

Space Weather Highlights

29 September - 05 October 1997

Solar activity ranged from very low to low. Isolated C-class subflares occurred on 29 September and 02 October. Otherwise, very low activity prevailed. Region 8088 (S28, L = 125, class/area Eai/290 on 25 September) which produced the major flare of 24 September (see PRF #1152) quietly crossed the west limb on 02 October. The region had been in a state of gradual decay since 25 September. The September monthly averaged S.I.D.C. Brussels sunspot number of 51.3 and Penticton F10.7 cm flux of 96.2 were the highest observed since January 1994 and February 1994, respectively. We are now roughly one year into Cycle 23, estimated to have begun in October 1996.

Solar wind data were received from the WIND spacecraft a few hours per day. WIND data was not reliable on 29 - 30 September due to spacecraft positioning. Velocities increased to 500 km/sec early on 01 October, then gradually decreased to around 350 km/sec during the rest of the period. Densities increased to near 30 p/cc early on 01 October and to 15 p/cc on 02 October. Otherwise, densities were in the 02 - 10 p/cc range. Bz varied from plus to minus 30 nT (GSM) during 01 October, then declined to a range of plus to minus 05 nT for the rest of the period. Solar sector orientation was away (ϕ angle near 135 degrees) on 01 October gradually shifting to toward conditions (ϕ angle near 315 degrees) by 04 October.

No significant proton enhancements were observed at geosynchronous altitude.

The greater than 2 MeV electron flux at geosynchronous altitude reached high levels during 29 September - 01 October, then declined to normal to moderate levels for the remainder of the period.

The geomagnetic field was at quiet to unsettled levels through 30 September. Activity increased to active to severe storm levels on 01 October with severe storm conditions confined to the high latitudes. This activity followed a sudden impulse of 19 nT recorded by the Boulder USGS magnetometer at 01/0100UT. Activity declined to quiet to unsettled levels after 01/1800UT. Conditions were mostly quiet during the remainder of the summary period.

Space Weather Forecast

08 October - 03 November 1997

Solar activity is expected to range from very low to low.

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.

The geomagnetic field is expected to be mostly quiet to unsettled.



Daily Solar Data

Date	Radio	Sun	Sunspot	X-ray	X-ray Flux			Flares				
	Flux 10.7 cm	spot No. (10 ⁶ hemi.)	Area	Background	C	M	X	S	1	2	3	4
29 September	90	27	220	B1.0	1	0	0	2	0	0	0	0
30 September	88	25	260	B2.4	0	0	0	0	0	0	0	0
01 October	87	38	160	B2.0	0	0	0	0	0	0	0	0
02 October	86	26	80	B1.0	1	0	0	2	0	0	0	0
03 October	86	27	90	A9.4	0	0	0	2	0	0	0	0
04 October	83	26	70	A8.9	0	0	0	0	0	0	0	0
05 October	84	26	40	A5.3	0	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
29 September	5.3E+5	1.7E+4	3.8E+3		1.4E+8	
30 September	4.8E+5	1.7E+4	3.8E+3		1.1E+8	
01 October	3.4E+6	1.7E+4	3.8E+3		1.9E+7	
02 October	1.3E+6	1.6E+4	3.4E+3		1.2E+7	
03 October	9.6E+5	1.7E+4	3.7E+3		1.2E+7	
04 October	7.9E+5	1.7E+4	3.6E+3		1.3E+7	
05 October	9.0E+5	1.7E+4	3.9E+3		1.5E+7	

Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
29 September	9	2-2-4-2-1-1-2-2	2	0-0-3-1-0-0-1-0	9	2-3-4-3-1-2-1-1
30 September	9	1-3-2-2-2-2-3-2	3	1-1-2-2-0-1-1-1	7	1-3-2-2-2-2-3-2
01 October	32	4-3-5-5-5-5-3-2	67	2-3-6-7-8-5-2-0	41	3-4-5-6-5-6-3-2
02 October	6	2-2-1-1-2-1-1-3	1	2-0-0-0-0-0-0-2	4	1-1-1-0-2-1-0-3
03 October	7	2-2-2-2-2-2-2-1	8	1-2-3-4-2-1-1-0	7	0-2-2-3-2-2-2-1
04 October	4	2-1-0-1-2-2-1-1	2	0-0-0-2-3-0-0-0	4	1-0-0-1-2-1-1-1
05 October	2	1-1-0-0-0-1-1-1	0	0-0-0-0-0-0-0-0	2	1-0-0-0-0-1-1-0

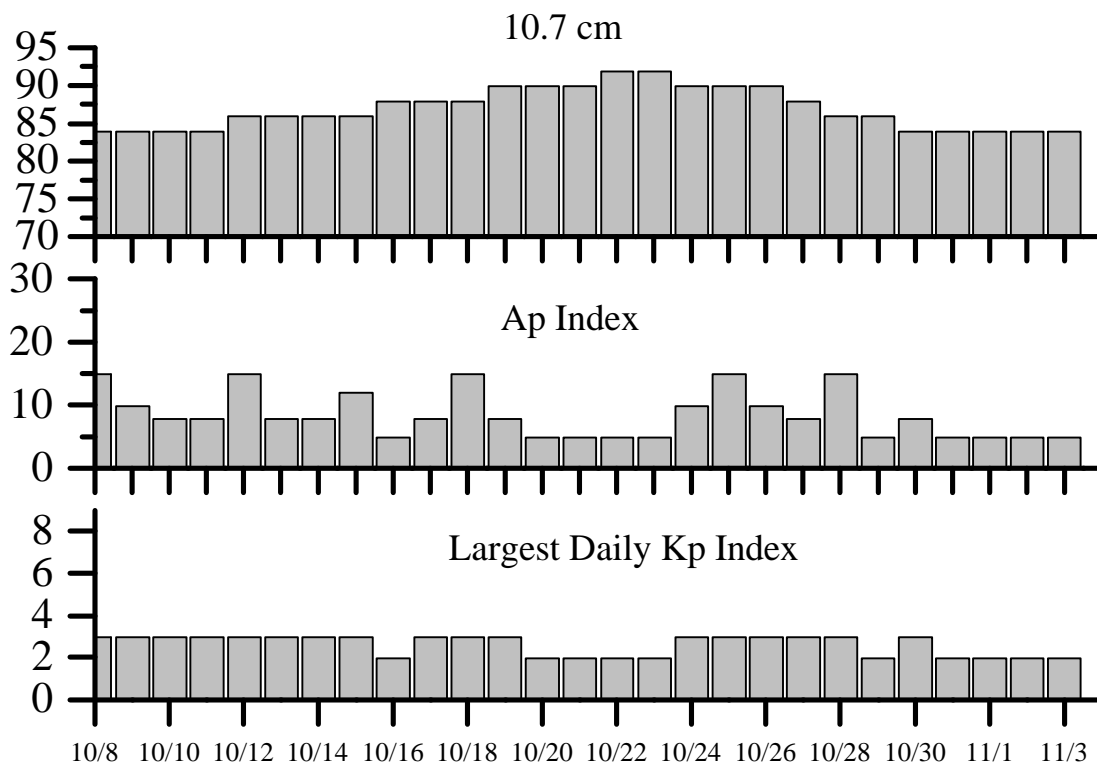


Alerts and Warnings Issued

<u>Date and Time of Issue (UT)</u>	<u>Type of Alert or Warning</u>	<u>Date and Time of Event (UT)</u>
29 Sep 0057	2 - 245MHz Radio Bursts	28 Sep 2214
30 Sep 0054	1 - 245MHz Radio Burst	29 Sep 0413
30 Sep 0054	>2MeV Electron Event ≥ 1000 pfu in progress	29 Sep
30 Sep 0054	245MHz Radio Noise Storm	29 Sep 2008
30 Sep 0111	3 - 245MHz Radio Bursts	29 Sep
30 Sep 1518	>2MeV Electron Event ≥ 1000 pfu in progress	29 Sep
01 Oct 0026	>2MeV Electron Event ≥ 1000 pfu in progress	30 Sep
01 Oct 0114	Sudden Impulse observed	01 Oct 0100
01 Oct 0301	Magnetic K = 4 observed	01 Oct 00 - 03
01 Oct 1159	K = 6 observed	01 Oct 09 - 12
01 Oct 1201	A ≥ 20 observed	01 Oct 1200
02 Oct 0017	>2MeV Electron Event ≥ 1000 pfu in progress	01 Oct
02 Oct 2355	Sudden Impulse observed	02 Oct 2321
03 Oct 0016	1 - 245MHz Radio Burst	02 Oct
05 Oct 2150	A ≥ 20 Watch	06 Oct
05 Oct 2200	A ≥ 20 Watch	07 Oct



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
08 Oct	84	15	3	22 Oct	92	5	2
09	84	10	3	23	92	5	2
10	84	8	3	24	90	10	3
11	84	8	3	25	90	15	3
12	86	15	3	26	90	10	3
13	86	8	3	27	88	8	3
14	86	8	3	28	86	15	3
15	86	12	3	29	86	5	2
16	88	5	2	30	84	8	3
17	88	8	3	31	84	5	2
18	88	15	3	01 Nov	84	5	2
19	90	8	3	02	84	5	2
20	90	5	2	03	84	5	2
21	90	5	2				



Energetic Event

