

Solar activity was very low to low. New Region 933 (S03, L=032, class/area, Cao/210 on 31 December) rotated onto the visible disk on 30 December and produced a C1/sf flare at 31/1717 UTC. Region 933 is the return of old Region 930 (S05, L=010, class/area, Dki/680 on 12 December) which was responsible for four X-class flares.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit was at high levels throughout the period.

The geomagnetic field ranged from quiet to unsettled levels at all latitudes. The period started with the solar wind speed elevated around 600 km/s as a coronal hole high speed stream was moving out of geoeffective position. Quiet to unsettled conditions were observed at all latitudes on 25 December. Solar wind speed continued to decrease to around 320 km/s early on 29 December with the IMF Bz variable between +/- 3 nT. The geomagnetic field was quiet during this time. A solar sector boundary crossing was observed early on 29 December followed by a brief increase in solar wind speed to around 380 km/s. Thereafter solar wind speed was in decline to a low around 290 km/s by midday on 31 December. The IMF Bz continued to not vary much beyond +/- 3 nT. The geomagnetic field was quiet for the rest of the period.

### **Space Weather Outlook** **03 January 2007 – 29 January 2007**

Solar activity is expected to be at very low to low levels. There is a slight chance for moderate level activity until 12 January when Region 933 departs the visible disk.

There is a slight chance for a proton event until Region 933 departs the visible disk on 12 January. No proton events are expected during the rest of the period.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to be at high levels during 03 – 28 January.

The geomagnetic field is expected to range from quiet to minor storm conditions. Recurrent coronal hole high-speed streams are forecast to disturb the field on 03 January and again on 16 - 19 January. Active to minor storm conditions are possible on 03 January. Unsettled to active conditions are possible on 16 – 19 January. Quiet to unsettled conditions are expected for the remainder of the period.



### *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
25 December	76	31	30	<A1.0	0	0	0	1	0	0	0	0
26 December	75	25	30	<A1.0	0	0	0	0	0	0	0	0
27 December	73	23	20	<A1.0	0	0	0	0	0	0	0	0
28 December	76	0	0	A1.8	0	0	0	0	0	0	0	0
29 December	78	0	0	A2.2	0	0	0	0	0	0	0	0
30 December	80	11	60	A4.9	0	0	0	0	0	0	0	0
31 December	83	28	260	A4.8	1	0	0	1	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
25 December	4.5E+6	1.7E+4	4.7E+3		6.2E+8	
26 December	3.9E+6	1.7E+4	5.0E+3		6.4E+8	
27 December	4.0E+6	1.7E+4	5.2E+3		6.3E+8	
28 December	5.6E+6	1.8E+4	5.3E+3		6.9E+8	
29 December	5.2E+6	1.7E+4	5.1E+3		5.5E+8	
30 December	4.4E+6	1.8E+4	4.4E+3		3.9E+8	
31 December	4.8E+6	1.8E+4	4.5E+3		2.3E+8	

