Space Weather Highlights **SWPC PRF 2208**
18 December - 24 December 2017 **25 December 2017**

Solar activity was at very low levels throughout the period. Region 2692 (N18, L=087, class/area=Eai/160 on 24 Dec) was the only active region with sunspots this period and produced multiple low and mid-level B-class flares throughout the week. No Earth-directed CMEs were observed.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit reached high levels on 18-23 Dec with moderate levels observed on 24 Dec.

Geomagnetic field activity reached active levels early on 18 Dec in response to the influence of a recurrent, positive polarity CH HSS. Quiet to unsettled conditions were observed on 19 and 23-24 Dec and generally quiet conditions were observed throughout the remainder of the week under a nominal solar wind regime.

Space Weather Outlook
25 December - 20 January 2018

Solar activity is expected to persist at very low levels throughout the period.

No proton events are expected at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to reach high levels on 26-30 Dec, 02-06 and 14-19 Jan. Normal and normal to moderate greater than 2 MeV electron flux values are expected throughout the remainder of the forecast period.

Geomagnetic field activity is likely to reach G1 (Minor) geomagnetic storm levels on 01 and 13 Jan with active levels expected on 25 Dec and 02, 08, 14 and 20 Jan under the influences of multiple, recurrent CH HSSs. Quiet and quiet to unsettled conditions are expected throughout the remainder of the forecast period.

Daily Solar Data

Date	Radio Flux 10.7cm	Sun spot No.	Sunspot Area (10^{-6} hemi.)	X-ray Background Flux	Flares						
					X-ray			Optical			
					C	M	X	S	1	2	3	4
18 December	72	0	0	A4.0	0	0	0	0	0	0	0	0
19 December	69	0	0	A4.1	0	0	0	0	0	0	0	0
20 December	74	16	70	A5.6	0	0	0	0	0	0	0	0
21 December	76	18	70	A5.8	0	0	0	0	0	0	0	0
22 December	75	18	70	A6.0	0	0	0	0	0	0	0	0
23 December	76	22	90	A5.7	0	0	1	0	0	0	0	0
24 December	76	22	160	A5.7	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	>0.6 MeV	>2MeV	>4 MeV
18 December		4.5e+06	1.6e+04	3.6e+03	1.7e+08	
19 December		1.8e+06	1.6e+04	3.7e+03	1.7e+08	
20 December		1.6e+06	1.6e+04	3.7e+03	1.7e+08	
21 December		1.3e+06	1.6e+04	3.8e+03	1.4e+08	
22 December		1.9e+06	1.6e+04	4.0e+03	1.4e+08	
23 December		2.0e+06	1.6e+04	4.0e+03	5.6e+07	
24 December		1.5e+06	1.6e+04	3.4e+03	9.3e+06	

