

Solar activity was very low through the period with only a few isolated low-level B-class flaring observed from Regions 2604 (N07, L=261, class/area Bxo/010 on 29 October) and 2605 (N07, L=191, class/area Cro/030 on 31 October). Other activity included several filament eruptions. The first was a filament eruption centered near S10W40 observed in SDO/AIA 193 imagery at 04/0230 UTC with an associated coronal mass ejection (CME) observed in coronagraph imagery off the west limb beginning at 04/0736 UTC. The second filament eruption occurred between 05/0200-0500 UTC in SDO/AIA 193 imagery centered near N24W15. An associated partial halo CME was observed in coronagraph imagery beginning at 05/0424 UTC. WSA Enlil modelling of the CMEs predicted an arrival approximately early to midday on 08 November.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit reached high levels throughout the period with a maximum flux of 21,357 pfu at 31/2030 UTC.

Geomagnetic field activity ranged from quiet to active levels. Solar wind parameters were in decline over the period on the trailing end of a positive polarity coronal hole high speed stream (CH HSS). Solar wind speed declined steadily from near 580 km/s to around 305 km/s by the end of the period. Total field ranged from 1 nT to 8 nT with prolonged periods of southward Bz from 02-03 November. The geomagnetic field was at quiet to unsettled levels on 31 October-01 November and 04 November, quiet to active levels on 02-03 November, and quiet levels on 05-06 November.

### **Space Weather Outlook** **07 November - 03 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 moderate levels with high levels likely on 07, 10-19, and 22 November-03 December due to CH HSS influence.

Geomagnetic field activity is expected to be at unsettled to active levels on 08 November and unsettled levels on 09 November due to the arrival of the 04 and 05 November CMEs. Unsettled to active levels are also expected from 10-15 and 19-30 November with G1 (Minor) geomagnetic storm levels likely on 12-13, 21-23, and 25 November and G2 (Moderate) geomagnetic storm levels likely on 21-22 November due to recurrent CH HSS effects.



### *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
31 October	77	12	30	A7.6	0	0	0	0	0	0	0	0
01 November	77	12	10	A7.2	0	0	0	0	0	0	0	0
02 November	76	0	0	A6.7	0	0	0	0	0	0	0	0
03 November	76	23	20	A6.6	0	0	0	0	0	0	0	0
04 November	77	25	30	A6.2	0	0	0	0	0	0	0	0
05 November	77	24	20	A6.4	0	0	0	0	0	0	0	0
06 November	76	23	20	A6.5	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
	31 October		4.5e+06	1.4e+04	3.4e+03	
01 November		3.9e+06	1.4e+04	3.4e+03		6.4e+08
02 November		2.4e+06	1.4e+04	3.5e+03		2.0e+08
03 November		5.2e+06	1.4e+04	3.2e+03		1.2e+08
04 November		3.4e+06	1.4e+04	3.2e+03		5.9e+07
05 November		2.1e+06	1.5e+04	3.7e+03		1.7e+08
06 November		1.2e+06	1.5e+04	3.6e+03		1.3e+08

### *Daily Geomagnetic Data*

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	31 October	8	2-3-3-2-2-2-1-1	11	1-2-3-4-4-2-1-0	11
01 November	9	2-2-2-3-2-2-2-3	30	1-1-2-7-5-4-2-2	11	2-2-2-3-3-2-2-3
02 November	12	4-1-1-2-3-2-1-4	25	3-2-1-4-6-5-2-3	15	4-2-1-2-3-3-2-4
03 November	12	3-3-3-3-2-2-2-3	51	3-5-7-7-4-4-2-2	18	4-3-4-4-3-3-2-4
04 November	3	2-2-1-0-1-0-1-0	7	2-1-3-4-0-0-1-0	5	3-2-1-1-0-0-1-1
05 November	2	0-1-1-0-1-1-1-0	2	1-0-2-1-0-0-0-0	3	1-1-1-0-0-0-0-0
06 November	4	1-0-2-1-2-1-1-1	12	0-0-3-4-5-0-1-0	3	1-1-2-1-2-1-1-1

