

Solar activity ranged from very low to moderate levels with the majority of the flare activity caused by Region 2824 (N21, L=195, class/area Csi/190 on 22 May). Very low levels were observed on 17 and 19-20 May with Low levels occurring on 18 and 21 May. Activity increased to moderate levels on 22-23 May due to a series of M1 flares from Region 2824 at 22/1711, 22/2136, and 23/1108 UTC. In addition to the M-class flares were several noteworthy C-class flares, including an impulsive C6/1n at 22/0256 UTC with an associated Type II (1530 km/s) Radio sweep, an impulsive C6/1n with an associated Type II (653 km/s), and a long duration C1 at 22/0844 UTC. Multiple CME signatures were observed from the region associated with these flares (and others). Each were modelled and put into a consolidated WSA-ENLIL run showing arrival times beginning late on 25 May.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit was at normal to moderate levels with a peak flux of 1,040 pfu which was briefly reached at 22/1635 UTC.

Geomagnetic field activity ranged from quiet to G1 (Minor) geomagnetic storm levels. The period began with nominal solar wind values in the 325-420 km/s range through early on 20 May. An isolated active period was observed early on 18 May due to possible weak CME influence from 13 May. The geomagnetic field was quiet on 17 May, quiet to active on 18 May, and quiet to unsettled on 19 May. Beginning at 20/1845 UTC, total field increased to 19 nT while solar wind speed subsequently increased to near 575 km/s due to the onset of a negative polarity coronal hole high speed stream (CH HSS). Solar wind speed slowly decreased back to nominal levels by the end of the period. The geomagnetic field responded with quiet to G1 (Minor) storm levels on 20 May, quiet to unsettled on 21 May, and quiet levels thereafter.

Space Weather Outlook **24 May - 19 June 2021**

Solar activity is expected to be low with a chance for further M-class flares on 24-30 May as Region 2824 rotates across the visible disk. Very low levels are expected on 31 May - 11 Jun. Low levels are expected to return on 12-19 Jun as Region 2824 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 reach high levels on 26-29 May due to CME enhancements.

Geomagnetic field activity is expected to reach G1 (Minor) storm levels on 25-27 May with G2 (Moderate) storming on 26 May due to the arrival of multiple CMEs from 22-23 May. G1 (Minor) storming is also likely on 16 Jun as a recurrent, negative polarity CH HSS is expected to



become geoeffective.



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 May	75	11	40	A7.3	0	0	0	2	0	0	0	0
18 May	76	24	160	A7.6	1	0	0	2	0	0	0	0
19 May	76	24	170	A6.7	0	0	0	0	0	0	0	0
20 May	72	13	150	A5.8	0	0	0	1	0	0	0	0
21 May	74	13	150	A7.1	1	0	0	5	0	0	0	0
22 May	76	19	190	B1.8	10	2	0	13	4	0	0	0
23 May	79	30	200	B1.4	4	1	0	9	2	1	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 May	5.5e+04	4.3e+04
18 May	5.7e+04	4.3e+04	1.7e+06
19 May	8.0e+04	4.4e+04	2.2e+06
20 May	1.3e+05	4.4e+04	1.5e+06
21 May	5.8e+04	4.4e+04	2.7e+07
22 May	5.4e+04	4.5e+04	3.9e+07
23 May	5.4e+04	4.6e+04	3.8e+07

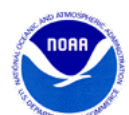
Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	17 May	6	1-1-2-1-2-1-2-3	4	1-1-3-1-0-1-1-1	6
18 May	10	3-3-4-2-2-1-1-0	19	3-4-5-4-3-3-1-0	10	3-4-3-2-2-1-1-1
19 May	5	2-1-2-1-2-1-1-2	3	2-1-1-0-1-0-1-1	6	2-1-1-1-1-1-1-3
20 May	17	3-2-3-3-4-3-3-4	33	2-3-4-6-6-4-3-3	24	3-2-3-4-5-4-4-4
21 May	8	2-2-3-2-2-2-2-1	9	2-3-2-4-1-1-1-1	7	3-2-2-2-1-1-1-1
22 May	5	1-1-1-1-3-1-2-1	0	1-1-1-1-0-0-0-0	5	1-1-2-1-2-1-2-1
23 May	4	0-2-1-1-1-1-2-2	3	1-1-1-2-0-1-0-1	4	1-2-1-1-1-1-1-2

