

Space Weather Highlights
06 October – 12 October 2003

SWO PRF 1467
14 October 2003

Solar activity ranged from very low to low levels. The period began with very low level activity on 06 October. Low levels were observed on 7 October due to minor C-class activity from Region 471. Region 471 (S08, L=222, class/area Eac/270 on 08 October), a moderately complex group, was the largest and most active region on the visible disk this period and was responsible for the majority of activity observed. Low level activity was again observed on the 8th and 10th due to minor C-class flares from Region 471. Very low levels were observed during the remainder of the period with no significant developments or activity noted on the disk or limb.

Solar wind data were available from the NASA Advanced Composition Explorer (ACE) spacecraft for most of the summary period. Solar wind speed was elevated to start the period due to a high speed coronal hole stream with wind speeds near 600 km/s. IMF Bz was mostly northward, but there were a few short periods of southward Bz noted early in the period. The high speed stream went into a brief declining phase late on the 7th before rising again due to another high speed stream. Speeds ranged from approximately 550 to 650 km/s through early on the 9th, but gradually declined to speeds below 400 km/s by the end of the period. IMF Bz was mostly northward throughout this period.

There were no greater than 10 MeV proton events at geosynchronous orbit during the period.

The greater than 2 MeV electron flux at geosynchronous orbit remained below high levels throughout this period.

Geomagnetic activity ranged from quiet to minor storm levels. The geomagnetic field was mildly disturbed for the first half of the period due to high speed coronal hole flow. Occasional active periods occurred with very isolated minor storm periods observed at higher latitudes. The latter half of the period was quiet with just very isolated unsettled levels observed.

Space Weather Outlook
15 October – 10 November 2003

Solar activity is expected to range from very low to low levels with a chance of isolated M-class events. There are no regions on the visible disk at this time that appear capable of anything other than a very isolated low C-class flare. Old active Region 464 is due to return to visible disk early in the period and may have the potential to elevate the solar activity levels.

No greater than 10 MeV proton events at geosynchronous orbit are expected during the period.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to reach high levels on 16 – 26 October, 3 – 4 November, and again on 10 November.

The geomagnetic field is expected to range from quiet to major storm levels during the period. The large recurrent coronal hole is due to return early in the period and is expected to produce occasional major storm levels. Effects from this large coronal hole will likely persist through 24 October. Isolated active periods are expected on 28 October through 4 November. Isolated minor to major storm periods are possible on 09 – 10 November due to a high speed coronal hole stream.



Daily Solar Data

Date	Radio Flux 10.7 cm	Sun spot No.	Sunspot Area (10 ⁻⁶ hemi.)	X-ray Background	Flares							
					X-ray Flux			Optical				
					C	M	X	S	1	2	3	4
06 October	112	93	380	B1.8	0	0	0	0	0	0	0	0
07 October	112	76	370	B2.6	2	0	0	1	0	0	0	0
08 October	113	69	410	B2.0	1	0	0	0	0	0	0	0
09 October	111	68	280	B1.9	1	0	0	2	0	0	0	0
10 October	112	79	250	B2.0	0	0	0	0	0	0	0	0
11 October	106	77	280	B2.1	0	0	0	0	0	0	0	0
12 October	98	35	130	B1.8	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 October	3.0E+5	1.2E+4	2.6E+3		1.1E+6
07 October	8.2E+5	1.1E+4	2.3E+3		5.7E+6	
08 October	4.6E+5	1.1E+4	2.3E+3		1.1E+7	
09 October	3.9E+5	1.1E+4	2.5E+3		2.0E+7	
10 October	3.8E+5	1.2E+4	2.4E+3		2.3E+7	
11 October	2.8E+5	1.2E+4	2.5E+3		2.3E+7	
12 October	4.9E+5	1.2E+4	2.6E+3		3.0E+7	

Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	06 October	7	1-1-1-1-2-2-3-3	7	1-1-0-1-2-2-3-3	10
07 October	11	4-2-2-3-2-2-2-2	18	4-2-3-5-4-2-2-1	13	4-2-2-3-3-3-3-3
08 October	6	1-1-2-1-2-1-2-3	7	2-1-2-3-1-1-2-2	9	2-2-2-2-3-3-3-3
09 October	4	3-1-1-1-1-1-1-0	4	3-2-1-1-1-0-1-0	8	4-2-2-2-2-2-2-2
10 October	4	0-0-0-0-1-2-3-1	0	0-0-0-0-0-0-0-1	5	2-1-1-2-2-2-1-2
11 October	2	1-0-1-1-1-1-0-1	0	0-0-0-0-0-0-0-0	5	2-1-2-1-2-2-1-2
12 October	3	0-0-0-1-2-2-1-2	2	0-0-1-1-1-1-0-0	6	1-2-1-3-2-2-2-2

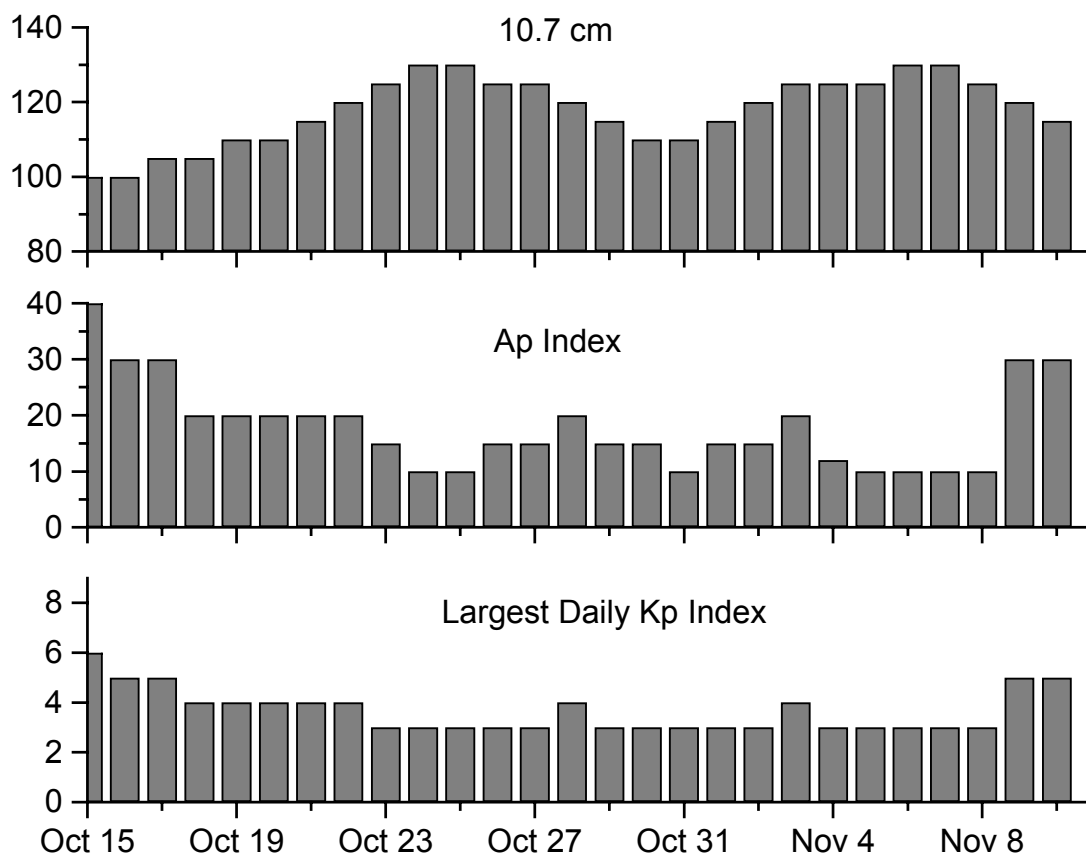


Alerts and Warnings Issued

<u>Date & Time of Issue</u>	<u>Type of Alert or Warning</u>	<u>Date & Time of Event UT</u>
06 Oct 0008	245 MHz Radio Burst	05 Oct
06 Oct 2241	ALERT: Geomagnetic K= 4	06 Oct 2240
07 Oct 0004	245 MHz Radio Burst	06 Oct
07 Oct 0036	WARNING: Geomagnetic K= 4	07 Oct 0038 – 1500
07 Oct 0122	ALERT: Geomagnetic K= 5	07 Oct 0120
07 Oct 1452	EXTENDED WARNING: Geomagnetic K= 4	07 Oct 0038 – 2359
09 Oct 0300	ALERT: Geomagnetic K= 4	09 Oct 0300
10 Oct 1937	WATCH: Geomagnetic A \geq 20	13 Oct
12 Oct 2053	CANCEL WATCH: Geomagnetic A \geq 20	13 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
15 Oct	100	40	6	29 Oct	115	15	3
16	100	30	5	30	110	15	3
17	105	30	5	31	110	10	3
18	105	20	4	01 Nov	115	15	3
19	110	20	4	02	120	15	3
20	110	20	4	03	125	20	4
21	115	20	4	04	125	12	3
22	120	20	4	05	125	10	3
23	125	15	3	06	130	10	3
24	130	10	3	07	130	10	3
25	130	10	3	08	125	10	3
26	125	15	3	09	120	30	5
27	125	15	3	10	115	30	5
28	120	20	4				



Energetic Events

Date	Time		X-ray Integ	Optical Information			Peak		Sweep Freq	
	Begin	Max		Class	Imp/ Brtns	Location		Radio Flux		Intensity
