

**Space Weather Highlights**  
**29 October - 04 November 2012**

**SWPC PRF 1940**  
**05 November 2012**

Solar activity was at very low to low levels. The largest flares of the period were a pair of C1 flares from Regions 1596 (N07, L=150, class/area Eho/460 on 21 October) and 1598 (S12, L=111, class/area Dki/420 on 23 October) at 0507 UTC and 1139 UTC on 31 October, respectively. Other activity of note was a 24 degree long filament eruption centered at S32E07 that occurred from 0640-0855 UTC on 30 October. No Earth-directed coronal mass ejections (CMEs) were observed during the reporting period.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit was at moderate levels on 29-30 October and again on 01 November. High levels were reached on 31 October. Normal background levels were observed from 02-04 November.

Geomagnetic field activity was at quiet to active levels with major to severe storm periods observed at high latitudes. The period began with quiet conditions until a sudden increase in solar wind speed at the ACE spacecraft from 290 - 360 km/s occurred at approximately 31/1445 UTC. A sudden impulse (13 nT) was observed at the Boulder magnetometer at 1539 UTC on 31 October. This initial activity was due to a pair of CMEs resulting from filament eruptions on 27 and 28 October. The geomagnetic field responded with a unsettled period during the 1500-1800 UTC period on 31 October. At approximately 31/2348 UTC, the total magnetic field (Bt) increased from 9 to 15 nT while the Bz component rotated to a southward (negative) component for approximately 20 hours (maximum deflection of 11 nT). The geomagnetic field responded with quiet to active levels with major to severe storm periods observed at high latitudes on 01 November. By 02 November through the rest of the reporting period, quiet conditions prevailed.

**Space Weather Outlook**  
**05 November - 01 December 2012**

Solar activity is expected to be very low to low until 08 November. From 08-21 November, a chance for M-class flares exist as old Region 1594 (S27, L=199) rotates across the visible disk. From 22 November until the end of the forecast period, very low to low levels are expected.

No proton events are expected at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to be at high levels from 09-24 November. Normal to moderate levels are expected from 25 November through 01 December.

Geomagnetic field activity is expected to be quiet to unsettled through the forecast period. Unsettled conditions with a chance for active periods are expected from 08-11 November and again on 13 November due to activity from a recurrent coronal hole high speed stream.



### *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
29 October	108	75	450	B2.4	0	0	0	0	0	0	0	0
30 October	106	56	400	B2.2	0	0	0	0	0	0	0	0
31 October	104	35	370	B2.4	2	0	0	0	0	0	0	0
01 November	98	48	350	B2.2	0	0	0	2	0	0	0	0
02 November	97	34	320	B1.9	0	0	0	0	0	0	0	0
03 November	93	35	110	B2.0	0	0	0	0	0	0	0	0
04 November	95	46	130	B1.7	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
	29 October	2.2e+05	1.1e+04	2.7e+03		5.5e+07
30 October	4.8e+05	1.1e+04	2.7e+03		4.9e+07	
31 October	2.1e+06	1.1e+04	2.8e+03		3.7e+07	
01 November	6.4e+05	1.1e+04	2.6e+03		3.4e+06	
02 November	1.6e+05	1.1e+04	2.7e+03		1.7e+06	
03 November	1.0e+05	1.1e+04	2.8e+03		3.9e+06	
04 November	5.8e+04	1.1e+04	2.8e+03		4.9e+06	

### *Daily Geomagnetic Data*

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	29 October	2	0-0-2-0-2-1-0-0	1	0-0-2-1-0-0-0-0	3
30 October	1	1-0-0-0-1-1-0-0	1	0-0-1-0-1-0-0-0	2	1-0-0-0-1-0-0-0
31 October	5	0-0-0-1-2-3-2-2	2	0-0-0-0-1-2-1-1	5	0-0-0-0-1-3-2-2
01 November	17	3-3-3-4-3-4-3-2	48	2-2-3-6-6-7-4-4	17	3-2-3-4-3-4-3-3
02 November	5	2-2-1-2-1-1-1-1	3	2-2-0-0-0-1-0-1	5	2-2-1-1-1-1-1-1
03 November	2	0-0-0-0-2-1-1-0	1	0-0-0-0-1-2-0-0	3	0-0-0-0-1-1-1-0
04 November	1	0-0-0-0-2-1-0-0	2	0-1-1-1-2-0-0-0	2	0-1-1-0-1-0-0-0

