

**Space Weather Highlights  
08 -14 September 1997**

Solar activity ranged from very low to moderate. Region 8083 (S28, L = 355, class/area Dko/710 on 10 September) produced an M1/SF flare at 08/1938UT. A 220 SFU Tenflare accompanied the flare. Region 8084 (N22, L = 320, class/area Dsi/270 on 10 September) entered a period of extremely rapid growth during 08 September and produced isolated C-class subflares.

Solar wind data were received from the WIND spacecraft a few hours per day (data for 08 - 09 September were unreliable due to spacecraft position). Velocities ranged from 370 - 520 km/sec. Particle densities ranged from 02 - 11 p/cc. Bz ranged from minus 08 to plus 07 nT (GSM). Solar sector orientation was mostly away (phi angle near 135 degrees).

There were no significant proton enhancements observed at satellite altitudes.

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

The geomagnetic field was disturbed during 08 - 10 September with active levels observed at all latitudes. Isolated minor storm periods occurred as well, but mostly at high latitudes. Field conditions declined to mostly quiet to unsettled levels during the remaining days with isolated active periods at high latitudes.

**Space Weather Forecast  
17 September 1997 -13 October 1997**

Solar activity is expected to range from low to moderate. Best chance for isolated M-class flare activity occurs after 27 September, with the return of previously active regions.

No significant proton enhancements are expected at satellite altitudes.

The greater than 2 MeV electron flux at geosynchronous altitude is expected to be normal to moderate during most of the period. However, high fluxes are expected during 26 - 28 September.

The geomagnetic field is expected to be predominately quiet to unsettled. However, increased activity is expected during 24 - 25 September due to a recurrent high speed coronal hole wind stream.



### Daily Solar Data

Date	Radio Flux	Sun spot	Sunspot Area	X-ray Background	X-ray Flux			Flares				
	10.7 cm	No. (10 <sup>6</sup> hemi.)	(10 <sup>6</sup> hemi.)		C	M	X	S	1	2	3	4
08 September	119	97	1000	B3.5	4	1	0	8	0	0	0	0
09 September	116	101	1370	B4.8	2	0	0	6	2	0	0	0
10 September	115	95	1590	B3.3	1	0	0	5	0	0	0	0
11 September	109	98	1450	B2.4	0	0	0	4	0	0	0	0
12 September	109	97	1050	B2.2	3	0	0	8	0	0	0	0
13 September	108	85	940	B2.8	1	0	0	6	0	0	0	0
14 September	103	74	790	B2.4	6	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
08 September	1.9E+6	1.7E+4	4.2E+3		5.3E+6	
09 September	4.9E+5	1.7E+4	4.0E+3		6.6E+7	
10 September	1.2E+6	1.7E+4	4.2E+3		1.0E+8	
11 September	3.1E+5	1.7E+4	4.1E+3		1.2E+8	
12 September	7.7E+5	1.7E+4	4.2E+3		5.0E+8	
13 September	4.2E+5	1.7E+4	4.2E+3		4.6E+8	
14 September	8.1E+5	1.7E+4	4.2E+3		1.3E+8	

