Space Weather Highlights
18 July - 24 July 2022

SWPC PRF 2447
25 July 2022

Solar activity was low. Only C-class flare activity was observed during the period with a C5.6 flare from Region 3060 and a C6.1 from Region 3056 on 21 Jul being the largest events. The C5.6 flare caused the eruption of an approximately 12 degree long filament centered near N15W01. This resulted in Type II and IV radio sweeps, est. 1063 Km/s, and a full halo CME. No other Earth-directed CMEs were observed.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit was at high levels on 20-21 Jul with a peak flux of 1,920 pfu observed at GOES at 20/1620 UTC. The 2 MeV electron flux was at background to moderate levels 18-19 Jul and 22-24 Jul.

Geomagnetic field activity reached active to G1 (Minor) storming levels on 19 Jul with the arrival of the 15 Jul CME from the previous reporting period. G1 (Minor) levels were reached again on 21 Jul due to negative polarity CH HSS effects. Predominantly unsettled levels continued afterwards until early on 23 Jul when an isolated G1 (Minor) storming period was observed yet again with the arrival of the full halo CME from 21 Jul. Primarily quiet conditions were observed on 18, 20 and 23-24 Jul with isolated unsettled periods.

Space Weather Outlook
25 July - 20 August 2022

Solar activity is expected to be at low levels with a slight chance for R1-2 (Minor-Moderate) radio blackouts through 08 Aug. Activity is expected to increase to a chance for R1-2 (Minor-Moderate) radio blackouts 09-18 Aug with the anticipated return of more active, compex regions. Low levels will likely return 19-20 Aug barring significant development of new active regions.

No proton events are expected at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to be at moderate to high levels through 27 Jul in response to negative polarity CH HSS effects. Background to moderate levels are anticipated for 28 Jul through 11 Aug. A chance for high levels returns 12 Aug through the remainder of the period due to recurrent CH features.

Geomagnetic field activity is expected to reach G1 (Minor) storming on 17 Aug, and reach active levels on 31 Jul, 03 Aug and 18-19 Aug due to recurrent CH HSS features. Otherwise, quiet to unsettled conditions are expected for the forecast 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
18 July	152	125	740	B9.7	3	0	0	5	0	0	0	0
19 July	144	114	570	B9.6	7	0	0	10	0	0	0	0
20 July	133	129	560	B8.3	6	0	0	3	0	0	0	0
21 July	122	124	530	B6.2	9	0	0	8	0	0	0	0
22 July	114	107	430	B5.3	3	0	0	5	0	0	0	0
23 July	111	96	360	B4.3	8	0	0	6	0	0	0	0
24 July	107	80	240	B3.1	2	0	0	4	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
18 July	9.0e+04	3.4e+04	8.0e+07
19 July	1.9e+05	3.1e+04	7.5e+06
20 July	4.1e+04	3.1e+04	7.6e+07
21 July	1.3e+05	3.2e+04	3.5e+07
22 July	7.0e+04	3.3e+04	2.7e+07
23 July	2.0e+06	3.0e+04	1.6e+07
24 July	1.9e+05	2.8e+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
18 July	10	1-2-1-3-2-2-2-4	18	0-1-3-5-5-1-4-0	8	1-1-2-3-2-1-2-3
19 July	19	3-4-4-3-4-3-2-3	43	1-4-6-5-5-6-5-2	26	3-4-5-4-4-4-4-4
20 July	7	2-3-1-2-2-2-1-2	12	3-2-1-4-4-2-1-2	7	2-3-1-2-2-1-1-2
21 July	14	2-1-1-3-3-4-4-3	25	1-1-2-5-4-6-3-3	22	2-1-2-3-3-5-5-4
22 July	11	3-2-3-3-2-2-2-3	20	4-3-5-5-2-2-1-2	11	3-3-3-3-1-2-2-3
23 July	15	3-5-3-3-2-2-2-2	26	3-5-5-4-5-2-2-2	17	3-5-4-2-2-1-1-3
24 July	9	2-3-2-2-3-2-2-2	15	3-3-3-4-3-3-2-2	12	3-2-2-2-2-2-3-2

