

Solar activity was at very low levels during the period. The two numbered regions on the visible disk were Region 2603 (N13, L=340, class/area Dao/080 on 26 October) and 2604 (N07, L=261, class/area Bxo/010 on 29 October). Other activity included a slow moving coronal mass ejection (CME) directed mostly south of the ecliptic beginning at 30/1012 UTC in SOHO/LASCO C2 imagery. The source of the CME was unclear and may be associated with magnetic re-connection near S30E15. Preliminary analysis indicated a possible weak glancing blow arrival around midday on 04 November. Further analysis is currently underway.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit was at moderate levels on 24-25 October and reached high levels from 26-30 October. The largest flux value of the period was 47,726 pfu observed at 27/1530 UTC.

Geomagnetic field activity ranged from quiet to G3 (Strong) storm levels. The period started off under the waning influence of a weak isolated positive polarity coronal hole high speed stream (CH HSS). Solar wind speeds were mostly in the 380 km/s to 430 km/s range with total field values between 5 nT and 10 nT and prolonged periods of southward Bz. The geomagnetic field responded with quiet to active levels on 24 October. Early on 25 October, total field began to rise to a maximum of 21 nT at 25/1016 UTC while the Bz component deflected southward to -17 nT indicating the onset of a co-rotating interaction region. This was followed by a rise in solar wind speed to around 750-830 km/s as a large, polar-connected, positive polarity CH HSS moved into geoeffective position. Coronal hole influence declined to the 530-680 km/s by midday on 27 October and remained there until the end of the period. The geomagnetic field responded with active to G3 (Strong) storm levels on 25 October, active to G2 (Moderate) storm levels on 26 October, unsettled to G1 (Minor) storm levels on 27 and 29 October, unsettled to active levels on 28 October, and quiet to active levels on 30 October.

### **Space Weather Outlook** **31 October - 26 November 2016**

Solar activity is expected to be at very low to low levels throughout 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 moderate levels with high levels likely from 31 October-06 November, 12-19 November, and again from 22-26 November due to CH HSS influence.

Geomagnetic field activity is expected to be at unsettled to active levels from 31 October-01 November, 11-15, and 19-26 November with G1 (Minor) storm levels likely on 13, 21-23, and



25 November and G2 (Moderate) storm levels likely on 21-22 November due to recurrent CH HSS activity.



### *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
24 October	75	13	20	A7.0	0	0	0	0	0	0	0	0
25 October	78	17	70	A7.6	0	0	0	0	0	0	0	0
26 October	78	15	80	A8.1	0	0	0	0	0	0	0	0
27 October	79	12	60	A8.3	0	0	0	0	0	0	0	0
28 October	79	0	0	A8.9	0	0	0	0	0	0	0	0
29 October	79	16	10	A9.7	0	0	0	0	0	0	0	0
30 October	76	12	10	A8.4	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
	24 October	3.4e+06	1.5e+04	3.4e+03	1.3e+07	
25 October	4.2e+06	1.4e+04	3.2e+03	1.2e+07		
26 October	1.8e+07	1.5e+04	3.1e+03	6.2e+08		
27 October	1.3e+07	1.4e+04	3.4e+03	1.2e+09		
28 October	3.7e+06	1.4e+04	3.3e+03	1.4e+09		
29 October	5.5e+06	1.4e+04	3.3e+03	2.0e+08		
30 October	5.2e+06	1.4e+04	3.1e+03	3.3e+08		

### *Daily Geomagnetic Data*

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	24 October	17	0-0-0-0-4-2-2-4	41	3-4-5-4-7-5-2-3	16
25 October	39	4-4-3-5-6-5-3-5	54	4-3-5-5-7-6-5-4	60	4-5-4-5-7-6-5-6
26 October	31	4-4-4-5-4-4-3-5	90	4-5-6-8-7-7-4-3	46	5-5-4-6-5-6-5-5
27 October	18	4-4-4-3-2-3-3-2	48	4-4-5-6-6-6-4-3	28	5-5-4-3-3-5-4-3
28 October	16	3-2-4-3-3-2-3-4	27	3-2-4-6-5-3-2-3	17	3-3-4-3-3-3-3-4
29 October	18	4-4-4-3-3-3-2-2	47	4-6-6-6-5-4-3-3	27	5-5-4-3-4-3-3-3
30 October	13	3-3-3-3-3-3-2-2	36	2-4-4-5-7-3-3-2	27	4-4-3-3-4-3-3-2



