

Space Weather Highlights
04 May - 10 May 2009

SWO PRF 1758
12 May 2009

Solar activity was very low. No flares were observed during 04 – 07 May. Four B1 X-ray flares were observed during 08 – 10 May. The visible disk was spotless.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit was at normal levels during the period.

Geomagnetic field activity was at predominantly quiet levels during 02 - 06 May. Field activity increased to quiet to active levels during 07 - 08 May, with isolated minor storm periods observed at high latitudes, due to the influence of a coronal hole high-speed stream (CH HSS). ACE solar wind velocities increased from 414 km/s at 07/1803 UTC to a high of 527 km/s at 08/1136 UTC. During this period, the Bz component of the IMF varied between -5 nT and +5 nT. Field activity decreased to predominantly quiet levels on 09 - 10 May, and solar wind velocities gradually decreased to 415 km/s at the end of the forecast period.

Space Weather Outlook
13 May – 08 June 2009

Solar activity is expected to be very low.

No proton events are expected at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to be at normal flux levels.

Geomagnetic field activity is expected to be at mostly quiet levels through 14 May. Activity is expected to increase to quiet to unsettled levels on 15 May, due to a recurrent CH HSS. Activity is expected to decrease to predominantly quiet levels during 16 May – 02 June. Quiet to active conditions, with isolated major storm levels possible at high latitudes, are expected during 02 – 04 June, due to a recurrent CH HSS. Predominantly quiet conditions are expected during 05 – 08 June.

Notice: On May 8, 2009 the Solar Cycle 24 Prediction Panel released a consensus decision on the prediction of the next solar cycle (Cycle 24). See <http://www.swpc.noaa.gov/SolarCycle/> for more details. The updated Solar Cycle plots and prediction tables are included in this issue.



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
04 May	68	0	0	<A1.0	0	0	0	0	0	0	0	0
05 May	68	0	0	<A1.0	0	0	0	0	0	0	0	0
06 May	69	0	0	<A1.0	0	0	0	0	0	0	0	0
07 May	70	0	0	<A1.0	0	0	0	0	0	0	0	0
08 May	71	0	0	<A1.0	0	0	0	0	0	0	0	0
09 May	72	0	0	<A1.0	0	0	0	0	0	0	0	0
10 May	72	0	0	<A1.0	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
04 May	4.4e+05	2.0e+04	4.7e+03		1.4e+05	
05 May	7.4e+05	2.0e+04	4.5e+03		2.0e+05	
06 May	7.6e+05	2.0e+04	4.3e+03		1.3e+05	
07 May	6.3e+05	2.0e+04	4.3e+03		1.5e+05	
08 May	7.7e+05	1.9e+04	4.0e+03		3.5e+06	
09 May	5.5e+05	1.9e+04	4.2e+03		7.6e+06	
10 May	6.2e+05	1.9e+04	4.2e+03		1.7e+07	

