Space Weather Highlights
26 February - 03 March 2024

SWPC PRF 2531
04 March 2024

Solar activity reached moderate levels on 28 Feb as Region 3590 (N18, L=223, class/area=Fkc/1450 on 25 Feb) produced a long-duration M1.5 (R1-Minor) flare at 28/1854 UTC. A subsequent CME associated with the flare was analyzed and the model results suggested the ejecta was off the Sun-Earth line. A filament eruption, centered near S11E30, was observed starting around 28/0900 UTC. It produced Type II radio sweep along with a C5.1/Sf flare at 28/0909 UTC. A subsequent CME signature in SOHO/LASCO C2. Analysis and modeling of the event suggested arrival late on 03 Mar. The remaining 11 active regions on the visible disk were either quiet or produced only C-class X-ray activity.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit was at normal to moderate levels.

Geomagnetic field activity ranged from quiet to G2 (Moderate) geomagnetic storm levels. A period of sustained southward Bz, which reached -7 nT, was observed for a few hours on late on 26 Feb and into 27 Feb. The geomagnetic field responded with an isolated period of G1 (minor) geomagnetic storm levels. As the solar wind returned to nominal conditions, quiet to unsettled levels followed through 02 Mar. The arrival of a coronal mass ejection that left the Sun on 28 Feb was observed just before midday on 03 Mar. Total magnetic field strength increased to a peak of 19 nT and the Bz component was oriented far southward (down to -18 nT). Solar wind speeds remained relatively low with speeds averaging near 350 km/s. The geomagetic field response reached G2 (Moderate) geomagnetic storm levels during the 03/1800-2100 UTC synoptic period.

Space Weather Outlook
04 March - 30 March 2024

Solar activity is expected to be at low levels with a chance for R1-R2 (Minor-Moderate) radio blackouts 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 be normal to moderate levels throughout the outlook period.

Geomagnetic field activity is expected to range from quiet to active levels. Active levels are expected on 04 Mar in response to waning influence from a CME that left the Sun on 28 Feb. Unsettled conditions are likely on 10-11 Mar and 28 Mar due to multiple, recurrent CH HSSs. The remainder of the outlook period is likely to be mostly quiet.

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
26 February	172	133	1420	B9.5	3	0	0	2	0	0	0	0
27 February	168	103	1130	B7.5	4	0	0	6	0	0	0	0
28 February	180	127	1340	C1.1	8	1	0	4	0	0	0	0
29 February	164	107	1560	B9.9	5	0	0	0	0	0	0	0
01 March	153	120	1300	C1.1	9	0	0	8	0	0	0	0
02 March	152	91	700	C1.2	5	0	0	2	0	0	0	0
03 March	146	90	530	B9.2	8	0	0	8	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
26 February	6.6e+05	1.8e+04	1.0e+06
27 February	4.8e+05	1.7e+04	1.2e+06
28 February	5.0e+05	1.7e+04	1.5e+06
29 February	6.2e+05	1.7e+04	1.6e+06
01 March	8.5e+05	1.7e+04	1.3e+06
02 March	5.5e+05	1.7e+04	3.5e+06
03 March	5.2e+05	1.7e+04	3.2e+06

