

**Space Weather Highlights**  
**30 October – 05 November 2006**

**SEC PRF 1627**  
**07 November 2006**

Solar activity was at very low to low levels. Two regions were responsible for C-flare activity this period, Region 921 (S06, L=139, class/area, Ehi/370 on 02 November) and Region 922 (S14, L=124, class/area, Dso/090 on 02 November). Region 921, the largest of the spot groups, produced two C-flares; a C1.3/Sf at 05/0751 UTC and a C3.7/Sf at 05/1227 UTC. Region 922 produced a low level C1 flare at 0423 UTC on 02 November. A Type II radio sweep occurred on 05 November at 1730 with estimated shock speeds of 1089 km/s. An associated CME was observed in LASCO C3 imagery at 05/1818 UTC with an estimated plane of sky speed of 1050 km/s. The CME ejecta were directed off the east limb and are not expected to be geoeffective.

No greater than 10 MeV proton events were observed.

The greater than 2 MeV electron flux at geosynchronous orbit was at high levels on 30 October – 03 November.

The geomagnetic field ranged from quiet to unsettled at middle latitudes, while active to major storm conditions were observed at high latitudes. A minor storm period was observed early in the summary period at high latitudes. The period began under the waning influence of a coronal hole high speed stream. Solar wind speed at ACE was decreasing from 600 km/s while the IMF Bz was generally fluctuating between +/- 5 nT. As a result, the geomagnetic field was at unsettled to minor storm levels through midday on 30 October at high latitudes with quiet to unsettled levels at middle latitudes. Thereafter, and through midday on 03 November, solar wind speed gradually decreased to a low of approximately 325 km/s midday on the 3rd and the IMF Bz did not vary much beyond +/- 3 nT. As a result, the geomagnetic field was at mostly quiet levels. By midday on 03 November, a very pronounced crossing of a solar sector boundary was observed. Wind speed and density both increased. As a result, quiet to unsettled levels were observed at middle latitudes, with minor to major storm periods at high latitudes on 03 November. By 04 November, wind speed had increased to about 450 km/s and the IMF Bz was fluctuating between +/- 7 nT. Only an isolated active period was observed at high latitudes. By the end of the period, wind speed had gradually declined to around 400 km/s. Several prolonged periods of southward Bz resulted in minor storm periods at high latitudes on 05 November.

**Space Weather Outlook**  
**08 November – 04 December 2006**

Solar activity is expected to be at very low to low levels with a slight chance for an isolated M-flare.

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 10 – 23 November and 26 – 30 November.

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 09 – 11 November, 17 November, and again on 24 – 25 November. Unsettled to minor storm periods are possible on 09 – 11 November and 24 – 25 November, while unsettled to active levels are expected on 17 November.



**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
30 October	76	15	50	A3.1	0	0	0	1	0	0	0	0
31 October	80	34	150	A4.7	0	0	0	0	0	0	0	0
01 November	87	46	310	A6.8	0	0	0	0	0	0	0	0
02 November	88	59	460	A7.5	1	0	0	0	0	0	0	0
03 November	87	57	320	A6.2	0	0	0	0	0	0	0	0
04 November	86	52	400	A4.5	0	0	0	0	0	0	0	0
05 November	85	62	380	A4.7	2	0	0	2	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
	30 October	1.6E+6	1.6E+4	3.6E+3		1.3E+8
31 October	7.5E+5	1.7E+4	3.8E+3		2.0E+8	
01 November	8.1E+5	1.7E+4	3.8E+3		1.4E+8	
02 November	6.4E+5	1.7E+4	3.8E+3		1.2E+8	
03 November	1.8E+6	1.7E+4	3.9E+3		5.7E+7	
04 November	7.7E+5	1.6E+4	3.7E+3		2.1E+7	
05 November	6.1E+5	1.7E+4	3.7E+3		9.2E+6	

