Space Weather Highlights
17 October - 23 October 2022

SWPC PRF 2460
24 October 2022

Solar activity was at low levels. The spotted regions across the visible disk were either simple or only moderately complex. The result was a peak of C-class X-ray activity with a recorded max of C6.4 from a region around the NW limb.

Other activity included a filament eruption centered near S28E32 with a subsequent CME signature in the NW beginning at 22/2224 UTC. The CME is unlikely to have an Earth-directed component. Two other filaments erupted, centered near S45E60 around 23/1421 UTC and near S30E90 around 23/1604 UTC in SUVI 304 imagery. Analysis and modeling is ongoing at the time of this writing. No other CMEs observed appeared to have an Earth-directed component.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit was normal to moderate levels on every day except 20 Oct, when it briefly reached high levels.

Geomagnetic field activity was at quiet to G1 (Minor) geomagnetic storm levels. G1 levels were observed on 22 Oct due to the onset of a CIR ahead of a negative polarity CH HSS. Active levels were observed 23 Oct in response to the subsequent high-speed stream. Unsettled levels were observed on 20 Oct and 17 Oct due to brief periods of southward Bz. The remainder of the summary period was at quiet levels.

Space Weather Outlook
24 October - 19 November 2022

Solar activity is expected to be low or very low levels throughout the outlook period. There is a slight chance for M-class activity (R1-R1 Minor-Moderate) on 27 Oct - 10 Nov due to active regions with M-class flare history that are scheduled to return 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 moderate to high levels. High levels are anticipated on 24 Oct - 28 Oct and 31 Oct - 06 Nov due to multiple recurrent CH HSSs. Moderate levels are likely for the remainder of the outlook period.

Geomagnetic field activity is expected to be at quiet to G1 (Minor) geomagnetic storm conditions. G1 levels are likely on 24 Oct, 29-30 Oct, 10-11 Nov, and 18-19 Nov; active levels are likely on 25 Oct, 31 Oct - 02 Nov and 12 Nov; unsettled levels are likely on 28 Oct. All elevated levels of geomagnetic activity are anticipated in response to multiple, recurrent CH HSSs. The remainder of the outlook period is likely to be at mostly quiet levels.

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
17 October	126	84	190	B6.5	4	0	0	1	0	0	0	0
18 October	114	50	240	B5.5	5	0	0	5	1	0	0	0
19 October	113	50	230	B4.6	5	0	0	2	0	0	0	0
20 October	116	33	100	B6.0	13	0	0	16	2	0	0	0
21 October	109	60	110	B5.6	6	0	0	0	0	0	0	0
22 October	105	55	110	B3.6	5	0	0	0	0	0	0	0
23 October	108	65	90	B2.4	3	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	>2MeV
17 October	1.5e+05	3.0e+04	3.1e+07
18 October	9.5e+05	3.0e+04	3.3e+07
19 October	8.9e+04	2.9e+04	3.4e+07
20 October	1.6e+05	2.9e+04	3.5e+07
21 October	2.8e+05	3.0e+04	3.3e+07
22 October	2.5e+06	2.9e+04	1.9e+06
23 October	2.0e+05	2.9e+04	1.2e+06

