

**Space Weather Highlights**  
**29 July - 04 August 2002**

**SWO PRF 1405**  
**06 August 2002**

Solar activity ranged from low to high levels for the fifth consecutive week. Activity alternated between low and moderate levels during 29 July – 02 August due to C-class flares and isolated M-class flares from Region 39 (S15, L = 204, class/area Fkc/940 on 26 July) and Region 44 (S21, L = 210, Fkc/780 on 01 August). For flare times and magnitudes, please refer to the Energetic Events or Optical Flares lists. Events of note during this period included a filament eruption from the northwest quadrant early on 29 July associated with a partial-halo CME and a long-duration M4 at 29/1044 UTC from Region 44. Activity increased to high levels during 03 – 04 August with an impulsive X1/Sf flare at 03/1907 UTC from Region 39 and an M6 X-ray flare at 04/0955 UTC from beyond the southwest limb near (old) Regions 39 and 44 (both regions departed the visible disk early on 04 August).

Solar wind data were available from the NASA Advanced Composition Explorer (ACE) spacecraft for most of the summary period. Three CME-related shock passages occurred during the period. They passed the ACE spacecraft at approximately 29/1330 UTC, 31/1100 UTC, and 01/0425 UTC. All were likely due to CME activity from Regions 39 and/or 44. Peak solar wind velocities associated with these passages were in the 500 to 550 km/sec range. IMF Bz was mostly northward following the passages. However there were brief periods of southward Bz with maximum deflections to minus 12 nT (GSM).

There were no proton events at geo-synchronous orbit.

Greater than 2 MeV electron fluxes at geo-synchronous orbit were at normal to moderate levels.

Geomagnetic field activity was at quiet to unsettled levels during the first half of 29 July, then increased to unsettled to active levels following a weak sudden impulse (SI) at 29/1330 UTC (9 nT, Boulder USGS magnetometer). Field activity decreased to quiet to unsettled levels during 30 – 31 July. Activity increased to unsettled to minor storm levels on 01 August following a SI at 01/0511 UTC (26 nT, Boulder USGS magnetometer). Another SI was observed at 01/2313 UTC (66 nT, Boulder USGS magnetometer). Field activity ranged from quiet to major storm levels on 02 August. Field activity ranged from quiet to minor storm levels during 03 – 04 August.

**Space Weather Outlook**  
**07 August - 02 September 2002**

Solar activity is expected to range from low to moderate levels. Isolated low-level M-class flares are expected during the period. However, there is a chance for isolated major flare activity during the second half of the period with the return of old Regions 39 and 44.

There will be a chance for a proton event during the latter half 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 7 - 8 and 23 August due to coronal hole effects.



### Daily Solar Data

Date	Radio Flux 10.7 cm	Sun spot No.	Sunspot Area (10 <sup>-6</sup> hemi.)	X-ray Background	Flares							
					X-ray Flux			Optical				
					C	M	X	S	1	2	3	4
29 July	234	304	2560	C4.6	10	3	0	10	1	0	0	0
30 July	227	297	1860	C1.4	5	0	0	7	0	0	0	0
31 July	209	265	2230	C1.7	13	1	0	20	1	0	0	0
01 August	193	259	2170	C1.9	19	0	0	27	0	0	0	0
02 August	180	220	2210	C1.2	17	1	0	15	0	0	0	0
03 August	168	218	1680	C1.3	11	0	1	15	0	0	0	0
04 August	151	150	1310	C1.5	8	1	0	0	0	0	0	0

### Daily Particle Data

Date	Proton Fluence (protons/cm <sup>2</sup> -day-sr)			Electron Fluence (electrons/cm <sup>2</sup> -day-sr)		
	>1MeV	>10MeV	>100MeV	>6MeV	>2MeV	>4MeV
29 July	3.4E+6	1.6E+5	1.7E+3		7.2E+6	
30 July	3.0E+6	6.8E+4	1.6E+3		8.7E+6	
31 July	6.2E+5	2.3E+4	1.6E+3		3.1E+6	
01 August	2.9E+5	1.2E+4	1.6E+3		1.0E+6	
02 August	1.6E+5	8.5E+3	1.5E+3		9.8E+4	
03 August	1.3E+5	1.0E+4	2.2E+3		1.0E+7	
04 August	1.1E+6	1.6E+4	2.4E+3		7.1E+6	

### Daily Geomagnetic Data

Date	Middle Latitude		High Latitude		Estimated	
	Fredericksburg		College		Planetary	
	A	K-indices	A	K-indices	A	K-indices
29 July	9	1-2-2-1-4-3-2-2	9	2-3-2-2-4-2-1-1	11	2-3-2-2-4-3-3-2
30 July	5	1-1-1-1-1-2-2-2	4	1-2-0-0-0-2-2-2	8	2-2-1-2-2-3-3-3
31 July	6	1-1-1-2-3-2-1-1	18	2-1-1-0-5-6-1-1	9	3-2-1-2-3-3-3-2
01 August	27	0-3-3-3-4-3-3-5	32	2-3-4-4-6-6-2-3	26	2-4-4-4-5-4-3-5
02 August	28	5-5-4-1-4-2-3-5	33	6-5-3-2-4-4-3-5	37	6-6-4-2-3-4-4-5
03 August	11	4-2-3-2-2-1-3-2	20	4-3-5-4-3-3-2-2	20	5-4-4-3-3-3-4-3
04 August	12	4-4-3-2-2-1-2-1	29	6-4-5-4-2-1-4-3	16	4-5-4-3-2-2-3-1

