

Space Weather Highlights
15 - 21 November 2010

SWPC PRF 1838
23 November 2010

Solar activity began the week at low levels with a C2/Sf flare from Region 1124 (N14, L=170, class/area Dki/260 on 15 November), which was the dominant region on the disk throughout the summary period. Activity for the remainder of the week, however, was very low, characterized by occasional B-class flares. Region 1124 quietly rotated off the disk on 20 November.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit reached high levels each day from 15-20 November and was at moderate levels on 21 November.

The geomagnetic field was mostly quiet with some isolated unsettled to active periods at some locations for 15-16 November. Generally quiet levels prevailed for 17-20 November. Quiet levels also predominated for 21 November with the exception of a weak substorm (unsettled at mid latitudes and active at high latitudes) from 0900-1200 UTC.

Space Weather Outlook
24 November – 20 December 2010

Solar activity is expected to be very low with just a slight chance for an isolated C-class event for 24 November through 03 December. There is a chance for an increase in C-class flare activity for 04-16 December with the return of longitudes associated with old Region 1124. Activity levels are expected to return to predominantly very low for the remainder of the interval from 17-20 December.

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 for 24 November – 12 December. An increase to high levels is possible for 13-15 December due to a recurrent high speed stream. Normal to moderate levels are expected for the remainder of the forecast period.

The geomagnetic field is expected to be predominantly quiet for 24 November – 10 December. A small increase to quiet to unsettled levels is possible for 11-14 December due to a recurrent high speed stream. Quiet levels should prevail for the remainder of the forecast period.



Daily Solar Data

Date	Radio	Sun	Sunspot	X-ray	Flares							
	Flux	spot	Area	Background	X-ray Flux			Optical				
	10.7 cm	No.	(10 ⁻⁶ hemi.)		C	M	X	S	1	2	3	4
15 November	91	62	330	B1.6	1	0	0	8	0	0	0	0
16 November	92	55	470	B1.6	0	0	0	0	0	0	0	0
17 November	91	61	400	B1.2	0	0	0	1	0	0	0	0
18 November	87	40	250	B1.2	0	0	0	0	0	0	0	0
19 November	84	37	330	B1.1	0	0	0	0	0	0	0	0
20 November	80	24	120	B1.1	0	0	0	0	0	0	0	0
21 November	78	25	80	A7.1	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)		
	>1 MeV	>10 MeV	>100 MeV	>.6 MeV	>2MeV	>4 MeV
15 November	4.4e+05	1.3e+04	3.1e+03		8.1e+07	
16 November	1.3e+06	1.4e+04	3.4e+03		8.5e+07	
17 November	2.1e+06	1.7e+04	6.3e+03		8.1e+07	
18 November	2.8e+06	1.7e+04	5.9e+03		8.7e+07	
19 November	1.8e+06	1.4e+04	3.4e+03		7.7e+07	
20 November	1.9e+06	1.4e+04	3.2e+03		6.6e+07	
21 November	1.7e+06	1.5e+04	3.6e+03		4.0e+07	

Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
15 November	5	1-3-1-2-1-1-0-2	8	2-1-3-4-2-0-0-2	7	2-3-1-2-1-1-1-3
16 November	4	3-0-0-1-1-2-1-1	8	2-1-0-3-4-3-0-0	6	3-1-0-1-2-3-1-1
17 November	3	1-2-1-1-1-1-0-0	2	0-2-1-0-0-0-1-0	4	1-3-1-0-1-1-0-1
18 November	4	0-2-1-2-2-1-1-0	4	0-2-1-3-1-1-1-0	5	1-2-1-1-1-1-2-1
19 November	2	1-1-0-1-1-0-0-0	1	0-0-1-1-0-0-0-0	2	1-1-0-0-1-1-0-0
20 November	2	0-0-2-1-1-0-0-0	1	0-0-1-0-1-0-0-0	2	0-0-1-0-0-0-0-0
21 November	2	1-0-0-2-1-0-1-1	5	0-0-0-4-2-1-1-0	3	1-0-0-2-1-0-0-1

