

Space Weather Highlights
25 May - 31 May 2009

SWO PRF 1761
02 June 2009

Solar activity was very low. No flares were observed. New cycle polarity Region 1019 (N28, L=297, class/area Cro/080 on 02 June) was numbered on 31 May. It was simply structured and produced no flares during the summary period.

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 quiet levels at all latitudes during most of the period. However, activity increased to unsettled levels on 28 May with a brief period of active levels at high latitudes. The increase followed a sudden impulse at 28/0520 UTC (33 nT, as observed by the Boulder USGS magnetometer). ACE solar wind measurements indicated an interplanetary shock passage at approximately 28/0418 UTC. There was no obvious source for the shock. Solar wind changes associated with the shock passage included a jump in velocity (284 – 338 km/sec at 28/0418 UTC), increased interplanetary magnetic field (IMF) Bt (peak 12 nT at 28/0722 UTC), and intermittent periods of southward IMF Bz (minimum -8 nT at 28/0857 UTC).

Space Weather Outlook
03 June – 29 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 quiet to unsettled levels during 03 – 04 June. Mostly quiet conditions are expected during 05 – 28 June, with unsettled periods possible on 10 June. Activity is expected to increase to unsettled levels on 29 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.



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 May	69	0	0	<A1.0	0	0	0	0	0	0	0	0
26 May	68	0	0	<A1.0	0	0	0	0	0	0	0	0
27 May	67	0	0	<A1.0	0	0	0	0	0	0	0	0
28 May	68	0	0	<A1.0	0	0	0	0	0	0	0	0
29 May	68	0	0	<A1.0	0	0	0	0	0	0	0	0
30 May	69	0	0	<A1.0	0	0	0	0	0	0	0	0
31 May	69	15	30	<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
	25 May	6.0e+05	2.0e+04	4.4e+03		3.6e+05
26 May	7.0e+05	2.0e+04	4.6e+03		3.9e+05	
27 May	6.8e+05	2.0e+04	4.6e+03		3.6e+05	
28 May	5.2e+05	2.0e+04	4.6e+03		1.2e+05	
29 May	4.6e+05	1.9e+04	4.1e+03		5.7e+04	
30 May	5.5e+05	2.0e+04	4.3e+03		7.7e+04	
31 May	5.5e+05	1.9e+04	4.3e+03		9.3e+04	

