

**Space Weather Highlights**  
**09 - 15 July 2001**

**SWO PRF 1350**  
**17 July 2001**

Solar activity ranged from very low to moderate levels. Activity was at mostly very low levels through 13 July with isolated B-class subflares. Activity increased to moderate levels on 14 July due to an isolated M1/Sf flare at 14/2133 UTC from Region 9539 (S18, L = 165, class/area Eai/110 on 15 July), which began a gradual growth phase on 12 July. Activity dropped to low levels on 15 July with isolated C-class flares from Region 9539.

Data were available from the Advanced Composition Explorer (ACE) spacecraft for most of the period. No significant coronal transients or high speed streams were observed. Periods of sustained southward IMF Bz occurred during 10 and 12 - 15 July with maximum southerly deflections to minus 10 nT (GSM).

There were no proton events during the period.

The greater than 2 MeV electron flux at geosynchronous orbit was at normal levels during the period.

Geomagnetic field activity was at quiet to active levels during 09 - 11 July with brief minor storm periods at high latitudes. Activity decreased to quiet to unsettled levels during 12 - 13 July. Activity increased to quiet to (isolated) minor storm levels during 14 - 15 July.

**Space Weather Outlook**  
**18 July - 13 August 2001**

Solar activity is expected to range from low to moderate levels. Isolated M-class flares will be possible during the period. There will be a slight chance for a major flare during the period.

There will be a slight chance for a proton event during the period.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to be at normal to moderate levels during most of the period.

The geomagnetic field is expected to be at quiet to unsettled levels during most of the period, barring an Earth-directed CME. However, active conditions will be possible during 18 July and 12 - 13 August due to recurrent 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
09 July	130	109	380	B7.3	5	0	0	5	0	0	0	0
10 July	130	116	420	B3.1	0	0	0	1	0	0	0	0
11 July	132	115	410	B3.3	2	0	0	1	0	0	0	0
12 July	134	119	510	B6.0	0	0	0	1	0	0	0	0
13 July	133	146	660	B3.6	0	0	0	3	0	0	0	0
14 July	141	161	720	B3.4	5	1	0	8	0	0	0	0
15 July	142	142	860	B7.0	4	0	0	6	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
09 July	6.6E+4	1.1E+4	2.3E+3		2.0E+6	
10 July	6.0E+4	1.1E+4	2.4E+3		2.6E+6	
11 July	3.2E+4	1.1E+4	2.4E+3		1.8E+5	
12 July	3.4E+5	1.3E+4	2.5E+3		6.1E+5	
13 July	3.3E+5	1.3E+4	2.8E+3		5.4E+5	
14 July	1.8E+5	1.2E+4	2.7E+3		7.5E+5	
15 July	7.0E+4	1.1E+4	2.6E+3		1.0E+6	

**Daily Geomagnetic Data**

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
09 July	7	4-2-1-1-1-1-1-1	10	5-3-1-0-0-1-2-1	11	4-3-1-2-2-3-2-2
10 July	7	1-2-2-2-2-2-2-2	18	0-2-4-4-4-5-2-1	11	1-2-3-3-3-3-3-3
11 July	5	3-2-0-0-2-1-2-1	15	5-5-2-0-2-1-1-1	9	3-3-1-1-2-3-3-2
12 July	8	2-2-3-1-2-1-1-3	10	4-3-2-2-2-1-2-1	9	2-2-3-2-3-3-2-3
13 July	7	3-2-1-2-1-1-1-3	*	*-*-*-*-*-*-*	9	2-2-1-2-2-3-3-3
14 July	13	4-5-1-2-2-1-1-2	16	3-4-1-4-4-4-0-1	13	4-4-2-2-3-3-2-2
15 July	6	1-1-1-1-2-2-3-2	13	1-1-2-2-3-5-3-1	11	2-0-3-2-3-4-4-2

