

**Space Weather Highlights
02 – 08 February 1998**

Solar activity was very low. Isolated B-class X-ray bursts occurred almost daily.

Solar wind data were received from the WIND spacecraft a few hours per day. Velocities ranged 270 - 450 km/sec with an increase from 290 - 410 km/sec detected on 08 February. Densities were in the 02 - 15 p/cc range during most of the period. However, increases to 40 p/cc and 27 p/cc were noted on 05 and 08 February, respectively. Bz hovered about zero in the plus to minus 07 nT (GSM) range. Solar sector orientation was mostly toward through 06 February, but was not discernible during the rest of the period.

There were no significant proton enhancements observed at geosynchronous altitude.

The greater than 2 MeV electron flux at geosynchronous altitude was at normal levels during most of the period.

The geomagnetic field was at quiet levels through most of the period. Activity increased late 08 February with unsettled to active levels observed at middle latitudes and unsettled to major storm levels observed at high latitudes.

**Space Weather Forecast
11 February 1998 - 09 March 1998**

Solar activity is expected to be very low to low.

No significant proton enhancements are expected at geosynchronous altitude.

The greater than 2 MeV electron flux at geosynchronous altitude is expected to be at mostly normal levels.

The geomagnetic field is expected to be quiet to unsettled.



Daily Solar Data

Date	Radio Flux	Sun spot	Sunspot Area	X-ray Background	X-ray Flux			Flares				
	10.7 cm	No. (10 ⁶ hemi.)			C	M	X	S	1	2	3	4
02 February	89	23	110	A6.6	0	0	0	1	0	0	0	0
03 February	89	39	120	A6.1	0	0	0	0	0	0	0	0
04 February	89	26	110	A5.5	0	0	0	0	0	0	0	0
05 February	86	40	90	A7.9	0	0	0	0	0	0	0	0
06 February	84	41	100	A3.6	0	0	0	3	0	0	0	0
07 February	83	27	70	A3.5	0	0	0	0	0	0	0	0
08 February	84	37	80	A4.5	0	0	0	0	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
02 February	2.2E+5	1.7E+4	4.1E+3		1.1E+6	
03 February	1.5E+5	1.8E+4	4.5E+3		1.2E+6	
04 February	3.4E+5	1.8E+4	4.1E+3		4.6E+6	
05 February	4.2E+5	1.7E+4	4.0E+3		6.6E+6	
06 February	3.7E+5	1.7E+4	4.0E+3		4.9E+6	
07 February	5.1E+5	1.7E+4	4.0E+3		3.9E+6	
08 February	4.9E+5	1.7E+4	4.0E+3		2.6E+6	

Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
02 February	2	1-1-1-1-0-0-1-1	0	0-1-0-0-0-0-0-0	3	1-0-1-0-1-1-0-1
03 February	4	0-0-0-0-3-2-0-2	4	2-0-0-0-1-3-1-0	3	0-0-0-0-2-2-1-2
04 February	6	3-2-1-2-2-1-1-0	17	2-2-3-4-5-4-1-0	8	3-3-2-2-3-2-1-1
05 February	3	0-2-0-0-2-2-1-1	0	0-1-0-0-0-0-0-0	3	0-1-0-0-1-2-1-1
06 February	2	1-1-0-0-2-0-0-0	1	0-0-0-0-2-1-0-0	3	1-1-0-0-1-2-1-0
07 February	2	0-2-1-0-0-0-1-0	1	0-0-0-0-2-0-0-0	3	0-1-1-0-1-1-1-1
08 February	4	0-1-0-1-1-1-2-3	33	2-2-1-6-4-3-5-6	7	0-0-0-1-2-2-3-3