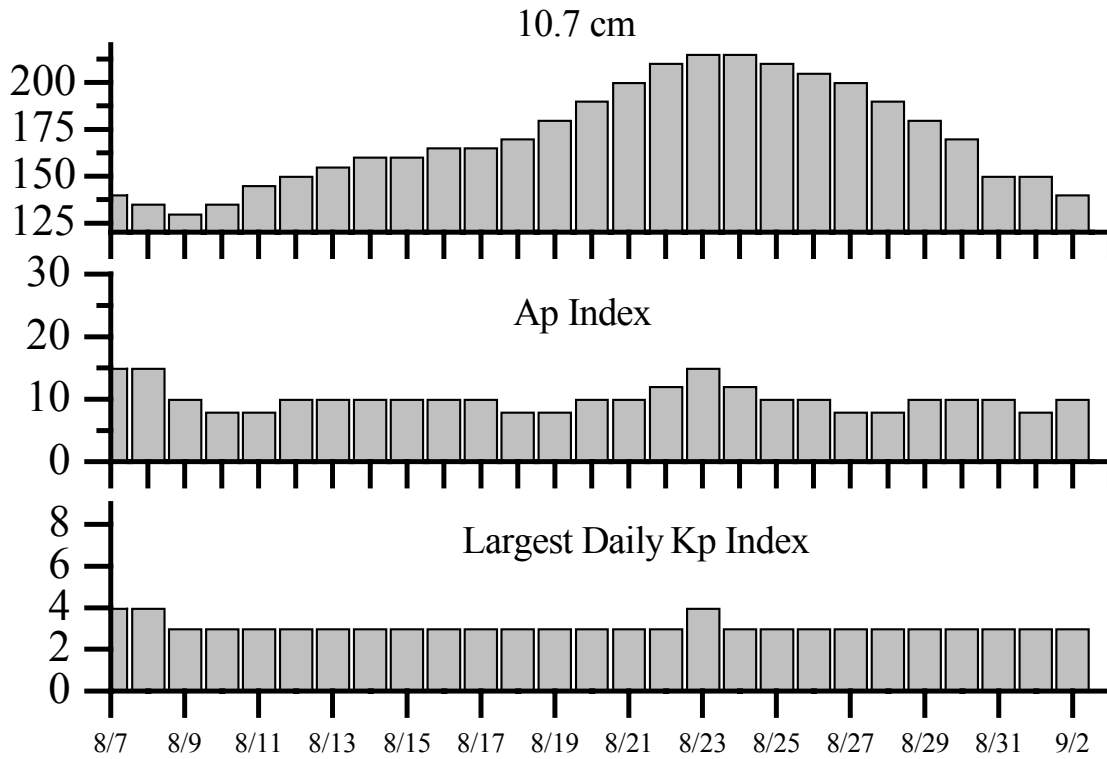


### *Alerts and Warnings Issued*

Date & Time of Issue	Type of Alert or Warning	Date & Time of Event UT
29 Jul 0010	4 - 245 MHz Bursts	28 Jul
29 Jul 0248	SUMMARY: 10cm Radio Burst	29 Jul 0236
29 Jul 0313	ALERT: Type II Radio Emission	29 Jul 0240
29 Jul 1005	WARNING: Geomagnetic Sudden Impulse	29 Jul 1015 - 1130
29 Jul 1311	WARNING: Geomagnetic Sudden Impulse	29 Jul 1315 - 1430
29 Jul 1333	SUMMARY: Geomagnetic Sudden Impulse	29 Jul 1330
29 Jul 1400	WARNING: Geomagnetic K= 4	29/1405 - 30/1500 Jul
29 Jul 1447	ALERT: Geomagnetic K= 4	29 Jul 1446
29 Jul 2205	WATCH: Geomagnetic A $\geq$ 20	01 Aug 01
30 Jul 0007	3 - 245 MHz Bursts	29 Jul
30 Jul 0007	1 - 245 MHz Radio Noise Storm	29 Jul
30 Jul 0007	2 - 245 MHz Bursts	30 Jul
30 Jul 0007	1 - 245 MHz Radio Noise Storm	30 Jul
31 Jul 1016	CANCEL WATCH: Geomagnetic A $\geq$ 20	
01 Aug 0020	3 - 245 MHz Bursts	31 Jul
01 Aug 0020	1 - 245 MHz Radio Noise Storm	31 Jul
01 Aug 0449	WARNING: Geomagnetic Sudden Impulse	01 Aug 0455 -0520
01 Aug 0520	SUMMARY: Geomagnetic Sudden Impulse	01 Aug 0511
01 Aug 0816	WARNING: Geomagnetic K= 4 expected	01 Aug 0820 -1500
01 Aug 0834	ALERT: Geomagnetic K= 4	01 Aug 0830
01 Aug 2230	WARNING: Geomagnetic Sudden Impulse	01 Aug 2245 - 2330
01 Aug 2248	WARNING: Geomagnetic K= 4	01/2250 - 02/1500 Aug
01 Aug 2317	SUMMARY: Geomagnetic Sudden Impulse	01 Aug 2313
01 Aug 2318	ALERT: Geomagnetic K= 4	01 Aug 2313
01 Aug 2325	ALERT: Geomagnetic K= 5	01 Aug 2315
01 Aug 2336	WARNING: Geomagnetic K=5	01/2340 - 02/0600
02 Aug 0017	8 - 245 MHz Bursts	01 Aug
02 Aug 0017	1 - 245 MHz Radio Noise Storm	01 Aug
02 Aug 0528	ALERT: Geomagnetic K= 6	02 Aug 0528
02 Aug 0540	EXTENDED WARNING: Geomagnetic K= 5	01 Aug 2340 - Aug 02 1500
02 Aug 1630	WARNING: Geomagnetic K-index of 4	02/1630 - Aug 03 1500
02 Aug 1947	ALERT: Geomagnetic K= 4	02 Aug 1632
02 Aug 2137	SUMMARY: Geomagnetic Sudden Impulse	02 Aug 2116
02 Aug 2224	ALERT: Geomagnetic K= 5	02 Aug 2223
02 Aug 2225	WARNING: Geomagnetic K= 5 expected	02/2225 -03/1500 Aug
03 Aug 0025	3 - 245 MHz Bursts	02 Aug
03 Aug 0025	1 - 245 MHz Radio Noise Storm	02 Aug
03 Aug 1907	ALERT: X-Ray Flux exceeded M5	03 Aug 1906
03 Aug 1928	SUMMARY: X-ray Event exceeded X1	03 Aug 1907
04 Aug 0027	3 - 245 MHz Bursts	03 Aug
04 Aug 0025	1 - 245 MHz Radio Noise Storm	03 Aug
04 Aug 0256	ALERT: Geomagnetic K= 4	03 Aug 0254
04 Aug 0257	WARNING: Geomagnetic K= 4 expected	03/0257 - 04/1500 Aug
04 Aug 0543	ALERT: Geomagnetic K= 5	04 Aug 0539
04 Aug 0934	SUMMARY: 10cm Radio Burst	04 Aug 0913
04 Aug 0941	ALERT: X-Ray Flux exceeded M5	04 Aug 0940
04 Aug 1038	SUMMARY: X-ray Event exceeded M5	04 Aug 0955



### 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
07 Aug	140	15	4	21	200	10	3
08	135	15	4	22	210	12	3
09	130	10	3	23	215	15	4
10	135	8	3	24	215	12	3
11	145	8	3	25	210	10	3
12	150	10	3	26	205	10	3
13	155	10	3	27	200	8	3
14 Aug	160	10	3	28	190	8	3
15	160	10	3	29	180	10	3
16	165	10	3	30	170	10	3
17	165	10	3	31	150	10	3
18	170	8	3	01 Sep	150	8	3
19	180	8	3	02	140	10	3
20	190	10	3				



### Energetic Events

Date	Time		X-ray		Optical Information			Peak		Sweep Freq		
	Begin	Max	½ Max	Class	Integ Flux	Imp/Location		Rgn #	Radio Flux		Intensity	
						Brtns	Lat CMD		245	2695	II	IV
29 Jul 02	0019	0023	0027	M1.4	.006					74		
29 Jul 02	0229	0238	0246	M4.8	.026				860	380		3
29 Jul 02	1027	1044	1113	M4.7	.085				100	110		
31 Jul 02	0139	0153	0202	M1.2	.012	Sb	S13W30	39		38		
02 Aug	1048	1053	1058	M1.0	.005	Sf	S15W62	39				
03 Aug	1859	1907	1911	X1.0	.033	Sf	S16W76	39	190	85		
04 Aug	0858	0955	1033	M6.6	.230					930		

