

Space Weather Highlights
17 – 23 January 2011

SWPC PRF 1847
25 January 2011

Solar activity was at very low levels from 17 - 20 January. Region 1147 (N24, L=342, class/area Cso/170 on 20 January) was responsible for the majority of the activity during this period producing numerous B-class events. Region 1149 (N18, L=344, class/area Dsi/170 on 22 January) emerged late on 20 January and immediately started producing B-class events. Activity increased to low levels during 20 - 22 January as Region 1149 grew into a beta-gamma magnetic classification. Eight C-class flares were observed during this period with a majority coming from Region 1149. Region 1149 also produced the largest flare of the period which was a C3/Sf at 0416 UTC on 21 January. Activity decreased to very low levels on 23 January as both regions became quiet and stable.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit was normal to moderate levels throughout the period.

Geomagnetic field activity ranged from predominantly quiet levels at lower latitudes to a few periods at minor storm levels at high latitudes. Mostly quiet periods predominated from 17 - 18 January. On 19 January, a recurrent coronal hole high speed stream (CH HSS) moved into a geoeffective position. Observations from the ACE spacecraft indicated an increase in solar wind velocities from around 400km/s - 530km/s with the Bz component of the interplanetary magnetic field generally varying between +/- 6 nT. Two periods at minor storm levels were observed at high latitudes on 19/0900-1500 UTC in response to the CH HSS. Predominantly quiet levels were observed for the rest of the summary period as the effects of the CH HSS waned.

Space Weather Outlook
26 January – 21 February 2011

Solar activity is expected to be at very low to low levels during 26 - 30 January. Very low levels are expected for the remainder of the period.

No proton events are expected at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to be at normal levels during 26 January - 04 February. Moderate to high levels are expected from 04 - 09 February. A return to normal to moderate levels is expected for the remainder of the period.

Geomagnetic field activity is expected to be at predominantly quiet levels from 26 January - 02 February. Field activity is expected to increase to quiet to unsettled levels during 02 - 05 February due to a recurrent CH HSS. Predominantly quiet levels are expected to prevail for the remainder of the period.



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
17 January	82	36	170	A9.0	0	0	0	0	0	0	0	0
18 January	81	34	190	A5.7	0	0	0	0	0	0	0	0
19 January	81	28	140	A5.7	0	0	0	0	0	0	0	0
20 January	82	32	190	A6.8	0	0	0	0	0	0	0	0
21 January	88	42	160	B1.1	7	0	0	3	0	0	0	0
22 January	88	36	240	B1.0	1	0	0	0	0	0	0	0
23 January	84	38	260	A7.7	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
	17 January	5.2e+05	1.4e+04	3.3e+03		2.2e+07
18 January	8.7e+05	1.4e+04	3.5e+03		3.3e+07	
19 January	6.2e+05	1.4e+04	3.4e+03		1.4e+07	
20 January	2.8e+05	1.4e+04	3.6e+03		1.8e+07	
21 January	4.5e+05	1.4e+04	3.4e+03		2.0e+07	
22 January	3.8e+05	1.4e+04	3.5e+03		1.4e+07	
23 January	2.9e+05	1.4e+04	3.5e+03		1.6e+07	