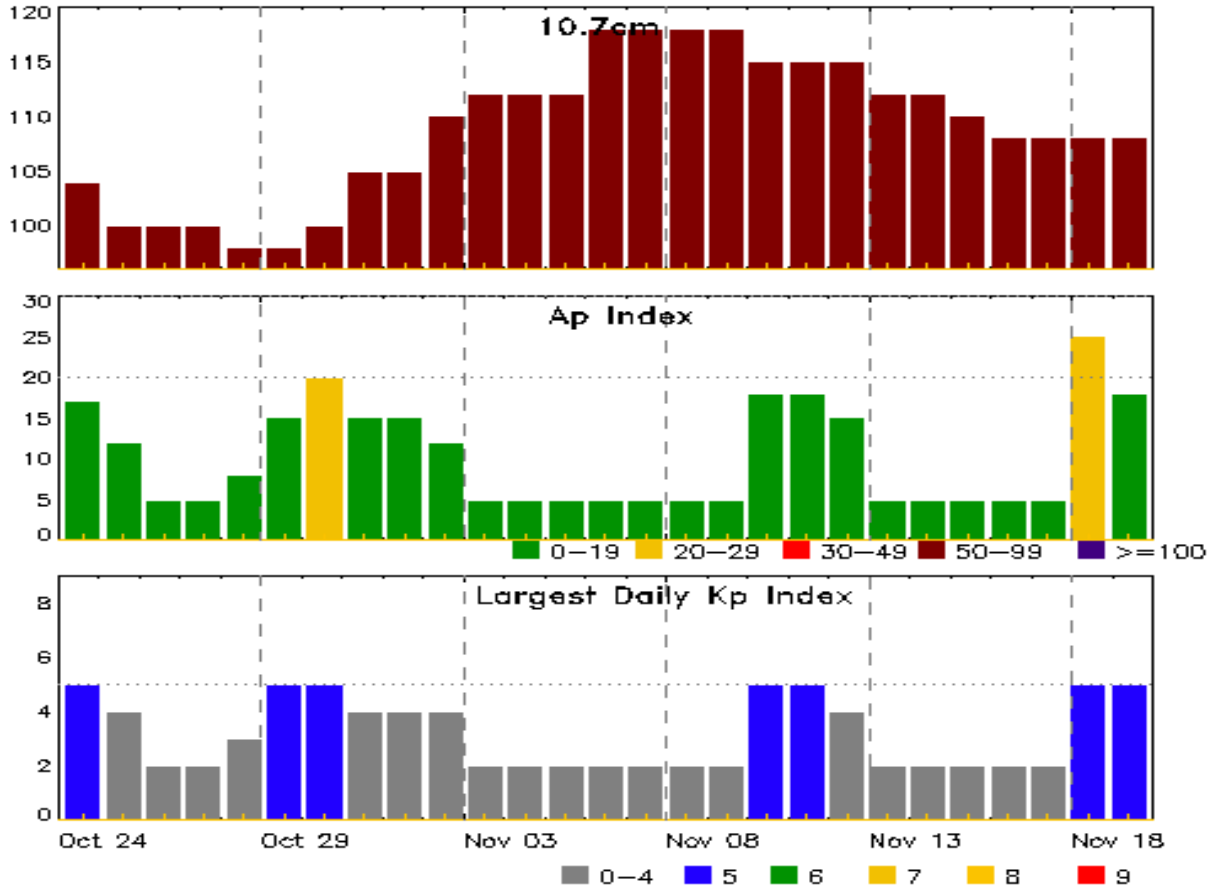
Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
17 October	4	1-0-0-1-2-3-1-1	5	2-1-1-1-2-3-0-1	6	2-1-1-1-2-3-1-1
18 October	0	1-0-0-1-1-3-0-0	4	1-1-0-2-2-1-1-1	6	1-1-1-2-1-2-2-2
19 October	2	0-0-0-0-0-0-0-1	2	1-1-2-0-1-0-0-0	5	2-2-1-1-1-0-1-1
20 October	0	0-0-0-4-4-0-0-0	13	0-0-3-4-5-2-0-1	7	1-1-1-2-3-2-1-3
21 October	4	1-1-2-0-0-0-0-1	4	1-1-2-3-1-0-1-0	5	1-1-1-2-0-1-2-1
22 October	87	2-2-3-9-0-0-0-2	50	0-0-5-6-5-7-6-2	27	2-2-3-5-4-5-5-3
23 October	139	1-2-2-9-0-0-9-3	12	2-2-3-1-2-4-3-3	15	3-2-2-1-2-4-4-4