### Flare List

Date	Time			X-ray Class.	Imp / Brtns	Optical		Rgn	
	Begin	Max	End			Location	Lat CMD		
29 July	0019	0023	0027	M1.4					
	0229	0238	0246	M4.8					
	B0250	U0250	0255		1f	S20W14	0044		
	B0617	U0624	A0624	C2.9	Sf	S11W15	0039		
	0635	0640	0655		Sf	S13W10	0039		
	0731	0751	0804	C3.4					
	1027	1044	1113	M4.7					
	1521	1608	1633		Sf	S08W01	0050		
	1626	1626	1632		Sf	S13W18	0039		
	1704	1706	1722	C2.7	Sf	S20W24	0044		
	1753	1756	1758	C3.8					
	1808	1810	1813	C2.5	Sf	S14W16	0039		
	1838	1848	1856	C2.2					
	1937	1939	1956	C8.6	Sf	S09W02	0050		
	2033	2036	2041	C3.1	Sf	N14W53	0038		
	2052	2054	2057		Sf	S10W03	0050		
	2102	2109	2137	C6.5	Sf	S08W03	0050		
	2238	2245	2257	C4.2					
	30 July	0254	0257	0300	C2.7				
		0314	0317	0323	C2.5				
0527		0528	0536	C3.3	Sf	S13W24	0039		
0556		0557	0600		Sf	S13W23	0039		
0616		0624	0634		Sf	S08W27	0039		
0717		0720	0729	C3.4	Sf	S09W28	0039		
0824		0828	0831	C3.4					
1131		1134	1144		Sf	S19W30	0044		
31 July	B1512	U1518	1522		Sf	S19W27	0044		
	1540	1541	1545		Sf	N20E03	0048		
	0046	0047	0051		Sf	S07W17	0050		
	0050	0051	0105	C4.9	Sf	S19W34	0044		
	0113	0115	0151	C3.0	Sb	N18W71	0038		



*Flare List - continued.*

Date	Time			X-ray Class.	Optical		Rgn
	Begin	Max	End		Imp / Brtns	Location Lat CMD	
31 July	0144	0149	0230	M1.2	Sb	S13W30	0039
	0207	0209	0222		Sf	S08W22	0050
	0445	0445	0459		Sf	S18W39	0044
	0455	0456	0503		Sf	S09W24	0050
	0718	0724	0730		Sf	S09W26	0050
	0849	0854	0900	C2.4			
	0950	0958	1006	C9.6			
	1010	1010	1017		Sf	S18W42	0044
	B1115	U1117	A1117	C4.2	Sf	S16W34	0039
	1206	1209	1211	C2.7			
	1340	1340	1342		Sf	S09W29	0050
	1415	1418	1423		Sf	S09W31	0050
	1449	1452	1454	C2.3			
	1513	1514	1515		Sf	S10W30	0050
	1524	1525	1529	C2.6	Sf	S09W30	0050
	1703	1704	1707		Sf	S10W32	0050
	1842	1842	1844		Sf	S10W32	0050
	2001	U2003	A2019	C2.8	Sf	N21W12	0048
	2018	2022	2025	C3.3			
	B2117	U2117	A2123		Sf	S20W40	0044
	2227	2230	2233	C2.2			
	2250	2255	2301	C3.0			
	2305	2305	2308		Sf	S09W34	0050
	2328	2355	0012	C4.7			
	2343	2345	0025		1f	S13W44	0039
	2345	2345	2355		Sf	S22W47	0044
01 August	0028	0044	0054	C3.9			
	0050	0054	0111		Sf	S11W46	0039
	0224	0224	0236	C2.5	Sf	S08W36	0050
	0241	0242	0252	C2.6	Sf	S21W45	0044
	0335	0336	0340		Sf	S08W36	0050
	0358	0401	0413	C2.5	Sf	S10E12	0057
	0434	0438	0444		Sf	S09W41	0050
	0503	0519	0533	C5.0	Sf	S07W36	0050
	0609	0609	0614		Sf	S08W39	0050
	0615	0617	0619		Sf	S15W53	0039
	0617	0617	0623		Sf	S08W37	0050
	0624	0647	0656	C2.9	Sf	S18W54	0044
	0705	0706	0714	C3.3	Sf	S09W42	0050
	0742	0744	0748		Sf	S15W54	0039
	0744	0746	0749	C4.1	Sf	S08W40	0050



*Flare List - continued.*

Date	Time			X-ray	Optical		Rgn Lat CMD	
	Begin	Max	End		Imp / Class.	Location Brtns		
01 August	0946	0948	1003		Sf	S07W35	0050	
	1049	1055	1104	C3.5	Sf	S08W43	0050	
	1206	1206	1214		Sf	S18W56	0044	
	1346	1347	1359	C3.7	Sf	S08W43	0050	
	1403	1407	1412	C4.6	Sf	S08W45	0050	
	1410	1411	1414		Sf	S12W58	0039	
	1430	1430	1433		Sf	S09W41	0050	
	1541	1544	1548	C3.4				
	1551	1559	1603	C6.0				
	1706	1707	1711	C6.0	Sf	S18W58	0044	
	B1706	U1706	A1713		Sf	S14W55	0039	
	1801	1814	1846	C4.6	Sf	S17W54	0044	
	1819	1823	1828		Sf	S12W60	0039	
	1930	1933	1935	C2.2				
	2015	2022	2027	C4.8				
	2129	2131	2135	C3.6	Sf	S10W48	0050	
	B2330	U2331	2341	C2.4	Sf	S20W52	0039	
	02 August	B0046	U0048	A0104		Sf	S10W50	0050
		0137	0141	0145	C2.1			0055
		0206	0206	0212	C2.4	Sf	S09W52	0050
0304		0307	0312	C1.7			0057	
0325		0328	0332	C2.2			0057	
0617		0625	0635	C4.2			0044	
0652		0652	0656	C4.2	Sf	S16W68	0039	
0907		0915	0920	C3.1				
1051		1051	1134	M1.0	Sf	S15W62	0039	
1244		1247	1251	C4.2	Sf	S15W65	0039	
1255		1256	1303		Sf	S16W65	0039	
1347		1355	1406	C3.6				
1353		1356	1359	C3.6	Sf	S14W66	0039	
1424		1426	1455	C2.8	Sf	S07W08	0057	
1432		1436	1442	C2.8	Sf	S10W69	0039	
1701		1707	1714	C3.1			0057	
1925		1925	1934		Sf	S08W06	0057	
1936		1936	1942		Sf	S15W69	0039	
1953		1958	2010	C4.4	Sf	S08W07	0057	
2004		2006	A2011		Sf	S16W70	0039	
2015	2018	2020	C4.2			0039		
2032	2034	2040		Sf	S16W71	0039		
2252	2253	A2258	C8.3	Sf	S09W10	0057		
2358	0001	0004	C3.2			0044		



*Flare List - continued.*

Date	Time			X-ray	Optical		Rgn
	Begin	Max	End		Imp / Class.	Location Brtns	
03 August	0149	0150	0154		Sf	S18W88	0044
	0435	0437	0455	C7.5	Sf	S09W14	0057
	0519	0520	0525		Sf	S30W16	
	0534	0539	0549		Sf	S12W79	0039
	0611	0615	0619	C2.1			
	0729	0731	0733		Sf	S07W18	0057
	0839	0839	0844		Sf	S31W20	
	0918	0919	0923	C2.7	Sf	S08W68	0050
	1022	1025	1027	C1.7			
	1259	1304	1309	C5.3			
	1513	1528	1539	C2.9			
	1654	1655	1702	C2.7	Sf	S09W73	0050
	1722	1726	1743		Sf	S19W49	0052
	1734	1734	1745		Sf	S08W19	0057
	1827	1833	1841	C2.4			
	1910	1910	1916	X1.0	Sf	S16W76	0039
	1949	1953	1956		Sf	S08W21	0057
	2107	2115	2139	C3.7	Sf	S08W22	0057
	2125	2132	2137	C6.1			0044
	2212	2213	2216		Sf	S07W24	0057
2327	2328	2343	C3.8	Sf	S08W28	0057	
04 August	0155	0200	0206	C2.8			
	0255	0259	0302	C2.4			
	0444	0450	0454	C3.8			
	0714	0720	0725	C7.4			
	0858	0955	1033	M6.6			
	1410	1418	1428	C6.9			
	1452	1458	1502	C4.8			
	1901	1905	1922	C2.1			
2139	2143	2148	C2.6				