Daily Geomagnetic Data

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

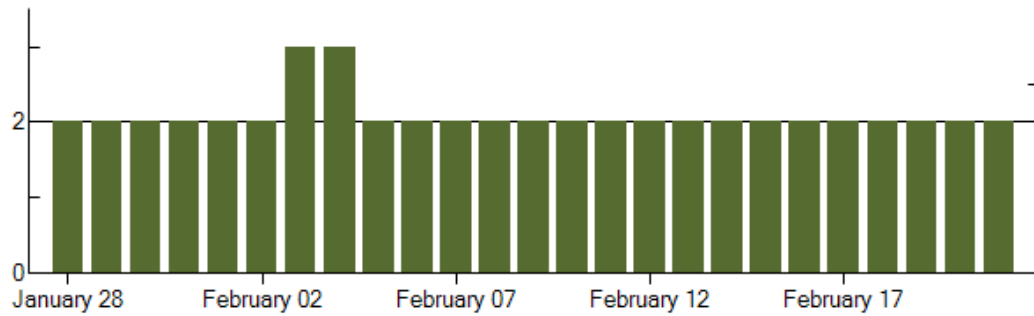
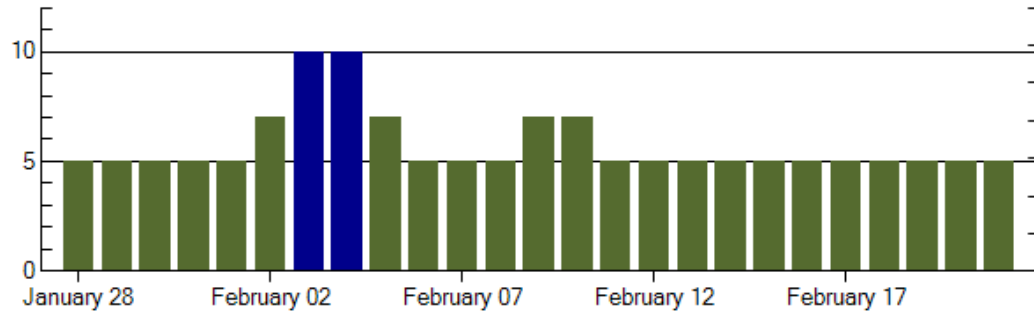
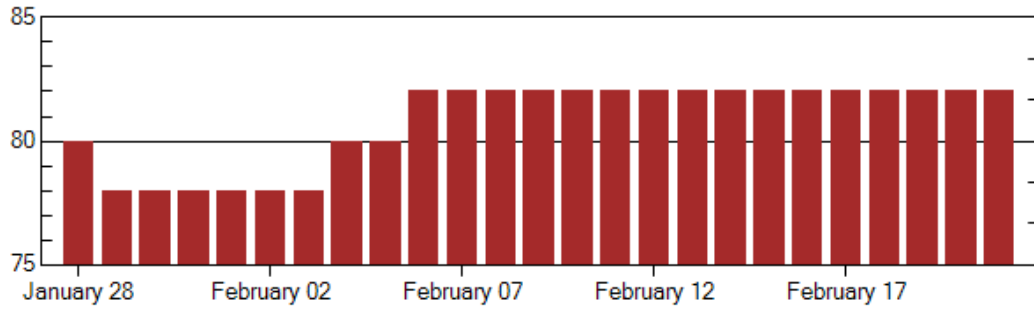


Alerts and Warnings Issued

Date & Time of Issue	Type of Alert or Warning	Date & Time of Event UTC
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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
26 Jan	82	5	2	09 Feb	82	7	2
27	82	5	2	10	82	7	2
28	80	5	2	11	82	5	2
29	78	5	2	12	82	5	2
30	78	5	2	13	82	5	2
31	78	5	2	14	82	5	2
01 Feb	78	5	2	15	82	5	2
02	78	7	2	16	82	5	2
03	78	10	3	17	82	5	2
04	80	10	3	18	82	5	2
05	80	7	2	19	82	5	2
06	82	5	2	20	82	5	2
07	82	5	2	21	82	5	2
08	82	5	2				



Energetic Events

Date	Time		X-ray	Optical Information			Peak		Sweep Freq	
	Begin	Max	Integ	Imp/	Location		Radio Flux		Intensity	
			Class	Flux	Brtns	Lat	CMD	#	245	2695

