

Space Weather Highlights
07 November - 13 November 2016

SWPC PRF 2150
14 November 2016

Solar activity was very low through the period with only a few low-level B-class flares observed from Regions 2605 (N07, L=191, class/area Cro/030 on 31 October), 2607 (S17, L=143, class/area Dai/100 on 11 November), and 2610 (N15, L=022, class/area Cro/030 on 12 November). No Earth-directed coronal mass ejections (CME) were observed in available satellite imagery during the reporting period.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit was at normal to moderate levels on 09, and 11-12 November and high levels on 07-08, 10, and 13 November. The maximum flux of 10,253 pfu was observed at 13/1825 UTC.

Geomagnetic field activity was at quiet to active levels with an isolated period of G1 (Minor) storming reported during the 11/0000-0300 UTC synoptic period in response to a negative polarity coronal hole high speed stream. Solar wind speed increased steadily from background levels near 300 km/s to a peak of 767 km/s towards the end of the period. Total field ranged between 3 and 16 nT while the Bz component reached a maximum southward deviation of -11 nT. The geomagnetic field was at mostly quiet levels on 07-09 November, quiet to active levels on 10 and 12-13 November, and quiet to G1 (Minor) levels on 11 November.

Space Weather Outlook
14 November - 10 December 2016

Solar activity is expected to be at very low levels with a slight chance for C-class flares over the forecast period.

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 14-19, 22 November - 05 December, 07 and 10 December due to recurrent CH HSS influence.

Geomagnetic field activity is expected to be at unsettled to active levels on 14-15, 19-29 November, and 07-10 December with G1 (Minor) geomagnetic storm levels likely on 21-23 and 25 November, G2 (Moderate) levels likely on 21-22 November, and G3 (Strong) levels likely on 21 November due to recurrent CH HSS effects.



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	
07 November	77	24	20	A6.7	0	0	0	0	0	0	0	0	0
08 November	77	0	0	A7.1	0	0	0	0	0	0	0	0	0
09 November	80	12	10	A9.8	0	0	0	0	0	0	0	0	0
10 November	80	13	50	B1.2	0	0	0	0	0	0	0	0	0
11 November	78	26	120	A8.2	0	0	0	0	0	0	0	0	0
12 November	78	51	190	A8.6	0	0	0	1	0	0	0	0	0
13 November	78	38	40	A8.2	0	0	0	1	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
	07 November		1.7e+06	1.5e+04	3.5e+03	
08 November		1.9e+06	1.4e+04	3.5e+03		4.8e+07
09 November		9.8e+05	1.4e+04	3.3e+03		8.4e+06
10 November		1.4e+06	1.4e+04	3.3e+03		5.6e+06
11 November		7.1e+05	1.5e+04	3.8e+03		1.4e+05
12 November		4.5e+06	1.4e+04	3.4e+03		2.8e+06
13 November		3.3e+06	1.4e+04	3.1e+03		3.1e+08

Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	07 November	2	1-1-1-0-1-1-0-0	0	0-0-1-0-0-0-0-0	4
08 November	2	0-0-0-1-2-1-0-0	7	0-0-0-2-4-1-3-0	3	0-0-1-1-2-1-1-1
09 November	5	0-0-2-2-2-1-2-2	9	0-0-2-4-4-2-1-1	7	1-0-2-2-2-1-3-2
10 November	11	2-2-2-3-3-3-2-3	49	1-1-2-6-7-7-3-2	14	2-2-2-3-3-4-3-3
11 November	10	4-2-2-2-1-2-2-3	13	3-1-2-4-3-3-3-2	13	5-2-2-2-2-3-2-3
12 November	13	2-3-2-4-3-2-2-3	36	2-4-3-6-6-4-4-4	19	3-4-2-4-4-3-3-4
13 November	19	4-4-4-3-2-2-4-3	26	4-3-3-5-5-4-3-3	27	4-4-4-3-3-3-4-4

