

**Space Weather Highlights
06-12 July 1998**

Solar activity ranged from very low to low. Isolated B- and C-class x-ray flares occurred. Sunspot regions were simple and stable during most of the period. All in all, an unremarkable week.

Solar wind data were available from the Advanced Composition Explorer (ACE) spacecraft during most of the period. Velocities were increasing at the start of the period and peaked at 670 km/sec early on 06 July. Velocities gradually decreased to 300 km/sec by 10 July, then slowly increased to 440 km/sec by the end of the period. Densities ranged from 02 - 10 p/cc during much of the period, but were enhanced during 06, 09, and 11 July. Bz displayed significant southward shifts (maximum deflections of minus 10 to minus 12 nT (GSM)) on 06, 09, and 11 - 12 July. Solar sector orientation was mostly toward (phi angle near 315 degrees) through 09 July, then shifted to away (phi angle near 135 degrees) for the rest of the period.

There were no significant proton enhancements detected at geosynchronous altitude.

The greater than 2 MeV electron flux at geosynchronous altitude was at normal to moderate levels during most of the period.

The geomagnetic field was disturbed during 06 July with active periods detected at middle latitudes and active to minor storm periods at high latitudes. This activity declined to quiet levels through midday on 09 July, then increased during the remainder of the day with active to minor storm levels at middle latitudes and active to major storm levels at high latitudes. Geomagnetic field activity decreased to quiet to unsettled levels for the rest of the period.

**Space Weather Forecast
15 July 1998-10 August 1998**

Solar activity is expected to be low during most of the period with a fair chance for isolated M-class flares. No major flare activity is expected.

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 mostly quiet to unsettled levels. Active periods are possible during 15 - 16 July.



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
06 July	121	110	410	B3.5	1	0	0	0	0	0	0	0
07 July	115	92	380	B2.8	1	0	0	1	1	0	0	0
08 July	112	56	310	B2.5	2	0	0	0	0	0	0	0
09 July	114	61	310	B5.0	1	0	0	1	0	0	0	0
10 July	109	91	290	B2.4	1	0	0	3	0	0	0	0
11 July	108	96	350	B3.1	2	0	0	5	0	0	0	0
12 July	99	82	270	B2.6	0	0	0	0	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
06 July	3.5E+5	1.5E+4	3.6E+3		6.5E+6	
07 July	1.1E+5	1.4E+4	3.6E+3		1.3E+7	
08 July	1.7E+5	1.5E+4	3.8E+3		2.0E+7	
09 July	5.8E+5	1.6E+4	4.0E+3		1.0E+7	
10 July	2.8E+5	1.8E+4	4.6E+3		2.3E+6	
11 July	3.6E+5	1.7E+4	4.6E+3		3.2E+6	
12 July	1.8E+5	1.6E+4	4.7E+3		3.8E+6	

Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
06 July	10	2-3-3-2-3-2-2-2	33	4-5-5-5-5-4-2-1	19	3-4-4-4-4-3-2-2
07 July	5	2-2-1-1-2-2-1-1	4	2-2-1-1-3-0-0-0	6	2-2-1-2-2-2-1-1
08 July	3	1-2-0-0-0-1-2-1	1	0-2-0-0-0-0-1-0	5	1-2-1-1-1-2-2-2
09 July	10	0-0-2-1-2-3-3-4	16	0-0-2-2-5-5-2-3	11	0-1-1-1-3-4-3-4
10 July	5	3-1-0-0-0-1-1-3	3	2-1-0-0-0-1-2-2	6	3-1-0-1-2-3-2-2
11 July	11	3-2-2-2-2-2-4-2	15	2-2-2-1-4-4-4-2	11	3-2-1-2-3-3-4-3
12 July	8	2-1-4-2-1-0-1-2	7	2-1-3-3-1-0-1-2	10	2-1-4-4-2-2-2-2

