

Space Weather Highlights
25 January - 31 January 2016

SWPC PRF 2109
01 February 2016

Solar activity was at very low to low levels during the period. Low levels were observed from 25-29 January with Regions 2488 (N02, L=320, class/area Dai/240 on 25 January) and 2489 (N10, L=253, class/area Eko/300 on 29 January) producing the majority of the C-class flaring. The largest flare of the period was a C9/1f at 28/1202 UTC from Region 2488. Region 2488 was in slow decay over the period. Region 2489 continued to exhibit growth through 28 January and slowly decayed thereafter. Several filament eruptions, and subsequent coronal mass ejections (CMEs), were observed during the period, but none had an Earth-directed component.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit was at high levels from 25-27 January, moderate levels on 28 January, and normal levels from 29-31 January. The maximum flux of the period was 2,117 pfu observed at 26/1500 UTC.

Geomagnetic field activity was at mostly quiet levels throughout the period with isolated unsettled periods on 27-28 and 31 January and an isolated active period observed late on 31 January. Solar wind parameters were in decline as the period began under the waning influence of a negative polarity coronal hole high speed stream (CH HSS). Solar wind speed gradually decreased from approximately 480 km/s early in the period to around 260 km/s by 30 January before increasing slightly to 300 km/s by the end-of-the-period. A solar sector boundary crossing into a positive (away) orientation occurred at approximately 27/0834 UTC, accompanied by a slight increase in total field (Bt) measurements to 9 nT on 27 and 28 January. On 31 January, another increase in Bt to 10 nT was observed along with a prolonged period of southward Bz. The geomagnetic field responded with isolated active levels to end the period.

Space Weather Outlook
01 February - 27 February 2016

Solar activity is expected to be at very low to low levels with a chance for M-class flares (R1-R2, Minor-Moderate) from 03-25 February with the return of old Regions 2484 (N08, L=094) and 2488 (N02, L=320).

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 04-07, 09-15, and 18-23 February as a result of CH HSS influence.

Geomagnetic field activity is expected to be at unsettled to active levels on 01 February due to continued effects from a prolonged period of southward Bz. Unsettled to active levels are likely from 02-04, 08-09, and 17-20 February due to recurrent CH HSS 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
25 January	108	58	330	B2.6	2	0	0	7	0	0	0	0
26 January	115	61	360	B2.4	1	0	0	3	0	0	0	0
27 January	113	75	500	B3.1	1	0	0	8	0	0	0	0
28 January	110	64	540	B2.5	4	0	0	2	1	0	0	0
29 January	107	49	460	B2.7	4	0	0	2	0	0	0	0
30 January	105	30	390	B2.7	0	0	0	0	0	0	0	0
31 January	101	39	260	B2.5	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
	25 January	5.0e+05	1.3e+04	3.5e+03	5.6e+07	
26 January	1.3e+06	1.3e+04	3.2e+03	1.0e+08		
27 January	8.5e+05	1.3e+04	3.0e+03	5.8e+07		
28 January	2.5e+05	1.3e+04	3.0e+03	1.3e+07		
29 January	8.0e+04	1.3e+04	3.1e+03	1.8e+06		
30 January	2.1e+05	1.4e+04	3.3e+03	3.7e+06		
31 January	3.0e+05	1.3e+04	3.1e+03	1.1e+06		

Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	25 January	3	1-1-1-0-2-2-1-0	0	0-0-0-1-0-0-0-0	3
26 January	3	0-0-1-1-2-2-2-0	2	0-0-1-1-1-1-0-0	4	0-1-1-1-1-1-2-1
27 January	3	0-2-1-1-1-1-1-1	1	0-1-1-0-1-0-0-0	5	1-3-1-2-1-1-0-1
28 January	5	1-1-2-2-2-2-1-0	22	0-0-6-6-3-1-0-0	6	1-1-3-3-1-1-1-1
29 January	3	0-0-0-1-2-2-1-1	1	0-0-2-1-0-0-0-0	3	0-1-1-1-1-1-1-1
30 January	3	0-1-1-0-2-2-1-1	1	0-0-1-1-1-0-0-0	3	0-0-1-1-0-1-1-1
31 January	8	1-2-3-2-2-1-1-3	15	0-0-3-4-5-3-2-2	6	2-2-3-2-2-2-2-4

