

Space Weather Highlights
15-21 June 1998

Solar activity was very low to low during most of the period, but increased to moderate levels on 16 June. Old Region 8232 (S21, L = 348, class/area Dko/380 on 05 June) produced a long-duration M1 X-ray flare which peaked at 16/1842UT. The region was a day behind the west limb at the time of the flare. A loop prominence system was associated with the flare. A prominence erupted from the southwest limb on 15 June and was accompanied by a long-duration C1 X-ray flare. A 36-degree filament disappeared from the southeast quadrant on 15 June. Region 8243 (N18, L = 214, class/area Dho/270 on 22 June) produced a C4/1N flare at 20/1430UT with associated Types II and IV radio sweeps.

Solar wind data were available from the Advanced Composition Explorer (ACE) spacecraft during most of the period. Velocities ranged from 300 - 460 km/sec during 15 - 18 June. Velocities increased to 520 km/sec during 19 June then decreased to a range of 400 - 480 km/sec for the remainder of the period. Densities ranged from 01 - 09 p/cc during 15 - 17 June. Densities were slightly enhanced for the remainder of the period and ranged from 02 - 13 p/cc. Bz variations increased during 15 and 19 - 21 June with maximum deflections of plus 15 to minus 10 nT (GSM) detected on 19 June. Solar sector orientation was away (phi angle near 135 degrees) during 15 - 17 June, then shifted to toward (phi angle near 315 degrees) for the balance of the period.

There were no significant proton enhancements detected at geosynchronous altitude.

The greater than 2 MeV electron flux at geosynchronous altitude increased to moderate levels on 21 June.

The geomagnetic field was quiet to unsettled during most of the period. Brief active to minor storm periods were detected at some high latitude stations.

Space Weather Forecast
24 June 1998 - 20 July 1998

Solar activity is expected to be low during most of the period.

No proton enhancements are expected at geosynchronous altitude.

The greater than 2 MeV electron flux at geosynchronous altitude 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.



Daily Solar Data

Date	Radio Flux	Sun spot	Sunspot Area	X-ray Background	X-ray Flux			Flares				
	10.7 cm	No. (10^6 hemi.)			C	M	X	S	1	2	3	4
15 June	100	79	270	B2.3	1	0	0	1	0	0	0	0
16 June	104	71	290	B1.9	0	1	0	0	0	0	0	0
17 June	101	94	340	B5.3	0	0	0	1	0	0	0	0
18 June	100	68	260	B1.5	0	0	0	2	0	0	0	0
19 June	099	67	260	B1.2	0	0	0	2	0	0	0	0
20 June	101	80	280	B1.9	3	0	0	4	2	0	0	0
21 June	102	87	350	B3.2	5	0	0	5	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
15 June	1.1E+5	1.6E+4	3.7E+3		7.5E+4	
16 June	1.9E+5	1.7E+4	3.5E+3		2.7E+5	
17 June	1.1E+6	8.6E+4	4.0E+3		9.6E+5	
18 June	3.0E+6	9.4E+4	3.6E+3		1.3E+6	
19 June	1.6E+6	2.3E+4	3.2E+3		3.7E+5	
20 June	5.5E+5	1.6E+4	3.3E+3		4.2E+5	
21 June	1.2E+6	1.5E+4	3.1E+3		1.0E+7	

