

Space Weather Highlights
13 February - 19 February 2017

SWPC PRF 2164
20 February 2017

Solar activity was at very low levels with only weak background flare activity observed. An 11 degree long filament eruption, centered near N08E02, was observed in SDO/AIA 193 imagery beginning around 19/0525 UTC. A faint CME was observed off the NE limb, observed in LASCO C2 imagery, at around 19/0648 UTC. WSA-Enlil analysis indicated a possible glancing blow at Earth mid to late on 22 Feb. No other activity was observed.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit reached high levels on 13-14 Feb with moderate levels observed on 15-19 Feb.

Geomagnetic field activity was at quiet levels on 13-15 Feb, quiet to isolated unsettled to active levels on 16 Feb, quiet to active levels on 17-18 Feb and quiet to unsettled levels on 19 Feb. A recurrent, positive polarity coronal hole high speed stream (CH HSS) became geoeffective early on 17 Feb affecting the geomagnetic field through late on 19 Feb. During this period, solar wind speeds generally ranged from 500-600 km/s, total field Bt peaked at 13 nT early on 17 Feb while the Bz component reached a maximum southward extent of -8 nT early on 17 Feb. Phi angle was in a predominately positive orientation.

Space Weather Outlook
20 February - 18 March 2017

Solar activity is expected to be at very low levels with a chance for isolated C-class activity throughout the period.

No proton events are expected at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to be at high levels on 20-27 Feb and 01-13 Mar. Normal to moderate levels are expected for the remainder of the outlook period.

Geomagnetic field activity is expected to reach G2 (Moderate) geomagnetic storm levels on 28 Feb and G1 (Minor) storm levels on 24 Feb, 01-02 Mar and again on 16 Mar due to recurrent CH HSS influence. Active geomagnetic field activity is expected on 23 and 25 Feb, 03-05 Mar and 17 Mar due to CH HSS influence. Isolated active conditions are likely on 22 Feb due to a glancing blow from the 19 Feb CME. Quiet to unsettled activity is expected for the remainder of the period under a nominal solar wind regime.



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
13 February	75	16	60	A6.3	0	0	0	0	0	0	0	0
14 February	75	15	50	A6.2	0	0	0	0	0	0	0	0
15 February	75	23	30	A5.9	0	0	0	0	0	0	0	0
16 February	74	23	10	A5.7	0	0	0	0	0	0	0	0
17 February	75	14	20	A7.6	0	0	0	0	0	0	0	0
18 February	77	13	20	B1.0	0	0	0	0	0	0	0	0
19 February	78	23	30	B1.4	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
	13 February		1.1e+06	1.5e+04	3.4e+03	
14 February		1.0e+06	1.5e+04	3.6e+03		6.8e+07
15 February		1.0e+06	1.5e+04	3.5e+03		3.9e+07
16 February		1.3e+06	1.5e+04	3.5e+03		8.4e+06
17 February		1.2e+06	1.4e+04	3.5e+03		3.8e+06
18 February		7.4e+05	1.5e+04	3.4e+03		6.1e+06
19 February		6.4e+05	1.5e+04	3.6e+03		2.0e+07

Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	13 February	2	1-1-0-0-1-1-1-1	2	1-0-0-1-0-1-1-1	5
14 February	1	0-0-0-0-1-1-1-0	1	0-0-0-0-0-0-1-1	2	0-0-0-0-0-1-1-1
15 February	2	0-0-1-1-1-1-2-0	2	0-0-1-2-0-0-1-0	3	0-0-1-1-1-1-1-1
16 February	7	1-2-2-0-3-3-2-1	31	0-0-3-1-6-7-2-0	9	1-2-2-0-3-3-2-2
17 February	16	1-3-4-4-2-3-2-4	37	1-3-6-6-5-5-3-2	20	2-4-4-4-2-4-3-4
18 February	11	3-4-1-1-1-2-3-3	13	3-4-2-3-2-3-2-2	16	4-4-2-2-1-2-3-3
19 February	9	3-3-2-1-2-2-3-0	8	2-2-2-3-3-2-2-0	15	3-3-2-1-2-3-3-1

