

Solar activity ranged from very low to high levels. An almost spotless visible disk resulted in very low levels from 13 - 17 October. There were a few spot groups visible during this period, but all were small with alpha or simple beta magnetic configurations. Solar imagery on the 17th hinted strongly that one or more considerably complex regions were rotating around the east limb. Occasional long-duration B-class activity on the 17th also lent credence to the probability that activity levels would soon increase. The first of these active regions rotated into view on 18 October and was numbered as Region 484 (N05, L=351, class/area Dac/240 on 19 October). Activity increased to low levels on the 18th as this compact, rapidly developing region produced several low C-class flares. A halo CME was also observed on the 18th, originating from behind the southeast limb. Activity increased to high levels on 19 October. Region 484 produced an X1/1n flare at 19/1650 UTC. The flare was accompanied by strong radio bursts, a Type II radio sweep, and a coronal mass ejection. Two M1 flares also occurred in this region at 19/0626 UTC and 19/1926 UTC. Region 484 grew dramatically during this 24-hour period and developed a strong delta configuration in a spot group containing over 1000 millionths of white light areal coverage. (Note: At the time of this writing, Region 484 was still in growth phase, exceeding 1600 millionths in size. Activity on the SE limb suggests that another considerably active region is about to rotate into view.)

Solar wind data were available from the NASA Advanced Composition Explorer (ACE) spacecraft for most of the summary period. The period began with the solar wind speed on a steady rise as a large east-west coronal hole rotated into a geoeffective position. This recurrent coronal hole rotated into geoeffective position late on the 13th, and the associated high speed stream peaked at near 800 km/s early on the 15th. IMF Bz was mostly southward, as much as -15 nT early in the period. The high speed stream was in decline but remained elevated, generally in the 500 - 600 km/s range through the end of the 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 was at high levels on 15 - 19 October.

Geomagnetic activity ranged from quiet to severe storm levels. The period began at mostly quiet to unsettled levels with isolated active periods. A recurrent high speed coronal hole stream became geoeffective late on the 13th. The geomagnetic field response was unsettled to major storming at all latitudes with occasional severe storm levels at higher latitudes, on the 14th and 15th, tapering off to very isolated major storm levels by the 16th and 17th. Elevated solar wind speeds and periods of sustained southward Bz prolonged the disturbance through the end of the period: Unsettled to minor storm levels were observed on the 18th, and again on the 19th, with occasional major storm periods at higher latitudes on the 19th.



Space Weather Outlook

22 October - 17 November 2003

Solar activity is expected to range from low to high levels. Moderate to high levels are expected for the first half of the period due to active regions in the eastern solar hemisphere. Region 484 is a very large and complex active region, capable of producing M and X-class activity. Activity on the SE limb late in the period suggests another considerably active region will rotate into view early in the forecast period and further enhance the probability for a major flare. Solar activity levels should decrease for the latter half of the period as these active regions rotate around the west limb.

There is a possibility for a greater than 10 MeV proton events at geosynchronous orbit during the first half of the period.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to reach high levels on 22 - 26 October, 3 - 4 November, and again on 10 - 17 November.

