

**Space Weather Highlights**  
**30 November - 06 December 2015**

**SWPC PRF 2101**  
**07 December 2015**

Solar activity was at low levels. Regions 2458 (N10, L=356, class/area Dao/160 on 24 Nov), 2462 (N09, L=216, class/area Hax/40 on 04 Dec), 2463 (S11, L=205, class/area Dao/130 on 05 Dec) and 2464 (S12, L=189, class/area Axx/10 on 05 Dec) each produced C-class flares. The largest event of the period was a C4/Sf at 1702 UTC on 04 December. No Earth-directed coronal mass ejections were observed during the period.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit was normal levels on 30 November and reached moderate levels on 01 December. High levels were observed from 02-04 December before returning to moderate levels for the remainder of the period.

Geomagnetic field activity was quiet to active with an isolated minor storm period from 0600-0900 UTC on 30 November due to effects from a positive polarity coronal hole high speed stream (CH HSS). Quiet to active levels were observed on 01 December as HSS influence continued. Predominately quiet conditions were observed from 02-04 December with some unsettled periods on 02 and 04 December. Quiet to active levels returned on 05 December due to effects from a co-rotating interaction region (CIR) ahead of a second positive polarity CH HSS. Unsettled to active conditions dominated 06 December with an isolated minor storm period observed from 0900-1200 UTC.

**Space Weather Outlook**  
**07 December - 02 January 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 normal to moderate levels for the majority of the period with high levels likely on 08-09 December, 11-15 December and 29-31 December following anticipated recurrent CH HSS events.

Geomagnetic field activity is expected to reach minor storm levels on 07 and 08 December due to continued effects from a positive polarity CH HSS. Predominately unsettled to active conditions are expected to from 09-13 December with minor storm periods possible as HSS effects persist. Mostly quiet levels are expected from 14-26 December. Quiet to active conditions are likely on 27 and 28 December due effects from a second recurrent CH HSS followed by quiet to unsettled conditions on 29 December as influence subsides. Quiet conditions are expected on 30-31 December. Unsettled to active conditions are expected on 01 January with minor storm levels likely on 02 January as a third recurrent CH HSS moves into a geoeffective position.



### *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
30 November	96	51	120	B1.9	1	0	0	3	1	0	0	0
01 December	95	27	70	B1.9	2	0	0	2	0	0	0	0
02 December	95	26	60	B1.8	1	0	0	2	0	0	0	0
03 December	95	47	50	B1.9	1	0	0	1	0	0	0	0
04 December	98	25	120	B2.3	2	0	0	6	0	0	0	0
05 December	101	41	170	B2.5	2	0	0	5	0	0	0	0
06 December	102	38	130	B2.4	1	0	0	4	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
	30 November		3.7e+05	1.2e+04	3.0e+03	
01 December		2.3e+05	1.2e+04	2.8e+03		4.6e+06
02 December		2.1e+05	1.3e+04	2.9e+03		3.7e+07
03 December		1.1e+05	1.2e+04	2.8e+03		5.9e+07
04 December		1.2e+05	1.2e+04	2.7e+03		6.7e+07
05 December		3.0e+05	1.2e+04	3.0e+03		1.6e+07
06 December		1.0e+06	1.2e+04	2.8e+03		1.2e+07

### *Daily Geomagnetic Data*

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	30 November	10	2-3-3-3-2-2-2-2	25	3-3-6-5-3-3-2-2	19
01 December	11	2-3-1-2-3-3-2-3	32	2-2-1-6-6-5-3-3	14	2-3-1-3-3-4-3-4
02 December	7	2-2-3-2-2-2-1-1	16	2-1-4-5-3-3-2-1	9	3-2-3-2-3-2-2-1
03 December	3	0-2-1-1-1-1-0-2	2	1-1-1-2-0-0-0-0	4	1-2-1-1-0-0-1-1
04 December	4	0-3-1-1-1-1-1-1	1	0-0-1-1-1-0-0-0	5	1-3-2-1-1-0-1-2
05 December	14	1-2-4-4-2-3-3-2	27	0-0-5-5-5-5-3-2	16	2-2-4-4-3-4-4-3
06 December	26	2-4-2-5-5-4-3-4	52	2-4-4-7-7-5-3-3	12	3-4-3-5-4-4-4-4

