

**Space Weather Highlights**  
**28 September 2009 – 04 October 2009**

**SWO PRF 1779**  
**06 October 2009**

Solar activity was very low. Region 1027 (N24, L=240, class/area Dao/110 on 24 September) produced a B7 flare on 01 October as it was nearing the west limb. No flare activity occurred during the remainder of the 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 to active levels on 28 September with brief minor storm conditions at high latitudes. Activity decreased to quiet levels during the remainder of the period. A geomagnetic sudden impulse (18 nT, as measured by the Boulder USGS magnetometer) was detected at 04/0422 UTC. ACE solar wind measurements indicated the 28 September activity was associated with a period of southward IMF Bz (minimum -6 nT at 28/0530 UTC) and enhanced IMF Bt (peak 8 nT at 28/0534 UTC). ACE data indicated the sudden impulse was associated with a weak interplanetary shock. A velocity increase (approximately 297 to 362 km/sec) and increased IMF Bt were associated with the sudden impulse. There was no obvious source for the sudden impulse.

**Space Weather Outlook**  
**07 October 2009 – 02 November 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 levels through the period.

Geomagnetic field activity is expected to be at quiet levels during most of the period. However, unsettled conditions are expected during 24 - 25 October due to recurrence.



### 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	
28 September	73	11	10	<A1.0	0	0	0	0	0	0	0	0	0
29 September	72	14	40	<A1.0	0	0	0	0	0	0	0	0	0
30 September	72	11	10	<A1.0	0	0	0	0	0	0	0	0	0
01 October	72	11	10	<A1.0	0	0	0	0	0	0	0	0	0
02 October	72	0	0	<A1.0	0	0	0	0	0	0	0	0	0
03 October	72	0	0	<A1.0	0	0	0	0	0	0	0	0	0
04 October	71	0	0	<A1.0	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
	28 September	6.9e+05	2.0e+04	4.5e+03		5.2e+04
29 September	4.9e+05	1.9e+04	4.5e+03		7.5e+04	
30 September	6.3e+05	2.0e+04	4.4e+03		7.3e+04	
01 October	3.6e+05	2.0e+04	4.5e+03		3.9e+04	
02 October	4.2e+05	2.0e+04	4.5e+03		4.8e+04	
03 October	6.2e+05	2.0e+04	4.7e+03		5.4e+04	
04 October	5.7e+05	2.0e+04	4.5e+03		5.2e+04	