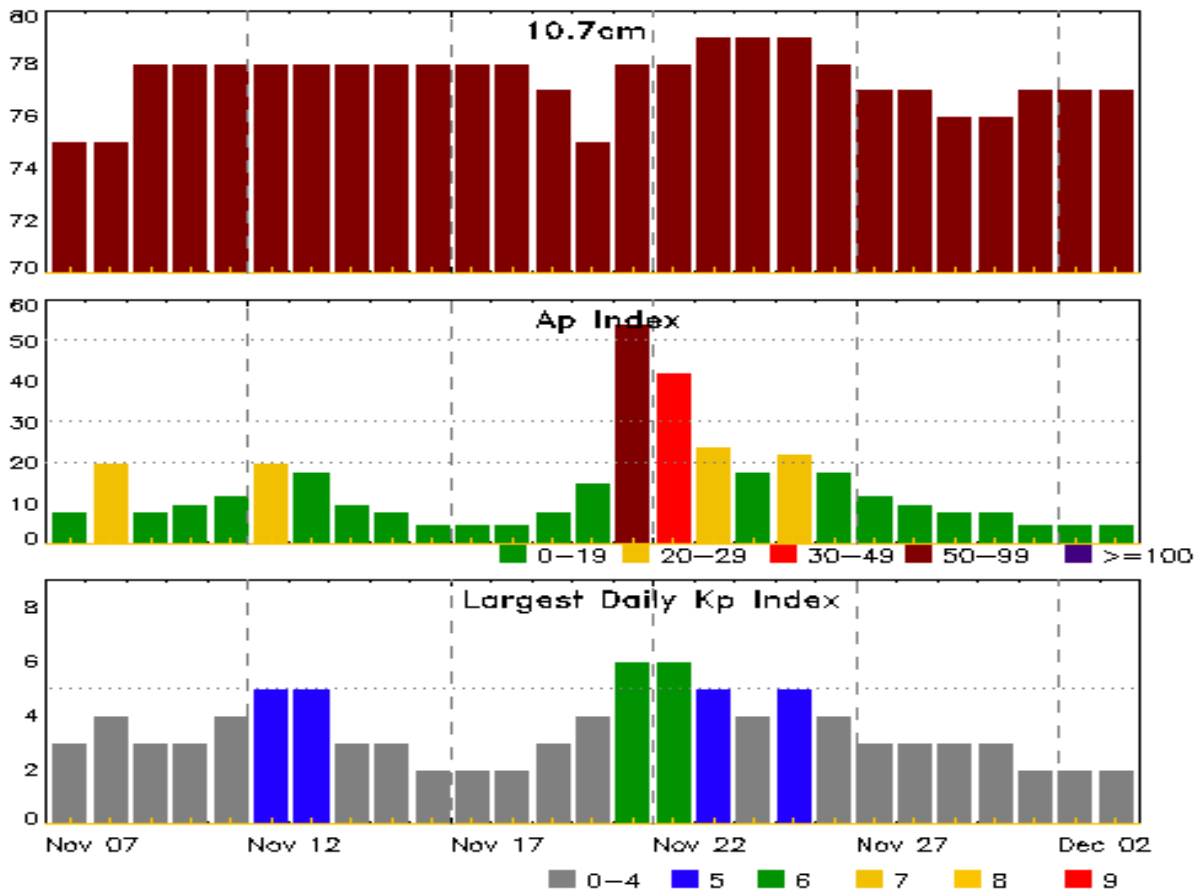


### *Alerts and Warnings Issued*

Date & Time of Issue UTC	Type of Alert or Warning	Date & Time of Event UTC
31 Oct 0522	CONTINUED ALERT: Electron 2MeV Integral Flux $\geq$ 1000pfu	26/0150
31 Oct 0855	EXTENDED WARNING: Geomagnetic K = 4	28/0740 - 31/2300
01 Nov 0500	CONTINUED ALERT: Electron 2MeV Integral Flux $\geq$ 1000pfu	26/0150
01 Nov 1435	WARNING: Geomagnetic K = 4	01/1434 - 1800
02 Nov 0034	WARNING: Geomagnetic K = 4	02/0033 - 0700
02 Nov 0048	ALERT: Geomagnetic K = 4	02/0047
02 Nov 0945	CONTINUED ALERT: Electron 2MeV Integral Flux $\geq$ 1000pfu	26/0150
02 Nov 1224	WARNING: Geomagnetic K = 4	02/1230 - 1800
02 Nov 2300	WARNING: Geomagnetic K = 4	02/2300 - 03/0600
02 Nov 2322	ALERT: Geomagnetic K = 4	02/2322
03 Nov 0555	EXTENDED WARNING: Geomagnetic K = 4	02/2300 - 03/1200
03 Nov 0946	CONTINUED ALERT: Electron 2MeV Integral Flux $\geq$ 1000pfu	26/0150
03 Nov 1122	EXTENDED WARNING: Geomagnetic K = 4	02/2300 - 03/1800
03 Nov 1728	EXTENDED WARNING: Geomagnetic K = 4	02/2300 - 04/0600
04 Nov 0556	EXTENDED WARNING: Geomagnetic K = 4	02/2300 - 04/1200
04 Nov 1416	CONTINUED ALERT: Electron 2MeV Integral Flux $\geq$ 1000pfu	26/0150
05 Nov 0934	CONTINUED ALERT: Electron 2MeV Integral Flux $\geq$ 1000pfu	26/0150
06 Nov 0519	CONTINUED ALERT: Electron 2MeV Integral Flux $\geq$ 1000pfu	26/0150



## 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
07 Nov	75	8	3	21 Nov	78	54	6
08	75	20	4	22	78	42	6
09	78	8	3	23	79	24	5
10	78	10	3	24	79	18	4
11	78	12	4	25	79	22	5
12	78	20	5	26	78	18	4
13	78	18	5	27	77	12	3
14	78	10	3	28	77	10	3
15	78	8	3	29	76	8	3
16	78	5	2	30	76	8	3
17	78	5	2	01 Dec	77	5	2
18	78	5	2	02	77	5	2
19	77	8	3	03	77	5	2
20	75	15	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 #	245	2695	II	IV

**No Events Observed**

### ***Flare List***

Date	Time			X-ray Class	Optical			Rgn #
	Begin	Max	End		Imp/ Brtns	Location Lat CMD		
01 Nov	0330	0341	0347	B1.8				
01 Nov	2016	2023	2030	B2.5			2604	
04 Nov	1226	1247	1321	B2.2			2605	



## 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 2604

28 Oct	N06W09	256	plage															
29 Oct	N07W27	261	10	7	Bxo	6	B											
30 Oct	N07W41	262	10	1	Bxo	2	B											
31 Oct	N07W54	261	plage															
01 Nov	N07W69	263	plage															
02 Nov	N07W84	265	plage															
										0	0	0	0	0	0	0	0	0

Crossed West Limb.  
 Absolute heliographic longitude: 256

### 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											
										0	0	0	0	0	0	0	0	0

Still on Disk.  
 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											
										0	0	0	0	0	0	0	0	0

