Space Weather Highlights
23 October - 29 October 2023

SWPC PRF 2513
30 October 2023

Solar activity reached moderate levels on 26 Oct due to an M1.4 flare at 26/2324 UTC from the SE limb; the largest event of the period. Low levels of solar activity and C-class flares were observed throughout the remainder of the week. No Earth-directed CMEs were observed.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit was at normal to moderate levels over 23-28 Oct, with high levels observed on 29 Oct following a prolonged period of increased geomagnetic field activity and enhanced solar wind conditions.

Geomagnetic field activity was at quiet levels with ambient solar wind conditions observed over 23-25 Oct. The effects of a CIR followed by positive polarity CH HSS influences produced periods of G1 (Minor) storm conditions on 26 Oct, and active conditions on 27 Oct. The onset of another CIR followed by positive polarity CH HSS influences resulted in active conditions on 28 Oct, and periods of G1 (Minor) storms on 29 Oct.

Space Weather Outlook
30 October - 25 November 2023

Solar activity is expected to be at low levels with a varying chance for M-class (R1-R2) flare activity throughout the outlook period.

No proton events are expected at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to reach high levels on 30 Oct-05 Nov and 25 Nov. Normal to moderate flux levels are expected throughout the remainder of the period.

Geomagnetic field activity is expected to reach G1 (Minor) storm levels on 30 Oct, and active levels on 31 Oct, in response to positive polarity CH HSS influences. Active conditions are expected on 09 Nov due to negative polarity CH HSS influences. Positive polarity CH HSS effects are expected to result in active levels on 22 and 24-25 Nov. Quiet and quiet to unsettled conditions are expected throughout the remainder of the outlook period.

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 October	122	25	70	B5.5	2	0	0	4	0	0	0	0
24 October	121	34	40	B6.2	3	0	0	0	0	0	0	0
25 October	126	26	60	B5.4	10	0	0	1	0	0	0	0
26 October	126	57	90	B5.9	9	1	0	3	0	0	0	0
27 October	128	66	60	B6.2	1	0	0	0	0	0	0	0
28 October	128	70	80	B5.0	3	0	0	4	0	0	0	0
29 October	135	61	70	B5.8	8	0	0	4	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	>2MeV
23 October	3.0e+04	1.8e+04	2.8e+06
24 October	3.3e+04	1.9e+04	5.3e+06
25 October	3.5e+04	1.9e+04	7.2e+06
26 October	5.6e+04	1.8e+04	1.3e+06
27 October	2.5e+04	1.9e+04	6.9e+06
28 October	8.1e+04	1.9e+04	2.7e+06
29 October	3.3e+05	1.9e+04	3.3e+07