			1/2 Max			Flux	Rgn #	Lat	CMD	245

No Events Observed

Flare List

Date	Time			X-ray Class	Optical		Rgn
	Begin	Max	End		Imp / Brtns	Location Lat CMD	
06 October	1835	1840	1845	B5.8			471
	1941	1948	1955	B4.6			471
	2243	2248	2252	B6.6			471
	2340	2350	0002	B7.0			471
07 October	0254	0257	0301	B3.2			471
	0556	0559	0604	B5.6			471
	0724	0738	0740	B6.0			471
	0825	0829	0841	B6.1			471
	1637	1642	1646	B6.4			471
	1734	1743	1753	C1.8			471
	2118	2125	2134	B6.8			471
	2349	2352	0029	C3.2	S07W17	SF	471
08 October	0209	0250	0302	B9.7			471
	0313	0318	0328	C1.0			471
	1743	1750	1802	B6.1			471
09 October	0845	0913	0917	B4.1			
	1423	1510	1529	B8.4			
	2146	2200	2215	B5.7			
	2245	2248	2252	B4.2			
	2309	2313	2314		S07W47	SF	471
	2339	2341	2354	C2.6	S06W46	SF	471
10 October	2002	2009	2018	B7.6			
	2052	2055	2101	B5.8			
	2120	2130	2139	B7.8			
11 October	0721	0727	0746	B4.4			
	1105	1109	1112	B3.6			
	2333	2341	2359	B4.5			



Region Summary

Location		Sunspot Characteristics																		
		Flares																		
Date	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 470</i>																				
29 Sep	S13E32	278	0030	03	Dso	006	B													
30 Sep	S12E18	279	0040	06	Dso	007	B													
01 Oct	S13E04	279	0030	07	Dso	007	B	1				1								
02 Oct	S14W08	278	0020	01	Hsx	002	A													
03 Oct	S17W26	283	0020	08	Cso	005	B													
04 Oct	S17W39	283																		
05 Oct	S17W52	283	0020	03	Cso	002	B													
06 Oct	S17W65	283																		
07 Oct	S17W78	283																		
08 Oct	S17W91	283																		
								1	0	0	1	0	0	0	0	0				

Crossed West Limb.

