

**Space Weather Highlights**  
**28 July - 03 August 2003**

**SWO PRF 1457**  
**05 August 2003**

Solar activity was at low to moderate levels. A moderately complex beta-gamma configuration was evident in Region 421 (S08, L=355 class/area Eao/310 on 29 July) on the 28th and occasional minor C-class flares were noted. Activity increased to moderate levels on 29 July when Region 421 produced an M1/1f at 0139 UTC. Region 422 (N14, L=103 class/area Dao/200 on 29 July) also emerged quite quickly on the 28th and was responsible for low C-class flares on the 28th and 29th. Moderate levels were again observed on 30 July as Region 422 produced an M2/1b flare at 0410 UTC, with associated centimetric bursts including a 190 sfu Tenflare. Activity decreased to low levels on 31 July and 01 August. Both Region 421 and 422 entered a decay phase on the 30th that continued through the end of the period. On 01 August, new Region 424 (S18, L=291, class/area Dki/580 on 03 August) rotated onto the visible disk. Region 424 produced at least six C-class flares on 01 August with the largest one a C5 at 0126 UTC. Region 424 continued a rapid growth phase on 02 - 03 August and produced moderate level activity on 02 August with an M1/1f at 2354 UTC. LASCO imagery indicates a full halo CME associated with the M1 event, however further analysis suggests that the halo may be from a backside event. The period ended on 03 August with minor C-class activity from Region 424.

Solar wind data were available from the NASA Advanced Composition Explorer (ACE) spacecraft for most of the summary period. A large coronal hole high speed stream began on 28 July and dominated the period. Solar wind speeds increased late on the 28th and were elevated near 750 - 900 km/s for most of the period. Wind speed began a steady decline late on 01 August and reached 550 km/s at the close of the period. The Bz component of the interplanetary magnetic field oscillated between +/- 10 nT early in the period but was between +/- 6 nT for most of the period.

There were no greater than 10 MeV proton events at geosynchronous orbit during the period.

The greater than 2 MeV electron flux at geo-synchronous orbit reached high levels on 29 July - 03 August.

The geomagnetic field ranged from quiet to minor storm levels. A large coronal hole high speed stream was responsible for all of the minor storm activity during the period. Activity was at unsettled to minor storm levels on 28 July - 01 August with a 15-hour period of continuous minor storm condition on 01 August. High speed stream effects diminished on 02 - 03 August with unsettled to active conditions.

**Space Weather Outlook**  
**06 August - 01 September 2003**

Solar activity is expected to range from low to moderate levels during the period. Region 424 has the potential for isolated M-class activity during the first half of the period. An area of active longitudes is due to return to the visible disk on 08 August and is expected to have C-class and isolated M-class potential. Activity during the second half of the period is expected to be at low levels.

No greater than 10 MeV proton events at geosynchronous orbit are expected.

The greater than 2 MeV electron flux is expected to reach high levels on 09 - 11 August, on 13 -15 August and again on 25 August - 01 September.

The geomagnetic field is expected to range from quiet to major storm levels during the period. Coronal hole effects are expected on 07 - 09 August and 11 - 13 August with isolated major storm levels possible. The large coronal hole high speed stream is due to return late in the period and is expected to produce minor storm levels on 22 - 29 August.



**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
28 July	103	56	620	B2.2	2	0	0	3	0	0	0	0
29 July	100	63	650	B1.6	3	1	0	2	1	0	0	0
30 July	99	63	450	B1.6	1	1	0	0	1	0	0	0
31 July	102	65	430	B1.8	1	0	0	1	0	0	0	0
01 August	107	85	490	B2.9	9	0	0	0	0	0	0	0
02 August	111	95	710	B3.3	5	1	0	11	2	0	0	0
03 August	120	144	1060	B2.6	6	0	0	11	1	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
	28 July	8.3E+5	1.1E+4	2.5E+3		3.2E+7
29 July	8.5E+6	1.3E+4	2.3E+3		1.1E+8	
30 July	6.6E+6	1.2E+4	2.3E+3		3.9E+8	
31 July	5.7E+6	1.3E+4	2.3E+3		3.0E+8	
01 August	4.3E+6	1.2E+4	2.3E+3		8.1E+8	
02 August	2.8E+6	1.0E+4	2.4E+3		6.8E+8	
03 August	1.4E+6	1.2E+4	2.5E+3		7.7E+8	

