Space Weather Highlights
18 April - 24 April 2022

SWPC PRF 2434
25 April 2022

Solar activity reached high levels during the period. Moderate levels were observed on 18 Apr with M1 flares observed from Regions 2987 (N30, L=262, plage) and 2993 (N22, L111, class/area Fkc/600 on 21 Apr). Region 2992 (S28, L=244, class/area Dao/300 on 18 Apr) contributed an M3 flare at 19/2049 UTC. Activity increased to high levels on 20-21 Apr with an M7 flare at 20/0136 UTC from Region 2992. This region also produced an X2 flare at 20/0357 UTC. Associated with the X2 flare was a Tenflare and Type II sweep. Region 2993 produced an M9 flare at 21/0159 UTC. There was a Tenflare, Type II and Type IV sweeps with this event. Region 2993 also managed an M3 flare with a Type II sweep on 22 Apr. Low levels were observed on 23-24 Apr. No Earth-directed CMEs were observed during the period.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit reached high levels on 18-20 Apr. Normal to moderate levels were observed on 21-24 Apr.

Geomagnetic field activity reached active levels on 23 Apr due to influences from a positive polarity CH HSS. Quiet to unsettled levels were observed on 18-22 Apr and 24 Apr.

Space Weather Outlook
25 April - 21 May 2022

Solar activity is expected to be at moderate to high levels (R-R2, Minor-Moderate), with a slight chance for very high levels (R3, Strong) on 25-30 Apr and 11-21 May due to the flare potential from Regions 2993 and 2994. Very low to low activity is expected on 1-10 May.

A slight chance for proton events exists on 25-30 Apr and 11-21 May due to the potential from Regions 2993 and 2994.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to reach high levels on 30 Apr - 1 May, 7-9 May, and 14-17 May due to recurrent CH HSS influences. Normal to moderate levels are expected for the remainder of the outlook period.

Geomagnetic field activity is expected to be reach G1 (Minor) storm levels on 29 Apr due the arrival of a recurrent, negative polarity CH HSS. Unsettled to active levels are expected on 30 Apr, 7-8 May, 14 May, and 20 May all due to recurrent CH HSS influences. Quiet levels are expected for the remainder of the outlook 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 April	141	79	1390	C1.3	13	3	0	5	0	0	0	0
19 April	160	68	1820	C1.3	10	3	0	3	0	0	0	0
20 April	160	80	1400	C1.6	13	3	1	13	1	0	0	0
21 April	164	119	1760	C1.5	4	1	0	10	2	0	0	0
22 April	163	101	1590	B8.0	7	2	0	2	0	1	0	0
23 April	160	118	1430	B8.1	8	0	0	5	0	0	0	0
24 April	159	112	1600	B7.6	3	0	0	2	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 April	8.2e+04	4.0e+04	5.7e+07
19 April	2.8e+05	4.1e+04	9.2e+07
20 April	2.9e+05	4.2e+04	7.4e+07
21 April	1.9e+05	4.0e+04	3.4e+06
22 April	1.5e+05	4.0e+04	9.0e+06
23 April	1.6e+05	3.9e+04	1.1e+07
24 April	7.2e+04	3.8e+04	8.9e+06