Daily Geomagnetic Data

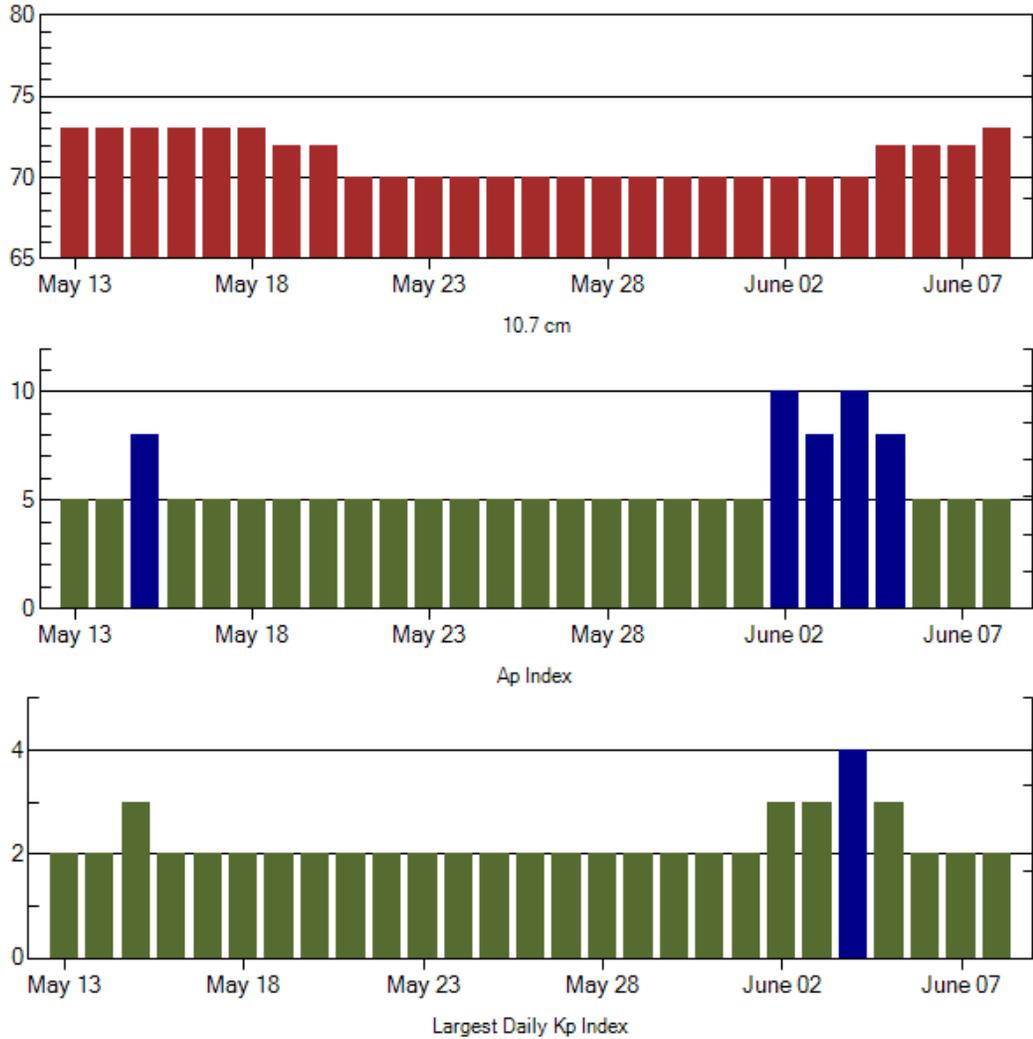
Date	Middle Latitude		High Latitude		Estimated	
	Fredericksburg		College		Planetary	
	A	K-indices	A	K-indices	A	K-indices
04 May	2	0-1-1-1-1-0-0-0	3	1-1-1-3-1-0-0-0	4	1-1-1-2-1-1-1-1
05 May	2	0-0-0-1-1-0-0-2	0	0-0-0-0-0-0-0-1	2	0-0-0-0-1-2-1-2
06 May	6	2-2-1-1-2-1-2-2	3	2-1-0-1-1-1-1-1	6	2-1-1-1-2-2-2-3
07 May	7	3-3-1-1-1-1-2-2	7	3-2-2-3-1-2-1-1	10	2-4-1-2-2-2-1-3
08 May	12	4-3-4-1-2-1-2-2	23	4-5-5-4-4-1-1-1	13	4-4-4-1-2-2-2-2
09 May	6	0-2-1-2-2-2-2-2	11	0-2-3-5-2-2-1-0	6	1-2-1-2-2-2-1-2
10 May	3	0-2-0-1-2-1-1-1	4	1-2-1-1-2-1-0-1	4	1-2-0-0-1-0-2-2

Alerts and Warnings Issued

Date & Time of Issue	Type of Alert or Warning	Date & Time of Event UTC
08 May 0142	WARNING: Geomagnetic K = 4	08 May 0141 - 1600
08 May 0152	ALERT: Geomagnetic K = 4	08 May 0151



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
13 May	73	5	2	27 May	70	5	2
14	73	5	2	28	70	5	2
15	73	8	3	29	70	5	2
16	73	5	2	30	70	5	2
17	73	5	2	31	70	5	2
18	73	5	2	01 Jun	70	5	2
19	72	5	2	02	70	10	3
20	72	5	2	03	70	8	3
21	70	5	2	04	70	10	4
22	70	5	2	05	72	8	3
23	70	5	2	06	72	5	2
24	70	5	2	07	72	5	2
25	70	5	2	08	73	5	2
26	70	5	2				



