

Space Weather Highlights
23 - 29 July 2001

SWO PRF 1352
31 July 2001

Activity was low during most of the period, briefly dipping to very low levels on 26 July. Isolated B- and C-class subflares occurred during most days. Region 9543 (S23, L = 076, class/area Eai/380 on 22 July) produced isolated C-class flares during 23 – 24 July as it slowly developed. This region began to gradually decay on 25 July. Region 9553 (N13, L = 009, class/area Dai/190 on 26 July) produced isolated C-class subflares during 25 – 26 July as it grew at a moderate pace before entering a decay phase late on 26 July. At the close of the period, mostly small, simple sunspot groups populated the disk.

Data were available from the Advanced Composition Explorer (ACE) spacecraft for most of the period. A coronal hole-related high speed stream was observed during 24 - 26 July with peak velocities near 600 km/sec on 25 - 26 July. Coronal hole effects subsided during 27 July.

There were no proton events during the period.

The greater than 2 MeV electron flux at geosynchronous orbit reached high levels during 27 - 28 July. Geomagnetic field activity was at quiet to active levels during 24 - 26 July due to coronal hole effects. Activity decreased to quiet to unsettled levels for the rest of the period.

Space Weather Outlook
01 August - 27 August 2001

Solar activity is expected to be at mostly low levels. However, isolated M-class flares will be possible during the period.

No proton events are expected.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to be at normal to moderate levels during most of the period. However, high flux levels will be possible around 15 - 17 and 23 - 24 August.

The geomagnetic field is expected to be at quiet to unsettled levels during most of the period, barring an Earth-directed CME. However, brief active periods will be possible during 01, 12 - 13, 21 - 22 and 27 August due to coronal hole effects.



Daily Solar Data

Date	Radio Flux 10.7 cm	Sun spot No.	Sunspot Area (10 ⁶ hemi.)	X-ray Background	Flares							
					X-ray Flux			Optical				
					C	M	X	S	1	2	3	4
23 July	143	143	660	B3.4	8	0	0	4	0	0	0	0
24 July	133	143	660	B6.6	3	0	0	4	0	0	0	0
25 July	133	96	540	B4.0	2	0	0	2	0	0	0	0
26 July	123	115	690	B4.0	0	0	0	0	0	0	0	0
27 July	121	96	460	B3.2	2	0	0	1	0	0	0	0
28 July	116	88	270	B5.9	2	0	0	0	0	0	0	0
29 July	117	59	190	B2.7	4	0	0	1	0	0	0	0

Daily Particle Data

Date	Proton Fluence (protons/cm ² -day-sr)			Electron Fluence (electrons/cm ² -day-sr)		
	>1MeV	>10MeV	>100MeV	>.6MeV	>2MeV	>4MeV
23 July	1.1E+5	1.2E+4	2.7E+3		7.2E+6	
24 July	1.0E+5	1.1E+4	2.5E+3		5.3E+6	
25 July	5.8E+5	1.1E+4	2.5E+3		2.4E+6	
26 July	1.5E+5	1.1E+4	2.3E+3		1.4E+7	
27 July	1.4E+5	1.1E+4	2.6E+3		3.9E+7	
28 July	1.2E+5	1.1E+4	2.5E+3		6.5E+7	
29 July	2.6E+5	1.2E+4	2.5E+3		3.4E+7	

Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	23 July	8	2-3-2-1-2-1-3-2	15	3-3-1-2-5-3-2-2	12
24 July	11	3-2-2-2-3-2-3-3	25	3-2-3-3-6-3-5-2	15	3-3-3-2-4-3-3-3
25 July	21	3-4-4-4-3-3-4-3	*	3-4-7-6-3-*-4-2	22	3-4-5-4-3-4-4-3
26 July	11	4-4-2-2-2-0-2-2	16	3-4-2-4-5-0-1-1	14	4-4-2-3-3-3-2-3
27 July	8	1-2-3-1-2-2-2-3	13	2-1-3-5-3-2-1-*	9	2-2-3-3-2-3-2-3
28 July	2	2-1-0-0-1-0-1-1	*	1-0-0-0-*-0-0-0	5	2-0-0-2-2-2-2-2
29 July	5	1-2-3-1-1-1-1-1	8	1-2-3-2-4-1-1-0	8	1-2-3-2-3-3-2-2