### Region Summary

Date	Location		Sunspot Characteristics				Flares										
	( ° Lat ° CMD)	Helio	Area (10 <sup>-6</sup> hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical						
		Lon						C	M	X	S	1	2	3	4		
<i>Region 38</i>																	
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										
29 Jul	N18W55	242	0020	02	Cso	002	B	1				1					
30 Jul	N18W68	242															
31 Jul	N18W81	242						1				1					
								2	0	0	2	0	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 241

<i>Region 39</i>																	
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					
29 Jul	S15W18	205	0890	15	Ekc	057	Bgd	2				4					
30 Jul	S14W30	203	0620	18	Fki	063	Bgd	2				4					
31 Jul	S15W44	204	0570	16	Fkc	051	Bgd	1	1			2	1				
01 Aug	S15W58	205	0430	16	Fai	038	Bg	1				7					
02 Aug	S15W70	204	0480	15	Eai	017	Bg	5	1			9					
03 Aug	S16W83	204	0330	15	Eao	013	Bg					1	2				
								28	4	2	47	2	1	0	0		

Still on Disk.

Absolute heliographic longitude: 204



**Region Summary - continued.**

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

*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															
29 Jul	N16W71	259															
30 Jul	N16W84	259															

0 0 0 0 0 0 0 0

Crossed West Limb.

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										
29 Jul	S19W56	243															
30 Jul	S22W64	237	0000	01	Axx	001	A										
31 Jul	S22W77	237															

0 0 0 1 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 242



**Region Summary - continued.**

Date	Location		Sunspot Characteristics				Flares											
	( ° Lat ° CMD)	Helio	Area (10 <sup>-6</sup> hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical							
		Lon						C	M	X	S	1	2	3	4			
<i>Region 43</i>																		
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						
29 Jul	N12W26	213	0190	09	Dai	023	B											
30 Jul	N12W39	212	0100	10	Dsi	023	B											
31 Jul	N12W53	213	0090	09	Dao	011	B											
01 Aug	N13W66	213	0030	10	Dao	006	B											
02 Aug	N13W79	213																
								1	0	0	2	0	0	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 213

<i>Region 44</i>																		
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					
29 Jul	S21W24	211	0580	19	Fai	042	Bg	1				1	1					
30 Jul	S20W33	206	0380	23	Fki	054	Bg					2						
31 Jul	S21W49	209	0620	20	Fkc	049	Bg	1				5						
01 Aug	S21W62	209	0780	21	Fkc	040	Bg	4				5						
02 Aug	S21W76	210	0780	23	Fki	023	Bg	2										
03 Aug	S24W88	209	0280	10	Dao	009	B	1				1						
								22	6	0	34	4	1	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 210



**Region Summary - continued.**

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

*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											
29 Jul	N06W53	240	0030	06	Bxo	006	B											
30 Jul	N06W66	240																
31 Jul	N06W79	240																

0 0 0 0 0 0 0 0

Crossed West Limb.

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																
29 Jul	N15W43	231																
30 Jul	N15W56	231																
31 Jul	N15W69	231																
01 Aug	N15W82	231																

0 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 231

*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											
29 Jul	N20E12	175	0060	06	Dso	010	B											
30 Jul	N21E00	173	0040	05	Dro	008	B											1
31 Jul	N19W14	174	0020	06	Cso	009	B	1										1
01 Aug	N19W27	174																
02 Aug	N21W38	172	0020	04	Cro	003	B											
03 Aug	N21W51	172																
04 Aug	N21W64	172																

1 0 0 4 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 173



**Region Summary - continued.**

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

*Region 49*

26 Jul	S06W30	257	0220	03	Cso	002	B											
27 Jul	S05W44	257	0030	05	Dao	010	B											
28 Jul	S05W57	257																
29 Jul	S05W70	257																
30 Jul	S05W83	257																
												0	0	0	0	0	0	0

Crossed West Limb.

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
29 Jul	S07W06	193	0570	10	Dki	031	Bg	2										4
30 Jul	S08W19	192	0540	12	Eki	037	Bg											
31 Jul	S08W32	192	0730	14	Ekc	043	Bg	1										11
01 Aug	S08W45	192	0680	15	Ekc	052	Bg	8										14
02 Aug	S08W59	193	0570	18	Fki	036	Bg	1										2
03 Aug	S08W73	194	0470	17	Fki	025	Bg	2										2
04 Aug	S08W87	194	0420	19	Fho	007	B											
												16	0	0	40	0	0	0

Still on Disk.

Absolute heliographic longitude: 193

*Region 51*

27 Jul	S17E66	147	0090	09	Cao	002	B											
28 Jul	S16E54	146	0100	02	Hsx	001	A											
29 Jul	S17E40	147	0060	02	Hsx	001	A											
30 Jul	S16E28	145	0090	02	Hsx	001	A											
31 Jul	S17E15	145	0070	02	Hsx	001	A											
01 Aug	S16E01	146	0080	02	Hsx	001	A											
02 Aug	S16W12	146	0090	02	Hsx	001	A											
03 Aug	S16W25	146	0080	02	Hsx	001	A											
04 Aug	S15W38	145	0090	02	Hsx	001	A											
												0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 146



**Region Summary - continued.**

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

*Region 52*

28 Jul	N09E17	183	0030	05	Cro	005	B											
29 Jul	N09E02	185	0010	03	Bxo	002	B											
30 Jul	N09W11	185																
31 Jul	N09W24	185																
01 Aug	S15W37	172																
02 Aug	S15W50	172																
03 Aug	S15W63	172											1					
04 Aug	S15W76	172																

Still on Disk.

Absolute heliographic longitude: 185

*Region 53*

28 Jul	S17E24	176	0010	00	Hrx	001	A											
29 Jul	S17E12	175	0020	04	Cso	005	B											
30 Jul	S17W02	175	0020	01	Cso	002	B											
31 Jul	S17W15	175																
01 Aug	S17W28	175																
02 Aug	S17W41	175																
03 Aug	S17W54	175																
04 Aug	S17W67	175																

Still on Disk.

Absolute heliographic longitude: 175

*Region 54*

28 Jul	S21E70	130	0040	05	Cro	002	B											
29 Jul	S22E55	132	0050	05	Dso	004	B											
30 Jul	S22E42	131	0030	06	Dro	004	B											
31 Jul	S22E27	133	0020	05	Cso	003	B											
01 Aug	S22E13	134	0010	01	Axx	001	A											
02 Aug	S22W01	135	0010	01	Hrx	002	A											
03 Aug	S22W14	135																
04 Aug	S22W27	135																

Still on Disk.