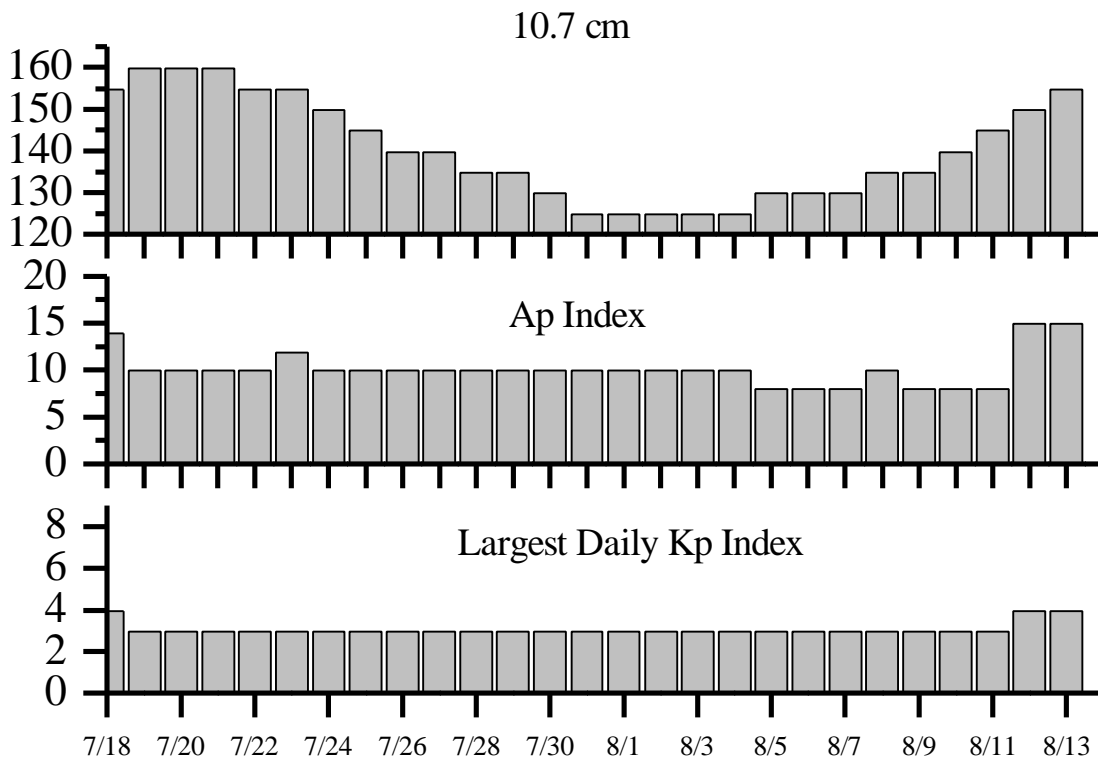


*Alerts and Warnings Issued*

Date & Time of Issue	Type of Alert or Warning	Date & Time of Event UT
09 Jul 0042	245 MHz Radio Burst	08 Jul
09 Jul 0255	K = 4 Warning	09 Jul 0300 - 1500
09 Jul 0300	K = 5 Observed	09 Jul 0000 - 0300
14 Jul 0438	K = 4 Warning	14 Jul 0438 - 1500
14 Jul 0450	K = 5 Warning	14 Jul 0450 - 1500
14 Jul 0601	K = 4 Observed	14 Jul 0300 - 0600
15 Jul 1800	K = 4 Observed	15 Jul 1500 - 1800



## 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
18 July	155	14	4	01 Aug	125	10	3
19	160	10	3	02	125	10	3
20	160	10	3	03	125	10	3
21	160	10	3	04	125	10	3
22	155	10	3	05	130	8	3
23	155	12	3	06	130	8	3
24	150	10	3	07	130	8	3
25	145	10	3	08	135	10	3
26	140	10	3	09	135	8	3
27	140	10	3	10	140	8	3
28	135	10	3	11	145	8	3
29	135	10	3	12	150	15	4
30	130	10	3	13	155	15	4
31	125	10	3				