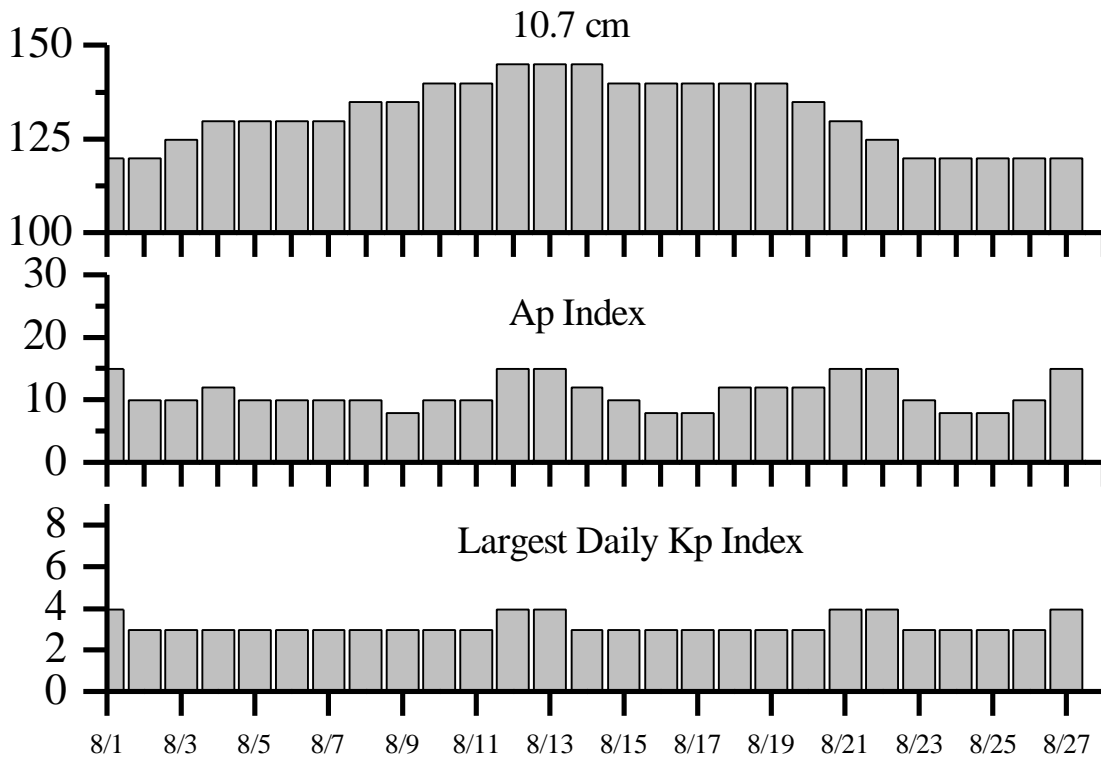


Alerts and Warnings Issued

Date & Time of Issue	Type of Alert or Warning	Date & Time of Event UT
23 Jul 0602	K= 4 Observed	23 Jul 0300 - 0600
24 Jul 0047	1 - 245 MHz Bursts	23 Jul
24 Jul 1422	K= 4 Warning	24 Jul 1430 - 1800
24 Jul 1512	K= 4 Observed	24 Jul 1200 - 1500
25 Jul 0015	1 - 245 MHz Bursts	24 Jul
25 Jul 0417	K= 4 Warning	25 Jul 0425 - 1500
25 Jul 0600	K= 4 Observed	25 Jul 0300 - 0600
25 Jul 1158	A \geq 20 Observed	25 Jul 1200
25 Jul 1653	K= 4 Warning	25/1655 - 26/1500 Jul
25 Jul 1800	K= 4 Observed	25 Jul 1500 - 1800
26 Jul 0021	1 - 245 MHz Bursts	25 Jul
26 Jul 0021	1 - 245 MHz Noise Storms	25 Jul
26 Jul 1814	ENDED A \geq 20 Observed	25 Jul 1200
27 Jul 0043	1- 245 MHz Burst	26 Jul
27 Jul 0043	245 MHz Noise Storm	26 Jul
27 Jul 1618	Electron Event $>2\text{MeV}$ $\geq 1000\text{pfu}$	27 Jul 1600
28 Jul 0122	CONTINUED Electron Event $>2\text{MeV}$ $\geq 1000\text{pfu}$	27 Jul 1600
29 Jul 0100	CONTINUED Electron Event $>2\text{MeV}$ $\geq 1000\text{pfu}$	27 Jul 1600