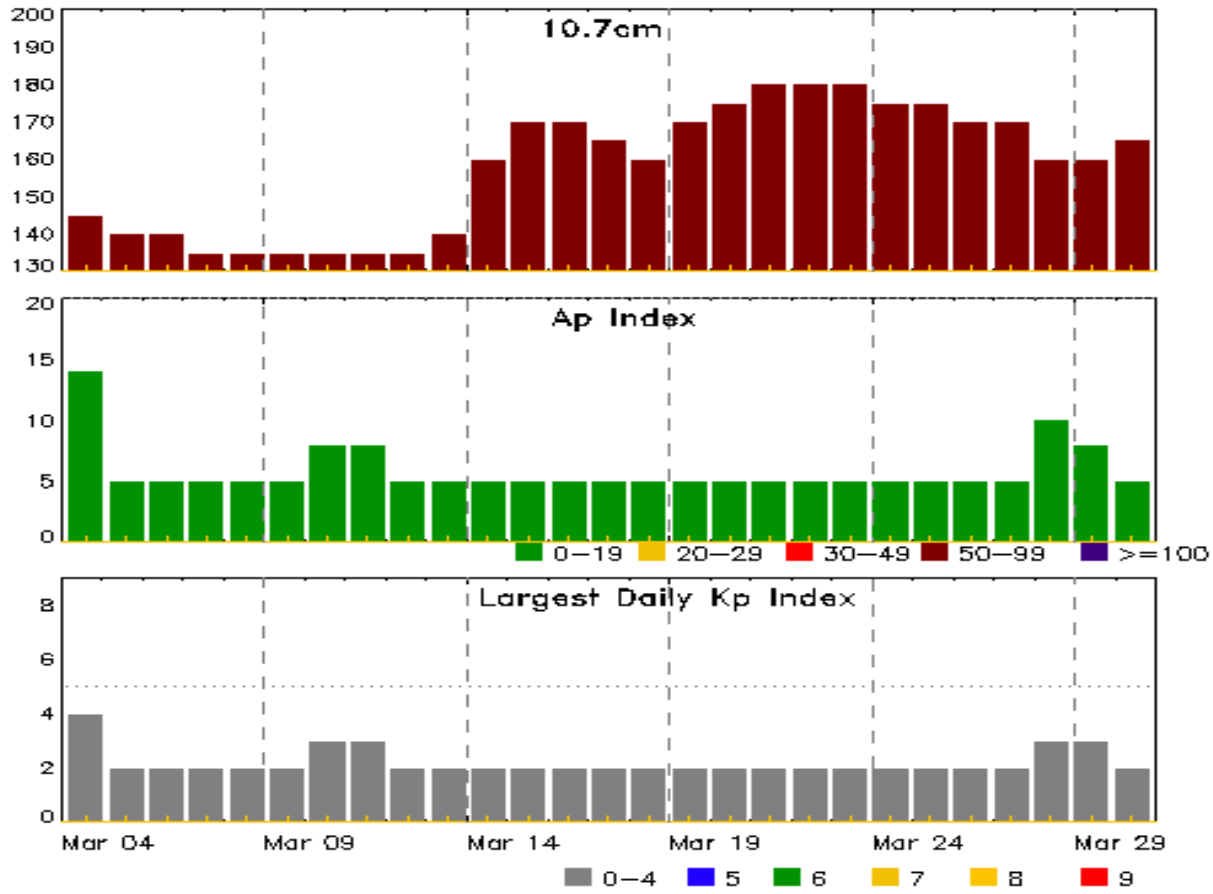
Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
26 February	10	3-2-3-2-3-2-2-2	13	2-1-3-4-5-1-1-0	11	3-3-3-3-3-2-2-2
27 February	9	3-4-3-1-1-1-2-0	9	3-4-3-0-2-1-2-0	13	4-5-3-1-1-1-3-1
28 February	5	1-1-1-2-2-2-1-1	7	0-0-1-5-1-0-1-0	6	2-1-2-2-1-1-1-1
29 February	4	1-0-2-1-2-1-1-1	4	0-0-2-1-3-2-0-0	4	1-0-2-1-2-1-1-1
01 March	9	3-3-3-1-2-2-1-1	11	1-2-4-4-2-2-2-0	9	3-3-3-2-2-2-2-1
02 March	3	2-1-1-1-2-1-0-0	3	1-1-2-1-2-0-1-0	5	2-2-1-1-1-0-1-1
03 March	20	3-0-0-2-5-5-4-3	49	0-0-0-3-7-7-6-3	12	3-1-1-3-5-5-6-4

