

Space Weather Highlights
24 December - 30 December 2018

SWPC PRF 2261
31 December 2018

Solar activity was very low throughout the period. No Earth-directed CMEs were observed this period.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit reached high levels on 29-30 December, with moderate levels on 24-25, and 28 December. Normal levels were observed on 26-27 December.

Geomagnetic field activity reached G1 (Minor) storm levels on 28 December and quiet to unsettled levels on 27, 29-30 December in response to recurrent CH HSS influence. Quiet conditions prevailed on 24-26 December.

Space Weather Outlook
31 December - 26 January 2019

Solar activity is expected to be very low throughout the outlook 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 31 December, 01-03, 06-12, and 25-26 January with moderate flux levels expected on 04-05, 13-21, and 24 January. Normal levels are expected throughout the remainder of the period.

Geomagnetic field activity is expected to reach G1 (Minor) storm levels on 24 January, with active levels expected on 04-06, and 16 January due to recurrent CH HSS effects. Quiet to unsettled conditions are expected throughout the remainder of the outlook 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
24 December	70	0	0	A0.0	0	0	0	0	0	0	0	0	0
25 December	70	0	0	A0.0	0	0	0	0	0	0	0	0	0
26 December	69	0	0	A0.0	0	0	0	0	0	0	0	0	0
27 December	69	0	0	A0.0	0	0	0	0	0	0	0	0	0
28 December	69	0	0	A1.0	0	0	0	0	0	0	0	0	0
29 December	69	0	0	A1.1	0	0	0	0	0	0	0	0	0
30 December	69	0	0	A1.1	0	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
24 December		9.7e+05	1.7e+04	4.0e+03		1.4e+07
25 December		1.2e+06	1.6e+04	3.5e+03		6.7e+06
26 December		9.4e+05	1.7e+04	3.9e+03		1.4e+06
27 December		2.1e+06	1.8e+04	3.9e+03		1.8e+06
28 December		2.5e+06	1.7e+04	4.0e+03		1.8e+06
29 December		1.7e+06	1.7e+04	3.5e+03		6.5e+07
30 December		1.6e+06	1.7e+04	4.0e+03		1.2e+08

Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
24 December	3	1-0-0-1-2-2-1-1	1	0-0-0-0-1-0-1-0	4	1-0-0-1-1-1-1-1
25 December	4	1-2-0-0-2-2-1-1	2	0-0-0-0-2-2-0-0	4	1-2-0-0-1-1-1-1
26 December	2	0-1-0-1-1-1-1-0	4	0-0-0-1-4-1-0-0	3	1-0-0-1-1-1-1-0
27 December	5	2-2-0-0-2-2-1-2	1	0-0-1-0-0-0-0-1	5	1-2-1-0-0-1-1-3
28 December	19	4-4-4-3-3-2-3-3	26	1-3-5-5-5-4-3-2	24	4-4-5-3-4-3-4-3
29 December	9	2-2-3-2-3-2-2-2	20	2-2-5-5-4-3-2-0	11	3-3-3-2-3-2-2-2
30 December	7	1-3-2-2-2-2-1-1	13	1-1-4-4-4-2-1-1	5	1-3-3-2-2-3-2-2

