

Space Weather Highlights
16 February - 22 February 2015

SWPC PRF 2060
23 February 2015

Solar activity began the period with very low levels on 16-17 February with a few B-class flares observed from Region 2282 (N11, L-187, class/area Eho/250 on 11 Feb). Activity increased to low levels on 18-21 February with weak C-class flares observed from Regions 2282 and 2286 (S18, L=193, class/area Cao/030 on 18 Feb). During this time frame, the largest events were a C3/Sf flare at 18/2207 UTC from Region 2282 and a long duration C2 x-ray event on 20/1522 UTC from departed Region 2286. By 22 February, activity declined to very low levels. During the period, no Earth-directed CMEs were observed.

No proton events were observed at geosynchronous orbit. However, a greater than 10 MeV proton enhancement was observed beginning midday on 21 February and remained enhanced through period's end. Peak flux reached 1.3 pfu at 21/1925 UTC. The enhancement was due to effects from a large CME whose origin was a large filament eruption located backside in the south central portion of the disk.

The greater than 2 MeV electron flux at geosynchronous orbit was at moderate levels on 16, 19-21 February and normal levels on 17-18 and 22 February.

Geomagnetic field activity was generally quiet to unsettled throughout the week with periods of active to isolated minor storm periods on 17-18 February. This activity was due to high speed winds from a negative polarity, trans-equatorial coronal hole. Solar wind speeds were mostly nominal through the period at 325-350 km/s but reached a peak of about 485 km/s early on 18 February. IMF total field averaged about 5 nT with a maximum of 16 nT observed early on 17 February. The Bz component did not vary much beyond +/- 5 nT for a majority of the period. However, during the coronal hole influence, Bz ranged from +14 to -12 nT. Phi was in a predominately negative (towards) orientation throughout the period.

Space Weather Outlook
23 February - 21 March 2015

Solar activity is expected to be at very low to low levels through about 04 March. From 05-18 March, a chance for moderate activity exists due to the return of old Region 2282 (N11, L=191) which was an M-class flare producer on its last transit. Upon old Region 2282's exit, very low to low conditions are expected from 19-21 March.

No proton events are expected at geosynchronous orbit in the absence of any significant solar activity.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to be at normal to moderate levels throughout a majority of the outlook period. However, moderate to high levels are likely on 01-09 March and again on 15-19 March due to coronal hole high speed stream activity.

Geomagnetic field activity is expected to be at predominately quiet to unsettled levels throughout



the outlook period with active conditions likely on 27-28 February, 01-02 March and 16-17 March due to coronal hole high speed stream activity.



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
16 February	118	44	220	B3.6	0	0	0	0	0	0	0	0
17 February	119	40	180	B3.8	0	0	0	1	0	0	0	0
18 February	121	95	250	B4.0	2	0	0	7	1	0	0	0
19 February	119	86	240	B3.8	2	0	0	5	0	0	0	0
20 February	120	53	100	B4.2	3	0	0	6	0	0	0	0
21 February	116	54	110	B3.3	2	0	0	1	0	0	0	0
22 February	118	49	70	B3.0	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)		
	>1 MeV	>10 MeV	>100 MeV	>0.6 MeV	>2MeV	>4 MeV
	16 February	2.6e+05	1.1e+04	2.6e+03		2.4e+06
17 February	1.7e+05	1.1e+04	2.4e+03		3.4e+05	
18 February	1.0e+05	1.1e+04	2.2e+03		1.2e+06	
19 February	9.3e+04	1.0e+04	2.5e+03		1.4e+07	
20 February	7.4e+04	1.1e+04	2.7e+03		2.5e+07	
21 February	2.2e+05	2.9e+04	2.5e+03		4.3e+06	
22 February	7.8e+05	5.1e+04	2.5e+03		2.4e+06	

Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	16 February	4	0-1-0-1-2-1-2-2	3	0-0-2-2-1-0-1-1	5
17 February	18	3-2-3-3-3-3-3-5	27	2-2-3-6-3-5-3-4	22	3-3-3-4-3-3-4-5
18 February	15	5-3-3-3-2-2-2-2	28	4-4-5-5-5-3-2-1	19	5-4-3-3-2-2-2-3
19 February	5	2-2-2-1-1-2-1-1	8	1-2-3-1-3-3-1-1	8	3-3-2-1-1-2-2-2
20 February	4	0-2-2-1-2-1-1-1	7	1-0-2-3-4-1-0-1	6	1-2-2-2-2-1-1-2
21 February	8	3-3-1-1-2-2-2-2	6	2-2-2-3-1-1-0-1	7	3-3-1-1-2-1-1-2
22 February	6	2-1-1-2-2-2-1-2	7	1-2-1-3-3-2-1-0	7	3-2-1-2-1-1-1-2

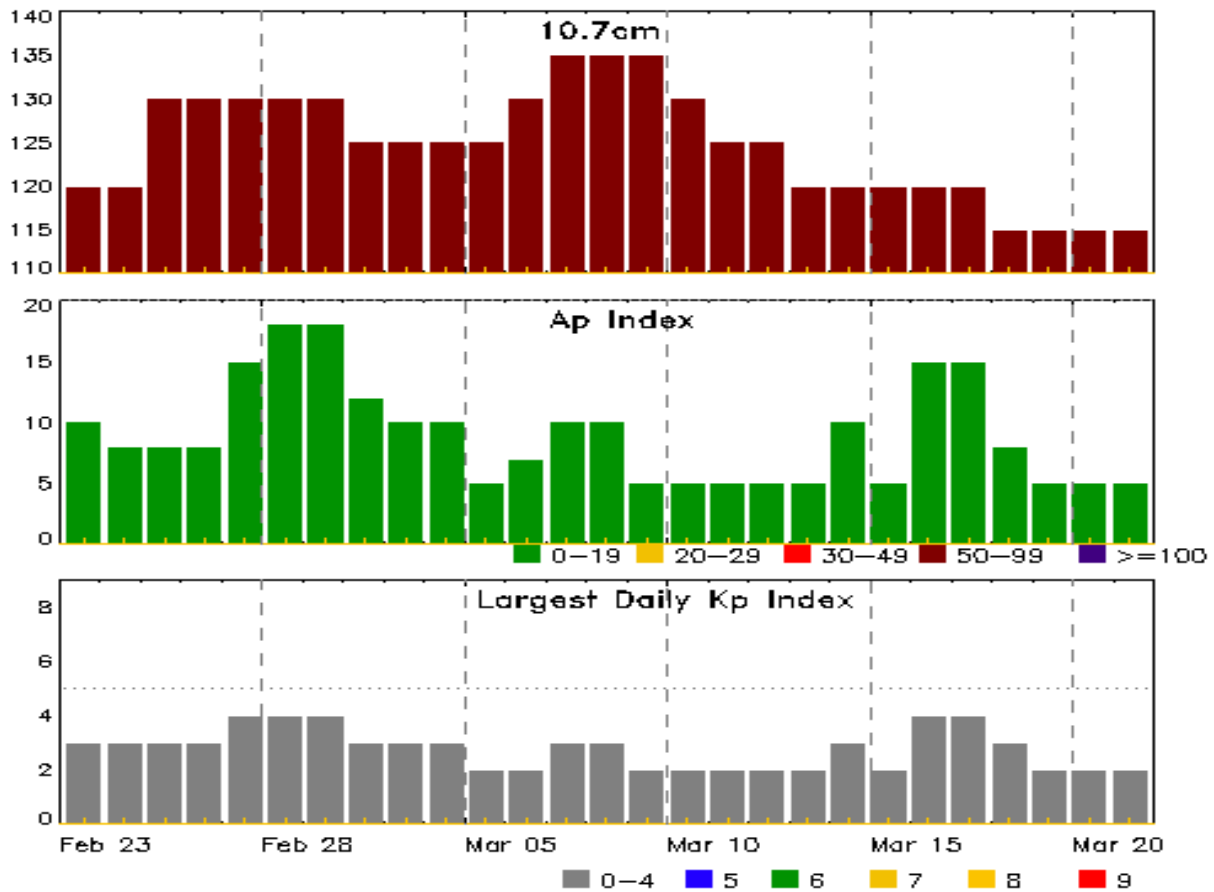


Alerts and Warnings Issued

Date & Time of Issue UTC	Type of Alert or Warning	Date & Time of Event UTC
16 Feb 2242	WARNING: Geomagnetic K = 4	16/2245 - 17/1400
17 Feb 1202	ALERT: Geomagnetic K = 4	17/1200
17 Feb 1329	EXTENDED WARNING: Geomagnetic K = 4	16/2245 - 17/2359
17 Feb 2241	EXTENDED WARNING: Geomagnetic K = 4	16/2245 - 18/0800
17 Feb 2258	WATCH: Geomagnetic Storm Category G1 predicted	
17 Feb 2331	WARNING: Geomagnetic K = 5	17/2331 - 18/0600
17 Feb 2339	ALERT: Geomagnetic K = 5	17/2338
18 Feb 0730	EXTENDED WARNING: Geomagnetic K = 4	16/2245 - 18/1600



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
23 Feb	120	10	3	09 Mar	135	5	2
24	120	8	3	10	130	5	2
25	130	8	3	11	125	5	2
26	130	8	3	12	125	5	2
27	130	15	4	13	120	5	2
28	130	18	4	14	120	10	3
01 Mar	130	18	4	15	120	5	2
02	125	12	3	16	120	15	4
03	125	10	3	17	120	15	4
04	125	10	3	18	115	8	3
05	125	5	2	19	115	5	2
06	130	7	2	20	115	5	2
07	135	10	3	21	115	5	2
08	135	10	3				



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 Flux		Intensity	