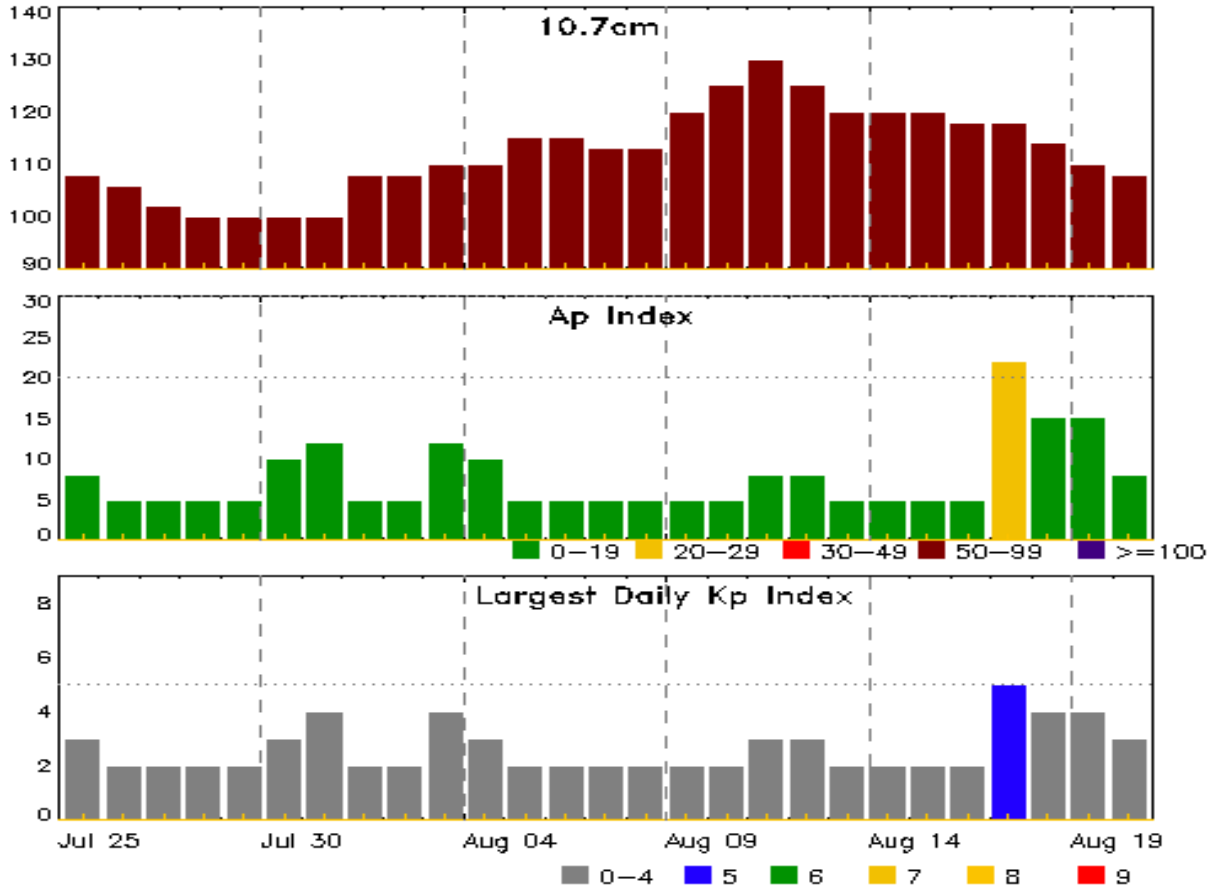
Alerts and Warnings Issued

Date & Time of Issue UTC	Type of Alert or Warning	Date & Time of Event UTC
18 Jul 0500	CONTINUED ALERT: Electron 2MeV Integral Flux >= 1000pfu	16/1025
18 Jul 1756	WATCH: Geomagnetic Storm Category G1 predicted	
18 Jul 2129	WARNING: Geomagnetic K = 4	18/2127 - 19/0300
19 Jul 0439	WARNING: Geomagnetic K = 4	19/0439 - 0900
19 Jul 0559	ALERT: Geomagnetic K = 4	19/0559
19 Jul 0652	WARNING: Geomagnetic K = 5	19/0651 - 1200
19 Jul 0656	EXTENDED WARNING: Geomagnetic K = 4	19/0439 - 1500
19 Jul 0901	ALERT: Geomagnetic K = 5	19/0859
19 Jul 1127	EXTENDED WARNING: Geomagnetic K = 5	19/0651 - 1800
19 Jul 1127	EXTENDED WARNING: Geomagnetic K = 4	19/0439 - 2100
19 Jul 1401	WATCH: Geomagnetic Storm Category G1 predicted	
19 Jul 2019	EXTENDED WARNING: Geomagnetic K = 4	19/0439 - 20/0900
20 Jul 0954	ALERT: Electron 2MeV Integral Flux >= 1000pfu	20/0935
20 Jul 1821	WATCH: Geomagnetic Storm Category G1 predicted	
21 Jul 0202	ALERT: Type IV Radio Emission	21/0128
21 Jul 0203	ALERT: Type II Radio Emission	21/0121
21 Jul 0802	CONTINUED ALERT: Electron 2MeV Integral Flux >= 1000pfu	20/0935
21 Jul 1107	WARNING: Geomagnetic K = 4	21/1107 - 1800
21 Jul 1537	EXTENDED WARNING: Geomagnetic K = 4	21/1107 - 22/0000
21 Jul 1635	ALERT: Geomagnetic K = 4	21/1634