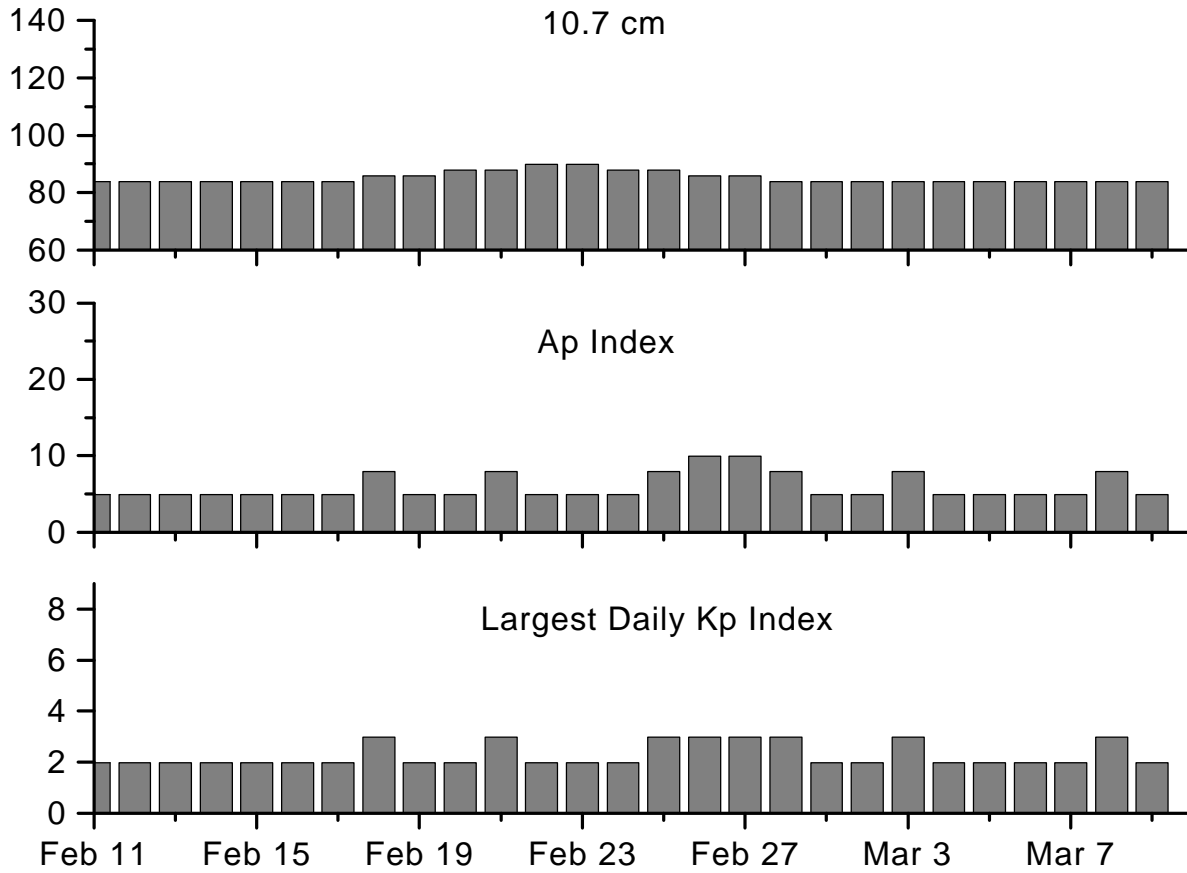


Alerts and Warnings Issued

Date and Time of Issue (UT)	Type of Alert or Warning	Date and Time of Event (UT)
02 Feb 1407	Stratwarm Alert Exists Monday	
03 Feb 0022	1-245 MHz Radio Burst	02 Feb
03 Feb 1341	Stratwarm Alert exists Tuesday	
04 Feb 1329	Stratwarm Alert Exists Wednesday	
05 Feb 1306	Stratwarm Alert Exists Thursday	
06 Feb 1306	Stratwarm Alert Exists Friday	
07 Feb 1320	Stratwarm Alert Exists Saturday	
08 Feb 0038	Stratwarm Alert Exists Sunday	



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
11 Feb	84	5	2	25	88	8	3
12	84	5	2	26	86	10	3
13	84	5	2	27	86	10	3
14	84	5	2	28	84	8	3
15	84	5	2	01 Mar	84	5	2
16	84	5	2	02	84	5	2
17	84	5	2	03	84	8	3
18	86	8	3	04	84	5	2
19	86	5	2	05	84	5	2
20	88	5	2	06	84	5	2
21	88	8	3	07	84	5	2
22	90	5	2	08	84	8	3
23	90	5	2	09	84	5	2
24	88	5	2				