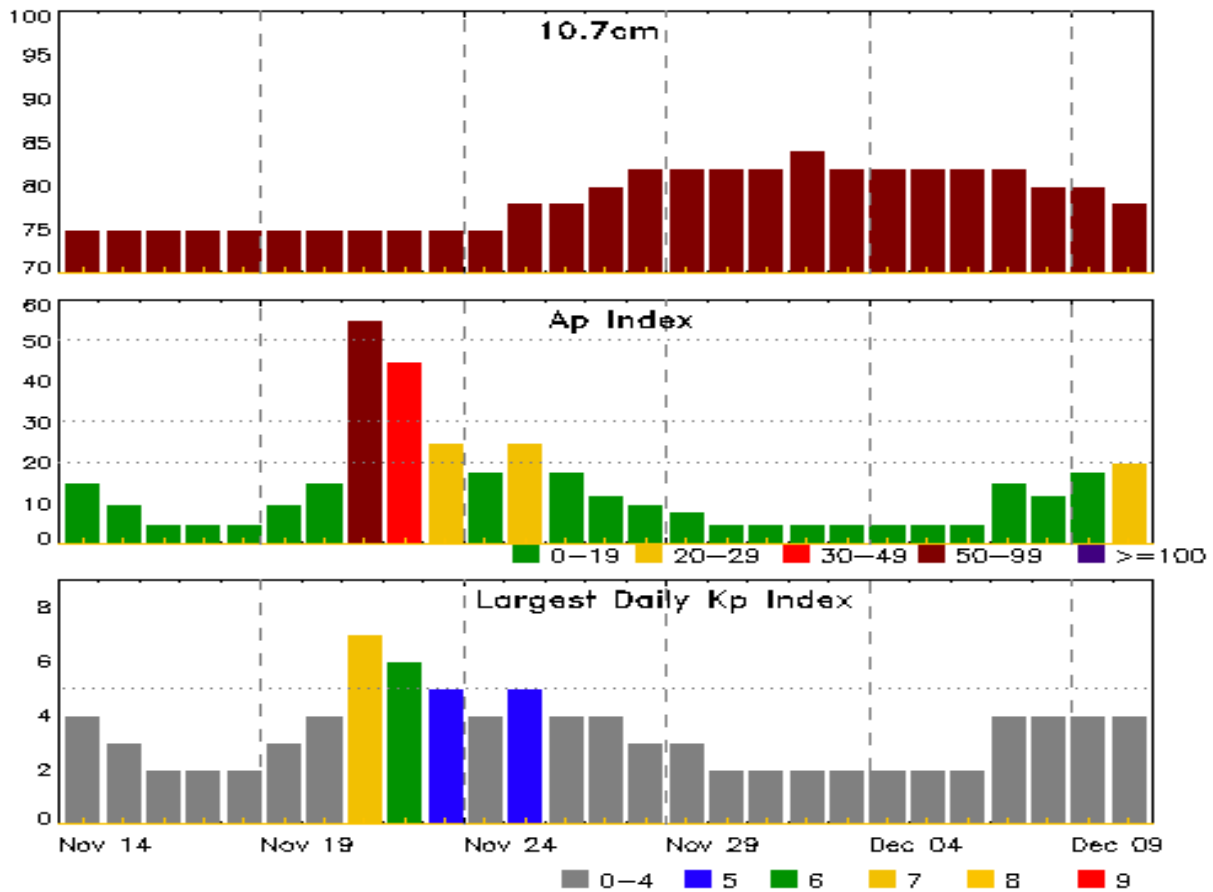


Alerts and Warnings Issued

Date & Time of Issue UTC	Type of Alert or Warning	Date & Time of Event UTC
07 Nov 1348	CONTINUED ALERT: Electron 2MeV Integral Flux \geq 1000pfu	26/0150
07 Nov 1707	WATCH: Geomagnetic Storm Category G1 predicted	
08 Nov 1111	CONTINUED ALERT: Electron 2MeV Integral Flux \geq 1000pfu	26/0150
09 Nov 2008	WATCH: Geomagnetic Storm Category G1 predicted	
10 Nov 1307	WARNING: Geomagnetic K = 4	10/1308 - 1800
10 Nov 1517	ALERT: Electron 2MeV Integral Flux \geq 1000pfu	10/1515
10 Nov 1612	ALERT: Geomagnetic K = 4	10/1601
10 Nov 1706	WARNING: Geomagnetic K = 5	10/1705 - 11/0100
10 Nov 1706	EXTENDED WARNING: Geomagnetic K = 4	10/1308 - 11/0100
10 Nov 2108	WATCH: Geomagnetic Storm Category G1 predicted	
11 Nov 0039	EXTENDED WARNING: Geomagnetic K = 4	10/1308 - 11/0600
11 Nov 0128	WARNING: Geomagnetic K = 5	11/0127 - 0600
11 Nov 0204	ALERT: Geomagnetic K = 5	11/0204
11 Nov 0545	EXTENDED WARNING: Geomagnetic K = 4	10/1308 - 11/1800
11 Nov 0546	EXTENDED WARNING: Geomagnetic K = 5	11/0127 - 1500
11 Nov 2158	WARNING: Geomagnetic K = 4	11/2200 - 12/0900
12 Nov 0546	ALERT: Geomagnetic K = 4	12/0545
12 Nov 0803	EXTENDED WARNING: Geomagnetic K = 4	11/2200 - 12/1500
12 Nov 1435	EXTENDED WARNING: Geomagnetic K = 4	11/2200 - 12/2300
12 Nov 2135	EXTENDED WARNING: Geomagnetic K = 4	11/2200 - 13/1200
13 Nov 1007	ALERT: Electron 2MeV Integral Flux \geq 1000pfu	13/0950
13 Nov 1157	EXTENDED WARNING: Geomagnetic K = 4	11/2200 - 14/0000
13 Nov 2004	WARNING: Geomagnetic K = 5	13/2003 - 14/0100
13 Nov 2004	EXTENDED WARNING: Geomagnetic K = 4	11/2200 - 14/0600



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
14 Nov	75	15	4	28 Nov	82	10	3
15	75	10	3	29	82	8	3
16	75	5	2	30	82	5	2
17	75	5	2	01 Dec	82	5	2