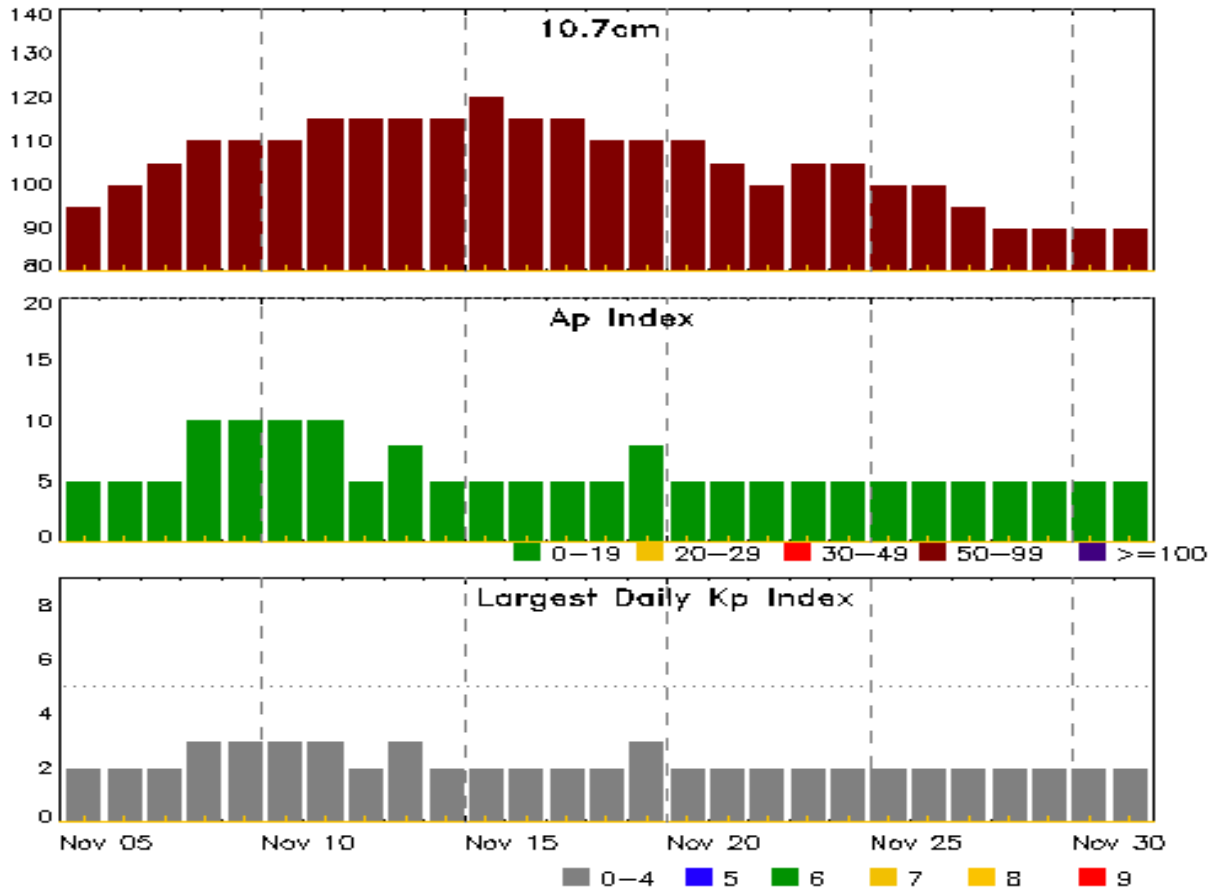


### *Alerts and Warnings Issued*

<b>Date &amp; Time of Issue UTC</b>	<b>Type of Alert or Warning</b>	<b>Date &amp; Time of Event UTC</b>
29 Oct 2117	WATCH: Geomagnetic Storm Category G1 predicted	
31 Oct 1428	ALERT: Electron 2MeV Integral Flux $\geq$ 1000pfu	31/1415
31 Oct 1552	SUMMARY: Geomagnetic Sudden Impulse	31/1539
01 Nov 0725	WARNING: Geomagnetic K = 4	01/0730 - 1900
01 Nov 1024	ALERT: Geomagnetic K = 4	01/1024
01 Nov 1848	EXTENDED WARNING: Geomagnetic K = 4	01/0730 - 02/0000



