

Space Weather Highlights
18 November - 24 November 2019

SWPC PRF 2308
25 November 2019

Solar activity was very low. No sunspots were observed on the visible disk. No Earth-directed CMEs were observed in available coronagraph imagery.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit was at normal to moderate levels on 18-23 Nov. Moderate to high levels were observed on 24 Nov in response to the influence of a positive polarity CH HSS.

Geomagnetic field activity ranged from quiet to active levels. Quiet to active levels were observed on 21-22 Nov and quiet to unsettled on 23-24 Nov due to influence from a positive polarity CH HSS. Solar wind speeds increased to above 600 km/s over 21 Nov and remained elevated but in slow decline through 24 Nov. The remainder of the reporting period was at quiet levels under nominal solar wind conditions.

Space Weather Outlook
25 November - 21 December 2019

Solar activity is expected to be at very low levels 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 be at normal to high levels. High levels are expected on 25-28 Nov and again on 20-21 Dec. Moderate levels are expected on 01-17 Dec. All enhancements to electron flux are anticipated in response to multiple CH HSSs.

Geomagnetic field activity is expected to range from quiet unsettled. Unsettled conditions are expected on 25-28 Nov, 08 Dec, and 18-21 Dec in response to multiple CH HSSs. The remainder of the outlook period is expected to be at quiet levels.



Daily Solar Data

Date	Radio	Sun	Sunspot	X-ray		Flares							
	Flux	spot	Area	Background		X-ray			Optical				
	10.7cm	No.	(10 ⁻⁶ hemi.)	Flux		C	M	X	S	1	2	3	4
18 November	70	0	0	A7.4	0	0	0	0	0	0	0	0	0
19 November	69	0	0	A7.2	0	0	0	0	0	0	0	0	0
20 November	70	0	0	A7.2	0	0	0	0	0	0	0	0	0
21 November	71	0	0	A7.4	0	0	0	0	0	0	0	0	0
22 November	70	0	0	A7.8	0	0	0	0	0	0	0	0	0
23 November	70	0	0	A7.9	0	0	0	0	0	0	0	0	0
24 November	71	0	0	A8.1	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
18 November		2.7e+05	2.1e+04	3.9e+03		7.7e+06
19 November		3.1e+05	2.2e+04	3.9e+03		1.1e+07
20 November		4.8e+05	2.2e+04	4.0e+03		1.3e+07
21 November		7.3e+05	2.2e+04	3.9e+03		5.7e+06
22 November		6.8e+05	2.2e+04	4.0e+03		1.3e+07
23 November		5.0e+05	2.0e+04	3.8e+03		2.6e+07
24 November		4.4e+05	2.2e+04	3.9e+03		5.4e+07

Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
18 November	1	0-0-0-0-1-1-1-0	0	0-0-0-1-0-0-0-0	2	0-0-0-0-0-0-1-0
19 November	1	0-1-0-0-0-1-1-0	0	0-0-0-0-0-0-0-0	2	0-1-0-0-0-1-1-0
20 November	1	0-1-0-0-0-1-0-1	0	0-0-0-0-0-0-0-1	2	0-1-0-0-0-0-0-1
21 November	7	2-2-1-1-2-2-2-3	9	0-0-1-3-3-3-2-3	12	2-2-2-2-2-3-3-4
22 November	8	3-1-2-2-2-2-2-2	19	4-1-2-5-4-3-3-2	13	4-2-2-2-3-3-3-2
23 November	7	2-1-2-3-2-1-2-2	15	1-1-3-0-5-0-0-2	10	3-2-2-3-3-2-3-2
24 November	8	3-2-3-2-1-2-1-2	15	2-2-3-4-5-2-1-1	18	3-3-3-2-2-3-1-3