**Daily Geomagnetic Data**

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	30 October	6	2-1-2-3-1-1-1-1	14	3-2-3-5-3-2-1-0	9
31 October	2	2-0-0-0-1-1-1-1	4	0-0-0-1-3-2-1-0	4	2-0-1-0-1-1-1-2
01 November	5	2-2-1-1-1-2-1-1	10	2-1-4-2-4-1-1-0	6	2-1-1-1-2-1-2-2
02 November	6	2-3-1-1-1-1-2-1	9	1-2-2-3-3-3-2-1	8	2-3-1-1-2-3-3-2
03 November	5	1-3-1-2-2-1-1-0	21	2-2-3-5-6-2-1-0	8	1-3-1-3-3-1-1-1
04 November	4	1-2-1-1-1-1-2-1	9	1-3-4-2-1-2-1-1	6	1-2-2-1-1-2-2-2
05 November	3	0-0-2-2-1-1-0-0	15	0-0-3-5-5-2-1-0	5	0-1-2-3-1-1-0-1



*Alerts and Warnings Issued*

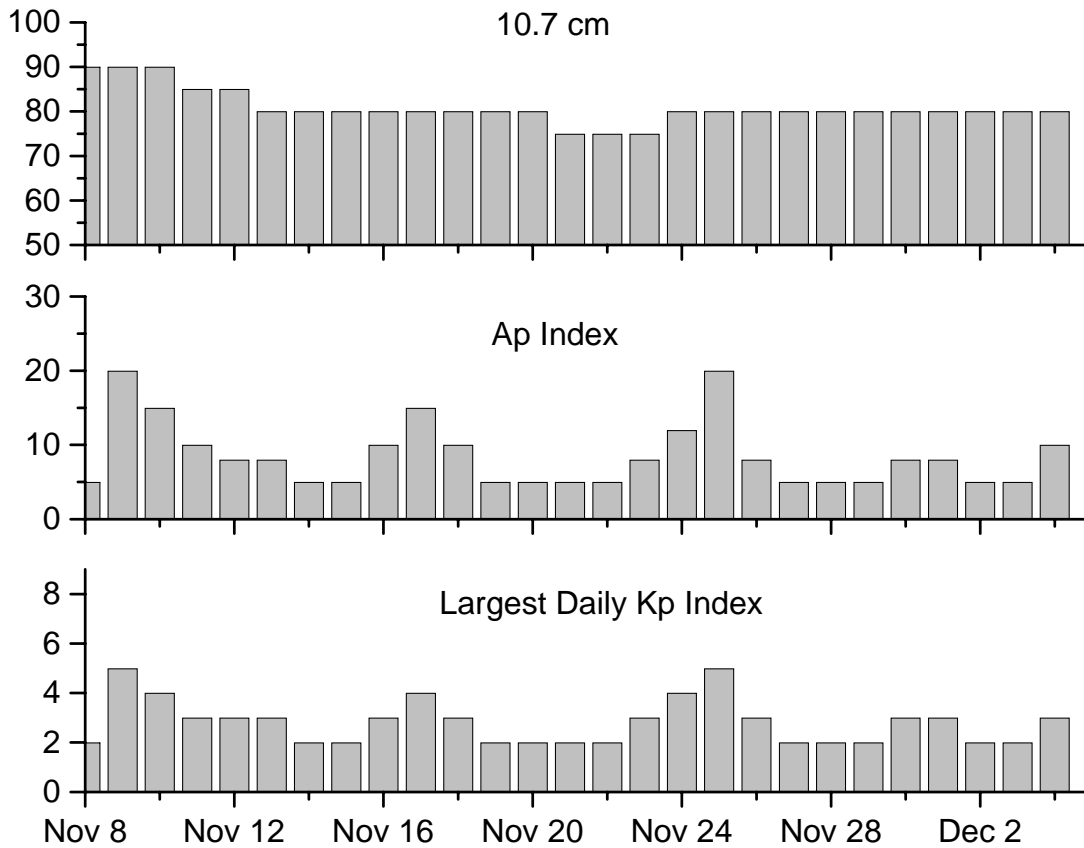
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Date & Time of Issue	Type of Alert or Warning	Date & Time of Event UTC
30 Oct 1110	ALERT: Electron 2MeV Integral Flux >1000pfu	30 Oct 1050
31 Oct 0502	ALERT: Electron 2MeV Integral Flux >1000pfu	31 Oct 0500
01 Nov 1046	ALERT: Electron 2MeV Integral Flux >1000pfu	01 Nov 1025
02 Nov 1052	ALERT: Electron 2MeV Integral Flux >1000pfu	02 Nov 1035
03 Nov 1115	ALERT: Electron 2MeV Integral Flux >1000pfu	03 Nov 1100
05 Nov 2013	ALERT: Type II Radio Emission	05 Nov 1730

