

**Space Weather Highlights
01-07 February 1999**

Solar activity ranged from very low to low levels. Isolated, small c-class events occurred, most of which were not optically correlated. The 06 February 10.7 cm radio flux reading (99.0) was the lowest since last July. A few large, high-latitude filaments disappeared from the southern hemisphere during 05 - 06 February.

Real-time solar wind data were available from the Advanced Composition Explorer (ACE) spacecraft during most of the period. Phi data indicated a shift to a toward solar sector (negative polarity, phi angle near 315 degrees) on 03 February. We remained within a toward sector for the rest of the period. Particle densities at >10 MeV were enhanced on 03 - 04 February and peaked at 18 p/cc. IMF Bz hovered around zero in the plus to minus 08 nT (GSM) range during most of the period. However, Bz became more variable on 04 February with maximum southerly deflections to minus 12 nT. No significant velocity changes were detected during the period.

There were no significant proton enhancements detected at geo-synchronous altitude.

The greater than 2 MeV electron flux at geosynchronous altitude was at normal to moderate levels through the period.

The geomagnetic field was at quiet to unsettled levels during most of the period. However, there were brief active to minor storm periods detected during 05 - 07 February.

**Space Weather Outlook
10 February 1999 - 08 March 1999**

Solar activity is expected to be low to moderate. Isolated M-class flares are possible during the forecast period.

No significant proton enhancements are expected at geosynchronous altitude.

The greater than 2 MeV electron flux at geosynchronous altitude is expected to be at normal to moderate levels during most of the period with high levels possible during 10 - 13 February.

The geomagnetic field is expected to be at quiet to unsettled levels during most of the period. However, active periods are possible during 10 - 11 February due to recurrent coronal hole effects.



Daily Solar Data

Date	Radio Flux 10.7 cm	Sun spot No. (10 ⁶ hemi.)	Sunspot Area (10 ⁶ hemi.)	X-ray Background	Flares							
					X-ray Flux			Optical				
					C	M	X	S	1	2	3	4
01 February	118	36	80	B3.0	1	0	0	1	0	0	0	0
02 February	111	47	30	B4.7	0	0	0	2	0	0	0	0
03 February	109	42	100	B3.5	1	0	0	0	0	0	0	0
04 February	107	20	190	B2.1	1	0	0	0	0	0	0	0
05 February	104	15	20	B2.3	0	0	0	0	0	0	0	0
06 February	99	27	50	B1.9	0	0	0	0	0	0	0	0
07 February	110	36	20	B1.6	0	0	0	2	0	0	0	0

Daily Particle Data

Date	Proton Fluence (protons/cm ² -day-sr)			Electron Fluence (electrons/cm ² -day-sr)		
	>1MeV	>10MeV	>100MeV	>.6MeV	>2MeV	>4MeV
01 February	6.1E+4	1.5E+4	3.5E+3		5.2E+6	
02 February	1.4E+5	1.5E+4	3.8E+3		3.2E+6	
03 February	2.3E+5	1.9E+4	4.5E+3		2.7E+6	
04 February	1.3E+5	1.8E+4	5.0E+3		1.8E+6	
05 February	9.5E+4	1.7E+4	5.1E+3		6.8E+5	
06 February	2.9E+5	1.7E+4	4.9E+3		3.4E+6	
07 February	1.7E+5	1.7E+4	5.3E+3		1.8E+7	

