

Space Weather Highlights

20 - 26 October 1997

Solar activity was very low to low. Isolated B-class subflares occurred during most of the period. A 22 degree-long filament disappeared from the southeast quadrant late on 20 October. A long-duration B-class X-ray flare and a weak Type II radio sweep were associated with the disappearance. A space-based sensor also detected a partial-halo coronal mass ejection (CME) coincident with the disappearance. Activity rose to low levels on 21 October with the occurrence of a C3/SF flare at 21/1754UT. A halo CME was associated with this flare. Activity declined to very low levels after 21 October.

Solar wind data were received from the WIND spacecraft a few hours per day. Data were unreliable during 21 - 22 October due to spacecraft location within the magnetopause. Velocities were steady at around 300 km/sec early in the period, then gradually increased to 550 km/sec during the rest of the period. Solar wind particle densities were enhanced during 23 - 24 October peaking near 60 p/cc on the 24th. Densities dropped to around 05 p/cc during 25 - 26 October. Bz was in the plus to minus 10 nT range (GSM) during most of the period, but varied from minus 23 to plus 17 nT during 24 October. Solar sector orientation was mostly away (phi angle near 135 degrees) on 20 October, but was not discernible during 23 - 24 October. Orientation was mostly away during 25 - 26 October.

No significant proton enhancements were observed at geosynchronous altitude.

The greater than 2 MeV electron flux at geosynchronous altitude reached high levels late on 26 October.

The geomagnetic field was quiet to unsettled through late 23 October. Activity increased after 23/2100UT with active to minor storm levels observed at all latitudes and isolated major storm periods at high latitudes. The increased activity persisted through the remainder of the interval.

Space Weather Forecast

29 October 1997 - 24 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
20 October	83	25	60	A8.1	0	0	0	0	0	0	0	0
21 October	85	27	50	A5.8	1	0	0	1	0	0	0	0
22 October	81	13	10	A7.2	0	0	0	0	0	0	0	0
23 October	80	0	0	A2.4	0	0	0	0	0	0	0	0
24 October	79	11	0	A2.0	0	0	0	0	0	0	0	0
25 October	81	13	20	A2.3	0	0	0	0	0	0	0	0
26 October	82	14	30	A5.5	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
20 October	6.2E+5	1.9E+4	5.0E+3		1.7E+6	
21 October	1.1E+6	1.9E+4	5.2E+3		1.9E+6	
22 October	6.7E+5	2.1E+4	4.8E+3		4.2E+5	
23 October	7.5E+5	1.9E+4	4.6E+3		2.9E+5	
24 October	1.6E+5	1.7E+4	4.0E+3		1.2E+5	
25 October	3.8E+5	1.6E+4	3.6E+3		2.9E+6	
26 October	6.1E+5	1.6E+4	3.5E+3		4.6E+7	

Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
20 October	5	2-1-3-1-1-1-1-1	2	0-0-3-0-1-0-0-0	6	2-1-3-1-1-2-1-1
21 October	3	1-1-1-1-1-1-1-1	2	0-0-2-3-0-0-0-0	4	1-0-1-2-2-2-1-1
22 October	7	3-3-1-1-1-1-2-2	0	0-0-0-0-0-0-0-0	5	2-2-1-1-2-2-2-2
23 October	6	0-1-2-2-1-2-2-3	3	0-0-1-0-0-1-1-3	6	0-0-1-2-2-2-2-3
24 October	18	2-3-3-4-4-3-2-4	14	1-2-4-5-3-1-1-2	25	2-3-3-5-6-3-2-3
25 October	14	4-4-2-3-2-2-2-3	14	3-3-2-4-4-3-1-1	19	5-5-2-4-3-3-2-3
26 October	15	4-3-1-1-3-3-3-4	12	3-1-0-0-4-5-2-1	14	4-3-0-1-3-4-3-4

