

**Space Weather Highlights**  
**17-23 Aug 1998**

Solar activity rose to high levels during the period. Region 8307 (N31, L = 038, class/area Dko/570 on 22 August) produced five major flares: an X1 at 17/2120UT with an associated 290 SFU Tenflare and a loop prominence system, an X2/SN at 18/0824UT accompanied by a Type IV sweep and a 680 SFU Tenflare, an X4/1B at 18/2219UT with Types II and IV radio sweeps, a loop prominence system, and a 2400 SFU Tenflare; an X3/1F at 19/2145UT with Types II and IV sweeps and a 1300 SFU Tenflare; and an impulsive M9/2B at 22/0009UT. Region 8307 also produced a few M-class flares.

Real-time solar wind data were available from the Advanced Composition Explorer (ACE) spacecraft during most of the period. There were two events of interest. The first was a small, relatively slow shock passage during 19 - 20 August as evidenced by enhanced densities, slow bulk velocities and a semi-smooth transition of Bz from minus to positive. The second occurred during 22 - 23 August with increased windspeeds and decreased densities which indicated the presence of a high-speed windstream associated with an equatorward extension of the northern polar crown coronal hole.

The greater than 10 MeV proton flux at geosynchronous altitude became slightly enhanced early on 20 August in the wake of the X3/1F at 19/2145UT and again early on 22 August following the M9/2B at 22/0009UT.

The greater than 2 MeV electron flux at geosynchronous altitude was at normal to moderate levels.

The geomagnetic field was mostly quiet during 17 - 18 August. Activity increased during 19 - 20 August with unsettled to active levels at all latitudes and brief minor storm periods at high latitudes. Activity declined to quiet to unsettled levels during 21 August, then increased again during the last two days of the period with active levels at middle latitudes and active to major storm levels at high latitudes.

**Space Weather Forecast**  
**26 August 1998 - 21 September 1998**

Solar activity is expected to be moderate to high. New Region 8307 is expected to produce M- and X-class flares before it departs the visible disk around 01 September.

Region 8307 has crossed into the western hemisphere and is expected to produce event-level proton fluxes before it departs the disk.

The greater than 2 MeV electron flux at geosynchronous altitude is expected to be at moderate to high levels during 27 August - 01 September. Otherwise, normal to moderate fluxes are expected.

The geomagnetic field is expected to be at quiet to unsettled levels during most of the period. However, minor to severe storm levels are expected during 26 - 28 August in response to recent major flare activity. Active levels are also possible during 18 - 19 September due to recurrent coronal hole effects.



### *Daily Solar Data*

Date	Radio Flux 10.7 cm	Sun spot No. ( $10^6$ hemi.)	Sunspot Area	X-ray Background	X-ray Flux			Flares				
					C	M	X	S	Optical			
								S	1	2	3	4
17 August	136	90	950	C1.2	5	0	1	4	0	0	0	0
18 August	133	104	1040	B5.1	1	1	2	3	1	0	0	0
19 August	135	132	1150	C4.5	3	2	1	7	1	0	0	0
20 August	139	120	830	C1.6	5	0	0	5	1	0	0	0
21 August	132	138	830	B5.3	5	1	0	2	0	0	0	0
22 August	133	102	820	C1.6	6	0	0	9	2	1	0	0
23 August	126	121	671	B4.0	3	1	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
17 August	4.8E+4	1.6E+4	3.7E+3		3.0E+6	
18 August	4.7E+4	1.7E+4	4.0E+3		2.9E+6	
19 August	1.2E+5	2.3E+4	3.9E+3		3.6E+6	
20 August	2.3E+5	4.0E+4	5.3E+3		2.2E+5	
21 August	1.2E+5	2.3E+4	4.0E+3		3.5E+5	
22 August	1.3E+6	5.6E+4	4.1E+3		2.7E+5	
23 August	6.9E+6	1.8E+5	2.9E+3		2.5E+6	

