

Solar activity began the week at very low levels with no flare activity and just one sunspot group, Region 1112 (S20, L=208, class/area Eai/180 on 17 October), although there was a filament eruption late on 10 October which was associated with a slow CME early on 11 October. Activity increased slightly on 13-14 October with occasional B-class flares, mostly due to new Region 1113 (N18, L=141, class/area Hsx/160 on 17 October) which rotated onto the disk. A slow CME was noted in the coronagraph images around mid-day on 14 October. Region 1112 began to grow, starting on 15 October, and started contributing to the B-level flare activity. As the region continued to grow, activity increased to moderate levels on 16 October due to an M2/1n at 1912 UTC which was associated with a type II radio sweep and a set of discrete radio bursts, including a 140 SFU tenflare at 1916 UTC. Activity decreased to low levels for 17 October as Region 1112 produced a few C-class flares and upper level B-class flares. A general increase in sunspot counts and background flux levels was noted during the last three days of the analysis interval.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit began the week at normal background levels. An increase began mid-day on 12 October, and moderate levels prevailed for 13-15 October accompanied by a brief interval of high flux levels on 13 October. Normal background levels resumed late on 15 October and continued through the remainder of the interval.

An initially quiet field became somewhat disturbed around 0600 UTC on 11 October with unsettled to active levels at mid-latitudes and some isolated major to severe storm levels at high latitudes. Quiet to unsettled levels, with some isolated active periods at high latitudes, prevailed for 12 October as the disturbance diminished. Quiet levels predominated for 13-16 October. A short-lived increase to unsettled to active levels, with some minor to major storm periods at high latitudes, was observed on 17 October from 0300 UTC to 1500 UTC, after which conditions returned to quiet levels for the remainder of the day.

Solar wind data from the NASA ACE spacecraft indicated a possible CME passage on 11 October, mostly likely from the filament eruption and associated partial-halo CME that were observed on 06 October. Density values reached a maximum of 45 p/cc at 0547 UTC and the IMF z-component Bz showed an extended negative interval from 0824-1805 UTC with peak negative values around -13 nT. An additional transient-like feature was observed at ACE on 17 October between 0111 UTC and 1150 UTC as Bz went through an extended negative period with peak negative values around -7 nT. A possible source for this transient may have been the slow CME observed on 14 October.

### **Space Weather Outlook**

#### **20 October – 15 November 2010**

Solar activity is expected to be predominantly at very low to low levels. The possibility for intervals of low level activity depends on the emergence of new sunspot groups. Recurrence would suggest a possible increase for 05-15 November as old Region 1112 will return at that time.

No proton events are expected at geosynchronous orbit.



The greater than 2 MeV electron flux at geosynchronous orbit is expected to be at normal to moderate levels during the period.

Geomagnetic field activity is expected to be quiet to unsettled for 20-22 October. An increase to unsettled levels with a chance for active periods is forecast for 23-25 October due to a favorably positioned coronal hole. Quiet levels should prevail for 26-30 October. A small increase is possible due to a recurrent coronal hole for 31 October - 02 November. Quiet levels should prevail for the remainder of the outlook interval.



### *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	
11 October	75	11	30	A6.4	0	0	0	0	0	0	0	0	0
12 October	75	11	20	A6.5	0	0	0	0	0	0	0	0	0
13 October	78	24	130	A6.7	0	0	0	0	0	0	0	0	0
14 October	80	34	120	A7.7	0	0	0	1	0	0	0	0	0
15 October	82	51	380	A7.9	0	0	0	0	0	0	0	0	0
16 October	87	48	420	A9.6	0	1	0	0	1	0	0	0	0
17 October	84	61	500	B1.0	2	0	0	3	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)		
	>1 MeV	>10 MeV	>100 MeV	>.6 MeV	>2MeV	>4 MeV
11 October	4.7e+05	1.4e+04	3.3e+03		8.6e+05	
12 October	1.4e+05	1.4e+04	3.3e+03		3.0e+06	
13 October	3.4e+05	1.5e+04	3.5e+03		3.1e+07	
14 October	3.0e+05	1.5e+04	3.7e+03		3.1e+07	
15 October	4.1e+05	1.4e+04	3.5e+03		1.6e+07	
16 October	1.6e+05	1.4e+04	3.4e+03		1.7e+06	
17 October	1.2e+05	1.3e+04	3.3e+03		2.6e+06	

