

**Space Weather Highlights**  
**23 September - 29 September 2024**

**SWPC PRF 2561**  
**30 September 2024**

Solar activity reached moderate levels on 23, 25-26, and 29 Sep with a total of six R1 (Minor) events observed throughout the week. Low levels of solar activity and C-class flare activity were observed throughout the remainder of the period. The largest events of the period were a pair of M1.7 flares from Region 3842 (S15, L=178, class/area=Dai/230 on 29 Sep) at 29/1424 and 1441 UTC. No Earth-directed CMEs resulted from this weeks solar activity.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit reached high levels on 23 Sep, and normal to moderate levels on 24-29 Sep.

Geomagnetic field activity reached active levels on 23 and 26 Sep, and G1 (Minor) storm levels on 24-25 Sep, due to the passage of CMEs (23-25 Sep) and the influence of a positive polarity CH HSS (25-26 Sep). Quiet to unsettled conditions were observed over 27-29 Sep.

**Space Weather Outlook**  
**30 September - 26 October 2024**

Solar activity is expected to range from low to moderate levels. R1-R2 (Minor-Moderate) events are likely, with a slight chance for R3 or greater events, throughout the period.

No proton events are expected at geosynchronous orbit, barring significant flare activity.

The greater than 2 MeV electron flux at geosynchronous orbit is likely to reach high levels on 12-15 Oct, with normal to moderate levels likely to persist throughout the remainder of the period.

Geomagnetic field activity is likely to reach active levels on 30 Sep due to negative polarity CH HSS influences. Active levels are likely on 05-06, and 10 Oct due to positive polarity CH HSS influences. Periods of G1 (Minor) storming are likely on 11-12, and 22 Oct due to positive polarity CH HSS influences.



### **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		
23 September	167	224	690	C1.4	2	1	0	2	0
24 September	172	123	730	C1.4	7	0	0	5	0
25 September	174	160	720	C1.7	2	1	0	2	1
26 September	181	189	740	C1.8	4	1	0	4	1
27 September	186	122	530	C2.3	6	0	0	13	0
28 September	195	148	630	C1.8	5	0	0	10	0
29 September	197	154	660	C1.8	3	3	0	7	1

### **Daily Particle Data**

Date	Proton Fluence (protons/cm <sup>2</sup> -day -sr)		>2MeV	Electron Fluence (electrons/cm <sup>2</sup> -day -sr)	
	>1 MeV	>10 MeV		>2MeV	
23 September	2.1e+06	1.5e+04			4.4e+07
24 September	1.0e+06	1.5e+04			2.2e+06
25 September	8.7e+06	1.5e+04			8.5e+06
26 September	1.6e+07	1.5e+04			3.6e+07
27 September	5.3e+06	1.5e+04			7.0e+06
28 September	1.6e+06	1.5e+04			9.2e+06
29 September	2.1e+06	1.5e+04			8.1e+06

### **Daily Geomagnetic Data**

Date	Middle Latitude		High Latitude		Estimated	
	A	K-indices	A	K-indices	A	K-indices
23 September	9	1-1-2-3-3-3-2-2	24	1-0-0-5-6-5-2-1	13	2-1-2-3-4-4-2-1
24 September	12	3-2-2-2-2-2-3-4	27	3-3-3-5-5-5-3-3	17	4-3-2-3-3-2-3-5
25 September	24	4-4-4-4-4-4-3-3	56	4-4-6-6-5-7-4-3	32	4-5-4-4-4-5-4-4
26 September	11	4-3-2-2-3-2-2-0	16	3-4-3-4-4-3-1-0	13	4-4-2-2-3-2-2-1
27 September	5	1-2-2-2-2-2-1-0	18	1-2-4-5-5-2-0-0	7	2-3-2-2-2-1-1-0
28 September	5	0-0-1-1-2-3-2-2	13	0-0-2-4-3-5-1-1	7	0-0-1-2-2-3-2-2
29 September	17	3-2-4-4-4-2-2-3	20	2-2-5-5-4-2-2-2	18	3-3-3-3-3-2-3-3

