

Space Weather Highlights
15 October - 21 October 2012

SWPC PRF 1938
22 October 2012

Solar activity ranged from low to high levels. Activity was low during 15 - 19 October due to mostly low-level C-class flares. The largest flare of this interval was a C7 at 17/0802 UTC from Region 1596 (N07, L=150, class/area Eho/460 on 21 October) which displayed a beta-gamma magnetic configuration during most of its transit. Activity increased to high levels on 20 October due to an impulsive M9 x-ray flare at 20/1814 UTC from Region 1598 (S12, L=113, class/area Dhi/270 on 21 October) as it crossed the east limb. The M9 flare was associated with a Type II radio sweep (estimated shock speed 516 km/s) and a non-Earth-directed coronal mass ejection (CME). Activity decreased to moderate levels on 21 October due to an M1/Sf flare at 21/2003 UTC from Region 1598, which was also associated with a non-Earth-directed CME.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit was at high levels during most of the period.

Geomagnetic field activity was at unsettled levels early on 15 October, then decreased to quiet levels for the rest of the period.

Space Weather Outlook
22 October - 17 November 2012

Solar activity is expected to be at low to moderate levels during 22 October - 02 November with M-class flare activity likely from Region 1598. Activity is expected to decrease to low levels during 03 - 17 November. However, there will be a chance for M-class flare activity beginning 15 November as (old) Region 1598 returns to the visible disk.

No proton events are expected at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to be at mostly high levels during 22 - 24 October. A decrease to normal to moderate flux levels is expected during 25 October - 04 November. An increase to mostly high flux levels is expected during 05 - 17 November.

Geomagnetic field activity is expected to be at quiet to unsettled levels during 22 - 23 October with a slight chance for active levels due to a coronal hole high-speed stream (CH HSS). Quiet levels are expected during 24 October - 07 November. An increase to unsettled levels is expected on 08 November due to a solar sector boundary passage followed by a co-rotating interaction region in advance of a CH HSS. A further increase to active to minor storm levels is expected on 09 November due to the onset of a CH HSS. Activity is expected to decrease to quiet to active levels on 10 November as CH HSS effects subside. A further decrease to quiet levels is expected during 11 - 17 November.



Daily Solar Data

Date	Radio Flux 10.7cm	Sun spot No.	Sunspot Area (10 ⁻⁶ hemi.)	X-ray Background Flux	Flares							
					X-ray			Optical				
					C	M	X	S	1	2	3	4
15 October	137	119	550	B5.5	5	0	0	2	0	0	0	0
16 October	137	107	490	B4.3	3	0	0	2	1	0	0	0
17 October	135	100	390	B4.5	6	0	0	3	0	0	0	0
18 October	138	112	640	B4.4	1	0	0	0	0	0	0	0
19 October	141	110	690	B5.4	4	0	0	5	1	0	0	0
20 October	151	112	870	B6.2	3	1	0	0	0	0	0	0
21 October	144	75	930	B6.1	9	1	0	2	0	0	0	0

Daily Particle Data

Date	Proton Fluence (protons/cm ² -day -sr)			Electron Fluence (electrons/cm ² -day -sr)		
	>1 MeV	>10 MeV	>100 MeV	>0.6 MeV	>2MeV	>4 MeV
	15 October	2.8e+05	1.1e+04	2.7e+03		2.7e+08
16 October	7.1e+05	1.1e+04	2.7e+03		4.8e+08	
17 October	6.8e+05	1.2e+04	2.9e+03		4.7e+08	
18 October	7.6e+05	1.1e+04	2.7e+03		5.2e+08	
19 October	9.6e+05	1.1e+04	2.6e+03		6.0e+08	
20 October	1.5e+06	1.1e+04	2.6e+03		5.5e+08	
21 October	1.7e+06	1.1e+04	2.9e+03		4.6e+08	

Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	15 October	7	3-2-2-2-2-1-2-1	12	3-2-3-4-3-1-2-1	8
16 October	5	1-1-2-1-2-2-1-1	14	2-1-4-4-4-3-1-1	5	1-1-2-1-2-1-1-1
17 October	6	2-1-3-1-2-1-1-2	7	1-3-3-1-2-1-0-2	7	2-2-2-1-2-1-0-2
18 October	4	2-1-0-1-2-2-1-1	3	1-1-0-3-0-1-1-0	5	2-1-0-1-1-2-1-1
19 October	3	2-0-0-1-2-1-1-0	1	1-1-0-0-0-0-0-0	4	2-1-0-1-1-1-1-0
20 October	3	0-0-0-1-2-1-2-1	0	0-0-0-0-0-0-0-0	3	0-0-0-1-1-1-1-0
21 October	2	0-0-0-1-2-1-1-0	0	0-0-0-0-0-0-0-0	3	0-0-1-1-1-1-1-0

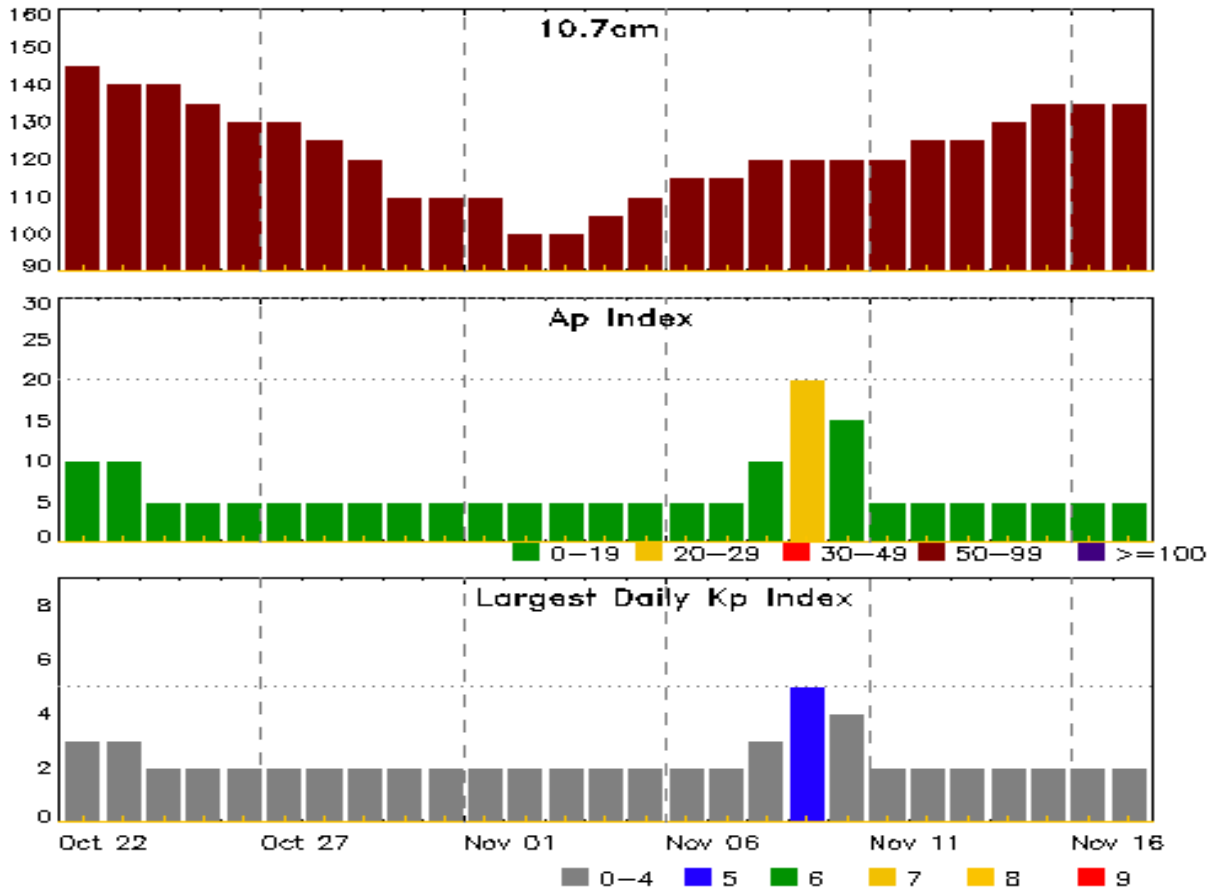


Alerts and Warnings Issued

Date & Time of Issue UTC	Type of Alert or Warning	Date & Time of Event UTC
15 Oct 0051	EXTENDED WARNING: Geomagnetic K = 4	12/2250 - 15/0700
15 Oct 0610	CONTINUED ALERT: Electron 2MeV Integral Flux >= 1000pfu	09/1015
16 Oct 0522	CONTINUED ALERT: Electron 2MeV Integral Flux >= 1000pfu	09/1015
17 Oct 0503	CONTINUED ALERT: Electron 2MeV Integral Flux >= 1000pfu	09/1015
18 Oct 0506	CONTINUED ALERT: Electron 2MeV Integral Flux >= 1000pfu	09/1015
19 Oct 0517	CONTINUED ALERT: Electron 2MeV Integral Flux >= 1000pfu	09/1015
20 Oct 0503	CONTINUED ALERT: Electron 2MeV Integral Flux >= 1000pfu	09/1015
20 Oct 1816	ALERT: X-ray Flux exceeded M5	20/1814
20 Oct 1842	SUMMARY: X-ray Event exceeded M5	20/1805 - 1819
20 Oct 1849	ALERT: Type II Radio Emission	20/1815
21 Oct 0505	CONTINUED ALERT: Electron 2MeV Integral Flux >= 1000pfu	09/1015



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
22 Oct	145	10	3	05 Nov	110	5	2
23	140	10	3	06	115	5	2
24	140	5	2	07	115	5	2
25	135	5	2	08	120	10	3
26	130	5	2	09	120	20	5
