

Space Weather Highlights
21 October - 27 October 2019

SWPC PRF 2304
28 October 2019

Solar activity was very low. The solar disk was spotless throughout the period. A faint, slow-moving, possibly Earth-directed CME was observed in satellite imagery at 25/0654 UTC, with a potential arrival late on 29 Oct or early on 30 Oct.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit reached high levels on 25-27 Oct with a peak flux of 36,223 pfu observed at 27/1900 UTC. Electron flux was at normal levels throughout the remainder of the reporting period.

Geomagnetic field activity reached G2 (Moderate) storm levels on 25 Oct, G1 (Minor) storm levels on 26 Oct, and active levels on 24 Oct in response to a recurrent, positive-polarity CH HSS. Quiet to unsettled conditions were observed throughout the remainder of the period.

Space Weather Outlook
28 October - 23 November 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 reach high levels on 28-31 Oct, and 21-23 Nov, with moderate levels on 01-15, and 20 Nov, in response to coronal hole high speed stream (CH HSS) influence.

Geomagnetic field activity is expected to reach G1 (Minor) storm levels on 21-22 Nov, with active levels on 28-30 Oct, and 20, 23 Nov, due to recurrent CH HSS activity. Quiet to unsettled conditions are anticipated 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
21 October	64	0	0	A6.4	0	0	0	0	0	0	0	0
22 October	66	0	0	A6.4	0	0	0	0	0	0	0	0
23 October	65	0	0	A6.4	0	0	0	0	0	0	0	0
24 October	65	0	0	A6.5	0	0	0	0	0	0	0	0
25 October	69	0	0	A6.8	0	0	0	0	0	0	0	0
26 October	69	0	0	A6.9	0	0	0	0	0	0	0	0
27 October	69	0	0	A7.3	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
21 October		3.5e+05	2.1e+04	3.9e+03		2.8e+06
22 October		4.3e+05	2.1e+04	4.0e+03		3.5e+06
23 October		3.7e+05	2.2e+04	4.0e+03		3.2e+06
24 October		1.2e+06	2.1e+04	4.0e+03		5.8e+05
25 October		4.2e+06	2.1e+04	3.7e+03		4.9e+08
26 October		2.1e+06	2.1e+04	3.6e+03		4.6e+08
27 October		1.6e+06	2.0e+04	3.6e+03		1.0e+09

Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
21 October	4	2-1-1-1-2-0-1-1	3	2-0-0-3-1-0-0-0	5	3-1-1-2-1-0-1-1
22 October	2	0-0-1-0-1-1-2-0	0	0-0-1-0-0-0-0-0	3	0-0-1-0-1-1-1-0
23 October	1	0-0-0-0-1-1-1-0	1	1-0-0-0-0-1-0-0	2	1-0-0-0-0-1-1-0
24 October	12	0-1-2-3-3-3-3-4	25	0-0-0-5-6-5-3-2	18	0-2-1-4-3-4-4-4
25 October	29	4-4-5-6-3-3-2-3	62	5-5-7-7-5-5-3-2	29	5-4-6-5-3-3-3-3
26 October	17	3-2-3-4-4-3-3-3	59	2-3-6-7-7-5-3-4	25	3-3-4-5-4-4-4-4
27 October	11	4-3-3-1-2-2-2-2	25	3-3-6-4-3-3-4-2	27	4-3-3-2-2-3-3-3