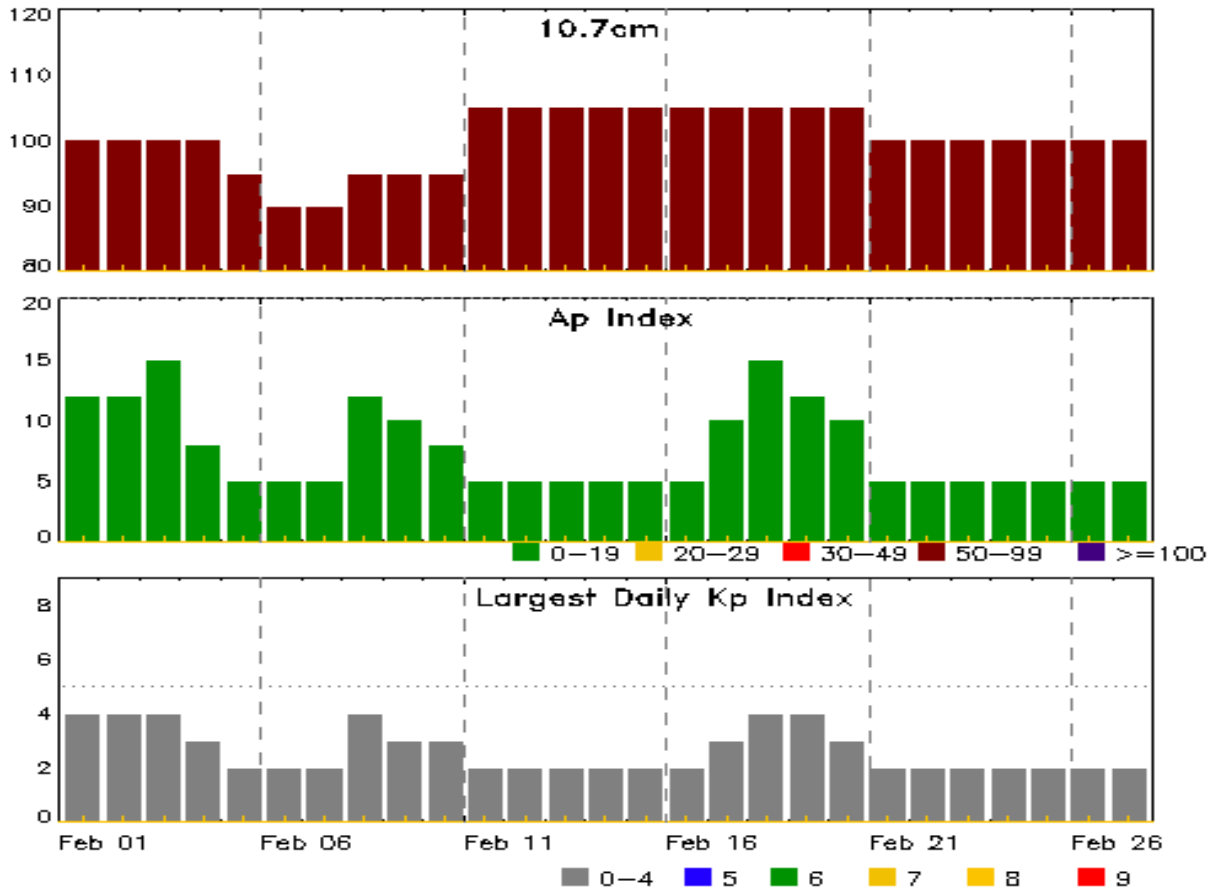


Alerts and Warnings Issued

Date & Time of Issue UTC	Type of Alert or Warning	Date & Time of Event UTC
25 Jan 1726	CONTINUED ALERT: Electron 2MeV Integral Flux \geq 1000pfu	22/1325
26 Jan 0930	CONTINUED ALERT: Electron 2MeV Integral Flux \geq 1000pfu	22/1325
31 Jan 2230	WARNING: Geomagnetic K = 4	31/2228 - 01/0600



