

Solar activity was low very low on 10-11 Oct and 15-16 Oct. Activity was at low levels on 12-14 Oct, with the strongest flare, a C1 at 13/2105 UTC, occurring from around the east limb. Region 2599 (S15, L=144, class/area Cko/460 on 05 Oct) was the only numbered region to produce a C-class flare; a C1/Sf at 12/1155 UTC. On 14 Oct, two filament eruptions were observed in GONG and SDO/AIA imagery in the NE quadrant. Around 14/1500 UTC, a five degree long filament erupted along a channel centered near N01E30. Later, around 14/2230 UTC, a ten degree long filament erupted along a channel centered near N09E45. No associated CME signatures were observed in available coronagraph imagery.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit was at normal background levels on 13-14 Oct. Moderate levels were observed on 11-12 Oct. High levels were reached on 10 Oct, and 14-16 Oct.

Geomagnetic field activity during the reporting period ranged from quiet to major storm (G2-Moderate) levels. Quiet to unsettled levels were observed on 10 Oct and tapered down to quiet levels until late on 12 Oct, when unsettled levels were observed from the onset of the 08 Oct CME. Unsettled to levels continued into 13 Oct, increasing to G2 (Moderate) storm levels late on 13 Oct and into early on 14 Oct. Minor (G1-Minor) storm levels gave way to unsettled and then quiet conditions as 14 Oct progressed. Quiet to unsettled levels persisted over 15-16 Oct, increasing to G1 (Minor) storm levels once again, late on 16 Oct, in response to the onset of a negative polarity CH HSS.

The solar wind environment was at near-background levels from 10-12 Oct. Late on 12 Oct, an enhancement was observed after 12/2120 UTC, marking the arrival of a CME from a filament eruption centered near N38E40 on 08 Oct. During the sheath, a moderate increase in solar wind speed was observed, increasing from an ambient 370 km/s to an enhanced 400-445 km/s. Total magnetic field strength ranged from 2-10 nT. The Bz component displayed a primarily northward orientation. Around 13/0520 UTC, enhancements in the solar wind suggested the transitions from the sheath to the CME driver. Density dropped and total magnetic field strength steadily increased to a peak of 24 nT around 13/2200 UTC. The Bz component rotated in a sustained far southward orientation, with a slow rotation northward beginning around 13/2200 UTC. Solar wind speeds were relatively modest, ranging from around 380-450 km/s during the event. Solar wind parameters slowly declined towards background conditions through 15 Oct. Early on 16 Oct, the onset of a negative polarity CH HSS was observed. Solar wind speeds steadily increased, reaching peak wind speeds around 750 km/s as the reporting period ended.



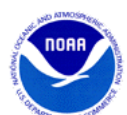
Space Weather Outlook 17 October - 12 November 2016

Solar activity is expected to be very low with a chance for C-class flare 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 moderate levels on 21-23 Oct and 7-11 Nov; high levels on 17-20 Oct, 25-26, 30 Oct - 06 Nov, and 12 Nov; very high levels on 27-29 Oct. Enhancement in the 2 MeV electron flux is anticipated as a result of multiple, recurrent CH HSSs.

Geomagnetic field activity is likely to reach major storm (G2-Moderate) levels on 17 Oct due to elevated winds from the influence of a negative polarity coronal hole. Conditions are expected to decrease to active by 18 Oct, and quiet to unsettled conditions on 19 Oct, as the negative polarity CH HSS wanes. Active conditions are again likely on 22 Oct with the onset of recurrent, positive polarity CH HSS. Conditions are forecast to reach minor (G1-Minor) storm levels on 23 Oct and G2 storm levels from 24-26 Oct as solar wind speeds expected to climb. G1 storm conditions are likely from 27-31 Oct, and active conditions by 01 Nov, as the CH HSS slowly subsides. Quiet conditions are likely from 02-10 Nov under an ambient solar wind regime. Unsettled conditions on 11 Nov are likely to give way to G1 storm conditions on 12 Nov as another negative polarity CH HSS is anticipated to enhance the near-Earth space environment.