### Daily Geomagnetic Data

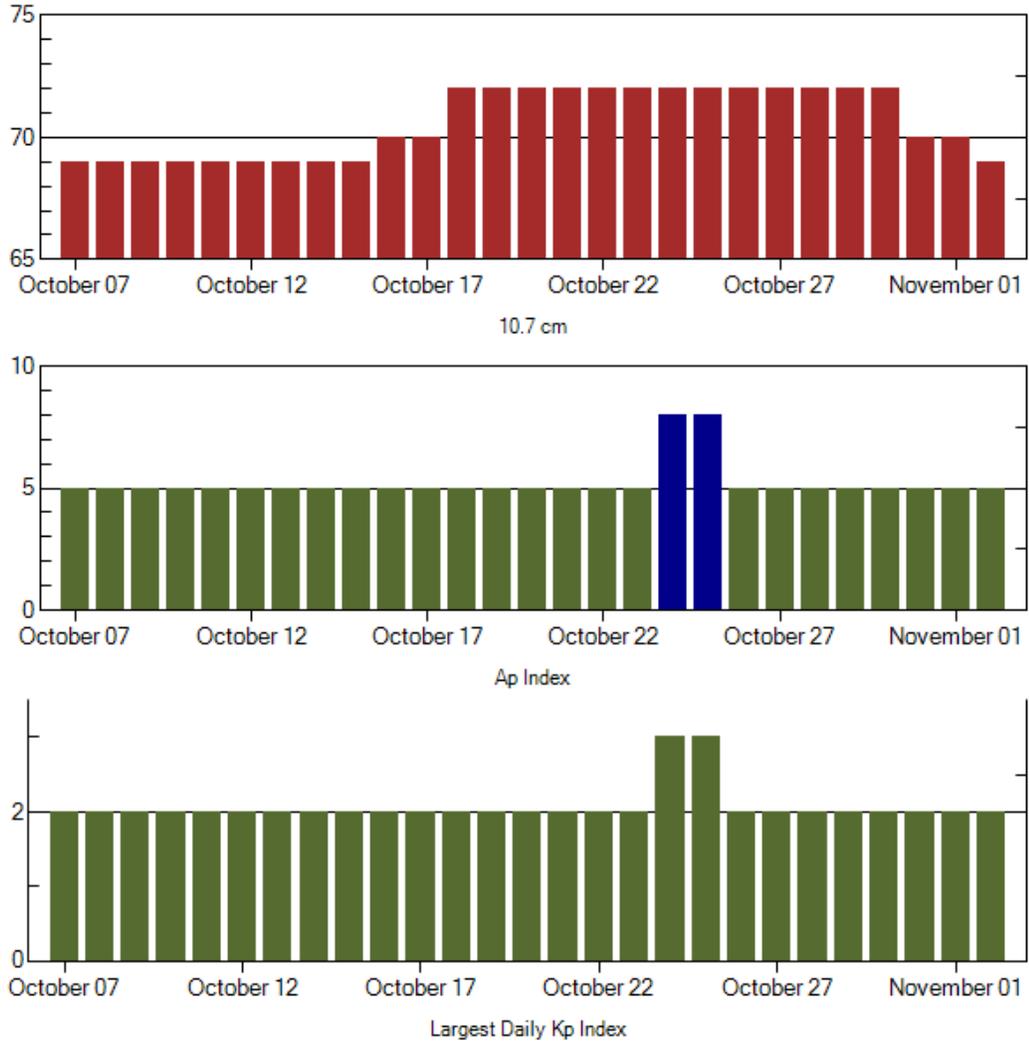
Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	28 September	6	2-2-3-1-2-1-1-1	11	0-1-5-4-1-0-1-0	8
29 September	0	0-0-0-0-1-0-0-0	0	0-0-0-1-0-0-0-0	2	0-0-0-0-1-1-1-1
30 September	5	2-1-1-1-2-1-2-1	2	2-1-1-0-0-0-1-0	4	1-1-1-1-1-0-2-1
01 October	2	1-1-0-0-1-1-0-0	0	0-0-0-1-0-0-0-0	2	1-1-0-1-0-0-1-0
02 October	0	0-0-0-0-0-0-0-0	0	0-0-0-1-0-0-0-0	2	1-1-0-0-1-1-0-1
03 October	1	0-0-0-0-1-0-1-0	0	0-0-0-0-0-0-1-0	1	0-0-0-0-1-0-0-1
04 October	4	0-2-0-2-2-1-1-1	2	0-1-1-1-1-0-0-0	4	1-2-1-1-1-0-1-1

### Alerts and Warnings Issued

Date & Time of Issue	Type of Alert or Warning	Date & Time of Event UTC
28 Sep 0749	ALERT: Geomagnetic K = 4	28 Sep 0745
28 Sep 0814	ALERT: Geomagnetic K = 5	28 Sep 0810
04 Oct 0517	SUMMARY: Geomagnetic Sudden Impulse	04 Oct 0422



### 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
07 Oct	69	5	2	21 Oct	72	5	2
08	69	5	2	22	72	5	2
09	69	5	2	23	72	5	2
10	69	5	2	24	72	8	3
11	69	5	2	25	72	8	3
12	69	5	2	26	72	5	2
13	69	5	2	27	72	5	2
14	69	5	2	28	72	5	2
15	69	5	2	29	72	5	2
16	70	5	2	30	72	5	2
17	70	5	2	31	70	5	2
18	72	5	2	01 Nov	70	5	2
19	72	5	2	02	69	5	2
20	72	5	2				





*Region 1027*

22 Sep	N24E32	239	40	5	DRO	4	B
23 Sep	N23E21	238	100	7	DSC	9	B
24 Sep	N24E05	240	110	8	DAO	11	B
25 Sep	N24W08	239	60	8	CAO	4	B
26 Sep	N24W21	239	60	7	BXO	4	B
27 Sep	N24W34	239	10	1	AXX	1	A
28 Sep	N23W47	239	60	5	DAO	5	B
29 Sep	N23W62	241	40	5	CRO	4	B
30 Sep	N23W76	241	10		AXX	1	A
01 Oct	N24W89	241	10		AXX	1	A