									245	2695	II	IV

No Events Observed

Flare List

Date	Time			X-ray Class	Imp/ Brtns	Location Lat CMD	Rgn #
	Begin	Max	End				
16 Feb	1548	1600	1606	B8.8			2282
17 Feb	0635	0644	0655	B7.3	SF	N04W39	2282
18 Feb	1100	1103	1111	B5.7	SF	N15E30	2287
18 Feb	1146	1152	1157		SF	N14E28	2287
18 Feb	1246	1311	1321		SF	N14E28	2287
18 Feb	1359	1400	1407		SF	S07E75	
18 Feb	1617	1620	1623	B8.7	1F	S09E75	2289
18 Feb	1828	1828	1832		SF	S09E72	
18 Feb	1912	1917	1920	B7.9	SF	S09E72	2289
18 Feb	2138	2145	2151	C1.1			2282
18 Feb	2153	2208	2213	C3.5	SF	N13W61	2282
19 Feb	0053	0058	0101	C1.2	SF	N09W63	2282
19 Feb	0108	0112	0115	B9.5			2289
19 Feb	0807	0808	0813		SF	N21E74	2290
19 Feb	0835	0836	0838		SF	N21E73	2290
19 Feb	0842	0846	0857		SF	N21E68	2290
19 Feb	0941	0941	0950		SF	N15E17	2287
19 Feb	1742	1806	1825	C1.1			2286
20 Feb	0106	0110	0115	B6.1			2287
20 Feb	0401	0404	0406		SF	S20W76	2286
20 Feb	0423	0434	0442		SF	S19W76	2286
20 Feb	0455	0505	0518		SF	S19W84	2286
20 Feb	0622	0626	0630		SF	S18W87	2286
20 Feb	0931	0932	0936		SF	N13W27	2284
20 Feb	1001	1027	1051	C1.5			2286
20 Feb	1203	1209	1225		SF	N12W31	2284
20 Feb	1504	1522	1554	C2.3			2286
20 Feb	1817	1825	1835	B8.6			
20 Feb	2010	2015	2021	C1.3			2286
20 Feb	2156	2159	2202	B7.1			2286
20 Feb	2316	2319	2322	B7.2			2286



Flare List

Date	Time			X-ray Class	Optical		Rgn #
	Begin	Max	End		Imp/ Brtns	Location Lat CMD	
21 Feb	0038	0042	0045	B8.8			2286
21 Feb	0328	0333	0350	C1.0			2286
21 Feb	0456	0502	0511	C1.2			2286
21 Feb	B1103	U1103	A1106		SF	N20E20	
21 Feb	1820	1850	1941	B7.1			2291
22 Feb	2002	2021	2102	B9.2			2288