Alerts and Warnings Issued

Date & Time of Issue UTC	Type of Alert or Warning	Date & Time of Event UTC
19 Oct 0646	SUMMARY: 10cm Radio Burst	19/0503 - 0504
20 Oct 1602	ALERT: Electron 2MeV Integral Flux >= 1000pfu	20/1350
21 Oct 1602	CONTINUED ALERT: Electron 2MeV Integral Flux >= 1000pfu	20/1350
21 Oct 2233	WATCH: Geomagnetic Storm Category G1 predicted	
22 Oct 0832	WARNING: Geomagnetic K = 4	22/0832 - 1800
22 Oct 1103	ALERT: Geomagnetic K = 4	22/1100
22 Oct 1117	WARNING: Geomagnetic K = 5	22/1116 - 1800
22 Oct 1133	ALERT: Geomagnetic K = 5	22/1133
22 Oct 1554	ALERT: Geomagnetic K = 5	22/1554
22 Oct 1603	EXTENDED WARNING: Geomagnetic K = 4	22/0832 - 23/0600
22 Oct 1603	WARNING: Geomagnetic K = 6	22/1603 - 2100
22 Oct 1603	EXTENDED WARNING: Geomagnetic K = 5	22/1116 - 2359
22 Oct 2017	ALERT: Geomagnetic K = 5	22/2016
22 Oct 2114	WATCH: Geomagnetic Storm Category G2 predicted	
22 Oct 2348	EXTENDED WARNING: Geomagnetic K = 5	22/1116 - 23/0600
23 Oct 0552	EXTENDED WARNING: Geomagnetic K = 4	22/0832 - 23/1800
23 Oct 1727	EXTENDED WARNING: Geomagnetic K = 4	22/0832 - 24/0600
23 Oct 2048	WARNING: Geomagnetic K = 5	23/2048 - 24/0600

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
24 Oct	104	17	5	07 Nov	118	5	2
25	100	12	4	08	118	5	2
26	100	5	2	09	118	5	2
27	100	5	2	10	115	18	5
28	98	8	3	11	115	18	5
29	98	15	5	12	115	15	4
30	100	20	5	13	112	5	2
31	105	15	4	14	112	5	2
01 Nov	105	15	4	15	110	5	2
02	110	12	4	16	108	5	2
03	112	5	2	17	108	5	2
04	112	5	2	18	108	25	5
05	112	5	2	19	108	18	5
06	118	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

No Events Observed

Flare List

	Time				Optical		
Date	Begin	Max	End	X-ray Class	Imp/ Brtns	Location Lat CMD	Rgn #
17 Oct	0158	0211	0216	C1.6			3116
17 Oct	B1016	U1037	A1125		SF	S34W48	3124
17 Oct	1511	1517	1525	C1.0			
17 Oct	1648	1714	1752	C3.3			3124
17 Oct	2321	2329	2342	C1.5			
18 Oct	0316	0329	0345	C1.0			
18 Oct	0454	0457	0459		SF	S36W58	3124
18 Oct	0733	0740	0744	C1.6	1N	S34W58	3124
18 Oct	0754	0803	0806		SF	S34W58	3124
18 Oct	0844	0844	0851		SF	S34W61	3124
18 Oct	0948	0949	0951		SF	S34W61	3124
18 Oct	1011	U1013	1020		SF	S35W55	3124
18 Oct	1408	1413	1417	C1.9			3124
18 Oct	1632	1639	1643	C1.0			3124
18 Oct	1746	1752	1806	B8.2			
18 Oct	1832	1836	1840	B8.5			
18 Oct	2136	2146	2152	C1.2			3124
18 Oct	2340	2347	0000	B7.3			
19 Oct	0009	0015	0020	B8.7			
19 Oct	0032	0035	0039	C1.0			
19 Oct	0133	0140	0144	B9.1			
19 Oct	0728	0737	0741	C1.1			3124
19 Oct	1355	1400	1409	B6.5			
19 Oct	1507	1516	1528	B6.5			
19 Oct	1710	1718	1715		SF	S10E19	3126
19 Oct	1734	1750	1759	C3.5	SF	S09E19	3126
19 Oct	2100	2108	2113	B9.2			3126
19 Oct	2121	2126	2131	B7.5			3126
19 Oct	2140	2145	2150	C4.2			3126
19 Oct	2334	2338	2343	C1.0			3126
20 Oct	0031	0038	0042	B6.6			3126