No Events Observed

Flare List

Date	Time			X-ray Class.	Imp/ Brtns	Optical		Rgn
	Begin	Max	End			Location	Lat	
17 January	0326	0329	0332	B1.1				1147
	0626	0634	0642	B4.1				1147
	0940	0944	0957	B1.5				1147
	1153	1200	1208	B3.4				1147
	1249	1255	1307	B2.9				1147
	1315	1319	1321	B2.6				1147
	1709	1720	1728	B2.2				1147
	2026	2029	2032	B1.4				1147
	2145	2151	2159	B5.8				1147
	2324	2340	2351	B2.2				1147
18 January	1835	1856	1909	B1.7				1147
	0127	0144	0154	B2.0				1147
	0225	0228	0231	B1.9				1147
19 January	0313	0356	0422	B1.8				1147
	0109	0121	0127	B1.1				1147
	0217	0223	0232	B1.4				1147
20 January	0844	0847	0850	B1.0				1147
	2336	2343	2347	B2.5				1147
	1450	1457	1501	B4.2				1147
21 January	2021	2027	2031	B1.1				1147
	2257	2303	2306	B2.9				1149
	2349	2355	2358	B2.4				1149
	0232	0238	0250	B2.7				1149
	0417	0417	0426	C3.3	SF	N17E06		1149
21 January	0650	0701	0710	B9.5				1149
	0951	0957	1012	B4.5				1149
	1044	1055	1100	B4.5				1149
	1150	1153	1155	B3.9				1149
	1205	1215	1220	C1.0				1149
	1424	1438	1449	C1.4				1149
	1517	1521	1525	C1.1				1147
	1709	1712	1717	C2.2	SF	N18W01		1149
	1857	1910	1930	C1.1				1149
	2029	2033	2037	C1.3	SF	N18W04		1149
2326	2336	2340	B3.2				1149	



Flare List - continued

Date	Time			X-ray Class.	Imp/ Brtns	Optical	Rgn
	Begin	Max	End			Location Lat CMD	
22 January	0109	0114	0126	B1.7			1149
	0156	0200	0206	B1.5			1149
	0625	0628	0634	B1.4			
	0801	0828	0848	C2.4			1149
	1132	1138	1147	B3.7			1149
	1313	1321	1333	B4.3			1149
	1907	1910	1917	B1.7			1149
	2214	2226	2240	B2.3			1149
23 January	0110	0113	0115	B2.3			1149
	0940	0953	1007	B2.6			1149
	1150	1153	1200	B2.0			1149
	1225	1229	1232	B1.4			1149
	1809	1820	1833	B2.8			1149
	2345	2350	2354	B1.6			1147

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

Region 1145

09 Jan	N15E39	97	10	4	BXO	4	B										
10 Jan	N16E27	98	10	5	BXO	3	B										
11 Jan	N16E14	98															
12 Jan	N16E01	98															
13 Jan	N16W12	98															
14 Jan	N16W25	100		1	AXX	1	A										
15 Jan	N16W43	100															
16 Jan	N16W56	100															
17 Jan	N16W69	100															
18 Jan	N16W82	100															

0 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 98



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 1146

10 Jan	N23E46	77		1	AXX	1	A										
11 Jan	N23E33	76	10	2	BXO	3	B										
12 Jan	N24E19	78	10	2	BXO	2	B										
13 Jan	N23E06	76	10	3	BXO	4	B										
14 Jan	N23W06	76															
15 Jan	N23W19	76															
16 Jan	N23W32	76															
17 Jan	N23W45	76															
18 Jan	N23W58	76															
19 Jan	N23W71	76															
20 Jan	N23W84	76															
																	0 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 76

Region 1147

15 Jan	N24E80	344	120	1	HRX	1	A										
16 Jan	N27E65	339	120	6	DSO	5	B										
17 Jan	N25E52	339	150	11	CSO	12	B										
18 Jan	N26E37	340	160	13	CSO	12	BG										
19 Jan	N25E22	343	130	9	CSO	7	BG										
20 Jan	N24E09	342	170	9	CSO	9	B										
21 Jan	N24W07	345	90	5	HSX	2	A	1									
2 Jan	N24W22	347	90	2	HSX	1	A										
23 Jan	N24W36	348	80	2	HSX	1	A										
																	1 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 345

Region 1148

17 Jan	S28W32	65	20	5	BXO	4	B										
18 Jan	S28W46	63	30	4	CRO	2	B										
19 Jan	S28W57	62	10	1	AXX	1	A										
20 Jan	S28W72	63	20	2	BXO	3	A										
21 Jan	S34W83	63															
																	0 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 65



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							
<i>Region 1149</i>																						
21 Jan	N18W05	343	70	7	DRI	20	BG	5				3										
22 Jan	N18W19	344	150	8	DSI	15	BG	1														
23 Jan	N18W32	344	180	9	DRI	17	B															
								6	0	0	0	3	0	0	0	0	0	0	0			

Still on Disk.