0 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 240

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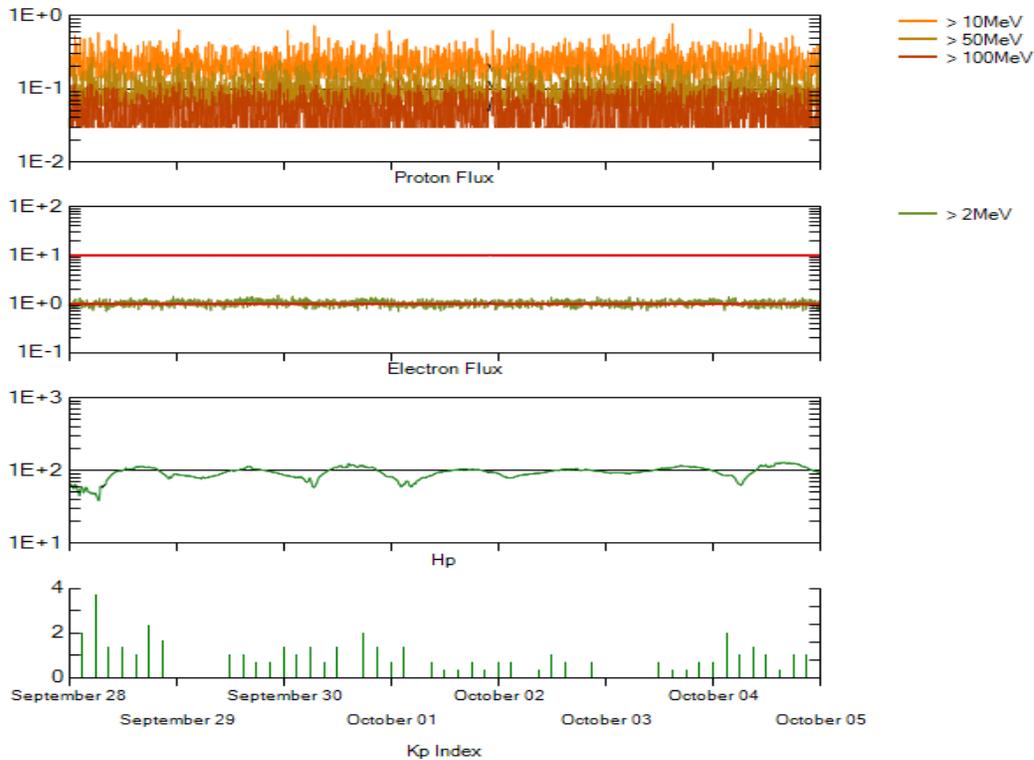
**Recent Solar Indices (preliminary)**  
**Of the observed monthly mean values**

Month	Sunspot Numbers			Radio Flux		Geomagnetic			
	Observed values SEC	Ratio RI	Ratio RI/SEC	Smooth values SEC	Smooth values RI	*Penticton 10.7 cm	Smooth Value	Planetary Ap	Smooth Value
<b>2007</b>									
October	1.3	0.9	0.69	10.0	6.0	67.5	71.8	7	7.9
November	2.5	1.7	0.68	9.4	5.7	69.6	71.4	7	7.8
December	16.2	10.1	0.62	8.1	4.9	78.5	70.8	6	7.8
<b>2008</b>									
January	5.1	3.3	0.65	6.9	4.2	74.3	70.3	8	7.8
February	3.8	2.1	0.55	5.9	3.6	71.1	69.9	11	7.6
March	15.9	9.3	0.58	5.3	3.3	72.9	69.8	11	7.5
April	4.9	2.9	0.59	5.3	3.4	70.2	69.8	9	7.3
May	5.7	3.2	0.56	5.7	3.5	68.4	69.8	6	7.2
June	4.2	3.4	0.81	5.2	3.3	65.9	69.4	7	7.0
July	1.0	0.8	0.80	4.5	2.8	65.7	68.8	5	6.8
August	0.0	0.5	**	4.4	2.7	66.3	68.6	5	6.3
September	1.5	1.1	0.73	3.7	2.3	67.1	68.4	6	5.8
October	5.2	2.9	0.56	2.9	1.9	68.3	68.2	7	5.4
November	6.8	4.1	0.60	2.7	1.8	68.6	68.3	4	5.1
December	1.3	0.8	0.62	2.7	1.7	69.2	68.5	4	4.9
<b>2009</b>									
January	2.8	1.3	0.46	3.0	1.8	69.8	68.7	4	4.7
February	2.5	1.4	0.56	3.1	1.9	70.0	68.9	5	4.7
March	0.7	0.7	1.00	3.4	2.0	69.2	69.0	5	4.5
April	1.2	1.2	1.00			69.7		4	
May	3.9	2.9	0.74			70.5		4	
June	6.6	2.6	0.39			68.6		4	
July	5.0	3.5	0.70			68.2		4	
August	0.3	0.0	0.00			67.4		5	
September	6.6	4.2	0.64			70.4		3	

**NOTE:** Values are final except for the most recent 6 months which are considered preliminary. 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 28 September 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/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.

