

**Space Weather Highlights**  
**11 – 17 September 2006**

**SEC PRF 1620**  
**19 September 2006**

Solar activity was at very low to low levels. Region 908 (S13, L=130, class/area, Hkx/260 on 08 September) produced a C1.0/sf at 11/2309 UTC. Before rotating off the disk on 14 September, Region 909 (S08, L=165, class/area, Dsi/080 on 09 September) produced a C1.0 at 14/0735 UTC.

No greater than 10 MeV proton events were observed.

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

The geomagnetic field was quiet to unsettled the entire period. Solar wind speed ranged from a high of about 500 km/s midday on 13 September to a low of 310 km/s early on 16 September. The period began with the solar wind speed around 350 km/s while the IMF Bz fluctuated briefly between +8 to -12 nT. The geomagnetic field responded with quiet to unsettled conditions at middle latitudes with quiet to active periods at high latitudes through 11/1500 UTC. Thereafter until 17 September, the IMF Bz settled down, not varying much beyond +/- 5 nT. On 13 September, a prolonged period of southward Bz combined with a brief increase in the solar wind speed caused unsettled to active conditions at high latitudes. On midday on 16 September, a solar sector boundary crossing was observed followed by a slow increase in solar wind speed. By midday on 17 September, the IMF Bz began fluctuating between +/- 8 nT as a coronal hole high speed stream moved into geoeffective position. High latitudes observed unsettled to major storm conditions while middle latitudes were quiet to unsettled. The period ended with a wind speed around 490 km/s and increasing.

**Space Weather Outlook**  
**20 September – 16 October 2006**

Solar activity is expected to be at very low to low levels.

No greater than 10 MeV proton events are expected.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to be at high levels on 20 – 25 September, 02 – 07 October, and again on 15 – 16 October.

The geomagnetic field is expected to be mostly quiet to unsettled for the majority of the forecast period. Recurrent coronal hole high speed wind streams are expected to rotate into geoeffective positions on 23 – 24 September, 28 September – 01 October, and again on 14 – 15 October. Unsettled to minor storm periods are possible on 23 – 24 September, 28 September – 02 October and again on 14 – 15 October.



### 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
11 September	85	42	250	A6.2	1	0	0	1	0	0	0	0
12 September	84	41	220	A5.1	0	0	0	0	0	0	0	0
13 September	83	38	270	A6.5	0	0	0	0	0	0	0	0
14 September	83	25	220	A7.2	1	0	0	1	0	0	0	0
15 September	80	12	180	A5.4	0	0	0	0	0	0	0	0
16 September	79	13	190	A3.7	0	0	0	0	0	0	0	0
17 September	78	11	120	A2.7	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
	11 September	2.3E+5	1.7E+4	3.7E+3		9.2E+6
12 September	2.2E+5	1.7E+4	3.9E+3		1.3E+7	
13 September	2.5E+5	1.7E+4	3.8E+3		2.7E+6	
14 September	3.3E+5	1.8E+4	4.0E+3		5.3E+6	
15 September	4.3E+5	1.8E+4	3.9E+3		7.8E+6	
16 September	4.0E+5	1.7E+4	4.1E+3		1.0E+7	
17 September	9.9E+5	1.7E+4	4.1E+3		3.0E+6	