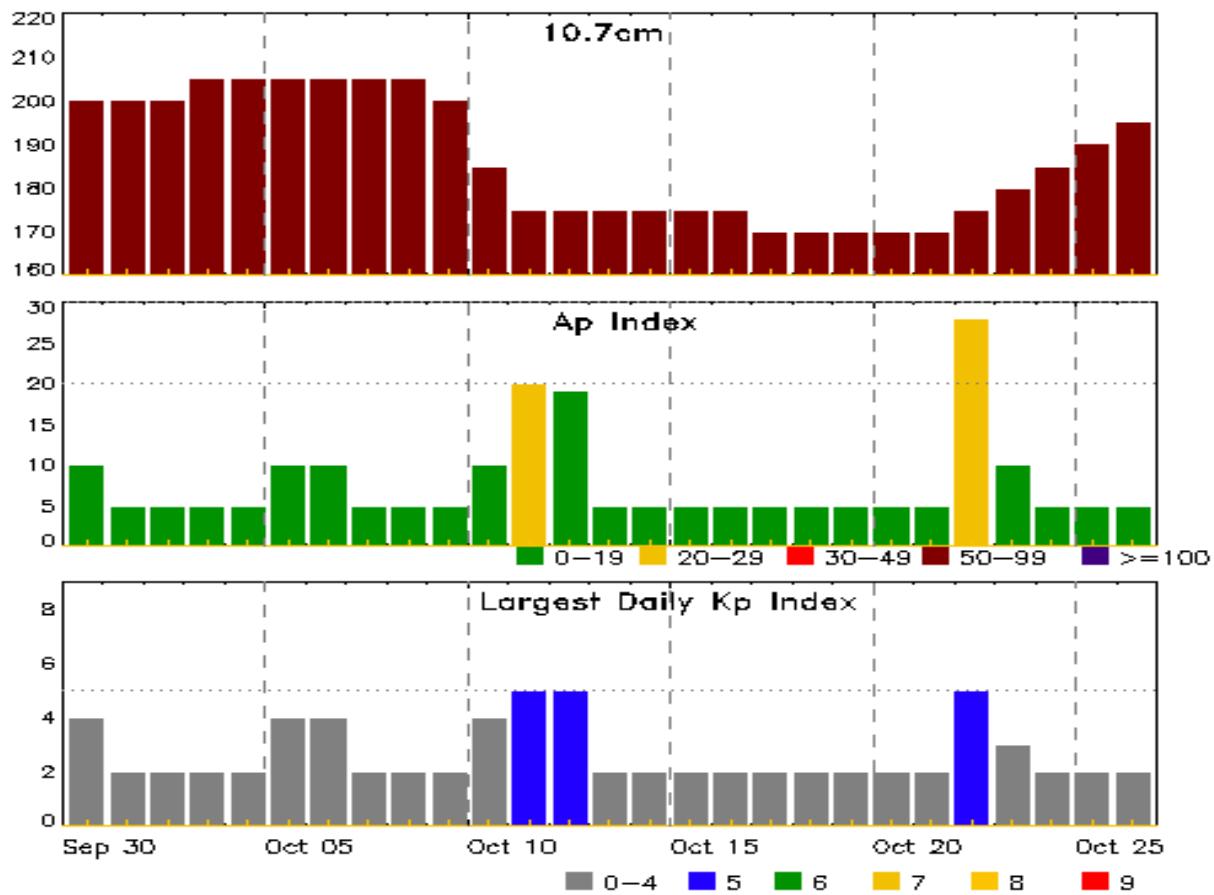


## ***Alerts and Warnings Issued***

<b>Date &amp; Time of Issue UTC</b>	<b>Type of Alert or Warning</b>	<b>Date &amp; Time of Event UTC</b>
23 Sep 1400	WARNING: Geomagnetic K = 4	23/1400 - 2100
23 Sep 1413	CONTINUED ALERT: Electron 2MeV Integral Flux $\geq$ 1000pfu	19/1740
23 Sep 1434	ALERT: Geomagnetic K = 4	
23 Sep 2051	WATCH: Geomagnetic Storm Category G1 predicted	
23 Sep 2053	EXTENDED WARNING: Geomagnetic K = 4	23/1400 - 24/0900
24 Sep 2244	WARNING: Geomagnetic K = 4	24/2245 - 25/1800
24 Sep 2342	ALERT: Geomagnetic K = 4	
24 Sep 2346	WARNING: Geomagnetic K = 5	24/2345 - 25/0900
25 Sep 0000	ALERT: Geomagnetic K = 5	
25 Sep 0549	ALERT: Geomagnetic K = 5	
25 Sep 0838	EXTENDED WARNING: Geomagnetic K = 5	24/2345 - 25/1500
25 Sep 1457	EXTENDED WARNING: Geomagnetic K = 4	24/2245 - 26/0600
25 Sep 1457	EXTENDED WARNING: Geomagnetic K = 5	24/2345 - 25/2359
25 Sep 1619	ALERT: Geomagnetic K = 5	
25 Sep 2052	WATCH: Geomagnetic Storm Category G1 predicted	
26 Sep 0532	EXTENDED WARNING: Geomagnetic K = 4	24/2245 - 26/1500
29 Sep 0425	WARNING: Geomagnetic K = 4	29/0424 - 2359
29 Sep 2349	EXTENDED WARNING: Geomagnetic K = 4	29/0424 - 30/0900



## Twenty-seven Day Outlook



Date	Radio Flux	Planetary	Largest	Date	Radio Flux	Planetary	Largest
	10.7cm	A Index	Kp Index		10.7cm	A Index	Kp Index
30 Sep	200	10	4	14 Oct	175	5	2
01 Oct	200	5	2	15	175	5	2
02	200	5	2	16	175	5	2
03	205	5	2	17	170	5	2
04	205	5	2	18	170	5	2
05	205	10	4	19	170	5	2
06	205	10	4	20	170	5	2
07	205	5	2	21	170	5	2
