Space Weather Highlights
28 June - 04 July 2021

SWPC PRF 2392
05 July 2021

Solar activity ranged from very low to high levels. Region 2838 (N24W88, class/area Cro/030 on 03 Jul) rapidly emerged near the NW limb on 03 Jul. It produced the strongest event of the period, an impulsive X1/Sn flare (R3 - Strong) at 03/1429 UTC. Associated with the event was a Type II radio sweep (357 km/s) along with low-level radio bursts across several different frequencies. Subsequent coronagraph imagery from SOHO LASCO/C2 showed several different westward CME signatures. Analysis determined all to be oriented away from the Sun-Earth line. The region also produced an M2/Sf flare (R1 - Minor) at 03/0717 UTC, an M1/Sf flare (R1) at 03/1702 UTC and a final M1/Sf flare (R1) at 04/0509 UTC as the region rotated behind the NW limb.

The largest region on the visible disk was Region 2835 (S18W16, class/area Ekc/770 on 01 Jul). The largest flare it produced during the reporting period was a C3 at 30/1815 UTC. The growth Region 2835 peaked on 01 Jul and has been in gradual decay in the days since. The three remaining numbered active regions were relatively simple and stable or in decay.

No proton events were observed at geosynchronous orbit.

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

Geomagnetic field activity varied from quiet to active levels. Late on 30 Jun, a relatively gradual increase in solar wind parameters was observed which was likely from transient influence of a CME that left the Sun on 27 Jun. Solar wind speeds increased from the mid 300 km/s to a peak of just over 500 km/s. Total magnetic field strength (Bt) increased to a brief peak of 13 nt early on 01 Jul. Bz reached a maximum southward flux of -9 nT. The following geomagnetic field response was mostly unsettled to active through the later part of 30 Jun. A decline in Bt early on 01 Jul resulted in quiet conditions despite wind speeds being elevated through 03 Jul. The remainder of the summary period was quiet.

Space Weather Outlook
05 July - 31 July 2021

Solar activity is expected to be very low to low over the outlook period. There is potential for Region 2838 (N24, L=100), which produced an X1/Sn flare at 03/1429 UTC as it rotated around the NW limb, to increase flare probabilities after 16 Jul if it maintains around the farside and rotates back onto the visible disk.

No proton events are expected at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to range from normal to high levels. High levels are likely on 12-14 Jul and 20-23 Jul in response to CH HSS activity.

The remainder of the outlook period is likely to be at normal to moderate levels.

Geomagnetic field activity is expected to be at quiet to active levels. Active levels are likely on 10 Jul and 18-19 Jul; unsettled levels are likely on 05-06 Jul, 11 Jul and 20 Jul. All elevated levels on geomagnetic activity are in response to multiple, recurrent CH HSSs. The remainder of the outlook period is expected to be at 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
28 June	89	50	280	B1.8	2	0	0	3	0	0	0	0
29 June	93	56	410	B1.5	0	0	0	2	0	0	0	0
30 June	94	53	540	B1.7	2	0	0	3	0	0	0	0
01 July	94	56	810	B1.5	0	0	0	1	0	0	0	0
02 July	95	72	600	B1.5	0	0	0	0	0	0	0	0
03 July	94	81	680	B3.0	3	2	1	11	0	0	0	0
04 July	91	60	590	B2.4	4	1	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
28 June	5.3e+04	4.5e+04	6.1e+06
29 June	7.6e+04	4.5e+04	8.6e+06
30 June	7.1e+04	4.5e+04	1.8e+06
01 July	5.8e+04	4.4e+04	1.7e+06
02 July	5.2e+04	4.5e+04	1.3e+06
03 July	5.9e+04	4.7e+04	1.8e+06
04 July	8.8e+04	4.6e+04	2.0e+06