### Daily Geomagnetic Data

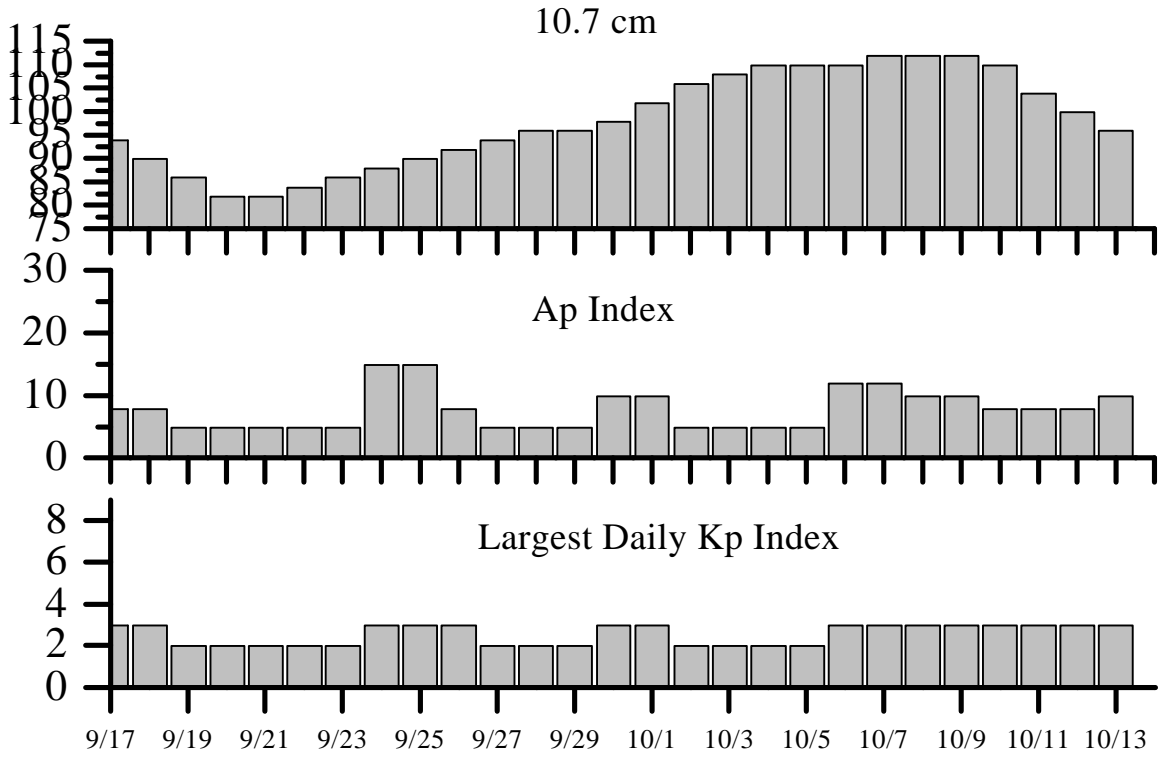
Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
08 September	12	1-0-1-1-4-3-4-3	6	0-0-0-1-4-2-3-0	9	0-0-0-1-3-2-4-3
09 September	19	2-3-5-3-3-2-3-4	*	1-2-4-3-4-3-*-*	19	2-3-4-5-3-3-3-3
10 September	17	3-2-3-3-4-3-3-4	*	1-2-4-3-4-3-*-*	19	3-2-3-3-3-3-3-3
11 September	9	3-1-2-2-2-2-2-3	*	*-*-*-*-*-*0	9	3-1-1-3-3-2-2-3
12 September	13	4-3-3-3-2-2-2-2	10	3-0-4-3-2-3-1-0	15	4-3-3-3-4-2-3-2
13 September	9	3-2-3-1-2-2-2-2	9	3-1-3-3-1-2-1-2	10	3-3-3-2-2-2-2-3
14 September	13	2-3-3-4-3-3-2-1	15	2-1-4-4-5-2-0-1	12	3-3-3-4-3-2-2-2



*Alerts and Warnings Issued*

Date and Time of Issue (UT)	Type of Alert or Warning	Date and Time of Event (UT)
08 Sep 0028	4 - 245MHz Radio Bursts	07 Sep 0856
08 Sep 1513	K= 4 observed	08 Sep 12 -15
08 Sep 2009	2695MHz Radio Burst	08 Sep 1931
09 Sep 0023	2 - 245MHz Radio Bursts	08 Sep 1938
09 Sep 0901	K=4 observed	09 Sep 06 - 09
09 Sep 0912	K=4 observed	09 Sep 06 - 09
09 Sep 1903	>2MeV Electron Event $\geq$ 1000pfu	09 Sep 1848
10 Sep 0013	1-245MHz Radio Burst	09 Sep 1120
10 Sep 0013	245MHz Radio Noise Storm	09 Sep 0030
11 Sep 0007	>2MeV Electron Event in Progress $\geq$ 1000pfu	10 Sep 2359
11 Sep 0007	K= 4 observed	10 Sep 21-24
11 Sep 0718	Type II Radio Emission	11 Sep 0639
12 Sep 0014	1-245MHz Radio Burst	11 Sep 2135
12 Sep 0014	>2MeV Electron Event in Progress $\geq$ 1000pfu	11 Sep 2359
12 Sep 0305	K= 4 observed	12 Sep 00 -03
13 Sep 0002	>2MeV Electron Event in Progress $\geq$ 1000pfu	12 Sep
13 Sep 0029	245MHz Radio Noise Storm	12 Sep 1129
13 Sep 0034	13 - 245MHz Radio Bursts	12 Sep 0018
13 Sep 0106	Type II Radio Emission	12 Sep 1605
14 Sep 0005	>2MeV Electron Event in Progress $\geq$ 1000pfu	13 Sep
14 Sep 0026	1 - 245MHz Radio Burst	13 Sep 0226





