

Solar activity was at very low to low levels. Very low activity was observed on 04-05 January and 08-10 January while isolated low activity occurred on 06-07 January. A pair of C1 x-ray events were observed from Region 2480 (N02, L=125, class/area E9.0/190 on 10 Jan) on 06/1137 UTC and 07/0617 UTC, respectively. No Earth-directed coronal mass ejections were observed during the summary period.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit was at high levels throughout the period.

Geomagnetic field activity was at predominately quiet levels on 04-05 January and 08-10 January. On 06 January, activity increased to unsettled to active levels with an isolated period of minor storming (G1-Minor) observed early on the 6th. Unsettled to active conditions persisted through late on the 7th. This increase in activity was due to the presence of a recurrent, positive polarity coronal hole high speed stream (CH HSS). Solar wind parameters, measured at the ACE satellite, indicated an increase in wind speeds early on 06 Jan from about 475 km/s to a peak of 643 km/s at 06/1025 UTC. Wind speeds remained elevated between 575 - 625 km/s through about 07/2000 UTC when a gradual decline to about 430 km/s were observed through the end of the summary period. Total field (Bt) averaged about 5 nT for a majority of the period, but ranged from 7-16 nT from 05/0820 UTC - 06/0131 UTC. The Bz component varied between +/- 4 nT with increased variability recorded between +12 nT to -10 nT from 05/0935 UTC to 06/0022 UTC. The phi angle was in a predominately positive (away from the Sun) orientation throughout the summary period.

**Space Weather Outlook**  
**11 January - 06 February 2016**

Solar activity is expected to be at very low to low levels from 11-14 January and from 29 January - 06 February. From 15-28 January, activity levels are expected to increase to low to moderate levels (R1-Minor) due to the return of old active Region 2473 (S21, L=334).

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 11-12, 17-22, 26-28 January and 31 January - 02 February. High levels are expected on 13-16, 23-25, 29-30 January and 03-06 February due to enhanced winds from a series of geoeffective CH HSSs.

Geomagnetic field activity is expected to be at unsettled to active conditions on 12-13, 22-23, 28-29 January and 02-03 February with isolated minor storm levels (G1-Minor) likely on 12 and



18 January, all due to a series of recurrent CH HSSs. Quiet to unsettled conditions are expected for the remaining days of the outlook period.



### *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
04 January	95	60	160	B2.2	0	0	0	0	0	0	0	0
05 January	95	29	100	B2.2	0	0	0	0	0	0	0	0
06 January	100	38	160	B3.0	1	0	0	0	0	0	0	0
07 January	103	57	300	B2.8	1	0	0	1	0	0	0	0
08 January	109	80	340	B2.4	0	0	0	1	0	0	0	0
09 January	107	84	390	B2.2	0	0	0	0	0	0	0	0
10 January	109	73	270	B2.4	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
	04 January	3.1e+06	1.4e+04	2.9e+03	2.9e+03	2.7e+08
05 January	5.8e+06	1.3e+04	3.1e+03	3.1e+03	2.3e+08	
06 January	1.8e+06	1.2e+04	3.1e+03	3.1e+03	6.5e+07	
07 January	1.4e+06	1.2e+04	2.9e+03	2.9e+03	1.7e+08	
08 January	9.4e+05	1.3e+04	2.9e+03	2.9e+03	2.1e+08	
09 January	9.8e+05	1.2e+04	3.0e+03	3.0e+03	1.8e+08	
10 January	1.0e+06	1.2e+04	2.7e+03	2.7e+03	1.0e+08	

### *Daily Geomagnetic Data*

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	04 January	4	0-1-2-0-2-2-2-0	3	1-1-2-0-1-1-1-0	5
05 January	5	1-1-1-2-1-2-2-1	3	0-1-0-1-0-2-1-2	7	1-1-1-2-1-2-3-2
06 January	12	4-2-2-3-2-2-2-3	27	2-2-6-6-3-3-1-2	17	5-3-3-3-3-2-3-4
07 January	11	4-2-2-3-3-2-2-0	22	2-2-3-6-4-4-2-1	14	4-3-3-4-3-3-2-1
08 January	6	1-2-1-2-3-2-1-1	20	1-1-3-6-5-2-1-0	8	1-3-2-2-3-1-1-2
09 January	5	1-2-1-1-2-1-2-1	7	1-0-2-4-3-1-1-0	6	2-1-2-1-2-1-2-1
10 January	7	1-2-1-2-3-2-2-1	11	1-0-3-4-4-2-1-1	9	2-2-1-2-2-1-2-2

