

Space Weather Highlights
05 September - 11 September 2016

SWPC PRF 2141
12 September 2016

Solar activity was at very low levels on 05-11 Sep. Region 2591 (N05, L=144, Cro/025 on 11 Sep) produced a B9.6 flare at 10/1920 UTC, the strongest of the period. No Earth-directed CMEs were observed during the period.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit was at very high levels on 05 Sep and high levels from 06-11 Sep due to CH HSS influence. The largest flux value of the period was 56,842 pfu observed at 05/1815 UTC.

Geomagnetic field activity was at quiet to minor storm levels on 05 Sep due to a period of prolonged southward Bz during the waning phase of a CH HSS. Solar wind speed continued to decline over the period from a high near 600 km/s to 340 km/s by the end of the period. Activity decreased to quiet to active conditions on 06 Sep and to quiet to unsettled conditions on 07 Sep. A final increase to quiet to active conditions was observed on 08 Sep before quiet conditions dominated for the remainder of the period.

Space Weather Outlook
12 September - 08 October 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 on 12-20 Sep and 26-28 Sep. High levels expected on 21-25 Sep, 29 Sep - 01 Oct, and 06-08 Oct. Very high levels are likely between 02-05 Oct. High and very high levels are anticipated to result from recurrent CH HSS events.

Geomagnetic field activity is expected to be at quiet to active levels on 12 Sep as a solar sector boundary crossing is anticipated to transition into a weak, negative polarity, CH HSS. As the CH HSS influence wanes, quiet to unsettled levels are likely over 13-14 Sep. Quiet conditions are expected on 15-16 Sep under an ambient solar wind environment. 17-21 Sep will likely be at quiet to active conditions as a negative polarity CH HSS influences the near-Earth environment. Quiet conditions are again expected from 22-25 Sep. 26-27 Sep are likely to be at unsettled to active conditions from a small, positive polarity, CH HSS. 28-30 Sep are likely to see field active range from unsettled to major storm levels from a strong, positive polarity, CH HSS. As the CH HSS influence wanes, unsettled to minor storm levels are likely on 01 Oct and quiet to active levels are expected from 02-05 Oct. Quiet conditions are expected to return over 06-08 Oct under a nominal solar wind regime.



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
05 September	94	22	420	B1.4	0	0	0	1	0	0	0	0
06 September	92	32	410	B1.3	0	0	0	1	0	0	0	0
07 September	93	50	470	B1.4	0	0	0	0	0	0	0	0
08 September	95	49	400	B1.0	0	0	0	1	0	0	0	0
09 September	91	65	430	B1.1	0	0	0	3	0	0	0	0
10 September	93	66	450	B1.5	0	0	0	2	0	0	0	0
11 September	86	63	340	B1.0	0	0	0	0	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
	05 September		3.0e+06	1.4e+04	3.0e+03	
06 September		1.2e+06	1.3e+04	3.1e+03		1.1e+09
07 September		1.3e+06	1.3e+04	3.2e+03		1.0e+09
08 September		1.1e+06	1.4e+04	3.1e+03		3.4e+08
09 September		5.0e+05	1.3e+04	3.1e+03		8.2e+07
10 September		3.8e+05	1.4e+04	3.6e+03		2.3e+08
11 September		4.8e+05	1.3e+04	3.3e+03		5.1e+08

Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	05 September	13	2-4-3-2-2-3-3-2	36	3-4-6-5-4-5-4-3	17
06 September	12	3-3-3-2-2-2-3-3	18	3-3-4-4-4-2-3-2	14	3-3-3-3-2-2-4-2
07 September	8	3-3-1-2-2-2-1-2	25	2-2-1-5-6-5-2-1	12	3-3-1-3-3-3-2-2
08 September	12	3-3-3-3-3-2-2-2	31	2-4-4-6-5-5-2-1	14	3-4-3-3-3-2-2-2
09 September	6	3-1-1-1-2-1-1-2	1	1-0-0-0-0-0-1-1	5	2-1-1-1-1-1-1-2
10 September	4	1-1-2-1-2-1-1-1	2	1-1-2-1-0-0-1-0	5	1-2-2-1-1-0-1-2
11 September	3	0-0-1-1-2-1-1-1	7	1-0-2-3-3-3-0-0	3	1-0-1-1-2-1-1-1

