

## Space Weather Highlights 13 – 19 Sep 2004

SWO PRF 1516  
21 September 2004

Solar activity ranged from very low to moderate. Very low levels were observed on 16 – 17 September; low levels occurred on 13, 15, and 18 September; while moderate activity occurred on 14 and 19 September. Region 672 (N05, L=347, class/area, Eai/320 on 15 September) produced the majority of this period's activity with seven C-class and two M-class flares. At 0930 UTC on 14 September, Region 672 produced an M1.5/1f flare with associated Type II (estimated shock velocity of 1018 km/s) and Type IV radio sweeps. On 19/1712 UTC, Region 672 produced an M1.9 with associated Type II (604 km/s) and Type IV radio sweeps and a 520 sfu Tenflare. LASCO imagery was not available for either M-flare. New Region 673 (S13, L=269, class/area, Eso/360 on 18 September) rotated onto the disk on 14 September as a relatively large spot group, but produced only low-level C-class activity.

Solar wind data were available from the NASA Advanced Composition Explorer (ACE) spacecraft during most of the summary period. The period began with wind speed near 350 km/s and the IMF Bz weak with fluctuations not varying much beyond +/- 3 nT through late on 13 September. At 13/1930 UTC, a strong shock was felt at ACE as effects from the 12 September M4.8 flare and associated full halo CME impacted Earth. Shortly after the shock, a 24 nT sudden impulse was observed at Boulder at 13/2003 UTC.

Wind speed sharply increased from about 325 km/s to near 600 km/s, but the IMF had only brief periods of strong southward orientation. By late on 14 September, the IMF Bz had stabilized to +/- 5 nT and wind speed slowly decreased to near 550 km/s. These conditions persisted through most of 16 September. By 1600 UTC on the 16th, the IMF Bz began to fluctuate between +/- 8 nT, and temperature and density showed a slight increase through late on the 17th; those signatures were suggestive of a co-rotating interactive region followed by a weak coronal hole wind stream. Near 2130 UTC on 17 September, solar wind speed increased from about 450 km/s to near 510 km/s and the IMF Bz dropped weakly southward to -5 nT as a weak transient was felt at ACE. These conditions persisted for about 6 hours. Thereafter, and through the end of the summary period, wind speed decayed to near 400 km/s and the IMF Bz did not vary much beyond +/- 5 nT.

Two greater than 10 MeV proton events at geosynchronous orbit were observed during the period. The first event was a result of the 12 September M4.8 flare and associated CME and began at 13/2105 UTC, reached a peak of 273 pfu at 14/0005 UTC, and ended at 15/1240 UTC. The second event was a result of the M1.9 flare and associated CME from 19 September. The event began at 19/1925 UTC, reached a peak of 57 pfu at 20/0100 UTC, and ended at 20/1205 UTC.

The greater than 2 MeV electron flux at geosynchronous orbit was at high levels on 15 – 19 September.

The geomagnetic field was at quiet to minor storm levels. The period began with mostly quiet to unsettled levels, but quickly rose to active to minor storming as effects from the full halo CME impacted the geomagnetic field late on 13 September. From 15 – 16 September, activity levels were predominately quiet to active. By early on 17 September, and through midday on the 18th, the field became mostly unsettled to minor storming as a coronal hole wind stream rotated into a geoeffective position. Thereafter, and through the end of the summary period, the field was quiet to unsettled.

## Space Weather Outlook 22 September - 18 October 2004

Solar activity is expected to be predominately very low to low with isolated moderate activity possible on 22 September as Region 672 rotates around the west limb. Through 28 September, activity is expected to be very low to low. Thereafter, and through the end of the forecast period, solar activity is expected to be predominately very low to low with isolated moderate activity possible after old Region 667 (28 September) and old Region 672 (06 October) are due to return.

A greater than 10 MeV proton event is not expected.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to be at high levels on 23 - 25 September, 04 - 06 October and from 11 – 17 October.