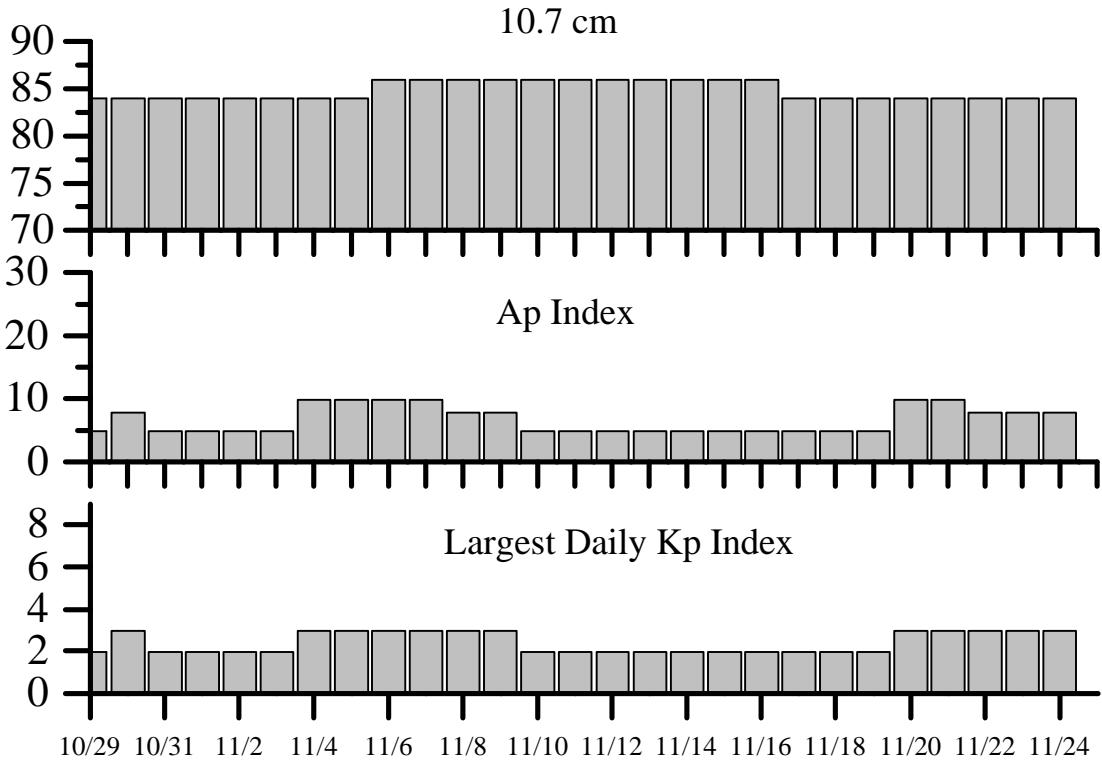


Alerts and Warnings Issued

Date and Time of Issue (UT)	Type of Alert or Warning	Date and Time of Event (UT)
20 Oct 0904	K= 4 observed	20 Oct 06-09
21 Oct 1446	Type II Radio Emission	21 Oct 0107
22 Oct 1650	A \geq 20 Watch	25 Oct
23 Oct 0903	Sudden Impulse observed at Boulder	23 Oct 0830
23 Oct 1813	A \geq 30 Watch	26 Oct
24 Oct 1512	K = 4 Observed	24 Oct 12-15
24 Oct 1740	A \geq 20 Watch	24 Oct
25 Oct 0338	K= 4 Observed	25 Oct 00-03
25 Oct 0605	K= 5 Observed	25 Oct 03-06
25 Oct 0607	A \geq 20 Observed	25 Oct 0600
26 Oct 0304	K= 4 Observed	26 Oct 00-03
26 Oct 1637	> 2MeV Electron Event \geq 1000pfu	26 Oct 1628



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
29 Oct	84	5	2	11 Nov	86	5	2
30	84	8	3	12	86	5	2
31	84	5	2	13	86	5	2
01 Nov	84	5	2	14	86	5	2
02	84	5	2	15	86	5	2
03	84	5	2	16	86	5	2
04	84	10	3	17	84	5	2
05	84	10	3	18	84	5	2
06	86	10	3	19	84	5	2
07	86	10	3	20	84	10	3
08	86	8	3	21	84	10	3
09	86	8	3	22	84	8	3
10	86	5	2	23	84	8	3
				24	84	8	3