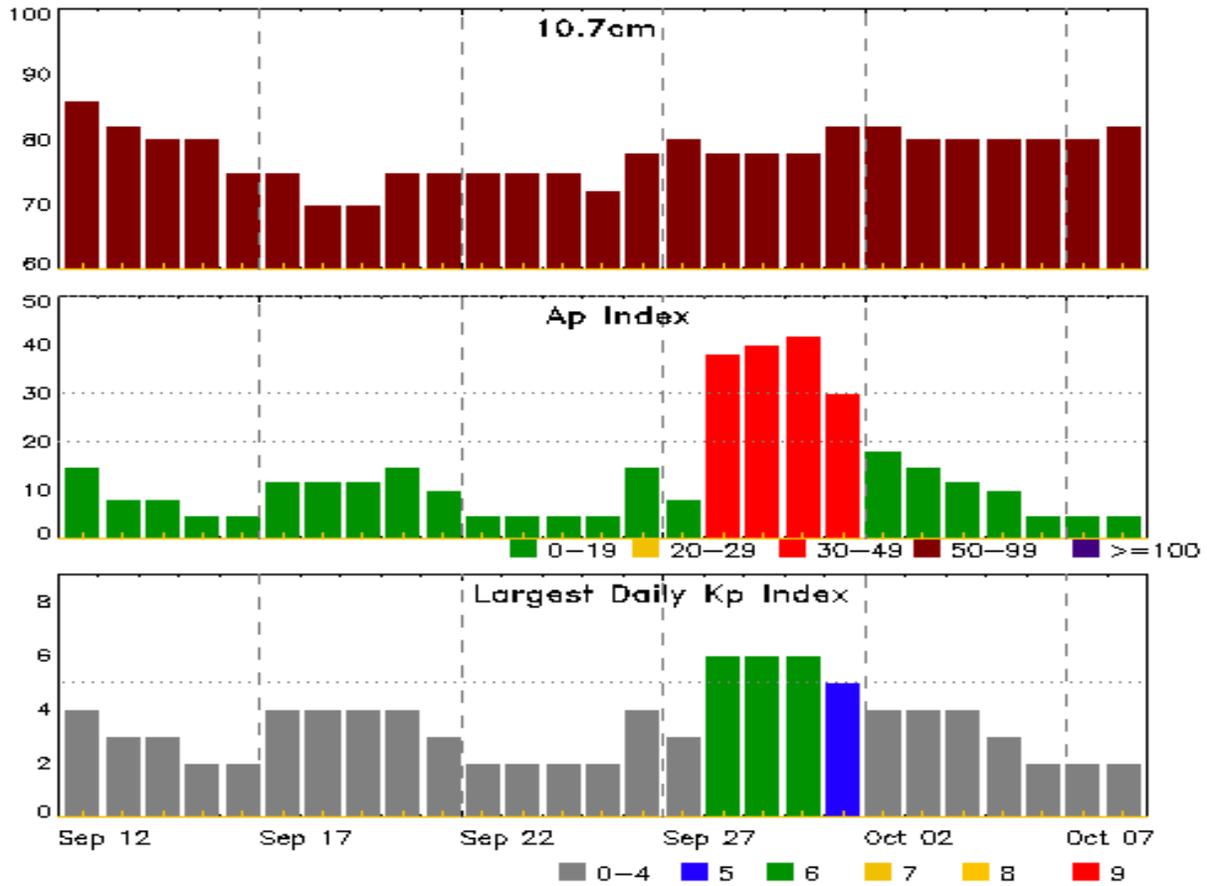


Alerts and Warnings Issued

Date & Time of Issue UTC	Type of Alert or Warning	Date & Time of Event UTC
05 Sep 0501	CONTINUED ALERT: Electron 2MeV Integral Flux \geq 1000pfu	02/1305
05 Sep 0857	EXTENDED WARNING: Geomagnetic K = 4	04/0111 - 05/1800
05 Sep 1707	EXTENDED WARNING: Geomagnetic K = 4	04/0111 - 06/0300
05 Sep 2100	WARNING: Geomagnetic K = 5	05/2058 - 2359
05 Sep 2101	ALERT: Geomagnetic K = 5	05/2059
06 Sep 0516	CONTINUED ALERT: Electron 2MeV Integral Flux \geq 1000pfu	02/1305
06 Sep 0524	WARNING: Geomagnetic K = 4	06/0525 - 1500
06 Sep 1956	WARNING: Geomagnetic K = 4	06/1956 - 2359
06 Sep 2058	ALERT: Geomagnetic K = 4	06/2058
07 Sep 0436	WARNING: Geomagnetic K = 4	07/0435 - 1000
07 Sep 0500	CONTINUED ALERT: Electron 2MeV Integral Flux \geq 1000pfu	02/1305
07 Sep 1653	WARNING: Geomagnetic K = 4	07/1654 - 2100
08 Sep 0421	WARNING: Geomagnetic K = 4	08/0420 - 1500
08 Sep 0501	CONTINUED ALERT: Electron 2MeV Integral Flux \geq 1000pfu	02/1305
08 Sep 0602	ALERT: Geomagnetic K = 4	08/0559
09 Sep 1444	CONTINUED ALERT: Electron 2MeV Integral Flux \geq 1000pfu	02/1305
10 Sep 0501	CONTINUED ALERT: Electron 2MeV Integral Flux \geq 1000pfu	02/1305
11 Sep 0501	CONTINUED ALERT: Electron 2MeV Integral Flux \geq 1000pfu	02/1305



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
12 Sep	86	15	4	26 Sep	78	15	4
13	82	8	3	27	80	8	3
14	80	8	3	28	78	38	6
15	80	5	2	29	78	40	6
16	75	5	2	30	78	42	6
17	75	12	4	01 Oct	82	30	5