The geomagnetic field is expected to range from quiet to minor storm levels. Active to minor storm periods are possible on 22 and 23 September due to possible CME effects from the 19 September M1.9 flare. From 03 – 05 October and from 10 – 16 October, recurrent high speed coronal hole streams are expected to produce occasional active periods. The remainder of the forecast period is expected to be mostly quiet to unsettled.



### *Daily Solar Data*

Date	Radio Flux 10.7 cm	Sun spot No.	Sunspot Area (10 <sup>-6</sup> hemi.)	X-ray Background	Flares							
					X-ray Flux			Optical				
					C	M	X	S	1	2	3	4
13 September	118	65	510	B3.0	3	0	0	0	0	0	0	0
14 September	115	70	370	B4.7	3	1	0	0	1	0	0	0
15 September	110	67	460	B3.2	4	0	0	2	0	0	0	0
16 September	108	80	470	B1.9	0	0	0	2	0	0	0	0
17 September	105	76	470	B1.8	0	0	0	0	0	0	0	0
18 September	103	50	460	B1.9	1	0	0	0	0	0	0	0
19 September	105	42	370	B1.4	2	1	0	0	0	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
	13 September	6.2E+7	1.9E+6	3.6E+3		2.1E+7
14 September	4.6E+8	8.5E+6	2.7E+3		3.5E+7	
15 September	6.1E+7	7.4E+5	2.3E+3		1.5E+8	
16 September	2.7E+7	1.5E+5	2.4E+3		3.0E+8	
17 September	5.9E+6	3.7E+4	2.4E+3		1.6E+8	
18 September	1.5E+6	1.7E+4	2.3E+3		9.8E+7	
19 September	1.6E+6	6.0E+5	5.3E+3		2.0E+8	

### *Daily Geomagnetic Data*

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	13 September	5	0-0-0-0-0-0-3-4	3	0-0-0-0-0-0-2-3	8
14 September	17	4-3-3-3-3-2-4-3	41	3-4-5-6-5-6-3-3	28	4-4-4-5-4-3-4-4
15 September	9	4-2-1-1-2-2-2-2	23	4-3-3-5-5-3-2-2	14	4-3-2-3-3-3-3-2
16 September	14	3-2-4-2-3-2-3-3	30	3-3-3-6-6-3-3-2	17	3-3-4-4-4-3-3-3
17 September	15	4-4-3-2-2-1-3-3	26	4-4-4-4-5-4-2-3	20	5-4-4-3-3-3-3-4
18 September	16	5-5-1-3-2-0-1-0	16	4-4-2-5-3-0-0-0	16	5-5-1-3-3-2-1-2
19 September	4	1-0-1-1-1-1-1-3	3	1-0-1-2-1-1-1-1	5	1-1-1-1-2-2-2-3