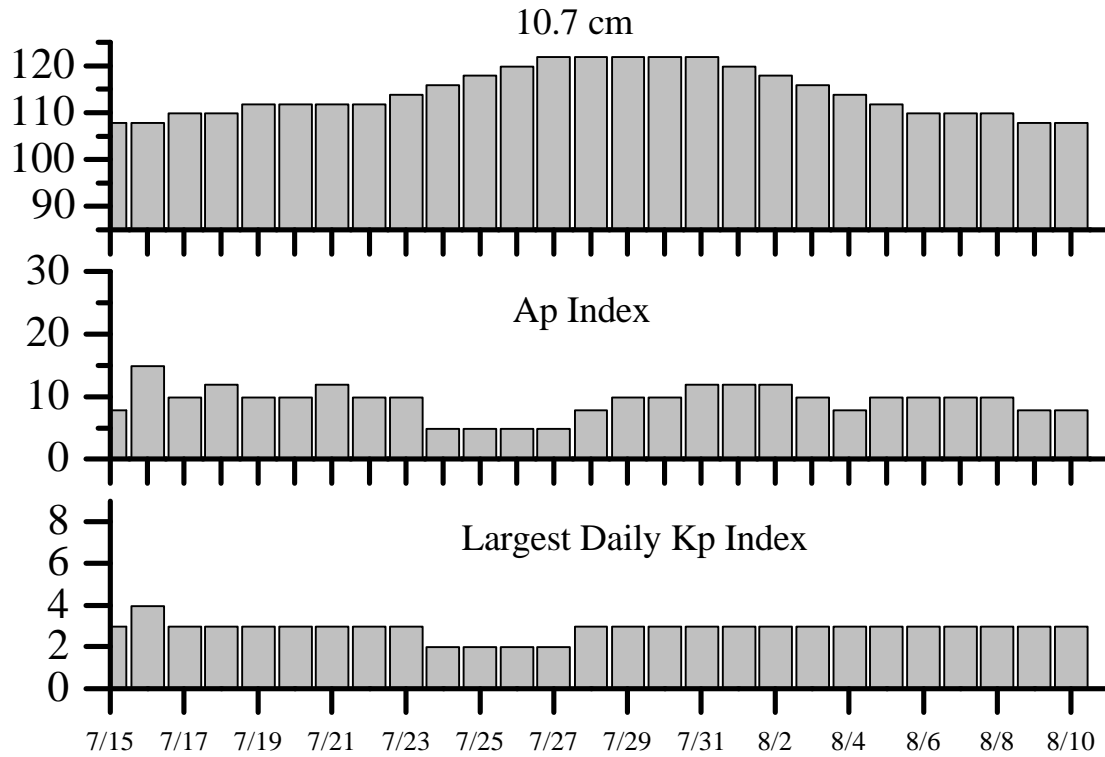


Alerts and Warnings Issued

<u>Date and Time of Issue (UT)</u>	<u>Type of Alert or Warning</u>	<u>Date and Time of Event (UT)</u>
06 Jul 0011	245 Radio Noise Storm	05 Jul
06 Jul 0600	K= 4 Observed	06 Jul 03- 06
07 Jul 0010	6-245 MHz Radio Bursts	06 Jul
07 Jul 0010	245 MHz Radio Noise Storm	06 Jul
08 Jul 0006	7-245 MHz Radio Bursts	07 Jul
08 Jul 0006	245 MHz Radio Noise Storm	07 Jul
09 Jul 0110	4-245 MHz Radio Bursts	08 Jul
09 Jul 0110	245 MHz Radio Noise Storm	08 Jul
09 Jul 1803	K= 4 Observed	09 Jul 15-18
10 Jul 0000	K= 4 Observed	09 Jul 21- 24



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
15 July	108	8	3	29	122	10	3
16	108	15	4	30	122	10	3
17	110	10	3	31	122	12	3
18	110	12	3	01 Aug	120	12	3
19	112	10	3	02	118	12	3
20	112	10	3	03	116	10	3
21	112	12	3	04	114	8	3
22 July	112	10	3	05	112	10	3
23	114	10	3	06	110	10	3
24	116	5	2	07	110	10	3
25	118	5	2	08	110	10	3
26	120	5	2	09	108	8	3
27	122	5	2	10	108	8	3
28	122	8	3				



