Space Weather Highlights
16 May - 22 May 2022

SWPC PRF 2438
23 May 2022

Solar activity reached moderate levels on 16,18, and 20 May, and high levels on 19 May, due to M-flare activity. Region 3017 (N14, L=084, class/area=Cro/40 on 22 May) produced an M2/Sf flare at 16/1327 UTC and an M5/1f flare at 19/0719 UTC. Region 3014 (N24, L=105, class/area=Dkc/1190 on 20 May) was the largest and most magnetically complex region on the disk this period, and produced four M-flares; an M1/Sf flare at 18/2202 UTC, an M1/1n flare at 19/1009 UTC, an M1/Sf flare at 19/1516 UTC, and an M3/1b flare at 20/0745 UTC. Solar activity was at low levels over 21-22 May. No Earth-directed CMEs were detected this period.

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 was quiet to unsettled on 16-17 May due to positive polarity CH HSS effects. Quiet to unsettled conditions prevailed over 18-19 May following CH HSS influences. Additional positive polarity CH HSS influences were observed over 20-22 May with quiet to active conditions measured in response on 20 and 22 May. Quiet to unsettled levels were observed on 21 May.

Space Weather Outlook
23 May - 18 June 2022

Solar activity is expected to be low with a chance for M-flares throughout the forecast period.

No proton events are expected at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to reach moderate levels on 26 May-11 Jun, and high levels on 23-25 May and 12-18 Jun.

Geomagnetic field activity is expected to reach active levels in response to multiple recurrent CH HSSs on 11, 13, 16, and 18 Jun. Quiet and quiet to unsettled levels are expected to prevail throughout the remainder of the 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
16 May	162	173	800	C1.2	4	1	0	4	0	0	0	0
17 May	171	153	680	C1.8	8	0	0	2	0	0	0	0
18 May	180	147	1350	C1.6	9	1	0	6	0	0	0	0
19 May	173	154	1500	C1.7	5	3	0	17	1	0	0	0
20 May	166	109	1400	C1.3	5	1	0	9	2	0	0	0
21 May	167	110	1100	C1.2	6	0	0	5	0	0	0	0
22 May	165	138	1040	C1.2	7	0	0	3	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
16 May	6.7e+04	3.8e+04	1.3e+06
17 May	5.9e+04	3.7e+04	1.5e+06
18 May	4.7e+04	3.8e+04	2.3e+06
19 May	5.2e+04	3.7e+04	2.8e+06
20 May	6.7e+04	3.5e+04	2.9e+06
21 May	7.7e+04	3.4e+04	2.4e+07
22 May	7.4e+04	3.5e+04	2.7e+07