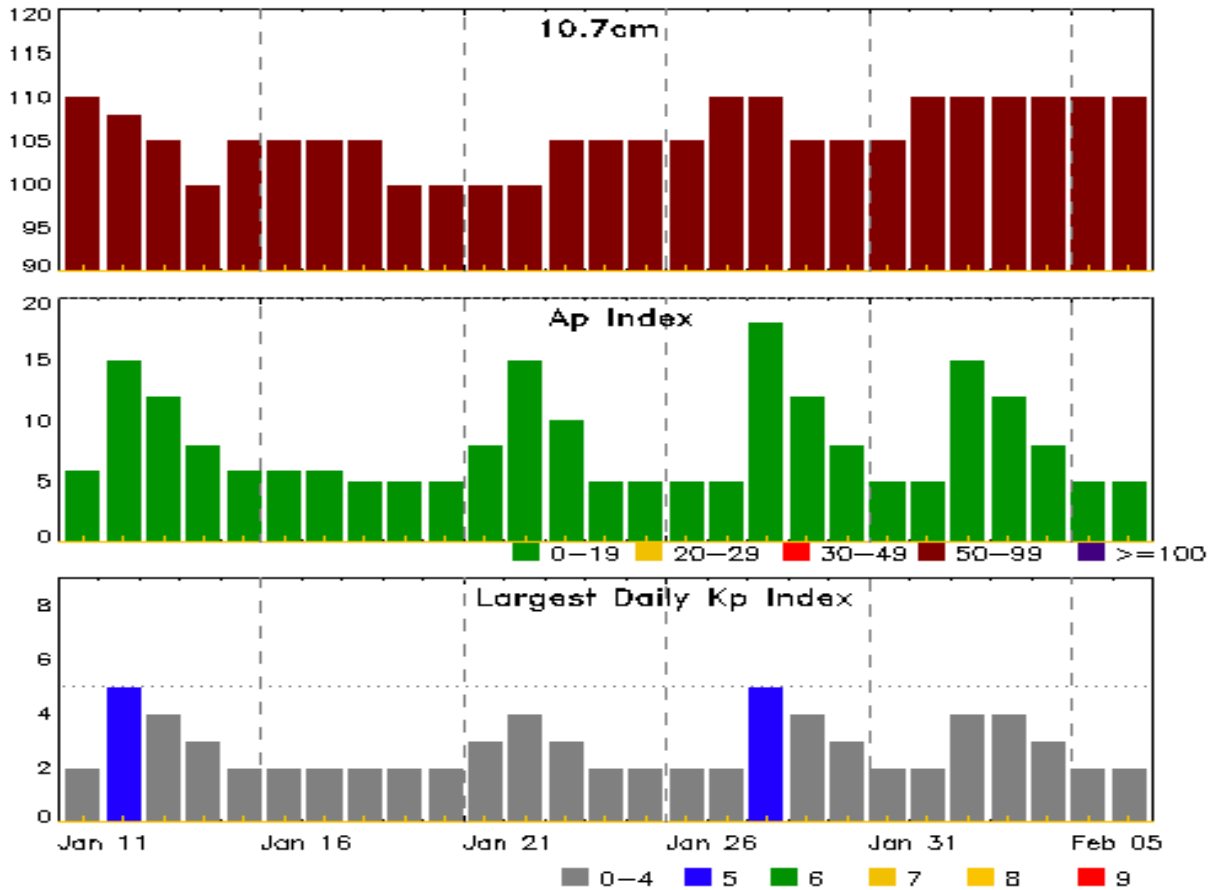


### *Alerts and Warnings Issued*

Date & Time of Issue UTC	Type of Alert or Warning	Date & Time of Event UTC
04 Jan 0501	CONTINUED ALERT: Electron 2MeV Integral Flux $\geq$ 1000pfu	01/2035
04 Jan 2054	WATCH: Geomagnetic Storm Category G1 predicted	
05 Jan 0501	CONTINUED ALERT: Electron 2MeV Integral Flux $\geq$ 1000pfu	01/2035
06 Jan 0049	WARNING: Geomagnetic K = 4	06/0050 - 1300
06 Jan 0057	ALERT: Geomagnetic K = 4	06/0057
06 Jan 0116	WARNING: Geomagnetic K = 5	06/0118 - 1000
06 Jan 0300	ALERT: Geomagnetic K = 5	06/0300
06 Jan 0933	EXTENDED WARNING: Geomagnetic K = 4	06/0050 - 2300
06 Jan 0935	EXTENDED WARNING: Geomagnetic K = 5	06/0118 - 2100
06 Jan 1039	CONTINUED ALERT: Electron 2MeV Integral Flux $\geq$ 1000pfu	01/2035
06 Jan 2343	WARNING: Geomagnetic K = 4	06/2343 - 07/1200
07 Jan 0000	ALERT: Geomagnetic K = 4	06/2359
07 Jan 0241	CONTINUED ALERT: Electron 2MeV Integral Flux $\geq$ 1000pfu	01/2035
07 Jan 1155	EXTENDED WARNING: Geomagnetic K = 4	06/2343 - 07/2300
07 Jan 2259	EXTENDED WARNING: Geomagnetic K = 4	06/2343 - 08/0900
08 Jan 0858	CONTINUED ALERT: Electron 2MeV Integral Flux $\geq$ 1000pfu	01/2035
09 Jan 0536	CONTINUED ALERT: Electron 2MeV Integral Flux $\geq$ 1000pfu	01/2035
09 Jan 2047	WATCH: Geomagnetic Storm Category G1 predicted	
10 Jan 0837	CONTINUED ALERT: Electron 2MeV Integral Flux $\geq$ 1000pfu	01/2035