Region Summary

Date	Location		Sunspot Characteristics					Flares								
	Lat	CMD	Helio	Area	Extent	Spot	Spot	Mag	X-ray			Optical				
			Lon	10 ⁻⁶ hemi.	(helio)	Class	Count	Class	C	M	X	S	1	2	3	4
Region 2281																
03 Feb	N13E75		249	60	2	Cao	1	B								
04 Feb	N13E61		249	50	10	Cao	3	B						4		
05 Feb	N13E46		252	80	10	Cao	5	B								
06 Feb	N14E34		251	80	8	Cao	5	B	1					5		
07 Feb	N13E23		249	70	4	Dao	6	BG								
08 Feb	N14E09		249	110	6	Dac	10	BG								
09 Feb	N14W06		251	50	8	Dac	11	BG	2					2		
10 Feb	N12W20		252	60	11	Eac	14	BG								
11 Feb	N13W34		252	20	14	Cao	17	B								
12 Feb	N13W48		254	plage												
13 Feb	N13W62		255	plage												
14 Feb	N13W76		255	plage												
15 Feb	N13W90		256	plage												
									3	0	0	11	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 251

Region 2282																
07 Feb	N15E76		196	30	2	Hsx	1	A								
08 Feb	N15E65		193	90	3	Cao	2	B	1				2	1		
09 Feb	N14E51		194	110	3	Dso	7	B	2	1			2			
10 Feb	N11E48		184	220	9	Dso	10	BG	1							
11 Feb	N11E31		187	250	13	Eho	13	B	2					3		
12 Feb	N10E16		190	240	13	Eso	15	BG	1					4		
13 Feb	N10E04		189	220	12	Csi	10	BG						3		
14 Feb	N11W09		188	220	11	Csi	13	BG						1		
15 Feb	N11W24		190	210	10	Cso	8	B								
16 Feb	N11W37		190	210	9	Cso	10	B								
17 Feb	N11W51		191	170	8	Cao	7	B						1		
18 Feb	N11W64		191	140	7	Cao	6	B	2					1		
19 Feb	N10W76		188	90	6	Hsx	2	A	1					1		
20 Feb	N10W90		190	plage												
									10	1	0	18	1	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 189



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 2283																							
12 Feb	N06W11	217	20	3	Cro	2	B																
13 Feb	N06W24	217	10	3	Bxo	4	B																
14 Feb	N07W38	217	10	1	Axx	1	A																
15 Feb	N07W53	219	plage										1										
16 Feb	N07W66	219	plage																				
17 Feb	N07W81	221	plage																				
													0	0	0	1	0	0	0	0	0		

Crossed West Limb.
Absolute heliographic longitude: 217

Region 2284																							
13 Feb	N14E56	137	30	4	Cro	3	B																
14 Feb	N13E43	136	20	6	Cro	5	B																
15 Feb	N14E29	137	10	6	Bxo	2	B																
16 Feb	N15E16	137	0	1	Axx	1	A																
17 Feb	N14E04	136	0	1	Axx	1	A																
18 Feb	N14W09	136	0	1	Axx	1	A																
19 Feb	N14W23	137	plage																				
20 Feb	N14W37	137	plage										2										
21 Feb	N14W51	138	plage																				
22 Feb	N14W65	139	plage																				
													0	0	0	2	0	0	0	0	0		

Still on Disk.
Absolute heliographic longitude: 136

Region 2285																							
15 Feb	S09W14	180	20	3	Cro	5	B																
16 Feb	S09W29	182	10	2	Bxo	3	B																
17 Feb	S08W43	183	10	1	Axx	2	A																
18 Feb	S08W57	184	plage																				
19 Feb	S08W71	185	plage																				
20 Feb	S08W85	185	plage																				
													0	0	0	0	0	0	0	0	0		

Crossed West Limb.
Absolute heliographic longitude: 180



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

Region 2286

18 Feb	S18W66	193	30	2	Cao	4	B										
19 Feb	S20W80	192	30	2	Hsx	2	A	1									
								1	0	0	0	0	0	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 193

Region 2287

18 Feb	N14E21	106	30	4	Dro	6	B					3					
19 Feb	N14E08	104	50	6	Dsi	10	B					1					
20 Feb	N14W04	104	30	8	Cri	5	B										
21 Feb	N14W18	105	30	7	Dro	5	B										
22 Feb	N15W33	107	20	4	Cro	3	B										
								0	0	0	4	0	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 104