21 Jul 1649	WARNING: Geomagnetic K = 5	21/1649 - 2359
21 Jul 1705	ALERT: Geomagnetic K = 5	21/1704
21 Jul 1749	ALERT: Electron 2MeV Integral Flux >= 1000pfu	21/1725
21 Jul 2057	ALERT: Geomagnetic K = 5	21/2057
21 Jul 2156	WATCH: Geomagnetic Storm Category G2 predicted	
21 Jul 2339	EXTENDED WARNING: Geomagnetic K = 4	21/1107 - 22/0600
22 Jul 0506	EXTENDED WARNING: Geomagnetic K = 4	21/1107 - 22/2359
23 Jul 0242	WARNING: Geomagnetic Sudden Impulse expected	23/0245 - 0345

Alerts and Warnings Issued

Date & Time of Issue UTC	Type of Alert or Warning	Date & Time of Event UTC
23 Jul 0243	WARNING: Geomagnetic K = 4	23/0242 - 1800
23 Jul 0312	SUMMARY: Geomagnetic Sudden Impulse	23/0259
23 Jul 0337	ALERT: Geomagnetic K = 4	23/0330
23 Jul 0338	WARNING: Geomagnetic K = 5	23/0336 - 1800
23 Jul 0407	ALERT: Geomagnetic K = 5	23/0359
23 Jul 0456	WARNING: Geomagnetic K = 6	23/0455 - 1800

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
25 Jul	108	8	3	08 Aug	113	5	2
26	106	5	2	09	120	5	2
27	102	5	2	10	125	5	2
28	100	5	2	11	130	8	3
29	100	5	2	12	125	8	3
30	100	10	3	13	120	5	2
31	100	12	4	14	120	5	2
01 Aug	108	5	2	15	120	5	2
02	108	5	2	16	118	5	2
03	110	12	4	17	118	22	5
04	110	10	3	18	114	15	4
05	115	5	2	19	110	15	4
06	115	5	2	20	108	8	3
07	113	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