Daily Geomagnetic Data

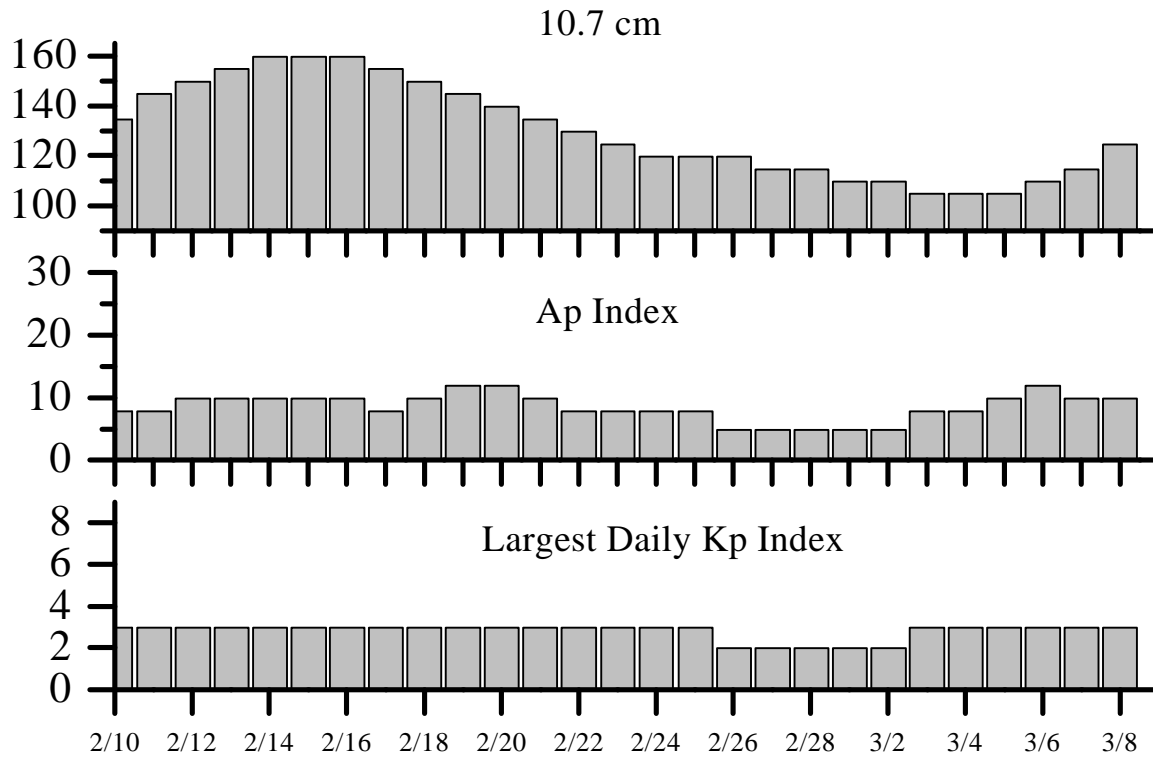
Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	01 February	0	0-0-0-0-0-0-0-1	0	0-0-0-1-0-0-0-0	2
02 February	3	0-0-1-2-2-0-0-1	*	0-0-1-1-1-1-1-1	2	0-0-0-0-0-1-1-1
03 February	4	0-0-1-2-2-1-2-2	2	0-0-1-1-1-2-0-1	5	0-0-2-2-2-2-2-2
04 February	5	1-1-1-2-1-2-2-1	14	1-0-2-2-5-4-3-2	7	0-2-2-1-2-3-3-2
05 February	7	2-1-1-2-3-2-2-2	13	2-1-0-3-5-3-3-1	8	2-1-1-2-3-3-3-2
06 February	11	1-3-3-3-2-3-2-2	17	1-2-2-4-5-4-2-2	12	1-3-3-3-2-4-3-2
07 February	9	2-2-2-3-2-3-2-2	20	1-2-3-5-5-4-2-1	12	1-3-3-4-3-3-2-3

Alerts and Warnings Issued

Date and Time of Issue (UT)	Type of Alert or Warning	Date and Time of Event (UT)
04 Feb 1804	K= 4 Observed	04 Feb 15 - 18
06 Feb 0900	K= 4 Observed	06 Feb 06 - 09
07 Feb 0032	1-245 Radio Burst	06 Feb
07 Feb 1200	K= 4 Observed	07 Feb 09 - 12



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
10 Feb	135	8	3	24 Feb	120	8	3
11	145	8	3	25	120	8	3
12	150	10	3	26	120	5	2
13	155	10	3	27	115	5	2
14	160	10	3	28	115	5	2
15	160	10	3	01 Mar	110	5	2
16	160	10	3	02	110	5	2
17	155	8	3	03	105	8	3
18	150	10	3	04	105	8	3
19	145	12	3	05	105	10	3
20	140	12	3	06	110	12	3
21	135	10	3	07	115	10	3
22	130	8	3	08	125	10	3
23	125	8	3				



Energetic Events

Date	Time (UT)		X-ray		Optical Information			Peak		Sweep Freq	
	Begin	Max	Max	Class	Imp	Location	Rgn	Radio Flux		Intensity	
								245	2695	II	IV
No Events Observed											

