

**Space Weather Highlights**  
**05 - 11 August 2002**

**SWO PRF 1406**  
**13 August 2002**

Solar activity was low for most of the period. Activity reached moderate levels on 05 August due to a minor M-class flare from Region 63 (N17, L = 003, class/area Eao/250 on 09 August) and 07 August due to an isolate M-class event from Region 57 (S08, L = 146, class/area Eac/380 on 04 August). For flare times and magnitudes, please refer to the Energetic Events or Optical Flare lists. Region 57 began the period in a decay phase and continued until it rotated beyond the western limb on 08 August. Region 61 (N08, L = 041, class/area Ekc/360 on 09 August) exhibited steady growth early in the period and developed a minor magnetic delta configuration in the intermediate spots on 07-08 August. The only other events of interest were a number of disappearing filaments, most notable a 19 degree filament which lifted off at approximately 11/0700 UTC and was visible in LASCO EIT195 imagery. Late in the period, a moderate sized spot group Region 69 (S08, L = 297, class/area Eko/450 on 11 August) rotated onto view and appears to be developing.

Solar wind data were available from the NASA Advanced Composition Explorer (ACE) spacecraft for most of the summary period. Solar wind velocities decreased during the first half of the period down to approximately 300 km/s on 08 August. Wind velocities increased on 09-10 August to a peak velocity around 450 km/s and on 11 August a high-speed stream increased solar wind velocity to around 550 km/s.

There were no proton events at geo-synchronous orbit.

Greater than 2 MeV electrons flux at geo-synchronous orbit was at normal to moderate levels.

Geomagnetic field activity was at quiet to unsettled levels for most of the period. On 09-11 August, periods of active conditions were observed and the higher latitudes reported periods of minor to major storming. An isolated period of minor storm level was observed on 10 August.

**Space Weather Outlook**  
**14 August - 09 September 2002**

Solar activity is expected to be low to moderate. M-class events are expected during the first half of the forecast period. There is a chance of major flare activity due to the return of old Regions 39, old Region 44 and presence of Region 69 on the disk early in the period.

There will be a chance for a proton event during the first half of the period.

Greater than 2 MeV electrons flux is expected to be moderate on 14-16 August due to coronal hole effects. Normal to moderate levels are expected the remainder of the period.

Geomagnetic field activity is expected to be quiet to unsettled during most of the forecast period. Active conditions are possible on 23 August and 07-08 September due to returning 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
05 August	142	144	780	B9.5	2	1	0	2	0	0	0	0
06 August	145	135	910	B8.0	8	0	0	8	2	0	0	0
07 August	136	141	970	B6.8	7	1	0	2	0	0	0	0
08 August	135	150	880	B5.5	5	0	0	2	0	0	0	0
09 August	140	164	770	B6.8	3	0	0	1	0	0	0	0
10 August	148	140	870	B8.0	2	0	0	0	0	0	0	0
11 August	172	180	1280	B8.5	12	0	0	5	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
05 August	5.5E+5	1.3E+4	2.5E+3		1.6E+7	
06 August	1.9E+5	1.2E+4	2.7E+3		8.6E+6	
07 August	1.5E+5	1.2E+4	2.9E+3		1.2E+7	
08 August	2.3E+5	1.3E+4	3.0E+3		4.2E+6	
09 August	1.3E+5	1.4E+4	3.0E+3		8.8E+5	
10 August	2.5E+5	1.3E+4	3.3E+3		2.0E+6	
11 August	2.1E+5	1.8E+4	3.3E+3		4.0E+6	

### Daily Geomagnetic Data

Date	Middle Latitude		High Latitude		Estimated	
	Fredericksburg		College		Planetary	
	A	K-indices	A	K-indices	A	K-indices
05 August	4	1-2-1-0-1-1-1-2	4	1-2-1-1-0-1-1-2	8	2-2-2-1-2-2-3-3
06 August	4	2-2-1-1-2-1-0-1	4	2-2-1-2-2-0-1-0	9	3-3-1-2-2-3-3-1
07 August	4	2-2-1-1-1-1-1-1	4	2-1-2-1-1-1-1-1	8	2-3-2-2-2-2-3-2
08 August	5	1-1-0-1-2-1-2-3	5	1-2-0-0-3-1-2-2	10	2-3-1-2-3-3-3-3
09 August	9	1-1-2-2-3-2-3-3	20	1-1-2-2-6-4-3-3	15	2-2-2-2-4-3-4-4
10 August	13	4-4-1-2-3-2-2-2	24	5-5-3-3-5-2-2-2	16	4-5-2-2-3-3-3-3
11 August	13	2-1-2-3-3-3-4-3	31	1-2-2-6-6-5-3-2	15	2-3-2-4-4-3-3-3