Energetic Events

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

No Events Observed

Flare List

Date	Time			X-ray Class.	Optical		Rgn #
	Begin	Max	End		Imp / Brtns	Location Lat CMD	
02 February	0521	0529	0535	B4.6			
	1554	1600	1603	B1.2			
	1647	1650	1652	B1.6			
	B1750	U1751	1757	B7.7	SF	N25E74	
	2006	2014	2023	B1.4			
03 February	0755	0803	0814	B3.0			
	1355	1358	1402	B1.0			
	1422	1437	1445	B3.7			
	1852	1855	1859	B1.0			
04 February	1744	1751	1757	B6.6			
05 February	No Flares Observed						
06 February	1747	1749	1753		SF	S18W57	8152
	1825	1828	1841		SF	S18W57	8152
	1909	1915	1923	B3.1	SF	S18W56	8152
	2031	2034	2036	B1.0			
	2124	2129	2131	B3.1			
07 February	0801	0815	0833	B2.1			
	1025	1032	1040	B2.2			
	1142	1146	1155	B1.0			
	1453	1457	1517	B1.0			
	1709	1742	1757	B2.6			
08 February	1051	1055	1057	B2.5			
	1754	1758	1807	B1.2			
	1809	1816	1828	B2.6			
	2114	2126	2136	B6.7			
	2239	2243	2248	B1.0			



Region Summary

Date	Location		Sunspot Characteristics					Flares							
	(° Lat ° CMD)	Helio Lon	Area (10 ⁶ hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical				
								C	M	X	S	1	2	3	4
<i>Region 8143</i>															
22 Jan	S35E72	281	0010	00	AXX	001	A						3		
23 Jan	S35E59	280	0080	07	CAO	008	B						2		
24 Jan	S34E47	279	0180	14	CAO	010	B								
25 Jan	S35E36	277	0200	15	ESO	014	BG								
26 Jan	S36E23	277	0250	17	FSI	017	BG						2		
27 Jan	S36E10	277	0260	17	FAI	021	BG								
28 Jan	S36W04	278	0460	18	FAI	017	BG								
29 Jan	S36W16	276	0170	18	FHO	010	BG	1					1		
30 Jan	S33W34	281	0100	02	HSX	003	A						1		
31 Jan	S35W51	285	0090	02	HSX	003	A								
01 Feb	S35W64	286	0110	02	HSX	002	A								
02 Feb	S35W75	284	0110	02	HSX	001	A								
03 Feb	S36W90	285	0060	02	HSX	001	A								
								1	0	0	9	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 278

Region 8144

23 Jan	N12E64	275	0000	00	AXX	001	A								
24 Jan	N13E49	277	0000	00	AXX	001	A								
25 Jan	N13E37	276	0010	04	BXO	002	B								
26 Jan	N13E23	277	0000	00	AXX	001	A								
27 Jan	N13E19	268	0010	02	AXX	003	A								
28 Jan	N14E04	270	0010	02	BXO	005	B								
29 Jan	N14W07	267	0010	01	AXX	002	A								
30 Jan	N14W20	267													
31 Jan	N14W33	267													
01 Feb	N14W46	267													
02 Feb	N14W59	267													
								0	0	0	0	0	0	0	0

Died on Disk.

Absolute heliographic longitude: 270



Region Summary- continued.

Date	Location		Sunspot Characteristics					Flares									
	(° Lat ° CMD)	Helio Lon	Area (10 ⁶ hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical						
								C	M	X	S	1	2	3	4		
<i>Region 8145</i>																	
24 Jan	N28E59	267	0020	04	BXO	005	B										
25 Jan	N29E48	265	0030	06	BXO	003	B		1			1					
26 Jan	N28E35	265	0020	06	BXO	005	B	1				2					
27 Jan	N28E24	263	0020	04	BXO	006	B										
28 Jan	N28E11	263	0020	04	BXO	007	B										
29 Jan	N28W02	262	0010	04	BXO	004	B										
30 Jan	N28W14	261	0010	04	BXO	004	B										
31 Jan	N28W27	261	0030	01	AXX	002	A										
01 Feb	N28W41	263	0010	04	BXO	003	B										
02 Feb	N28W54	263															
03 Feb	N28W67	263															
								1	1	0	2	1	0	0	0	0	

Died on Disk.

Absolute heliographic longitude: 262

Region 8146

24 Jan	N15E62	264	0000	00	AXX	001	A										
25 Jan	N15E49	264	0020	06	BXO	005	B										
26 Jan	N15E34	266	0030	06	BXO	007	B										
27 Jan	N16E24	263	0020	04	BXO	008	B										
28 Jan	N15E09	265	0020	03	BXO	007	B										
29 Jan	N16W03	263	0010	03	BXO	004	B										
30 Jan	N16W17	264	0030	02	AXX	004	A										
31 Jan	N16W31	265	0000	01	AXX	002	A										
01 Feb	N16W44	265															
02 Feb	N16W57	265															
03 Feb	N16W70	265															
								0	0	0	0	0	0	0	0	0	

Died on Disk.