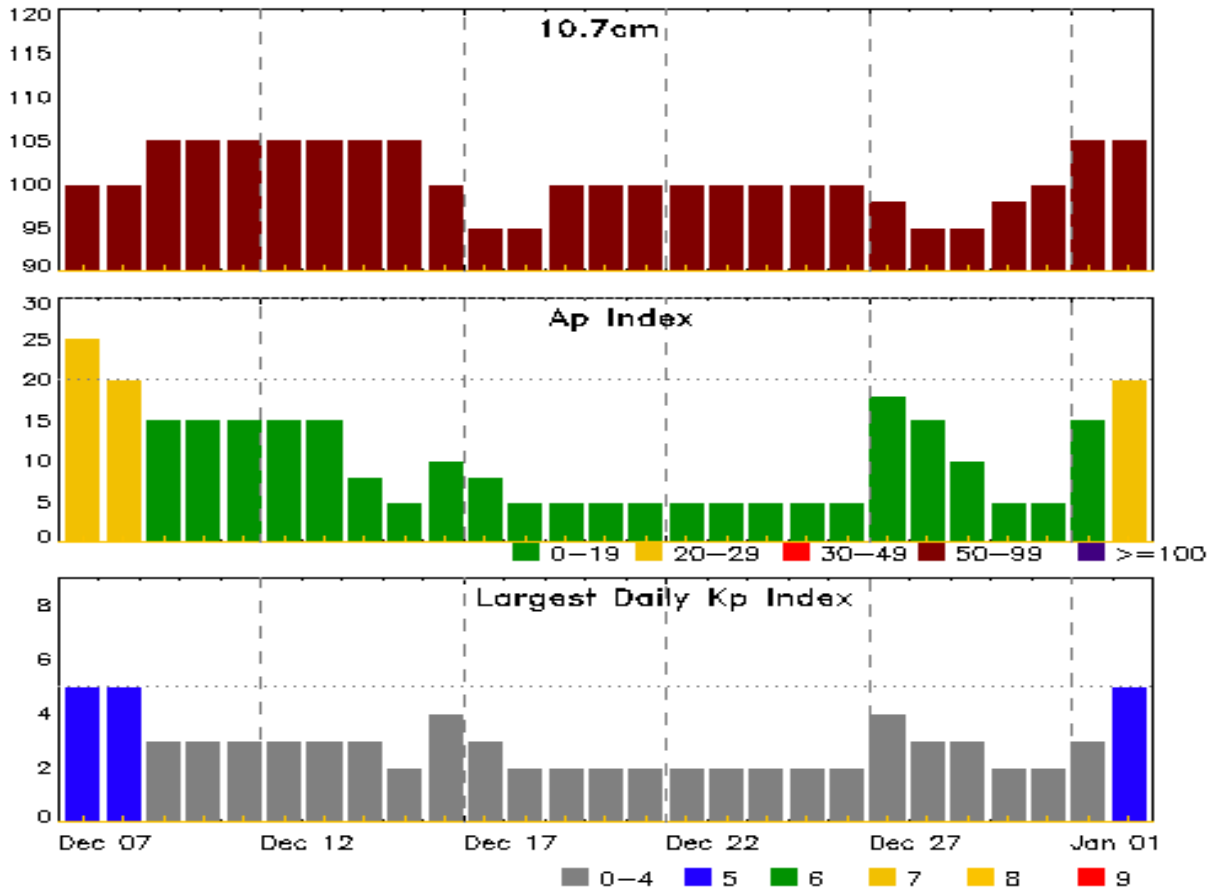


### *Alerts and Warnings Issued*

<b>Date &amp; Time of Issue UTC</b>	<b>Type of Alert or Warning</b>	<b>Date &amp; Time of Event UTC</b>
30 Nov 0003	ALERT: Geomagnetic K = 4	29/2359
30 Nov 0536	EXTENDED WARNING: Geomagnetic K = 4	29/2325 - 30/1800
30 Nov 0839	WARNING: Geomagnetic K = 5	30/0839 - 1500
30 Nov 0844	ALERT: Geomagnetic K = 5	30/0844
01 Dec 0701	CANCELLATION: Geomagnetic Storm Category G1 predicted	
01 Dec 1028	SUMMARY: 10cm Radio Burst	01/0808 - 0809
01 Dec 1514	WARNING: Geomagnetic K = 4	01/1515 - 02/0700
01 Dec 1800	ALERT: Geomagnetic K = 4	01/1759
02 Dec 1627	ALERT: Electron 2MeV Integral Flux $\geq$ 1000pfu	02/1610
03 Dec 1406	CONTINUED ALERT: Electron 2MeV Integral Flux $\geq$ 1000pfu	02/1610
03 Dec 1902	WATCH: Geomagnetic Storm Category G1 predicted	
04 Dec 1226	CONTINUED ALERT: Electron 2MeV Integral Flux $\geq$ 1000pfu	02/1610
04 Dec 1931	WATCH: Geomagnetic Storm Category G1 predicted	
05 Dec 0833	WARNING: Geomagnetic K = 4	05/0833 - 1500
05 Dec 0857	ALERT: Geomagnetic K = 4	05/0856
05 Dec 1454	EXTENDED WARNING: Geomagnetic K = 4	05/0833 - 2300
05 Dec 2056	WATCH: Geomagnetic Storm Category G1 predicted	
05 Dec 2256	EXTENDED WARNING: Geomagnetic K = 4	05/0833 - 06/0700
06 Dec 0434	EXTENDED WARNING: Geomagnetic K = 4	05/0833 - 06/1800
06 Dec 0434	WARNING: Geomagnetic K = 5	06/0433 - 1600
06 Dec 1201	ALERT: Geomagnetic K = 5	06/1159
06 Dec 1522	EXTENDED WARNING: Geomagnetic K = 5	06/0433 - 07/0700
06 Dec 1522	EXTENDED WARNING: Geomagnetic K = 4	05/0833 - 07/1000