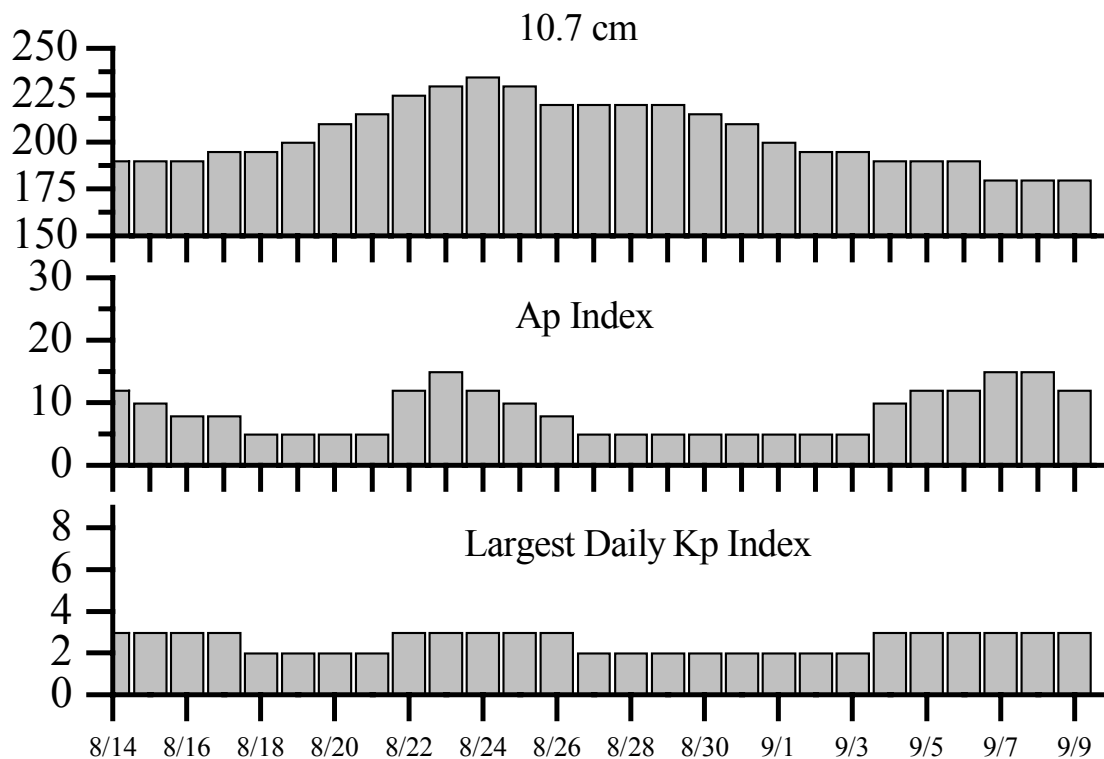


### *Alerts and Warnings Issued*

<u>Date &amp; Time of Issue</u>	<u>Type of Alert or Warning</u>	<u>Date &amp; Time of Event UT</u>
05 Aug 0029	4 - 245 MHz Bursts	04 Aug
05 Aug 0029	1 - 245 MHz Radio Noise Storm	04 Aug
06 Aug 1308	SUMMARY: 10cm Radio Burst	06 Aug 1256
08 Aug 0053	1 - 245 MHz Radio Noise Storm	07 Aug
09 Aug 0036	1 - 245 MHz Radio Noise Storm	08 Aug
09 Aug 1357	WARNING: Geomagnetic K= 4	09 Aug 1400 - 2359
09 Aug 1403	ALERT: Geomagnetic K= 4	09 Aug 1401
09 Aug 2318	EXTENDED WARNING: Geomagnetic K= 4	09/1400 - 10/1800 Aug
10 Aug 0121	1 - 245 MHz Radio Noise Storm	09 Aug
11 Aug 0133	3 - 245 MHz Bursts	10 Aug
11 Aug 0133	1 - 245 MHz Radio Noise Storm	10 Aug
11 Aug 1445	ALERT: Geomagnetic K= 4	11 Aug 1440
11 Aug 1552	WARNING: Geomagnetic K= 4 expected	11 Aug 1555 - 2359
11 Aug 2355	EXTENDED WARNING: Geomagnetic K= 4	11/1555 -12/1800 Aug