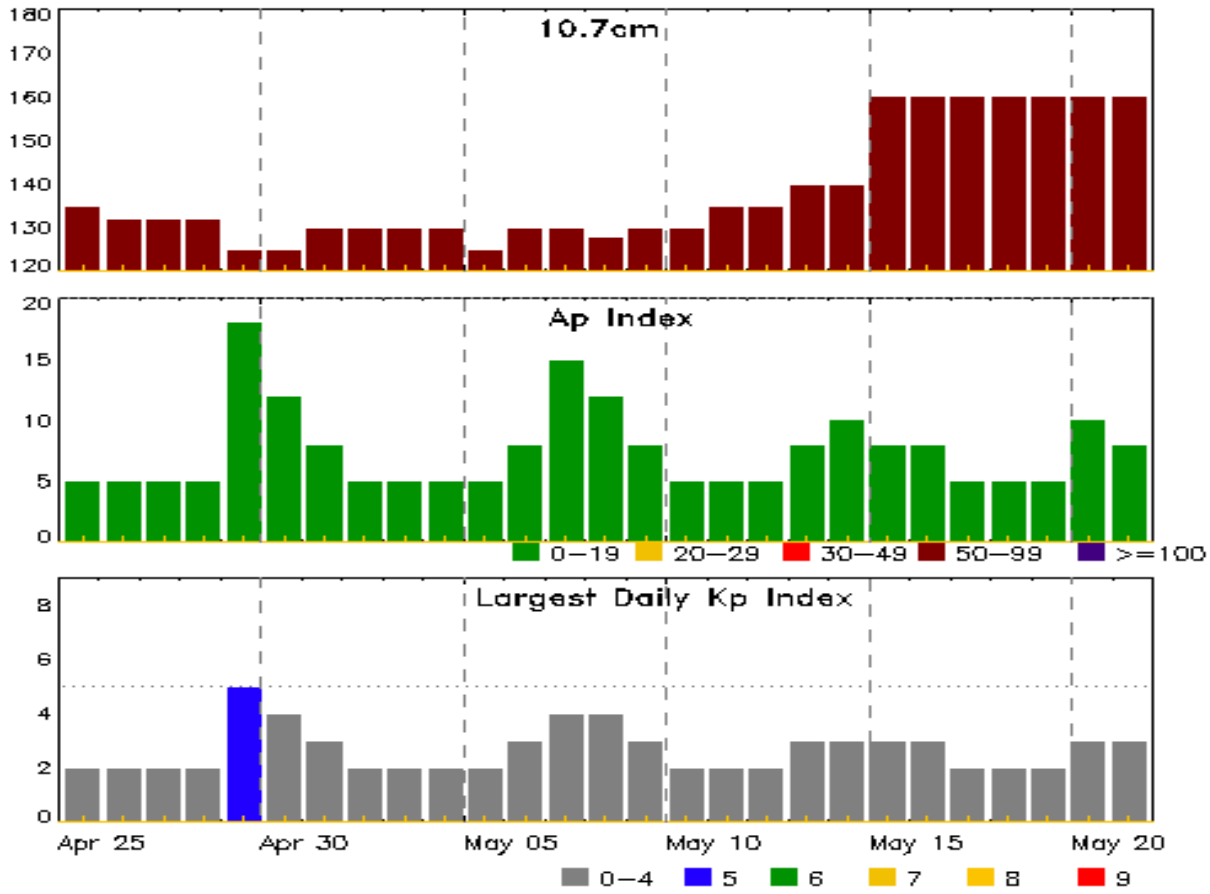
Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
18 April	7	1-2-2-2-2-2-3-1	14	1-2-4-5-2-2-2-2	8	2-2-2-2-1-2-3-1
19 April	8	3-3-2-2-2-2-1-1	10	2-3-2-3-4-1-0-1	7	3-3-2-2-2-1-0-1
20 April	9	3-2-2-2-1-2-2-3	6	2-2-3-1-0-1-1-2	9	3-2-2-2-1-2-2-3
21 April	9	3-3-2-2-3-1-2-1	22	3-3-5-5-4-2-2-2	10	3-3-3-2-3-2-2-1
22 April	7	1-3-1-2-2-2-2-2	6	2-2-1-2-1-2-2-1	7	1-3-1-2-1-2-2-2
23 April	12	2-2-2-3-4-2-2-3	23	2-2-1-6-5-3-2-3	13	2-2-2-4-3-2-2-4
24 April	5	2-2-2-1-2-1-1-0	3	2-2-1-0-1-1-1-0	9	2-2-2-1-1-1-1-0