### Daily Geomagnetic Data

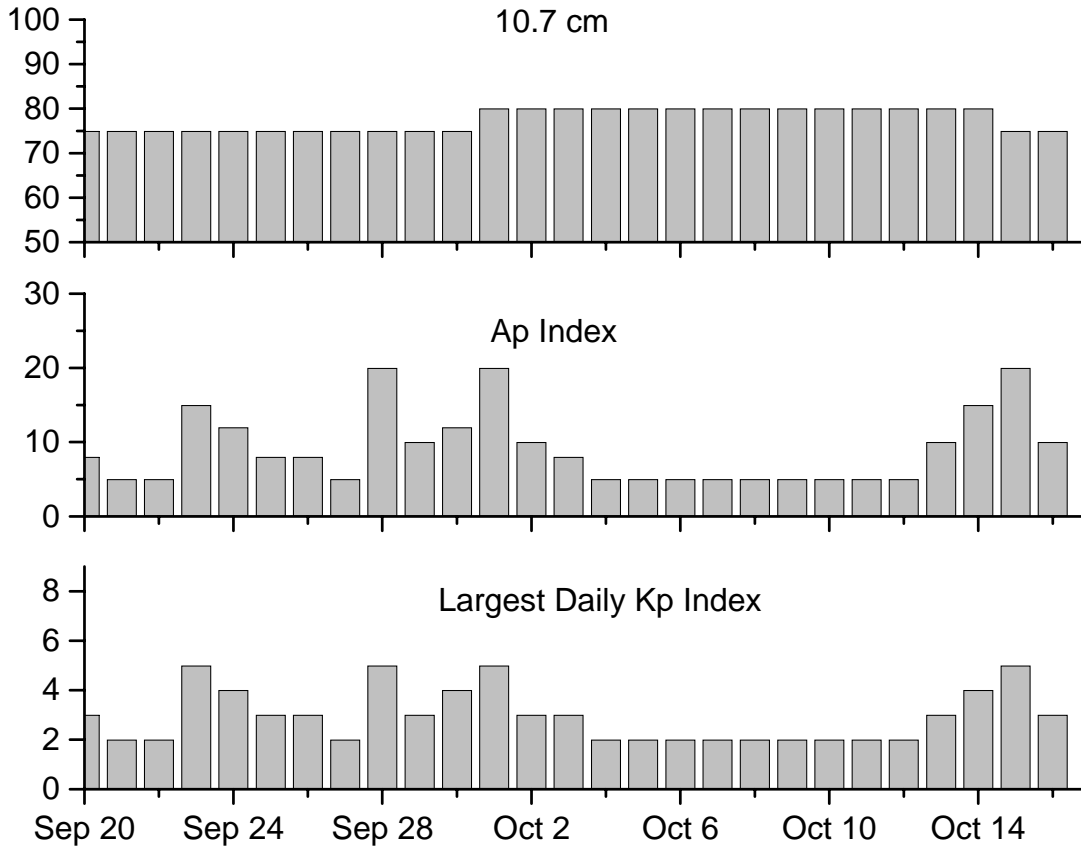
Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	11 September	7	2-2-3-3-2-1-0-1	11	2-2-3-4-4-1-0-1	8
12 September	2	1-0-1-1-1-0-1-1	3	1-0-2-2-0-1-1-0	4	1-0-2-1-1-1-1-1
13 September	3	1-2-1-2-1-1-0-0	8	0-3-4-2-3-0-0-0	6	1-3-2-1-1-1-0-1
14 September	4	1-3-2-1-1-1-0-0	5	1-2-2-3-2-0-0-0	6	1-3-2-2-1-1-1-1
15 September	0	0-0-0-0-0-0-0-0	0	1-0-0-0-0-0-0-0	3	1-0-0-0-1-0-2-2
16 September	1	0-0-0-0-1-1-1-0	1	1-1-0-0-0-1-0-0	3	0-0-0-0-1-1-2-2
17 September	9	0-1-3-3-3-1-3-2	27	1-1-3-6-6-1-3-3	16	1-1-2-4-4-1-4-3

### Alerts and Warnings Issued

Date & Time of Issue	Type of Alert or Warning	Date & Time of Event UTC
17 Sep 0935	ALERT: Geomagnetic K=4	17 Sep 0930
17 Sep 0937	WARNING: Geomagnetic K=4	17 Sep 0940 - 1600
17 Sep 1058	ALERT: Geomagnetic K=5	17 Sep 1057
17 Sep 1107	WARNING: Geomagnetic K=5	17 Sep 1110 - 1600
17 Sep 2027	ALERT: Geomagnetic K=4	17 Sep 2025
17 Sep 2217	WARNING: Geomagnetic K=4	17 Sep 2220 – 18 Sep 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
20 Sept	75	8	3	04 Oct	80	5	2
21	75	5	2	05	80	5	2
22	75	5	2	06	80	5	2
23	75	15	5	07	80	5	2
24	75	12	4	08	80	5	2
25	75	8	3	09	80	5	2
26	75	8	3	10	80	5	2
27	75	5	2	11	80	5	2
28	75	20	5	12	80	5	2
29	75	10	3	13	80	10	3
30	75	12	4	14	80	15	4
01 Oct	80	20	5	15	75	20	5
02	80	10	3	16	75	10	3
03	80	8	3				