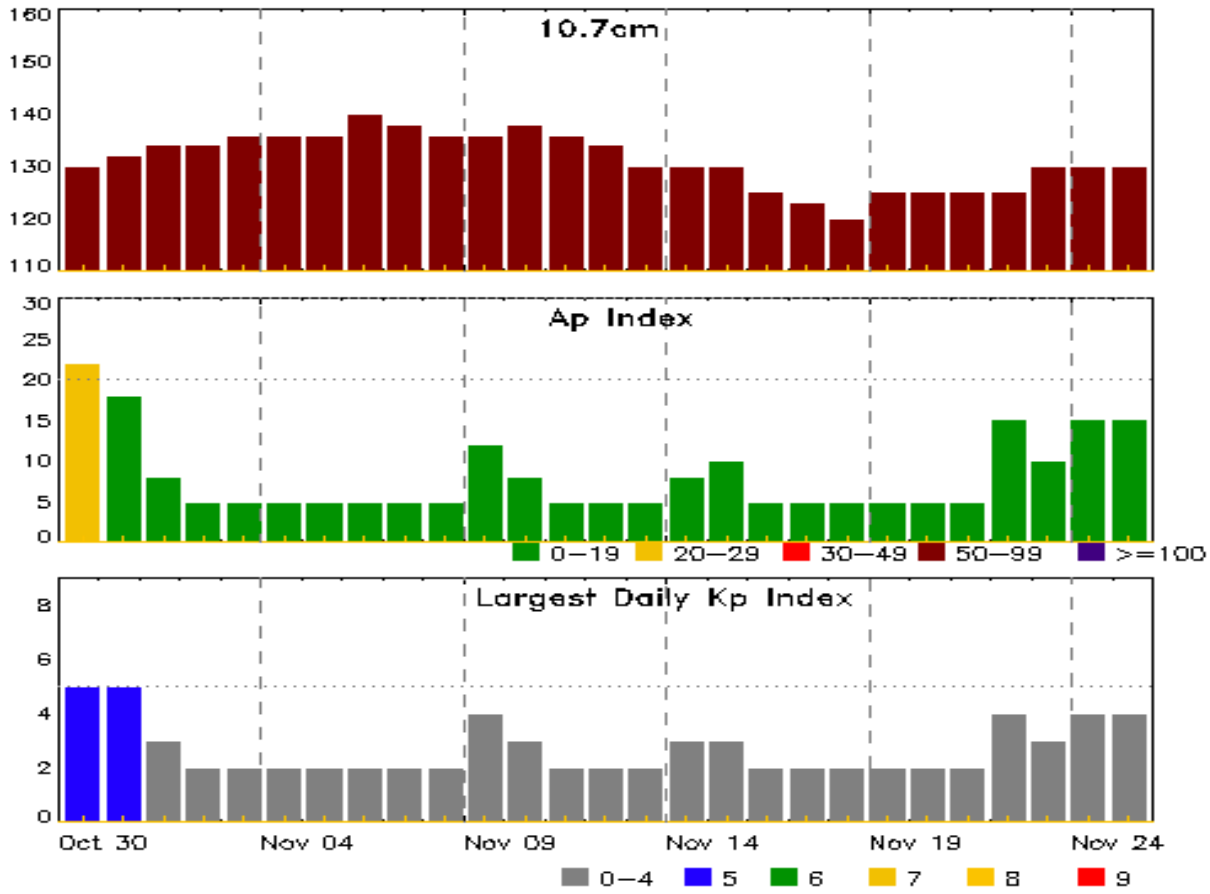
Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
23 October	2	1-0-0-0-1-1-0-1	1	1-0-0-0-1-1-0-0	3	1-0-0-0-1-1-1-1
24 October	2	1-0-0-1-1-1-1-1	3	1-0-1-2-0-1-1-1	4	0-0-1-1-1-1-1-1
25 October	3	1-0-0-1-2-1-1-1	2	0-0-0-1-1-1-1-0	4	1-1-0-1-1-1-1-2
26 October	18	2-2-2-4-4-3-4-4	29	1-2-1-6-6-5-2-1	23	3-3-2-5-4-3-4-5
27 October	9	3-4-2-2-2-1-1-1	33	3-5-4-5-3-3-3-6	11	3-4-3-2-2-2-1-1
28 October	13	1-2-2-4-4-2-2-3	86	6-6-7-7-7-6-3-3	19	1-3-3-4-4-3-3-4
29 October	21	4-3-4-4-4-3-3-3	49	4-5-6-6-6-5-3-3	39	5-4-5-4-4-4-3-4