***Energetic Events***

Date	Time		X-ray		Optical Information			Peak		Sweep Freq		
	Begin	Max	½ Max	Class	Integ Flux	Imp/ Brtns	Location Lat CMD	Rgn #	Radio Flux		Intensity	
									245	2695	II	IV
14 Jul 01	2126	2133	2140	M1.0	.005	SF	S19W02	9539				

***Flare List***

Date	Time			X-ray Class.	Optical Imp / Brtns	Location Lat CMD	Rgn
	Begin	Max	End				
09 July	0034	0043	0117	C2.3	SF	S08E20	9531
	0334	0337	0339	B7.0			
	0529	0533	0536	B9.2			
	0538	0542	0544	C3.1			
	0739	0740	0749	B9.6	SF	S05E16	9531
	0838	0840	0903	C1.5	SF	S06E15	9531
	0854	0857	0900	C1.8			
	1025	1025	1030	B5.0	SF	S06E16	9531
	1245	1251	1306	C1.3	SF	S06E13	9531
	1524	1527	1530	B5.3			
10 July	1756	1800	1805	B8.5			
	0709	0709	0719	B4.7	SF	S07E05	9531
11 July	1218	1225	1253	B7.1			
	0046	0047	0050	C1.2	SF	S07W10	9531
12 July	1703	1711	1721	C2.4			
	0002	0155	0201	B9.7			
13 July	2019	2022	2024	B4.9			
	2248	2248	2251	B7.0	SF	S19E27	9539
	0044	0046	0051	B5.0			
14 July	0750	0750	0756	B7.3	SF	S08W17	9533
	2318	2319	2323		SF	N16E69	9541
	2326	2328	2330		SF	N16E68	9541
	0148	0153	0157	B7.1			
15 July	0230	0233	0236	B5.6			
	0425	0429	0443	C2.0	SF	S17E05	9539
	0512	0513	0542	C1.2	SF	S17E06	9539
	1007	1019	1025	C1.2			
	1733	1758	1808	C1.45	SF	S19E01	9539
	1848	1849	1853		SF	N18E59	9541
	1901	1905	1923	C1.18	SF	S17E04	9539
	1953	2001	2013		SF	S19E04	9539
	2126	2141	2152	M1.0	SF	S19W02	9539
	2208	2209	2215		SF	N07E80	9542
15 July	0009	0023	0108	C7.7	1F	S19W05	9539
	0046	0048	0052	C2.0			9539
	0505	0507	0512	B6.1	SF	S24E88	9543
	0645	0652	0721	C6.9	SF	S19W08	9539



**Flare List- continued**

Date	Time			X-ray Class.	Imp / Brtns	Optical	Rgn
	Begin	Max	End			Location Lat CMD	
15 July	0735	0736	0801		SF	S18W10	9539
	1135	1140	1152	B9.9			
	1352	1408	1435	C2.4	SF	S19W10	9539
	1435	1444	1448		SF	S25E79	9543
	2038	2044	2051	B5.7	SF	S09W50	9533
	2320	2325	2332	B8.6			

**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

*Region 9522*

28 Jun	S08E66	309	0030	02	HSX	001	A											
29 Jun	S08E52	309	0030	01	HSX	001	A											
30 Jun	S08E38	310	0030	01	HAX	001	A											
01 Jul	S08E24	311	0020	01	HSX	001	A											
02 Jul	S08E12	310	0010	02	HSX	001	A											
03 Jul	S08W01	310	0010	01	HRX	001	A											
04 Jul	S08W14	310																
05 Jul	S09W26	307	0000	04	BXO	003	B											
06 Jul	S09W39	307																
07 Jul	S09W52	307																
08 Jul	S09W65	307																
09 Jul	S09W78	307																