### *Daily Geomagnetic Data*

Date	Middle Latitude		High Latitude		Estimated	
	Fredericksburg		College		Planetary	
	A	K-indices	A	K-indices	A	K-indices
17 August	1	0-1-1-0-1-0-0-1	*	0-*-0-1-0-0-0-0	5	1-1-2-1-1-2-2-2
18 August	3	0-0-1-1-0-1-2-2	1	0-0-1-0-0-0-1-1	6	1-2-2-1-2-2-3-2
19 August	6	1-1-1-1-2-1-2-3	8	2-1-0-0-3-3-2-3	9	2-0-1-1-2-2-3-4
20 August	14	3-3-2-4-2-2-3-3	26	3-3-3-5-4-5-4-2	18	4-3-3-4-3-4-3-3
21 August	3	3-1-0-0-1-1-0-1	13	2-1-0-0-0-0-5-5	6	3-1-1-1-2-2-2-2
22 August	13	1-2-4-3-3-2-3-3	41	5-2-4-7-4-4-4-3	23	2-2-4-6-4-3-3-3
23 August	14	4-3-4-2-3-2-2-1	30	3-3-4-5-5-4-5-1	23	4-4-5-4-3-3-3-3

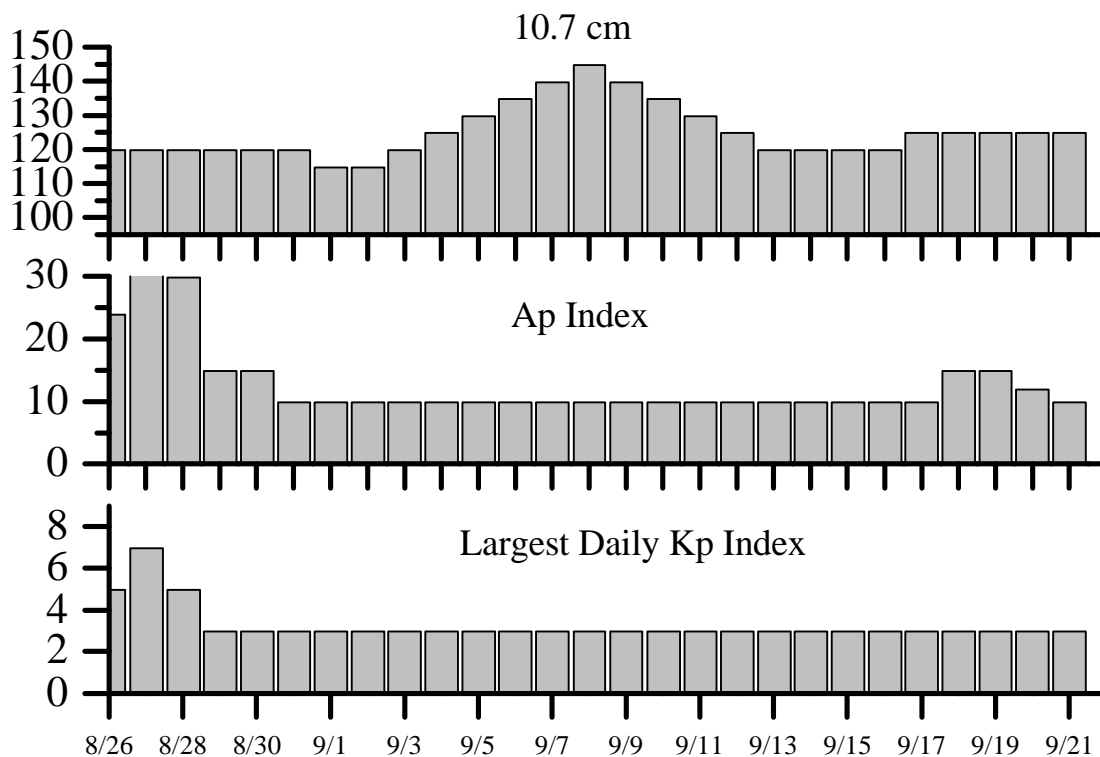


### *Alerts and Warnings Issued*

Date and Time of Issue (UT)	Type of Alert or Warning	Date and Time of Event (UT)
17 Aug 0719	2695MHz Radio Burst 270 s.f.u.	17 Aug 0659
17 Aug 2137	X-ray event X1	17 Aug 2120
17 Aug 2214	2695MHz Radio Burst 290 s.f.u.	17 Aug 2123
18 Aug 0037	Type II Radio Emission	17 Aug 0710
18 Aug 0853	2695MHz Radio Burst 640 s.f.u.	18 Aug 0818
18 Aug 0853	Type IV Radio Emission	18 Aug 0818
18 Aug 0934	X-ray event X2.8	18 Aug 0818
18 Aug 2241	Type II Radio Emission	18 Aug 2215
18 Aug 2241	X-ray event X4.9	18 Aug 2219
18 Aug 2304	Type IV Radio Emission	18 Aug 2218
19 Aug 0143	2695MHz Radio Burst 2400 s.f.u.	18 Aug 2214
19 Aug 0228	3- 245 MHz Radio Bursts	18 Aug
19 Aug 0228	245 MHz Radio Noise Storm	18 Aug
19 Aug 1500	Type II Radio Emission	19 Aug 1416
19 Aug 2155	X-ray event X3.9	19 Aug 2145
19 Aug 2205	Type II Radio Emission	19 Aug 2145
19 Aug 2211	2695MHz Radio Burst 1300 s.f.u.	19 Aug 2140
19 Aug 2244	Type IV Radio Emission	19 Aug 2143
20 Aug 1200	K= 4 Observed	20 Aug 09 - 12
20 Aug 1407	Type II Radio Emission	20 Aug 1236
22 Aug 0026	X-ray event M9.3	22 Aug 0009
22 Aug 0257	Type IV Radio Emission	22 Aug 0004
22 Aug 0900	K= 4 Observed	22 Aug 06 - 09
22 Aug 1200	K= 5 Observed	22 Aug 09 - 12
22 Aug 2117	A $\geq$ 20 Watch	25 Aug
23 Aug 0600	A $\geq$ 20 Observed	23 Aug 0600
23 Aug 1008	2695MHz Radio Burst 500 s.f.u.	23 Aug 0929