Daily Geomagnetic Data

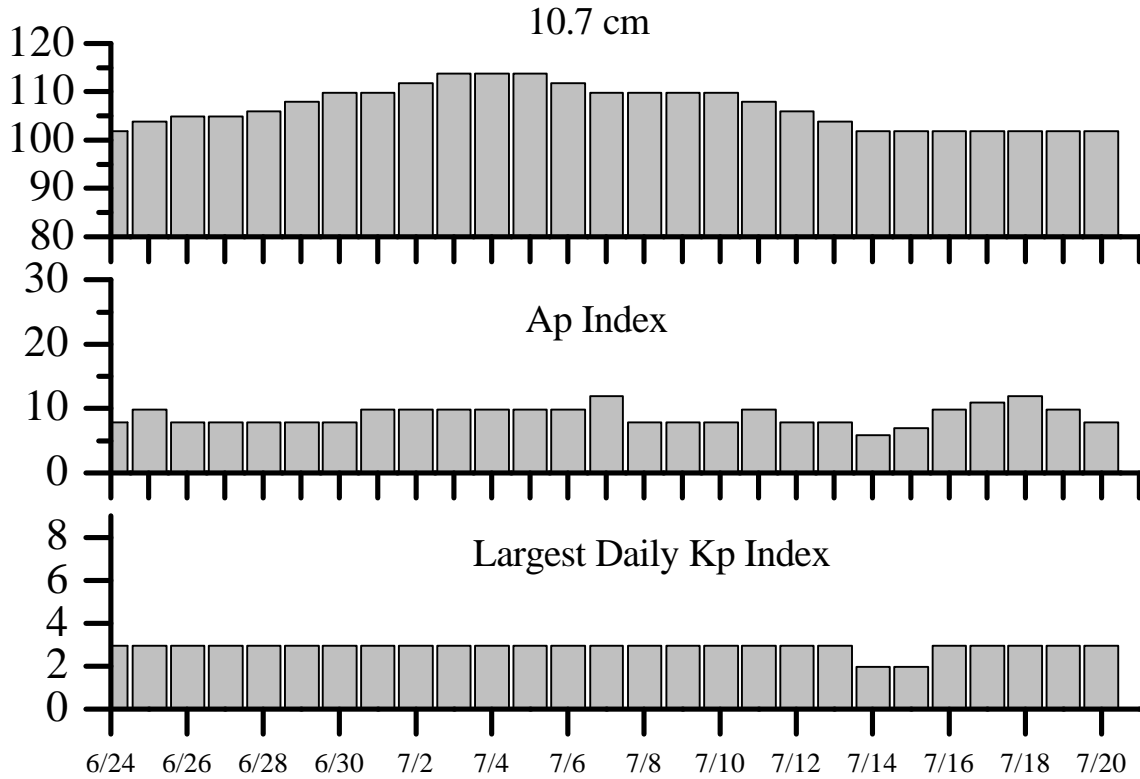
Date	Middle Latitude		High Latitude		Estimated	
	Fredericksburg		College		Planetary	
	A	K-indices	A	K-indices	A	K-indices
15 June	6	1-2-2-2-2-1-1	13	1-2-2-3-5-3-1-1	8	2-2-2-2-3-3-2
16 June	5	1-2-2-1-0-2-2-2	8	1-2-2-2-2-4-1-2	8	2-2-2-2-2-3-3-2
17 June	2	1-1-1-0-1-0-0-1	4	2-2-1-0-0-3-0-0	5	2-2-2-1-2-2-2-2
18 June	7	1-1-1-1-1-1-2-4	*	*-1-0-1-1-0-2-2	7	1-1-1-2-2-2-2-4
19 June	12	3-1-3-4-2-2-3-1	24	3-1-6-5-4-2-2-1	14	3-1-4-4-3-2-3-1
20 June	8	1-3-2-1-2-1-3-3	19	2-4-4-4-4-3-2-1	14	2-3-3-3-3-3-3-4
21 June	13	2-3-3-4-2-2-2-3	25	4-4-3-6-4-1-1-2	15	4-3-4-4-2-2-2-3

Alerts and Warnings Issued

Date and Time of Issue (UT)	Type of Alert or Warning	Date and Time of Event (UT)
17 Jun 0038	245 MHz Noise Storm	16 Jun
18 Jun 0053	245 MHz Noise Storm	17 Jun
19 Jun 0301	K= 4 Observed	19 Jun 00-03
20 Jun 1509	Type II Radio Emission	20 Jun 1422
20 Jun 1538	Type IV Radio Emission	20 Jun 1445
21 Jun 0007	K= 4 Observed	20 Jun 21-24
21 Jun 1200	K= 5 Observed	21 Jun 09-12



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
24 June	102	8	3	08 July	110	8	3
25	104	10	3	09	110	8	3
26	105	8	3	10	110	8	3
27	105	8	3	11	108	10	3
28	106	8	3	12	106	8	3
29	108	8	3	13	104	8	3
30	110	8	3	14	102	6	2
01 July	110	10	3	15	102	7	2
02	112	10	3	16	102	10	3
03	114	10	3	17	102	11	3
04	114	10	3	18	102	12	3
05	112	10	3	19	102	10	3
06	110	10	3	20	102	8	3
07	110	12	3				