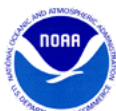
### *Alerts and Warnings Issued*

Date & Time of Issue UTC	Type of Alert or Warning	Date & Time of Event UTC
24 Oct 0212	WARNING: Geomagnetic K = 4	24/0215 - 1400
24 Oct 0304	ALERT: Geomagnetic K = 4	24/0259
24 Oct 1304	EXTENDED WARNING: Geomagnetic K = 4	24/0215 - 25/0600
24 Oct 1304	WARNING: Geomagnetic K = 5	24/1303 - 1800
24 Oct 2112	WATCH: Geomagnetic Storm Category G2 predicted	
25 Oct 0214	WARNING: Geomagnetic K = 5	25/0215 - 0900
25 Oct 0214	EXTENDED WARNING: Geomagnetic K = 4	24/0215 - 25/1200
25 Oct 0601	ALERT: Geomagnetic K = 5	25/0559
25 Oct 0836	EXTENDED WARNING: Geomagnetic K = 4	24/0215 - 25/1800
25 Oct 0838	EXTENDED WARNING: Geomagnetic K = 5	25/0215 - 1500
25 Oct 1121	ALERT: Geomagnetic K = 5	25/1119
25 Oct 1128	WARNING: Geomagnetic K = 6	25/1127 - 1500
25 Oct 1259	ALERT: Geomagnetic K = 5	25/1259
25 Oct 1340	ALERT: Geomagnetic K = 6	25/1339
25 Oct 1345	EXTENDED WARNING: Geomagnetic K = 4	24/0215 - 26/0600
25 Oct 1345	EXTENDED WARNING: Geomagnetic K = 6	25/1127 - 2100
25 Oct 1345	WARNING: Geomagnetic K >= 7	25/1345 - 1800
25 Oct 1345	EXTENDED WARNING: Geomagnetic K = 5	25/0215 - 2100
25 Oct 1503	ALERT: Geomagnetic K = 7	25/1459
25 Oct 1705	ALERT: Geomagnetic K = 5	25/1658
25 Oct 1721	ALERT: Geomagnetic K = 6	25/1714
25 Oct 1953	ALERT: Geomagnetic K = 5	25/1946
25 Oct 2012	EXTENDED WARNING: Geomagnetic K = 6	25/1127 - 26/0300
25 Oct 2012	EXTENDED WARNING: Geomagnetic K = 5	25/0215 - 26/0600
25 Oct 2104	WATCH: Geomagnetic Storm Category G2 predicted	
25 Oct 2159	ALERT: Geomagnetic K = 5	25/2156
25 Oct 2242	ALERT: Geomagnetic K = 6	25/2236
26 Oct 0208	ALERT: Electron 2MeV Integral Flux >= 1000pfu	26/0150
26 Oct 0257	ALERT: Geomagnetic K = 5	26/0256