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### 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
08 Nov	90	5	2	22 Nov	75	5	2
09	90	20	5	23	75	8	3
10	90	15	4	24	80	12	4
11	85	10	3	25	80	20	5
12	85	8	3	26	80	8	3
13	80	8	3	27	80	5	2
14	80	5	2	28	80	5	2
15	80	5	2	29	80	5	2
16	80	10	3	30	80	8	3
17	80	15	4	01 Dec	80	8	3
18	80	10	3	02	80	5	2
19	80	5	2	03	80	5	2
20	80	5	2	04	80	10	3
21	75	5	2				



### *Energetic Events*

Date	Time		X-ray		Optical Information			Peak		Sweep Freq	
	Begin	Max	Max	Class	Flux	Imp/ Brtns	Location Lat CMD	Rgn #	Radio Flux		Intensity
									245	2695	II
<i>No Events Observed</i>											

### *Flare List*

Date	Begin	Time		Optical X-ray Class.	Imp/ Brtns	Location Lat CMD	Rgn
		Max	End				
30 October	0909	0920	0935	B1.7			
	2223	2235	2243				
31 October	0149	0153	0155	B1.4	Sf	S05E59	921
	0400	0404	0408				
	0527	0542	0552				
	1233	1248	1301				
	1532	1538	1540				
	1625	1632	1638				
	1952	2028	2058				
01 November	0420	0424	0427	B1.2			
	0636	0641	0645	B1.2			
	0821	0837	0856	B2.4			
	1818	1822	1825	B5.8			
02 November	1903	1907	1910	B6.2			
	0201	0205	0210	B1.3			
	0212	0216	0218	B3.5			
	0323	0332	0338	B6.2			
	0405	0408	0412	B1.6			
	0413	0423	0433	C1.0			922
	0557	0600	0603	B2.3			
	0810	0813	0816	B2.2			
	1008	1011	1016	B2.2			
	1649	1656	1703	B3.0			
	1738	1743	1754	B1.6			
	1905	1914	1925	B1.6			
	2128	2135	2139	B5.2			
03 November	0049	0056	0102	B1.2			
	0422	0433	0438	B5.3			
	0508	0511	0513	B1.9			
	0922	0925	0928	B1.1			
	1749	1752	1756	B1.1			
	1925	1929	1932	B1.5			
	2152	2156	2201	B1.0			



*Flare List-Continued*

Date	Time			Optical	Imp / Brtns	Location Lat CMD	Rgn
	Begin	Max	End	X-ray Class.			
04 November	0533	0544	0550	B1.4			
	1314	1317	1321	B1.6			
	1535	1540	1547	B1.2			
	1715	1719	1722	B1.6			
05 November	0311	0314	0316	B1.3	921		
	0747	0749	0753	C1.3	Sf	S08W12	921
	1114	1122	1134	B1.2			
	1226	1227	1239	C3.7	Sf	S07W13	921



### Region Summary

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

#### Region 919

27 Oct	S15W01	236	0020	04	Bxo	004	B										
28 Oct	S15W15	236	0020	04	Bxo	003	B										
29 Oct	S15W28	236															
30 Oct	S15W41	236															
31 Oct	S15W54	236															
01 Nov	S15W67	236															
02 Nov	S15W80	236															
											0	0	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 236