Absolute heliographic longitude: 263

Region 8148

02 Feb	S29E10	199	0000	01	BXO	002	B										
03 Feb	S29W03	199															
								0	0	0	0	0	0	0	0	0	

Died on Disk.

Absolute heliographic longitude: 199



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 8149</i>																						
02 Feb	N25E70	139																				
03 Feb	N25E57	139																				
04 Feb	N25E44	139																				
05 Feb	N25E31	139																				
06 Feb	N25E18	139																				
07 Feb	N25E05	139																				
08 Feb	N25W08	139																				
													0	0	0	0	0	0	0	0	0	0
Still on Disk.																						
Absolute heliographic longitude: 139																						
<i>Region 8150</i>																						
03 Feb	N26W29	224	0030	05	BXO	006	B															
04 Feb	N25W43	225	0050	06	CSO	004	B															
05 Feb	N25W56	225	0020	07	CRO	003	B															
06 Feb	N25W69	225	0010	02	AXX	002	A															
07 Feb	N25W82	225																				
													0	0	0	0	0	0	0	0	0	0
Crossed West Limb.																						
Absolute heliographic longitude: 224																						
<i>Region 8151</i>																						
03 Feb	S24E75	120	0030	02	CSO	002	B															
04 Feb	S24E61	121	0060	03	CSO	002	B															
05 Feb	S22E49	120	0060	02	HSX	004	A															
06 Feb	S23E38	118	0060	02	HSX	002	A															
07 Feb	S21E24	119	0030	02	HSX	001	A															
08 Feb	S22E11	119	0040	02	HSX	001	A															
													0	0	0	0	0	0	0	0	0	0
Still on Disk.																						
Absolute heliographic longitude: 119																						
<i>Region 8152</i>																						
05 Feb	S19W45	214	0010	02	BXO	003	B															
06 Feb	S20W58	214	0030	05	BXO	007	B															
07 Feb	S22W71	214	0040	06	BXO	006	B															
08 Feb	S21W86	216	0030	07	BXO	004	B															
													0	0	0	3	0	0	0	0	0	0
Still on Disk.																						
Absolute heliographic longitude: 214																						



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

Region 8153

08 Feb	S40E38	092	0010	03	BXO	002	B	0	0	0	0	0	0	0	0	0
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Still on Disk.

