Space Weather Highlights **SWO PRF 1404**
22 - 28 July 2002 **29 July 2002**

Solar activity ranged from low to high levels for the fourth consecutive week. Activity increased to from low to high levels on 23 and 26 July due to major solar flares from Regions 39 and 44. Region 39 (S15, L = 204, class/area Fkc/940 on 26 July) was active as it rotated into view on 22 July. It was the likely source for an X3 flare from beyond the southeast limb on 20 July as well as back side CME activity observed during 16 – 21 July. Region 39 produced an X4/2b flare at 23/0035 UTC associated with an 1800 sfu Tenflare, Type II and IV radio sweeps, and a halo CME. Region 39 was large and magnetically complex with strong, persistent magnetic delta configurations within its leading and trailing spots. Region 44 (S21, L = 210, class/area Fki/590 on 27 July) was located just to the southwest of Region 39. It produced two major flares late on 26 July: an M8/2n at 26/2112 UTC and an M5 at 26/2217 UTC. The M8/2n flare was associated with a halo CME. Region 44 was also large and magnetically complex. A magnetic delta configuration developed within its intermediate spots late in the period. Region 50 (S07, L = 191, class/area Dao/290 on 28 July) entered a rapid growth phase on 28 July and produced isolated subflares.

Solar wind data were available from the NASA Advanced Composition Explorer (ACE) spacecraft for most of the summary period. A series of weak CME passages occurred during 22 – 26 July with shocks observed at L1 at approximately 22/0450 UTC, 24/0800 UTC, and 25/1300 UTC. Solar wind velocities increased during the passages with peaks in the 500 to 580 km/sec range. ACE data indicated a possible weak negative-polarity high-speed stream during 27 – 28 July with peak "gusts" to 540 km/sec.

A greater than 10 MeV proton event began at geo-synchronous orbit at 22/0655 UTC, reached a maximum of 28 pfu at 23/1025 UTC, and ended at 27/0320 UTC.

Greater than 2 MeV electron fluxes at geo-synchronous orbit were at normal to high levels during 22 – 25 July, then decreased to normal to moderate levels for the rest of the period.

Geomagnetic field activity ranged from quiet to minor storm levels during 22 – 23 July due to weak CME passages. Activity decreased to quiet to unsettled levels on 24 July. Quiet to active levels occurred during 25 – 26 July due to weak CME passages. Unsettled to active levels occurred during 27 – 28 July, possibly due to a weak, negative-polarity high-speed stream.

Space Weather Outlook
31 July – 26 August 2002

Solar activity is expected to range from low to high levels. Isolated low-level M-class flares are expected throughout the period. Regions 39 and 44 may produce isolated major flares before they rotate out of view on 04 August.

Proton events will be possible until Regions 39 and 44 rotate out of view on 04 August. There will also be a slight chance for a proton event during the rest of the period.

Greater than 2 MeV flux levels are expected to be at normal to moderate levels during most of the period.

Geomagnetic field activity is expected to be at quiet to unsettled levels during most of the period. However, active conditions are possible during 01 – 02, 05, and 08 August.

Daily Solar Data

Date	Radio Flux 10.7 cm	Sun spot No.	Sunspot Area (10^{-6} hemi.)	X-ray Background	Flares: X-ray Flux C	M	X	Flares: Optical S	1	2	3	4
22 July	190	176	1900	B9.3	4	0	0	5	0	0	0	0
23 July	198	226	2390	C8.6	6	0	1	9	0	1	0	0
24 July	208	270	2330	C1.3	9	1	0	8	1	0	0	0
25 July	218	299	2130	C1.3	12	0	0	7	0	0	0	0
26 July	242	319	2710	C1.8	6	7	0	16	2	1	0	0
27 July	231	323	2580	C9.8	6	0	0	9	0	0	0	0
28 July	239	300	2410	C1.2	14	2	0	13	1	0	0	0

Daily Particle Data

Date	Proton Fluence (protons/cm ^{2}-day-sr) >1MeV	>10MeV	>100MeV	Electron Fluence (electrons/cm^2-day-sr) > 6MeV	>2MeV	>4MeV
22 July	1.0E+7	1.4E+6	3.4E+3		5.1E+7	
23 July	1.9E+7	2.0E+6	3.1E+3		9.2E+7	
24 July	1.3E+7	1.7E+6	2.6E+3		3.2E+7	
25 July	1.4E+7	1.2E+6	2.5E+3		7.2E+7	
26 July	1.2E+7	8.7E+5	2.4E+3		5.8E+6	
27 July	9.1E+6	5.8E+5	2.1E+3		4.8E+6	
28 July	4.8E+6	3.0E+5	1.8E+3		3.7E+6	

Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg A	K-indices	High Latitude College A	K-indices	Estimated Planetary A	K-indices
22 July	12	2-2-4-3-2-2-3-3	35	2-4-6-4-5-4-3-5	20	3-3-4-5-4-3-3-3
23 July	11	3-1-3-2-2-2-3-4	17	3-3-4-4-3-3-2-3	18	4-3-3-3-2-3-4-4
24 July	8	2-3-2-2-2-2-2-1	8	2-3-2-3-2-1-2-1	12	3-3-3-2-3-3-3-2
25 July	9	1-2-2-2-3-2-3-2	9	2-2-2-3-3-2-2-2	13	3-3-2-3-3-3-4-3
26 July	10	3-2-2-2-2-2-3-3	23	4-3-3-6-2-3-3-2	17	4-3-3-4-3-3-4-3
27 July	11	3-2-2-3-3-2-3-2	20	3-3-3-5-4-4-2-2	19	4-3-3-4-4-3-4-3
28 July	9	3-3-1-2-2-2-2-2	14	4-4-2-3-3-2-2-1	12	4-3-2-3-3-3-3-2

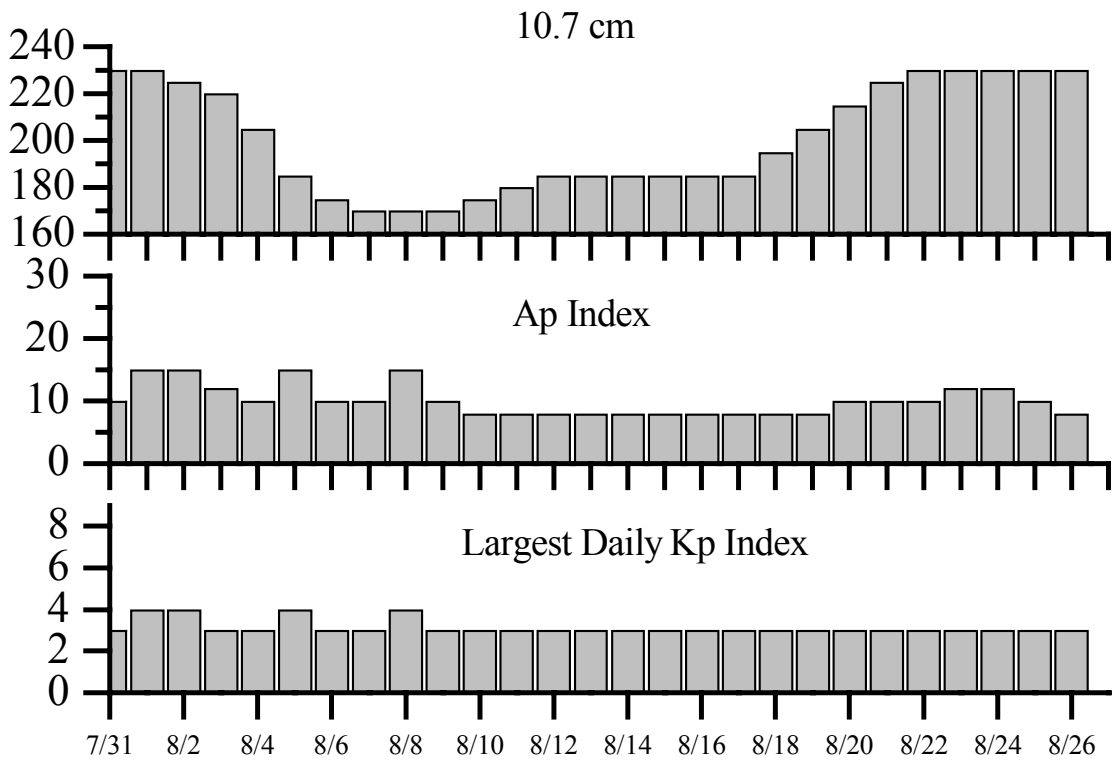
Alerts and Warnings Issued

Date & Time of Issue	Type of Alert or Warning	Date & Time of Event UT
22 Jul 0632	WARNING: Proton 10MeV > 10pfu	22 Jul 0635 – 1200
22 Jul 0721	ALERT: Proton Event 10MeV exceeded 10pfu	22 Jul 0655
22 Jul 0728	ALERT: Geomagnetic K = 4	22 Jul 0720
22 Jul 0948	ALERT: Geomagnetic K = 4	22 Jul 0947
22 Jul 1430	WARNING: Geomagnetic K = 4 expected	22 Jul 1431 – 2359
22 Jul 1438	WARNING: Proton 10MeV > 10pfu	22 Jul 1445 – 23/1500
22 Jul 1450	ALERT: Electron 2MeV exceeded 1000pfu	22 Jul 1425
23 Jul 0007	2 – 245 MHz Radio Bursts	22 Jul
23 Jul 0007	245 MHz Noise Storm	22 Jul
23 Jul 0027	ALERT: X-Ray Flux exceeded M5	23 Jul 0027
23 Jul 0043	ALERT: Type II Radio Emission	23 Jul 0029
23 Jul 0058	SUMMARY: X-ray Event exceeded X1	23 Jul 0035
23 Jul 0108	ALERT: Type IV Radio Emission	23 Jul 0050
23 Jul 0125	SUMMARY: 10cm Radio Burst	23 Jul 0029
23 Jul 0134	CONT. ALERT: Proton Event 10MeV exceeded 10pfu	22 Jul 0655
23 Jul 1210	ALERT: Electron 2MeV exceeded 1000pfu	23 Jul 1150
23 Jul 1451	EXTENDED WARNING: Proton 10MeV > 10pfu	22 Jul 1445 – 24/1500
23 Jul 2047	WATCH: Geomagnetic A-index $\geq$ 30	25 Jul
23 Jul 2048	WATCH: Geomagnetic A-index $\geq$ 20	26 Jul
24 Jul 0011	6 – 245 MHz Radio Bursts	23 Jul
24 Jul 0011	2 –2 245 MHz Noise Storms	23 Jul
24 Jul 0019	CONT. ALERT: Proton Event 10MeV exceeded 10pfu	22 Jul 0655
24 Jul 1447	EXTENDED WARNING: Proton 10MeV > 10pfu	22 Jul 1445 – 25/1500
24 Jul 1714	ALERT: Type IV Radio Emission	24 Jul 1557
25 Jul 0009	245 MHz Radio Burst	24 Jul
25 Jul 0009	245 MHz Noise Storm	24 Jul
25 Jul 0035	CONT. ALERT: Proton Event 10MeV exceeded 10pfu	22 Jul 0655
25 Jul 0737	WARNING: Geomagnetic Sudden Impulse expected	25 Jul 0800 - 0900
25 Jul 1317	WARNING: Geomagnetic Sudden Impulse expected	25 Jul 1330 - 1430