#### Region 921

30 Oct	S06E58	137	0050	05	Cro	005	B										
31 Oct	S07E44	138	0120	08	Dai	012	Bg										
01 Nov	S07E30	139	0270	13	Eai	022	Bg										
02 Nov	S06E16	139	0370	14	Ehi	031	Bg										
03 Nov	S06E02	140	0250	14	Esi	026	Bg										
04 Nov	S06W11	140	0320	14	Eai	022	Bg										
05 Nov	S08W24	140	0290	13	Eso	026	Bg	2			2						
								2	0	0	3	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 140

#### Region 922

31 Oct	S15E58	124	0030	05	Cro	002	B										
01 Nov	S14E44	125	0040	06	Cso	004	B										
02 Nov	S14E31	124	0090	07	Dso	008	B	1									
03 Nov	S13E18	124	0070	07	Dso	011	B										
04 Nov	S14E03	126	0080	08	Dso	010	B										
05 Nov	S09W13	129	0090	10	Cao	016	B										
								1	0	0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 126



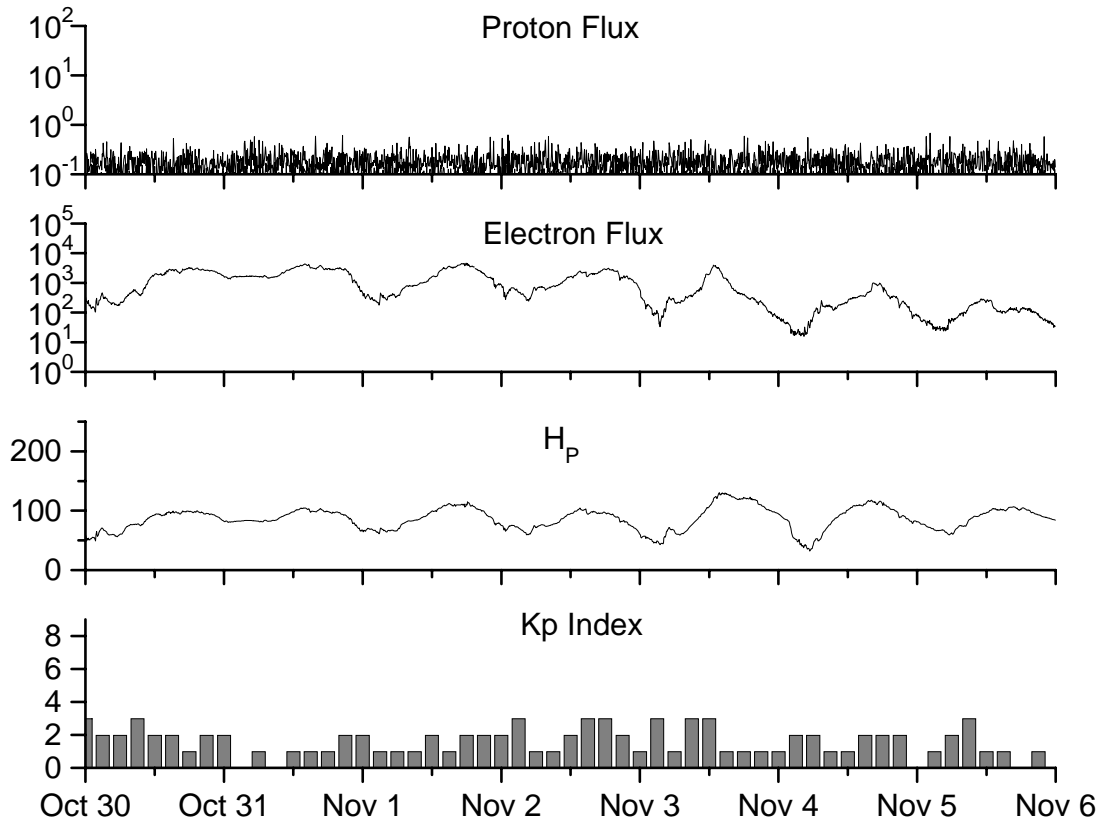
**Recent Solar Indices (preliminary)  
of the observed monthly mean values**

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>2004</b>									
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	37.2	20.8	83.8	84.0	6	9.9
February	5.3	4.7	0.89	33.4	18.7	76.6	82.6	6	9.2
March	21.3	10.8	0.51	31.0	17.4	75.5	81.6	8	8.4
April	55.2	30.2	0.55	30.6	17.1	89.0	80.9	11	7.9
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	
September	25.2	14.5	0.58			77.8		8	
October	15.7	10.4	0.66			74.3		7	

**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 30 October 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.