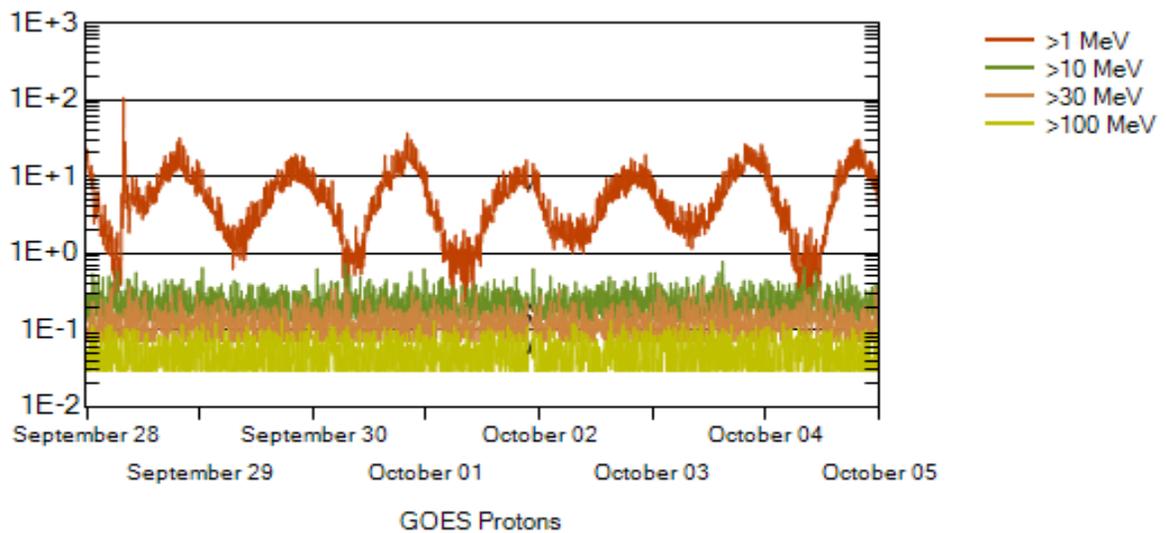
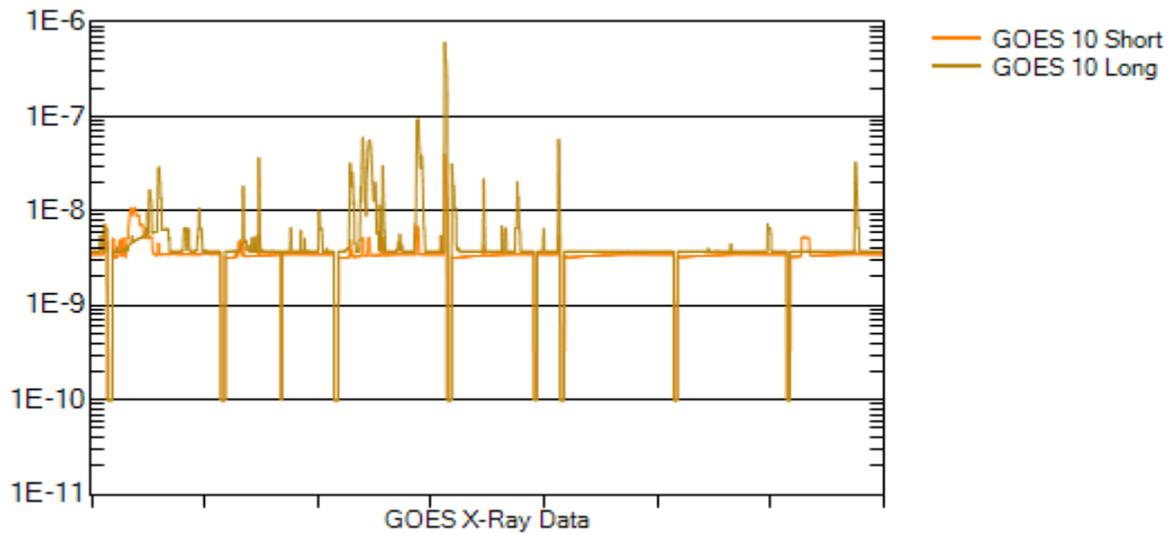
Electrons plot contains the five-minute averaged integral electron flux (electrons/cm<sup>2</sup>-sec-sr) with energies greater than 2 MeV at GOES-11.