### 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
14 Aug	190	12	3	28	220	5	2
15	190	10	3	29	220	5	2
16	190	8	3	30	215	5	2
17	195	8	3	31	210	5	2
18	195	5	2	01 Sep	200	5	2
19	200	5	2	02	195	5	2
20	210	5	2	03	195	5	2
21	215	5	2	04	190	10	3
22	225	12	3	05	190	12	3
23	230	15	3	06	190	12	3
24	235	12	3	07	180	15	3
25	230	10	3	08	180	15	3
26	220	8	3	09	180	12	3
27	220	5	2				



### *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
05 Aug	2114	2122	2130	M1.0	.007							
07 Aug	0118	0126	0148	M1.1	.013							

### *Flare List*

Date	Time			X-ray Class.	Imp / Brtns	Optical		Rgn
	Begin	Max	End			Location Lat CMD		
05 August	0329	0329	0336	C1.5	Sf	S07W45		0057
	0515	0517	0528	C4.8	Sf	S10W43		0057
	2114	2122	2130	M1.0				0063
06 August	0138	0143	0213	C8.3	1f	S07W57		0057
	0517	0518	0527	C2.1	Sf	N18E84		
	1129	1130	1140	C4.3	Sf	S08W58		0057
	1210	1210	1223	C2.8	Sf	N09E51		0061
	1231	1232	1242	C3.3	Sf	N09E51		0061
	1246	1258	1310	C7.9	1n	N17E80		0063
	1441	1444	1447		Sf	S05E08		0058
	1521	1524	1602	C7.6	Sf	S06W66		0057
	2007	2007	2011	C1.3	Sf	N09E66		
07 August	2235	2236	2243		Sf	N18E76		0063
	0118	0126	0148	M1.1				0057
	0318	0324	0344	C1.3				
	0529	0535	0547	C1.5				
	0635	0636	0651	C1.5	Sf	N18E61		0063
	0711	0719	0726	C2.6				
	1007	1010	1012	B9.8				
	1033	1038	1046	C1.9				
	1336	1336	1348	C1.3	Sf	N09E35		0061
	1354	1400	1409	C1.4				
08 August	1935	1939	1944	B8.8				
	0100	0104	0107	C1.9				
	B0701	U0702	A0711	C1.1	Sf	N10E27		0061
	0934	0941	0951	C1.2				
	1110	1112	1115	C1.4	Sf	S08W83		0057
09 August	1155	1159	1204	C1.3				
	0416	0422	0434	C1.6				
	B0648	U0648	0657	C1.4	Sf	N09E08		0061
10 August	0838	0900	0919	C2.0				
	0941	0945	0949	C2.0				
	2007	2010	2017	C1.4				



*Flare List - continued.*

Date	Time			X-ray Class.	Optical		Rgn
	Begin	Max	End		Imp / Brtns	Location Lat CMD	
11 August	0855	0859	0907	C1.5			
	0923	0928	0932	C1.8			
	1137	1147	1158	C9.5			
	1336	1338	1349	C2.2	Sf	N13E47	0066
	1350	1357	1403	C1.9			
	1409	1411	1425	C2.3	Sf	S05E79	0069
	1441	1443	1517	C2.3	Sf	N09W18	0061
	1631	1631	1635		Sf	N10W21	0061
	1645	1649	1651	C3.0			
	1735	1801	1813	C7.9			
	2022	2026	2029	C1.7			
	2119	2119	2126	C3.6	Sf	S03W60	0058
	2210	2222	2231	C3.3			









**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												
05 Aug	N14W16	110	0030	07	Cso	005	B												
06 Aug	N14W29	110	0020	02	Hsx	002	A												
07 Aug	N12W44	111	0020	02	Hrx	002	A												
08 Aug	N13W58	112	0010	00	Hrx	001	A												
09 Aug	N13W71	112																	
10 Aug	N13W84	112																	
									1	0	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																	
05 Aug	N05W17	112																	
06 Aug	N05W30	112																	
07 Aug	N05W43	112																	
									0	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												
05 Aug	S07W53	147	0370	14	Eai	031	Bg	2			2								
06 Aug	S07W66	147	0340	12	Eai	015	Bg	3			2	1							
07 Aug	S08W79	146	0270	14	Eai	008	Bg		1										
08 Aug	S08W91	145	0150	05	Dai	006	B	1			1								
								14	1	0	16	1	0	0	0	0			

Crossed West Limb.