Alerts and Warnings Issued

Date & Time of Issue UTC	Type of Alert or Warning	Date & Time of Event UTC
18 Apr 1251	CONTINUED ALERT: Electron 2MeV Integral Flux >= 1000pfu	16/1715
18 Apr 2156	WARNING: Geomagnetic K = 4	18/2156 - 19/0300
19 Apr 0507	SUMMARY: 10cm Radio Burst	19/0448 - 0449
19 Apr 0533	WARNING: Geomagnetic K = 4	19/0534 - 1200
19 Apr 1031	CONTINUED ALERT: Electron 2MeV Integral Flux >= 1000pfu	16/1715
20 Apr 0133	ALERT: X-ray Flux exceeded M5	20/0131
20 Apr 0155	SUMMARY: X-ray Event exceeded M5	20/0120 - 0144
20 Apr 0358	ALERT: X-ray Flux exceeded M5	20/0355
20 Apr 0421	SUMMARY: 10cm Radio Burst	20/0354 - 0355
20 Apr 0423	SUMMARY: X-ray Event exceeded X1	20/0341 - 0404
20 Apr 0426	ALERT: Type II Radio Emission	20/0355
20 Apr 1328	CONTINUED ALERT: Electron 2MeV Integral Flux >= 1000pfu	16/1715
20 Apr 2312	WARNING: Geomagnetic K = 4	20/2312 - 21/0600
21 Apr 0158	ALERT: X-ray Flux exceeded M5	21/0155
21 Apr 0211	SUMMARY: X-ray Event exceeded M5	21/0147 - 0205
21 Apr 0219	SUMMARY: 10cm Radio Burst	21/0153 - 0156
21 Apr 0227	ALERT: Type II Radio Emission	21/0157
21 Apr 0309	ALERT: Type IV Radio Emission	21/0215
21 Apr 0547	EXTENDED WARNING: Geomagnetic K = 4	20/2312 - 21/1200
21 Apr 2326	ALERT: Type II Radio Emission	21/2246
22 Apr 1415	ALERT: Type II Radio Emission	22/1328
23 Apr 1037	WARNING: Geomagnetic K = 4	23/1036 - 2100
23 Apr 1205	ALERT: Geomagnetic K = 4	23/1200
23 Apr 2138	WARNING: Geomagnetic K = 4	23/2137 - 24/0300

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 Apr	135	5	2	09 May	130	8	3
26	132	5	2	10	130	5	2
27	132	5	2	11	135	5	2
28	132	5	2	12	135	5	2
29	125	18	5	13	140	8	3
30	125	12	4	14	140	10	3
01 May	130	8	3	15	160	8	3
02	130	5	2	16	160	8	3
03	130	5	2	17	160	5	2
04	130	5	2	18	160	5	2
05	125	5	2	19	160	5	2
06	130	8	3	20	160	10	3
07	130	15	4	21	160	8	3
08	128	12	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
18 Apr	0737	0748	0754	M1.3	0.006	SF	N19E67	2993				
18 Apr	1004	1027	1049	M1.1	0.020			2993				
18 Apr	1712	1724	1731	M1.9	0.009	SF	S31W87	2987				
19 Apr	0443	0450	0459	M1.0	0.007			2993	29	150		
19 Apr	2039	2049	2058	M3.7	0.023			2992				
19 Apr	2109	2113	2118	M1.6	0.007	SN	N14E47	2994				
20 Apr	0107	0114	0120	M1.2	0.006	1N	N12E44	2994				
20 Apr	0120	0136	0144	M7.2	0.064			2992	200			
20 Apr	0341	0357	0404	X2.2	0.100			2992	2600	510	3	
20 Apr	1224	1253	1302	M1.9	0.019	SF	N21E38	2993	130			
21 Apr	0147	0159	0205	M9.6	0.046			2993	3000	370	2	
22 Apr	0452	0514	0528	M1.1	0.017			2993				
22 Apr	1316	1325	1330	M3.4	0.010	2B	N22W01	2993	210		1	

Flare List

	Time			Optical			
Date	Begin	Max	End	X-ray Class	Imp/ Brtns	Location Lat CMD	Rgn #
18 Apr	0029	0036	0048	C5.9			2993
18 Apr	0050	0056	0100	C5.2			2993
18 Apr	0127	0138	0145	C2.8			2993
18 Apr	0229	0237	0252	C2.7			2994
18 Apr	0301	0319	0333	C8.5			2992
18 Apr	0358	0403	0407	C7.3			2994
18 Apr	0442	0449	0458	C2.9			2992
18 Apr	0737	0748	0754	M1.3	SF	N19E67	2993
18 Apr	0910	0914	0918	C2.5			2993
18 Apr	1004	1027	1049	M1.1			2993
18 Apr	1309	1325	1338	C2.0			
18 Apr	1410	1424	1445	C3.9	SF	N21E57	2993
18 Apr	1712	1724	1731	M1.9	SF	S31W87	2987
18 Apr	1947	1955	2002	C3.0			
18 Apr	2005	2015	2030	C7.3	SF	N23E52	2993
18 Apr	2220	2220	2223		SF	N24E47	2993
18 Apr	2224	2232	2240	C3.1			2987
19 Apr	0032	0040	0045	C1.5			

