

Solar activity was very low to low with a single C-class flare observed on 17 Oct. At 17/0038 UTC, a C4 flare was observed from Region 2599 (S15, L=144, class/area Cko/460 on 05 Oct) which had rotated around the southwest limb on 15 Oct. A nine degree long filament, centered near N26W02, was observed erupting in SDO/AIA 304 and GONG imagery at about 20/1300 UTC. A slow-moving, faint CME was observed in LASCO C2 imagery with possible effects observed on 23 October.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit ranged from normal to very high levels. On 18 Oct very high levels were observed, with a peak level of 52,137 pfu. High levels were observed on 17 Oct and 19-22 Oct. Normal to high levels were observed on 23 Oct.

Geomagnetic field activity during the reporting period ranged from quiet to active levels. Quiet to active conditions were observed on 17 Oct and tapered into quiet to unsettled levels through 19 Oct due to the waning effects of a CH HSS. Quiet conditions were observed from 20-22 Oct under an ambient solar wind regime. Quiet to unsettled conditions were noted 23-24 Oct due to a SSBC and initial CH HSS effects.

The solar wind environment was above background levels on 17 Oct under the influence of a CH HSS with wind speeds between 700-800 km/s. Wind speeds gradually tapered to background conditions on 18-19 Oct. Winds increased again to around 450 km/s and minor enhancements to total field were observed on 23 Oct due to a SSBC and weak CH HSS effects.

Space Weather Outlook

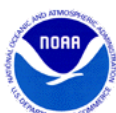
24 October - 19 November 2016

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

No proton events are expected at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to reach high levels on 24-26 Oct, 30 Oct-6 Nov, and 12-19 Nov and very high levels 27-29 Oct. Normal to moderate levels are expected 7-11 Nov. Enhancement in the 2 MeV electron flux is due to the anticipation of multiple, recurrent CH HSSs.

Geomagnetic field activity is likely to reach major storm levels (G2-Moderate) on 24-26 Oct, and minor storm levels (G1-Minor) on 27-29 Oct, due to the effects of a positive polarity CH HSS. Active conditions are likely to linger through 01 Nov as effects of the CH HSS wane. Thereafter, conditions are expected to be predominately quiet with isolated unsettled periods through 10 Nov. Active conditions are likely on 12 Nov, increasing to G1 storm conditions on 13



Nov, under the influence of a negative polarity CH HSS. Conditions are likely to decrease to unsettled from 14-15 Nov as CH HSS effects wane. Quiet conditions are then expected on 16-18 Nov, increasing to unsettled by 19 Nov with the onset of another positive polarity CH HSS.



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
17 October	76	23	80	A9.0	1	0	0	0	0	0	0	0
18 October	77	24	120	A7.1	0	0	0	1	0	0	0	0
19 October	77	31	80	A6.9	0	0	0	0	0	0	0	0
20 October	75	16	50	A6.7	0	0	0	1	0	0	0	0
21 October	78	29	50	A7.3	0	0	0	1	0	0	0	0
22 October	78	27	40	A7.1	0	0	0	0	0	0	0	0
23 October	77	14	20	A7.8	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
	17 October	5.3e+06	1.3e+04	3.1e+03	5.8e+08	
18 October	3.4e+06	1.4e+04	3.3e+03	1.5e+09		
19 October	3.3e+06	1.4e+04	3.5e+03	1.3e+09		
20 October	3.5e+06	1.4e+04	3.4e+03	1.7e+09		
21 October	4.7e+06	1.4e+04	3.6e+03	1.6e+09		
22 October	4.2e+06	1.5e+04	3.8e+03	5.5e+08		
23 October	2.2e+06	1.5e+04	3.4e+03	6.3e+07		

Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	17 October	12	3-3-3-3-2-2-2-3	36	3-3-6-6-5-4-2-3	20
18 October	10	3-3-3-2-1-2-1-3	16	4-3-4-4-3-2-2-1	11	3-3-3-2-1-2-1-3
19 October	5	2-2-1-1-2-2-1-0	6	3-1-2-3-1-1-1-0	7	3-2-2-2-1-2-2-1
20 October	5	1-0-0-1-1-1-4-1	1	0-0-0-0-0-0-2-0	3	1-0-1-1-0-0-2-1
21 October	2	0-1-0-0-1-1-1-0	0	0-0-0-0-0-0-0-0	2	1-1-1-0-0-0-0-0
22 October	0	0-0-0-0-0-0-0-0	6	1-0-1-3-1-3-2-1	6	2-1-1-2-1-2-2-2
23 October	0	0-0-0-0-0-0-0-0	16	0-1-5-4-4-2-2-2	3	1-2-3-2-2-2-3-3