Energetic Events

Date	Time (UT)			X-ray	Optical Information			Peak		Sweep Freq		
	Begin	Max	½	Integ	Imp	Location		Rgn	Radio Flux		Intensity	
			Max			Class	Flux		Brtns	Lat	CMD	#
16 Jun	1803	1842	1928	M1.0	.037							

Flare List

Date	Time			X-ray	Imp /	Optical		Rgn
	Begin	Max	End			Class.	Brtns	
15 June	0600	0750	0937	C1.4				8232
	1325	1328	1330					
16 June	1803	1842	1928	M1.0				
17 June	1915	1921	1941	B5.5	SF	N18E20		8243
18 June	1147	1151	1155	B2.4				
	1225	1228	1232	B2.4				
	1436	1440	1444	B1.8				
	1502	1508	1513	B1.9				
	1716	1721	1729	B4.2				
	1909	1910	1917	B2.3	SF	N20E07		8243
	1930	1931	1937	B2.9	SF	N21E06		8243
	2203	2219	2228	B9.1				
19 June	0043	0045	0050	B2.3	SF	N15E02		8243
	0149	0153	0157	B2.2				
	0229	0230	0241	B1.6				
	0435	0436	0440	B1.7				
	0453	0457	0459	B2.2				
	0652	0656	0728	B8.5	SF	S32E36		8249
20 June	2048	2051	2054	B2.8				
	2201	2210	2217	B3.8				
	1419	1426	1456	C4.0	1N	N13W23		8243
	2028	2028	2033	B5.0	SF	N16W21		8243
	2057	2100	2131	C1.9	1F	N16W21		8243
	2148	2151	2158		SF	N19W22		8243
	2201	2210	2228	C3.9	SF	N17W23		8243
21 June	2329	2337	2342		SF	N16W23		8243
	0031	0032	0036		SF	N16W24		8243
	0101	0102	0106	B6.8	SF	N17W23		8243
	0459	0515	0519	C2.7	SF	N17W25		8243
	0726	0733	0739	C1.6				
	0953	1002	1047	C3.4				
	1802	1808	1814	C1.2	SF	N16W38		8243
	2046	2051	2055	B5.4				
	2106	2109	2116	C2.1	SF	N16W39		8243



Region Summary

Date	Location		Sunspot Characteristics					Flares																
	Helio		Area (10 ⁶ 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 8232</i>																								
02 Jun	S19E73	351	0220	03	HHX	001	A																	
03 Jun	S19E62	349	0280	10	CHO	003	B						2											
04 Jun	S19E49	349	0360	10	CHO	008	B	2					6											
05 Jun	S18E33	352	0380	08	DKO	012	BG	3					5											
06 Jun	S19E19	353	0330	09	DHO	010	BG						1											
07 Jun	S20E09	350	0360	11	CHO	012	B	1					2	1										
08 Jun	S22W03	348	0340	12	CHO	015	B	1					1		1									
09 Jun	S21W18	350	0290	12	CKO	006	B																	
10 Jun	S22W31	350	0360	12	CKO	012	B																	
11 Jun	S21W42	347	0320	12	CKO	012	B																	
12 Jun	S21W59	351	0290	04	HKX	003	A																	
13 Jun	S21W72	350	0220	04	HHX	003	A						1											
14 Jun	S21W84	349	0180	03	HHX	002	A																	
													7	0	0	18	1	1	0	0				

Crossed West Limb.

Absolute heliographic longitude: 348

<i>Region 8233</i>																								
03 Jun	N28E63	348	0010	05	BXO	002	B						7											
04 Jun	N28E48	350	0030	07	BXO	006	B																	
05 Jun	N28E35	350	0020	08	BXO	006	B						2											
06 Jun	N28E20	352	0000	04	BXO	003	B																	
07 Jun	N31E10	349	0010	02	AXX	004	A																	
08 Jun	N29W01	346	0010	03	BXO	005	B																	
09 Jun	N28W15	347	0000	01	BXO	002	B																	
10 Jun	N28W28	347																						
11 Jun	N28W41	347																						
12 Jun	N28W54	347																						
13 Jun	N28W67	347																						
14 Jun	N28W80	347																						
													0	0	0	9	0	0	0	0				

Crossed West Limb.