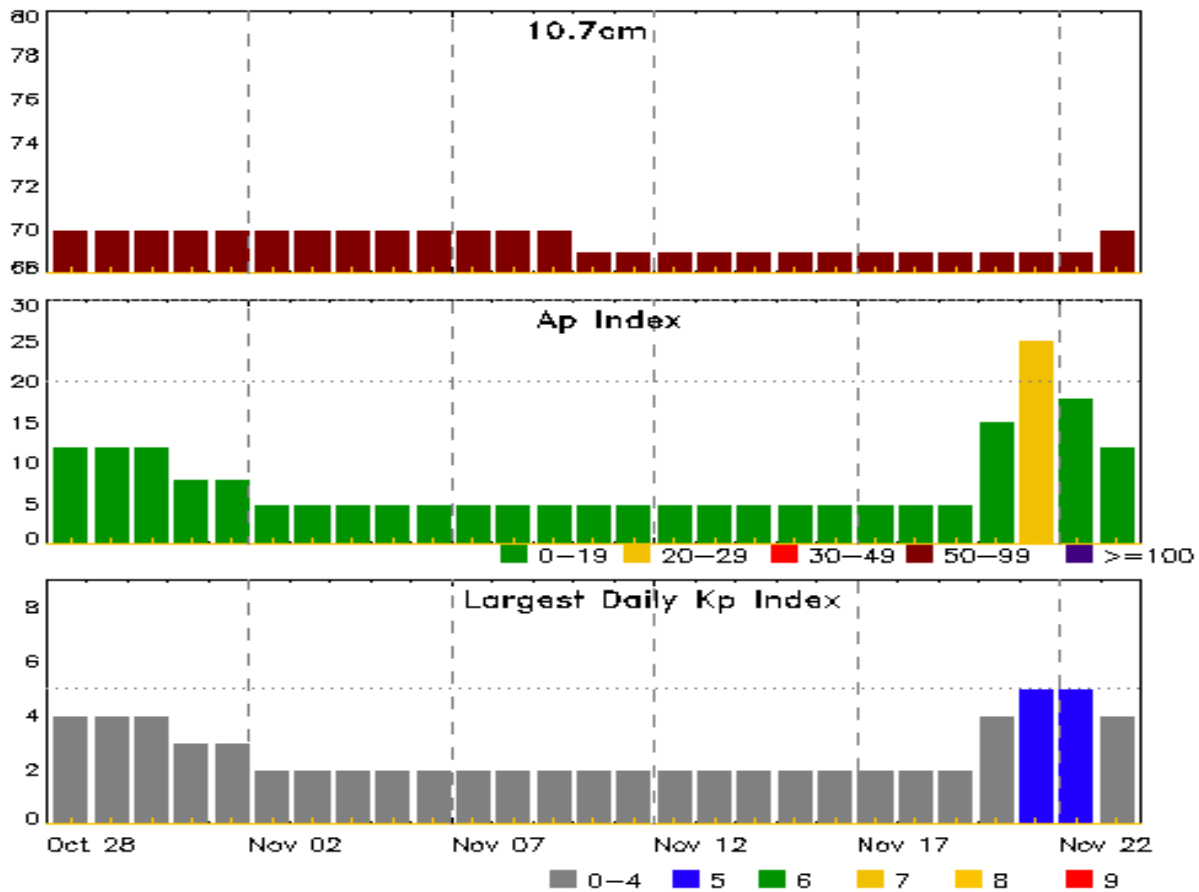


Alerts and Warnings Issued

Date & Time of Issue UTC	Type of Alert or Warning	Date & Time of Event UTC
21 Oct 2107	WATCH: Geomagnetic Storm Category G1 predicted	
22 Oct 2112	WATCH: Geomagnetic Storm Category G1 predicted	
24 Oct 1103	WARNING: Geomagnetic K = 4	24/1102 - 2100
24 Oct 1155	ALERT: Geomagnetic K = 4	24/1155
24 Oct 1600	EXTENDED WARNING: Geomagnetic K = 4	24/1102 - 25/1800
24 Oct 1600	WARNING: Geomagnetic K = 5	24/1600 - 25/0300
25 Oct 0251	EXTENDED WARNING: Geomagnetic K = 5	24/1600 - 25/1200
25 Oct 0251	ALERT: Geomagnetic K = 5	25/0250
25 Oct 0707	ALERT: Geomagnetic K = 5	25/0706
25 Oct 0713	EXTENDED WARNING: Geomagnetic K = 4	24/1102 - 25/2100
25 Oct 0722	WARNING: Geomagnetic K = 6	25/0721 - 1200
25 Oct 0722	EXTENDED WARNING: Geomagnetic K = 5	24/1600 - 25/1800
25 Oct 0850	ALERT: Geomagnetic K = 6	25/0849
25 Oct 0900	ALERT: Electron 2MeV Integral Flux ≥ 1000 pfu	25/0845
25 Oct 1757	EXTENDED WARNING: Geomagnetic K = 5	24/1600 - 26/0300
25 Oct 1757	EXTENDED WARNING: Geomagnetic K = 4	24/1102 - 26/1200
26 Oct 0859	CONTINUED ALERT: Electron 2MeV Integral Flux ≥ 1000 pfu	25/0845
26 Oct 1117	WARNING: Geomagnetic K = 5	26/1115 - 1500
26 Oct 1124	EXTENDED WARNING: Geomagnetic K = 4	24/1102 - 26/2359
26 Oct 1159	ALERT: Geomagnetic K = 5	26/1159
26 Oct 1600	WARNING: Geomagnetic K = 5	26/1600 - 2359
26 Oct 2341	EXTENDED WARNING: Geomagnetic K = 4	24/1102 - 27/1200
26 Oct 2341	EXTENDED WARNING: Geomagnetic K = 5	26/1600 - 27/0600
27 Oct 0901	ALERT: Electron 2MeV Integral Flux ≥ 1000 pfu	27/0859
27 Oct 1156	EXTENDED WARNING: Geomagnetic K = 4	24/1102 - 28/0600