Absolute heliographic longitude: 279

Region 471

30 Sep	S07E63	234	0190	09	Dsi	015	B	1				1								
01 Oct	S08E53	230	0330	23	Fsi	020	B													
02 Oct	S08E42	228	0520	22	Fko	016	Bg	1												
03 Oct	S08E35	222	0200	12	Eai	031	Bg	2				2								
04 Oct	S08E22	222	0210	13	Eac	034	Bg	3	1			1								
05 Oct	S08E09	222	0150	14	Ekc	038	Bg	2				2								
06 Oct	S08W04	222	0170	13	Eai	033	Bg													
07 Oct	S08W18	222	0190	12	Eac	026	Bg	2				1								
08 Oct	S08W31	222	0270	11	Eac	032	Bg	1												
09 Oct	S08W44	222	0140	09	Dai	019	B	1				1								
10 Oct	S08W57	222	0090	10	Dai	022	B													
11 Oct	S07W70	222	0110	10	Dao	018	B													
12 Oct	S08W85	223	0070	01	Hsx	001	A													
								13	1	0	8	0	0	0	0	0				

Still on Disk.

Absolute heliographic longitude: 222



Region Summary - continued.

Location		Sunspot Characteristics						Flares						
Date	(° 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 472

01 Oct S23W02	285	0020	03	Dso	005	B
02 Oct S22W16	286	0040	06	Dso	005	B
03 Oct S22W31	288	0020	08	Cao	005	B
04 Oct S22W47	291	0020	01	Cso	002	B
05 Oct S22W60	291					
06 Oct S22W73	291					
07 Oct S22W86	291					

0 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 285

Region 473

03 Oct S07E20	237	0100	02	Hsx	001	A
04 Oct S09E07	237	0140	04	Cso	009	B
05 Oct S09W06	237	0130	04	Cho	007	B
06 Oct S09W19	237	0120	07	Cao	006	B
07 Oct S09W33	237	0120	05	Cso	005	B
08 Oct S09W46	237	0100	04	Cso	003	B
09 Oct S08W62	240	0080	03	Hhx	001	A
10 Oct S08W74	239	0090	03	Hhx	001	A
11 Oct S08W89	241	0080	03	Hax	001	A

1 0 0 1 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 237

Region 474

04 Oct S14W49	293	0020	06	Cso	004	B
05 Oct S14W62	293	0010	01	Axx	001	A
06 Oct S14W75	293					
07 Oct S14W88	293					

0 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 293



Region Summary - continued.

Location		Sunspot Characteristics						Flares			X-ray				Optical			
Date	(° Lat ° CMD)	Helio Lon	Area (10 ⁶ hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	C	M	X	S	1	2	3	4			

Region 475

05 Oct S22E47	184	0020	03	Cso	003	B
06 Oct S22E34	184	0020	03	Cso	002	B
07 Oct S22E21	184					
08 Oct S22E08	184					
09 Oct S22W05	184					
10 Oct S22W18	184					
11 Oct S22W31	184					
12 Oct S22W44	184					

0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 184

Region 476

06 Oct S16E12	206	0010	01	Hax	001	A
07 Oct S16W02	206	0010	03	Bxo	002	B
08 Oct S16W15	206					
09 Oct S16W28	206					
10 Oct S16W41	206					
11 Oct S16W54	206					
12 Oct S16W67	206					

0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 206

Region 477

06 Oct S15E63	155	0060	01	Hsx	001	A
07 Oct S15E60	144	0050	02	Hax	003	A
08 Oct S15E47	144	0040	03	Cso	004	B
09 Oct S15E32	146	0050	04	Cho	005	B
10 Oct S15E19	146	0040	03	Cso	004	B
11 Oct S14E04	148	0050	04	Cso	006	B
12 Oct S15W08	146	0040	04	Cso	003	B

0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 148



Region Summary - continued.