Flare List

Date	Time			Optical			
	Begin	Max	End	X-ray Class	Imp/ Brtns	Location Lat CMD	Rgn #
19 Apr	0400	0417	0425	C3.5			2993
19 Apr	0443	0450	0459	M1.0			2993
19 Apr	0755	0804	0815	C2.6			2992
19 Apr	0949	0953	0957	C6.3	SF	N22E40	2993
19 Apr	1050	1103	1110	C3.1			2992
19 Apr	1310	1310	1312		SF	N12E52	2994
19 Apr	1355	1406	1415	C3.3			2994
19 Apr	1442	1446	1455	C2.2			2992
19 Apr	1812	1817	1821	C3.9			2994
19 Apr	1821	1840	1842	C4.4			2994
19 Apr	1842	1848	1852	C4.4			2994
19 Apr	2039	2049	2058	M3.7			2992
19 Apr	2109	2113	2118	M1.6	SN	N14E47	2994
20 Apr	0003	0012	0023	C3.0			2994
20 Apr	0046	0051	0103	C3.9			2992
20 Apr	0107	0114	0120	M1.2			2994
20 Apr	0120	0136	0144	M7.2			2992
20 Apr	0120	0127	0219		1N	N12E44	2994
20 Apr	0238	0244	0256	C3.8			
20 Apr	0341	0357	0404	X2.2			2992
20 Apr	0341	0342	0346		SF	N20E37	2993
20 Apr	0506	0510	0514	C2.6			2992
20 Apr	0535	0540	0544	C4.0			2992
20 Apr	0610	0613	0619		SF	N20E37	2993
20 Apr	0935	0955	1003	C4.2			
20 Apr	1003	1008	1018	C5.1			2993
20 Apr	1005	1009	1035		SF	N14E38	2994
20 Apr	1007	1008	1019		SF	N22E31	2993
20 Apr	1145	1152	1158	C3.0			
20 Apr	1224	1253	1302	M1.9	SF	N21E38	2993
20 Apr	1350	1354	1359	C3.1			
20 Apr	1703	1703	1707		SF	N13E34	2994
20 Apr	1739	1756	1813	C7.7			2993
20 Apr	1744	1745	1826		SF	N16E31	2994
20 Apr	1808	1820	1821		SF	N20E27	2993
20 Apr	1833	1835	1910	C8.9	SF	N14E31	2994
20 Apr	1913	1916	1922		SF	N14E33	2994
20 Apr	2205	2206	2209		SF	N24E24	2993