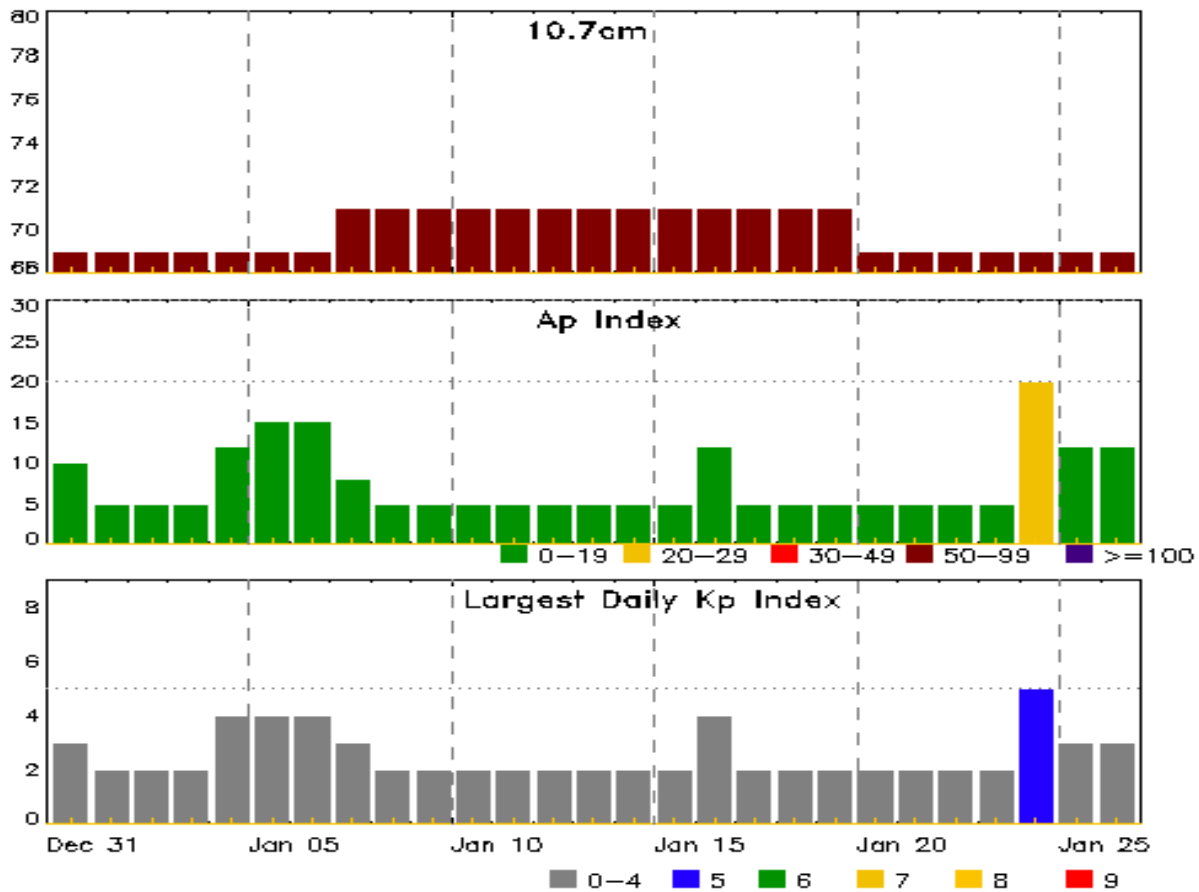


Alerts and Warnings Issued

Date & Time of Issue UTC	Type of Alert or Warning	Date & Time of Event UTC
28 Dec 0222	WARNING: Geomagnetic K = 4	28/0220 - 0600
28 Dec 0249	ALERT: Geomagnetic K = 4	28/0249
28 Dec 0555	EXTENDED WARNING: Geomagnetic K = 4	28/0220 - 1500
28 Dec 0610	WARNING: Geomagnetic K = 5	28/0610 - 1200
28 Dec 0900	ALERT: Geomagnetic K = 5	28/0859
28 Dec 1408	EXTENDED WARNING: Geomagnetic K = 4	28/0220 - 2359
28 Dec 2104	EXTENDED WARNING: Geomagnetic K = 4	28/0220 - 29/0600
29 Dec 1630	ALERT: Electron 2MeV Integral Flux ≥ 1000 pfu	29/1615
30 Dec 1426	CONTINUED ALERT: Electron 2MeV Integral Flux ≥ 1000 pfu	29/1615



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
31 Dec	69	10	3	14 Jan	71	5	2
01 Jan	69	5	2	15	71	5	2
02	69	5	2	16	71	12	4
03	69	5	2	17	71	5	2
04	69	12	4	18	71	5	2
05	69	15	4	19	71	5	2
06	69	15	4	20	69	5	2
07	71	8	3	21	69	5	2
08	71	5	2	22	69	5	2
09	71	5	2	23	69	5	2
10	71	5	2	24	69	20	5
11	71	5	2	25	69	12	3
12	71	5	2	26	69	12	3
13	71	5	2				

Energetic Events

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

No Events Observed

Flare List

Date	Time			Optical			
	Begin	Max	End	X-ray Class	Imp/ Brtns	Location Lat CMD	Rgn #
26 Dec	0944	0946	0948	A2.1			
29 Dec	1316	1317	1318	A1.1			



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 2731															
14 Dec	N13E49	23	10	5	Bxo	2	B								
15 Dec	N13E35	24	10	1	Axx	2	A								
16 Dec	N13E21	25	plage												
17 Dec	N13E07	26	plage												
18 Dec	N13W07	27	plage												
19 Dec	N13W21	28	plage												
20 Dec	N13W35	28	plage												
21 Dec	N13W49	29	plage												
22 Dec	N13W63	30	plage												
23 Dec	N13W77	31	plage												
24 Dec	N13W91	32	plage												
								0	0	0	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 26