Region 2288

18 Feb	S07W39	165	30	4	Cro	6	B										
19 Feb	S07W52	164	30	5	Dso	4	B										
20 Feb	S08W66	166	40	6	Cao	4	B										
21 Feb	S08W80	167	40	8	Cao	5	B										
								0	0	0	0	0	0	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 165

Region 2289

18 Feb	S07E69	58	10		Axx	1	A					1	1				
19 Feb	S07E55	57	10	1	Axx	1	A										
20 Feb	S07E43	57	10	1	Axx	1	A										
21 Feb	S07E29	58	10	1	Axx	1	A										
22 Feb	S07E17	57	10	1	Axx	1	A										
								0	0	0	1	1	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 57



Region Summary - continued

Date	Location		Sunspot Characteristics				Flares											
	Lat CMD	Lon	Area 10 ⁶ hemi.	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical							
								C	M	X	S	1	2	3	4			
Region 2290																		
18 Feb	N19E70	57	10	1	Axx	1	A											
19 Feb	N19E54	58	30	5	Dro	7	B					3						
20 Feb	N19E43	57	20	4	Dri	3	B											
21 Feb	N19E31	56	30	7	Cro	3	B											
22 Feb	N20E18	56	30	7	Dro	3	B											
								0	0	0	3	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 56