Alerts and Warnings Issued

Date & Time of Issue UTC	Type of Alert or Warning	Date & Time of Event UTC
27 Feb 0113	WARNING: Geomagnetic K = 4	27/0113 - 0900
27 Feb 0305	ALERT: Geomagnetic K = 4	
27 Feb 0351	WARNING: Geomagnetic K = 5	27/0350 - 0900
27 Feb 0351	EXTENDED WARNING: Geomagnetic K = 4	27/0113 - 1200
27 Feb 0601	ALERT: Geomagnetic K = 5	
28 Feb 0936	ALERT: Type II Radio Emission	28/0907
03 Mar 1009	WARNING: Geomagnetic K = 4	03/1010 - 1800
03 Mar 1334	ALERT: Geomagnetic K = 4	
03 Mar 1353	WARNING: Geomagnetic K = 5	03/1352 - 2359
03 Mar 1354	EXTENDED WARNING: Geomagnetic K = 4	03/1010 - 2359
03 Mar 1428	ALERT: Geomagnetic K = 5	
03 Mar 1731	ALERT: Geomagnetic K = 5	
03 Mar 1848	ALERT: Geomagnetic K = 5	
03 Mar 1955	WARNING: Geomagnetic K = 6	03/1954 - 2359
03 Mar 2124	ALERT: Geomagnetic K = 6	
03 Mar 2345	EXTENDED WARNING: Geomagnetic K = 4	03/1010 - 04/1200

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
04 Mar	145	14	4	18 Mar	160	5	2
05	140	5	2	19	170	5	2
06	140	5	2	20	175	5	2
07	135	5	2	21	180	5	2
08	135	5	2	22	180	5	2
09	135	5	2	23	180	5	2
10	135	8	3	24	175	5	2
11	135	8	3	25	175	5	2
12	135	5	2	26	170	5	2
13	140	5	2	27	170	5	2
14	160	5	2	28	160	10	3
15	170	5	2	29	160	8	3
16	170	5	2	30	165	5	2
17	165	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
28 Feb		1624	1854	2115	M1.5		0.160		3590			

Flare List

	Time				Optical		
Date	Begin	Max	End	X-ray Class	Imp/ Brtns	Location Lat CMD	Rgn #
26 Feb	1428	1428	1435		SF	N19W17	3590
26 Feb	1554	1601	1608	C1.5			3590
26 Feb	B1608	1608	1650		SF	N19W27	3590
26 Feb	1825	1835	1841	C2.0			3590
26 Feb	2152	2155	2159	C1.3			3590
27 Feb	0639	0644	0648	C1.2			3596
27 Feb	0714	0742	0817	C3.4			3590
27 Feb	B0837	U0847	A0911		SF	N20E28	3595
27 Feb	B0842	U0842	A0905		SF	N19W24	3590
27 Feb	B0917	U1033	A1105		SF	N20E27	3595
27 Feb	B0927	U0927	A0932		SF	S33E32	3591
27 Feb	B1114	U1116	A1122		SF	S33E32	3591
27 Feb	B1135	U1135	A1139		SF	N20E27	3595
27 Feb	1420	1435	1454	C1.5			3595
27 Feb	1951	2000	2011	C1.7			3595
28 Feb	0027	0031	0044	C2.2	SF	N07E17	3594
28 Feb	0223	0229	0233	C1.6			3590
28 Feb	0431	0439	0445	C1.8			3596
28 Feb	0555	0607	0612	C2.9			3590
28 Feb	0654	0700	0704	C1.6			3590
28 Feb	0704	0726	0747	C2.4	SF	N14W45	3590
28 Feb	0759	U0800	A0843		SF	N05E16	3594
28 Feb	0856	0909	0927	C5.1	SF	S18E31	
28 Feb	1624	1854	2115	M1.5			3590
28 Feb	2351	0000	0008	C6.5			3590
29 Feb	0504	0513	0524	C3.9			3590
29 Feb	0732	0739	0745	C1.8			3590
29 Feb	1323	1334	1340	C2.3			
29 Feb	2056	2103	2109	C2.4			3590
29 Feb	2356	0001	0008	C3.8			3590