Flare List

Date	Time			Optical			
	Begin	Max	End	X-ray Class	Imp/ Brtns	Location Lat CMD	Rgn #
20 Apr	2227	2233	2240	C2.3	SF	N22E19	2993
20 Apr	2323	2334	2348	C5.6	SF	N23E19	2993
21 Apr	0000	2330	0008		SF	N16E28	2994
21 Apr	0019	0020	0024		SF	N16E28	2994
21 Apr	0147	0159	0205	M9.6			2993
21 Apr	B0214	0224	0246		1N	N25E23	2993
21 Apr	0506	0508	0520		SF	N17E31	2993
21 Apr	0530	0531	0601		SF	N17E31	2993
21 Apr	1247	1255	1301	C5.4	1F	N14E15	2994
21 Apr	1335	1335	1339		SF	N24E12	2993
21 Apr	1718	1727	1734	C3.1	SF	N24E12	2993
21 Apr	1826	1826	1829		SF	N23E08	2993
21 Apr	1850	1851	1855		SF	N16E20	2994
21 Apr	2058	2104	2108	C7.0	SN	N16E21	2993
21 Apr	2103	2103	2106		SF	N17E10	2994
21 Apr	2239	2245	2251	C1.6			
22 Apr	0316	0401	0424	C7.6			2993
22 Apr	0452	0514	0528	M1.1			2993
22 Apr	0818	0823	0827	C1.1			2993
22 Apr	1132	1140	1147	C1.1	SF	N25E51	2996
22 Apr	1212	1229	1240	C3.5			
22 Apr	1316	1325	1330	M3.4	2B	N22W01	2993
22 Apr	1339	1345	1350	C3.6			
22 Apr	1502	1508	1517	C2.0	SF	N22W01	2993
22 Apr	2158	2207	2213	C2.4			2993
23 Apr	0232	0240	0247	C1.1			2993
23 Apr	0552	0604	0613	C1.9	SF	N22W02	2993
23 Apr	0658	0707	0715	C1.5	SF	N16W01	2993
23 Apr	0800	0804	0808		SF	N16W01	2993
23 Apr	0951	0952	0953		SF	N19W07	2993
23 Apr	1605	1613	1619	C1.3			2994
23 Apr	1918	1942	1953	C2.5	SF	N19W11	2994
23 Apr	2045	2053	2101	C1.2			2994
23 Apr	2143	2149	2156	C1.4			2993
23 Apr	2343	2354	0005	C1.5			2993
24 Apr	0354	0412	0425	C3.7	SF	N22W17	2993
24 Apr	0912	0930	0940	C1.6			
24 Apr	2055	2106	2112	C2.7			2994

Flare List

	Time				Optical		
Date	Begin	Max	End	X-ray Class	Imp/ Brtns	Location Lat CMD	Rgn #
24 Apr	2312	2313	2317		SF	N22W25	2993

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 2987												
07 Apr	S30E43	262	10	1	Axx	1	A								
08 Apr	S31E35	256	plage												
09 Apr	S31E21	257	plage												
10 Apr	S31E08	257	plage												
11 Apr	S31W06	258	plage					1							
12 Apr	S31W20	259	plage												
13 Apr	S31W34	260	plage												
14 Apr	S31W48	260	plage												
15 Apr	S31W61	260	plage												
16 Apr	S31W74	260	plage												
17 Apr	S31W87	260	plage												
								1	0	0	0	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 258

			Region 2988												
11 Apr	N15E49	202	10	1	Bxo	3	B								
12 Apr	N16E37	202	10	1	Bxo	2	B								
13 Apr	N14E22	204	10	4	Axx	1	A								
14 Apr	N14E08	204	plage												
15 Apr	N14W05	204	plage												
16 Apr	N14W18	204	plage												
17 Apr	N14W31	204	plage												
18 Apr	N14W44	204	plage												
19 Apr	N14W58	204	plage												
20 Apr	N14W72	205	plage												
21 Apr	N14W86	206	plage												
								0	0	0	0	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 204

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 2989													
12 Apr	N19E73	166	10		Axx	1	A								
13 Apr	N18E60	166	30	1	Bxo	3	B								
14 Apr	N18E45	167	20	1	Hrx	1	A								
15 Apr	N18E32	167	30	1	Hrx	1	A								
16 Apr	N18E19	167	20	1	Bxo	2	B								
17 Apr	N18E06	167	plage												
18 Apr	N18W07	167	plage												
19 Apr	N18W21	167	plage												
20 Apr	N18W35	168	plage												
21 Apr	N18W49	169	plage												
22 Apr	N18W63	170	plage												
23 Apr	N18W77	170	plage												
								0	0	0	0	0	0	0	0

Died on Disk.
Absolute heliographic longitude: 167

		Region 2990													
13 Apr	N16E47	179	20	3	Bxo	3	B								
14 Apr	N16E32	180	40	6	Dao	5	B								
15 Apr	N16E19	180	70	6	Dao	3	B								
16 Apr	N16E07	178	60	6	Dao	4	B								
17 Apr	N16W07	179	60	6	Dao	5	B								
18 Apr	N16W31	190	30	3	Bxo	6	B								
19 Apr	N16W45	191	plage												
20 Apr	N16W59	192	plage												
21 Apr	N16W73	193	plage												
22 Apr	N16W87	194	plage												
								0	0	0	0	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 178