Absolute heliographic longitude: 346



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 8234

04 Jun	N16E65	333	0020	08	BXO	004	B										
05 Jun	N16E52	333	0040	07	BXO	012	B										
06 Jun	N16E37	335	0020	09	BXO	006	B										
07 Jun	N16E21	338	0010	00	AXX	001	A										
08 Jun	N16E08	338															
09 Jun	N16W05	338															
10 Jun	N16W18	338															
11 Jun	N16W31	338															
12 Jun	N16W44	338															
13 Jun	N13W47	325		00	AXX	001	A										
										0	0	0	0	0	0	0	0

Died on Disk.

Absolute heliographic longitude: 338

Region 8237

07 Jun	S24E69	290	0010	06	BXO	002	B										
08 Jun	S24E55	290	0020	06	AXX	003	A										
09 Jun	S25E43	289	0010	04	BXO	002	B										
10 Jun	S25E35	283	0010	00	AXX	002	A										
12 Jun	S20E05	287	0010	03	BXO	005	B										
13 Jun	S25W07	285	0010	04	BXO	003	B	1				2	1				
14 Jun	S25W20	285															
15 Jun	S26W31	283	0000	00	AXX	001	A										
16 Jun	S26W44	283															
17 Jun	S26W57	283															
18 Jun	S26W70	283															
										1	0	0	2	1	0	0	0

Died on Disk.

Absolute heliographic longitude: 287

Region 8238

08 Jun	S19E06	339	0000	00	AXX	001	A										
09 Jun	S19W07	339															
										0	0	0	0	0	0	0	0

Died on Disk.

Absolute heliographic longitude: 339



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 8239</i>																					
08 Jun	N21E59	286	0010	05	BXO	002	B														
09 Jun	N21E46	286																			
10 Jun	N21E33	286																			
11 Jun	N21E20	286																			
12 Jun	N25E14	278	0010	04	BXO	004	B														
13 Jun	N25E03	275	0000	03	BXO	002	B														
14 Jun	N25W10	275																			
15 Jun	N25W23	275																			
16 Jun	N25W36	275																			
17 Jun	N25W49	275																			
18 Jun	N25W62	275																			

0 0 0 0 0 0 0 0

Died on Disk.

Absolute heliographic longitude: 275

<i>Region 8241</i>																				
09 Jun	S27E17	315	0030	05	CSO	004	B													
10 Jun	S26E03	315	0030	07	DSO	008	B													
11 Jun	S27W10	315	0030	08	CRO	008	B													
12 Jun	S26W26	318	0010	03	BXO	004	B													
13 Jun	S26W38	316	0010	03	BXO	002	B													
14 Jun	S26W51	316																		
15 Jun	S26W64	316																		
16 Jun	S26W77	316																		
17 Jun	S26W90	316																		

0 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 315



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 8242</i>																		
11 Jun	S20E70	235	0090	02	HSX	001	A											
12 Jun	S22E55	237	0140	02	HSX	002	A	2				3						
13 Jun	S22E43	235	0100	04	CSO	004	B	2	1			5	1					
14 Jun	S21E28	237	0060	03	CSO	004	B					2	1					
15 Jun	S21E16	236	0040	03	CAO	005	B											
16 Jun	S21E03	236	0020	03	BXO	006	B											
17 Jun	S22W10	236	0010	07	BXO	007	B											
18 Jun	S23W23	236	0020	03	BXO	003	B											
19 Jun	S22W39	238	0000	00	AXX	001	A											
20 Jun	S22W52	238																
21 Jun	S20W61	234	0010	02	BXO	004	B											
								4	1	0	10	2	0	0	0	0		

Still on Disk.

Absolute heliographic longitude: 236

<i>Region 8243</i>																		
12 Jun	N18E75	217	0120	02	HAX	001	A											
13 Jun	N18E65	213	0140	02	HAX	001	A											
14 Jun	N18E51	214	0180	04	CAO	006	B					3						
15 Jun	N17E39	213	0180	05	CHO	004	B											
16 Jun	N18E25	214	0180	03	CSO	003	B											
17 Jun	N18E12	214	0220	06	CSO	014	B											
18 Jun	N17W01	214	0160	08	CSO	006	B											
19 Jun	N18W16	215	0140	08	CSO	007	B											
20 Jun	N18W25	211	0220	07	CSO	017	B	1					2					
21 Jun	N17W38	211	0240	08	DSO	022	B	1										
								2	0	0	3	2	0	0	0	0		

Still on Disk.

