

Space Weather Highlights 15 - 21 July 2002

SWO PRF 1403
23 July 2002

Solar activity alternated between low and high levels during the period. Major solar flares occurred on 15, 17, 18, and 20 July from two active regions: Region 30 (N19, L = 012, class/area Fkc/1350 on 16 July) and Region 39 (S12, L = 212, class/area Dac/330 on 22 July). Region 30 produced an X3/3b flare at 15/2008 UTC, an M8/1b at 17/0713 UTC, and an X1/2b at 18/0744 UTC, all of which were associated with Earth-directed coronal mass ejections (CME). Region 30 entered a decay phase on 16 July, though it remained large and magnetically complex with multiple delta magnetic configurations. It rotated out of view on the day of this report. Region 39, which rotated into view on 22 July, was the likely source for an X3 X-ray flare at 20/2130 UTC from beyond the southeast limb. It was also the likely source for multiple far side CME activity observed during the period. On the day of this report, Region 39 produced an X4 X-ray flare associated with a halo CME, which will be summarized in next week's report. Region 39 was still too close to the limb for a detailed analysis, but appeared to be very large and magnetically complex.

Solar wind data were available from the NASA Advanced Composition Explorer (ACE) spacecraft for most of the summary period. A weak high-speed solar wind stream associated with a positive-polarity coronal hole was observed during 15 – 16 July with peak velocities to around 440 km/sec. CME passages occurred during 17 – 18 July and 19 – 21 July following major flare activity from Region 30. The 17 – 18 July passage was relatively weak. It began about 17/1520 UTC and was associated with peak velocities of about 500 km/sec and brief periods of southward IMF Bz with maximum deflections to minus 16 nT (GSM). Multiple CME passages occurred during 19 – 21 July with velocities as high as 920 km/sec detected on 19 and 20 July. IMF Bz was mostly southward from late on 19 July through 21 July with maximum deflections to minus 10 nT (GSM).

A greater than 10 MeV proton event began at 16/1750 UTC following the X3/3b flare on 15 July. This event peaked at 234 pfu at 17/1600 UTC, and ended at 18/1550 UTC. Another greater than 10 MeV event began at 19/1050 UTC, reached a peak of 13 pfu at 19/1515 UTC, then ended at 19/1535 UTC. Greater than 10 MeV fluxes remained enhanced and began to gradually increase on 21 July following the X3 flare of 20 July.

Greater than 2 MeV electron fluxes at geo-synchronous orbit were at normal to moderate levels through 20 July, then increased to normal to high levels on 21 July.

Geomagnetic field activity was at quiet to active levels during 15 – 16 July due to weak coronal hole effects. Quiet to active conditions occurred on 17 July due to a CME passage. Field activity ranged from quiet to minor storm levels during 19 – 21 July due to multiple CME passages.

Space Weather Outlook 24 July - 19 August 2002

Solar activity is expected to range from low to high levels. Isolated low-level M-class flares are expected throughout the period. Region 39 is likely to produce isolated major flares before it rotates out of view on 04 August.

Proton events will be possible until Region 39 rotates out of view on 04 August. There will also be a chance for a proton event during the rest of the period with the return of old Region 30 on 06 August.

Greater than 2 MeV electron fluxes at geo-synchronous orbit are expected to be at normal to moderate levels for most of the period.

Geomagnetic field activity is expected to be at unsettled to minor storm levels during 24 – 26 July due to a CME passage. Active conditions will be possible during 02, 05, and 08 August due to coronal hole effects. Quiet to unsettled conditions are expected for the remainder of the period.



Daily Solar Data

Date	Radio Flux 10.7 cm	Sun spot No.	Sunspot Area (10 ⁻⁶ hemi.)	X-ray Background	Flares							
					X-ray Flux			Optical				
					C	M	X	S	1	2	3	4
15 July	160	209	1140	B7.3	8	1	1	10	0	0	1	0
16 July	172	182	2080	C2.0	8	0	0	18	0	0	0	0
17 July	180	179	2330	B7.6	6	1	0	13	1	0	0	0
18 July	181	166	2150	B7.4	11	1	1	6	1	1	0	0
19 July	182	148	2050	B9.7	6	0	0	9	0	0	0	0
20 July	185	136	1650	C1.3	3	0	1	5	2	0	0	0
21 July	183	131	1640	C8.6	5	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)		
	>1MeV	>10MeV	>100MeV	>6MeV	>2MeV	>4MeV
15 July	2.4E+5	1.2E+4	2.5E+3		3.6E+6	
16 July	3.4E+6	7.3E+5	3.1E+3		3.9E+5	
17 July	2.5E+8	6.4E+6	4.2E+3		1.4E+7	
18 July	1.1E+8	1.3E+6	2.9E+3		2.9E+6	
19 July	3.8E+7	5.2E+5	4.4E+3		9.8E+5	
20 July	6.6E+6	1.1E+5	2.6E+3		3.3E+6	
21 July	2.9E+6	2.6E+5	3.0E+3		5.0E+7	