18	75	5	2	02	84	5	2
19	75	10	3	03	82	5	2
20	75	15	4	04	82	5	2
21	75	55	7	05	82	5	2
22	75	45	6	06	82	5	2
23	75	25	5	07	82	15	4
24	75	18	4	08	80	12	4
25	78	25	5	09	80	18	4
26	78	18	4	10	78	20	4
27	80	12	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	Imp/ Brtns	Optical		Rgn #
	Begin	Max	End			Location Lat CMD	Rgn #	
07 Nov	0448	0502	0505	B1.5				2605
10 Nov	2244	2247	2250	B1.7				2607
12 Nov	1332	1332	1335		SF	N15E35		
12 Nov	1606	1610	1614	B2.9				2610
13 Nov	0130	0141	0155	B1.8				2610
13 Nov	1729	1732	1736	B1.5	SF	N14E23		2610



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 2605

31 Oct	N07E16	191	30	3	Cro	2	B										
01 Nov	N07E03	191	10	3	Bxo	2	B										
02 Nov	N07W11	192	plage														
03 Nov	N08W20	188	10	2	Bxo	2	B										
04 Nov	N08W34	189	20	4	Bxo	4	B										
05 Nov	N08W48	190	10	3	Bxo	3	B										
06 Nov	N08W63	191	10	4	Bxo	2	B										
07 Nov	N08W76	191	10	1	Bxo	2	B										
08 Nov	N08W90	192	plage														
									0	0	0	0	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 191

Region 2606

03 Nov	N12E61	107	10	1	Axx	1	A										
04 Nov	N11E50	105	10	1	Axx	1	A										
05 Nov	N11E36	106	10	1	Axx	1	A										
06 Nov	N10E24	104	10	1	Axx	1	A										
07 Nov	N11E10	105	10	1	Bxo	2	B										
08 Nov	N11W04	106	plage														
09 Nov	N11W18	107	plage														
10 Nov	N11W32	108	plage														
11 Nov	N11W46	108	plage														
12 Nov	N11W60	109	plage														
13 Nov	N11W74	110	plage														
									0	0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 106

Region 2607

09 Nov	S18W53	142	10	1	Bxo	2	B										
10 Nov	S17W68	144	50	5	Cso	3	B										
11 Nov	S17W81	143	100	7	Dai	3	B										
									0	0	0	0	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 142