Energetic Events

Date	Time			X-ray	Optical Information			Peak		Sweep Freq			
			½	Integ	Imp/	Location		Rgn	Radio Flux		Intensity		
	Begin	Max	Max	Class	Flux	Brtns	Lat	CMD	#	245	2695	II	IV
08 May	0429	0430	0430							210			
09 May	1613	1614	1614							150			
09 May	1948	1948	1948							250			

Flare List

Date	Time			X-ray	Imp /	Optical	Rgn
	Begin	Max	End	Class.	Brtns	Location	
				Lat	CMD		
04 May	No Flares Observed						
05 May	No Flares Observed						
06 May	No Flares Observed						
07 May	No Flares Observed						
08 May	2122	2127	2130	B1.8			
09 May	0128	0133	0137	B1.5			
10 May	0300	0304	0307	B1.4			
	1212	1216	1221	B1.2			

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

No Active Regions.



Recent Solar Indices (preliminary)
Of the observed monthly mean values

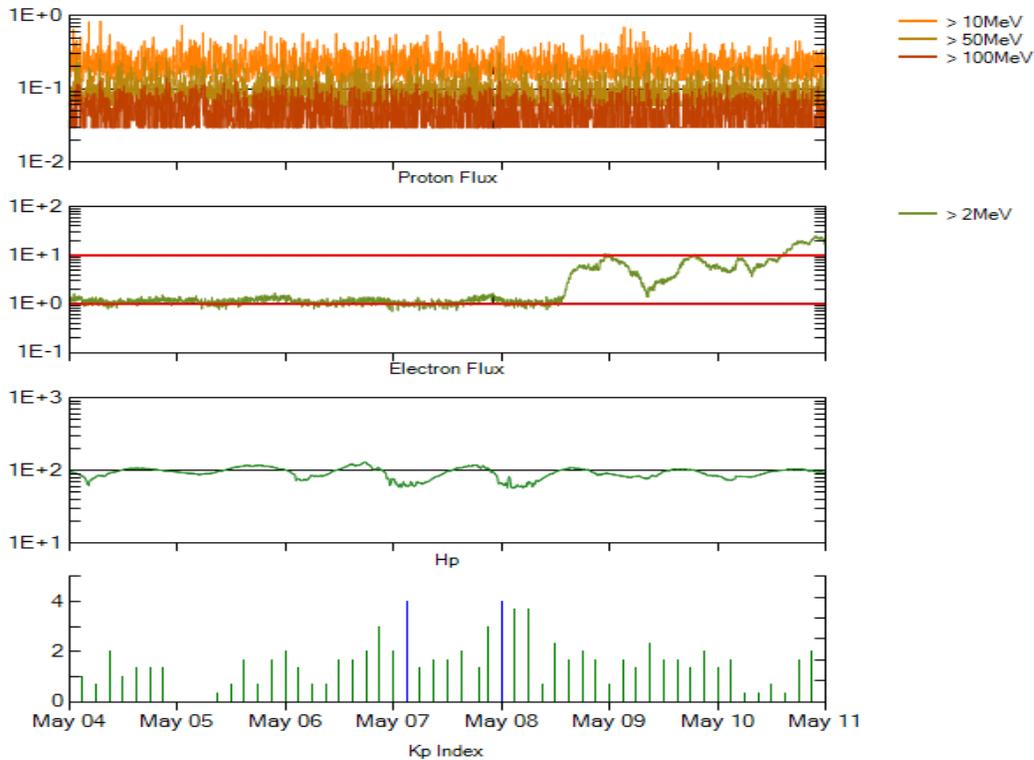
Month	Sunspot Numbers			Radio Flux		Geomagnetic			
	Observed SEC	values RI	Ratio RI/SEC	Smooth SEC	values RI	*Penticton 10.7 cm	Smooth Value	Planetary Ap	Smooth Value
2007									
May	19.4	11.7	0.60	14.2	8.7	74.5	74.2	9	8.4
June	20.0	12.0	0.60	12.8	7.7	73.7	73.2	7	7.8
July	15.6	10.0	0.64	11.6	7.0	71.6	72.5	8	7.4
August	9.9	6.2	0.63	10.2	6.1	69.2	71.8	7	7.6
September	4.8	2.4	0.50	9.9	5.9	67.1	71.5	9	7.8
October	1.3	0.9	0.70	10.0	6.1	65.5	71.5	9	7.9
November	2.5	1.7	0.68	9.4	5.7	69.7	71.1	5	7.8
December	16.2	10.1	0.62	8.1	5.0	78.6	70.5	4	7.8
2008									
January	5.1	3.4	0.67	6.9	4.2	72.1	70.0	6	7.7
February	3.8	2.1	0.55	5.9	3.6	71.2	69.6	9	7.6
March	15.9	9.3	0.58	5.3	3.3	72.9	69.5	10	7.4
April	4.9	2.9	0.59	5.3	3.3	70.3	69.6	9	7.1
May	5.7	2.9	0.51	5.7	3.5	68.4	69.7	6	6.9
June	4.2	3.1	0.74	5.2	3.2	65.9	69.2	7	6.8
July	1.0	0.5	0.50	4.5	2.7	65.8	68.8	6	6.6
August	0.0	0.5	**	4.4	2.6	66.4	68.6	5	6.2
September	1.5	1.1	0.73	3.7	2.2	67.1	68.4	5	5.8
October	5.2	2.9	0.56	2.9	1.8	68.3	68.2	6	5.4
November	6.8	4.1	0.60			68.6		3	
December	1.3	0.8	0.62			69.2		2	
2009									
January	2.8	1.5	0.54			69.8		3	
February	2.5	1.4	0.56			70.0		4	
March	0.7	0.7	1.00			69.2		4	
April	1.2	1.2	1.00			69.7		4	