The geomagnetic field is expected to range from quiet to major storm levels during the period. A coronal hole currently in a geoeffective position will produce unsettled to minor storm levels on the 22nd and 23rd. There is a chance for some transient effects on the 23rd and 24th due to recent CME activity on the eastern hemisphere, but most CME material did not appear to have an earthward component. Geomagnetic activity for the remainder of October through early November is expected to be mostly quiet to unsettled with isolated active periods (barring any CME impact). Isolated minor to major storm periods are possible on 09 – 17 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	
13 October	94	25	40	B1.7	0	0	0	0	0	0	0	0	0
14 October	92	24	20	B1.0	0	0	0	0	0	0	0	0	0
15 October	96	29	40	B1.1	0	0	0	1	0	0	0	0	0
16 October	95	28	90	B1.5	0	0	0	1	0	0	0	0	0
17 October	99	66	150	B1.4	0	0	0	0	0	0	0	0	0
18 October	109	91	370	B2.4	9	0	0	8	2	0	0	0	0
19 October	120	89	1110	B5.6	3	2	1	9	2	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
13 October	3.8E+5	1.2E+4	2.7E+3		1.9E+6	
14 October	2.3E+6	1.2E+4	2.6E+3		1.9E+6	
15 October	1.3E+7	1.2E+4	2.5E+3		1.3E+8	
16 October	3.3E+6	1.1E+4	2.7E+3		6.8E+8	
17 October	2.6E+6	1.2E+4	2.7E+3		5.0E+8	
18 October	1.1E+6	1.2E+4	2.6E+3		3.6E+8	
19 October	4.3E+6	1.3E+4	2.8E+3		3.1E+8	

Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	13 October	12	3-2-1-2-3-3-2-4	21	0-1-1-5-5-5-2-2	13
14 October	33	2-4-5-3-3-4-5-6	65	3-4-6-7-5-6-6-5	48	3-4-6-6-6-4-5-6
15 October	22	3-3-4-4-3-3-3-5	71	4-4-7-7-6-6-5-4	42	3-4-7-6-4-4-4-4
16 October	16	4-3-3-3-2-3-2-4	36	4-2-5-6-5-5-3-3	26	5-3-4-5-4-4-4-4
17 October	20	4-5-4-3-3-2-2-3	54	4-6-7-6-5-4-3-3	31	4-5-5-5-4-3-3-3
18 October	15	4-4-3-2-3-2-2-3	30	3-4-5-5-5-4-3-3	27	4-5-4-4-4-3-4-4
19 October	22	3-3-5-3-3-3-4-4	62	3-4-7-6-6-6-5-4	32	3-4-5-5-5-4-4-4

