Space Weather Highlights
21 March - 27 March 2022

SWPC PRF 2430
28 March 2022

Solar activity reached moderate levels at 25/0526 UTC due to an M1/1f flare from Region 2974 (S18, L=090, class/area Cso/90 on 23 Mar). Type II (estimated shock velocity of 959 km/s) and Type IV radio sweeps were observed with this event. A subsequent CME signature was first observed in SOHO/LASCO C2 imagery beginning at 25/0548 UTC. Analysis and modeling of the CME suggested an Earth-directed component with an anticipated arrival on 27 Mar. Solar activity reached low levels on 22-24 and 26-27 Mar. Very low levels were observed on 21 Mar.

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 reached active levels late on 27 Mar due to positive-polarity CH HSS influence. Quiet to unsettled levels were observed on 22, 24-26 Mar. Quiet conditions prevailed on 21 and 23 Mar.

Space Weather Outlook
28 March - 23 April 2022

Solar activity is likely to be low, with a slight 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 reach high levels on 04-07 Apr, with moderate levels expected during the remaining portion of the period.

Geomagnetic field activity is likely to reach G1 (Minor) storm levels on 28 Mar due to combined CME and CH HSS effects. Active levels are expected on 03, 20-21 Apr due to recurrent CH HSS influence. Quiet to unsettled levels are anticipated 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
21 March	98	30	60	B2.5	0	0	0	0	0	0	0	0
22 March	106	29	100	B4.1	6	0	0	0	0	0	0	0
23 March	106	27	250	B6.2	6	0	0	3	0	0	0	0
24 March	112	44	620	B5.0	7	0	0	1	0	0	0	0
25 March	112	50	640	B3.4	1	1	0	1	1	0	0	0
26 March	119	48	590	B3.9	1	0	0	0	0	0	0	0
27 March	130	97	780	B6.0	3	0	0	1	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
21 March	4.5e+05	1.5e+05	1.1e+06
22 March	5.8e+05	6.4e+04	1.4e+06
23 March	4.9e+05	4.7e+04	1.2e+06
24 March	1.5e+05	4.2e+04	1.0e+06
25 March	1.0e+05	4.2e+04	1.8e+06
26 March	3.2e+05	4.2e+04	2.9e+06
27 March	4.2e+05	4.0e+04	1.1e+06