## 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 Dec	100	25	5	21 Dec	100	5	2
08	100	20	5	22	100	5	2
09	105	15	3	23	100	5	2
10	105	15	3	24	100	5	2
11	105	15	3	25	100	5	2
12	105	15	3	26	100	5	2
13	105	15	3	27	98	18	4
14	105	8	3	28	95	15	3
15	105	5	2	29	95	10	3
16	100	10	4	30	98	5	2
17	95	8	3	31	100	5	2
18	95	5	2	01 Jan	105	15	3
19	100	5	2	02	105	20	5
20	100	5	2				



## *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		Intensity	
									245	2695	II	IV

**No Events Observed**

## *Flare List*

Date	Time			X-ray Class	Imp/ Brtns	Location Lat CMD	Rgn #
	Begin	Max	End				
30 Nov	0837	0850	0902	B8.7	1F	N09W23	2458
30 Nov	1652	1706	1722	C1.0	SF	N12W33	2458
30 Nov	1705	1709	1719		SF	N12W33	2458
30 Nov	2114	2150	2219	B7.5	SF	N09W32	2458
01 Dec	0403	0408	0432	C1.0	SF	N11W42	2458
01 Dec	0617	0631	0639	B4.1			2458
01 Dec	0757	0810	0818	C3.6	SF	N10W43	2458
01 Dec	1423	1434	1446	B3.4			2458
02 Dec	0425	0446	0504	C2.2	SF	N10W53	2458
02 Dec	1823	1835	1855	B8.1	SF	N10W60	2458
03 Dec	0601	0628	0645	C1.2			2458
03 Dec	1712	1738	1751	B3.3			2459
03 Dec	2103	2200	2218	B7.5			2458
03 Dec	2126	2127	2129		SF	N11W73	2458
04 Dec	0237	0248	0250	B5.0			2458
04 Dec	0526	0534	0545	C1.0			2463
04 Dec	1423	1436	1451	B5.9			2463
04 Dec	1653	1702	1746	C4.0	SF	N09E58	2462
04 Dec	1927	1930	1932	B5.6	SF	S10E67	2463
04 Dec	2038	2047	2053		SF	S10E67	2463
04 Dec	2113	2113	2116		SF	S10E65	2463
04 Dec	2256	2302	2305	B7.7	SF	S10E64	2463
04 Dec	2341	2341	2344		SF	S10E66	2463
05 Dec	0752	0759	0803	B3.9			2463
05 Dec	B1006	U1009	A1012		SF	S09E60	2463
05 Dec	B1015	U1016	A1020		SF	S09E60	2463
05 Dec	1043	1047	1049	B4.4	SF	S09E60	2463
05 Dec	1316	1319	1322	B4.1			2463
05 Dec	B1416	U1416	A1418		SF	S09E57	2463
05 Dec	1514	1521	1526	C1.9			2464
05 Dec	1616	1623	1632	C1.9			2463



## *Flare List*

Date	Time			X-ray Class	Imp/ Brtns	Optical		Rgn #
	Begin	Max	End			Location Lat CMD		
05 Dec	2306	2317	2333	B8.3	SF	S10E54		2463
06 Dec	0323	0326	0328	B7.4	SF	S10E50		2463
06 Dec	0643	0651	0722	B7.5				2463
06 Dec	0937	0938	0941		SF	S12E55		2463
06 Dec	B1218	U1218	A1227		SF	S07E46		2463
06 Dec	2049	2108	2121	C1.1	SF	S09E41		2463



## Region Summary

Date	Location		Sunspot Characteristics					Flares												
	Lat	CMD	Helio Lon	Area 10 <sup>6</sup> hemi.	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical								
									C	M	X	S	1	2	3	4				
<b>Region 2457</b>																				
18 Nov	N12E84		38	plage						1										
19 Nov	N12E70		38	20	4	Bxo	3	B												
20 Nov	N11E63		32	110	7	Dso	8	B					3							
21 Nov	N11E49		32	130	8	Dsi	10	B	2				2							
22 Nov	N11E36		32	120	8	Dai	13	B	1				12							
23 Nov	N11E23		32	120	8	Dsi	14	BG												
24 Nov	N12E11		31	70	9	Cao	11	BG												
25 Nov	N12W02		30	30	8	Hsx	2	A												
26 Nov	N12W17		32	30	8	Hax	1	A												
27 Nov	N13W27		29	20	6	Hax	1	A												
28 Nov	N12W40		29	20	1	Hax	1	A												
29 Nov	N12W54		30	10	1	Hax	2	A												
30 Nov	N12W65		28	20	1	Hax	1	A												
01 Dec	N12W79		29	plage																
										4	0	0	17	0	0	0	0	0		

Crossed West Limb.