Region 2291

22 Feb	N13W02	76	10	3	Axx	2	A											
								0	0	0	0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 76

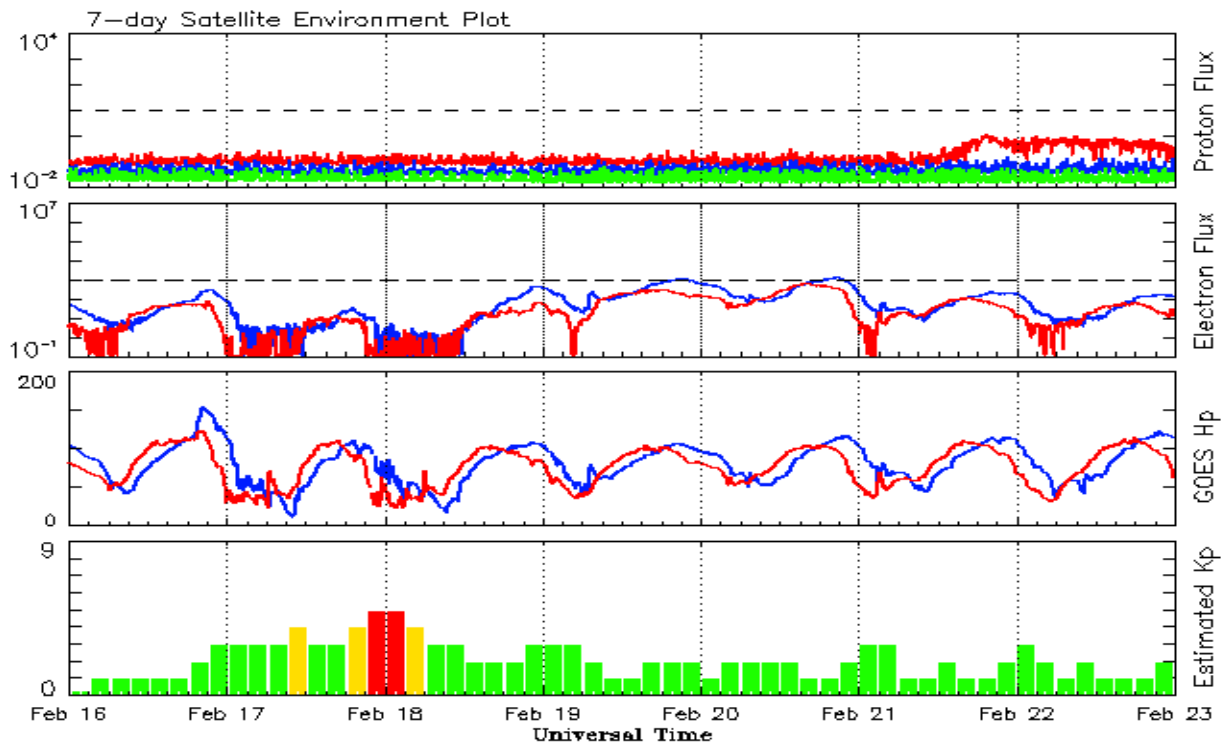


Recent Solar Indices (preliminary)
Observed monthly mean values

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
2013									
February	60.0	38.1	0.63	86.7	58.4	104.4	118.0	5	7.4
March	81.0	57.9	0.71	85.7	57.6	111.2	117.1	9	7.4
April	112.8	72.4	0.64	86.7	57.9	125.0	116.6	5	7.2
May	125.5	78.7	0.63	90.5	59.9	131.3	118.1	10	7.0
June	80.1	52.5	0.66	94.4	62.6	110.2	120.9	13	7.1
July	86.1	57.0	0.66	97.9	65.5	115.6	123.9	9	7.3
August	90.2	66.0	0.73	103.7	68.9	114.7	127.9	9	7.6
September	55.0	37.0	0.67	111.0	73.0	102.7	132.3	5	7.8
October	127.1	85.6	0.67	114.3	74.9	132.3	134.7	7	7.8
November	125.7	77.6	0.62	114.6	75.3	148.4	135.4	5	7.9
December	118.2	90.3	0.76	115.4	75.9	147.7	135.9	5	7.5
2014									
January	125.9	81.8	0.65	117.7	77.3	158.6	137.3	6	7.1
February	174.6	102.3	0.59	119.5	78.3	170.3	138.6	12	6.9
March	141.1	91.9	0.65	123.2	80.8	149.9	140.8	6	7.2
April	130.5	84.7	0.65	124.8	81.9	144.3	143.5	9	7.5
May	116.8	75.2	0.64	122.3	80.5	130.0	144.7	7	7.9
June	107.7	71.0	0.66	121.4	79.7	122.2	145.5	7	8.4
July	113.6	72.4	0.64	120.4	78.6	137.3	145.2	5	8.8
August	106.2	74.6	0.70			124.7		9	
September	127.4	87.6	0.69			146.1		11	
October	92.0	60.6	0.66			153.7		10	
November	101.8	70.1	0.69			155.3		10	
December	120.0	78.0	0.65			158.7		12	
2015									
January	101.2	67.0	0.66			141.7		10	

Note: Values are final except for the most recent 6 months which are considered preliminary.
Cycle 24 started in Dec 2008 with an RI=1.7.





*Weekly Geosynchronous Satellite Environment Summary
Week Beginning 16 February 2015*

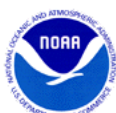
The proton flux plot contains the five-minute averaged integral proton flux (protons/cm²-sec -sr) as measured by the SWPC Primary GOES satellite, near West 75, for each of three energy thresholds: greater than 10, 50, and 100 MeV.

