

**Space Weather Highlights**  
**03 December - 09 December 2012**

**SWPC PRF 1945**  
**10 December 2012**

Solar activity reached low levels this week with a total of four C-class events, the largest of which was a C3 event at 2121 UTC that came from region 1621 (N16,L=19, clas/area Axx/10 on 07 December. This region appeared on 24 November as an Alpha class region and slowly grew in size (to 130 mil), becoming a Beta class region which it maintained for 8 days. The region began to decay and produced the C-class event after it crossed the western limb on 07 December.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit was at normal levels all week.

Geomagnetic field activity was quiet all week. Solar wind speed measured 260 km/s - 350 km/s on average with a peak of 459 km/s on 04 December due to the arrival of a coronal hole high speed stream. The maximum southward component of Bz reached -10.9 nT at 04/0440 UTC, the total IMF reached 13.0 nT at 03/1958 UTC. There were no CMEs with a significant earthward component during this week.

**Space Weather Outlook**  
**10 December - 05 January 2013**

Solar activity is expected to be at low levels with a chance of isolated M-class flares through the entire forecast period (10 December 2012 - 05 January 2013).

No proton events are expected at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to be at normal levels except during 14-21 December following the onset of a coronal hole high speed stream on 14 December and sustained by another stream which is expected to become geoeffective on 15 December.

Geomagnetic field activity is expected to be at quiet levels for the majority of the forecast period. An isolated period of unsettled levels is expected on 17 December with elevated ambient background solar wind speeds and again on 29 December associated with a recurrent solar sector boundary crossing.



### *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
03 December	97	44	280	B1.2	1	0	0	0	0	0	0	0
04 December	96	58	280	B1.2	0	0	0	0	0	0	0	0
05 December	96	78	220	B1.2	1	0	0	0	0	0	0	0
06 December	97	49	130	B1.2	0	0	0	0	0	0	0	0
07 December	97	23	130	B1.2	1	0	0	0	0	0	0	0
08 December	101	35	80	B1.3	0	0	0	1	0	0	0	0
09 December	104	40	130	B1.4	1	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
	03 December	1.6e+05	1.1e+04	2.6e+03		1.8e+06
04 December	8.1e+04	1.0e+04	2.6e+03		1.5e+06	
05 December	7.8e+04	1.1e+04	2.8e+03		1.7e+06	
06 December	9.4e+04	1.1e+04	2.8e+03		1.8e+06	
07 December	1.3e+05	1.1e+04	2.8e+03		2.0e+06	
08 December	2.1e+05	1.1e+04	2.8e+03		2.1e+06	
09 December	2.8e+05	1.2e+04	2.6e+03		1.6e+06	

### *Daily Geomagnetic Data*

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	03 December	3	0-1-1-1-1-1-1-2	4	0-0-2-3-2-1-0-0	4
04 December	5	1-2-2-1-1-0-2-0	2	0-2-2-0-0-0-0-0	3	1-2-2-1-0-0-1-0
05 December	4	2-1-0-3-2-0-0-1	0	0-0-0-0-0-0-0-0	2	1-0-0-1-0-0-1-1
06 December	2	1-2-0-0-1-0-1-0	0	0-0-0-0-1-0-0-0	1	0-0-0-0-0-0-1-0
07 December	1	1-1-0-0-0-0-1-0	0	0-0-0-0-0-0-0-0	1	0-0-0-0-0-0-0-0
08 December	1	1-1-0-0-1-0-0-0	0	0-0-0-0-0-0-0-0	1	0-1-0-0-0-0-0-0
09 December	3	0-2-0-0-1-0-1-2	2	0-0-0-0-2-1-1-1	4	0-1-0-0-0-1-1-2