Flare List

Date	Time			Optical			
	Begin	Max	End	X-ray Class	Imp/ Brtns	Location Lat CMD	Rgn #
01 Mar	0121	0125	0129	C3.9			3590
01 Mar	0315	0321	0326	C2.5			3590
01 Mar	0518	0524	0530	C1.7			3598
01 Mar	0626	0626	0631		SF	N15W70	3590
01 Mar	0655	0703	0709	C2.1			3590
01 Mar	1312	1313	1318		SF	S14W25	3598
01 Mar	1702	1703	1712		SF	S10W28	3598
01 Mar	1732	1743	1749	C2.3	SF	S10W28	3598
01 Mar	1806	1812	1818	C1.9			3599
01 Mar	1929	1937	1948	C2.2			3590
01 Mar	2023	2030	2039	C1.7			3590
01 Mar	2102	2105	2108		SF	S10W31	3598
01 Mar	2110	2114	2127		SF	S10W32	3598
01 Mar	2129	2135	2157		SF	S09W32	3598
01 Mar	2345	2348	2353	C2.3	SF	N24W18	3595
02 Mar	0229	0236	0245	C2.0			3598
02 Mar	1116	1124	1129	C2.0	SF	N21W24	3595
02 Mar	1224	1230	1236	C1.5			3591
02 Mar	1247	1258	1308	C6.6	SF	N22W25	3595
02 Mar	2338	2346	2358	C1.8			
03 Mar	0347	0355	0359	C2.8			3599
03 Mar	0811	0813	0815		SF	S12W48	3598
03 Mar	1027	1033	1040	C1.7	SF	S12W50	3598
03 Mar	1303	1313	1318	C1.6	SF	S12W50	3598
03 Mar	1411	1412	1415		SF	S12W50	3598
03 Mar	1521	1527	1531	C1.4			3598
03 Mar	1641	1729	1750	C3.1			
03 Mar	2034	2041	2045		SF	N19E47	
03 Mar	2125	2132	2141	C1.4	SF	N19E46	
03 Mar	2146	2149	2153	C1.5			
03 Mar	2243	2246	2304		SF	N19E45	
03 Mar	2322	2332	2343	C1.8	SF	N19E44	

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 3586												
14 Feb	N29E68	287	50	3	Hsx	1	A								
15 Feb	N27E57	285	100	2	Hsx	1	A	1							
16 Feb	N27E45	284	160	2	Hsx	1	A	1							
17 Feb	N27E33	282	150	2	Hsx	1	A								
18 Feb	N27E20	282	140	2	Hsx	2	A								
19 Feb	N27E07	282	160	2	Cso	1	B								
20 Feb	N27W07	282	90	2	Hsx	1	A								
21 Feb	N27W20	282	70	3	Hsx	2	A								
22 Feb	N27W32	281	80	2	Hsx	2	A								
23 Feb	N28W46	282	80	2	Hsx	1	A								
24 Feb	N27W58	281	80	2	Hsx	1	A								
25 Feb	N27W70	280	120	2	Hsx	1	A								
26 Feb	N27W83	279	80	2	Hsx	1	A								
								2	0	0	0	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 282

			Region 3590												
18 Feb	N19E78	224	250	4	Hhx	1	A	3			1				
19 Feb	N18E61	226	530	14	Eho	4	B	5			1				
20 Feb	N17E51	223	760	20	Fki	7	BG				1				
21 Feb	N17E38	224	740	17	Fki	23	BGD	8		1	7				
22 Feb	N18E26	222	900	17	Fkc	24	BGD	4	1	2	8		2		
23 Feb	N18E13	223	1150	18	Fkc	44	BGD	6	4		1	2			
24 Feb	N18W01	224	1400	20	Fkc	45	BGD	11	4						
25 Feb	N18W13	223	1450	20	Fkc	29	BGD	3	1		3	1			
26 Feb	N18W31	227	1130	17	Fkc	42	BGD	3			2				
27 Feb	N18W40	223	900	18	Fkc	19	BGD	1			1				
28 Feb	N18W53	222	930	18	Fko	24	BGD	5	1		1				
29 Feb	N18W65	222	1000	18	Fkc	12	BGD	4							
01 Mar	N18W80	224	680	12	Ekc	7	B	5			1				
02 Mar	N18W92	223	plage												
								58	11	3	27	3	2	0	0

Crossed West Limb.
Absolute heliographic longitude: 224

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 3591												
23 Feb	S35E71	165	60	3	Hsx	1	A								
24 Feb	S36E60	163	40	3	Hsx	1	A								
25 Feb	S36E46	164	70	3	Hsx	1	A				1				
26 Feb	S35E33	163	40	2	Hsx	1	A								
27 Feb	S35E20	163	50	2	Hsx	1	A				2				
28 Feb	S36E09	161	90	2	Hsx	1	A								
29 Feb	S36W04	161	90	2	Hsx	1	A								
01 Mar	S36W17	161	60	2	Hsx	1	A								
02 Mar	S36W28	159	70	4	Cso	3	B	1							
03 Mar	S36W40	158	60	2	Hsx	1	A								
								1	0	0	3	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 161