27	130	5	2	10	120	15	4
28	125	5	2	11	120	5	2
29	120	5	2	12	125	5	2
30	110	5	2	13	125	5	2
31	110	5	2	14	130	5	2
01 Nov	110	5	2	15	135	5	2
02	100	5	2	16	135	5	2
03	100	5	2	17	135	5	2
04	105	5	2				



Energetic Events

Date	Time			X-ray		Optical Information			Peak		Sweep Freq	
	Begin	Max	Half Max	Class	Integ Flux	Imp/ Brtns	Location	Rgn #	245	2695	II	IV
20 Oct	1805	1814	1819	M9.0	0.035			1598	280			1
21 Oct	1946	2003	2020	M1.3	0.014	SF	S10E76	1598				

Flare List

Date	Time			X-ray Class	Imp/ Brtns	Location	Rgn #
	Begin	Max	End				
15 Oct	0218	0222	0226	B8.1			1589
15 Oct	0326	0333	0339	C2.2			1593
15 Oct	0415	0424	0432	C4.0			1593
15 Oct	0804	0809	0813	C1.1	SF	N10E45	1591
15 Oct	1455	1542	1613	C4.4			1593
15 Oct	1541	1542	1545		SF	N10E41	1591
15 Oct	1844	1859	1906	C1.4			1589
15 Oct	2251	2257	2305	B9.2			1591
15 Oct	2356	2359	0004	B7.5			
16 Oct	0144	0148	0151	B8.4			
16 Oct	0613	0617	0621	B8.2			
16 Oct	0646	0653	0658	C1.8	SF	N09E32	1591
16 Oct	0849	0849	0852		SF	N09E31	1591
16 Oct	1612	1627	1639	C3.3	1F	N13W11	1589
16 Oct	2306	2310	2313	C1.0			1594
17 Oct	0044	0049	0102	C1.1	SF	N12W17	1589
17 Oct	0556	0605	0615	C1.2			
17 Oct	0736	0738	0746		SF	N11W21	1589
17 Oct	0752	0802	0816	C7.4			1596
17 Oct	1216	1221	1226	C1.3			1594
17 Oct	1238	1239	1241		SF	S25E39	1594
17 Oct	1427	1434	1440	C2.0			1596
17 Oct	1550	1556	1603	C1.0			
18 Oct	1959	2012	2022	B7.3			1596
18 Oct	2230	2259	2321	C1.4			1596
19 Oct	0106	0115	0133	C1.3	SF	N12W43	1589
19 Oct	0300	0310	0328		SF	S21W32	1597
19 Oct	0437	0441	0451	B8.6			1597
19 Oct	0508	0518	0618	C1.8	SF	N12W46	1589



