

Space Weather Highlights
26 January - 01 February 2004

SWO PRF 1483
03 February 2004

Solar activity ranged from very low to low levels. The period began at low levels with occasional C-class flares from Region 542 (N10, L=264, class/area Dai/110 on 21 January), and Region 543 (S16, L=269, class/area Dao/100 on 21 January). The largest was a C6 flare from Region 543 at 26/2241 UTC. The solar disk was devoid of sunspots on both the 27th and 28th; consequently, activity decreased to very low levels. Activity continued at very low levels on 29 January, however, a new region rotating on the east limb was quite active. Activity increased to low levels on the 30th with low C-class activity from the east limb near N13. This region continued to produce C-class flares as it rotated into view on 31 January and 01 February. It was numbered as Region 549 (N14, L=046, class/area Eao/180 on 01 February), and produced a C4 flare at 31/0622 UTC.

Solar wind data were available from the NASA Advanced Composition Explorer (ACE) spacecraft during most of the summary period. The period began quietly with solar wind speed at around 430 km/s. Solar wind signatures indicated a solar sector boundary crossing on the 27th. A gradual increase in solar wind speed began early on the 28th, as a coronal hole rotated into a geoeffective position. Solar wind speed increased to near 600 km/s late on the 28th and then began a gradual decline back to near 430 km/s. A second and stronger high speed stream began on the 30th with solar wind speeds increasing to over 700 km/s. Speeds decreased quickly late on the 30th, but rose again on the 31st as yet another high speed stream began.

There were no greater than 10 MeV proton events at geosynchronous orbit during the summary period.

The greater than 2 MeV electron flux at geosynchronous orbit reached high levels every day this period.

The geomagnetic field ranged from quiet to minor storm levels. Quiet to unsettled conditions with high latitude active periods were observed on 26 and 27 January. A high speed solar wind stream began on the 28th and created a weak disturbance with occasional minor storm periods at all latitudes. As the high speed stream subsided, the geomagnetic field returned to mostly quiet to unsettled levels. Solar wind speed increased to near 700 km/s on the 30th and produced brief periods of active to minor storm conditions. Conditions for the remainder of the period were generally quiet to unsettled with isolated active periods.

Space Weather Outlook
04 February - 01 March 2004

Solar activity is expected to be at very low to low levels with a small chance of an M-class flare. A series of old active regions is due to return on 08 – 10 February, which will likely boost the activity levels. Late February will see a return to low and even very low conditions as the active longitudes rotate out of view

No greater than 10 MeV proton events are expected during the period.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to reach high levels on 04 - 07 February, 12 – 18 February, and again on 24 February – 1 March, due to recurrent coronal holes.

Geomagnetic activity is expected to range from quiet to minor storm levels with a chance of isolated major storm levels. The current coronal hole high speed stream will persist for the first few days of the period and produce occasional active conditions. Recurrent coronal hole high speed streams are expected in mid and late February and will likely produce occasional active to minor storm periods.



Daily Solar Data

Date	Radio Flux 10.7 cm	Sun spot No.	Sunspot Area (10 ⁻⁶ hemi.)	X-ray Background	Flares								
					X-ray Flux			Optical					
					C	M	X	S	1	2	3	4	
26 January	98	38	30	B1.5	1	0	0	0	0	0	0	0	0
27 January	94	0	0	B1.2	0	0	0	0	0	0	0	0	0
28 January	89	0	0	A8.7	0	0	0	0	0	0	0	0	0
29 January	87	25	70	A7.5	0	0	0	0	0	0	0	0	0
30 January	93	42	120	B1.6	4	0	0	0	0	0	0	0	0
31 January	94	49	160	B1.0	1	0	0	0	0	0	0	0	0
01 February	97	57	280	B1.3	2	0	0	2	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
	26 January	6.1E+5	1.1E+4	2.2E+3		5.1E+7
27 January	8.3E+5	1.1E+4	2.3E+3		5.9E+7	
28 January	9.7E+5	1.1E+4	2.6E+3		4.7E+7	
29 January	6.6E+5	1.2E+4	2.7E+3		4.7E+7	
30 January	6.6E+5	1.2E+4	2.7E+3		3.3E+7	
31 January	2.4E+6	1.2E+4	2.6E+3		5.9E+7	
01 February	8.2E+5	1.1E+4	2.6E+3		5.3E+7	

Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	26 January	9	2-2-3-3-2-2-2-2	29	3-2-4-5-5-5-4-3	17
27 January	13	3-3-2-2-3-3-3-3	20	3-4-3-4-4-4-3-2	16	3-4-2-3-3-3-3-3
28 January	24	5-4-5-3-3-3-3-2	29	3-3-5-4-5-5-3-3	19	5-4-4-3-3-3-3-2
29 January	8	1-2-1-4-2-2-1-2	16	2-2-0-5-5-2-1-2	10	1-2-2-4-4-3-2-2
30 January	19	2-3-3-5-4-3-3-2	40	2-2-3-7-6-5-2-3	17	2-3-3-5-4-3-3-3
31 January	11	1-2-3-4-3-2-2-1	17	1-1-2-6-4-1-2-1	12	2-1-3-5-3-1-2-1
01 February	10	2-2-2-2-3-3-2-3	11	1-2-1-3-4-3-2-2	11	2-3-2-2-3-3-3-3

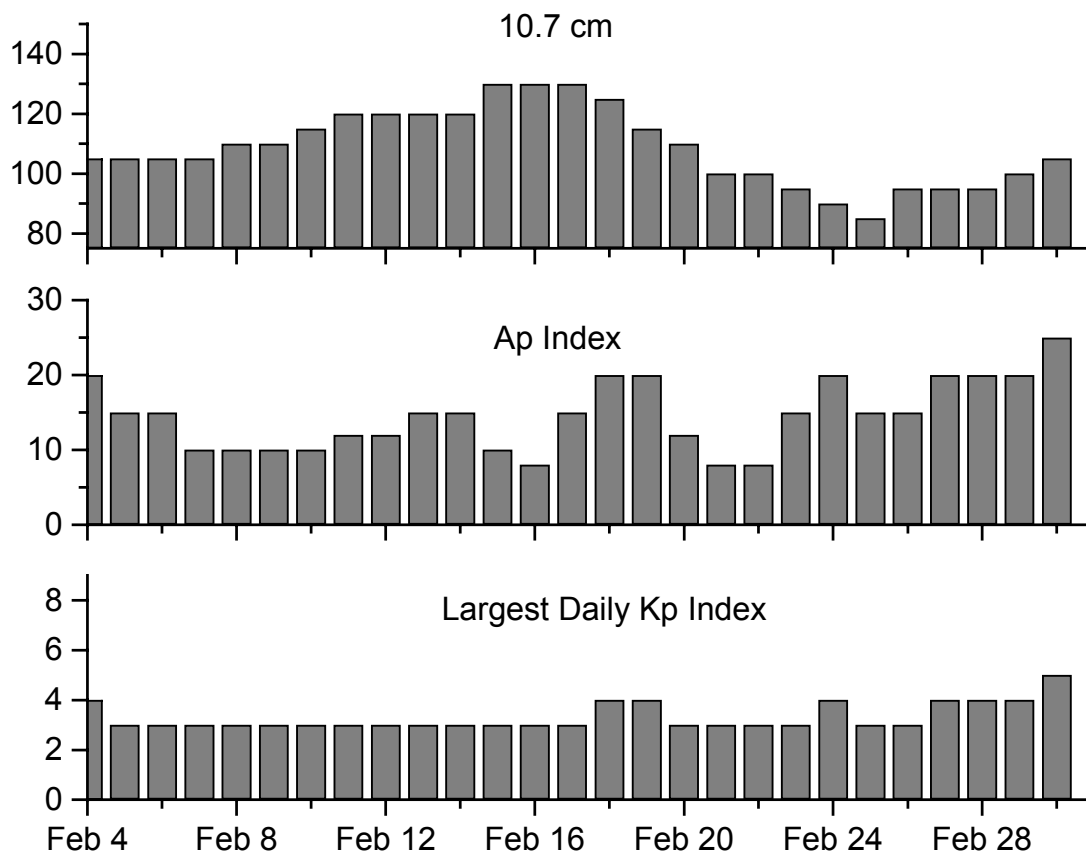


Alerts and Warnings Issued

<u>Date & Time of Issue</u>	<u>Type of Alert or Warning</u>	<u>Date & Time of Event UT</u>
26 Jan 0819	WARNING: Geomagnetic K= 4	26 Jan 0820 - 1500
26 Jan 0821	ALERT: Geomagnetic K= 4	26 Jan 0822
26 Jan 1532	ALERT: Electron 2MeV Integral Flux > 1000pfu	26 Jan 1510
26 Jan 1658	ALERT: Geomagnetic K= 4	26 Jan 1652
26 Jan 2023	WARNING: Geomagnetic K= 4	26 Jan 2022 -27 Jan 0600
26 Jan 2025	ALERT: Geomagnetic K= 4	26 Jan 2024
27 Jan 1402	ALERT: Electron 2MeV Integral Flux > 1000pfu	27 Jan 1340
28 Jan 0109	WARNING: Geomagnetic K= 4	28 Jan 0110 - 1500
28 Jan 0113	ALERT: Geomagnetic K= 4	28 Jan 0111
28 Jan 0135	ALERT: Geomagnetic K=5	28 Jan 0132
28 Jan 0650	WARNING: Geomagnetic K= 5	28 Jan 0650 - 1000