### *Daily Geomagnetic Data*

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
11 October	10	1-2-2-3-4-2-2-2	49	0-0-4-6-6-7-5-3	20	1-2-3-4-5-4-3-2
12 October	7	3-2-2-1-2-1-1-2	15	2-3-3-3-4-4-1-2	10	3-3-3-1-2-3-2-2
13 October	3	1-1-1-1-0-1-1-1	4	2-1-1-2-2-1-0-0	4	2-1-2-1-1-1-1-1
14 October	0	1-0-0-0-0-0-0-0	0	0-0-0-0-0-0-0-0	2	1-0-0-0-0-0-0-1
15 October	3	0-1-0-1-1-1-1-2	3	0-0-0-1-3-0-1-0	5	0-1-0-1-1-1-3-1
16 October	3	1-1-1-0-1-1-2-1	5	1-0-1-0-2-3-1-2	6	1-2-1-0-1-1-3-2
17 October	10	2-3-4-2-1-1-2-2	22	2-2-6-5-4-1-1-1	11	2-3-4-3-1-0-2-3

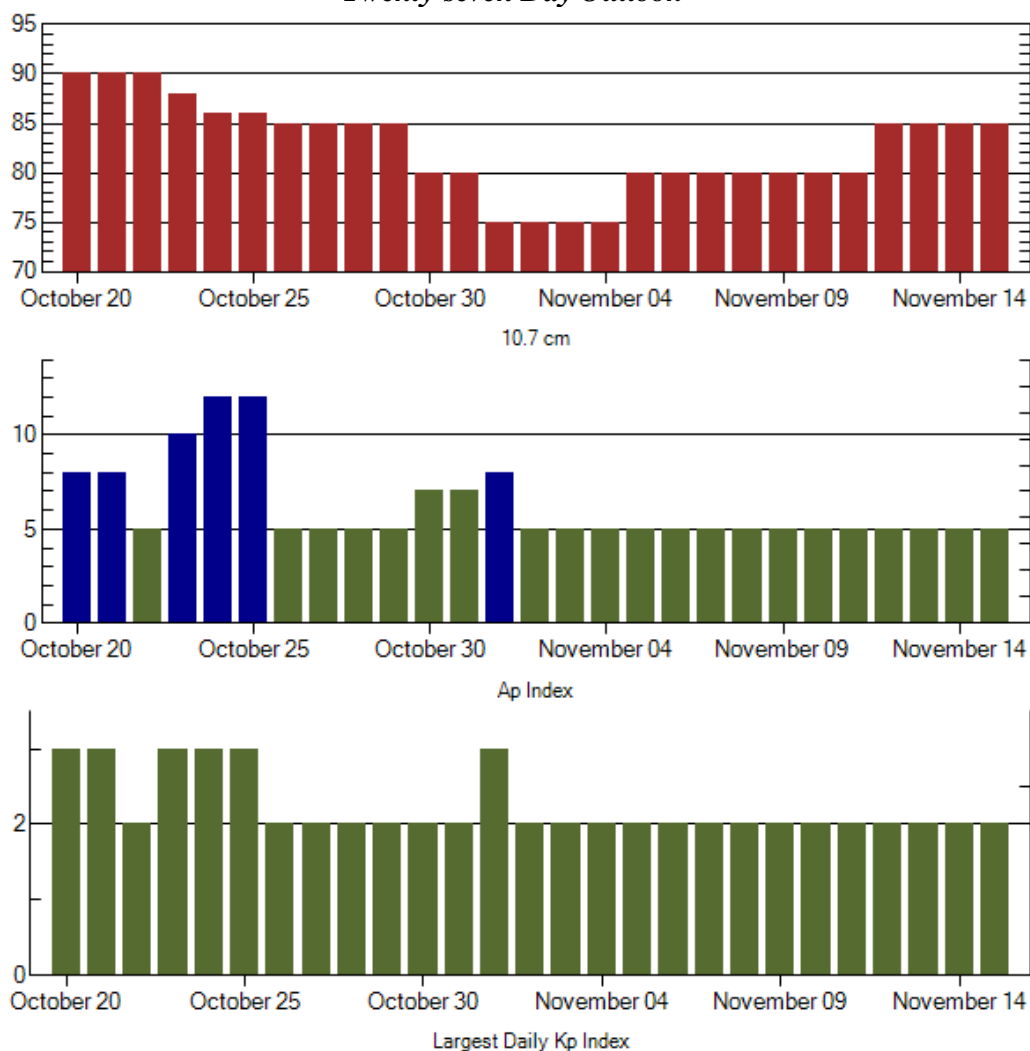


### *Alerts and Warnings Issued*

Date & Time of Issue	Type of Alert or Warning	Date & Time of Event UTC
11 Oct 1116	ALERT: Geomagnetic K = 4	11 Oct 1058
11 Oct 1118	WARNING: Geomagnetic K = 4	11 Oct 1120 - 1800
11 Oct 1320	ALERT: Geomagnetic K = 4	11 Oct 1317
11 Oct 1335	WARNING: Geomagnetic K = 5	11 Oct 1330 - 12/0300
11 Oct 1351	ALERT: Geomagnetic K = 5	11 Oct 1351
13 Oct 1833	ALERT: Electron 2MeV Integral Flux $\geq$ 1000pfu	13 Oct 1615
16 Oct 1938	SUMMARY: 10cm Radio Burst	16 Oct 1910 - 1911
16 Oct 1950	ALERT: Type II Radio Emission	16 Oct 1916
17 Oct 0519	WARNING: Geomagnetic K = 4	17 Oct 0520 - 1600
17 Oct 0702	ALERT: Geomagnetic K = 4	17 Oct 0700
17 Oct 0709	WARNING: Geomagnetic K = 5	17 Oct 0707 - 1600
17 Oct 0745	ALERT: Geomagnetic K = 5	17 Oct 0744



## 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
20 Oct	90	8	3	03 Nov	75	5	2
21	90	8	3	04	75	5	2
22	90	5	2	05	80	5	2
23	88	10	3	06	80	5	2
24	86	12	3	07	80	5	2
25	86	12	3	08	80	5	2
26	85	5	2	09	80	5	2
27	85	5	2	10	80	5	2
28	85	5	2	11	80	5	2
29	85	5	2	12	85	5	2
30	80	7	2	13	85	5	2
31	80	7	2	14	85	5	2
01 Nov	75	8	3	15	85	5	2
02	75	5	2				