18	70	12	4	02	82	18	4
19	70	12	4	03	80	15	4
20	75	15	4	04	80	12	4
21	75	10	3	05	80	10	3
22	75	5	2	06	80	5	2
23	75	5	2	07	80	5	2
24	75	5	2	08	82	5	2
25	72	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				
05 Sep	0907	0912	0922	B6.4			2585
05 Sep	2135	2146	2152	B3.0	SF	N07E05	2585
06 Sep	1346	1350	1359		SF	N11W65	2586
07 Sep	0228	0234	0238	B3.0			2585
07 Sep	0411	0417	0422	B3.6			2585
07 Sep	0929	0933	0936	B2.3			2586
07 Sep	1035	1040	1050	B6.6			2585
07 Sep	1211	1214	1217	B2.9			2585
08 Sep	0225	0228	0231	B2.2			2585
08 Sep	0352	0356	0358	B2.6			2585
08 Sep	0414	0422	0425	B3.4			2585
08 Sep	0443	0447	0451	B8.3			2585
08 Sep	0604	0609	0613	B5.1			2585
08 Sep	0637	0642	0646	B4.1			2585
08 Sep	0732	0735	0739	B2.8			2585
08 Sep	1241	1246	1253	B3.7			2585
08 Sep	1619	1624	1627	B3.1			2585
08 Sep	1913	1917	1921	B8.2	SF	N13W36	2585
09 Sep	0302	0323	0334	B7.9			2588
09 Sep	0428	0431	0435	B2.8			2589
09 Sep	0656	0701	0706	B3.8	SF	N05W41	2585
09 Sep	0926	0926	0926		SF	N16E10	2589
09 Sep	1330	1337	1356		SF	N15E07	2589
09 Sep	1837	1842	1849	B3.6			2585
09 Sep	2024	2027	2030	B3.7			2585
09 Sep	2217	2221	2227	B3.9			2585
10 Sep	0659	0706	0713	B3.6			2589
10 Sep	0818	0823	0826	B5.3			2585
10 Sep	1336	1339	1350	B2.3			2585
10 Sep	1854	1858	1907	B4.8	SF	N04E20	2591
10 Sep	1915	1920	1941	B9.6	SF	N04E20	2591



Flare List

Date	Time			X-ray Class	Optical		Rgn #
	Begin	Max	End		Imp/ Brtns	Location Lat CMD	
10 Sep	2049	2059	2105	B2.1			2589