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
28 Oct	70	12	4	11 Nov	69	5	2
29	70	12	4	12	69	5	2
30	70	12	4	13	69	5	2
31	70	8	3	14	69	5	2
01 Nov	70	8	3	15	69	5	2
02	70	5	2	16	69	5	2
03	70	5	2	17	69	5	2
04	70	5	2	18	69	5	2
05	70	5	2	19	69	5	2
06	70	5	2	20	69	15	4
07	70	5	2	21	69	25	5
08	70	5	2	22	69	18	5
09	70	5	2	23	70	12	4
10	69	5	2				

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 Class	Optical		
	Begin	Max	End		Imp/ Brtns	Location Lat CMD	Rgn #
No Flares Observed							



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

No Active Regions

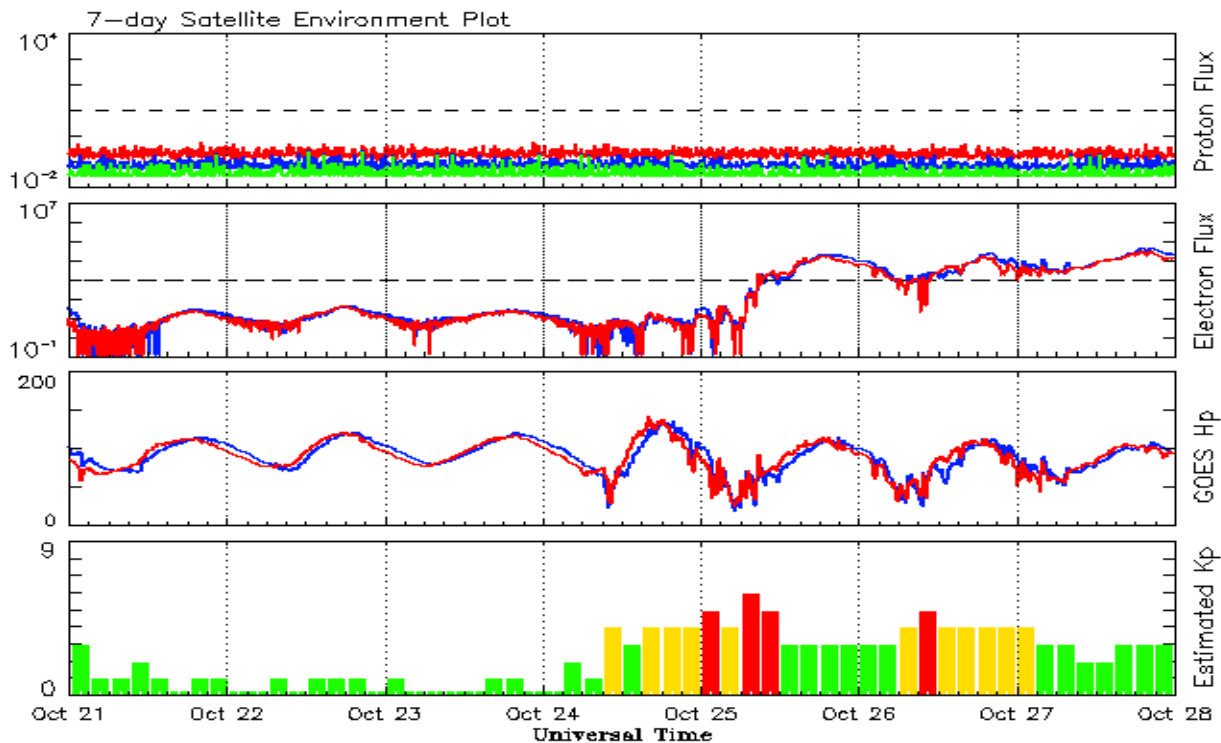


Recent Solar Indices (preliminary)
Observed monthly mean values

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									
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	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			72.4		6	
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	