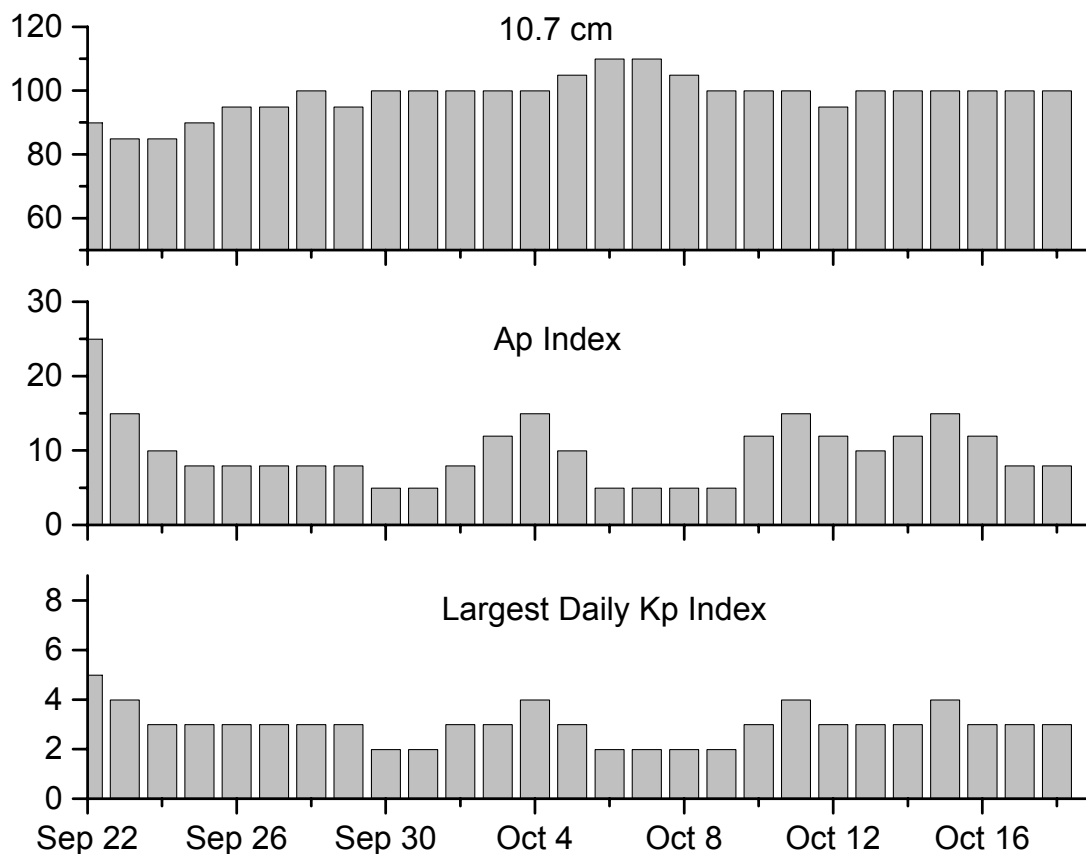


### *Alerts and Warnings Issued*

<u>Date &amp; Time of Issue</u>	<u>Type of Alert or Warning</u>	<u>Date &amp; Time of Event UT</u>
13 Sep 0013	2 – 245 MHz Radio Bursts	12 Sep
13 Sep 1957	WARNING: Geomagnetic Sudden Impulse	13 Sep 2004 - 2045
13 Sep 2009	SUMMARY: Geomagnetic Sudden Impulse	13 Sep 2006
13 Sep 2018	WARNING: Geomagnetic K= 4	13 Sep 2020 - 2359
13 Sep 2052	WATCH: Geomagnetic A $\geq$ 30	14 Sep
13 Sep 2105	WATCH: Geomagnetic A $\geq$ 20	15 Sep
13 Sep 2144	WARNING: Proton 10MeV Integral Flux > 10pfu	13 Sep 2145 – 14 Sep 0300
13 Sep 2221	ALERT: Proton Event 10MeV Integral Flux > 100pfu	13 Sep 2205
13 Sep 2306	WARNING: Geomagnetic K= 5	13 Sep 2330 – 14 Sep 1500
14 Sep 0036	1 – 245 MHz Radio Burst	13 Sep
14 Sep 0102	CONT ALERT: Proton Event 10MeV Integral Flux > 100pfu	13 Sep 2205
14 Sep 0229	EXT WARNING: Proton 10MeV Integral Flux > 10pfu	13 Sep 2145 -14 Sep 1500
14 Sep 0456	EXT WARNING: Geomagnetic K= 4	13 Sep 2020 – 14 Sep 1500
14 Sep 0931	ALERT: Type IV Radio Emission	14 Sep 0909
14 Sep 1116	ALERT: Type II Radio Emission	14 Sep 0926
14 Sep 1406	SUMMARY: Proton Event 10MeV Integral Flux > 100pfu	13 Sep 2205
14 Sep 1451	EXT WARNING: Geomagnetic K = 4	13 Sep 2020 – 14 Sep 2359
14 Sep 2135	WATCH: Geomagnetic A $\geq$ 20	16 Sep
14 Sep 2136	WATCH: Geomagnetic A $\geq$ 20	17 Sep
14 Sep 2206	EXT WARNING: Proton 10MeV Integral Flux > 10pfu	13 Sep 2145 – 15 Sep 1500
15 Sep 0011	2 – 245 MHz Radio Bursts	14 Sep
15 Sep 0052	WARNING: Geomagnetic K = 4	15 Sep 0053 – 15 Sep 1500
15 Sep 0057	ALERT: Geomagnetic K = 4	15 Sep 0055
15 Sep 0108	CONT ALERT: Proton Event 10MeV Integral Flux > 10pfu	13 Sep 2011
15 Sep 1019	SUMMARY: Proton Event 10MeV Integral Flux > 10pfu	13 Sep 2011
15 Sep 1222	ALERT: Electron 2MeV Integral Flux > 1000pfu	15 Sep 1150
16 Sep 0010	1 – 245 MHz Radio Burst	15 Sep
16 Sep 0646	ALERT: Geomagnetic K= 4	16 Sep 0644
16 Sep 1132	ALERT: Electron 2MeV Integral Flux > 1000pfu	16 Sep 1115
16 Sep 1145	ALERT: Geomagnetic K = 4	16 Sep 1144