25 Jul 1342	ALERT: Electron 2MeV exceeded 1000pfu	25 Jul 1215
25 Jul 1452	EXTENDED WARNING: Proton 10MeV > 10pfu	22 Jul 1445 – 26/1500
25 Jul 2028	CANCEL WATCH: Geomagnetic A-index $\geq$ 20	26 Jul
26 Jul 0016	SUMMARY: 10cm Radio Burst	26 Jul 0008
26 Jul 0023	4 – 245 MHz Radio Bursts	25 Jul
26 Jul 0023	245 MHz Noise Storm	25 Jul
26 Jul 0042	CONT. ALERT: Proton Event 10MeV exceeded 10pfu	22 Jul 0655
26 Jul 1446	EXTENDED WARNING: Proton 10MeV > 10pfu	22 Jul 1445 – 27/0000
26 Jul 2107	ALERT: X-Ray Flux exceeded M5	26 Jul 2105
26 Jul 2130	SUMMARY: X-ray Event exceeded M5	26 Jul 2112
26 Jul 2229	ALERT: X-Ray Flux exceeded M5	26 Jul 2214
26 Jul 2241	SUMMARY: X-ray Event exceeded M5	26 Jul 2217
26 Jul 2257	SUMMARY: 10cm Radio Burst	26 Jul 2209
26 Jul 2306	EXTENDED WARNING: Proton 10MeV > 10pfu	22 Jul 1445 – 27/1500
27 Jul 0023	7 – 245 MHz Radio Bursts	26 Jul
27 Jul 0023	245 MHz Noise Storm	26 Jul

Alerts and Warnings Issued- continued

Date & Time of Issue	Type of Alert or Warning	Date & Time of Event UT
27 Jul 0306	CONT. ALERT: Proton Event 10MeV exceeded 10pfu	22 Jul 0655
27 Jul 1615	WATCH: Geomagnetic A-index $\geq$ 20	29 Jul
27 Jul 1829	SUMMARY: Proton Event 10MeV exceeded 10pfu	22 Jul 0655
28 Jul 0014	4 – 245 MHz Radio Bursts	26 Jul
28 Jul 0014	245 MHz Noise Storm	26 Jul

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
31 Jul	230	10	3	14 Aug	185	8	3
01 Aug	230	15	4	15	185	8	3
02	225	15	4	16	185	8	3
03	220	12	3	17	185	8	3
04	205	10	3	18	195	8	3
05	185	15	4	19	205	8	3
06	175	10	3	20	215	10	3
07	170	10	3	21	225	10	3
08	170	15	4	22	230	10	3
09	170	10	3	23	230	12	3
10	175	8	3	24	230	12	3
11	180	8	3	25	230	10	3
12	185	8	3	26	230	8	3
13	185	8	3				

Energetic Events

Date	Time			X-ray		Optical Information			Peak Radio Flux		Sweep Freq Intensity	
	Begin	Max	½ Max	Class	Integ Flux	Imp/Location Brtns	Lat CMD	Rgn #	245	2695	II	IV
23 Jul 02	0018	0035	0047	X4.8	.460	2b	S13E72	39	6600	1800	3	1
24 Jul 02	1524	1555	1622	M1.2	.029	1f	S13E49	39				1
26 Jul 02	0004	0010	0016	M4.9	.022	1n	S20E28	44		250		
26 Jul 02	0628	0642	0648	M1.1	.007	Sn	S20E27	44				
26 Jul 02	0804	0829	0902	M1.3	.034	Sn	S19E27	44				
26 Jul 02	1857	1903	1906	M1.0	.004	Sf	S21E21	44	630	44		
26 Jul 02	2051	2112	2129	M8.7	.120	2n	S19E26	44	250	180		
26 Jul 02	2203	2217	2232	M5.3	.074				8300	1000		
26 Jul 02	2236	2238	2241	M4.6	.012			44		44		
28 Jul 02	0018	0035	0044	M2.3	.017	Sf	S11E03	39	100			
28 Jul 02	2258	2312	2324	M2.2	.024							