*Alerts and Warnings Issued*

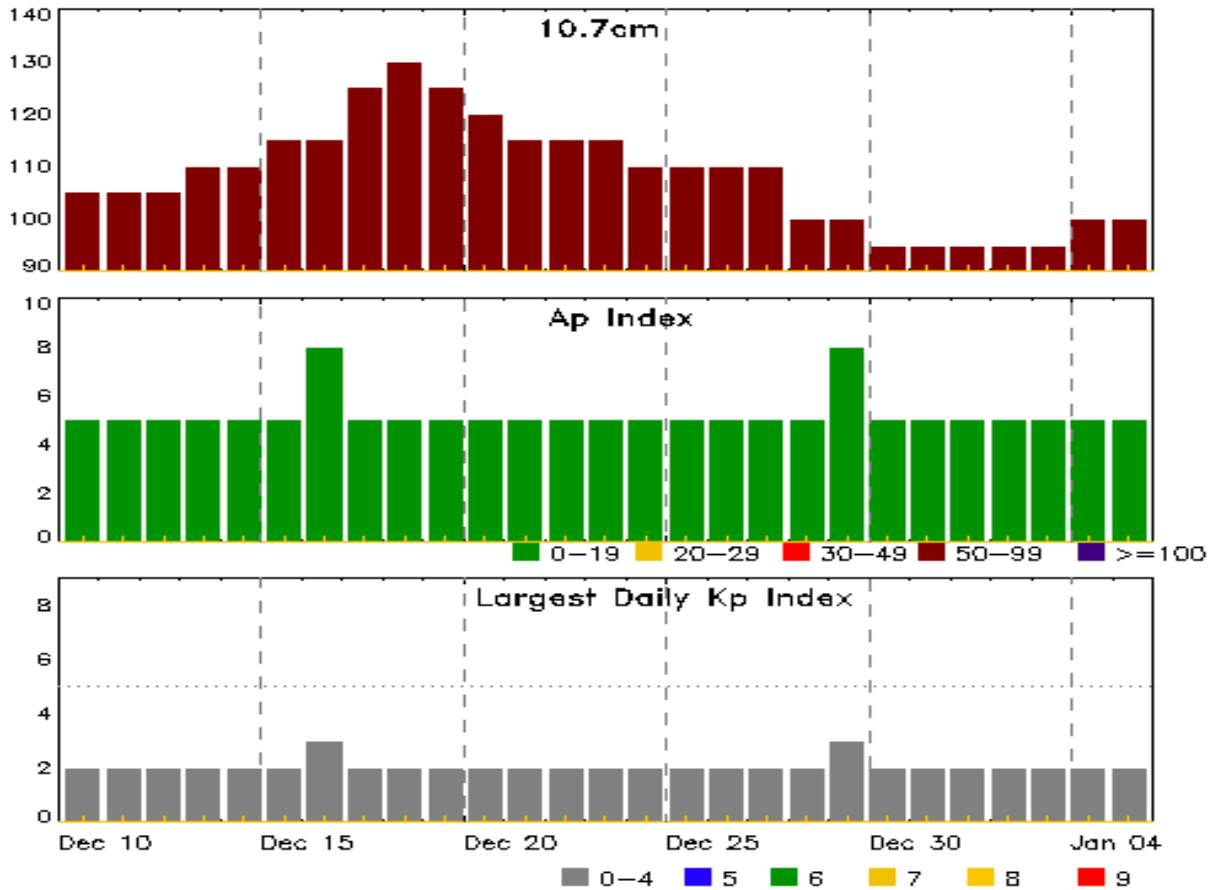
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<b>Date &amp; Time of Issue UTC</b>	<b>Type of Alert or Warning</b>	<b>Date &amp; Time of Event UTC</b>
No Alerts or Warnings Issued		

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## 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
10 Dec	105	5	2	24 Dec	110	5	2
11	105	5	2	25	110	5	2
12	105	5	2	26	110	5	2
13	110	5	2	27	110	5	2
14	110	5	2	28	100	5	2
15	115	5	2	29	100	8	3
16	115	8	3	30	95	5	2
17	125	5	2	31	95	5	2
18	130	5	2	01 Jan	95	5	2
19	125	5	2	02	95	5	2
20	120	5	2	03	95	5	2
21	115	5	2	04	100	5	2
22	115	5	2	05	100	5	2
23	115	5	2				