## 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
05 Nov	95	5	2	19 Nov	110	8	3
06	100	5	2	20	110	5	2
07	105	5	2	21	105	5	2
08	110	10	3	22	100	5	2
09	110	10	3	23	105	5	2
10	110	10	3	24	105	5	2
11	115	10	3	25	100	5	2
12	115	5	2	26	100	5	2
13	115	8	3	27	95	5	2
14	115	5	2	28	90	5	2
15	120	5	2	29	90	5	2
16	115	5	2	30	90	5	2
17	115	5	2	01 Dec	90	5	2
18	110	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 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 #	
29 Oct	0255	0302	0305	B6.9				1596
30 Oct	0116	0137	0150	B8.4				1598
31 Oct	0459	0507	0513	C1.2				1596
31 Oct	0650	0654	0656	B3.9				
31 Oct	0713	0718	0723	B4.8				
31 Oct	1133	1139	1145	C1.1				1598
31 Oct	1306	1311	1318	B3.9				1598
01 Nov	0907	0907	0912		SF	S10W65		1598
01 Nov	0919	0922	0924		SF	S11W66		1598
01 Nov	1400	1404	1412	B4.3				1598
01 Nov	1458	1505	1512	B7.0				1598
02 Nov	0658	0703	0707	B6.9				1598
02 Nov	1858	1920	1928	B5.8				1598
02 Nov	2318	2325	2333	B5.7				1598
03 Nov	1920	1925	1934	B3.2				1599
04 Nov	2238	2241	2243	B2.6				1603



## 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	4					
<b>Region 1596</b>																					
17 Oct	N11E85	150	plage																		2
18 Oct	N11E73	149	300	16	Eao	4	B														1
19 Oct	N08E60	149	330	12	Eko	5	BG														
20 Oct	N06E46	150	280	11	Eko	6	BG														1
21 Oct	N07E33	150	460	11	Eho	9	BG														2
22 Oct	N07E20	149	310	10	Dki	31	BG														
23 Oct	N07E06	149	300	11	Eko	14	B														
24 Oct	N08W08	150	290	12	Eko	13	B														
25 Oct	N07W21	151	230	11	Eao	10	B														
26 Oct	N08W35	152	230	11	Eao	9	B														
27 Oct	N08W48	152	170	10	Dao	5	BG														
28 Oct	N06W65	155	150	5	Dao	5	B														
29 Oct	N05W79	155	110	3	Cao	3	B														
30 Oct	N08W94	157	60	10	Hsx	1	A														
								8	0	0	4	0	0	0	0						

Crossed West Limb.  
 Absolute heliographic longitude: 149

<b>Region 1598</b>																					
19 Oct	S09E96	286	plage																		
20 Oct	S09E82	114	100	2	Hsx	1	A														
21 Oct	S12E70	113	270	7	Dhi	4	B														
22 Oct	S10E56	113	370	8	Dhi	10	B														
23 Oct	S12E44	111	420	8	Dki	16	BD														
24 Oct	S12E29	113	360	9	Dki	12	BD														
25 Oct	S12E18	112	370	9	Dko	17	BD														
26 Oct	S12E04	113	340	7	Dko	17	BD														
27 Oct	S11W10	114	330	5	Dkc	11	BD														
28 Oct	S11W23	113	240	4	Dac	7	B														
29 Oct	S11W37	113	210	3	Cso	6	B														
30 Oct	S11W51	114	210	4	Hsx	2	A														
31 Oct	S11W65	114	230	4	Hsx	2	A														
01 Nov	S11W77	114	160	6	Hsx	2	A														
02 Nov	S11W90	114	140	5	Hsx	1	A														
								25	3	1	18	1	0	0	0						

Crossed West Limb.  
 Absolute heliographic longitude: 113



**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 1599</b>																		
23 Oct	S09E73		83	60	2	Hsx	1	A										
24 Oct	S10E58		84	100	2	Hsx	1	A										
25 Oct	S10E43		87	100	2	Hsx	1	A										
26 Oct	S11E30		87	120	2	Hsx	1	A										
27 Oct	S11E16		88	110	2	Hsx	1	A										
28 Oct	S11E04		86	60	2	Hsx	1	A										
29 Oct	S11W10		86	80	2	Hsx	1	A										
30 Oct	S12W23		87	100	2	Hsx	1	A										
31 Oct	S13W38		87	110	3	Hsx	2	A										
01 Nov	S11W49		86	100	3	Hsx	1	A										
02 Nov	S13W62		86	120	3	Hsx	1	A										
03 Nov	S13W77		88	80	3	Cso	2	B										
04 Nov	S12W89		87	90	2	Hsx	1	A										
										0	0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 86

**Region 1600**

26 Oct	N09W14		131	40	4	Dso	4	B										
27 Oct	N09W28		132	20	5	Cro	2	B										
28 Oct	N09W42		132	10	5	Axx	2	A				1						
29 Oct	N09W54		130	20	4	Cso	3	B										
30 Oct	N09W68		132	plage														
31 Oct	N09W82		133	plage														
										0	0	0	1	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 131