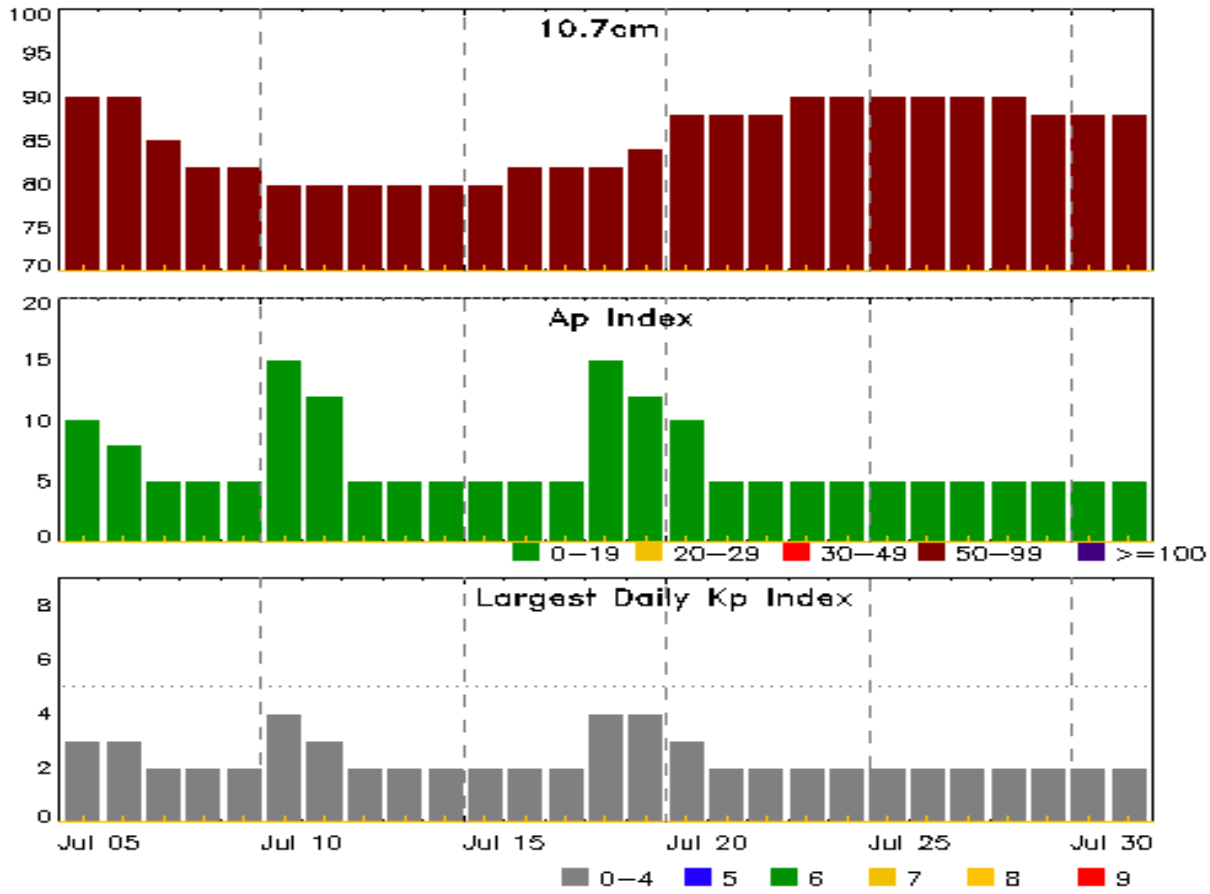
Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
28 June	4	1-1-0-1-2-2-1-2	1	1-0-0-1-0-0-0-0	4	1-0-1-1-1-1-1-1
29 June	5	1-1-0-2-2-2-2-1	1	0-0-0-0-1-1-1-0	5	1-0-1-1-1-2-2-1
30 June	11	1-2-3-3-2-2-3-3	12	0-2-3-4-2-3-2-3	14	0-2-3-3-2-3-4-4
01 July	7	3-3-1-1-2-2-1-1	7	4-2-1-1-1-2-1-1	7	3-3-1-1-1-1-1-1
02 July	6	1-1-2-1-2-2-2-2	5	1-2-1-2-1-2-1-1	5	1-1-2-1-1-2-1-1
03 July	4	2-1-2-1-2-1-1-0	3	2-2-2-1-0-0-0-1	4	2-1-2-1-1-1-0-0
04 July	4	1-2-1-1-2-1-1-0	1	1-1-1-0-0-0-0-0	3	1-1-1-1-1-1-0-1

Alerts and Warnings Issued

Date & Time of Issue UTC	Type of Alert or Warning	Date & Time of Event UTC
30 Jun 1724	WARNING: Geomagnetic K = 4	30/1726 - 01/0300
30 Jun 2101	ALERT: Geomagnetic K = 4	30/2059
01 Jul 0009	EXTENDED WARNING: Geomagnetic K = 4	30/1726 - 01/0600
03 Jul 1434	ALERT: X-ray Flux exceeded M5	03/1427
03 Jul 1500	SUMMARY: X-ray Event exceeded X1	03/1418 - 1434
03 Jul 1624	ALERT: Type II Radio Emission	03/1437

