Space Weather Highlights
19 May - 25 May 2025

SWPC PRF 2595
26 May 2025

Solar activity ranged from low to high levels. Region 4098 (S04, L=021, class/area=Dai/170 on 25 May) produced the strongest event of the period, an impulsive X1.1 flare (R3-Strong) at 25/0152 UTC. An associated Tenflare (170 sfu) and subsequent, narrow CME was observed. The CME was oriented far to the west and no expected to contain an Earth-directed component. The region also produced an impulsive M8.9/2b (R2-Moderate) event at 25/1630 UTC. Region 4087 (N15, L=057, class/area=Dso/240 on 18 May) was the only other region to produce an event above R1 (Minor) with an M1.2/Sn flare at 21/0008 UTC.

No Earth-directed CMEs were observed in available coronagraph imagery.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit reached high levels on 18-19 May and 21-24 May in response to a high-speed stream from a large, polar-crown-connected coronal hole. 20 May and 25 May electron flux was at normal to moderate levels.

Geomagnetic field activity was at quiet to unsettled over 19-20 May. An isolated period of active conditions were observed on 21 May. Quiet conditions were observed over 22-25 May. The solar wind was under the influence of a positive polarity CH HSS for the week. Solar wind speeds reached of peak of ~630 km/s on 21 May and gradually waned over the following days.

Space Weather Outlook
26 May - 21 June 2025

Solar activity is likely to reach moderate levels (R1-R2/Minor-Moderate), with a chance for R3 (Strong), over the next three days as Region 4098 (S04, L=021, class/area=Dai/170 on 25 May), the most productive region on the visible disk, makes its way to the west limb of the Sun. A chance for M-class X-ray activity (R1-R2) will persist throughout the outlook period due to multiple regions on the visible as well as multiple active regions scheduled to return from 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 be at high levels on 30 May - 05 Jun and 14-21 Jun following recurrent coronal hole influence. The remainder of the period is expected to be at normal to moderate levels.

Geomagnetic field activity is expected to be at mostly elevated due to anticipated influence from multiple, recurrent coronal holes. G1 (minor) geomagnetic storms are likely on 13-14 Jun; active conditions are likely over 28-29 May, 02 Jun, 05 Jun, 10-11 Jun, and 15-17 Jun; unsettled conditions are likely over 26-27 May, 30 May - 01 Jun, 03-04 Jun, 06-07 Jun, and 18-21 Jun. Quiet conditions are only expected on 08-09 Jun.

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
19 May	117	66	310	B5.5	3	1	0	0	0	0	0	0
20 May	119	67	290	B5.3	11	0	0	2	0	0	0	0
21 May	119	88	320	B4.7	4	1	0	3	0	0	0	0
22 May	120	99	350	B4.7	4	0	0	6	0	0	0	0
23 May	122	122	330	B5.7	3	0	0	4	0	0	0	0
24 May	130	105	490	B6.6	11	1	0	3	2	0	0	0
25 May	133	93	510	C1.1	7	3	1	8	1	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
19 May	1.4e+06	1.7e+04	7.7e+07
20 May	6.4e+05	1.6e+04	3.8e+07
21 May	1.2e+05	1.6e+04	3.6e+07
22 May	1.5e+05	1.6e+04	6.9e+07
23 May	1.7e+05	1.6e+04	7.4e+07
24 May	2.7e+05	1.6e+04	5.2e+07
25 May	2.7e+05	1.6e+04	2.6e+07