Still on Disk.  
 Absolute heliographic longitude: 104

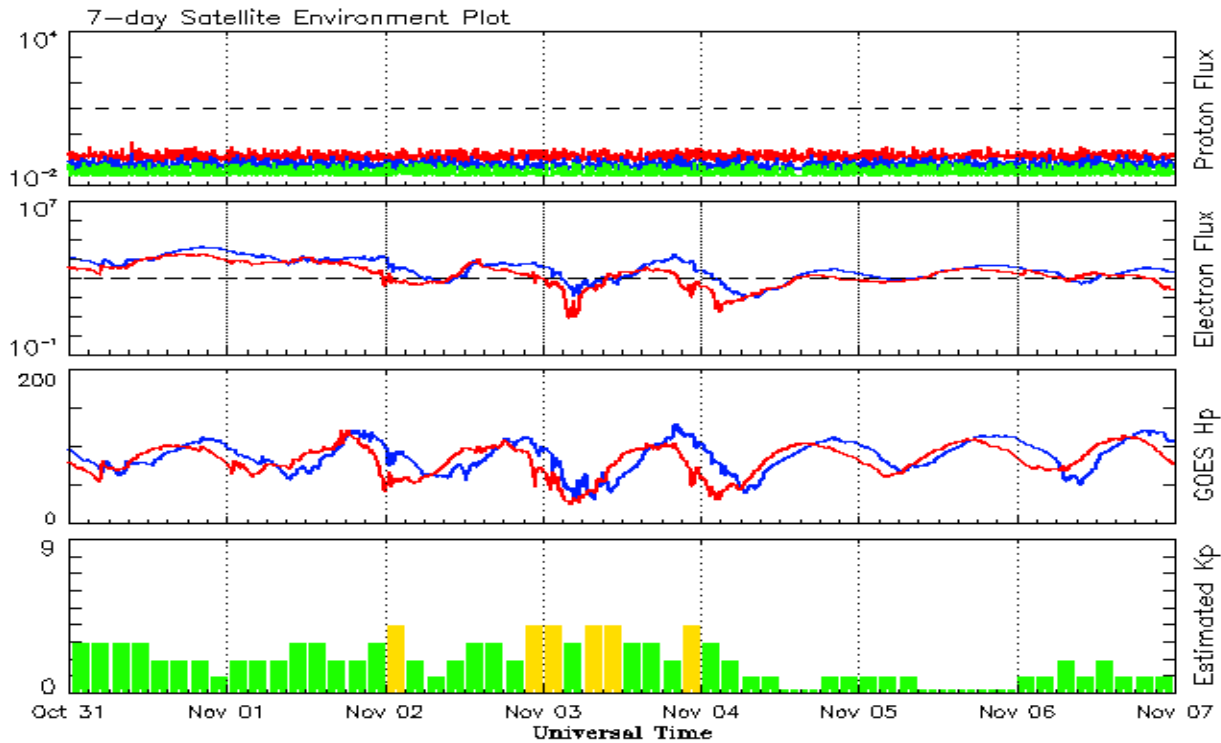


**Recent Solar Indices (preliminary)**  
**Observed monthly mean values**

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>										
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	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 31 October 2016*

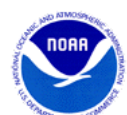
The proton flux plot contains the five-minute averaged integral proton flux (protons/cm<sup>2</sup>-sec -sr) as measured by the SWPC Primary GOES satellite, near West 75, for each of three energy thresholds: greater than 10, 50, and 100 MeV.

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.