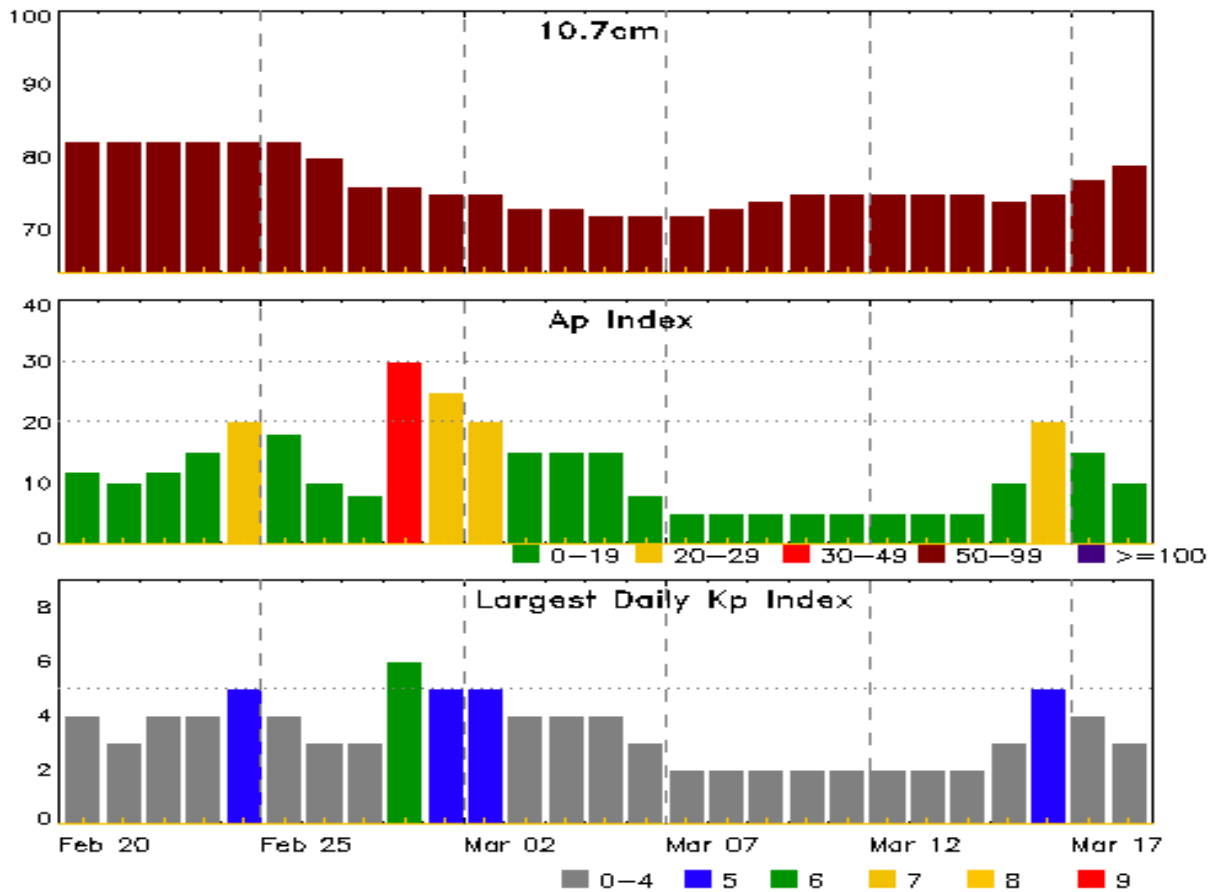


Alerts and Warnings Issued

Date & Time of Issue UTC	Type of Alert or Warning	Date & Time of Event UTC
13 Feb 0603	SUMMARY: 10cm Radio Burst	13/0445 - 0445
13 Feb 1025	CONTINUED ALERT: Electron 2MeV Integral Flux \geq 1000pfu	01/1240
14 Feb 1305	CONTINUED ALERT: Electron 2MeV Integral Flux \geq 1000pfu	01/1240
16 Feb 1730	WARNING: Geomagnetic K = 4	16/1730 - 2359
17 Feb 0437	WARNING: Geomagnetic K = 4	17/0436 - 1500
17 Feb 0446	ALERT: Geomagnetic K = 4	17/0446
17 Feb 0852	WARNING: Geomagnetic K = 5	17/0852 - 1200
17 Feb 1750	WARNING: Geomagnetic K = 4	17/1749 - 2359
17 Feb 1803	ALERT: Geomagnetic K = 4	17/1759
17 Feb 2312	EXTENDED WARNING: Geomagnetic K = 4	17/1749 - 18/0700
18 Feb 0359	EXTENDED WARNING: Geomagnetic K = 4	17/1749 - 18/1200
18 Feb 0359	WARNING: Geomagnetic K = 5	18/0357 - 0900
19 Feb 0005	WARNING: Geomagnetic K = 4	19/0000 - 0900
19 Feb 0857	EXTENDED WARNING: Geomagnetic K = 4	19/0000 - 1500