Energetic Event

Date	Time (UT)			X-ray		Optical Information			Peak		Sweep Freq	
	Begin	Max	Max	Class	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		Rgn #
	Begin	Max	End			Lat	CMD	
20 October	0219	0222	0226	B1.2				
	0330	0335	0338	B5.1				
	1110	1117	1132	B1.7				
	1213	1216	1219	B1.2				
	1350	1355	1402	B1.9				
21 October	0045	0236	0247	B3.4				
	1733	1750	1819	C3.3	SF	N16E07		8097
22 October	No Flares Observed							
23 October	No Flares Observed							
24 October	No Flares Observed							
25 October	2035	2041	2058	B1.7				
26 October	0221	0227	0232	B1.3				
	2245	2249	2251	B1.9				

Region Summary

Date	Location		Sunspot Characteristics					Flares			
	° Lat	° CMD	Area (10 ⁶ hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray		Optical	
								C	M	X	S

Region 8095

12 Oct	N33E42	215	0010	03	BXO	002	B										
13 Oct	N33E32	212	0000	01	AXX	002	A										
14 Oct	N33E19	212															
15 Oct	N33E06	212															
16 Oct	N33W07	212															
17 Oct	N33W20	212															

0 0 0 0 0 0 0 0 0

Died on Disk.

Absolute heliographic longitude: 212



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 8096</i>																	
14 Oct	N14E62	169	0020	04	BXO	003	B				1						
15 Oct	N15E47	171	0050	06	CSO	006	B										
16 Oct	N14E34	171	0030	06	BXO	005	B										
17 Oct	N13E21	171	0040	07	BXO	010	B										
18 Oct	N13E08	170	0030	06	CSO	007	B										
19 Oct	N13W03	167	0030	04	CSO	004	B										
20 Oct	N13W16	167	0020	02	HSX	004	A										
21 Oct	N13W29	167	0010	03	BXO	003	B										
22 Oct	N13W43	168	0000	02													
23 Oct	N13W56	168															
24 Oct	N13W69	168															
25 Oct	N13W82	168															

0 0 0 1 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 167

		<i>Region</i>		<i>8097</i>													
15 Oct	N18E77	141	0060	02	HSX	002	A										
16 Oct	N16E69	136	0060	08	CSO	002	B				1						
17 Oct	N17E57	135	0080	08	CSO	003	B										
18 Oct	N17E43	135	0060	08	CSO	003	B										
19 Oct	N17E26	138	0030	02	HSX	001	A										
20 Oct	N16E13	138	0040	02	HSX	001	A										
21 Oct	N16W01	139	0040	03	CRO	004	B	1			1						
22 Oct	N16W14	139	0010	02	BXO	003	B										
23 Oct	N16W27	139															
24 Oct	N16W40	139															
25 Oct	N16W53	139															
26 Oct	N16W66	139															

1 0 0 2 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 139

		<i>Region</i>		<i>8098</i>													
24 Oct	S26W03	101	0000	00	AXX	001	A										
25 Oct	S26W16	101															
26 Oct	S26W29	101															

0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 101



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 8099</i>																						
25 Oct	N20E64	021	0020	04	CRO	003	B															
26 Oct	N19E52	020	0030	06	CSO	004	B															

0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 020



**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	11.5
November	15.7	09.0	0.57	18.5	11.4	74.2	73.2	09	10.8
December	16.2	10.0	0.62	17.6	10.8	72.6	72.8	09	10.0
1996									
January	17.6	11.5	0.65	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	70.7	72.1	11	09.9
April	08.5	04.8	0.56	13.6	08.5	69.3	71.6	11	09.7
May	11.8	05.5	0.47	12.9	08.0	70.1	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	0.62	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	08.5*	69.4	72.3	15	09.3
October	02.3	00.9	0.39	14.0	08.9*	69.2	72.6	13	09.1
November	26.7	17.9	0.67	15.4	09.9*	78.7	73.0	08	09.1
December	21.1	13.3	0.63	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*	0.65*			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*	

