

**Space Weather Highlights**  
**23 January - 29 January 2017**

**SWPC PRF 2161**  
**30 January 2017**

Solar activity was at mostly very low levels with low levels observed on 28 January due to an isolated C2 flare at 28/2109 UTC from Region 2627 (N06, L=193, class/area Dai/110 on 22 January). An associated coronal mass ejection (CME) was observed off of the west limb in coronagraph imagery beginning at 28/2148 UTC but was determined not to have a geoeffective component. No Earth-directed CMEs were observed.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit was at normal to moderate levels with high levels observed on 23-24, and 26-29 January. The largest flux value of the period was 2,495 pfu observed at 28/1800 UTC.

Geomagnetic field activity ranged from quiet to active levels over the period. Solar wind parameters were indicative of background conditions to start the period. Midday on 26 January, wind speed began to increase as an isolated, positive polarity coronal hole high-speed stream (CH HSS) became geoeffective. Wind speed reached a maximum of 697 km/s at 27/0609 UTC and total field peaked at 16 nT at 26/2330 UTC before gradually decreasing throughout the remainder of the period. The geomagnetic field was at quiet levels on 23-24 January, quiet to unsettled levels on 25, 28-29 January, and quiet to active levels on 26-27 January.

**Space Weather Outlook**  
**30 January - 25 February 2017**

Solar activity is expected to be very low with a slight chance for C-class flares on 30 January - 04 February as Regions 2628 (N12, L=174, class/area Dso/220 on 23 January) and 2629 (N15, L=110, class/area Dao/220 on 25 January) rotate across the visible disk. Very low levels are expected from 05-11 February. Very low levels with a slight chance for C-class flares are expected on 12-25 February with the return of Region 2627.

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 with high levels likely on 01-13, 16-18, and 22-25 February due to CH HSS influence.

Geomagnetic field activity is expected to be at unsettled to active levels on 30 January - 07 February, and again on 14-18 and 22-25 February with G1 (Minor) geomagnetic storm levels likely on 31 January, and 01 February due to recurrent CH HSS effects.



### *Daily Solar Data*

Date	Radio Flux 10.7cm	Sun spot No.	Sunspot Area (10 <sup>-6</sup> hemi.)	X-ray Background Flux	Flares							
					X-ray			Optical				
					C	M	X	S	1	2	3	4
23 January	84	53	320	B1.0	0	0	0	0	0	0	0	0
24 January	82	55	320	B1.0	0	0	0	4	0	0	0	0
25 January	85	46	410	B1.4	0	0	0	6	0	0	0	0
26 January	83	31	270	B1.1	0	0	0	2	0	0	0	0
27 January	80	33	270	A9.1	0	0	0	0	0	0	0	0
28 January	79	28	240	A8.5	1	0	0	0	0	0	0	0
29 January	77	24	230	A8.2	0	0	0	0	0	0	0	0

### *Daily Particle Data*

Date	Proton Fluence (protons/cm <sup>2</sup> -day -sr)			Electron Fluence (electrons/cm <sup>2</sup> -day -sr)		
	>1 MeV	>10 MeV	>100 MeV	>0.6 MeV	>2MeV	>4 MeV
	23 January	3.0e+06	1.5e+04	3.8e+03	5.3e+07	
24 January	2.0e+06	1.5e+04	3.7e+03	5.2e+07		
25 January	4.3e+06	1.5e+04	3.7e+03	3.2e+07		
26 January	2.6e+06	1.5e+04	3.4e+03	1.2e+07		
27 January	3.5e+06	1.5e+04	3.5e+03	3.5e+07		
28 January	1.6e+06	1.5e+04	3.6e+03	8.8e+07		
29 January	8.6e+05	1.5e+04	3.6e+03	8.0e+07		