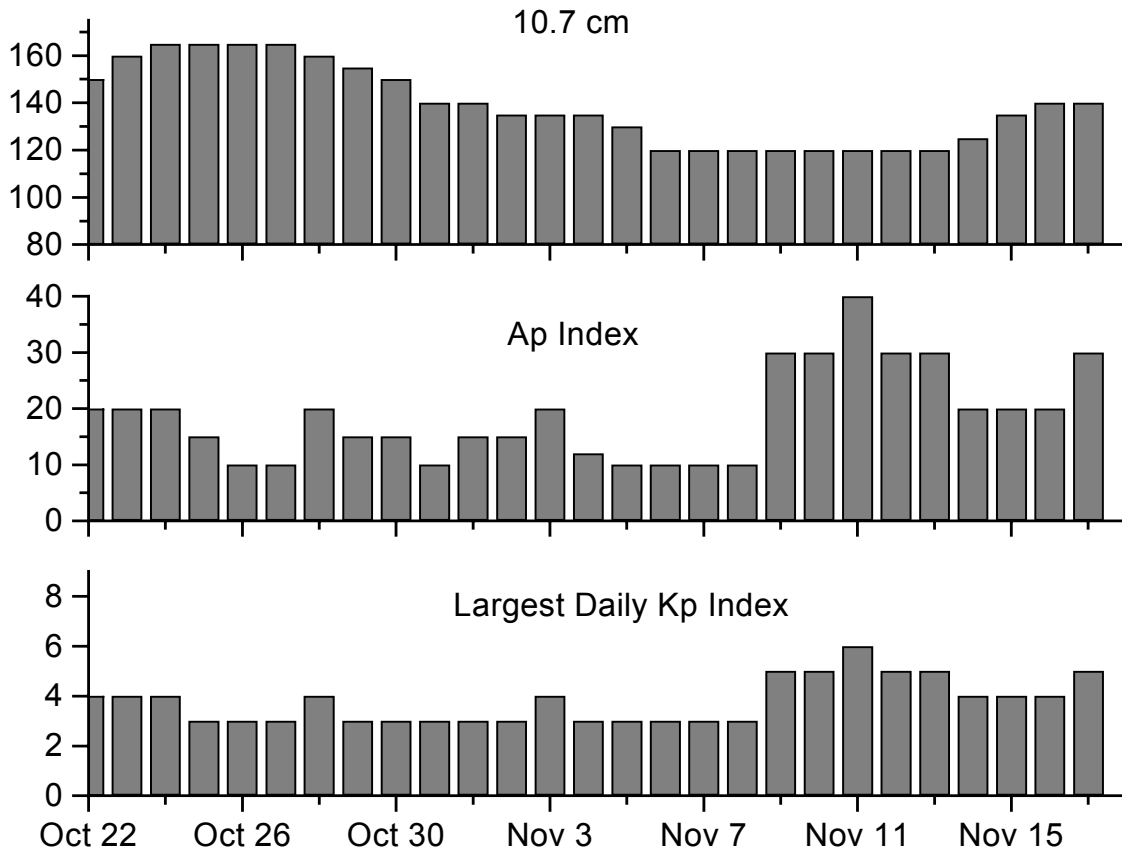


Alerts and Warnings Issued

Date & Time of Issue	Type of Alert or Warning	Date & Time of Event UT
13 Oct 1419	ALERT: Geomagnetic K-index of 4	13 Oct 1418
13 Oct 1452	WARNING: Geomagnetic K= 4	13 Oct 1455 - 2359
13 Oct 2000	WATCH: Geomagnetic A \geq 20	15 Oct
13 Oct 2002	WATCH: Geomagnetic A \geq 20	16 Oct
13 Oct 2221	EXTENDED WARNING: Geomagnetic K= 4	13 Oct 1455 - 14 Oct 1500
14 Oct 0631	ALERT: Geomagnetic K = 5	14 Oct 0630
14 Oct 1442	EXTENDED WARNING: Geomagnetic K= 4	13 Oct 1455 - 15 Oct 1500
14 Oct 1621	ALERT: Geomagnetic K = 5	14 Oct 1620
14 Oct 1629	WARNING: Geomagnetic K= 5	14 Oct 1630 -15 Oct 1500
14 Oct 1932	WARNING: Geomagnetic K= 6	14 Oct 1940 - 15 Oct 1500
14 Oct 2006	WATCH: Geomagnetic A \geq 20	17 Oct
14 Oct 2253	ALERT: Geomagnetic K= 6	14 Oct 2252
15 Oct 0745	ALERT: Geomagnetic K= 6	15 Oct 0744
15 Oct 1204	ALERT: Electron 2MeV Integral Flux > 1000pfu	15 Oct 1145
15 Oct 1434	EXTENDED WARNING: Geomagnetic K= 5	14 Oct 1630 -16 Oct 1500
16 Oct 0620	ALERT: Electron 2MeV Integral Flux > 1000pfu	16 Oct 0605
16 Oct 1455	EXTENDED WARNING: Geomagnetic K=4	13 Oct 1455 - 16 Oct 2359
16 Oct 2348	EXTENDED WARNING: Geomagnetic K= 4	13 Oct 1455 -17 Oct 1500
17 Oct 0508	ALERT: Electron 2MeV Integral Flux > 1000pfu	17 Oct 0500
17 Oct 0514	ALERT: Geomagnetic K= 5	17 Oct 0508
17 Oct 0519	WARNING: Geomagnetic K= 5	17 Oct 0519 - 1500
17 Oct 1454	EXTENDED WARNING: Geomagnetic K= 4	13 Oct 1455 - 17 Oct 2359
17 Oct 2354	EXTENDED WARNING: Geomagnetic K= 4	13 Oct 1455 - 18 Oct 1500
18 Oct 0203	ALERT: Geomagnetic K= 5	18 Oct 0159
18 Oct 0205	WARNING: Geomagnetic K= 5	18 Oct 0207 - 18 Oct 1500
18 Oct 0505	ALERT: Electron 2MeV Integral Flux > 1000pfu	18 Oct 0500
18 Oct 1449	EXTENDED WARNING: Geomagnetic K= 4	13 Oct 1455 - 18 Oct 2359
18 Oct 1641	WATCH: Geomagnetic A \geq 20	21 Oct
18 Oct 2355	EXTENDED WARNING: Geomagnetic K= 4	13 Oct 1455 - 19 Oct 1500
19 Oct 0028	2 - 245 MHz Radio Bursts	18 Oct
19 Oct 0028	1 - 245 MHz Radio Noise Storm	18 Oct
19 Oct 0320	ALERT: Electron 2MeV Integral Flux > 1000pfu	19 Oct 0255
19 Oct 0924	ALERT: Geomagnetic K = 5	19 Oct 0830
19 Oct 1015	WARNING: Geomagnetic K = 5	19 Oct 1016 - 1500
19 Oct 1455	EXTENDED WARNING: Geomagnetic K = 4	13 Oct 1455 - 19 Oct 2359
19 Oct 1642	ALERT: X-Ray Flux exceeded M5	19 Oct 1641
19 Oct 1745	ALERT: Type II Radio Emission	19 Oct 1650
19 Oct 1750	SUMMARY: X-ray Event exceeded X1	19 Oct 1650
19 Oct 1818	ALERT: Geomagnetic K= 5	19 Oct 1757
19 Oct 1855	SUMMARY: 10cm Radio Burst	19 Oct 1634