Absolute heliographic longitude: 343

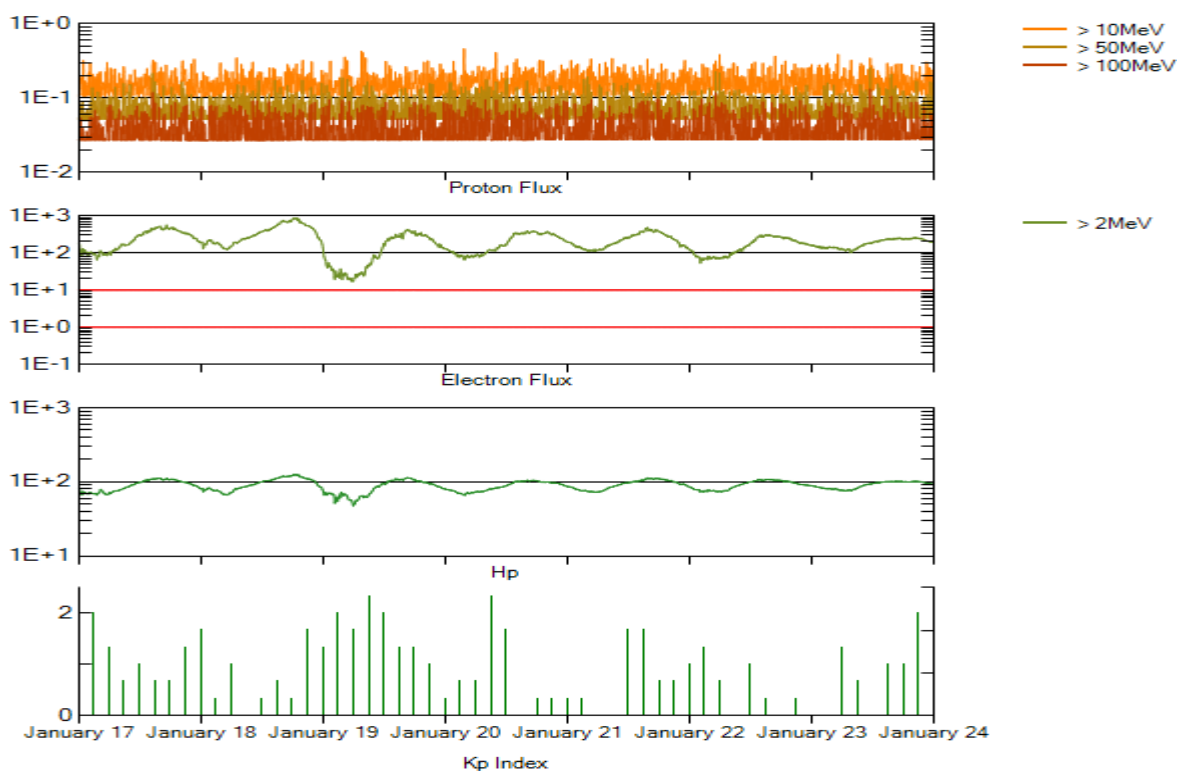


Recent Solar Indices (preliminary)
Of the observed monthly mean values

Month	Sunspot Numbers			Radio Flux		Geomagnetic			
	Observed SEC	values RI	Ratio RI/SEC	Smooth SEC	values RI	Penticton 10.7 cm	Smooth Value	Planetary Ap	Smooth Value
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	23.8	15.5	73.8	79.0	8	5.7
June	17.9	13.6	0.75	25.2	16.4	72.6	79.7	7	5.8
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	
November	36.1	21.6	0.60			82.5		5	
December	22.0	14.5	0.66			84.3		3	

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 for cycle 23 was December 2008.