***Energetic Events***

Date	Time		X-ray	Optical Information			Peak		Sweep Freq	
	Begin	Max	Integ	Imp/	Location	Rgn	Radio Flux		Intensity	
			Class	Flux	Brtns		Lat	CMD	#	245
<i>No Events Observed</i>										

***Flare List***

Date	Time			Optical	Imp / Brtns	Location Lat CMD	Rgn
	Begin	Max	End	X-ray Class.			
11 September	1424	1438	1447	B1.9			908
	2304	2305	2319	C1.0	Sf	S11W03	908
12 September	0216	0227	0241	B1.8			908
	1814	1818	1827	B1.3			909
	1954	1959	2002	B1.8			909
	2313	2318	2331	B2.3			909
13 September	0041	0046	0052	B1.8			909
	0248	0253	0256	B1.8			909
	0407	0416	0421	B7.5			909
	1149	1153	1159	B1.0			909
	2027	2031	2034	B2.1			909
14 September	0310	0314	0316	B1.2			909
	0514	0518	0530	B1.3			
	0727	0735	0749	C1.0			909
	1102	1107	1111	B1.5			909
	1223	1241	1247	B4.1			909
	1329	1335	1339	B2.4			909
	1350	1357	1419	B2.2			908
	1519	1532	1546	B3.2			
	1618	1623	1628	B2.3			909
	1657	1701	1706	B2.0			909
15 September	2252	2253	2255	B3.2	Sf	S12W44	908
	0605	0610	0614	B3.6			908
	0616	0622	0626	B8.1			908
	0646	0650	0654	B1.1			
	2036	2039	2043	B1.0			
	2101	2105	2108	B3.3			908
	2135	2138	2141	B1.1			
	16 September	No Flares Observed					
17 September	1321	1325	1329	B1.2			



### Region Summary

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

#### Region 907

05 Sep	S13E44	157	0020	08	Bxo	005	B												
06 Sep	S13E31	157	0030	07	Csi	007	B												
07 Sep	S13E17	158	0020	07	Cso	003	B												
08 Sep	S13E03	159	0010	01	Axx	001	A												
09 Sep	S13W08	156	0020	06	Dso	004	B												
10 Sep	S12W20	155	0010	06	Bxo	005	B												
11 Sep	S12W32	159	0010	02	Hax	003	A												
12 Sep	S11W51	160	0010	01	Axx	001	A												
13 Sep	S12W62	158	0020	01	Axx	001	A												
14 Sep	S12W75	158																	
15 Sep	S12W88	158																	
											0	0	0	0	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 159

#### Region 908

05 Sep	S13E71	130	0110	03	Hax	001	A												
06 Sep	S12E59	129	0200	04	Hax	001	A												
07 Sep	S13E45	130	0210	05	Hax	001	A												
08 Sep	S13E32	130	0260	06	Hkx	003	A												
09 Sep	S15E19	129	0240	05	Cko	003	B												
10 Sep	S14E06	129	0230	05	Cao	005	B												
11 Sep	S13W07	129	0210	04	Hax	004	A	1			1								
12 Sep	S12W18	127	0190	09	Cao	007	B												
13 Sep	S13W34	130	0190	06	Cao	005	B												
14 Sep	S13W47	130	0190	05	Hax	004	A					1							
15 Sep	S13W60	129	0180	03	Hsx	002	A												
16 Sep	S13W73	129	0190	03	Hsx	003	A												
17 Sep	S14W90	133	0120	04	Hax	001	A												
											1	0	0	2	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 129