Absolute heliographic longitude: 092



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

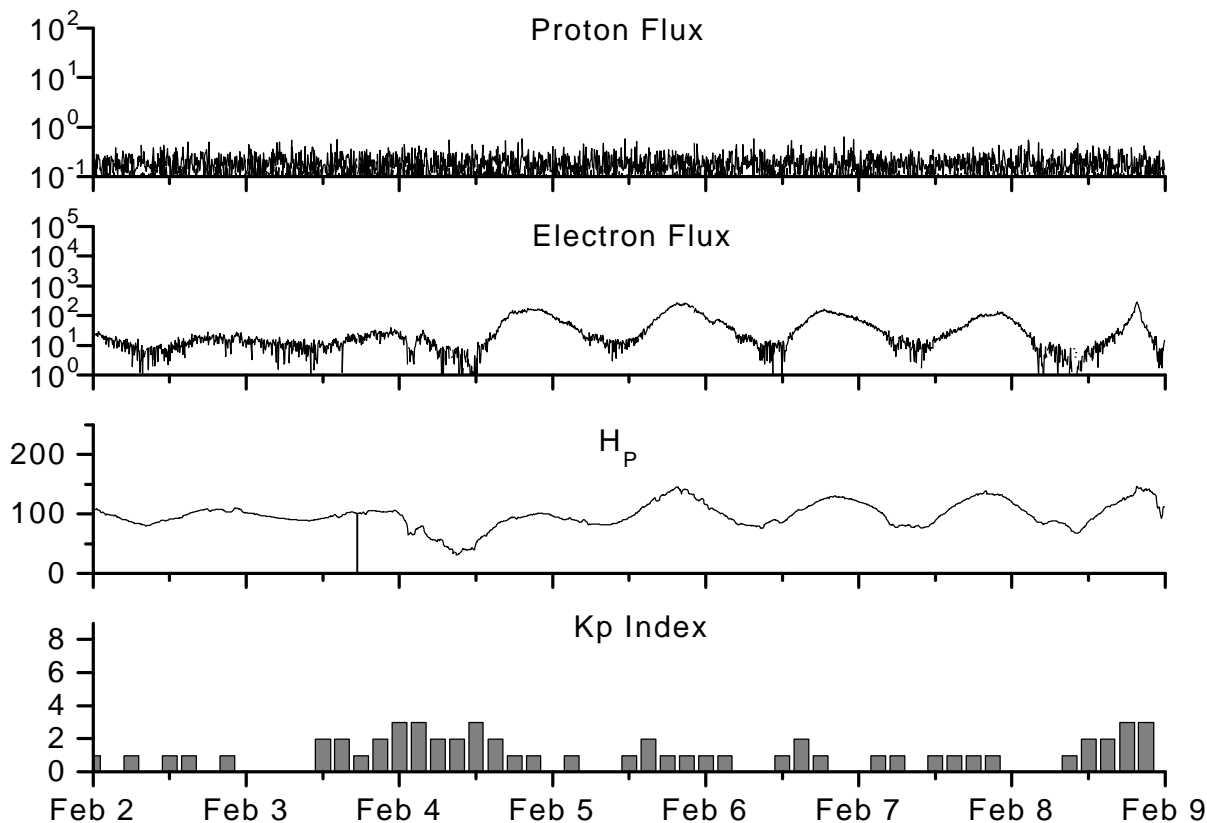
Month	Sunspot Numbers					Radio Flux		Geomagnetic	
	Observed values SWO	Ratio RI	Ratio RI/SWO	Smooth values SWO	Smooth values RI	**Penticton 10.7 cm	Smooth Value	Planetary Ap	Smooth Value
1996									
February	09.1	04.4	0.48	16.2	10.1	71.5	72.2	10	09.8
March	12.1	09.2	0.76	15.4	09.7	72.7	72.1	11	09.9
April	08.5	04.8	0.56	13.6	08.5	69.3	71.6	11	09.7
May	11.8	05.5	0.47	12.9	08.0	72.1	71.4	07	09.5
June	18.8	11.8	0.63	13.5	08.5	69.6	71.8	05	09.4
July	13.2	08.2	0.62	13.4	08.4	71.2	72.0	07	09.3
August	20.5	14.4	0.70	13.1	08.3	72.4	72.1	09	09.4
September	02.9	01.6	0.55	13.3	08.4	69.4	72.3	15	09.3
October	02.3	00.9	0.39	14.0	08.8	69.2	72.6	13	09.1
November	26.7	17.9	0.67	15.4	09.8	78.7	73.0	08	09.1
December	21.1	13.3	0.63	16.2	10.4	77.8	73.3	07	09.3
1997									
January	09.0	05.7	0.63	16.5	10.5*	74.0	73.4	09	09.3*
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	09.0*
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	18.4*	74.6	78.4*	08	08.6*
June	22.1	12.7	0.57	29.0	20.4	71.7	80.1*	07	08.6*
July	17.0	10.5*	0.62*	32.4	22.7*	71.1	81.8*	06*	08.4*
August	36.7	24.7*	0.67*			79.0		08*	
September	52.8	51.3*	0.88*			96.2*		10*	
October	33.6	23.3*	0.69*			85.0*		10*	
November	53.5	39.3*	0.73*			99.5*		10*	
December	57.9	41.5*	0.72*			98.8*		05*	
1998									
January	51.8	32.3*	0.62*			93.5*		07*	

*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 02 February 1998

Protons plot contains the five-minute averaged integral proton flux (protons/ cm^2 -sec-sr) as measured by GOES-9 (W135) for each of three energy thresholds: greater than 10, 50, and 100 MeV.