### *Daily Geomagnetic Data*

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	23 January	2	0-0-1-0-1-2-1-1	2	0-0-1-1-2-1-1-0	5
24 January	3	2-0-0-0-1-2-0-1	0	0-0-1-0-0-0-0-0	3	2-1-1-0-0-0-1-1
25 January	4	1-3-1-2-1-1-0-0	3	1-1-1-3-0-0-0-0	6	2-3-1-2-0-0-0-1
26 January	11	0-0-2-2-3-3-4-3	24	0-0-1-4-6-4-5-2	13	0-0-2-2-3-4-4-3
27 January	17	3-4-5-2-3-3-1-1	38	3-4-5-6-6-5-1-0	21	4-4-4-3-4-3-2-2
28 January	7	3-3-1-1-1-1-1-2	5	1-2-1-2-2-1-1-1	9	3-3-2-1-1-1-2-3
29 January	5	2-2-1-1-2-2-2-0	10	1-2-1-4-4-2-1-0	12	3-3-2-1-2-2-2-1

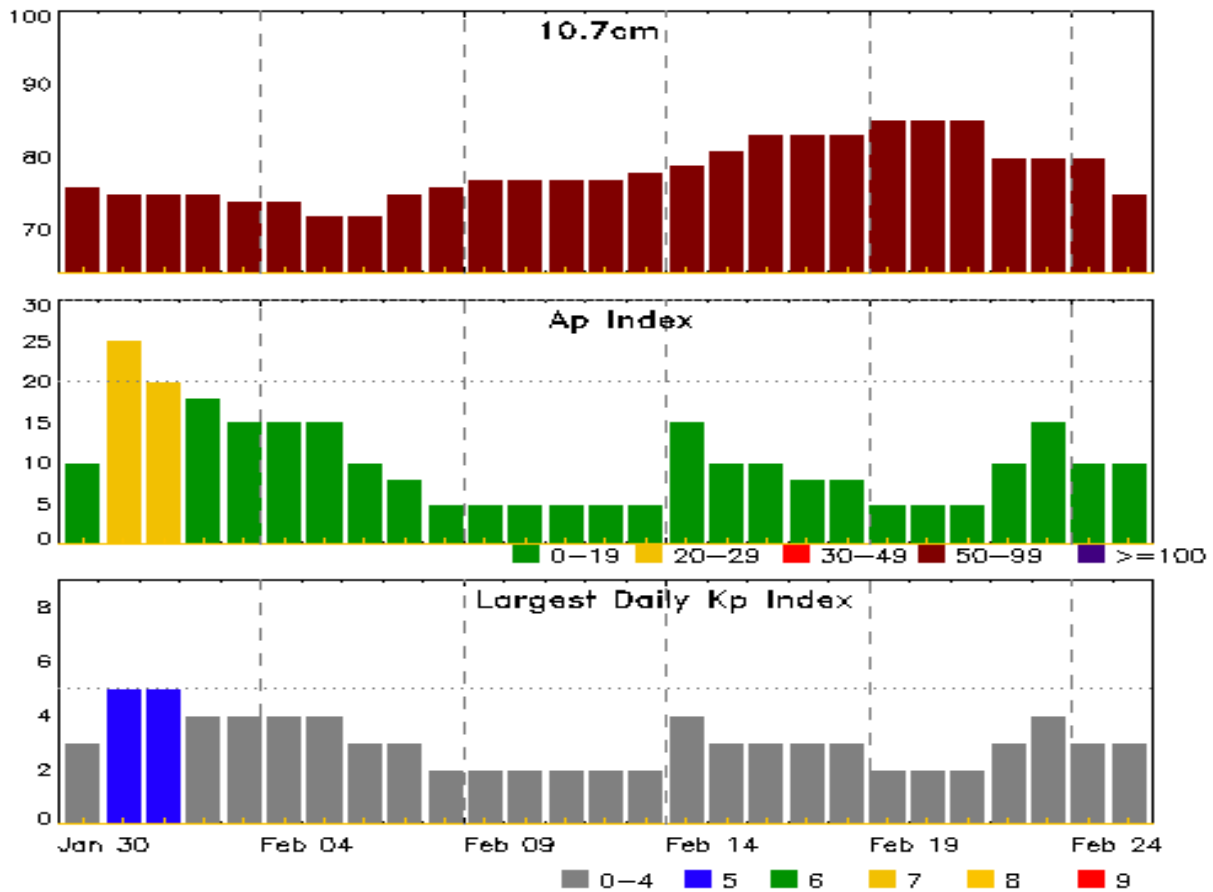


### *Alerts and Warnings Issued*

<b>Date &amp; Time of Issue UTC</b>	<b>Type of Alert or Warning</b>	<b>Date &amp; Time of Event UTC</b>
23 Jan 1431	CONTINUED ALERT: Electron 2MeV Integral Flux $\geq$ 1000pfu	20/1340
24 Jan 1716	CONTINUED ALERT: Electron 2MeV Integral Flux $\geq$ 1000pfu	20/1340
26 Jan 1350	WARNING: Geomagnetic K = 4	26/1350 - 2359
26 Jan 1354	ALERT: Electron 2MeV Integral Flux $\geq$ 1000pfu	26/1350
26 Jan 1805	ALERT: Geomagnetic K = 4	26/1759
26 Jan 2342	EXTENDED WARNING: Geomagnetic K = 4	26/1350 - 27/1300
27 Jan 0136	WARNING: Geomagnetic K = 5	27/0136 - 0600
27 Jan 0539	EXTENDED WARNING: Geomagnetic K = 4	26/1350 - 27/2100
27 Jan 0539	EXTENDED WARNING: Geomagnetic K = 5	27/0136 - 1500
27 Jan 1605	CONTINUED ALERT: Electron 2MeV Integral Flux $\geq$ 1000pfu	26/1350
27 Jan 2057	EXTENDED WARNING: Geomagnetic K = 4	26/1350 - 28/0300
28 Jan 1135	CONTINUED ALERT: Electron 2MeV Integral Flux $\geq$ 1000pfu	26/1350
28 Jan 1830	WATCH: Geomagnetic Storm Category G1 predicted	
29 Jan 1221	CONTINUED ALERT: Electron 2MeV Integral Flux $\geq$ 1000pfu	26/1350
29 Jan 1420	WATCH: Geomagnetic Storm Category G1 predicted	