Flare List

Date	Time			X-ray	Optical		Rgn
	Begin	Max	End	Class.	Imp / Brtns	Location Lat CMD	
22 July	0633	0639	0652	C1.5			
	0928	0930	0944	C2.3	Sf	S12W12	0036
	1151	1156	1201	C2.7			
	1616	1617	1619		Sf	N17W76	0030
	1645	1649	1659		Sf	S08W31	0035
	1913	1923	1933		Sf	S09W28	0035
	B2215	U2215	A2226	C3.1	Sf	S08W33	0035
23 July	0023	0029	0240	X4.8	2b	S13E72	0039
	0040	0043	0052		Sf	S11W29	0035
	0516	0523	0534		Sf	S07W34	0035
	0542	0546	0610		Sf	S08W22	0036
	0620	0628	0648		Sf	S08W22	0036
	0722	0814	0833	C3.7			
	0901	0904	0915	C4.0	Sf	S08W37	0035
	1059	1102	1107	C2.8	Sf	S08W22	0036
	1218	1223	1230	C2.9			
	2100	2105	2108	C3.0	Sf	S07W24	0036
	2115	2115	2121		Sf	S07W24	0036
	2247	2248	2254	C2.6	Sf	S20E59	0044
24 July	0029	0033	0039	C2.0			
	0101	0104	0106	C2.5			
	0242	0246	0248	C3.6			
	0322	U0325	0335	C4.5	Sf	S16E59	0039
	1130	1139	1147	C2.5			
	1132	1134	1138		Sf	S09E51	0039
	1241	1245	1400	C6.1	Sf	S21E49	0039
	1514	1545	1659	M1.2	1f	S13E49	0039
	1746	1749	1753		Sf	S06W40	0036

Flare List - continued.

Date	Time Begin	Time Max	Time End	X-ray Class.	Optical Imp / Brtns	Optical Location Lat CMD	Rgn
24 July	1812	1813	1823	C3.2	Sf	S12E51	0039
	1845	1845	1855	C2.2	Sf	S13E51	0039
	1914	1916	1920	C2.3	Sf	S13E47	0039
	2032	2032	2039		Sf	S21E49	0044
25 July	0035	0038	0040	C1.9			0039
	0310	0313	0316	C2.9			0039
	0403	0403	0408	C2.7	Sf	S13E46	0039
	0838	0842	0851	C1.7			0039
	0914	0921	0956	C2.9			0039
	1240	1240	1252		Sf	S21E08	0042
	1424	1429	1441	C2.7	Sf	S14W47	0036
	1525	1525	1534		Sf	S12W54	0036
	1551	1558	1610	C2.6			0036
	1902	1902	1910	C2.5	Sf	S16E44	0039
	2031	2034	2039	C2.0			
	2111	2111	2117	C2.8	Sf	S20E33	0044
	2155	2202	2214	C3.1			0044
	B2258	U2307	A2317	C6.7	Sf	S20E33	0044
26 July	B0007	U0014	A0020	M4.9	1n	S20E28	0044
	0312	0319	0333	C5.8			0044
	0631	0641	0659	M1.1	Sn	S20E27	0044
	0657	0701	0725		Sf	S14E31	0039
	0807	0828	0901	M1.3	Sn	S19E27	0044
	B0813	U0814	A0820		Sf	N19E60	0048
	0920	0922	0929		Sf	S20E30	0044
	1255	1315	1324	C2.7			0044
	1304	1321	1439	C3.0	Sf	S22E29	0044
	1328	1328	1334		Sf	N19E58	0048
	1530	1537	1546	C4.2	Sf	S20E22	0044
	1607	1613	1634	C3.8	Sf	S18E19	0044
	1658	1659	1705		Sf	S19E22	0044
	1817	1821	1837	C9.5	Sf	S22E18	0044
	1838	1838	1842		Sf	S20E21	0044
	1845	1901	1909	M1.0	Sf	S21E21	0044
	1910	1910	1918		Sf	S18E17	0044
	1925	1925	1929		Sf	S18E24	0044
	2051	2113	A2259	M8.7	2n	S19E26	0044
	2141	2143	2147		Sf	S11E19	0039
	2203	2217	2232	M5.3			
	2236	2238	2241	M4.6			0044
	B2331	U2331	0200		1n	S18E20	0044
27 July	0141	0147	0150	C1.1			
	0214	0216	0222	C9.6	Sf	S14E14	0039

Flare List - continued.

