Space Weather Highlights
05 June - 11 June 2023

SWPC PRF 2493
12 June 2023

Solar activity was moderate. There were two M-class flares during the period. The largest event was an M4.7 flare (R1-Minor) at 07/1146 UTC from Region 3327 (S14, L=052, class/area = Dki/300 on 06 June). Region 3331 (N18, L=066, class/area = Dro/20 on 07 June) produced an M2.5 flare (R1-Minor) at 09/1711 UTC. The remaining numbered regions on the visible disk were either quiet or produced C-class events.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit reached moderate levels each day of the highlight period.

Geomagnetic field activity ranged from quiet to unsettled levels. Unsettled levels were reached on 06, 07, and 11 June. Quiet conditions were observed on 05 and 08-10 June.

Space Weather Outlook
12 June - 08 July 2023

Solar activity is likely to be at low to moderate levels (R1-R2, Minor-Moderate) throughout the outlook period due to several complex regions currently on the visible disk and the anticipated return of several regions that have produced moderate level activity currently on the farside of the Sun.

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 17-21 June in response to elevated wind speeds from multiple, recurrent CH HSSs. The remainder of the outlook period is anticipated to be at moderate levels.

Geomagnetic field activity is expected to range from quiet to active levels. Active conditions are likely on 12-13, 16, 27-28 June and 09 July with unsettled conditions likely on 17-18 June and 01-02 July due to recurrent CH HSS influence. Quiet conditions are expected for 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
05 June	169	151	990	C1.4	5	0	0	6	0	0	0	0
06 June	172	133	940	C1.2	6	0	0	2	0	0	0	0
07 June	167	177	1000	C1.2	5	1	0	6	1	0	0	0
08 June	169	149	980	B9.7	7	0	0	5	0	0	0	0
09 June	164	152	750	B9.6	5	1	0	6	1	0	0	0
10 June	161	116	640	B7.7	7	0	0	2	0	0	0	0
11 June	154	116	630	B8.5	5	0	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	>2MeV
05 June	4.2e+04	2.1e+04	1.4e+06
06 June	3.5e+04	2.2e+04	1.5e+06
07 June	2.7e+04	2.2e+04	1.4e+06
08 June	2.8e+04	2.1e+04	1.7e+06
09 June	2.7e+04	2.2e+04	2.7e+06
10 June	2.9e+04	2.1e+04	1.5e+06
11 June	3.8e+04	2.2e+04	1.5e+06