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
22 Oct	150	20	4	05 Oct	130	10	3
23	160	20	4	06	120	10	3
24	165	20	4	07	120	10	3
25	165	15	3	08	120	10	3
26	165	10	3	09	120	30	5
27	165	10	3	10	120	30	5
28	160	20	4	11	120	40	6
29	155	15	3	12	120	30	5
30	150	15	3	13	120	30	5
31	140	10	3	14	125	20	4
01 Nov	140	15	3	15	135	20	4
02	135	15	3	16	140	20	4
03	135	20	4	17	140	30	5
04	135	12	3				



Energetic Events

Date	Time		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
19 Oct	0608	0626	0641	M1.9	.023	1f	N06E62	484	350	37		
19 Oct	1629	1650	1704	X1.1	.140	1n	N08E58	484	650	510	1	
19 Oct	1921	1926	1930	M1.0	.004	Sf	N05E54	484				

Flare List

Date	Time			X-ray Class.	Optical		Rgn
	Begin	Max	End		Imp / Brtns	Location Lat CMD	
13 October	1619	1630	1640	B8.6			
14 October	No Flares Observed						
15 October	2236	2237	2244	B7.8	Sf	S14W48	477
	2353	2357	0000	B4.4			
16 October	0254	0258	0301	B6.6	Sf	S13W52	477
	0735	0759	0812	B7.8			
	1648	1653	1700	B2.7			477
	1739	1751	1756	B3.4			
	1943	1954	2001	B2.8			
	2128	2134	2140	B4.1			
17 October	0152	0156	0200	B2.9			477
	0423	0426	0429	B3.1			482
	0655	0701	0708	B9.0			482
	0859	0932	1006	B8.9			
	1719	1723	1729	B2.2			482
18 October	0404	0413	0422	B7.1			484
	0534	0538	0542	C2.0	Sf	N05E80	484
	0612	0623	0633	B7.6			
	0853	0856	0904	C3.3	1f	N05E75	484
	1208	1211	1214	B3.9			484
	1448	1522	1531	C3.3			484
	1633	1634	1701	C4.9	Sf	N08E74	484
	1706	1715	1730	C2.6			484
	1740	1742	1744		Sf	N07E72	484
	1802	1802	1811	B9.0	Sf	N05E69	484
	1842	1843	1918	C3.0	Sf	N07E69	484
	1926	1930	1936		Sf	N03E68	484
	2029	2034	2049	C3.3	Sf	N07E68	484
	2127	2128	2132	C2.3	Sf	N03E67	484
	2216	2217	2225	C6.5	1f	N03E67	484
19 October	0022	0022	0026		Sf	N03E65	484
	0348	0349	0354		Sf	N03E63	484
	0611	0621	0707	M1.9	1f	N06E62	484
	0808	0809	0812	C1.3	Sf	N06E60	484



Flare List - continued.