**Region 1601**

29 Oct	S10E11		66	10	1	Axx	1	A										
30 Oct	S10W05		68	0		Axx	1	A										
31 Oct	S10W19		68	plage														
01 Nov	S10W33		71	plage														
02 Nov	S10W47		72	plage														
03 Nov	S10W61		72	plage														
04 Nov	S10W75		73	plage														
										0	0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 68



### *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 1602</b>																	
29 Oct	S17E65		12	20	1	Hrx	1	A									
30 Oct	S19E50		12	30	1	Hrx	1	A									
31 Oct	S19E37		12	30	1	Hax	1	A									
01 Nov	S19E27		10	80	3	Cao	3	B									
02 Nov	S19E13		11	60	3	Hax	2	A									
03 Nov	S19W01		12	20	1	Hrx	1	A									
04 Nov	S19W15		13	10	1	Axx	1	A									
									0	0	0	0	0	0	0	0	0
Still on Disk.																	
Absolute heliographic longitude: 12																	
<b>Region 1603</b>																	
01 Nov	N08W18		55	10	2	Bxo	2	B									
02 Nov	N08W32		57	plage													
03 Nov	N08W46		57	plage													
04 Nov	N08W60		58	plage													
									0	0	0	0	0	0	0	0	0
Still on Disk.																	
Absolute heliographic longitude: 55																	
<b>Region 1604</b>																	
03 Nov	N08E48		322	10	5	Bxo	2	B									
04 Nov	N07E33		324	plage													
									0	0	0	0	0	0	0	0	0
Still on Disk.																	
Absolute heliographic longitude: 324																	
<b>Region 1605</b>																	
04 Nov	N17E24		333	10	4	Bxo	2	B									
									0	0	0	0	0	0	0	0	0
Still on Disk.																	
Absolute heliographic longitude: 333																	
<b>Region 1606</b>																	
04 Nov	S16E45		310	20	2	Cro	2	B									
									0	0	0	0	0	0	0	0	0