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
01 Aug	120	15	4	15 Aug	140	10	3
02	120	10	3	16	140	8	3
03	125	10	3	17	140	8	3
04	130	12	3	18	140	12	3
05	130	10	3	19	140	12	3
06	130	10	3	20	135	12	3
07	130	10	3	21	130	15	4
08	135	10	3	22	125	15	4
09	135	8	3	23	120	10	3
10	140	10	3	24	120	8	3
11	140	10	3	25	120	8	3
12	145	15	4	26	120	10	3
13	145	15	4	27	120	15	3
14	145	12	3				



Energetic Events

Date	Time		X-ray		Optical Information			Peak		Sweep Freq		
	Begin	Max	½ Max	Class	Integ Flux	Imp/ Brtns	Location		Radio Flux		Intensity	
							Lat	CMD	245	2695	II	IV

No Events Observed

Flare List

Date	Time			X-ray Class.	Imp / Brtns	Optical Location		Rgn
	Begin	Max	End			Lat	CMD	
23 July	0022	0024	0025	B5.2				
	0139	0144	0147	B8.1				
	0151	0155	0159	B9.8				
	0621	0623	0627	C5.0	SF	N10W65	9545	
	0803	0810	0815	B9.5				
	1312	1312	1315	C1.6	SF	N09W70	9545	
	1422	1426	1428	C3.9				
	1711	1715	1718	C1.0				
	1829	1829	1832	C1.4	SF	S21W28	9543	
	2103	2107	2109	C1.0				
	2155	2157	2203	C1.2				
	2239	2242	2248	C1.3	SF	S20W31	9543	
24 July	0006	0011	0014	C1.8				
	0244	0248	0254	B9.2				
	0503	0507	0522	C1.6	SF	S19W34	9543	
	0609	0614	0617	C1.0				
	0801	0802	0806		SF	N07W76	9545	
	0924	0927	0935	B8.4	SF	S18W40	9543	
25 July	1946	1946	1952	B9.0	SF	N13E23	9553	
	0208	0211	0214	B6.1	SF	S21W49	9543	
	0510	0515	0521	B7.3				
	0528	0535	0541	C1.7				
26 July	0927	0928	0932	C1.0	SF	S22W50	9543	
	0143	0148	0156	B6.4				
	0732	0737	0746	B8.1				
	1616	1623	1631	B6.2				
27 July	2035	2038	2044	B4.6				
	0017	0020	0025	B5.1				
	0205	0206	0210	C1.3	SF	S23W67	9543	
	1056	1059	1101	B5.9				
	2003	2009	2013	B5.1				
	2026	2033	2046	C1.0				
	2243	2246	2249	B5.9				



Flare List- continued

Date	Time			X-ray Class.	Optical		Rgn
	Begin	Max	End		Imp / Brtns	Location Lat CMD	
28 July	0033	0132	0206	C1.2			
	1028	1037	1049	B7.5			
	1124	1128	1133	B7.2			
	1341	1353	1408	C7.8			
	1904	1909	1919	B8.0			
	2150	2153	2155	B5.2			
	2355	0001	0012	B6.8			
29 July	0138	0146	0152	C3.6			
	0537	0541	0544	B4.2			
	0610	0612	0624	C1.1	SF	S20E43	9557
	0922	0926	0930	C1.0			
	1635	1643	1646	B8.9			
	1903	1910	1917	C1.2			

Region Summary

Date	Location		Sunspot Characteristics					Flares										
	(° Lat ° CMD)	Helio	Area (10 ⁻⁶ hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical							
		Lon						C	M	X	S	1	2	3	4			
<i>Region 9538</i>																		
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											
16 Jul	N16E16	120	0190	03	CSO	001	B											
17 Jul	N16E03	120	0180	03	HSX	001	A											
18 Jul	N17W11	121	0180	03	HAX	001	A											
19 Jul	N17W23	120	0130	03	HAX	001	A											
20 Jul	N17W37	121	0130	03	HAX	001	A											
21 Jul	N16W51	121	0120	02	HAX	001	A							1				
22 Jul	N16W64	121	0150	02	HAX	001	A											
23 Jul	N15W78	122	0120	02	HAX	001	A											
24 Jul	N15W90	121	0090	03	HSX	001	A											
								0	0	0	1	0	0	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 120



Region Summary - continued.