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 2991												
14 Apr	S24E63	149	60	2	Hsx	1	A								
15 Apr	S24E51	148	60	2	Hsx	1	A								
16 Apr	S24E39	147	60	2	Hax	1	A								
17 Apr	S24E26	146	50	2	Hax	1	A								
18 Apr	S24E12	147	50	1	Hax	1	A								
19 Apr	S23W01	147	30	1	Hsx	1	A								
20 Apr	S23W15	148	10	1	Hsx	1	A								
21 Apr	S21W20	139	30	3	Cro	6	B								
22 Apr	S22W33	140	30	4	Cro	5	B								
23 Apr	S23W51	144	10	2	Axx	2	A								
24 Apr	S23W63	143	10		Axx	1	A								
								0	0	0	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 147

			Region 2992												
16 Apr	S31W62	248	40	5	Cao	4	B								
17 Apr	S31W76	248	110	6	Dao	5	B	4	2		8				
18 Apr	S28W85	244	300	3	Dao	3	B	2							
								6	2	0	8	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 248

			Region 2993												
15 Apr	N22E89	111	plage						2						
16 Apr	N22E75	111	300	8	Cho	6	B	9	1						
17 Apr	N21E61	111	400	9	Dho	8	B	4	2						
18 Apr	N18E51	108	560	7	Dhi	12	BG	6	2		4				
19 Apr	N19E36	109	680	12	Ehi	19	BG	2	1		1				
20 Apr	N20E24	109	490	10	Dhi	19	BG	4	1		8				
21 Apr	N22E08	111	600	19	Fkc	35	BG	1	1		6	1			
22 Apr	N19W04	110	500	11	Ekc	18	BG	4	2		1		1		
23 Apr	N19W18	111	360	8	Dkc	10	B	5			4				
24 Apr	N19W32	111	440	7	Dkc	11	BGD	1			2				
								36	12	0	26	1	1	0	0

Still on Disk.
Absolute heliographic longitude: 110

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 2994												
15 Apr	N14E89	111	plage					2							
16 Apr	N14E75	111	250	5	Hhx	1	A								
17 Apr	N13E66	106	350	12	Eho	5	B	2		1					
18 Apr	N13E53	107	450	12	Eko	7	BG	2							
19 Apr	N14E40	106	930	13	Eko	7	BG	4	1		2				
20 Apr	N14E25	107	610	8	Dko	8	BG	2	1		5	1			
21 Apr	N15E15	104	770	12	Ekc	22	BG	2			4	1			
22 Apr	N14W00	105	700	12	Eki	19	B								
23 Apr	N14W12	105	580	12	Eki	22	B	3			1				
24 Apr	N14W27	107	650	12	Eki	20	BG	1							
								18	2	1	12	2	0	0	0

Still on Disk.
Absolute heliographic longitude: 105

			Region 2995												
19 Apr	N13E69	76	180	2	Hsx	1	A								
20 Apr	N14E56	76	240	3	Hsx	1	A								
21 Apr	N16E44	75	260	8	Cho	3	B								
22 Apr	N14E29	76	270	7	Cho	5	B								
23 Apr	N15E18	74	280	9	Cho	7	B								
24 Apr	N15E02	77	290	4	Hhx	3	A								
								0	0	0	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 77

			Region 2996												
20 Apr	N23E65	67	50	2	Hsx	1	A								
21 Apr	N25E56	64	100	7	Cao	3	B								
22 Apr	N25E40	66	90	4	Cao	4	B	1			1				
23 Apr	N25E27	65	70	2	Cao	3	B								
24 Apr	N26E15	64	80	2	Cao	2	B								
								1	0	0	1	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 64

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 2997												
23 Apr	N14E63	30	10	4	Bxo	3	B								
24 Apr	N13E49	31	10	6	Bxo	4	B								
								0	0	0	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 31

			Region 2998												
23 Apr	S19E13	80	120	2	Hsx	1	A								
24 Apr	S19W01	81	120	2	Hax	1	A								
								0	0	0	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 81

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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