### *Daily Geomagnetic Data*

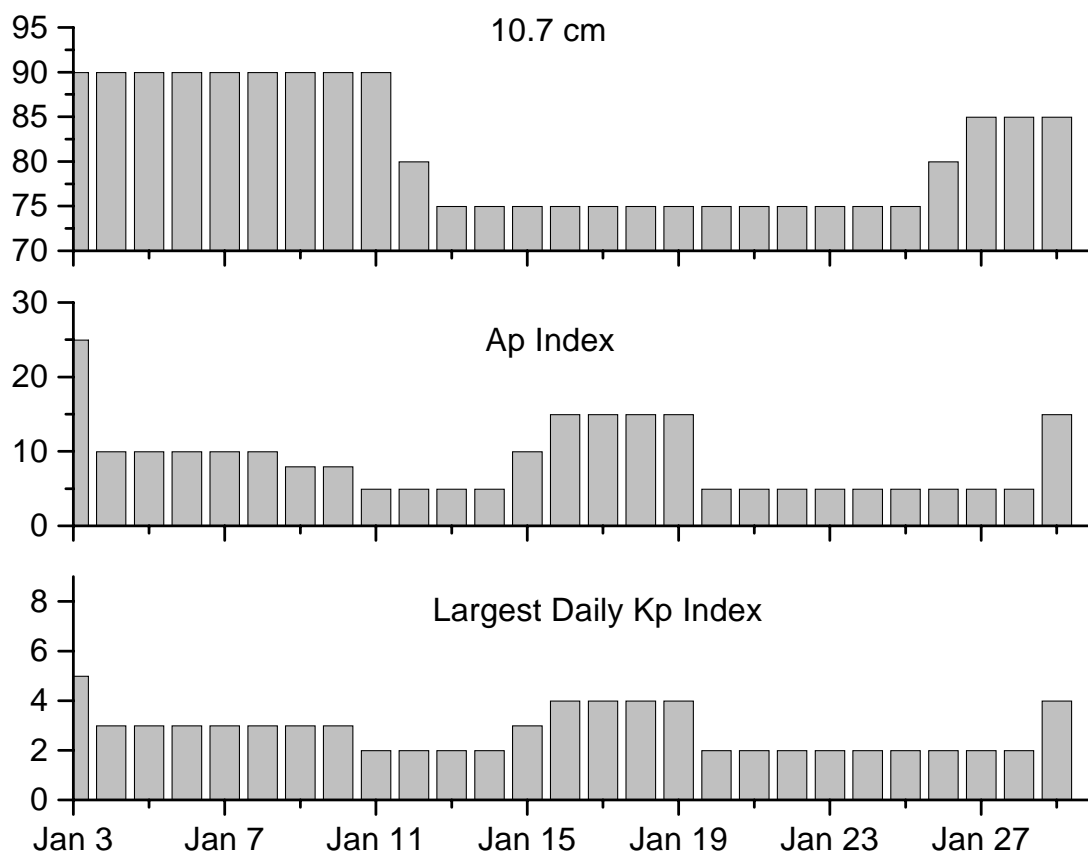
Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
25 December	4	3-1-1-1-1-0-1	10	3-2-2-2-3-3-1-2	6	3-2-2-1-2-1-0-1
26 December	3	1-1-1-1-1-1-0	3	1-0-1-2-1-1-1-0	3	1-0-1-1-1-1-1-0
27 December	2	1-1-0-0-1-2-1-0	0	0-0-0-1-0-0-0-0	2	1-0-0-0-0-1-0-0
28 December	1	0-0-0-0-1-1-0-0	0	0-0-0-0-0-0-0-0	2	0-0-0-0-0-1-0-2
29 December	1	0-0-0-0-1-1-1-0	0	0-0-0-1-0-0-0-0	2	0-0-0-0-1-1-1-1
30 December	2	1-0-0-0-1-1-1-0	0	0-0-0-0-0-0-0-0	2	1-0-0-0-0-0-0-0
31 December	1	0-0-0-0-1-1-0-0	0	0-0-0-0-0-0-0-0	0	0-0-0-0-0-0-0-0

### *Alerts and Warnings Issued*

Date & Time of Issue	Type of Alert or Warning	Date & Time of Event UTC
25 Dec 0509	ALERT: Electron 2MeV Integral Flux ≥1000pfu	25 Dec 0500
26 Dec 0501	ALERT: Electron 2MeV Integral Flux ≥1000pfu	26 Dec 0500
27 Dec 0504	ALERT: Electron 2MeV Integral Flux ≥1000pfu	27 Dec 0500
28 Dec 0502	ALERT: Electron 2MeV Integral Flux ≥1000pfu	28 Dec 0500
29 Dec 0547	ALERT: Electron 2MeV Integral Flux ≥1000pfu	29 Dec 0500
30 Dec 0554	ALERT: Electron 2MeV Integral Flux ≥1000pfu	30 Dec 0500
31 Dec 0559	ALERT: Electron 2MeV Integral Flux ≥1000pfu	31 Dec 0510



# *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 Jan	90	25	5	17 Jan	75	15	4
04	90	10	3	18	75	15	4
05	90	10	3	19	75	15	4
06	90	10	3	20	75	5	2
07	90	10	3	21	75	5	2
08	90	10	3	22	75	5	2
09	90	8	3	23	75	5	2
10	90	8	3	24	75	5	2
11	90	5	2	25	75	5	2
12	80	5	2	26	80	5	2
13	75	5	2	27	85	5	2
14	75	5	2	28	85	5	2
15	75	10	3	29	85	15	4
16	75	15	4				