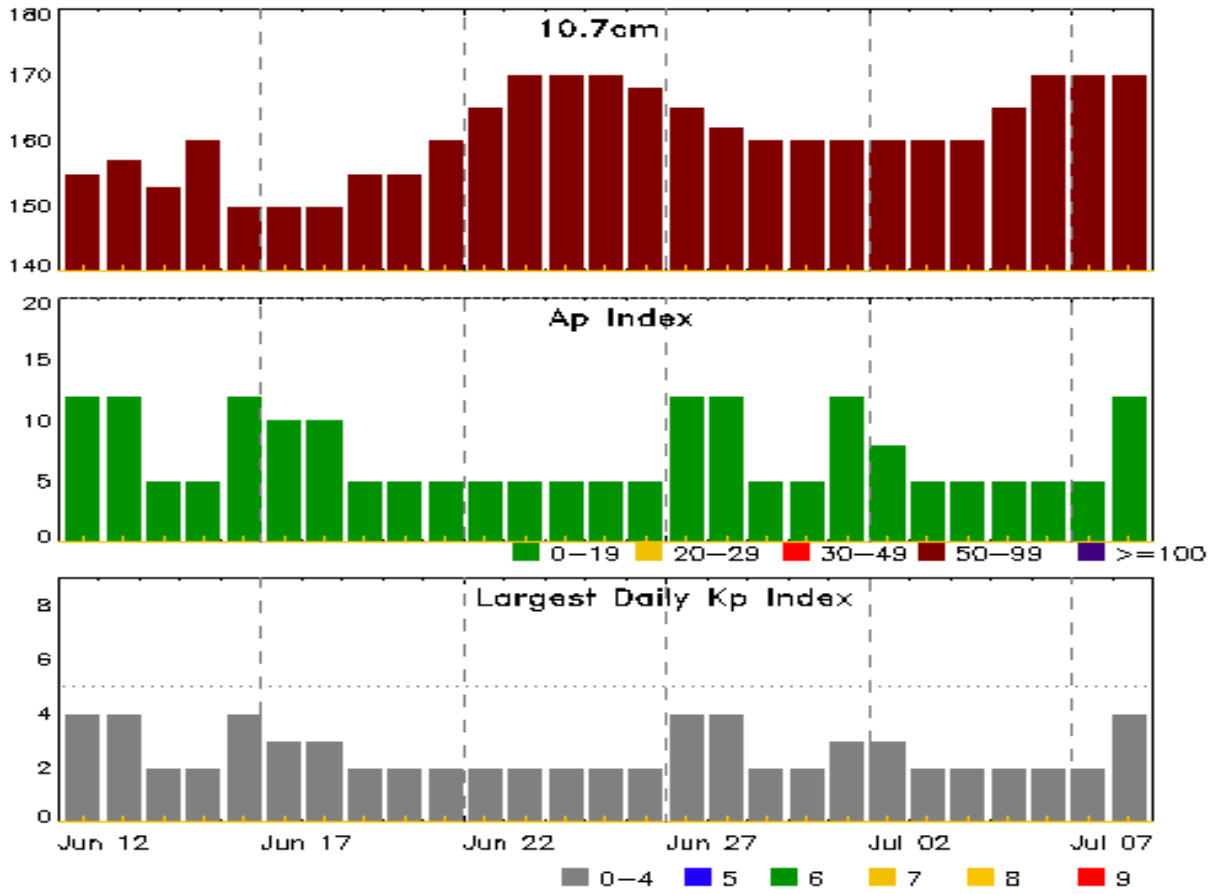
Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
05 June	6	1-1-2-3-2-1-1-2	3	1-0-1-2-0-0-2-1	5	1-1-1-2-1-1-1-2
06 June	10	3-3-1-3-3-2-2-1	8	3-2-1-4-1-0-1-1	7	3-2-1-2-2-1-1-1
07 June	6	1-1-1-2-2-1-1-3	2	0-1-1-1-0-0-1-1	5	1-1-1-2-1-1-0-3
08 June	6	2-2-1-2-2-2-2-1	6	2-2-1-3-3-0-1-0	5	2-2-1-2-2-1-1-1
09 June	6	1-1-1-2-2-2-2-2	2	2-0-0-0-0-0-1-1	4	1-1-1-1-1-1-2-2
10 June	4	1-1-1-1-2-2-1-1	2	1-0-0-2-1-1-1-0	5	1-1-1-2-1-1-2-1
11 June	10	3-3-3-2-2-2-2-2	13	3-3-2-4-4-2-1-1	12	3-3-2-2-2-3-2-2

Alerts and Warnings Issued

Date & Time of Issue UTC	Type of Alert or Warning	Date & Time of Event UTC
07 Jun 0944	ALERT: Type II Radio Emission	07/0637
09 Jun 0246	ALERT: Type II Radio Emission	08/2114

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 Jun	155	12	4	26 Jun	168	5	2
13	157	12	4	27	165	12	4
14	153	5	2	28	162	12	4
15	160	5	2	29	160	5	2
16	150	12	4	30	160	5	2
17	150	10	3	01 Jul	160	12	3
18	150	10	3	02	160	8	3
19	155	5	2	03	160	5	2
20	155	5	2	04	160	5	2
21	160	5	2	05	165	5	2
22	165	5	2	06	170	5	2
23	170	5	2	07	170	5	2
24	170	5	2	08	170	12	4
25	170	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
07 Jun	1118		1146	1159	M4.7	0.059		3327		100		
09 Jun	1648		1711	1725	M2.5	0.030		3331				