Daily Geomagnetic Data

Date	Middle Latitude		High Latitude		Estimated	
	Fredericksburg		College		Planetary	
	A	K-indices	A	K-indices	A	K-indices
15 July	5	0-0-1-1-1-2-3-2	2	0-0-1-0-1-0-1-1	8	2-2-1-1-2-3-4-2
16 July	9	2-2-1-2-2-2-3-3	10	2-3-1-3-3-2-3-2	11	2-3-2-2-2-2-4-4
17 July	15	3-3-3-2-2-4-3-3	20	2-3-5-4-3-4-3-2	18	3-3-4-3-3-4-4-3
18 July	4	3-1-1-2-1-0-0-0	4	2-2-1-3-1-0-0-0	8	3-3-2-3-2-2-2-1
19 July	9	1-0-0-3-2-3-2-4	8	1-1-0-3-3-2-2-3	12	2-2-1-3-2-3-2-4
20 July	13	4-3-2-2-1-2-2-4	23	4-5-4-4-3-2-3-3	18	4-4-3-2-2-3-3-4
21 July	17	5-4-3-1-3-2-2-3	33	4-4-5-2-4-6-5-1	19	4-4-4-2-3-3-3-1



Alerts and Warnings Issued

<u>Date & Time of Issue</u>	<u>Type of Alert or Warning</u>	<u>Date & Time of Event UT</u>
15 Jul 0021	1 - 245 MHz Radio Burst	14 Jul
15 Jul 1211	SUMMARY: 10cm Radio Burst	15 Jul 1145
15 Jul 1218	ALERT: Type IV Radio Emission	15 Jul 1142
15 Jul 2006	ALERT: X-Ray Flux exceeded M5	15 Jul 2005
15 Jul 2017	SUMMARY: X-ray Event exceeded X1	15 Jul 2008
15 Jul 2035	WARNING: Proton 10MeV Integral Flux above 10pfu	16 Jul 0200 - 1800
15 Jul 2201	WATCH: Geomagnetic $A \geq 20$	17 Jul
15 Jul 2339	SUMMARY: 10cm Radio Burst	15 Jul 2142
15 Jul 2344	ALERT: Type IV Radio Emission	15 Jul 1955
16 Jul 0019	5 - 245 MHz Radio Bursts	15 Jul
16 Jul 1306	ALERT: Type II Radio Emission	16 Jul 1229
16 Jul 1752	EXT WARNING: Proton 10MeV Integral Flux > 10pfu	16 Jul 0200 - 17 Jul 1800
16 Jul 1807	ALERT: Proton Event 10MeV Integral Flux > 10pfu	16 Jul 1750
16 Jul 2005	WATCH: Geomagnetic $A \geq 20$	18 Jul
17 Jul 0011	4 - 245 MHz Radio Bursts	16 Jul
17 Jul 0103	CONTINUED ALERT: Proton Event 10MeV Integral Flux > 10pfu	16 Jul 1750
17 Jul 0715	SUMMARY: 10cm Radio Burst	17 Jul 0703
17 Jul 0720	ALERT: Type II Radio Emission	17 Jul 0706
17 Jul 0721	ALERT: X-Ray Flux > M5	17 Jul 0710
17 Jul 0749	SUMMARY: X-ray Event > M5	17 Jul 0713
17 Jul 0804	ALERT: Geomagnetic $K=4$	17 Jul 0744
17 Jul 0824	WARNING: Geomagnetic $K=4$	17 Jul 0830 - 1800
17 Jul 1305	ALERT: Proton Event 10MeV Integral Flux > 100pfu	17 Jul 1250
17 Jul 1532	WARNING: Geomagnetic Sudden Impulse	17 Jul 1531 -1630
17 Jul 1627	SUMMARY: Geomagnetic Sudden Impulse	17 Jul 1604
17 Jul 1729	EXT WARNING: Geomagnetic $K=4$	17 Jul 0830 - 18 Jul 1500
17 Jul 1908	SUMMARY: Proton Event 10MeV Integral Flux > 100pfu	17 Jul 1600
18 Jul 0038	EXT WARNING: Proton 10MeV Integral Flux > 10pfu	16 Jul 0200 -18 Jul 1800
18 Jul 0041	CONT ALERT: Proton Event 10MeV Integral Flux > 10pfu	16 Jul 1750
18 Jul 0051	3 - 245 MHz Radio Bursts	17 Jul
18 Jul 0051	1 - 245 MHz Radio Noise Storms	17 Jul
18 Jul 0346	SUMMARY: 10cm Radio Burst	18 Jul 0333
18 Jul 0755	SUMMARY: X-ray Event exceeded X1	18 Jul 0744
18 Jul 0802	ALERT: Type II Radio Emission	18 Jul 0747
18 Jul 0804	SUMMARY: 10cm Radio Burst	18 Jul 0743
18 Jul 0830	ALERT: Type IV Radio Emission	18 Jul 0809
18 Jul 1715	EXT WARNING: Proton 10MeV Integral Flux > 10pfu	16 Jul 0200 - 19 Jul 1500
18 Jul 1947	ALERT: Type II Radio Emission	18 Jul 1911
18 Jul 2023	ALERT: Type IV Radio Emission	18 Jul 1920
18 Jul 2109	SUMMARY: Proton Event 10MeV Integral Flux > 10pfu	17 Jul 1600
19 Jul 0044	16 - 245 MHz Radio Bursts	18 Jul
19 Jul 0044	1 - 245 MHz Radio Noise Storms	18 Jul
19 Jul 0516	ALERT: Type II Radio Emission	19 Jul 0331
19 Jul 0907	WARNING: Proton 100MeV Integral Flux > 1pfu	19 Jul 0910 -2359
19 Jul 0948	WARNING: Geomagnetic Sudden Impulse	19 Jul 0950 -1030
19 Jul 1018	SUMMARY: Geomagnetic Sudden Impulse	19 Jul 1011
19 Jul 1106	ALERT: Proton Event 10MeV Integral Flux exceeded 10pfu	19 Jul 1050
19 Jul 1450	EXT WARNING: Proton 10MeV Integral Flux > 10pfu	16 Jul 0200 - 20 Jul 1500
19 Jul 1510	WARNING: Geomagnetic Sudden Impulse	19 Jul 1510 -1800