## 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
11 Jan	110	6	2	25 Jan	105	5	2
12	108	15	5	26	105	5	2
13	105	12	4	27	110	5	2
14	100	8	3	28	110	18	5
15	105	6	2	29	105	12	4
16	105	6	2	30	105	8	3
17	105	6	2	31	105	5	2
18	105	5	2	01 Feb	110	5	2
19	100	5	2	02	110	15	4
20	100	5	2	03	110	12	4
21	100	8	3	04	110	8	3
22	100	15	4	05	110	5	2
23	105	10	3	06	110	5	2
24	105	5	2				



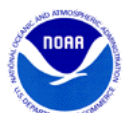
### *Energetic Events*

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

**No Events Observed**

### *Flare List*

Date	Time			X-ray Class	Optical			Rgn #
	Begin	Max	End		Imp/ Brtns	Location Lat CMD		
04 Jan	0617	0621	0624	B4.1			2479	
05 Jan	1632	1648	1659	B3.8				
05 Jan	2333	2337	2338	B6.3			2476	
06 Jan	0014	0025	0037	B4.4			2476	
06 Jan	0327	0348	0403	B6.6			2480	
06 Jan	0613	0616	0620	B5.6			2478	
06 Jan	0920	0925	0928	B8.2			2480	
06 Jan	1131	1137	1139	C1.8			2480	
06 Jan	1444	1445	1446	B9.3			2480	
06 Jan	1925	1930	1934	B6.8			2480	
06 Jan	2147	2200	2217	B7.0			2480	
06 Jan	2300	2309	2323	B5.8				
07 Jan	0145	0148	0151	B6.0			2480	
07 Jan	0239	0242	0244	B7.0			2480	
07 Jan	0348	0352	0359	B8.1			2480	
07 Jan	0611	0617	0623	C1.0			2480	
07 Jan	1236	1239	1241	B4.3	SF	N03E71	2480	
08 Jan	0004	0021	0028	B4.2			2481	
08 Jan	0409	0414	0418	B4.5			2481	
08 Jan	1123	1131	1141	B8.6	SF	N03W03	2482	
10 Jan	1709	1713	1717	B4.2			2483	