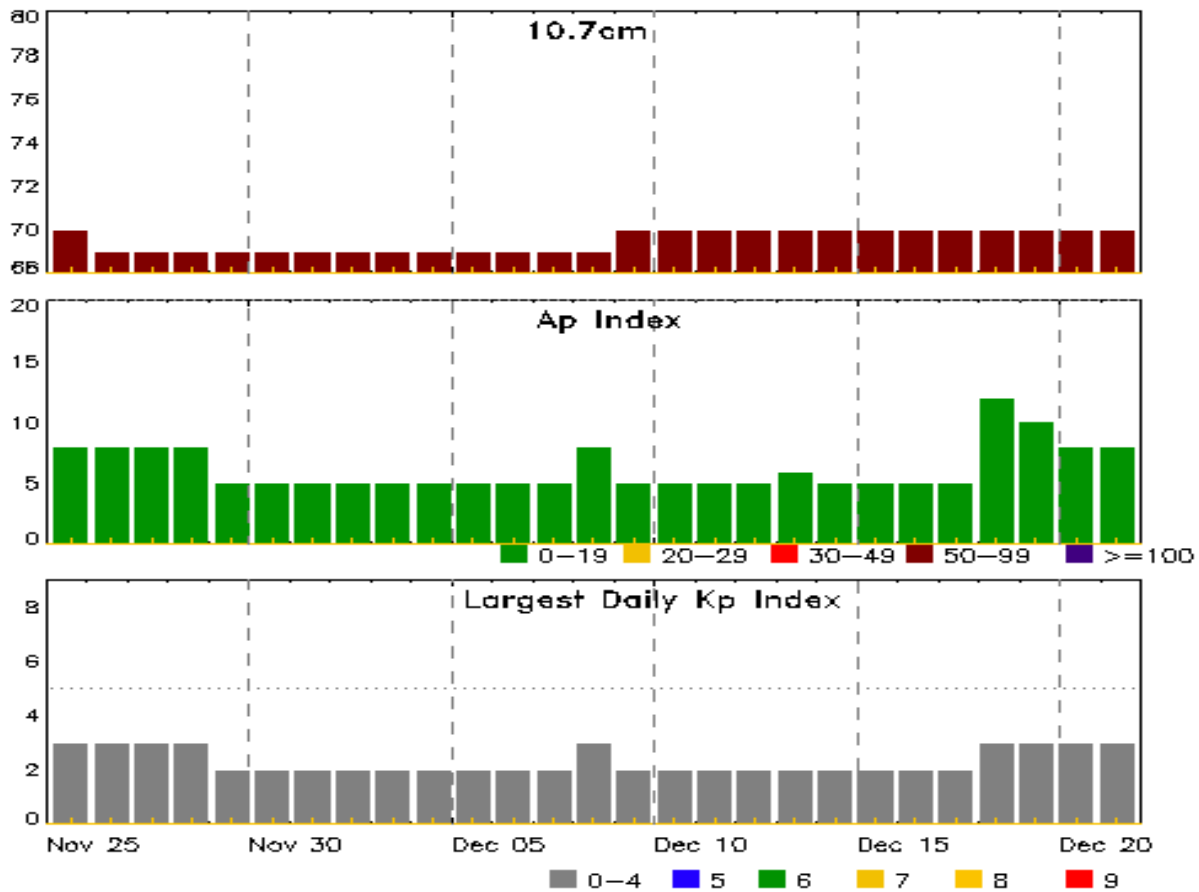


Alerts and Warnings Issued

Date & Time of Issue UTC	Type of Alert or Warning	Date & Time of Event UTC
18 Nov 2112	WATCH: Geomagnetic Storm Category G1 predicted	
21 Nov 1758	WARNING: Geomagnetic K = 4	21/1758 - 22/0600
21 Nov 2244	ALERT: Geomagnetic K = 4	21/1544
21 Nov 2246	CANCELLATION: Geomagnetic K = 4	
21 Nov 2247	ALERT: Geomagnetic K = 4	21/2244
22 Nov 0515	EXTENDED WARNING: Geomagnetic K = 4	21/1758 - 22/2100
23 Nov 1358	WARNING: Geomagnetic K = 4	23/1400 - 1800
24 Nov 1529	ALERT: Electron 2MeV Integral Flux ≥ 1000 pfu	24/1515



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 Nov	70	8	3	09 Dec	70	5	2
26	69	8	3	10	70	5	2
27	69	8	3	11	70	5	2
28	69	8	3	12	70	5	2
29	69	5	2	13	70	6	2
30	69	5	2	14	70	5	2
01 Dec	69	5	2	15	70	5	2
02	69	5	2	16	70	5	2
03	69	5	2	17	70	5	2
04	69	5	2	18	70	12	3
05	69	5	2	19	70	10	3
06	69	5	2	20	70	8	3
07	69	5	2	21	70	8	3
08	69	8	3				

Energetic Events

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

No Events Observed

Flare List

Date	Time			X-ray	Optical		
	Begin	Max	End		Class	Imp/ Brtns	Location Lat CMD
18 Nov	0001	0002	0003		A1.1		
18 Nov	1252	1303	1312		B1.1		