No Events Observed

Flare List

	Time				Optical		
Date	Begin	Max	End	X-ray Class	Imp/ Brtns	Location Lat CMD	Rgn #
18 Jul	0013	0013	0015		SF	S14W73	3055
18 Jul	0552	0556	0559		SF	S16W77	3055
18 Jul	1342	1343	1345		SF	S16W36	3056
18 Jul	1357	1400	1404	C1.7	SF	N17W13	3057
18 Jul	1559	1614	1629	C2.4	SF	N14W16	3057
18 Jul	2349	2354	2359	C3.9			3058
19 Jul	0002	2358	0008		SF	S16W45	3056
19 Jul	0209	0217	0226	C1.6			
19 Jul	0239	0252	0318	C2.2			
19 Jul	0424	0429	0436	C2.3	SF	N24W52	3061
19 Jul	0647	0658	0710		SF	S19W41	3056
19 Jul	0725	0725	0736		SF	S19W41	3056
19 Jul	0800	0800	0805		SF	N17W22	3057
19 Jul	1004	1006	1008		SF	N15E07	3058
19 Jul	1039	1040	1044		SF	S17W48	3056
19 Jul	1103	1112	1122	C1.3			
19 Jul	1230	1231	1242		SF	N17W27	3057
19 Jul	1320	1330	1357	C1.5			
19 Jul	1616	1616	1619		SF	S18W49	3056
19 Jul	1713	1723	1729	C1.6	SF	N18W27	3057
19 Jul	2250	2254	2308	C1.8			3056
20 Jul	0004	0006	0046		SF	S19W54	3056
20 Jul	0206	0215	0219	C3.3	SF	N13E04	3058
20 Jul	0348	0403	0408		SF	N15W39	3057
20 Jul	0517	0523	0529	C1.1			
20 Jul	0812	0818	0833		SF	S19W54	3056
20 Jul	0855	0902	0906	C1.8	SF	S19W54	3056
20 Jul	1458	1504	1510	C2.0			
20 Jul	1653	1657	1707	C1.1			
20 Jul	1917	1931	1945	C3.9			3056
20 Jul	2233	2237	2245	C1.3			3056

Flare List

Date	Time			Optical			
	Begin	Max	End	X-ray Class	Imp/ Brtns	Location Lat CMD	Rgn #
20 Jul	2301	0009	0025	C4.1			3062
21 Jul	0038	0044	0048	C4.2			3057
21 Jul	0102	0111	0133	C5.6			3060
21 Jul	0115	0144	0149		SF	N15W52	3057
21 Jul	0135	0137	0149		SF	N14W12	3058
21 Jul	0315	0318	0329		SF	N17W50	3057
21 Jul	0356	0356	0401		SF	N17W50	3057
21 Jul	0608	0615	0623	C1.3			3056
21 Jul	1116	1149	1211	C3.1	SF	N09E25	3064
21 Jul	1249	1256	1305	C2.6			3056
21 Jul	1512	1522	1534	C1.5	SF	N09E24	3064
21 Jul	1949	1958	2002	C1.3	SF	N16W61	3057
21 Jul	2042	2054	2103	B8.9			3056
21 Jul	2213	2223	2230	C1.6	SF	N11E19	3064
21 Jul	2339	2346	2354	C6.1			3056
22 Jul	0056	0100	0104	B9.7	SF	N18W63	3057
22 Jul	0307	0316	0324	C1.5	SF	N11E18	3064
22 Jul	0409	0420	0429	B9.1			3057
22 Jul	0745	0801	0819	C1.1			3056
22 Jul	1144	1151	1158	C1.0			3064
22 Jul	1257	1304	1308	B8.8			3064
22 Jul	1308	1314	1318	B9.0			3056
22 Jul	1348	1356	1405	B9.0	SF	S18E07	3065
22 Jul	1445	1454	1459	B7.4			3056
22 Jul	1459	1516	1521	B8.1			3058
22 Jul	1547	1547	1559		SF	N16W36	3058
22 Jul	1612	1614	1619		SF	N15W35	3058
22 Jul	2125	2135	2142	B9.8			3064
23 Jul	0527	0532	0537	B7.4	SF	N10E02	3064
23 Jul	0757	0811	0817	C1.3	SF	N15W79	3057
23 Jul	0917	0924	0930	B9.5			3062
23 Jul	0934	0946	0954	C1.7	SF	N11W00	3064
23 Jul	0954	1002	1006	C1.8			3057
23 Jul	1042	1047	1055	B6.9			3057
23 Jul	1258	1312	1328		SF	N11W44	3058
23 Jul	1406	1410	1416	B9.0			3057
23 Jul	1437	1447	1455	C1.0			3057
23 Jul	1504	1511	1519	C1.8	SF	N10W03	3064

Flare List

Date	Time			Optical			
	Begin	Max	End	X-ray Class	Imp/ Brtns	Location Lat CMD	Rgn #
23 Jul	1747	1805	1820	C1.9			3057
23 Jul	1932	1943	1954	C1.6	SF	N12W05	3064
23 Jul	2235	2241	2247	C3.6			3057
24 Jul	0235	0251	0300	B6.7			3060
24 Jul	0445	0448	0517		SF	N11W50	3060
24 Jul	0601	0602	0607		SF	N11W51	3058
24 Jul	0625	0731	0813	C2.6			3057
24 Jul	1011	1024	1035	C1.8	SF	N13W41	3063
24 Jul	1155	1211	1224	B8.6	SF	N11W54	3060
24 Jul	1457	1502	1506	B4.9			3060
24 Jul	1832	1904	1936	B9.2			3062