### *Alerts and Warnings Issued*

<b>Date &amp; Time of Issue UTC</b>	<b>Type of Alert or Warning</b>	<b>Date &amp; Time of Event UTC</b>
26 Oct 0257	EXTENDED WARNING: Geomagnetic K = 4	24/0215 - 26/2359
26 Oct 0257	EXTENDED WARNING: Geomagnetic K = 6	25/1127 - 26/1200
26 Oct 0257	EXTENDED WARNING: Geomagnetic K = 5	25/0215 - 26/1500
26 Oct 0719	CONTINUED ALERT: Electron 2MeV Integral Flux $\geq$ 1000pfu	26/0150
26 Oct 1004	ALERT: Geomagnetic K = 5	26/1003
26 Oct 1021	ALERT: Geomagnetic K = 6	26/1020
26 Oct 1122	EXTENDED WARNING: Geomagnetic K = 5	25/0215 - 26/1800
26 Oct 1122	EXTENDED WARNING: Geomagnetic K = 6	25/1127 - 26/1500
26 Oct 1439	ALERT: Geomagnetic K = 5	26/1433
26 Oct 1621	EXTENDED WARNING: Geomagnetic K = 5	25/0215 - 26/2359
26 Oct 1708	ALERT: Geomagnetic K = 5	26/1701
26 Oct 1716	WARNING: Geomagnetic K = 6	26/1716 - 2100
26 Oct 1747	ALERT: Geomagnetic K = 6	26/1740
26 Oct 2100	ALERT: Geomagnetic K = 5	26/2059
26 Oct 2307	EXTENDED WARNING: Geomagnetic K = 5	25/0215 - 27/0600
26 Oct 2307	EXTENDED WARNING: Geomagnetic K = 4	24/0215 - 27/1300
26 Oct 2342	ALERT: Geomagnetic K = 5	26/2341
27 Oct 0300	ALERT: Geomagnetic K = 5	27/0259
27 Oct 0437	ALERT: Geomagnetic K = 5	27/0437
27 Oct 0501	CONTINUED ALERT: Electron 2MeV Integral Flux $\geq$ 1000pfu	26/0150
27 Oct 0555	EXTENDED WARNING: Geomagnetic K = 5	25/0215 - 27/1500
27 Oct 0555	EXTENDED WARNING: Geomagnetic K = 4	24/0215 - 27/2359
27 Oct 1618	WARNING: Geomagnetic K = 5	27/1618 - 2100
27 Oct 1801	ALERT: Geomagnetic K = 5	27/1759
27 Oct 2354	EXTENDED WARNING: Geomagnetic K = 4	24/0215 - 28/0700
28 Oct 0504	CONTINUED ALERT: Electron 2MeV Integral Flux $\geq$ 1000pfu	26/0150
28 Oct 0739	WARNING: Geomagnetic K = 4	28/0740 - 1500