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 2752

13 Nov	S23E56	286	plage
14 Nov	S23E42	288	plage
15 Nov	S23E28	289	plage
16 Nov	S23E14	290	plage
17 Nov	S23W00	291	plage
18 Nov	S23W14	291	plage
19 Nov	S23W28	292	plage
20 Nov	S23W42	293	plage
21 Nov	S23W56	294	plage
22 Nov	S23W70	295	plage
23 Nov	S23W84	296	plage
24 Nov	S23W98	296	plage

0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 291

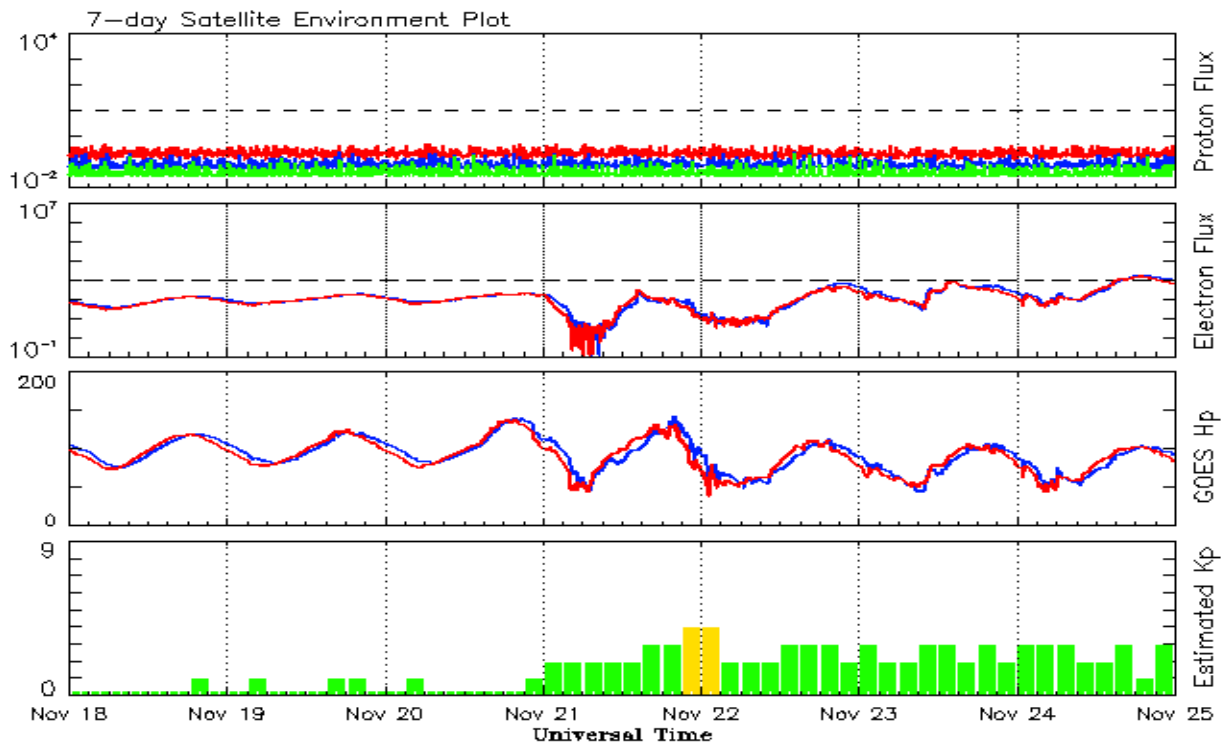


Recent Solar Indices (preliminary)
Observed monthly mean values

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
2017									
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	9.1	4.3	72.5	70.0	7	7.4
July	1.3	1.0	0.77	9.4	4.2	69.7	70.0	6	7.3
August	10.0	5.2	0.53	9.0	4.0	69.1	70.0	10	7.3
September	5.7	2.0	0.35	8.7	3.9	68.3	70.1	9	7.3
October	6.9	2.9	0.42	9.2	4.1	69.5	70.3	7	7.1
November	7.3	2.9	0.48	9.5	4.0	68.9	70.4	6	7.0
December	5.6	1.9	0.34	9.3	3.6	70.0	70.3	7	6.9
2019									
January	16.0	4.6	0.29	9.0	3.2	71.6	70.0	6	6.8
February		0.5		8.7	3.0	70.6	69.8	7	6.7
March	14.8	5.6	0.39	8.3	2.8	71.5	69.7	6	6.6
April	11.5	5.5	0.48	7.9	2.6	72.4	69.6	6	6.7
May	18.1	5.9	0.34			71.3		7	
June	11.6	0.7	0.06			68.1		5	
July	1.6	0.5	0.31			67.1		6	
August	2.5	0.4	0.16			67.0		7	
September	2.6	0.7	0.27			68.1		10	
October	1.8	0.2	0.11			67.4		8	