16 Sep 1257	ALERT: Geomagnetic K = 4	16 Sep 1256
16 Sep 1648	ALERT: Geomagnetic K = 4	16 Sep 1644
16 Sep 2127	CANCEL WATCH: Geomagnetic A = 20	14 Sep 2136
17 Sep 0035	WARNING: Geomagnetic K= 4	17 Sep 0100 - 1500
17 Sep 0132	ALERT: Geomagnetic K= 4	17 Sep 0130
17 Sep 0147	ALERT: Geomagnetic K = 5	17 Sep 0145
17 Sep 0538	ALERT: Geomagnetic K = 5	17 Sep 0530
17 Sep 1122	ALERT: Electron 2MeV Integral Flux > 1000pfu	17 Sep 1100
17 Sep 2235	ALERT: Geomagnetic K= 4	17 Sep 2234
18 Sep 0028	1 – 245 MHz Radio Burst	17 Sep
18 Sep 0021	WARNING: Geomagnetic K = 4	18 Sep 0100 - 1500
18 Sep 0250	ALERT: Geomagnetic K = 6	18 Sep 0249
18 Sep 0308	WARNING: Geomagnetic K= 5	18 Sep 0330 - 1500
18 Sep 0325	ALERT: Geomagnetic K= 5	18 Sep 0324
18 Sep 1126	ALERT: Electron 2MeV Integral Flux > 1000pfu	18 Sep 1105
19 Sep 0018	245 MHz Noise Storm	18 Sep
19 Sep 0837	ALERT: Electron 2MeV Integral Flux > 1000pfu	19 Sep 0815
19 Sep 1727	ALERT: Type II Radio Emission	19 Sep 1656
19 Sep 1736	SUMMARY: 10cm Radio Burst	19 Sep 1650
19 Sep 1741	ALERT: Type IV Radio Emission	19 Sep 1716
19 Sep 1842	WARNING: Proton 10MeV Integral Flux > 10pfu	19 Sep 1900 – 19 Sep 2359
19 Sep 1941	ALERT: Proton Event 10MeV Integral Flux > 10pfu	19 Sep 1925
19 Sep 2354	EXT WARNING: Proton 10MeV Integral Flux > 10pfu	19 Sep 1900 – 20 Sep 1500



### 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 Sep	90	25	5	06 Oct	110	5	2
23	85	15	4	07	110	5	2
24	85	10	3	08	105	5	2
25	90	8	3	09	100	5	2
26	95	8	3	10	100	12	3
27	95	8	3	11	100	15	4
28	100	8	3	12	95	12	3
29	95	8	3	13	100	10	3
30	100	5	2	14	100	12	3
01 Oct	100	5	2	15	100	15	4
02	100	8	3	16	100	12	3
03	100	12	3	17	100	8	3
04	100	15	4	18	100	8	3
05	105	10	3				



### *Energetic Events*

Date	Time		X-ray		Optical Information			Peak		Sweep Freq		
	Begin	Max	Max	Class	Flux	Imp/ Brtns	Location Lat CMD	Rgn #	Radio Flux		Intensity	
									245	2695	II	IV
14 Sep	0747	0930	1000	M1.5	.045	1f	N04E17	672	510	120	1	1
19 Sep	1646	1712	1739	M1.9	.039			672	130	520	3	1