Location		Sunspot Characteristics						Flares			X-ray				Optical			
Date	(° Lat ° CMD)	Helio Lon	Area (10 ⁶ hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	C	M	X	S	1	2	3	4			
<i>Region 478</i>																		
09 Oct	N10W05	183	0010	03	Bxo	003	B											
10 Oct	N09W20	185	0010	01	Axx	001	A											
11 Oct	N12W31	183	0010	01	Axx	001	A											
12 Oct	N12W44	183	0000	00		000												
								0	0	0	0	0	0	0	0	0		
Still on Disk.																		
Absolute heliographic longitude: 183																		
<i>Region 479</i>																		
10 Oct	N24E63	102	0020	01	Axx	001	A											
11 Oct	N23E52	100	0030	02	Hsx	001	A											
12 Oct	N23E40	099	0020	01	Hsx	001	A											
								0	0	0	0	0	0	0	0	0		
Still on Disk.																		
Absolute heliographic longitude: 099																		

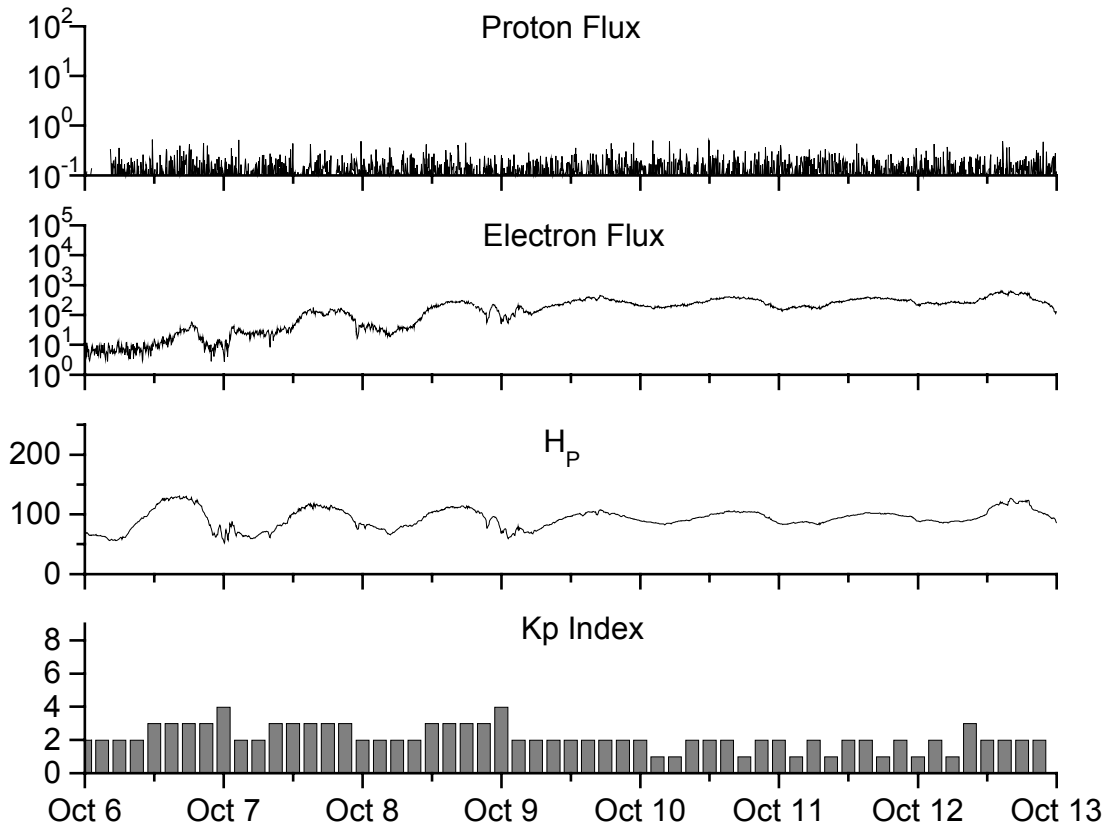


**Recent Solar Indices (preliminary)
of the observed monthly mean values**

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
2001									
October	197.3	125.5	0.64	179.5	114.0	208.1	191.9	20	12.0
November	178.6	106.5	0.60	183.7	115.5	212.7	193.7	16	12.0
December	217.5	132.2	0.61	184.5	114.6	235.6	193.9	09	12.2
2002									
January	189.0	114.1	0.60	184.8	113.5	227.3	194.6	08	12.3
February	194.5	107.4	0.55	188.6	114.7	205.0	197.2	10	12.8