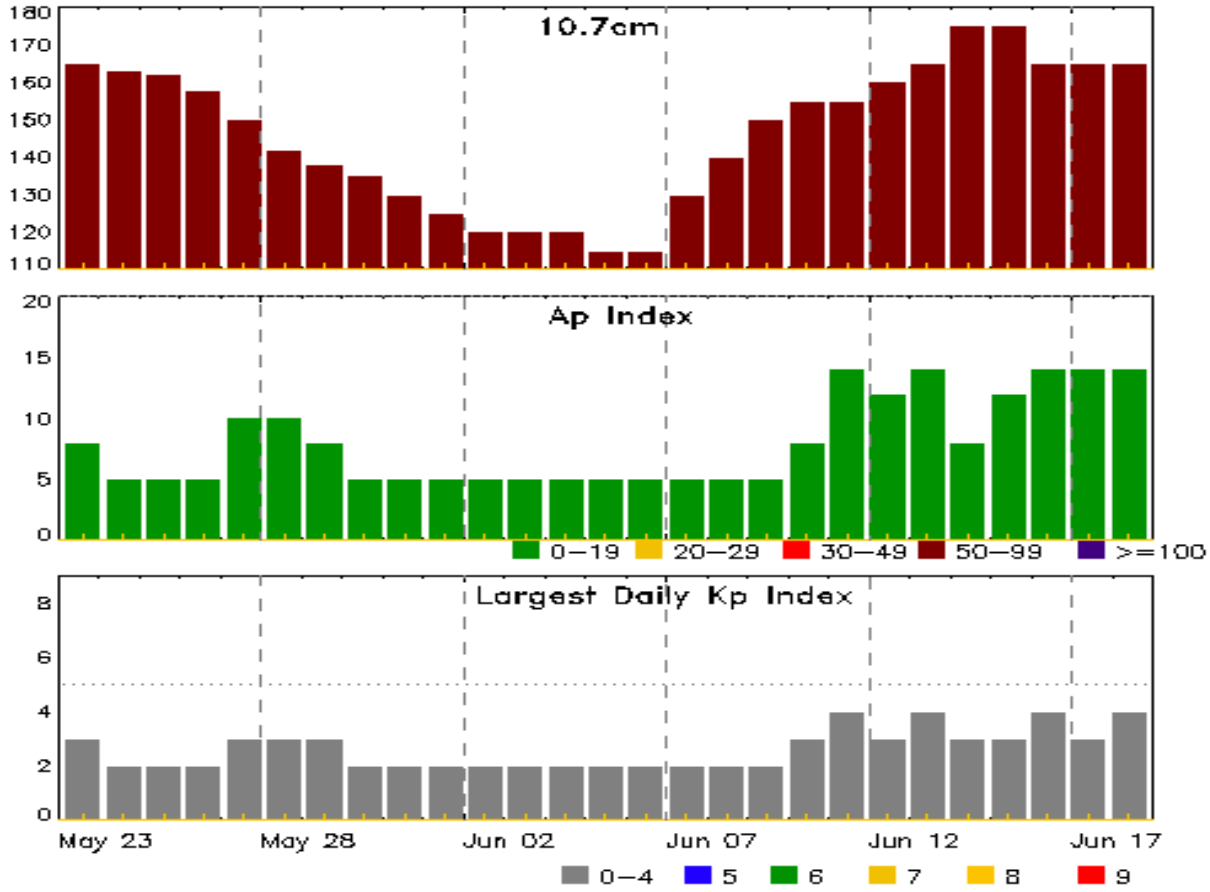
Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
16 May	11	1-3-3-4-2-2-2-1	17	1-3-4-4-5-2-2-0	10	2-3-3-3-2-2-2-1
17 May	15	2-3-4-4-4-1-2-2	21	1-3-4-5-5-3-2-2	12	1-3-3-3-3-2-2-2
18 May	7	3-2-1-2-2-1-2-2	6	2-1-0-3-2-1-1-2	7	3-2-1-2-1-1-2-2
19 May	10	2-2-3-3-3-2-2-2	10	2-3-3-1-3-2-2-2	10	3-3-3-2-3-2-2-2
20 May	12	1-2-2-4-3-3-1-3	15	2-3-2-5-3-3-2-2	12	2-3-2-3-2-3-2-4
21 May	9	3-3-2-2-3-2-1-1	25	2-4-3-2-6-5-3-1	10	3-3-2-1-3-3-2-0
22 May	11	3-3-4-2-2-2-2-1	23	2-4-4-4-6-2-2-1	22	4-3-3-2-3-2-1-1

Alerts and Warnings Issued

Date & Time of Issue UTC	Type of Alert or Warning	Date & Time of Event UTC
16 May 0500	WARNING: Geomagnetic K = 4	16/0500 - 0900
17 May 1358	WARNING: Geomagnetic K = 4	17/1358 - 2100
19 May 0721	ALERT: X-ray Flux exceeded M5	19/0716
19 May 0736	SUMMARY: X-ray Event exceeded M5	19/0700 - 0731
19 May 1318	ALERT: Type II Radio Emission	19/1202
20 May 0808	SUMMARY: 10cm Radio Burst	20/0743 - 0745
20 May 2242	WARNING: Geomagnetic K = 4	20/2240 - 21/0600
21 May 0000	ALERT: Geomagnetic K = 4	20/2359
22 May 0121	WARNING: Geomagnetic K = 4	22/0120 - 0900
22 May 0150	ALERT: Geomagnetic K = 4	22/0150
22 May 0840	EXTENDED WARNING: Geomagnetic K = 4	22/0120 - 1500
22 May 1455	EXTENDED WARNING: Geomagnetic K = 4	22/0120 - 2359

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
23 May	165	8	3	06 Jun	115	5	2
24	163	5	2	07	130	5	2
25	162	5	2	08	140	5	2
26	158	5	2	09	150	5	2
27	150	10	3	10	155	8	3
28	142	10	3	11	155	14	4
29	138	8	3	12	160	12	3
30	135	5	2	13	165	14	4
31	130	5	2	14	175	8	3
01 Jun	125	5	2	15	175	12	3
02	120	5	2	16	165	14	4
03	120	5	2	17	165	14	3
04	120	5	2	18	165	14	4
05	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
16 May	1310	1327	1344	M2.4	0.031	SF	N14E73	3017				
18 May	2156	2202	2208	M1.1	0.006	SF	S15W01	3014				
19 May	0700	0719	0731	M5.6	0.054	1F	N12E37	3017				
19 May	1000	1009	1020	M1.5	0.011	1N	N20E18	3014				
19 May	1505	1516	1523	M1.1	0.008	SF	N21E13	3014				
20 May	0735	0745	0749	M3.0	0.008	1B	N20E03	3014			210	