0 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 310



**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 9525*

30 Jun	N19E72	276	0040	02	HSX	001	A												
01 Jul	N19E60	275	0050	03	CAO	002	B												
02 Jul	N18E47	275	0040	03	CAO	003	B												
03 Jul	N20E34	275	0050	05	CAO	005	B												1
04 Jul	N20E23	272	0070	06	DAO	008	B												
05 Jul	N19E10	271	0030	05	CSO	007	B												
06 Jul	N18W03	271	0030	04	CSO	005	B												
07 Jul	N20W16	271	0020	03	BXO	004	B												
08 Jul	N19W30	272	0000	01	AXX	002	A												
09 Jul	N19W43	272																	
10 Jul	N19W56	272																	
11 Jul	N19W69	272																	
12 Jul	N19W82	272																	
																			0 0 0 1 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 271

*Region 9526*

01 Jul	N09E64	271	0040	01	HSX	002	A												
02 Jul	N08E53	269	0030	07	CAO	003	B												
03 Jul	N09E37	272	0010	01	AXX	001	A												
04 Jul	N08E24	271	0010	01	HSX	001	A												
05 Jul	N08E11	271																	
06 Jul	N08W02	271																	
07 Jul	N08W15	271																	
08 Jul	N08W28	271																	
09 Jul	N08W41	271																	
10 Jul	N08W54	271																	
11 Jul	N08W67	271																	
12 Jul	N08W80	271																	
																			0 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 271



**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 9527*

01 Jul S16E74	261	0070	02	HAX	002	A												
02 Jul S17E60	262	0110	05	CAO	004	B												
03 Jul S17E50	259	0130	07	CAO	006	B												
04 Jul S17E36	259	0120	06	CAO	004	B												
05 Jul S18E22	259	0130	02	HAX	003	A												
06 Jul S18E08	260	0110	03	HAX	003	A												
07 Jul S18W05	260	0100	03	HAX	003	A												
08 Jul S17W17	259	0070	07	CAO	007	B												
09 Jul S18W31	260	0050	03	CAO	005	B												
10 Jul S18W44	259	0030	03	CSO	003	B												
11 Jul S19W55	257	0020	05	BXO	004	B												
12 Jul S19W66	255																	
13 Jul S19W79	255																	

0 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 260

*Region 9528*

02 Jul N04E59	263	0070	03	CAO	003	B												
03 Jul N06E47	262	0050	05	CAO	005	B												
04 Jul N04E32	263	0040	02	CAO	002	B												
05 Jul N04E19	262	0020	01	AXX	002	A												
06 Jul N04E05	263	0010	04	BXO	002	B												
07 Jul N04W09	264	0000	00	AXX	001	A												
08 Jul N04W22	264																	
09 Jul N04W35	264																	
10 Jul N04W48	264																	
11 Jul N04W61	264																	

0 0 0 1 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 263







**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 9532*

08 Jul	N09W46	288	0010	02	BXO	002	B
09 Jul	N08W57	286	0040	04	CSO	004	B
10 Jul	N07W75	290	0010	01	AXX	001	A
11 Jul	N07W88	290					

0 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 288

*Region 9533*

09 Jul	S09E29	200	0040	04	CSO	003	B
10 Jul	S09E17	198	0040	06	DAO	006	B
11 Jul	S09E03	199	0020	06	DSO	005	B
12 Jul	S09W12	201	0030	07	CSO	007	B
13 Jul	S09W26	202	0030	06	CSO	005	B
14 Jul	S09W40	203	0050	06	DAO	008	B
15 Jul	S08W54	203	0040	07	DSO	008	B

1  
1  
0 0 0 2 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 199

*Region 9534*

10 Jul	N18E68	147	0020	04	BXO	002	B
11 Jul	N15E55	147					
12 Jul	N15E42	147					
13 Jul	N15E29	147					
14 Jul	N15E16	147					
15 Jul	N15E03	147					

0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 147

*Region 9535*

10 Jul	N10E76	139	0090	03	HAX	001	A
11 Jul	N06E63	139	0120	02	HSX	001	A
12 Jul	N08E48	141	0120	02	HSX	001	A
13 Jul	N05E35	141	0130	02	HSX	001	A
14 Jul	N06E22	141	0130	03	HSX	001	A
15 Jul	N06E08	141	0160	02	HSX	001	A