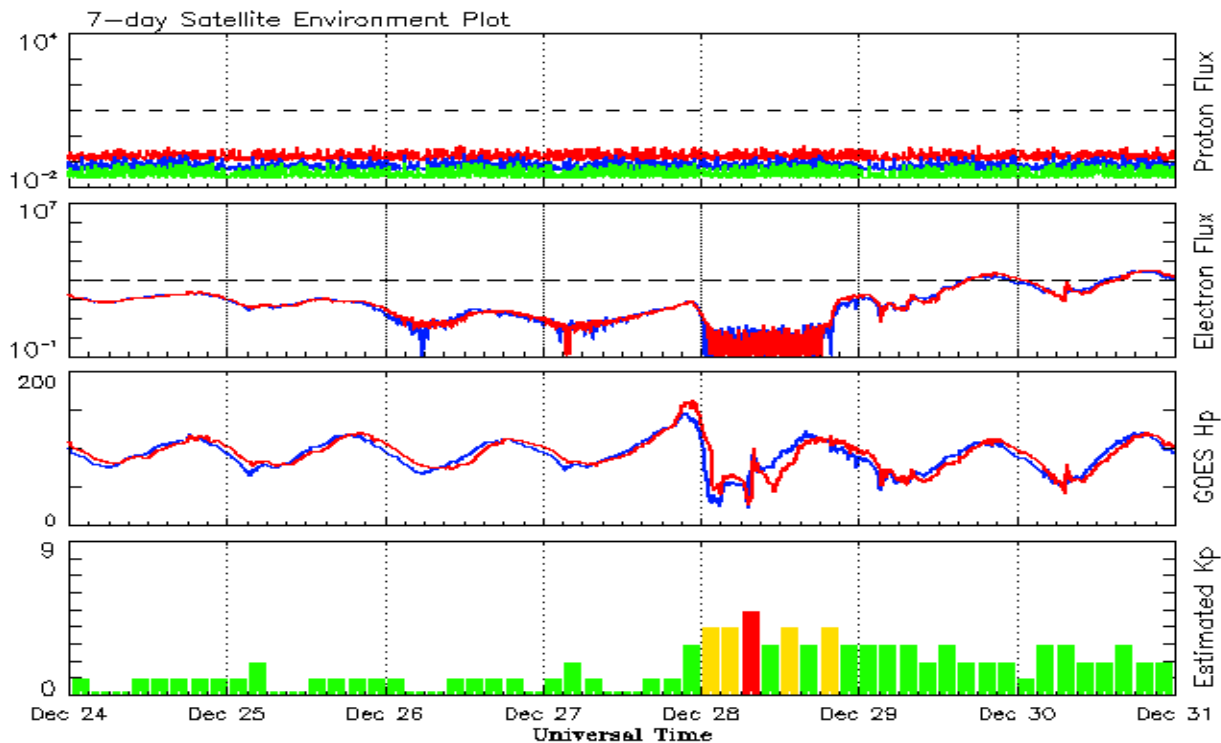


Recent Solar Indices (preliminary)
Observed monthly mean values

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
2016									
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	15.4	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	22.0	13.3	74.8	77.3	7	11.3
July	18.8	10.7	0.59	20.8	12.6	77.7	76.8	9	11.0
August	25.0	19.6	0.80	19.7	11.8	77.9	76.3	12	10.7
September	42.2	26.2	0.62	18.6	11.0	92.0	75.9	19	10.3
October	16.0	7.9	0.49	16.8	10.0	76.4	75.1	11	9.8
November	7.7	3.4	0.44	15.7	9.2	72.1	74.6	11	9.5
December	7.6	4.9	0.64	15.7	9.1	71.5	74.4	8	9.4
2018									
January	7.8	4.1	0.51	15.0	8.5	70.0	74.0	6	9.3
February	16.0	6.4	0.40	13.7	7.6	72.0	73.3	7	9.1
March	6.0	1.5	0.25	11.5	5.9	68.4	71.9	8	8.6
April	7.0	5.3	0.76	9.6	4.7	70.0	70.6	7	8.0
May	15.0	7.9	0.53	9.2	4.5	70.9	70.2	8	7.6
June	19.7	9.4	0.48			72.5		7	
July	1.3	1.0	0.77			69.7		6	
August	10.0	5.3	0.53			69.1		10	
September	5.7	2.0	0.35			68.3		9	
October	6.9	2.9	0.42			69.5		7	
November	7.3	3.5	0.48			68.9		6	