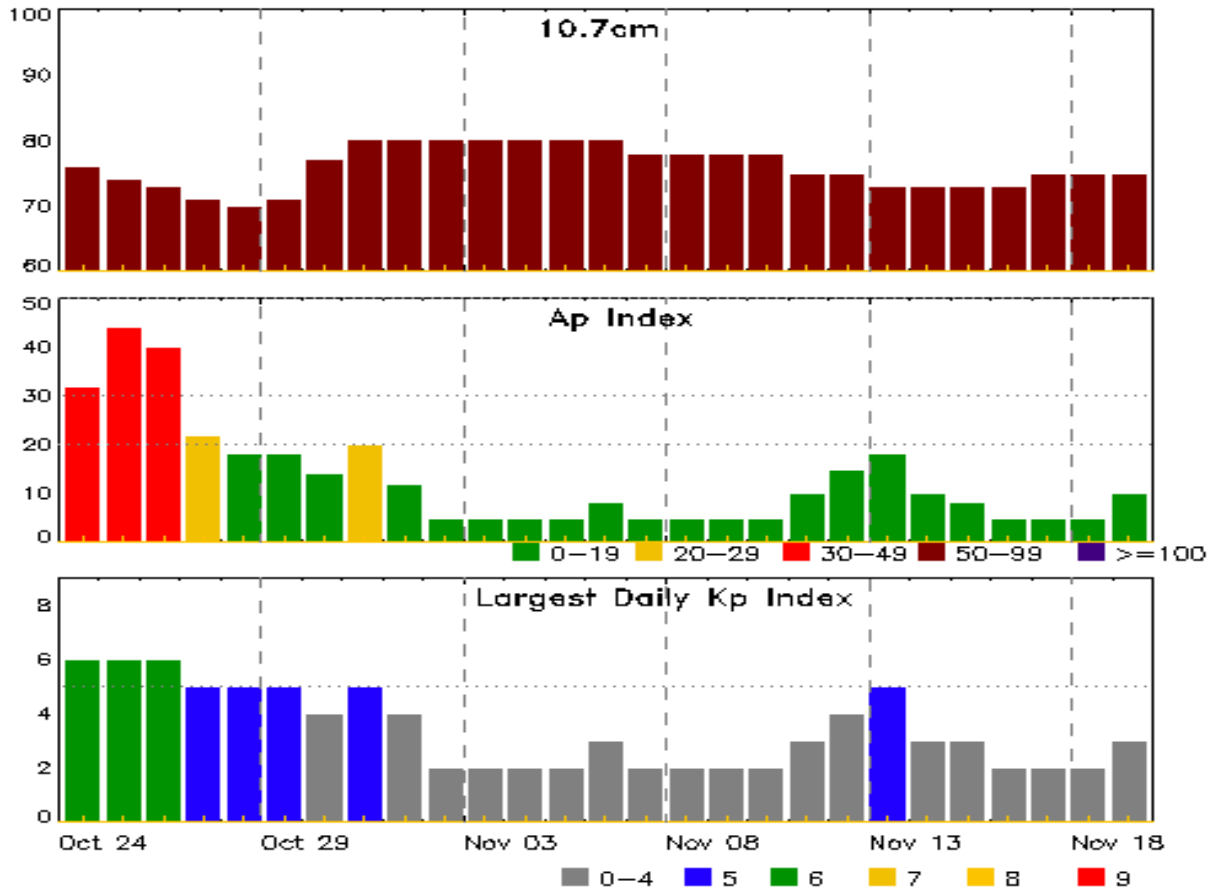


Alerts and Warnings Issued

Date & Time of Issue UTC	Type of Alert or Warning	Date & Time of Event UTC
17 Oct 0242	EXTENDED WARNING: Geomagnetic K = 4	16/0804 - 17/1300
17 Oct 0242	EXTENDED WARNING: Geomagnetic K = 5	16/1834 - 17/1300
17 Oct 0751	CONTINUED ALERT: Electron 2MeV Integral Flux \geq 1000pfu	14/0120
17 Oct 1240	EXTENDED WARNING: Geomagnetic K = 4	16/0804 - 17/2100
17 Oct 1254	CANCELLATION: Geomagnetic Storm Category G2 predicted	
17 Oct 2034	EXTENDED WARNING: Geomagnetic K = 4	16/0804 - 18/0300
18 Oct 0242	EXTENDED WARNING: Geomagnetic K = 4	16/0804 - 18/0900
18 Oct 0500	CONTINUED ALERT: Electron 2MeV Integral Flux \geq 1000pfu	14/0120
19 Oct 0501	CONTINUED ALERT: Electron 2MeV Integral Flux \geq 1000pfu	14/0120
20 Oct 0500	CONTINUED ALERT: Electron 2MeV Integral Flux \geq 1000pfu	14/0120
20 Oct 1838	WATCH: Geomagnetic Storm Category G1 predicted	
21 Oct 0501	CONTINUED ALERT: Electron 2MeV Integral Flux \geq 1000pfu	14/0120
21 Oct 1913	WATCH: Geomagnetic Storm Category G2 predicted	
22 Oct 0500	CONTINUED ALERT: Electron 2MeV Integral Flux \geq 1000pfu	14/0120
22 Oct 2136	WATCH: Geomagnetic Storm Category G2 predicted	
23 Oct 0803	WARNING: Geomagnetic K = 4	23/0802 - 2200
23 Oct 1318	CONTINUED ALERT: Electron 2MeV Integral Flux \geq 1000pfu	14/0120
23 Oct 2034	WATCH: Geomagnetic Storm Category G2 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