NOTE: All smoothed and monthly values are preliminary estimates.

Cycle 23 started in May 1996 with an RI=8.0. Cycle 23 maximum was April 2000 with an RI=120.8.

**SWPC sunspot number was less than RI value, so a ratio could not be computed.





*Weekly Geosynchronous Satellite Environment Summary
Week Beginning 04 May 2009*

GOES-11 designated Primary Electron Satellite and GOES-10 Secondary: December 1, 2008 the GOES-12 Electron sensor began experiencing periods of noise and sensor is unreliable.

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.

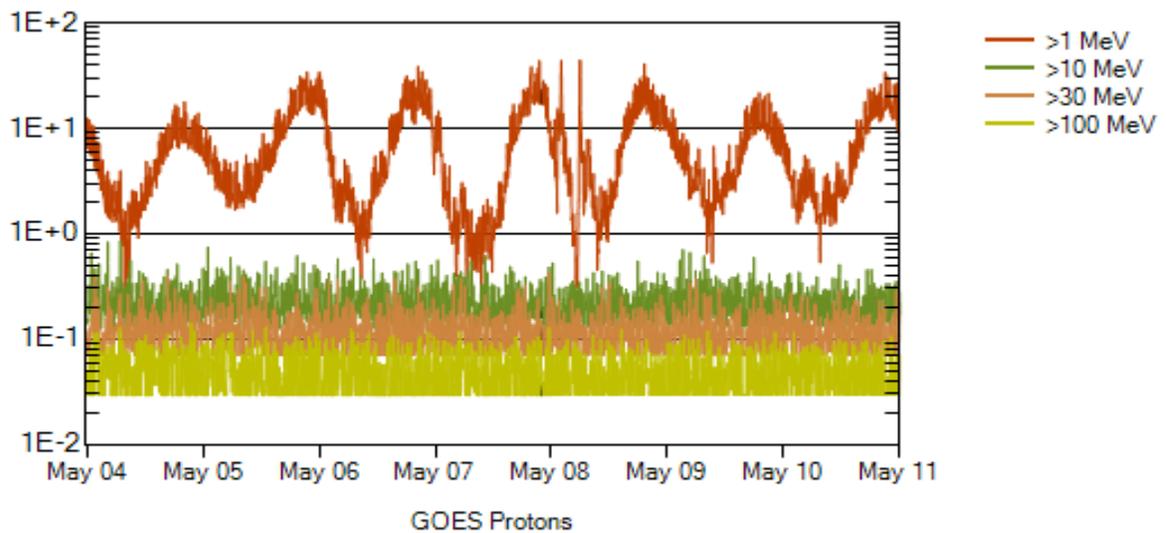
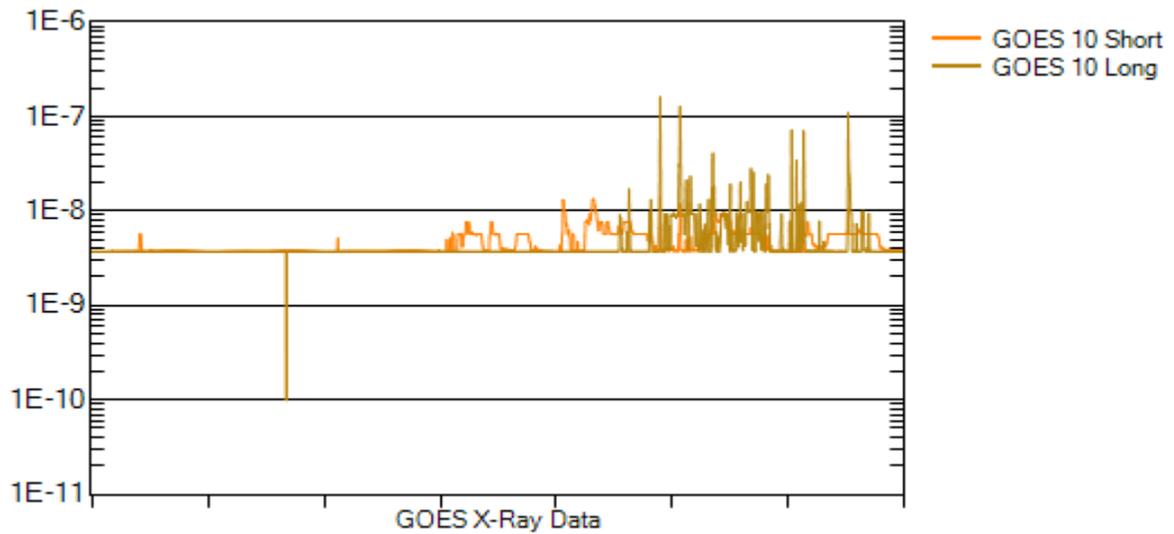
Electrons plot contains the five-minute averaged integral electron flux (electrons/cm²-sec-sr) with energies greater than 2 MeV at GOES-11 (W135).

Hp plot contains the five minute averaged magnetic field H - component in nanoteslas (nT) as measured by GOES-11. The H component is parallel to the spin axis of the satellite, which is nearly parallel to the Earth's rotation axis.

Kp 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 Kp values derived from a more extensive network of magnetometers.

The data included here are those now available in real time at the SWPC 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 Kp 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