Region Summary

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

Region 2584

31 Aug	S06E62	230	75	6	Cao	7	B										
01 Sep	S08E41	238	10	1	Bxo	2	B										
02 Sep	S08E27	239	plage														
03 Sep	S08E13	240	plage														
04 Sep	S08W01	241	plage														
05 Sep	S08W15	241	plage														
06 Sep	S08W29	242	plage														
07 Sep	S08W43	243	plage														
08 Sep	S08W57	244	plage														
09 Sep	S08W71	245	plage														
10 Sep	S08W85	245	plage														
									0	0	0	0	0	0	0	0	0

Crossed West Limb.
 Absolute heliographic longitude: 241

Region 2585

30 Aug	N08E85	221	plage														
31 Aug	N08E71	221	230	9	Csi	13	B										
01 Sep	N07E56	223	520	11	Eai	8	B							3			
02 Sep	N06E43	223	460	11	Ekc	17	BG							8			
03 Sep	N08E31	222	590	11	Ekc	14	BG							2			
04 Sep	N08E16	224	550	12	Ekc	25	BG							2			
05 Sep	N08E02	224	420	12	Eki	12	B							1			
06 Sep	N07W11	224	400	13	Eki	10	BG										
07 Sep	N08W25	225	430	13	Eki	12	BG										
08 Sep	N08W37	224	380	12	Eko	12	BD							1			
09 Sep	N09W50	224	380	11	Eko	13	BG							1			
10 Sep	N08W64	224	340	12	Eko	9	BD										
11 Sep	N08W78	225	240	11	Eso	7	B										
									3	0	0	18	0	0	0	0	0

Still on Disk.
 Absolute heliographic longitude: 224



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 2586																	
01 Sep	N08W03	282	10	3	Bxo	2	B										
02 Sep	N05W17	283	30	4	Bxo	2	B										
03 Sep	N05W33	286	10	1	Hrx	1	A										
04 Sep	N07W47	287	10	2	Bxo	2	B										
05 Sep	N07W61	287	plage														
06 Sep	N07W76	289	plage								1						
07 Sep	N07W89	289	10	2	Axx	2	A										
								0	0	0	1	0	0	0	0	0	

Crossed West Limb.
 Absolute heliographic longitude: 282

Region 2587																	
04 Sep	N10E28	212	0	1	Axx	2	A										
05 Sep	N10E14	212	plage														
06 Sep	N10W00	213	plage														
07 Sep	N10W14	214	plage														
08 Sep	N10W28	215	plage														
09 Sep	N10W42	216	plage														
10 Sep	N10W56	216	plage														
11 Sep	N10W70	217	plage														
								0	0	0	0	0	0	0	0	0	

Still on Disk.
 Absolute heliographic longitude: 213

Region 2588																	
06 Sep	N12E08	205	10	3	Bxo	2	B										
07 Sep	N12W06	206	30	5	Dso	6	B										
08 Sep	N12W19	206	10	6	Bxo	4	B										
09 Sep	N13W33	207	10	6	Axx	1	A										
10 Sep	N11W51	210	10		Axx	1	A										
11 Sep	N11W65	212	5		Axx	1	A										
								0	0	0	0	0	0	0	0	0	

Still on Disk.
 Absolute heliographic longitude: 206



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

Region 2589

08 Sep	N14E14	173	10	3	Bxo	3	B										
09 Sep	N15W01	175	30	4	Cro	7	B					2					
10 Sep	N14W13	173	80	6	Dai	12	B										
11 Sep	N15W28	175	70	6	Dso	8	B										
								0	0	0	2	0	0	0	0	0	

Still on Disk.

Absolute heliographic longitude: 175

Region 2590

09 Sep	N08W20	193	10	3	Bxo	4	B										
10 Sep	N08W34	194	plage														
11 Sep	N08W48	195	plage														
								0	0	0	0	0	0	0	0	0	

Still on Disk.

Absolute heliographic longitude: 193

Region 2591

10 Sep	N05E18	142	20	5	Cro	4	B					2					
11 Sep	N05E03	144	25	6	Cro	7	B										
								0	0	0	2	0	0	0	0	0	

Still on Disk.