Absolute heliographic longitude: 145



**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 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												
05 Aug S06E15	079	0020	01	Hsx	001	A												
06 Aug S06E03	078	0040	06	Cso	007	B						1						
07 Aug S06W08	075	0050	08	Dao	008	B												
08 Aug S06W22	076	0050	07	Dao	008	B												
09 Aug S07W35	076	0090	08	Dao	015	B												
10 Aug S06W48	075	0080	09	Dso	008	B												
11 Aug S05W61	075	0110	09	Dso	010	B	1					1						
							1	0	0	0	2	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 078

*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												
05 Aug N15E28	066	0080	07	Dao	010	B												
06 Aug N13E14	067	0060	07	Cso	010	B												
07 Aug N13E00	067	0040	05	Cso	004	B												
08 Aug N13W15	069	0020	03	Cso	003	B												
09 Aug N14W26	067	0030	05	Dso	008	B												
10 Aug N15W39	066	0030	04	Cso	003	B												
11 Aug N15W52	066	0000	00		000													
							0	0	0	0	0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 067

*Region 60*

03 Aug S28W26	147	0030	04	Bxo	008	B												
04 Aug S28W41	148	0040	07	Dro	005	B												
05 Aug S27W52	146	0020	07	Cro	004	B												
06 Aug S27W65	146																	
07 Aug S27W78	146																	
08 Aug S27W91	146																	
							0	0	0	0	0	0	0	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 147



**Region Summary - continued.**

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

*Region 61*

03 Aug N08E77	044	0180	02	Hsx	001	A								
04 Aug N08E65	042	0190	05	Dao	007	B								
05 Aug N07E53	041	0190	08	Cao	009	B								
06 Aug N08E41	040	0280	11	Eai	027	B	2			2				
07 Aug N09E27	040	0310	10	Dai	030	Bd	1			1				
08 Aug N08E14	040	0340	10	Dki	031	Bd	1			1				
09 Aug N08E00	041	0360	12	Ekc	051	Bg	1			1				
10 Aug N08W15	042	0290	11	Ehi	028	Bg								
11 Aug N07W28	042	0150	10	Cai	019	Bg	1			2				
							6	0	0	7	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 041

*Region 62*

05 Aug S05W23	117	0010	03	Cro	003	B								
06 Aug S05W36	117													
07 Aug S05W49	117													
08 Aug S05W62	117													
09 Aug S05W75	117													
							0	0	0	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 117

*Region 63*

06 Aug N15E75	006	0110	12	Eso	003	B	1			1	1			
07 Aug N17E66	001	0200	11	Eao	004	B	1			1				
08 Aug N18E51	003	0220	11	Eao	006	B								
09 Aug N17E38	003	0250	14	Eao	015	B								
10 Aug N17E26	001	0220	10	Dao	011	B								
11 Aug N17E13	001	0160	10	Dso	010	B								
							2	0	0	2	1	0	0	0

Still on Disk.

Absolute heliographic longitude: 001

*Region 64*

07 Aug S20E13	054	0020	03	Cso	004	B								
08 Aug S20W02	056	0020	02	Hsx	003	A								
09 Aug S20W14	055	0020	03	Dro	003	B								
10 Aug S20W27	055													
11 Aug S20W40	055													
							0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 056



**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 65*

08 Aug S10E55	359	0000	00	Axx	001	A												
09 Aug S09E41	000	0010	01	Axx	001	A												
10 Aug S09E26	001	0010	03	Bxo	002	B												
11 Aug S09E13	001																	

Still on Disk.

Absolute heliographic longitude: 001

*Region 66*

09 Aug N14E70	331	0010	01	Axx	001	A												
10 Aug N13E57	330	0080	08	Dso	006	B												
11 Aug N13E42	332	0050	05	Dro	008	B	1				1							
							1	0	0	1	0	0	0	0	0			

Still on Disk.