Alerts and Warnings Issued

Date & Time of Issue UTC	Type of Alert or Warning	Date & Time of Event UTC
26 Oct 0815	WARNING: Geomagnetic K = 4	26/0815 - 1200
26 Oct 1036	ALERT: Geomagnetic K = 4	26/1030
26 Oct 1041	EXTENDED WARNING: Geomagnetic K = 4	26/0815 - 1800
26 Oct 1041	WARNING: Geomagnetic K = 5	26/1041 - 1500
26 Oct 1148	ALERT: Geomagnetic K = 5	26/1130
26 Oct 1444	EXTENDED WARNING: Geomagnetic K = 5	26/1041 - 1800
26 Oct 1445	EXTENDED WARNING: Geomagnetic K = 4	26/0815 - 27/0300
26 Oct 2043	WARNING: Geomagnetic K = 5	26/2042 - 27/0300
26 Oct 2045	EXTENDED WARNING: Geomagnetic K = 4	26/0815 - 27/0600
26 Oct 2053	WATCH: Geomagnetic Storm Category G1 predicted	
26 Oct 2307	WATCH: Geomagnetic Storm Category G1 predicted	
26 Oct 2346	ALERT: Type II Radio Emission	26/2318
27 Oct 0004	ALERT: Geomagnetic K = 5	26/2359
27 Oct 0434	EXTENDED WARNING: Geomagnetic K = 4	26/0815 - 27/1500
27 Oct 1951	WATCH: Geomagnetic Storm Category G1 predicted	
28 Oct 0516	WARNING: Geomagnetic K = 4	28/0515 - 1200
28 Oct 1049	ALERT: Geomagnetic K = 4	28/1049
28 Oct 1153	EXTENDED WARNING: Geomagnetic K = 4	28/0515 - 1800
28 Oct 1755	EXTENDED WARNING: Geomagnetic K = 4	28/0515 - 29/0400
29 Oct 0203	WARNING: Geomagnetic K = 5	29/0202 - 1200
29 Oct 0206	EXTENDED WARNING: Geomagnetic K = 4	28/0515 - 29/1500
29 Oct 0223	ALERT: Geomagnetic K = 5	29/0218
29 Oct 0902	ALERT: Geomagnetic K = 5	29/0859
29 Oct 1143	EXTENDED WARNING: Geomagnetic K = 5	29/0202 - 2100
29 Oct 1143	EXTENDED WARNING: Geomagnetic K = 4	28/0515 - 29/2359
29 Oct 1540	ALERT: Electron 2MeV Integral Flux >= 1000pfu	29/1520
29 Oct 2354	EXTENDED WARNING: Geomagnetic K = 4	28/0515 - 30/1200

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
30 Oct	130	22	5	13 Nov	130	5	2
31	132	18	5	14	130	8	3
01 Nov	134	8	3	15	130	10	3
02	134	5	2	16	125	5	2
03	136	5	2	17	123	5	2
04	136	5	2	18	120	5	2
05	136	5	2	19	125	5	2
06	140	5	2	20	125	5	2
07	138	5	2	21	125	5	2
08	136	5	2	22	125	15	4
09	136	12	4	23	130	10	3
10	138	8	3	24	130	15	4
11	136	5	2	25	130	15	4
12	134	5	2				

Energetic Events

	Time			X-ray		Optical Information			Peak Radio Flux		Sweep Freq Intensity	
Date	Begin	Max	Half Max	Class	Integ Flux	Imp/ Brtns	Location Lat CMD	Rgn #	245	2695	II	IV
26 Oct		2247	2324	0020		M1.4	0.053				2	

Flare List

	Time				Optical		
Date	Begin	Max	End	X-ray Class	Imp/ Brtns	Location Lat CMD	Rgn #
23 Oct	0658	0709	0722	C1.4	SF	S10W12	3468
23 Oct	1249	U1249	A1256		SF	S10W14	3468
23 Oct	1315	1315	1322		SF	S09W15	3468
23 Oct	B1741	1742	1747		SF	S08W18	3468
23 Oct	1947	1958	2005	C2.3			3468
24 Oct	1217	1226	1233	B8.6			
24 Oct	1442	1450	1522	C1.5			3469
24 Oct	1954	2018	2118	C1.3			
24 Oct	2339	2346	2349	C1.4			
25 Oct	0038	0045	0050	C2.6			
25 Oct	0120	0128	0143	C1.3			3469
25 Oct	0625	0640	0647	C1.8			
25 Oct	1014	1023	1032	C1.0			
25 Oct	1239	1246	1252	C1.5			
25 Oct	1255	1306	1317	C1.7			
25 Oct	1610	1622	1625	C1.6			
25 Oct	1617	1620	1630	C1.6	SF	N17E49	
25 Oct	2157	2215	2233	C1.6			
25 Oct	2235	2244	2249	C3.0			3471
26 Oct	0137	0149	0158	C1.0			
26 Oct	0433	0444	0453	C1.7			
26 Oct	0609	0617	0622	B9.5			
26 Oct	1213	1223	1237	C1.7			3473
26 Oct	1317	1326	1331	C4.2	SF	S20W38	
26 Oct	1624	1639	1706	C2.4	SF	S22W27	3471
26 Oct	1831	1840	1847	C1.6			3471
26 Oct	1918	1928	1937	C1.2			3473
26 Oct	1949	1958	2005	C1.4			3473
26 Oct	2153	2203	2221	C1.5	SF	N17E30	
26 Oct	2247	2324	0020	M1.4			