Date	Location		Sunspot Characteristics					Flares									
	° Lat ° CMD)	Helio	Area (10 ⁶ hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical						
		Lon						C	M	X	S	1	2	3	4		
<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										
16 Jul	N17E29	107	0110	05	DSO	006	B										
17 Jul	N17E16	107	0130	05	DAO	006	B										
18 Jul	N18E02	108	0100	04	CSO	005	B										
19 Jul	N18W10	107	0080	03	CSO	004	B										
20 Jul	N16W28	112	0070	03	CAO	003	B										
21 Jul	N18W38	108	0030	03	CAO	002	B						1				
22 Jul	N19W51	108	0020	01	HSX	001	A										
23 Jul	N19W65	109	0020	01	AXX	001	A										
24 Jul	N18W77	108	0010	01	HRX	001	A										
25 Jul	N18W89	107															
								0	0	0	0	4	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 108

<i>Region 9542</i>																	
15 Jul	N06E66	083	0030	05	CSO	002	B										
16 Jul	N08E54	082	0020	05	CSO	004	B										
17 Jul	N08E40	083	0020	03	BXO	004	B										
18 Jul	N08E26	084	0020	03	BXO	004	B										
19 Jul	N08E13	084	0040	05	CRO	008	B						1				
20 Jul	N08W02	086	0030	06	CRO	008	B						1				
21 Jul	N08W15	085	0020	06	DSO	008	B										
22 Jul	N08W28	085															
23 Jul	N08W41	085															
24 Jul	N08W54	085															
25 Jul	N08W67	085															
26 Jul	N08W80	085															
								0	0	0	0	2	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 086



Region Summary - continued.

Date	Location		Sunspot Characteristics				Flares														
	° Lat ° CMD)	Helio	Area (10 ⁶ hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical										
		Lon						C	M	X	S	1	2	3	4						
<i>Region 9543</i>																					
15 Jul	S24E71	078	0060	03	HAX	001	A													2	
16 Jul	S24E62	074	0230	13	ESO	006	B	1												1	
17 Jul	S23E48	075	0250	14	EAO	013	B	1												2	
18 Jul	S23E34	076	0270	14	EAI	012	B														
19 Jul	S23E22	075	0230	15	ESO	013	B	1												1	
20 Jul	S23E07	077	0270	15	EAI	024	BG	1												1	
21 Jul	S23W06	076	0230	14	EAI	030	BG	2												2	
22 Jul	S22W19	076	0380	15	EAI	041	BG													1	
23 Jul	S25W31	075	0250	15	EAI	040	BG	2												2	
24 Jul	S23W44	075	0350	15	EKI	032	BG	1												2	
25 Jul	S23W58	076	0310	16	FAI	017	BG	1												2	
26 Jul	S24W70	074	0310	15	EAO	011	BG														
27 Jul	S25W82	073	0190	13	ESI	007	BG	1												1	
28 Jul	S23W89	067	0060	02	HSX	001	A														
																					11 0 0 17 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 076

<i>Region 9545</i>																					
16 Jul	N09E22	114	0030	05	DAO	006	BG	1												3	
17 Jul	N09E08	115	0050	07	DAO	007	BG														
18 Jul	N09W08	118	0030	05	CSO	003	B													2	
19 Jul	N08W22	119	0020	01	AXX	001	A														
20 Jul	N08W37	121	0010	01	HRX	001	A														
21 Jul	N09W43	113	0030	04	DSO	007	B														
22 Jul	N09W57	114	0070	07	DSO	016	B														
23 Jul	N08W72	116	0120	07	DAO	007	B	2												2	
24 Jul	N08W85	116	0100	03	HAX	002	A													1	
																					3 0 0 8 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 115



Region Summary - continued.