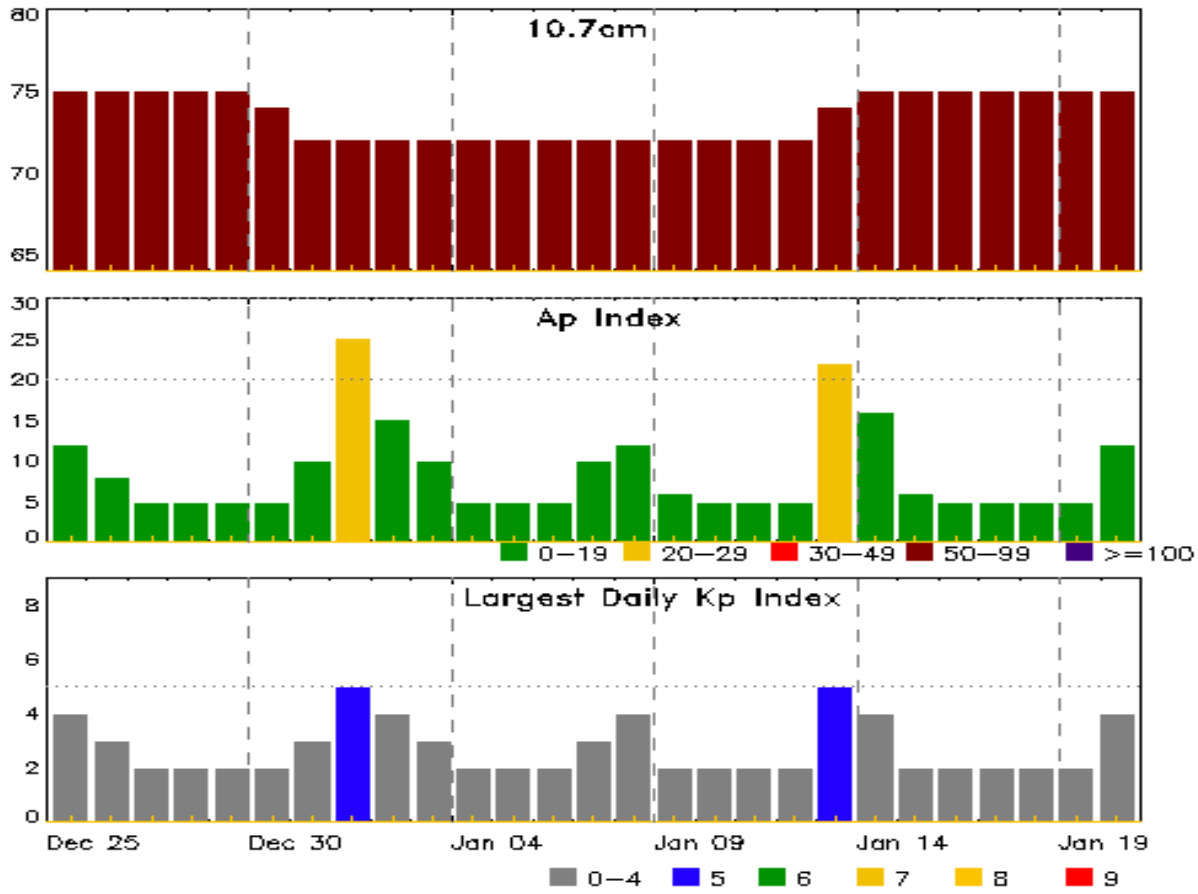
Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
18 December	12	3-3-4-3-2-2-1-1	37	3-5-7-5-4-2-2-1	17	4-4-4-3-3-2-2-1
19 December	4	1-1-1-0-1-2-2-2	2	0-0-0-0-1-2-1-1	6	1-1-1-1-1-2-2-3
20 December	3	1-2-1-1-1-1-1-0	12	2-2-4-5-2-1-0-0	5	2-2-1-2-1-1-2-0
21 December	2	0-1-0-1-1-1-0-0	6	0-0-1-4-3-1-0-0	3	1-1-1-1-1-1-0-0
22 December	2	0-1-1-0-0-1-1-1	0	0-0-0-0-1-0-0-0	2	0-1-1-0-0-0-0-1
23 December	4	1-2-1-2-1-0-2-1	6	0-1-1-4-3-0-0-0	5	1-3-2-2-1-0-1-1
24 December	9	1-2-2-2-3-2-2-3	32	0-1-2-7-5-5-2-1	5	1-2-2-3-3-3-3-3

Alerts and Warnings Issued

Date & Time of Issue UTC	Type of Alert or Warning	Date & Time of Event UTC
18 Dec 0225	EXTENDED WARNING: Geomagnetic K = 5	17/1900 - 18/1500
18 Dec 0225	EXTENDED WARNING: Geomagnetic K = 4	17/0445 - 18/2100
18 Dec 0900	CONTINUED ALERT: Electron 2MeV Integral Flux >= 1000pfu	17/2100
18 Dec 1950	CANCELLATION: Geomagnetic Storm Category G1 predicted	
19 Dec 0900	CONTINUED ALERT: Electron 2MeV Integral Flux >= 1000pfu	17/2100
20 Dec 1135	CONTINUED ALERT: Electron 2MeV Integral Flux >= 1000pfu	17/2100
21 Dec 1155	CONTINUED ALERT: Electron 2MeV Integral Flux >= 1000pfu	17/2100
22 Dec 1155	CONTINUED ALERT: Electron 2MeV Integral Flux >= 1000pfu	17/2100
23 Dec 1903	CONTINUED ALERT: Electron 2MeV Integral Flux >= 1000pfu	17/2100
24 Dec 1341	WARNING: Geomagnetic K = 4	24/1340 - 25/0600

Twenty-seven Day Outlook



Date	Radio Flux 10.7cm	Planetary A Index	Largest Kp Index	Date	Radio Flux 10.7cm	Planetary A Index	Largest Kp Index
25 Dec	75	12	4	08 Jan	72	12	4
26	75	8	3	09	72	6	2
27	75	5	2	10	72	5	2
28	75	5	2	11	72	5	2
29	75	5	2	12	72	5	2
30	74	5	2	13	74	22	5
31	72	10	3	14	75	16	4
01 Jan	72	25	5	15	75	6	2
02	72	15	4	16	75	5	2
03	72	10	3	17	75	5	2
04	72	5	2	18	75	5	2
05	72	5	2	19	75	5	2
06	72	5	2	20	75	12	4
07	72	10	3				