Flare List

Date	Time			X-ray	Optical		Rgn
	Begin	Max	End		Imp /	Location	
				Class	Brtns	Lat CMD	#
01 February	0218	0222	0226	B5.7			
	0429	0436	0446	B9.0			
	0836	0837	0843	C3.8	SF	N18W76	8446
	1657	1701	1706	B9.4			
	2328	2331	2335	B8.5			
02 February	0208	0212	0215	B9.8			
	0506	0509	0511	B5.5			
	0516	0531	0540	B9.2			
	1855	1855	1859		SF	S26E47	8453
	2134	2135	2142	B4.3	SF	S25E46	8453
03 February	0139	0152	0159	C1.1			
04 February	0624	0706	0758	C5.1			
	1620	1623	1627	B9.6			
05 February	No Flares Observed						
06 February	0609	0614	0621	B5.3			
	0746	0755	0805	B6.9			
	1120	1127	1138	B8.6			
	1527	1531	1534	B6.8			
07 February	0637	0649	0659	B4.7			
	1852	1858	1923	B6.6	SF	N21E18	
	2220	2221	2227		SF	N22E75	8456



Region Summary

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

Region 8446

21 Jan	N14E60	169	0010	04	BXO	003	B										
22 Jan	N15E46	169	0000	03	BXO	002	B										
23 Jan	N14E33	169	0010	01	AXX	002	A										
24 Jan	N15E19	170	0000	01	AXX	001	A						1				
25 Jan	N15E06	170															
26 Jan	N15W07	170															
27 Jan	N15W20	170															
28 Jan	N17W31	167	0020	04	BXO	005	B										
29 Jan	N17W43	166	0020	06	DRO	011	B						2				
30 Jan	N17W59	169	0160	09	DSO	006	B						1				
31 Jan	N17W72	169	0170	10	DSO	008	B						1				
01 Feb	N18W82	165	0060	04	CSO	002	B	1					1				
									1	0	0	6	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 170

Region 8448

24 Jan	S16E22	167	0000	01	AXX	001	A										
25 Jan	S16E09	167	0010	04	BXO	003	B										
26 Jan	S17W06	169	0000	00	AXX	001	A										
27 Jan	S17W18	167		00	AXX	001	A										
28 Jan	S17W31	167											1				
29 Jan	S17W44	167															
30 Jan	S17W57	167															
31 Jan	S17W70	167															
01 Feb	S17W83	167															
										0	0	0	1	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 169

Region 8451

31 Jan	N28W40	137	0020	02	BXO	004	B										
01 Feb	N27W54	137	0010	02	AXX	002	A										
02 Feb	N27W67	137															
03 Feb	N27W80	137															
04 Feb	N27W93	137															
										0	0	0	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 137



Region Summary - continued

Date	Location		Sunspot Characteristics				Flares											
	(° Lat ° CMD)	Helio	Area (10 ⁻⁶ hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical							
		Lon						C	M	X	S	1	2	3	4			
<i>Region 8452</i>																		
31 Jan	N22W30	127	0010	03	BXO	002	B											
01 Feb	N24W44	127	0010	02	AXX	002	A											
02 Feb	N22W60	131	0000	01	AXX	001	A											
03 Feb	N19W70	128	0010	00	AXX	001	A											
04 Feb	N19W83	128																
								0	0	0	0	0	0	0	0	0	0	0
Crossed West Limb. Absolute heliographic longitude: 127																		
<i>Region 8453</i>																		
02 Feb	S26E44	027	0020	07	BXO	014	B											2
03 Feb	S26E32	026	0080	06	DAO	009	B											
04 Feb	S23E19	026	0190	06	CAO	010	B											
05 Feb	S26E04	028	0020	05	CSO	005	B											
06 Feb	S26W10	029	0040	04	CAO	005	B											
07 Feb	S26W21	026	0020	06	CSO	004	B											
								0	0	0	2	0	0	0	0	0	0	0
Still on Disk. Absolute heliographic longitude: 028																		
<i>Region 8454</i>																		
02 Feb	S22E16	055	0010	03	BXO	002	B											
03 Feb	S22E04	054	0010	02	CRO	002	B											
04 Feb	S22W09	054																
05 Feb	S22W22	054																
06 Feb	S22W35	054																
07 Feb	S22W48	054																
								0	0	0	0	0	0	0	0	0	0	0
Still on Disk. Absolute heliographic longitude: 054																		
<i>Region 8455</i>																		
06 Feb	S19E33	346	0010	01	HRX	002	A											
07 Feb	S18E19	346	0000	00	AXX	001	A											
								0	0	0	0	0	0	0	0	0	0	0
Still on Disk. Absolute heliographic longitude: 346																		
<i>Region 8456</i>																		
07 Feb	N23E65	300	0000	00	AXX	001	A											1
								0	0	0	1	0	0	0	0	0	0	0
Still on Disk. Absolute heliographic longitude: 300																		