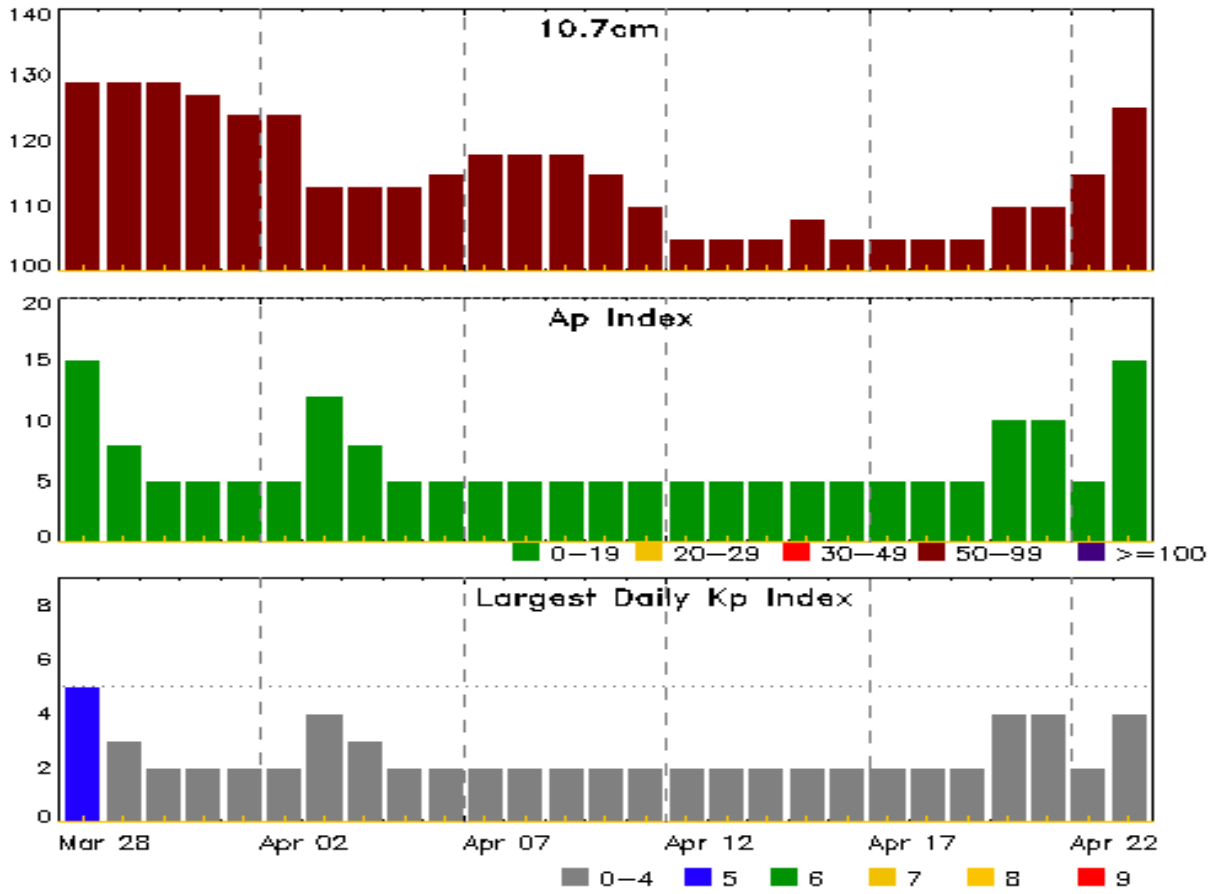
Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
21 March	4	1-0-0-1-2-3-1-1	0	0-0-0-0-0-0-0-1	4	2-0-0-1-1-1-1-1
22 March	7	2-2-1-1-2-2-3-2	5	2-1-1-1-1-1-2-2	9	2-3-2-1-1-1-3-2
23 March	6	2-1-2-2-2-2-2-1	10	1-1-4-4-1-2-1-1	7	2-1-2-2-1-2-2-1
24 March	7	3-1-1-2-2-2-1-2	12	2-1-0-4-5-1-1-1	9	3-2-1-3-3-2-1-2
25 March	10	3-3-2-3-2-2-2-1	13	2-1-3-5-3-1-2-1	10	3-3-2-3-2-2-2-1
26 March	7	2-0-1-3-2-3-2-1	11	1-1-1-5-1-2-3-1	7	2-1-1-2-1-2-3-2
27 March	15	1-2-2-3-3-4-4-3	29	2-2-2-5-4-6-5-2	7	2-2-2-3-3-4-4-4

Alerts and Warnings Issued

Date & Time of Issue UTC	Type of Alert or Warning	Date & Time of Event UTC
21 Mar 0639	ALERT: Type II Radio Emission	21/0549
21 Mar 0752	WARNING: Proton 10MeV Integral Flux > 10pfu	21/0750 - 2359
21 Mar 1655	CANCELLATION: Proton 10MeV Integral Flux > 10pfu	
22 Mar 0401	WARNING: Geomagnetic K = 4	22/0400 - 1500
22 Mar 2037	WARNING: Geomagnetic K = 4	22/2037 - 23/0600
25 Mar 0306	WARNING: Geomagnetic K = 4	25/0305 - 1500
25 Mar 0533	ALERT: Type II Radio Emission	25/0514
25 Mar 0546	ALERT: Type IV Radio Emission	25/0522
25 Mar 2136	WATCH: Geomagnetic Storm Category G1 predicted	
27 Mar 1130	WARNING: Geomagnetic K = 4	27/1129 - 2100
27 Mar 1753	ALERT: Geomagnetic K = 4	27/1752
27 Mar 1954	WARNING: Geomagnetic K = 5	27/1955 - 28/0600
27 Mar 2051	EXTENDED WARNING: Geomagnetic K = 4	27/1129 - 28/1200

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
28 Mar	129	15	5	11 Apr	110	5	2
29	129	8	3	12	105	5	2
30	129	5	2	13	105	5	2
31	127	5	2	14	105	5	2
01 Apr	124	5	2	15	108	5	2
02	124	5	2	16	105	5	2
03	113	12	4	17	105	5	2
04	113	8	3	18	105	5	2
05	113	5	2	19	105	5	2
06	115	5	2	20	110	10	4
07	118	5	2	21	110	10	4
08	118	5	2	22	115	5	2
09	118	5	2	23	125	15	4
10	115	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
25 Mar	0502	0526	0550	M1.4	0.026	1F	S21	E36	2974	100		2	2