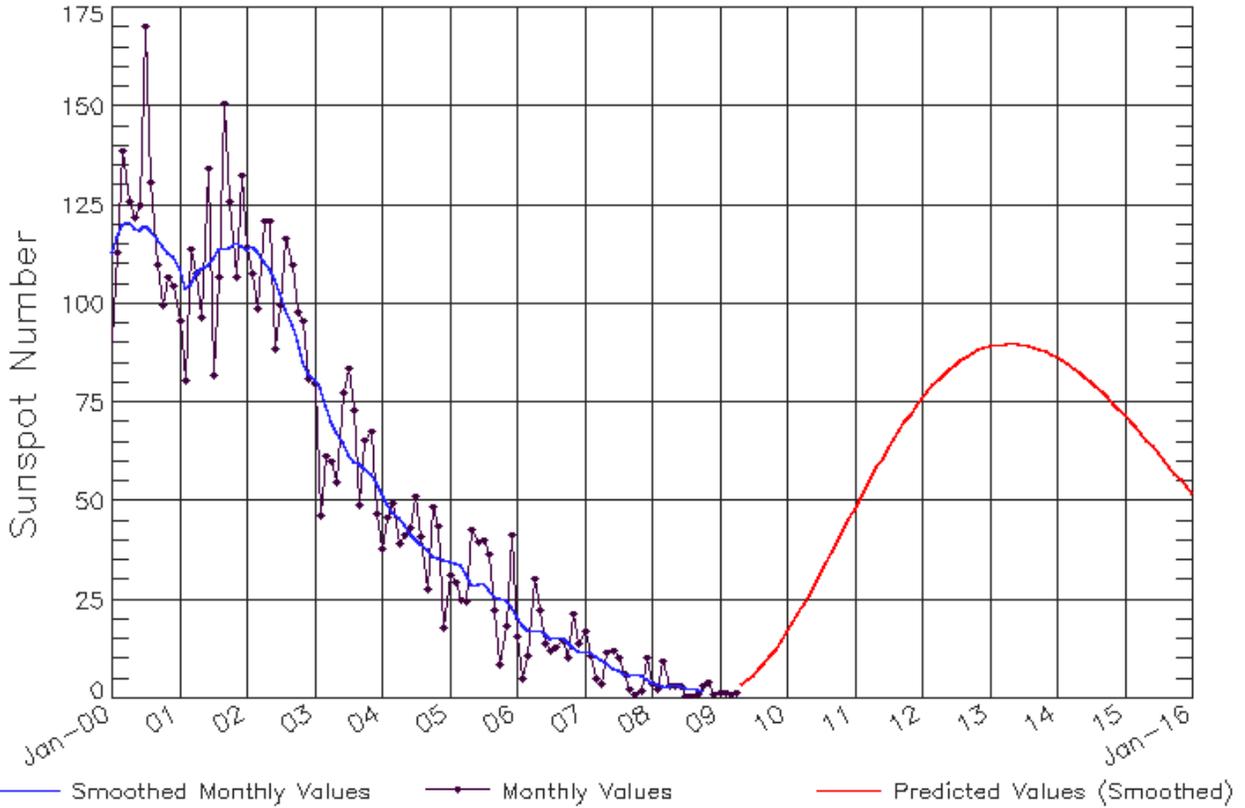
X-ray plot contains five-minute averaged x-ray flux (watts/m^2) as measured by GOES 10 (W060) and GOES 11 (W135) in two wavelength bands, .05 - .4 and .1 - .8 nm. The letters A, B, C, M and X refer to x-ray event levels for the .1 - .8 nm band.