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
05 Jul	90	10	3	19 Jul	84	12	4
06	90	8	3	20	88	10	3
07	85	5	2	21	88	5	2
08	82	5	2	22	88	5	2
09	82	5	2	23	90	5	2
10	80	15	4	24	90	5	2
11	80	12	3	25	90	5	2
12	80	5	2	26	90	5	2
13	80	5	2	27	90	5	2
14	80	5	2	28	90	5	2
15	80	5	2	29	88	5	2
16	82	5	2	30	88	5	2
17	82	5	2	31	88	5	2
18	82	15	4				

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
03 Jul	0704	0717	0722	M2.7	0.012	SF	N23	W78	2838	340		
03 Jul	1418	1429	1434	X1.5	0.046	SN	N24	W81	2838	120		1
03 Jul	1659	1703	1714	M1.0	0.006	SF	N24	W82	2838			
04 Jul	0501	0509	0515	M1.5	0.007	SF	N00	E00	2838			

Flare List

	Time			Optical			
Date	Begin	Max	End	X-ray Class	Imp/ Brtns	Location Lat CMD	Rgn #
28 Jun	0200	0210	0235	B5.0			2835
28 Jun	0743	0747	0751	B2.7			
28 Jun	0754	0808	0824	B6.9	SF	S26E25	2836
28 Jun	0915	0935	0947	C2.0	SF	S29E27	2836
28 Jun	1126	1133	1139	B4.3			
28 Jun	1424	1430	1437	B9.2	SF	S18E29	2835
28 Jun	1446	1446	1447		SF	S18E30	2835
28 Jun	1709	1714	1722	B5.5			2835
28 Jun	1758	1806	1818	B3.8			2835
28 Jun	1856	1911	1916	C1.6			2835
28 Jun	1926	1937	1945	B7.6			2835
28 Jun	2142	2150	2222	B5.5			2835
28 Jun	2309	2315	2322	B3.0			2835
29 Jun	0514	0537	0600	B6.9	SF	N14E08	
29 Jun	1030	1039	1044	B3.4			2835
29 Jun	1108	1124	1144	B6.5			2837
29 Jun	1232	1242	1248	B8.6			2835
29 Jun	1300	1301	1302		SF	S17E16	2835
29 Jun	1347	1355	1400	B2.2			2835
29 Jun	1437	1442	1446	B6.2			2835
29 Jun	1725	1735	1741	B3.2			2835
29 Jun	1915	1920	1927	B3.3			2835
30 Jun	0225	0231	0256	B2.1			2835
30 Jun	0256	0307	0313	B4.8	SF	S19E09	2835
30 Jun	0704	0723	0739	B4.6			2835
30 Jun	0821	0840	0849	B4.4	SF	S20E09	2835
30 Jun	0909	0910	0911		SF	S19E08	2835

Flare List

Date	Time			Optical			
	Begin	Max	End	X-ray Class	Imp/ Brtns	Location Lat CMD	Rgn #
30 Jun	1248	1255	1313	B3.8			2835
30 Jun	1723	1728	1732	C1.4			2835
30 Jun	1809	1815	1819	C3.6			2835
30 Jun	1839	1844	1852	B2.8			2835
30 Jun	2316	2322	2326	B2.8			2835
01 Jul	0906	0913	0918	B3.0			2835
01 Jul	1034	1044	1101	B3.0			2835
01 Jul	1320	1326	1330	B2.9			2835
01 Jul	1658	1701	1705	B2.5			2835
01 Jul	1753	1801	1808	B2.8			2837
01 Jul	1814	1824	1830	B5.1	SF	S17W12	2835
01 Jul	1845	1856	1909	B2.8			2835
02 Jul	0116	0123	0132	B3.1			2837
02 Jul	0611	0617	0633	B2.9			2837
02 Jul	0633	0639	0644	B3.2			2837
02 Jul	1007	1021	1046	B3.0			2836
02 Jul	1840	1843	1847	B3.4			2835
02 Jul	2148	2154	2202	B8.5			2838
02 Jul	2254	2304	2308	B3.6			2835
03 Jul	0102	0115	0122	B5.1	SF	N23W78	2838
03 Jul	0214	0231	0239	C5.7	SF	N23W78	2838
03 Jul	0439	0444	0455	B5.1			2838
03 Jul	0458	0508	0524	C1.9	SF	N24W75	2838
03 Jul	0544	0545	0550		SF	N23W78	2838
03 Jul	0547	0548	0549		SF	S19E09	2835
03 Jul	0704	0717	0722	M2.7	SF	N23W78	2838
03 Jul	0805	0805	0806		SF	S17W32	2835
03 Jul	1255	1311	1322	C1.9			2838
03 Jul	1418	1429	1434	X1.5	SN	N24W81	2838
03 Jul	1626	1633	1642	B8.6	SF	S16W37	2835
03 Jul	1652	1655	1659	B7.6			2838
03 Jul	1655	1702	1709	M1.0	SF	N24W82	2838
03 Jul	2000	2009	2016	B7.0			
03 Jul	2117	2124	2128	B5.1	SF	S20W44	2835
03 Jul	2134	2141	2146	B5.2			2838
03 Jul	2151	2202	2208	B6.0			2838
03 Jul	2323	2330	2337	B6.1			2838
04 Jul	0103	0117	0124	B5.7			2838