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
20 Feb	82	12	4	06 Mar	72	8	3
21	82	10	3	07	72	5	2
22	82	12	4	08	73	5	2
23	82	15	4	09	74	5	2
24	82	20	5	10	75	5	2
25	82	18	4	11	75	5	2
26	80	10	3	12	75	5	2
27	76	8	3	13	75	5	2
28	76	30	6	14	75	5	2
01 Mar	75	25	5	15	74	10	3
02	75	20	5	16	75	20	5
03	73	15	4	17	77	15	4
04	73	15	4	18	79	10	3
05	72	15	4				



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 245	Radio Flux 2695	Intensity II

No Events Observed

Flare List

Date	Time			X-ray Class	Optical			Rgn #
	Begin	Max	End		Imp/ Brtns	Location Lat CMD		
13 Feb	0626	0636	0650	B1.8			2635	
15 Feb	1234	1243	1246	B2.3			2636	
15 Feb	2048	2051	2054	B1.0			2636	
17 Feb	0927	0932	0938	B1.6			2636	
17 Feb	0953	0956	0958	B1.3			2636	
18 Feb	0042	0145	0233	B2.8				
18 Feb	0256	0319	0341	B3.1				
19 Feb	0537	0541	0548	B3.0				
19 Feb	1647	1650	1655	B2.6				



Region Summary

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 2634

05 Feb	N02E70	300	10			Axx	1	A										
06 Feb	N05E56	300	10			Bxo	5	B										
07 Feb	N03E44	299	10			Axx	1	A										
08 Feb	N03E29	301	plage															
09 Feb	N03E16	301	plage															
10 Feb	N03E02	302	plage															
11 Feb	N03W12	303	plage															
12 Feb	N03W26	303	plage															
13 Feb	N03W40	304	plage															
14 Feb	N03W55	306	plage															
15 Feb	N03W70	308	plage															
16 Feb	N03W85	310	plage															
										0	0	0	0	0	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 302

Region 2635

08 Feb	N13E28	302	plage										2					
09 Feb	N13E13	303	70	5	Dao	5	B	3				1						
10 Feb	N14W00	304	110	6	Dai	8	B											
11 Feb	N12W15	304	110	6	Dai	8	B											
12 Feb	N12W27	303	90	6	Dai	8	B											
13 Feb	N12W40	304	60	7	Cso	6	B											
14 Feb	N12W53	304	50	5	Cso	5	B											
15 Feb	N13W66	304	20	1	Hrx	1	A											
16 Feb	N13W80	305	0		Axx	1	A											
										3	0	0	3	0	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 304

Region 2636

15 Feb	N11E53	185	10			Axx	2	A										
16 Feb	N11E40	185	10	1	Hrx	2	A											
17 Feb	N11E27	185	20	3	Cro	4	B											
18 Feb	N11E15	183	20	2	Bxo	3	B											
19 Feb	N11E01	184	10			Axx	1	A										
										0	0	0	0	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 184



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 2637</i>																
19 Feb	S03E61	124	20	1	Axx	2	A	0	0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 124