*Twenty-seven Day Outlook*

Date	Radio Flux			Planetary			Largest		
	10.7 cm	A Index	Kp Index	Date	10.7 cm	A Index	Kp Index		
17 Sep	94	8	3	01 Oct	102	10	3		
18	90	8	3	02	106	5	2		
19	86	5	2	03	108	5	2		
20	82	5	2	04	110	5	2		
21	82	5	2	05	110	5	2		
22	84	5	2	06	110	5	3		
23	86	5	2	07	112	12	3		
24	88	15	3	08	112	12	3		
25	90	15	3	09	112	10	3		
26	92	8	3	10	110	10	3		
27	94	5	2	11	104	8	3		
28	96	5	2	12	100	8	3		
29	96	5	2	13	96	8	3		
30	98	10	3						



### *Energetic Event*

Date	Time (UT)			X-ray		Optical Information			Peak		Sweep Freq		
	Begin	Max	½	Class	Integ Flux	Imp Brtns	Location		Rgn #	Radio Flux		Intensity	
			Max				Lat	CMD		245	2695	II	IV
08 Sep	1923	1927	1948	M1.0	.009	SF	S28W07		8083	110	220		

### *Flare List*

Date	Time			X-ray Class.	Optical		Rgn #	
	Begin	Max	End		Imp / Brtns	Location Lat CMD		
08 September	0117	0120	0127	B5.9				
	0154	0158	0202	B6.7				
	0908	0915	0924		SF	N23E35	8084	
	0952	0958	1006	C1.0				
	1026	1027	1031	C2.3	SF	S25E58	8085	
	1207	1211	1215	B8.1				
	1359	1402	1409	C1.8	SF	S27E55	8085	
	1608	1609	1618	B7.7	SF	S25E56	8085	
	1702	1702	1711		SF	N21E30	8084	
	1733	1738	1756	C3.5	SF	S26E53	8085	
	1928	1932	2110	M1.0	SF	S28W07	8083	
	2029	2030	2033		SF	N22E30	8084	
	09 September	0517	0520	0523	B5.6			
0911		0914	0922		SF	N21E24	8084	
0948		0951	1035	C9.7	1N	S20E44	8085	
1352		1358	1418	B6.4	SF	S28W17	8083	
1401		1404	1408	B7.8			8083	
1516		1520	A1527		SF	S23E42	8085	
1751		1752	1755		SF	S26W19	8083	
1837		1842	1940	C2.5	1F	S25E43	8085	
1950		1953	1957		SF	S29E45	8085	
2004		2011	2023	B7.1				
2303		2305	2308		SF	S27W20	8083	
10 September		0023	0033	0057	B6.8			
		0759	0803	0812		SF	S24W32	8083
	0846	0846	0854		SF	N20E06	8084	
	1008	1014	1027	C1.0				
	1102	1102	1109		SF	N19E05	8084	
	1302	1304	1310		SF	N19E04	8084	
	1811	1813	1823		SF	N22E01	8084	
11 September	1152	1153	1201		SF	S24E22	8085	
	1333	1337	1343	B3.7				
	1621	1622	1627	B4.9	SF	N24W07	8084	
	2243	2243	2249		SF	N23W08	8084	
	2323	2324	2327	B5.2	SF	N23W08	8084	
12 September	0028	0029	0031	B8.5	SF	N22W16	8084	
	0041	0044	0047	B3.0				