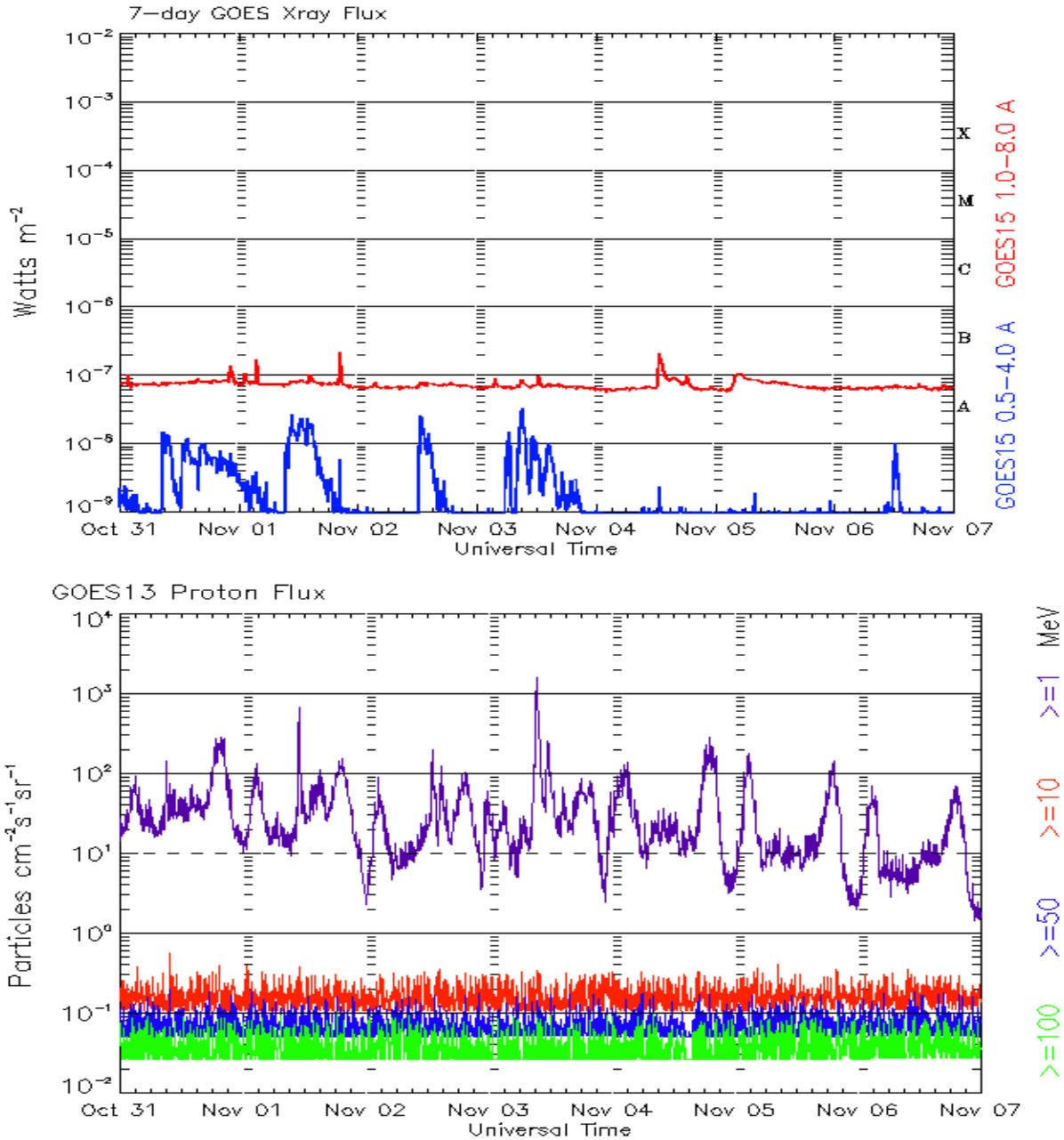
The Hp plot contains the five minute averaged Hp magnetic field component in nanoteslas (nT) as by the SWPC Primary GOES satellite. The Hp component is parallel to the spin axis of the satellite, which is nearly parallel to the Earth's rotation axis.