0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 141



**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 9536*

11 Jul N11E40	162	0030	04	CSO	004	B
12 Jul N12E23	166	0020	02	CSO	005	B
13 Jul N11E09	167	0020	02	CSO	004	B
14 Jul N11W03	166	0010	03	CRO	004	B
15 Jul N11W16	166					

0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 166

*Region 9537*

11 Jul S07E39	163	0030	03	CRO	006	B
12 Jul S06E25	164	0060	06	DAO	010	B
13 Jul S08E11	165	0060	07	DAO	014	B
14 Jul S08W03	166	0040	07	DAO	010	B
15 Jul S08W16	165	0030	05	DSO	009	B

0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 166

*Region 9538*

11 Jul N17E86	116	0030	03	HSX	001	A
12 Jul N18E68	121	0140	03	HAX	001	A
13 Jul N16E56	120	0130	02	HAX	001	A
14 Jul N16E42	121	0180	03	HAX	001	A
15 Jul N16E28	121	0250	03	HKX	001	A

0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 121

*Region 9539*

12 Jul S18E26	163	0030	07	CSO	005	B
13 Jul S19E11	165	0050	11	EAO	009	B
14 Jul S18W02	165	0110	11	EAI	026	BG
15 Jul S18W15	164	0110	12	EAI	021	BG

1  
6  
3 1  
8 1 0 10 1 0 0 0

Still on Disk.

Absolute heliographic longitude: 165



**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 9540</i>																	
13 Jul	N13E42	134	0010	01	AXX	001	A										
14 Jul	N20E31	132	0010	03	BXO	002	B										
15 Jul	N20E18	132															
								0	0	0	0	0	0	0	0	0	0
Still on Disk.																	
Absolute heliographic longitude: 132																	
<i>Region 9541</i>																	
13 Jul	N16E69	107	0120	07	CAO	005	B										2
14 Jul	N18E54	109	0120	07	DSO	006	B										1
15 Jul	N17E42	107	0150	07	DSO	008	B										
								0	0	0	3	0	0	0	0	0	0
Still on Disk.																	
Absolute heliographic longitude: 107																	
<i>Region 9542</i>																	
14 Jul	N07E80	083															1
15 Jul	N06E66	083	0030	05	CSO	002	B										
								0	0	0	1	0	0	0	0	0	0
Still on Disk.																	
Absolute heliographic longitude: 83																	
<i>Region 9543</i>																	
15 Jul	S24E71	078	0060	03	HAX	001	A										2
								0	0	0	2	0	0	0	0	0	0
Still on Disk.																	
Absolute heliographic longitude: 78																	