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



ISES Solar Cycle Sunspot Number Progression

Data Through Apr 09



Updated 2009 May 8

NOAA/SWPC Boulder, CO USA

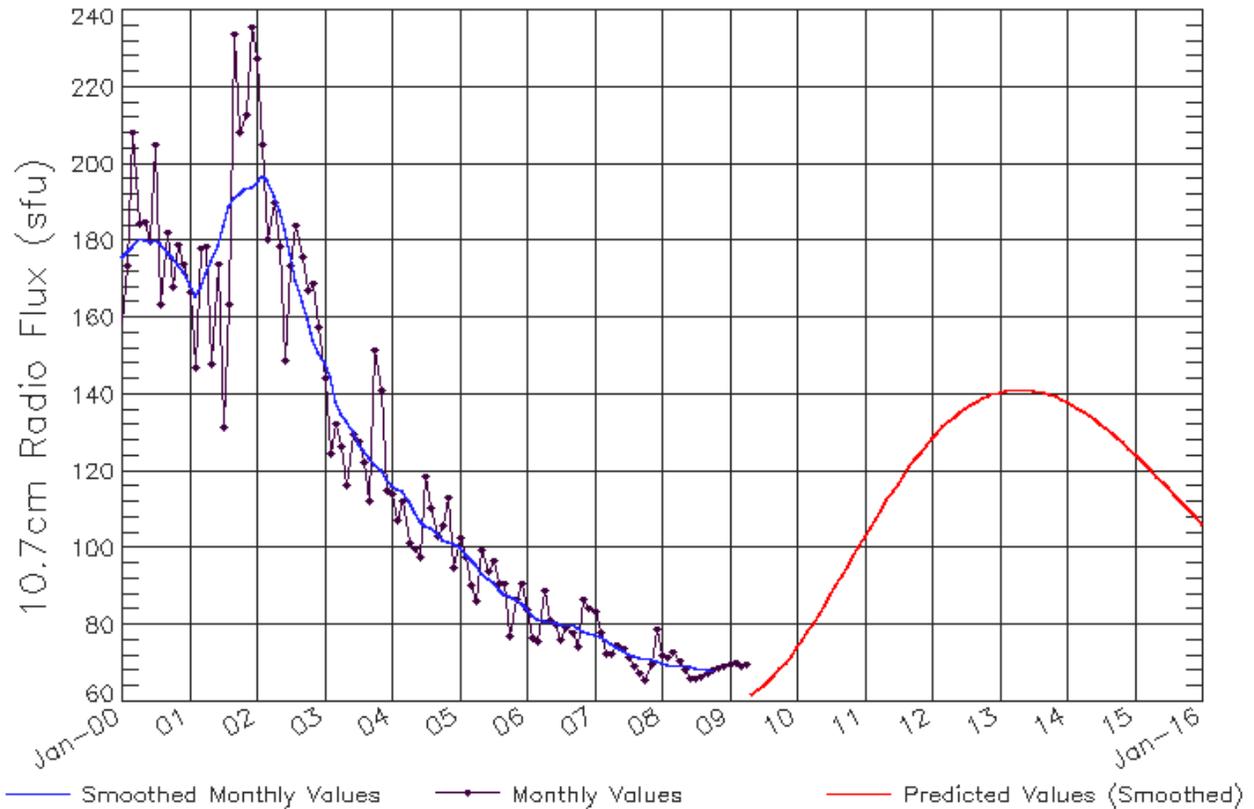
SEC Prediction of Smoothed Sunspot Number