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 31 October 2016*

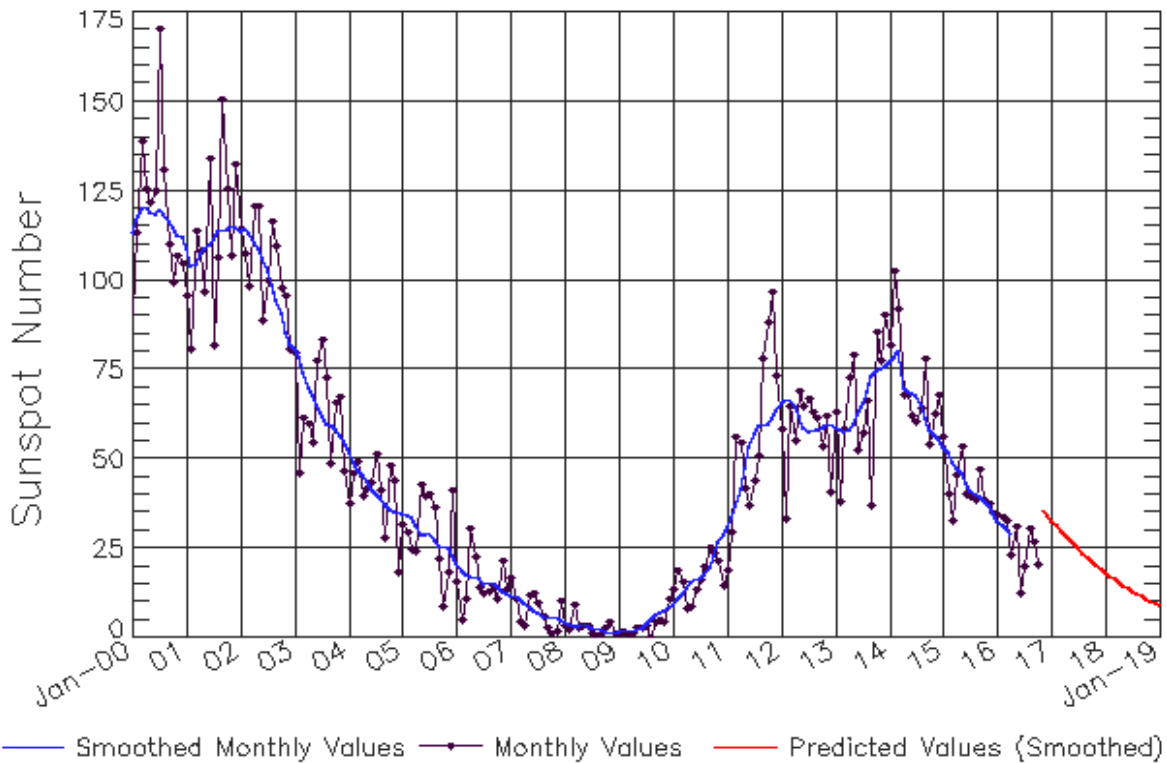
The x-ray plots contains five-minute averages x-ray flux (Watt/m<sup>2</sup>) as measure by the SWPC primary GOES X-ray satellite, usually at West 105 longitude, in two wavelength bands, 0.05 - 0.4 and 0.1 - 0.8 nm. The letters A, B, C, M and X refer to x-ray event levels for the 0.1 - 0.8 nm band.

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.