Date	Time Begin	Time Max	Time End	X-ray Class.	Optical Imp / Brtns	Optical Location Lat CMD	Rgn
27 July	0435	0438	0446	C5.1	Sf	S20E12	0044
	0628	0631	0652		Sf	S12E15	0039
	0836	0837	0842	C2.5	Sf	S11E12	0039
	1343	1343	1347		Sf	S21E13	0044
	1511	1512	1515	C1.7	Sf	S11E08	0039
	1558	1602	1606		Sf	S08E27	0050
	1608	1621	1627		Sf	S07E27	0050
	1818	1828	1838	C5.5			
	1948	1948	1952		Sf	S08E25	0050
28 July	B0030	U0030	0125		1n	S22E07	0044
	0031	0032	0042	M2.3	Sf	S11E03	0039
	0112	0116	0118	C5.3			
	0404	0432	0454	C2.8			
	0418	0422	0431		Sf	S13E04	0039
	0555	0557	0612	C3.6	Sf	S19W02	0044
	0641	0643	0647	C2.5	Sf	S12E01	0039
	0842	0844	0853	C3.6	Sf	S19E03	0044
	1048	1049	1053	C2.2	Sf	S08E16	0050
	1054	1104	1126	C7.6	Sf	S14E00	0039
	1058	1058	1102		Sf	S07E16	0050
	1141	1142	1149	C2.2	Sf	S07E14	0050
	B1336	U1339	1346		Sf	N13W09	0043
	B1458	U1459	1506	C2.3	Sf	S15E00	0039
	1541	1600	1616	C2.9			
	1659	1706	1712	C4.0			
	1849	1854	1858	C7.1			
	2002	2015	2022	C6.4			
	B2044	U2053	A2108	C5.1	Sf	N11W11	0043
	B2125	U2129	A2134		Sf	S07E10	0050
	2258	2312	2324	M2.2			

Region Summary

Date	Location (° Lat ° CMD)	Helio Lon	Sunspot Characteristics Area (10^{-6} hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	Flares X-ray C	M	X	Optical S	1	2	3	4
			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								
22 Jul	N20W86	006	0230	12	Eao	003	B				1				
								40	6	2	67	4	3	1	0

Crossed West Limb.
Absolute heliographic longitude: 12

			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													
22 Jul	N12W78	359													
23 Jul	N12W91	359													
								0	0	0	1	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 359

Region Summary - continued.

Date	Location (° Lat ° CMD)	Helio Lon	Sunspot Characteristics: Area (10^{-6} hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	Flares: X-ray C	M	X	Optical S	1	2	3	4
			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				
22 Jul	S09W32	312	0080	12	Eao	012	B	1			3				
23 Jul	S09W46	313	0080	12	Eao	013	B	1			3				
24 Jul	S09W59	312	0070	11	Eao	009	B								
25 Jul	S09W74	314	0050	11	Eao	005	B								
26 Jul	S09W87	314													
								5	0	0	10	0	0	0	0

Crossed West Limb.
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								
22 Jul	S07W15	295	0970	13	Ekc	051	Bg	1			1				
23 Jul	S07W28	295	0910	13	Ekc	059	Bg	2			5				
24 Jul	S07W42	295	0820	12	Ekc	046	Bg				1				
25 Jul	S07W54	294	0590	13	Ekc	041	Bg	2			2				
26 Jul	S07W68	295	0500	11	Cko	017	B								
27 Jul	S08W84	297	0320	09	Dao	006	B								
								8	0	0	23	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 295

Region Summary - continued.

Date	Location (° Lat ° CMD)	Helio Lon	Sunspot Characteristics Area (10^{-6} hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	Flares X-ray C	M	X	Optical S	1	2	3	4
			Region 37												
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								
22 Jul	N13W06	286	0190	02	Hsx	001	A								
23 Jul	N15W19	286	0180	03	Hsx	001	A								
24 Jul	N14W32	285	0150	02	Hsx	002	A								
25 Jul	N14W45	285	0170	02	Hsx	001	A								
26 Jul	N15W58	285	0170	06	Cao	004	B								
27 Jul	N13W73	286	0120	03	Hsx	001	A								
28 Jul	N13W87	287	0090	02	Hsx	001	A								
								2	0	0	2	1	0	0	0

Still on Disk.
Absolute heliographic longitude: 286

			Region 38												
21 Jul	N17E51	242	0060	06	Dao	005	B								
22 Jul	N17E37	243	0070	06	Dao	006	B								
23 Jul	N16E24	243	0080	07	Dso	009	B								
24 Jul	N17E12	241	0060	06	Dao	011	B								
25 Jul	N16W01	241	0040	05	Cso	008	B								
26 Jul	N16W14	241	0020	01	Axx	006	A								
27 Jul	N17W28	241	0020	01	Hsx	002	A								
28 Jul	N18W44	244	0020	05	Cso	003	B								
								0	0	0	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 241

			Region 39												
22 Jul	S12E68	212	0330	10	Dac	007	B								
23 Jul	S15E59	208	0940	18	Fkc	022	Bgd			1			1		
24 Jul	S15E48	205	0940	15	Ekc	039	Bgd	5	1		6	1			
25 Jul	S16E34	206	0850	17	Fkc	052	Bgd	6			2				
26 Jul	S16E22	205	0940	16	Fkc	072	Bgd				2				
27 Jul	S15E08	205	0900	17	Fki	062	Bgd	3			4				
28 Jul	S15W04	204	0920	17	Fki	048	Bgd	3	1		5				
								17	2	1	19	1	1	0	0

Still on Disk.
Absolute heliographic longitude: 204

Region Summary - continued.