## *Energetic Events*

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

**No Events Observed**

## *Flare List*

Date	Time			X-ray Class	Imp/ Brtns	Location Lat CMD	Rgn #
	Begin	Max	End				
03 Dec	0023	0036	0050	C1.1			
03 Dec	0313	0400	0436	B3.9			
03 Dec	1004	1031	1042	B3.3			1623
03 Dec	1129	1138	1203	B3.9			1623
03 Dec	1851	1856	1903	B2.7			1623
03 Dec	2336	2341	2348	B2.2			1623
04 Dec	0157	0212	0221	B7.0			1623
04 Dec	0310	0315	0320	B2.1			1623
04 Dec	0413	0427	0431	B2.3			1623
04 Dec	0441	0449	0516	B3.2			1623
04 Dec	0810	0824	0830	B4.8			1623
04 Dec	1030	1039	1047	B3.6			1623
04 Dec	1418	1423	1428	B2.9			1623
04 Dec	2042	2046	2051	B2.6			1628
05 Dec	0012	0028	0050	C1.7			1628
05 Dec	0520	0556	0612	B4.1			
05 Dec	1739	1751	1805	B8.6			1621
06 Dec	0334	0337	0341	B2.6			1623
06 Dec	0411	0420	0427	B3.3			1623
06 Dec	1740	1756	1808	B6.4			1628
06 Dec	2154	2223	2231	B2.5			1628
07 Dec	0513	0519	0529	B2.0			1621
07 Dec	0902	1007	1048	B4.8			1621
07 Dec	1426	1432	1436	B2.6			1621
07 Dec	2113	2121	2127	C3.9			1621
08 Dec	0042	0047	0051	B2.8			1625
08 Dec	0420	0425	0427	B9.5			1629
08 Dec	0516	0520	0522	B3.1			1629
08 Dec	0717	0720	0740	B2.2			
08 Dec	0859	0903	0906	B3.6			
08 Dec	1010	1014	1017	B2.9			



## *Flare List*

Date	Time			X-ray Class	Optical		Rgn #
	Begin	Max	End		Imp/ Brtns	Location Lat CMD	
08 Dec	1017	1022	1024	B8.4			1629
08 Dec	1135	1138	1141	B3.2			1629
08 Dec	1323	1328	1333	B3.7			1629
08 Dec	1506	1510	1512	B4.5	SF	N13E37	1629
08 Dec	1700	1703	1707	B2.5			1629
08 Dec	1833	1837	1840	B5.2			1629
09 Dec	0152	0156	0200	B1.9			1630
09 Dec	1036	1137	1151	B6.2			
09 Dec	1741	1747	1752	C1.4			1630
09 Dec	1914	1918	1924	B3.8			1630
09 Dec	1955	2008	2040	B7.4			1630
09 Dec	2044	2047	2050	B6.6			1630
09 Dec	2056	2100	2103	B7.9			1629
09 Dec	2206	2302	2309	B3.7			



## Region Summary

Date	Location		Sunspot Characteristics				Flares									
	Lat	CMD	Helio	Area	Extent	Spot	Spot	Mag	X-ray			Optical				
			Lon	10 <sup>6</sup> hemi.	(helio)	Class	Count	Class	C	M	X	S	1	2	3	4
<b>Region 1621</b>																
24 Nov	N15E76		18	60	2	Hax	1	A								
25 Nov	N15E62		19	100	3	Hsx	1	A								
26 Nov	N15E48		20	110	4	Hsx	1	A								
27 Nov	N16E37		17	130	3	Cao	2	B								
28 Nov	N15E25		16	100	3	Cso	1	B								
29 Nov	N15E10		17	130	2	Hsx	1	A								
30 Nov	N15W02		17	120	3	Cso	2	B								
01 Dec	N15W16		18	100	3	Cso	3	B								
02 Dec	N15W30		18	80	2	Cso	3	B								
03 Dec	N17W42		18	80	3	Dao	4	B								
04 Dec	N15W56		17	60	3	Dao	8	B								
05 Dec	N16W69		18	30	3	Dao	5	B								
06 Dec	N16W83		19	10	2	Axx	2	A								
									0	0	0	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 17

<b>Region 1622</b>																
26 Nov	S24E16		52	10	4	Bxo	2	B								
27 Nov	S24E02		53	plage												
28 Nov	S24W12		54	plage												
29 Nov	S24W26		55	plage												
30 Nov	S24W40		55	plage												
01 Dec	S24W54		56	plage												
02 Dec	S24W68		57	plage												
									0	0	0	0	0	0	0	0

Died on Disk.