## Region Summary

Date	Location		Sunspot Characteristics				Flares										
	Lat CMD	Lon	Helio 10 <sup>-6</sup> hemi.	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical						
								C	M	X	S	1	2	3	4		
<b>Region 2476</b>																	
01 Jan	S11E61	200	10	1	Axx	1	A										
02 Jan	S10E47	201	20	4	Cro	6	B										
03 Jan	S10E34	201	80	7	Dai	16	B					1					
04 Jan	S10E20	202	70	6	Dao	12	B										
05 Jan	S10E06	202	30	6	Cro	8	B										
06 Jan	S09W08	203	10	4	Bxo	3	B										
07 Jan	S09W22	204	10	1	Axx	2	A										
08 Jan	S09W36	205	plage														
09 Jan	S09W50	206	plage														
10 Jan	S09W64	206	plage														
								0	0	0	1	0	0	0	0	0	

Still on Disk.

Absolute heliographic longitude: 202

<b>Region 2477</b>																	
01 Jan	N12E75	186	20	2	Hsx	1	A										
02 Jan	N12E61	187	70	3	Hsx	1	A										
03 Jan	N12E47	188	70	2	Hsx	1	A										
04 Jan	N12E33	189	70	2	Hsx	1	A										
05 Jan	N12E19	189	70	2	Hsx	1	A										
06 Jan	N12E05	190	70	2	Hsx	1	A										
07 Jan	N12W09	191	60	2	Hax	1	A										
08 Jan	N12W21	190	50	2	Hax	1	A										
09 Jan	N11W33	189	40	2	Hax	2	A										
10 Jan	N12W45	187	10	1	Hsx	2	A										
								0	0	0	0	0	0	0	0	0	

Still on Disk.

Absolute heliographic longitude: 190



**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	4		
<b>Region 2478</b>																	
02 Jan	N07E53	195	10	2	Bxo	2	B										
03 Jan	N07E38	197	20	2	Cro	3	B										
04 Jan	N07E24	198	10	3	Bxo	3	B										
05 Jan	N07E10	198	plage														
06 Jan	N07W04	199	plage														
07 Jan	N07W18	200	plage														
08 Jan	N07W28	197	10	2	Bxo	3	B										
09 Jan	N06W40	196	10	4	Bxo	3	B										
10 Jan	N06W55	197	plage														
								0	0	0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 199

<b>Region 2479</b>																	
04 Jan	N11E05	217	10	3	Bxo	4	B										
05 Jan	N11W09	217	plage														
06 Jan	N11W23	218	plage														
07 Jan	N11W37	219	plage														
08 Jan	N11W51	220	plage														
09 Jan	N11W65	221	plage														
10 Jan	N11W79	221	plage														
								0	0	0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 217

<b>Region 2480</b>																	
06 Jan	N04E74	121	80	5	Cao	4	B	1									
07 Jan	N03E58	124	180	10	Dao	6	B	1			1						
08 Jan	N03E43	126	180	10	Dao	6	B										
09 Jan	N03E32	124	180	10	Dao	7	B										
10 Jan	N02E17	125	190	11	Eso	7	B										
								2	0	0	1	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 125





### *Region Summary - continued*

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

#### ***Region 2481***

07 Jan	S18W55	237	50	4	Dao	8	B										
08 Jan	S18W69	238	80	4	Dao	5	B										
09 Jan	S19W81	237	120	7	Dao	3	B										
								0	0	0	0	0	0	0	0	0	0

Crossed West Limb.  
Absolute heliographic longitude: 237

#### ***Region 2482***

08 Jan	N03W10	178	10	3	Bxo	2	B										
09 Jan	N02W23	179	10	3	Bxo	4	B										
10 Jan	N02W36	178	10	3	Bxo	3	B										
								0	0	0	0	0	0	0	0	0	0

