

Space Weather Highlights
21 February - 27 February 2011

SWPC PRF 1852
01 March 2011

Solar activity ranged from very low to moderate levels during the period. Numerous C-class flares were observed on 21 February. The largest of these was a C7 x-ray event at 21/1012 UTC from Region 1158 (S21, L=036, Ekc/600 on 15 February). Activity decreased to very low levels on 22 February, with a few B-class events from Region 1161 (N11, L=331, Ekc/260 on 20 February). Activity increased to low levels as Region 1161 produced a C1 x-ray event at 23/1223 UTC. Activity increased further to moderate levels when Region 1163 (N17, L=177, Dai/120 on 25 February) was numbered on 24 February and produced an M3 event at 24/0735 UTC. Associated with this event was a Type IV Radio Sweep, a 180 sfu Tenflare, and a Type II Sweep with an estimated shock velocity of 1283 km/s. Activity decreased to low levels on 25 February with three C1 events observed during the day. Region 1164 (N28, L=162, Hkx/250 on 25 February) was numbered on 25 February. A 24-degree filament (centered near N34E40) was observed lifting off the disk at 25/0637 UTC, as viewed on SDO/AIA171 imagery. Activity remained at low levels with a few C-class events from Region 1164. New Region 1165 (S22, L=181, class/area Bxo/020 on 26 February) emerged on the disk on as a simple bi-polar spot group.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit was at high levels on 21-22 and 24 February. The flux was at moderate levels on 23 February and 26-27 February.

Geomagnetic field activity ranged from quiet to active levels during the period. Activity was at predominantly quiet levels, with isolated active periods observed at high latitudes on 21 February. This elevated activity was due to residual effects from the CMEs associated with the M and X-class events of 13-15 February. During the period, solar wind velocities reached a peak of 444 km/s at 22/1158 UTC. The Bz component of the interplanetary magnetic field did not vary much beyond +/- 5 nT during the period.

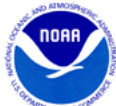
Space Weather Outlook
02 March - 28 March 2011

Solar activity is expected to be at predominately low to moderate levels through the forecast period. A slight chance for high-level activity is possible from 05-22 March due to the return of old Regions 1158 (S21, L=31), 1161 (N11, L=334) and 1162 (N17, L=338).

No proton events are expected at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to be at normal to moderate levels on 02 March. High levels are expected from 03-13 March due to a recurrent coronal hole high speed stream (CH HSS). A decrease to normal to moderate levels is expected through 18 March. Another increase to high levels is expected from 18-23 March due to a second CH HSS. Normal to moderate levels are expected for the remainder of the period.

Geomagnetic field activity is expected to be unsettled to active with a chance for isolated minor



storm periods from 02-05 March due to a recurrent CH HSS. Mostly quiet levels are expected from 06-07 March. Quiet to unsettled conditions are expected from 08-09 March due to another CH HSS. Mostly quiet levels are expected for the remainder of the period.



Daily Solar Data

Date	Radio Flux 10.7cm	Sun spot No.	Sunspot Area (10 ⁻⁶ hemi.)	X-ray Background Flux	Flares							
					X-ray			Optical				
					C	M	X	S	1	2	3	4
21 February	97	60	340	B2.6	10	0	0	0	0	0	0	0
22 February	91	34	350	B1.7	0	0	0	0	0	0	0	0
23 February	89	27	200	B1.8	1	0	0	0	0	0	0	0
24 February	89	23	260	B2.6	2	1	0	0	0	0	0	0
25 February	88	31	370	B2.7	3	0	0	0	0	0	0	0
26 February	90	49	330	B2.2	1	0	0	0	0	0	0	0
27 February	90	44	190	B1.7	1	0	0	3	0	0	0	0

Daily Particle Data

Date	Proton Fluence (protons/cm ² -day -sr)			Electron Fluence (electrons/cm ² -day -sr)		
	>1 MeV	>10 MeV	>100 MeV	>0.6 MeV	>2MeV	>4 MeV
	21 February	2.1e+05	1.4e+04	3.7e+03		1.3e+08
22 February	1.3e+05	1.4e+04	3.6e+03		7.8e+07	
23 February	7.4e+04	1.4e+04	3.6e+03		6.0e+07	
24 February	1.0e+05	1.4e+04	3.6e+03		7.2e+07	
25 February	1.6e+05	1.4e+04	3.3e+03		5.9e+07	
26 February	1.1e+05	1.5e+04	3.4e+03		2.6e+07	
27 February	5.9e+04	1.4e+04	3.5e+03		1.6e+07	

Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	21 February	7	2-2-1-2-2-2-2-2	11	2-1-1-4-4-3-1-1	7
22 February	1	1-0-0-1-0-1-0-0	2	1-0-0-2-1-0-0-0	1	1-0-0-1-0-0-0-0
23 February	1	0-0-1-0-1-1-0-0	0	0-0-0-0-1-0-0-0	4	0-0-0-0-1-2-2-2
24 February	0	0-1-0-0-0-0-0-0	0	0-0-0-1-0-0-0-0	3	0-1-0-0-0-1-1-1
25 February	1	0-0-0-0-1-0-1-0	0	0-0-0-0-1-0-0-0	3	0-0-0-0-1-1-1-1
26 February	2	0-1-0-1-1-1-1-0	3	0-0-2-2-2-1-1-0	4	0-1-1-1-1-1-1-1
27 February	1	0-0-0-0-1-1-0-0	1	0-0-0-0-2-0-0-0	2	1-0-0-0-1-1-0-1

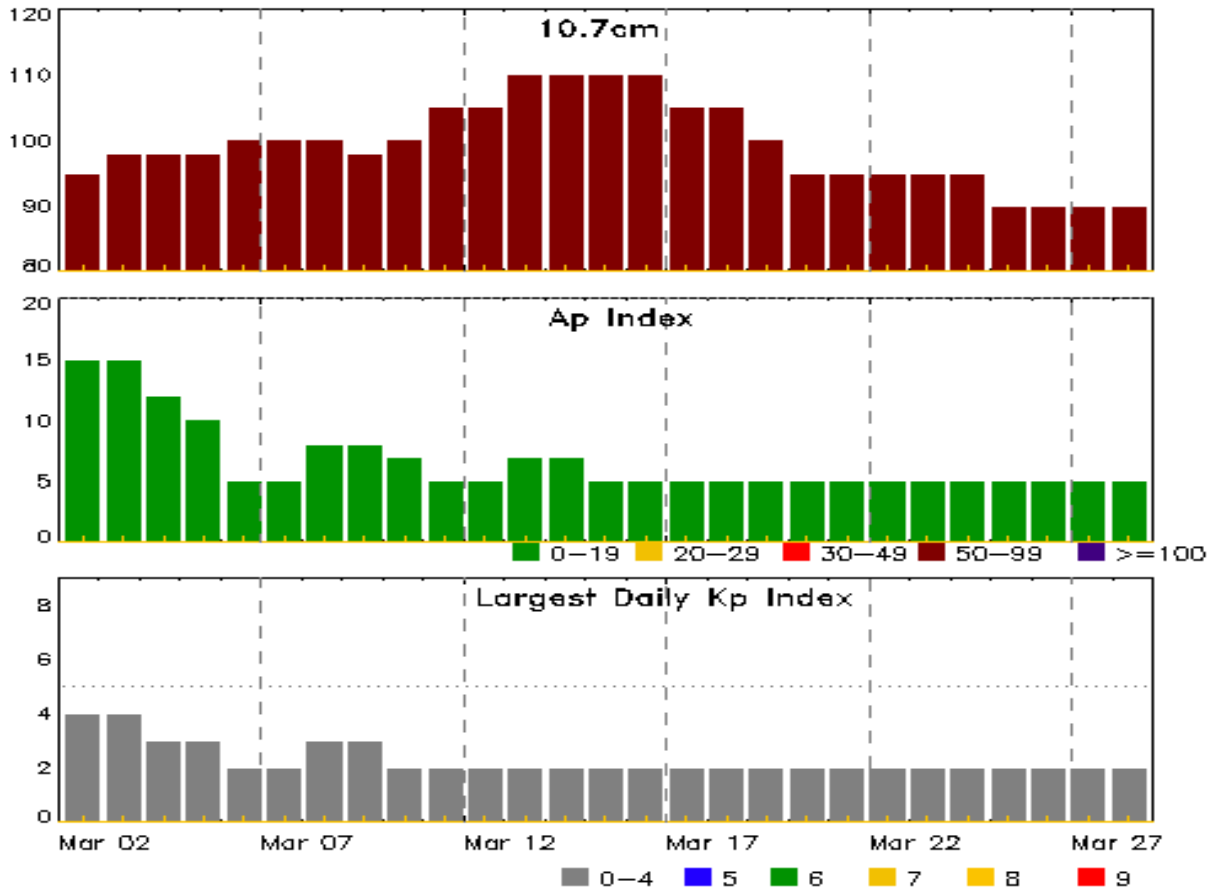


Alerts and Warnings Issued

Date & Time of Issue UTC	Type of Alert or Warning	Date & Time of Event UTC
21 Feb 1237	CONTINUED ALERT: Electron 2MeV Integral Flux \geq 1000pfu	20/1220
22 Feb 1134	CONTINUED ALERT: Electron 2MeV Integral Flux \geq 1000pfu	20/1220
24 Feb 0756	ALERT: Type II Radio Emission	24/0737
24 Feb 0800	ALERT: Type IV Radio Emission	24/0738
24 Feb 0805	SUMMARY: 10cm Radio Burst	24/0731 - 0736
24 Feb 1332	ALERT: Electron 2MeV Integral Flux \geq 1000pfu	24/1305
25 Feb 1149	ALERT: Electron 2MeV Integral Flux \geq 1000pfu	25/1140



Twenty-seven Day Outlook



Date	Radio Flux 10.7cm	Planetary A Index	Largest Kp Index	Date	Radio Flux 10.7cm	Planetary A Index	Largest Kp Index
02 Mar	95	15	4	16 Mar	110	5	2
03	98	15	4	17	105	5	2
04	98	12	3	18	105	5	2
05	98	10	3	19	100	5	2
06	100	5	2	20	95	5	2
07	100	5	2	21	95	5	2
08	100	8	3	22	95	5	2
09	98	8	3	23	95	5	2
10	100	7	2	24	95	5	2
11	105	5	2	25	90	5	2
