

Space Weather Highlights
22 February - 28 February 2016

SWPC PRF 2113
29 February 2016

Solar activity reached low levels with only C-class flare activity observed this period. Region 2506 (S05, L=224, class/area=110/Dai o 28 Feb) was responsible for nearly all flare activity this period including three low-level C-class flares, the largest of which was a C3/Sf flare at 0500 UTC on 27 Feb. A filament eruption centered near S16E19 (vicinity of Region 2506) was observed in SDO/AIA imagery between 0030-0130 UTC on 18 Feb but no associated coronal mass ejection (CME) was observed in LASCO coronagraph imagery suggesting the bulk of the plasma was reabsorbed. No Earth-directed CMEs were observed this period.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit reached high levels on 22-24 and 28 Feb with moderate levels observed throughout the remainder of the period.

Geomagnetic field activity briefly reached unsettled levels on 23-24 and 26 Feb with quiet conditions observed throughout the remainder of the period under a nominal solar wind regime.

Space Weather Outlook
29 February - 26 March 2016

Solar activity is expected to be very low with a chance for C-class flares on 29 Feb and 15-26 Mar. Solar activity is expected to increase to low levels with a chance for M-class flares (R1-R2 (Minor-Moderate) Radio Blackouts) on 01-14 Mar due to the return of old Region 2497 (N12, L=240) which produced four M-class flares last rotation.

No proton events are expected at geosynchronous orbit barring any significant flare activity.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to reach high levels on 15-22 Mar, moderate levels on 04-05, 07-08, 13-14, and 23-26 Mar, and at normal levels for the remainder of the period.

Geomagnetic field activity is expected to reach G1 (Minor) geomagnetic storm levels on 14-16 Mar and active levels on 01, 06, and 17 Mar due to the effects of multiple recurrent coronal hole high speed streams (CH HSSs). Quiet or quiet to unsettled geomagnetic field conditions under a nominal solar wind regime 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
22 February	94	29	220	B1.6	0	0	0	1	0	0	0	0
23 February	91	27	230	B1.5	0	0	0	0	0	0	0	0
24 February	88	39	230	B1.3	1	0	0	2	0	0	0	0
25 February	92	26	50	B1.4	0	0	0	1	0	0	0	0
26 February	89	41	60	B1.2	1	0	0	1	0	0	0	0
27 February	90	37	70	B1.5	1	0	0	4	0	0	0	0
28 February	93	38	120	B1.7	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
	22 February		5.4e+05	1.3e+04	3.2e+03	
23 February		5.6e+05	1.3e+04	3.1e+03		2.1e+08
24 February		1.7e+05	1.3e+04	3.4e+03		3.0e+07
25 February		2.4e+05	1.3e+04	3.3e+03		2.2e+07
26 February		2.8e+05	1.3e+04	2.9e+03		1.9e+07
27 February		2.7e+05	1.3e+04	2.9e+03		1.9e+07
28 February		2.5e+05	1.2e+04	2.7e+03		3.2e+07

Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	22 February	3	0-1-0-1-2-2-1-1	2	0-0-0-2-1-1-0-0	4
23 February	5	2-1-1-0-1-2-2-2	2	1-0-0-0-1-1-1-2	6	2-1-1-1-1-1-2-3
24 February	5	2-2-1-1-2-2-1-1	9	2-1-3-3-4-1-1-0	7	3-2-2-1-2-1-1-2
25 February	6	1-2-2-1-1-2-2-2	2	1-0-1-1-1-0-0-0	5	1-2-2-1-1-1-1-2
26 February	5	2-2-1-1-2-2-1-0	3	1-0-0-0-3-1-0-0	7	3-3-1-1-2-1-1-0
27 February	3	0-1-2-1-1-1-1-1	4	0-0-3-3-1-0-0-0	4	0-1-2-1-0-1-1-1
28 February	4	1-1-2-1-2-1-1-0	4	0-0-1-2-3-1-0-0	5	1-1-2-1-1-0-1-1