Flare List

	Time			Optical			
Date	Begin	Max	End	X-ray Class	Imp/ Brtns	Location Lat CMD	Rgn #
05 Jun	0005	0015	0048		SF	S15E73	3327
05 Jun	0014	0026	0052		SF	N11W05	3320
05 Jun	0248	0254	0310	C4.0	SF	S07E23	3323
05 Jun	0630	0638	0648	C3.5	SF	N10W02	3320
05 Jun	1001	1010	1021	C2.5			
05 Jun	1105	U1110	A1145	C2.5	SF	S08E19	3323
05 Jun	2119	2128	2141	C3.6			
05 Jun	2255	2259	2302		SF	S16E70	3327
06 Jun	0054	0103	0115	C2.1			3327
06 Jun	0431	0434	0446		SF	S15E55	3327
06 Jun	0828	0841	0906	C5.6			3327
06 Jun	0907	0914	0921	C6.3			3327
06 Jun	1713	1721	1725	C2.4			
06 Jun	1825	1832	1850	C2.1			
06 Jun	1855	1900	1905	C7.5	SF	S17E50	3327
07 Jun	0332	0340	0344	C1.9			
07 Jun	0616	0645	0709	C7.1	SF	S17E42	3327
07 Jun	0901	0913	0937	C2.7			3327
07 Jun	1118	1146	1159	M4.7			3327
07 Jun	1259	1311	1314		SF	S15E37	3327
07 Jun	B1315	U1316	A1323		SF	S15E37	3327
07 Jun	1414	1419	1432		SF	S15E37	3327
07 Jun	1442	1443	1448		SF	S17E37	3327
07 Jun	1523	1524	1532		SF	S09W12	3323
07 Jun	1548	1555	1602	C2.1			
07 Jun	1751	1755	1759		SF	S17E34	3327
07 Jun	1825	1829	1846	C8.7	1N	S17E34	3327
08 Jun	0209	0216	0222	C1.6			3327
08 Jun	0248	0258	0306	C3.2	SF	S15E28	3327

Flare List

Date	Time			Optical			
	Begin	Max	End	X-ray Class	Imp/ Brtns	Location Lat CMD	Rgn #
08 Jun	0443	0459	0511	C7.3	SF	S17E31	3327
08 Jun	0607	0609	0611		SF	N15W86	3324
08 Jun	0749	0758	0810	C2.0			
08 Jun	1008	1024	1037	C4.8			
08 Jun	1650	1656	1703	C1.8	SF	S14E20	3327
08 Jun	2312	2313	2318		SF	S16W47	3321
08 Jun	2356	0007	0024	C2.1	SF	S17E19	3327
09 Jun	0115	0124	0133	C1.9	SF	S22E57	3331
09 Jun	0508	0509	0511		SF	N24E14	3329
09 Jun	0613	0613	0626		SF	S07W38	3323
09 Jun	1334	1344	1355	C3.1	SF	S13E09	3327
09 Jun	1423	1424	1426		SF	S07W38	3323
09 Jun	1428	1440	1449	C4.5	1F	S18E09	3327
09 Jun	1648	1711	1725	M2.5			3331
09 Jun	2308	2315	2322	C1.4			3323
09 Jun	2334	2342	2348	C2.3			3321
10 Jun	0213	0220	0227	C1.2			3323
10 Jun	0227	0233	0238	C1.1			3323
10 Jun	0324	0332	0346	C1.5			3323
10 Jun	1529	1534	1542	C1.3	SF	S13W13	3327
10 Jun	1825	1851	1857	C4.5	SF	S12W14	3327
10 Jun	2059	2106	2111	C3.8			3323
10 Jun	2110	2116	2125	C5.7			3323
11 Jun	0155	0202	0207	C2.8	SF	S06W72	3323
11 Jun	0441	0450	0500	C1.7			3327
11 Jun	0530	0539	0546	C1.8			3327
11 Jun	0621	0631	0637	C3.3			3321
11 Jun	1436	1444	1456	C1.7	SF	S16W17	3327

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 3300												
09 May	N10W01	105	30	5	Cro	5	B								
10 May	N10W13	104	50	5	Dao	6	B								
11 May	N10W27	105	50	4	Dao	4	B								
12 May	N09W40	105	10	2	Axx	2	A								
13 May	N09W53	105	10	2	Axx	2	A								
14 May	N09W67	105	plage												
15 May	N09W81	106	plage												
11 Jun	N18W43	70	plage												
								0	0	0	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 105