*Weekly Geosynchronous Satellite Environment Summary
Week Beginning 17 January 2011*

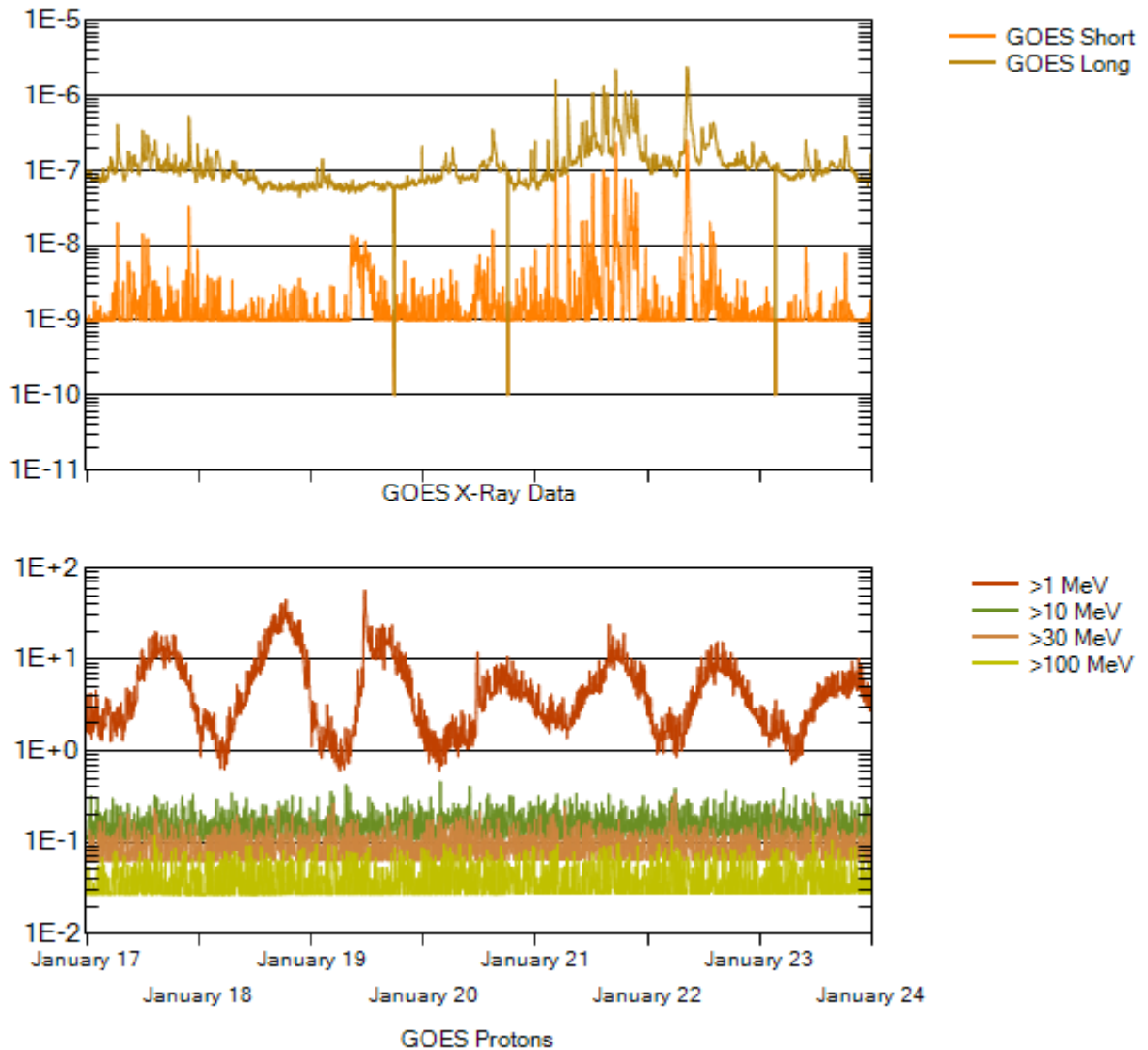
The proton flux plot contains the five-minute averaged integral proton flux (protons/cm²-sec -sr) as measured by GOES-13 (W75) for each of three energy thresholds: greater than 10, 50, and 100 MeV. The electron flux plot contains the five-minute averaged integral electron flux (electrons/cm²-sec -sr) 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
Week Beginning 17 January 2011

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.