			Region 3592												
23 Feb	S10E69	167	80	7	Dso	2	B								
24 Feb	S12E58	165	140	4	Dso	5	B								
25 Feb	S13E45	165	130	7	Dao	7	B								
26 Feb	S13E30	165	40	7	Cro	7	B								
27 Feb	S11E15	167	20	7	Cro	5	B								
28 Feb	S14E04	165	10	9	Axx	8	A								
29 Feb	S13W18	165	plage												
01 Mar	S14W20	164	10	1	Axx	1	A								
02 Mar	S14W34	165	plage												
03 Mar	S15W47	164	plage												
								0	0	0	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 165

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 3594												
23 Feb	N06E68	168	30	5	Cao	5	B								
24 Feb	N05E55	168	50	2	Cao	4	B								
25 Feb	N05E43	167	60	5	Cao	6	B								
26 Feb	N05E26	169	40	1	Hax	2	A								
27 Feb	N05E13	169	20	1	Hax	1	A								
28 Feb	N05W00	169	30	1	Hax	1	A	1			2				
29 Feb	N05W13	170	20	1	Hrx	1	A								
01 Mar	N05W27	171	10	1	Axx	1	A								
02 Mar	N05W42	173	plage												
03 Mar	N05W57	175	plage												
								1	0	0	2	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 169

			Region 3595												
25 Feb	N20E46	164	80	5	Cai	10	B								
26 Feb	N20E29	167	40	5	Bxo	6	B								
27 Feb	N20E18	164	60	9	Cai	13	B	2			3				
28 Feb	N20E04	165	170	10	Dao	15	BG								
29 Feb	N20W10	167	320	10	Dko	12	BG								
01 Mar	N20W23	167	370	11	Eko	9	BG	1			1				
02 Mar	N20W35	166	380	11	Eko	8	BG	2			2				
03 Mar	N20W48	165	220	11	Eso	4	BG								
								5	0	0	6	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 165

			Region 3596												
26 Feb	N17E62	135	50	3	Cao	4	B								
27 Feb	N17E48	134	80	4	Dao	4	B	1							
28 Feb	N18E36	133	100	7	Dao	5	B	1							
29 Feb	N18E24	133	110	5	Cao	6	B								
01 Mar	N19E09	135	40	4	Cao	4	B								
02 Mar	N19W03	134	30	4	Cao	3	B								
03 Mar	N19W18	135	20	1	Hrx	1	A								
								2	0	0	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 134

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 3597												
28 Feb	N07E16	154	10	2	Bxo	3	B								
29 Feb	N07E02	155	10	2	Bxo	4	B								
01 Mar	N08W13	157	10	1	Axx	1	A								
02 Mar	N08W27	158	plage												
03 Mar	N08W41	159	plage												
								0	0	0	0	0	0	0	0
Still on Disk.															
Absolute heliographic longitude: 155															
			Region 3598												
29 Feb	S13W18	175	10	3	Hrx	1	A								
01 Mar	S13W33	177	80	6	Dai	5	B	2			6				
02 Mar	S13W45	176	110	8	Dai	12	B	1							
03 Mar	S13W58	176	110	9	Dai	8	B	3			4				
								6	0	0	10	0	0	0	0
Still on Disk.															
Absolute heliographic longitude: 175															
			Region 3599												
01 Mar	S13E75	69	40	2	Hax	1	A	1							
02 Mar	S13E60	71	30	7	Cro	4	B								
03 Mar	S13E48	70	30	9	Cro	3	B	1							
								2	0	0	0	0	0	0	0
Still on Disk.															
Absolute heliographic longitude: 70															
			Region 3600												
02 Mar	S18E73	58	80	2	Hsx	1	A								
03 Mar	S18E59	59	80	2	Hsx	1	A								
								0	0	0	0	0	0	0	0
Still on Disk.															
Absolute heliographic longitude: 59															
			Region 3601												
03 Mar	N13W07	125	10	3	Bxo	2	B								
								0	0	0	0	0	0	0	0
Still on Disk.															
Absolute heliographic longitude: 125															

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
Space Weather Prediction Center
325 Broadway, Boulder CO 80305

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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