28 Jan 0711	ALERT: Geomagnetic K= 5	28 Jan 0711
28 Jan 1438	ALERT: Electron 2MeV Integral Flux > 1000pfu	28 Jan 1410
28 Jan 1455	EXTENDED WARNING: Geomagnetic K= 4	28 Jan 0110 - 2359
29 Jan 1146	WARNING: Geomagnetic K= 4	29 Jan 1146 - 1600
29 Jan 1148	ALERT: Electron 2MeV Integral Flux > 1000pfu	29 Jan 1110
29 Jan 1155	ALERT: Geomagnetic K= 4	29 Jan 1150
30 Jan 1056	WARNING: Geomagnetic K= 4	30 Jan 1055 - 1500
30 Jan 1106	WARNING: Geomagnetic K= 5	30 Jan 1105 - 1500
30 Jan 1108	ALERT: Geomagnetic K= 5	30 Jan 1108
30 Jan 1242	ALERT: Electron 2MeV Integral Flux > 1000pfu	30 Jan 1220
30 Jan 1503	ALERT: Geomagnetic K= 4	30 Jan 1500
31 Jan 1011	WARNING: Geomagnetic K= 4	31 Jan 1011 - 1500
31 Jan 1039	ALERT: Geomagnetic K= 4	31 Jan 1030
31 Jan 1205	ALERT: Electron 2MeV Integral Flux > 1000pfu	31 Jan 1140
01 Feb 0024	1 - 245 MHz Burst	31 Jan
01 Feb 1524	ALERT: Electron 2MeV Integral Flux > 1000pfu	01 Feb 1500



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
04 Feb	105	20	4	18 Feb	125	20	4
05	150	15	3	19	115	20	4
06	105	15	3	20	110	12	3
07	105	10	3	21	100	8	2
08	110	10	3	22	100	8	2
09	110	10	3	23	95	15	3
10	115	10	3	24	90	20	4
11	120	12	3	25	85	15	3
12	120	12	3	26	95	15	3
13	120	15	3	27	95	20	4
14	120	15	3	28	95	20	4
15	130	10	3	29	100	20	4
16	130	8	2	01 Mar	105	25	5
17	130	15	3				