Date	Time (UT)		X-ray		Optical Information			Peak		Sweep Freq		
	Begin	Max	1/2 Max	Class	Integ Flux	Imp Brtns	Location		Radio Flux		Intensity	
							Lat	CMD	245	2695	II	IV

No Event Observed

Flare List

Date	Time			X-ray Class.	Imp / Brtns	Optical Location		Rgn #
	Begin	Max	End			Lat	CMD	
29 September	0708	0711	0714	B1.3				
	1105	1108	1110	B1.6				
	1234	1235	1239	B3.3	SF	S31W52	8088	
	1456	1459	1502	B1.7				
	1623	1625	1635	C2.6	SF	S32W52	8088	
	1952	2006	2025	B6.6				
30 September	1549	1552	1554	B1.4				
01 October	1041	1046	1050	B2.2				
	1325	1330	1334	B2.3				
	1616	1626	1638	B8.5				
02 October	0057	0108	0121	B7.8				
	0242	0245	0256	C1.0	SF	S35E54	8090	
	0438	0456	0816	B1.1				
	1000	1017	1031	B4.6				
	1300	1300	1306	B2.6	SF	N24E67	8091	
03 October	2106	2112	2118	B2.0				
	0521	0523	0528	B3.7	SF	N18E55	8091	
	1157	1158	1205	B2.4	SF	N20E58	8091	
04 October	1819	1823	1826	B2.9				
	1825	1829	1834	B1.2				
05 October	2206	2211	2214	B1.3				
	1753	1757	1809	B3.9	SF	N18E22	8091	



Region Summary

Date	Location		Sunspot Characteristics				Flares								
	(° Lat ° CMD)	Helio Lon	Area (10 ⁶ hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical				
							C	M	X	S	1	2	3	4	
<i>Region</i>		<i>8087</i>													
21 Sep	S22E72	102	0030	02	HSX	001	A								
22 Sep	S21E58	103	0050	02	HSX	001	A	2			2				
23 Sep	S21E44	104	0060	02	HAX	002	A								
24 Sep	S22E32	103	0040	02	HSX	002	A								
25 Sep	S23E23	099	0030	14	BXO	005	B								
26 Sep	S26E14	094	0010	02	AXX	002	A								
27 Sep	S25E06	089	0000	00	AXX	001	A								
28 Sep	S25W07	089	0000	00		000									
29 Sep	S25W20	089	0000	00		000									
30 Sep	S25W33	089	0000	00		000									
01 Oct	S25W46	089	0000	00		000									
02 Oct	S25W59	089	0000	00		000									
03 Oct	S25W72	089	0000	00		000									
								2	0	0	2	0	0	0	0

Died on Disk.