Recent Solar Indices (preliminary)

of the observed monthly mean values

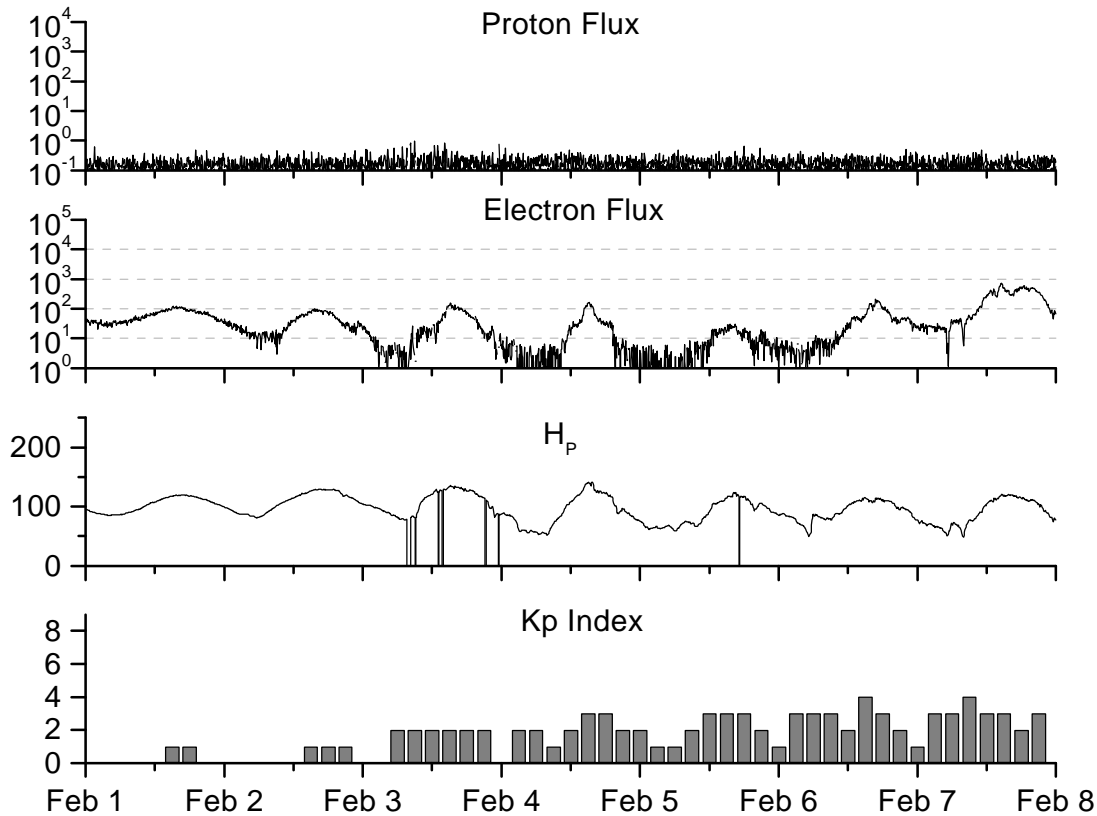
Month	Sunspot Numbers			Radio Flux		Geomagnetic			
	Observed values SWO	Ratio RI	Ratio RI/SWO	Smooth values SWO	Smooth values RI	**Penticton 10.7 cm	Smooth Value	Planetary Ap	Smooth Value
1997									
February	11.3	07.6	0.67	17.4	11.0	73.8	73.7	11	09.2
March	14.4	08.7	0.60	20.4	13.5	73.5	75.1	08	08.9
April	24.5	15.5	0.63	24.0	16.5	74.5	76.8	10	08.6
May	28.6	18.5	0.65	26.4	18.3	74.6	78.4	08	08.6
June	22.1	12.7	0.57	29.0	20.3	71.7	80.1	07	08.6
July	17.0	10.4	0.61	32.4	22.6	71.1	81.8	06	08.5
August	36.7	24.4	0.66	35.9	25.0	79.0	83.4	07	08.3
September	52.8	51.3	0.88	40.5	28.3	96.2	85.7	10	08.4
October	33.6	22.8	0.68	45.4	31.8	84.9	88.6	11	08.6
November	53.5	39.0	0.73	49.3	35.0	99.5	91.3	11	09.0
December	57.9	41.2	0.71	54.2	39.0*	98.8	94.2*	05	09.5
1998									
January	51.8	31.9	0.62	60.6	43.7*	93.4	97.5*	08	09.9*
February	54.4	40.3	0.74	67.4	48.8*	93.4	101.7*	08	10.5*
March	81.8	54.8	0.67	73.3	53.4*	109.1	105.8*	13	11.2*
April	73.6	53.4	0.73	77.7	56.5*	108.3	109.1*	10	11.4*
May	74.3	56.3	0.76	81.4	59.3*	106.7	112.4*	18	11.7*
June	93.6	70.7*	0.76*	85.9	62.4*	108.4*	116.2*	10	12.0*
July	98.3	66.2*	0.67*	90.3	65.4*	114.0*	120.3*	11*	12.2*
August	118.6	91.7*	0.77*			136.0*		18*	
September	119.0	92.9*	0.78*			138.4*		14*	
October	77.0	55.6*	0.72*			121.9*		13*	
November	99.5	73.6*	0.74*			140.2*		16*	
December	120.8	81.6*	0.68*			150.1*		08*	
1999									
January	94.3	62.4*	0.66*			140.6*		08*	