12	105	5	2	26	90	5	2
13	110	7	2	27	90	5	2
14	110	7	2	28	90	5	2
15	110	5	2				



Energetic Events

Date	Time			X-ray	Optical Information			Peak		Sweep Freq		
	Begin	Max	Half Max	Class	Integ Flux	Imp/ Brtns	Location Lat CMD	Rgn #	Radio 245	Flux 2695	Intensity II	IV
24 Feb	0723	0735	0742	M3.5	0.020			1163	800	180	2	1

Flare List

Date	Time			X-ray Class	Optical		
	Begin	Max	End		Imp/ Brtns	Location Lat CMD	Rgn #
21 Feb	0141	0146	0150	B8.8			1161
21 Feb	0213	0224	0227	C4.6			1158
21 Feb	0310	0315	0318	C1.8			1158
21 Feb	0404	0410	0413	C1.5			1158
21 Feb	0500	0506	0508	C4.1			1158
21 Feb	0602	0610	0614	C4.3			
21 Feb	0901	0906	0909	C2.7			1158
21 Feb	1000	1004	1007	C1.8			1158
21 Feb	1008	1012	1015	C7.8			1158
21 Feb	1539	1544	1555	C1.5			1158
21 Feb	1825	1835	1847	C1.4			1161
22 Feb	1033	1048	1112	B6.5			1161
22 Feb	1215	1219	1222	B3.5			1161
22 Feb	1434	1438	1442	B2.7			1161
23 Feb	0935	0939	0947	B3.1			1161
23 Feb	1024	1028	1033	B3.7			1161
23 Feb	1110	1118	1125	B6.1			1161
23 Feb	1215	1223	1229	C1.2			1161
24 Feb	0249	0253	0257	B3.9			1161
24 Feb	0723	0735	0742	M3.5			1163
24 Feb	1347	1353	1356	C1.8			1163
24 Feb	1712	1740	1751	B8.5			1163
24 Feb	1820	1823	1841	B5.9			
24 Feb	1856	1900	1908	B9.1			
24 Feb	1934	1938	1943	C2.7			1163
24 Feb	1950	1953	1958	B9.2			1163
25 Feb	0138	0142	0145	B4.8			1163
25 Feb	0322	0325	0333	B4.2			1163
25 Feb	0515	0518	0522	C1.4			1163
25 Feb	0540	0544	0546	C1.6			1163
25 Feb	1053	1058	1107	B6.2			1164