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	Hi/Lo											
2008	4 (***)	4 (***)	3 (***)	3 (***)	4 (***)	3 (***)	3 (***)	3 (***)	2 (***)	2 (***)	2 (1)	2 (2)
2009	2 (3)	3 (5)	3 (5)	4 (6)	5 (7)	6 (7)	7 (8)	8 (9)	10 (9)	12 (10)	13 (10)	15 (10)
2010	17 (10)	19 (10)	21 (10)	24 (10)	26 (10)	29 (10)	32 (10)	34 (10)	37 (10)	40 (10)	43 (10)	45 (10)
2011	48 (10)	51 (10)	53 (10)	56 (10)	59 (10)	61 (10)	63 (10)	66 (10)	68 (10)	70 (10)	72 (10)	74 (10)
2012	76 (10)	78 (10)	79 (10)	81 (10)	82 (10)	84 (10)	85 (10)	86 (10)	87 (10)	88 (10)	88 (10)	89 (10)
2013	89 (10)	90 (10)	90 (10)	90 (10)	90 (10)	90 (10)	90 (10)	89 (10)	89 (10)	89 (10)	88 (10)	87 (10)
2014	86 (10)	86 (10)	85 (10)	84 (10)	83 (10)	81 (10)	80 (10)	79 (10)	78 (10)	76 (10)	75 (10)	73 (10)
2015	72 (10)	70 (10)	69 (10)	67 (10)	65 (10)	64 (10)	62 (10)	60 (10)	59 (10)	57 (10)	55 (10)	54 (10)