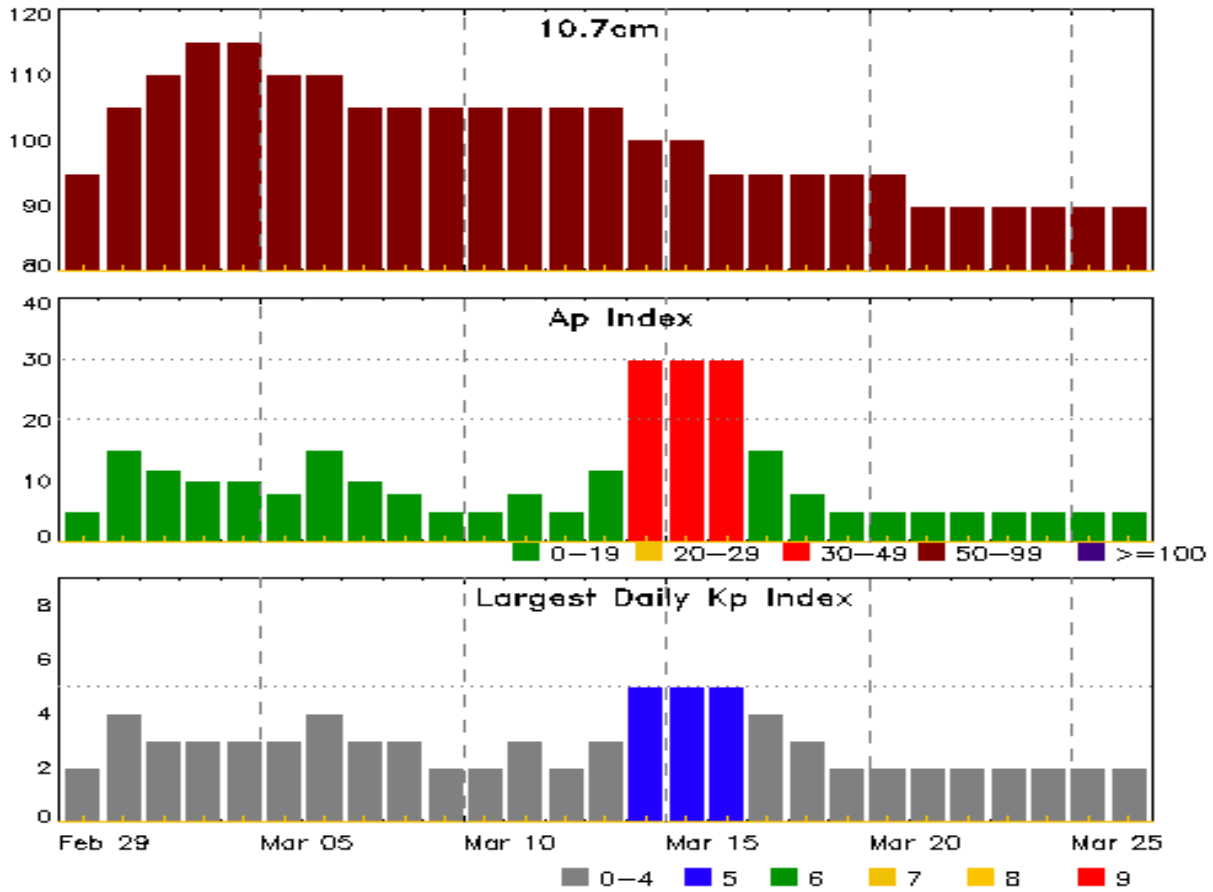


Alerts and Warnings Issued

Date & Time of Issue UTC	Type of Alert or Warning	Date & Time of Event UTC
22 Feb 0541	CONTINUED ALERT: Electron 2MeV Integral Flux \geq 1000pfu	17/1310
23 Feb 0500	CONTINUED ALERT: Electron 2MeV Integral Flux \geq 1000pfu	17/1310
24 Feb 1559	CONTINUED ALERT: Electron 2MeV Integral Flux \geq 1000pfu	17/1310
26 Feb 0157	WARNING: Geomagnetic K = 4	26/0156 - 0700
28 Feb 1425	ALERT: Electron 2MeV Integral Flux \geq 1000pfu	28/1410