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
10 October	102	64	440	B1.8	0	0	0	0	0	0	0	0
11 October	99	56	400	B2.0	0	0	0	1	0	0	0	0
12 October	98	40	300	B1.8	1	0	0	3	0	0	0	0
13 October	95	41	270	B2.2	1	0	0	1	0	0	0	0
14 October	93	38	260	B2.2	1	0	0	2	0	0	0	0
15 October	85	35	190	B1.6	0	0	0	0	0	0	0	0
16 October	81	25	130	B1.4	0	0	0	1	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
	10 October	1.7e+06	1.4e+04	3.4e+03	5.8e+07	
11 October	8.2e+05	1.4e+04	3.5e+03	2.0e+07		
12 October	1.1e+06	1.3e+04	3.1e+03	3.9e+07		
13 October	2.3e+06	1.4e+04	3.0e+03	5.6e+06		
14 October	2.6e+06	1.5e+04	3.6e+03	6.3e+07		
15 October	1.7e+06	1.4e+04	3.5e+03	1.3e+08		
16 October	2.6e+06	1.4e+04	3.3e+03	1.5e+08		

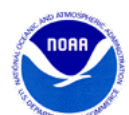
Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	10 October	7	2-2-3-1-2-2-2-1	16	2-2-5-3-4-3-2-1	11
11 October	3	1-0-1-1-1-2-1-1	2	0-0-2-1-0-0-0-1	4	1-1-1-1-0-0-1-1
12 October	5	1-1-1-0-1-2-1-3	3	1-0-0-1-1-1-1-2	6	1-1-1-1-1-1-1-3
13 October	30	3-3-5-4-5-3-4-5	76	2-3-5-5-7-8-6-4	43	3-3-5-4-5-6-6-5
14 October	20	5-4-5-3-2-2-1-2	27	4-3-6-5-4-2-1-2	24	6-4-5-3-2-2-1-1
15 October	8	2-2-2-2-2-2-2-3	17	1-1-4-5-4-3-2-2	11	3-3-2-2-2-3-2-3
16 October	13	2-1-3-3-3-2-4-3	26	3-1-5-4-5-4-4-3	15	3-1-3-3-3-2-5-4



Alerts and Warnings Issued

Date & Time of Issue UTC	Type of Alert or Warning	Date & Time of Event UTC
10 Oct 0223	WARNING: Geomagnetic K = 4	10/0222 - 1300
10 Oct 1303	CONTINUED ALERT: Electron 2MeV Integral Flux >= 1000pfu	27/1525
10 Oct 2158	WATCH: Geomagnetic Storm Category G1 predicted	
11 Oct 1940	WATCH: Geomagnetic Storm Category G1 predicted	
12 Oct 1942	WATCH: Geomagnetic Storm Category G2 predicted	
12 Oct 2131	WARNING: Geomagnetic Sudden Impulse expected	12/2200 - 2300
12 Oct 2227	SUMMARY: Geomagnetic Sudden Impulse	12/2214
12 Oct 2228	WARNING: Geomagnetic K = 4	12/2228 - 13/0700
13 Oct 0644	EXTENDED WARNING: Geomagnetic K = 4	12/2228 - 13/1500
13 Oct 0706	WARNING: Geomagnetic K = 5	13/0706 - 1500
13 Oct 0723	ALERT: Geomagnetic K = 4	13/0722
13 Oct 0815	ALERT: Geomagnetic K = 5	13/0815
13 Oct 1047	EXTENDED WARNING: Geomagnetic K = 4	12/2228 - 13/2000
13 Oct 1237	WARNING: Geomagnetic K = 6	13/1237 - 1800
13 Oct 1237	EXTENDED WARNING: Geomagnetic K = 4	12/2228 - 14/0300
13 Oct 1237	EXTENDED WARNING: Geomagnetic K = 5	13/0706 - 2300
13 Oct 1307	ALERT: Geomagnetic K = 5	13/1306
13 Oct 1329	WATCH: Geomagnetic Storm Category G3 predicted	
13 Oct 1640	ALERT: Geomagnetic K = 5	13/1639
13 Oct 1758	ALERT: Geomagnetic K = 6	13/1759
13 Oct 1758	EXTENDED WARNING: Geomagnetic K = 6	13/1237 - 14/0300
13 Oct 1758	EXTENDED WARNING: Geomagnetic K = 5	13/0706 - 14/0300
13 Oct 1924	ALERT: Geomagnetic K = 5	13/1920
13 Oct 2013	ALERT: Geomagnetic K = 6	13/2012
13 Oct 2337	ALERT: Geomagnetic K = 5	13/2336
14 Oct 0126	ALERT: Geomagnetic K = 5	14/0125
14 Oct 0136	ALERT: Electron 2MeV Integral Flux >= 1000pfu	14/0120
14 Oct 0139	ALERT: Geomagnetic K = 6	14/0139