### ***Energetic Events***

Date	Time		X-ray		Optical Information			Peak		Sweep Freq	
	$\frac{1}{2}$		Integ		Imp/	Location	Rgn	Radio Flux		Intensity	
	Begin	Max	Max	Class	Flux	Brtns	Lat CMD	#	245	2695	II

*No Events Observed*

### ***Flare List***

Date	Time			Optical	Imp /	Location	Rgn
	Begin	Max	End	X-ray Class.			
25 December	1759	1803	1806	B1.3			
	1933	1935	1940	B3.9	Sf	S06E38	
	2106	2110	2115	B1.7			932
26 December	<i>No Flares Observed</i>						
27 December	<i>No Flares Observed</i>						
28 December	<i>No Flares Observed</i>						
29 December	1028	1043	1052	B1.6			
30 December	0142	0202	0209	B2.5			
	0235	0240	0246	B3.0			
	0636	0640	0648	B1.8			
	1127	1132	1139	B1.1			
	1154	1159	1203	B1.3			
31 December	0041	0046	0053	B1.1			933
	0715	0715	0734	C1.3	Sf	S01E75	933
	1111	1119	1124	B1.5			933
	1459	1503	1508	B2.3			933

### ***Region Summary***

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

#### *Region 931*

25 Dec S08E55	122	0010	01	Axx	001	A
26 Dec S08E39	125	0010	01	Axx	001	A
27 Dec S07E27	123	0010	01	Axx	001	A
28 Dec S07E14	123					
29 Dec S07E01	123					
30 Dec S07W12	123					
31 Dec S07W25	123					

0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 123



### ***Region Summary – continued.***

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

#### *Region 932*

25 Dec S07E35	142	0020	04	Cso	010	B
26 Dec S07E21	143	0020	04	Cso	004	B
27 Dec S08E08	142	0010	04	Bxo	002	B
28 Dec S08W05	142					
29 Dec S08W18	142					
30 Dec S08W31	142					
31 Dec S08W44	142					

0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 142

#### *Region 933*

30 Dec S04E78	033	0060	01	Axx	001	A
31 Dec S03E66	032	0210	09	Cao	004	B

1 1  
1 0 0 1 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 032

#### *Region 934*

31 Dec N04E64	034	0050	03	Cro	004	B
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0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 034