Flare List

Date	Time			Optical			
	Begin	Max	End	X-ray Class	Imp/ Brtns	Location Lat CMD	Rgn #
20 Oct	0150	0155	0159	C2.6	SF	N25W78	3122
20 Oct	0255	0256	0259		SF	N25W78	3122
20 Oct	0302	0304	0305		SF	N25W78	3122
20 Oct	0313	0323	0343	C5.3	1F	N25W78	3122
20 Oct	0402	0407	0407		SF	N25W78	3122
20 Oct	0414	0416	0419		SF	N25W78	3122
20 Oct	0544	0551	0555	B8.9	SF	N25W83	3122
20 Oct	0625	0632	0649	C2.0	1F	N26W84	3122
20 Oct	0656	0700	0708		SF	N26W84	3122
20 Oct	0749	0752	0756		SF	N25W83	3122
20 Oct	0822	0823	0829		SF	N25W85	3122
20 Oct	1004	1005	1007		SF	N26W84	3122
20 Oct	1101	1110	1112		SF	N26W84	3122
20 Oct	1156	1212	1220		SF	N27W87	3122
20 Oct	1234	1239	1253	C1.0			3122
20 Oct	1321	1328	1358		SF	N27W90	3122
20 Oct	1359	1419	1429		SF	N27W90	3122
20 Oct	1431	1433	1444		SF	N27W87	3122
20 Oct	1517	1524	1528	C2.7	SF	N27W90	3122
20 Oct	1640	1653	1657	C5.9			3122
20 Oct	1740	1746	1750	C4.0			3122
20 Oct	1906	1911	1918	C2.0			3122
20 Oct	1947	1951	1959	C2.0			3122
20 Oct	2020	2028	2039	C1.6			3122
20 Oct	2042	2048	2102	C2.5			3122
20 Oct	2204	2220	2228	C2.7			3122
20 Oct	2300	2307	2314	C1.5			3122
21 Oct	0107	0114	0119	C2.4			
21 Oct	0205	0214	0225	C1.2			
21 Oct	0316	0324	0331	C1.1			
21 Oct	0426	0433	0445	C1.6			
21 Oct	0601	0613	0626	C2.5			
21 Oct	0707	0717	0727	C2.9			
21 Oct	1341	1347	1351	B7.9			3126
22 Oct	0013	0024	0034	B8.9			
22 Oct	0034	0041	0045	B9.6			
22 Oct	0045	0108	0125	C1.3			
22 Oct	0125	0138	0157	C2.2			

Flare List

	Time			Optical			
Date	Begin	Max	End	X-ray Class	Imp/ Brtns	Location Lat CMD	Rgn #
22 Oct	0244	0303	0320	C4.1			3125
22 Oct	0527	0542	0610	C6.4			
22 Oct	1024	1042	1112	C2.1			
22 Oct	1455	1507	1523	B7.5			
23 Oct	0714	0723	0741	B3.7			3130
23 Oct	1552	1626	1638	C1.9			3130
23 Oct	1805	1822	1837	C2.5			3130
23 Oct	2057	2115	2136	C1.2			
23 Oct	2348	2354	2358	B5.6			

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 3118												
06 Oct	N09E59	359	10	2	Bxo	2	B								
07 Oct	N09E46	359	20	2	Bxo	3	B								
08 Oct	N08E34	358	20	3	Dro	4	B	1			2				
09 Oct	N08E20	359	30	3	Dro	4	B								
10 Oct	N08E07	358	40	3	Cao	7	B								
11 Oct	N09W06	358	10	2	Bxo	3	B								
12 Oct	N09W19	357	10	1	Axx	1	A								
13 Oct	N09W33	359	plage												
14 Oct	N09W47	360	plage												
15 Oct	N09W61	1	plage												
16 Oct	N09W75	2	plage												
17 Oct	N09W89	3	plage												
								1	0	0	2	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 358