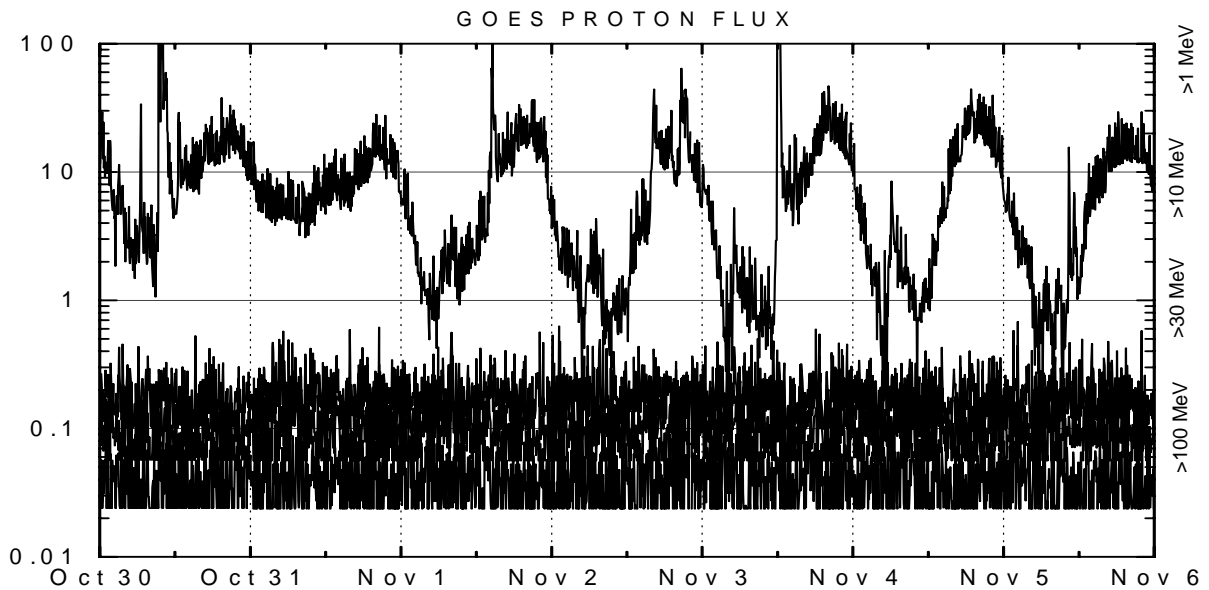
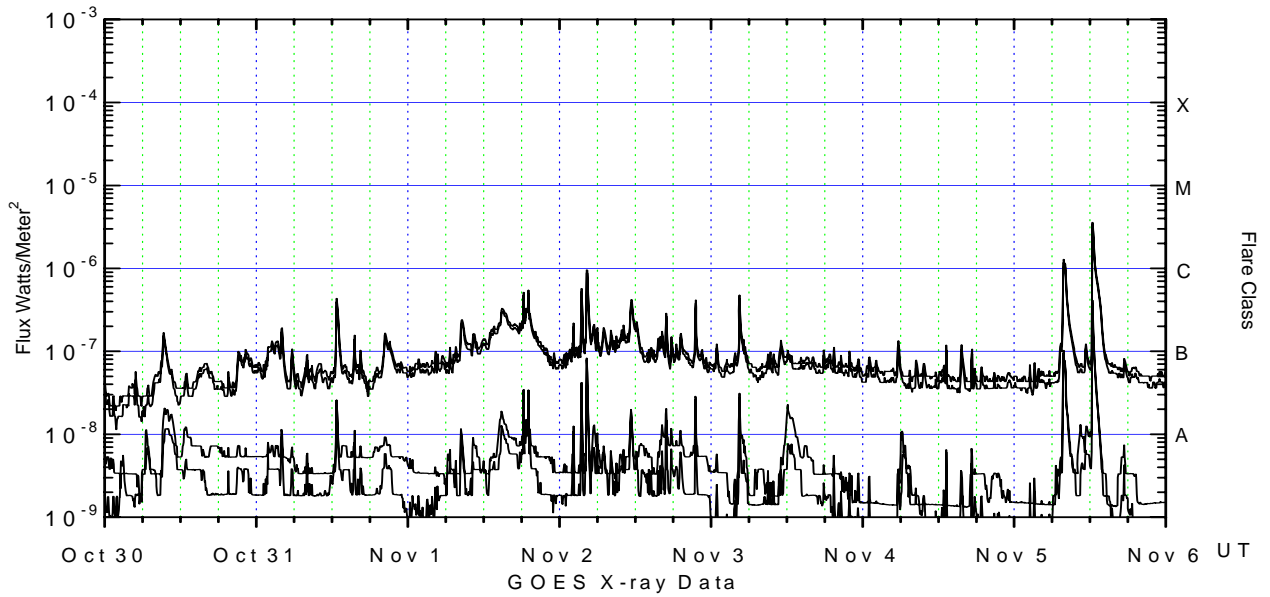
*Electrons* plot contains the five-minute averaged integral electron flux (electrons/cm<sup>2</sup>-sec -sr) with energies greater than 2 MeV at GOES-12 (W075).