Absolute heliographic longitude: 214



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 8244</i>																	
12 Jun	N34E40	252	0020	06	BXO	003	B										
13 Jun	N34E27	251	0020	07	BXO	004	B										
14 Jun	N32E14	251	0010	08	BXO	004	B										
15 Jun	N34E03	249	0020	04	BXO	007	B						1				
16 Jun	N34W09	248	0030	07	CRO	010	B										
17 Jun	N35W22	248	0040	07	DRO	016	B										
18 Jun	N34W35	248	0020	07	BXO	007	B										
19 Jun	N35W49	248	0030	07	BXO	007	B										
20 Jun	N35W62	248	0010	05	BXO	003	B										
21 Jun	N35W75	248															
								0	0	0	1	0	0	0	0	0	
Still on Disk.																	
Absolute heliographic longitude: 249																	
<i>Region 8245</i>																	
13 Jun	S29E15	263	0020	03	CSO	004	B										
14 Jun	S29E03	262	0020	04	CRO	004	B						1				
15 Jun	S30W08	260	0000	00	AXX	001	A										
16 Jun	S30W20	260	0000	00	AXX	001	A										
17 Jun	S30W32	260															
18 Jun	S30W44	260															
								0	0	0	1	0	0	0	0	0	
Died on Disk.																	
Absolute heliographic longitude: 262																	
<i>Region 8246</i>																	
13 Jun	N14W48	326	0010	00	AXX	001	A										
14 Jun	N13W62	327	0000	00	AXX	001	A										
15 Jun	N13W75	327															
16 Jun	N13W88	327															
								0	0	0	0	0	0	0	0	0	
Crossed West Limb.																	
Absolute heliographic longitude: 326																	



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

Region 8247

13 Jun	S22E31	247	0010	00	AXX	001	A										
14 Jun	S23E17	248	0010	00	AXX	001	A										
15 Jun	S23E04	248															
16 Jun	S23W09	248															
17 Jun	S23W22	248															
18 Jun	S23W35	248															

0 0 0 0 0 0 0 0 0

Died on Disk.

Absolute heliographic longitude: 248

Region 8248

14 Jun	N21E02	263	0010	02	AXX	002	A										
15 Jun	N21W11	263															
16 Jun	N21W24	263															
17 Jun	N21W37	263															
18 Jun	N21W50	263															

0 0 0 0 0 0 0 0 0

Died on Disk.

Absolute heliographic longitude: 263

Region 8249

15 Jun	S27E74	178	0030	01	HSX	001	A										
16 Jun	S25E62	177	0060	02	HAX	001	A										
17 Jun	S28E49	177	0060	02	HSX	001	A										
18 Jun	S28E36	177	0060	02	HSX	001	A										
19 Jun	S27E22	177	0080	01	HSX	001	A										
20 Jun	S27E10	176	0040	02	HSX	001	A										
21 Jun	S27W03	176	0060	02	HSX	001	A										

0 0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 176



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 8250</i>																	
17 Jun	S26E03	223	0010	03	BXO	006	B										
18 Jun	S25W09	222	0000	00	AXX	001	A										
19 Jun	S25W22	222															
20 Jun	S25W35	222															
21 Jun	S25W48	222															
								0	0	0	0	0	0	0	0	0	0
Still on Disk.																	
Absolute heliographic longitude: 223																	
<i>Region 8251</i>																	
19 Jun	N16W24	223	0010	00	AXX	001	A										
20 Jun	N16W39	225	0010	06	CRO	006	B										
21 Jun	N16W53	226	0030	06	CSO	008	B										
								0	0	0	0	0	0	0	0	0	0
Still on Disk.																	
Absolute heliographic longitude: 223																	
<i>Region 8252</i>																	
20 Jun	S29W03	189	0000	03	BXO	003	B										
21 Jun	S29W16	189	0010	05	BXO	002	B										
								0	0	0	0	0	0	0	0	0	0
Still on Disk.																	
Absolute heliographic longitude: 189																	