**Daily Geomagnetic Data**

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	28 July	15	2-2-3-3-4-4-2-3	*	2-*-*-*-*-4-3	17
29 July	24	4-5-4-2-3-3-4-4	57	3-4-6-6-6-6-6-4	36	4-5-4-4-5-5-5-5
30 July	24	3-4-4-5-3-3-4-3	43	4-4-5-6-5-6-3-3	29	4-4-5-5-4-4-4-4
31 July	22	3-3-4-5-3-3-3-4	59	3-5-6-7-6-6-3-3	32	4-5-4-5-4-4-3-4
01 August	28	5-5-4-3-3-3-3-5	74	5-5-7-7-7-5-3-3	37	5-5-5-5-5-3-3-5
02 August	15	4-3-3-2-2-2-4-3	37	4-4-6-6-4-4-3-3	21	4-4-4-3-3-3-4-4
03 August	10	3-3-2-2-2-2-2-3	24	3-4-5-5-4-3-2-2	15	3-4-3-3-3-3-3-3

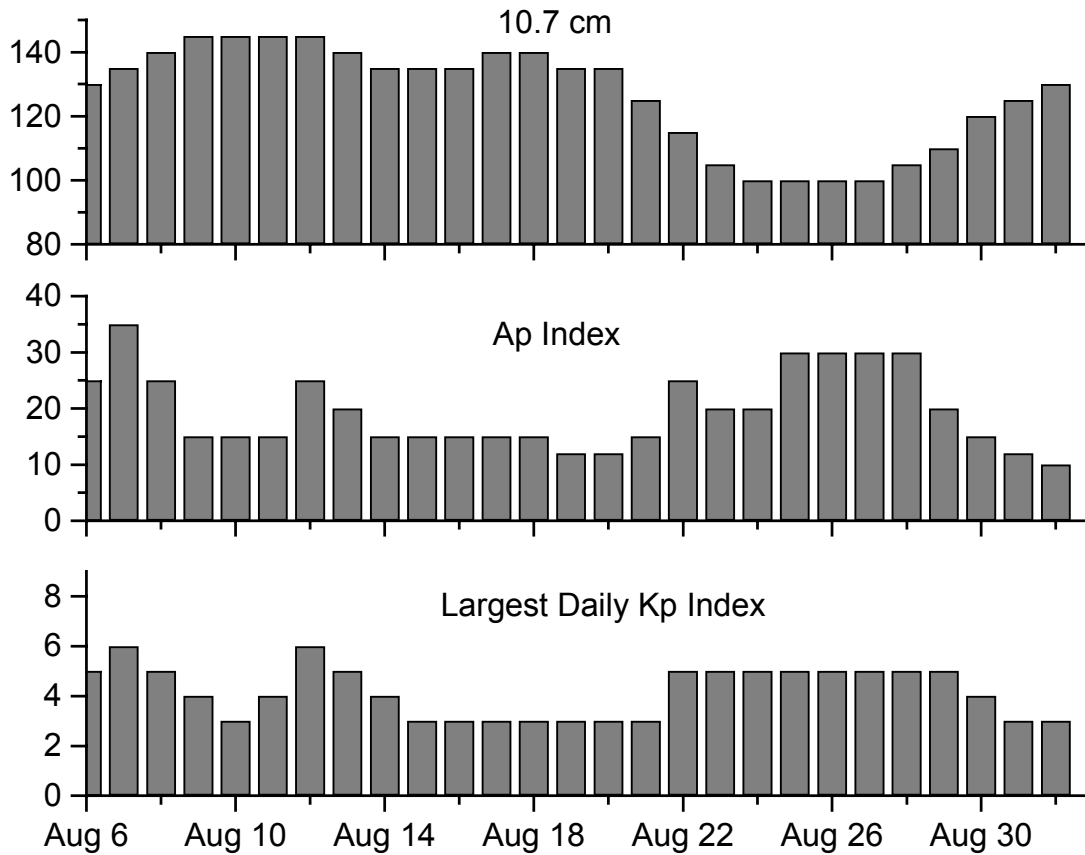


### *Alerts and Warnings Issued*

<u>Date &amp; Time of Issue</u>	<u>Type of Alert or Warning</u>	<u>Date &amp; Time of Event UT</u>
28 Jul 1141	ALERT: Geomagnetic K = 4	28 Jul 1141
28 Jul 1455	EXTENDED WARNING: Geomagnetic K= 4	27 Jul 1459 - 2359
28 Jul 2103	WATCH: Geomagnetic A $\geq$ 20	31 Jul
28 Jul 2212	WARNING: Geomagnetic K = 5	28 Jul 2230 - Jul 29 1500
29 Jul 0249	ALERT: Geomagnetic K = 5	29 Jul 0245
29 Jul 0408	ALERT: Geomagnetic K = 6	29 Jul 0406
29 Jul 0438	WARNING: Geomagnetic K = 6	29 Jul 0438 - 1500
29 Jul 0443	ALERT: Geomagnetic K = 6	29 Jul 0442
29 Jul 1302	ALERT: Electron 2MeV Integral Flux > 1000pfu	29 Jul 1245
29 Jul 1449	EXTENDED WARNING: Geomagnetic K= 5	28 Jul 2230 - 29 Jul 2359
29 Jul 2147	WATCH: Geomagnetic A $\geq$ 20	30 Jul
29 Jul 2353	EXTENDED WARNING: Geomagnetic K = 5	28 Jul 2230 - 30 Jul 1500