**Region Summary-Continued**

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

*Region 909*

06 Sep	S08E25	163	0050	08	Csi	015	B											
07 Sep	S09E09	166	0030	05	Cao	005	B											
08 Sep	S09W04	166	0060	06	Dso	015	B											
09 Sep	S08W17	165	0080	10	Dsi	014	B											
10 Sep	S11W30	165	0080	10	Dro	010	B											
11 Sep	S10W46	168	0030	09	Dro	005	B											
12 Sep	S09W60	169	0020	09	Bxo	003	B											
13 Sep	S09W80	176	0060	04	Bxo	002	B											
14 Sep	S08W95	178	0030	01	Axx	001	A				1							
											1	0	0	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 166

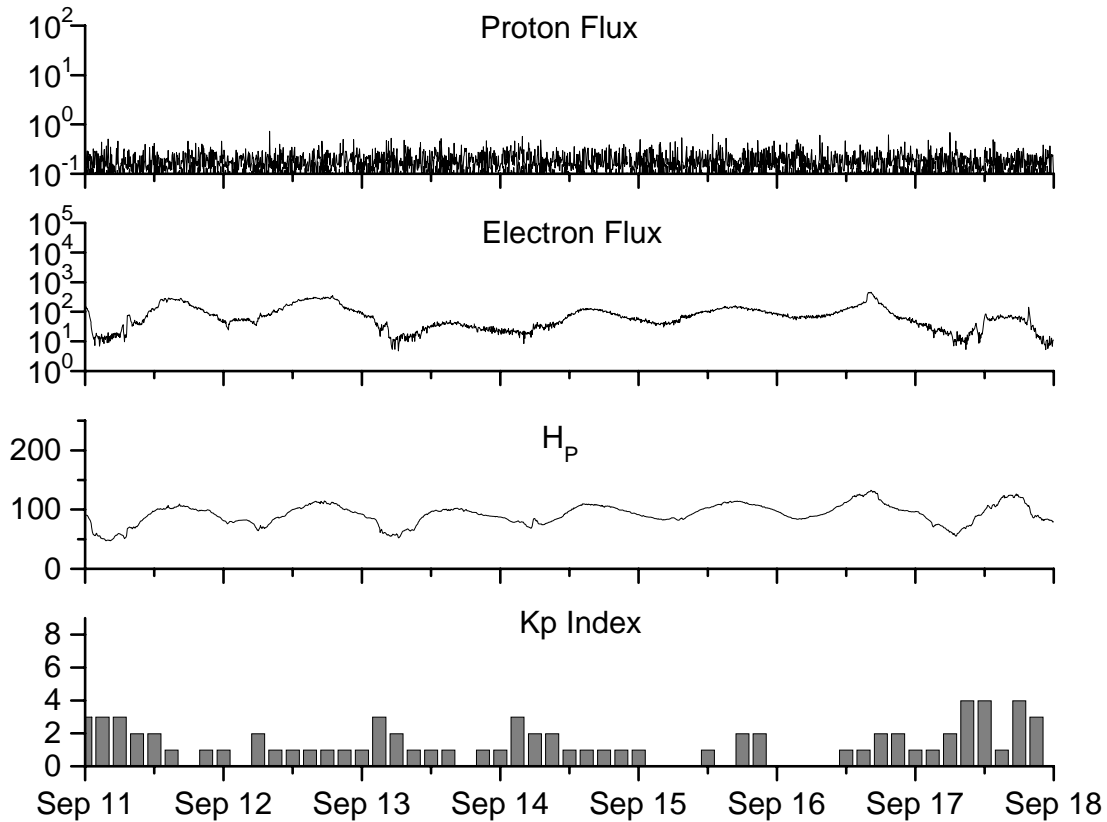


**Recent Solar Indices (preliminary)  
of the observed monthly mean values**

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
<b>2004</b>									
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	60.0	35.4	113.2	101.5	26	14.1
December	34.7	17.9	0.52	58.8	35.3	94.6	101.3	11	14.8
<b>2005</b>									
January	52.0	31.3	0.60	57.3	34.7	102.4	100.3	22	14.7
February	45.4	29.1	0.64	56.4	34.0	97.3	98.5	11	14.6
March	41.0	24.8	0.60	55.8	33.6	90.0	97.2	12	15.3
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
<b>2006</b>									
January	28.0	15.4	0.55			83.8		6	
February	5.3	4.7	0.89			76.6		6	
March	21.3	10.8	0.51			75.5		8	
April	55.2	30.2	0.55			89.0		11	
May	39.6	22.2	0.56			81.0		8	
June	37.7	13.9	0.37			80.1		8	
July	22.6	12.2	0.54			75.8		7	
August	22.8	12.9	0.57			79.0		9	

**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 11 September 2006*

*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).