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

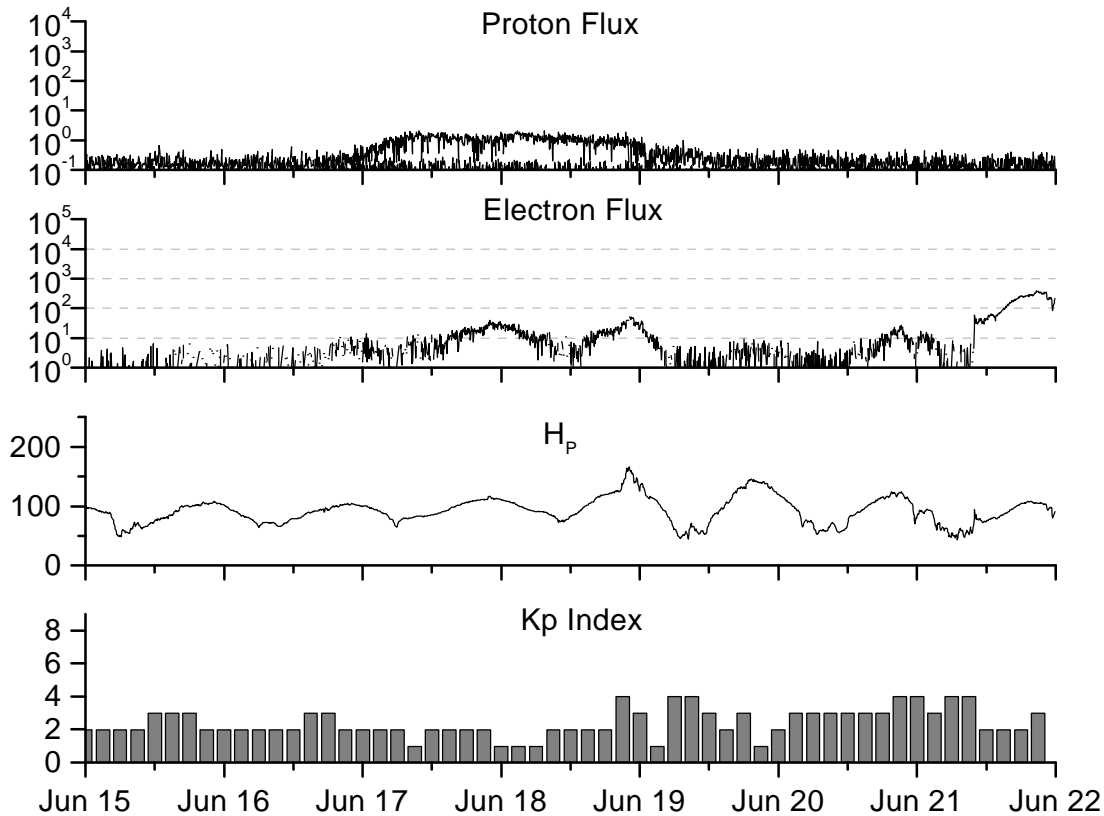
Month	Sunspot Numbers					Radio Flux		Geomagnetic	
	Observed SWO	values RI	Ratio RI/SWO	Smooth SWO	values RI	**Penticton 10.7 cm	Smooth Value	Planetary Ap	Smooth Value
1996									
June	18.8	11.8	0.63	13.5	08.5	69.6	71.8	05	09.4
July	13.2	08.2	0.62	13.4	08.4	71.2	72.0	07	09.3
August	20.5	14.4	0.70	13.1	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
1997									
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	08.7*
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	08.2*
October	33.6	22.8	0.68	45.4	31.9*	84.9	88.6*	11	08.3*
November	53.5	39.0	0.73	49.3	35.1*	99.5	91.4*	11	08.7*
December	57.9	41.2	0.71			98.8		05*	
1998									
January	51.8	32.3*	0.62*			93.5*		07*	
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*	

*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 15 June 1998

Protons plot contains the five-minute averaged integral proton flux (protons/ cm^2 -sec-sr) as measured by GOES-9 (W135) for each of three energy thresholds: greater than 10, 50, and 100 MeV.