### ***Energetic Events***

Date	Time			X-ray		Optical Information			Peak		Sweep Freq	
	½			Integ		Imp/	Location	Rgn	Radio Flux		Intensity	
	Begin	Max	Max	Class	Flux	Brtns	Lat CMD	#	245	2695	II	IV
16 Oct	1907	1912	1915	M2.9	0.006	1N	S20W26	1112	290	140	3	

### ***Flare List***

Date	Time			X-ray Class.	Optical		Rgn
	Begin	Max	End		Imp / Brtns	Location Lat CMD	
11 October	No Flares Observed						
12 October	No Flares Observed						
13 October	1140	1145	1150	B2.0			1113
	1159	1203	1206	B1.3			1113
	1448	1458	1506	B2.1			1113
	1600	1627	1643	B4.0			1113
	2207	2210	2213	B1.1			1113
14 October	1214	1217	1221	B3.9			1112
	1354	1359	1404	B3.4			1112
	1422	1426	1433	B3.9	SF	S18E6	1112
	1658	1703	1708	B2.1			1113
15 October	0748	0752	0755	B1.0			1115
	0813	0817	0821	B1.2			1113
	1303	1307	1313	B1.0			1113
	2254	2257	2306	B1.2			1112
16 October	0141	0146	0155	B2.6			1112
	1653	1703	1706	B7.2			1112
	1910	1913	1930	M2.9	1N	S20W26	1112
17 October	0008	0011	0013	B1.5			1112
	0026	0034	0038	B4.5			1112
	0826	0830	0833	B1.7			1112
	B0906	U0907	A0928	C1.7	SF	S19W31	1112
	B1033	U1100	A1120	B7.7	SF	S20W31	1112
	1323	1328	1335	B2.3			1112
	1737	1739	1753	C1.6	SF	S21W42	1112



## Region Summary

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	4
Region 1111															
29 Sep	N23E55	346	10	1	AXX	1	A								
30 Sep	N24E42	345	10	1	AXX	1	A								
01 Oct	N20E30	343	10	6	BXO	2	B								
02 Oct	N24E21	340	30	4	CRO	3	B								
03 Oct	N24E06	341	30	4	DRO	5	B								
04 Oct	N24W05	341	20	5	DSO	2	B								
05 Oct	N22W18	341			AXX	1	A								
06 Oct	N22W31	341													
07 Oct	N22W44	341													
08 Oct	N24W56	339		1	AXX	1	A								
09 Oct	N24W68	337													
10 Oct	N24W81	337													
								0	0	0	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 341