Date	Location (° Lat ° CMD)	Helio Lon	Sunspot Characteristics Area (10^{-6} hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	Flares X-ray C	X-ray M	X-ray X	Optical S	Optical 1	Optical 2	Optical 3	Optical 4
			Region 40												
22 Jul	S22E01	279	0010	03	Bxo	002	B								
23 Jul	S22W14	281	0010	01	Axx	002	A								
24 Jul	S20W29	282	0020	03	Cro	006	B								
25 Jul	S19W43	283	0010	04	Bxo	004	B								
26 Jul	S19W56	283													
27 Jul	S19W69	283													
28 Jul	S19W82	283													
								0	0	0	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 279

			Region 41												
22 Jul	N16E22	258	0010	01	Axx	001	A								
23 Jul	N17E04	263	0020	03	Cao	003	B								
24 Jul	N17W04	257	0010	01	Cro	002	B								
25 Jul	N16W19	259	0010	03	Bxo	004	B								
26 Jul	N16W32	259													
27 Jul	N16W45	259													
28 Jul	N16W58	259													
								0	0	0	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 263

			Region 42												
22 Jul	S18E38	242	0010	02	Axx	003	A								
23 Jul	S19E26	241	0010	04	Bxo	004	B								
24 Jul	S20E14	239	0030	03	Cao	006	B								
25 Jul	S20W02	242	0030	03	Cao	004	B				1				
26 Jul	S19W13	240	0030	03	Cao	003	B								
27 Jul	S21W29	242	0020	02	Hsx	003	A								
28 Jul	S19W43	243	0010	01	Hrx	001	A								
								0	0	0	1	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 242

Region Summary - continued.

Date	Location (° Lat ° CMD)	Helio Lon	Sunspot Characteristics Area (10^{-6} hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	Flares X-ray C	M	X	Optical S	1	2	3	4
			Region 43												
23 Jul	N12E56	211	0020	04	Bxo	005	B								
24 Jul	N12E41	212	0080	06	Dao	009	B								
25 Jul	N12E28	212	0140	08	Dao	017	B								
26 Jul	N12E14	213	0160	08	Dao	020	B								
27 Jul	N12E00	213	0160	09	Dao	017	B								
28 Jul	N12W13	213	0160	10	Dai	020	B	1			2				
								1	0	0	2	0	0	0	0
Still on Disk.															
Absolute heliographic longitude:		213													
			Region 44												
23 Jul	S19E57	210	0140	06	Dao	008	B	1			1				
24 Jul	S20E43	210	0120	08	Dao	014	B				1				
25 Jul	S21E30	210	0180	11	Eai	022	B	3			2				
26 Jul	S21E17	210	0430	13	Eki	042	Bg	6	6		12	2	1		
27 Jul	S22E03	210	0590	17	Fki	045	Bgd	1			2				
28 Jul	S21W11	211	0530	18	Fki	043	Bgd	2			2	1			
								13	6	0	20	3	1	0	0
Still on Disk.															
Absolute heliographic longitude:		210													
			Region 45												
24 Jul	N04E17	236	0020	04	Cao	004	B								
25 Jul	N04E03	237	0030	05	Cao	008	B								
26 Jul	N05W10	237	0170	06	Dai	020	B								
27 Jul	N05W25	238	0160	06	Dai	016	B								
28 Jul	N05W39	239	0110	06	Dao	012	B								
								0	0	0	0	0	0	0	0
Still on Disk.															
Absolute heliographic longitude:		237													
			Region 46												
24 Jul	N14E22	231	0010	03	Cso	002	B								
25 Jul	N15E09	231	0010	01	Axx	001	A								
26 Jul	N15W04	231													
27 Jul	N15W17	231													
28 Jul	N15W30	231													
								0	0	0	0	0	0	0	0
Still on Disk.															
Absolute heliographic longitude:		231													

Region Summary - continued.