			Region 3316												
26 May	N09E36	204	20	4	Cro	5	B								
27 May	N09E22	204	30	5	Cro	7	B				1				
28 May	N08E08	205	30	6	Dro	5	B	1							
29 May	N09W04	203	30	5	Bxo	4	B								
30 May	N08W20	206	0	1	Axx	2	A								
31 May	N07W34	206	10		Axx	1	A								
01 Jun	N09W45	204	10	1	Axx	1	A								
02 Jun	N09W59	206	plage												
03 Jun	N09W73	207	plage												
04 Jun	N09W87	207	plage												
								1	0	0	1	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 203

			Region 3319												
29 May	S19W01	200	10	5	Bxo	5	B								
30 May	S18W15	201	70	8	Dai	13	B	1			1				
31 May	S19W27	199	300	10	Dhi	19	BGD	1	1		1				
01 Jun	S19W41	200	240	11	Eai	13	BG								
02 Jun	S19W56	203	240	13	Eai	13	BG				1				
03 Jun	S19W70	204	200	13	Eai	13	BG	2			2				
04 Jun	S19W82	202	220	11	Eac	7	BG	1							
05 Jun	S22W91	197	60	6	Hsx	1	A								
								5	1	0	5	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 200

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 3320												
29 May	S11E72	127	30	1	Hrx	1	A	1							
30 May	N09E58	127	40	2	Hsx	1	A								
31 May	N10E46	126	120	4	Cso	2	B								
01 Jun	N10E31	127	30	9	Cso	2	B								
02 Jun	N10E20	127	20	9	Cso	3	B								
03 Jun	N10E07	127	30	8	Cso	4	B	1			1				
04 Jun	N10W04	124	30	9	Cso	5	B	1							
05 Jun	N10W21	127	40	7	Cso	3	B	1			2				
06 Jun	N10W35	128	20	4	Hsx	2	A								
07 Jun	N10W48	128	10	1	Hrx	1	A								
08 Jun	N10W62	129	10	1	Hrx	1	A								
09 Jun	N10W75	129	10	1	Axx	1	A								
10 Jun	N10W89	130	plage												
								4	0	0	3	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 124

			Region 3321												
30 May	S16E66	119	120	2	Hsx	1	A				1				
31 May	S15E52	120	260	5	Hhx	3	A								
01 Jun	S15E41	118	210	4	Hax	2	A				1				
02 Jun	S15E27	120	180	3	Hax	2	A								
03 Jun	S15E13	121	180	5	Hax	1	A								
04 Jun	S15E01	119	170	3	Hsx	1	A								
05 Jun	S15W11	118	200	6	Hsx	14	A								
06 Jun	S14W25	118	190	6	Hsx	7	A								
07 Jun	S14W39	119	200	4	Cso	3	B								
08 Jun	S15W53	120	170	5	Cso	2	B				1				
09 Jun	S16W66	120	150	3	Hsx	1	A	1							
10 Jun	S16W79	120	150	2	Hsx	1	A								
11 Jun	S15W91	119	90	9	Hsx	1	A	1							
								2	0	0	3	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 119

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 3323												
31 May	S05E68	104	200	2	Dao	3	B	8	2		6				
01 Jun	S08E57	101	170	10	Dac	8	BG	5			12				
02 Jun	S07E45	102	230	14	Esi	13	BG	2			6				
03 Jun	S07E32	102	310	13	Ekc	13	BG	3			4				
04 Jun	S07E20	100	320	14	Ehi	18	BG	5			7				
05 Jun	S08W04	110	330	15	Eki	35	BG	2			2				
06 Jun	S08W14	107	300	15	Eki	20	BG								
07 Jun	S08W20	100	150	14	Eai	30	BG				1				
08 Jun	S08W35	102	150	13	Eai	19	BG								
09 Jun	S08W47	101	70	13	Ero	12	B	1			2				
10 Jun	S08W61	102	10	13	Bxo	6	B	5							
11 Jun	S10W78	105	plage					1			1				
								32	2	0	41	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 110

			Region 3324												
02 Jun	N15W12	159	20	5	Bxo	6	B		1		1				
03 Jun	N15W25	159	10	5	Bxo	6	B								
04 Jun	N11W38	158	plage												
05 Jun	N11W52	159	plage												
06 Jun	N11W66	160	plage												
07 Jun	N15W77	158	40	5	Bxo	2	B								
								0	1	0	1	0	0	0	0