Flare List

Date	Time			Optical			
	Begin	Max	End	X-ray Class	Imp/ Brtns	Location Lat CMD	Rgn #
27 Oct	0839	0854	0907	C2.1			3473
28 Oct	0525	0535	0553	B9.7	SF	N13E57	3473
28 Oct	0553	0559	0605	C1.2	SF	N13E57	3473
28 Oct	0609	0623	0639	C1.6			3473
28 Oct	1007	1015	1025	B8.1			3472
28 Oct	1350	1357	1404	C1.0	SF	S24W54	3471
28 Oct	2155	2156	2158		SF	S15E25	3474
29 Oct	0243	0250	0257	B9.4			3474
29 Oct	0734	0746	0755	C4.3			3474
29 Oct	0850	0855	0857	C1.8			3474
29 Oct	0857	0902	0906	C2.4			3474
29 Oct	0947	0949	0953	C2.5	SF	S17E23	3474
29 Oct	1130	1143	1152	C6.6	SF	S18E20	3474
29 Oct	1300	1309	1313	C7.8	SF	S19E22	3474
29 Oct	1350	1358	1407	C2.0	SF	S17E18	3474
29 Oct	1754	1804	1811	B9.4			
29 Oct	1904	1925	1945	C2.6	SF	S17E16	3474

Region Summary

	Location		Sunspot Characteristics					Flares							
		Helio	Area	Extent	Spot	Spot	Mag	X-ray			Optical				
Date	Lat CMD	Lon	10^{-6} hemi.	(helio)	Class	Count	Class	C	M	X	S	1	2	3	4
			Region 3465												
11 Oct	N10E69	146	120	4	Dso	3	B								
12 Oct	N10E56	146	180	3	Hsx	3	A								
13 Oct	N10E43	146	200	3	Hsx	3	A	2			2				
14 Oct	N10E30	146	220	3	Hax	3	A				1				
15 Oct	N10E15	147	240	3	Hax	6	A								
16 Oct	N11E03	145	190	6	Hax	6	A				1				
17 Oct	N10W10	146	220	5	Cao	19	B	1			1				
18 Oct	N11W22	145	140	7	Cao	18	B								
19 Oct	N12W37	147	80	4	Hax	7	A	1			1				
20 Oct	N12W50	145	30	4	Hrx	7	A								
21 Oct	N12W64	147	plage												
22 Oct	N12W78	148	plage												
								4	0	0	6	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 145

			Region 3467												
13 Oct	N12E82	108	plage					2							
14 Oct	N12E66	110	40	6	Cao	5	B	1							
15 Oct	N13E53	109	40	7	Cao	5	B	1							
16 Oct	N13E42	106	10	3	Axx	2	A	2							
17 Oct	N13E28	108	plage								1				
18 Oct	N14E14	109	plage												
19 Oct	N14W00	110	plage												
20 Oct	N14W14	110	plage					1							
21 Oct	N14W26	109	10	1	Axx	2	A	1							
22 Oct	N14W40	110	plage												
23 Oct	N14W54	111	plage												
24 Oct	N14W68	112	plage												
25 Oct	N14W82	112	plage												
								8	0	0	1	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 110