Energetic Events

Date	Time		X-ray		Optical Information			Peak		Sweep Freq		
	Begin	Max	½ Max	Class	Integ Flux	Imp/ Brtns	Location Lat CMD	Rgn #	Radio Flux		Intensity	
									245	2695	II	IV

No Events Observed

Flare List

Date	Time			X-ray Class.	Optical		Rgn
	Begin	Max	End		Imp / Brtns	Location Lat CMD	
26 January	0602	0610	0614	C1.6			542
	1155	1205	1215	B8.3			540
	2341	2346	2351	B2.6			
27 January	1428	1439	1449	B3.0			542
	1740	1744	1749	B2.5			542
28 January	No Flares Observed						
29 January	No Flares Observed						
30 January	1040	1043	1048	B5.9			
	1143	1152	1157	C1.4			
	1221	1225	1228	C1.1			
	1245	1253	1303	B8.3			
	1601	1608	1614	C2.1			
	2007	2011	2016	B4.9			
	2102	2107	2111	C1.0			
	2256	2302	2304	B2.3			
	2318	2324	2328	B8.0			
	31 January	0212	0219	0224	B2.7		
0358		0412	0421	B6.3			549
0537		0540	0542	B3.0			549
0607		0622	0628	C4.1			549
0824		0828	0834	B1.8			549
1742		1750	1757	B2.5			549
2147		2151	2155	B2.4			549
01 February	0107	0111	0116	B2.7			549
	0141	0144	0146	B2.6			
	0252	0256	0302	C1.9	Sf	N08E64	549
	0438	0443	0446	B2.4			549
	0532	0536	0540	B2.3			549
	0601	0605	0607	C1.9	Sf	N11E70	549
	0643	0649	0652	B6.9			549
	0731	0735	0738	B4.1			549
	0746	0749	0751	B2.6			549
	0854	0858	0904	B2.2			547
	0924	0927	0930	B2.0			
	1000	1009	1020	B6.1			549
	1155	1202	1206	B3.5			549
	1638	1645	1650	B8.4			549



Flare List - continued.

Date	Time			X-ray Class.	Optical		Rgn
	Begin	Max	End		Imp / Brtns	Location Lat CMD	
01 February	1704	1707	1710	B3.2			549
	1806	1811	1815	B3.4			549
	2013	2019	2023	B3.8			549
	2359	0005	0012	B4.8			549

Region Summary

Date	Location		Sunspot Characteristics				Flares														
	Helio		Area (10 ⁻⁶ hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical										
	(° Lat ° CMD)	Lon						C	M	X	S	1	2	3	4						
<i>Region 542</i>																					
16 Jan	N11E54	260	0060	03	Cso	002	B														
17 Jan	N11E43	258	0030	01	Hsx	001	A														
18 Jan	N11E30	258																			
19 Jan	N08E15	259	0110	15	Bxo	011	B														
20 Jan	N10W03	264	0110	08	Dai	012	Bg														
21 Jan	N10W16	264	0110	11	Dai	021	Bg														
22 Jan	N10W29	264	0090	08	Dsi	014	B														
23 Jan	N10W42	264	0040	06	Cso	007	B														
24 Jan	N10W61	269	0030	01	Hsx	001	A														
25 Jan	N09W71	266	0040	04	Cso	003	B														1
26 Jan	N06W82	264	0010	02	Axx	002	A	1													
								1	0	0	1	0	0	0	0	0					

Crossed West Limb.

Absolute heliographic longitude: 264

Region 543

19 Jan	S18E05	269	0070	04	Cai	005	Bg	1													
20 Jan	S17W08	269	0080	05	Dao	005	Bg														
21 Jan	S16W21	269	0100	05	Dao	010	Bg	1				1									
22 Jan	S16W34	269	0080	04	Dso	006	Bg														
23 Jan	S16W47	269	0040	04	Cso	004	B														
24 Jan	S16W60	268	0050	02	Hsx	001	A														
25 Jan	S16W72	267	0020	01	Hsx	001	A	1					1								
26 Jan	S17W89	271	0010	01	Axx	001	A														
								3	0	0	2	0	0	0	0	0					

Crossed West Limb.