Date	Time			X-ray Class.	Optical		Rgn
	Begin	Max	End		Imp / Brtns	Location Lat CMD	
19 October	1331	1335	1338	C1.6			
	1417	1417	1424		Sf	N05E56	484
	1632	1652	1748	X1.1	1n	N08E58	484
	1857	1857	1900		Sf	N03E55	484
	1924	1927	1931	M1.0	Sf	N05E54	484
	2021	2021	2026		Sf	N07E53	484
	2102	2103	2111		Sf	N08E55	484
	2247	2248	2326	C3.8	Sf	N06E51	484

Region Summary

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

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																
14 Oct	S22W70	184																
15 Oct	S22W83	184																

0 0 0 0 0 0 0 0

Crossed West Limb.

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																
13 Oct	S16W80	206																
14 Oct	S16W93	206																

0 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 206



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 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											
13 Oct	S15W22	147	0020	02	Hax	003	A											
14 Oct	S15W35	147	0010	01	Axx	001	A											
15 Oct	S14W49	148	0010	03	Bxo	002	B											1
16 Oct	S14W63	149	0050	06	Dro	005	B											1
17 Oct	S15W78	151	0040	08	Hsx	003	A											
																		0 0 0 2 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 148

Region 478

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																
14 Oct	N12W70	183																
15 Oct	N12W83	183																
																		0 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 183

Region 479

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											
13 Oct	N23E26	099	0020	01	Hax	002	A											
14 Oct	N24E07	100	0010	02	Bxo	003	B											
15 Oct	N24W06	105																
16 Oct	N24W19	105																
17 Oct	N24W31	104	0010	02	Hax	002	A											
18 Oct	N25W44	103	0020	04	Cso	004	B											
19 Oct	N25W58	104	0010	01	Axx	001	A											
																		0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 105



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 480

15 Oct	N20W26	125	0030	04	Bxo	007	B										
16 Oct	N20W40	126	0040	06	Dro	003	B										
17 Oct	N21W51	124	0010	01	Axx	002	A										
18 Oct	N21W64	124															
19 Oct	N21W77	124															
								0	0	0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 125

Region 481

17 Oct	S08W17	090	0030	04	Cao	005	B										
18 Oct	S08W32	091	0030	04	Cso	008	B										
19 Oct	S09W48	094	0010	02	Axx	003	A										
								0	0	0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 090

Region 482

17 Oct	N16E62	011	0060	05	Cso	004	B										
18 Oct	N17E50	009	0070	07	Cao	008	B										
19 Oct	N16E34	012	0050	03	Dao	005	B										
								0	0	0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 012

Region 483

18 Oct	S08E55	004	0010	00	Axx	001	A										
19 Oct	S09E40	006	0010	05	Bxo	002	B										
								0	0	0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 006

Region 484

18 Oct	N05E68	351	0240	04	Dac	020	B	9			8	2					
19 Oct	N06E53	353	1030	10	Dkc	028	Bgd	2	2	1	9	2					
								11	2	1	17	4	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 353