*Flare List – continued.*

Date	Begin	Time			X-ray Brtns	Optical		Rgn
		Max	End	Class.		Imp / Lat CMD	Location #05 September	
12 September	0211	0214	0217	C1.1	SF	N22W17	8084	
	1411	1420	1429		SF	N22W19	8084	
	1459	1503	1506	B4.7				
	B1604	U1604	A1610		SF	N24W20	8084	
	1606	1607	1610		SF	N23W18	8084	
	1731	1732	1737		SF	N23W19	8084	
	1859	1900	1914	C1.1	SF	N23W19	8084	
	2008	2008	2016	C1.0	SF	N22W20	8084	
	2159	2202	2205	B3.8				
	13 September	0056	0103	0114	B6.6			
0629		0632	0638	B8.4	SF	N21W26	8084	
B0653		U0653	A0730		SF	N29E61	8086	
0841		0842	0902		SF	N23E61	8086	
B0942		U0948	A0955		SF	N28E60	8086	
1212		U1215	A1227		SF	N22W28	8084	
1531		1533	1542		SF	N29E58	8086	
1747		1757	1801	B4.9				
1945		1956	2001	C2.4				
2336		2342	2356	B6.6				
14 September	0254	0254	0258	C2.8	SF	S23W79	8083	
	0327	0332	0336	B7.3				
	0351	0414	0420	C1.2				
	0629	0630	0645	B5.1	SF	S25W18	8085	
	0954	0955	0958		SF	N28E46	8086	
	B1057	U1116	A1158	C2.7	1F	S25W21	8085	
	1202	1210	1214	C1.9				
	1355	1357	1406	B6.7	SF	N22W42	8084	
	1701	1702	1708	C1.5	SF	N28E43	8086	
	2013	2022	2039	C1.0	SF	N22W52	8084	



## 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	4			
<i>Region 8081</i>																		
31 Aug	N34E72	019	0020	01	HRX	001	A											
01 Sep	N34E61	017	0020	01	HSX	002	A											
02 Sep	N34E50	015	0020	01	HRX	003	A											
03 Sep	N34E37	015	0020	02	AXX	004	A											
04 Sep	N33E26	012	0010	01	AXX	002	A											
05 Sep	N33E17	012	0010	03	BXO	004	B											
06 Sep	N30E06	012	0010	00	AXX	001	A											
07 Sep	N34W13	012	0000	00	AXX	001	A											
08 Sep	N34W26	012																
09 Sep	N34W39	012																
10 Sep	N34W52	012																
11 Sep	N34W65	012																
12 Sep	N34W78	012																

0 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 006

<i>Region 8082</i>																		
01 Sep	N22E70	008	0000	00	AXX	001	A											
02 Sep	N21E58	007	0000	00	AXX	001	A											
03 Sep	N21E45	007																
04 Sep	N22E36	002	0000	00	AXX	001	A											
05 Sep	N21E22	003	0030	05	BXO	011	B											4
06 Sep	N21E09	003	0050	06	CSO	010	B											1
07 Sep	N21W04	003	0040	08	DSO	010	B											1
08 Sep	N21W17	003	0020	07	CRO	007	B											
09 Sep	N21W31	004	0010	08	BXO	004	B											
10 Sep	N20W46	005																
11 Sep	N19W60	006																
12 Sep	N19W73	006																
13 Sep	N19W86	006																

0 0 0 6 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 003



*Region Summary – continued.*

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	4	
<i>Region 8083</i>															
03 Sep	S28E55	357	0070	04	CRO	004	B				3				
04 Sep	S27E41	357	0200	05	DSO	007	B				3				
05 Sep	S27E28	357	0300	09	DKO	011	B								
06 Sep	S27E15	357	0300	09	DAO	011	B								
07 Sep	S28E04	355	0360	10	DAI	014	B				1				
08 Sep	S28W09	355	0450	09	DAI	019	B	1			1				
09 Sep	S28W22	355	0540	09	DKO	015	B				3				
10 Sep	S28W35	354	0710	10	DKO	019	B				1				
11 Sep	S28W48	354	0600	10	DKO	011	B								
12 Sep	S27W59	352	0340	11	EKO	012	B								
13 Sep	S28W73	353	0290	08	DAO	007	B								
14 Sep	S27W85	352	0060	02	HSX	001	A	1			1				
								1	1	0	13	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 355