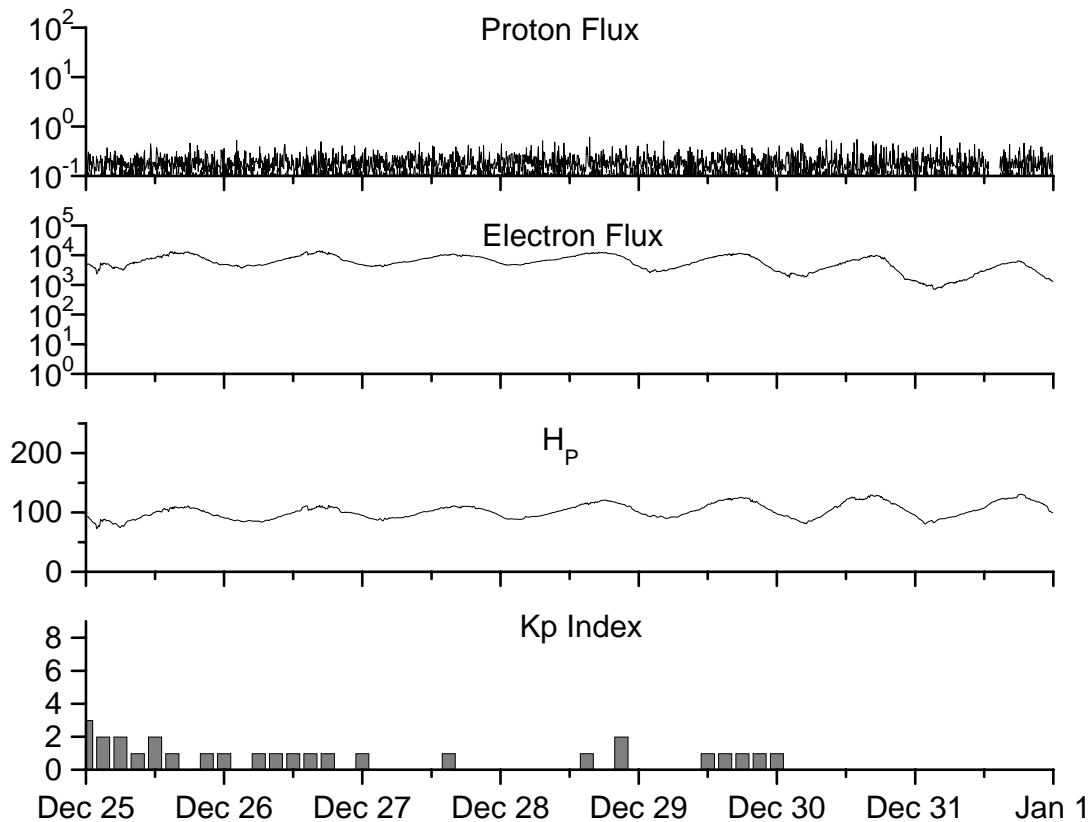


***Recent Solar Indices (preliminary)  
of the observed monthly mean values***

Month	Sunspot Numbers					Radio Flux		Geomagnetic	
	Observed values		Ratio	Smooth values		*Penticton	Smooth	Planetary	Smooth
	SEC	RI	RI/SEC	SEC	RI	10.7 cm	Value	Ap	Value
<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	30.7	17.3	81.0	80.8	8	7.9
June	37.7	13.9	0.37	28.9	16.3	80.1	80.6	8	8.3
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	
November	31.5	21.5	0.68			86.4		8	
December	22.2	13.6	0.61			84.3		14	

**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 25 December 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.

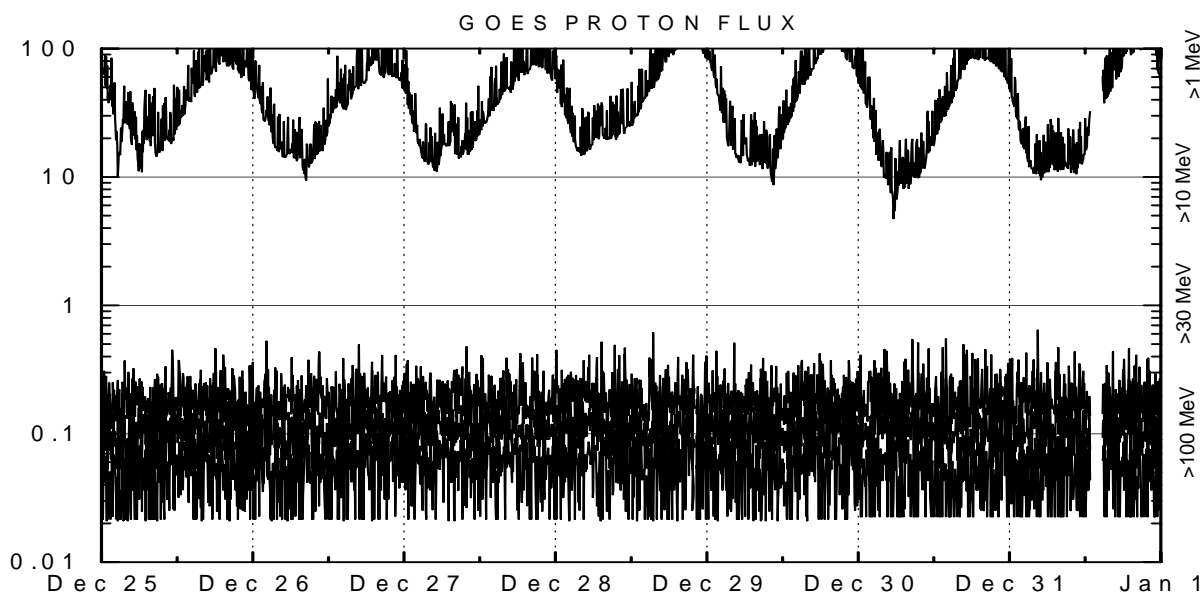
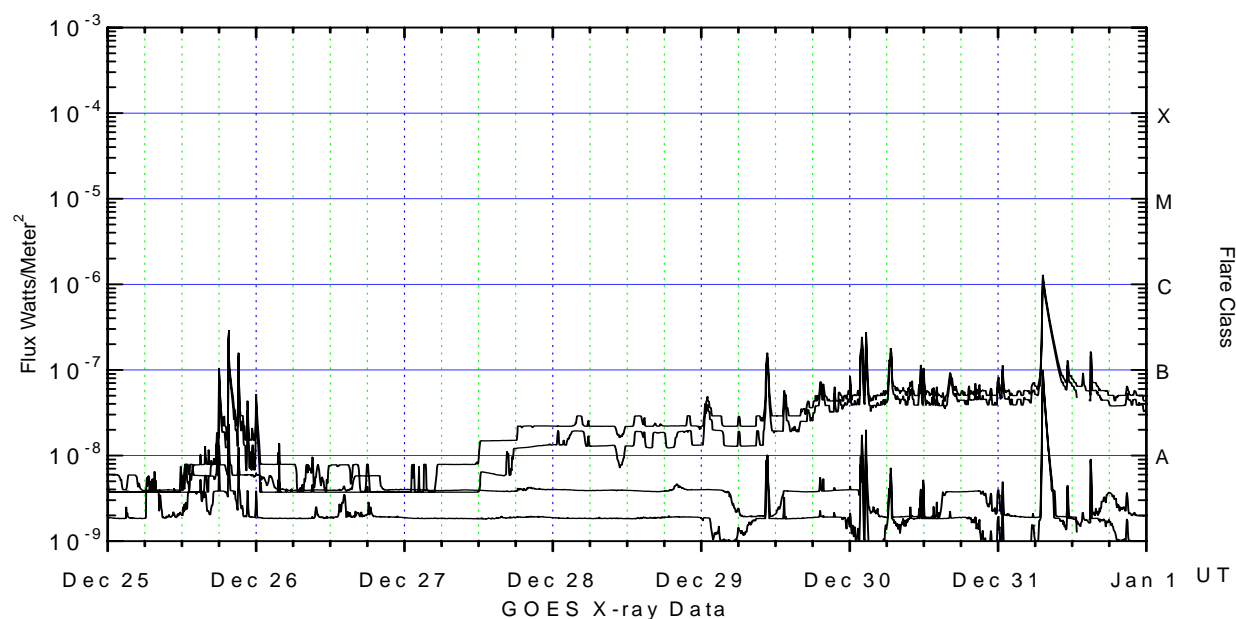
*Electrons* plot contains the five-minute averaged integral electron flux (electrons/cm<sup>2</sup>-sec-sr) with energies greater than 2 MeV at GOES-12 (W075).