Absolute heliographic longitude: 135



**Region Summary - continued.**

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

*Region 55*

29 Jul	N14E75	112	0080	02	Hax	001	A											
30 Jul	N14E64	109	0040	07	Dro	004	B											
31 Jul	N14E51	109	0080	06	Dso	004	B											
01 Aug	N14E38	109	0060	07	Dso	003	B											
02 Aug	N15E26	108	0070	08	Dso	003	B	1										
03 Aug	N14E13	108	0050	08	Dso	008	B											
04 Aug	N13W01	108	0040	07	Dao	004	B											
									1	0	0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 108

*Region 56*

31 Jul	N04E49	111	0030	04	Cso	004	B											
01 Aug	N05E36	111	0030	04	Cso	005	B											
02 Aug	N05E22	112	0010	04	Bxo	003	B											
03 Aug	N05E09	112																
04 Aug	N05W04	112																
									0	0	0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 112

*Region 57*

01 Aug	S08E02	145	0050	08	Dao	012	B											
02 Aug	S08W10	144	0100	09	Dao	017	B	6		4								
03 Aug	S08W25	146	0150	11	Eai	044	Bg	2		7								
04 Aug	S08W39	146	0380	13	Eac	033	Bg											
								8	0	0	11	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 145

*Region 58*

01 Aug	S05E72	075	0020	02	Axx	001	A											
02 Aug	S07E57	077	0010	01	Hrx	001	A											
03 Aug	S06E43	078	0020	01	Hrx	001	A											
04 Aug	S07E28	079	0030	01	Hsx	001	A											
								0	0	0	0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 079



**Region Summary - continued.**

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

*Region 59*

02 Aug	N14E67	067	0070	06	Dso	004	B											
03 Aug	N15E54	067	0090	07	Dso	008	B											
04 Aug	N15E41	066	0120	07	Dao	012	B											
									0	0	0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 066

*Region 60*

03 Aug	S28W26	147	0030	04	Bxo	008	B											
04 Aug	S28W41	148	0040	07	Dro	005	B											
									0	0	0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 147

*Region 61*

03 Aug	N08E77	044	0180	02	Hsx	001	A											
04 Aug	N08E65	042	0190	05	Dao	007	B											
									0	0	0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 042



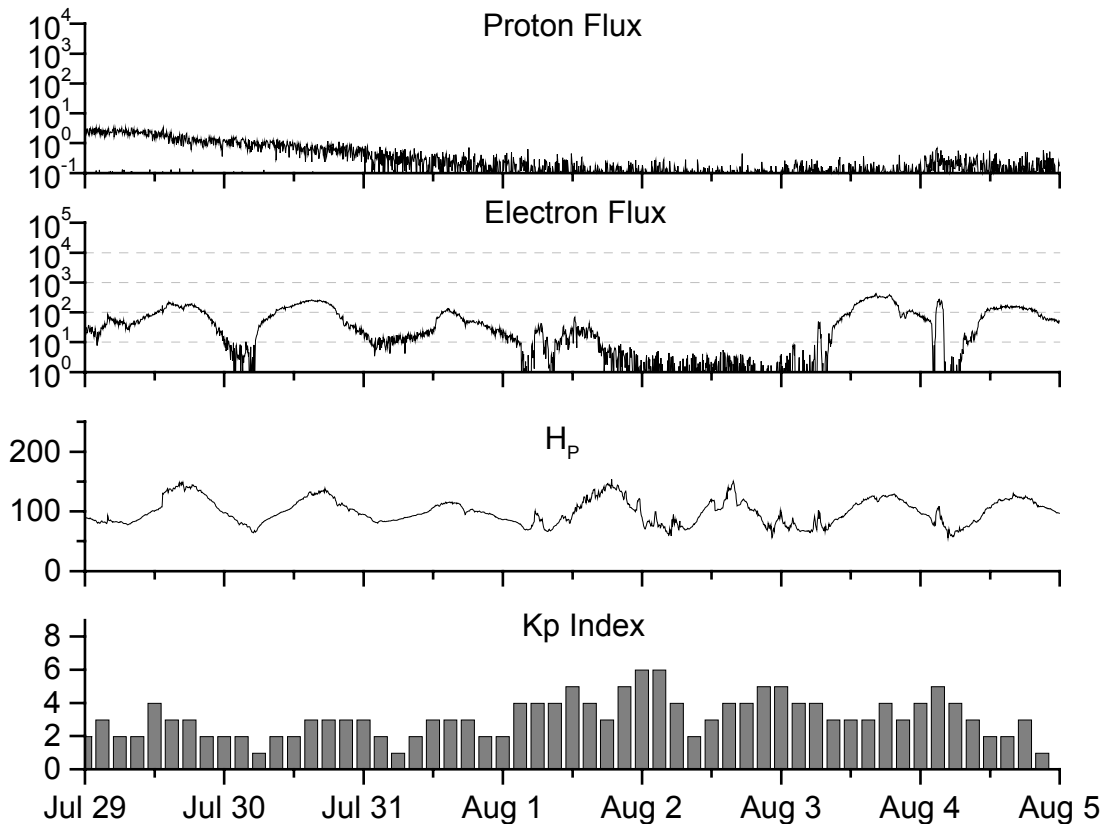


**Recent Solar Indices (preliminary)  
of the observed monthly mean values**

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
<b>2000</b>									
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
<b>2001</b>									
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
<b>2002</b>									
January	189.0	113.9	0.60	184.8	113.5	226.4	194.6	07	12.0
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	
July	183.5	99.9	0.54			174.5		13	

**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 29 July 2002*

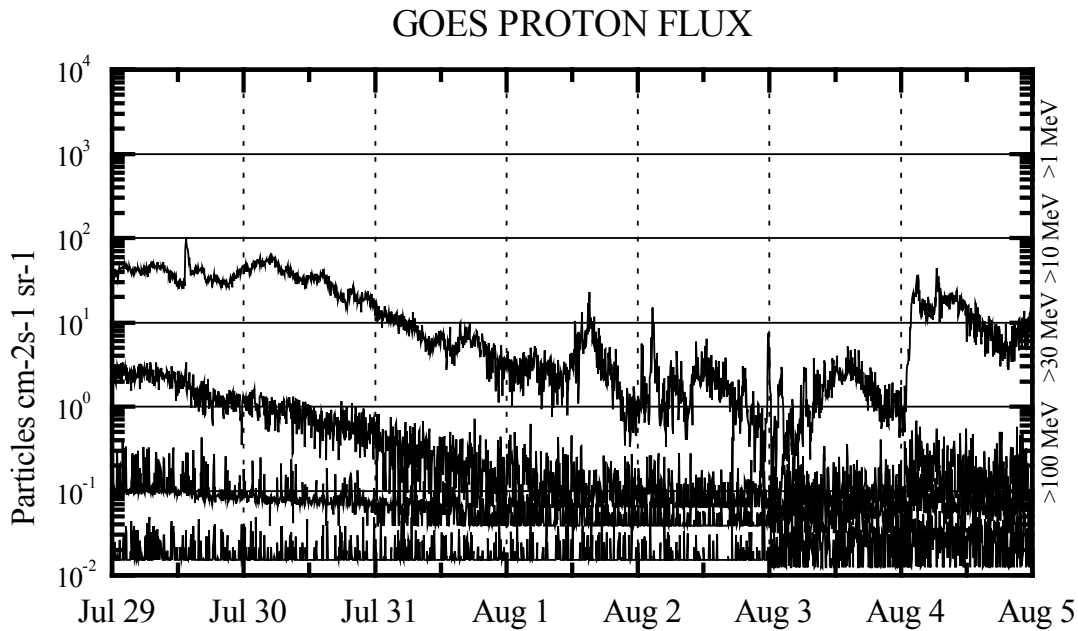
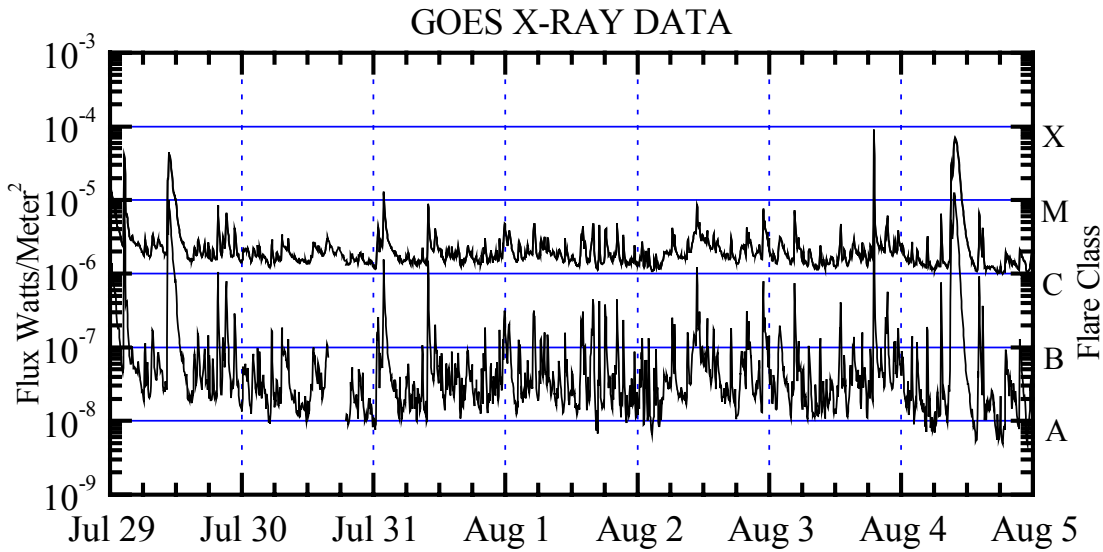
*Protons* plot contains the five-minute averaged integral proton flux (protons/cm<sup>2</sup>-sec-sr) as measured by GOES-8 (W75) for each of three energy thresholds: greater than 10, 50, and 100 MeV.