Flare List

Date	Time			Optical			Rgn #
	Begin	Max	End	X-ray Class	Imp/Brtns	Location Lat CMD	
19 Oct	0628	0649	0712		SF	N12W46	1589
19 Oct	B0957	U0959	A1008		SF	N17E29	1593
19 Oct	1842	1851	1901	C1.7	1F	S25E15	1594
19 Oct	2046	2052	2055	C3.6			1598
20 Oct	1429	1448	1503	C1.8			1598
20 Oct	1718	1737	1746	C2.4			1598
20 Oct	1805	1814	1819	M9.0			1598
20 Oct	2002	2010	2022	C2.7			1596
21 Oct	0254	0308	0316	C7.8			1598
21 Oct	0315	0316	0318		SF	N03E47	1596
21 Oct	0524	0534	0546	C5.6			1598
21 Oct	1106	1109	1118	C1.1			1596
21 Oct	1258	1316	1332	C1.8			1596
21 Oct	1752	1818	1831	C1.1			1598
21 Oct	1842	1845	1848	C1.2			1598
21 Oct	1946	2003	2020	M1.3	SF	S10E76	1598
21 Oct	2145	2151	2159	C1.1			1598
21 Oct	2238	2300	2308	C1.2			1598
21 Oct	2339	2348	2353	C1.2			1598



Region Summary

Date	Location		Sunspot Characteristics				Flares																
	Lat CMD	Lon	Helio 10 ⁻⁶ hemi.	Area	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical											
									C	M	X	S	1	2	3	4							
Region 1586																							
07 Oct	S12E66	301	90	2	Hsx	1	A																
08 Oct	S13E52	302	80	3	Hsx	1	A																
09 Oct	S13E38	302	80	2	Hsx	1	A																
10 Oct	S12E24	302	60	1	Hsx	1	A																
11 Oct	S13E11	304	80	2	Hsx	1	A																
12 Oct	S12W01	302	80	2	Hsx	1	A																
13 Oct	S12W15	303	80	2	Hsx	1	A																
14 Oct	S13W28	303	70	3	Hsx	2	A																
15 Oct	S13W36	303	60	2	Hsx	1	A																
16 Oct	S12W54	302	40	2	Hsx	1	A																
17 Oct	S14W67	301	60	2	Hsx	1	A																
18 Oct	S13W80	302	50	5	Hsx	1	A																
19 Oct	S12W93	302	60	2	Hsx	1	A																
													0	0	0	0	0	0	0	0	0	0	

Crossed West Limb.
Absolute heliographic longitude: 302

Region 1589																							
09 Oct	N13E75	265	110	6	Cao	3	B																
10 Oct	N13E61	265	200	8	Dai	12	B	1				1											
11 Oct	N12E49	266	280	10	Dac	20	BG	2				3											
12 Oct	N13E34	266	280	10	Dkc	29	BG	4				3	1										
13 Oct	N13E22	266	270	12	Ekc	27	BGD	1				1											
14 Oct	N13E09	266	240	11	Eac	34	BG																
15 Oct	N14W06	267	130	7	Dri	27	BG	1															
16 Oct	N12W19	267	80	8	Dri	13	B	1					1										
17 Oct	N13W32	267	90	6	Dsi	14	B	1				2											
18 Oct	N12W45	267	20	7	Bxi	13	B																
19 Oct	N12W59	268	30	6	Cro	10	B	2				3											
20 Oct	N12W70	266	90	2	Cso	4	B																
21 Oct	N12W84	267	plage																				
													14	0	0	13	2	0	0	0	0	0	