Absolute heliographic longitude: 144

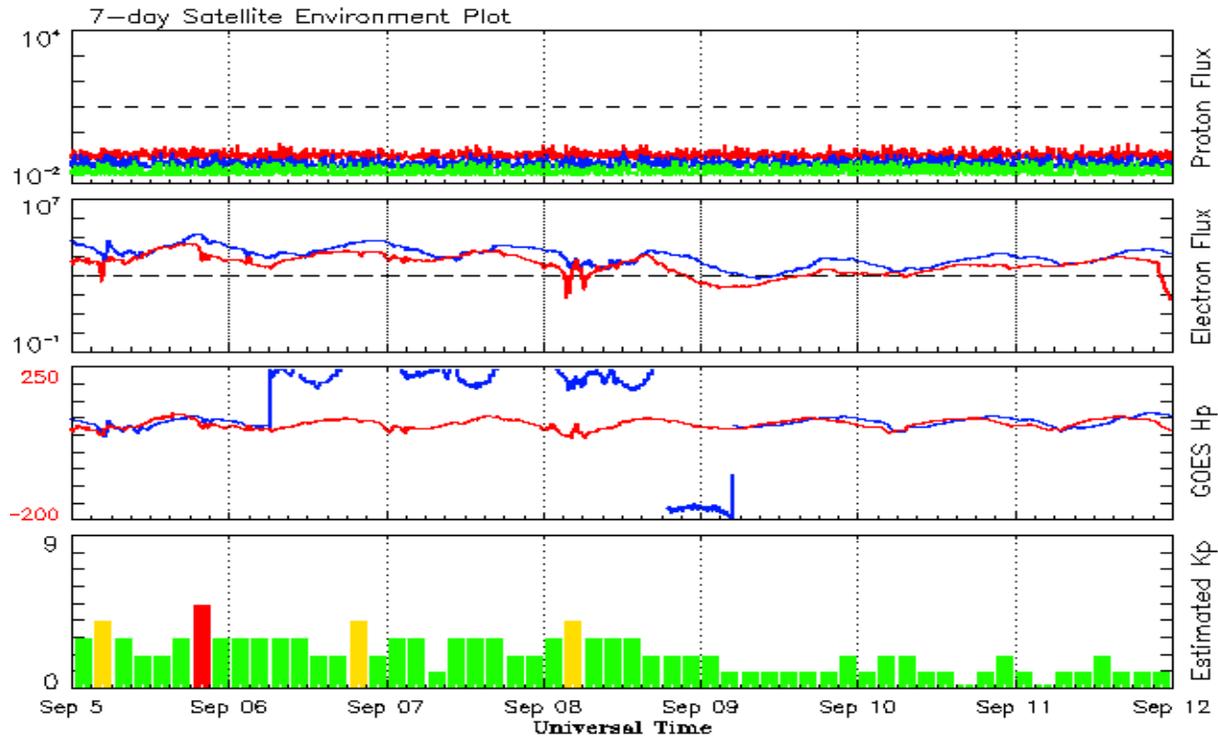


Recent Solar Indices (preliminary)
Observed monthly mean values

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
2014									
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
2015									
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	36.8	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
2016									
January	50.4	34.2	0.67	51.4	32.7	103.5	99.9	10	12.3
February	56.0	33.8	0.61	49.6	31.6	103.5	98.1	10	12.0
March	40.9	32.5	0.80			91.6		11	
April	39.2	22.8	0.58			93.4		10	
May	48.9	31.3	0.64			93.1		12	
June	19.3	12.5	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	

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 05 September 2016*

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.