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

Region 9549

18 Jul	S04E57	053	0020	01	AXX	001	A										
19 Jul	S04E45	052	0020	01	HSX	001	A										
20 Jul	S04E32	052	0020	01	AXX	001	A										
21 Jul	S05E16	054	0010	01	HRX	001	A										
22 Jul	S05E03	054															
23 Jul	S05W10	054															
24 Jul	S05W23	054															
25 Jul	S05W36	054															
26 Jul	S05W49	054															
27 Jul	S05W62	054															
28 Jul	S05W75	054															
29 Jul	S05W88	054															

0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 054

Region 9550

18 Jul	N08E38	072	0010	03	BXO	002	B										
19 Jul	N07E24	073	0010	04	BXO	003	B										
20 Jul	N07E11	073															
21 Jul	N07W02	073															
22 Jul	N07W15	073															
23 Jul	N07W28	073															
24 Jul	N07W41	073															
25 Jul	N07W54	073															
26 Jul	N07W67	073															
27 Jul	N09W78	069	0010	01	AXX	001	A										

0 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 073

Region 9552

23 Jul	N13E15	029	0010	05	CRO	002	B										
24 Jul	N13E02	029															
25 Jul	N13W11	029															
26 Jul	N13W24	029															
27 Jul	N13W37	029															
28 Jul	N13W50	029															

0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 029



Region Summary - continued.

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

Region 9553

23 Jul	N13E34	010	0030	04	CSO	003	B											
24 Jul	N12E21	010	0020	05	CSO	008	B							1				
25 Jul	N13E08	010	0100	06	DAI	013	B											
26 Jul	N13W05	009	0190	08	DAI	015	B											
27 Jul	N12W18	009	0110	08	DAO	021	B											
28 Jul	N13W33	011	0030	10	CRO	013	B											
29 Jul	N14W46	011	0010	04	BXO	003	B											

0 0 0 1 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 009

Region 9554

24 Jul	N16W61	092	0010	02	BXO	002	B											
25 Jul	N17W75	093	0020	01	HRX	001	A											
26 Jul	N16W86	090	0010	01	AXX	001	A											

0 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 092

Region 9555

24 Jul	S09E55	336	0000	03	BXO	002	B											
25 Jul	S09E38	340	0010	03	CRO	002	B											
26 Jul	S09E28	336	0010	03	BXO	002	B											
27 Jul	S09E15	336																
28 Jul	S09E01	337	0000	01	HRX	001	A											
29 Jul	S09W12	337																

0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 337

Region 9556

25 Jul	S07W42	060	0020	03	CAO	002	B											
26 Jul	S07W56	060	0020	03	CSO	002	B											
27 Jul	S07W69	060																
28 Jul	S07W82	060																

0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 060



Region Summary - continued.

Date	Location		Sunspot Characteristics				Flares									
	(° Lat ° CMD)	Helio	Area (10 ⁶ hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical					
		Lon						C	M	X	S	1	2	3	4	
<i>Region 9557</i>																
26 Jul	S18E72	292	0080	04	HSX	001	A									
27 Jul	S18E58	293	0070	02	HSX	001	A									
28 Jul	S20E48	290	0090	12	ESO	004	B									
29 Jul	S20E36	289	0130	16	FAO	009	B	1				1				
								1	0	0	1	0	0	0	0	0
Still on Disk.																
Absolute heliographic longitude: 289																
<i>Region 9558</i>																
26 Jul	N18W30	034	0010	02	BXO	002	B									
27 Jul	N18W43	034														
28 Jul	N18W56	034														
29 Jul	N18W69	034														
								0	0	0	0	0	0	0	0	0
Still on Disk.																
Absolute heliographic longitude: 034																
<i>Region 9559</i>																
27 Jul	S25E14	337	0010	03	DSO	005	B									
28 Jul	S24E00	338	0030	07	CRO	008	B									
29 Jul	S24W14	339	0040	07	DRO	006	B									
								0	0	0	0	0	0	0	0	0
Still on Disk.																
Absolute heliographic longitude: 338																
<i>Region 9560</i>																
29 Jul	N18E46	279	0010	00	AXX	001	A									
								0	0	0	0	0	0	0	0	0