Absolute heliographic longitude: 30

<b>Region 2458</b>																				
22 Nov	N09E72		356	60	2	Hax	1	A												
23 Nov	N09E57		358	120	5	Cso	4	B												
24 Nov	N10E46		356	160	7	Dao	8	B												
25 Nov	N08E33		355	100	7	Dai	10	B												
26 Nov	N08E21		354	80	9	Cao	8	B												
27 Nov	N08E07		355	70	3	Cao	3	B												
28 Nov	N08W07		356	80	6	Cao	4	B												
29 Nov	N08W21		357	40	6	Cao	3	B					1							
30 Nov	N09W36		359	80	5	Cao	8	B	1				3	1						
01 Dec	N09W51		1	60	4	Cao	6	B	2				2							
02 Dec	N11W66		2	50	5	Cao	5	B	1				2							
03 Dec	N09W79		1	10	7	Bxo	4	B	1				1							
										5	0	0	9	1	0	0	0	0		

Crossed West Limb.

Absolute heliographic longitude: 355



**Region Summary - continued**

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	4	
<b>Region 2459</b>																	
24 Nov	N05E75	327	30	3	Cao	3	B										
25 Nov	N04E59	329	60	1	Cai	4	B										
26 Nov	N04E45	330	40	2	Cao	3	B										
27 Nov	N04E33	329	10	2	Cao	2	B										
28 Nov	N04E19	330	10	2	Axx	1	A										
29 Nov	N04E04	332	10	1	Axx	1	A					1					
30 Nov	N04W07	330	10	1	Hrx	1	A										
01 Dec	N04W20	330	10	1	Hrx	1	A										
02 Dec	N05W34	330	10	1	Axx	1	A										
03 Dec	N05W49	332	10	1	Axx	1	A										
04 Dec	N05W64	334	plage														
05 Dec	N05W79	336	plage														
								0	0	0	1	0	0	0	0	0	

Crossed West Limb.  
Absolute heliographic longitude: 332

<b>Region 2460</b>																	
25 Nov	N13E29	359	10	3	Bxo	2	B										
26 Nov	N12E16	359	20	4	Cro	4	B										
27 Nov	N12W01	3	10	1	Bxo	2	B										
28 Nov	N12W15	4	plage														
29 Nov	N12W29	5	plage														
30 Nov	N12W43	6	plage														
01 Dec	N12W57	7	plage														
02 Dec	N12W71	7	plage														
03 Dec	N12W85	8	plage														
								0	0	0	0	0	0	0	0	0	

Crossed West Limb.  
Absolute heliographic longitude: 3

<b>Region 2461</b>																	
29 Nov	S07W54	29	10	1	Axx	1	A										
30 Nov	S07W67	30	10		Axx	1	A										
01 Dec	S07W80	30	plage														
02 Dec	S07W95	31	plage														
								0	0	0	0	0	0	0	0	0	

Crossed West Limb.  
Absolute heliographic longitude: 29





**Region Summary - continued**

Date	Location		Sunspot Characteristics				Flares							
	Lat CMD	Lon	Helio 10 <sup>-6</sup> hemi.	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical			
								C	M	X	S	1	2	3

**Region 2462**

03 Dec	N09E68	214	10	1	Hax	1	A										
04 Dec	N09E54	216	40	1	Hax	1	A	1				1					
05 Dec	N09E42	215	30	2	Hax	3	A										
06 Dec	N09E29	215	10	2	Axx	1	A										
								1	0	0	1	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 215

**Region 2463**

03 Dec	S09E76	206	20	4	Hax	1	A										
04 Dec	S09E62	208	80	6	Dao	4	B	1				5					
05 Dec	S11E52	205	130	10	Dao	7	B	1				5					
06 Dec	S11E39	205	110	12	Eso	6	B	1				4					
								3	0	0	14	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 205

**Region 2464**

05 Dec	S12E68	189	10	1	Axx	1	A	1									
06 Dec	S12E53	191	10	2	Axx	1	A										
								1	0	0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 191