Still on Disk.  
Absolute heliographic longitude: 310

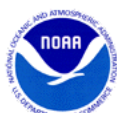


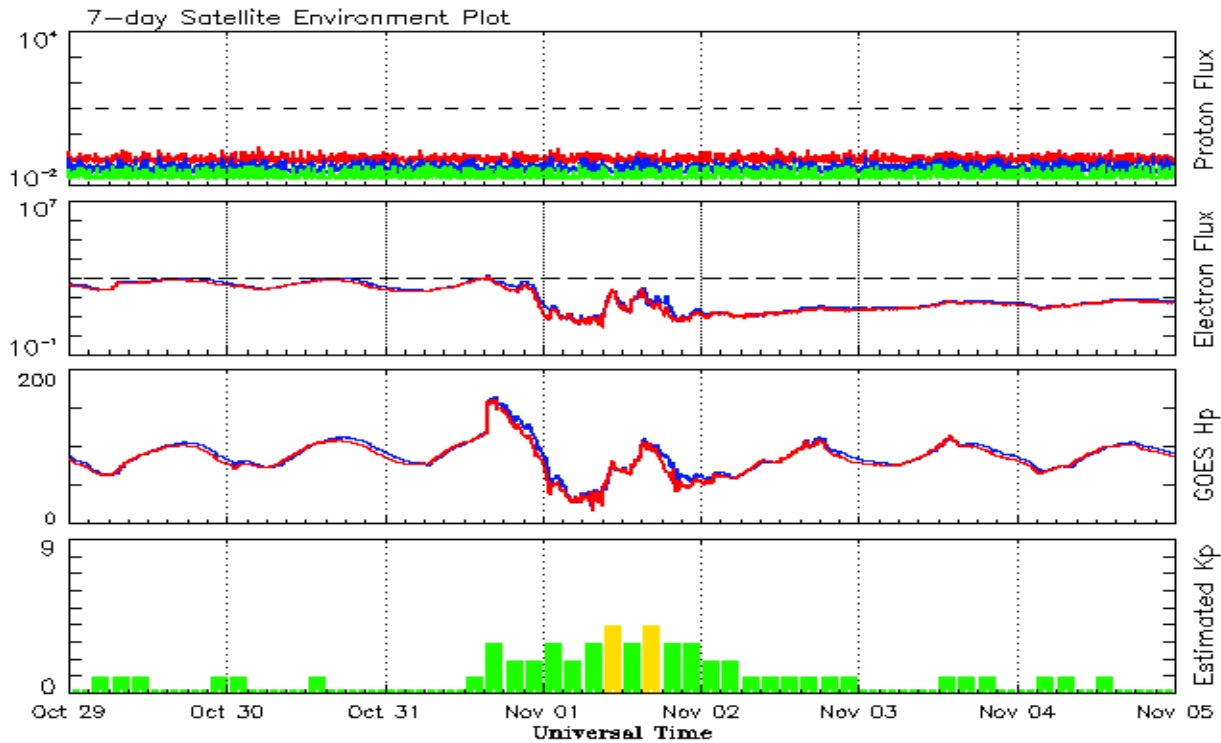


**Recent Solar Indices (preliminary)**  
**Observed monthly mean values**

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>2010</b>									
November	36.1	21.5	0.60	40.5	26.5	82.5	87.7	5	6.4
December	22.0	14.4	0.66	43.8	28.8	84.3	89.6	4	6.5
<b>2011</b>									
January	32.1	18.8	0.59	47.2	30.9	83.7	91.2	6	6.7
February	53.2	29.6	0.55	50.6	33.4	94.5	92.7	6	6.8
March	81.0	55.8	0.69	55.2	36.9	115.3	95.8	7	7.2
April	81.7	54.4	0.67	61.5	41.8	112.6	100.4	9	7.5
May	61.4	41.6	0.68	69.0	47.6	95.9	105.6	9	7.5
June	55.5	37.0	0.67	76.5	53.2	95.8	110.9	8	7.4
July	67.0	43.8	0.66	82.5	57.3	94.2	115.4	9	7.3
August	66.1	50.6	0.77	84.9	59.0	101.7	117.9	8	7.4
September	106.4	78.0	0.73	84.6	59.5	134.5	118.4	13	7.7
October	116.8	88.0	0.75	84.6	59.9	137.2	118.4	7	8.0
November	133.1	96.7	0.73	86.3	61.1	153.1	119.5	3	8.0
December	106.3	73.0	0.69	89.2	63.4	141.2	121.6	3	8.0
<b>2012</b>									
January	91.3	58.3	0.64	92.0	65.5	133.1	124.4	6	8.3
February	50.1	32.9	0.66	94.2	66.9	106.7	126.7	7	8.4
March	77.9	64.3	0.82	94.1	66.8	115.1	126.8	14	8.1
April	84.4	55.2	0.65	91.3	64.6	113.1	125.8	9	8.0
May	99.5	69.0	0.69			121.5		8	
June	88.6	64.5	0.73			120.5		10	
July	99.6	66.5	0.67			135.6		13	
August	85.8	63.1	0.74			115.7		7	
September	84.0	61.5	0.73			123.2		8	
October	73.5	53.3	0.73			123.3		9	

**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 29 October 2012*

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.