Daily Geomagnetic Data

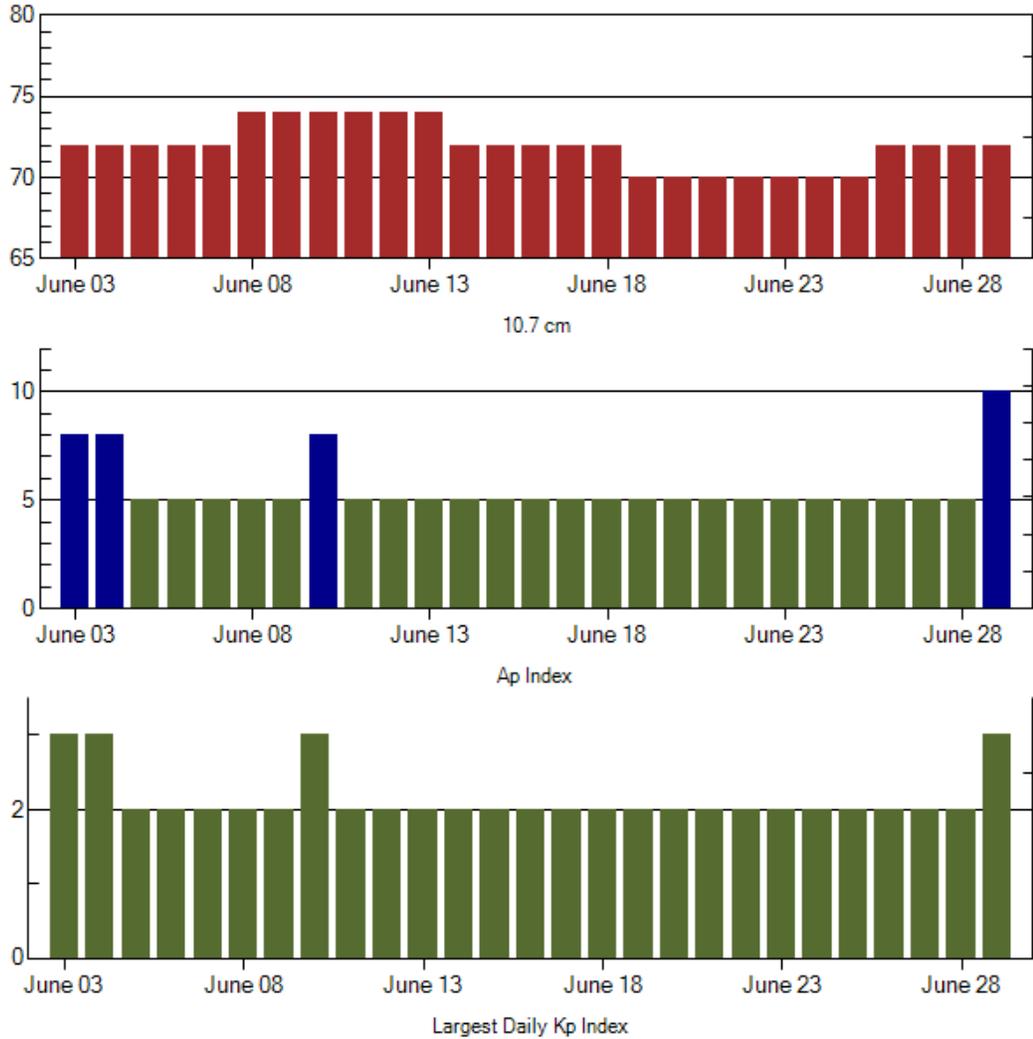
Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	25 May	1	0-0-0-1-1-0-1-0	1	0-0-1-0-0-0-1-0	3
26 May	2	1-0-1-0-1-0-0-1	1	1-0-1-0-0-0-0-0	4	1-0-1-0-1-1-1-2
27 May	2	0-0-0-0-1-1-1-1	0	1-0-0-0-0-0-0-0	3	1-0-0-0-0-2-1-2
28 May	5	0-3-2-2-2-1-1-0	9	0-3-3-4-3-1-1-0	7	1-3-2-3-2-2-1-2
29 May	4	1-1-1-1-2-1-1-2	3	1-1-0-1-2-1-1-1	5	1-2-1-1-2-2-2-2
30 May	2	1-1-0-0-0-0-1-1	2	1-1-1-1-0-1-1-0	3	2-2-0-0-0-0-0-1
31 May	3	1-0-2-0-1-1-2-1	1	0-0-1-0-0-0-1-0	3	1-0-1-0-1-1-1-1

Alerts and Warnings Issued

Date & Time of Issue	Type of Alert or Warning	Date & Time of Event UTC
28 May 0451	WARNING: Geomagnetic Sudden Impulse expected	28 May 0525 - 0545
28 May 0528	SUMMARY: Geomagnetic Sudden Impulse	28 May 0520
28 May 0548	SUMMARY: Geomagnetic Sudden Impulse	28 May 0520



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
03 Jun	72	8	3	17 Jun	72	5	2
04	72	8	3	18	72	5	2
05	72	5	2	19	70	5	2
06	72	5	2	20	70	5	2
07	72	5	2	21	70	5	2
08	74	5	2	22	70	5	2
09	74	5	2	23	70	5	2
10	74	8	3	24	70	5	2
11	74	5	2	25	70	5	2
12	74	5	2	26	72	5	2
13	74	5	2	27	72	5	2
14	72	5	2	28	72	5	2
15	72	5	2	29	72	10	3
16	72	5	2				