*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.

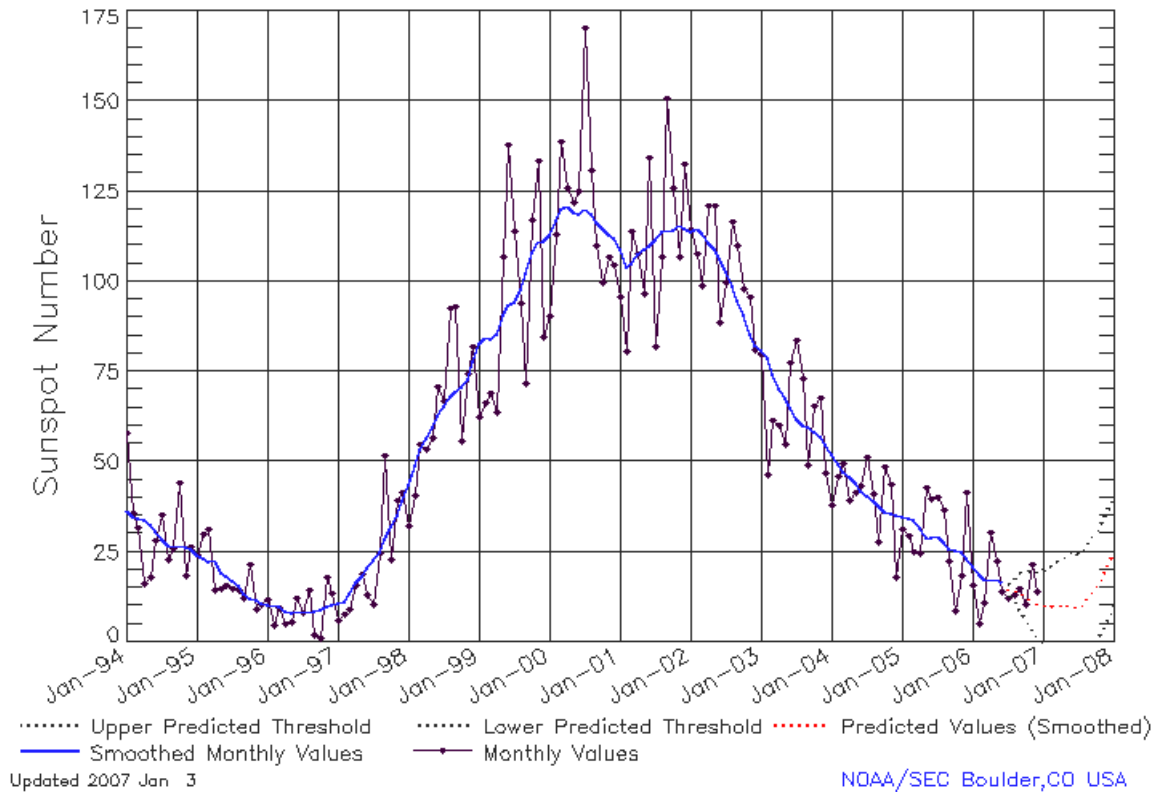
Proton plot contains the five-minute averaged integral proton flux (protons/cm<sup>2</sup>-sec-sr) as measured by GOES-11 (W135) for each of the energy thresholds: >1, >10, >30 and >100 MeV. P10 event threshold is 10 pfu (protons/cm<sup>2</sup>-sec-sr) at greater than 10 MeV.