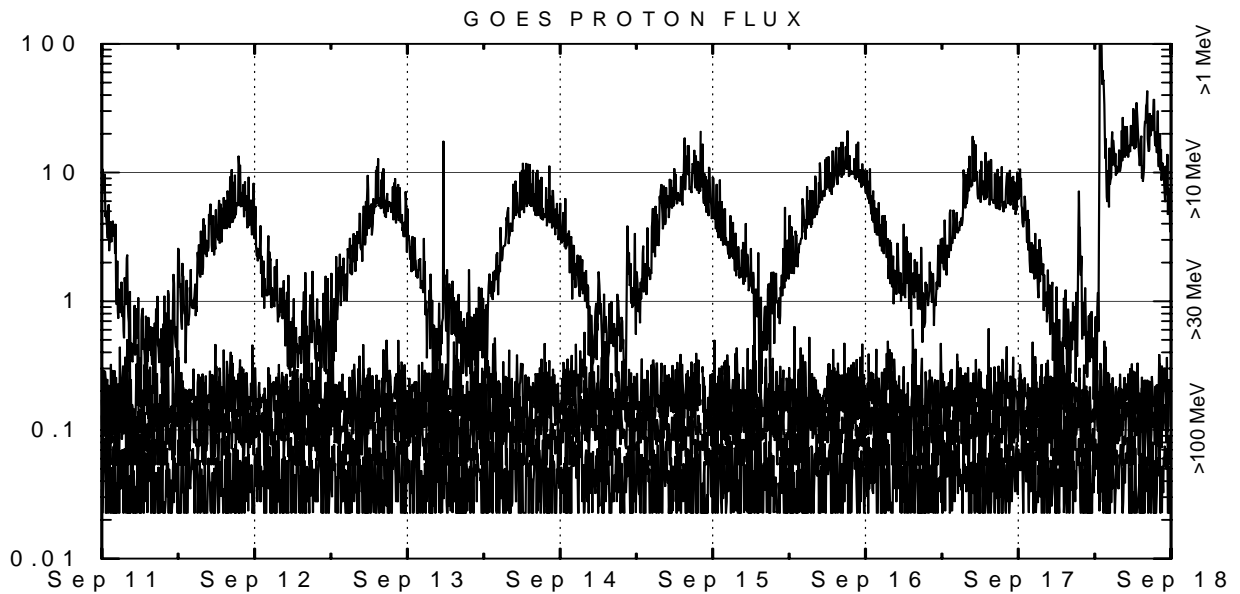
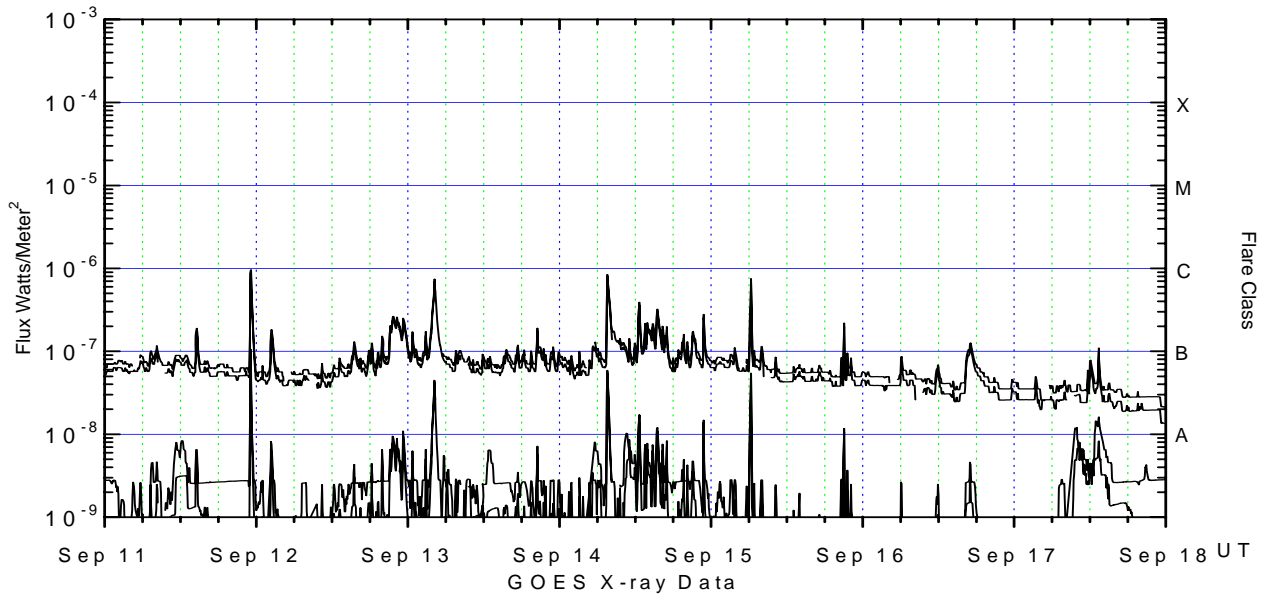
*H<sub>p</sub>* plot contains the five minute averaged magnetic field H - component in nanoteslas (nT) as measured by GOES-12. The H component is parallel to the spin axis of the satellite, which is nearly parallel to the Earth's rotation axis.