Energetic Events

Date	Time (UT)		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

No Events Observed

Flare List

Date	Time			X-ray Class.	Imp / Brtns	Optical		Rgn #
	Begin	Max	End			Location Lat CMD		
06 July	1113	1123	1140	B8.8				
	1258	1304	1314	B6.2				
	1350	1400	1411	C1.2				
	1938	1948	2001	B6.4				
07 July	0535	0543	0548	B5.2				
	1010	1013	1030	C1.4	1F	N26W45		8259
	1220	1224	1231	B4.4				
	1249	1252	1255	B5.8				
08 July	1447	1453	1457	B5.0				
	1642	1646	1650	B6.5				
	1954	1954	2005	B7.0	SF	N16W16		8264
	0326	0331	0335	B8.4				
09 July	1027	1055	1120	C1.9				
	2246	2313	2329	C1.1				
	1025	1117	1141	C2.5				
10 July	1532	1536	1554		SF	N16W40		8264
	0307	0311	0315	B5.0				
	0405	0410	0413	C1.2				
	0453	0455	0504	B9.6	SF	S21W56		8263
11 July	B0632	U0635	0646	B7.2	SF	S22E78		
	0903	0906	0909	B4.6				
	1216	1231	1237	B6.7				
	1905	1905	1911	B3.6	SF	S21E46		
	2308	2316	2324	B8.8				
	0041	0047	0054	B9.8				
	0231	0234	0236	B4.9				
	0434	0450	0508	C1.7	SF	S21W63		8263
	0438	0438	0446		SF	N16W60		8264
	1039	1043	1045	B7.1				
1057	1058	1106	B9.9	SF	S23E62		8270	
1249	1253	1257	C4.3	SF	N17W66		8264	
1703	1708	1714	B5.5					
1815	1819	1822	B5.3					
1838	1838	1844	B4.4	SF	S22E55		8270	
2336	2343	2348	B9.5					



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 8258</i>																	
26 Jun	S14E64	043	0040	01	HSX	001	A											
27 Jun	S16E54	040	0070	09	CSO	002	B											
28 Jun	S14E39	042	0060	02	HSX	001	A											
29 Jun	S14E24	044	0050	02	HSX	001	A											
30 Jun	S13E11	043	0060	02	HSX	001	A											
01 Jul	S14W02	043	0060	02	HSX	001	A											
02 Jul	S14W16	044	0050	03	HSX	001	A											
03 Jul	S14W29	044	0060	02	HSX	001	A											
04 Jul	S14W43	045	0050	01	HSX	001	A											
05 Jul	S14W56	044	0040	01	HSX	001	A											
06 Jul	S14W70	044	0040	01	HSX	001	A											
07 Jul	S13W82	043	0020	01	HRX	001	A											

0 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 043

Region 8259

27 Jun	N25E73	021	0010	02	AXX	002	A											
28 Jun	N27E63	018	0090	09	CSO	003	B											
29 Jun	N27E52	016	0060	10	CSO	005	B											
30 Jun	N27E37	017	0040	10	CRO	005	B	1										
01 Jul	N27E25	016	0040	12	CSO	008	B	1										
02 Jul	N28E15	013	0030	05	CAO	005	B											
03 Jul	N27E03	012	0010	03	BXO	006	B											
04 Jul	N28W10	012	0010	03	BXO	003	B											
05 Jul	N25W24	012	0010	09	BXO	004	B	1					1					
06 Jul	N25W38	012	0000	08	BXO	002	B											
07 Jul	N25W51	012						1					1					
08 Jul	N25W64	012																
09 Jul	N25W77	012																
10 Jul	N25W90	012																