24 Oct	76	32	6	07 Nov	78	5	2
25	74	44	6	08	78	5	2
26	73	40	6	09	78	5	2
27	71	22	5	10	78	5	2
28	70	18	5	11	75	10	3
29	71	18	5	12	75	15	4
30	77	14	4	13	73	18	5
31	80	20	5	14	73	10	3
01 Nov	80	12	4	15	73	8	3
02	80	5	2	16	73	5	2
03	80	5	2	17	75	5	2
04	80	5	2	18	75	5	2
05	80	5	2	19	75	10	3
06	80	8	3				



Energetic Events

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

No Events Observed

Flare List

Date	Time			X-ray Class	Imp/ Brtns	Optical		Rgn #
	Begin	Max	End			Location Lat CMD	Rgn #	
17 Oct	0008	0038	0052	C4.2				2599
18 Oct	0810	0811	0813		SF	N06W15		2602
20 Oct	2348	2349	2352		SF	N06W51		2602
21 Oct	0946	0949	0951	B1.2				2603
21 Oct	1204	1204	1207		SF	N14E10		2603
21 Oct	1639	1642	1646	B1.6				2603
23 Oct	0641	0645	0647	B1.3				2602



Region Summary

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 2600																			
06 Oct	N11E72	105	60	2	Hsx	1	A												
07 Oct	N11E60	104	60	2	Hsx	1	A												
08 Oct	N12E47	104	90	2	Cso	3	B												
09 Oct	N13E33	105	110	4	Cso	3	B												
10 Oct	N11E19	105	80	2	Hsx	1	A												
11 Oct	N11E06	104	100	4	Hsx	1	A												
12 Oct	N11W07	104	100	2	Hsx	1	A												
13 Oct	N11W20	105	90	2	Hsx	1	A												
14 Oct	N11W34	106	90	2	Hsx	1	A												
15 Oct	N11W48	106	90	2	Hsx	1	A												
16 Oct	N11W61	106	90	2	Hsx	1	A												
17 Oct	N13W73	105	50	2	Hsx	1	A												
18 Oct	N12W89	107	80	3	Hsx	1	A												
												0	0	0	0	0	0	0	0