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

*H<sub>p</sub>* 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<sub>p</sub>* 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<sub>p</sub> 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<sub>p</sub> are "global" parameters that are applicable to a first order approximation over large areas. H<sub>parallel</sub> is subject to more localized phenomena and the measurements generally are applicable to within a few degrees of longitude of the measuring satellite.



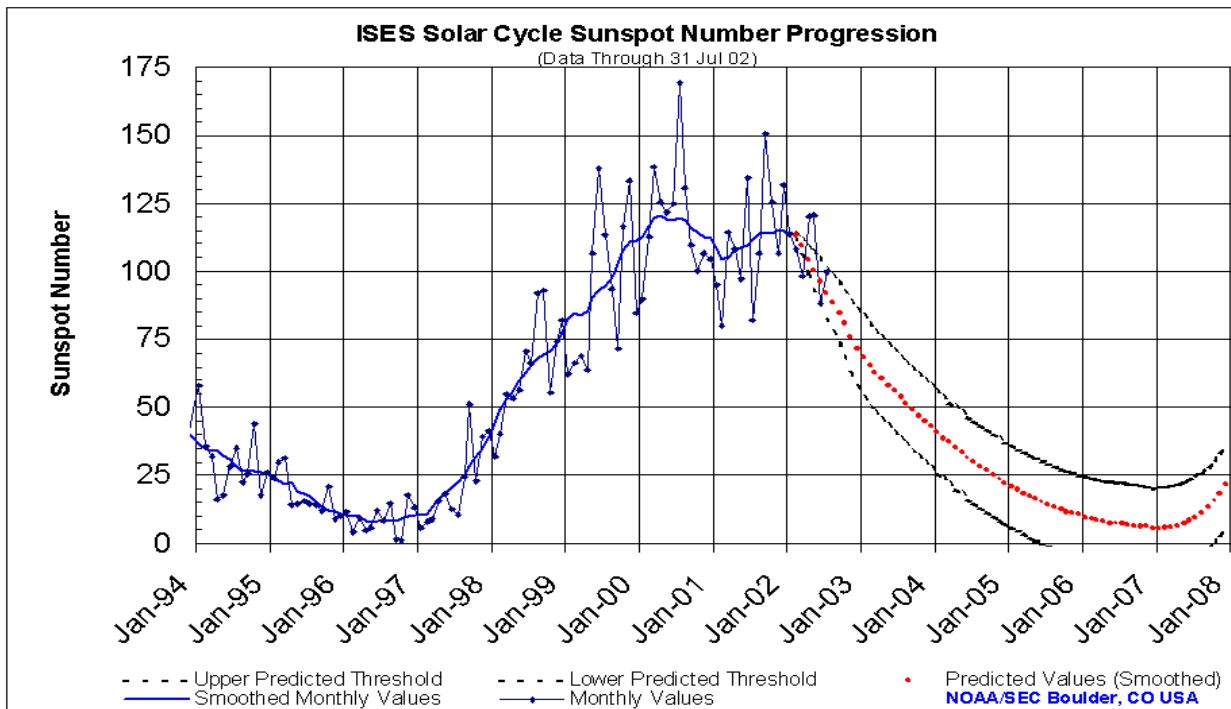


#### Weekly GOES Satellite X-ray and Proton Plots

X-ray plot contains five-minute averaged x-ray flux (watts/m<sup>2</sup>) 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<sup>2</sup>-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<sup>2</sup>-sec-sr) at greater than 10 MeV.