Absolute heliographic longitude: 332

*Region 67*

10 Aug N09E71	316	0070	02	Hax	001	A												
11 Aug N09E58	316	0150	08	Dao	010	B												

Still on Disk.

Absolute heliographic longitude: 316

*Region 68*

10 Aug S07E71	316	0090	02	Hax	001	A												
11 Aug S08E60	314	0150	10	Dso	009	B												

Still on Disk.

Absolute heliographic longitude: 314

*Region 69*

11 Aug S08E77	297	0450	13	Eko	005	B	1				1							
							1	0	0	1	0	0	0	0				

Still on Disk.

Absolute heliographic longitude: 297

*Region 70*

11 Aug N05W05	019	0010	05	Bxo	005	B												

Still on Disk.

Absolute heliographic longitude: 019



***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	4							
<i>Region 71</i>																						
11 Aug	N11E68	306	0040	02	Hax	002	A															
Still on Disk.																						
Absolute heliographic longitude: 306																						
<i>Region 72</i>																						
11 Aug	S18W23	037	0010	02	Bxo	002	B															
Still on Disk.																						
Absolute heliographic longitude: 037																						

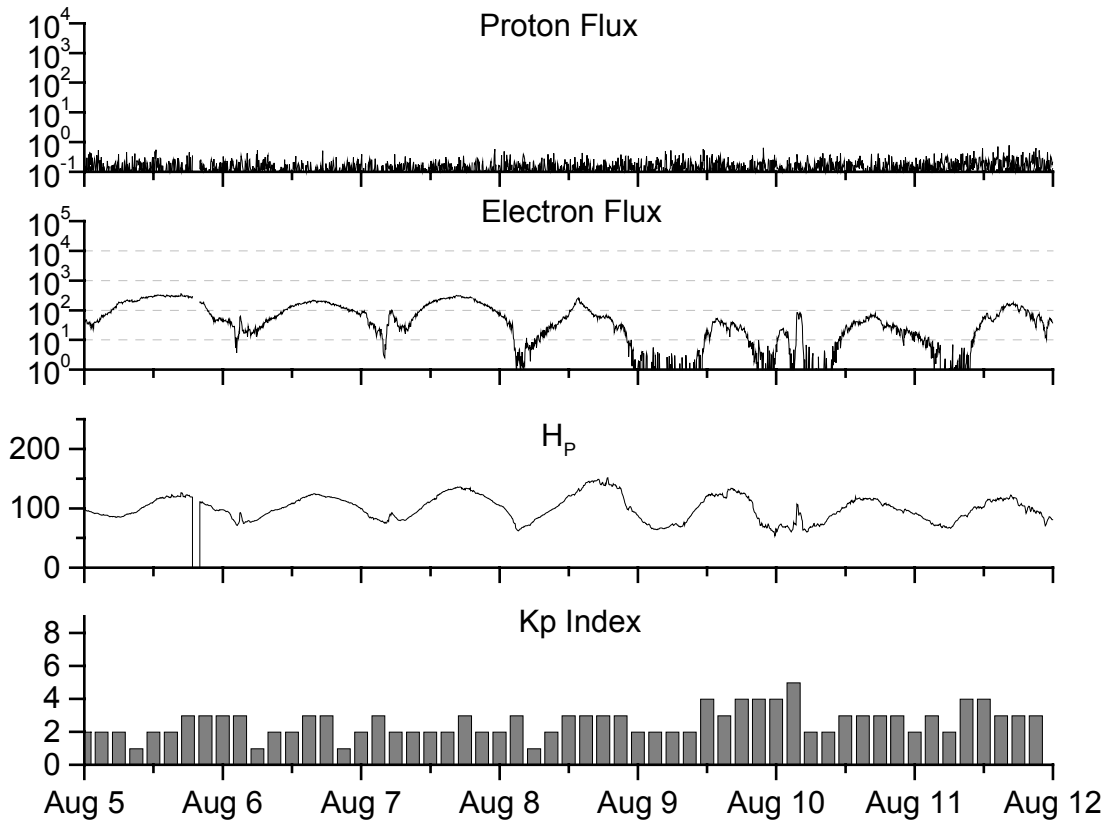


**Recent Solar Indices (preliminary)  
of the observed monthly mean values**

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 05 August 2002*

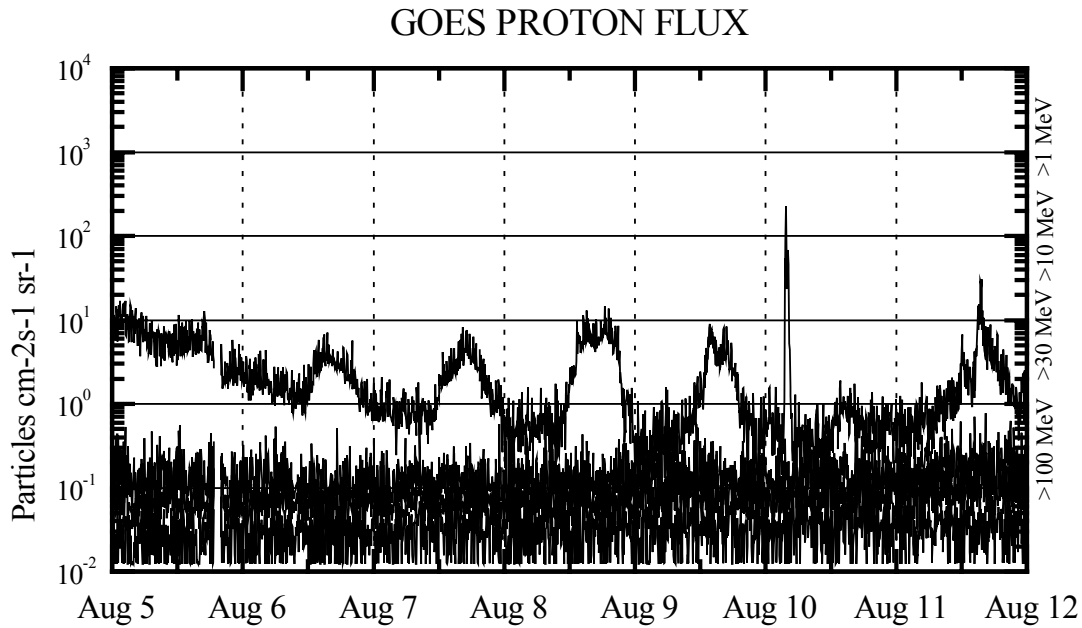
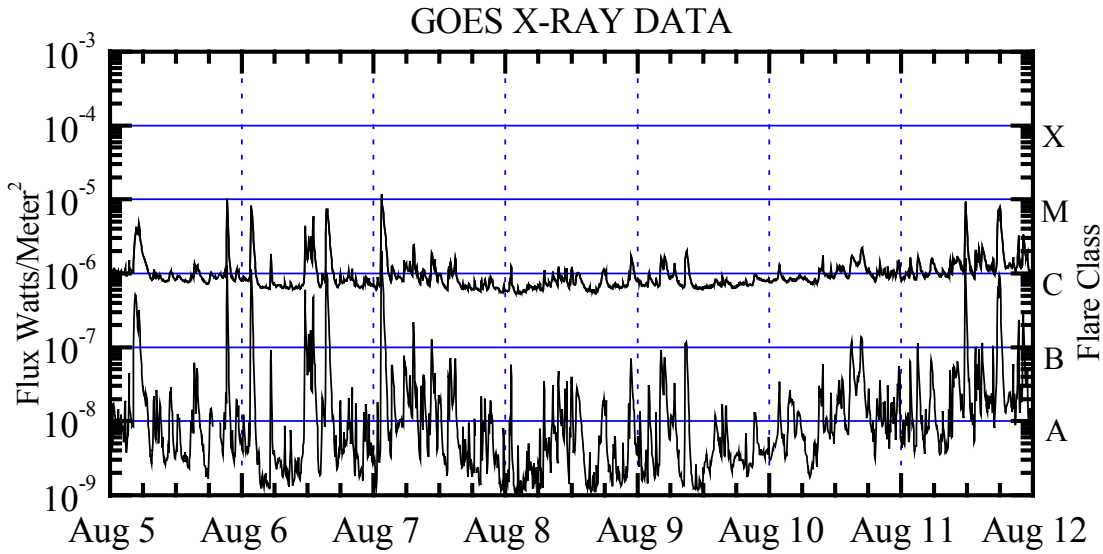
*Protons* plot contains the five-minute averaged integral proton flux (protons/cm<sup>2</sup>-sec-sr) as measured by GOES-8 (W75) for each of three energy thresholds: greater than 10, 50, and 100 MeV.

*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.