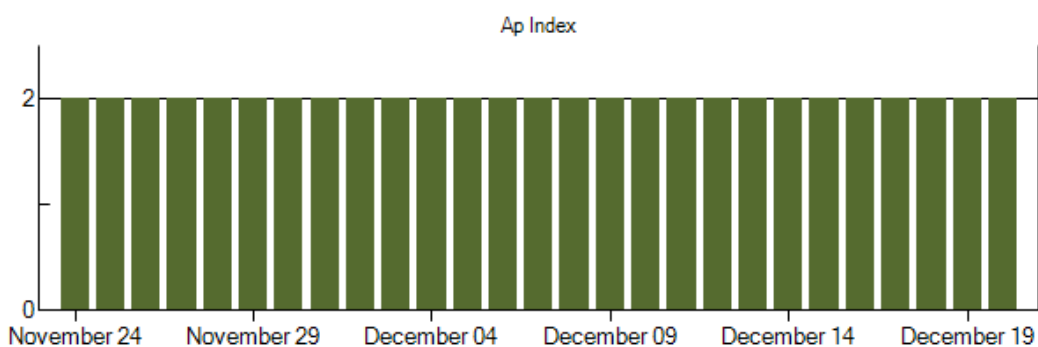
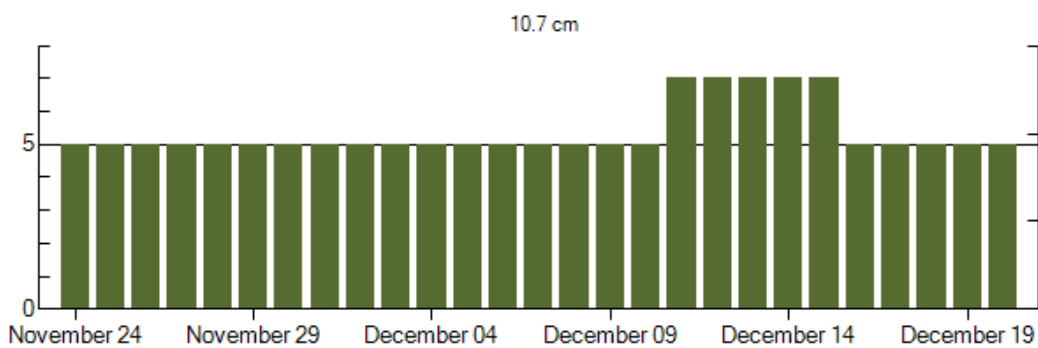
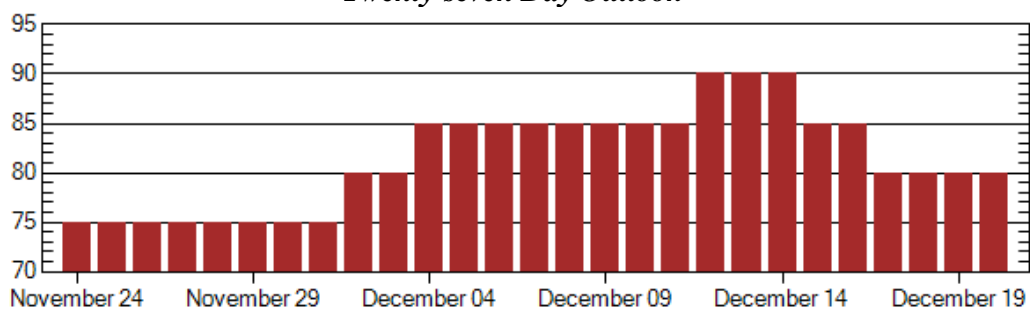