Absolute heliographic longitude: 89

Region 8088

21 Sep	S28E53	121	0010	02	BXO	002	B								
22 Sep	S28E38	123	0140	08	CSO	013	B	4			10				
23 Sep	S28E24	124	0230	09	DAO	015	B				8				
24 Sep	S28E10	125	0260	11	EAI	025	BG	4	2		5	2			
25 Sep	S28W03	125	0290	12	EAI	025	BG	2			3	1			
26 Sep	S29W16	124	0250	12	ESO	018	B	1			1				
27 Sep	S29W30	125	0240	10	DAO	012	B								
28 Sep	S29W41	123	0260	09	DAO	013	B								
29 Sep	S29W55	124	0210	09	DAO	005	B	1			2				
30 Sep	S29W67	123	0200	10	CAO	004	B								
01 Oct	S29W84	126	0080	04	HAX	001	A								
02 Oct	S29W97	126													
								12	2	0	29	3	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 125



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 8089

29 Sep	N20W44	113	0010	01	AXX	002	A											
30 Sep	N20W57	113																
01 Oct	N20W70	113																
02 Oct	N20W83	113																
03 Oct	N20W96	113																
												0	0	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 113

Region 8090

30 Sep	S27E69	347	0060	03	HSX	001	A											
01 Oct	S27E55	347	0060	02	HSX	001	A											
02 Oct	S27E41	348	0040	01	HSX	001	A	1			1							
03 Oct	S27E28	348	0030	01	HSX	001	A											
04 Oct	S27E15	348	0030	01	HSX	001	A											
05 Oct	S28E03	347	0010	01	HRX	001	A											
												1	0	0	1	0	0	0

Still on Disk.

Absolute heliographic longitude: 347

Region 8091

01 Oct	N22E72	330	0020	08	BXO	006	B											
02 Oct	N25E60	329	0040	08	CRO	005	B						1					
03 Oct	N25E47	329	0060	08	CSO	006	B						2					
04 Oct	N23E34	329	0040	07	CSO	005	B											
05 Oct	N23E21	329	0030	08	CSO	005	B						1					
														0	0	0	4	0

Still on Disk.