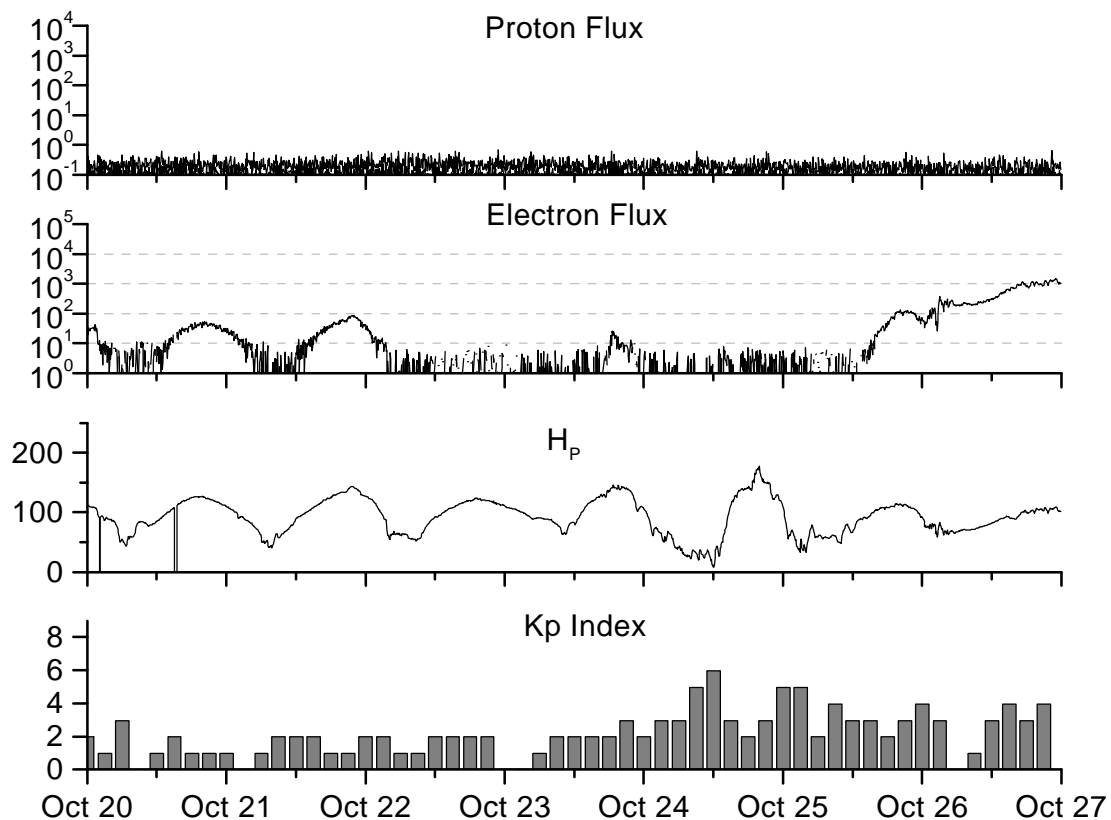
*Preliminary estimates.

October 1996 has been selected as the start of Solar Cycle 23.

The highest smoothed sunspot number for Solar Cycle 22, RI=158.5, occurred in July 1989.

The highest smoothed 10.7cm Radio Flux value for Solar Cycle 22, of 213.1, occurred in June 1989.





Weekly Geosynchronous Satellite Environment Summary

Week Beginning 20 October 1997

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.