Still on Disk.
Absolute heliographic longitude: 267



Region Summary - continued

Date	Location		Sunspot Characteristics					Flares															
	Lat CMD	Helio Lon	Area 10 ⁶ hemi.	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical												
								C	M	X	S	1	2	3	4								
Region 1590																							
11 Oct	S29E59	256	30	5	Cso	2	B																
12 Oct	S29E46	256	20	2	Hax	1	A	1					1										
13 Oct	S30E31	257	40	2	Cso	2	B																
14 Oct	S30E17	258	40	1	Hsx	1	A																
15 Oct	S30E05	256	30	2	Hrx	1	A																
16 Oct	S30W07	255	20	6	Cro	7	B																
17 Oct	S30W18	253	10	2	Cro	3	B																
18 Oct	S30W29	251	10	2	Bxo	2	B																
19 Oct	S30W42	251	10	4	Bxo	2	B																
20 Oct	S31W53	249	120	10	Cso	6	B																
21 Oct	S31W67	250	plage																				
									1	0	0		1	0	0	0	0	0					

Still on Disk.

Absolute heliographic longitude: 256

Region 1591

12 Oct	N07E72	228	200	6	Dso	2	B														
13 Oct	N07E59	229	190	5	Dso	3	B														
14 Oct	N07E45	230	220	8	Dsi	5	B	5					4								
15 Oct	N07E32	229	230	6	Dso	12	B	1					2								
16 Oct	N07E20	228	190	5	Dso	6	B	1					2								
17 Oct	N07E07	227	130	6	Dso	6	B														
18 Oct	N08W08	230	170	2	Hsx	1	A														
19 Oct	N08W22	231	150	3	Hsx	1	A														
20 Oct	N07W34	230	110	3	Hsx	1	A														
21 Oct	N07W47	230	120	2	Hsx	1	A														
									7	0	0		8	0	0	0	0	0			

Still on Disk.

Absolute heliographic longitude: 227



Region Summary - continued

Date	Location		Sunspot Characteristics				Flares																
	Lat CMD	Lon	Helio 10 ⁻⁶ hemi.	Area	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical											
									C	M	X	S	1	2	3	4							
Region 1592																							
14 Oct	N23E20	255	20	4	Dro	5	B																
15 Oct	N23E06	255	10	5	Bxo	5	B																
16 Oct	N22W08	256	10	1	Axx	1	A																
17 Oct	N24W20	255	plage																				
18 Oct	N24W34	256	plage																				
19 Oct	N24W48	257	plage																				
20 Oct	N24W62	258	plage																				
21 Oct	N24W76	259	plage																				
												0	0	0	0	0	0	0	0	0	0	0	

Still on Disk.

Absolute heliographic longitude: 255

Region 1593																							
15 Oct	N17E78	183	60	2	Hsx	1	A	3															
16 Oct	N15E62	186	60	3	Hax	3	A																
17 Oct	N17E49	185	40	2	Hax	1	A																
18 Oct	N18E36	186	30	1	Hax	3	A																
19 Oct	N17E22	187	40	3	Cso	5	B					1											
20 Oct	N15E09	187	70	6	Dso	6	B																
21 Oct	N15W05	188	40	4	Dso	6	B																
								3	0	0	0	1	0	0	0	0	0	0	0	0	0	0	

Still on Disk.

Absolute heliographic longitude: 188

Region 1594																							
15 Oct	S26E61	199	30	3	Dro	2	B																
16 Oct	S26E47	200	90	5	Dao	6	B	1															
17 Oct	S27E33	201	50	7	Dao	4	B	1				1											
18 Oct	S27E23	199	40	7	Cro	4	B																
19 Oct	S27E11	198	10	2	Bxo	2	B	1							1								
20 Oct	S27W03	199	10	2	Bxo	2	B																
21 Oct	S27W17	200	plage																				
								3	0	0	0	1	1	0	0	0	0	0	0	0	0	0	

Still on Disk.