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
29 Feb	95	5	2	14 Mar	100	30	5
01 Mar	105	15	4	15	100	30	5
02	110	12	3	16	95	30	5
03	115	10	3	17	95	15	4
04	115	10	3	18	95	8	3
05	110	8	3	19	95	5	2
06	110	15	4	20	95	5	2
07	105	10	3	21	90	5	2
08	105	8	3	22	90	5	2
09	105	5	2	23	90	5	2
10	105	5	2	24	90	5	2
11	105	8	3	25	90	5	2
12	105	5	2	26	90	5	2
13	105	12	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				
22 Feb	1627	1631	1633	B4.0			2505
22 Feb	1841	1845	1847	B4.3			2506
22 Feb	2043	2055	2059	B8.7	SF	S07E84	2506
23 Feb	0101	0109	0113	B9.7			2506
24 Feb	0054	0101	0104	B3.0			2506
24 Feb	0113	0118	0120	B3.5			2506
24 Feb	0343	0348	0350	B2.6			2506
24 Feb	0527	0530	0532	B1.9			2501
24 Feb	0657	0702	0705	B2.9			2501
24 Feb	0808	0812	0815	B3.0			2501
24 Feb	1223	1229	1232	C1.4			2506
24 Feb	1641	1646	1649	B4.4	SF	S09E53	2506
24 Feb	1717	1720	1722	B4.5			2506
24 Feb	1840	1846	1848	B4.3			2506
24 Feb	2124	2136	2146	B3.4	SF	S07E58	2506
25 Feb	0915	0923	0943	B3.2			2506
25 Feb	1013	1016	1019	B3.4			2506
25 Feb	1259	1303	1306	B2.4	SF	S29E25	2506
25 Feb	1911	1956	2009	B8.0			2506
26 Feb	0510	0513	0517	B2.8			2506
26 Feb	0943	0951	1006	C1.0	SF	S07E32	2506
26 Feb	2158	2202	2206	B3.0			2506
27 Feb	0451	0456	0501	B6.5	SF	S08E17	2506
27 Feb	0516	0521	0526	B6.3			2506
27 Feb	0544	0555	0601	C3.3	SF	S10E20	2506
27 Feb	0750	0801	0802		SF	S07E18	2506
27 Feb	1130	1134	1137	B2.5			2506
27 Feb	1414	1414	1415		SF	S07E14	2506
27 Feb	1511	1515	1518	B2.8			2506
28 Feb	0630	0656	0711	B4.5			2506
28 Feb	1131	1138	1152	B4.1			2506



Flare List

Date	Time			X-ray Class	Optical		Rgn #
	Begin	Max	End		Imp/ Brtns	Location Lat CMD	
28 Feb	1717	1721	1732	B2.6			2506



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

Region 2499

12 Feb	N11E38	30	10	1	Axx	1	A											
13 Feb	N11E24	31	plage															
14 Feb	N11E11	31	plage															
15 Feb	N11W03	32	plage															
16 Feb	N11W17	32	plage															
17 Feb	N11W31	33	plage															
18 Feb	N11W45	34	plage															
19 Feb	N11W59	35	plage															
20 Feb	N11W73	36	plage															
21 Feb	N11W87	37	plage															
										0	0	0	0	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 32

Region 2501

14 Feb	N04E76	325	60	2	Hsx	1	A											
15 Feb	N04E62	327	60	2	Hsx	1	A											
16 Feb	N04E48	327	30	1	Hsx	1	A											
17 Feb	N05E34	328	50	2	Hsx	1	A											
18 Feb	N05E20	329	50	2	Hsx	1	A	1				1						
19 Feb	N04E09	327	80	4	Cso	3	B											
20 Feb	N04W04	327	80	3	Cso	3	B											
21 Feb	N04W18	328	70	3	Cso	4	B											
22 Feb	N04W32	328	60	2	Hsx	1	A											
23 Feb	N05W46	329	70	1	Hsx	1	A											
24 Feb	N05W60	330	60	1	Hsx	1	A											
25 Feb	N04W73	330	20	1	Hax	1	A											
26 Feb	N04W86	330	20	1	Hax	1	A											
										1	0	0	1	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 327



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 2502

16 Feb	N08W00	15	10	3	Bxo	4	B										
17 Feb	N08W14	16	10	4	Bxo	2	B										
18 Feb	N09W28	17	10	3	Bxo	3	B										
19 Feb	N07W42	18	plage														
20 Feb	N07W55	18	plage														
21 Feb	N07W70	20	plage														
22 Feb	N07W84	20	plage														
									0	0	0	0	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 15