March	153.1	98.4	0.64	188.9	113.3	180.3	195.7	10	12.9
April	194.9	120.7	0.62	186.2	110.5	189.8	191.5	15	13.2
May	204.1	120.8	0.59	183.6	108.9	178.4	188.0	15	13.3
June	146.0	88.3	0.60	179.9	106.3	148.7	183.0	11	13.5
July	183.5	99.6	0.54	175.4	102.7	173.5	176.3	11	13.7
August	191.0	116.4	0.61	169.2	98.7	183.9	169.5	16	14.2
September	206.4	109.6	0.53	163.4	94.6	175.8	164.1	14	15.0
October	153.9	97.5	0.63	158.8	90.5	167.0	159.4	23	15.6
November	159.8	95.5	0.60	150.9	85.2	168.7	154.8	16	16.3
December	147.9	80.8	0.55	144.6	82.1	158.6	150.9	13	17.0
2003									
January	149.3	79.7	0.53	141.7	81.0	144.0	149.2	13	18.2
February	87.0	46.0	0.53	136.4	78.5	124.5	144.7	17	18.9
March	119.7	61.1	0.51	128.1	74.2	132.2	139.5	21	19.4
April	119.7	60.0	0.50			126.3		20	
May	89.6	55.2	0.62			129.3		26	
June	118.4	77.4	0.65			129.4		24	
July	132.8	85.0	0.64			127.8		20	
August	114.3	72.7	0.64			122.1		23	
September	82.6	48.8	0.59			112.3		19	

NOTE: All smoothed values after September 2002 and monthly values after March 2003 are preliminary estimates. The lowest smoothed sunspot index number for Cycle 22, RI = 8.0, occurred in May 1996. The highest smoothed sunspot number for Cycle 23, RI= 120.8, occurred April 2000. *After June 1991, 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 October 2003