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 3053												
05 Jul	N14E72	136	180	2	Hsx	1	A	5			4	1			
06 Jul	N15E59	134	240	8	Dso	5	B	2			1				
07 Jul	N14E47	134	680	12	Eko	11	B				2				
08 Jul	N15E35	133	700	12	Eko	13	B	2	1		1				
09 Jul	N15E20	134	650	13	Eki	18	B	1			4	1			
10 Jul	N15E07	134	420	14	Eki	18	B				2				
11 Jul	N16W06	134	410	14	Eki	24	B	3			4				
12 Jul	N15W19	133	250	13	Eki	23	B	4			7				
13 Jul	N15W34	135	280	14	Eko	19	B	2			3				
14 Jul	N16W48	136	270	12	Eki	14	B	5			9				
15 Jul	N17W61	136	300	14	Cki	13	B				1				
16 Jul	N15W77	138	110	6	Cai	5	B				1	1			
17 Jul	N17W90	137	60	4	Cao	3	B	1							
								25	1	0	39	3	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 134

			Region 3055												
07 Jul	S18E60	121	130	7	Dao	4	B	1			1				
08 Jul	S17E46	122	230	9	Dai	8	B	2							
09 Jul	S17E33	122	450	11	Eko	11	B	1			9				
10 Jul	S17E20	121	630	12	Ekc	22	B				10				
11 Jul	S16E05	122	960	12	Ekc	25	B	2			4				
12 Jul	S16W09	123	800	13	Eki	24	B	1							
13 Jul	S17W21	122	820	13	Eki	27	B	1			1				
14 Jul	S21W30	119	860	12	Eki	24	B				1				
15 Jul	S18W48	123	930	12	Eki	16	B				2				
16 Jul	S16W52	124	590	12	Eki	15	B		1		3	1			
17 Jul	S17W71	124	490	14	Ehi	10	B	1			3	1			
18 Jul	S17W84	119	100	4	Cao	3	B				2				
								9	1	0	36	2	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 122

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 3056												
10 Jul	S15E65	76	60	4	Cro	5	B	13	1		5				
11 Jul	S17E54	74	200	8	Cao	9	B	4	1		7	2			
12 Jul	S16E37	76	140	7	Cao	9	B	4			2				
13 Jul	S17E23	78	170	4	Cao	7	B	4			6				
14 Jul	S17E12	75	130	9	Cai	28	B	7			16				
15 Jul	S18W01	76	250	11	Eai	28	B	4			9				
16 Jul	S17W16	78	200	12	Eai	31	BG	3			8				
17 Jul	S17W29	78	140	10	Dai	33	B	2			3				
18 Jul	S16W42	77	90	8	Dri	17	B				1				
19 Jul	S16W57	79	80	8	Dri	11	B	1			5				
20 Jul	S14W73	81	40	10	Cro	7	B	1			2				
21 Jul	S14W87	83	20	2	Hrx	1	A	3							
								46	2	0	64	2	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 76

			Region 3057												
11 Jul	N17E68	59	220	3	Dso	2	B								
12 Jul	N16E57	57	380	10	Dho	10	B	4			4				
13 Jul	N15E45	55	250	11	Eho	8	B	1			1				
14 Jul	N15E32	55	320	12	Eki	10	B								
15 Jul	N16E16	58	230	10	Cki	13	B	1				1			
16 Jul	N16E04	57	320	11	Ehi	16	B		1		1	1			
17 Jul	N15W09	56	360	11	Eki	19	B	1			2				
18 Jul	N17W21	56	240	11	Eki	15	B	2			2				
19 Jul	N15W37	59	190	9	Eso	11	B	1			3				
20 Jul	N17W48	56	200	10	Hsx	8	A								
21 Jul	N17W62	58	160	5	Cso	5	B	2			4				
22 Jul	N17W79	62	120	3	Hsx	1	A				1				
23 Jul	N17W91	60	100	2	Hsx	1	A	5			1				
								17	1	0	19	2	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 57