*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*

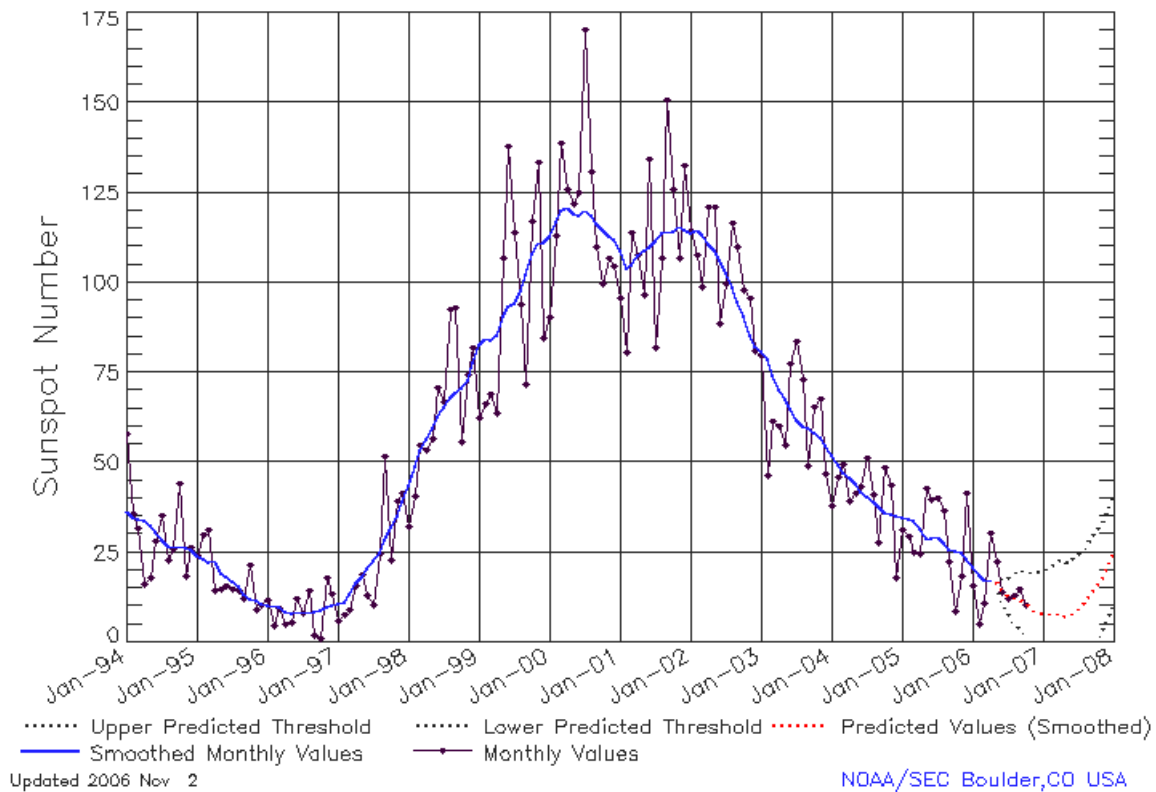
X-ray plot contains five-minute averaged x-ray flux (watts/m<sup>2</sup>) as measured by GOES 12 (W075) and GOES 11 (W135) in two wavelength bands, .05 - .4 and .1 - .8 nm. The letters A, B, C, M and X refer to x-ray event levels for the .1 - .8 nm band.