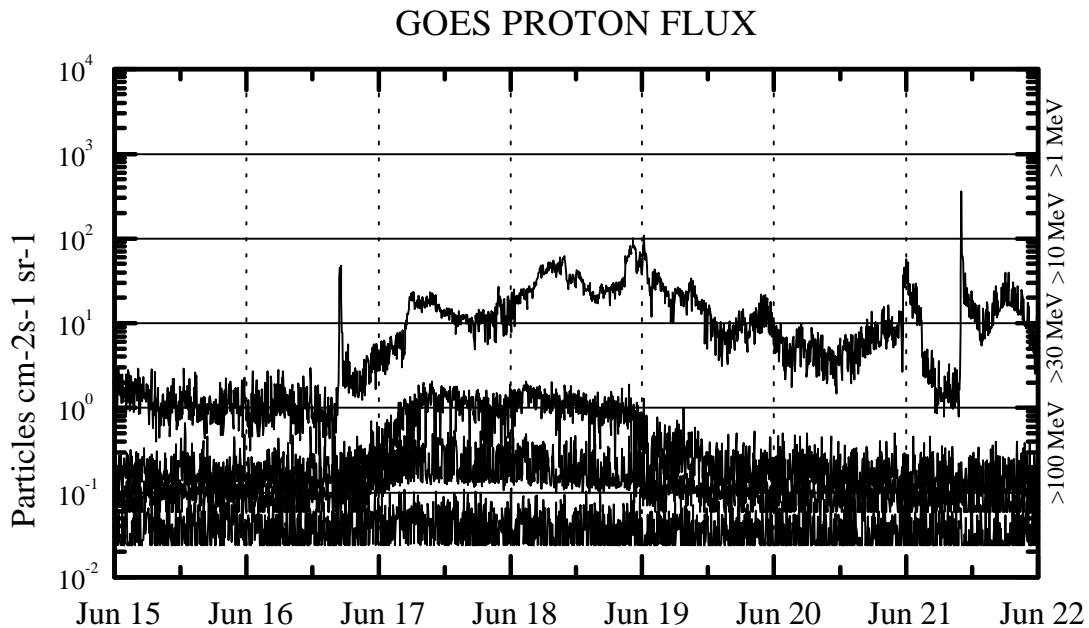
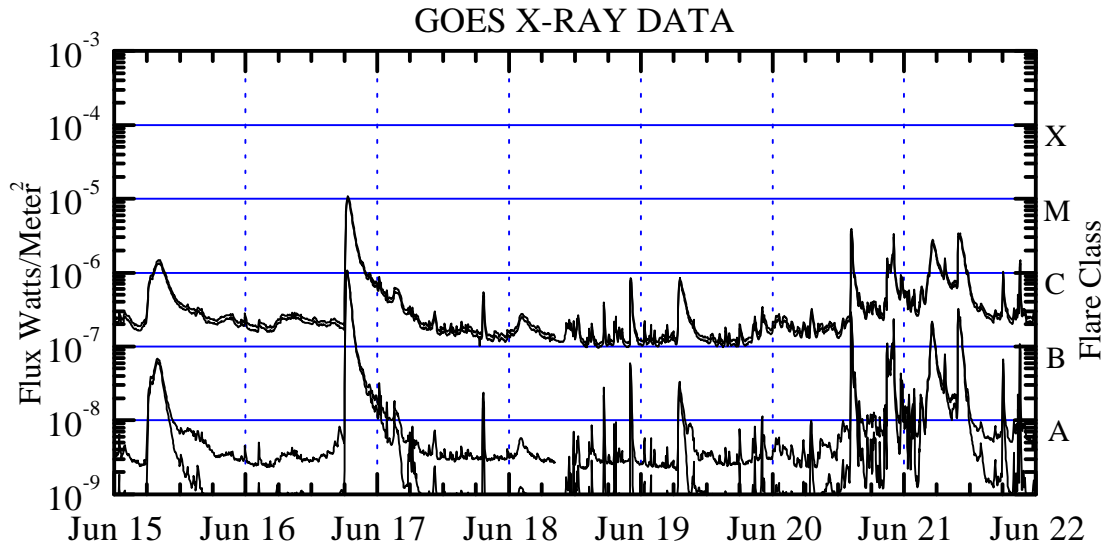
Electrons plot contains the five-minute averaged integral electron flux (electrons/ cm^2 -sec-sr) with energies greater than 2 MeV at GOES-9.

H_p plot contains the five minute averaged magnetic field H component in nanoteslas (nT) as measured by GOES-9. 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 USAF 55th 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_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_{parallel} 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 (watts/m²) as measured by GOES 8 and 9 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-9 (W135) 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.