30 Jul 0420	SUMMARY: 10cm Radio Burst	30 Jul 0409
30 Jul 0439	WARNING: Geomagnetic K = 6	30 Jul 0450 - 1500
30 Jul 0948	ALERT: Electron 2MeV Integral Flux > 1000pfu	30 Jul 0930
30 Jul 1432	EXTENDED WARNING: Geomagnetic K = 5	28 Jul 2230 - 30 Jul 2359
30 Jul 2200	EXTENDED WARNING: Geomagnetic K = 5	28 Jul 2230 - 31 Jul 1500
31 Jul 0007	1 - 245 MHz Radio Burst	30 Jul
31 Jul 1004	ALERT: Electron 2MeV Integral Flux > 1000pfu	31 Jul 0945
31 Jul 1456	EXTENDED WARNING: Geomagnetic K = 5	28 Jul 2230 - 31 Jul 2359
31 Jul 2017	WATCH: Geomagnetic A $\geq$ 20	01 Aug
31 Jul 2350	EXTENDED WARNING: Geomagnetic K = 5	28 Jul 2230 - 01Aug 2359
01 Aug 0135	ALERT: Geomagnetic K = 5	01 Aug 0135
01 Aug 0625	ALERT: Electron 2MeV Integral Flux > 1000pfu	01 Aug 0600
01 Aug 2354	EXTENDED WARNING: Geomagnetic K = 5	28 Jul 2230 - 02 Aug 1500
02 Aug 0534	ALERT: Electron 2MeV Integral Flux > 1000pfu	02 Aug 0500
02 Aug 1712	WARNING: Geomagnetic K = 4	02 Aug 1712 - 2359
02 Aug 1745	ALERT: Geomagnetic K = 4	02 Aug 1741
02 Aug 2044	WARNING: Geomagnetic K = 5	02 Aug 2044 - 2359
02 Aug 2354	WARNING: Geomagnetic K = 4	02 Aug 2354 - 03 Aug 1500
03 Aug 0017	3 - 245 MHz Radio Bursts	02 Aug
03 Aug 0017	1 - 245 MHz Radio Noise Storm	02 Aug
03 Aug 0442	ALERT: Geomagnetic K = 4	03 Aug 0441
03 Aug 0522	ALERT: Electron 2MeV Integral Flux > 1000pfu	03 Aug 0500