Absolute heliographic longitude: 329



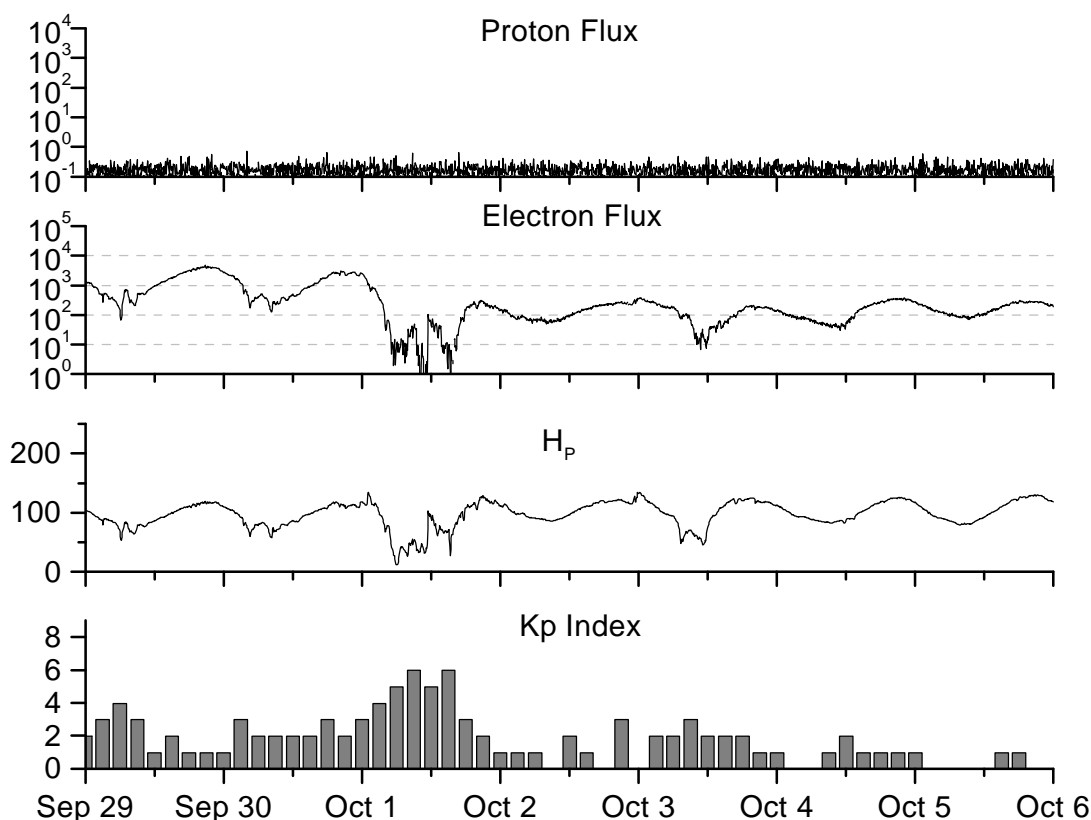
**Recent Solar Indices (preliminary)
of the observed monthly mean values**

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
1995									
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
1996									
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
1997									
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	73.7*	11	09.2*
March	14.4	08.8*	0.61*	20.4	13.7*	73.5	75.1*	08	09.0*
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*			79.0*		08*	
September	58.2	51.3*	0.88*			96.2*		10*	

*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 29 September 1997

Protons 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 three energy thresholds: greater than 10, 50, and 100 MeV.