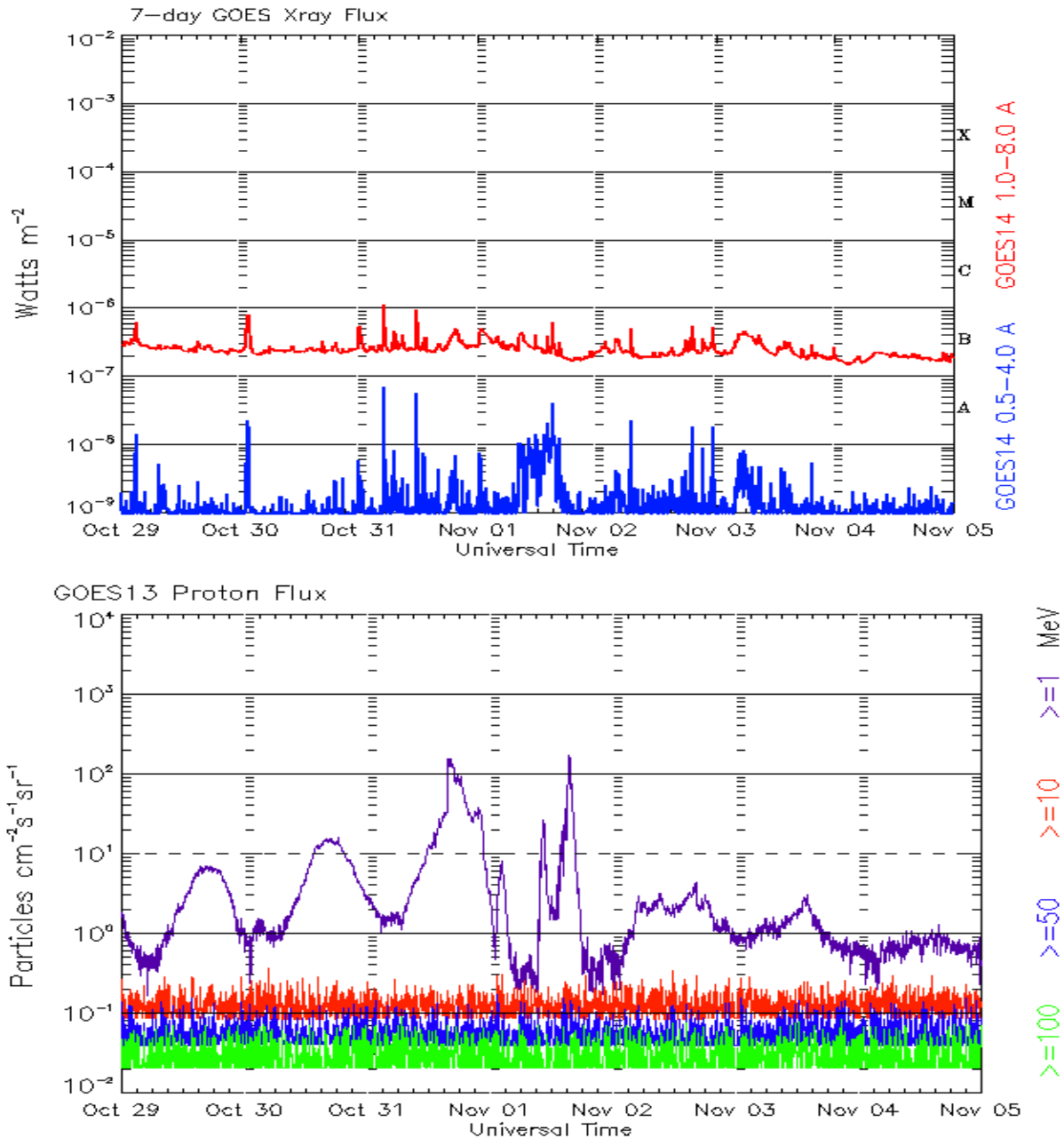
The electron flux plot contains the five-minute averaged integral electron flux (electrons/cm<sup>2</sup>-sec -sr) with energies greater than 2 MeV by the SWPC Primary GOES satellite.

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 29 October 2012*

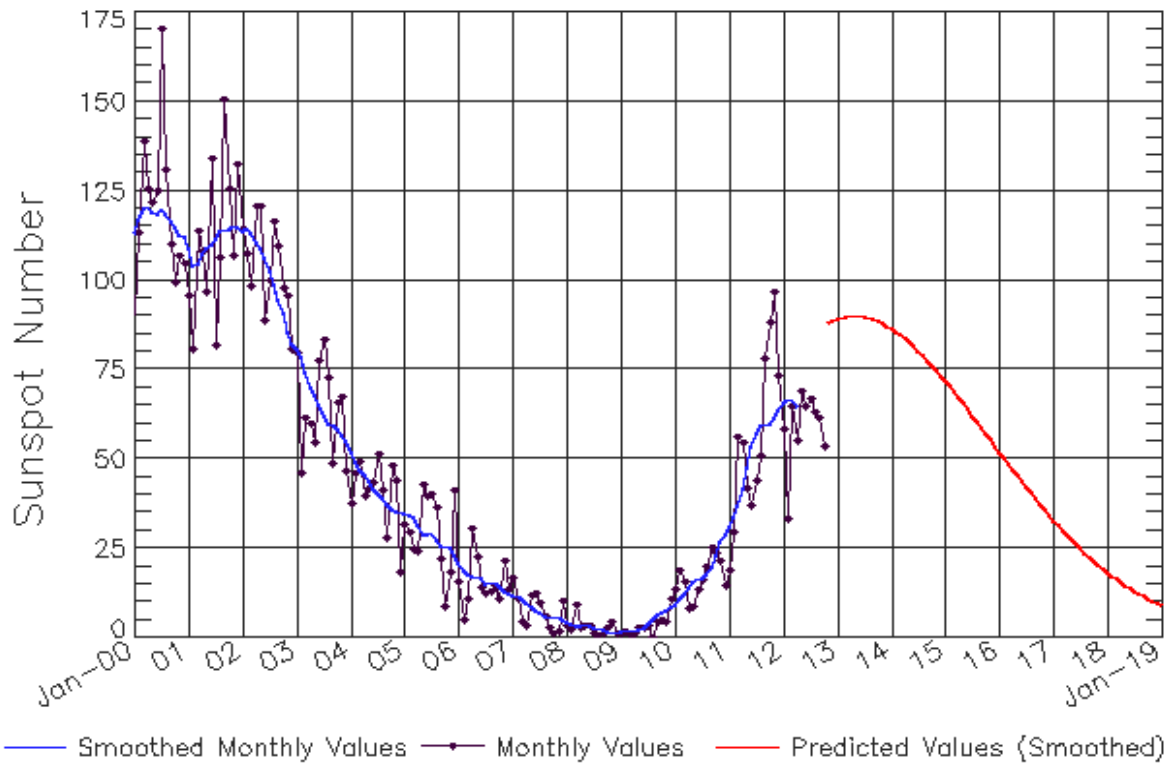
The x-ray plots contains five-minute averages x-ray flux (Watt/m<sup>2</sup>) as measure by the SWPC primary GOES X-ray satellite, usually at West 105 longitude, in two wavelength bands, 0.05 - 0.4 and 0.1 - 0.8 nm. The letters A, B, C, M and X refer to x-ray event levels for the 0.1 - 0.8 nm band.