Absolute heliographic longitude: 269



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 544

20 Jan	N08E09	252	0130	08	Dai	014	Bg
21 Jan	N08W04	252	0130	08	Dso	011	Bg
22 Jan	N08W17	252	0130	09	Cso	011	B
23 Jan	N08W30	252	0100	10	Dao	008	B
24 Jan	N08W44	252	0040	07	Bxo	004	B
25 Jan	N08W57	252	0010	06	Bxo	003	B
26 Jan	N03W76	258	0010	03	Bxo	005	B
27 Jan	N03W89	258					

0 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 252

Region 545

29 Jan	S20W19	161	0020	05	Dso	004	B
30 Jan	S20W32	161	0040	05	Dso	005	B
31 Jan	S20W45	161					
01 Feb	S20W58	161					

0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 161

Region 546

29 Jan	S12E68	074	0050	02	Hsx	001	A
30 Jan	S11E55	074	0050	04	Cso	003	B
31 Jan	S12E41	075	0040	01	Hsx	001	A
01 Feb	S12E27	076	0030	04	Cso	003	B

0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 076

Region 547

30 Jan	S09E14	115	0030	05	Cso	004	B
31 Jan	S10E01	115	0020	04	Dso	004	B
01 Feb	S10W12	115	0060	04	Dso	006	B

0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 115



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 548

31 Jan	N06E30	086	0010	01	Hsx	001	A											
01 Feb	N06E17	086	0010	03	Bxo	003	B											
										0	0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 086

Region 549

31 Jan	N13E70	046	0090	08	Dso	003	B	1										
01 Feb	N14E57	046	0180	11	Eao	005	B	2			2							
								3	0	0	2	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 046