### 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
06 Aug	130	25	5	20 Aug	125	12	3
07	135	35	6	21	115	15	3
08	140	25	5	22	105	25	5
09	145	15	4	23	100	20	5
10	145	15	3	24	100	20	5
11	145	15	4	25	100	30	5
12	145	25	6	26	100	30	5
13	140	20	5	27	100	30	5
14	135	15	4	28	105	30	5
15	135	15	3	29	110	20	5
16	140	15	3	30	120	15	4
17	140	15	3	31	125	12	3
18	135	15	3	01 Sep	130	10	3
19	135	12	3				



### *Energetic Events*

Date	Time		X-ray		Optical Information			Peak		Sweep Freq		
	Begin	Max	$\frac{1}{2}$	Class	Integ Flux	Imp/ Brtns	Location		Radio Flux		Intensity	
			Max				Lat	CMD	245	2695	II	IV
29 Jul	0128	0139	0143	M1.3	.005	1f	S13E72	421		34		
30 Jul	0404	0410	0412	M2.5	.005	1b	N14W55	422		190		
02 Aug	2341	2354	0002	M1.3	.009	1f	S17E63	424				

### *Flare List*

Date	Time			X-ray Class.	Imp / Brtns	Optical		Rgn	
	Begin	Max	End			Location	Lat CMD		
28 July	0025	0028	0039	B4.6				422	
	0101	0102	0106		Sf	N13W26		422	
	0325	0328	0331	B5.1				422	
	0513	0520	0535	B4.9				421	
	0557	0609	0619		Sf	N14W31		422	
	0658	0702	0704	B4.5				422	
	1012	1016	1026	B6.2				422	
	1107	1112	1114	C1.2				421	
	1159	1203	1216	B9.2				422	
	1346	1347	1352	C1.0	Sf	N13W33		422	
	29 July	B0133	U0137	A0148	M1.3	1f	S13E72		421
		0532	0548	0550	C1.0				421
		0948	1009	1014	B3.7				422
1245		1304	1312	B8.0				422	
1449		1454	1459	B4.0				421	
1555		1557	1559	B3.7	Sf	S10E63		421	
1633		1641	1646	C1.7				422	
1906		1910	1920	B2.7				422	
2132		2138	2144	B6.1				422	
2257		2303	2309	B9.0				422	
30 July	2348	2349	0002	C1.4	Sf	N15W55		422	
	0059	0108	0122	B3.1				422	
	0212	0220	0229	C2.2				422	
	0408	0409	0446	M2.5	1b	N14W55		422	
	0517	0520	0530	B3.4				422	
	0652	0656	0700	B9.5				422	
	0952	1014	1024	B9.1				421	
	1943	1947	1950	B1.5					
	31 July	0046	0049	0052	B2.7				
		0440	0441	0444	B3.6	Sf	N13W67		422
0759		0803	0805	B3.0				422	
0830		0840	0845	B2.9					
1027		1029	1030	B2.7					
1618		1624	1638	B6.8					
2001		2007	2011	B6.5					
2117		2123	2129	B5.4					