Alerts and Warnings Issued

Date & Time of Issue UTC	Type of Alert or Warning	Date & Time of Event UTC
14 Oct 0250	EXTENDED WARNING: Geomagnetic K = 6	13/1237 - 14/0900
14 Oct 0250	EXTENDED WARNING: Geomagnetic K = 4	12/2228 - 14/1500
14 Oct 0250	EXTENDED WARNING: Geomagnetic K = 5	13/0706 - 14/1200
14 Oct 0820	ALERT: Geomagnetic K = 5	14/0820
14 Oct 1053	EXTENDED WARNING: Geomagnetic K = 4	12/2228 - 14/2100
14 Oct 1136	CONTINUED ALERT: Electron 2MeV Integral Flux \geq 1000pfu	14/0120
14 Oct 1909	CANCELLATION: Geomagnetic Storm Category G3 predicted	
14 Oct 2024	EXTENDED WARNING: Geomagnetic K = 4	12/2228 - 15/0600
14 Oct 2024	WATCH: Geomagnetic Storm Category G1 predicted	
15 Oct 1001	CONTINUED ALERT: Electron 2MeV Integral Flux \geq 1000pfu	14/0120
16 Oct 0806	WARNING: Geomagnetic K = 4	16/0804 - 17/0600
16 Oct 0931	CONTINUED ALERT: Electron 2MeV Integral Flux \geq 1000pfu	14/0120
16 Oct 1833	WARNING: Geomagnetic K = 5	16/1834 - 17/0300
16 Oct 1833	ALERT: Geomagnetic K = 4	16/1833
16 Oct 1853	ALERT: Geomagnetic K = 5	16/1853
16 Oct 2112	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
17 Oct	80	26	6	31 Oct	85	25	5
18	80	12	4	01 Nov	85	12	4
19	75	8	3	02	85	5	2
20	75	5	2	03	85	5	2
21	75	5	2	04	85	5	2
22	75	12	4	05	85	5	2
23	75	22	5	06	90	8	3
24	70	35	6	07	90	5	2
25	70	35	6	08	90	5	2
26	70	35	6	09	85	5	2
27	75	20	5	10	85	5	2
28	75	15	5	11	85	10	3
29	75	15	5	12	80	24	5
30	80	15	5				



Energetic Events

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

No Events Observed

Flare List

Date	Time			X-ray Class	Optical			
	Begin	Max	End		Imp/ Brtns	Location	Rgn #	Lat CMD
10 Oct	0054	0104	0110	B4.1				2598
10 Oct	0117	0125	0131	B4.6				2598
10 Oct	1736	1740	1743	B3.8				2599
10 Oct	1953	1957	2000	B4.0				
11 Oct	0730	0730	0732		SF	N06W59		2601
11 Oct	0945	0948	0951	B3.7				2598
12 Oct	0534	0537	0539	B5.3	SF	N04W71		2601
12 Oct	1151	1155	1159	C1.1	SF	S18W38		2599
12 Oct	1409	1411	1414		SF	S17W42		2599
12 Oct	1724	1729	1738	B4.4				
12 Oct	2100	2104	2107	B5.3				
13 Oct	0205	0205	0207		SF	N06E56		2602
13 Oct	0236	0240	0252	B5.6				
13 Oct	0330	0334	0337	B5.5				
13 Oct	0429	0438	0441	B8.8				
13 Oct	0538	0541	0545	B3.7				
13 Oct	0828	0833	0840	B8.6				
13 Oct	1714	1720	1729	B7.4				
13 Oct	2040	2105	2121	C1.3				
14 Oct	0357	0406	0419	B5.6				
14 Oct	0853	0900	0906	B8.6	SF	N04E39		2602
14 Oct	0911	0911	0915		SF	N06E39		2602
14 Oct	1119	1126	1133	B9.4				2599
14 Oct	1328	1331	1334	B4.9				2602
14 Oct	1443	1449	1454	C1.0				
15 Oct	0445	0455	0505	B3.0				2602
15 Oct	2323	2345	0004	B4.2				2599
16 Oct	1036	1057	1110	B5.5				
16 Oct	1127	1135	1142	B7.5				2599
16 Oct	1329	1356	1404	B3.5	SF	N06E09		2602
16 Oct	1703	1725	1738	B7.4				