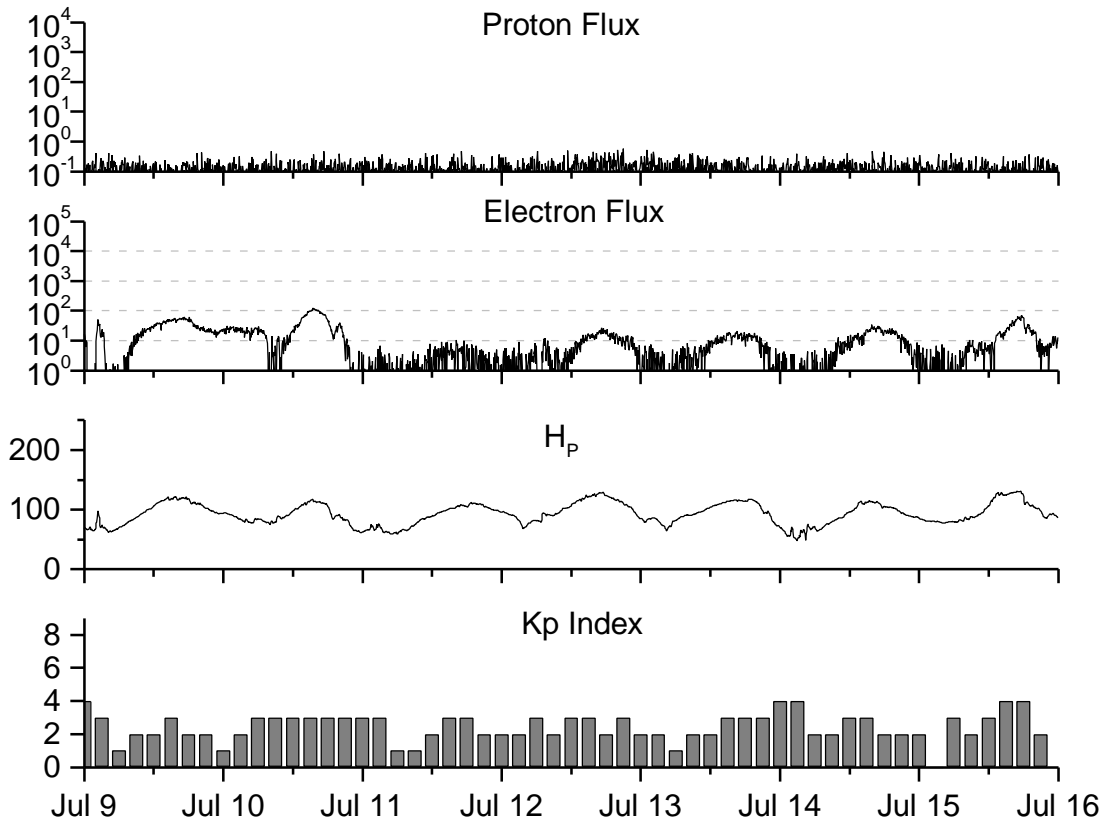


**Recent Solar Indices (preliminary)  
of the observed monthly mean values**

Month	Sunspot Numbers				Radio Flux		Geomagnetic		
	Observed values SWO	RI	Ratio RI/SWO	Smooth values SWO	RI	*Penticton 10.7 cm	Smooth Value	Planetary Ap	Smooth Value
<b>1999</b>									
July	169.2	113.5	0.67	138.0	94.3	165.6	154.4	10	12.6
August	136.1	93.7	0.69	142.8	97.5	170.8	156.3	15	12.9
September	107.4	71.5	0.67	150.0	102.3	135.7	161.0	19	12.8
October	167.7	116.7	0.70	158.5	107.8	164.8	167.2	19	12.7
November	199.3	133.2	0.67	164.7	110.0	191.5	171.5	14	13.1
December	123.5	86.4	0.69	165.9	111.1	169.8	173.4	10	13.8
<b>2000</b>									
January	140.8	90.1	0.64	168.0	112.9	158.1	175.5	13	14.5
February	161.9	112.9	0.70	172.1	116.7	173.2	176.8	15	15.0
March	203.6	138.5	0.68	175.4	119.9	208.2	178.4	09	15.0
April	193.4	125.5	0.65	176.3	120.8	184.2	180.5	15	15.0
May	188.8	121.6	0.64	173.1	119.0	184.5	180.0	15	15.0
June	190.3	124.9	0.66	172.0	118.7	179.8	179.7	15	15.1
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
<b>2001</b>									
January	142.7	95.1	0.67			166.7		08	
February	131.0	80.1	0.61			147.3		06	
March	166.7	114.2	0.69			177.7		17	
April	163.6	108.2	0.66			178.3		18	
May	135.1	97.3	0.72			148.7		12	
June	196.7	134.0	0.68			173.7		12	

**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 09 July 2001*

*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.