Energetic Events

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

No Events Observed

Flare List

Date	Time			X-ray Class.	Imp/ Brtns	Optical		Rgn
	Begin	Max	End			Lat	CMD	
25 May	No Flares Observed							
26 May	No Flares Observed							
27 May	No Flares Observed							
28 May	No Flares Observed							
29 May	No Flares Observed							
30 May	No Flares Observed							
31 May	No Flares Observed							

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

Region 1018

23 May	S33E38	46	0030	03	BXO	003	B										
24 May	S33E25	46	0000	00		000											
25 May	S33E12	46	0000	00		000											
26 May	S33W01	46	0000	00		000											
27 May	S33W14	46	0000	00		000											
28 May	S33W27	46	0000	00		000											
29 May	S33W40	45	0000	00		000											
30 May	S33W53	45	0000	00		000											
31 May	S33W66	45	0000	00		000											

0 0 0 0 0 0 0 0 0

Died on Disk

Absolute heliographic longitude: 46

Region 1019

31 May	N27E41	298	0030	04	BXO	005	B										
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0 0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 298



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

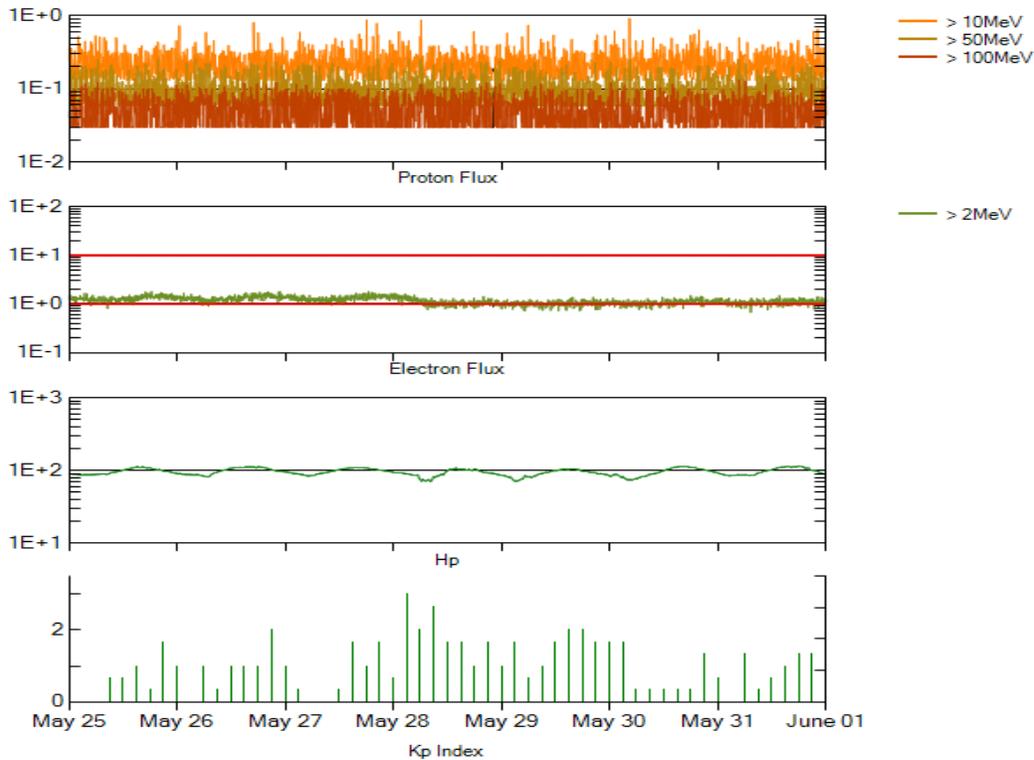
Month	Sunspot Numbers			Smooth values		Radio Flux		Geomagnetic	
	Observed SEC	values RI	Ratio RI/SEC	SEC	RI	*Penticton 10.7 cm	Smooth Value	Planetary Ap	Smooth Value
2007									
June	20.0	12.0	0.60	12.8	7.7	73.7	73.2	7	7.8
July	15.6	10.0	0.64	11.6	7.0	71.6	72.5	8	7.4
August	9.9	6.2	0.63	10.2	6.1	69.2	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	2.7	1.7	68.6	68.3	3	5.1
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	
May	3.9	2.9	0.74			70.6		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 25 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.