## 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
30 Jan	76	10	3	13 Feb	78	5	2
31	75	25	5	14	79	15	4
01 Feb	75	20	5	15	81	10	3
02	75	18	4	16	83	10	3
03	74	15	4	17	83	8	3
04	74	15	4	18	83	8	3
05	72	15	4	19	85	5	2
06	72	10	3	20	85	5	2
07	75	8	3	21	85	5	2
08	76	5	2	22	80	10	3
09	77	5	2	23	80	15	4
10	77	5	2	24	80	10	3
11	77	5	2	25	75	10	3
12	77	5	2				



## *Energetic Events*

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

**No Events Observed**

## *Flare List*

Date	Time			X-ray Class	Imp/ Brtns	Location Lat CMD	Rgn #
	Begin	Max	End				
24 Jan	1603	1608	1611	B1.9			2629
24 Jan	1747	1755	1801	B5.2			2629
24 Jan	1839	1845	1856	B2.6			2629
24 Jan	B1931	1947	2002		SF	N14E62	
24 Jan	2058	2115	2224		SF	N14E61	2629
24 Jan	2316	2316	2326		SF	N14E59	2629
24 Jan	2344	2349	2354	B3.2	SF	N14E59	2629
25 Jan	0215	0220	0224	B4.6			2629
25 Jan	0354	0358	0402	B2.4			2629
25 Jan	0416	0420	0424	B3.0			
25 Jan	0903	0912	0927		SF	N16E57	2629
25 Jan	0943	0948	0954	B4.0			
25 Jan	1048	1051	1055	B2.3			
25 Jan	1257	1257	1325		SF	N16E52	2629
25 Jan	1519	1530	1547	B6.5	SF	N13E51	2629
25 Jan	1648	1653	1659	B4.6	SF	N16E52	2629
25 Jan	1755	1801	1811	B3.0			2629
25 Jan	1922	1932	1942	B3.8	SF	N14E48	2629
25 Jan	2009	2012	2016	B2.2			2629
25 Jan	2122	2128	2132	B8.5	SF	N14E47	2629
25 Jan	2248	2252	2256	B2.2			2629
26 Jan	0348	0352	0357	B2.2			2629
26 Jan	0406	0412	0415	B4.1	SF	N15E44	2629
26 Jan	0440	0443	0446	B2.1			2629
26 Jan	0523	0528	0533	B2.3			2629
26 Jan	0608	0613	0618	B3.9	SF	N15E44	2629
26 Jan	1218	1221	1223	B2.0			2629
26 Jan	1626	1633	1639	B2.6			2629
26 Jan	1648	1651	1654	B2.2			2629
27 Jan	1038	1045	1052	B5.4			2627
27 Jan	1535	1539	1543	B2.3			2629