08	205	5	2	22	175	28	5
09	200	5	2	23	180	10	3
10	185	10	4	24	185	5	2
11	175	20	5	25	190	5	2
12	175	19	5	26	195	5	2
13	175	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 #	Radio Flux 245	2695	II	IV
23 Sep	1423	1456	1534	M1.3	0.041					3836		
25 Sep	2257	2312	2323	M1.3	0.012	1F	S12W46			3828		
26 Sep	2258	2312	2320	M1.4	0.011					3839		
29 Sep	1249	1253	1258	M1.0	0.005	SF	S11E25					
29 Sep	1409	1424	1431	M1.7	0.021	1F	S15E51			3842		
29 Sep	1431	1441	1446	M1.7	0.016					3842		

### *Flare List*

Date	Time			Optical			
	Begin	Max	End	X-ray Class	Imp/ Brtns	Location Lat	Rgn #
23 Sep	0959	1006	1010	C4.5			3825
23 Sep	1423	1456	1534	M1.3			3836
23 Sep	1506	1512	1520		SF	N22W33	3833
23 Sep	1710	1716	1725	C3.3	SF	S10W15	3828
24 Sep	0333	0351	0626	C6.5	SF	S25E51	3835
24 Sep	0522	0529	0534	C2.4			3833
24 Sep	0626	0633	0645	C2.1			3835
24 Sep	0803	0809	0814	C2.2			3836
24 Sep	0926	0934	0939	C3.3			3833
24 Sep	1129	1146	1201	C6.9			3828
24 Sep	1416	1416	1420		SF	S23E46	3835
24 Sep	B1502	U1502	1507		SF	S23E44	3835
24 Sep	1921	1928	1935	C2.8	SF	N21W49	3833
24 Sep	2140	2140	2144		SF	S13E59	3836
25 Sep	1441	1555	1641	C9.6	SF	S11E58	3836
25 Sep	1655	1656	1703		SF	S15E48	3836
25 Sep	2009	2039	2110	C4.4			3836
25 Sep	2257	2312	2323	M1.3	1F	S12W46	3828
26 Sep	B0527	U0530	0535		SF	N22W69	3833
26 Sep	0531	0533	0538		SF	S12E47	3836
26 Sep	0604	0612	0616	C2.9	SF	S12E48	3836
26 Sep	1022	1028	1038		SF	S12E46	3836
26 Sep	1122	1131	1140	C3.8			3839
26 Sep	1941	1949	1954	C5.0	1F	S13E78	3839
26 Sep	2033	2039	2045	C8.1			3839