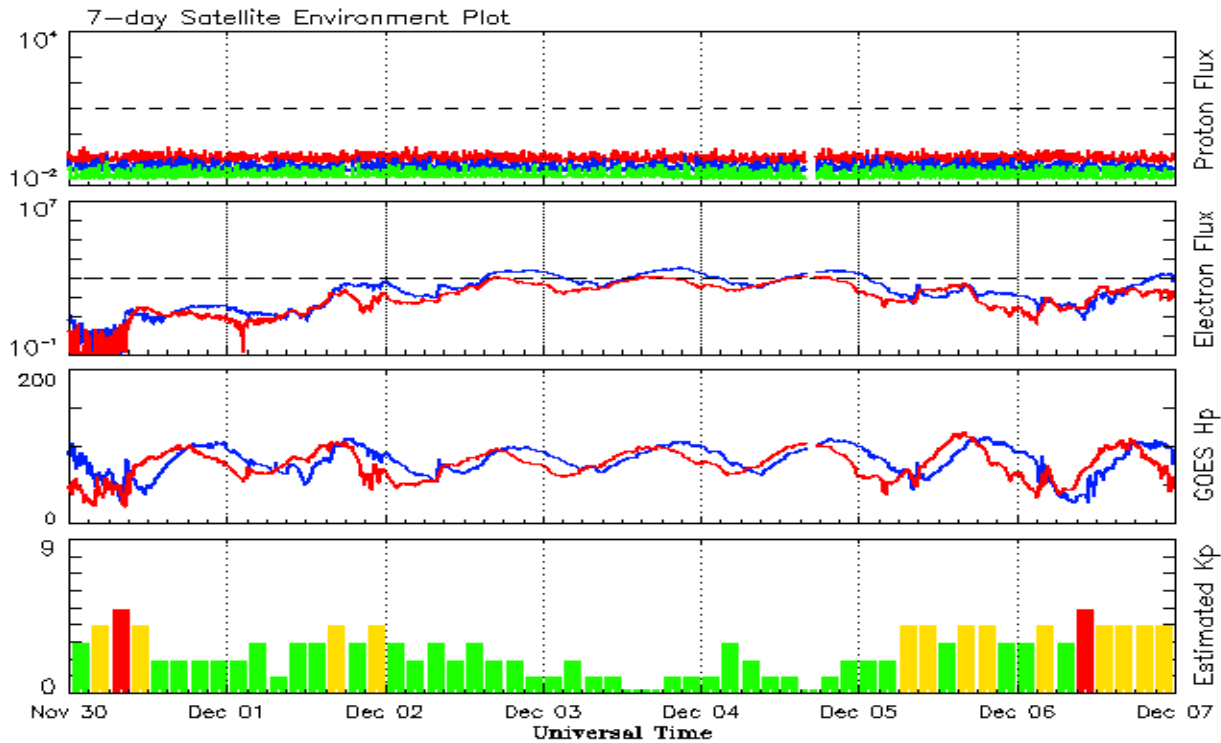


**Recent Solar Indices (preliminary)**  
**Observed monthly mean values**

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>2013</b>									
December	118.2	90.3	0.76	115.4	75.9	147.7	135.9	5	7.5
<b>2014</b>									
January	125.9	81.8	0.65	117.7	77.3	158.6	137.3	6	7.1
February	174.6	102.3	0.59	119.5	78.3	170.3	138.6	12	6.9
March	141.1	91.9	0.65	123.2	80.8	149.9	140.8	6	7.2
April	130.5	67.5	0.65	124.8	69.8	144.3	143.5	9	7.5
May	116.8	67.5	0.64	122.3	69.0	130.0	144.7	7	7.9
June	107.7	61.7	0.66	121.4	68.5	122.2	145.5	7	8.4
July	113.6	60.1	0.64	120.4	67.6	137.3	145.2	5	8.8
August	106.2	64.1	0.70	115.1	65.0	124.7	142.8	9	8.9
September	127.4	78.0	0.69	107.4	61.1	146.1	140.1	11	9.3
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	45.6	120.1	123.3	9	12.7
June	77.3	39.9	0.53			123.2		14	
July	68.4	39.8	0.58			107.0		10	
August	61.6	38.8	0.63			106.2		16	
September	72.5	46.9	0.65			102.1		16	
October	59.5	37.0	0.62			104.1		15	
November	61.8	37.9	0.61			109.6		13	

**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 30 November 2015*

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.