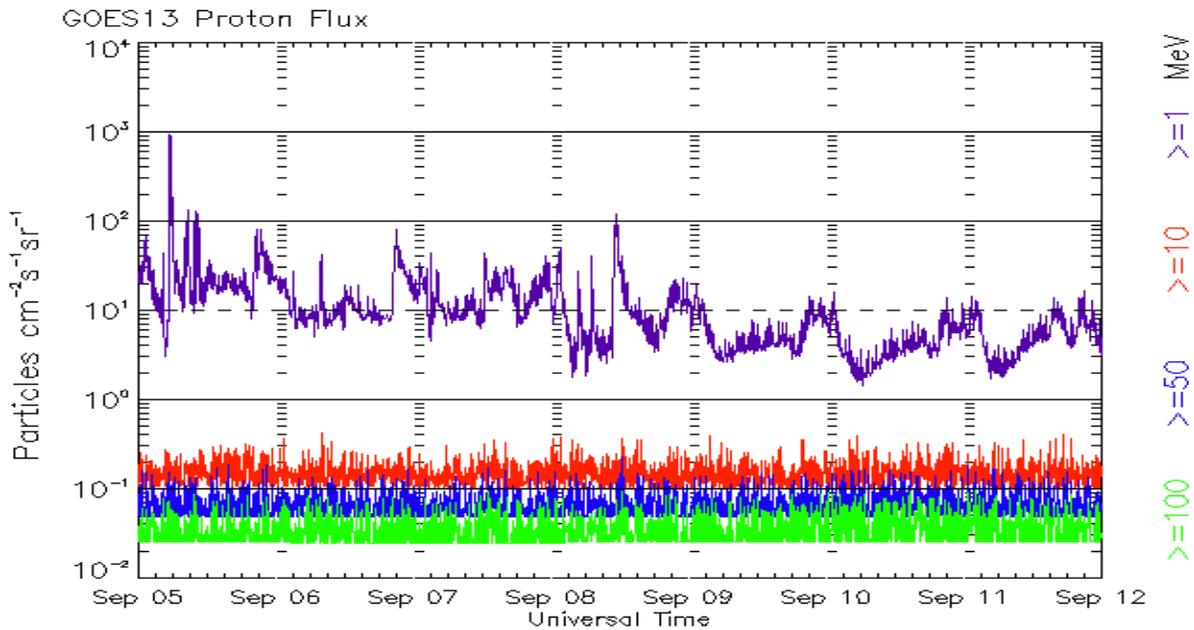
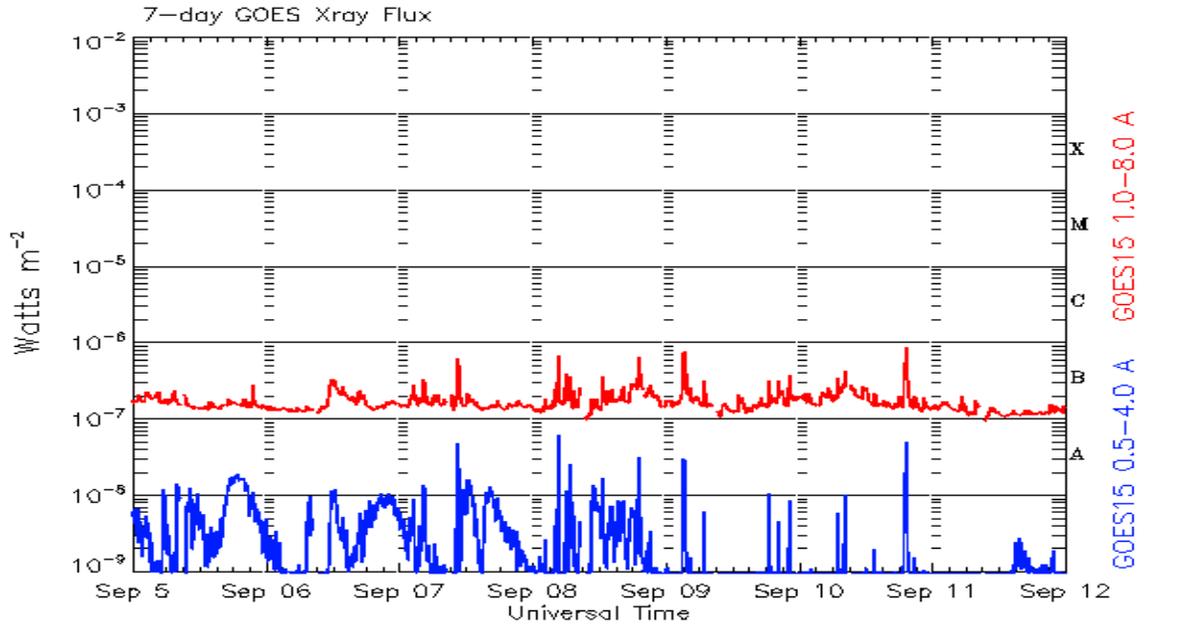
The electron flux plot contains the five-minute averaged integral electron flux (electrons/cm²-sec -sr) with energies greater than 2 MeV by the SWPC Primary GOES satellite.

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 05 September 2016*

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.



Preliminary Report and Forecast of Solar Geophysical Data (The Weekly)

Published every Monday by the Space Weather Prediction Center.

U.S. Department of Commerce
NOAA / National Weather Service
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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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