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 3058												
14 Jul	N15E71	17	230	4	Dao	7	B		2						
15 Jul	N14E56	18	220	8	Dao	9	B	4			10				
16 Jul	N16E38	23	60	4	Dai	9	BGD	1			7				
17 Jul	N13E26	22	310	8	Dki	9	BGD	2			3				
18 Jul	N14E16	19	80	8	Dri	9	B	1							
19 Jul	N13W00	21	70	9	Dro	7	B				1				
20 Jul	N13W15	23	30	4	Bxo	5	B	1			1				
21 Jul	N14W29	25	20	3	Axx	2	A				1				
22 Jul	N14W42	25	10	2	Axx	3	A				2				
23 Jul	N14W56	25	plage								1				
24 Jul	N14W70	26	plage								1				
								9	2	0	27	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 21

			Region 3059												
15 Jul	S07E71	4	180	3	Dao	2	B								
16 Jul	S10E55	6	180	7	Dso	5	B	2			3				
17 Jul	S10E41	8	200	9	Dso	5	B								
18 Jul	S10E29	5	120	9	Csi	7	B								
19 Jul	S07E15	6	130	9	Cso	6	B								
20 Jul	S08W00	8	130	10	Cso	8	B								
21 Jul	S08W14	10	100	5	Hsx	3	A								
22 Jul	S08W28	11	100	5	Hsx	1	A								
23 Jul	S08W42	11	70	2	Hsx	1	A								
24 Jul	S08W56	12	50	2	Hsx	1	A								
								2	0	0	3	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 8

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 3060												
16 Jul	N13E58	14	50	2	Hsx	2	A								
17 Jul	N10E33	15	60	4	Hax	3	A								
18 Jul	N13E22	13	40	2	Hsx	1	A								
19 Jul	N14E07	15	30	7	Hsx	6	A								
20 Jul	N13W06	14	30	7	Hrx	6	A								
21 Jul	N14W20	16	30	5	Hrx	4	A	1							
22 Jul	N12W34	17	30	4	Bxo	5	B								
23 Jul	N11W48	17	20	4	Bxo	6	B								
24 Jul	N12W61	17	30	4	Cro	5	B				2				
								1	0	0	2	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 14

			Region 3061												
17 Jul	N24W40	88	40	4	Cso	4	B								
18 Jul	N23W53	89	70	4	Cro	3	B								
19 Jul	N22W65	87	10	2	Axx	2	A	1			1				
20 Jul	N24W78	86	plage												
								1	0	0	1	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 88

			Region 3062												
19 Jul	S23E72	310	60	3	Hsx	1	A								
20 Jul	S26E60	308	70	2	Hsx	1	A	1							
21 Jul	S25E48	308	120	2	Hsx	1	A								
22 Jul	S26E36	306	100	2	Hsx	1	A								
23 Jul	S25E23	306	100	2	Hsx	1	A								
24 Jul	S25E10	306	90	2	Hsx	1	A								
								1	0	0	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 306

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 3063												
20 Jul	N10E09	358	30	4	Bxo	8	B								
21 Jul	N11W03	359	30	6	Bxo	7	B								
22 Jul	N11W18	1	10	4	Axx	2	A								
23 Jul	N12W28	357	10	3	Bxo	2	B								
24 Jul	N12W41	357	10	3	Axx	3	A	1			1				
								1	0	0	1	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 359

			Region 3064												
20 Jul	N08E29	339	30	5	Bxo	6	B								
21 Jul	N08E16	340	40	9	Cso	8	B	3			3				
22 Jul	N09E03	340	40	10	Cao	8	B	2			1				
23 Jul	N09W11	340	40	11	Cao	10	B	3			4				
24 Jul	N09W26	342	30	11	Cro	4	B								
								8	0	0	8	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 340

			Region 3065												
21 Jul	S19E15	341	10	2	Bxo	3	B								
22 Jul	S19E01	342	20	3	Bxo	6	B				1				
23 Jul	S19W12	341	20	6	Cro	5	B								
24 Jul	S19W26	342	30	6	Cro	6	B								
								0	0	0	1	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 342

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.

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