Date	Location (° Lat ° CMD)	Helio Lon	Sunspot Characteristics: Area (10^{-6} hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	Flares: X-ray C	M	X	Optical S	1	2	3	4
			Region 47												
25 Jul	N07W48	288	0020	03	Cso	002	B								
26 Jul	N07W62	289	0030	04	Bxo	004	B								
27 Jul	N09W74	287	0030	04	Cao	007	B								
28 Jul	N09W87	287													
								0	0	0	0	0	0	0	0
Still on Disk.															
Absolute heliographic longitude:		288													
			Region 48												
26 Jul	N18E52	175	0030	04	Cao	005	B				2				
27 Jul	N20E38	175	0050	06	Cso	009	B								
28 Jul	N21E25	175	0100	08	Dso	010	B								
								0	0	0	2	0	0	0	0
Still on Disk.															
Absolute heliographic longitude:		175													
			Region 49												
26 Jul	S06W30	257	0220	03	Cso	002	B								
27 Jul	S05W44	257	0030	05	Dao	010	B								
28 Jul	S05W57	257													
								0	0	0	0	0	0	0	0
Still on Disk.															
Absolute heliographic longitude:		257													
			Region 50												
26 Jul	S07E36	191	0010	03	Bxo	004	B								
27 Jul	S07E23	190	0090	05	Dso	013	B				3				
28 Jul	S07E09	191	0290	08	Dao	023	B	2			4				
								2	0	0	7	0	0	0	0
Still on Disk.															
Absolute heliographic longitude:		191													
			Region 51												
27 Jul	S17E66	147	0090	09	Cao	002	B								
28 Jul	S16E54	146	0100	02	Hsx	001	A								
								0	0	0	0	0	0	0	0
Still on Disk.															
Absolute heliographic longitude:		146													

Region Summary - continued.

Date	Location (° Lat ° CMD)	Helio Lon	Sunspot Characteristics: Area (10^{-6} hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	Flares: X-ray C	M	X	Optical S	1	2	3	4
			Region 52												
28 Jul	N09E17	183	0030	05	Cro	005	B	0	0	0	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 183

			Region 53												
28 Jul	S17E24	176	0010	00	Hrx	001	A	0	0	0	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 176

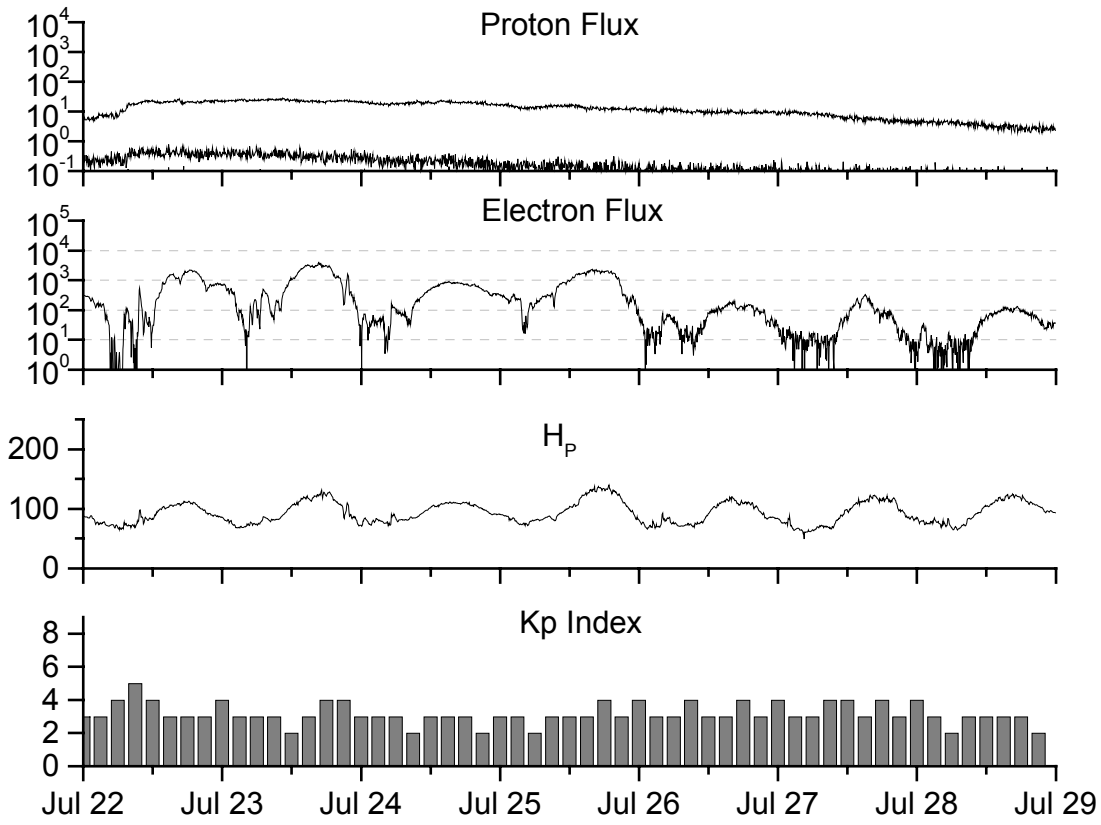
			Region 54												
28 Jul	S21E70	130	0040	05	Cro	002	B	0	0	0	0	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 130