23 Aug 2152	A $\geq$ 20 Watch	24 Aug
23 Aug 2207	A $\geq$ 20 Watch	26 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
26 Aug	120	24	5	09 Sep	140	10	3
27	120	65	7	10	135	10	3
28	120	30	5	11	130	10	3
29	120	15	3	12	125	10	3
30	120	15	3	13	120	10	3
31	120	10	3	14	120	10	3
01 Sep	115	10	3	15	120	10	3
02	115	10	3	16	120	10	3
03	120	10	3	17	125	10	3
04	125	10	3	18	125	15	3
05	130	10	3	19	125	15	3
06	135	10	3	20	125	12	3
07	140	10	3	21	125	10	3
08	145	10	3				



### *Energetic Events*

Date	Time (UT)			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
17 Aug	2110	2120	2130	X1.2	.093				9200	290		
18 Aug	0400	0416	0427	M1.5	.014				53	28		
18 Aug	0814	0824	0832	X2.8	.170	SN	N33E87	8307	13000	680		3
18 Aug	2210	2219	2228	X4.9	.300	1B	N33E87	8307	5300	2400	3	2
19 Aug	1222	1242	1251	M2.3	.018	SF	N35E78	8307	97	35		
19 Aug	1404	1426	1444	M3.0	.048	SF	N35E80	8307	530	110	3	1
19 Aug	2135	2145	2150	X3.9	.150	1F	N32E75	8307	18000	1300	3	3
21 Aug	2357	0009	0016	M9.0	.061	2B	N42E51	8307			3	2
23 Aug	0923	0934	0947	M2.2	.017	1N	N32E33	8307	47	500		

### *Flare List*

Date	Time			X-ray Class.	Imp / Brtns	Optical		Rgn #
	Begin	Max	End			Lat	CMD	
17 August	0658	0717	0921	C1.3				
	1000	1007	1110	C1.5				
	1458	1511	1523	C3.3				
	1712	1714	1717		SF	N19W50	8299	
	1811	1824	1835	C6.9				
	2030	2033	2044		SF	N17W52	8299	
	2110	2120	2130	X1.2				
	2304	2306	2317		SF	N19W54	8299	
18 August	2353	0002	0025	C1.2	SF	N19W52	8299	
	0143	0147	0150		SF	N16W55	8299	
	0400	0416	0427	M1.5				8307
	0413	0413	0419		SF	N20W56	8299	
	0616	0626	0631	C1.2				8297
	0826	0831	0842	X2.8	SN	N33E87	8307	
19 August	2213	2216	2350	X4.9	1B	N33E87	8307	
	0251	0252	0259		SF	N15W64	8299	
	0411	0411	0414		SF	N16W70	8299	
	0923	0928	0934	C1.3				
	1025	U1028	A1041	C5.8	SF	N17W71	8299	
	1238	1241	1251	M2.3	SF	N35E78	8307	
	1408	1429	1456	M3.0	SF	N35E80	8307	
	1525	1533	1536		SF	N30E77	8307	
	2033	2039	2055	C3.2				
	B2207	U2207	A2238	X3.9	1F	N32E75	8307	
2256	2302	2306		SF	N30E70	8307		