### *Flare List*

Date	Time			X-ray Class.	Imp / Brtns	Optical Location Lat CMD	Rgn
	Begin	Max	End				
13 September	0001	0008	0013	C1.0			669
	0205	0208	0214	B3.9			
	0339	0342	0344	B5.0			672
	0949	0952	0955	B6.5			
	1208	1211	1213	B6.5			667
	1334	1339	1342	C1.4			672
	2007	2011	2014	C1.4			672
14 September	2214	2217	2219	B9.9			
	2336	2339	2344	B6.2			
	0549	0552	0554	C2.2			672
	0854	0930	1131	M1.5	1f	N04E17	672
	1354	1404	1418	C2.3			673
15 September	1647	1655	1725	C1.8			673
	2139	2142	2201	B5.7			
	0745	0746	0756	C2.7	Sf	N08E08	672
	1002	1009	1015	B5.1			673
	1521	1525	1530	B6.4			672
	1613	1621	1627	B6.1			672
	1651	1713	1723	C1.1			672
	1742	1751	1753	C1.1			672
16 September	1836	1838	1842	B9.7	Sf	N08W01	672
	2005	2055	2211	C1.3			673
	0030	0030	0033	B8.7	Sf	N07W05	672
	0344	0345	0350	B8.4	Sf	N05W11	672
17 September	0218	0223	0233	B3.1			673
18 September	0218	0223	0244	B4.8			672
	0930	0938	0941	B4.8			673
	1106	1110	1114	B5.1			673
	1218	1223	1226	B6.2			673
	1352	1401	1408	B7.5			673
	1514	1520	1527	B7.5			672
	1603	1609	1615	C1.0			673
	2316	2323	2328	B7.1			672



**Flare List – continued.**

Date	Time			X-ray Class.	Optical		Rgn
	Begin	Max	End		Imp / Brtns	Location Lat CMD	
19 September	0006	0012	0019	B5.0			673
	0753	0759	0806	B6.6			672
	1016	1148	1213	C3.8			672
	1646	1712	1739	M1.9			672
	2052	2115	2132	C1.9			

**Region Summary**

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

*Region 667*

01 Sep	S09E76	093	0180	04	Hax	002	A										
02 Sep	S10E62	093	0250	04	Hkx	003	A										
03 Sep	S11E48	094	0250	04	Hhx	001	A										
04 Sep	S10E36	093	0340	04	Hkx	002	A										
05 Sep	S11E23	093	0250	05	Hkx	004	A										
06 Sep	S11E09	094	0240	05	Dao	010	B										
07 Sep	S11W04	093	0290	03	Hkx	004	A										
08 Sep	S11W17	093	0260	04	Hkx	003	A										
09 Sep	S11W32	095	0250	04	Hkx	007	A										
10 Sep	S11W45	095	0250	03	Hhx	005	A										
11 Sep	S11W58	095	0180	05	Dao	007	B										
12 Sep	S11W72	095	0230	06	Cao	004	B	1	1		1						
13 Sep	S10W85	095	0180	03	Hax	001	A										
14 Sep	S10W98	095															
								1	1	0	1	0	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 093

*Region 669*

05 Sep	S06E35	081	0030	03	Bxo	007	B										
06 Sep	S07E19	084	0050	06	Dso	012	B										
07 Sep	S06E06	083	0090	05	Dai	015	B	1									
08 Sep	S05W09	085	0090	06	Dai	021	B	1			2						
09 Sep	S06W24	087	0100	07	Dao	017	B										
10 Sep	S06W78	087	0130	07	Dsi	018	B										
11 Sep	S06W51	088	0080	07	Cso	008	B										
12 Sep	S06W66	089	0080	02	Hsx	002	A	1			1						
13 Sep	S04W81	091	0060	02	Hax	002	A	1									
14 Sep	S06W95	092	0060	02	Hax	001	A										
								4	0	0	3	0	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 083