## Flare List

Date	Time			Optical			
	Begin	Max	End	X-ray Class	Imp/Brtns	Location Lat CMD	Rgn #
26 Sep	2258	2312	2320	M1.4			3839
27 Sep	0040	0049	0059	C4.8			3839
27 Sep	0123	0134	0146	C5.3			3839
27 Sep	0300	0311	0321	C6.6			3839
27 Sep	0722	0722	0729		SF	S21E09	3835
27 Sep	0743	0800	0815	C9.9	SF	S15E83	3839
27 Sep	0848	0848	0852		SF	S15E67	3839
27 Sep	1015	1029	1048	C8.4	SF	S16E80	3839
27 Sep	1108	1110	1116		SF	S16E80	3839
27 Sep	1120	1130	1139		SF	S15E81	3839
27 Sep	1151	1151	1154		SF	S15E79	3839
27 Sep	1203	1205	1207		SF	S15E79	3839
27 Sep	1215	1232	1244		SF	S15E79	3839
27 Sep	1308	1311	1325		SF	S15E81	3839
27 Sep	1342	1343	1345		SF	S15E81	3839
27 Sep	1640	1641	1643		SF	S16E85	3839
27 Sep	1802	1806	1808		SF	S16E85	3839
27 Sep	1836	1846	1855	C3.3			3839
28 Sep	0017	0023	0030	C3.3			3836
28 Sep	0345	0349	0353	C3.0	SF	S15E74	3839
28 Sep	0601	0611	0620	C3.7			3835
28 Sep	0802	0809	0813	C3.7	SF	S22W07	3835
28 Sep	0929	0929	0931		SF	S23W06	3835
28 Sep	0946	0953	0957		SF	S17W30	3834
28 Sep	1000	1001	1008		SF	S23W07	3835
28 Sep	1030	1046	1059		SF	S18W30	3834
28 Sep	1046	1046	1053		SF	S22W05	3835
28 Sep	1328	1328	1332		SF	S23W09	3835
28 Sep	B1422	U1425	1426		SF	S23W11	3835
28 Sep	1550	1559	1606	C2.8	SF	S08E11	3836
29 Sep	0523	0612	0654	C4.9			3836
29 Sep	B1105	U1107	A1120		SF	S12E46	3836
29 Sep	1249	1253	1258	M1.0	SF	S11E25	
29 Sep	1337	U1348	A1412		SF	S12E04	3836
29 Sep	1409	1424	1431	M1.7	1F	S15E51	3842
29 Sep	1431	1441	1446	M1.7			3842
29 Sep	1455	U1455	1511		SF	S12E03	3836
29 Sep	2001	2001	2006		SF	S18E49	3842



## *Flare List*

Date	Time			Optical			
	Begin	Max	End	X-ray Class	Imp/ Brtns	Location Lat CMD	Rgn #
29 Sep	2048	2053	2057	C2.5	SF	S07W03	3836
29 Sep	2132	2145	2150	C6.4	SF	S10E54	3842



## Region Summary

Date	Lat	CMD	Location		Sunspot Characteristics					Flares							
			Helio	Lon	Area $10^{-6}$	Extent hemi.	Spot Class	Spot Count	Mag Class	X-ray			Optical				
										C	M	X	S	1	2	3	4

### **Region 3825**

12 Sep	S18E77	11	plage										1			
13 Sep	S18E63	11	240	6	Dac	6	BG	2	3				3			
14 Sep	S18E48	13	240	6	Dac	23	BGD	2	2	1			3			1
15 Sep	S15E35	13	140	12	Eai	10	BG	4								1
16 Sep	S16E20	13	180	12	Eai	13	BG	2					1			
17 Sep	S15E06	15	180	12	Ekc	35	BG									
18 Sep	S15W07	14	200	12	Esi	13	BG		1							
19 Sep	S16W21	15	130	13	Esi	13	BGD	1					1			
20 Sep	S16W33	13	110	12	Eso	8	BG									
21 Sep	S16W47	15	110	12	Eso	8	BG									
22 Sep	S16W61	16	110	12	Eso	3	BG									
23 Sep	S17W75	16	80	2	Hsx	1	A		1							
24 Sep	S17W79	8	60	2	Hsx	1	A						13	6	1	8
													1	1	0	0
													0	1	0	0

Crossed West Limb.