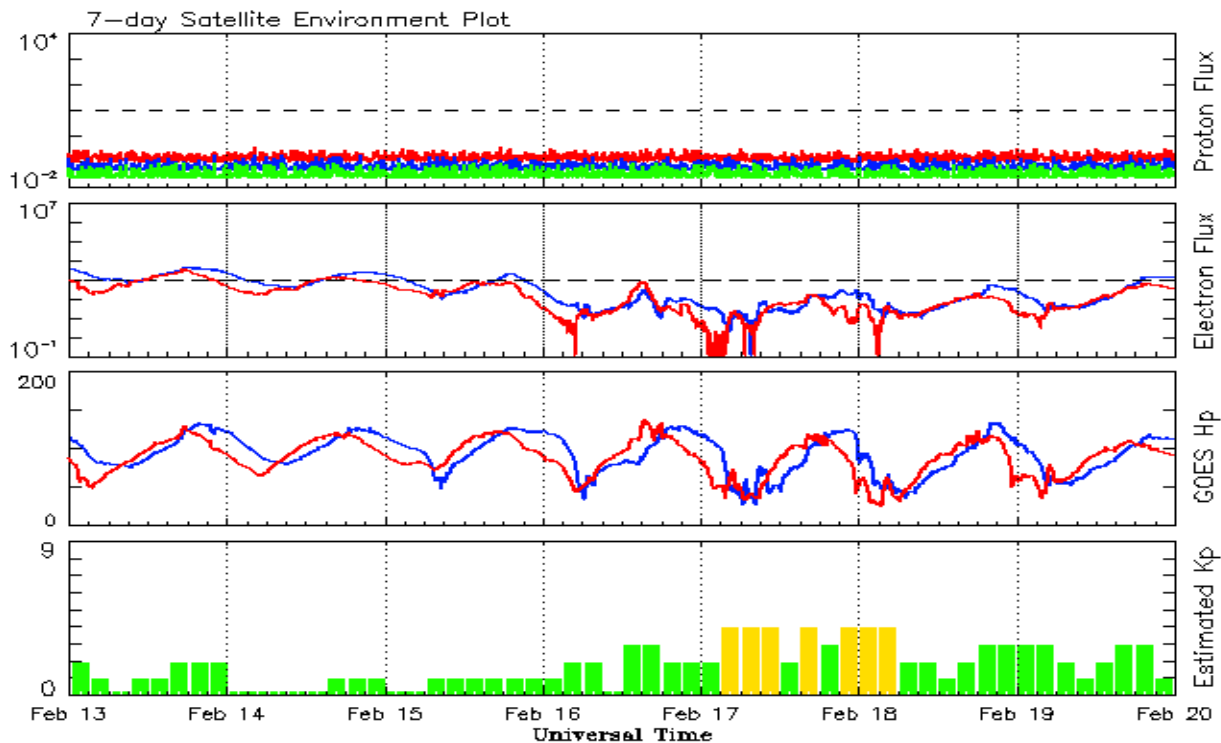


Recent Solar Indices (preliminary)
Observed monthly mean values

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
2015									
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	45.7	120.1	123.3	9	12.7
June	77.3	39.9	0.53	73.1	43.3	123.2	119.5	14	13.0
July	68.4	39.5	0.58	68.2	41.0	107.0	116.0	10	13.1
August	61.6	38.6	0.63	65.5	39.8	106.2	113.3	16	13.1
September	72.5	47.2	0.65	64.0	39.5	102.1	110.8	16	12.8
October	59.5	38.2	0.62	61.8	38.6	104.1	107.9	15	12.5
November	61.8	37.3	0.61	59.0	36.7	109.6	105.3	13	12.5
December	54.1	34.8	0.64	55.1	34.7	112.8	102.5	15	12.5
2016									
January	50.4	34.2	0.67	51.4	32.6	103.5	99.9	10	12.3
February	56.0	33.8	0.61	49.6	31.5	103.5	98.1	10	12.0
March	40.9	32.5	0.80	47.7	30.2	91.6	96.6	11	11.8
April	39.2	22.7	0.58	45.0	28.7	93.4	95.3	10	11.8
May	48.9	30.9	0.64	42.1	26.9	93.1	93.2	12	11.7
June	19.3	12.3	0.65	39.0	24.9	81.9	90.4	9	11.4
July	36.8	19.4	0.53	36.5	23.2	85.9	87.7	10	11.2
August	50.4	30.1	0.60			85.0		10	
September	37.4	26.8	0.72			87.8		16	
October	30.0	20.2	0.67			86.1		16	
November	22.4	12.8	0.57			78.7		10	
December	17.6	11.3	0.64			75.1		10	
2017									
January	28.1	15.5	0.55			77.4		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 13 February 2017*

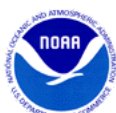
The proton flux plot contains the five-minute averaged integral proton flux (protons/cm²-sec -sr) as measured by the SWPC Primary GOES satellite, near West 75, for each of three energy thresholds: greater than 10, 50, and 100 MeV.