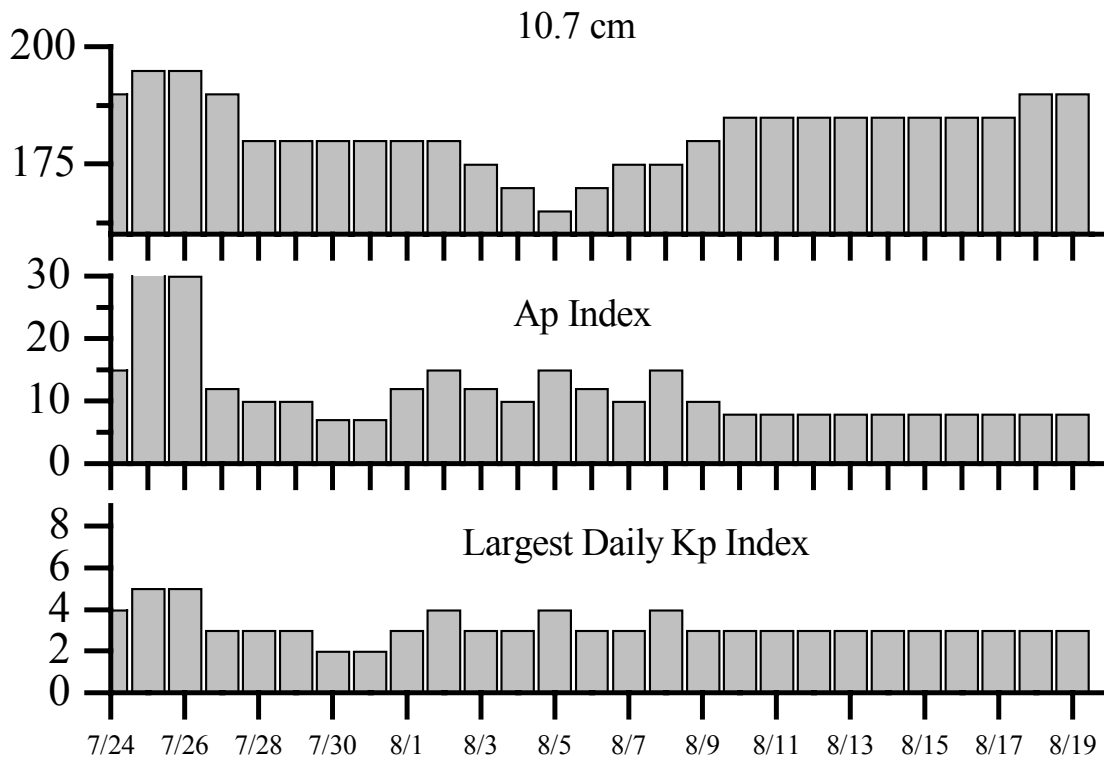


Alerts and Warnings Issued - continued.

<u>Date & Time of Issue</u>	<u>Type of Alert or Warning</u>	<u>Date & Time of Event UT</u>
19 Jul 2313	WARNING: Geomagnetic K= 4	19 Jul 2314 -20 Jul 1500
19 Jul 2315	ALERT: Geomagnetic K= 4	19 Jul 2312
20 Jul 0022	16 - 245 MHz Radio Bursts	19 Jul
20 Jul 0022	1 - 245 MHz Radio Noise Storm	19 Jul
20 Jul 0128	WARNING: Geomagnetic K= 5	20 Jul 0128 -1500
20 Jul 0129	ALERT: Geomagnetic K= 5	20 Jul 0126
20 Jul 1506	SUMMARY: Proton Event 10MeV Integral Flux > 10pfu	19 Jul 1515
20 Jul 2052	ALERT: Type II Radio Emission	20 Jul 2029
20 Jul 2110	ALERT: X-Ray Flux exceeded M5	20 Jul 2108
20 Jul 2139	ALERT: Type II Radio Emission	20 Jul 2109
20 Jul 2158	SUMMARY: X-ray Event exceeded X1	20 Jul 2130
20 Jul 2215	SUMMARY: 10cm Radio Burst	20 Jul 2129
20 Jul 2359	8 - 245 MHz Radio Bursts	20 Jul
20 Jul 2359	1 - 245 MHz Radio Noise Storm	20 Jul
21 Jul 0130	ALERT: Geomagnetic K= 4	21 Jul 0127
21 Jul 0321	ALERT: Geomagnetic K= 4	21 Jul 0319
21 Jul 0357	ALERT: Geomagnetic K= 5	21 Jul 0355
21 Jul 0636	ALERT: Geomagnetic K= 5	21 Jul 0634
21 Jul 1416	ALERT: Electron 2MeV Integral Flux > 1000pfu	21 Jul 1340



Twenty-seven Day Outlook



Date	Radio Flux 10.7 cm	Planetary A Index	Largest Kp Index	Date	Radio Flux 10.7 cm	Planetary A Index	Largest Kp Index
24 Jul	190	15	4	07 Aug	175	10	3
25	195	40	5	08	175	15	4
26	195	30	5	09	180	10	3
27	190	12	3	10	185	8	3
28	180	10	3	11	185	8	3
29	180	10	3	12	185	8	3
30	180	7	2	13	185	8	3
31	180	7	2	14	185	8	3
01 Aug	180	12	3	15	185	8	3
02	180	15	4	16	185	8	3
03	175	12	3	17	185	8	3
04	170	10	3	18	190	8	3
05	165	15	4	19	190	8	3
06	170	12	3				