<i>Region 8084</i>															
05 Sep	N22E64	321	0010	03	BXO	002	B								
06 Sep	N22E51	321	0010	00	HRX	001	A								
07 Sep	N21E36	323	0010	02	HRX	003	A								
08 Sep	N21E26	320	0070	06	CAO	015	B				3				
09 Sep	N22E13	320	0170	07	DAI	019	B				1				
10 Sep	N22W01	320	0270	09	DSI	022	B				4				
11 Sep	N22W13	319	0240	12	EAI	020	B				3				
12 Sep	N22W26	319	0240	13	EAO	022	BG	3			8				
13 Sep	N22W39	319	0230	13	EAO	016	BG				2				
14 Sep	N22W53	320	0270	12	ESO	012	BG	1			2				
								4	0	0	23	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 320





***Region Summary – continued.***

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	4
<i>Region 8085</i>														
06 Sep	S24E75	297	0040	01	HSX	001	A							
07 Sep	S25E64	295	0230	11	EAO	006	B	1			10			
08 Sep	S25E53	293	0460	16	FKI	016	B	3			4			
09 Sep	S25E40	293	0650	16	FKI	023	BG	2			2	2		
10 Sep	S26E27	292	0610	16	FKI	024	BG							
11 Sep	S26E15	291	0600	17	FKI	025	BG				1			
12 Sep	S26E02	291	0470	18	FKI	033	B							
13 Sep	S26W12	292	0380	17	FKI	018	B							
14 Sep	S26W25	292	0380	17	FKI	016	B	1			1	1		
								7	0	0	18	3	0	0

Still on Disk.

Absolute heliographic longitude: 291

<i>Region 8086</i>														
11 Sep	N27E76	230	0010	05	BXO	002	B							
12 Sep	N27E63	230	0000	00		000								
13 Sep	N27E50	230	0040	04	CSO	004	B				4			
14 Sep	N28E38	229	0080	06	CSO	005	B	1			2			
								1	0	0	6	0	0	0

Still on Disk.

Absolute heliographic longitude: 229



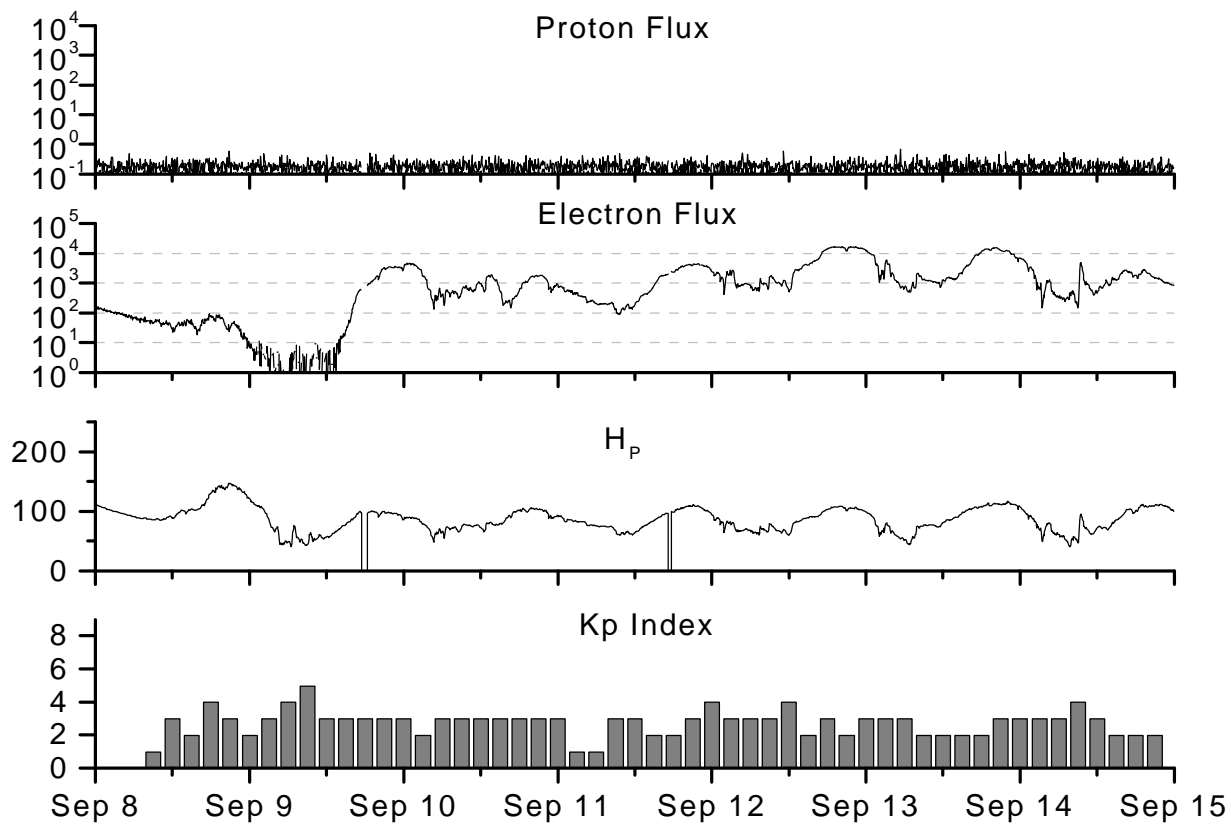
**Recent Solar Indices (preliminary)  
of the observed monthly mean values**