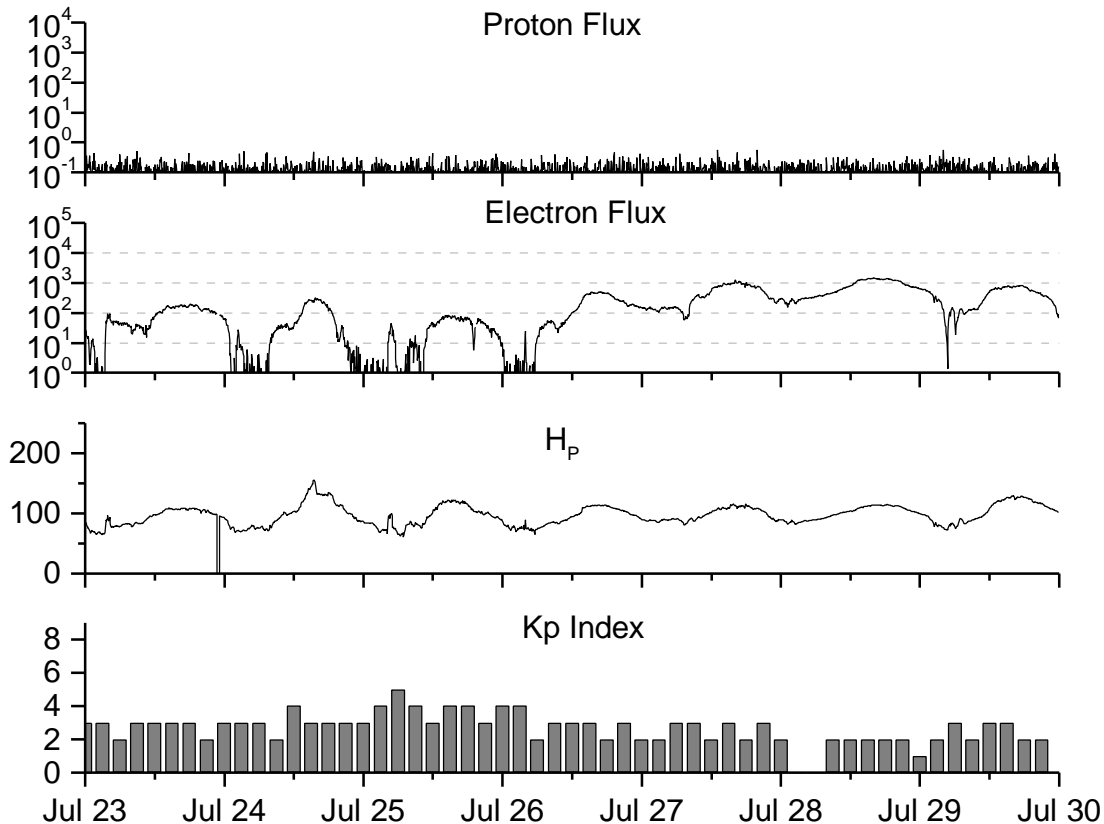


**Recent Solar Indices (preliminary)
of the observed monthly mean values**

Month	Sunspot Numbers			Radio Flux		Geomagnetic			
	<u>Observed values</u> SWO	<u>RI</u>	<u>Ratio</u> RI/SWO	<u>Smooth values</u> SWO	<u>RI</u>	<u>*Penticton</u> 10.7 cm	<u>Smooth</u> Value	<u>Planetary</u> Ap	<u>Smooth</u> Value
1999									
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
2000									
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
2001									
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 23 July 2001*

Protons plot contains the five-minute averaged integral proton flux (protons/cm²-sec -sr) as measured by GOES-8 (W75) for each of three energy thresholds: greater than 10, 50, and 100 MeV.