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
01 Feb	100	12	4	15 Feb	105	5	2
02	100	12	4	16	105	5	2
03	100	15	4	17	105	10	3
04	100	8	3	18	105	15	4
05	95	5	2	19	105	12	4
06	90	5	2	20	105	10	3
07	90	5	2	21	100	5	2
08	95	12	4	22	100	5	2
09	95	10	3	23	100	5	2
10	95	8	3	24	100	5	2
11	105	5	2	25	100	5	2
12	105	5	2	26	100	5	2
13	105	5	2	27	100	5	2
14	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		Intensity	
									245	2695	II	IV

No Events Observed

Flare List

Date	Time			X-ray Class	Imp/ Brtns	Location Lat CMD	Rgn #
	Begin	Max	End				
25 Jan	0650	0654	0701	B8.0			2489
25 Jan	0752	0755	0757	B4.9			2489
25 Jan	0814	0817	0820	B4.6			2489
25 Jan	0900	0907	0911	C1.4			2489
25 Jan	1027	1033	1035	C1.0			2489
25 Jan	1307	1307	1349		SF	S20E70	2490
25 Jan	1311	1312	1315		SF	N11E61	2489
25 Jan	1359	1402	A1415		SF	N11E61	2489
25 Jan	1832	1833	1844		SF	N10E57	2489
25 Jan	2154	2154	2158	B4.7	SF	N08E55	2489
25 Jan	2157	2157	2201		SF	S23E64	2490
25 Jan	2243	2244	2246		SF	N10E57	2489
26 Jan	0157	0201	0204	B5.3			2489
26 Jan	0301	0305	0310	B7.3			2489
26 Jan	0453	0456	0459	B5.3			2489
26 Jan	1116	1119	1134		SF	N12E49	2489
26 Jan	1432	1432	1434		SF	S18E56	2490
26 Jan	1704	1715	1840	C1.3			
26 Jan	1748	1755	1800		SF	S20W27	2486
27 Jan	0526	0537	0552	B9.4			2489
27 Jan	B0808	0811	0910		SF	N11E36	2489
27 Jan	1024	1034	1039		SF	N12E36	2489
27 Jan	1259	1301	1320		SF	N12E35	2489
27 Jan	1302	1302	1308		SF	S18E44	2490
27 Jan	1326	1330	1334	C1.0	SF	N11E33	2489
27 Jan	1712	1719	1723		SF	N08E34	2489
27 Jan	1725	1725	1728		SF	N08E34	2489
27 Jan	1922	1927	1933	B5.3	SF	S22E39	2490
27 Jan	2028	2031	2036	B5.2			2490
28 Jan	0318	0322	0325	B6.1			2489
28 Jan	0517	0523	0528	C5.3			2488



Flare List

Date	Time			X-ray Class	Optical		Rgn #
	Begin	Max	End		Imp/ Brtns	Location Lat CMD	
28 Jan	0652	0702	0712	C2.8			2488
28 Jan	1148	1202	1216	C9.6	1F	N06W45	2488
28 Jan	1855	1855	1858		SF	N08W48	2488
28 Jan	2148	2157	2202	C3.3	SF	N09W50	2488
29 Jan	0314	0338	0404	B8.7			2490
29 Jan	0415	0429	0436	C2.0			2488
29 Jan	0757	0818	0826	C3.5	SF	N02W59	2488
29 Jan	1453	1500	1511	B8.8			2488
29 Jan	1633	1641	1649	C1.2	SF	N11W61	2488
29 Jan	1741	1744	1747	B4.1			2488
29 Jan	2048	2146	2257	C2.0			
30 Jan	2120	2125	2128	B9.1			2488
31 Jan	0809	0813	0816	B5.3			2488
31 Jan	0956	1002	1007	B6.0			2488
31 Jan	1558	1601	1610	B4.3			2489
31 Jan	1901	1907	1911	B8.6			2488
31 Jan	2341	2347	2351	B5.6			



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 2485																	
14 Jan	N13E60		29	30	4	Cro	2	B					1				
15 Jan	N13E46		29	30	6	Dro	5	B									
16 Jan	N13E34		29	20	5	Cro	6	B									
17 Jan	N14E21		29	10	5	Bxo	5	B									
18 Jan	N14E07		30	10	5	Axx	5	A									
19 Jan	N15W04		28	10	2	Axx	4	A									
20 Jan	N15W18		29	plage													
21 Jan	N15W32		30	plage													
22 Jan	N15W46		30	plage													
23 Jan	N15W60		31	plage													
24 Jan	N15W74		32	plage													
25 Jan	N15W88		33	plage													
										0	0	0	1	0	0	0	0