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 2608

11 Nov	S07W60	122	20	5	Bxo	3	B										
12 Nov	S08W74	123	30	6	Bxo	3	B										
13 Nov	S08W85	121	0	1	Axx	1	A										
								0	0	0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 122

Region 2609

12 Nov	S08W00	49	30	3	Bxo	2	B										
13 Nov	S09W15	51	20	3	Cro	4	B										
								0	0	0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 49

Region 2610

12 Nov	N15E27	22	30	3	Cro	3	B										
13 Nov	N14E15	21	20	3	Cro	3	B				1						
								0	0	0	1	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 21

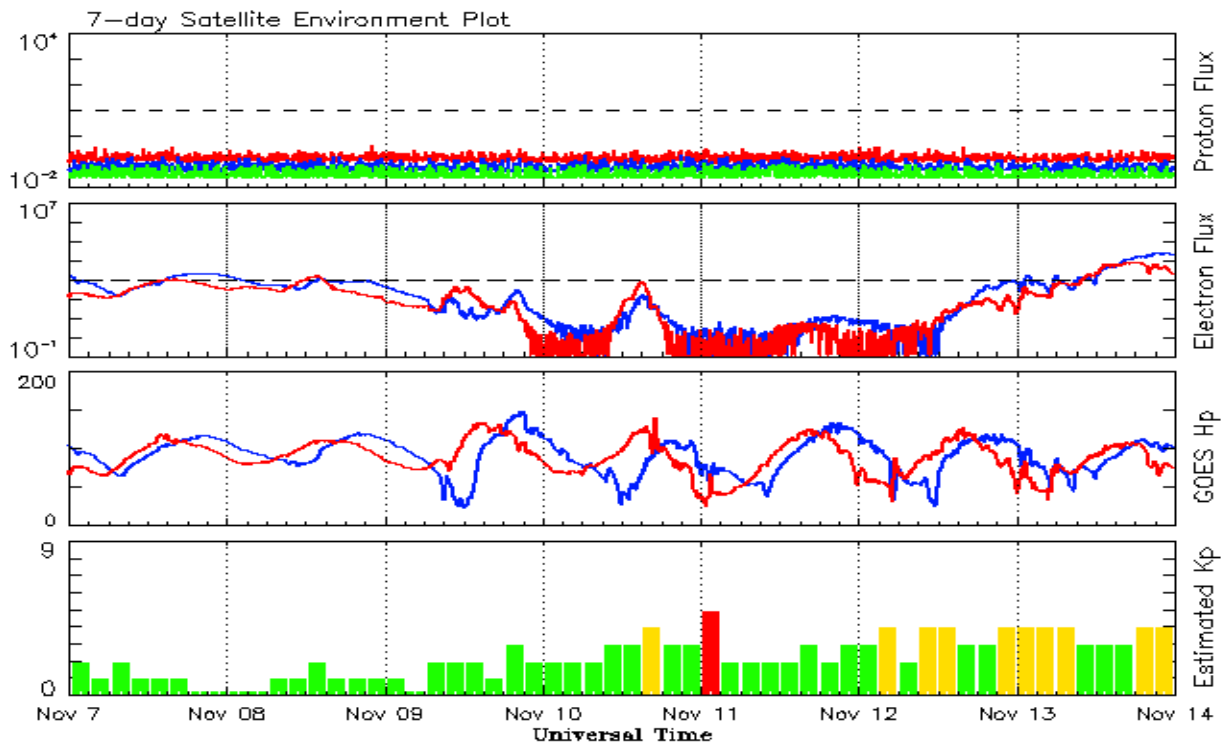


Recent Solar Indices (preliminary)
Observed monthly mean values

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										
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	45.7	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	30.3	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			93.1		12		
June	19.3	12.3	0.65			81.9		9		
July	36.8	19.5	0.53			85.9		10		
August	50.4	30.4	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		

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 07 November 2016*

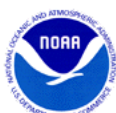
The proton flux plot contains the five-minute averaged integral proton flux (protons/cm²-sec -sr) as measured by the SWPC Primary GOES satellite, near West 75, for each of three energy thresholds: greater than 10, 50, and 100 MeV.