Flare List

	Time				Optical			
Date	Begin	Max	End	X-ray Class	Imp/ Brtns	Location Lat CMD	Rgn #
21 Mar	0042	0054	0106	B4.5			2971
21 Mar	0706	0712	0716	B4.6			
21 Mar	1906	1919	1927	B7.8			
22 Mar	0126	0132	0136	C1.1			2972
22 Mar	0228	0233	0239	B4.6			2968
22 Mar	0246	0253	0258	B5.7			2974
22 Mar	0329	0333	0340	B6.0			2974
22 Mar	0407	0427	0443	C1.0			
22 Mar	0922	0932	0941	B9.0			2974
22 Mar	1037	1055	1057	B8.0			
22 Mar	1057	1107	1118	C1.2			2974
22 Mar	1215	1242	1300	C7.0			
22 Mar	1648	1659	1707	B9.1			2974
22 Mar	1903	1921	1932	C1.4			2974
22 Mar	2014	2027	2044	C4.8			2974
23 Mar	0553	0558	0604	C1.3			
23 Mar	0842	0857	0916	C2.3			
23 Mar	1046	1055	1104	C1.8			
23 Mar	1156	1208	1227	C2.5	SF	S18E58	2974
23 Mar	1346	1357	1416	C3.0	SF	S20E54	2974
23 Mar	2312	2322	2329	C4.3	SF	N13E62	2975
24 Mar	0028	0050	0120	C2.8			2975
24 Mar	0142	0145	0150	C8.1			2975
24 Mar	0428	0434	0440	C1.1			
24 Mar	0803	0821	0844	C2.2			2975
24 Mar	1433	1441	1448	C2.1			2975
24 Mar	1857	1916	1941	C1.0			2975
24 Mar	2103	2115	2122	C1.9	SF	S19E43	2974
25 Mar	0227	0245	0259	C2.6			
25 Mar	0437	0442	0446	B9.0			

Flare List

Date	Time			Optical			
	Begin	Max	End	X-ray Class	Imp/ Brtns	Location Lat CMD	Rgn #
25 Mar	0502	0526	0550	M1.4	1F	S21E36	2974
25 Mar	1025	1041	1104	B8.3			
25 Mar	1414	1419	1423	B5.8			2974
25 Mar	1545	1553	1558	B5.5			2974
25 Mar	1858	1906	1910	B8.0	SF	N12E49	2976
26 Mar	1518	1538	1558	C2.3			
26 Mar	1909	1921	1930	B9.7			2975
27 Mar	0325	0331	0348	B7.1			
27 Mar	0348	0402	0414	B8.2			
27 Mar	B1040	U1109	B1114	C2.4			2978
27 Mar	1509	1518	1525	C1.2			
27 Mar	1611	1618	1627	C1.2			
27 Mar	1638	1638	1641		SF	N13E05	2975

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 2965												
08 Mar	N22E75	265	20	4	Dao	3	B								
09 Mar	N23E60	267	330	15	Eki	11	B	2							
10 Mar	N23E47	267	600	15	Eki	14	B								
11 Mar	N23E34	267	600	15	Eki	15	B	2			1				
12 Mar	N23E22	266	620	17	Fki	34	BG	2							
13 Mar	N24E09	265	600	17	Fki	20	B								
14 Mar	N24W03	264	500	17	Fki	25	BG	4	1		2				
15 Mar	N24W17	265	310	18	Fai	25	BG	5	2		10				
16 Mar	N24W30	265	270	19	Fai	20	BG								
17 Mar	N24W44	266	230	19	Fao	8	B	2							
18 Mar	N25W55	264	220	17	Fao	6	B								
19 Mar	N26W68	263	170	17	Cao	4	B	2			1				
20 Mar	N23W97	279	30	2	Hsx	1	A								
								19	3	0	14	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 264

			Region 2967												
12 Mar	N17E60	228	30	1	Hsx	1	A								
13 Mar	N17E46	228	30	1	Hsx	1	A								
14 Mar	N17E33	228	30	1	Hsx	1	A								
15 Mar	N18E19	229	20	1	Hrx	1	A								
16 Mar	N18E05	230	20	1	Hrx	1	A								
17 Mar	N17W09	231	20	1	Hrx	1	A								
18 Mar	N17W22	231	10	1	Axx	1	A								
19 Mar	N17W35	230	plage												
20 Mar	N17W49	231	plage												
21 Mar	N17W63	232	plage												
								0	0	0	0	0	0	0	0