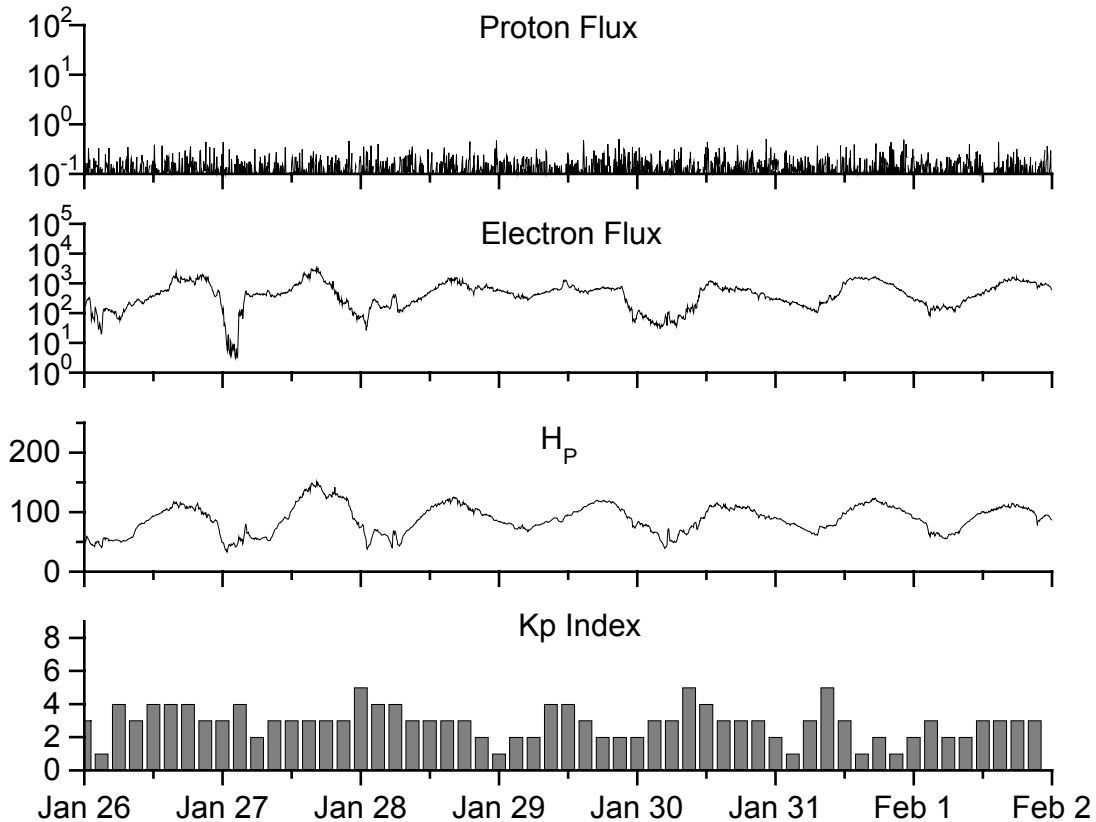


**Recent Solar Indices (preliminary)
of the observed monthly mean values**

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
2002									
January	189.0	114.1	0.60	184.8	113.5	227.3	194.6	08	12.3
February	194.5	107.4	0.55	188.6	114.7	205.0	197.2	10	12.8
March	153.1	98.4	0.64	188.9	113.3	180.3	195.7	10	12.9
April	194.9	120.7	0.62	186.2	110.5	189.8	191.5	15	13.2
May	204.1	120.8	0.59	183.6	108.9	178.4	188.0	15	13.3
June	146.0	88.3	0.60	179.9	106.3	148.7	183.0	11	13.5
July	183.5	99.6	0.54	175.4	102.7	173.5	176.3	11	13.7
August	191.0	116.4	0.61	169.2	98.7	183.9	169.5	16	14.2
September	206.4	109.6	0.53	163.4	94.6	175.8	164.1	14	15.0
October	153.9	97.5	0.63	158.8	90.5	167.0	159.4	23	15.6
November	159.8	95.5	0.60	150.9	85.2	168.7	154.8	16	16.3
December	147.9	80.8	0.55	144.6	82.1	158.6	150.9	13	17.0
2003									
January	149.3	79.7	0.53	141.7	81.0	144.0	149.2	13	18.2
February	87.0	46.0	0.53	136.4	78.5	124.5	144.7	17	18.9
March	119.7	61.1	0.51	128.1	74.2	132.2	139.5	21	19.4
April	119.7	60.0	0.50	121.5	70.3	126.3	136.3	20	20.0
May	89.6	55.2	0.62	118.3	67.8	129.3	135.0	26	21.0
June	118.4	77.4	0.65	113.6	65.2	129.4	132.6	24	21.8
July	132.8	85.0	0.64			127.8		20	
August	114.3	72.7	0.64			122.1		23	
September	82.6	48.8	0.59			112.3		19	
October	118.9	65.6	0.55			153.1		32	
November	118.9	67.2	0.57			153.1		31	
December	75.4	47.0	0.62			115.1		17	