Month	Sunspot Numbers					Radio Flux		Geomagnetic	
	Observed values		Ratio	Smooth values		**Penticton	Smooth	Planetary	Smooth
	SWO	RI	RI/SWO	SWO	RI	10.7 cm	Value	Ap	Value
<b>1995</b>									
September	16.5	11.8	0.72	22.0	13.4	72.0	74.8	13	11.8
October	31.6	21.1	0.67	19.7	12.1	77.9	73.8	16	11.4
November	15.7	09.0	0.57	18.5	11.4	74.2	73.2	09	10.7
December	16.2	10.0	0.62	17.6	10.8	72.6	72.8	09	10.0
<b>1996</b>									
January	17.6	11.5	0.55	16.8	10.4	74.5	72.4	09	09.8
February	09.1	04.4	0.48	16.2	10.1	71.5	72.2	10	09.8
March	12.1	09.2	0.76	15.4	09.7	72.7	72.1	11	09.9
April	08.5	04.8	0.60	13.6	08.5	69.3	71.6	11	09.7
May	11.8	05.5	0.47	12.9	08.0	72.1	71.4	07	09.5
June	18.8	11.8	0.63	13.5	08.5	69.6	71.8	05	09.4
July	13.2	08.2	0.67	13.4	08.4*	71.2	72.0	07	09.3
August	20.5	14.4	0.68	13.1	08.3*	72.4	72.1	09	09.4
September	02.9	01.6	0.62	13.3	08.5*	69.4	72.3	15	09.3
October	02.3	00.9	0.78	14.0	08.9*	69.2	72.6	13	09.1
November	26.7	17.9	0.72	15.4	09.9*	78.7	73.0	08	09.1
December	21.1	13.3	0.60	16.2	10.5*	77.8	73.3	07	09.3
<b>1997</b>									
January	09.0	06.5*	0.72*	16.5	10.6*	74.0	73.4*	09	09.3*
February	11.3	07.6*	0.67*	17.4	11.2*	73.8	73.6*	11	09.2*
March	14.4	08.8*	0.61*			73.5		08	
April	24.5	15.8*	0.64*			74.5		10	
May	28.6	18.5*	0.64*			74.6		08	
June	22.1	13.1*	0.59*			71.7		07	
July	17.0	10.5*	0.62*			71.1*		06*	
August	36.7	24.7*	0.67*			76.8*		08*	

\*Preliminary estimates.

The lowest smoothed sunspot indices number for Cycle 21, RI = 12.3, occurred September 1986. 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 08 September 1997*