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 Oct 06



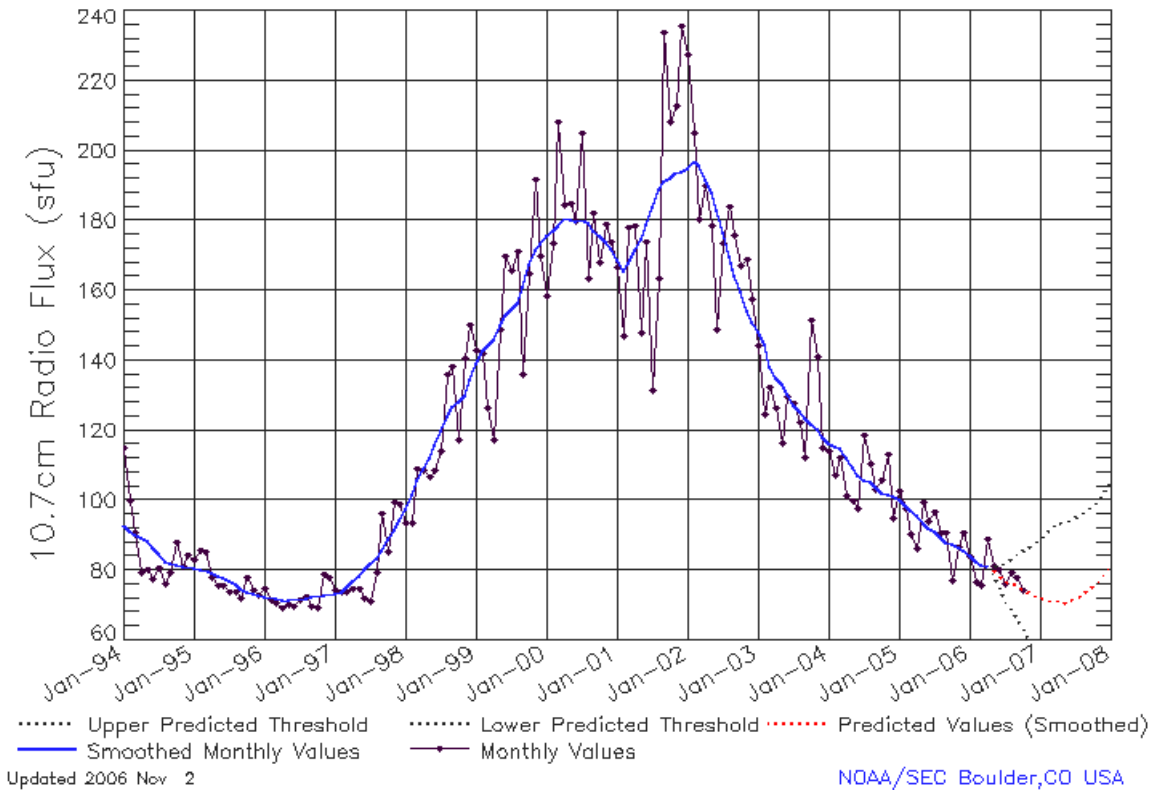
### SEC Prediction of Smoothed Sunspot Number