*Flare List-continued*

Date	Time			X-ray Class.	Optical		Rgn #
	Begin	Max	End		Imp / Brtns	Location Lat CMD	
20 August	0029	0029	0051	C5.7	SF	N16W81	8299
	0529	0530	0534		SF	N17E21	8309
	0553	0615	0631		SF	N18E24	8309
	1227	1232	1303	C1.8	1N	S34E36	
	1401	1404	1406	C1.0			
	1529	1532	1535	C1.7			
	1613	1613	1616		SF	N17E19	8309
	B1949	U1959	A2045		SF	N31E62	8307
21 August	2107	2118	2126	C2.1			
	0147	0154	0203	C2.5			
	0617	0625	0635	C2.7			
	0853	0903	0915	C4.5			
	1506	1507	1511		SF	N33E53	8307
22 August	1612	1613	1640	C1.0	SF	N32E51	8307
	2103	2114	2139	C5.1			
	B0000	0010	A0140	M9.0	2B	N42E51	8307
	0158	0215	0230		SF	N26E44	8307
	0320	0329	0340		SF	N27E44	8307
	0443	0446	0500		SF	N30E43	8307
	0508	0512	0517		SF	N19W03	8309
	0601	0601	0608		SF	N28E41	8309
	0847	0849	0852	C1.3	SF	N31E47	8307
	1307	1307	1311	C1.4	SF	N30E45	8307
	1506	1506	1511	C1.9	SF	N30E44	8307
	1646	1659	1748	C1.9	1F	N28E36	8307
	1928	1932	1949	C2.2	SF	N30E34	8307
	2030	2033	2035	C1.6			
	23 August	2147	2158	2210		1F	N27E46
0229		0240	0250	B6.7	SF	N17W13	8309
0514		0515	0519		SF	N20E44	8310
0608		0610	0727	C2.8	SF	N33E33	8307
0626		0637	0650	C5.5			
0752		0753	0759		SF	N15W14	8309
0834		0835	0845		SF	N17W16	8309
0926		0931	A1000	M2.2	1N	N32E33	8307
1107		1107	1156	C3.6	SF	N22E39	8310



### *Region Summary*

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

#### *Region 8296*

05 Aug	N16E70	228	0020	01	HSX	001	A	1										
06 Aug	N17E58	227	0020	01	HRX	001	A	1										
07 Aug	N16E44	227	0010	03	BXO	002	B	1										
08 Aug	N16E31	227																
09 Aug	N16E18	227																
10 Aug	N16E05	227																
11 Aug	N16W08	227																
12 Aug	N16W21	227																
13 Aug	N17W37	228																
14 Aug	N17W50	228																
15 Aug	N17W63	228																
16 Aug	N17W76	228																
17 Aug	N17W89	228																
																		3 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 227

#### *Region 8297*

06 Aug	N30E73	212	0220	04	HSX	001	A											
07 Aug	N30E59	212	0330	04	HHX	002	A											
08 Aug	N29E49	209	0400	13	CKO	005	B	1										
09 Aug	N30E35	209	0470	06	CKO	006	B											
10 Aug	N31E22	209	0450	06	CKO	008	B	1										
11 Aug	N28E12	206	0400	11	CKO	009	B											
12 Aug	N29E00	204	0400	12	CKO	012	B											
13 Aug	N32W16	207	0370	07	CHO	009	BG	1										
14 Aug	N31W29	207	0350	07	CHO	006	B	1										
15 Aug	N31W40	205	0350	10	CKO	011	B											
16 Aug	N31W54	206	0320	07	CAO	005	B											
17 Aug	N32W67	205	0270	06	DAO	003	B	1										
18 Aug	N32W80	205	0230	04	CAO	002	B	1										
19 Aug	N31W92	204	0120	02	HSX	001	A											
																		6 0 0 0 0 0 0 0

Crossed West Limb.