# ISES Solar Cycle Sunspot Number Progression

Observed data through Oct 2016



Updated 2016 Nov 7

NOAA/SWPC Boulder, CO USA

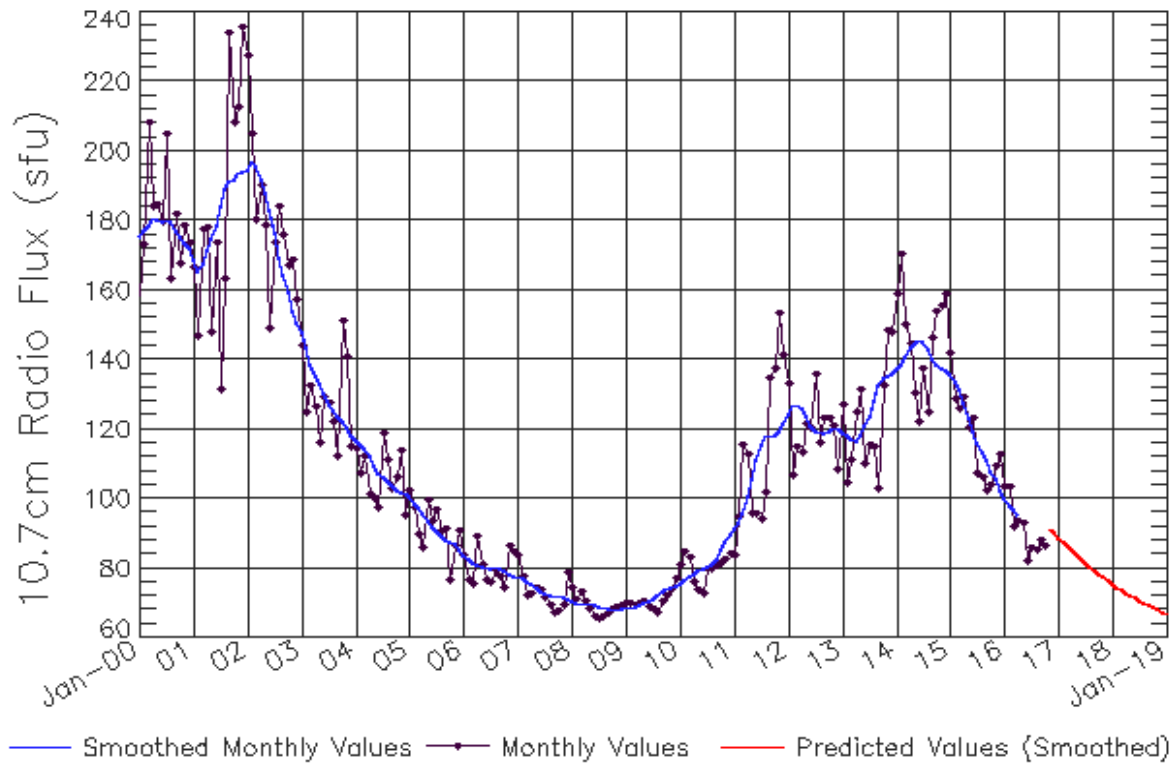
## *Smoothed Sunspot Number Prediction*

<b>Year</b>	<b>Jan</b>	<b>Feb</b>	<b>Mar</b>	<b>Apr</b>	<b>May</b>	<b>Jun</b>	<b>Jul</b>	<b>Aug</b>	<b>Sep</b>	<b>Oct</b>	<b>Nov</b>	<b>Dec</b>
2010	9	10	11	13	15	16	17	17	20	23	27	29
	(1)	(2)	(3)	(5)	(5)	(6)	(7)	(7)	(8)	(9)	(9)	(10)
2011	19	30	56	54	42	37	44	51	78	88	97	73
	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)
2012	58	33	64	55	69	65	67	63	61	53	62	41
	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)
2013	63	38	58	72	79	53	57	66	37	86	78	90
	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)
2014	82	102	92	68	68	62	60	64	78	54	62	68