Crossed West Limb.
 Absolute heliographic longitude: 28

Region 2486																	
17 Jan	S20E67		343	40	1	Hax	1	A									
18 Jan	S20E53		344	60	1	Hsx	1	A									
19 Jan	S20E43		340	50	2	Hax	2	A									
20 Jan	S20E31		338	50	1	Hsx	1	A									
21 Jan	S20E18		340	30	1	Hax	2	A									
22 Jan	S21E05		339	20	1	Hax	1	A									
23 Jan	S19W09		340	10	1	Hrx	1	A									
24 Jan	S19W23		341	plage													
25 Jan	S19W37		342	plage													
26 Jan	S19W51		343	plage									1				
27 Jan	S19W65		344	plage													
28 Jan	S19W79		345	plage													
										0	0	0	1	0	0	0	0

Crossed West Limb.
 Absolute heliographic longitude: 339



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			
Region 2487																		
19 Jan	S13E49	334	30	2	Cro	4	B											
20 Jan	S13E36	334	60	4	Dao	7	B	1				6						
21 Jan	S13E22	336	100	6	Dai	12	B	2										
22 Jan	S13E11	333	70	6	Dao	8	B											
23 Jan	S12W05	336	40	6	Cao	10	B											
24 Jan	S12W18	336	30	6	Cro	7	B											
25 Jan	S12W34	339	20	1	Hsx	1	A											
26 Jan	S12W48	340	10		Axx	1	A											
27 Jan	S12W63	342	10	1	Axx	2	A											
28 Jan	S12W77	343	plage															
								3	0	0		6	0	0	0	0	0	0

Died on Disk.

Absolute heliographic longitude: 336

Region 2488

20 Jan	N04E52	317	40	4	Cro	5	B					2						
21 Jan	N04E38	320	70	4	Dai	12	B	1										
22 Jan	N04E27	317	90	7	Dai	11	B					1						
23 Jan	N03E12	319	120	9	Dai	13	B					1						
24 Jan	N04W01	319	200	8	Dai	20	B	1				1						
25 Jan	N02W15	320	240	8	Dai	10	B											
26 Jan	N02W28	320	230	7	Dao	10	B											
27 Jan	N03W41	320	220	8	Dao	14	B											
28 Jan	N04W55	321	220	8	Dao	15	BG	4				2	1					
29 Jan	N04W68	320	150	8	Dao	8	B	3				2						
30 Jan	N04W83	322	130	7	Cao	4	B											
								9	0	0		9	1	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 319



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 2489																					
25 Jan	N09E54	251	60	3	Dso	6	B	2				5									
26 Jan	N10E39	253	100	9	Dao	8	B					1									
27 Jan	N10E27	252	250	9	Dki	15	B	1				6									
28 Jan	N09E14	252	300	10	Dko	15	B														
29 Jan	N10W01	253	300	11	Eko	6	B														
30 Jan	N10W14	253	260	10	Dho	6	B														
31 Jan	N10W29	255	240	4	Cso	4	B														
								3	0	0	12	0	0	0	0						

Still on Disk.

Absolute heliographic longitude: 253

Region 2490																					
25 Jan	S18E75	230	10	5	Bxo	1	B					2									
26 Jan	S18E57	235	20	5	Cro	2	B					1									
27 Jan	S17E41	238	20	10	Dro	4	B					2									
28 Jan	S18E29	237	20	8	Cro	4	B														
29 Jan	S18E13	239	10	2	Bxo	5	B														
30 Jan	S18W01	240	plage																		
31 Jan	S20W16	242	10	3	Bxo	3	B														
								0	0	0	5	0	0	0	0						

Still on Disk.

Absolute heliographic longitude: 240

Region 2491																					
31 Jan	N02E70	156	10	6	Bxo	2	B														
								0	0	0	0	0	0	0	0						

Still on Disk.