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	4			
<i>Region 8299</i>																		
07 Aug	N17E74	197	0130	02	HAX	003	A	1										
08 Aug	N16E64	194	0320	08	CKO	010	B	4	2			1	1					
09 Aug	N15E52	192	0460	11	CKO	013	B		2			1	1					
10 Aug	N15E40	191	0480	11	EKO	009	B											
11 Aug	N15E26	192	0460	12	CKO	013	B											
12 Aug	N16E14	190	0520	12	CKO	013	B	1										
13 Aug	N16W01	192	0510	08	CKO	013	BGD	1										
14 Aug	N16W13	191	0510	11	CKO	012	BGD	1										
15 Aug	N16W26	191	0490	11	CKO	015	BGD	1										
16 Aug	N17W40	192	0490	10	CAO	013	B											
17 Aug	N19W56	194	0390	08	DKI	011	BG	1	1									
18 Aug	N16W68	193	0410	08	CHI	006	B	1										
19 Aug	N16W80	192	0320	08	DAO	006	B	1										
20 Aug	N15W90	189	0080	03	HSX	001	A											
										12	5	0	0	2	2	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 192

*Region 8301*

09 Aug	S20E71	173	0120	03	HSX	001	A											
10 Aug	S22E60	171	0190	15	EAO	002	B											
11 Aug	S22E48	170	0190	12	ESO	003	B											
12 Aug	S20E35	169	0160	14	ESO	003	B											
13 Aug	S20E23	169	0150	14	ESO	002	B											
14 Aug	S21E09	169	0120	12	ESO	002	B											
15 Aug	S21W03	168	0120	12	ESO	002	B											
16 Aug	S21W17	169	0160	13	ESO	003	B											
17 Aug	S21W30	168	0100	12	EAO	004	B											
18 Aug	S21W43	168	0110	12	CAO	002	B											
19 Aug	S22W58	170	0100	03	HSX	001	A											
20 Aug	S22W73	172	0070	02	HSX	001	A											
21 Aug	S20W83	169	0050	06	CSO	003	B											
										0	0	0	0	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 168





### 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

#### Region 8302

12 Aug	S14E30	174	0010	03	BXO	002	B										
13 Aug	S14E18	173	0010	04	BXO	004	B										
14 Aug	S14E05	173															
15 Aug	S14W08	173															
16 Aug	S14W21	173															
17 Aug	S14W34	173															
18 Aug	S14W47	173															
19 Aug	S14W60	173															
20 Aug	S14W73	173															

0 0 0 0 0 0 0 0 0

Died on Disk.

Absolute heliographic longitude: 173

#### Region 8303

14 Aug	N20E52	126	0000	03	BXO	002	B										
15 Aug	N20E38	127	0000	00	AXX	001	A										
16 Aug	N20E25	127															
17 Aug	N20E12	127															
18 Aug	N21W02	127	0020	02	BXO	005	B										
19 Aug	N20W14	126	0020	04	BXO	005	B										
20 Aug	N20W27	126															
21 Aug	N20W40	126															
22 Aug	N20W53	126															
23 Aug	N20W66	126															

0 0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 127

#### Region 8304

15 Aug	S30E64	101	0090	02	HSX	001	A										
16 Aug	S30E53	099	0100	11	CSO	002	B										
17 Aug	S30E42	096	0110	11	CAO	004	B										
18 Aug	S30E29	096	0110	09	CSO	005	B										
19 Aug	S30E16	096	0090	12	CSO	004	B										
20 Aug	S27E03	096	0070	10	CSO	005	B										
21 Aug	S28W11	097	0050	10	CSO	004	B										
22 Aug	S26W24	097	0040	08	CSO	005	B										
23 Aug	S27W38	097	0030	06	CSO	002	B										