Absolute heliographic longitude: 53



### *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 1623</b>																				
27 Nov	N11E74	341	170	2	Dso	2	B	2												
28 Nov	N09E60	340	450	11	Eko	3	B	1				1								
29 Nov	N09E48	340	350	11	Eko	11	BG	5				7								
30 Nov	N08E35	339	210	8	Dao	9	BG													
01 Dec	N08E21	340	230	7	Dao	7	BG													
02 Dec	N08E08	340	130	7	Dao	4	B													
03 Dec	N08W05	341	140	7	Cso	6	B													
04 Dec	N08W18	341	150	10	Dso	4	B													
05 Dec	N08W33	342	120	9	Cso	7	B													
06 Dec	N08W47	342	90	5	Dso	4	B													
07 Dec	N07W61	343	110	3	Hsx	2	A													
08 Dec	N07W74	344	40	2	Hsx	1	A													
09 Dec	N07W87	343	40	2	Hsx	1	A													
								8	0	0	8	0	0	0	0	0				

Still on Disk.

Absolute heliographic longitude: 341

<b>Region 1624</b>																				
28 Nov	N20E08	33	10	2	Bxo	2	B													
29 Nov	N19W04	32	10	1	Axx	1	A													
30 Nov	N19W18	33	plage																	
01 Dec	N19W32	34	plage																	
02 Dec	N19W46	35	plage																	
03 Dec	N19W60	36	plage																	
04 Dec	N19W74	37	plage																	
05 Dec	N19W88	38	plage																	
								0	0	0	0	0	0	0	0	0				

Crossed West Limb.

Absolute heliographic longitude: 32





### *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 1625</b>																							
29 Nov	N15E51	338	230	8	Dso	10	BG	6				4											
30 Nov	N14E36	339	150	8	Dao	8	BG	1				4											
01 Dec	N14E21	340	110	7	Dao	9	BG	1				1											
02 Dec	N14E08	340	60	9	Dao	6	B																
03 Dec	N14W05	341	60	8	Dso	4	B																
04 Dec	N14W18	341	60	8	Cso	4	B																
05 Dec	N12W36	344	50	2	Hsx	2	A																
06 Dec	N12W49	344	20	2	Hsx	2	A																
07 Dec	N12W63	345	20	1	Hsx	1	A																
08 Dec	N12W77	347	10	1	Axx	1	A																
								8	0	0	9	0	0	0	0	0							

Died on Disk.

Absolute heliographic longitude: 341

#### **Region 1626**

04 Dec	N11E24	298	10	1	Hax	2	A														
05 Dec	N11E12	297	10	2	Bxo	2	B														
06 Dec	N11W02	298	plage																		
07 Dec	N11W16	299	plage																		
08 Dec	N11W30	300	plage																		
09 Dec	N11W44	301	plage																		
								0	0	0	0	0	0	0	0	0	0				

Still on Disk.

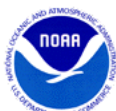
Absolute heliographic longitude: 298

#### **Region 1627**

05 Dec	S16W09	318	5		Axx	1	A														
06 Dec	S16W23	319	plage																		
07 Dec	S16W37	320	plage																		
08 Dec	S16W51	321	plage																		
09 Dec	S16W65	322	plage																		
								0	0	0	0	0	0	0	0	0	0				

Still on Disk.

Absolute heliographic longitude: 318



### *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

#### *Region 1628*

05 Dec	N10E65	243	5		Axx	1	A	1									
06 Dec	N09E51	244	10	1	Axx	1	A										
07 Dec	N09E37	246	plage														
08 Dec	N09E23	247	plage														
09 Dec	N09E09	248	plage														
								1	0	0	0	0	0	0	0	0	

Still on Disk.

Absolute heliographic longitude: 248

#### *Region 1629*

08 Dec	N12E32	238	30	4	Cro	3	B				1						
09 Dec	N11E19	237	50	6	Dao	4	B										
								0	0	0	1	0	0	0	0	0	

Still on Disk.

Absolute heliographic longitude: 237

#### *Region 1630*

09 Dec	N18E02	254	40	5	Dao	5	B	1									
								1	0	0	0	0	0	0	0	0	

Still on Disk.