*Flare List - continued.*

Date	Time			X-ray Class.	Optical		Rgn	
	Begin	Max	End		Imp / Brtns	Location Lat CMD		
31 July	2216	2221	2230	C1.9			423	
01 August	0119	0126	0132	C5.6			424	
	0327	0334	0357	C4.5				
	0523	0535	0542	C1.3			424	
	0607	0610	0616	B7.6			424	
	0706	0736	0750	C3.9			424	
	0934	0937	0942	B6.7			424	
	1042	1046	1050	B8.8			424	
	1110	1132	1144	C2.3			424	
	1321	1336	1357	C2.0				
	1648	1652	1659	C1.0			424	
	1659	1703	1710	C1.7				
	1724	1728	1732	C2.6			424	
	1827	1833	1839	B6.1			424	
	2044	2047	2050	B4.3				
	2211	2219	2229	B8.9				
	02 August	0043	0046	0047		Sf	S18E77	424
		0106	0212	0312	C1.7			
0227		0230	0235		Sf	S17E75	424	
0244		0245	0248		Sf	S18E75	424	
0327		0339	0344		Sf	S18E74	424	
0349		0354	0401		Sf	S18E74	424	
0702		0710	0715	B6.2	Sf	S18E72	424	
1533		1534	1553	B8.1	Sf	S17E71	424	
1604		1609	1617		Sf	S18E70	424	
1625		1650	1726	C1.1	Sf	S18E68	424	
1730		1734	1759	C4.5	1f	S17E68	424	
1917		1936	2005	B7.1	Sf	S17E67	424	
1930		1946	1954	C5.9			424	
2116		2132	2156	C3.8	Sf	S17E66	424	
2249		2256	2303	B9.0			424	
2345		2351	0031	M1.3	1f	S17E63	424	
03 August		0135	0141	0153		Sf	S18E62	424
	0223	0230	0250	C2.5	Sf	S18E62	424	
	0258	0305	0315	C1.1	1f	S18E62	424	
	0410	0418	0426	B6.5				
	0438	0450	0457		Sf	S18E61	424	
	0514	0517	0523		Sf	S18E60	424	



**Flare List - continued.**

Date	Time			X-ray Class.	Optical		Rgn
	Begin	Max	End		Imp / Brtns	Location Lat CMD	
03 August	0531	0531	0534		Sf	S18E60	424
	0608	0609	0612		Sf	S19E58	424
	0618	0622	0626	B4.7			427
	0701	0702	0705		Sf	S18E59	424
	0752	0754	0758	C1.5	Sf	N04W08	427
	0810	0811	0814		Sf	S18E58	424
	0934	0936	0948	C1.3	Sf	S22E60	424
	1308	1321	1341	B8.8			427
	1801	1809	1819	C1.0			424
	1912	1914	1920	C2.6	Sf	S16E53	424
	1938	1943	1950	B6.2			424
	2254	2259	2302	B8.4			424

**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 414</i>																	
17 Jul	S02E71	136	0090	03	Hax	001	A										
18 Jul	S02E58	136	0120	02	Hax	001	A										
19 Jul	S01E45	136	0110	02	Hax	002	A										
20 Jul	S02E32	136	0130	03	Hsx	001	A										
21 Jul	S03E19	136	0110	03	Hsx	002	A										
22 Jul	S03E05	137	0100	03	Hsx	001	A										
23 Jul	S03W08	136	0110	03	Hsx	001	A										
24 Jul	S04W20	135	0130	06	Cao	004	B										
25 Jul	S04W34	136	0110	06	Cso	003	B										
26 Jul	S04W49	138	0110	03	Hsx	002	A										
27 Jul	S04W62	138	0110	02	Hsx	001	A										
28 Jul	S04W76	138	0110	02	Hsx	001	A										
29 Jul	S04W91	140	0060	01	Hsx	001	A										

0 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 137



**Region Summary - continued.**

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

*Region 415*

19 Jul	N13E30	151	0040	06	Dao	011	B	2			2					
20 Jul	N13E16	152	0110	07	Dso	009	B				1					
21 Jul	N12E02	153	0080	10	Dso	010	B									
22 Jul	N12W11	153	0070	10	Cao	008	B									
23 Jul	N12W26	154	0050	08	Cso	006	B									
24 Jul	N11W39	154	0040	02	Hax	002	A									
25 Jul	N13W50	152	0010	04	Bxo	002	B									
26 Jul	N13W63	152														
27 Jul	N13W76	152														
28 Jul	N13W89	152														
									2	0	0	3	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 153