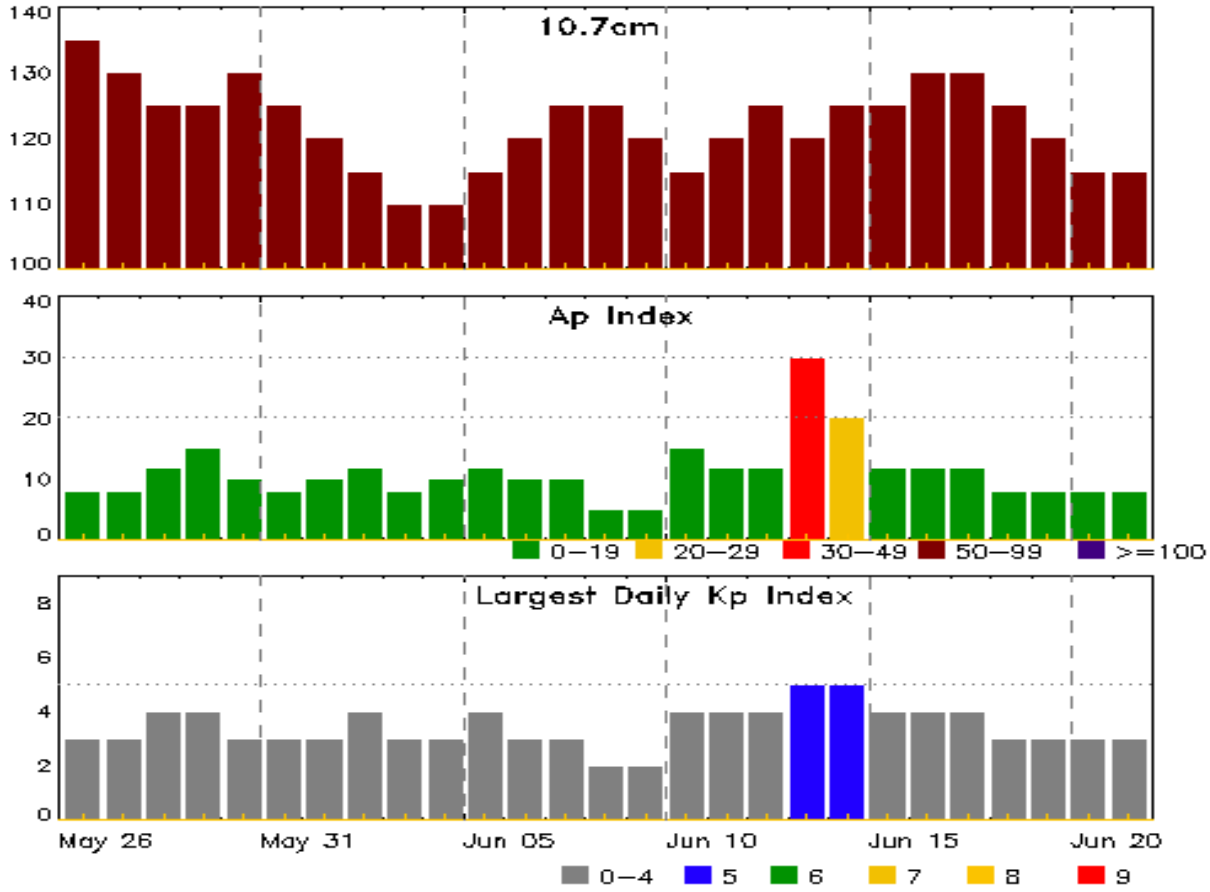
Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
19 May	10	3-3-1-2-3-2-2-2	13	3-4-2-3-3-3-0-2	10	3-3-2-2-2-2-2-2
20 May	12	2-3-3-3-3-2-2-3	34	3-5-5-6-5-3-2-2	13	2-3-3-3-3-3-2-3
21 May	12	3-3-3-3-3-2-2-2	23	3-4-5-5-3-2-2-3	13	4-3-3-3-2-1-2-2
22 May	7	2-2-2-2-2-2-2-2	8	3-2-1-3-2-1-2-1	7	2-2-2-1-2-1-2-2
23 May	8	2-2-2-2-3-2-2-2	9	2-1-2-3-3-3-1-1	7	2-2-2-2-2-2-1-2
24 May	6	2-1-2-2-2-2-2-1	3	1-1-1-1-2-0-1-1	5	2-1-2-1-2-1-1-1
25 May	8	2-2-2-1-3-3-2-1	5	2-2-2-2-1-1-1-1	6	2-2-2-1-2-1-1-1

Alerts and Warnings Issued

Date & Time of Issue UTC	Type of Alert or Warning	Date & Time of Event UTC
19 May 1013	CONTINUED ALERT: Electron 2MeV Integral Flux >= 1000pfu	18/1705
19 May 1801	CONTINUED ALERT: Electron 2MeV Integral Flux >= 1000pfu	18/1705
20 May 0711	WARNING: Geomagnetic K = 4	20/0711 - 1500
20 May 1427	CONTINUED ALERT: Electron 2MeV Integral Flux >= 1000pfu	18/1705
20 May 2255	SUMMARY: 10cm Radio Burst	20/2239 - 2243
21 May 0138	WARNING: Geomagnetic K = 4	21/0138 - 1200
21 May 0140	ALERT: Geomagnetic K = 4	
22 May 1256	ALERT: Electron 2MeV Integral Flux >= 1000pfu	22/1240
23 May 0914	CONTINUED ALERT: Electron 2MeV Integral Flux >= 1000pfu	22/1240
25 May 0154	ALERT: X-ray Flux exceeded M5	25/0150
25 May 0207	SUMMARY: 10cm Radio Burst	25/0149 - 0150
25 May 0214	SUMMARY: X-ray Event exceeded X1	25/0146 - 0157
25 May 1631	ALERT: X-ray Flux exceeded M5	25/1630
25 May 1641	SUMMARY: 10cm Radio Burst	25/1628 - 1630
25 May 1646	SUMMARY: X-ray Event exceeded M5	25/1618 - 1636