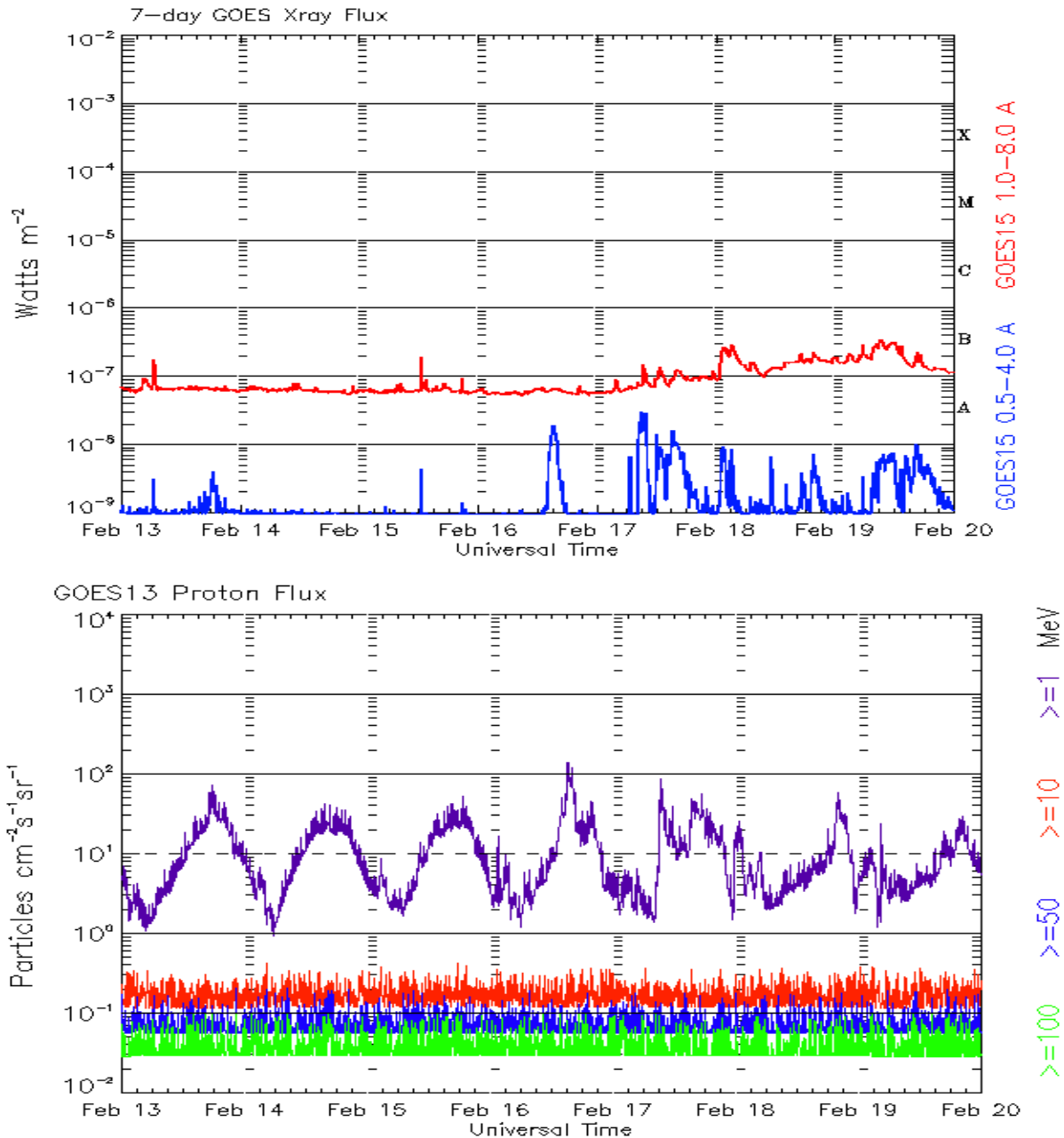
The electron flux plot contains the five-minute averaged integral electron flux (electrons/cm²-sec -sr) with energies greater than 2 MeV by the SWPC Primary GOES satellite.

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 13 February 2017*

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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