Flare List

Date	Time			X-ray Class	Optical		Rgn #
	Begin	Max	End		Imp/ Brtns	Location Lat CMD	
25 Feb	1718	1729	1737	C1.1			1164
25 Feb	1857	1901	1904	B4.5			
25 Feb	2229	2233	2246	B5.2			1163
26 Feb	0007	0010	0012	B4.3			1164
26 Feb	0054	0059	0103	B9.0			1163
26 Feb	0118	0121	0123	B4.6			1164
26 Feb	0503	0520	0539	B8.9			1164
26 Feb	0732	0735	0738	B4.5			1164
26 Feb	0809	0813	0815	C1.3			1164
26 Feb	0935	0939	0943	B3.7			1164
26 Feb	1434	1615	1642	B8.3			1163
26 Feb	1920	1924	1926	B3.9			1164
26 Feb	2046	2050	2052	B4.3			1163
26 Feb	2323	2330	2341	B5.7			1164
27 Feb	0041	0059	0114	B7.3			1164
27 Feb	0349	0355	0358	C4.2	SF	N27E58	1164
27 Feb	0504	0511	0515	B2.7			1164
27 Feb	0755	0757	0800	B2.8			1164
27 Feb	1430	1442	1449	B6.1	SF	N26E54	1164
27 Feb	1547	1553	1559	B7.2	SF	N23E51	1164
27 Feb	1714	1718	1722	B2.9			1164
27 Feb	2117	2134	2143	B7.7			1164
27 Feb	2221	2224	2226	B6.8			1164



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

Region 1160

13 Feb	N16E74	322	plage															1	
14 Feb	N16E60	323	plage																
15 Feb	N16E46	324	plage																
16 Feb	N16E32	324	plage																
17 Feb	N16E18	325	plage																
18 Feb	N16E04	326	plage																
19 Feb	N16W10	327	plage																
20 Feb	N16W24	328	plage																
21 Feb	N16W38	329	plage																
22 Feb	N16W52	329	plage																
24 Feb	N16W80	331	plage																
										1	0	0	0	0	0	0	0	0	

Crossed West Limb.

Absolute heliographic longitude: 326

Region 1161

14 Feb	N11E52	330	30	5	Bxo	3	B												
15 Feb	N11E38	331	130	8	Dai	13	B												
16 Feb	N13E25	330	120	9	Dhi	9	BG		1										
17 Feb	N12E13	329	140	12	Eac	14	BG												
18 Feb	N12W02	331	200	12	Eai	28	BG		2										
19 Feb	N11W15	332	250	15	Ekc	19	BGD		1										
20 Feb	N11W28	331	260	15	Ekc	39	BG		2										
21 Feb	N11W42	331	220	13	Ekc	25	BG		1										
22 Feb	N11W56	333	250	10	Eao	11	BG												
23 Feb	N11W69	336	130	9	Dso	4	B		1										
24 Feb	N11W87	334	60	9	Hax	1	A												
										7	1	0	0	0	0	0	0	0	

Crossed West Limb.

Absolute heliographic longitude: 331



Region Summary - continued

Date	Location		Sunspot Characteristics					Flares															
	Lat CMD	Lon	Helio 10 ⁻⁶ hemi.	Area	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical											
									C	M	X	S	1	2	3	4							
Region 1162																							
18 Feb	N18W06	336	260	7	Dai	18	BG	8	3			1											
19 Feb	N18W19	336	150	8	Dai	20	BG	4				1											
20 Feb	N18W32	335	160	9	Dsi	24	B	1															
21 Feb	N17W46	336	120	7	Dao	15	B																
22 Feb	N17W59	336	100	4	Dso	3	B																
23 Feb	N17W73	339	70	3	Cso	3	B																
24 Feb	N17W89	338	plage																				
								13	3	0	2	0	0	0	0	0	0	0	0				