0 0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 096





**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 8308</i>																	
18 Aug	S21E72	053	0060	02	HSX	001	A										
19 Aug	S22E58	054	0110	02	HAX	002	A										
20 Aug	S21E45	054	0100	03	HSX	002	A										
21 Aug	S21E33	053	0110	03	HSX	002	A										
22 Aug	S22E18	055	0110	02	HSX	001	A										
23 Aug	S22E07	052	0090	02	HSX	001	A										
										0	0	0	0	0	0	0	0
Still on Disk.																	
Absolute heliographic longitude: 052																	
<i>Region 8309</i>																	
19 Aug	N18E28	084	0000	02	AXX	002	A										
20 Aug	N17E15	084	0030	05	BXO	009	B										
21 Aug	N16E02	084	0050	07	DSO	008	B										
22 Aug	N16W13	086	0060	09	DAO	008	B										
23 Aug	N15W26	085	0070	11	ESO	013	B										
										0	0	0	0	0	0	0	0
Still on Disk.																	
Absolute heliographic longitude: 084																	
<i>Region 8310</i>																	
20 Aug	N23E66	033	0010	00	AXX	001	A										
21 Aug	N22E56	030	0030	14	BXO	002	B										
22 Aug	N24E44	029	0010	01	AXX	002	A					1					
23 Aug	N24E32	027	0010	01	AXX	002	A					1					
										2	0	0	0	0	0	0	0
Still on Disk.																	
Absolute heliographic longitude: 027																	
<i>Region 8311</i>																	
20 Aug	N19E01	098	0000	00	AXX	001	A										
21 Aug	N19W12	098															
										0	0	0	0	0	0	0	0
Died on Disk.																	
Absolute heliographic longitude: 098																	
<i>Region 8312</i>																	
21 Aug	N23W77	163	0000	00	AXX	001	A										
22 Aug	N23W95	168	0000	00	AXX	001	A										
										0	0	0	0	0	0	0	0
Crossed West Limb.																	
Absolute heliographic longitude: 163																	



**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

*Region 8313*

21 Aug	S18E43	043	0000	00	AXX	001	A								
22 Aug	S18E30	043													
23 Aug	S18E17	043													

0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 043

*Region 8314*

21 Aug	N17E77	009	0010	01	AXX	001	A								
22 Aug	N16E67	006	0020	08	BXO	003	B								
23 Aug	N17E55	004	0020	10	BXO	006	B								

0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 004

*Region 8315*

23 Aug	N25E57	002	0000	00	AXX	001	A								
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0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 002