Absolute heliographic longitude: 199



Region Summary - continued

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

Region 1595

17 Oct	S14W41	276	10	2	Axx	1	A										
18 Oct	S14W55	277	plage														
19 Oct	S14W69	278	plage														
20 Oct	S14W83	279	plage														
									0	0	0	0	0	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 276

Region 1596

17 Oct	N11E85	150	plage														
18 Oct	N11E73	149	300	16	Eao	4	B										
19 Oct	N08E60	149	330	12	Eko	5	BG										
20 Oct	N06E46	150	280	11	Eko	6	BG										
21 Oct	N07E33	150	460	11	Eho	9	BG					1					
									6	0	0	1	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 150

Region 1597

18 Oct	S21W30	252	20	4	Dro	4	B										
19 Oct	S21W43	252	60	6	Dao	4	B						1				
20 Oct	S22W58	254	90	6	Dso	6	B										
21 Oct	S22W69	252	40	8	Dso	5	B										
									0	0	0	1	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 252

Region 1598

19 Oct	S09E96	286	plage									1					
20 Oct	S09E82	114	100	2	Hsx	1	A					2	1				
21 Oct	S12E70	113	270	7	Dhi	4	B					7	1		1		
									10	2	0	1	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 113

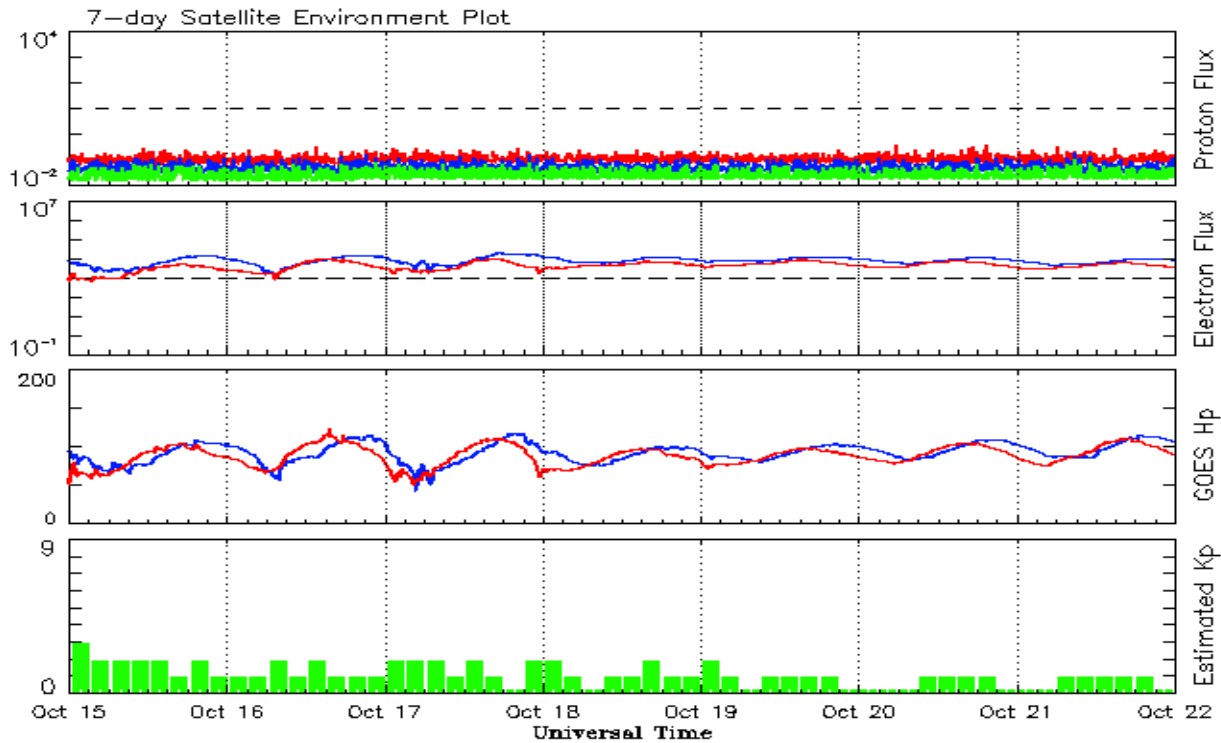


Recent Solar Indices (preliminary)
Observed monthly mean values

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
2010									
October	35.0	23.5	0.67	35.9	23.2	81.6	85.3	6	6.4
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
2011									
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	41.5	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	57.2	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
2012									
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			113.1		9	
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	

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 15 October 2012*

The proton flux plot contains the five-minute averaged integral proton flux (protons/cm²-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.