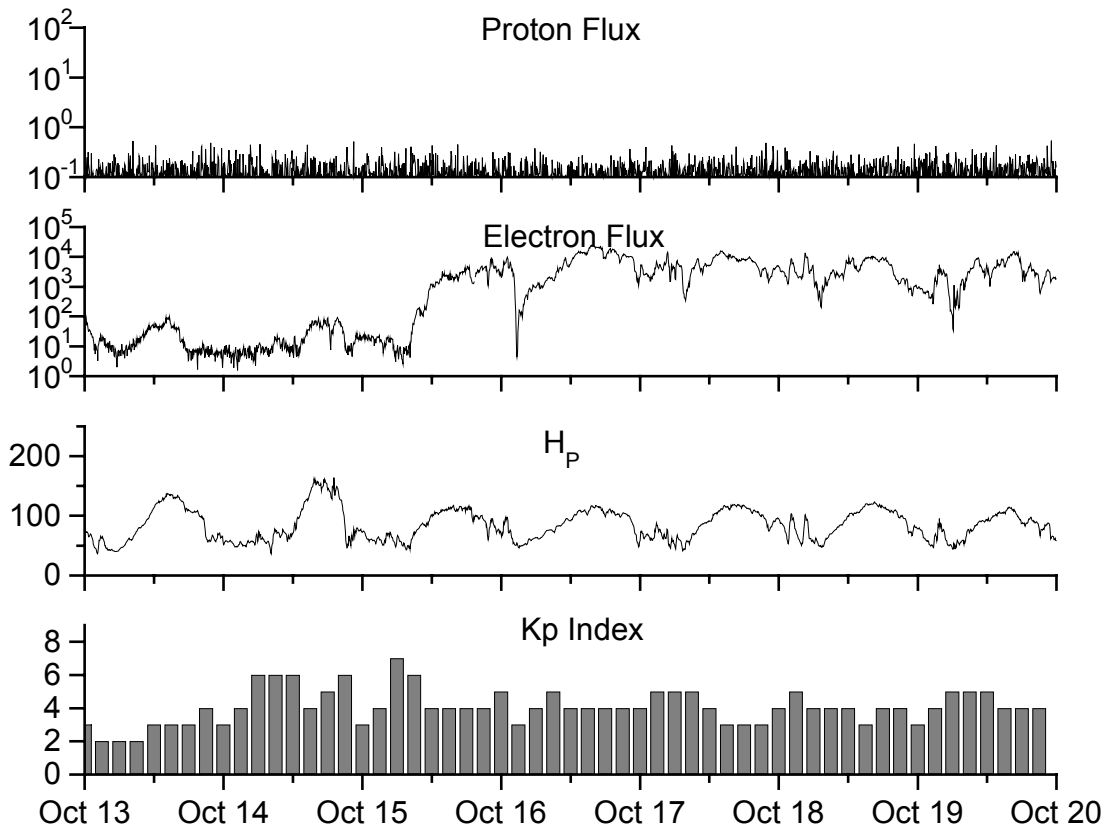


**Recent Solar Indices (preliminary)
of the observed monthly mean values**

Month	Sunspot Numbers			Radio Flux		Geomagnetic			
	Observed values SWO	Ratio RI	Ratio RI/SWO	Smooth values SWO	Smooth values RI	*Penticton 10.7 cm	Smooth Value	Planetary Ap	Smooth 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 13 October 2003