Energetic Events

Date	Time		X-ray		Optical Information			Peak		Sweep Freq		
	Begin	Max	½	Class	Integ Flux	Imp/Location		Rgn #	Radio Flux		Intensity	
			Max			Brtns	Lat		CMD	245	2695	II
15 Jul	1959	2008	2014	X3.0	.140	3b	N19W01	30	25000			1
15 Jul	2103	2132	2148	M1.8	.043	30				460		
17 Jul	0658	0713	0719	M8.5	.053	1b	N21W17	30	200	610	2	
18 Jul	0322	0337	0340	M2.2	.009	Sb	N20W27	30		200		
18 Jul	0724	0744	0749	X1.8	.056	2b	N19W30	30	2500	620	2	
20 Jul	2104	2130	2154	X3.3	.720				12000	2600	2	

Flare List

Date	Time			X-ray Class.	Imp / Brtns	Optical		Rgn
	Begin	Max	End			Location	Lat CMD	
15 July	0046	0050	0055	C1.8				
	0131	0133	0137		Sf	N19E09	0030	
	0201	0203	0213	C1.6	Sf	N24E08	0030	
	0422	0423	0429	C1.6	Sf	N19E08	0030	
	0506	0507	0527	C3.8	Sf	N21E09	0030	
	0901	0904	0910		Sf	N18E05	0030	
	1022	1030	1040	C1.6	Sf	N19E04	0030	
	1112	1145	1245	C9.1	Sf	N20E04	0030	
	B1402	U1403	1409	C3.6	Sf	N18E01	0030	
	1700	1720	1748		Sf	N22E06	0030	
	1839	1839	1852	C1.9	Sf	N17W01	0030	
	1950	2011	A2334	X3.0	3b	N19W01	0030	
	2103	2132	2148	M1.8			0030	
16 July	0008	0011	0015	C4.6				
	0512	0513	0521		Sf	S09E77	0036	
	0639	0640	0726	C6.5	Sn	N22W02	0030	
	B0703	U0711	A0728		Sf	N23W02	0030	
	1143	1143	1201	C3.5	Sf	S07E70	0036	
	1151	1202	1215		Sf	N18W14	0030	
	1202	1221	1237		Sf	S08E71	0036	
	1339	1410	1445	C8.5	Sf	N23W07	0030	
	B1514	1515	1518		Sf	S16W71	0025	
	1536	1539	1549		Sf	N21W09	0030	
	1614	1615	1640		Sf	N23W07	0030	
	1622	1622	1643		Sf	S15W67	0027	
	1707	1709	1712		Sf	S15W72	0027	
	1719	1720	1725		Sf	S16W73	0027	
	1729	1730	1735		Sf	S15W73	0027	
1912	1915	1917	C1.4					
2124	2139	A2222	C2.6	Sf	N19W14	0030		



Flare List - continued.

Date	Time			X-ray Class.	Optical		Rgn
	Begin	Max	End		Imp / Brtns	Location Lat CMD	
16 July	2222	2224	2241	C1.9	Sf	N16E72	0037
	2249	2255	2307	C2.0	Sf	N20W07	0030
	2251	2253	2256		Sf	S05E64	0036
17 July	0203	0208	0214	C2.3			
	0250	0251	0254		Sf	S08E60	0036
	0255	0255	0300		Sf	S08E60	0036
	0302	0303	0313		Sf	S08E60	0036
	0344	0345	0349		Sf	S08E60	0036
	0350	0354	0401		Sf	S08E60	0036
	0548	0550	0629	C4.0	Sf	N20W18	0030
	0552	0552	0603		Sf	S08E58	0036
	0650	0652	0657		Sf	S06E58	0036
	0701	0704	0759	M8.5	1b	N21W17	0030
	0809	0809	0815		Sf	S08E57	0036
	0825	0840	0857		Sf	N23W18	0030
	1832	1833	1838		Sf	N17E62	0037
	1904	1911	1919	C1.5			
	1943	1950	1956	C3.4			
	2009	2013	2019	C1.6			
	2045	2050	2051	C1.7	Sf	N24W24	0030
	2053	2056	2113		Sf	N23W23	0030
	18 July	B0330	U0336	A0345	M2.2	Sb	N20W27
0650		0651	0657	C1.7	Sf	N19W32	0030
0741		U0743	A0800	X1.8	2b	N19W30	0030
0830		0833	0853	C1.6	Sf	N21W29	0030
1153		1157	1215	C2.7	1f	N17E53	0037
1348		1354	1404	C5.4			0036
1745		1747	1754	C1.7	Sf	N21W37	0030
1800		1802	1810	C1.4	Sf	S09E28	0035
1952		1957	2006	C2.1			
2019		2019	2049	C3.3	Sf	S06E39	0036
2143		2152	2201	C2.6			
2256		2300	2302	C1.8			
2308		2317	2323	C8.2			
19 July	0507	0510	0517	C1.2	Sf	N19W45	0030
	0626	0634	0656		Sf	N15W40	0030
	0837	0840	0844	C1.0			
	0915	0919	0923	C1.3			
	B1019	U1021	A1037	C1.7	Sf	S09E19	0035
	1248	1249	1253	C1.2	Sf	N20W49	0030
	1811	1813	1831		Sf	N18W46	0030
	1846	1847	1904	C3.9	Sf	N17W47	0030
	1907	1907	1910		Sf	N17W48	0030



Flare List - continued.