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

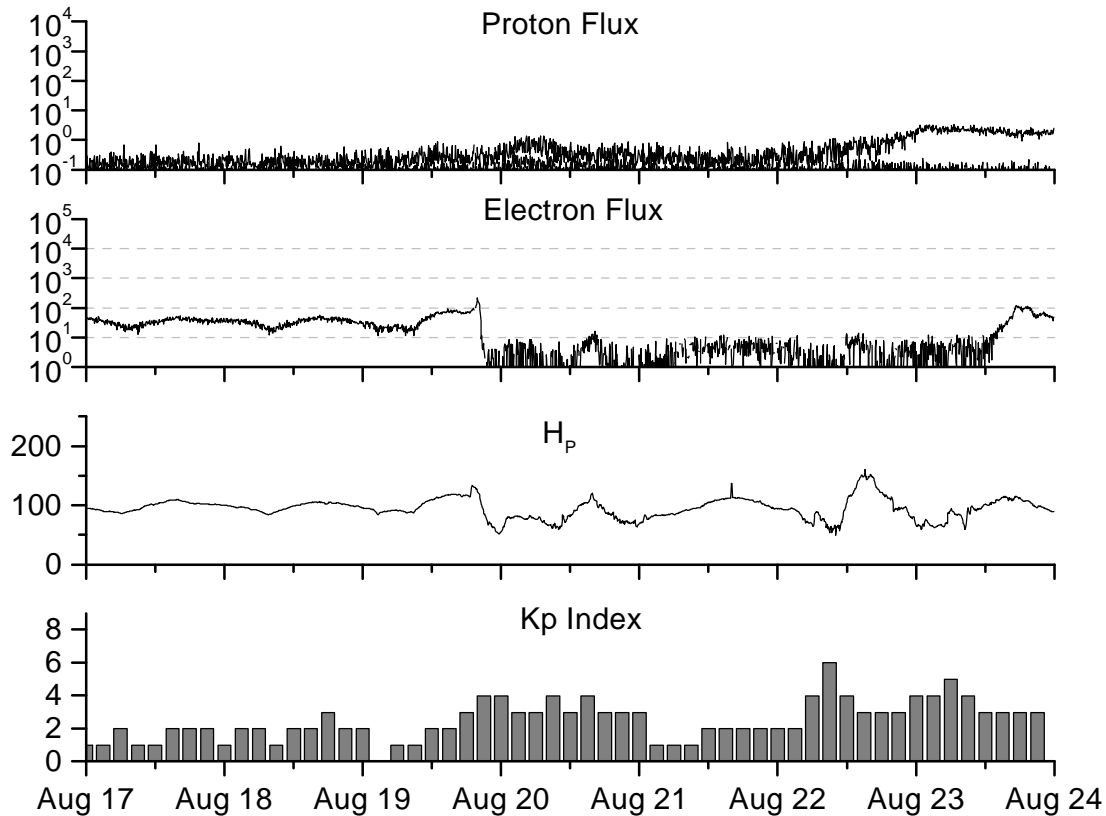
Month	Sunspot Numbers			Radio Flux		Geomagnetic			
	Observed values SWO	Ratio RI	Ratio RI/SWO	Smooth values SWO	Smooth values RI	**Penticton 10.7 cm	Smooth Value	Planetary Ap	Smooth Value
<b>1996</b>									
August	20.5	14.4	0.70	13.1	08.3	72.4	72.1	09	09.4
September	02.9	01.6	0.55	13.3	08.4	69.4	72.3	15	09.3
October	02.3	00.9	0.39	14.0	08.8	69.2	72.6	13	09.1
November	26.7	17.9	0.67	15.4	09.8	78.7	73.0	08	09.1
December	21.1	13.3	0.63	16.2	10.4	77.8	73.3	07	09.3
<b>1997</b>									
January	09.0	05.7	0.63	16.5	10.5	74.0	73.4	09	09.3
February	11.3	07.6	0.67	17.4	11.0	73.8	73.7	11	09.2
March	14.4	08.7	0.60	20.4	13.5	73.5	75.1	08	08.9
April	24.5	15.5	0.63	24.0	16.5	74.5	76.8	10	08.6
May	28.6	18.5	0.65	26.4	18.3	74.6	78.4	08	08.6
June	22.1	12.7	0.57	29.0	20.3	71.7	80.1	07	08.6
July	17.0	10.4	0.61	32.4	22.6*	71.1	81.8*	06	08.5
August	36.7	24.4	0.66	35.9	25.1*	79.0	83.4*	07	08.3
September	52.8	51.3	0.88	40.5	28.4*	96.2	85.7*	10	08.4
October	33.6	22.8	0.68	45.4	31.9*	84.9	88.6*	11	08.6
November	53.5	39.0	0.73	49.3	35.1*	99.5	91.4*	11	09.0
December	57.9	41.2	0.71	54.2	39.1*	98.8	94.2*	05	09.6*
<b>1998</b>									
January	51.8	32.3*	0.62*	60.6	43.8*	93.5*	97.6*	07	10.0*
February	54.4	40.7*	0.75*			93.6*		07	
March	81.8	54.8*	0.67*			109.4*		11	
April	73.6	53.3*	0.72*			108.3*		10	
May	74.3	56.9*	0.77*			106.6*		18	
June	93.6	70.5*	0.75*			108.4*		11*	
July	98.3	66.2*	0.67*			114.0*		12*	

\*Preliminary estimates.

The lowest smoothed sunspot indices 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.

\*\* From June 1991 onward, 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 17 August 1998*

*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.