**Region Summary - continued.**

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

*Region 670*

05 Sep	S14E34	082	0010	02	Axx	002	A												
06 Sep	S13E19	084	0010	01	Axx	004	A												
07 Sep	S14E04	085	0010	08	Bxo	014	B												
08 Sep	S14W07	083	0010	02	Axx	004	A												
09 Sep	S14W20	083																	
10 Sep	S14W33	083																	
11 Sep	S14W46	083																	
12 Sep	S14W59	083																	
13 Sep	S14W72	083																	
14 Sep	S14W85	083																	
15 Sep	S14W98	083																	
										0	0	0	0	0	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude:085

*Region 672*

09 Sep	N05E73	350	0300	07	Dai	005	B	2											
10 Sep	N05E60	350	0260	08	Dai	013	B	7											
11 Sep	N05E47	350	0270	13	Eai	030	Bg	1											
12 Sep	N05E33	350	0260	11	Eai	049	Bg		1									1	
13 Sep	N04E22	348	0270	09	Dao	032	Bg	2											
14 Sep	N05E10	347	0310	11	Eai	049	Bd	1	1									1	
15 Sep	N05W03	347	0320	12	Eai	046	Bd	3										2	
16 Sep	N05W17	348	0230	12	Eai	045	Bd											2	
17 Sep	N05W29	347	0150	11	Eai	037	B												
18 Sep	N06W45	349	0100	06	Cao	016	B												
19 Sep	N05W58	349	0070	06	Cro	007	B	1	1										
										17	3	0	4	1	1	0	0		

Still on Disk.

Absolute heliographic longitude:347

*Region 673*

15 Sep	S13E72	272	0140	03	Hax	001	A	1											
16 Sep	S12E61	269	0240	10	Eki	015	Bg												
17 Sep	S13E51	267	0320	12	Eko	019	B												
18 Sep	S13E35	269	0360	13	Eso	014	B	1											
19 Sep	S13E22	269	0300	11	Eso	015	B												
										2	0	0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude:269



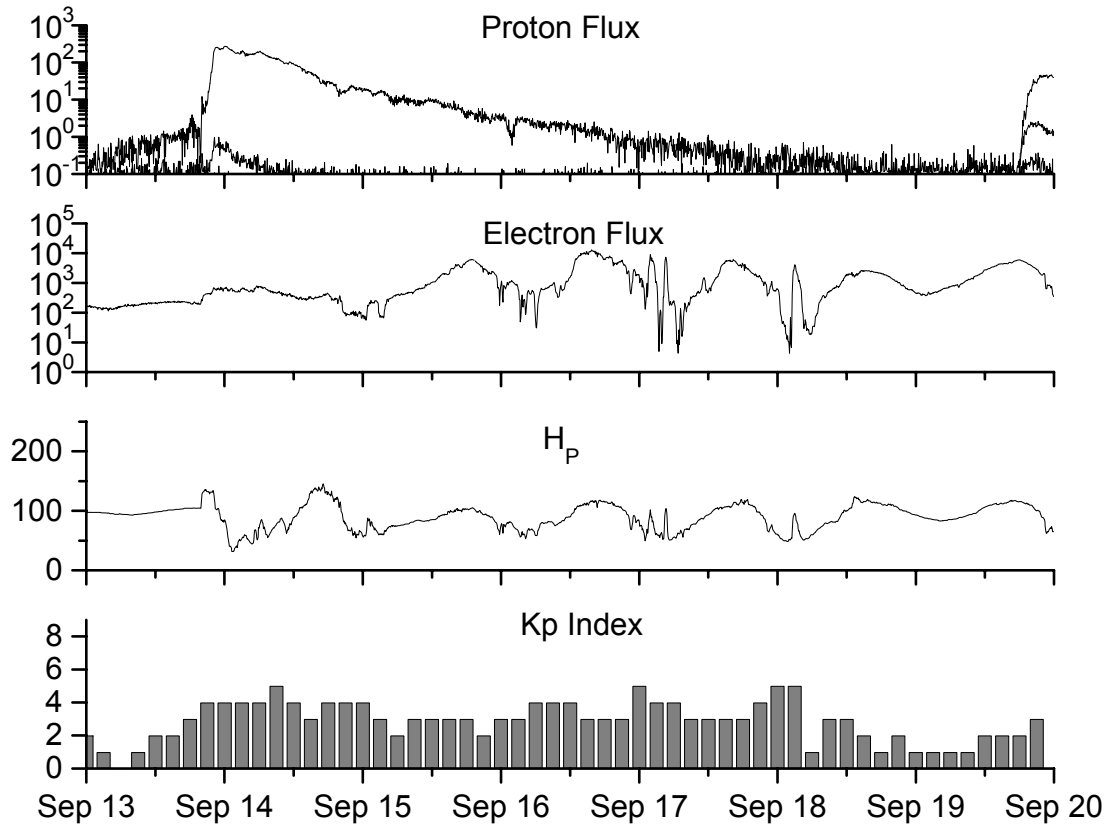
**Recent Solar Indices (preliminary)  
of the observed monthly mean values**