*Region 419*

23 Jul	N10E62	066	0010	01	Axx	002	A	1								
24 Jul	N11E50	065	0010	04	Bxo	003	B									
25 Jul	N10E35	067	0010	02	Axx	003	A									
26 Jul	N11E22	067	0020	08	Cao	008	B									
27 Jul	N11E09	067	0010	03	Bxo	002	B									
28 Jul	N11W03	067														
29 Jul	N11W16	067														
30 Jul	N11W29	065	0010	01	Axx	001	A									
31 Jul	N10W40	063														
									1	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 067







**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 423*

31 Jul	S19W03	026	0020	03	Cro	002	B	1									
01 Aug	S18W17	027	0010	03	Bxo	003	B										
02 Aug	S17W32	029	0010	01	Axx	001	A										
03 Aug	S15W38	021	0020	02	Dao	002	B										
									1	0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 026

*Region 424*

01 Aug	S18E77	293	0120	06	Dao	002	B	6									
02 Aug	S18E64	293	0310	10	Dki	006	B	4	1		11	2					
03 Aug	S18E52	291	0580	10	Dki	016	B	5			10	1					
								15	1	0	21	3	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 291

*Region 425*

02 Aug	S08E61	296	0120	07	Cso	003	B										
03 Aug	S08E50	293	0140	07	Cso	011	B										
								0	0	0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 293

*Region 426*

02 Aug	S12E32	325	0030	04	Cso	005	B										
03 Aug	S12E18	325	0030	04	Cso	007	B										
								0	0	0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 325

*Region 427*

03 Aug	N04W16	359	0060	04	Dao	011	B	1			1						
								1	0	0	1	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 359