Region 2503

17 Feb	N06W00	2	20	2	Cro	3	B	1				1					
18 Feb	N06W14	3	10	1	Axx	1	A										
19 Feb	N05W27	2	20	5	Cro	6	B										
20 Feb	N05W40	3	plage														
21 Feb	N05W55	5	plage														
22 Feb	N05W70	6	plage														
23 Feb	N05W84	7	plage														
									1	0	0	1	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 2

Region 2504

19 Feb	N12W02	338	10	3	Bxo	3	B										
20 Feb	N12W17	340	20	3	Cro	3	B										
21 Feb	N13W30	340	10	3	Bxo	3	B										
22 Feb	N13W44	340	plage														
23 Feb	N13W58	341	plage														
24 Feb	N13W72	342	plage														
25 Feb	N13W85	342	plage														
									0	0	0	0	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 338



Region Summary - continued

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 2505																
20 Feb	N08W32		355	110	7	Dai	10	B								
21 Feb	N08W45		355	180	9	Dac	10	B				3				
22 Feb	N08W59		355	160	9	Dac	8	B								
23 Feb	N08W73		356	160	10	Dac	6	B								
24 Feb	N08W87		357	160	10	Dac	6	B								
									0	0	0	3	0	0	0	0

Crossed West Limb.
 Absolute heliographic longitude: 355

Region 2506																
22 Feb	S07E77		222	plage								1				
24 Feb	S07E48		222	10	3	Bxo	2	B	1			2				
25 Feb	S07E35		222	30	5	Cao	5	B								
26 Feb	S07E22		222	30	8	Cro	7	B	1			1				
27 Feb	S06E08		223	60	7	Dai	15	B	1			4				
28 Feb	S05W07		224	110	8	Dai	15	BG								
									3	0	0	8	0	0	0	0

Still on Disk.
 Absolute heliographic longitude: 224

Region 2507																
26 Feb	N18W59		303	10	2	Bxo	3	B								
27 Feb	N19W73		304	10	3	Bxo	2	B								
28 Feb	N19W87		304	plage												
									0	0	0	0	0	0	0	0

Still on Disk.
 Absolute heliographic longitude: 303

Region 2508																
28 Feb	N07E09		208	10	5	Bxo	3	B								
									0	0	0	0	0	0	0	0