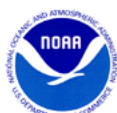
Absolute heliographic longitude: 254

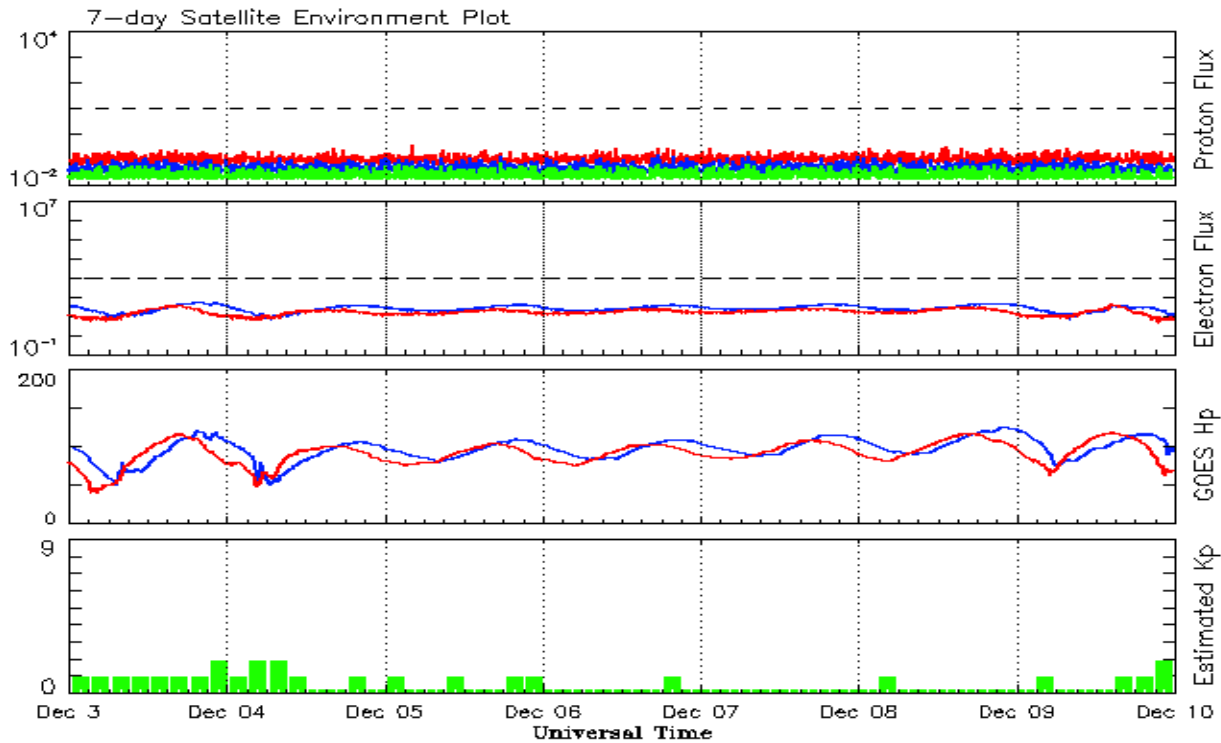


**Recent Solar Indices (preliminary)**  
**Observed monthly mean values**

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>									
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	87.7	61.7	121.5	123.8	8	8.2
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	
November	89.2	61.4	0.69			120.9		6	

**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 03 December 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.