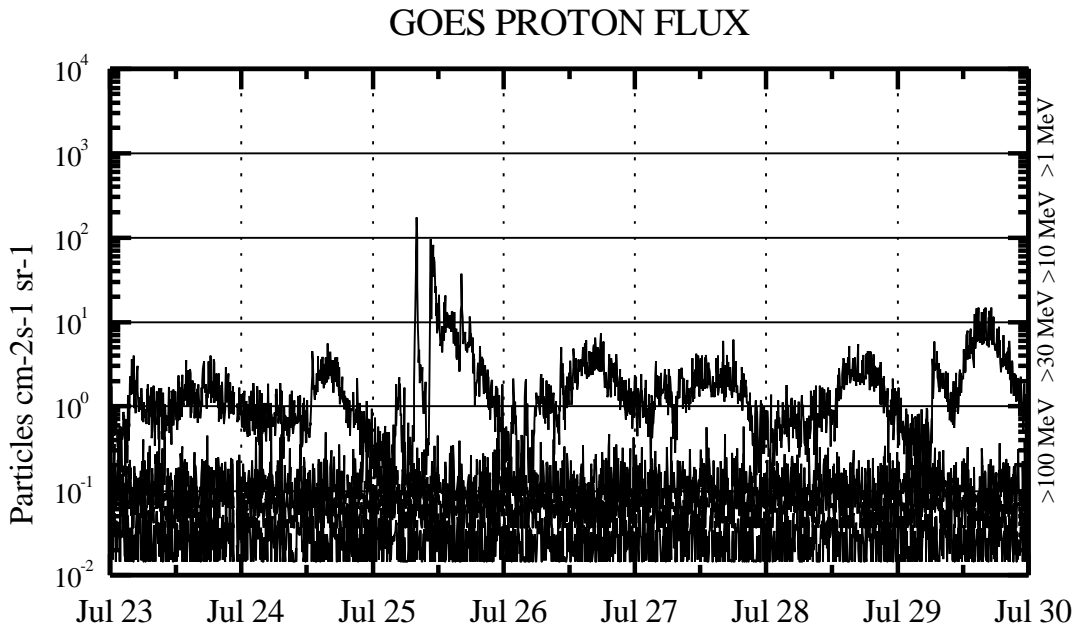
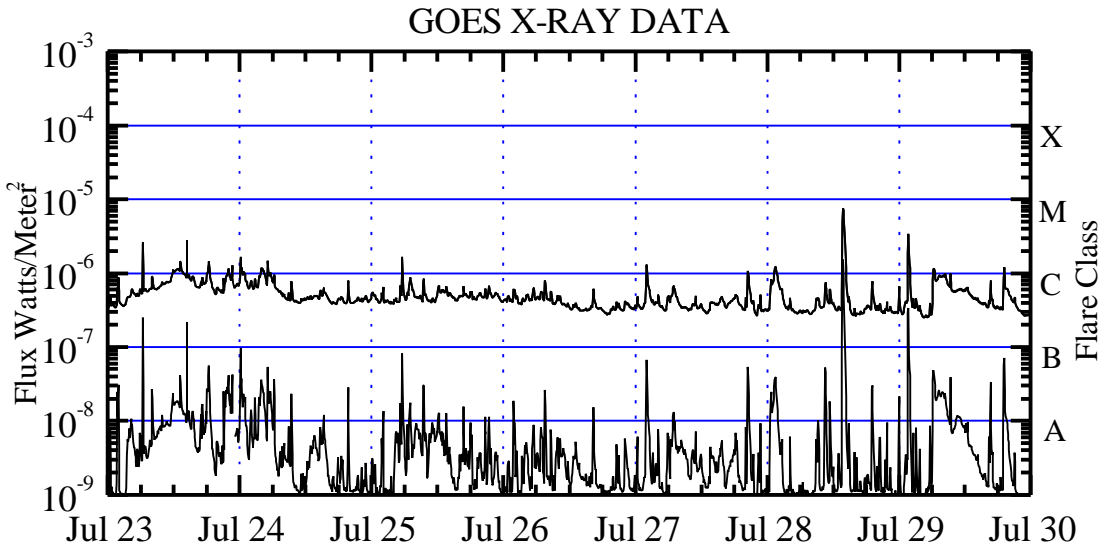
Electrons plot contains the five-minute averaged integral electron flux (electrons/cm²-sec -sr) with energies greater than 2 MeV at GOES-8.

H_p 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_p 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_p 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_p are "global" parameters that are applicable to a first order approximation over large areas. H_p 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/m²) 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/cm²-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/cm²-sec-sr) at greater than 10 MeV.