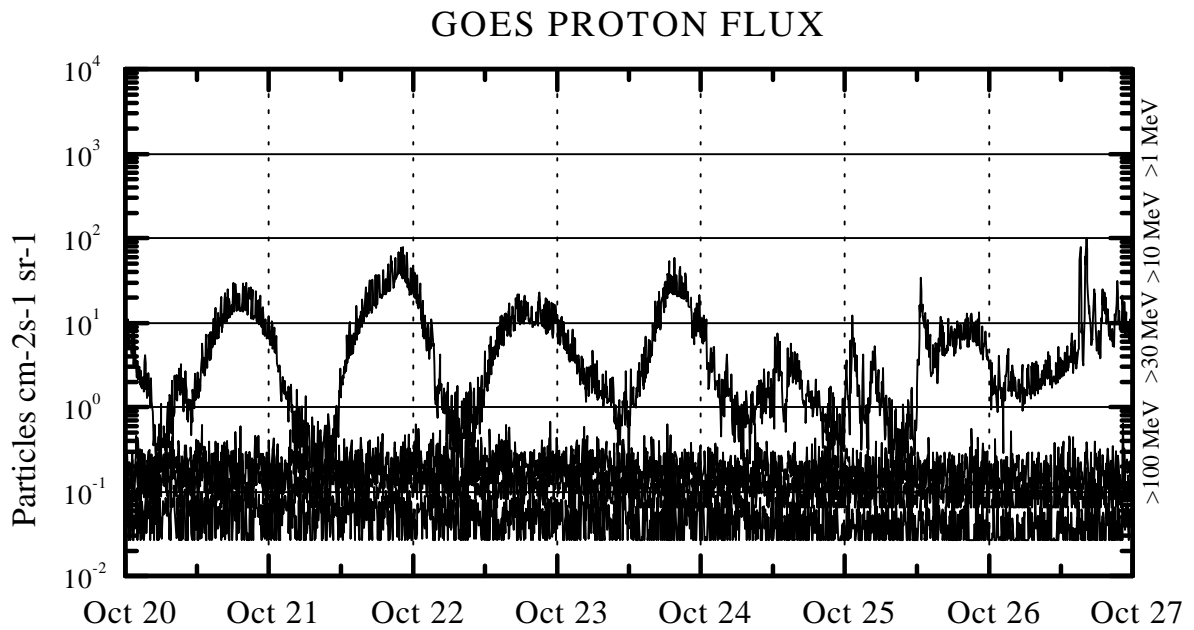
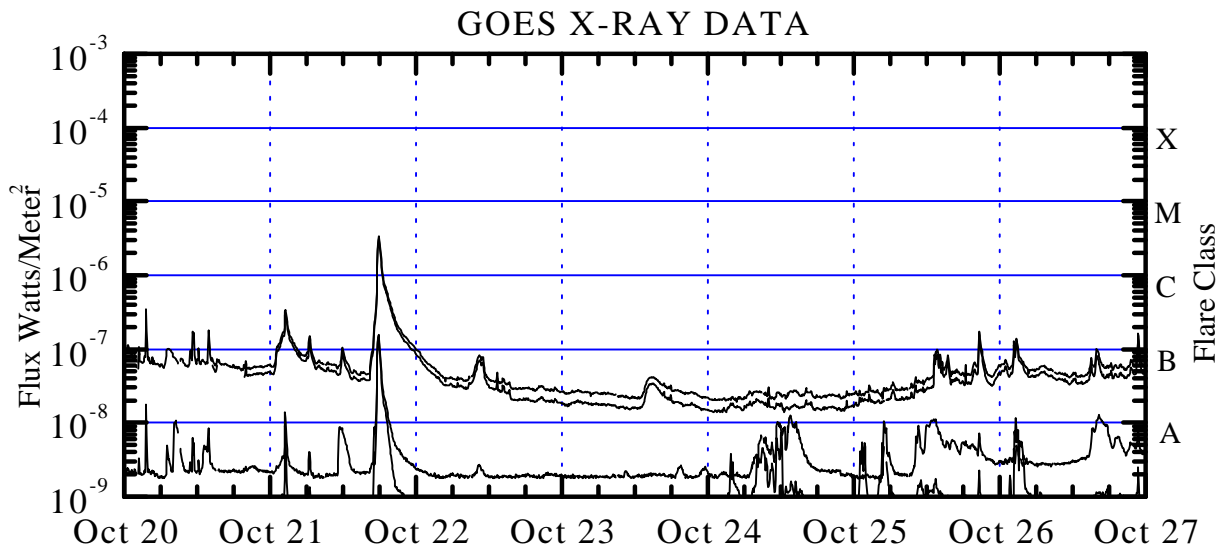
Electrons plot contains the five-minute averaged integral electron flux (electrons/ cm² -sec-sr) with energies greater than 2 MeV at GOES-9.