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 2012



Updated 2012 Nov 5

NOAA/SWPC Boulder, CO USA

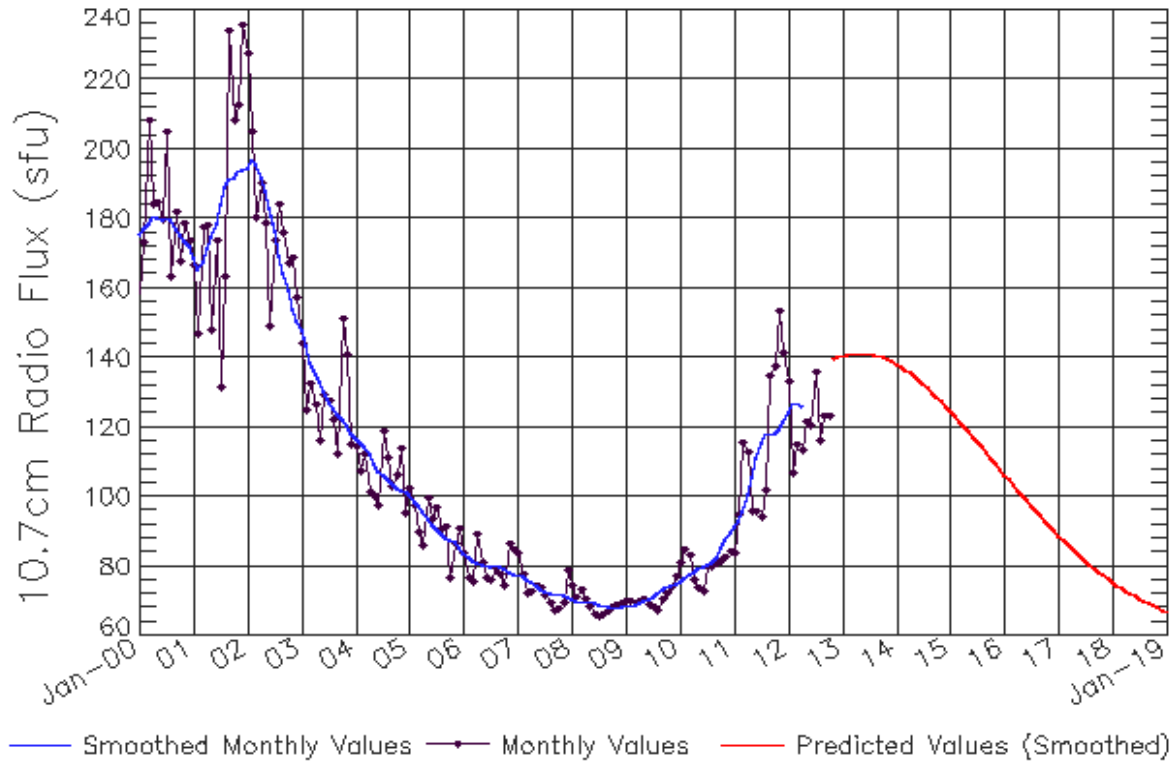
## Smoothed Sunspot Number Prediction

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2010	9 (***)	11 (***)	12 (***)	14 (***)	16 (***)	16 (***)	17 (***)	17 (***)	20 (***)	23 (***)	27 (***)	29 (***)
2011	31 (***)	33 (***)	37 (***)	42 (***)	48 (***)	53 (***)	57 (***)	59 (***)	60 (***)	60 (***)	61 (***)	63 (***)
2012	66 (***)	67 (***)	67 (***)	65 (***)	63 (1)	63 (2)	65 (3)	69 (5)	72 (5)	75 (6)	77 (7)	79 (7)
2013	81 (8)	83 (9)	85 (9)	88 (10)	90 (10)	90 (10)	90 (10)	89 (10)	89 (10)	89 (10)	88 (10)	87 (10)
2014	86 (10)	86 (10)	85 (10)	84 (10)	83 (10)	81 (10)	80 (10)	79 (10)	78 (10)	76 (10)	75 (10)	73 (10)
2015	72 (10)	70 (10)	69 (10)	67 (10)	65 (10)	64 (10)	62 (10)	60 (10)	59 (10)	57 (10)	55 (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 Oct 2012