Energetic Events

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

No Events Observed

Flare List

	Time				Optical		
Date	Begin	Max	End	X-ray Class	Imp/ Brtns	Location Lat CMD	Rgn #
19 Dec	1952	1958	2003	B2.4			2692
20 Dec	0756	0800	0806	B1.6			2692
20 Dec	1814	1822	1827	B3.0			2692
20 Dec	2049	2053	2101	B1.2			2692
20 Dec	2328	2331	2334	B1.0			2692
21 Dec	2325	2330	2334	B1.2			2692
22 Dec	0017	0021	0023	B1.7			2692
22 Dec	0111	0115	0117	B3.3			2692
22 Dec	0140	0150	0205	B7.2			2692
22 Dec	0228	0231	0233	B2.4			2692
22 Dec	0243	0250	0306	B4.7			2692
22 Dec	0331	0336	0344	B2.6			2692
22 Dec	0403	0406	0408	B1.2			2692
22 Dec	0628	0631	0636	B1.5			2692
22 Dec	1136	1140	1144	B3.0			2692
23 Dec	0624	0629	0631	B3.3	SF	N17E19	2692
23 Dec	2033	2036	2043	B1.0			2692

Region Summary

	Location		Sunspot Characteristics					Flares							
		Helio	Area	Extent	Spot	Spot	Mag	X-ray			Optical				
Date	Lat CMD	Lon	10^{-6} hemi.	(helio)	Class	Count	Class	C	M	X	S	1	2	3	4
		Region 2691													
10 Dec	S03E42	221	10	1	Axx	1	A								
11 Dec	S03E29	220	10	1	Bxo	3	B								
12 Dec	S03E16	220	10	4	Bxo	3	B								
13 Dec	S03E01	222	plage												
14 Dec	S03W12	222	plage												
15 Dec	S03W25	222	plage												
16 Dec	S03W38	222	plage												
17 Dec	S03W52	222	plage												
18 Dec	S03W67	224	plage												
19 Dec	S03W82	226	plage												
								0	0	0	0	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 222

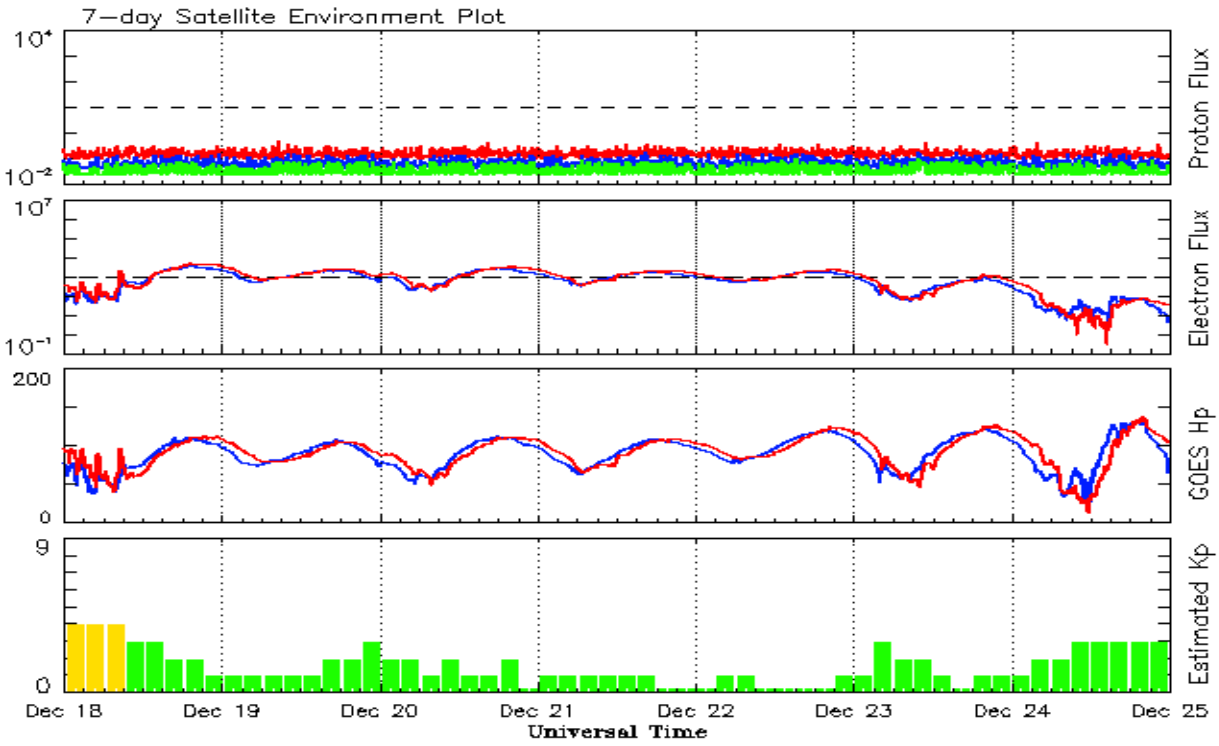
		Region 2692													
20 Dec	N16E45	86	70	4	Cao	6	B								
21 Dec	N18E30	88	70	8	Dao	8	B								
22 Dec	N18E16	89	70	8	Dao	8	B								
23 Dec	N18E03	87	90	10	Dao	12	B				1				
24 Dec	N18W09	87	160	12	Eai	12	B								
								0	0	0	1	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 87