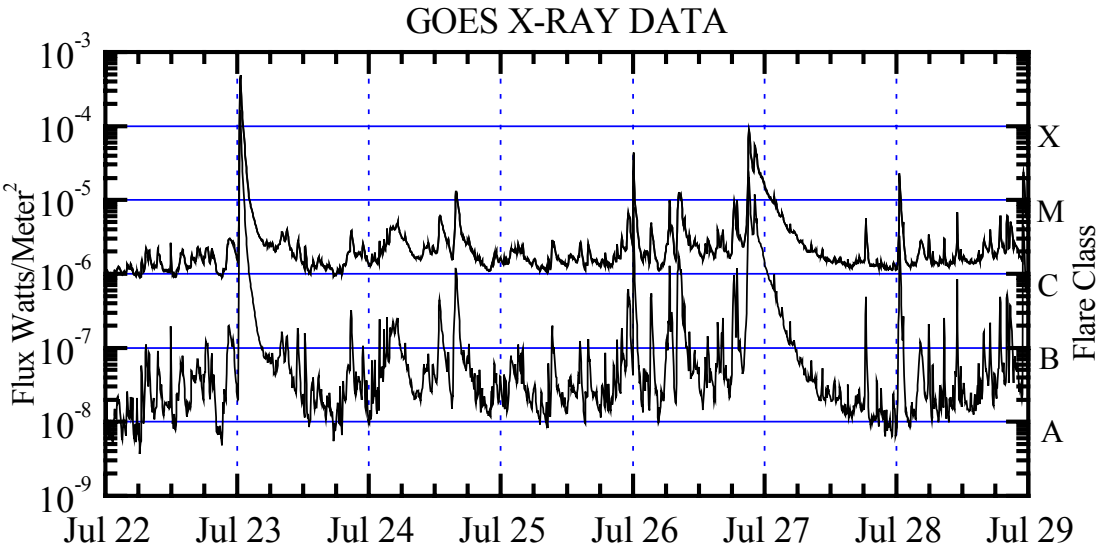
Recent Solar Indices (preliminary)
of the observed monthly mean values

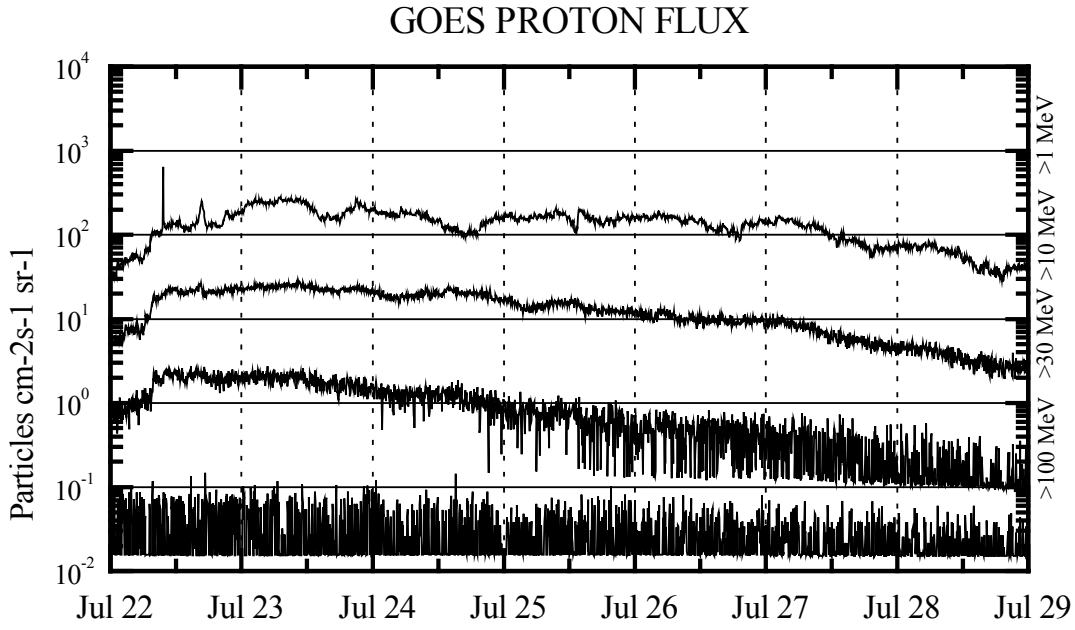
	Sunspot Numbers					Radio Flux		Geomagnetic	
	Observed values		Ratio	Smooth values		*Penticton	Smooth	Planetary	Smooth
Month	SWO	RI	RI/SWO	SWO	RI	10.7 cm	Value	Ap	Value
					2000				
July	236.7	169.1	0.71	173.0	119.7	204.7	180.2	21	14.8
August	166.6	130.5	0.78	171.8	118.6	163.1	179.5	16	14.2
September	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 22 July 2002
Protons plot contains the five-minute averaged integral proton flux (protons/cm^2 –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/cm^2 –sec –sr) with energies greater than 2 MeV at GOES-8.
Hp 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.
Kp 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 Kp 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 Kp are " global " parameters that are applicable to a first order approximation over large areas. Hparallel is subject to more localized phenomena and the measurements generally are applicable to within a few degrees of longitude of the measuring satellite.





W*eekly GOES Satellite X-ray and Proton Plots*

X-ray plot contains five-minute averaged x-ray flux (watts/m$^{2)}$ 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/cm^2 –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/cm^2-sec-sr) at greater than 10 MeV.