Flare List

Date	Time			X-ray Class	Optical		
	Begin	Max	End		Imp/ Brtns	Location Lat CMD	Rgn #
16 Oct	2242	2302	2315	B8.4			



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 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										
										0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 104

Region 2601

10 Oct	N06W57	181	20	3	Cro	3	B										
11 Oct	N06W71	181	10	3	Bxo	4	B					1					
12 Oct	N06W86	184	plage									1					
										0	0	0	2	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 181

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					
										0	0	0	4	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 43

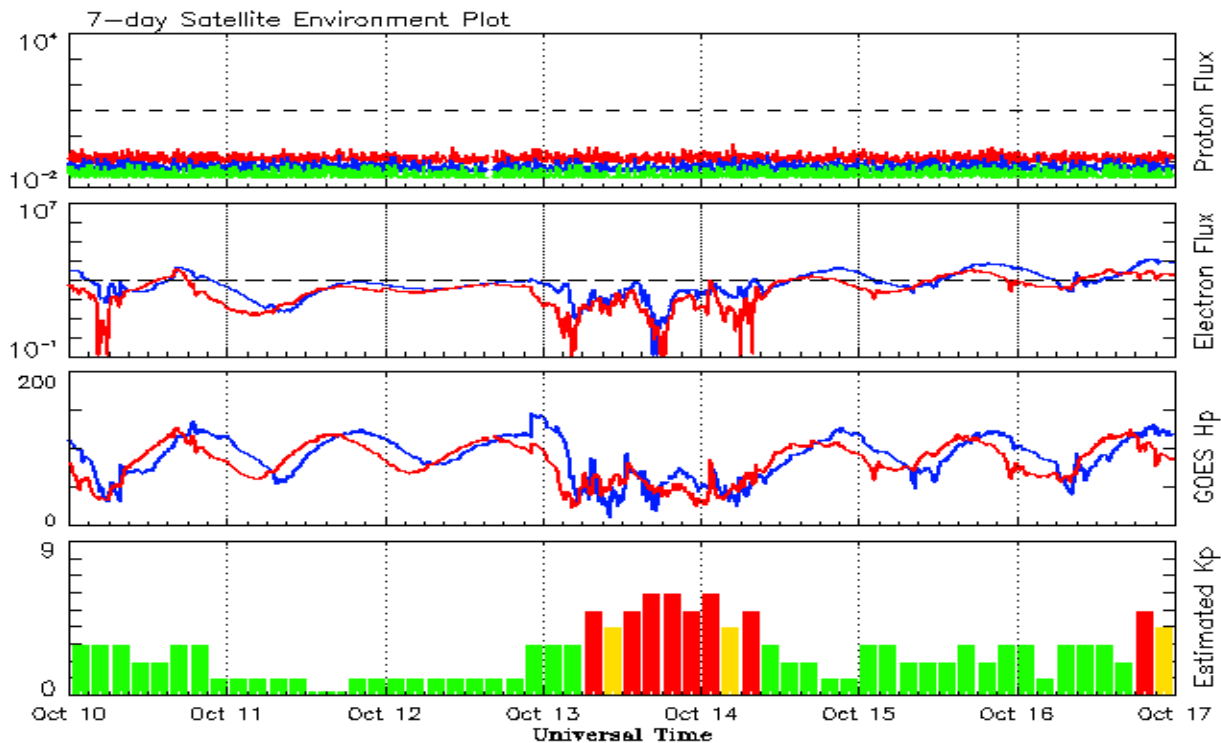


Recent Solar Indices (preliminary)
Observed monthly mean values

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 10 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.