Absolute heliographic longitude: 156

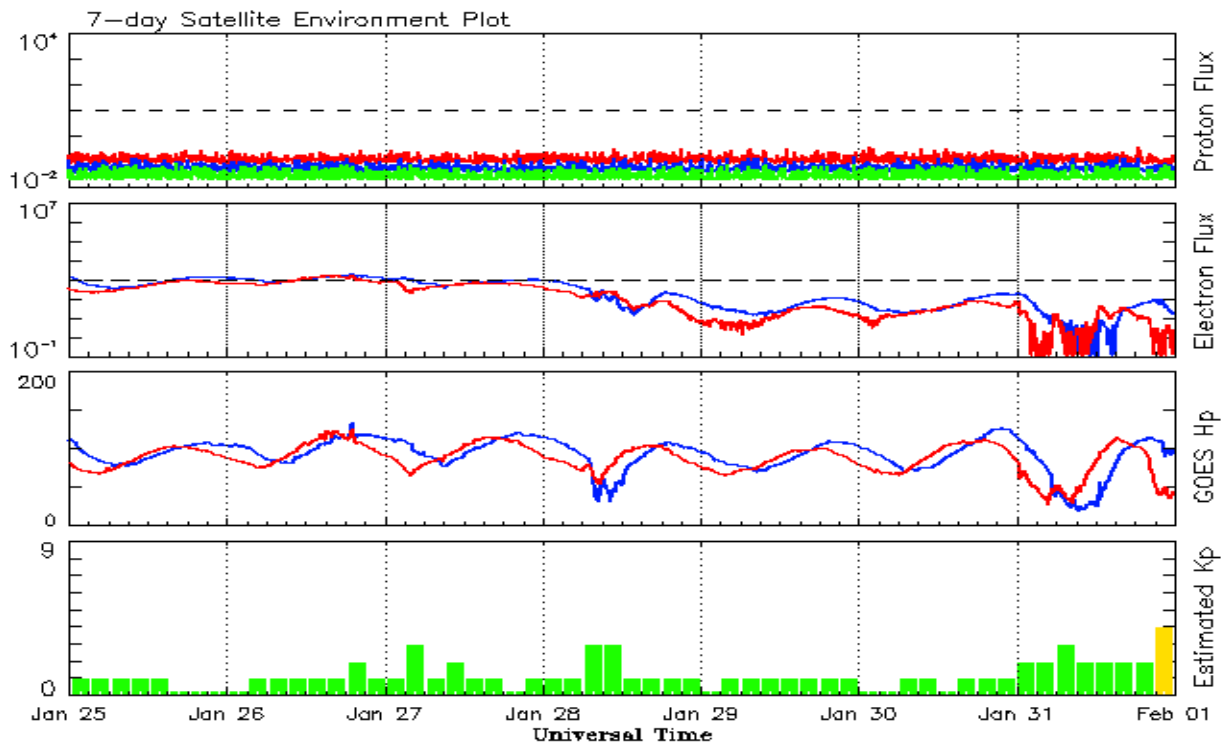


Recent Solar Indices (preliminary)
Observed monthly mean values

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										
February	174.6	102.3	0.59	119.5	119.5	78.3	170.3	138.6	12	6.9
March	141.1	91.9	0.65	123.2	123.2	80.8	149.9	140.8	6	7.2
April	130.5	67.5	0.65	124.8	124.8	69.8	144.3	143.5	9	7.5
May	116.8	67.5	0.64	122.3	122.3	69.0	130.0	144.7	7	7.9
June	107.7	61.7	0.66	121.4	121.4	68.5	122.2	145.5	7	8.4
July	113.6	60.1	0.64	120.4	120.4	67.6	137.3	145.2	5	8.8
August	106.2	64.1	0.70	115.1	115.1	65.0	124.7	142.8	9	8.9
September	127.4	78.0	0.69	107.4	107.4	61.1	146.1	140.1	11	9.3
October	92.0	54.0	0.66	101.7	101.7	58.4	153.7	138.4	10	9.9
November	101.8	62.2	0.69	97.9	97.9	56.8	155.3	137.4	10	10.1
December	120.0	67.7	0.65	95.2	95.2	55.3	158.7	137.0	12	10.5
2015										
January	101.2	55.8	0.66	92.1	92.1	53.6	141.7	135.8	10	11.0
February	70.6	40.0	0.63	88.3	88.3	51.7	128.8	133.8	10	11.5
March	61.7	32.7	0.62	84.2	84.2	49.3	126.0	131.2	17	12.0
April	72.5	45.2	0.75	80.5	80.5	47.3	129.2	127.3	12	12.4
May	83.0	53.3	0.71	77.5	77.5	45.6	120.1	123.3	9	12.7
June	77.3	39.9	0.53	73.1	73.1	43.2	123.2	119.5	14	13.0
July	68.4	39.5	0.58	68.2	68.2		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						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 25 January 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.