Date	Time			X-ray	Optical		Rgn Lat CMD
	Begin	Max	End		Imp / Class.	Location Brtns	
19 July	1934	1942	1959		Sf	N18W46	0030
	2017	2018	2020		Sf	N21W57	0030
20 July	0250	0300	0310	C4.0			
	B0759	U0759	A0817		Sf	S10E25	0036
	B1232	U1242	A1256	C9.6	1n	N20W61	0030
	B1245	U1245	1259		1n	N20W60	0030
	B1301	U1305	A1311		Sf	N21W59	0030
	1325	1329	1332	C2.7	Sf	N17E72	0000
	1654	1655	1658		Sf	N21W63	0030
	1701	1702	1704		Sf	N21W63	0030
	2104	2130	2154	X3.3			
	21 July	0307	0310	0312	C7.9		
0605		0613	0624	C6.7			
0735		0745	0754	C6.7			
1335		1336	1342	C1.8	Sf	S09W17	0035
1414		1421	1431	C3.4			
1547		1548	1550		Sf	S09W16	0035



Region Summary

Date	Location		Sunspot Characteristics				Flares											
	(° Lat ° CMD)	Helio	Area (10 ⁻⁶ hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical							
		Lon						C	M	X	S	1	2	3	4			
<i>Region 25</i>																		
04 Jul	S18E75	083	0050	02	Hsx	001	A											
05 Jul	S19E63	081	0080	02	Hsx	001	A											
06 Jul	S22E52	079	0070	09	Cso	003	B											
07 Jul	S21E37	081	0060	01	Hax	001	A						1					
08 Jul	S20E24	080	0030	03	Cso	004	B											
09 Jul	S20E09	082	0030	02	Hsx	001	A											
10 Jul	S20W03	081	0030	01	Hsx	001	A	2					3					
11 Jul	S20W16	081	0030	02	Hsx	001	A											
12 Jul	S20W29	081	0020	01	Hsx	001	A											
13 Jul	S20W42	081	0020	01	Hsx	001	A											
14 Jul	S20W55	081	0020	01	Hsx	001	A											
15 Jul	S19W71	083	0020	01	Hsx	001	A											
16 Jul	S18W80	079	0030	01	Hrx	001	A						1					
								2	0	0	5	0	0	0	0	0		

Crossed West Limb.

Absolute heliographic longitude: 081

<i>Region 28</i>																		
08 Jul	S17E42	062	0020	01	Hrx	001	A											
09 Jul	S16E26	065	0010	01	Hrx	001	A											
10 Jul	S16E12	066	0010	03	Bxo	002	B											
11 Jul	S16W01	066	0020	04	Cro	004	B											
12 Jul	S16W14	066	0000	04	Bxo	002	B											
13 Jul	S16W27	066	0000	00		000												
14 Jul	S16W40	066	0010	01	Axx	002	A											
15 Jul	S16W59	071	0020	04	Bxo	005	B											
16 Jul	S17W71	070	0030	03	Cso	003	B											
17 Jul	S15W86	072	0140	02	Hsx	001	A											
								0	0	0	0	0	0	0	0	0		

Crossed West Limb.

Absolute heliographic longitude: 066



Region Summary - continued.

Date	Location		Sunspot Characteristics				Flares							
	(° Lat ° CMD)	Helio Lon	Area (10 ⁻⁶ hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical			
							C	M	X	S	1	2	3	4

Region 29

08 Jul	S16E52	052	0020	03	Bxo	003	B								
09 Jul	S15E38	053	0040	04	Cro	007	B								
10 Jul	S14E25	053	0040	05	Dso	006	B								
11 Jul	S14E12	053	0050	06	Dao	011	B								
12 Jul	S14W01	053	0030	06	Cso	004	B								
13 Jul	S14W14	053	0050	08	Dao	007	B								
14 Jul	S14W29	053	0020	03	Cao	003	B								
15 Jul	S13W48	060	0020	02	Hrx	003	A								
16 Jul	S13W61	060													
17 Jul	S12W74	060	0020	03	Bxo	002	B								
18 Jul	S12W87	060													

0 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 053

Region 30

09 Jul	N18E74	017	0280	04	Cko	005	B								
10 Jul	N19E62	016	0460	11	Eko	005	Bg	2		5					
11 Jul	N19E49	016	0540	16	Fki	021	Bgd	3	2	5		1			
12 Jul	N19E37	015	0690	18	Fki	035	Bgd	4	1	8		1			
13 Jul	N19E24	015	0730	19	Fkc	066	Bgd	5		6	1				
14 Jul	N19E12	013	0780	20	Fkc	071	Bgd	6		5					
15 Jul	N18E00	012	0930	19	Fkc	090	Bgd	7	1	1	10			1	
16 Jul	N19W12	011	1350	20	Fkc	071	Bgd	4		8					
17 Jul	N19W25	011	1280	21	Fkc	093	Bgd	2	1	4	1				
18 Jul	N18W38	011	1060	22	Fkc	083	Bgd	3	1	1	4		1		
19 Jul	N17W52	011	0960	22	Fkc	065	Bgd	3		8					
20 Jul	N18W63	009	0460	16	Fki	030	Bgd	1		3	2				
21 Jul	N18W76	009	0330	15	Eai	014	Bg								

40 6 2 66 4 3 1 0

Still on Disk.