Flare List

	Time			Optical			
Date	Begin	Max	End	X-ray Class	Imp/ Brtns	Location Lat CMD	Rgn #
16 May	0032	0035	0037		SF	S16E38	3010
16 May	0434	0443	0501	C1.8			
16 May	0746	0750	0755	C1.9			
16 May	1001	1014	1021	C5.6			
16 May	1310	1327	1344	M2.4	SF	N14E73	3017
16 May	1413	1419	1422	C5.5			3017
16 May	2040	2047	2058	C2.3	SF	N22E44	3014
16 May	2124	2132	2140	C2.7			
16 May	2303	2314	2323	C2.3	SF	N14E36	3011
17 May	0000	0010	0014	C3.6	SF	N22E42	3014
17 May	0039	0046	0052	C2.9			3014
17 May	0458	0507	0518	C6.2			3015
17 May	0655	0702	0714	C3.4			3014
17 May	0823	0834	0840	C4.3			3011
17 May	1017	1032	1057	C3.0			3010
17 May	1126	1145	1204	C9.9			3010
17 May	1228	1235	1240	C8.6			
17 May	1619	1626	1633	C4.6			3007
17 May	1929	1936	1944	C3.2			3014
17 May	1948	1949	1951		SF	N22E32	3014
18 May	0438	0446	0451	C2.9			
18 May	0516	0524	0534	C2.5			3014
18 May	0706	0715	0727	C2.1			
18 May	0753	0802	0809	C2.7			
18 May	0816	0823	0830	C2.9			

Flare List

Date	Time			Optical			
	Begin	Max	End	X-ray Class	Imp/ Brtns	Location Lat CMD	Rgn #
18 May	0902	0906	0915		SF	N18E27	3014
18 May	0932	0944	0948		SF	S23W53	3007
18 May	0953	1006	1032	C2.7	SF	N18E27	3014
18 May	1036	1042	1048	C2.6			
18 May	1217	1220	1224		SF	S16E06	3010
18 May	1342	1355	1409	C2.3	SF	N13E14	3011
18 May	1543	1549	1553	C4.7	SF	N25E20	3014
18 May	1642	1644	1654		SF	N21E22	3014
18 May	2138	2143	2145	C5.1	SF	N22E21	3014
18 May	2156	2202	2208	M1.1	SF	S15W01	3014
19 May	0146	0146	0148		SF	N21E20	3014
19 May	0240	0252	0300	C3.9	SF	N22E19	3014
19 May	0327	0334	0342	C3.1	SF	N22E15	3014
19 May	0538	0551	0558	C5.5	SF	N21E18	3014
19 May	0629	0641	0656	C7.8	2B	N16E31	3015
19 May	0700	0719	0731	M5.6	1F	N12E37	3017
19 May	0756	0800	0815		SF	N16E31	3015
19 May	0822	0824	0829		SF	N16E31	3015
19 May	0830	0832	0837		SF	N16E32	3015
19 May	0909	1008	1040	M1.5	SF	N10E37	3017
19 May	1054	1107	1133		SF	N21E15	3014
19 May	1147	1149	1155		SF	N21E15	3014
19 May	1329	1333	1336		SF	S15W12	3010
19 May	1349	1352	1400		SF	N17E17	3014
19 May	1413	1413	1415		SF	N22E14	3014
19 May	1453	1454	1500		SF	N21E13	3014
19 May	1505	1516	1523	M1.1	SF	N21E13	3014
19 May	1527	1530	1539		SF	S15W13	3010
19 May	1900	1914	1921	C3.3	SF	S16W11	3010
19 May	2217	2231	2238		SF	N18E21	3015
20 May	0008	0012	0018	C3.9	SF	N22E03	3014
20 May	0735	0745	0749	M3.0	1B	N20E03	3014
20 May	0838	0843	0846		SF	N16E23	3017
20 May	1147	1156	1231		SF	N19W20	
20 May	1208	1212	1219	C2.7	SF	N20E03	3014
20 May	1257	1258	1259		SF	S12W25	3010
20 May	1721	1723	1730		SF	N23E02	3014
20 May	1846	1853	1902	C2.5	SF	N18E13	3017