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 21 October 2019*

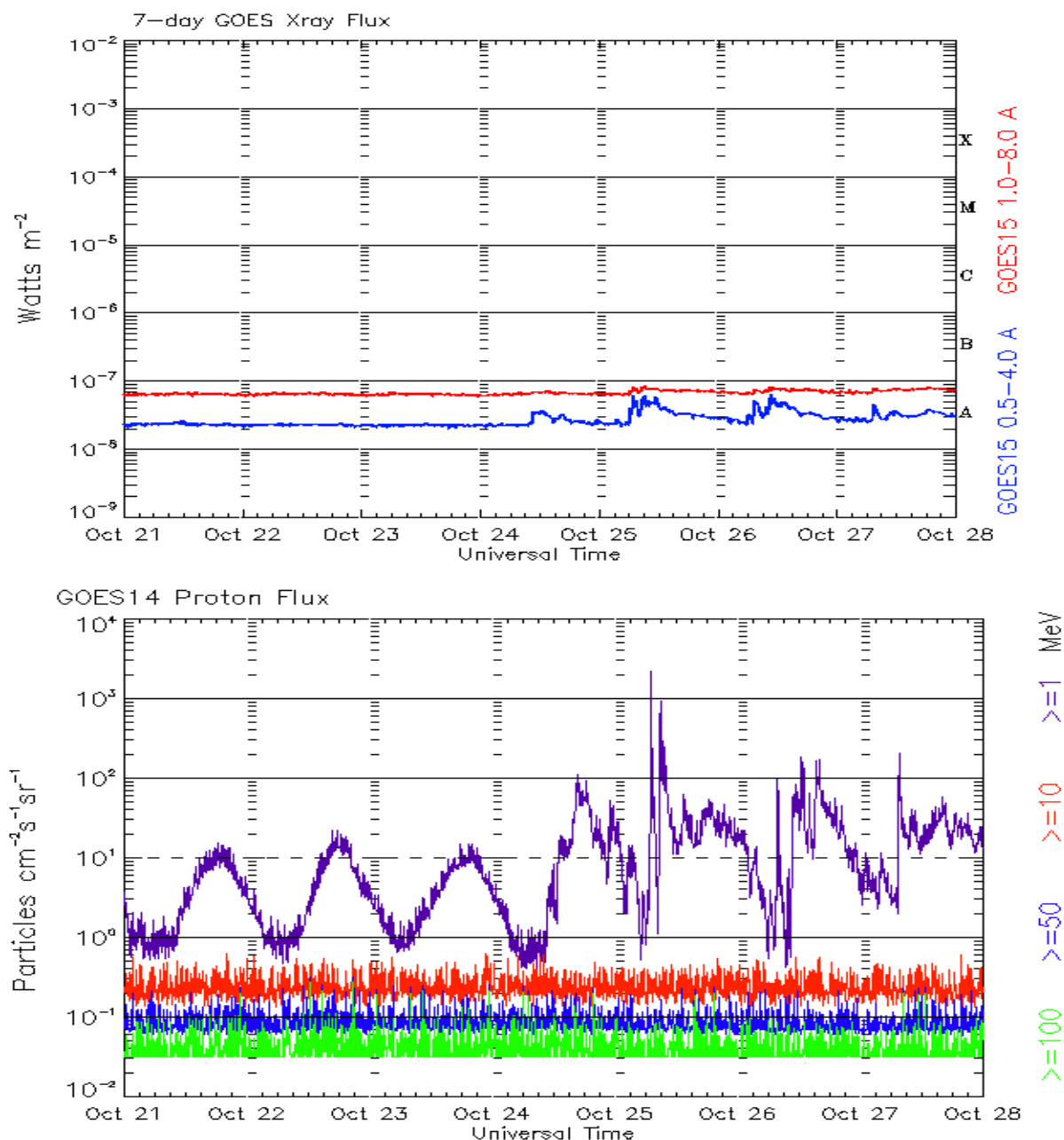
The proton flux plot contains the five-minute averaged integral proton flux (protons/cm²-sec -sr) as measured by the SWPC Primary GOES satellite, near West 75, for each of three energy thresholds: greater than 10, 50, and 100 MeV.

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. 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 21 October 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

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