Crossed West Limb.
 Absolute heliographic longitude: 336

Region 1163																							
24 Feb	N18E72	176	200	1	Cro	2	B	2	1														
25 Feb	N17E60	177	120	8	Dai	10	BG	2															
26 Feb	N18E46	178	110	6	Dai	9	BG																
27 Feb	N18E32	179	10	1	Axx	1	A																
								4	1	0	0	0	0	0	0	0	0	0	0				

Still on Disk.
 Absolute heliographic longitude: 179

Region 1164																							
25 Feb	N28E76	162	250	4	Hkx	1	A	1															
26 Feb	N28E60	164	200	10	Dao	7	BG	1															
27 Feb	N27E46	165	170	14	Eso	12	BG	1				3											
								3	0	0	3	0	0	0	0	0	0	0	0				

Still on Disk.
 Absolute heliographic longitude: 165

Region 1165																							
26 Feb	S22E43	181	20	4	Bxo	3	B																
27 Feb	S21E29	181	10	1	Axx	1	A																
								0	0	0	0	0	0	0	0	0	0	0	0				

Still on Disk.
 Absolute heliographic longitude: 181

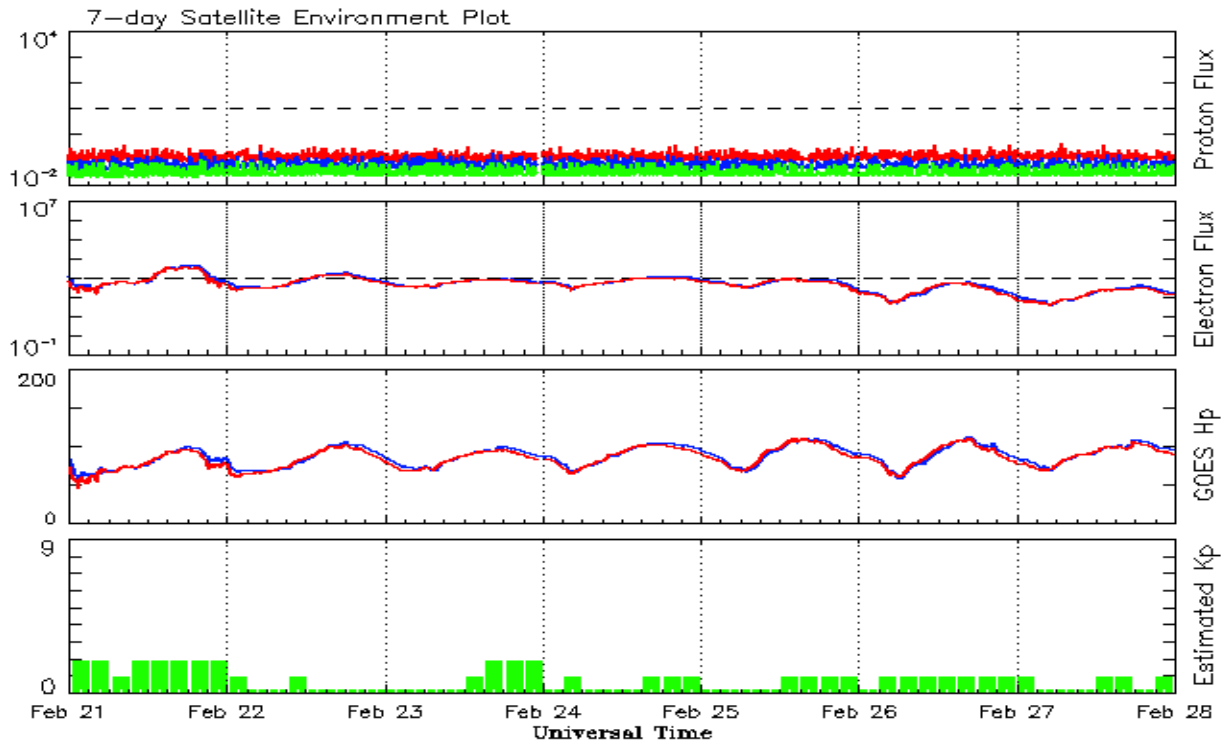


Recent Solar Indices (preliminary)
Observed monthly mean values

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
2009									
March	0.7	0.7	1.00	3.4	2.0	69.2	69.0	5	4.6
April	1.2	0.8	1.00	3.7	2.2	69.7	69.3	4	4.3
May	3.9	2.9	0.74	3.8	2.3	70.5	69.7	4	4.1
June	6.6	2.9	0.39	4.4	2.7	68.6	70.2	4	4.0
July	5.0	3.2	0.70	5.8	3.6	68.2	71.0	4	3.9
August	0.3	0.0	0.00	7.7	4.8	67.4	72.1	5	3.8
September	6.6	4.3	0.64	9.9	6.2	70.5	73.3	4	3.8