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

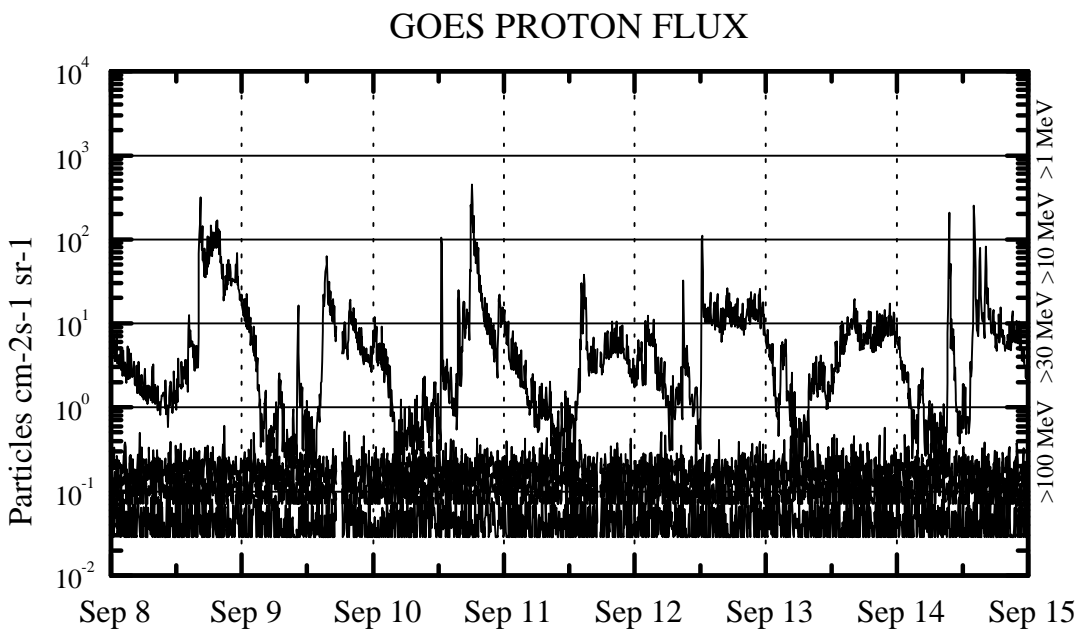
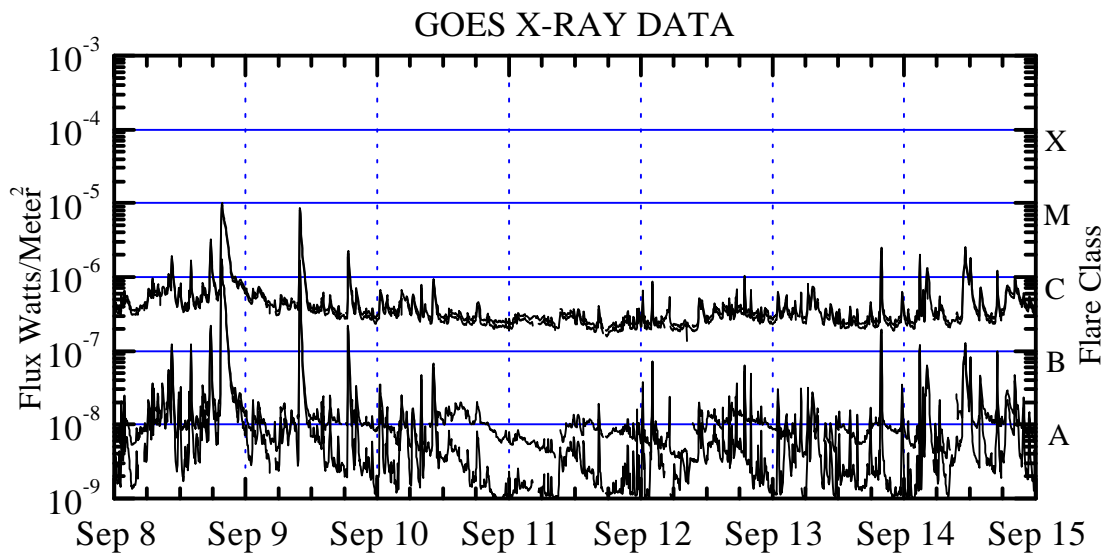
*Electrons* plot contains the five minute averaged integral electron flux (electrons/  $\text{cm}^2$ -sec-sr) with energies greater than 2 MeV at GOES-9.

*H<sub>p</sub>* 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<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. 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>parallel</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

Proton plot contains the five minute averaged integral proton flux (protons/ $\text{cm}^2\text{-sec-sr}$ ) 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/ $\text{cm}^2\text{-sec-sr}$ ) at greater than 10 MeV.

X-ray plot contains five minute averaged x-ray flux ( $\text{watts/m}^2$ ) 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.