Crossed West Limb.
 Absolute heliographic longitude: 104

Region 2602																												
12 Oct	N06E57	41	10	7	Bxo	4	B																					
13 Oct	N07E45	40	40	10	Cso	5	B												1									
14 Oct	N06E29	43	50	5	Cso	4	B												2									
15 Oct	N06E15	43	40	5	Cao	3	B																					
16 Oct	N06E02	43	40	9	Cao	4	B												1									
17 Oct	N06W11	43	30	5	Cao	2	B																					
18 Oct	N07W27	45	40	7	Cao	3	B												1									
19 Oct	N06W40	46	70	7	Dao	10	B																					
20 Oct	N06W53	46	50	7	Cao	6	B												1									
21 Oct	N06W67	46	40	7	Cao	4	B																					
22 Oct	N06W80	46	10	3	Axx	2	A																					
																				0	0	0	6	0	0	0	0	0

Crossed West Limb.
 Absolute heliographic longitude: 43

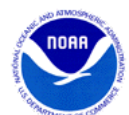


Region Summary - continued

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 2603																				
19 Oct	N13E31	335	10	1	Axx	1	A													
20 Oct	N13E18	335	plage																	
21 Oct	N13E04	335	10	5	Bxo	5	B				1									
22 Oct	N13W09	335	30	5	Cro	5	B													
23 Oct	N13W22	335	20	5	Cro	4	B													
												0	0	0	1	0	0	0	0	

Still on Disk.

Absolute heliographic longitude: 335

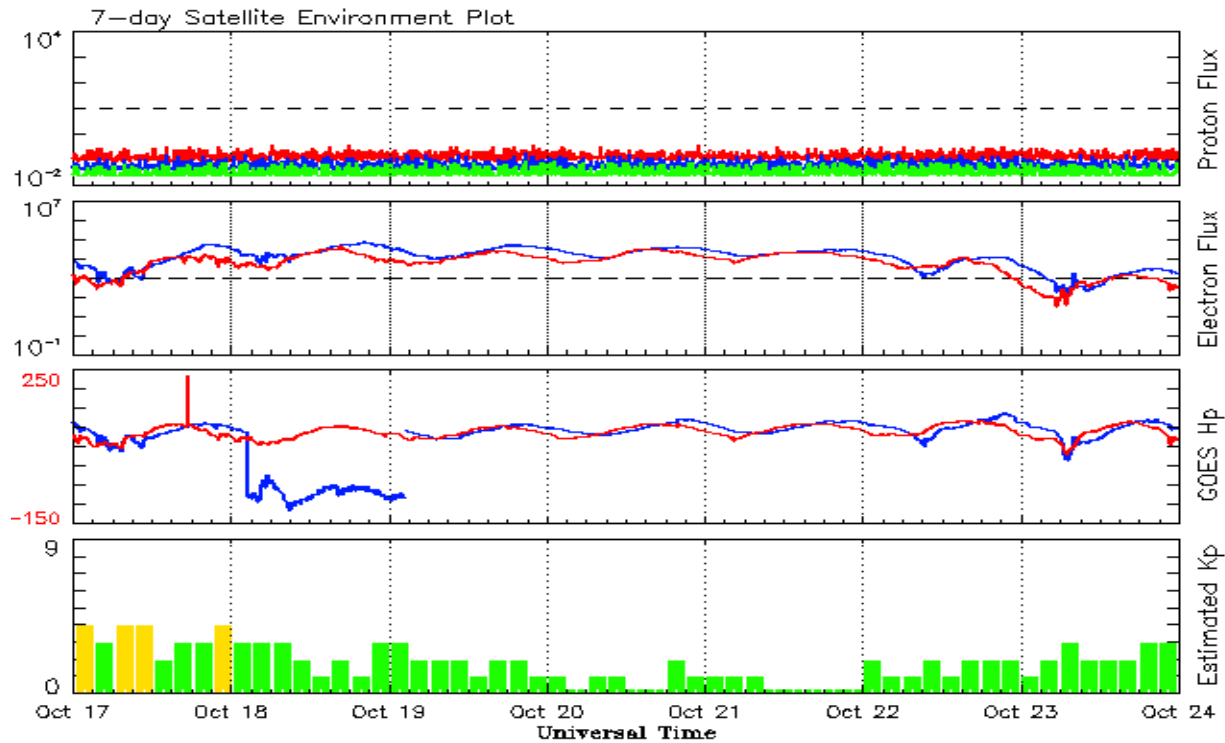


Recent Solar Indices (preliminary)
Observed monthly mean values

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									
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
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			93.4		10	
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	

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 17 October 2016*

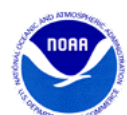
The proton flux plot contains the five-minute averaged integral proton flux (protons/cm²-sec -sr) as measured by the SWPC Primary GOES satellite, near West 75, for each of three energy thresholds: greater than 10, 50, and 100 MeV.