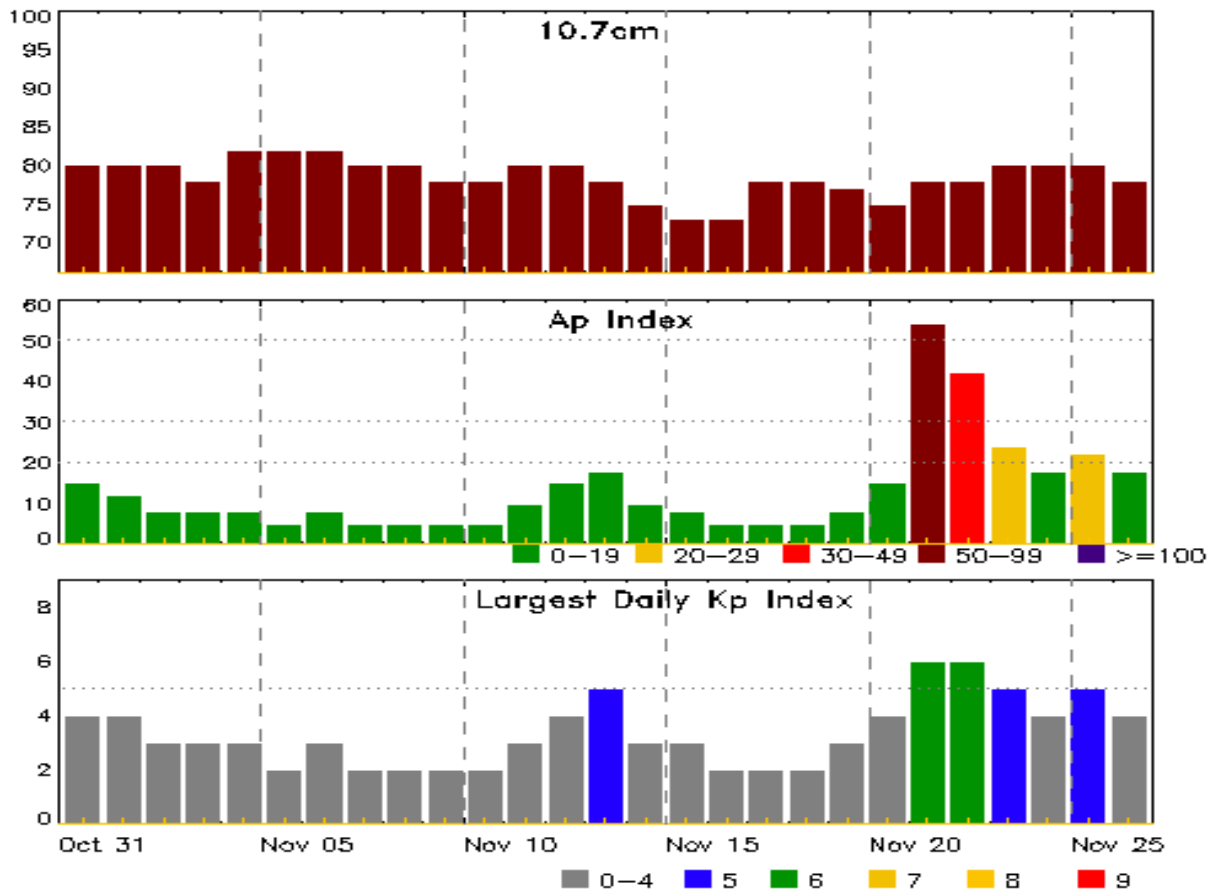


### *Alerts and Warnings Issued*

Date & Time of Issue UTC	Type of Alert or Warning	Date & Time of Event UTC
28 Oct 0900	ALERT: Geomagnetic K = 4	28/0859
28 Oct 1443	WATCH: Geomagnetic Storm Category G1 predicted	
28 Oct 1443	EXTENDED WARNING: Geomagnetic K = 4	28/0740 - 29/1200
28 Oct 2015	WARNING: Geomagnetic K = 5	28/2015 - 29/0600
29 Oct 0214	ALERT: Geomagnetic K = 5	29/0212
29 Oct 0429	ALERT: Geomagnetic K = 5	29/0428
29 Oct 0534	CONTINUED ALERT: Electron 2MeV Integral Flux $\geq$ 1000pfu	26/0150
29 Oct 0552	EXTENDED WARNING: Geomagnetic K = 5	28/2015 - 29/1200
29 Oct 1141	EXTENDED WARNING: Geomagnetic K = 4	28/0740 - 29/2300
29 Oct 2256	EXTENDED WARNING: Geomagnetic K = 4	28/0740 - 30/1200
30 Oct 0222	WARNING: Geomagnetic K = 5	30/0222 - 0900
30 Oct 0506	CONTINUED ALERT: Electron 2MeV Integral Flux $\geq$ 1000pfu	26/0150
30 Oct 1154	EXTENDED WARNING: Geomagnetic K = 4	28/0740 - 30/2300
30 Oct 2258	EXTENDED WARNING: Geomagnetic K = 4	28/0740 - 31/0900



## 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
31 Oct	80	15	4	14 Nov	75	10	3
01 Nov	80	12	4	15	73	8	3
02	80	8	3	16	73	5	2
03	78	8	3	17	78	5	2
04	82	8	3	18	78	5	2
05	82	5	2	19	77	8	3
06	82	8	3	20	75	15	4
07	80	5	2	21	78	54	6
08	80	5	2	22	78	42	6
09	78	5	2	23	80	24	5
10	78	5	2	24	80	18	4
11	80	10	3	25	80	22	5
12	80	15	4	26	78	18	4
13	78	18	5				



### *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	Optical			Rgn #
	Begin	Max	End		Imp/ Brtns	Location Lat CMD	Rgn #	
25 Oct	0054	0105	0113	B2.0			2603	
25 Oct	0856	0900	0905	B1.3			2603	
25 Oct	1425	1429	1436	B1.3				
25 Oct	2037	2042	2047	B1.9				
26 Oct	0354	0357	0359	B1.5				
26 Oct	0524	0530	0532	B1.2			2603	
26 Oct	0534	0540	0546	B1.7			2603	
28 Oct	0127	0131	0135	B1.6				
28 Oct	0424	0427	0430	B1.6				
28 Oct	0713	0717	0721	B3.1			2603	
28 Oct	0858	0905	0910	B2.0			2603	
28 Oct	2116	2121	2124	B2.1				
29 Oct	2300	2305	2311	B2.0				