	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)
2015	56	40	33	45	53	40	40	39	47	38	37	35
	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)
2016	34	34	33	23	31	12	20	30	27	20	36	34
	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)
2017	33	31	30	29	27	26	25	24	23	21	20	19
	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)
2018	18	17	16	15	15	14	13	12	12	11	10	10
	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)
2019	9	8	8	7	7	6	6	6	5	5	4	4
	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)



# ISES Solar Cycle F10.7cm Radio Flux Progression

Observed data through Oct 2016



Updated 2016 Nov 7

NOAA/SWPC Boulder, CO USA

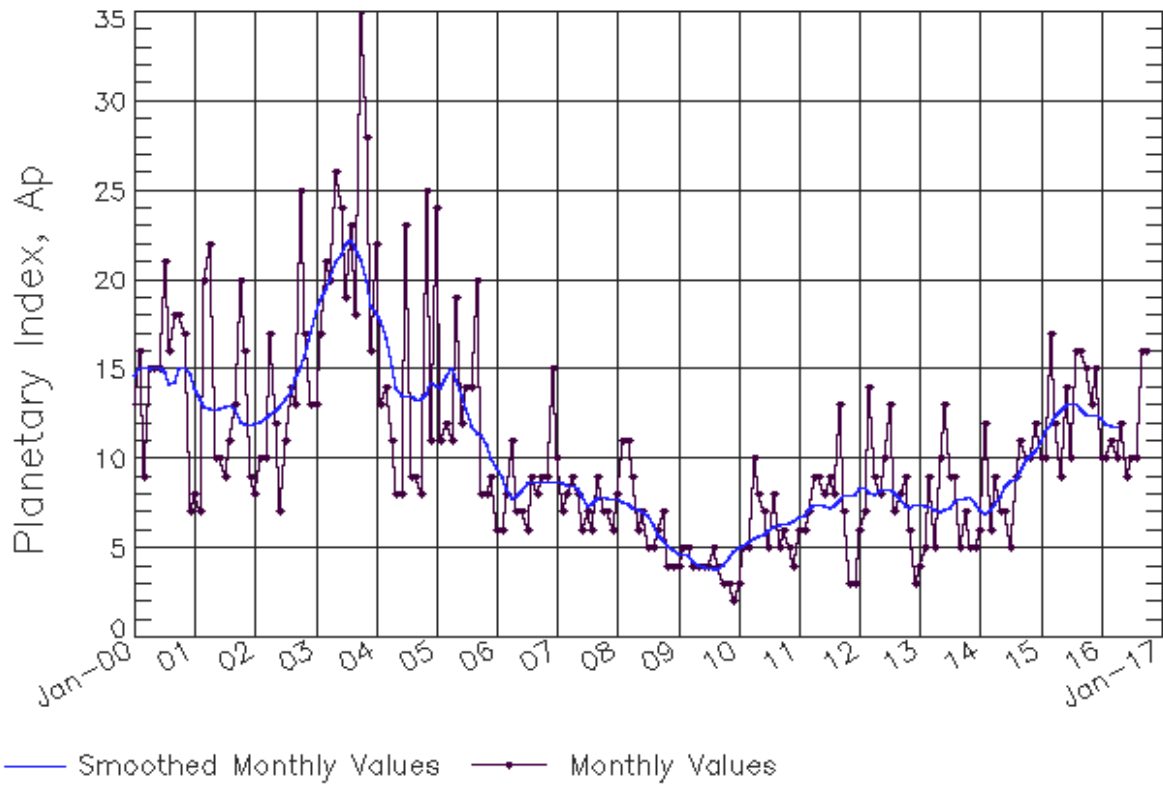
## Smoothed F10.7cm Radio Flux Prediction