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 24 December 2018*

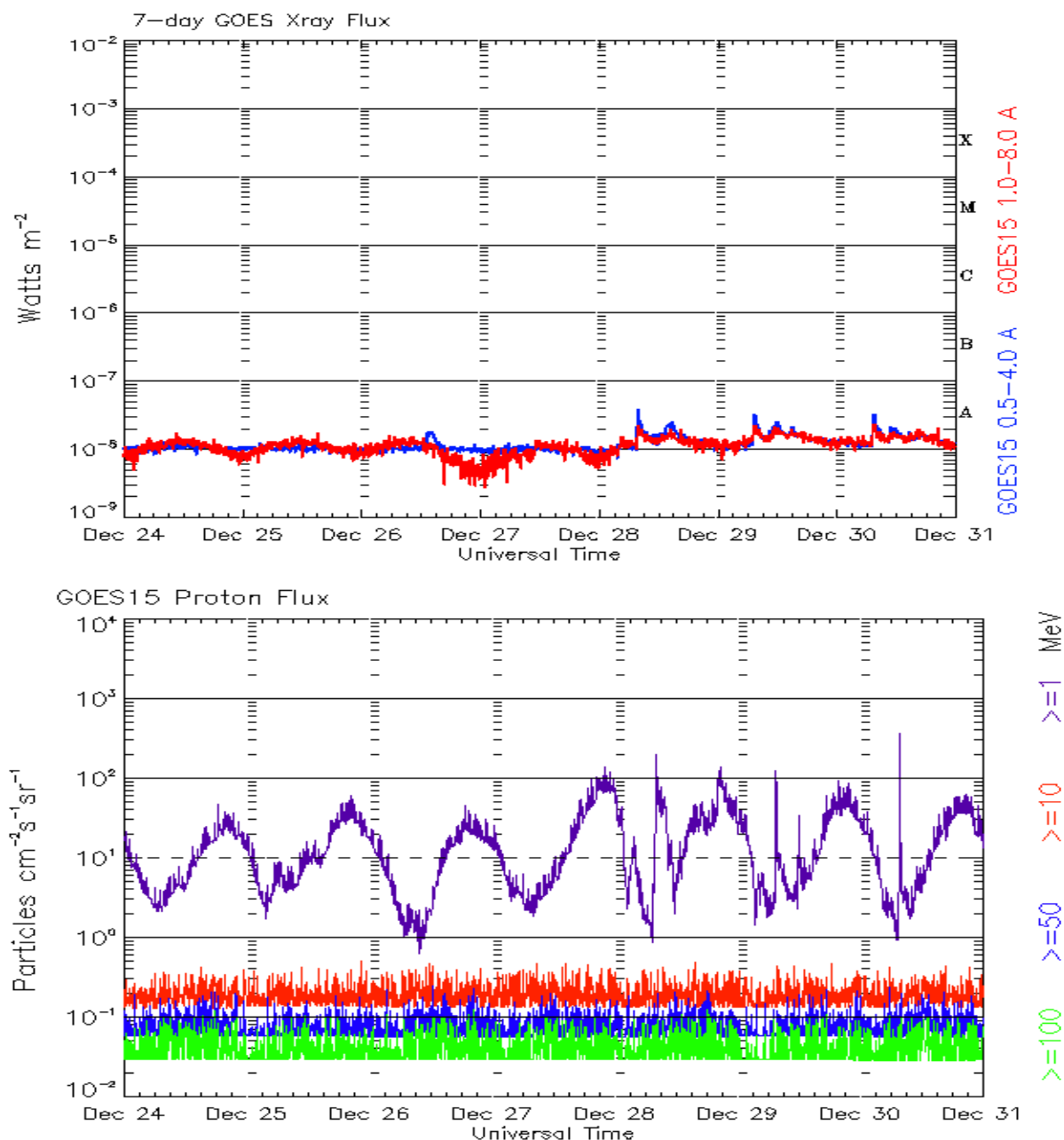
The proton flux plot contains the five-minute averaged integral proton flux (protons/cm²-sec -sr) as measured by the SWPC Primary GOES satellite, near West 75, for each of three energy thresholds: greater than 10, 50, and 100 MeV.

The electron flux plot contains the five-minute averaged integral electron flux (electrons/cm²-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. Hp 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 24 December 2018*

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 integral 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.



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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

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