Flare List

Date	Time			Optical			
	Begin	Max	End	X-ray Class	Imp/ Brtns	Location Lat CMD	Rgn #
20 May	2203	2212	2217	C8.4	1N	N13E60	3019
20 May	2212	2212	2222		SF	S16W29	3010
20 May	2324	2337	2345	C5.2	SF	N20W29	3007
21 May	0008	0013	0023	C3.5	SF	N20W27	3011
21 May	0543	0548	0558		SF	S21E64	
21 May	0632	0643	0700	C2.3			3014
21 May	1329	1337	1343	C3.4	SF	S16W39	3010
21 May	1427	1435	1440	C2.7	SF	N16W27	3011
21 May	1527	1539	1548	C2.5	SF	N21W20	3014
21 May	1859	1906	1913	C1.9			3010
22 May	0443	0444	0452		SF	N19W20	
22 May	0607	0615	0624	C2.2	SF	N18W47	3014
22 May	1347	1354	1407	C1.9			
22 May	1417	1431	1448	C3.7	SF	N11W12	3017
22 May	1538	1543	1550	C2.4			3014
22 May	2201	2211	2221	C1.6			3014
22 May	2221	2230	2242	C1.9			3017
22 May	2326	2340	2349	C4.6			3017

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 3006												
03 May	S27E76	246	plage							1					
04 May	S27E62	246	50	6	Cro	4	B		1						
05 May	S29E50	245	50	9	Cao	4	B	3	1		1				
06 May	S29E37	245	70	9	Cao	8	B	6							
07 May	S29E23	245	80	9	Cao	10	B	2			1				
08 May	S29E10	245	80	9	Cao	10	B								
09 May	S31E04	238	50	12	Cso	10	BD	2			1				
10 May	S30W07	235	180	14	Eai	22	BGD	2		1	3	1			
11 May	S31W20	235	130	14	Eao	19	B	4			8				
12 May	S31W33	235	140	14	Eao	20	B	4			5				
13 May	S31W46	235	120	14	Eao	18	B								
14 May	S31W59	235	10	7	Bxo	8	B	2			2				
15 May	S31W72	235	10	7	Bxo	3	B								
16 May	S31W86	235	plage												
								25	2	2	21	1	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 238

			Region 3007												
08 May	S23E64	190	60	5	Cao	3	B	2							
09 May	S24E58	184	160	13	Dso	8	B	3			1				
10 May	S24E45	184	240	14	Esi	20	B	4			6				
11 May	S24E32	184	300	15	Ehc	20	BGD	6	1		16	3			
12 May	S24E18	184	350	15	Ekc	30	BGD	1			5				
13 May	S24E05	184	330	11	Ekc	28	B	2			6				
14 May	S24W08	184	340	12	Ekc	30	B				1				
15 May	S24W21	184	340	12	Ekc	30	B								
16 May	S23W35	184	320	14	Ekc	36	B								
17 May	S23W48	184	170	13	Esi	18	B	1							
18 May	S22W61	184	120	11	Cso	10	B								
19 May	S22W75	185	110	5	Hsx	4	A								
20 May	S22W89	185	20	2	Hsx	1	A	1							
								20	1	0	35	3	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 184

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 3008												
11 May	N16E34	182	10	3	Bxo	2	B								
12 May	N16E20	182	30	4	Cao	5	B								
13 May	N16E07	182	30	5	Cao	4	B								
14 May	N16W06	182	plage												
15 May	N16W19	182	plage												
16 May	N16W33	182	plage												
17 May	N16W47	183	plage												
18 May	N16W61	184	plage												
19 May	N16W75	185	plage												
20 May	N16W89	185	plage												
								0	0	0	0	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 182

			Region 3009												
11 May	N14W21	237	10	3	Bxo	3	B								
12 May	N14W35	237	30	4	Cao	6	B								
13 May	N14W48	237	plage												
14 May	N14W61	237	plage												
15 May	N14W74	237	plage												
16 May	N14W88	237	plage												
								0	0	0	0	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 237

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 3010												
12 May	S13E71	131	30	2	Hsx	1	A	2							
13 May	S15E61	128	90	8	Dso	5	B								
14 May	S15E48	128	190	9	Dso	12	B	3			4				
15 May	S15E35	128	190	9	Dso	12	B				1				
16 May	S16E24	125	100	14	Cso	23	B				1				
17 May	S15E10	126	60	15	Cso	19	B	1							
18 May	S15W04	127	70	14	Cso	20	B				1				
19 May	S16W18	128	50	11	Cso	16	B	1			3				
20 May	S14W31	127	50	10	Cro	9	B				2				
21 May	S14W44	127	20	6	Cro	9	B	2			1				
22 May	S18W58	128	10	6	Bxo	2	B								
								9	0	0	13	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 127