Flare List

Date	Time			Optical			
	Begin	Max	End	X-ray Class	Imp/ Brtns	Location Lat CMD	Rgn #
04 Jul	0134	0149	0214	C2.0			2838
04 Jul	0326	0336	0344	C2.1			2838
04 Jul	0501	0509	0515	M1.5	SF	N00E00	2838
04 Jul	0639	0640	0643		SF	N19E49	
04 Jul	0648	0648	0655		SF	N19E49	
04 Jul	0722	0725	0728		SF	N19E49	
04 Jul	0738	0744	0750	B5.6	SF	N18E47	2839
04 Jul	0752	0757	0801	C1.3	SF	N18E47	2839
04 Jul	0842	0845	0852		SF	N18E47	2839
04 Jul	1056	1059	1103	B4.7			2839
04 Jul	1615	1621	1630	B3.2			2839
04 Jul	1724	1735	1753	B3.1			2835
04 Jul	1757	1813	1818	C1.7	SF	S20W54	2835
04 Jul	2112	2127	2145	B5.3			2838

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 2835												
25 Jun	S18E65	52	150	5	Dso	4	B								
26 Jun	S18E51	53	130	9	Dso	6	B				2				
27 Jun	S18E38	53	230	10	Dso	7	B								
28 Jun	S18E26	52	240	10	Dsi	12	BG	1			2				
29 Jun	S18E13	52	370	11	Eki	16	BGD				1				
30 Jun	S18W01	52	500	12	Eki	18	BGD	2			3				
01 Jul	S18W16	53	770	11	Ekc	20	BG				1				
02 Jul	S18W29	54	560	9	Dkc	31	BD								
03 Jul	S18W43	55	620	10	Dkc	33	BD				4				
04 Jul	S18W56	54	540	8	Dkc	17	B	1			1				
								4	0	0	14	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 52

			Region 2836												
27 Jun	S27E34	57	20	4	Cro	5	B								
28 Jun	S28E21	57	20	6	Cro	7	B	1			1				
29 Jun	S28E07	58	20	7	Cro	8	B								
30 Jun	S27W06	57	20	6	Cro	3	B								
01 Jul	S26W22	59	20	3	Hsx	1	A								
02 Jul	S26W36	61	10	1	Axx	2	A								
03 Jul	S26W50	62	10	1	Axx	1	A								
04 Jul	S26W64	62	plage												
								1	0	0	1	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 57

			Region 2837												
28 Jun	N17E69	9	20	1	Hsx	1	A								
29 Jun	N17E56	9	20	1	Hrx	2	A								
30 Jun	N17E42	9	20	1	Hrx	2	A								
01 Jul	N17E29	8	20	3	Bxo	5	B								
02 Jul	N17E15	10	30	5	Dro	9	B								
03 Jul	N17E01	11	20	6	Bxo	4	B								
04 Jul	N17W12	10	20	7	Bxo	9	B								
								0	0	0	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 11

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 2838													
03 Jul	N24W88	100	30	4	Cro	3	B	3	2	1	5				
								3	2	1	5	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 100

		Region 2839													
04 Jul	N19E37	321	30	5	Cro	4	B	1			3				
								1	0	0	3	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 321

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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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