### *Flare List*

Date	Time			Optical			Rgn #
	Begin	Max	End	X-ray Class	Imp/ Brtns	Location Lat CMD	
28 Jan	2056	2109	2121	C2.8			2627



## Region Summary

Date	Location		Sunspot Characteristics				Flares							
	Lat CMD	Helio Lon	Area 10 <sup>6</sup> hemi.	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical			
								C	M	X	S	1	2	3

### Region 2625

12 Jan	N03E72	254	30	1	Hsx	1	A										
13 Jan	N03E58	254	50	4	Cso	3	B										
14 Jan	N03E45	254	50	8	Cso	3	B										
15 Jan	N03E31	255	40	1	Hsx	1	A										
16 Jan	N01E18	254	60	1	Hsx	1	A										
17 Jan	N01E06	252	50	3	Hsx	2	A										
18 Jan	S00W07	252	40	5	Cao	2	B										
19 Jan	S00W20	253	20	5	Hax	2	A										
20 Jan	S00W35	255	40	1	Hax	2	A										
21 Jan	N01W48	255	30	2	Hax	3	A										
22 Jan	N01W62	256	0	1	Axx	1	A										
23 Jan	N01W77	258	plage														
									0	0	0	0	0	0	0	0	0

Died on Disk.

Absolute heliographic longitude: 252

### Region 2626

13 Jan	N08E67	245	20		Hsx	1	A										
14 Jan	N08E55	244	140	2	Hsx	2	A										
15 Jan	N09E42	244	140	3	Hax	2	A										
16 Jan	N08E29	243	120	3	Hax	3	A										
17 Jan	N08E16	242	90	3	Cao	4	B										
18 Jan	N07E03	243	60	2	Hax	3	A										
19 Jan	N08W11	244	70	2	Hax	4	A										
20 Jan	N08W24	244	50	3	Hax	3	A										
21 Jan	N08W37	244	40	3	Hsx	3	A										
22 Jan	N08W50	244	30	2	Hax	1	A										
23 Jan	N08W63	244	30	2	Hsx	2	A										
24 Jan	N08W74	241	10	1	Axx	2	A										
25 Jan	N08W88	242	plage														
									0	0	0	0	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 243



### *Region Summary - continued*

Date	Location		Sunspot Characteristics				Flares								
	Lat	CMD	Helio Lon	Area 10 <sup>-6</sup> hemi.	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical			
									C	M	X	S	1	2	3

#### ***Region 2627***

20 Jan	N05E28	192	70	5	Dao	12	B										
21 Jan	N06E15	192	80	6	Dai	13	B										
22 Jan	N06E01	193	110	7	Dai	11	B										
23 Jan	N06W12	193	70	7	Dai	13	B										
24 Jan	N06W25	192	30	7	Cro	4	B										
25 Jan	N06W39	193	10	7	Bxo	2	B										
26 Jan	N04W50	191	plage														
27 Jan	N04W65	193	plage														
28 Jan	N04W78	193	plage								1						
											1	0	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 193

#### ***Region 2628***

20 Jan	N12E49	171	20	1	Bxo	4	B					8						
21 Jan	N12E36	171	120	9	Dai	8	BG	6				5	1					
22 Jan	N12E21	173	210	9	Dao	8	BG											
23 Jan	N12E07	174	220	9	Dso	8	B											
24 Jan	N13W05	172	210	11	Eao	6	B											
25 Jan	N12W22	175	180	10	Cao	7	B											
26 Jan	N11W34	175	120	13	Cao	5	B											
27 Jan	N12W48	175	110	12	Cso	5	B											
28 Jan	N12W64	179	110	4	Hsx	3	A											
29 Jan	N11W79	181	110	2	Hsx	1	A											
											6	0	0	13	1	0	0	0

Still on Disk.