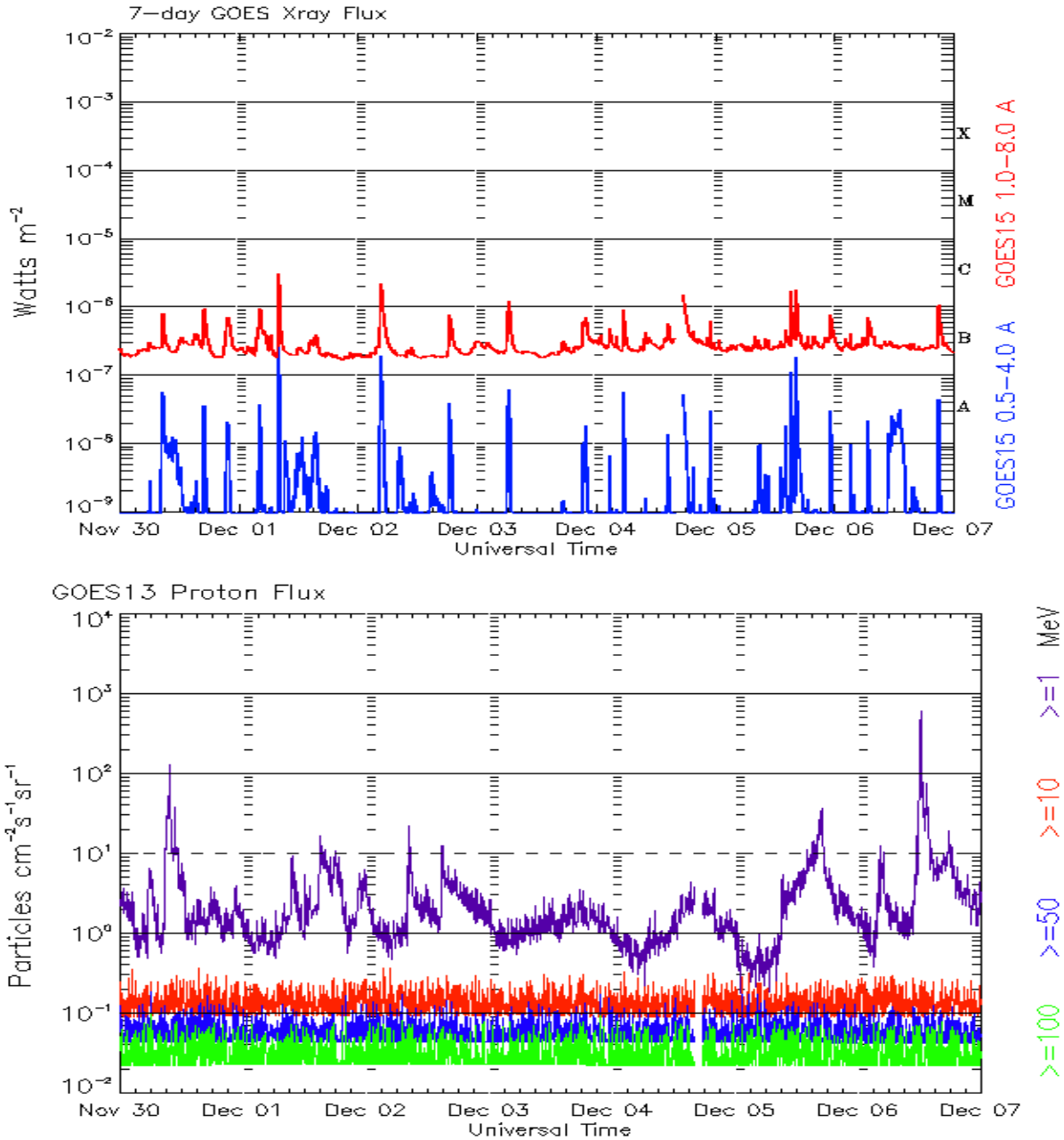
The electron flux plot contains the five-minute averaged integral electron flux (electrons/cm<sup>2</sup>-sec -sr) with energies greater than 2 MeV by the SWPC Primary GOES satellite.

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 30 November 2015*

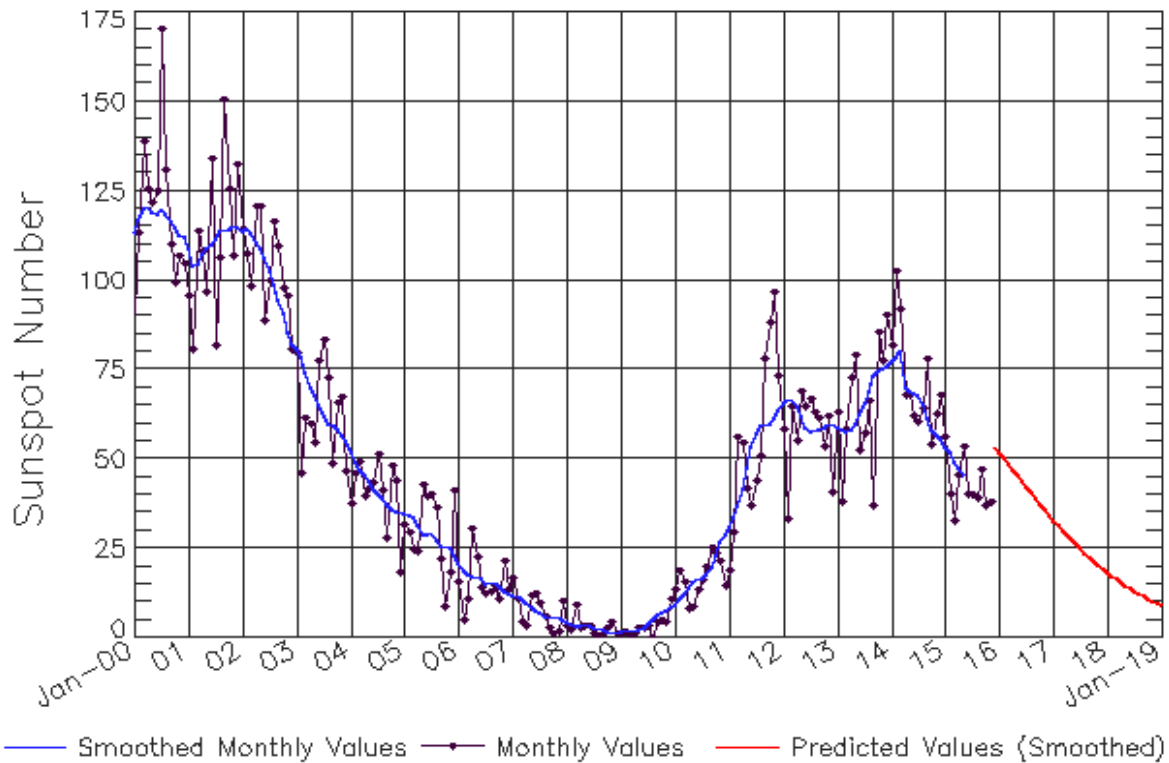
The x-ray plots contains five-minute averages x-ray flux (Watt/m<sup>2</sup>) as measure by the SWPC primary GOES X-ray satellite, usually at West 105 longitude, in two wavelength bands, 0.05 - 0.4 and 0.1 - 0.8 nm. The letters A, B, C, M and X refer to x-ray event levels for the 0.1 - 0.8 nm band.