Still on Disk.
 Absolute heliographic longitude: 208

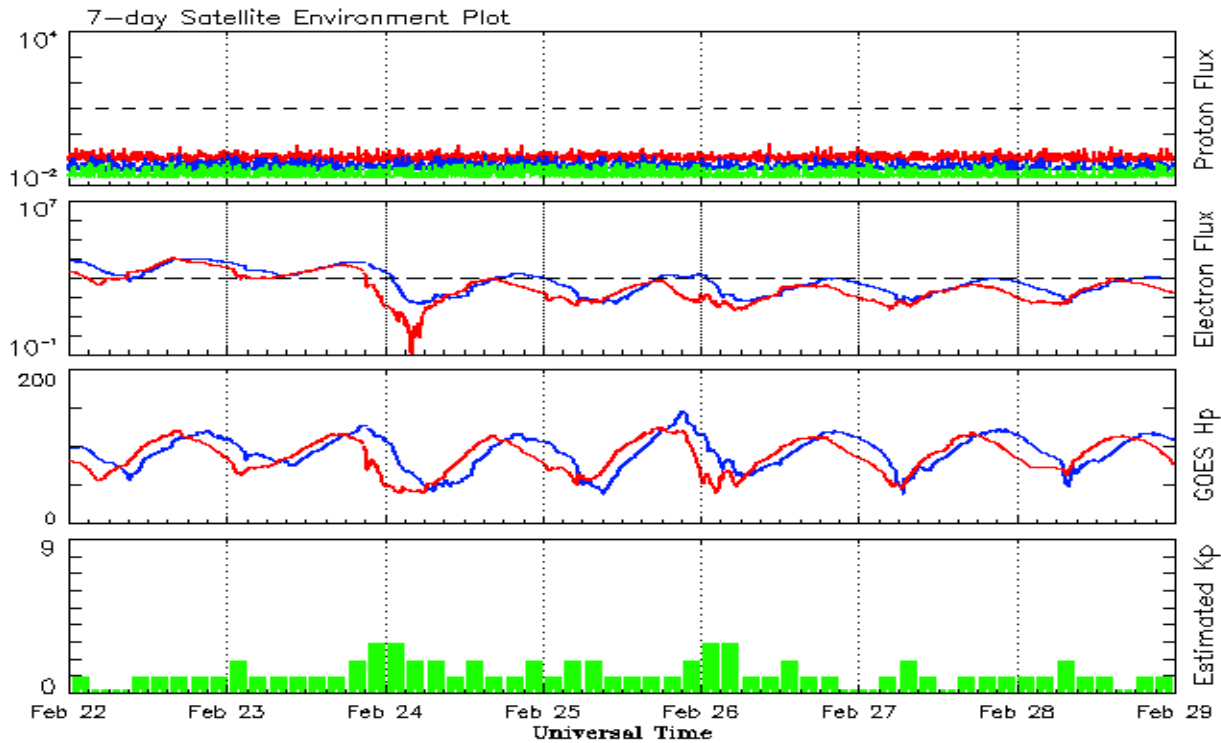


Recent Solar Indices (preliminary)
Observed monthly mean values

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
2014									
March	141.1	91.9	0.65	123.2	80.8	149.9	140.8	6	7.2
April	130.5	67.5	0.65	124.8	69.8	144.3	143.5	9	7.5
May	116.8	67.5	0.64	122.3	69.0	130.0	144.7	7	7.9
June	107.7	61.7	0.66	121.4	68.5	122.2	145.5	7	8.4
July	113.6	60.1	0.64	120.4	67.6	137.3	145.2	5	8.8
August	106.2	64.1	0.70	115.1	65.0	124.7	142.8	9	8.9
September	127.4	78.0	0.69	107.4	61.1	146.1	140.1	11	9.3
October	92.0	54.0	0.66	101.7	58.4	153.7	138.4	10	9.9
November	101.8	62.2	0.69	97.9	56.8	155.3	137.4	10	10.1
December	120.0	67.7	0.65	95.2	55.3	158.7	137.0	12	10.5
2015									
January	101.2	55.8	0.66	92.1	53.6	141.7	135.8	10	11.0
February	70.6	40.0	0.63	88.3	51.7	128.8	133.8	10	11.5
March	61.7	32.7	0.62	84.2	49.3	126.0	131.2	17	12.0
April	72.5	45.2	0.75	80.5	47.3	129.2	127.3	12	12.4
May	83.0	53.3	0.71	77.5	45.6	120.1	123.3	9	12.7
June	77.3	39.9	0.53	73.1	43.2	123.2	119.5	14	13.0
July	68.4	39.5	0.58	68.2	40.9	107.0	116.0	10	13.1
August	61.6	38.6	0.63			106.2		16	
September	72.5	47.2	0.65			102.1		16	
October	59.5	37.0	0.62			104.1		15	
November	61.8	37.9	0.61			109.6		13	
December	54.1	34.6	0.64			112.8		15	
2016									
January	50.4	34.0	0.67			103.5		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 22 February 2016*

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.