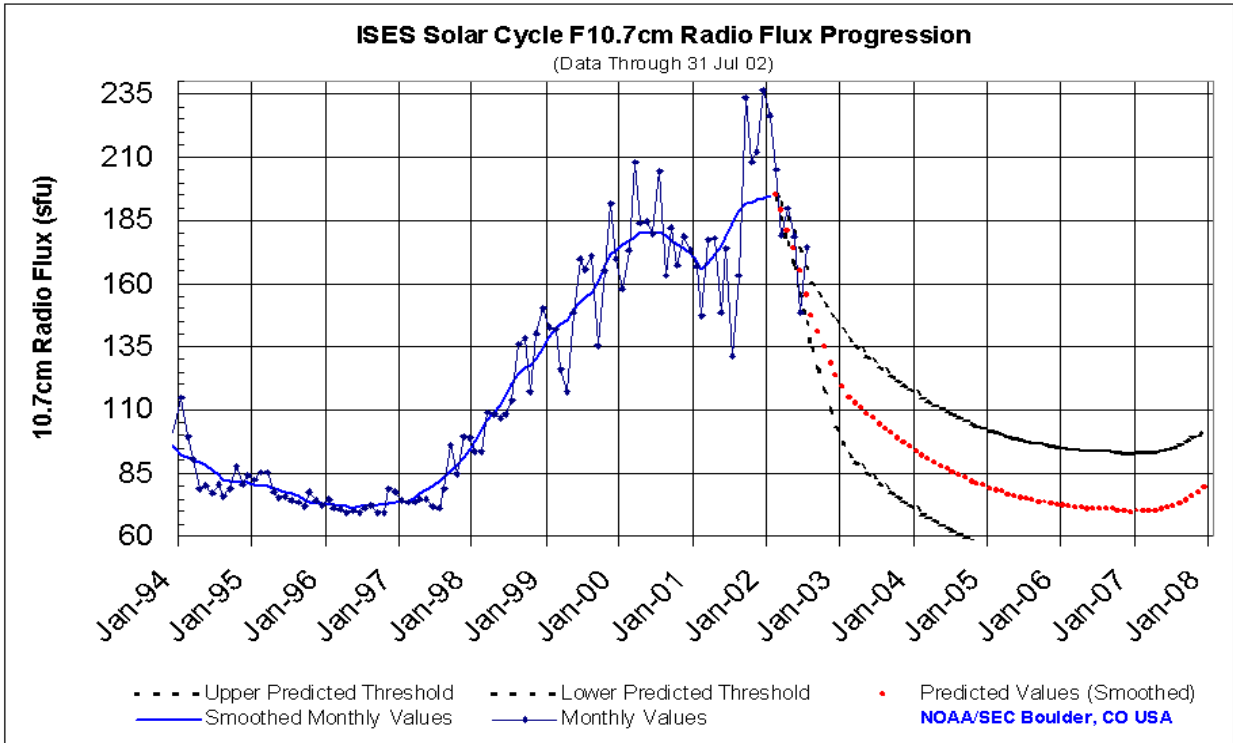




### SEC Prediction of Smoothed Sunspot Number

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1998	44 (***)	49 (***)	53 (***)	57 (***)	59 (***)	63 (***)	66 (***)	68 (***)	70 (***)	71 (***)	73 (***)	78 (***)
1999	83 (***)	85 (***)	84 (***)	86 (***)	91 (***)	93 (***)	94 (***)	97 (***)	102 (***)	108 (***)	111 (***)	111 (***)
2000	113 (***)	117 (***)	120 (***)	121 (***)	119 (***)	119 (***)	120 (***)	119 (***)	116 (***)	114 (***)	113 (***)	112 (***)
2001	109 (***)	104 (***)	105 (***)	108 (***)	109 (***)	110 (***)	112 (***)	114 (***)	114 (***)	114 (***)	116 (***)	115 (***)
2002	114 (***)	<b>113</b> (1)	<b>109</b> (3)	<b>104</b> (5)	<b>100</b> (7)	<b>96</b> (8)	<b>92</b> (9)	<b>88</b> (10)	<b>85</b> (11)	<b>81</b> (12)	<b>76</b> (13)	<b>72</b> (14)
2003	<b>69</b> (15)	<b>65</b> (15)	<b>63</b> (15)	<b>61</b> (15)	<b>58</b> (15)	<b>56</b> (15)	<b>54</b> (15)	<b>51</b> (15)	<b>49</b> (15)	<b>47</b> (15)	<b>45</b> (15)	<b>43</b> (15)
2004	<b>41</b> (15)	<b>39</b> (15)	<b>37</b> (15)	<b>35</b> (15)	<b>33</b> (15)	<b>31</b> (15)	<b>30</b> (15)	<b>28</b> (15)	<b>27</b> (15)	<b>25</b> (15)	<b>24</b> (15)	<b>22</b> (15)
2005	<b>21</b> (15)	<b>20</b> (15)	<b>18</b> (15)	<b>17</b> (15)	<b>16</b> (15)	<b>15</b> (15)	<b>14</b> (15)	<b>13</b> (15)	<b>12</b> (15)	<b>12</b> (15)	<b>11</b> (15)	<b>10</b> (15)
2006	<b>10</b> (15)	<b>9</b> (15)	<b>8</b> (15)	<b>8</b> (15)	<b>8</b> (15)	<b>7</b> (15)	<b>7</b> (15)	<b>7</b> (15)	<b>7</b> (15)	<b>6</b> (15)	<b>6</b> (15)	<b>5</b> (15)
2007	<b>5</b> (15)	<b>6</b> (15)	<b>6</b> (15)	<b>6</b> (15)	<b>7</b> (15)	<b>8</b> (15)	<b>10</b> (15)	<b>11</b> (15)	<b>13</b> (15)	<b>16</b> (15)	<b>18</b> (15)	<b>21</b> (15)





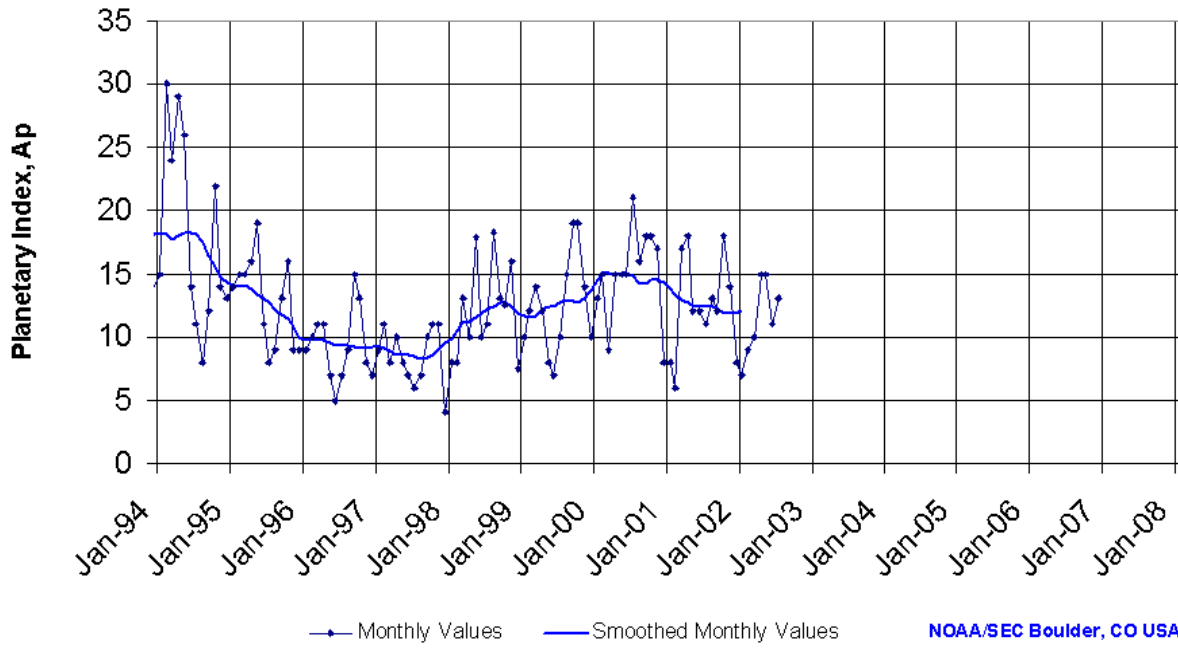
### SEC Prediction of Smoothed F10.7cm Radio Flux