4 0 0 0 2 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 012



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 8260</i>																					
27 Jun	S21E74	020	0040	01	HSX	001	A														
28 Jun	S22E64	017	0190	16	FAO	005	B														
29 Jun	S20E56	012	0280	15	EAC	016	B														
30 Jun	S22E44	010	0210	16	CAO	013	B														
01 Jul	S22E30	011	0100	18	CAO	015	B														
02 Jul	S24E12	016	0050	13	CAO	010	B														
03 Jul	S23E01	014	0030	13	CRO	009	B														
04 Jul	S23W14	016	0030	13	CSO	015	B														
05 Jul	S23W25	013	0050	09	CRO	016	B														
06 Jul	S23W39	013	0020	09	BXO	013	B														
07 Jul	S22W48	009	0020	10	BXO	004	B														
08 Jul	S22W61	009																			
09 Jul	S22W74	009																			
10 Jul	S22W87	009																			
								0	0	0	0	0	0	0	0	0	0	0	0	0	
Crossed West Limb.																					
Absolute heliographic longitude: 014																					
<i>Region 8261</i>																					
28 Jun	N32E16	065	0000	04	BXO	002	B														
29 Jun	N32E03	065																			
								0	0	0	0	0	0	0	0	0	0	0	0	0	
Died on Disk.																					
Absolute heliographic longitude: 065																					
<i>Region 8262</i>																					
29 Jun	N18E04	064	0010	03	BXO	004	B														
30 Jun	N18W09	064																			
								0	0	0	0	0	0	0	0	0	0	0	0	0	
Died on Disk.																					
Absolute heliographic longitude: 064																					



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 8265</i>																		
05 Jul	N20E44	304	0010	03	BXO	002	B												
06 Jul	N19E31	303	0000	02	AXX	002	A												
07 Jul	S24E04	317	0000	00	AXX	002	A												
08 Jul	S24W09	317	0000	00		000													
09 Jul	S24W17	312	0030	05	CSO	006	B												
10 Jul	S24W32	313	0030	03	AXX	004	A												
11 Jul	S24W46	314	0000	00	AXX	001	A												
12 Jul	S24W59	314																	

0 0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 317

		<i>Region 8266</i>																	
05 Jul	N24E73	275	0000	00	AXX	001	A												
06 Jul	N22E57	277	0000	00	AXX	001	A												
07 Jul	N23E46	275	0010	00	AXX	001	A												
08 Jul	N22E33	275	0000	00	AXX	001	A												
09 Jul	N22E20	275																	
10 Jul	N27E11	270	0000	01	AXX	002	A												
11 Jul	N25E00	268	0000	01	AXX	002	A												
12 Jul	N18W18	273	0010	03	BXO	002	B												

0 0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 268

		<i>Region 8267</i>																	
07 Jul	N33E33	288	0020	06	CRO	003	B												
08 Jul	N34E20	288	0020	06	BXO	003	B												
09 Jul	N33E09	286	0000	00	AXX	001	A												
10 Jul	N33W04	286																	
11 Jul	N33W17	286																	

0 0 0 0 0 0 0 0 0

Died on Disk.

Absolute heliographic longitude: 286

		<i>Region 8268</i>																	
10 Jul	N18W07	288	0000	00	AXX	001	A												
11 Jul	N18W20	288																	

0 0 0 0 0 0 0 0 0

Died on Disk.

Absolute heliographic longitude: 288



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 8269</i>																	
10 Jul	N19E68	213	0000	00	AXX	001	A										
11 Jul	N17E58	210	0040	05	CRO	004	B										
12 Jul	N19E43	212	0040	03	CRO	004	B										
								0	0	0	0	0	0	0	0	0	
Still on Disk.																	
Absolute heliographic longitude: 212																	
<i>Region 8270</i>																	
10 Jul	S19E66	215	0020	07	CSO	004	B										
11 Jul	S20E54	214	0080	06	CRO	012	B										
12 Jul	S20E41	214	0110	08	DAO	011	B										
								0	0	0	0	0	0	0	0	0	
Still on Disk.																	
Absolute heliographic longitude: 214																	
<i>Region 8271</i>																	
11 Jul	S09E63	205	0040	07	BXO	004	B										
12 Jul	S10E45	210	0020	03	CRO	003	B										
								0	0	0	0	0	0	0	0	0	
Still on Disk.																	
Absolute heliographic longitude: 210																	