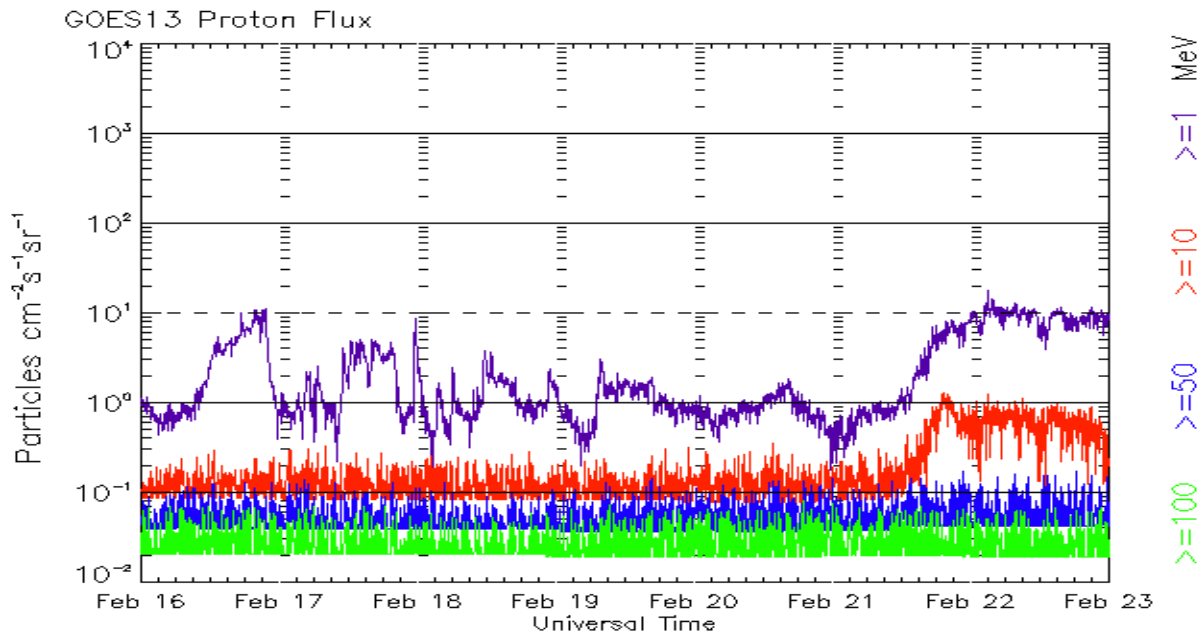
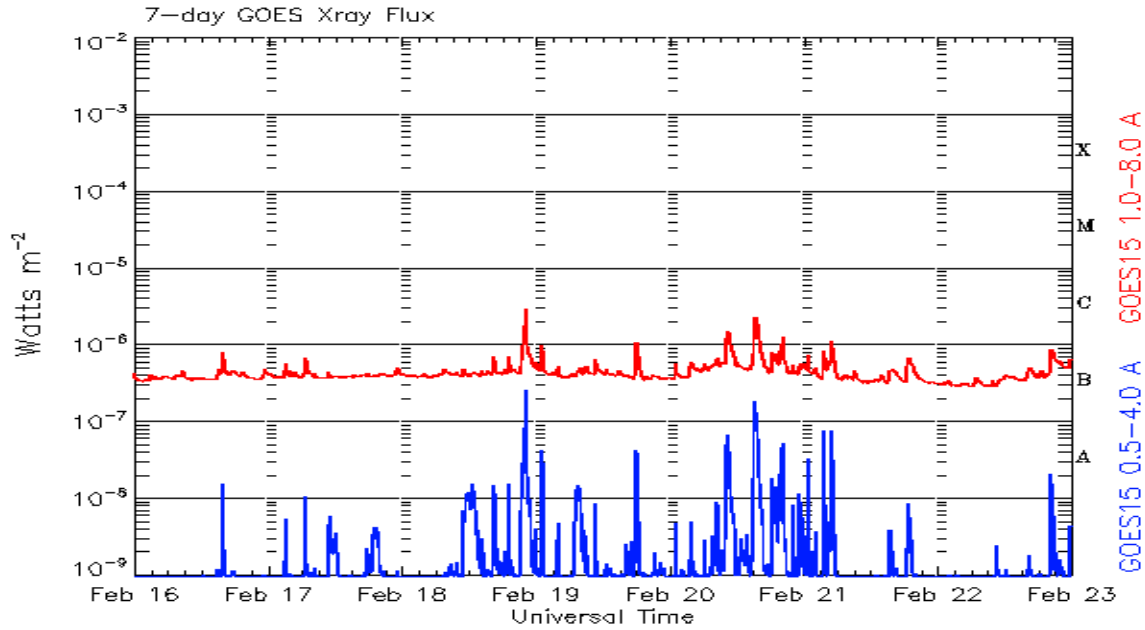
The electron flux plot contains the five-minute averaged integral electron flux (electrons/cm²-sec -sr) with energies greater than 2 MeV by the SWPC Primary GOES satellite.

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.

The Estimated 3-hour Planetary Kp-index is derived at the NOAA Space Weather Prediction Center using data from the following ground-based magnetometers: Boulder, Colorado; Chambon la Foret, France; Fredericksburg, Virginia; Fresno, California; Hartland, UK; Newport, Washington; Sitka, Alaska. These data are made available thanks to the cooperative efforts between SWPC and data providers around the world, which currently includes the U.S. Geological Survey, the British Geological Survey, and the Institut de Physique du Globe de Paris.

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 16 February 2015*

The x-ray plots contains five-minute averages x-ray flux (Watt/m²) 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/cm² -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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http://spaceweather.gov/weekly/Usr_guide.pdf -- User Guide