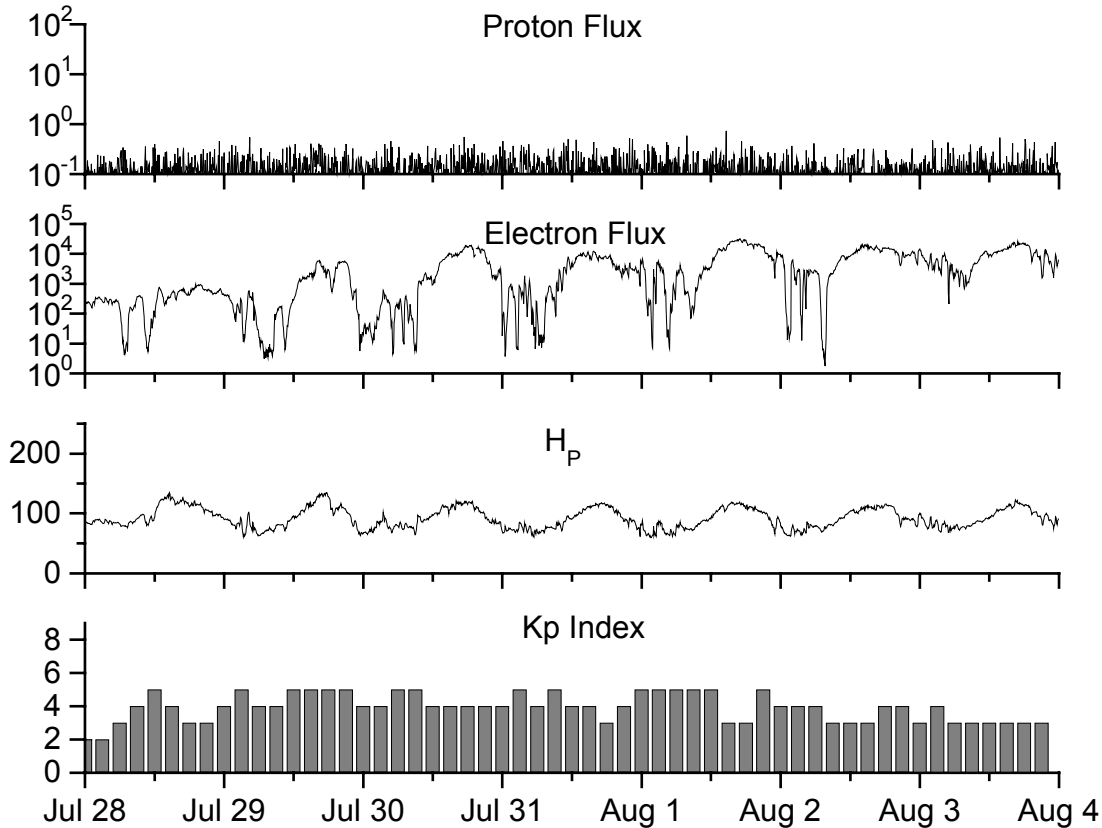


**Recent Solar Indices (preliminary)  
of the observed monthly mean values**

Month	Sunspot Numbers			Radio Flux		Geomagnetic			
	Observed values SWO	Ratio RI	Ratio RI/SWO	Smooth values SWO	Smooth RI	*Penticton 10.7 cm	Smooth Value	Planetary Ap	Smooth Value
<b>2001</b>									
July	124.6	81.1	0.66	172.1	111.7	131.3	183.9	9	12.9
August	159.4	106.4	0.67	176.7	113.6	163.1	188.8	11	13.0
September	229.1	150.7	0.66	178.8	114.1	233.8	191.3	13	12.8
October	197.3	125.5	0.64	179.5	114.0	208.1	191.9	20	12.0
November	178.6	106.5	0.60	183.7	115.5	212.7	193.7	16	12.0
December	217.5	132.2	0.61	184.5	114.6	235.6	193.9	09	12.2
<b>2002</b>									
January	189.0	114.1	0.60	184.8	113.5	227.3	194.6	08	12.4
February	194.5	107.4	0.55	188.6	114.7	205.0	197.2	10	12.8
March	153.1	98.4	0.64	188.9	113.4	180.3	195.7	10	13.0
April	194.9	120.7	0.62	186.2	110.5	189.8	191.5	15	13.2
May	204.1	120.8	0.59	183.6	108.9	178.4	188.0	15	13.3
June	146.0	88.3	0.60	179.9	106.3	148.7	183.0	11	13.5
July	183.5	99.9	0.54	175.4	102.7	173.5	173.5	13	13.9
August	191.0	116.4	0.61	169.3	98.7	183.9	169.5	16	14.3
September	206.4	109.6	0.53	163.4	94.6	175.8	164.2	14	14.9
October	153.9	97.5	0.63	158.7	90.5	167.0	159.5	23	15.5
November	159.8	95.5	0.60	150.5	85.3	168.7	154.3	16	16.1
December	147.9	80.8	0.55	144.6	82.1	158.6	150.9	13	17.0
<b>2003</b>									
January	149.3	79.5	0.53			144.6		13	
February	87.9	46.2	0.53			124.6		15	
March	119.7	61.5	0.51			132.3		19	
April	114.3	60.0	0.52			126.5		20	
May	89.6	55.2	0.62			116.2		25	
June	118.4	77.4	0.65			129.4		24	