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 November 2019*

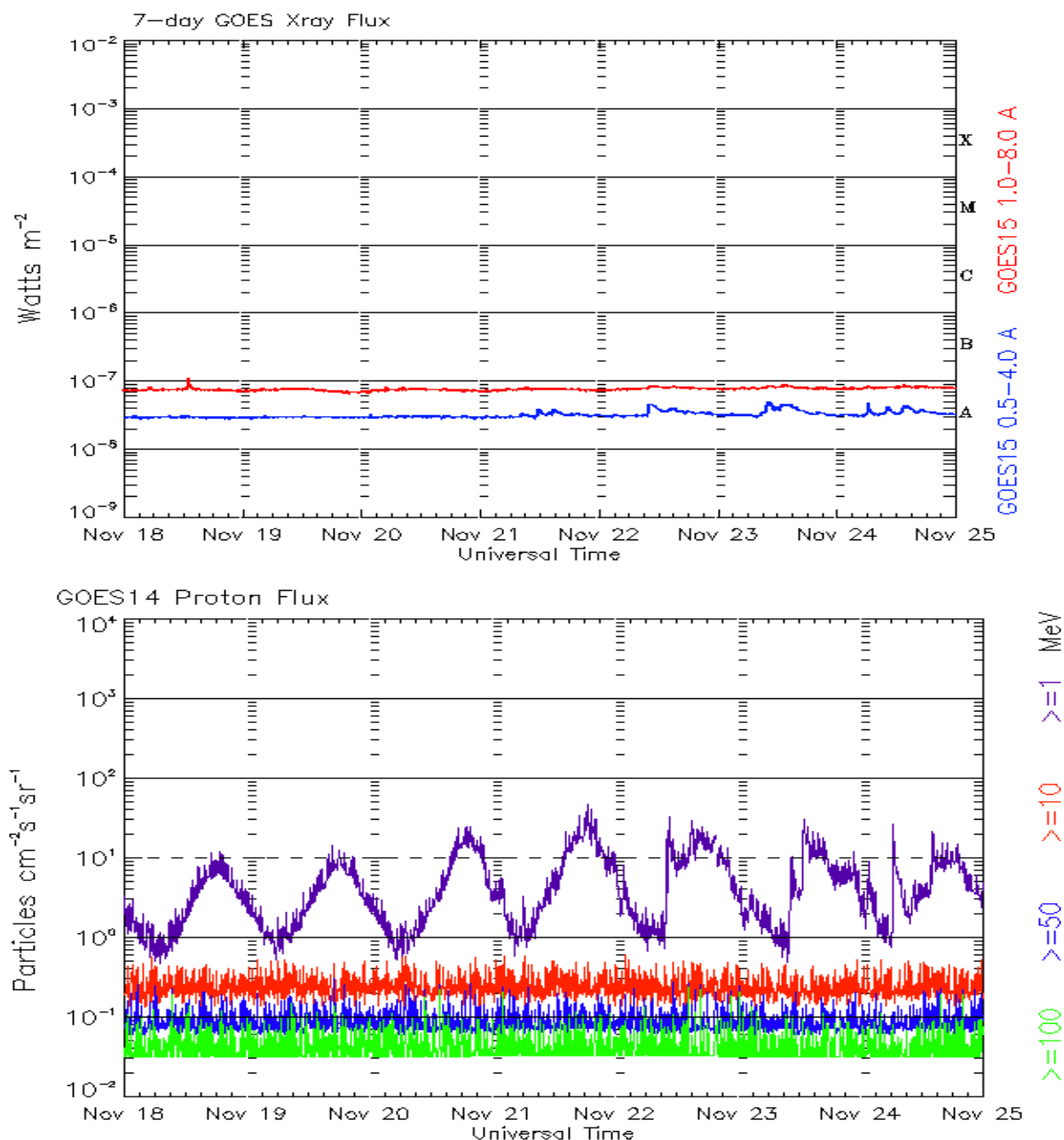
The proton flux plot contains the five-minute averaged integral proton flux (protons/cm²-sec -sr) as measured by the SWPC Primary GOES satellite, near West 75, for each of three energy thresholds: greater than 10, 50, and 100 MeV.

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. 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 November 2019*

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

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

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