Region Summary - continued

	Location		Sunspot Characteristics					Flares							
		Helio	Area	Extent	Spot	Spot	Mag	X-ray			Optical				
Date	Lat CMD	Lon	10^{-6} hemi.	(helio)	Class	Count	Class	C	M	X	S	1	2	3	4
			Region 3468												
16 Oct	S09E69	79	80	2	Hax	1	A								
17 Oct	S11E56	79	130	1	Hax	1	A								
18 Oct	S10E42	80	110	1	Hsx	3	A								
19 Oct	S10E29	81	70	2	Hsx	1	A								
20 Oct	S10E15	80	70	2	Hsx	2	A				1				
21 Oct	S10E01	82	70	2	Hsx	1	A								
22 Oct	S09W10	80	60	3	Hsx	2	A								
23 Oct	S09W25	81	60	3	Hsx	1	A	2			4				
24 Oct	S10W38	80	30	1	Hsx	1	A								
25 Oct	S09W52	82	20	1	Hsx	1	A								
26 Oct	S09W66	83	20	1	Hrx	1	A								
27 Oct	S09W80	84	10	1	Axx	1	A								
								2	0	0	5	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 82

			Region 3469												
20 Oct	N27W37	133	30	4	Dro	6	B								
21 Oct	N27W51	134	30	6	Dro	6	B								
22 Oct	N27W63	133	10	5	Bxo	3	B								
23 Oct	N28W76	133	plage												
24 Oct	N26W82	125	plage					1							
								1	0	0	0	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 133

			Region 3470												
21 Oct	N24E16	67	20	3	Cro	5	B								
22 Oct	N26E03	65	10	2	Axx	2	A								
23 Oct	N26W09	65	10	5	Bxo	4	B								
24 Oct	N23W25	68	0	2	Axx	1	A								
25 Oct	N23W39	69	plage												
26 Oct	N23W53	70	plage												
27 Oct	N23W67	71	plage												
28 Oct	N23W81	72	plage												
								0	0	0	0	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 65

Region Summary - continued

	Location		Sunspot Characteristics					Flares							
		Helio	Area	Extent	Spot	Spot	Mag	X-ray			Optical				
Date	Lat CMD	Lon	10^{-6} hemi.	(helio)	Class	Count	Class	C	M	X	S	1	2	3	4
			Region 3471												
22 Oct	S22E19	50	10		Axx	1	A								
23 Oct	S22E05	52	plage												
24 Oct	S23W06	49	10	3	Bxo	2	B								
25 Oct	S23W20	50	40	5	Cao	5	B	1							
26 Oct	S23W33	50	30	5	Dro	9	B	2			1				
27 Oct	S23W46	50	20	4	Cro	5	BG								
28 Oct	S23W57	48	10	4	Bxo	6	B	1			1				
29 Oct	S23W71	49	plage												
								4	0	0	2	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 52

			Region 3472												
26 Oct	N20E43	334	30	4	Cro	6	B								
27 Oct	N19E29	335	10	5	Cro	3	B								
28 Oct	N20E15	336	10	3	Bxo	2	B								
29 Oct	N20E01	337	10	5	Cao	5	B								
								0	0	0	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 337

			Region 3473												
26 Oct	N13E62	315	10	3	Bxo	1	B	3							
27 Oct	N16E57	303	10	2	Bxo	4	B	1							
28 Oct	N16E44	307	30	3	Cro	5	B	2			2				
29 Oct	N16E32	306	30	4	Cao	5	B								
								6	0	0	2	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 306

			Region 3474												
27 Oct	S17E37	323	10	1	Bxo	3	B								
28 Oct	S17E25	326	10	4	Bxo	5	B				1				
29 Oct	S17E12	326	20	7	Dai	8	BG	8			4				
								8	0	0	5	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 326

Region Summary - continued

	Location		Sunspot Characteristics					Flares							
		Helio	Area	Extent	Spot	Spot	Mag	X-ray			Optical				
Date	Lat CMD	Lon	10^{-6} hemi.	(helio)	Class	Count	Class	C	M	X	S	1	2	3	4
		Region 3475													
28 Oct	N13W51	42	20	2	Cro	2	B								
29 Oct	N13W65	43	10	2	Axx	3	A								
								0	0	0	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 42

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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