			Region 3011												
13 May	N16E66	123	30	6	Cro	3	B	2							
14 May	N16E53	123	30	4	Cro	2	B	2			3				
15 May	N16E40	123	10	5	Bxo	2	B								
16 May	N16E25	124	10	5	Bxo	3	B				1				
17 May	N18E08	128	0		Axx	1	A								
18 May	N18W06	129	plage					1							
19 May	N14W20	130	plage												
20 May	N16W34	130	plage												
21 May	N15W47	130	30	3	Cao	3	B	2			1				
22 May	N15W61	131	10	1	Axx	1	A								
								7	0	0	5	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 129

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 3012												
13 May	S19E01	188	10	3	Bxo	2	B								
14 May	S19W12	188	plage												
15 May	S19W25	188	plage												
16 May	S19W39	188	plage												
17 May	S19W53	189	plage												
18 May	S19W67	190	plage												
19 May	S19W81	191	plage												
								0	0	0	0	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 188

			Region 3013												
14 May	S28E29	147	10	2	Bxo	3	B								
15 May	S28E16	147	10	1	Axx	1	A								
16 May	S27E03	146	0	3	Axx	2	A								
17 May	S27W11	147	plage												
18 May	S27W25	148	plage												
19 May	S27W39	149	plage												
20 May	S27W53	149	plage												
21 May	S27W67	150	plage												
22 May	S27W81	151	plage												
								0	0	0	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 146

			Region 3014												
15 May	N21E53	110	100	5	Cao	7	B								
16 May	N22E44	105	140	10	Dac	13	BD				1				
17 May	N22E31	105	220	10	Dac	18	BG	4			2				
18 May	N21E17	106	850	11	Ekc	30	BGD	3	1		5				
19 May	N22E04	106	1100	11	Ekc	30	BGD	3	2		10				
20 May	N24W09	105	1190	10	Dkc	12	BGD	2	1		3	1			
21 May	N22W24	107	940	11	Ekc	14	BGD	2			1				
22 May	N22W38	108	890	11	Ekc	18	BGD	3							
								17	4	0	22	1	0	0	0

Still on Disk.
Absolute heliographic longitude: 106

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 3015												
15 May	N14E55	108	60	4	Dao	4	B								
16 May	N13E42	107	110	5	Hsx	7	A								
17 May	N13E28	108	90	5	Hsx	5	A	1							
18 May	N13E14	109	100	5	Hsx	5	A								
19 May	N14E01	109	50	4	Hsx	5	A	1			4				
20 May	N14W13	109	20	1	Cso	2	B								
21 May	N14W25	108	10	1	Hsx	1	A								
22 May	N14W39	109	10	1	Hsx	1	A								
								2	0	0	4	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 109

			Region 3016												
16 May	S18E73	76	100	2	Hsx	3	A								
17 May	S18E62	74	100	9	Dso	3	B								
18 May	S19E49	74	180	9	Dao	6	B								
19 May	S19E35	75	140	11	Eao	4	B								
20 May	S19E21	75	70	9	Dao	5	B								
21 May	S19E09	74	40	7	Cao	2	B								
22 May	S19W07	77	20	7	Cao	4	B								
								0	0	0	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 77

			Region 3017												
16 May	N14E66	84	20	6	Cro	6	BG		1		1				
17 May	N14E52	84	20	6	Cro	4	B								
18 May	N14E40	82	20	9	Cro	2	B								
19 May	N13E27	83	30	10	Cro	9	B		1			1			
20 May	N14E14	82	30	6	Cro	6	B	1			2				
21 May	N14W00	83	30	7	Cro	7	B								
22 May	N14W14	84	40	10	Cro	13	B	3			1				
								4	2	0	4	1	0	0	0

Still on Disk.
Absolute heliographic longitude: 83

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 3018												
17 May	S12E54	82	20	3	Cro	5	B								
18 May	S11E41	82	10	2	Axx	4	A								
19 May	S11E26	84	0	1	Axx	3	A								
20 May	S11E12	83	plage												
21 May	S11W02	85	plage												
22 May	S11W16	86	plage												
								0	0	0	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 85

			Region 3019												
19 May	N11E69	41	20	4	Cro	3	B								
20 May	N11E55	41	20	2	Cro	4	A	1				1			
21 May	N11E41	42	30	6	Cro	4	B								
22 May	N11E27	43	20	4	Cro	4	B								
								1	0	0	0	1	0	0	0

Still on Disk.
Absolute heliographic longitude: 43

			Region 3020												
22 May	S20E58	12	20	2	Hsx	1	A								
								0	0	0	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 12

			Region 3021												
22 May	N14E67	2	20	3	Cro	4	B								
								0	0	0	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 2

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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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