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_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.



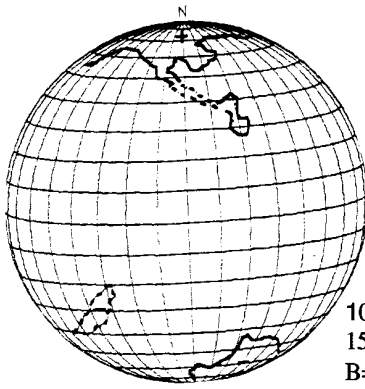


Weekly GOES Satellite X-ray and Proton Plots

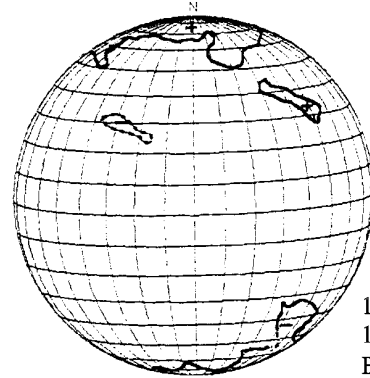
Proton plot contains the five minute averaged integral proton flux (protons/cm²-sec-sr) as measured by GOES-9 (W135) for each of the energy thresholds: >1, >10, >30 and >100 MeV. P10 event threshold is 10 pfu (protons/cm²-sec-sr) at greater than 10 MeV.

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.

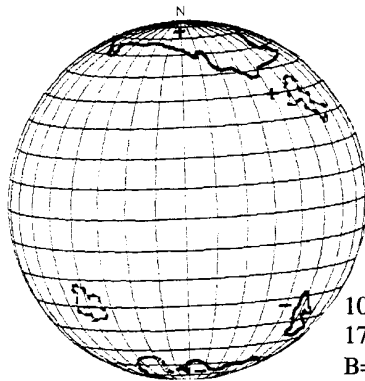




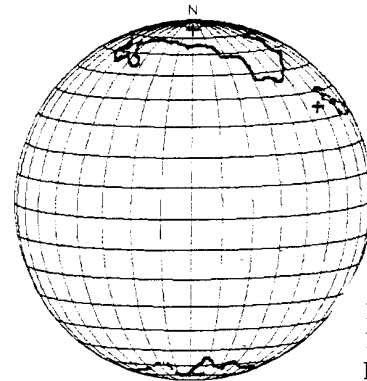
10/06/97
1541UT
B=+7°



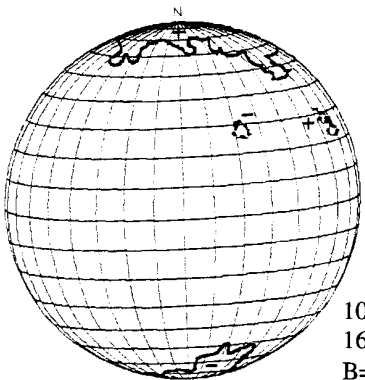
10/08/97
1729UT
B=+7°



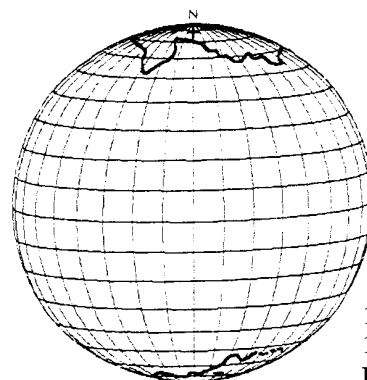
10/09/97
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B=+7°