Recent Solar Indices (preliminary)
Observed monthly mean values

	Sunspot Numbers					Radio Flux		Geomagnetic	
	Observed values		Ratio	Smooth values		Penticton	Smooth	Planetary	Smooth
Month	SEC	RI	RI/SEC	SEC	RI	10.7 cm	Value	Ap	Value
				2015					
December	54.1	34.8	0.64	55.1	34.7	112.8	102.5	15	12.5
				2016					
January	50.4	34.2	0.67	51.4	32.6	103.5	99.9	10	12.3
February	56.0	33.8	0.61	49.6	31.5	103.5	98.1	10	12.0
March	40.9	32.5	0.80	47.7	30.2	91.6	96.6	11	11.8
April	39.2	22.7	0.58	45.0	28.7	93.4	95.3	10	11.8
May	48.9	30.9	0.64	42.1	26.9	93.1	93.2	12	11.7
June	19.3	12.3	0.65	39.0	24.9	81.9	90.4	9	11.4
July	36.8	19.4	0.53	36.5	23.1	85.9	87.7	10	11.2
August	50.4	30.1	0.60	34.2	21.6	85.0	85.5	10	11.2
September	37.4	26.8	0.72	32.1	19.9	87.8	83.7	16	11.3
October	30.0	20.0	0.67	31.1	18.9	86.1	82.5	16	11.6
November	22.4	12.8	0.57	29.4	17.9	78.7	81.1	10	11.6
December	17.6	11.1	0.64	28.1	17.1	75.1	80.0	10	11.4
				2017					
January	28.1	15.7	0.55	27.3	16.7	77.4	79.4	10	11.3
February	22.0	15.8	0.71	25.5	15.9	76.9	78.7	10	11.3
March	25.4	10.6	0.42	24.6	15.5	74.6	78.6	15	11.5
April	30.4	19.4	0.64	24.3	14.9	80.9	78.4	13	11.5
May	18.1	11.3	0.62	23.1	14.0	73.5	77.7	9	11.3
June	18.0	11.5	0.64			74.8		7	
July	18.8	11.0	0.59			77.7		9	
August	25.0	19.9	0.80			77.9		12	
September	42.2	26.2	0.62			92.0		19	
October	16.0	7.9	0.49			76.4		11	
November	7.7	3.4	0.44			72.1		11	

Note: Values are final except for the most recent 6 months which are considered preliminary. Cycle 24 started in Dec 2008 with an RI=1.7.



Weekly Geosynchronous Satellite Environment Summary
Week Beginning 18 December 2017