Absolute heliographic longitude: 012



Region Summary - continued.

Date	Location		Sunspot Characteristics				Flares							
	(° Lat ° CMD)	Helio	Area (10 ⁻⁶ hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical			
		Lon						C	M	X	S	1	2	3

Region 31

11 Jul	N10E65	000	0010	01	Axx	001	A											
12 Jul	N10E50	002	0010	01	Axx	001	A											
13 Jul	N10E37	002	0010	02	Hrx	002	A						1					
14 Jul	N10E23	002	0000	00	Axx	001	A											
15 Jul	N09E11	001	0010	02	Axx	003	A											
16 Jul	N12E00	359	0000	00	Bxo	002	B											
17 Jul	N12W13	359																
18 Jul	N12W26	359																
19 Jul	N12W39	359																
20 Jul	N12W52	359																
21 Jul	N12W65	359																

0 0 0 1 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 359

Region 32

13 Jul	S20W14	053	0010	02	Axx	003	A											
14 Jul	S20W26	053																
15 Jul	S20W39	053																
16 Jul	S19W55	054	0000	00	Axx	001	A											
17 Jul	S19W68	054																
18 Jul	S19W81	054																

0 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 053

Region 33

13 Jul	N08E00	039	0020	02	Axx	002	A											
14 Jul	N08W14	039	0010	01	Axx	001	A											
15 Jul	N08W26	038	0020	04	Cso	004	B											
16 Jul	N09W41	040	0010	01	Axx	002	A											
17 Jul	N09W54	040	0000															
18 Jul	N09W67	040	0000															
19 Jul	N09W80	040	0000															

0 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 039



Region Summary - continued.

Date	Location		Sunspot Characteristics				Flares							
	(° Lat ° CMD)	Helio	Area (10 ⁻⁶ hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical			
		Lon						C	M	X	S	1	2	3

Region 34

14 Jul	S20E05	020	0010	03	Cro	003	B												
15 Jul	S20W09	021	0010	05	Cro	007	B												
16 Jul	S20W22	021																	
17 Jul	S20W35	021																	
18 Jul	S20W48	021																	
19 Jul	S20W61	021																	
20 Jul	S20W74	021																	
21 Jul	S20W87	021																	
										0	0	0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 020

Region 35

15 Jul	S09E63	309	0020	05	Bxo	002	B												
16 Jul	S08E48	311	0020	06	Bxo	002	B												
17 Jul	S10E33	313	0030	07	Cso	004	B												
18 Jul	S08E23	310	0070	10	Dao	016	B	1				1							
19 Jul	S08E09	310	0050	10	Dso	016	B	1				1							
20 Jul	S08W06	312	0040	09	Dso	017	B												
21 Jul	S08W20	313	0060	08	Dso	014	B	1				2							
								3	0	0	0	4	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 312

Region 36

15 Jul	S07E76	296	0090	04	Dao	004	B												
16 Jul	S07E64	295	0460	09	Dki	009	B	1				4							
17 Jul	S09E51	295	0670	09	Dki	018	Bgd					8							
18 Jul	S07E37	296	0860	11	Ekc	026	Bg	2				1							
19 Jul	S06E25	294	0880	13	Ekc	026	B												
20 Jul	S07E11	295	0980	13	Ekc	047	Bgd					1							
21 Jul	S06W02	295	1070	13	Ekc	047	Bgd												
								3	0	0	0	14	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 295



Region Summary - continued.

Date	Location		Sunspot Characteristics				Flares							
	(° Lat ° CMD)	Helio Lon	Area (10 ⁻⁶ hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical			
							C	M	X	S	1	2	3	4
<i>Region 37</i>														
16 Jul	N16E74	285	0180	02	Hsx	001	A	1			1			
17 Jul	N13E61	285	0190	03	Hsx	001	A				1			
18 Jul	N14E47	286	0160	03	Hhx	001	A	1				1		
19 Jul	N15E35	284	0160	03	Hsx	001	A							
20 Jul	N15E21	285	0170	03	Hax	002	A							
21 Jul	N16E07	286	0120	03	Hax	001	A							
								2	0	0	2	1	0	0

Still on Disk.