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*

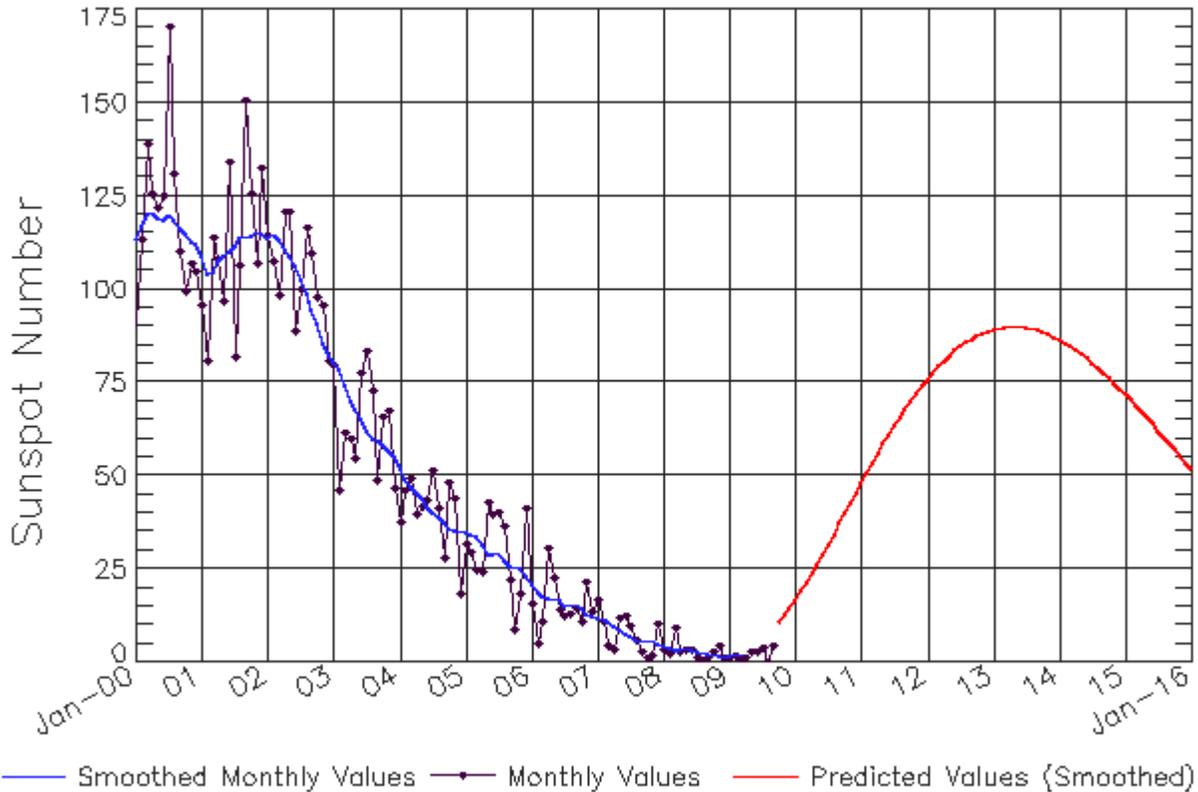
X-ray plot contains five-minute averaged x-ray flux ( $\text{watts/m}^2$ ) as measured by GOES 10 (W060) and GOES 11 (W135) in two wavelength bands, .05 - .4 and .1 - .8 nm. The letters A, B, C, M and X refer to x-ray event levels for the .1 - .8 nm band.