# ISES Solar Cycle Sunspot Number Progression

Data Through 31 Dec 06



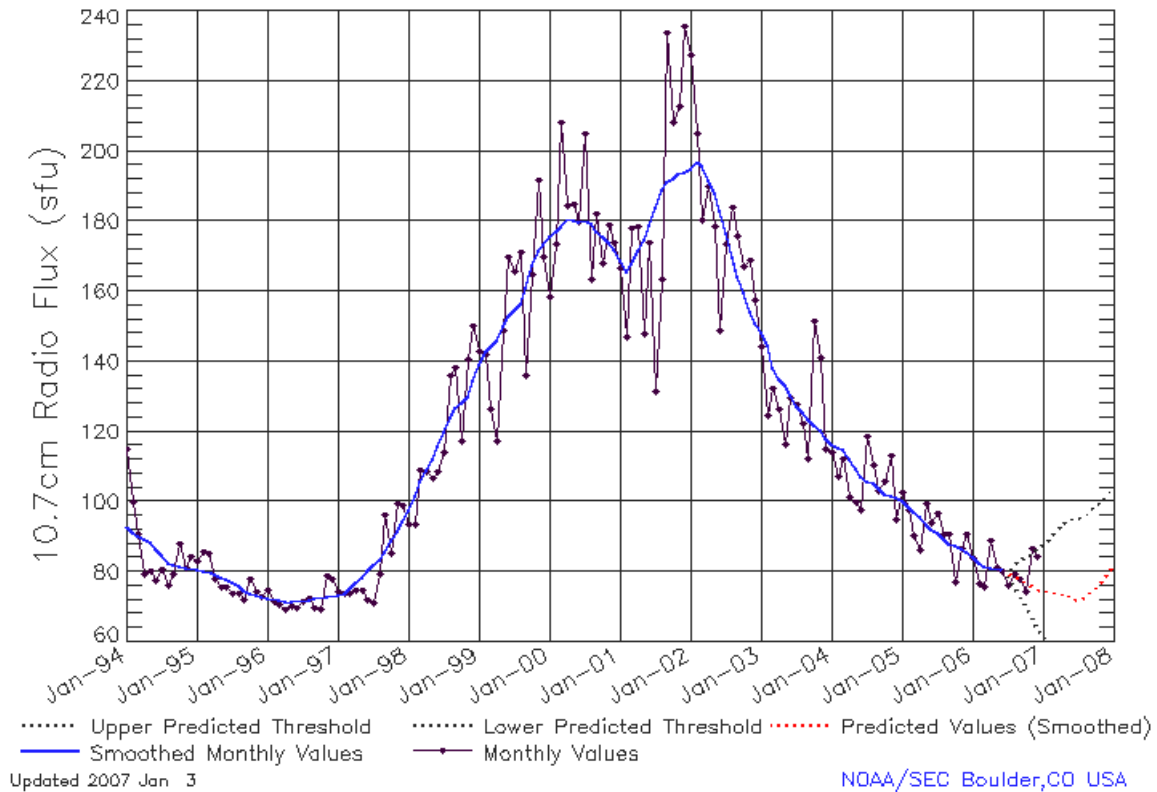
## SEC Prediction of Smoothed Sunspot Number