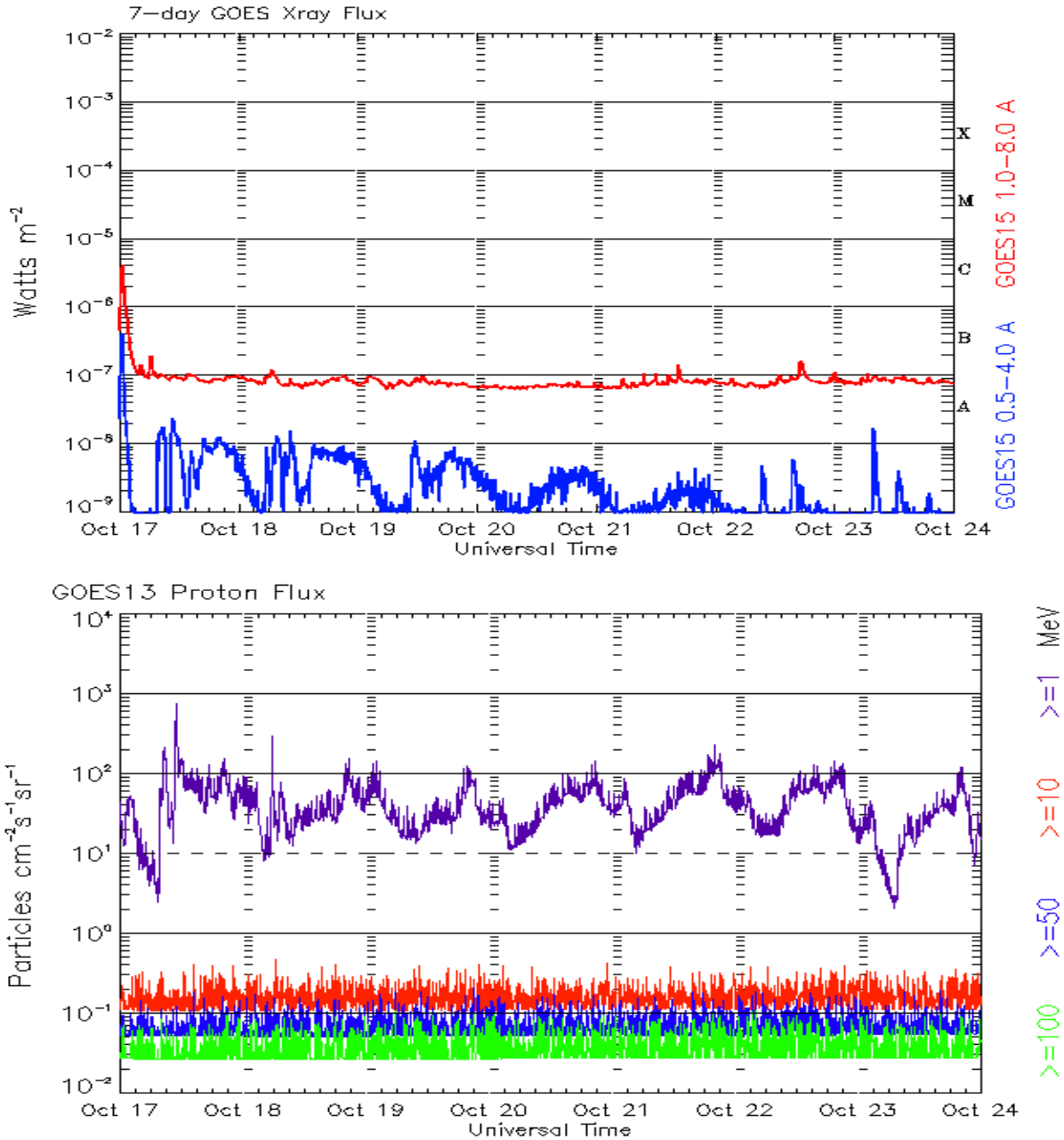
The electron flux plot contains the five-minute averaged integral electron flux (electrons/cm²-sec -sr) with energies greater than 2 MeV by the SWPC Primary GOES satellite.

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 17 October 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

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

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