*Preliminary estimates.

The lowest smoothed sunspot indices number for Cycle 22, RI = 8.0, occurred in May 1996. The highest smoothed sunspot number for Cycle 22, RI=158.5 occurred July 1989.

** From June 1991 onward, 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 01 February 1999

Protons plot contains the five-minute averaged integral proton flux (protons/ cm²-sec-sr) as measured by GOES-8 (W75) for each of three energy thresholds: greater than 10, 50, and 100 MeV.

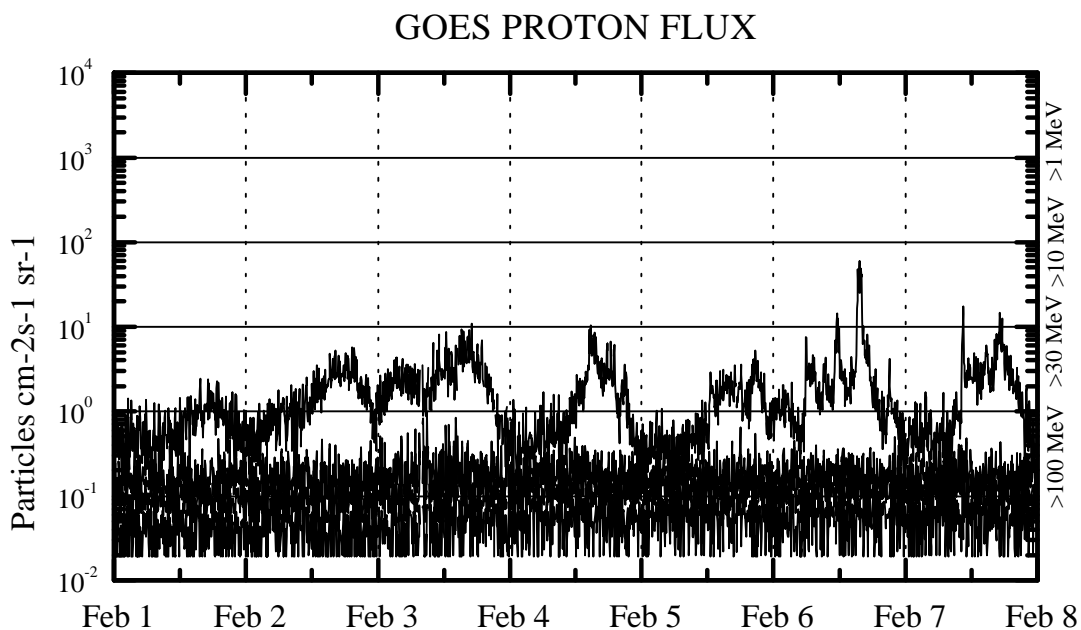
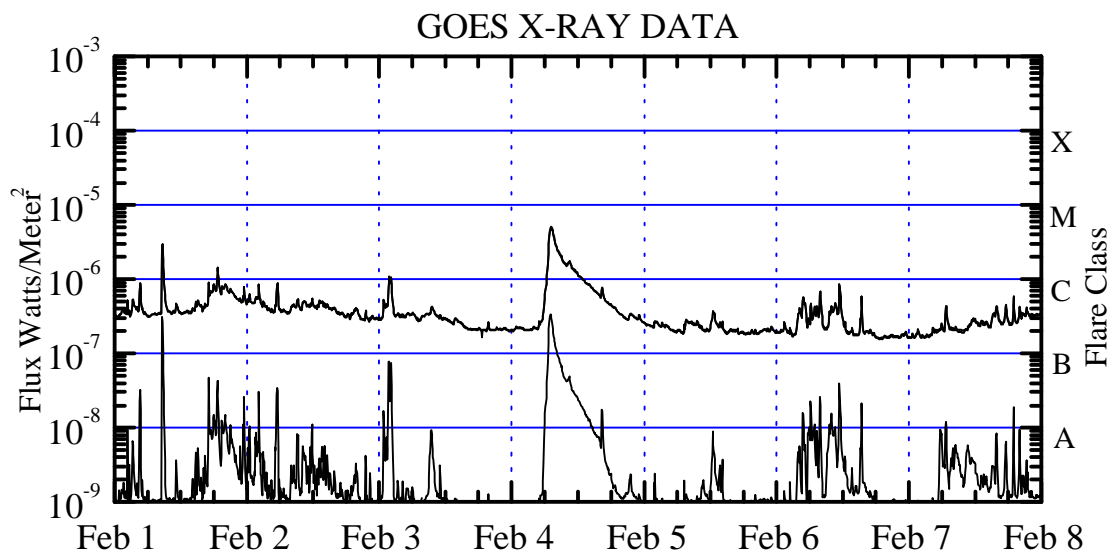
Electrons plot contains the five-minute averaged integral electron flux (electrons/ cm²-sec-sr) with energies greater than 2 MeV at GOES-8.

H_p plot contains the five minute averaged magnetic field H component in nanoteslas (nT) as measured by GOES-8. 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 USAF 55th Space Weather Squadron) 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 Heartland, UK. These data are made available through cooperation from the Geological Survey of Canada (GSC) 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 SWO 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 a more localized phenomena and the measurements generally are applicable to within a few degrees of longitude of the measuring satellite.