Absolute heliographic longitude: 15

### **Region 3827**

16 Sep	S28E65	31	120	3	Hsx	1	A									
17 Sep	S27E51	30	120	3	Hhx	1	A									
18 Sep	S26E33	334	100	4	Cao	3	B									
19 Sep	S27E19	336	110	5	Cao	3	B									
20 Sep	S26E07	333	120	4	Cao	4	B									
21 Sep	S26W07	335	120	4	Cao	4	B									
22 Sep	S26W21	336	120	3	Hsx	1	A									
23 Sep	S26W35	337	120	3	Cao	3	B									
24 Sep	S26W44	333	110	2	Hax	2	A									
25 Sep	S26W58	333	90	2	Hax	2	A									
26 Sep	S26W72	334	80	2	Hax	2	A									
27 Sep	S28W83	332	30	3	Hsx	1	A						0	0	0	0
													0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 333

## ***Region Summary - continued***

Date	Lat	CMD	Location		Sunspot Characteristics					Flares						
			Helio	Lon	Area $10^6$	Extent hemi.	Spot Class	Spot Count	Mag Class	X-ray			Optical			
										C	M	X	S	1	2	3
<b>Region 3828</b>																
16 Sep	S13E75		41		120	3	Hhx	1	A							
17 Sep	S13E61		40		120	3	Hhx	1	A			2				
18 Sep	S13E47		320		120	4	Cso	6	B			1				
19 Sep	S13E33		322		150	6	Cai	11	BGD							
20 Sep	S12E19		320		150	5	Cai	16	BG							
21 Sep	S12E05		323		150	5	Cai	16	BG							
22 Sep	S12W09		324		150	5	Dai	16	BG		1			3		
23 Sep	S12W23		325		180	7	Dko	20	B		1			1		
24 Sep	S11W34		323		160	3	Hax	5	A		1					
25 Sep	S11W48		323		150	3	Hax	8	A			1			1	
26 Sep	S11W62		324		140	3	Dao	5	B							
27 Sep	S12W74		323		30	3	Cro	2	B							
28 Sep	S12W88		324		10	1	Axx	1	A				6	1	0	4
													1	0	1	0
													0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 323

<b>Region 3831</b>																
19 Sep	N12E03		351		100	3	Cro	10	B		1		2			
20 Sep	N12W09		349		80	4	Dao	7	B		1		1			
21 Sep	N12W23		351		80	4	Dao	7	B		2		1			
22 Sep	N12W37		352		80	4	Dao	7	B			2				
23 Sep	N14W51		353		80	5	Cao	3	B							
24 Sep	N15W62		351		60	4	Cao	3	B							
25 Sep	N15W76		351		30	1	Cro	4	B							
26 Sep	N15W90		352		20	1	Cro	2	B					4	0	0
													6	0	0	0
													0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 351

<b>Region 3832</b>																
20 Sep	N13W45		25		20	3	Cro	3	B							
21 Sep	N13W59		27		20	3	Cro	3	B							
22 Sep	N13W73		28		plage											
23 Sep	N13W87		29		plage											
													0	0	0	0
													0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 25



## ***Region Summary - continued***

Date	Lat	CMD	Location		Sunspot Characteristics					Flares							
			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
<b>Region 3833</b>																	
20 Sep	N21W02		343		10	2	Bxo	3	B								
21 Sep	N21W16		344		50	2	Dai	7	B							1	
22 Sep	N21W30		345		50	2	Dai	7	BD								
23 Sep	N22W44		346		60	10	Dao	10	BD							1	
24 Sep	N22W53		342		50	3	Cro	6	B		3					1	
25 Sep	N22W67		342		90	5	Dro	14	BG								
26 Sep	N22W81		343		70	4	Cso	5	BG							1	
										3	0	0	4	0	0	0	

Crossed West Limb.

Absolute heliographic longitude: 343

### **Region 3834**

20 Sep	S14E65		275		110	2	Dso	2	B							
21 Sep	S14E51		277		110	2	Dso	2	B							
22 Sep	S14E37		278		110	2	Dso	2	B							
23 Sep	S16E23		279		40	3	Cao	4	B							
24 Sep	S15E14		275		40	3	Cao	5	B							
25 Sep	S15W00		275		60	5	Cso	12	B							
26 Sep	S15W14		276		50	7	Dsi	15	B							
27 Sep	S15W25		274		30	7	Cro	4	B							
28 Sep	S15W40		276		40	6	Cao	8	B							2
29 Sep	S16W54		277		40	5	Cao	6	B							
										0	0	0	2	0	0	0

Still on Disk.