Absolute heliographic longitude: 172

#### ***Region 2629***

24 Jan	N15E59	109	70	5	Cao	3	B					3						
25 Jan	N15E44	110	220	6	Dao	7	B					6						
26 Jan	N15E31	110	150	8	Dao	6	B					2						
27 Jan	N15E18	110	160	8	Dao	8	B											
28 Jan	N15E05	110	130	6	Dso	5	B											
29 Jan	N15W10	112	120	6	Cso	3	B											
											0	0	0	11	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 110



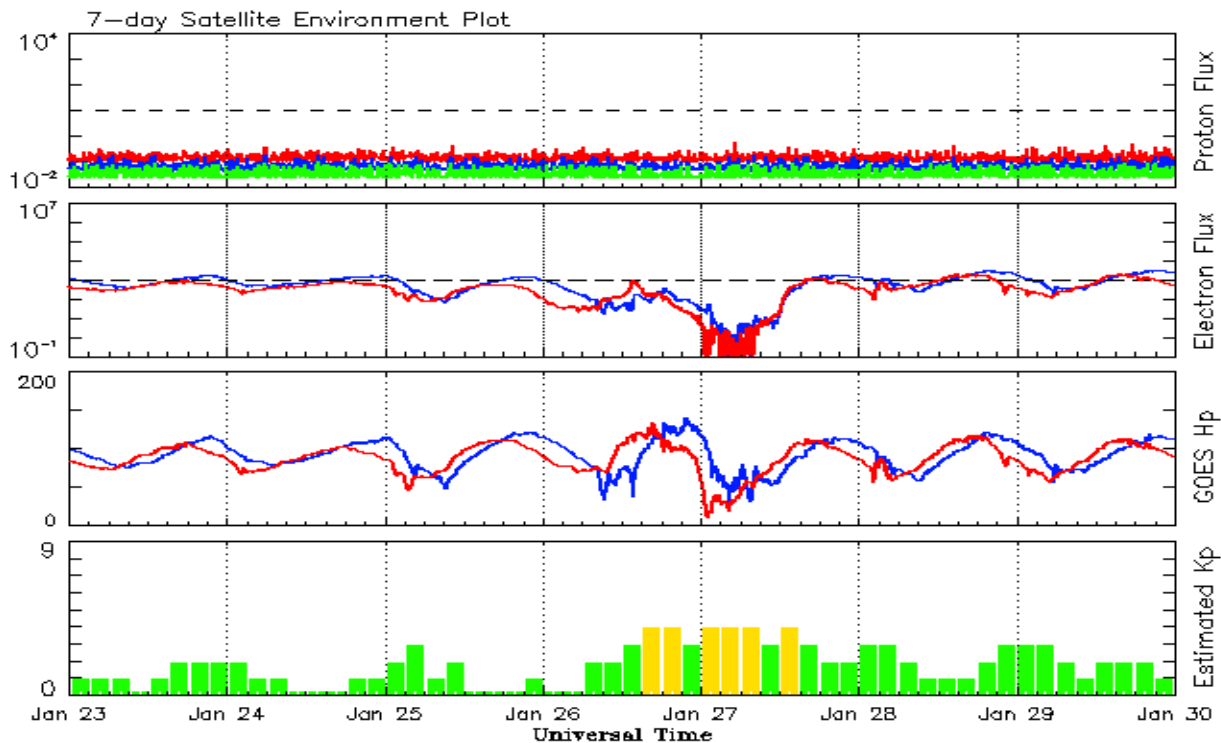


**Recent Solar Indices (preliminary)**  
**Observed monthly mean values**

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
<b>2015</b>									
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	45.7	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
<b>2016</b>									
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			85.9		10	
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	

**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 23 January 2017*

The proton flux plot contains the five-minute averaged integral proton flux (protons/cm<sup>2</sup>-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.