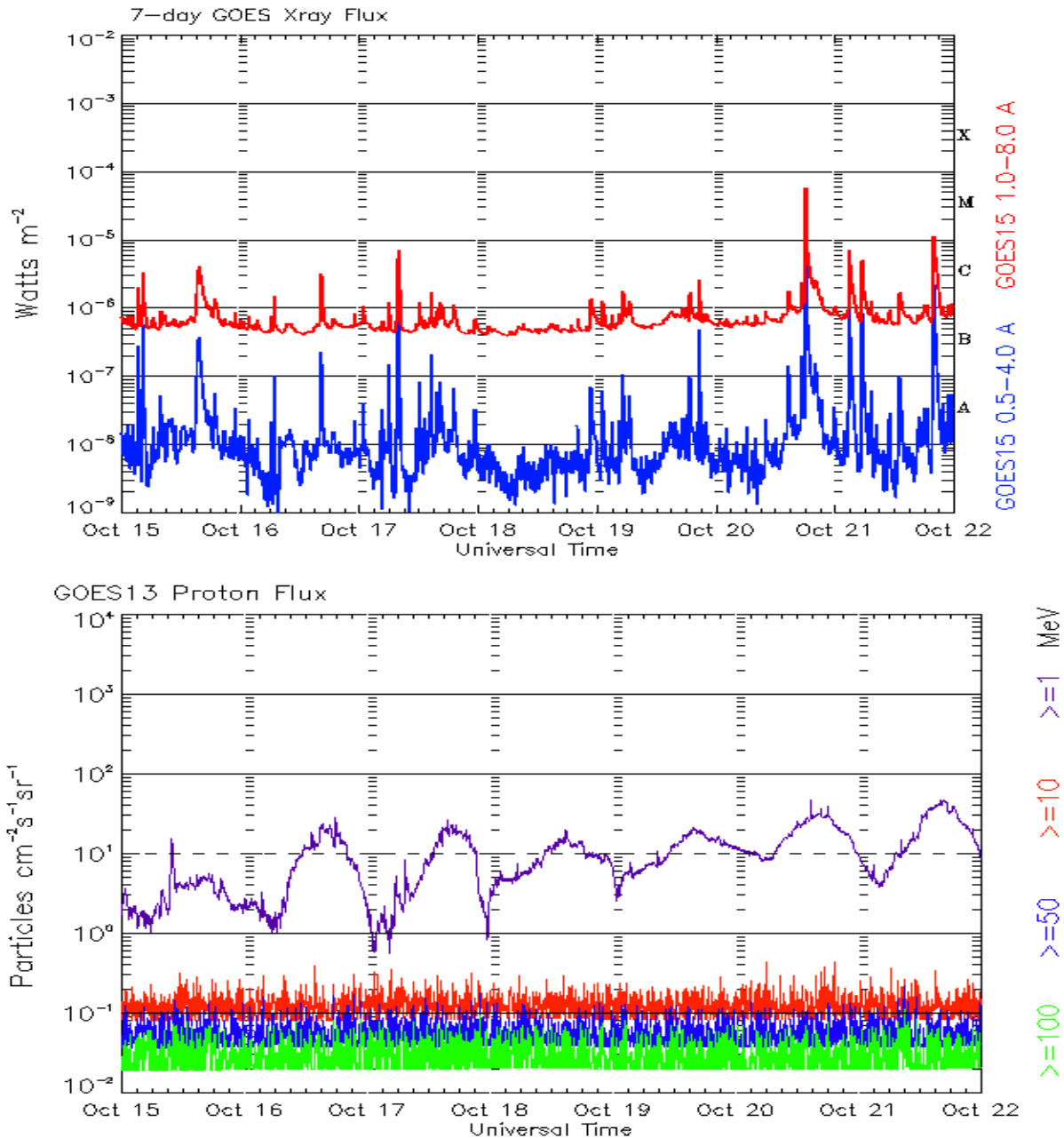
The electron flux plot contains the five-minute averaged integral electron flux (electrons/cm²-sec -sr) with energies greater than 2 MeV by the SWPC Primary GOES satellite.

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 15 October 2012*

The x-ray plots contains five-minute averages x-ray flux (Watt/m²) 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/cm² -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.



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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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