Alerts and Warnings Issued

Date & Time of Issue	Type of Alert or Warning	Date & Time of Event UTC
15 Nov 1142	CONTINUED ALERT: Electron 2MeV Integral Flux >= 1000pfu	13 Nov 1115
16 Nov 0217	WARNING: Geomagnetic K = 4	16 Nov 0218 - 1600
16 Nov 0735	CANCELLATION: Geomagnetic K = 4	
16 Nov 1236	CONTINUED ALERT: Electron 2MeV Integral Flux >= 1000pfu	13 Nov 1115
17 Nov 1000	CONTINUED ALERT: Electron 2MeV Integral Flux >= 1000pfu	13 Nov 1115
18 Nov 0950	CONTINUED ALERT: Electron 2MeV Integral Flux >= 1000pfu	13 Nov 1115
19 Nov 1321	CONTINUED ALERT: Electron 2MeV Integral Flux >= 1000pfu	13 Nov 1115
20 Nov 1150	CONTINUED ALERT: Electron 2MeV Integral Flux >= 1000pfu	13 Nov 1115



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
24 Nov	75	5	2	08 Dec	85	5	2
25	75	5	2	09	85	5	2
26	75	5	2	10	85	5	2
27	75	5	2	11	85	7	2
28	75	5	2	12	90	7	2
29	75	5	2	13	90	7	2
30	75	5	2	14	90	7	2
01 Dec	75	5	2	15	85	7	2
02	80	5	2	16	85	5	2
03	80	5	2	17	80	5	2
04	85	5	2	18	80	5	2
05	85	5	2	19	80	5	2
06	85	5	2	20	80	5	2
07	85	5	2				



Energetic Events

Date	Time		X-ray		Optical Information			Peak		Sweep Freq	
	$\frac{1}{2}$		Integ		Imp/	Location	Rgn	Radio Flux		Intensity	
	Begin	Max	Max	Class	Brtns	Lat CMD	#	245	2695	II	IV

No Events Observed

Flare List

Date	Time			X-ray	Imp /	Optical		Rgn
	Begin	Max	End			Location	Lat CMD	
15 November	0331	0332	0340	B9.2	SF	N12W19		1124
	0600	0602	0604		SF	N14W21		1124
	0608	0610	0611		SF	N14W21		1124
	0626	0626	0629		SF	S34E42		1126
	0731	0747	0813	C2.3	SF	N12W22		1124
	0919	0920	0927		SF	S48E28		1126
	0935	0937	0940		SF	N12W23		1124
	1032	1036	1039	B3.1				1124
	1117	1154	1218	B9.5				1124
	1436	1442	1448	B7.6				1123
	2055	2059	2102	B4.5				1126
	2225	2230	2234	B8.3				1126
	0306	0317	0330		SF	N12W19		1124
16 November	0033	0038	0044	B4.5				1126
	0258	0302	0304	B3.8				1123
	0710	0715	0720	B3.6				1126
	2241	2255	2300	B3.0				
	2332	2345	2353	B3.0				1127
17 November	0020	0023	0025		SF	N14W45		1124
	0028	0040	0047	B2.5				1124
	0435	0438	0440	B7.8				1126
	0807	0812	0816	B3.4				1123
18 November	0255	0258	0301	B1.8				
	0648	0653	0657	B4.0				1124
	1007	1010	1013	B2.0				1124
	1137	1140	1142	B3.3				1124
	1303	1307	1315	B2.4				1126
	2047	2051	2055	B2.5				
19 November	0652	0657	0701	B2.0				
	1152	1155	1157	B2.0				
20 November	0421	0428	0439	B2.8				1124
	1130	1134	1140	B1.8				1124
21 November	2047	2052	2055	B2.2				1124
	2150	2153	2157	B1.5				