Proton plot contains the five-minute averaged integral proton flux ( $\text{protons/cm}^2\text{-sec-sr}$ ) as measured by GOES-11 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 Sep 09



Updated 2009 Oct 6

NOAA/SWPC Boulder, CO USA

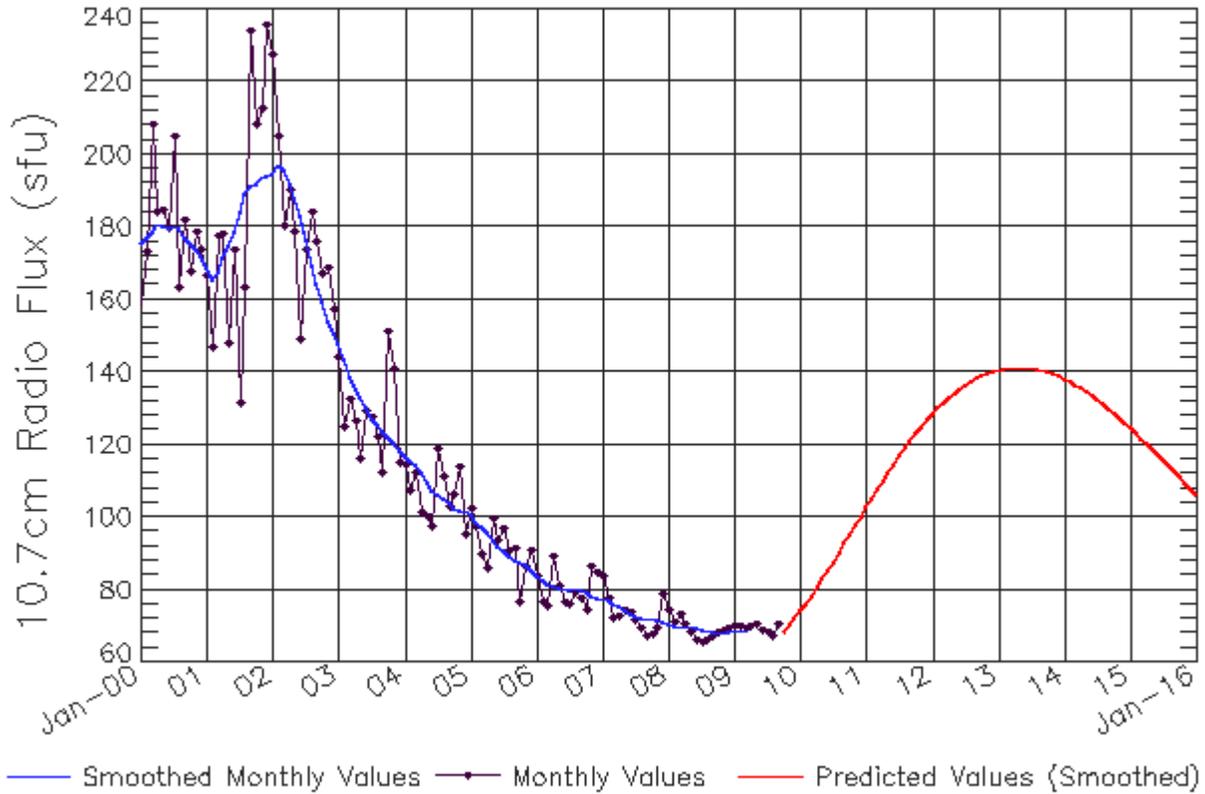
## Smoothed Sunspot Number Prediction

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2008	4 (***)	4 (***)	3 (***)	3 (***)	4 (***)	3 (***)	3 (***)	3 (***)	2 (***)	2 (***)	2 (***)	2 (***)
2009	2 (***)	2 (***)	2 (***)	3 (1)	3 (2)	4 (3)	5 (5)	7 (5)	8 (6)	10 (7)	12 (7)	14 (8)
2010	16 (9)	19 (9)	22 (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 Sep 09