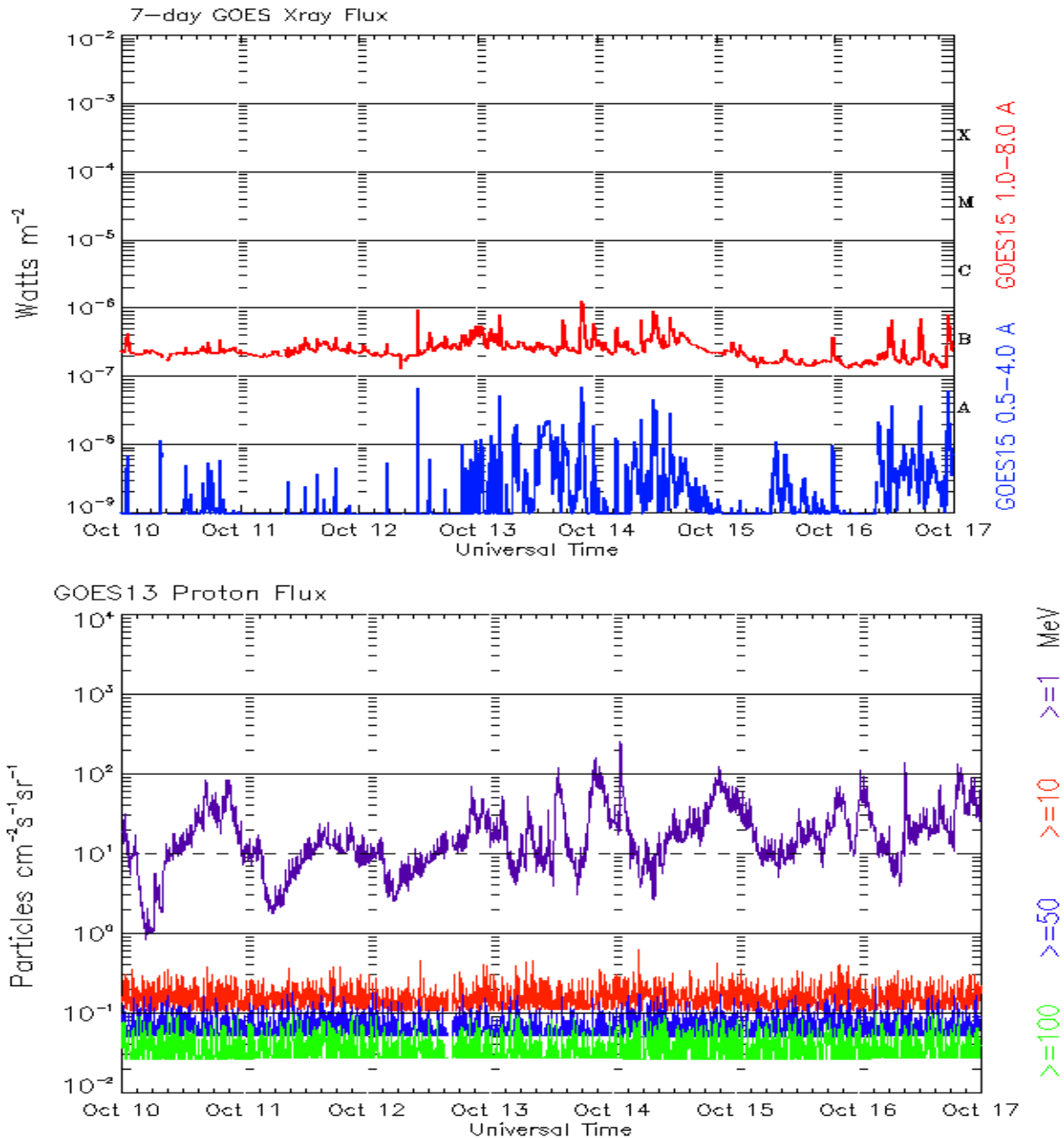
The electron flux plot contains the five-minute averaged integral electron flux (electrons/cm²-sec -sr) with energies greater than 2 MeV by the SWPC Primary GOES satellite.

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 10 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)

Published every Monday by the Space Weather Prediction Center.

U.S. Department of Commerce
NOAA / National Weather Service
Space Weather Prediction Center
325 Broadway, Boulder CO 80305

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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