October	7.0	4.8	0.66	11.3	7.1	72.3	74.1	3	4.1
November	7.7	4.1	0.55	12.4	7.6	73.6	74.5	3	4.5
December	15.7	10.8	0.68	13.6	8.3	76.8	74.9	2	4.8
2010									
January	21.3	13.2	0.62	14.8	9.3	81.1	75.5	3	5.0
February	31.0	18.8	0.60	16.7	10.6	84.7	76.5	5	5.1
March	24.7	15.4	0.62	19.1	12.3	83.3	77.5	5	5.3
April	11.2	8.0	0.71	21.4	14.0	75.9	78.3	10	5.5
May	19.9	8.7	0.44	23.8	15.5	73.8	79.0	8	5.7
June	17.9	13.6	0.75	25.2	16.4	72.6	79.7	7	5.8
July	23.1	16.1	0.70	25.9	16.8	79.9	80.1	5	6.0
August	28.2	19.6	0.70	27.3	17.4	79.7	80.7	8	6.2
September	35.6	25.2	0.71			81.1		5	
October	35.0	23.5	0.67			81.6		6	
November	36.1	21.6	0.60			82.5		5	
December	22.0	14.5	0.66			84.3		4	
2011									
January	32.1	19.0	0.59			83.7		6	
February	53.2	29.4	0.55			94.5		5	

Note: Values are final except for the most recent 6 months which are considered preliminary. Cycle 23 started in May 1996 with an RI=8.0. Cycle 23 maximum was April 2000 with an RI=120.8. Solar minimum for Cycle 23 was December 2008.





*Weekly Geosynchronous Satellite Environment Summary
Week Beginning 21 February 2011*

The proton flux plot contains the five-minute averaged integral proton flux (protons/cm²-sec -sr) as measured by the SWPC Primary GOES satellite, near West 75, for each of three energy thresholds: greater than 10, 50, and 100 MeV.