Absolute heliographic longitude: 275

### **Region 3835**

22 Sep	S22E63		252		30	3	Dao	8	B		1					
23 Sep	S25E49		253		50	5	Dso	3	B							
24 Sep	S22E38		251		100	10	Dao	12	B		2					3
25 Sep	S22E24		251		110	10	Dao	13	BG							
26 Sep	S22E10		251		100	7	Dai	20	BG							
27 Sep	S09E01		248		30	8	Dai	5	B							1
28 Sep	S22W15		251		100	7	Dai	10	B		2					6
29 Sep	S22W30		253		130	9	Dai	11	B							
										4	1	0	10	0	1	0

Still on Disk.

Absolute heliographic longitude: 248

## ***Region Summary - continued***

Date	Lat	CMD	Location		Sunspot Characteristics					Flares				
			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
<b>Region 3836</b>														
23 Sep	S12E72		230		80		5	Dsi	100	BG		1		
24 Sep	S10E59		230		150		8	Dac	9	BG	1		1	
25 Sep	S10E45		230		180		7	Dai	25	BG	2		2	
26 Sep	S10E31		231		200		7	Dai	30	BG	1		3	
27 Sep	S12E18		231		210		7	Dai	10	BG			1	
28 Sep	S10E02		234		150		6	Dai	16	BG	2			
29 Sep	S10W10		233		120		5	Cai	13	BG	2		4	
											8	1	0	11
											0	0	0	0
											0	0	0	0

Still on Disk.

Absolute heliographic longitude: 234

### **Region 3837**

25 Sep	S11W19		294		10		1	Axx	2	A				
26 Sep	S11W33		295		30		3	Cro	4	B				
27 Sep	S11W45		294		10		1	Hrx	1	A				
28 Sep	S11W59		295		10		1	Axx	1	A				
29 Sep	S11W73		296		10		1	Axx	1	A				
											0	0	0	0
											0	0	0	0
											0	0	0	0

Still on Disk.

Absolute heliographic longitude: 294

### **Region 3838**

26 Sep	N16E42		220		30		4	Cro	5	B				
27 Sep	N15E30		219		10		1	Axx	1	A				
28 Sep	N15E16		220		plage									
29 Sep	N15E02		221		plage									
											0	0	0	0
											0	0	0	0
											0	0	0	0

Still on Disk.

Absolute heliographic longitude: 221

### **Region 3839**

26 Sep	S14E73		189		20		2	Hsx	1	A	3	1		1
27 Sep	S14E63		186		170		17	Fai	7	B	6		12	
28 Sep	S14E48		187		50		4	Cso	2	B	1		1	
29 Sep	S15E34		189		30		3	Cso	3	B				
											10	1	0	13
											1	0	0	0
											0	0	0	0

Still on Disk.

Absolute heliographic longitude: 189



## ***Region Summary - continued***

Date	Lat	CMD	Location		Sunspot Characteristics				Flares								
			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
<b>Region 3840</b>																	
27 Sep	N16E16		233		10		1	Axx	1	A			0	0	0	0	0
28 Sep	N15E01		235		10		1	Axx	1	A			0	0	0	0	0
29 Sep	N15W13		236		10		3	Bxo	2	B			0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 235

## ***Region 3841***

28 Sep	N14E55		191		40		3	Cao	5	B			0	0	0	0	0
29 Sep	N14E32		191		30		4	Cri	5	B			0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 191

## ***Region 3842***

28 Sep	S14E57		177		220		9	Dai	14	BG			1	2	1	1	0
29 Sep	S15E45		178		230		7	Dai	15	BGD			1	2	0	1	1

Still on Disk.

Absolute heliographic longitude: 178

## ***Region 3843***

29 Sep	S07E15		207		60		4	Cao	8	B			0	0	0	0	0
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Still on Disk.

Absolute heliographic longitude: 207

## ***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

The Weekly has been published continuously since 1951 and is available online since 1997.

<https://www.swpc.noaa.gov/products/weekly-highlights-and-27-day-forecast> --

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<https://www.ngdc.noaa.gov/stp/satellite/goes-r.html> -- NCEI GOES data  
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