Updated 2009 Oct 6

NOAA/SWPC Boulder, CO USA

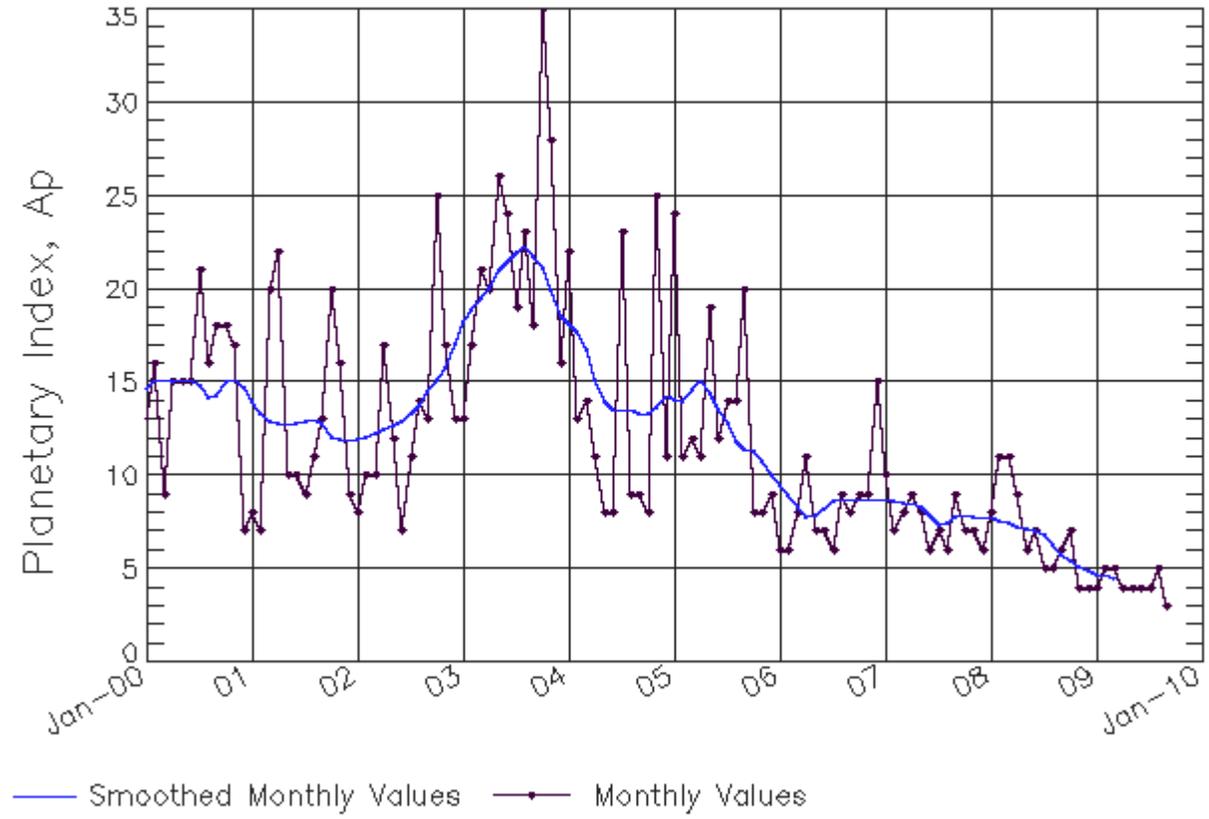
### Smoothed F10.7cm Radio Flux Prediction

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2008	70 (***)	70 (***)	70 (***)	70 (***)	70 (***)	69 (***)	69 (***)	69 (***)	68 (***)	68 (***)	68 (***)	69 (***)
2009	69 (***)	69 (***)	69 (***)	<b>69</b> (1)	<b>69</b> (1)	<b>69</b> (2)	<b>70</b> (3)	<b>70</b> (4)	<b>71</b> (4)	<b>72</b> (5)	<b>73</b> (6)	<b>74</b> (7)
2010	<b>75</b> (8)	<b>77</b> (8)	<b>79</b> (9)	<b>81</b> (9)	<b>83</b> (9)	<b>85</b> (9)	<b>88</b> (9)	<b>90</b> (9)	<b>93</b> (9)	<b>95</b> (9)	<b>98</b> (9)	<b>100</b> (9)
2011	<b>103</b> (9)	<b>105</b> (9)	<b>108</b> (9)	<b>110</b> (9)	<b>112</b> (9)	<b>115</b> (9)	<b>117</b> (9)	<b>119</b> (9)	<b>121</b> (9)	<b>123</b> (9)	<b>125</b> (9)	<b>127</b> (9)
2012	<b>128</b> (9)	<b>130</b> (9)	<b>132</b> (9)	<b>133</b> (9)	<b>134</b> (9)	<b>135</b> (9)	<b>136</b> (9)	<b>137</b> (9)	<b>138</b> (9)	<b>139</b> (9)	<b>140</b> (9)	<b>140</b> (9)
2013	<b>141</b> (9)	<b>140</b> (9)	<b>140</b> (9)	<b>139</b> (9)	<b>139</b> (9)							
2014	<b>138</b> (9)	<b>137</b> (9)	<b>136</b> (9)	<b>136</b> (9)	<b>135</b> (9)	<b>134</b> (9)	<b>132</b> (9)	<b>131</b> (9)	<b>130</b> (9)	<b>129</b> (9)	<b>127</b> (9)	<b>126</b> (9)
2015	<b>125</b> (9)	<b>123</b> (9)	<b>122</b> (9)	<b>120</b> (9)	<b>119</b> (9)	<b>117</b> (9)	<b>116</b> (9)	<b>114</b> (9)	<b>113</b> (9)	<b>111</b> (9)	<b>110</b> (9)	<b>108</b> (9)