Died on Disk.
Absolute heliographic longitude: 159

			Region 3325												
02 Jun	N11W02	149	10	3	Bxo	2	B								
03 Jun	N11W16	150	30	3	Cao	4	B								
04 Jun	N11W30	150	20	2	Hrx	1	A				1				
05 Jun	N09W43	150	40	3	Hrx	2	A								
06 Jun	N09W60	153	10		Hsx	1	A								
07 Jun	N12W74	154	10	3	Axx	1	A								
08 Jun	N11W84	152	plage												
								0	0	0	1	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 149

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 3326												
02 Jun	N25E73	74	120	1	Hsx	1	A	1							
03 Jun	N25E59	75	120	1	Hsx	1	A								
04 Jun	N29E46	74	70	2	Hsx	1	A								
05 Jun	N26E40	66	190	9	Hsx	3	A								
06 Jun	N26E23	69	70	2	Hsx	1	A								
07 Jun	N25E11	69	60	2	Hsx	1	A								
08 Jun	N25W03	70	60	2	Hsx	1	A								
09 Jun	N25W16	70	60	2	Hsx	1	A								
10 Jun	N26W29	70	80	1	Hsx	1	A								
11 Jun	N25W42	70	120	9	Hsx	3	A								
								1	0	0	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 70

			Region 3327												
03 Jun	S14E81	53	plage					1							
04 Jun	S14E67	53	100	4	Dao	7	B	4			6	1			
05 Jun	S15E56	50	120	8	Dai	10	B				2				
06 Jun	S14E40	52	300	10	Dki	16	BGD	4			2				
07 Jun	S16E28	51	250	11	Eki	28	BGD	3	1		5	1			
08 Jun	S16E15	52	270	12	Ekc	26	BGD	5			3				
09 Jun	S17E01	53	180	11	Eai	33	BG	2			2	1			
10 Jun	S15W13	54	110	11	Eai	30	BG	2			2				
11 Jun	S16W27	55	130	11	Eai	37	BG	3			1				
								24	1	0	23	3	0	0	0

Still on Disk.
Absolute heliographic longitude: 53

			Region 3328												
05 Jun	N11W03	109	10	3	Axx	3	A								
06 Jun	N11W17	111	plage												
07 Jun	N11W31	112	plage												
08 Jun	N11W45	113	plage												
09 Jun	N11W59	113	plage												
10 Jun	N11W73	114	plage												
11 Jun	N11W87	115	plage												
								0	0	0	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 109

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 3329												
06 Jun	N25E42	50	40	7	Dao	4	B								
07 Jun	N23E28	51	120	5	Dao	7	B								
08 Jun	N23E14	52	120	6	Dao	5	B								
09 Jun	N23E01	53	90	7	Dai	9	B				1				
10 Jun	N23W12	53	120	7	Cao	5	B								
11 Jun	N23W24	52	110	8	Cao	7	B								
								0	0	0	1	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 53

			Region 3330												
06 Jun	N18E27	66	10	5	Bxo	2	B								
07 Jun	N18E14	66	20	5	Dro	2	B								
08 Jun	N18W04	69	10	1	Axx	1	A								
09 Jun	N18W17	71	0		Axx	1	A								
10 Jun	N18W31	72	plage												
11 Jun	N18W45	73	plage												
								0	0	0	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 69

			Region 3331												
07 Jun	S22E62	18	140	12	Hax	2	A								
08 Jun	S22E48	18	170	10	Dso	3	B								
09 Jun	S22E37	17	180	11	Eso	3	B	1	1		1				
10 Jun	S22E25	16	170	12	Eao	2	B								
11 Jun	S22E13	15	170	12	Eao	7	B								
								1	1	0	1	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 15

			Region 3332												
08 Jun	S08E59	8	20	1	Hsx	1	A								
09 Jun	S08E45	9	10	1	Hrx	1	A								
10 Jun	S08E31	10	0		Axx	1	A								
11 Jun	S08E17	11	10	1	Axx	1	A								
								0	0	0	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 11

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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