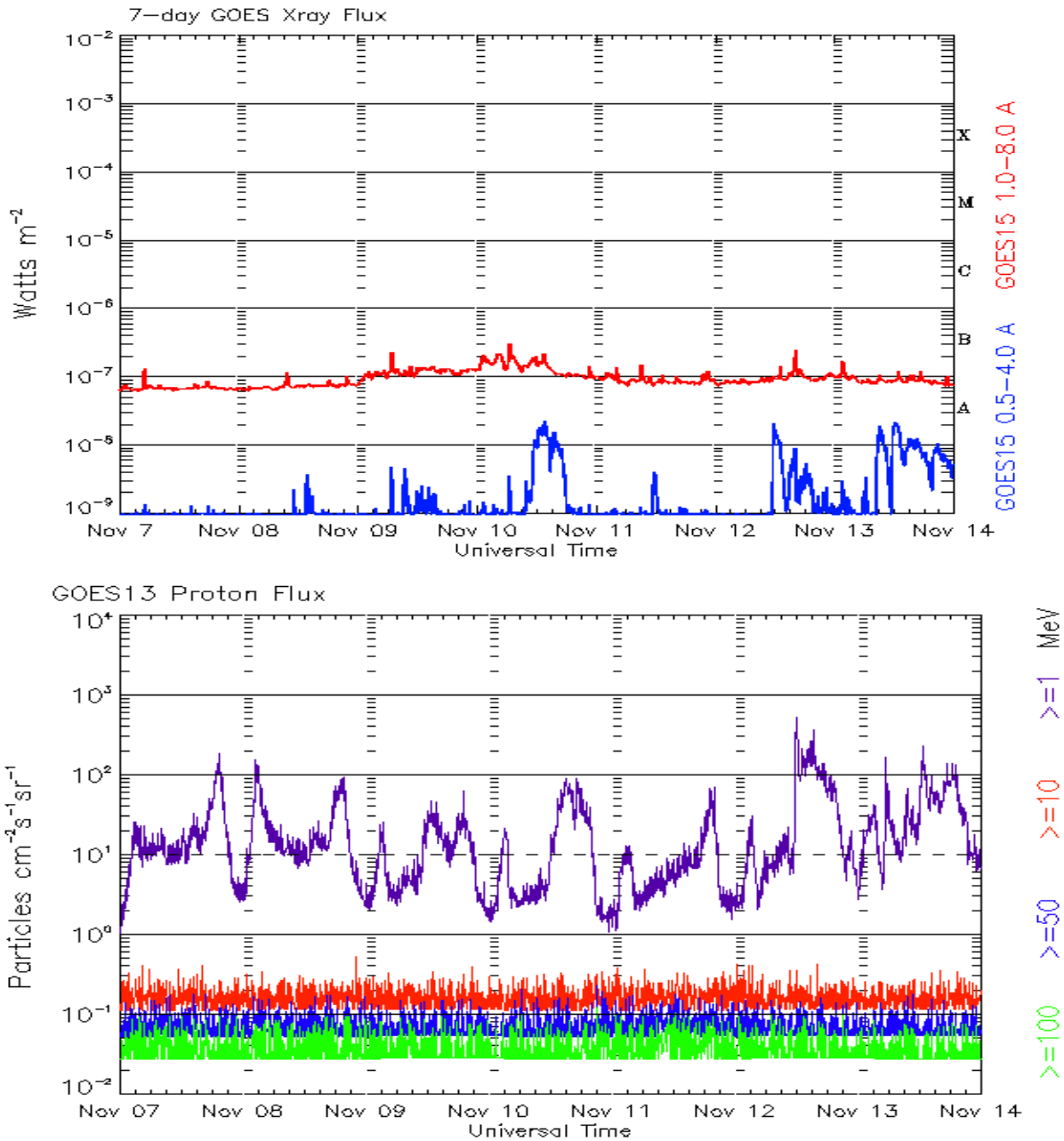
The electron flux plot contains the five-minute averaged integral electron flux (electrons/cm²-sec -sr) with energies greater than 2 MeV by the SWPC Primary GOES satellite.

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 07 November 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)

Published every Monday by the Space Weather Prediction Center.

U.S. Department of Commerce
NOAA / National Weather Service
Space Weather Prediction Center
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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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