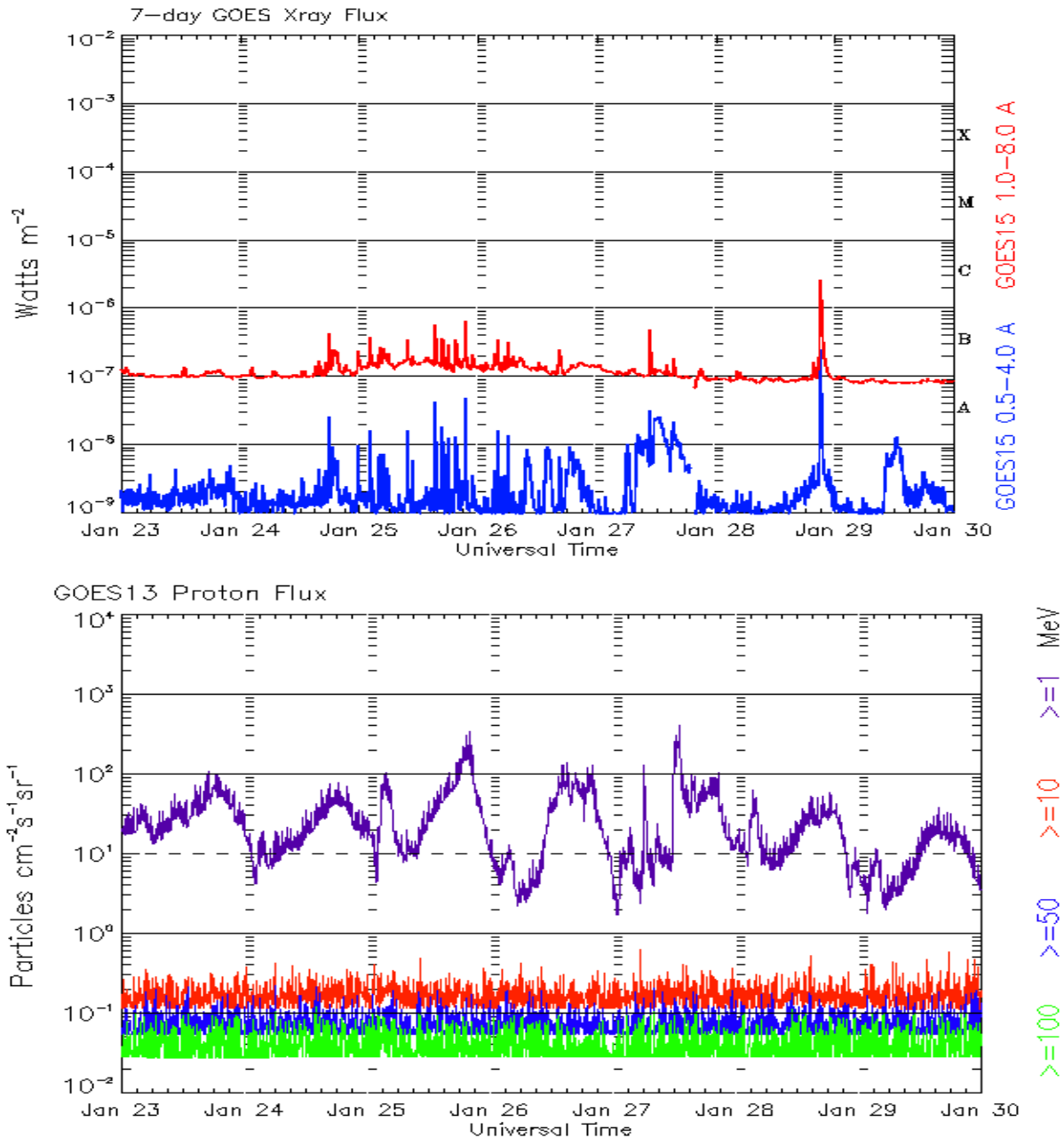
The electron flux plot contains the five-minute averaged integral electron flux (electrons/cm<sup>2</sup>-sec -sr) with energies greater than 2 MeV by the SWPC Primary GOES satellite.

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 23 January 2017*

The x-ray plots contains five-minute averages x-ray flux (Watt/m<sup>2</sup>) 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<sup>2</sup> -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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