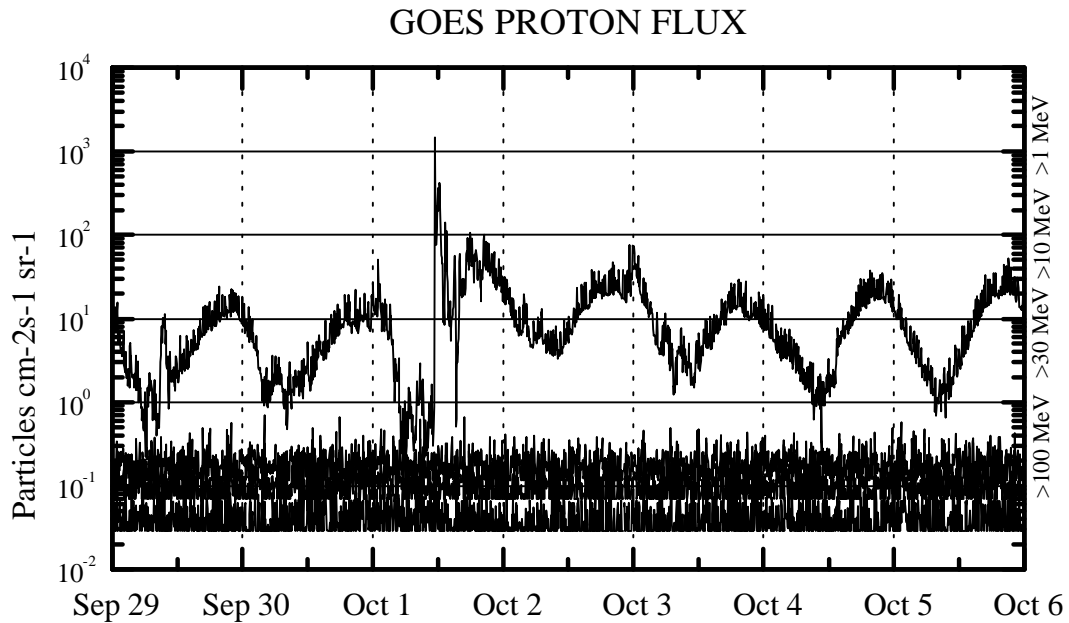
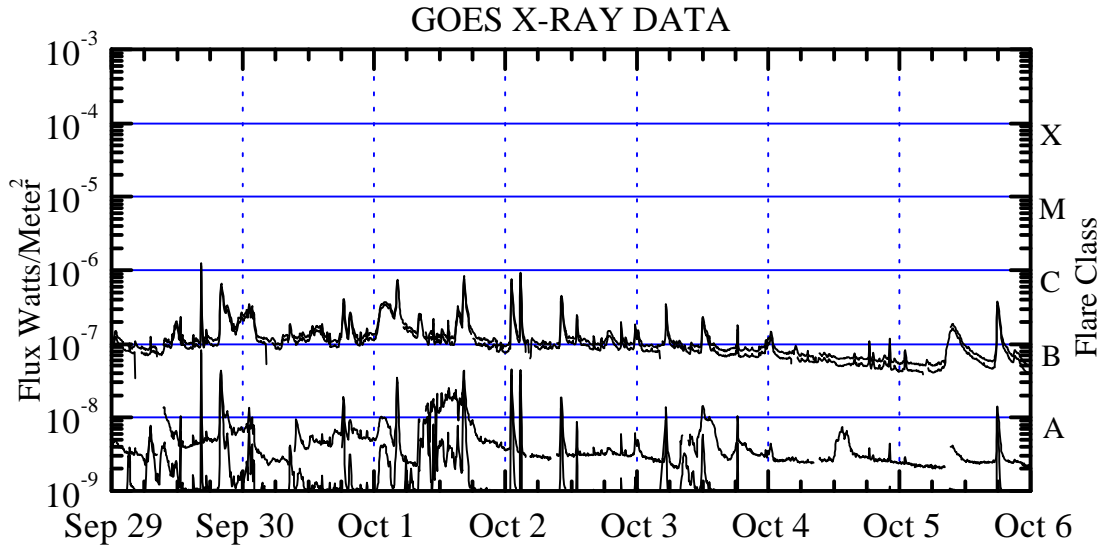
Electrons plot contains the five minute averaged integral electron flux (electrons/ $\text{cm}^2\text{-sec-sr}$) with energies greater than 2 MeV at GOES-9.

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. 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_pparallel is subject to a more localized phenomena and the measurements generally are applicable to within a few degrees of longitude of the measuring satellite.



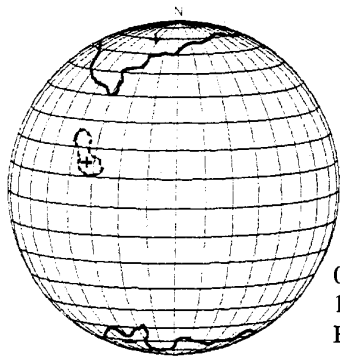


Weekly GOES Satellite X-ray and Proton Plots

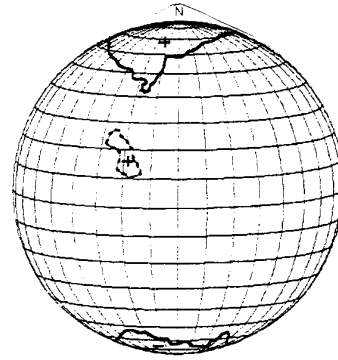
Proton plot contains the five minute averaged integral proton flux (protons/cm²-sec-sr) as measured by GOES-9 (W135) for each of the energy thresholds: >1 , >10 , >30 and >100 MeV. P10 event threshold is 10 pfu (protons/cm²-sec-sr) at greater than 10 MeV.