Month	Sunspot Numbers			Radio Flux		Geomagnetic			
	Observed SWO	values RI	Ratio RI/SWO	Smooth SWO	values RI	*Penticton 10.7 cm	Smooth Value	Planetary Ap	Smooth Value
<b>2002</b>									
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
<b>2003</b>									
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	121.5	70.3	126.3	135.0	20	20.1
May	89.6	55.2	0.62	118.3	67.8	129.3	133.1	26	21.0
June	118.4	77.4	0.65	113.6	65.2	129.4	130.2	24	21.5
July	132.8	85.0	0.64	106.9	62.0	127.8	127.2	19	22.0
August	114.3	72.7	0.64	102.8	60.3	122.1	125.2	23	22.2
September	82.6	48.8	0.59	100.7	59.8	112.3	123.7	18	21.8
October	118.9	65.6	0.55	96.6	58.4	153.1	121.8	35	21.1
November	118.9	67.2	0.57	93.6	57.0	153.1	120.1	28	20.0
December	75.4	47.0	0.62	91.4	55.0	115.1	118.0	16	18.6
<b>2004</b>									
January	62.3	37.2	0.60	87.9	52.0	114.1	116.3	22	18.1
February	75.6	46.0	0.61	84.2	49.4	107.0	115.5	13	17.7
March	81.0	48.9	0.60			112.2		14	
April	59.3	39.3	0.66			101.2		11	
May	77.3	41.5	0.54			99.8		8	
June	78.9	43.2	0.55			97.4		8	
July	87.8	51.0	0.58			118.5		23	
August	69.5	40.9	0.59			110.1		10	

**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 September 2004*

*Protons* plot contains the five-minute averaged integral proton flux (protons/cm<sup>2</sup>-sec-sr) as measured by GOES-11 (W98) for each of three energy thresholds: greater than 10, 50, and 100 MeV.