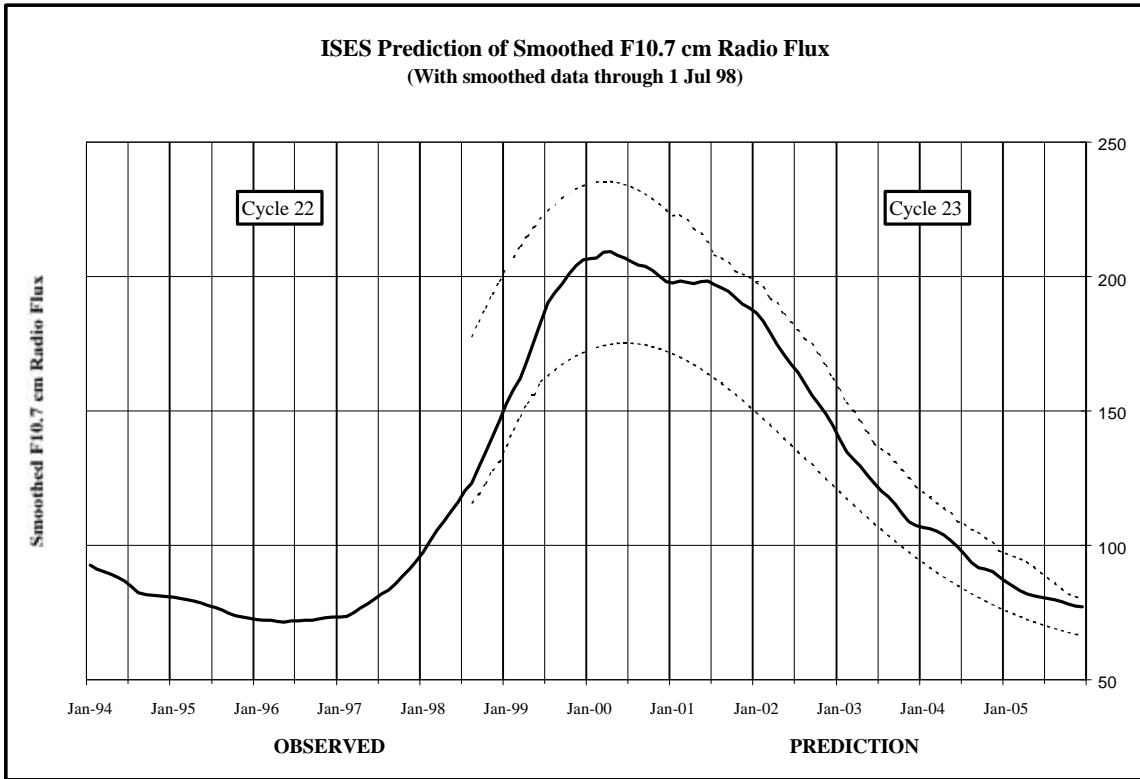


Weekly GOES Satellite X-ray and Proton Plots

X-ray plot contains five minute averaged x-ray flux (watts/m²) as measured by GOES 8 and 10 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/cm²-sec-sr) as measured by GOES-8 (W75) for each of the energy thresholds: >1, >10, >30 and >100 MeV. P10 event threshold