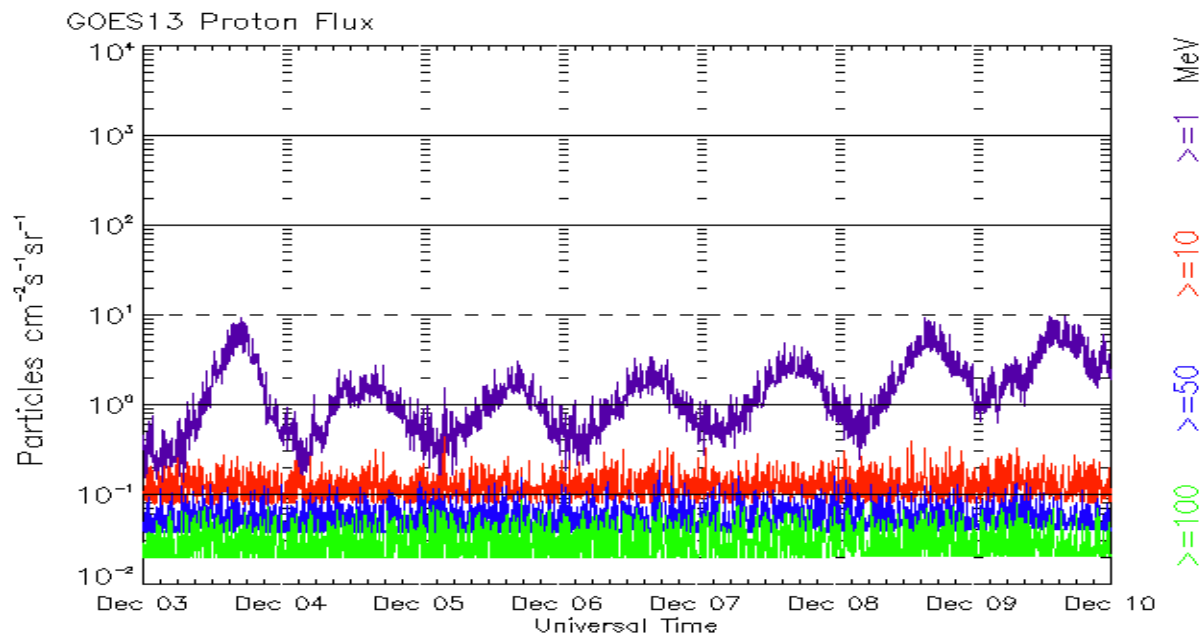
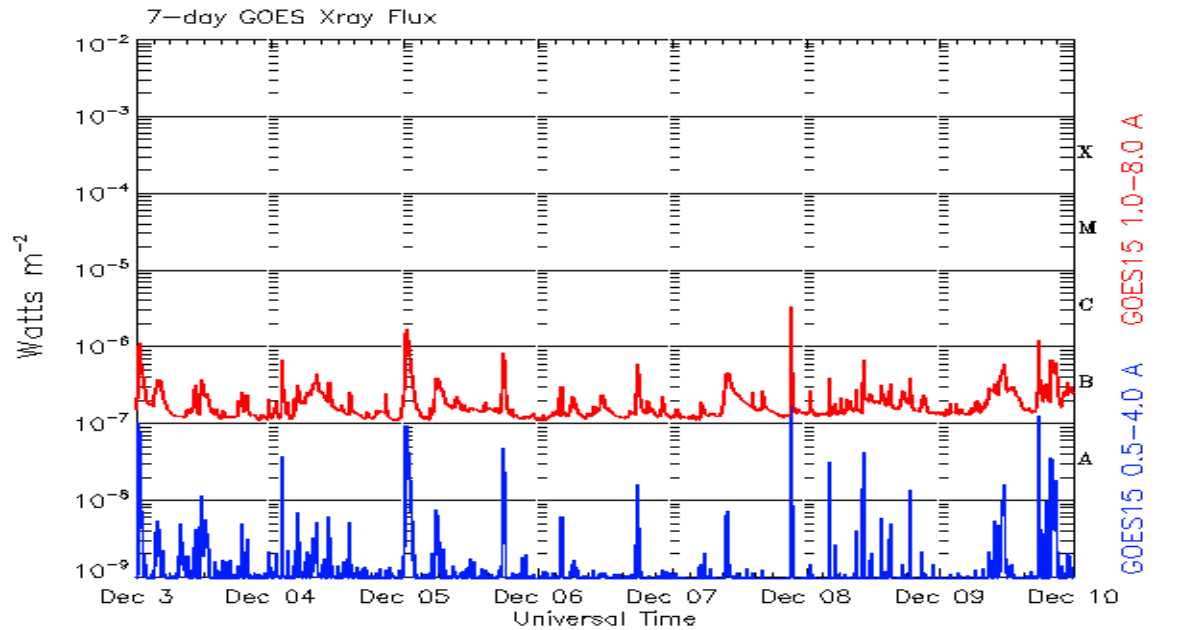
The electron flux plot contains the five-minute averaged integral electron flux (electrons/cm<sup>2</sup>-sec -sr) with energies greater than 2 MeV by the SWPC Primary GOES satellite.

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 03 December 2012*

The x-ray plots contains five-minute averages x-ray flux (Watt/ $m^2$ ) 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/ $cm^2$  -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)***

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