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 26 January 2004

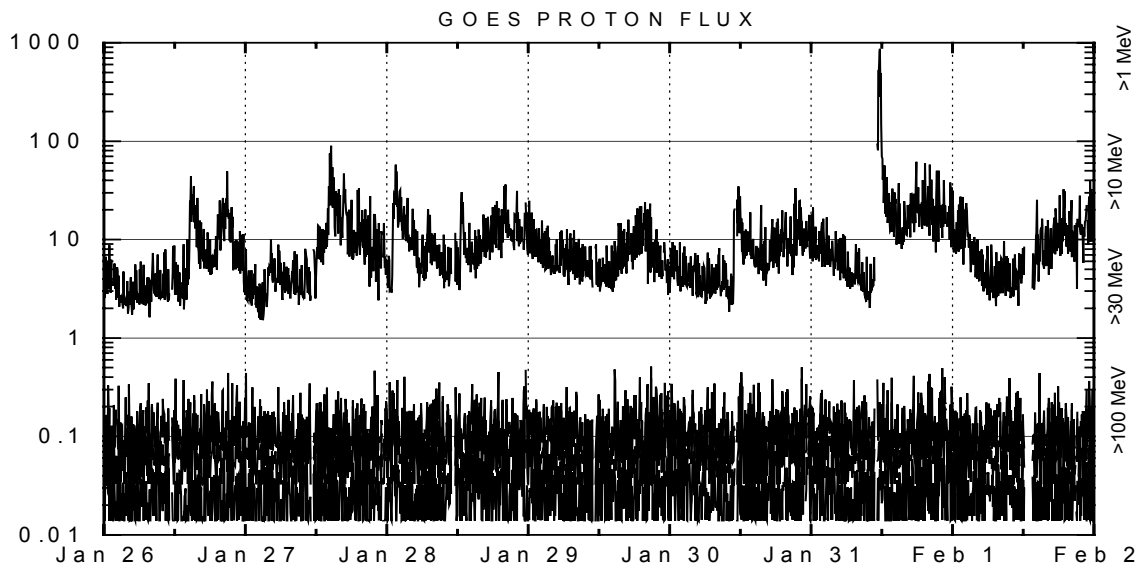
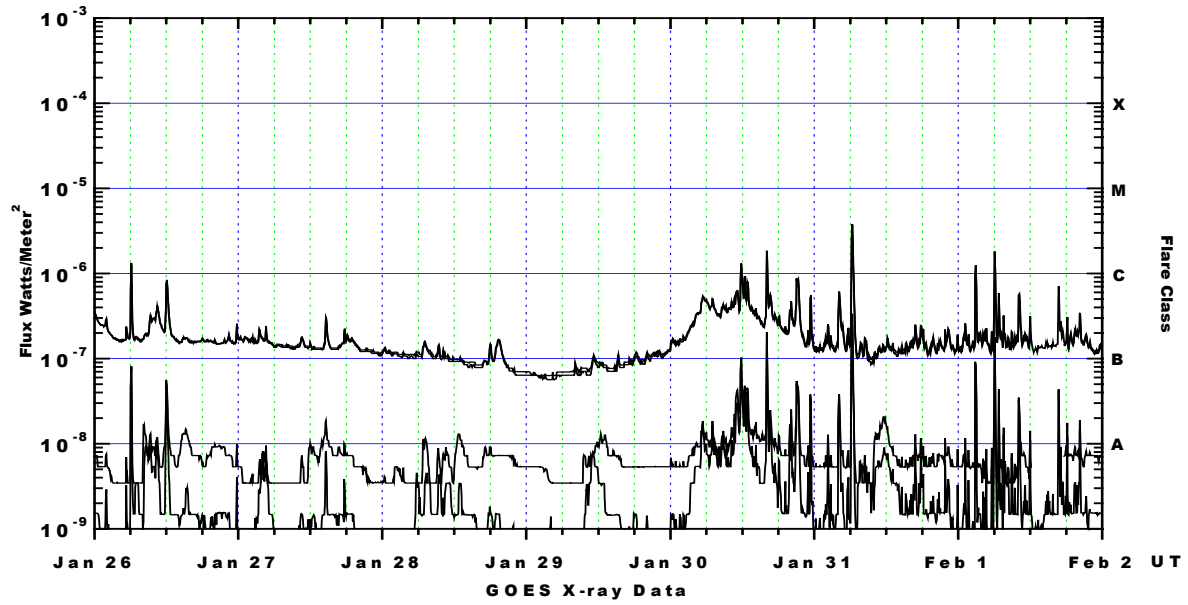
Protons plot contains the five-minute averaged integral proton flux (protons/cm²-sec -sr) as measured by GOES-11 (W113) for each of three energy thresholds: greater than 10, 50, and 100 MeV.

Electrons plot contains the five-minute averaged integral electron flux (electrons/cm²-sec -sr) with energies greater than 2 MeV at GOES-12.

H_p 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_p 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 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_{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/m²) as measured by GOES 12 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-11 (W113) 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.