Died on Disk.
Absolute heliographic longitude: 230

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 2968												
13 Mar	S21E43	231	10	1	Axx	1	A	1							
14 Mar	S21E29	232	plage												
15 Mar	S22E04	243	plage												
16 Mar	S23W04	239	plage												
17 Mar	S23W20	242	10	1	Axx	2	A								
18 Mar	S23W34	243	plage												
19 Mar	S23W48	243	plage												
20 Mar	S23W62	244	plage												
21 Mar	S23W76	245	plage												
								1	0	0	0	0	0	0	0

Died on Disk.
Absolute heliographic longitude: 243

			Region 2970												
14 Mar	S23E19	242	10	4	Bxo	4	B								
15 Mar	S23E04	244	10	4	Bxo	4	B								
16 Mar	S23W10	245	plage												
17 Mar	S23W24	246	plage												
18 Mar	S23W38	247	plage												
19 Mar	S23W52	247	plage												
20 Mar	S23W66	248	plage												
21 Mar	S23W80	249	plage												
								0	0	0	0	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 244

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 2971												
17 Mar	N17E42	180	20	2	Bxo	2	B								
18 Mar	N16E30	179	plage												
19 Mar	N16E16	179	plage												
20 Mar	N16E03	179	plage					1				1			
21 Mar	N16W11	180	plage												
22 Mar	N16W25	181	plage												
23 Mar	N16W39	182	plage												
24 Mar	N16W53	182	plage												
25 Mar	N16W67	183	plage												
26 Mar	N16W81	184	plage												
								1	0	0	0	1	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 179

			Region 2972												
19 Mar	S28E17	178	20	4	Bxo	5	B								
20 Mar	S27E04	178	30	4	Bxo	4	B								
21 Mar	S27W09	177	40	5	Dso	8	B								
22 Mar	S27W22	177	40	7	Cso	7	B	1							
23 Mar	S29W32	174	plage												
24 Mar	S29W46	175	plage												
25 Mar	S29W60	176	plage												
26 Mar	S29W74	177	plage												
27 Mar	S29W88	178	plage												
								1	0	0	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 178

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 2973												
20 Mar	N19E45	137	20	5	Bxo	4	B								
21 Mar	N19E33	134	20	4	Bxo	2	B								
22 Mar	N19E22	133	plage												
23 Mar	N19E08	135	plage												
24 Mar	N19W06	135	plage												
25 Mar	N19W20	136	plage												
26 Mar	N19W34	137	plage												
27 Mar	N19W48	138	plage												
								0	0	0	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 135

			Region 2974												
22 Mar	S17E61	94	60	4	Cso	2	B	3							
23 Mar	S18E54	90	90	6	Cso	2	B	2			2				
24 Mar	S19E39	90	60	3	Cso	3	B	1			1				
25 Mar	S19E25	91	30	4	Cro	2	B		1			1			
26 Mar	S19E11	92	20	1	Hrx	2	A								
27 Mar	S19W02	92	10	1	Axx	1	A								
								6	1	0	3	1	0	0	0

Still on Disk.
Absolute heliographic longitude: 92

			Region 2975												
23 Mar	N13E63	78	160	11	Dao	5	B	1			1				
24 Mar	N14E55	75	160	9	Cao	5	B	5							
25 Mar	N12E39	77	160	12	Eso	5	B								
26 Mar	N12E20	87	40	3	Hsx	3	A								
27 Mar	N12E05	85	50	9	Csi	22	B				1				
								6	0	0	2	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 85

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 2976												
24 Mar	N15E64	66	400	9	Dho	6	B								
25 Mar	N16E47	68	450	12	Eho	13	B				1				
26 Mar	N20E27	75	530	15	Eho	13	B								
27 Mar	N16E22	68	500	14	Eho	15	BD								
								0	0	0	1	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 68

			Region 2977												
27 Mar	N21W11	100	40	6	Dro	8	B								
								0	0	0	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 100

			Region 2978												
27 Mar	S15E75	14	180	2	Hsx	1	A	1							
								1	0	0	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 14

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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