<i>Region 1112</i>															
09 Oct	S18E65	204	40	1	HRX	2	A								
10 Oct	S18E54	202	50	2	HRX	3	A				3				
11 Oct	S19E40	202	30	1	HRX	1	A								
12 Oct	S19E26	203	20	1	HSX	1	A								
13 Oct	S17E14	202	10	3	CRO	3	B								
14 Oct	S18E00	202	20	2	CRO	2	B				1				
15 Oct	S19W15	203	70	9	DRO	7	B								
16 Oct	S18W28	205	120	7	DSI	16	BG	1			1				
17 Oct	S20W44	208	180	12	EAI	16	BG	2			3				
								2	1	0	7	1	0	0	0

Still on Disk.

Absolute heliographic longitude: 202

<i>Region 1113</i>															
13 Oct	N17E76	141	120	1	HAX	1	A								
14 Oct	N17E63	141	100	2	HSX	1	A								
15 Oct	N17E50	140	130	3	HSX	1	A								
16 Oct	N17E36	141	130	3	HSX	1	A								
17 Oct	N18E23	141	160	2	HSX	2	A								
								0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 141



### 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	4	
Region 1114																
14 Oct	S22W41	244	10	2	AXX	1	A									
15 Oct	S21W55	244			BXO	2	B									
16 Oct	S21W68	244														
17 Oct	S21W81	244														
								0	0	0	0	0	0	0	0	

Still on Disk.

Absolute heliographic longitude: 244

<i>Region 1115</i>															
15 Oct	S28E63	130	170	4	HSX	1	A								
16 Oct	S28E50	127	170	4	HSX	1	A								
17 Oct	S28E37	127	140	3	HSX	1	A								
								0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 127

<i>Region 1116</i>															
17 Oct	N22W14	178	20	2	BXO	2	B								
								0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 178