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2010	76 (***)	77 (***)	78 (***)	78 (***)	79 (***)	80 (***)	80 (***)	81 (***)	82 (***)	85 (***)	88 (***)	90 (***)
2011	91 (***)	93 (***)	96 (***)	100 (***)	106 (***)	111 (***)	115 (***)	118 (***)	118 (***)	118 (***)	120 (***)	122 (***)
2012	124 (***)	127 (***)	127 (***)	126 (***)	124 (***)	121 (***)	120 (***)	119 (***)	119 (***)	119 (***)	120 (***)	120 (***)
2013	119 (***)	118 (***)	117 (***)	117 (***)	118 (***)	121 (***)	124 (***)	128 (***)	132 (***)	135 (***)	135 (***)	136 (***)
2014	137 (***)	139 (***)	141 (***)	144 (***)	145 (***)	146 (***)	145 (***)	143 (***)	140 (***)	138 (***)	137 (***)	137 (***)
2015	136 (***)	134 (***)	131 (***)	127 (***)	123 (***)	120 (***)	116 (***)	113 (***)	111 (***)	108 (***)	105 (***)	103 (***)
2016	100 (***)	98 (***)	97 (***)	95 (***)	94 (1)	92 (1)	91 (2)	89 (3)	88 (4)	88 (4)	87 (5)	87 (6)
2017	87 (7)	86 (8)	86 (8)	85 (9)	84 (9)	83 (9)	82 (9)	80 (9)	79 (9)	78 (9)	77 (9)	76 (9)
2018	75 (9)	75 (9)	74 (9)	73 (9)	72 (9)	71 (9)	71 (9)	70 (9)	69 (9)	69 (9)	68 (9)	67 (9)
2019	67 (9)	66 (9)	66 (9)	65 (9)	65 (9)	65 (9)	64 (9)	64 (9)	63 (9)	63 (9)	63 (9)	63 (9)



# ISES Solar Cycle Ap Progression

Observed data through Oct 2016



Updated 2016 Nov 7

NOAA/SWPC Boulder, CO USA

*Solar Cycle Comparison charts are temporarily unavailable.*



## ***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.

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

<http://spaceweather.gov/ftpmenu/warehouse.html> -- Online archive from 1997

<http://spaceweather.gov/ftpmenu/> -- Some content as ascii text

<http://spaceweather.gov/SolarCycle/> -- Solar Cycle Progression web site

<http://spaceweather.gov/contacts.html> -- Contact and Copyright information

[http://spaceweather.gov/weekly/Usr\\_guide.pdf](http://spaceweather.gov/weekly/Usr_guide.pdf) -- User Guide