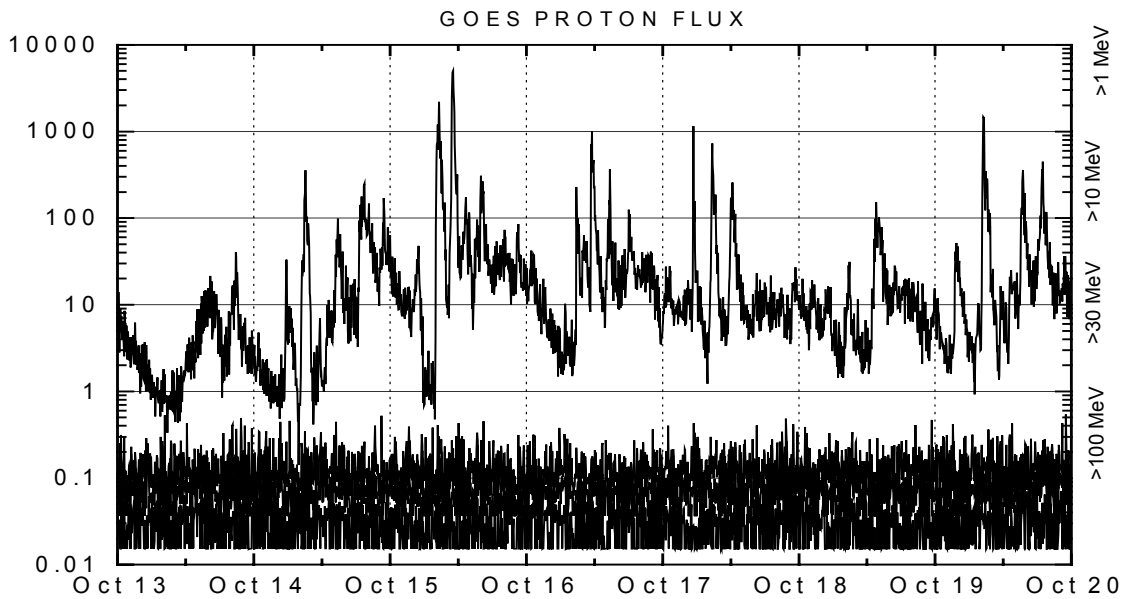
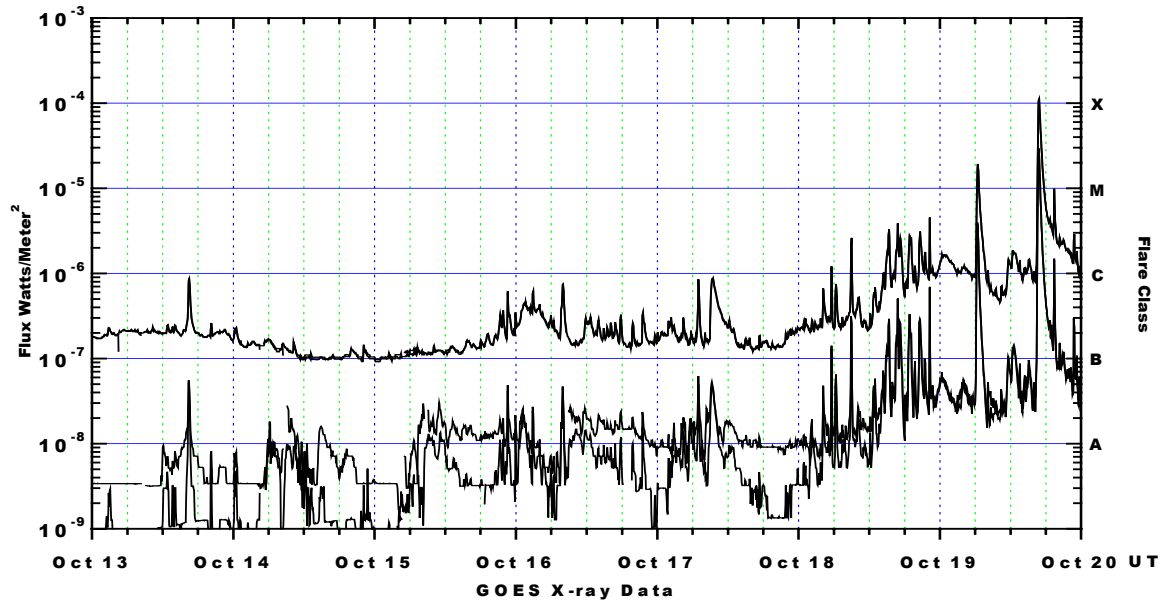
Protons plot contains the five-minute averaged integral proton flux (protons/cm²-sec-sr) as measured by GOES-11 (W113) for each of three energy thresholds: greater than 10, 50, and 100 MeV.

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.