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
26 May	135	8	3	09 Jun	120	5	2
27	130	8	3	10	115	15	4
28	125	12	4	11	120	12	4
29	125	15	4	12	125	12	4
30	130	10	3	13	120	30	5
31	125	8	3	14	125	20	5
01 Jun	120	10	3	15	125	12	4
02	115	12	4	16	130	12	4
03	110	8	3	17	130	12	4
04	110	10	3	18	125	8	3
05	115	12	4	19	120	8	3
06	120	10	3	20	115	8	3
07	125	10	3	21	115	8	3
08	125	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
19 May	0813	0821	0826	M3.2	0.011						120		
21 May	0001	0008	0010	M1.2	0.001	SN	N18	W21	4087				
24 May	2014	2023	2029	M2.1	0.010	1N	S05	W41	4098				
25 May	0146	0152	0157	X1.1	0.047				4098		280	170	
25 May	0627	0635	0638	M1.7	0.002				4098				
25 May	1005	1018	1025	M3.4	0.022	1N	S05	W50	4098				
25 May	1618	1630	1636	M8.9	0.034	2B	S05	W54	4098		580	160	

Flare List

	Time			Optical			
Date	Begin	Max	End	X-ray Class	Imp/ Brtns	Location Lat CMD	Rgn #
19 May	0024	0036	0050	C1.2			
19 May	0419	0432	0439	C2.3			
19 May	0528	0542	0553	C1.2			
19 May	0813	0821	0826	M3.2			
19 May	1837	1844	1852	B6.6			
19 May	2001	2011	2022	B8.9			
19 May	2201	2209	2218	B8.9			
19 May	2218	2225	2231	B9.8			4089
20 May	0116	0126	0132	C1.3			4093
20 May	0534	0538	0542	C1.0			4093
20 May	0545	0554	0600	C5.3			4093
20 May	0747	0754	0756	B9.3			4093
20 May	1007	1021	1034	C2.7			4093
20 May	1054	1059	1108	C2.5			4093
20 May	1300	1310	1314	C2.9			4093
20 May	1645	1653	1655	B7.4			4093
20 May	2024	2032	2037	C1.2			4093
20 May	2120	2130	2134	C2.1	SF	N18W20	4087
20 May	2218	2225	2228	C5.3	SF	N17W20	4087
20 May	2239	2247	2251	C1.6			4093
20 May	2349	2359	0001	C1.6			4087
21 May	0001	0008	0010	M1.2	SN	N18W21	4087
21 May	0106	0115	0122	C1.3			4093
21 May	0342	0349	0352	C1.2			4093

Flare List

Date	Time			Optical			
	Begin	Max	End	X-ray Class	Imp/ Brtns	Location Lat CMD	Rgn #
21 May	0704	0713	0723	B7.9			4095
21 May	0723	0744	0758	B8.9			4095
21 May	0824	0832	0837	B9.3			4087
21 May	0853	0907	0925	C1.2			4093
21 May	1754	1759	1804	B6.6			4087
21 May	1804	1807	1811	C2.6	SF	S04W57	4095
21 May	2017	2021	2026	B7.1	SF	N19W32	4087
22 May	0038	0047	0106	B7.4			4095
22 May	0052	0052	0053		SF	N20W37	4087
22 May	0330	0337	0342	B7.9			4095
22 May	1158	1221	1251	C1.4	SF	S13E71	4095
22 May	1454	1505	1525	B8.8			4095
22 May	1720	1722	1726	C1.3	SF	S15E61	4095
22 May	1923	1929	1946	C1.2			4095
22 May	2204	2221	2225		SF	S13E60	4097
22 May	2232	2241	2248	C2.5	SF	S07W73	4095
22 May	2302	2304	2314		SF	S13E60	4097
23 May	0349	0356	0403	C1.0	SF	S13E61	4097
23 May	0603	0605	0609		SF	S13E58	4097
23 May	0917	0925	0931	C1.4	SF	S13E58	4097
23 May	1500	1513	1544	C1.6	SF	N20W58	4087
24 May	0602	0610	0613	C3.8			4098
24 May	0652	0657	0701	C1.9			4098
24 May	0919	0926	0932	B9.1			4098
24 May	0932	0935	0941	B8.7			
24 May	0947	0953	0955	C1.1			4098
24 May	1027	1032	1040	C5.9			4098
24 May	1049	1052	1055	C2.1			4098
24 May	1230	1244	1249	C6.0			4098
24 May	1523	1541	1554	C2.3	SF	S03W38	4098
24 May	1606	1648	1713	C2.6	1B	S05W39	4098
24 May	1639	1647	1656	C5.3			
24 May	1746	1748	1751		SF	S04W39	4098
24 May	1842	1844	1845		SF	S04W40	4098
24 May	1910	1917	1924	C1.4			4094
24 May	2014	2023	2029	M2.1	1N	S05W41	4098
24 May	2338	2351	0001	C7.6			4098
25 May	0146	0152	0157	X1.1			4098