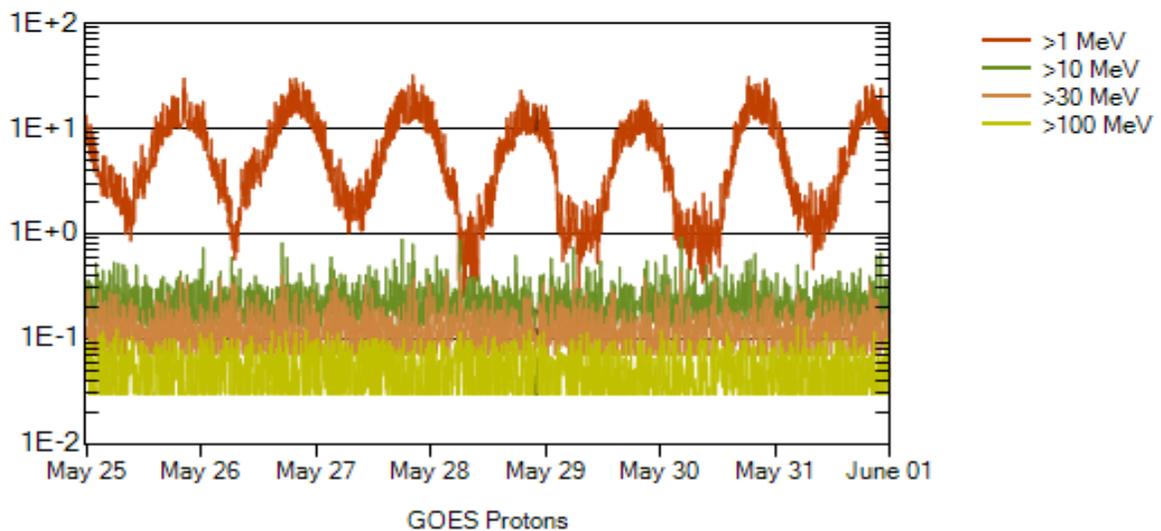
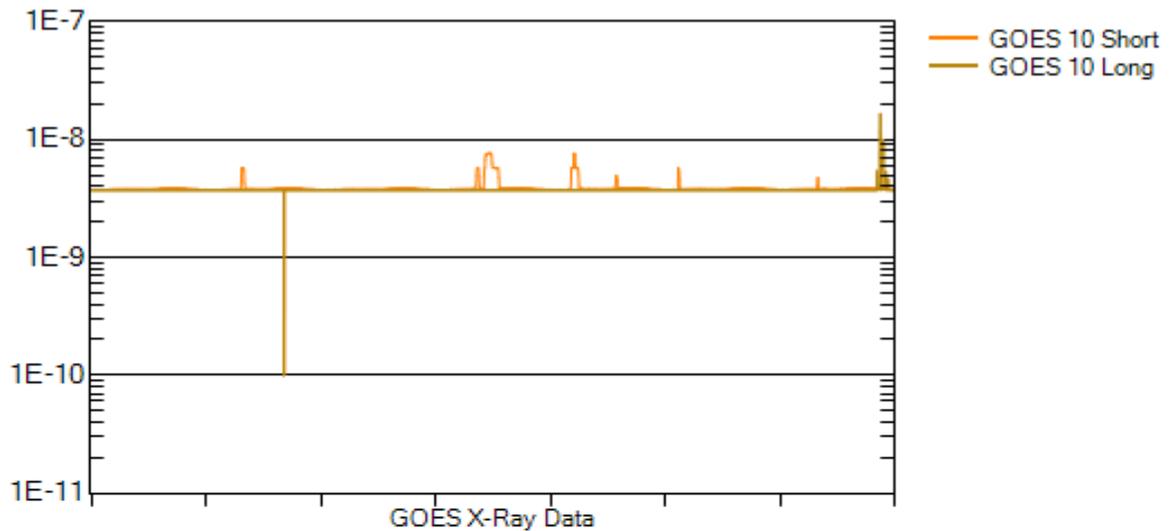
Electrons plot contains the five-minute averaged integral electron flux (electrons/cm²-sec-sr) with energies greater than 2 MeV at GOES-11 (W135).