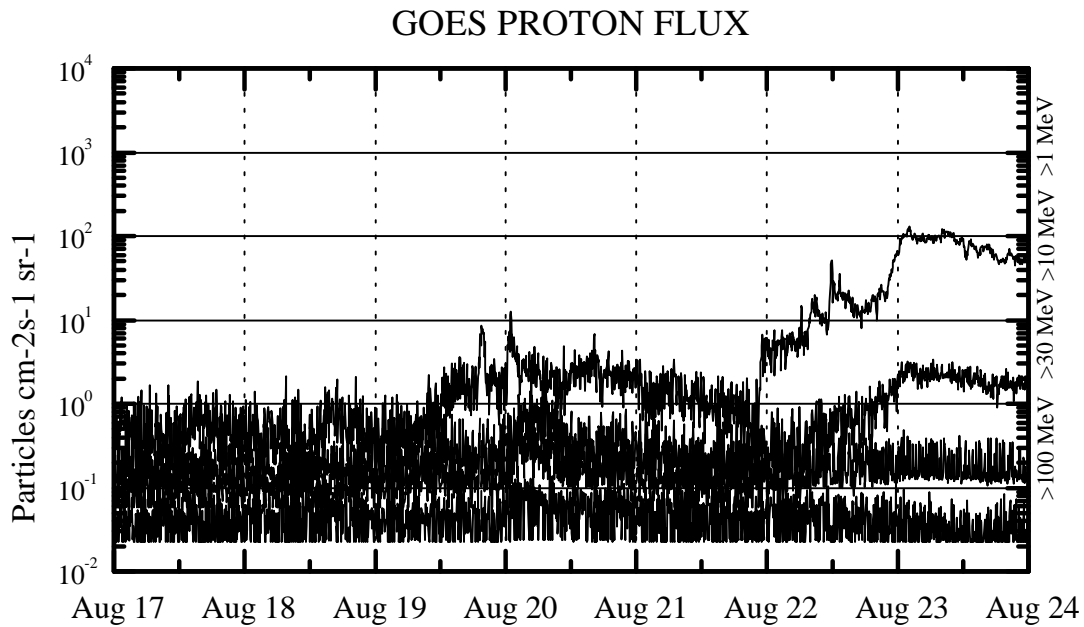
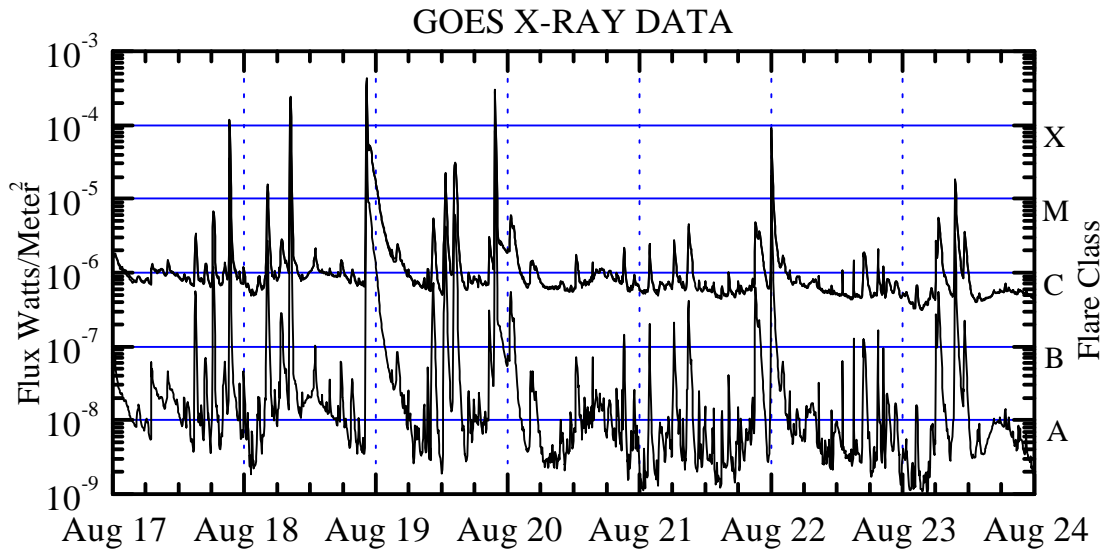
*Electrons* plot contains the five-minute averaged integral electron flux (electrons/ cm<sup>2</sup>-sec-sr) with energies greater than 2 MeV at GOES-8.

*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 USAF 55<sup>th</sup> Space Weather Squadron) 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 a 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 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 ( $\text{protons/cm}^2\text{-sec-sr}$ ) as measured by GOES-8 (W75) for each of the energy thresholds:  $>1$ ,  $>10$ ,  $>30$  and  $>100$  MeV. P10 event threshold is 10 pfu ( $\text{protons/cm}^2\text{-sec-sr}$ ) at greater than 10 MeV.