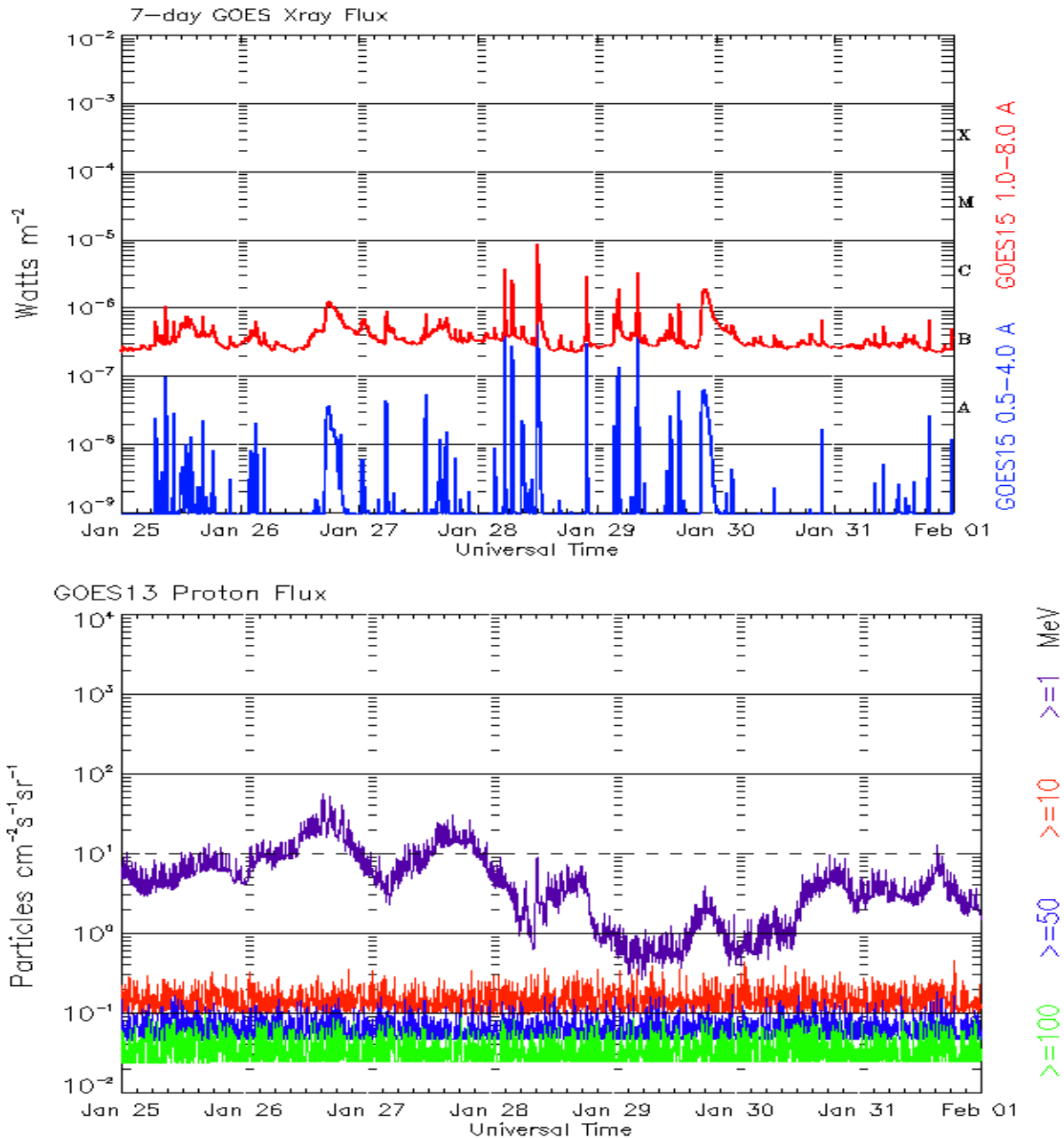
The electron flux plot contains the five-minute averaged integral electron flux (electrons/cm²-sec -sr) with energies greater than 2 MeV by the SWPC Primary GOES satellite.

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 25 January 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 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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