Flare List

Date	Time Begin	Time Max	Time End	Optical X-ray Class	Optical Imp/ Brtns	Optical Location Lat CMD	Optical Rgn #
25 May	0250	0257	0301	C5.3			4099
25 May	0301	0305	0309	C6.4			4099
25 May	0627	0635	0638	M1.7			4098
25 May	0736	0751	0802	C6.2	SF	S05W49	4098
25 May	0918	0922	0924	C2.0	SF	S04W49	4098
25 May	0951	0958	1005	C1.8			4098
25 May	1005	1018	1025	M3.4	1N	S05W50	4098
25 May	1408	1409	1410		SF	S04W51	4098
25 May	1414	1414	1423		SF	S04W52	4098
25 May	1613	1613	1615		SF	S05W54	4098
25 May	1618	1630	1636	M8.9	2B	S05W54	4098
25 May	1649	1649	1656		SF	S13E76	4099
25 May	1657	1700	1706		SF	S14E75	4099
25 May	1928	1933	1958	C2.0			4098
25 May	2253	2300	2305	C3.3	SF	S13E20	4097

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 4084												
08 May	S20E60	129	40	3	Cso	3	B								
09 May	S21E48	128	60	4	Cso	3	B								
10 May	S21E34	129	50	2	Hsx	1	A								
11 May	S21E21	129	20	2	Cso	2	B								
12 May	S20E07	129	10	2	Axx	4	A								
13 May	S20W07	130	plage												
14 May	S20W21	131	plage												
15 May	S20W35	132	plage												
16 May	S20W49	133	plage												
17 May	S20W63	133	plage												
18 May	S20W77	134	plage												
								0	0	0	0	0	0	0	0

Died on Disk.
Absolute heliographic longitude: 129

			Region 4085												
10 May	N02E24	139	10	3	Bxo	5	B								
11 May	N02E11	139	30	5	Dso	6	B	1			1				
12 May	N03W02	137	30	3	Cro	2	B								
13 May	N03W16	139	20	2	Bxo	4	B	2			1				
14 May	N03W30	140	10	3	Bxo	2	B								
15 May	N03W45	142	plage												
16 May	N03W60	144	plage												
17 May	N03W75	145	plage												
18 May	N03W90	147	plage												
								3	0	0	2	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 137

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 4087												
12 May	N15E77	59	90	3	Hsx	1	A	2							
13 May	N15E65	58	140	8	Dso	3	B				1				
14 May	N15E52	58	200	8	Dso	5	BGD	5	4	1	4	1	1		
15 May	N15E39	58	250	8	Dho	10	BGD	6	1		2	1			
16 May	N17E24	60	230	9	Dso	10	BGD	5			7				
17 May	N16E12	58	220	8	Dso	7	BGD								
18 May	N15W00	57	240	9	Dso	4	BGD								
19 May	N16W14	58	210	9	Dso	3	BD								
20 May	N16W27	58	160	11	Eso	4	BD	3			2				
21 May	N13W42	59	120	6	Hsx	2	A		1		2				
22 May	N15W57	61	90	2	Hsx	1	A				1				
23 May	N13W70	61	90	2	Hsx	1	A	1			1				
24 May	N13W84	62	120	3	Hsx	1	A								
								22	6	1	20	2	1	0	0

Crossed West Limb.
Absolute heliographic longitude: 57

			Region 4089												
16 May	N18E55	28	30	7	Dro	3	B	1							
17 May	N18E44	26	30	5	Dro	6	B								
18 May	N17E29	28	20	5	Cro	4	B	1							
19 May	N18E16	28	20	5	Bxi	6	B								
20 May	N18E01	29	10	5	Bxo	5	B								
21 May	N11W13	30	plage												
22 May	N11W27	31	plage												
23 May	N11W41	32	plage												
24 May	N11W55	33	plage												
25 May	N11W69	33	plage												
								2	0	0	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 29