ISES Solar Cycle F10.7cm Radio Flux Progression

Data Through Apr 09



Updated 2009 May 8

NOAA/SWPC Boulder, CO USA

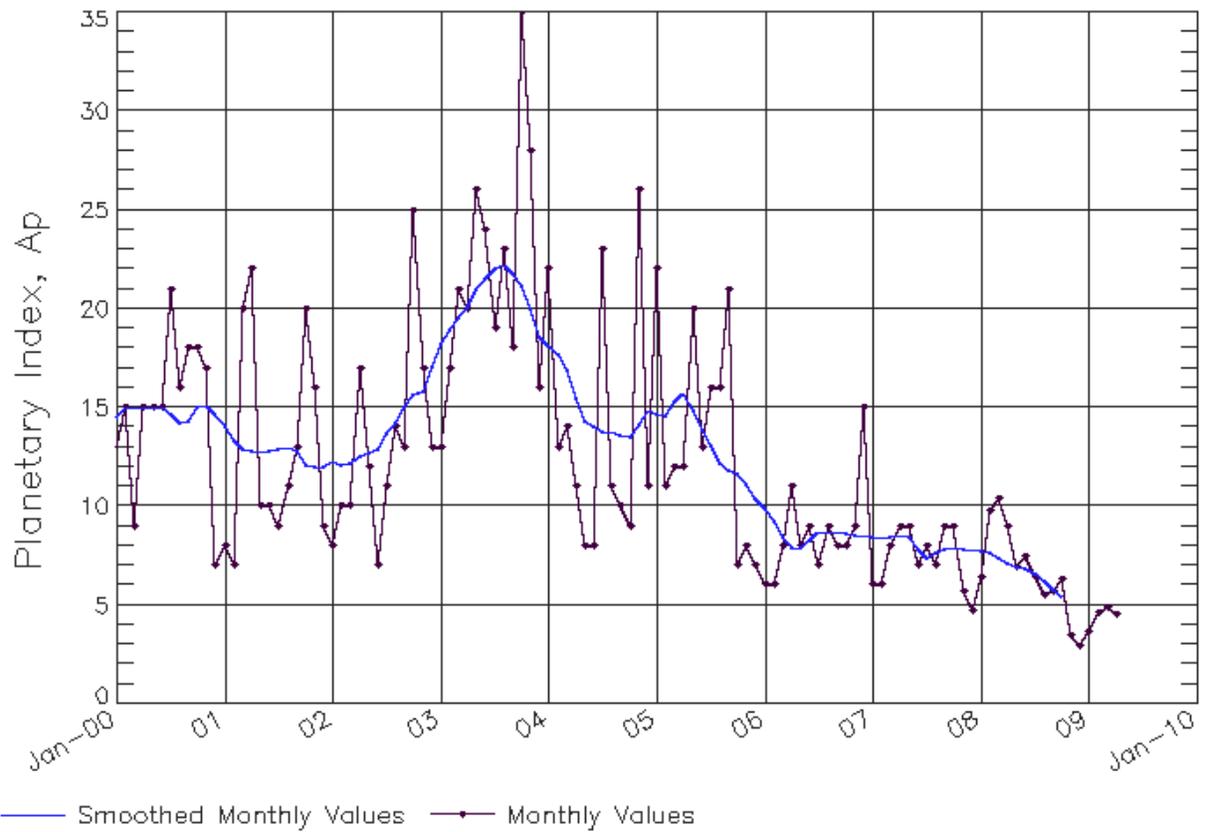
SEC Prediction of Smoothed F10.7cm Radio Flux

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	Hi/Lo	Hi/Lo	Hi/Lo									
2008	70 (***)	70 (***)	70 (***)	70 (***)	70 (***)	69 (***)	69 (***)	69 (***)	68 (***)	68 (***)	68 (1)	68 (1)
2009	67 (2)	67 (3)	67 (4)	67 (4)	67 (5)	67 (6)	68 (7)	68 (8)	69 (8)	70 (9)	70 (9)	72 (9)
2010	74 (9)	76 (9)	78 (9)	81 (9)	83 (9)	85 (9)	88 (9)	90 (9)	93 (9)	95 (9)	98 (9)	100 (9)
2011	103 (9)	105 (9)	108 (9)	110 (9)	112 (9)	115 (9)	117 (9)	119 (9)	121 (9)	123 (9)	125 (9)	127 (9)
2012	128 (9)	130 (9)	132 (9)	133 (9)	134 (9)	135 (9)	136 (9)	137 (9)	138 (9)	139 (9)	140 (9)	140 (9)
2013	141 (9)	140 (9)	140 (9)	139 (9)	139 (9)							
2014	138 (9)	137 (9)	136 (9)	136 (9)	135 (9)	134 (9)	132 (9)	131 (9)	130 (9)	129 (9)	127 (9)	126 (9)
2015	125 (9)	123 (9)	122 (9)	120 (9)	119 (9)	117 (9)	116 (9)	114 (9)	113 (9)	111 (9)	110 (9)	108 (9)



ISES Solar Cycle Ap Progression

Data Through Apr 09



Updated 2009 May 8

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