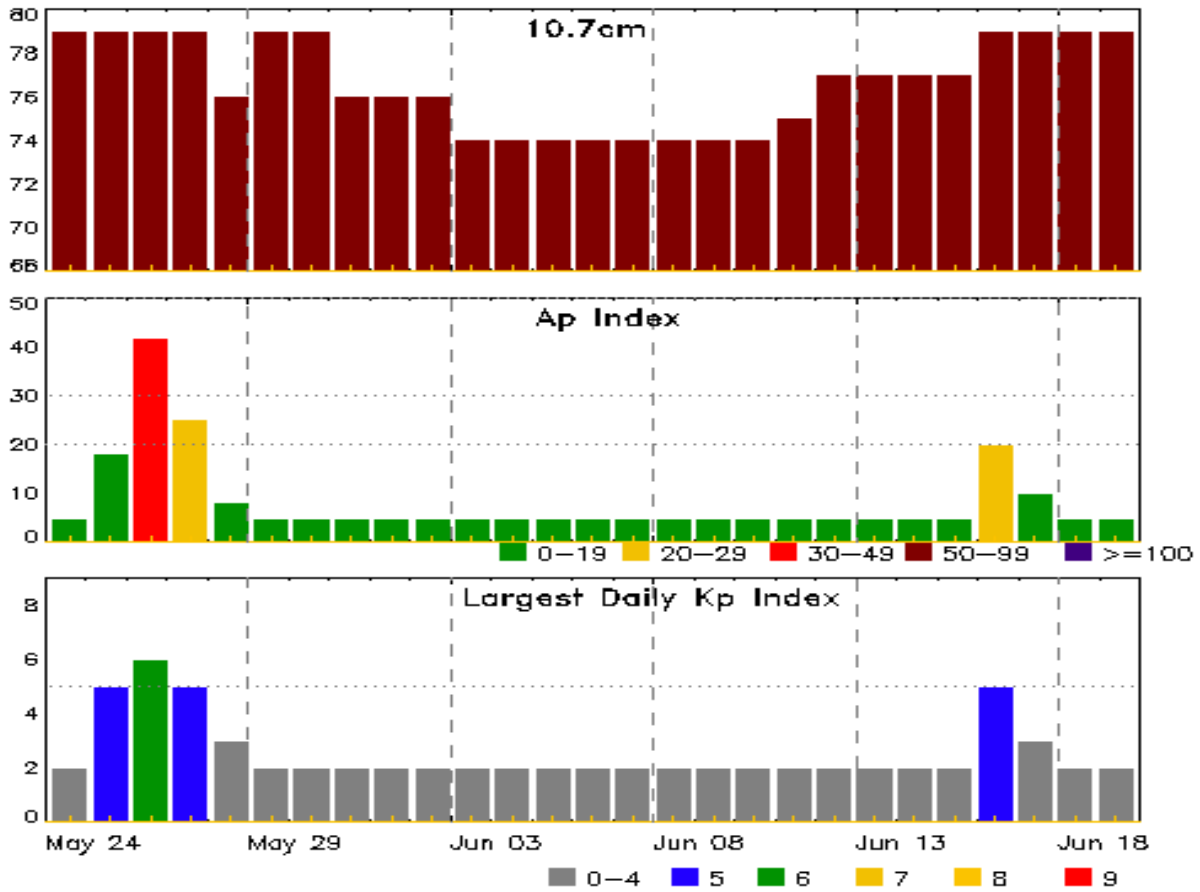


Alerts and Warnings Issued

Date & Time of Issue UTC	Type of Alert or Warning	Date & Time of Event UTC
18 May 0023	WARNING: Geomagnetic K = 4	18/0025 - 0900
18 May 0247	ALERT: Type II Radio Emission	18/0219
18 May 0601	ALERT: Geomagnetic K = 4	18/0559
18 May 0855	EXTENDED WARNING: Geomagnetic K = 4	18/0025 - 1500
20 May 0857	WARNING: Geomagnetic K = 4	20/0900 - 1800
20 May 1124	ALERT: Geomagnetic K = 4	20/1124
20 May 1212	WARNING: Geomagnetic K = 5	20/1213 - 1800
20 May 1348	ALERT: Geomagnetic K = 5	20/1336
20 May 1757	EXTENDED WARNING: Geomagnetic K = 4	20/0900 - 21/0300
22 May 0710	ALERT: Type II Radio Emission	22/0254
22 May 0711	ALERT: Type II Radio Emission	22/0618
23 May 0548	SUMMARY: 10cm Radio Burst	23/0506 - 0506
23 May 2010	WATCH: Geomagnetic Storm Category G2 predicted	



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 May	79	5	2	07 Jun	74	5	2
25	79	18	5	08	74	5	2
26	79	42	6	09	74	5	2
27	79	25	5	10	74	5	2
28	76	8	3	11	75	5	2
29	79	5	2	12	77	5	2
30	79	5	2	13	77	5	2
31	76	5	2	14	77	5	2
01 Jun	76	5	2	15	77	5	2
02	76	5	2	16	79	20	5
03	74	5	2	17	79	10	3
04	74	5	2	18	79	5	2
05	74	5	2	19	79	5	2
06	74	5	2				