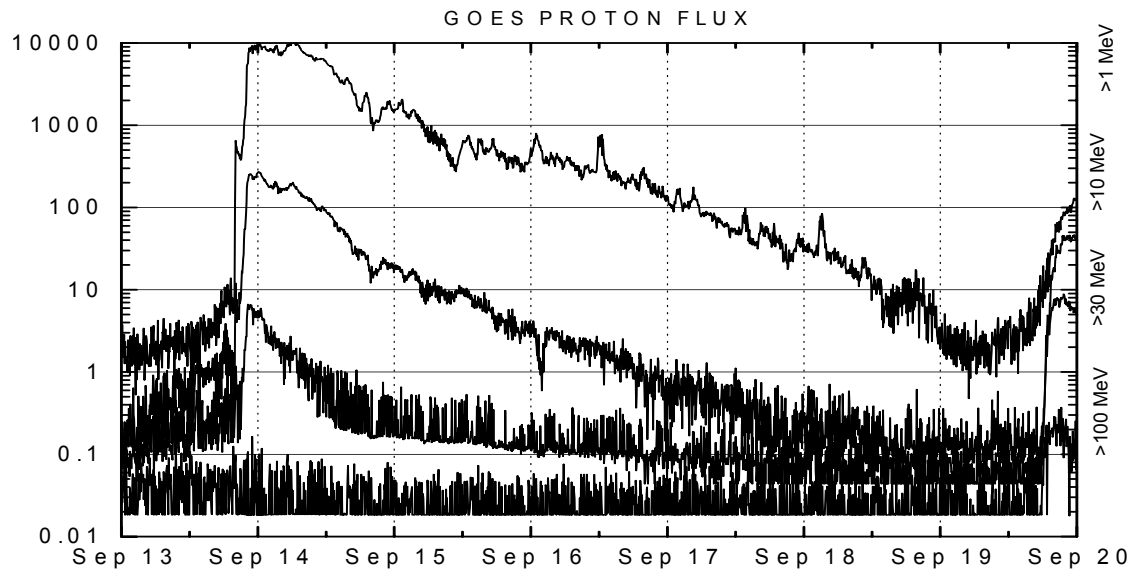
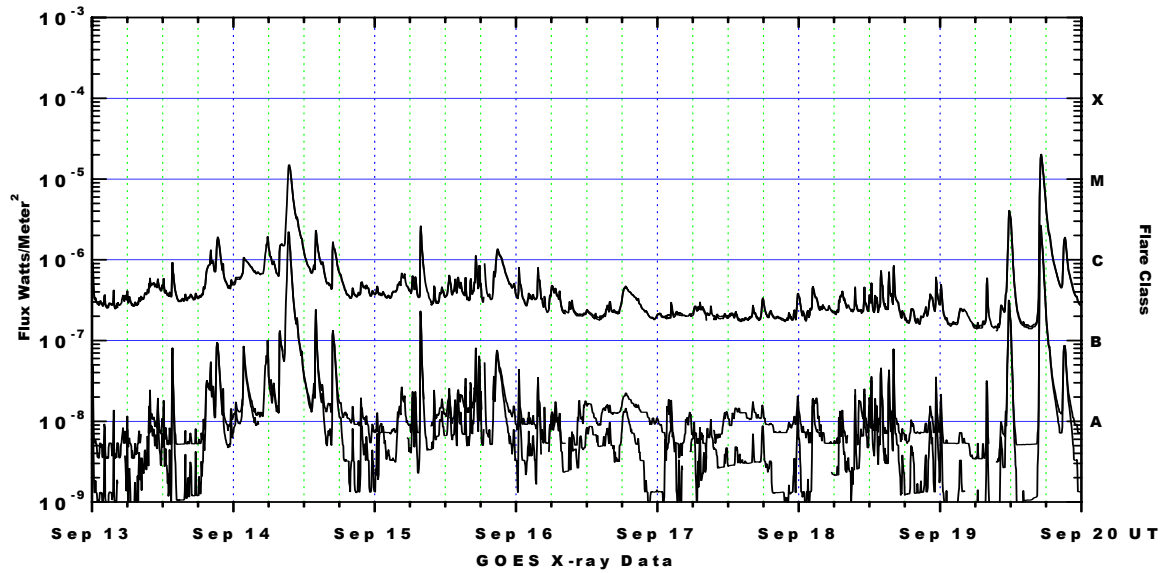
*Electrons* plot contains the five-minute averaged integral electron flux (electrons/cm<sup>2</sup>-sec-sr) with energies greater than 2 MeV at GOES-12 (W75).

*H<sub>p</sub>* 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<sub>p</sub>* 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 Hartland, UK. These data are made available through cooperation from the Geological Survey of Canada (GSC), British Geological Survey (BGS) 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>p</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*

X-ray plot contains five-minute averaged x-ray flux (watts/m<sup>2</sup>) as measured by GOES 12 (W75) and GOES 10 (W135) 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/cm<sup>2</sup>-sec-sr) as measured by GOES-11 (W98) for each of the energy thresholds: >1, >10, >30 and >100 MeV. P10 event threshold is 10 pfu (protons/cm<sup>2</sup>-sec-sr) at greater than 10 MeV.