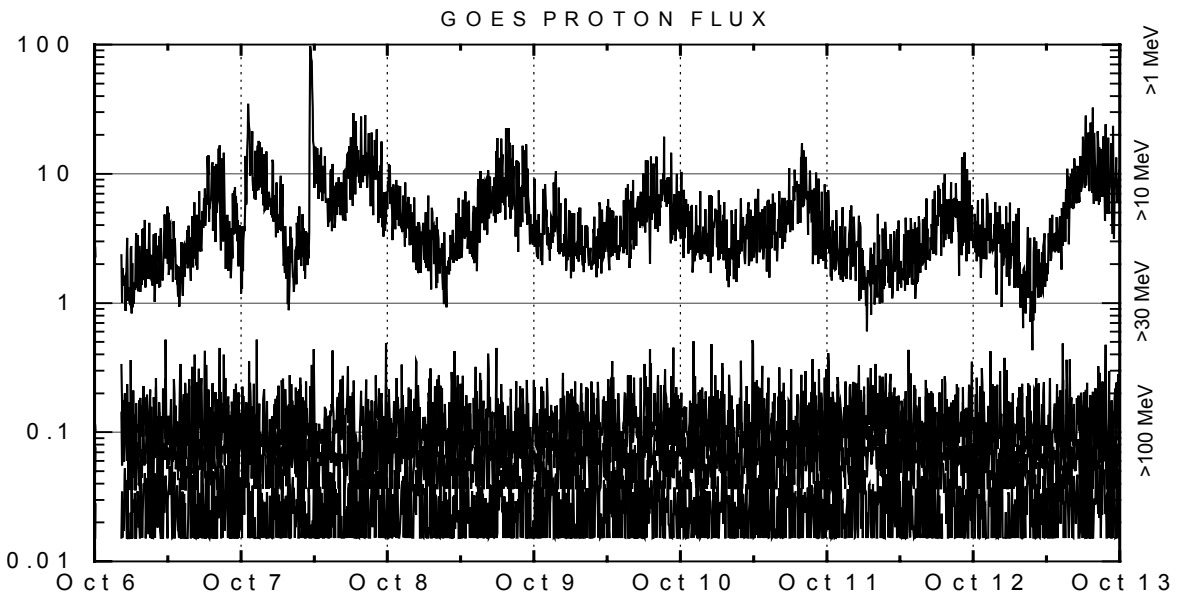
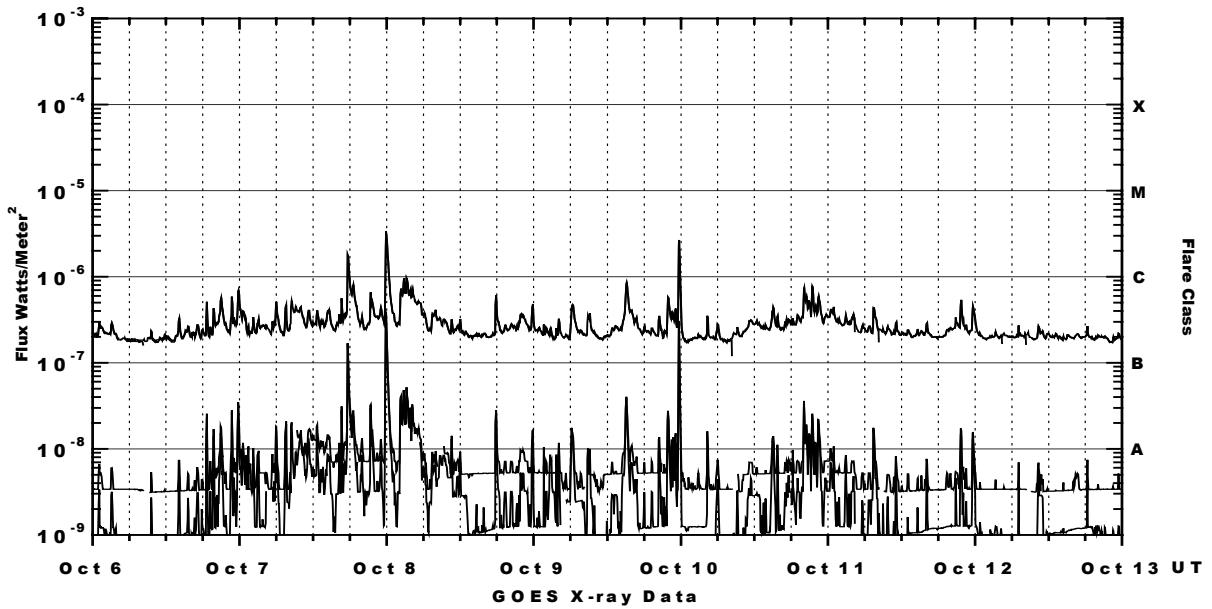
Protons plot contains the five-minute averaged integral proton flux (protons/cm²-sec-sr) as measured by GOES-11 (W113) for each of three energy thresholds: greater than 10, 50, and 100 MeV.

Electrons plot contains the five-minute averaged integral electron flux (electrons/cm²-sec-sr) with energies greater than 2 MeV at GOES-12.

H_p plot contains the five minute averaged magnetic field H - component in nanoteslas (nT) as measured by GOES-12. 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 Air Force Weather Agency) 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_p 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

X-ray plot contains five-minute averaged x-ray flux (watts/m²) as measured by GOES 12 and 10 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-11 (W113) 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.



Optical Flares



Space Environment Center



September 2003
(Month 84)

█ Preliminary data

Comparison of Cycles at current month in cycle