**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 28 Jul 2003*

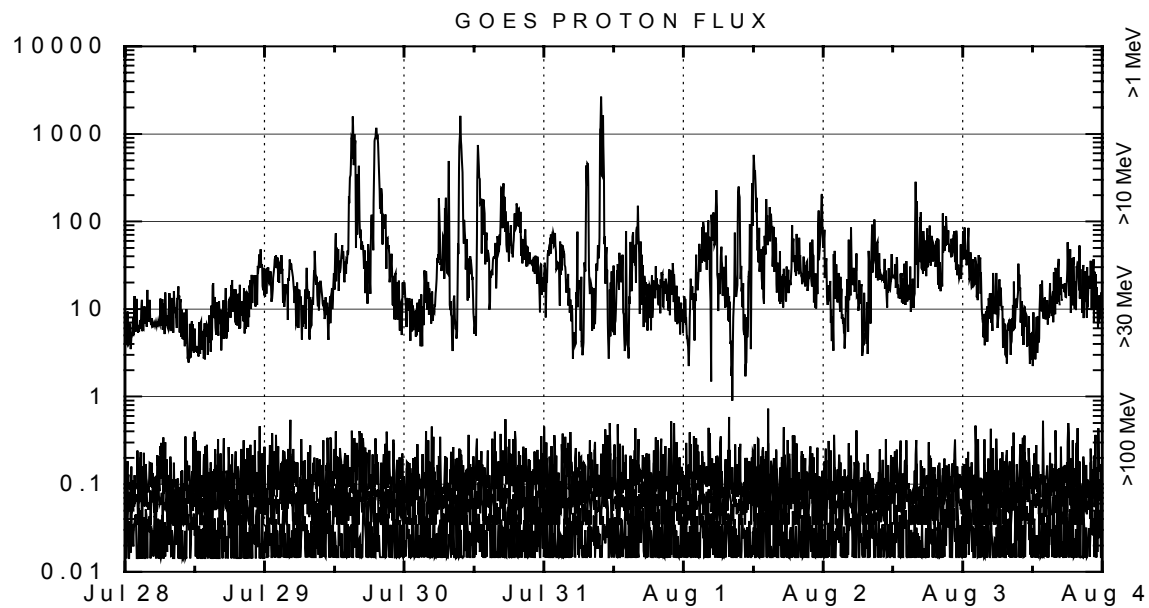
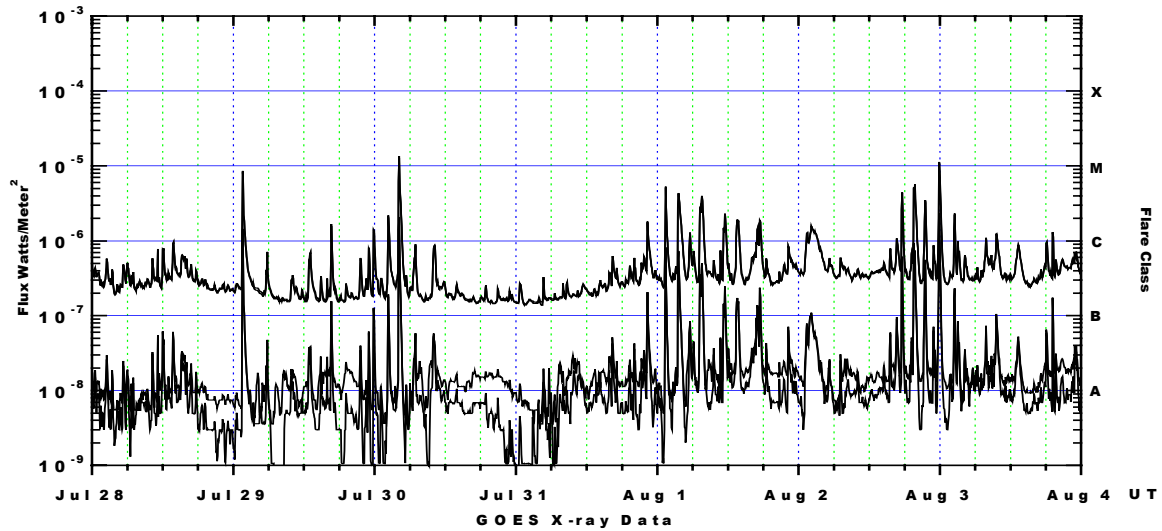
*Protons* plot contains the five-minute averaged integral proton flux (protons/cm<sup>2</sup>-sec -sr) as measured by GOES-11 (W113) for each of three energy thresholds: greater than 10, 50, and 100 MeV.

*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-12.

*H<sub>p</sub>* plot contains the five minute averaged magnetic field H - component in nanoteslas (nT) as measured by GOES-12. 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 ( $\text{watts/m}^2$ ) as measured by GOES 12 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 ( $\text{protons/cm}^2\text{-sec-sr}$ ) as measured by GOES-11 (W113) for each of the energy thresholds: >1, >10, >30 and >100 MeV. P10 event threshold is 10 pfu ( $\text{protons/cm}^2\text{-sec-sr}$ ) at greater than 10 MeV.