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	2	3	4
Region 1121															
03 Nov	S20E84	218						1							
04 Nov	S20E70	218	10	1	AXX	7	A	1	1		1				
05 Nov	S18E58	215	70	11	CRO	7	B	1	1		2				
06 Nov	S18E48	211	80	13	EAI	9	B	4	1		2	1			
07 Nov	S18E36	211	90	13	ESI	11	BG	1				1			
08 Nov	S19E20	213	50	13	ERO	12	BG								
09 Nov	S19E07	212	50	12	EAO	9	B								
10 Nov	S20W01	207	10	3	AXX	3	A								
11 Nov	S23W28	217						1							
12 Nov	S23W41	217													
13 Nov	S23W54	217													
14 Nov	S23W67	217													
15 Nov	S23W80	217													
								9	3	0	5	2	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 207

<i>Region 1123</i>															
10 Nov	S23E16	193	30	6	DRO	8	B				5				
11 Nov	S22E03	190	80	5	DAI	12	B	5			4				
12 Nov	S22W10	192	50	6	DAI	15	B	5			3				
13 Nov	S23W24	191	50	5	CRO	7	B	2			2				
14 Nov	S22W37	191	10	6	BXO	7	B								
15 Nov	S22W48	189	10	1	AXX	1	A								
16 Nov	S22W61	189													
17 Nov	S25W79	193	0	0	AXX	1	A								
								12	0	0	14	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 190



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			S	Optical			
		Lon						C	M	X		1	2	3	4
Region 1124															
10 Nov	N14E38	168	20	3	DRO	2	B								
11 Nov	N16E27	164	15	7	CAO	3	B				3				
12 Nov	N14E12	169	30	4	DAO	8	B								
13 Nov	N14W03	171	80	6	DSI	11	B								
14 Nov	N14W17	171	100	8	DSI	15	B				1				
15 Nov	N14W30	170	260	9	DKI	13	B	1			6				
16 Nov	N13W44	172	260	9	DSO	7	B								
17 Nov	N14W58	172	220	11	ESI	9	B				1				
18 Nov	N14W71	172	150	12	ESO	5	B								
19 Nov	N19W85	173	200	13	ESO	2	B								
								1	0	0	11	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 171

<i>Region 1125</i>															
11 Nov	N19E34	160	15	2	CRO	3	B								
12 Nov	N19E23	156	10	5	BXO	3	B								
13 Nov	N19E08	160	30	3	CRO	3	B				2				
14 Nov	N18W06	160	10	4	BXO	5	B								
15 Nov	N18W21	162	10	1	AXX	1	A								
16 Nov	N20W43	159	10	2	AXX	2	A								
17 Nov	N20W56	159													
18 Nov	N20W69	159													
19 Nov	N20W82	159													
								0	0	0	2	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 160



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
Region 1126															
12 Nov	S28E73	108	10	3	DSO	2	B								
13 Nov	S30E59	109	30	2	CRO	2	B								
14 Nov	S30E47	108	30	3	CRO	2	B								
15 Nov	S31E33	108	50	6	DRO	7	B				2				
16 Nov	S32E20	107	80	6	DAO	5	B								
17 Nov	S31E07	108	90	9	DAI	10	B								
18 Nov	S31W07	108	40	7	DSO	4	B								
19 Nov	S31W19	107	40	7	DSO	4	B								
20 Nov	S32W30	105	50	8	CAO	3	B								
21 Nov	S32W44	106	20	8	BXO	4	B								
								0	0	0	2	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 108

<i>Region 1127</i>															
16 Nov	N25E71	55	120	2	HSX	1	A								
17 Nov	N25E56	59	90	2	HSX	1	A								
18 Nov	N25E43	58	60	1	HSX	1	A								
19 Nov	N24E30	58	90	2	HSX	1	A								
20 Nov	N24E18	57	70	2	HSX	1	A								
21 Nov	N25E05	57	60	2	HSX	1	A								
								0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 57