			Region 3119												
07 Oct	N28E31	14	30	3	Bxo	6	B				2				
08 Oct	N28E19	13	110	7	Dao	9	B	1			1				
09 Oct	N28E07	12	140	8	Dai	12	B	2			4				
10 Oct	N27W08	14	180	9	Dai	27	B	2			2				
11 Oct	N28W18	11	150	10	Dsi	14	B	3			2				
12 Oct	N29W30	9	170	8	Dai	10	B								
13 Oct	N28W43	9	120	8	Dai	9	B	3			1				
14 Oct	N29W56	9	100	7	Dao	5	B								
15 Oct	N29W68	9	30	8	Cso	3	B				1				
16 Oct	N29W82	9	30	5	Cso	3	B								
17 Oct	N26W95	9	10	5	Bxo	3	B								
								11	0	0	13	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 12

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 3121												
13 Oct	N23E54	272	20	5	Bxo	4	B								
14 Oct	N24E41	272	20	6	Bxo	3	B								
15 Oct	N24E31	269	10	1	Axx	1	A								
16 Oct	N24E17	270	plage												
17 Oct	N24E03	271	plage												
18 Oct	N24W11	271	plage												
19 Oct	N24W25	272	plage												
20 Oct	N24W39	273	plage												
21 Oct	N24W53	274	plage												
22 Oct	N24W67	275	plage												
23 Oct	N24W81	275	plage												
								0	0	0	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 271

			Region 3122												
15 Oct	N25W29	329	30	3	Cro	4	B				1				
16 Oct	N25W43	330	20	7	Cro	5	B								
17 Oct	N25W57	331	20	7	Cro	5	B								
18 Oct	N26W64	328	10	1	Axx	1	A								
19 Oct	N26W78	325	10	1	Axx	1	A								
								0	0	0	1	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 329

			Region 3123												
15 Oct	N27W54	354	10	3	Bxo	2	B								
16 Oct	N27W68	355	30	4	Cao	6	B	2			4				
17 Oct	N25W82	356	40	4	Cao	9	B								
18 Oct	N28W93	353	40	2	Hsx	1	A								
								2	0	0	4	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 354

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 3124												
16 Oct	S36W42	329	30	8	Dro	5	B				3				
17 Oct	S36W56	330	110	6	Dao	11	B	1			1				
18 Oct	S34W68	328	180	8	Dso	5	B	4			5	1			
19 Oct	S33W79	325	180	8	Dao	5	B	1							
								6	0	0	9	1	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 329

			Region 3125												
17 Oct	S25E01	272	10	4	Cro	6	B								
18 Oct	S25W13	273	10	4	Bxo	3	B								
19 Oct	S25W27	273	10	1	Axx	1	A								
20 Oct	S25W41	275	plage												
21 Oct	S23W49	270	10	1	Axx	1	A								
22 Oct	S22W63	271	plage					1							
23 Oct	S22W76	270	plage												
								1	0	0	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 272

			Region 3126												
19 Oct	S11E15	231	30	2	Cri	3	B	3			2				
20 Oct	S11E02	232	80	5	Dsi	10	B								
21 Oct	S11W11	232	50	5	Dri	11	B								
22 Oct	S11W25	233	30	6	Cro	7	B								
23 Oct	S10W38	232	30	5	Cso	6	B								
								3	0	0	2	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 232

			Region 3127												
20 Oct	S23E23	210	20	2	Hax	3	A								
21 Oct	S23E10	211	30	4	Cro	6	B								
22 Oct	S23W05	213	20	2	Axx	3	A								
23 Oct	S22W19	213	10	1	Axx	1	A								
								0	0	0	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 213

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 3128												
21 Oct	S17W54	275	20	2	Hrx	2	A								
22 Oct	S17W67	275	30	3	Cao	3	B								
23 Oct	S17W81	275	20	4	Cao	2	B								
								0	0	0	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 275

			Region 3129												
22 Oct	S26W72	280	30	4	Cro	2	B								
23 Oct	S26W86	280	10	1	Axx	1	A								
								0	0	0	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 280

			Region 3130												
23 Oct	S24E09	185	20	4	Cro	5	B	2							
								2	0	0	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 185

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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