Absolute heliographic longitude: 286

Region 38

21 Jul	N17E51	242	0060	06	Dao	005	B							
								0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 242

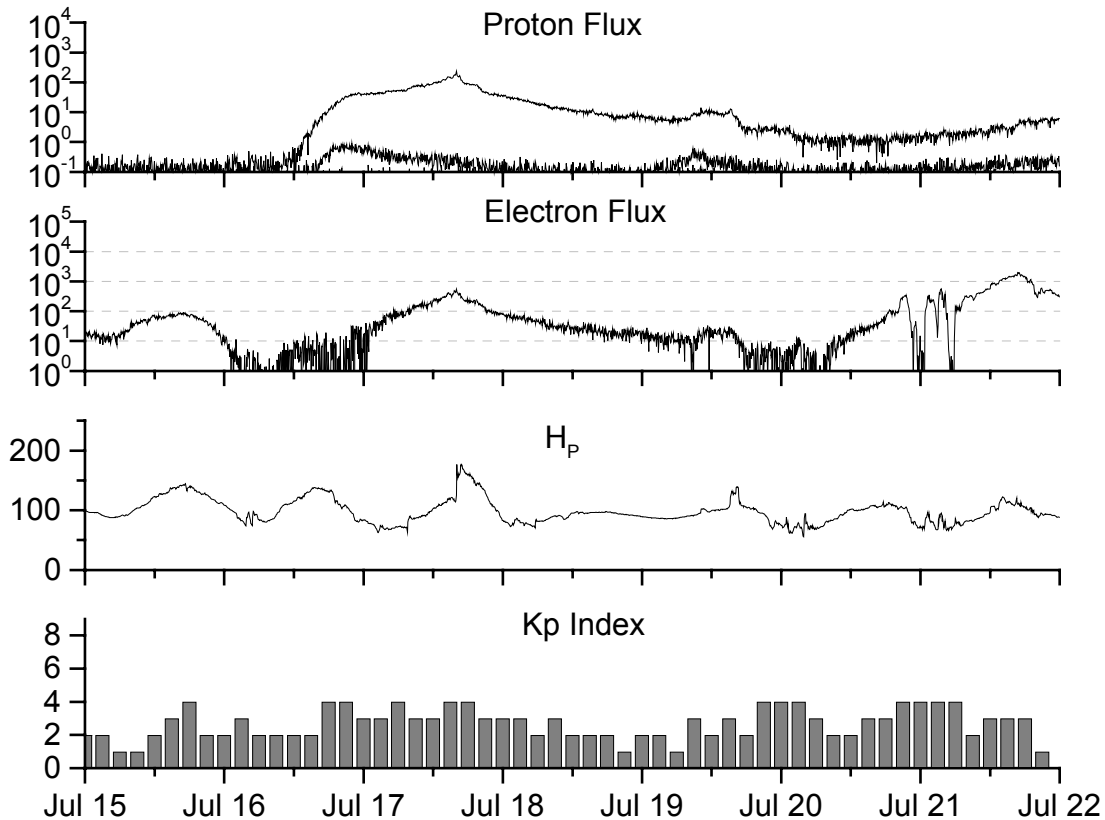


**Recent Solar Indices (preliminary)
of the observed monthly mean values**

Month	Sunspot Numbers			Radio Flux		Geomagnetic			
	Observed values SWO	Ratio RI	Ratio RI/SWO	Smooth values SWO	Smooth values RI	*Penticton 10.7 cm	Smooth Value	Planetary Ap	Smooth Value
2000									
July	236.7	169.1	0.71	173.0	119.7	204.7	180.2	21	14.8
August	166.6	130.5	0.78	171.8	118.6	163.1	179.5	16	14.2
September	157.9	109.9	0.70	169.0	116.2	182.1	177.1	18	14.2
October	138.9	100.1	0.72	166.2	114.4	167.7	175.6	18	14.6
November	149.9	106.5	0.71	162.7	112.7	178.8	173.6	17	14.6
December	146.4	104.5	0.71	160.8	112.1	173.6	172.0	08	14.4
2001									
January	142.7	95.1	0.67	156.3	108.8	166.7	168.8	08	13.8
February	131.0	80.1	0.61	151.4	104.2	147.3	165.8	06	13.3
March	166.7	114.2	0.69	154.0	104.9	177.7	167.9	17	12.9
April	163.6	108.2	0.66	159.4	107.7	178.3	171.7	18	12.7
May	135.1	97.3	0.72	163.1	108.8	148.7	174.8	12	12.5
June	196.7	134.0	0.68	167.2	109.9	173.7	178.8	12	12.4
July	124.6	82.2	0.66	172.1	111.8	131.3	183.9	11	12.4
August	159.4	106.8	0.67	176.7	113.8	163.2	188.8	13	12.5
September	229.1	150.7	0.66	178.8	114.3	233.3	191.3	12	12.3
October	197.4	125.6	0.64	179.5	114.1	208.2	191.9	18	11.9
November	178.6	106.5	0.60	183.7	115.6	212.5	193.6	14	11.9
December	217.5	131.8	0.61	184.5	114.7	236.6	193.8	08	12.0
2002									
January	189.0	113.9	0.60			226.4		07	
February	194.5	108.0	0.56			205.1		09	
March	153.1	98.1	0.64			179.5		10	
April	194.9	120.4	0.62			189.7		15	
May	204.1	120.8	0.59			178.4		15	
June	146.0	88.5	0.61			148.8		11	

NOTE: All smoothed values after June 1999 and monthly values after December 2000 are preliminary estimates. The lowest smoothed sunspot index number for Cycle 22, RI = 8.0, occurred in May 1996. The highest smoothed sunspot number for Cycle 22, RI= 158.5, occurred July 1989. *After June 1991, the 10.7 cm radio flux data source is Penticton, B.C. Canada. Prior to that, it was Ottawa.