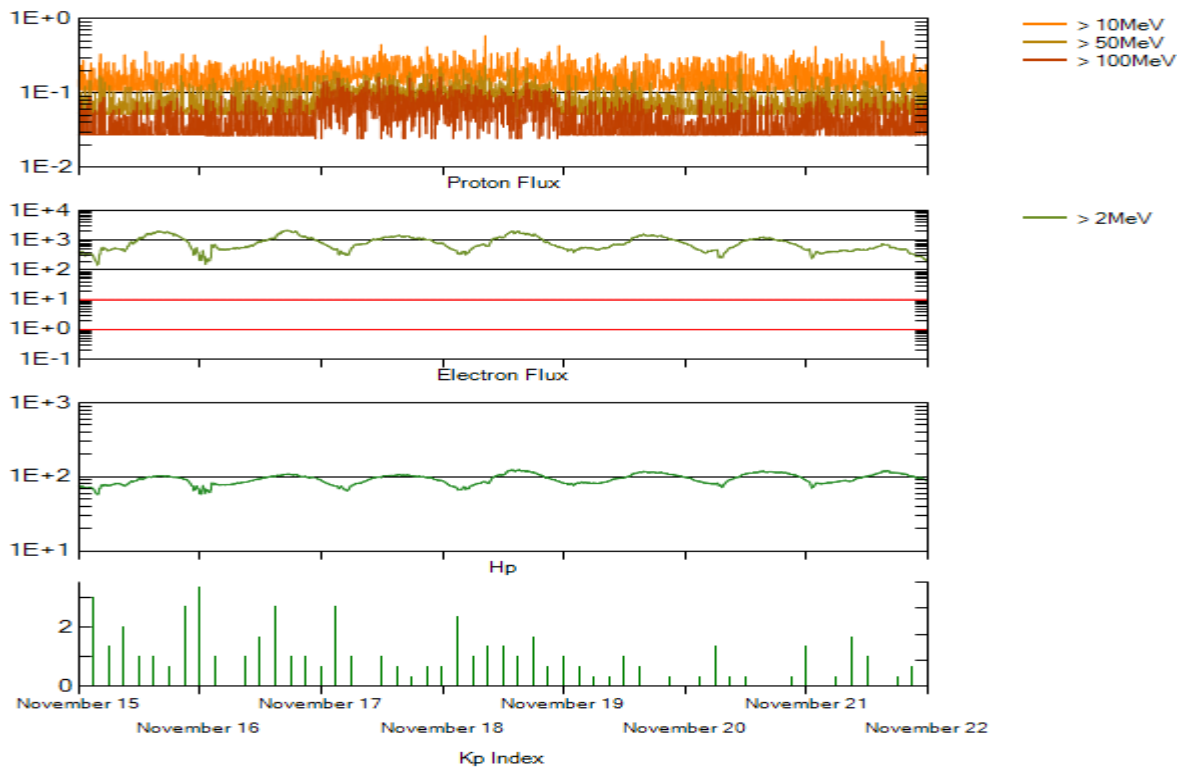
Recent Solar Indices (preliminary)

Of the observed monthly mean values

Month	Sunspot Numbers					Radio Flux		Geomagnetic	
	Observed values	Ratio	Smooth values			Penticton	Smooth	Planetary	Smooth
	SEC	RI	RI/SEC	SEC	RI	10.7 cm	Value	Ap	Value
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	8.0	0.71	21.4	14.0	75.9	78.3	10	5.5
May	19.9	8.7	0.44			73.8		8	
June	17.9	13.6	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	
October	35.0	23.5	0.67			81.6		6	