Energetic Events

Date	Time			X-ray	Optical Information				Peak		Sweep Freq	
	Begin	Max	Half	Class	Integ Flux	Imp/ Brtns	Location		Radio Flux		Intensity	
			Max				Lat	CMD	245	2695	II	IV
22 May	1703	1711	1716	M1.1	0.004	1N	N17E20		2824	1100	17	
22 May	2130	2136	2143	M1.4	0.007	1N	N19E15		2824	3300	40	
23 May	1100	1108	1114	M1.1	0.005	2N	N19E10		2824	230	85	

Flare List

Date	Time			X-ray Class	Imp/ Brtns	Location Lat CMD	Rgn #
	Begin	Max	End				
17 May	0302	0310	0317	B1.5			
17 May	1152	1158	1202	B1.2			
17 May	1450	1501	1505	B3.4			
17 May	1747	1754	1758	B1.4			
17 May	1816	1823	1827	B1.4			
17 May	1852	1857	1901	B4.3			
17 May	1956	2002	2007	B1.2			
17 May	2055	2103	2109	B1.4	SF	N16E87	
17 May	2152	2159	2207	B3.5	SF	N16E87	
17 May	2339	2346	2356	B1.3			
18 May	0158	0209	0213	C1.1	SF	N16E84	2824
18 May	0815	0823	0827	B2.3	SF	N16E73	2824
18 May	1317	1322	1326	B1.5			2824
18 May	1550	1558	1612	B1.0			2824
18 May	2127	2135	2145	B2.1			2824
19 May	0258	0307	0315	B1.2			2824
19 May	1702	1708	1714	B1.3			2824
20 May	1303	1304	1305		SF	N17E47	2824
20 May	1800	1810	1817	B1.2			
21 May	0109	0116	0120	B1.5	SF	N17E38	2824
21 May	0333	0338	0342	B2.0			
21 May	0511	0516	0521	B3.0	SF	N17E37	2824
21 May	0657	0703	0707	B1.4			2824
21 May	0823	0830	0834	B1.6			2824
21 May	0841	0846	0850	B3.8			
21 May	0910	0916	0934	B1.0			2824
21 May	0934	0942	0947	B1.9	SF	N22E37	2824
21 May	1009	1013	1017	B3.3	SF	N22E37	2824



Flare List

Date	Time			X-ray Class	Imp/ Brtns	Optical		Rgn #
	Begin	Max	End			Location Lat CMD		
21 May	1112	1122	1143	B1.2				
21 May	1213	1219	1223	B1.7				2824
21 May	1346	1355	1359	B3.1	SF	N21E34		2824
21 May	1645	1657	1701	B3.6				
21 May	1915	1928	1932	C4.8				2824
21 May	1945	1951	1957	B1.7				2824
21 May	2128	2131	2141	B1.3				
21 May	2211	2215	2219	B1.5				2824
21 May	2241	2245	2249	B1.1				2824
22 May	0037	0046	0050	B1.5				2824
22 May	0121	0129	0135	B1.8				2824
22 May	0149	0208	0215	B2.0				2824
22 May	0234	0245	0247	B1.7				
22 May	0247	0256	0300	C6.1	1N	N17E37		2824
22 May	0320	0333	0339	B4.0				2824
22 May	0529	0540	0545	B2.4				
22 May	0606	0617	0624	C6.0	1N	N17E37		2824
22 May	0645	0652	0658	C1.3	SF	N17E37		2824
22 May	0710	0844	1403	C1.3				2824
22 May	0823	0826	0830		SF	N24E26		2824
22 May	0831	0831	0835		SF	N25E27		2824
22 May	0843	0843	0852		SF	N17E37		2824
22 May	1117	1123	1129	C2.5	SF	N24E18		2824
22 May	1332	1332	1334		SF	N23E19		2824
22 May	1404	1416	1425	C1.1	SF	N24E18		2824
22 May	1512	1535	1544	C3.2	SF	N21E17		2824
22 May	1553	1553	1555		SF	N24E19		2824
22 May	1603	1618	1625	C1.8	SF	N17E20		2824
22 May	1703	1711	1716	M1.1	1N	N17E20		2824
22 May	2026	2035	2042	B8.9	SF	N18E17		2824
22 May	2108	2115	2130	B7.4	SF	N18E17		2824
22 May	2130	2136	2143	M1.4	1N	N19E15		2824
22 May	2153	2200	2205	C1.8				2824
22 May	2255	2302	2305	B8.5				2824
22 May	2305	2313	2317	C6.8	SF	N18E16		2824
23 May	0112	0123	0129	B3.5				2824
23 May	0133	0140	0145	B5.0	SF	N18E14		2824
23 May	0151	0159	0203	B5.7	SF	N18E14		2824