*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*

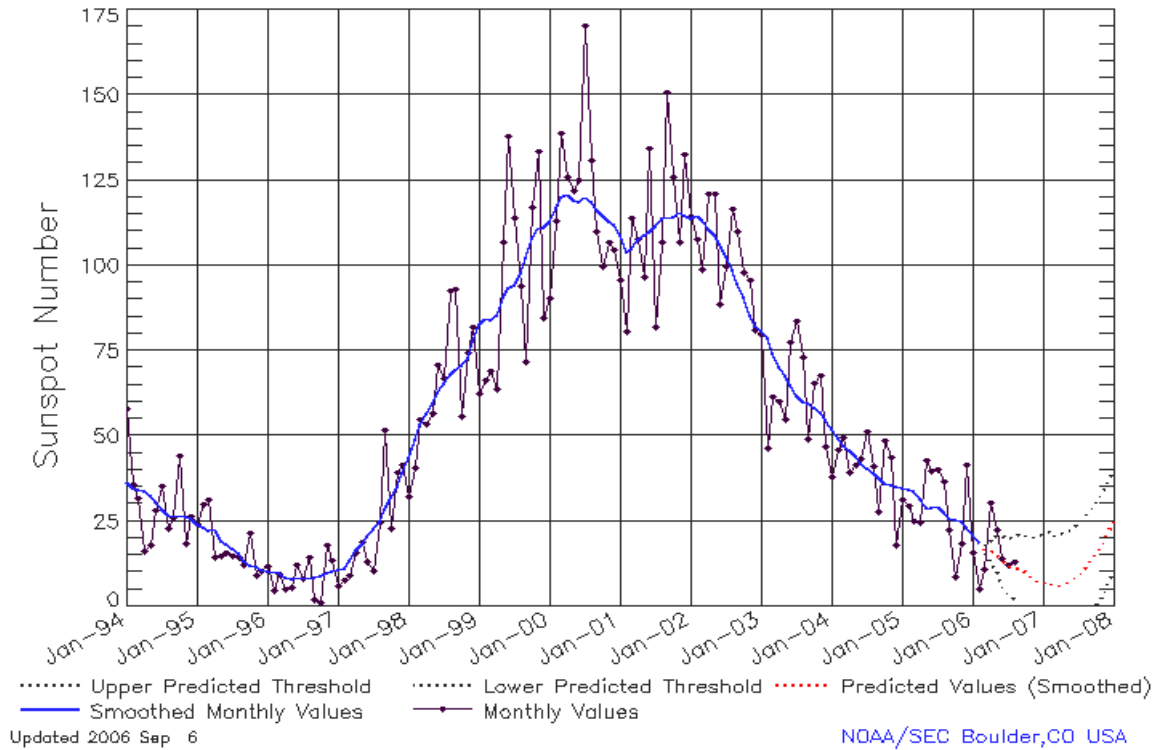
X-ray plot contains five-minute averaged x-ray flux (watts/m<sup>2</sup>) as measured by GOES 12 (W75) and GOES 11 (W135) in two wavelength bands, .05 - .4 and .1 - .8 nm. The letters A, B, C, M and X refer to x-ray event levels for the .1 - .8 nm band.