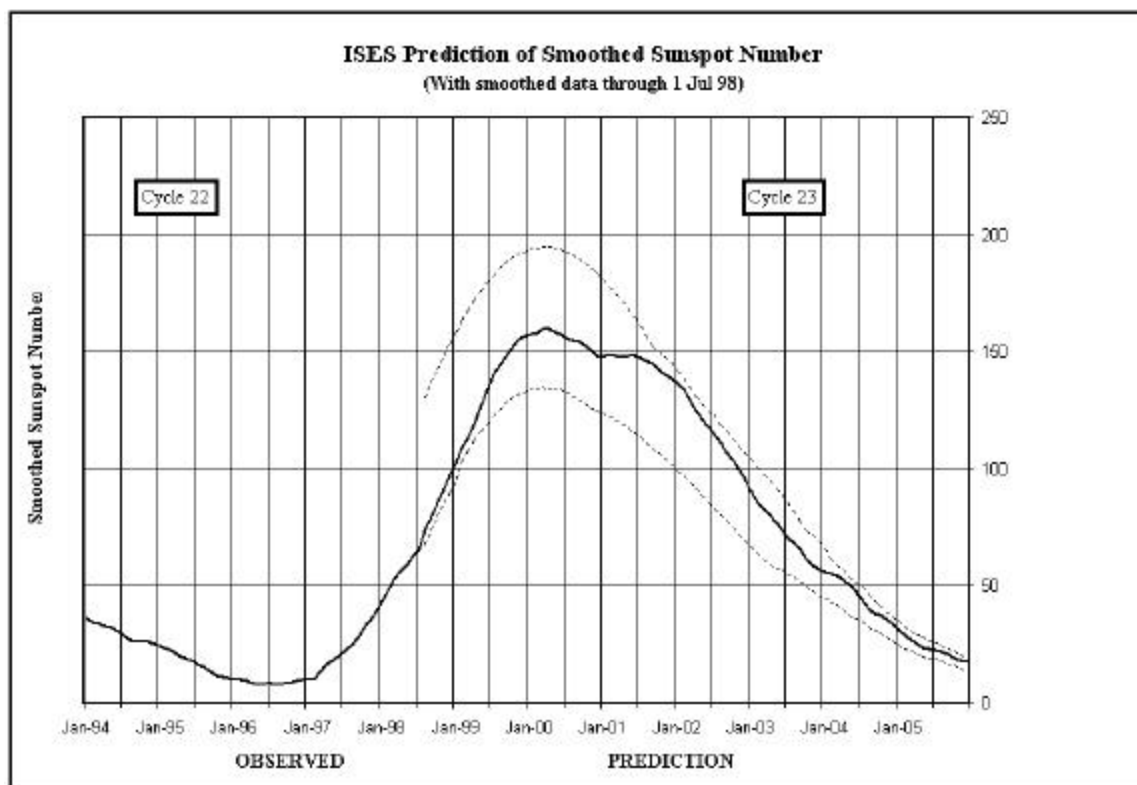




SEC Prediction of Smoothed F10.7cm Radio Flux

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1996	73 (***)	72 (***)	72 (***)	71 (***)	71 (***)	72 (***)	71 (***)	71 (***)	71 (***)	72 (***)	72 (***)	73 (***)
1997	73 (***)	73 (***)	74 (***)	76 (***)	77 (***)	79 (***)	80 (***)	82 (***)	84 (***)	87 (***)	89 (***)	92 (***)
1998	96 (***)	100 (***)	104 (***)	107 (***)	110 (***)	112 (***)	115 (***)	119 (1)	125 (2)	131 (4)	137 (6)	142 (8)
1999	148 (10)	154 (13)	158 (15)	165 (17)	172 (20)	179 (22)	186 (25)	194 (27)	197 (26)	201 (27)	204 (28)	206 (27)
2000	207 (27)	207 (27)	209 (27)	209 (28)	208 (27)	207 (27)	206 (27)	204 (28)	204 (27)	202 (27)	200 (27)	198 (26)
2001	198 (26)	198 (26)	198 (26)	197 (26)	198 (26)	198 (26)	197 (26)	196 (26)	195 (26)	192 (26)	190 (26)	188 (26)
2002	187 (25)	184 (25)	179 (24)	175 (23)	171 (22)	167 (22)	164 (21)	160 (20)	156 (20)	153 (19)	149 (18)	145 (17)
2003	140 (17)	135 (16)	132 (15)	130 (15)	126 (14)	123 (12)	120 (12)	118 (11)	115 (11)	112 (10)	110 (9)	108 (9)
2004	107 (9)	106 (9)	105 (9)	104 (8)	102 (8)	100 (8)	97 (7)	94 (6)	92 (5)	91 (5)	90 (5)	88 (5)
2005	87 (4)	85 (4)	83 (4)	82 (3)	81 (3)	81 (3)	80 (3)	80 (3)	79 (2)	78 (2)	78 (2)	77 (2)