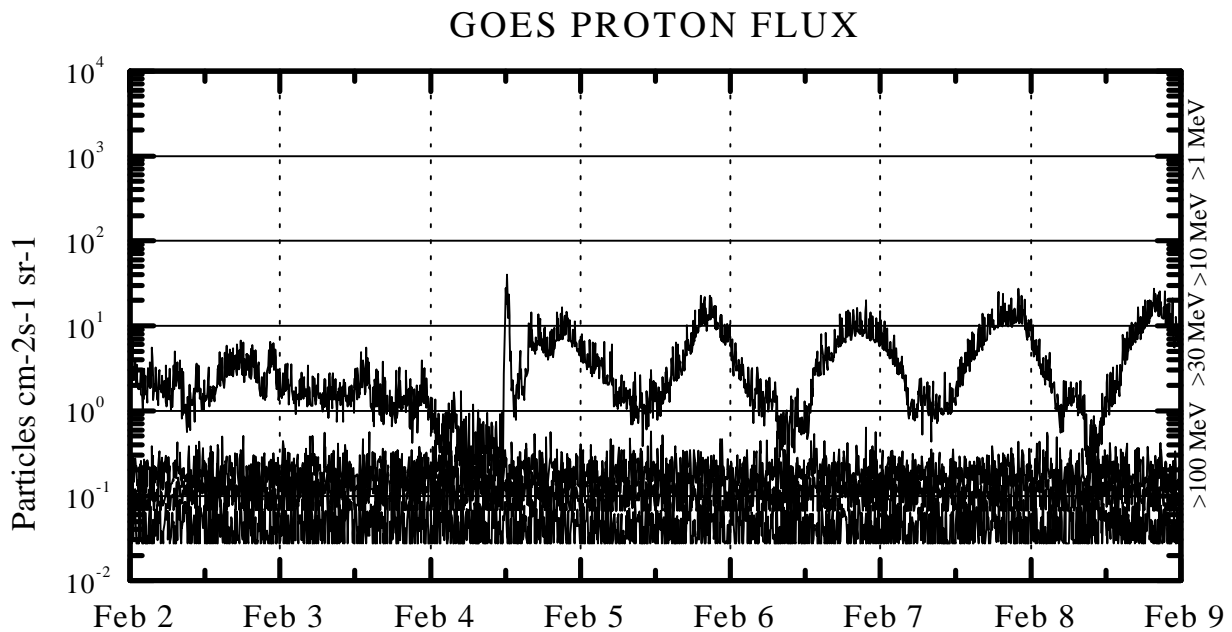
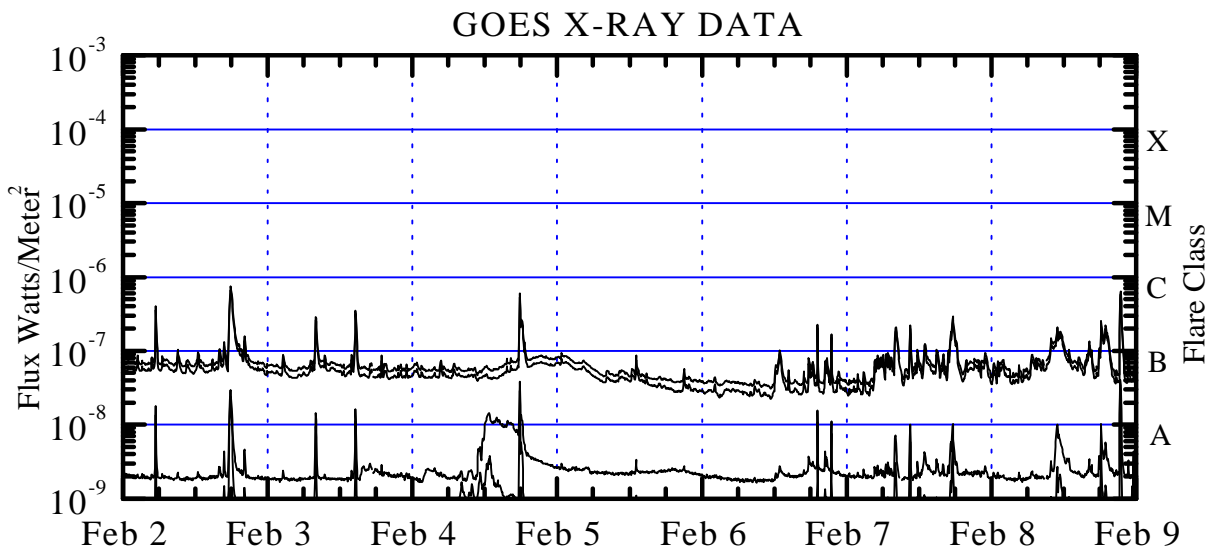
Electrons plot contains the five-minute averaged integral electron flux (electrons/ cm^2 -sec-sr) with energies greater than 2 MeV at GOES-9.

H_p plot contains the five minute averaged magnetic field H component in nanoteslas (nT) as measured by GOES-9. The H component is parallel to the spin axis of the satellite, which is nearly parallel to the Earth's rotation axis.

K_p 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 K_p 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 K_p are "global" parameters that are applicable to a first order approximation over large areas. H_p 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

Proton plot contains the five minute averaged integral proton flux (protons/cm²-sec-sr) as measured by GOES-9 (W135) for each of the energy thresholds: >1, >10, >30 and >100 MeV. P10 event threshold is 10 pfu (protons/cm²-sec-sr) at greater than 10 MeV.

X-ray plot contains five minute averaged x-ray flux (watts/m²) as measured by GOES 8 and 9 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.