Flare List

Date	Time			X-ray Class	Imp/ Brtns	Optical		Rgn #
	Begin	Max	End			Location Lat CMD		
23 May	0212	0220	0229	B6.4	SF	N17E13		2824
23 May	0302	0306	0311	B3.9				2824
23 May	0333	0337	0341	B3.6				2824
23 May	0419	0436	0443	B5.4				2824
23 May	0447	0451	0455	C1.0				2824
23 May	0459	0510	0520	C2.7				2824
23 May	0716	0725	0733	B3.8	SF	N19E13		2824
23 May	0756	0804	0808	B5.0	SF	N18E09		2824
23 May	0819	0826	0833	B3.3	SF	N18E11		2824
23 May	0910	0922	0935	C2.4	1F	N20E07		2824
23 May	1027	1048	1100	B9.0	SF	N18E10		2824
23 May	B1055	U1106	1134	M1.1	2N	N19E10		2824
23 May	1237	1241	1245	B2.2				2824
23 May	1252	1300	1307	B2.6				2824
23 May	1332	1346	1357	B3.2	SF	N18E08		2824
23 May	1418	1420	1422		SF	N19E04		2824
23 May	1511	1521	1525	B1.8				2824
23 May	1654	1656	1700	B3.4				2824
23 May	1700	1705	1710	C2.2	1N	N20E01		2824
23 May	1728	1735	1739	B4.0				2824
23 May	1802	1810	1814	B2.1				2824
23 May	2333	2339	2343	B1.2				2824



Region Summary

Date	Location		Sunspot Characteristics					Flares								
	Lat	CMD	Helio	Area	Extent	Spot	Spot	Mag	X-ray			Optical				
			Lon	10 ⁻⁶ hemi.	(helio)	Class	Count	Class	C	M	X	S	1	2	3	4
Region 2822																
07 May	N18E70		335	130	4	Cso	5	B		1			1			
08 May	N18E57		336	180	5	Csi	7	B	2			4				
09 May	N18E45		335	180	4	Dsi	8	BG	3			4				
10 May	N18E33		333	130	5	Dao	10	BG								
11 May	N18E18		335	190	4	Dao	9	BD								
12 May	N18E05		335	190	4	Dao	9	BD	1			2				
13 May	N18W10		335	100	3	Dao	3	BD				2				
14 May	N17W22		335	60	3	Cao	3	B								
15 May	N16W35		334	50	4	Cao	3	B								
16 May	N17W49		335	50	2	Hsx	1	A								
17 May	N17W64		336	40	2	Hsx	1	A								
18 May	N18W77		337	40	1	Hsx	1	A								
19 May	N18W91		338	40	1	Hsx	1	A								
									6	1	0	12	1	0	0	0

Crossed West Limb.
 Absolute heliographic longitude: 335

Region 2823																
10 May	S21E39		326	40	3	Cao	6	B				1				
11 May	S22E24		329	40	5	Cso	2	B								
12 May	S22E11		329	40	5	Cso	2	B								
13 May	S22W00		326	10	1	Hrx	1	A								
14 May	S23W14		327	10	1	Axx	1	A				1				
15 May	S23W25		325	10	1	Axx	1	A								
16 May	S23W39		326	plage												
17 May	S23W53		327	plage												
18 May	S23W67		327	plage												
19 May	S23W81		328	plage												
									0	0	0	2	0	0	0	0

Crossed West Limb.
 Absolute heliographic longitude: 326



Region Summary - continued

Date	Location		Sunspot Characteristics				Flares										
	Lat CMD	Lon	Heli 10 ⁻⁶ hemi.	Area	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical					
									C	M	X	S	1	2	3	4	
Region 2824																	
18 May	N19E65	194	120	2	Cao	3	B	1				2					
19 May	N19E52	195	130	2	Hsx	3	A										
20 May	N19E39	194	150	2	Hsx	3	A					1					
21 May	N20E27	194	150	3	Hsx	3	A	1				5					
22 May	N21E13	195	190	5	Csi	9	BG	10	2			13	4				
23 May	N19W00	194	190	5	Csi	9	BG	4	1			9	2	1			
								16	3	0		30	6	1	0	0	

Still on Disk.
 Absolute heliographic longitude: 194

Region 2825

23 May	N16E53	141	10	1	Axx	1	A										
								0	0	0		0	0	0	0	0	0

Still on Disk.
 Absolute heliographic longitude: 141



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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