SEC Prediction of Smoothed Sunspot Number

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1996	10 (***)	10 (***)	10 (***)	8 (***)	8 (***)	9 (***)	8 (***)	8 (***)	8 (***)	9 (***)	10 (***)	10 (***)
1997	11 (***)	11 (***)	14 (***)	17 (***)	18 (***)	20 (***)	23 (***)	25 (***)	28 (***)	32 (***)	35 (***)	39 (***)
1998	44 (***)	49 (***)	53 (***)	57 (***)	59 (***)	62 (***)	65 (***)	70 (1)	76 (2)	82 (4)	88 (6)	94 (8)
1999	99 (10)	105 (13)	109 (15)	115 (17)	123 (20)	129 (22)	136 (25)	144 (27)	148 (27)	151 (28)	155 (29)	157 (29)
2000	157 (29)	158 (29)	160 (29)	160 (30)	159 (29)	158 (29)	156 (29)	155 (29)	154 (28)	153 (28)	151 (28)	148 (27)
2001	148 (27)	149 (27)	148 (27)	148 (27)	149 (27)	149 (27)	147 (27)	146 (27)	145 (27)	143 (26)	140 (26)	139 (26)
2002	137 (25)	134 (25)	130 (24)	125 (23)	122 (22)	118 (22)	115 (21)	111 (20)	107 (20)	104 (19)	100 (18)	96 (17)
2003	91 (17)	86 (16)	83 (15)	81 (15)	77 (14)	74 (13)	71 (13)	69 (12)	66 (12)	62 (11)	59 (10)	57 (10)
2004	56 (10)	56 (10)	55 (10)	53 (9)	51 (9)	48 (9)	44 (8)	41 (7)	38 (7)	38 (7)	36 (6)	34 (6)
2005	31 (5)	29 (5)	27 (5)	25 (4)	24 (4)	23 (4)	23 (4)	22 (4)	21 (3)	20 (3)	19 (3)	18 (3)