	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	17	17	<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)	98)	(9)	(10)	(11)
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>
	(12)	(13)	(14)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)	(15)



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

Data Through 31 Oct 06



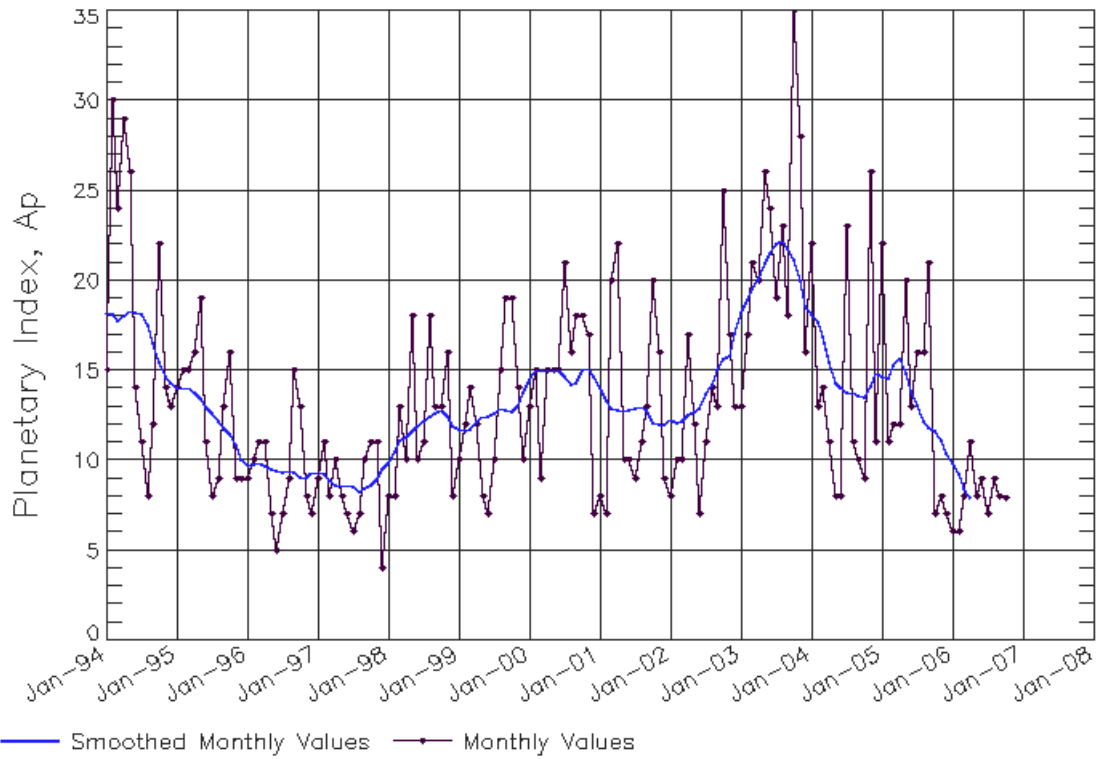
### SEC Prediction of Smoothed F10.7cm Radio Flux

	<b>Jan</b>	<b>Feb</b>	<b>Mar</b>	<b>Apr</b>	<b>May</b>	<b>Jun</b>	<b>Jul</b>	<b>Aug</b>	<b>Sep</b>	<b>Oct</b>	<b>Nov</b>	<b>Dec</b>
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	82	81	<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)	(13)	(13)	(14)
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>
	(14)	(13)	(12)	(11)	(10)	(10)	(10)	(10)	(10)	(10)	(11)	(11)



# ISES Solar Cycle Ap Progression

Data Through 31 Oct 06



Updated 2006 Nov 2

[NOAA/SEC Boulder, CO USA](#)