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

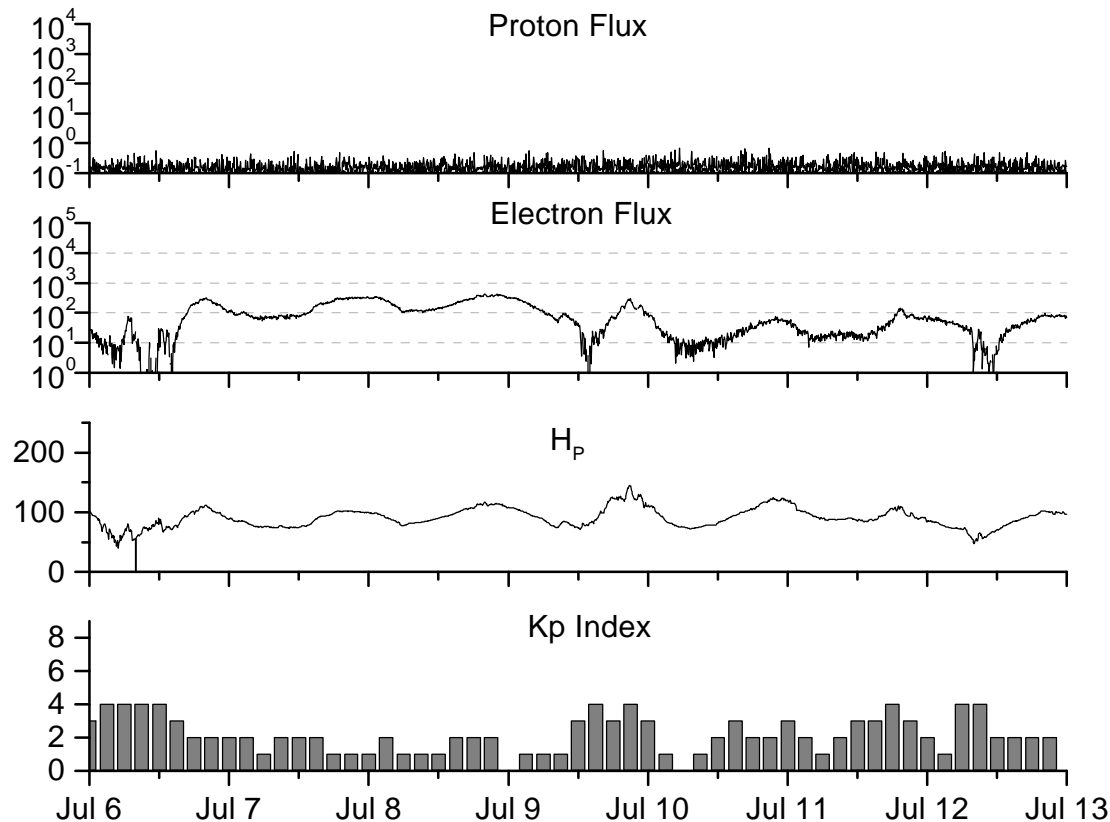
Month	Sunspot Numbers					Radio Flux		Geomagnetic	
	Observed SWO	values RI	Ratio RI/SWO	Smooth SWO	values RI	**Penticton 10.7 cm	Smooth Value	Planetary Ap	Smooth Value
1996									
July	13.2	08.2	0.62	13.4	08.4	71.2	72.0	07	09.3
August	20.5	14.4	0.70	13.1	08.3	72.4	72.1	09	09.4
September	02.9	01.6	0.55	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	54.2	39.1*	98.8	94.2*	05*	09.3*
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*	
June	93.6	70.5*	0.75*			108.4*		11*	

*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 06 July 1998

Protons plot contains the five-minute averaged integral proton flux (protons/ cm²-sec-sr) as measured by GOES-9 (W135) for each of three energy thresholds: greater than 10, 50, and 100 MeV.