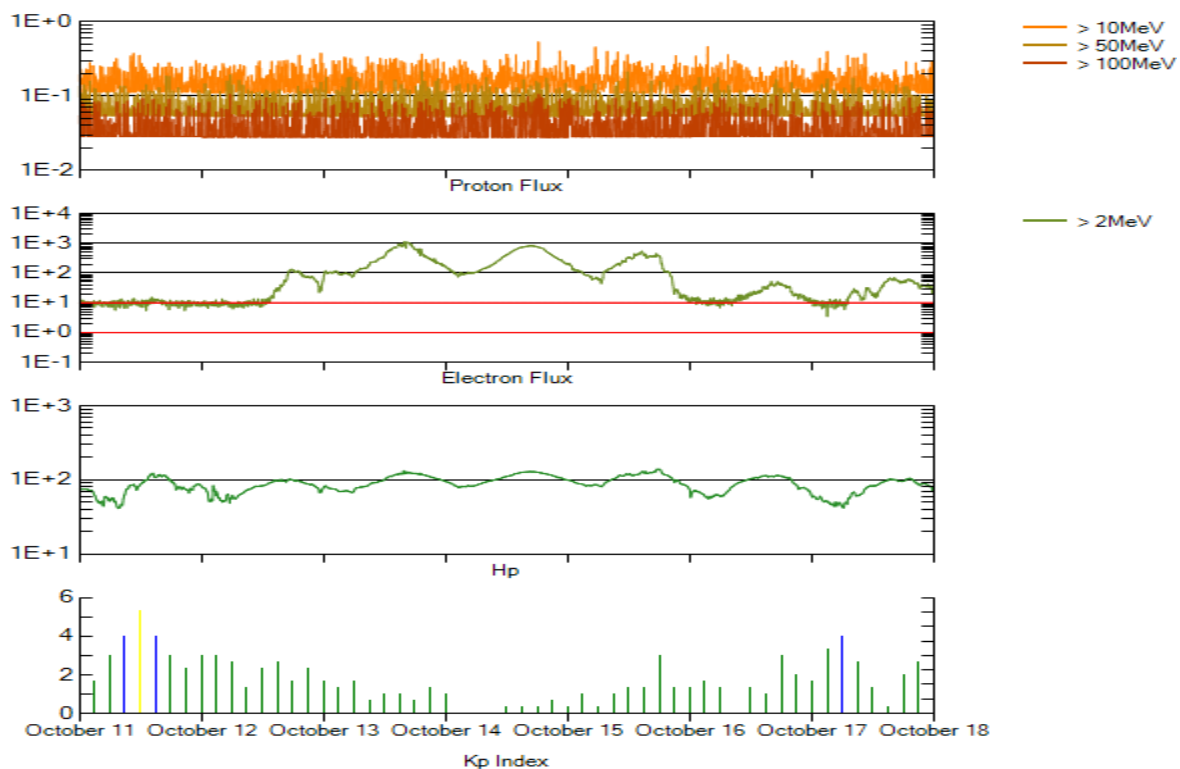


***Recent Solar Indices (preliminary)***  
***Of the observed monthly mean values***

Month	Sunspot Numbers					Radio Flux		Geomagnetic	
	Observed values	Ratio	Smooth values	SEC	RI	Penticton	Smooth	Planetary	Smooth
SEC	RI	RI/SEC	SEC	RI	10.7 cm	Value	Ap	Value	
2008									
October	5.2	2.9	0.56	2.9	1.8	68.3	68.2	7	5.4
November	6.8	4.1	0.60	2.7	1.7	68.6	68.3	4	5.1
December	1.3	0.8	0.62	2.7	1.7	69.2	68.5	4	4.9
2009									
January	2.8	1.3	0.46	3.0	1.8	69.8	68.7	4	4.7
February	2.5	1.4	0.56	3.1	1.9	70.0	68.8	5	4.7
March	0.7	0.7	1.00	3.4	2.0	69.2	69.0	5	4.6
April	1.2	0.8	1.00	3.7	2.2	69.7	69.3	4	4.3
May	3.9	2.9	0.74	3.8	2.3	70.5	69.7	4	4.1
June	6.6	2.9	0.39	4.4	2.7	68.6	70.2	4	4.0
July	5.0	3.2	0.70	5.8	3.6	68.2	71.0	4	3.9
August	0.3	0.0	0.00	7.7	4.8	67.4	72.1	5	3.8
September	6.6	4.3	0.64	9.9	6.2	70.5	73.3	4	3.8
October	7.0	4.8	0.66	11.3	7.1	72.3	74.1	3	4.1
November	7.7	4.1	0.55	12.4	7.6	73.6	74.5	3	4.5
December	15.7	10.8	0.68	13.6	8.3	76.8	74.9	2	4.8
2010									
January	21.3	13.2	0.62	14.8	9.3	81.1	75.5	3	5.0
February	31.0	18.8	0.60	16.7	10.6	84.7	76.5	5	5.1
March	24.7	15.4	0.62	19.1	12.3	83.3	77.5	5	5.3
April	11.2	7.9	0.71			75.9		10	
May	19.9	8.8	0.44			73.8		8	
June	17.9	13.5	0.75			72.6		7	
July	23.1	16.1	0.70			79.9		5	
August	28.2	19.6	0.70			79.7		8	
September	35.6	25.2	0.71			81.1		5	

**NOTE:** Values are final except for the most recent 6 months which are considered preliminary. Cycle 23 started in May 1996 with an RI=8.0. Cycle 23 maximum was April 2000 with an RI=120.8. Solar minimum, marking the start of Cycle 24, was December 2008.





*Weekly Geosynchronous Satellite Environment Summary*  
*Week Beginning 11 October 2010*