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



# ISES Solar Cycle F10.7cm Radio Flux Progression

Data Through 31 Dec 06



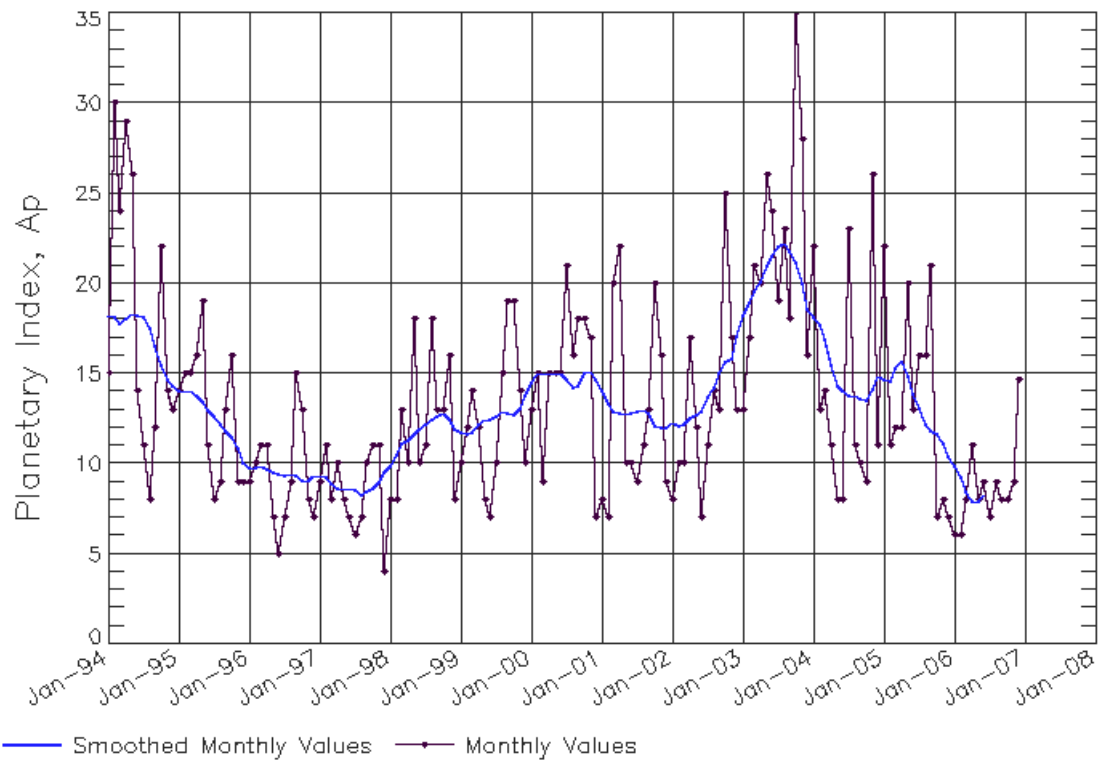
## SEC Prediction of Smoothed F10.7cm Radio Flux

	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	82	81	81	81	<b>80</b>	<b>79</b>	<b>78</b>	<b>77</b>	<b>76</b>	<b>75</b>
	(***)	(***)	(***)	(***)	(***)	(***)	(1)	(3)	(5)	(7)	(9)	(13)
2007	<b>75</b>	<b>74</b>	<b>74</b>	<b>74</b>	<b>74</b>	<b>73</b>	<b>72</b>	<b>73</b>	<b>74</b>	<b>76</b>	<b>77</b>	<b>79</b>
	(13)	(14)	(14)	(13)	(12)	(11)	(10)	(10)	(10)	(10)	(10)	(10)



# ISES Solar Cycle Ap Progression

Data Through 31 Dec 06



Updated 2007 Jan 3

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