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 Aug 06



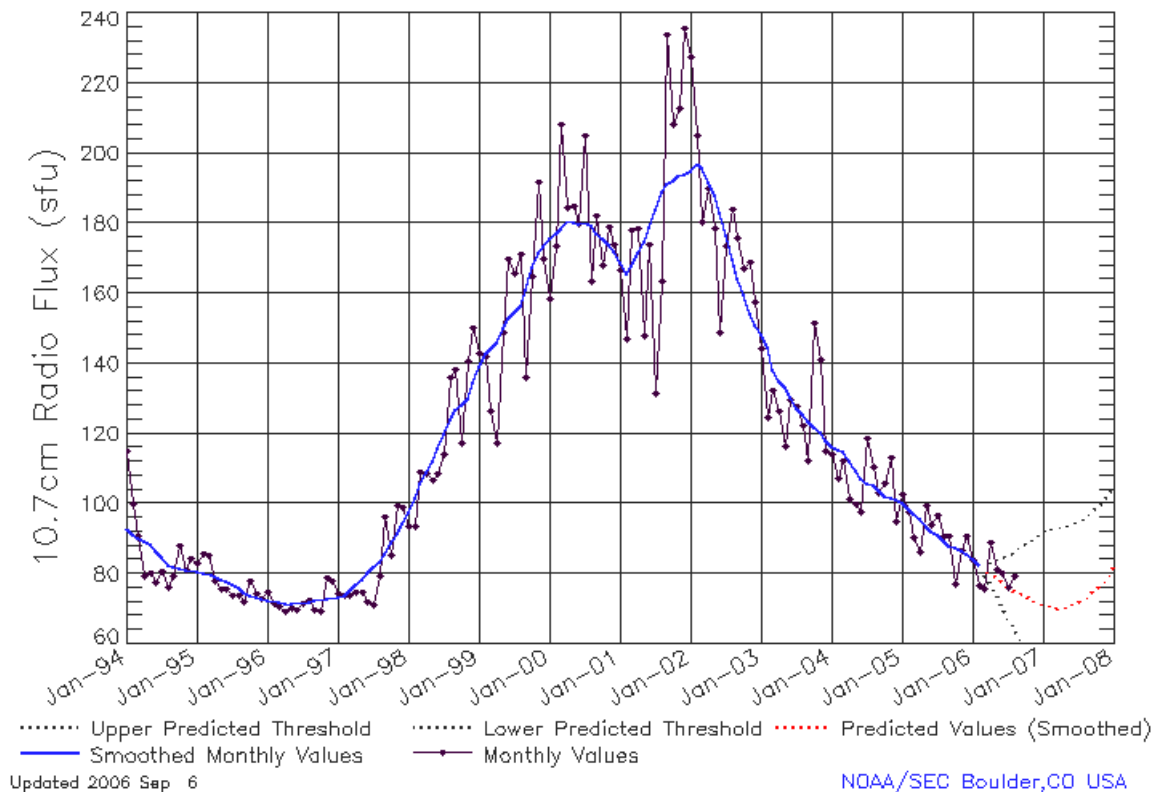
### SEC Prediction of Smoothed Sunspot Number