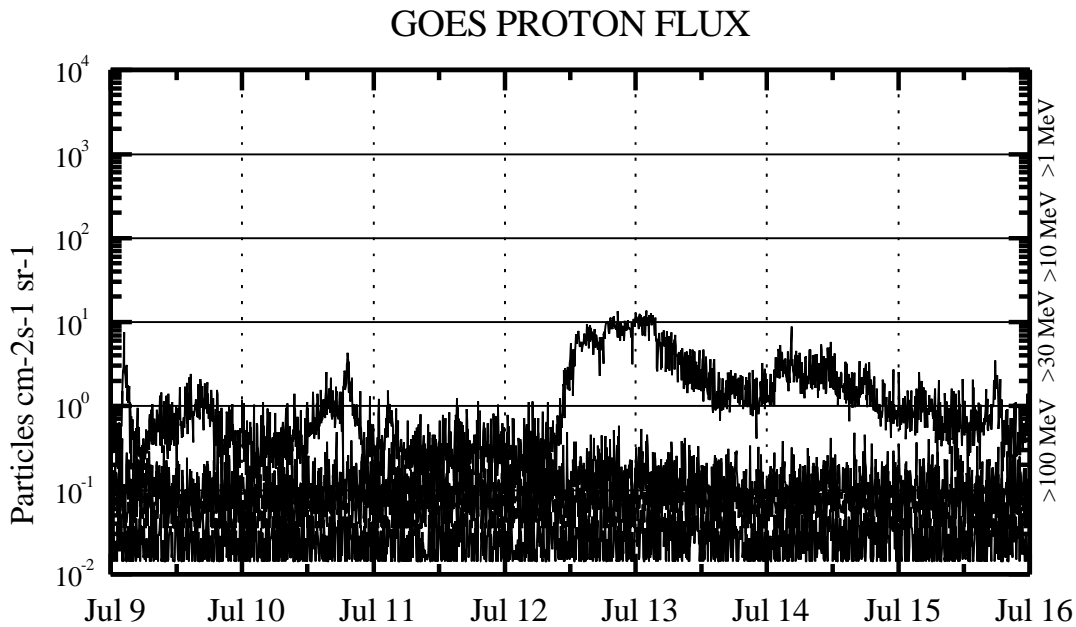
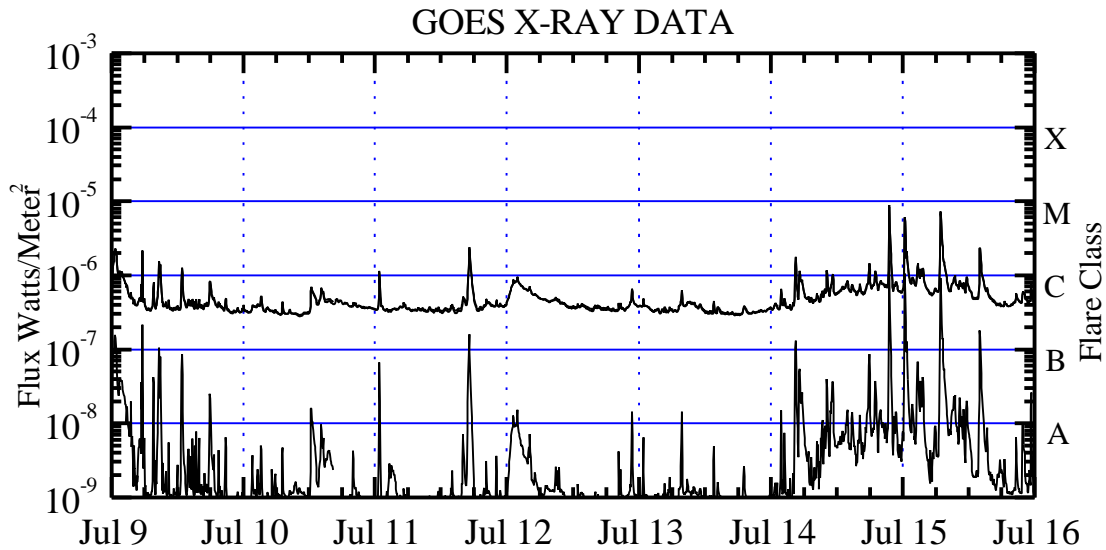
*Electrons* plot contains the five-minute averaged integral electron flux (electrons/cm<sup>2</sup> -sec -sr) with energies greater than 2 MeV at GOES-8.

*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>p</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.