## Region Summary

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 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										
24 Oct	N13W37	337	20	7	Cro	3	B										
25 Oct	N13W53	340	70	8	Dai	7	B										
26 Oct	N13W67	340	80	8	Dao	5	B										
27 Oct	N13W81	341	60	8	Dao	2	B										
								0	0	0	1	0	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 335

### Region 2604

28 Oct	N06W09	256	plage														
29 Oct	N07W27	261	10	7	Bxo	6	B										
30 Oct	N07W41	262	10	1	Bxo	2	B										
								0	0	0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 256

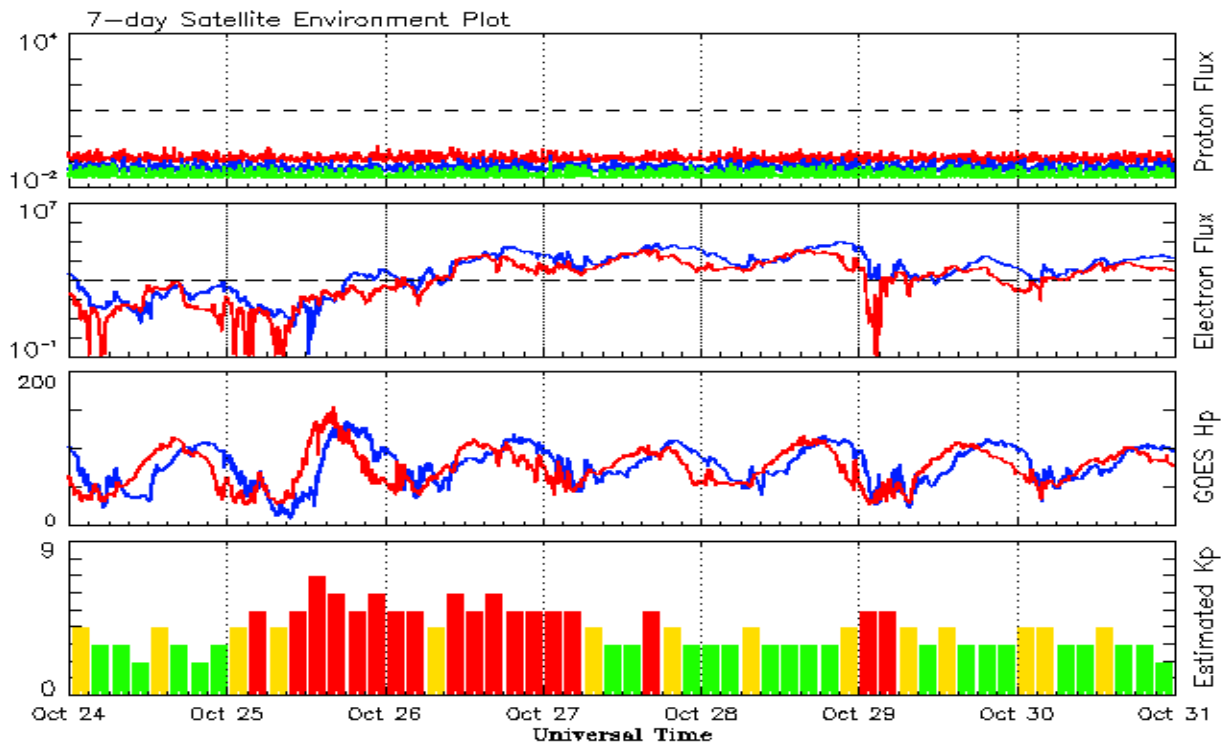


**Recent Solar Indices (preliminary)**  
**Observed monthly mean values**

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>									
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	45.7	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
<b>2016</b>									
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 24 October 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.

