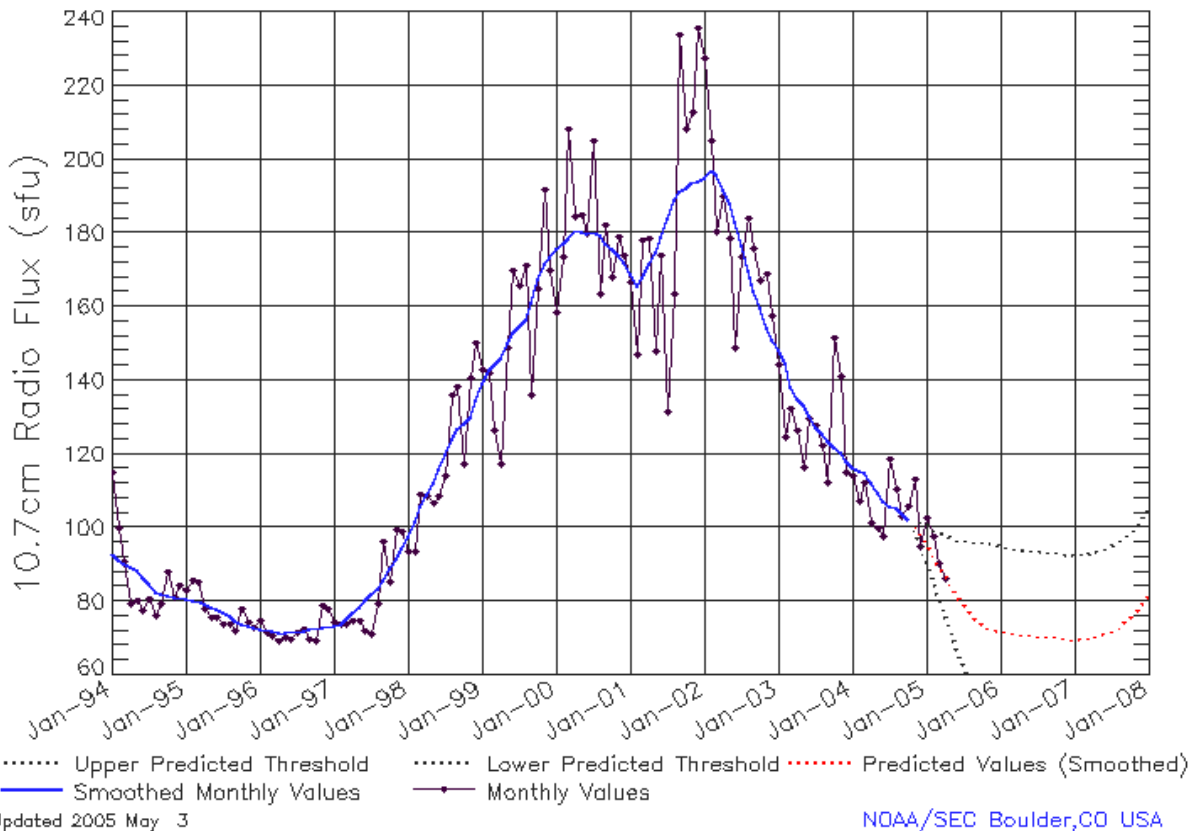
SEC Prediction of Smoothed Sunspot Number

	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	38	36	34	32
	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(1)	(3)
2005	29	27	25	23	20	18	17	15	14	12	11	10
	(5)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(15)	(15)
2006	10	9	8	8	8	7	7	7	7	6	6	5
	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)
2007	5	6	6	6	7	8	10	11	13	16	18	21
	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)



ISES Solar Cycle F10.7cm Radio Flux Progression

Data Through 30 Apr 05



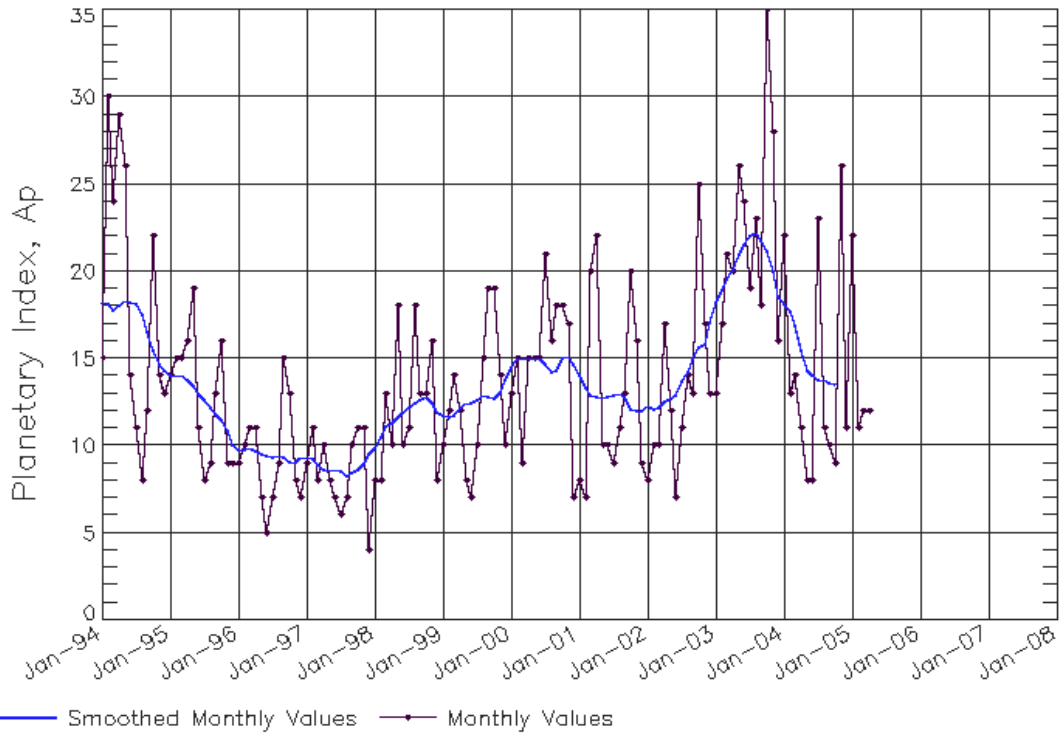
SEC Prediction of Smoothed F10.7cm Radio Flux

	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 (***)	104 (***)	102 (***)	101 (1)	99 (3)
2005	96 (5)	93 (7)	90 (9)	87 (11)	84 (13)	82 (15)	79 (17)	77 (19)	75 (21)	74 (22)	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 Apr 05



Updated 2005 May 3

NOAA/SEC Boulder, CO USA