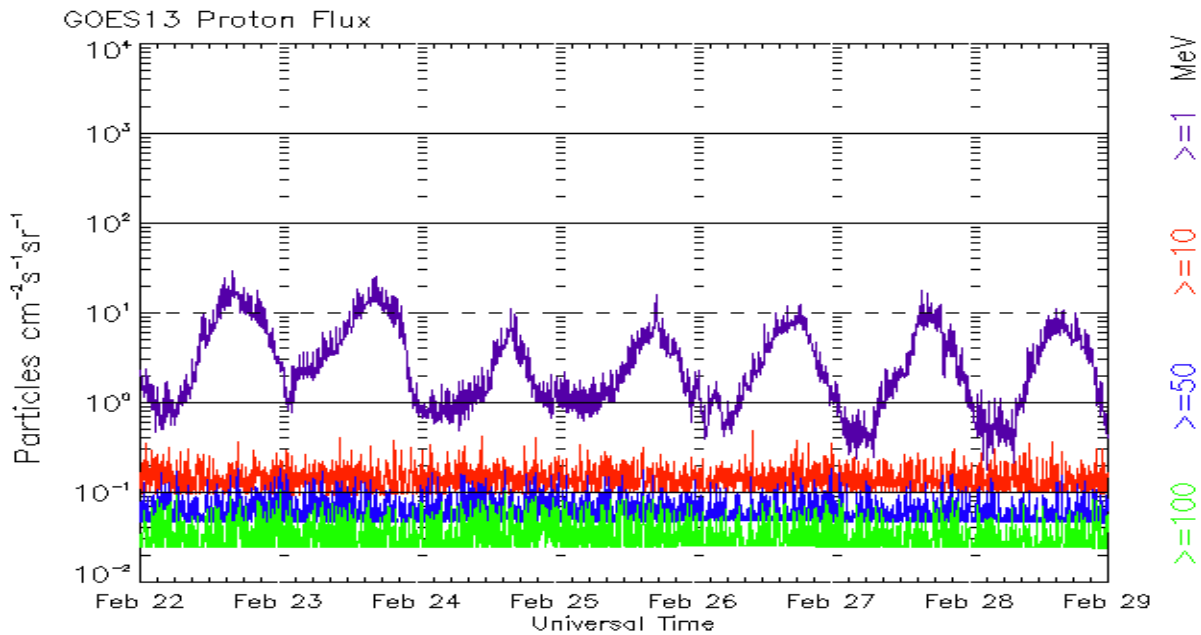
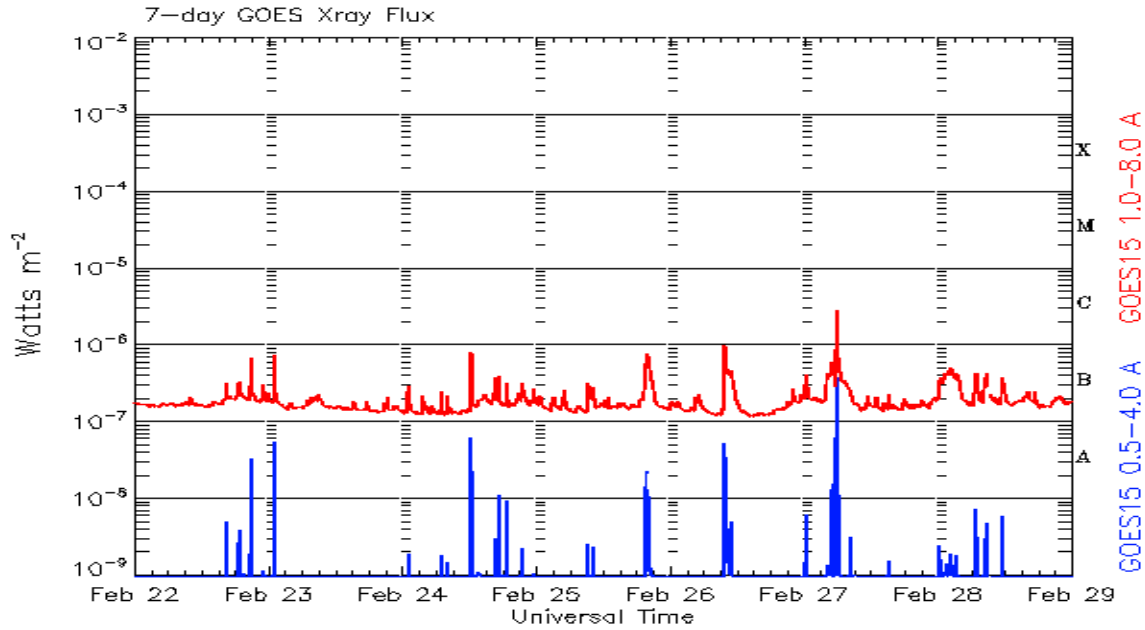
The electron flux plot contains the five-minute averaged integral electron flux (electrons/cm²-sec -sr) with energies greater than 2 MeV by the SWPC Primary GOES satellite.

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 22 February 2016*

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 integral 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.



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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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