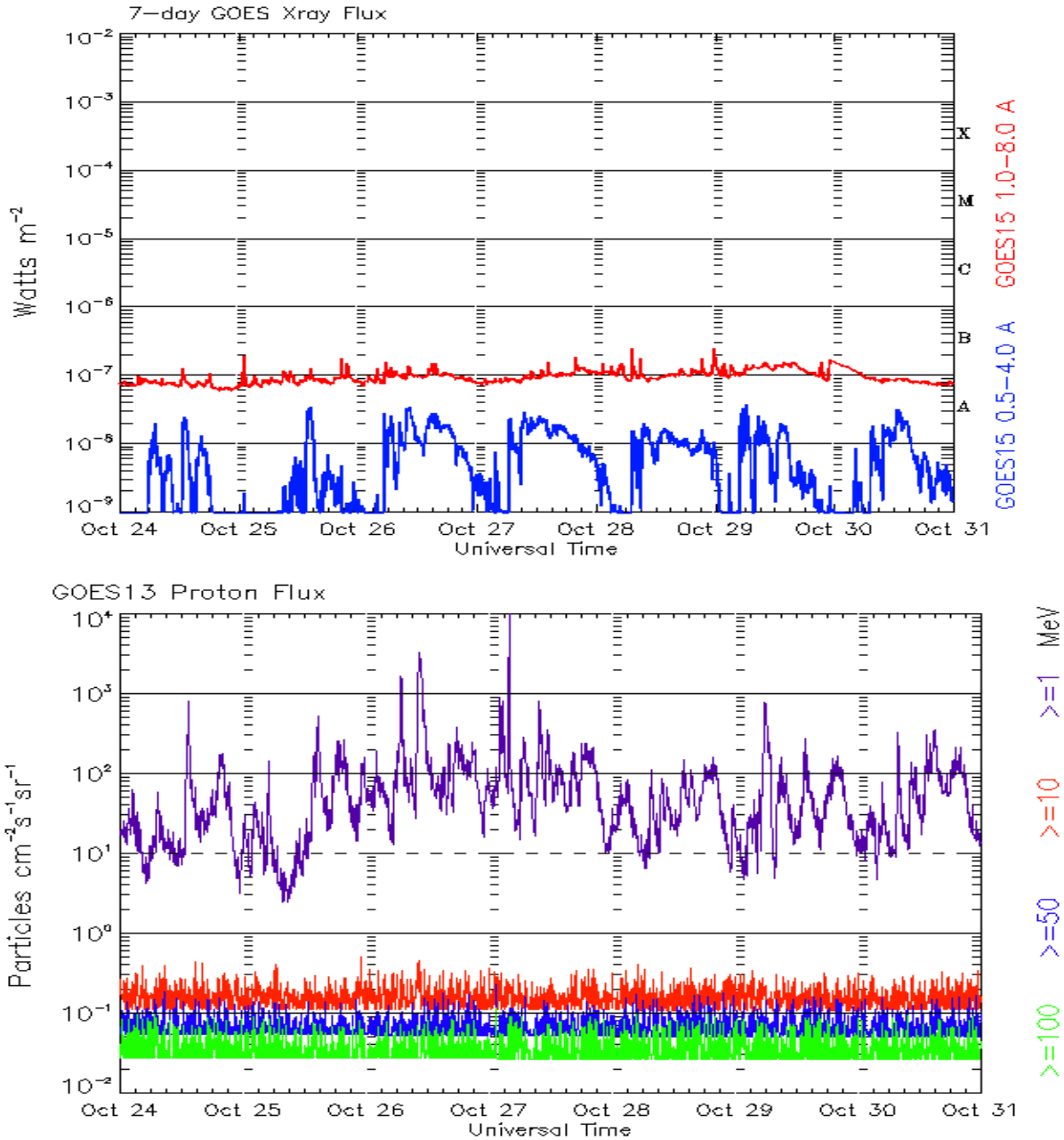
The electron flux plot contains the five-minute averaged integral electron flux (electrons/cm<sup>2</sup>-sec -sr) with energies greater than 2 MeV by the SWPC Primary GOES satellite.

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 24 October 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)***

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

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

<http://spaceweather.gov/weekly/> -- Current and previous year

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