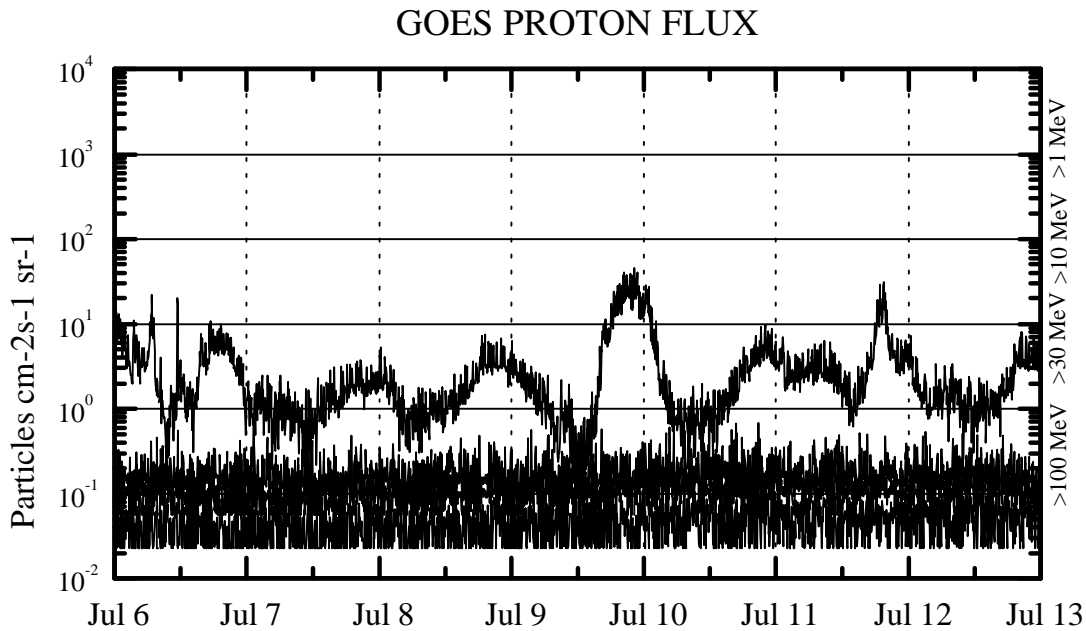
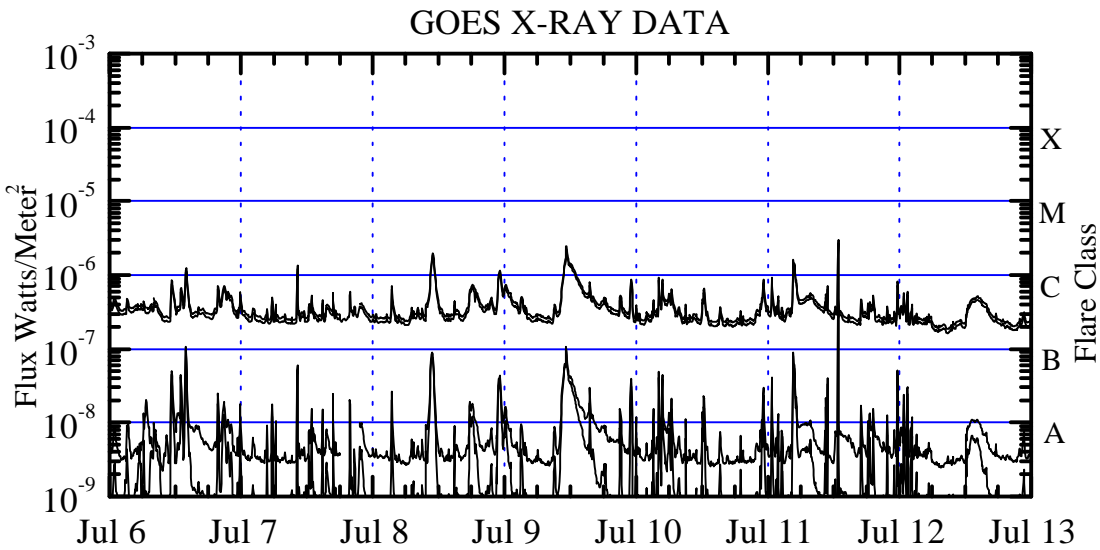
Electrons plot contains the five-minute averaged integral electron flux (electrons/ cm²-sec-sr) with energies greater than 2 MeV at GOES-9.

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.