The proton plot contains the five-minute averaged integral 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 Nov 2015



Updated 2015 Dec 7

NOAA/SWPC Boulder, CO USA

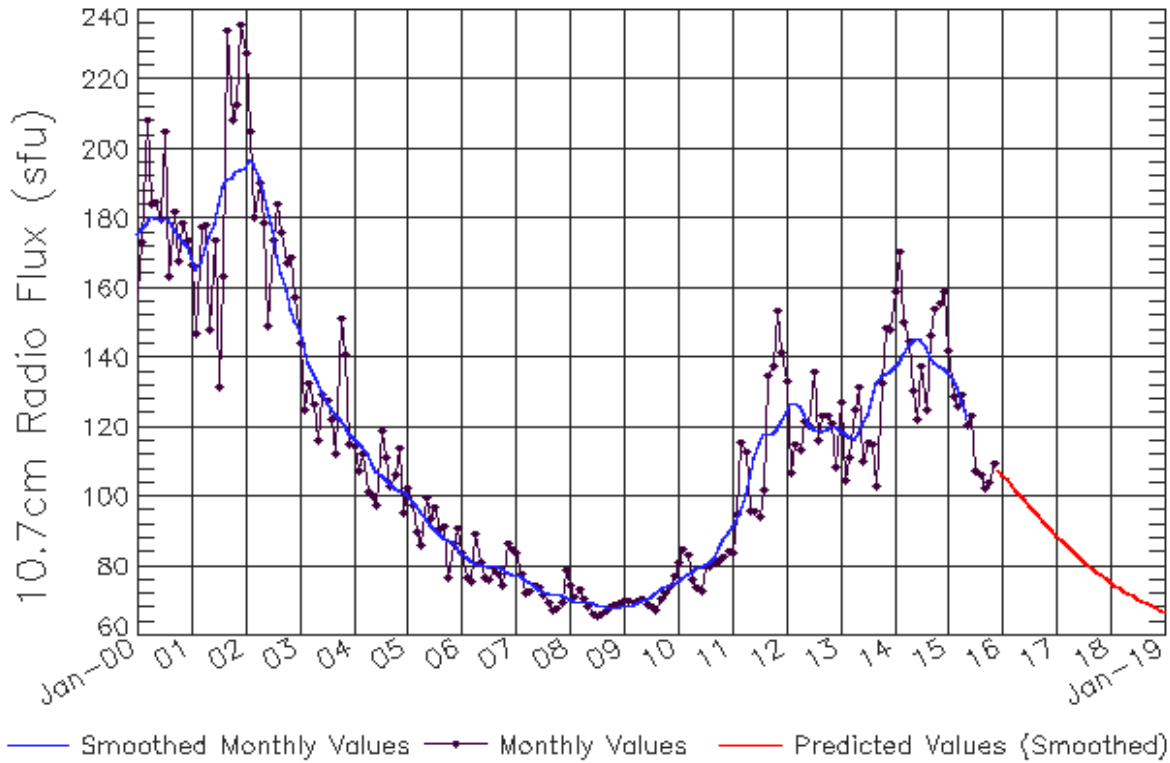
## Smoothed Sunspot Number Prediction

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2010	9 (1)	10 (2)	11 (3)	13 (5)	15 (5)	16 (6)	17 (7)	17 (7)	20 (8)	23 (9)	27 (9)	29 (10)
2011	19 (10)	30 (10)	56 (10)	54 (10)	42 (10)	37 (10)	44 (10)	51 (10)	78 (10)	88 (10)	97 (10)	73 (10)
2012	58 (10)	33 (10)	64 (10)	55 (10)	69 (10)	65 (10)	67 (10)	63 (10)	61 (10)	53 (10)	62 (10)	41 (10)
2013	63 (10)	38 (10)	58 (10)	72 (10)	79 (10)	53 (10)	57 (10)	66 (10)	37 (10)	86 (10)	78 (10)	90 (10)
2014	82 (10)	102 (10)	92 (10)	68 (10)	68 (10)	62 (10)	60 (10)	64 (10)	78 (10)	54 (10)	62 (10)	68 (10)
2015	56 (10)	40 (10)	33 (10)	45 (10)	53 (10)	40 (10)	40 (10)	39 (10)	47 (10)	37 (10)	38 (10)	54 (10)
2016	52 (10)	50 (10)	49 (10)	47 (10)	45 (10)	44 (10)	42 (10)	40 (10)	39 (10)	37 (10)	36 (10)	34 (10)