Weekly Geosynchronous Satellite Environment Summary

Week Beginning 15 July 2002

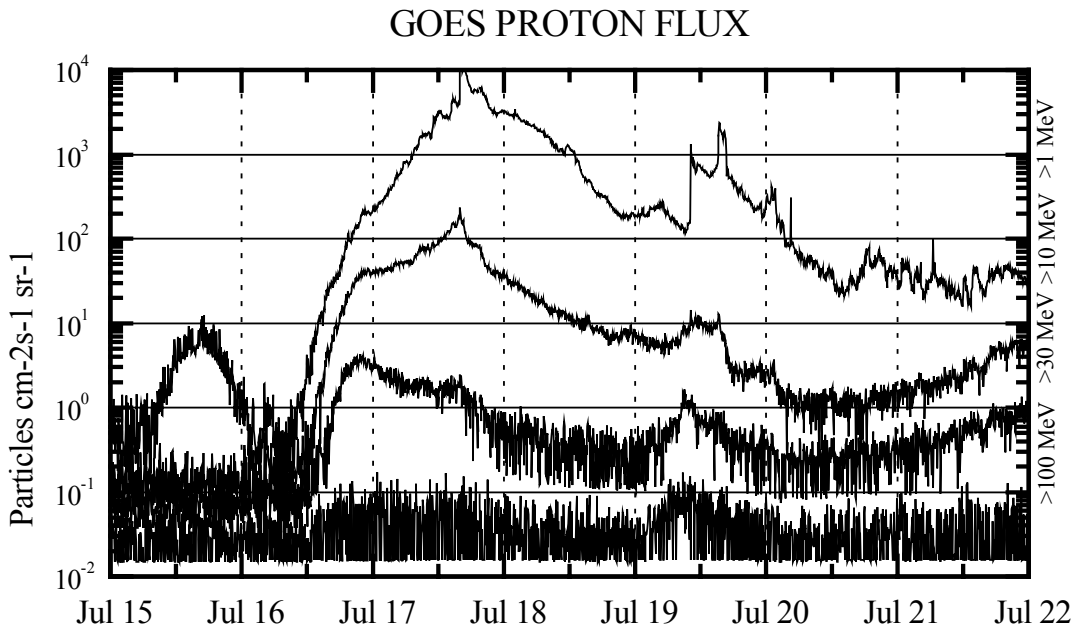
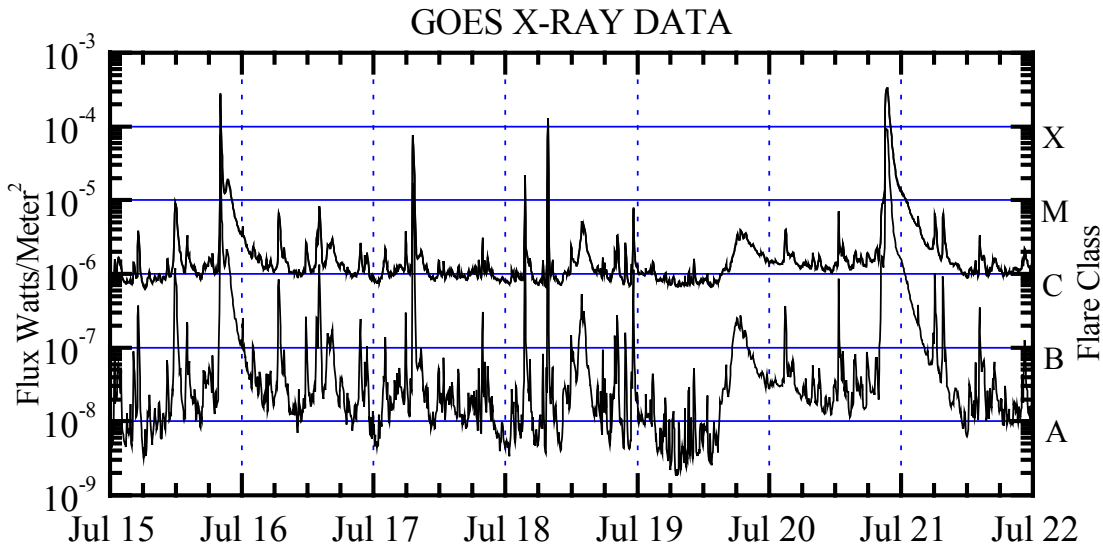
Protons plot contains the five-minute averaged integral proton flux (protons/cm²-sec-sr) as measured by GOES-8 (W75) for each of three energy thresholds: greater than 10, 50, and 100 MeV.

Electrons plot contains the five-minute averaged integral electron flux (electrons/cm²-sec-sr) with energies greater than 2 MeV at GOES-8.

H_p plot contains the five minute averaged magnetic field H - component in nanoteslas (nT) as measured by GOES-8. The H component is parallel to the spin axis of the satellite, which is nearly parallel to the Earth's rotation axis.

K_p plot contains the estimated planetary 3-hour K-index (derived by the Air Force Weather Agency) in real time from magnetometers at Meanook, Canada; Sitka, AK; Glenlea, Canada; St. Johns, Canada; Ottawa, Canada; Newport, WA; Fredericksburg, VA; Boulder, CO; Fresno, CA and Heartland, UK. These data are made available through cooperation from the Geological Survey of Canada (GSC) and the US Geological Survey. These may differ from the final K_p values derived from a more extensive network of magnetometers. The data included here are those now available in real time at the SWO and are incomplete in that they do not include the full set of parameters and energy ranges known to cause satellite operating anomalies. The proton and electron fluxes and K_p are "global" parameters that are applicable to a first order approximation over large areas. H_p is subject to more localized phenomena and the measurements generally are applicable to within a few degrees of longitude of the measuring satellite.





Weekly GOES Satellite X-ray and Proton Plots

X-ray plot contains five-minute averaged x-ray flux (watts/m²) as measured by GOES 8 and 10 in two wavelength bands, .05 - .4 and .1 - .8 nm. The letters A, B, C, M and X refer to x-ray event levels for the .1 - .8 nm band.

Proton plot contains the five-minute averaged integral proton flux (protons/cm²-sec-sr) as measured by GOES-8 (W75) for each of the energy thresholds: >1 , >10 , >30 and >100 MeV. P10 event threshold is 10 pfu (protons/cm²-sec-sr) at greater than 10 MeV.