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 15 November 2010

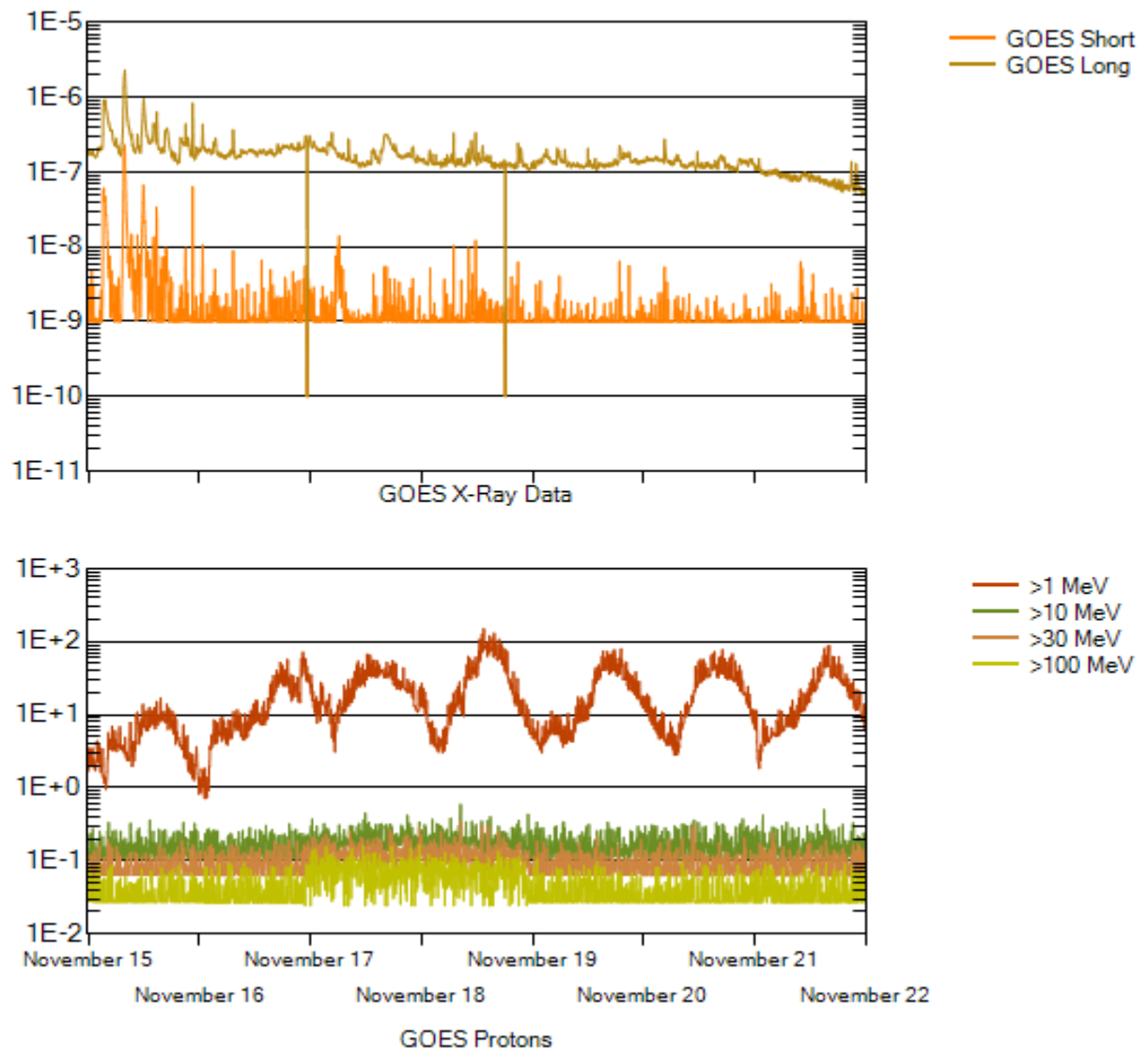
The proton flux plot contains the five-minute averaged integral proton flux (protons/cm²–sec–sr) as measured by GOES-13 (W75) for each of three energy thresholds: greater than 10, 50, and 100 MeV. The electron flux plot contains the five-minute averaged integral electron flux (electrons/cm²–sec–sr) with 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 (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.