2017	33 (10)	31 (10)	30 (10)	29 (10)	27 (10)	26 (10)	25 (10)	24 (10)	23 (10)	21 (10)	20 (10)	19 (10)
2018	18 (10)	17 (10)	16 (10)	15 (10)	15 (10)	14 (10)	13 (10)	12 (10)	12 (10)	11 (10)	10 (10)	10 (10)
2019	9 (10)	8 (10)	8 (10)	7 (10)	7 (10)	6 (10)	6 (10)	6 (10)	5 (10)	5 (10)	4 (10)	4 (10)



# ISES Solar Cycle F10.7cm Radio Flux Progression

Observed data through Nov 2015



Updated 2015 Dec 7

NOAA/SWPC Boulder, CO USA

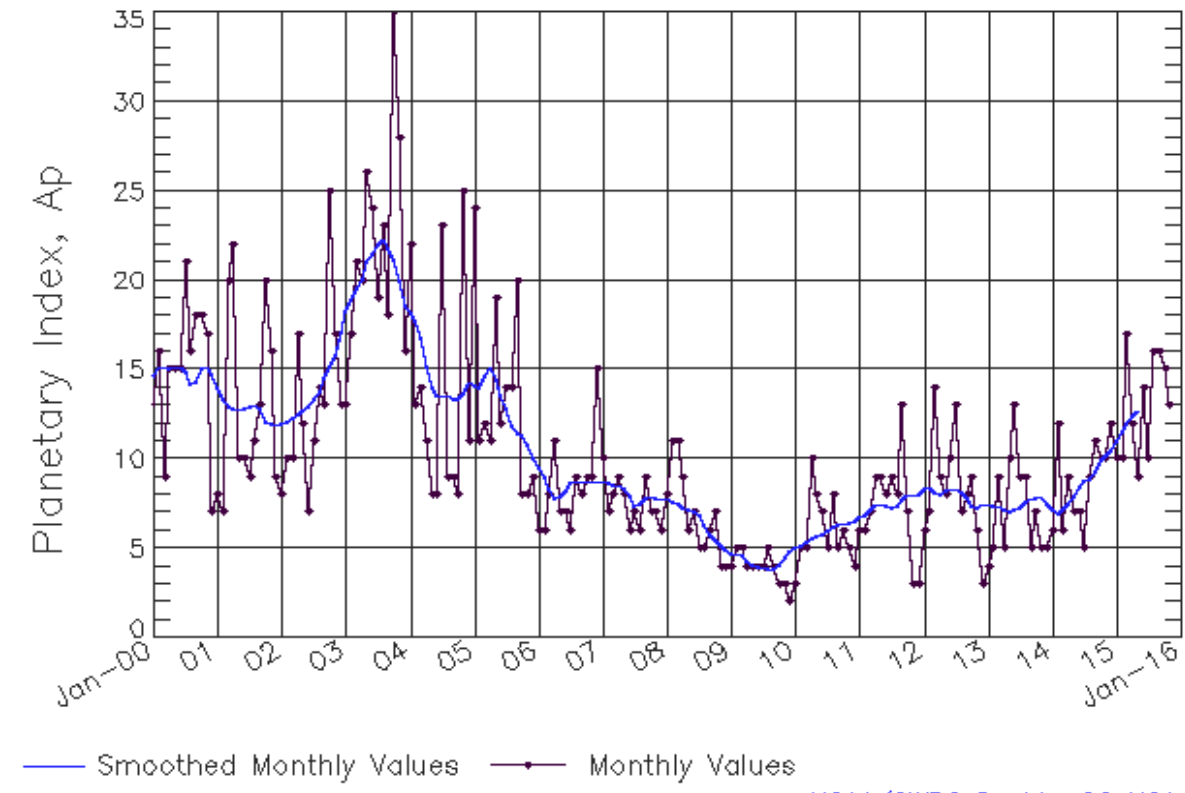
## Smoothed F10.7cm Radio Flux Prediction

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 (***)	119 (1)	116 (1)	113 (2)	111 (3)	109 (4)	107 (4)	105 (5)
2016	104 (6)	103 (7)	102 (8)	102 (8)	100 (9)	99 (9)	97 (9)	96 (9)	94 (9)	93 (9)	92 (9)	90 (9)
2017	89 (9)	88 (9)	86 (9)	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

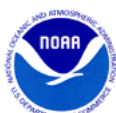
Observed data through Nov 2015



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*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

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