Still on Disk.  
Absolute heliographic longitude: 178

#### ***Region 2483***

08 Jan	N16E44	125	10	3	Bxo	3	B										
09 Jan	N17E30	126	30	6	Cso	5	B										
10 Jan	N17E17	125	50	6	Dao	8	B										
								0	0	0	0	0	0	0	0	0	0

Still on Disk.  
Absolute heliographic longitude: 125

#### ***Region 2484***

10 Jan	N05E48	94	10	2	Bxo	3	B										
								0	0	0	0	0	0	0	0	0	0

Still on Disk.  
Absolute heliographic longitude: 94

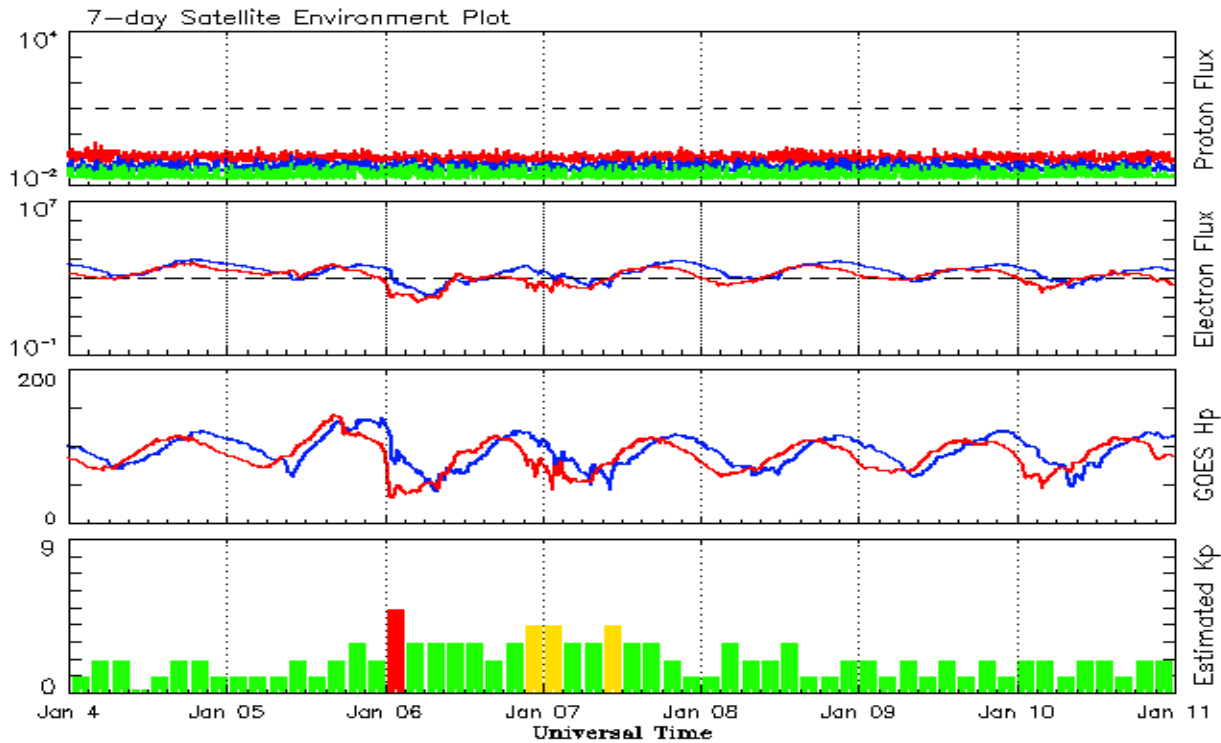


**Recent Solar Indices (preliminary)**  
**Observed monthly mean values**

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>2014</b>									
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	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
<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	45.6	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			107.0		10	
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	

**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 04 January 2016*

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.