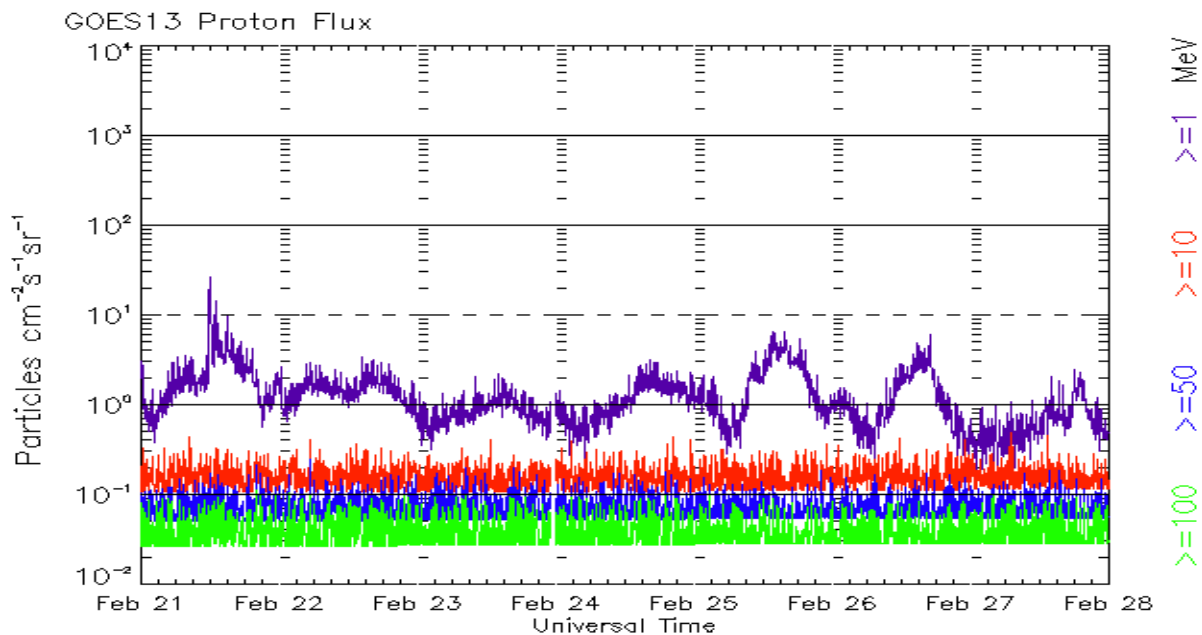
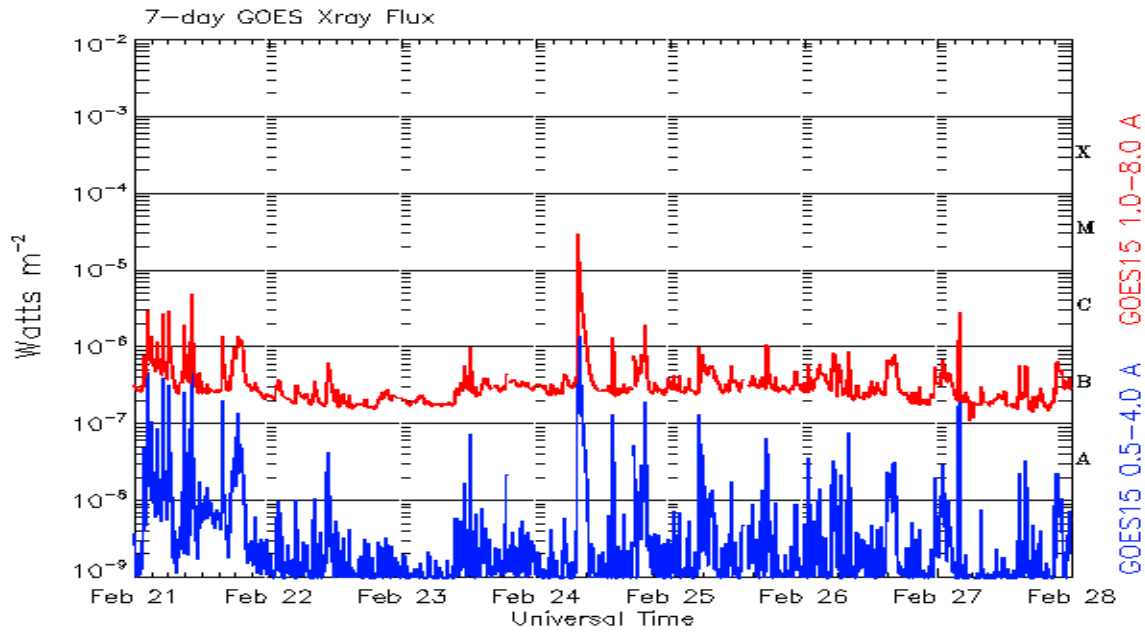
The electron flux plot contains the five-minute averaged integral electron flux (electrons/cm²-sec -sr) with energies greater than 2 MeV by the SWPC Primary GOES satellite.

The Hp plot contains the five minute averaged Hp magnetic field component in nanoteslas (nT) as by the SWPC Primary GOES satellite. The Hp 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 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 Kp values derived from a more extensive network of magnetometers.

The data included here are those now available in real time at the SWPC 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 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
Week Beginning 21 February 2011*

The x-ray plots contains five-minute averages x-ray flux (Watt/ m^2) as measure by the SWPC primary GOES X-ray satellite, usually at West 105 longitude, in two wavelength bands, 0.05 - 0.4 and 0.1 - 0.8 nm. The letters A, B, C, M and X refer to x-ray event levels for the 0.1 - 0.8 nm band.

The proton plot contains the five-minute averaged intergral flux units (pfu = protons/ cm^2 -sec -sr) as measured by the primary SWPC GOES Proton satellite for each of the energy thresholds: >1, >10, >30, and >100 MeV. The P10 event threshold is 10 pfu at greater than 10 MeV.



Preliminary Report and Forecast of Solar Geophysical Data (The Weekly)

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Notice: The 27-day Outlook, Satellite Environment, X-ray and Proton plots have been redesigned. Comments and suggestions are welcome SWPC.Webmaster@noaa.gov

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