Updated 2012 Nov 5

NOAA/SWPC Boulder, CO USA

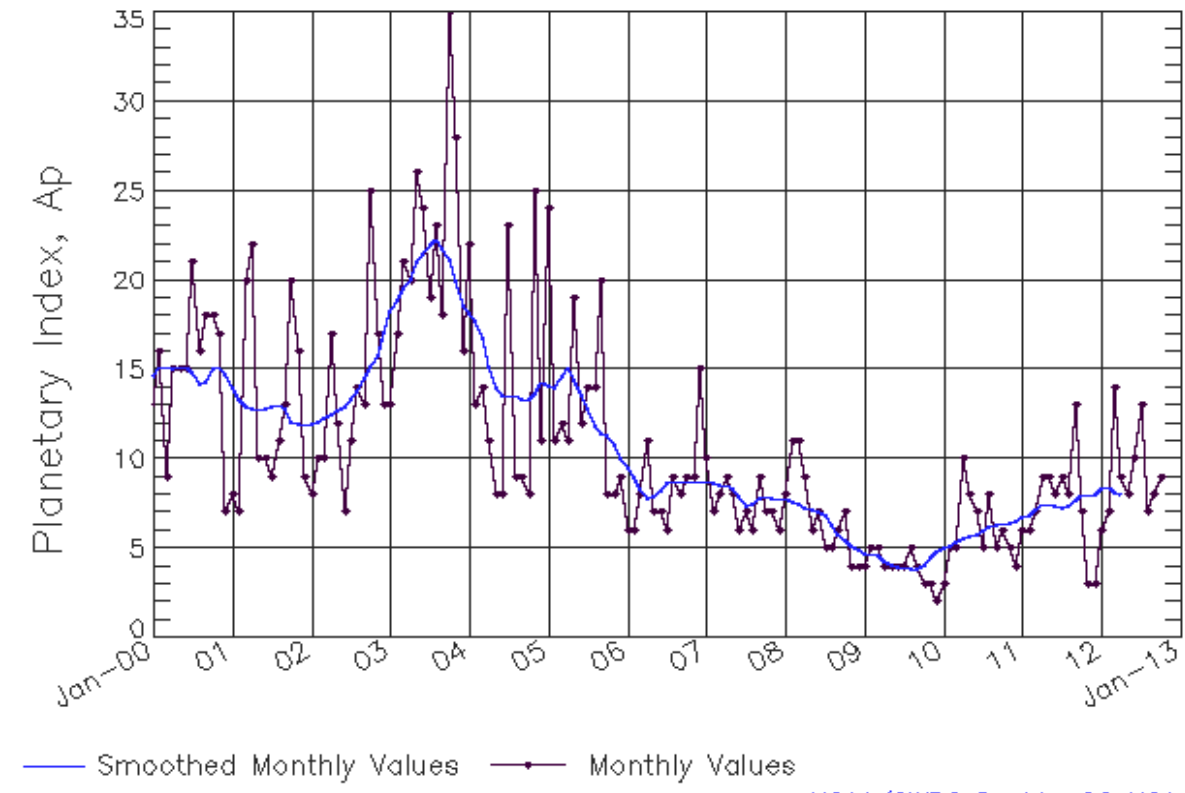
## Smoothed F10.7cm Radio Flux Prediction

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 (***)	125 (1)	124 (1)	124 (2)	126 (3)	129 (4)	131 (4)	133 (5)	135 (6)
2013	136 (7)	137 (8)	139 (8)	140 (9)	141 (9)	141 (9)	141 (9)	141 (9)	140 (9)	140 (9)	139 (9)	139 (9)
2014	138 (9)	137 (9)	136 (9)	136 (9)	135 (9)	134 (9)	132 (9)	131 (9)	130 (9)	129 (9)	127 (9)	126 (9)
2015	125 (9)	123 (9)	122 (9)	120 (9)	119 (9)	117 (9)	116 (9)	114 (9)	113 (9)	111 (9)	110 (9)	108 (9)
2016	106 (9)	105 (9)	103 (9)	102 (9)	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 Oct 2012



Updated 2012 Nov 5

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

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