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1998	98 (***)	102 (***)	106 (***)	109 (***)	112 (***)	116 (***)	120 (***)	124 (***)	127 (***)	128 (***)	130 (***)	134 (***)
1999	139 (***)	143 (***)	144 (***)	146 (***)	150 (***)	153 (***)	154 (***)	156 (***)	161 (***)	167 (***)	172 (***)	173 (***)
2000	175 (***)	176 (***)	178 (***)	181 (***)	180 (***)	180 (***)	180 (***)	180 (***)	177 (***)	176 (***)	174 (***)	172 (***)
2001	169 (***)	166 (***)	168 (***)	172 (***)	175 (***)	179 (***)	184 (***)	189 (***)	191 (***)	192 (***)	194 (***)	194 (***)
2002	195 (***)	<b>195</b> (1)	<b>189</b> (3)	<b>181</b> (5)	<b>174</b> (7)	<b>165</b> (9)	<b>156</b> (11)	<b>147</b> (13)	<b>141</b> (15)	<b>135</b> (17)	<b>129</b> (19)	<b>124</b> (21)
2003	<b>119</b> (22)	<b>115</b> (23)	<b>113</b> (23)	<b>111</b> (23)	<b>109</b> (23)	<b>107</b> (23)	<b>104</b> (23)	<b>103</b> (23)	<b>101</b> (23)	<b>99</b> (23)	<b>97</b> (23)	<b>95</b> (23)
2004	<b>94</b> (23)	<b>92</b> (23)	<b>91</b> (23)	<b>89</b> (23)	<b>88</b> (23)	<b>87</b> (23)	<b>85</b> (23)	<b>84</b> (23)	<b>83</b> (23)	<b>82</b> (23)	<b>81</b> (23)	<b>80</b> (23)
2005	<b>79</b> (23)	<b>78</b> (23)	<b>78</b> (23)	<b>77</b> (23)	<b>76</b> (23)	<b>75</b> (23)	<b>75</b> (23)	<b>74</b> (23)	<b>74</b> (23)	<b>73</b> (23)	<b>73</b> (23)	<b>73</b> (23)
2006	<b>72</b> (23)	<b>72</b> (23)	<b>71</b> (23)	<b>71</b> (23)	<b>71</b> (23)	<b>71</b> (23)	<b>71</b> (23)	<b>71</b> (23)	<b>70</b> (23)	<b>70</b> (23)	<b>70</b> (23)	<b>70</b> (23)
2007	<b>70</b> (23)	<b>70</b> (23)	<b>70</b> (23)	<b>70</b> (23)	<b>71</b> (23)	<b>71</b> (23)	<b>72</b> (23)	<b>73</b> (23)	<b>74</b> (23)	<b>76</b> (23)	<b>77</b> (23)	<b>79</b> (23)



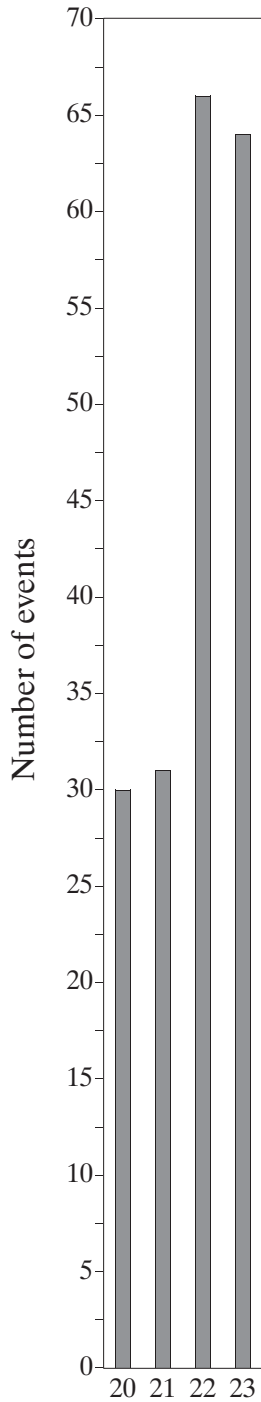
### ISES Solar Cycle Ap Progression

(Data Through 31 Jul 02)



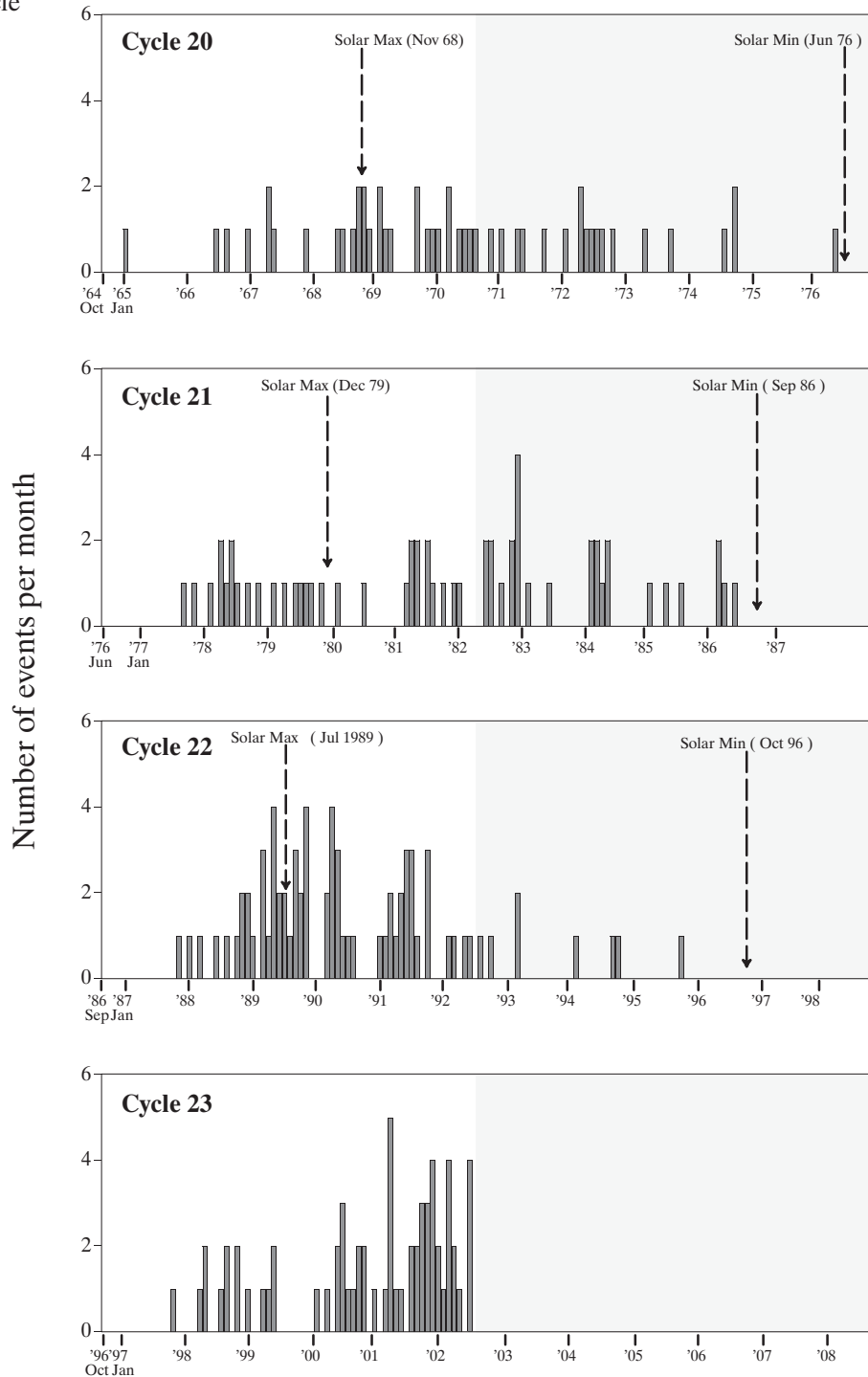
# Proton Events

Comparison of Cycles at current month in cycle



July 2002  
(Month 70)

▮ Preliminary data



SESC defines Proton Events as periods (in excess of 15 minutes) when the geosynchronous >10MeV proton flux remains above 10 pfu (particle flux unit =  $1p/cm^2*cm^2*s*sr$ ). Events continue and are counted as a single event until fluxes remain below 10 pfu regardless of whether enhancements from new sources occur. Using different event criteria may result in different event totals.