10/10/97
1745UT
B=+7°



10/11/97
1621UT
B=+7°



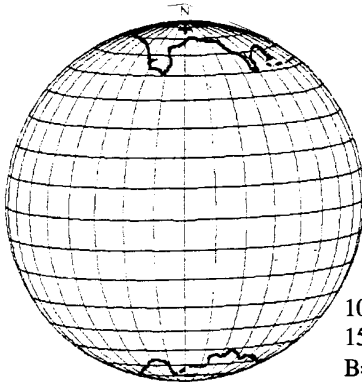
10/12/97
1706UT
B=+7°

No Data
10/07/97

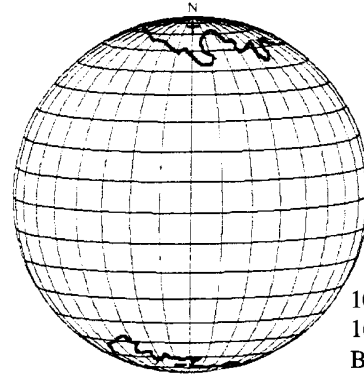
Coronal hole maps from the National Solar Observatory, Kitt Peak, Arizona

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.

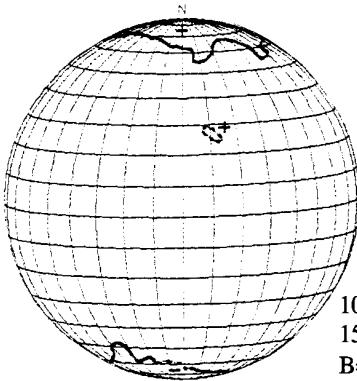




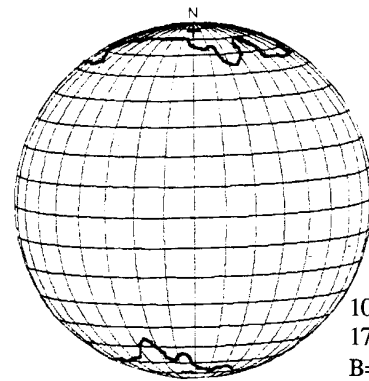
10/13/97
1502UT
B=+6°



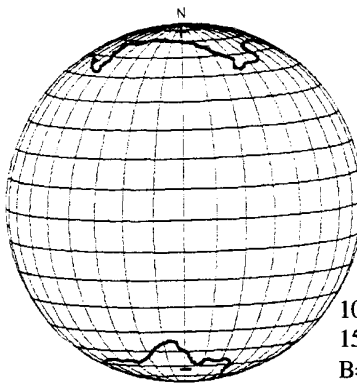
10/14/97
1643UT
B=+6°



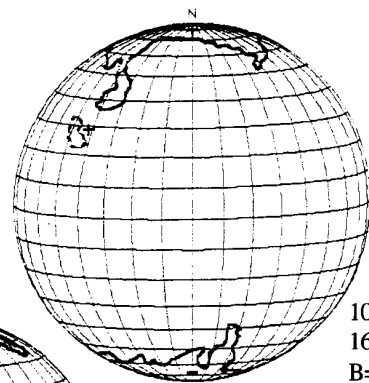
10/15/97
1537UT
B=+6°



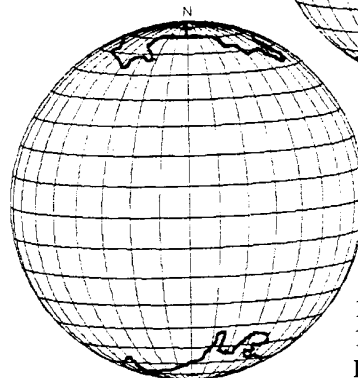
10/16/97
1716UT
B=+6°



10/17/97
1549UT
B=+6°



10/18/97
1628UT
B=+6°



10/19/97
1731UT
B=+6°

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

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