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

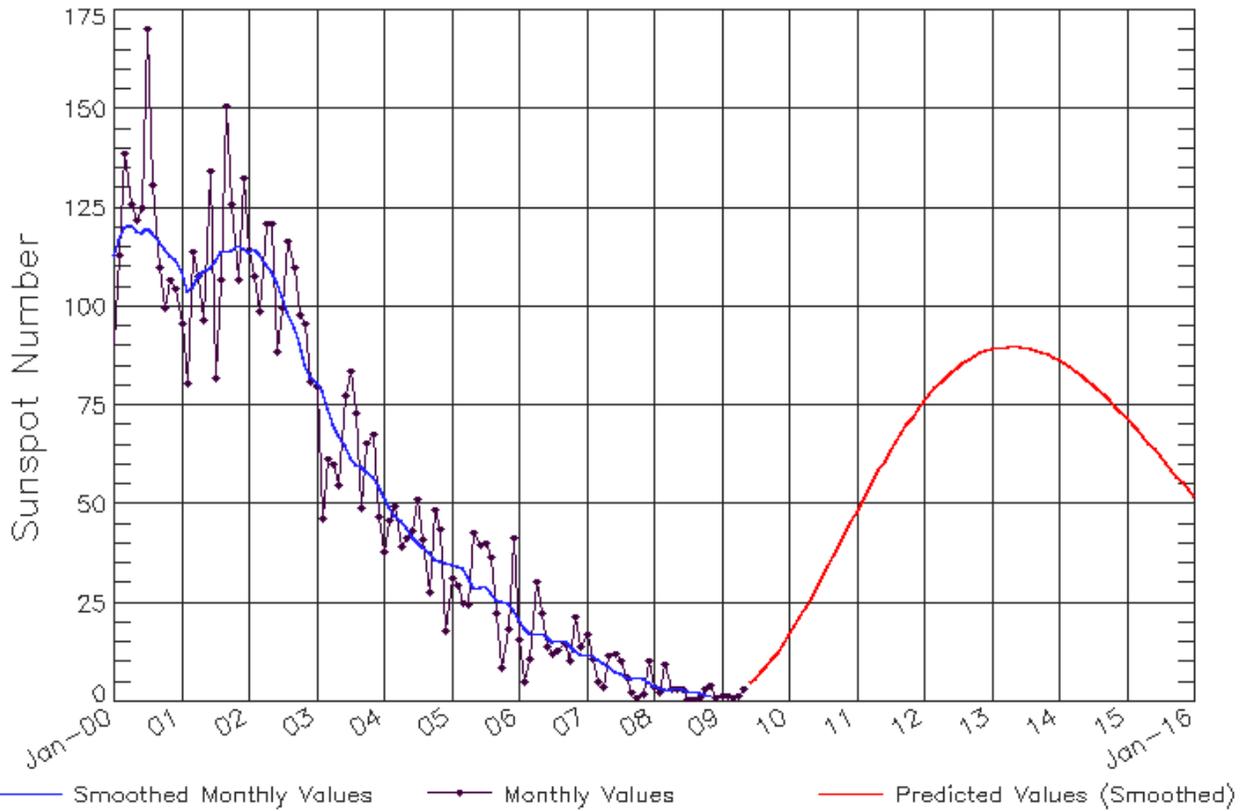
X-ray plot contains five-minute averaged x-ray flux (watts/m^2) as measured by GOES 10 (W060) and GOES 11 (W135) in two wavelength bands, .05 - .4 and .1 - .8 nm. The letters A, B, C, M and X refer to x-ray event levels for the .1 - .8 nm band.