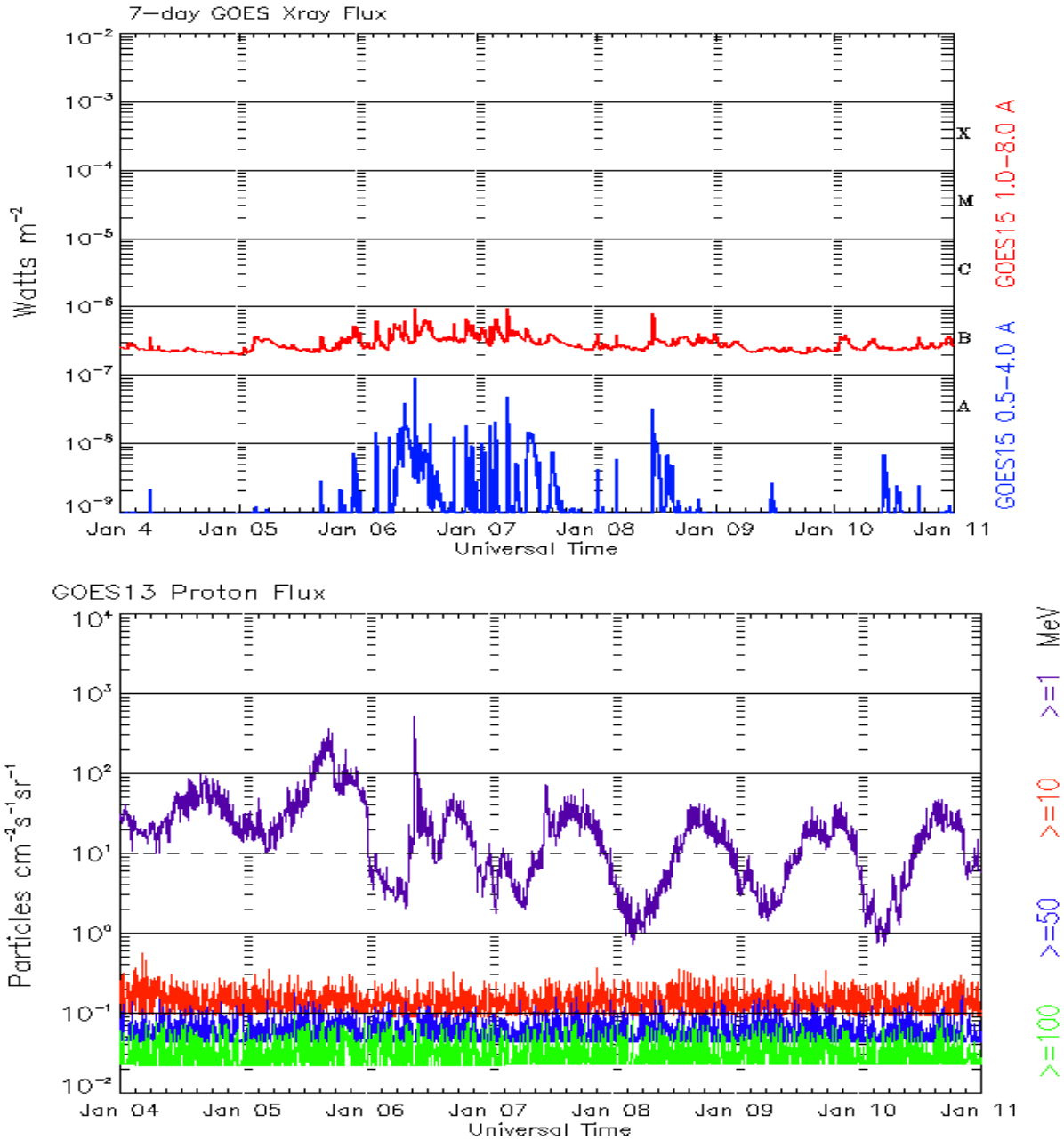
The electron flux plot contains the five-minute averaged integral electron flux (electrons/cm<sup>2</sup>-sec -sr) with energies greater than 2 MeV by the SWPC Primary GOES satellite.

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 04 January 2016*

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

The Weekly has been published continuously since 1951 and is available online since 1997.

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[http://spaceweather.gov/weekly/Usr\\_guide.pdf](http://spaceweather.gov/weekly/Usr_guide.pdf) -- User Guide