	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	<b>17</b>	<b>16</b>	<b>16</b>	<b>14</b>	<b>12</b>	<b>11</b>	<b>11</b>	<b>10</b>	<b>8</b>	<b>8</b>
	(**)	(**)	(1)	(3)	(5)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
2007	<b>7</b>	<b>7</b>	<b>6</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>10</b>	<b>11</b>	<b>13</b>	<b>16</b>	<b>18</b>	<b>21</b>
	(14)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)



## ISES Solar Cycle F10.7cm Radio Flux Progression

Data Through 31 Aug 06



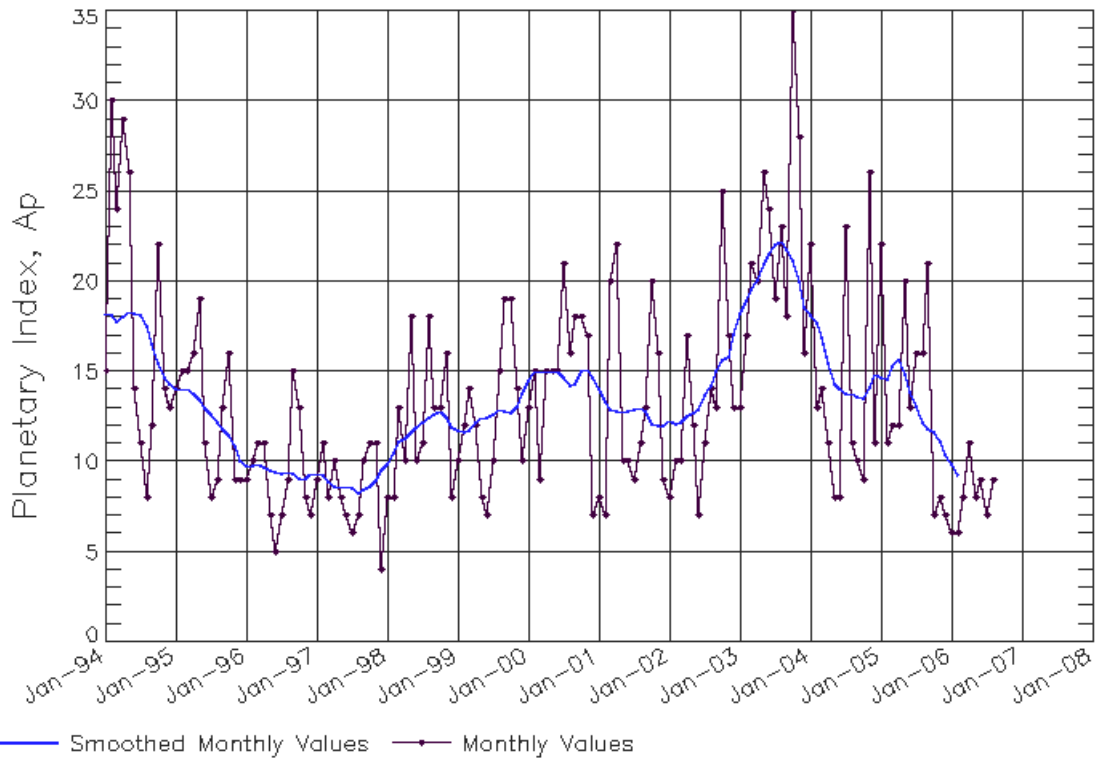
### SEC Prediction of Smoothed F10.7cm Radio Flux

	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	<b>81</b>	<b>80</b>	<b>79</b>	<b>78</b>	<b>76</b>	<b>75</b>	<b>75</b>	<b>74</b>	<b>73</b>	<b>72</b>
	(***)	(***)	(1)	(3)	(5)	(7)	(9)	(11)	(13)	(14)	(14)	(13)
2007	<b>71</b>	<b>70</b>	<b>70</b>	<b>71</b>	<b>71</b>	<b>71</b>	<b>72</b>	<b>73</b>	<b>74</b>	<b>76</b>	<b>77</b>	<b>79</b>
	(12)	(11)	(10)	(10)	(10)	(10)	(10)	(10)	(11)	(11)	(12)	(13)



# ISES Solar Cycle Ap Progression

Data Through 31 Aug 06



Updated 2006 Sep 6

NOAA/SEC Boulder, CO USA