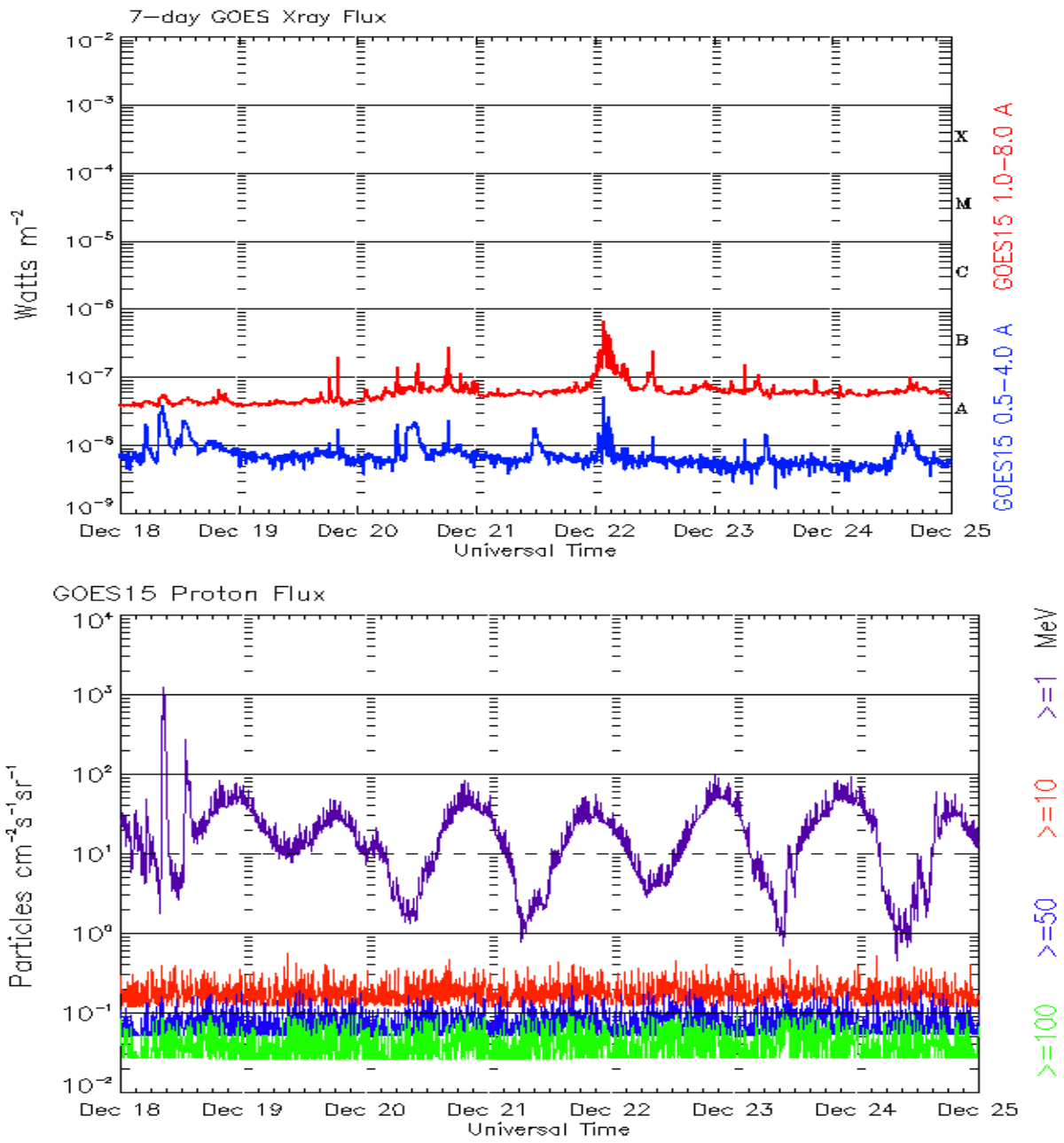
The proton flux plot contains the five-minute averaged integral proton flux (protons/cm^2-sec -sr) as measured by the SWPC Primary GOES satellite, near West 75, for each of three energy thresholds: greater than 10, 50, and 100 MeV.

The electron flux plot contains the five-minute averaged integral electron flux (electrons/cm^2-sec -sr) with energies greater than 2 MeV by the SWPC Primary GOES satellite.

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

The Estimated 3-hour Planetary Kp-index is derived at the NOAA Space Weather Prediction Center using data from the following ground-based magnetometers: Boulder, Colorado; Chambon la Foret, France; Fredericksburg, Virginia; Fresno, California; Hartland, UK; Newport, Washington; Sitka, Alaska. These data are made available thanks to the cooperative efforts between SWPC and data providers around the world, which currently includes the U.S. Geological Survey, the British Geological Survey, and the Institut de Physique du Globe de Paris.

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 18 December 2017

The x-ray plots contains five-minute averages x-ray flux (Watt/m^2) as measure by the SWPC primary GOES X-ray satellite, usually at West 105 longitude, 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 intergral flux units (pfu = protons/cm^2 -sec -sr) as measured by the primary SWPC GOES Proton satellite for each of the energy thresholds: >1, >10, >30, and >100 MeV. The P10 event threshold is 10 pfu at greater than 10 MeV.

Preliminary Report and Forecast of Solar Geophysical Data (The Weekly)

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Notice: The 27-day Outlook, Satellite Environment, X-ray and Proton plots have been redesigned. Comments and suggestions are welcome SWPC.Webmaster@noaa.gov

The Weekly has been published continuously since 1951 and is available online since 1997.

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