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 May 09



Updated 2009 Jun 2

NOAA/SWPC Boulder, CO USA

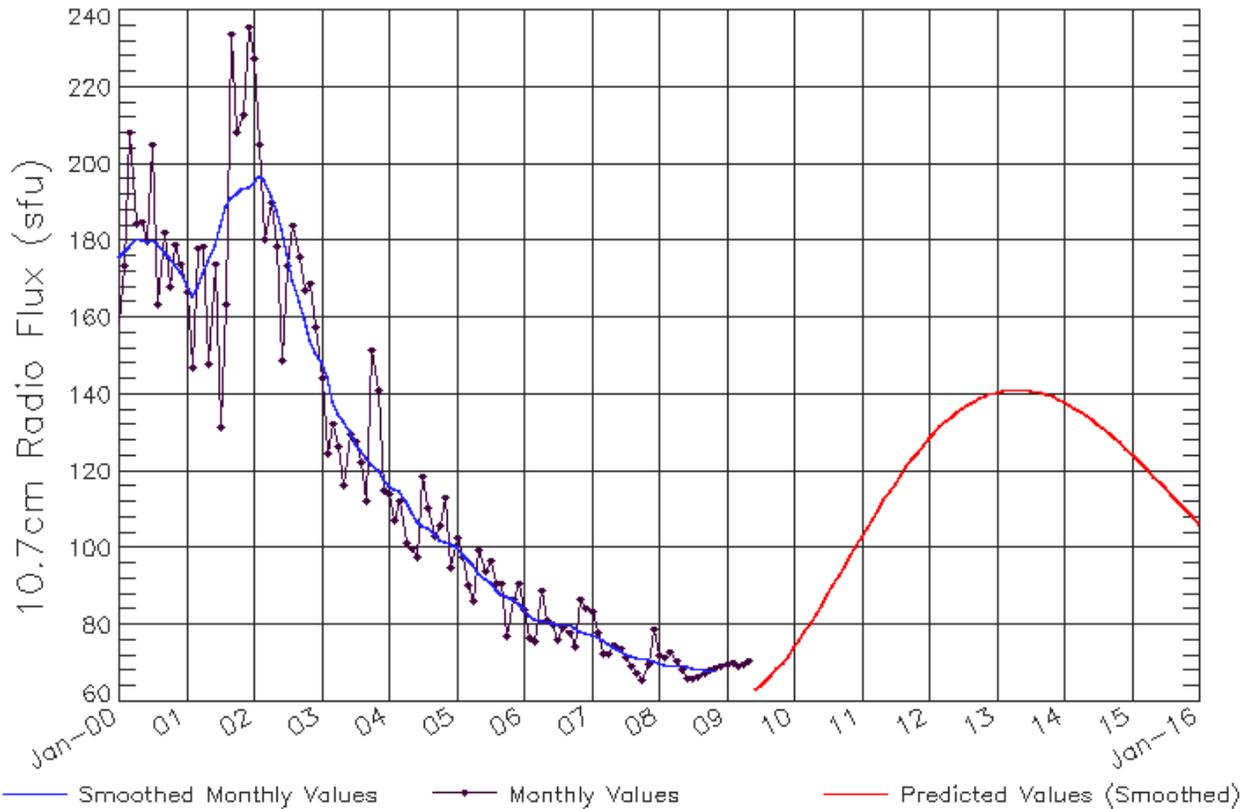
Smoothed Sunspot Number Prediction

	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 (***)	2 (1)
2009	2 (2)	3 (3)	3 (5)	4 (5)	5 (6)	5 (7)	7 (7)	8 (8)	10 (9)	11 (9)	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 May 09