# ISES Solar Cycle Ap Progression

Data Through Sep 09



Updated 2009 Oct 6

NOAA/SWPC Boulder, CO USA



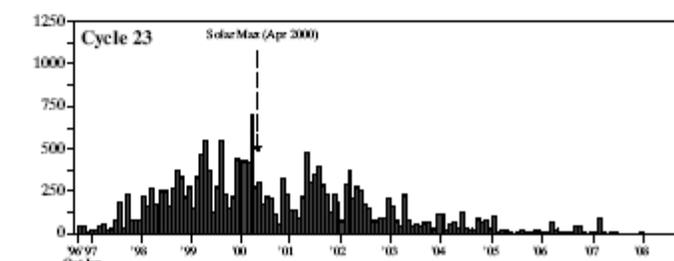
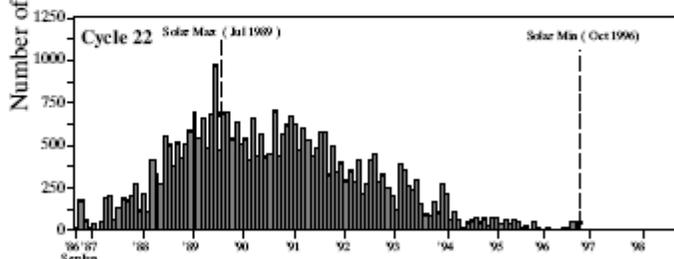
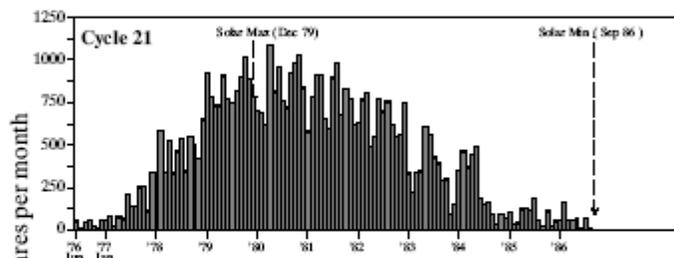
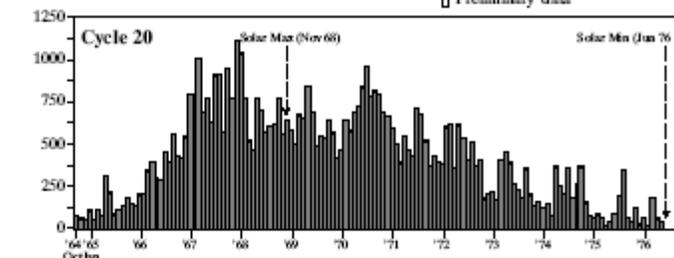
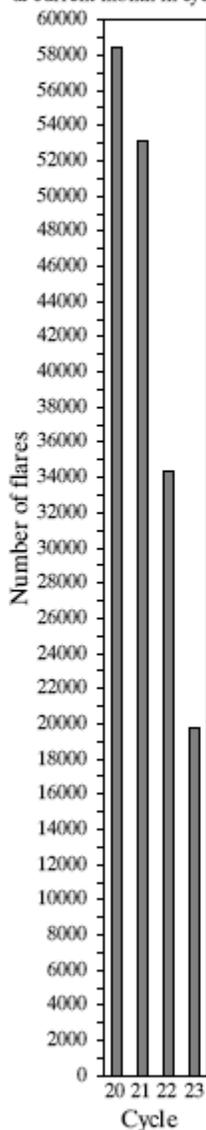
# Optical Flares



September 2009  
(Month 156)

Preliminary data

Comparison of Cycles at current month in cycle



N.Cohen