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.

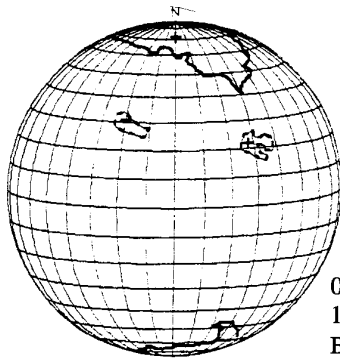




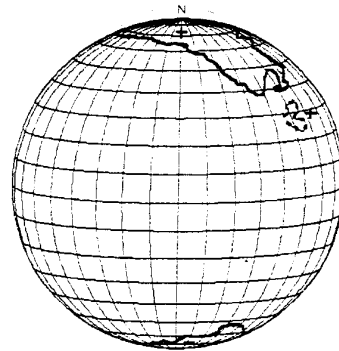
09/22/97
1522UT
B=+7°



09/23/97
1520UT
B=+7°



09/27/97
1613UT
B=+7°



09/28/97
1650UT
B=+7°

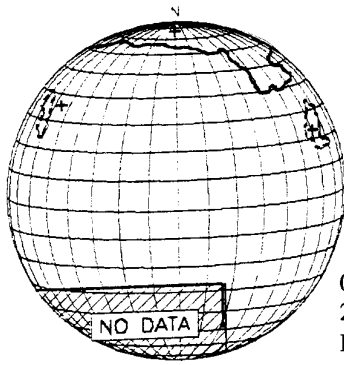
No Data

Sept 24,25,26,30

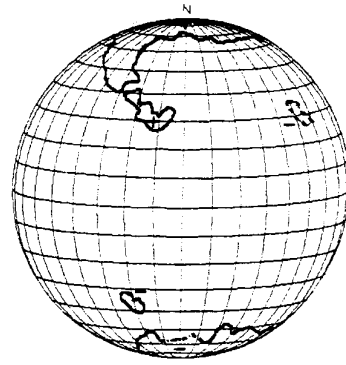
Coronal hole maps from the National Solar Observatory, Kitt Peak, Arizona

These maps are reproductions of the coronal hole contours as derived from the Kitt Peak 1083 nm raw data images. These are preliminary data, where solid (and dashed) lines are used to indicate more (and less) confidence in an inference and are printed whenever they are available at SWO.

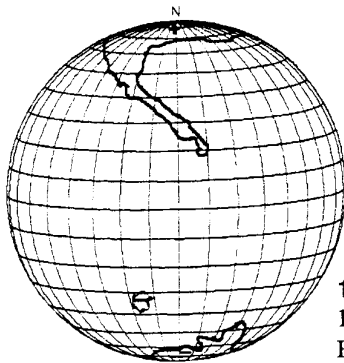




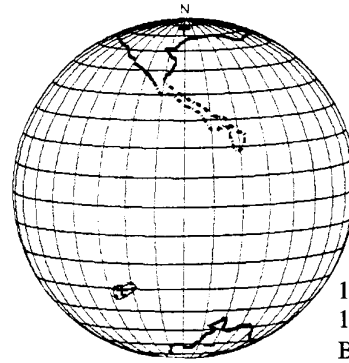
09/29/97
2004UT
B=+7°



10/03/97
1738UT
B=+7°



10/04/97
1748UT
B=+7°



10/05/97
1534UT
B=+7°

No Data

Sept. 30, Oct 1 & 2

Coronal hole maps from the National Solar Observatory, Kitt Peak, Arizona

These maps are reproductions of the coronal hole contours as derived from the Kitt Peak 1083 nm raw data images. These are preliminary data, where solid (and dashed) lines are used to indicate more (and less) confidence in an inference and are printed whenever they are available at SWO.