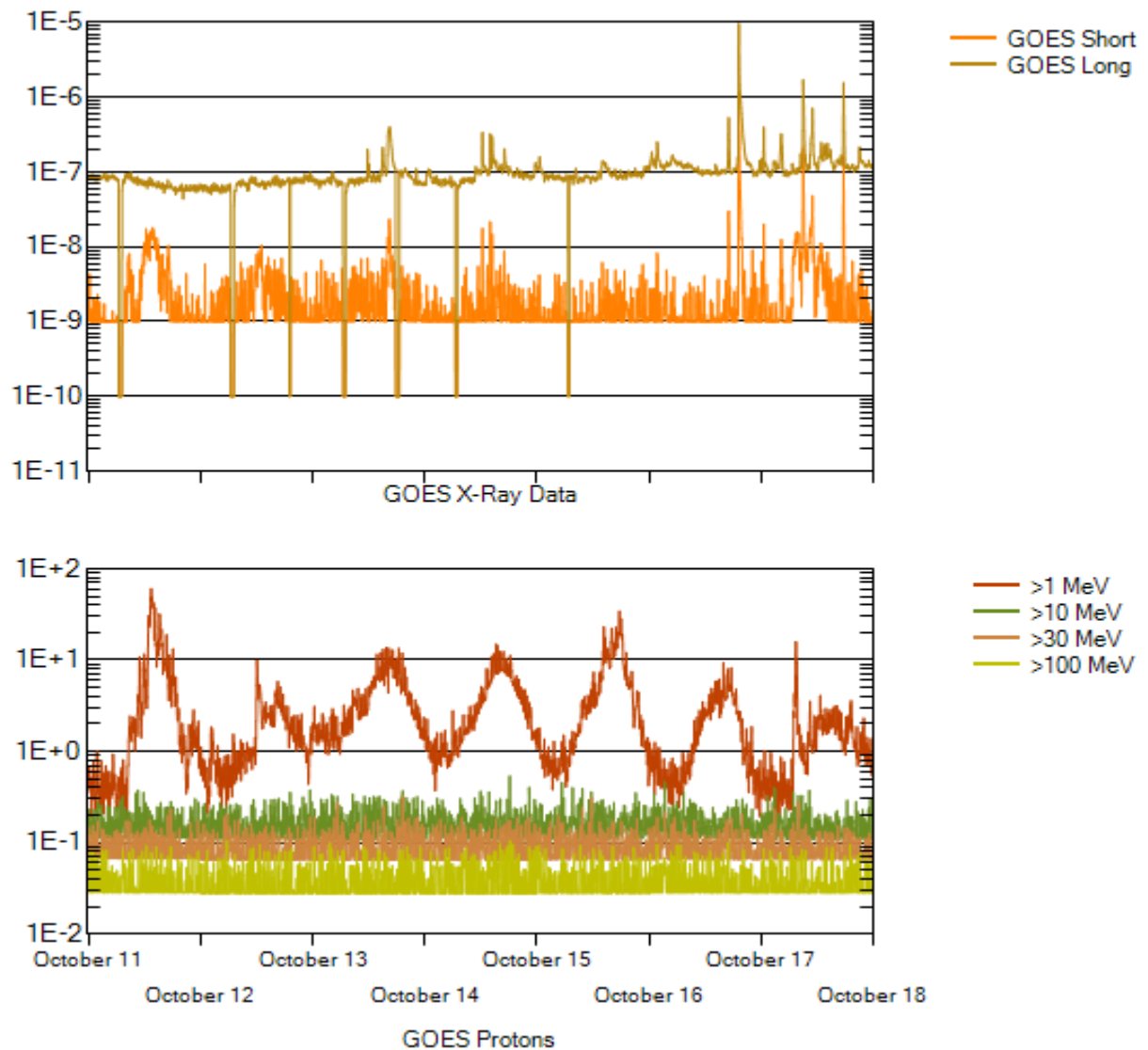
The proton flux plot contains the five-minute averaged integral proton flux (protons/cm<sup>2</sup>–sec–sr) as measured by GOES-13 (W75) for each of three energy thresholds: greater than 10, 50, and 100 MeV. The electron flux plot contains the five-minute averaged integral electron flux (electrons/cm<sup>2</sup>–sec–sr) with energies greater than 2 MeV at GOES-13.

The Hp plot contains the five minute averaged Hp magnetic field component in nanoteslas (nT) as measured by GOES-13. The Hp component is parallel to the spin axis of the satellite, which is nearly parallel to the Earth's rotation axis.

Kp 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 Kp values derived from a more extensive network of magnetometers.

The data included here are those now available in real time at the SWPC 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 Kp are “global” parameters that are applicable to a first order approximation over large areas. H parallel 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*

The x-ray plot contains five-minute averaged x-ray flux ( $\text{Watts/m}^2$ ) as measured by GOES 14 (W105) in two wavelength bands, 0.05 - 0.4 and 0.1 - 0.8 nm. The letters A, B, C, M and X refer to x-ray event levels for the 0.1 - 0.8 nm band.

The proton plot contains the five-minute averaged integral proton flux ( $\text{protons/cm}^2\text{-sec-sr}$ ) as measured by GOES-13 for each of the energy thresholds: >1, >10, >30 and >100 MeV. P10 event threshold is 10 pfu ( $\text{protons/cm}^2\text{-sec-sr}$ ) at greater than 10 MeV.