Updated 2009 Jun 2

NOAA/SWPC Boulder, CO USA

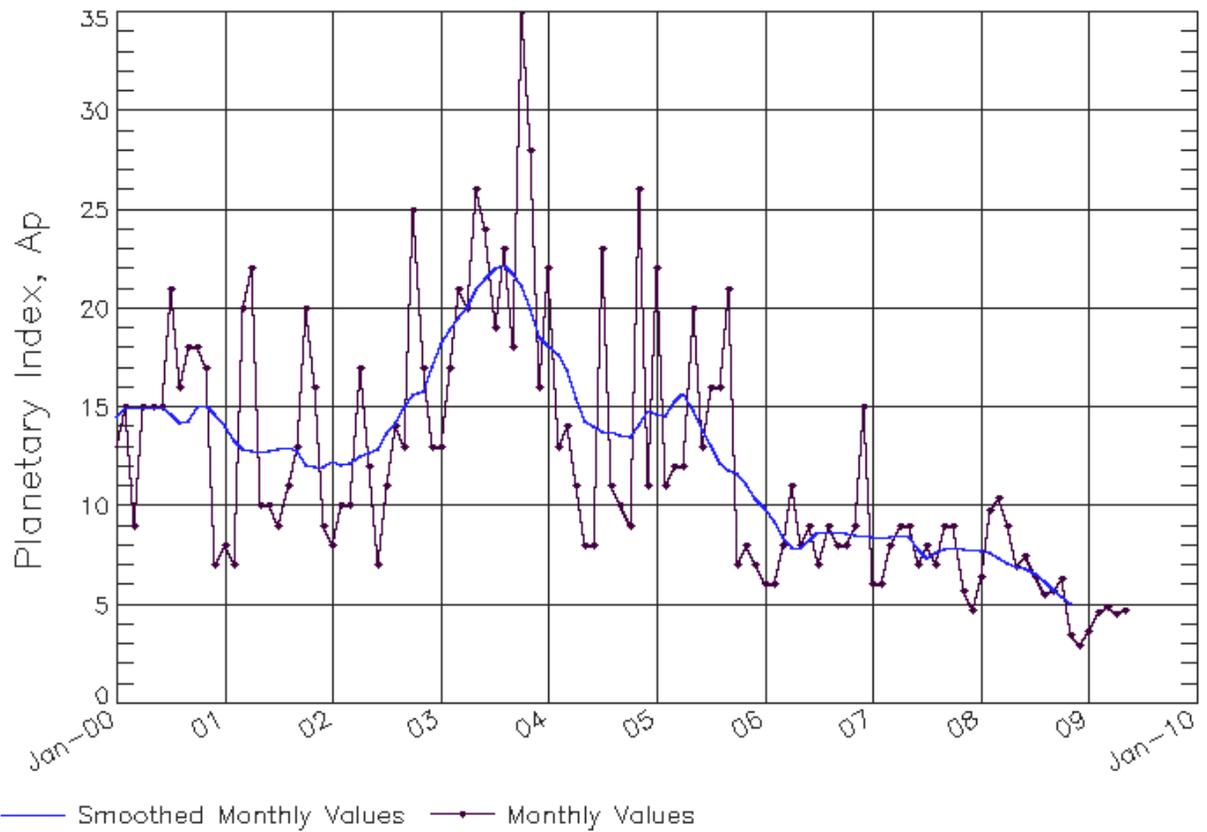
Smoothed F10.7cm Radio Flux Prediction

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	Hi/Lo											
2008	70 (***)	70 (***)	70 (***)	70 (***)	70 (***)	69 (***)	69 (***)	69 (***)	68 (***)	68 (***)	68 (***)	68 (1)
2009	68 (1)	68 (2)	68 (3)	68 (4)	68 (4)	68 (5)	68 (6)	69 (7)	70 (8)	70 (8)	71 (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 May 09



Updated 2009 Jun 2

NOAA/SWPC Boulder, CO USA



Severe Storm ($A_p \geq 100$) Geomagnetic Conditions



Space
Environment
Center

Comparison of Cycles
at current month in cycle