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 4090												
16 May	S12E63	21	60	4	Cao	3	B								
17 May	S12E51	19	40	4	Cso	2	B								
18 May	S13E37	20	40	2	Hax	2	A								
19 May	S12E22	22	40	2	Hax	3	A								
20 May	S12E09	22	40	2	Hax	2	A								
21 May	S12W04	21	30	1	Hax	2	A								
22 May	S12W17	21	30	1	Hsx	1	A								
23 May	S12W30	21	20	1	Hsx	1	A								
24 May	S12W43	21	40	1	Hsx	1	A								
25 May	S13W57	21	30	1	Hsx	1	A								
								0	0	0	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 21

			Region 4091												
17 May	S13E37	32	20	3	Cro	3	B								
18 May	S13E24	33	30	3	Cao	3	B								
19 May	S13E09	35	10	2	Bxo	3	B								
20 May	S13W05	36	plage												
21 May	S13W20	37	plage												
22 May	S13W34	38	plage												
23 May	S13W48	39	plage												
24 May	S13W62	40	plage												
25 May	S13W76	40	plage												
								0	0	0	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 36

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 4092												
18 May	S14E80	338	plage					1							
19 May	S14E66	338	30	1	Hsx	1	A								
20 May	S13E52	339	50	1	Hsx	1	A								
21 May	S13E39	338	50	2	Hsx	1	A								
22 May	S14E25	339	60	1	Hsx	1	A								
23 May	S13E13	338	60	1	Hsx	1	A								
24 May	S13W01	339	110	2	Hsx	1	A								
25 May	S13W14	338	110	2	Hsx	1	A								
								1	0	0	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 339

			Region 4093												
20 May	S06E64	327	30	7	Cro	5	B	8							
21 May	S06E52	325	30	7	Cao	3	B	3							
22 May	S07E36	328	20	1	Hsx	1	A								
23 May	S07E23	328	20	1	Hsx	1	A								
24 May	S06E09	329	20	1	Hsx	1	A								
25 May	S06W05	329	20	1	Hrx	1	A								
								11	0	0	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 329

			Region 4094												
21 May	N20E49	328	30	2	Cro	3	B								
22 May	N20E35	329	10	4	Cro	2	B								
23 May	N21E25	326	20	6	Cro	7	B								
24 May	N20E08	330	10	2	Axx	2	A	1							
25 May	N20W06	330	plage												
								1	0	0	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 330

			Region 4095												
21 May	S05W57	74	30	5	Cao	6	B	1			1				
22 May	S05W71	75	70	5	Dai	8	BG	4			1				
23 May	S06W84	75	20	6	Cro	5	B								
								5	0	0	2	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 74

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 4096												
21 May	N06E71	306	30	1	Hsx	1	A								
22 May	N06E57	307	50	2	Hsx	1	A								
23 May	N06E45	306	40	1	Hsx	1	A								
24 May	N06E31	307	60	2	Hsx	1	A								
25 May	N06E18	306	60	2	Hsx	1	A								
								0	0	0	0	0	0	0	0
Still on Disk.															
Absolute heliographic longitude: 306															
			Region 4097												
22 May	S13E63	301	20	3	Cro	4	B				2				
23 May	S13E45	306	30	6	Cri	8	BG	2			3				
24 May	S13E30	308	30	4	Cro	5	B								
25 May	S14E19	305	10	4	Bxo	4	B	1			1				
								3	0	0	6	0	0	0	0
Still on Disk.															
Absolute heliographic longitude: 305															
			Region 4098												
23 May	S05W26	17	30	6	Cai	7	B								
24 May	S05W41	19	100	7	Dai	13	B	9	1		3	2			
25 May	S04W57	21	170	8	Dai	12	BG	4	3	1	5	1			
								13	4	1	8	3	0	0	0
Still on Disk.															
Absolute heliographic longitude: 17															
			Region 4099												
25 May	S13E67	257	110	4	Cao	3	B	2			2				
								2	0	0	2	0	0	0	0
Still on Disk.															
Absolute heliographic longitude: 257															

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

The Weekly has been published continuously since 1951 and is available online since 1997.

https://www.swpc.noaa.gov/products/weekly-highlights-and-27-day-forecast -- Current
ftp://ftp.swpc.noaa.gov/pub/warehouse -- Online archive from 1997
https://www.ngdc.noaa.gov/stp/satellite/goes-r.html -- NCEI GOES data textarchive
https://www.swpc.noaa.gov/products/solar-cycle-progression -- Solar Cycle Progression web site
https://www.swpc.noaa.gov/content/contact-us -- Contact and Copyright information
https://www.swpc.noaa.gov/sites/default/files/images/u2/Usr_guide.pdf -- User Guide