

Space Weather Highlights
11 March - 17 March 2019

SWPC PRF 2272
18 March 2019

Solar activity was very low throughout the period. Region 2734 (N09, L=60, class/area=Cro/60 on 06 Mar) briefly contained spots early this period, but was quiet. A slow-moving CME off the east limb observed early on 12 Mar was determined to have a possible earth-directed component with an early 17 Mar arrival, based on ENLIL model output.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit reached high levels on 11-12 Mar.

Geomagnetic field activity reached G1 (Minor) geomagnetic storm levels early on 17 Mar, likely due in part to the arrival of the 12 Mar CME. Quiet to active conditions were observed on 16 Mar and quiet or quiet to unsettled conditions were observed throughout the remainder of the period.

Space Weather Outlook
18 March - 13 April 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 very high levels on 29-30 Mar with high levels expected on 27-28, 31 Mar and 01-07 Apr.

Geomagnetic field activity is expected to reach G1 (Minor) geomagnetic storm levels on 27-28 Mar and active conditions are expected on 26, 29 Mar and 12 Apr, all due to the influence of multiple recurrent CH HSSs.



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
11 March	70	11	10	A0.0	0	0	0	0	0	0	0	0
12 March	71	11	10	A0.0	0	0	0	0	0	0	0	0
13 March	71	0	0	A0.0	0	0	0	0	0	0	0	0
14 March	70	0	0	A0.0	0	0	0	0	0	0	0	0
15 March	70	0	0	A0.0	0	0	0	0	0	0	0	0
16 March	70	0	0	A0.0	0	0	0	0	0	0	0	0
17 March	69	0	0	A0.0	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
11 March	9.6e+05	1.6e+04	3.6e+03	1.1e+08		
12 March	4.4e+05	1.6e+04	3.6e+03	3.0e+07		
13 March	7.4e+05	1.7e+04	3.5e+03	1.4e+07		
14 March	7.3e+05	1.7e+04	3.8e+03	1.0e+07		
15 March	3.7e+05	1.7e+04	3.7e+03	3.4e+06		
16 March	9.6e+05	1.6e+04	3.6e+03	6.2e+06		
17 March	1.4e+06	1.6e+04	3.5e+03	2.0e+07		

Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
11 March	3	0-0-1-1-2-1-1-1	4	0-0-0-4-2-0-0-0	3	0-0-1-2-1-0-1-0
12 March	5	1-1-3-2-2-1-0-1	9	1-0-4-4-3-1-0-0	7	2-1-3-2-2-1-1-1
13 March	4	1-2-1-0-1-2-2-0	3	1-1-2-2-0-0-1-0	4	1-2-2-1-0-0-2-1
14 March	6	0-1-2-1-3-1-2-2	9	0-0-3-3-4-3-0-1	7	0-1-2-1-3-1-2-3
15 March	5	2-2-2-0-0-2-2-1	11	2-4-4-1-0-1-3-1	7	3-3-2-1-0-1-2-1
16 March	7	1-1-1-3-2-1-1-3	20	1-1-2-6-4-4-2-2	12	1-2-1-3-3-2-2-4
17 March	14	4-4-4-3-2-1-1-1	40	5-4-7-5-4-4-1-0	39	5-4-4-3-2-2-1-1

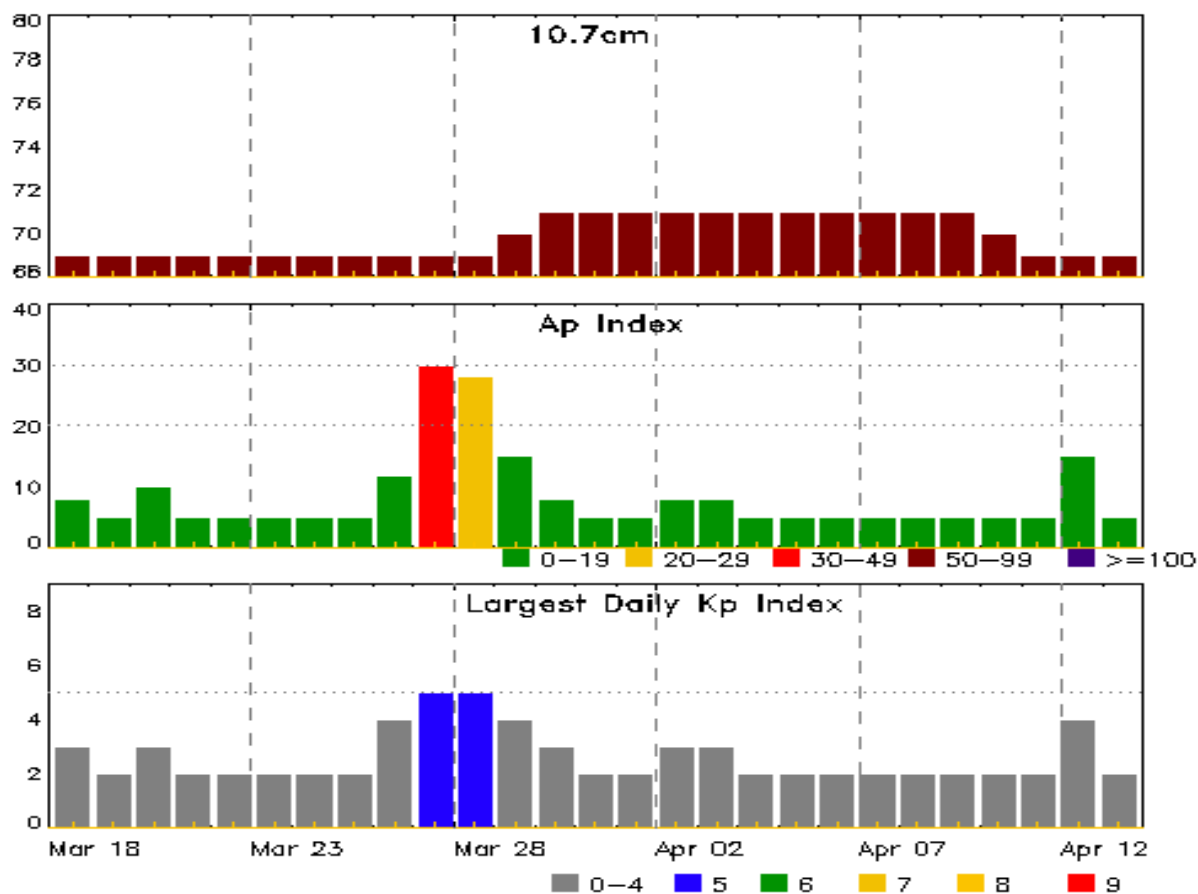


Alerts and Warnings Issued

Date & Time of Issue UTC	Type of Alert or Warning	Date & Time of Event UTC
11 Mar 1220	CONTINUED ALERT: Electron 2MeV Integral Flux \geq 1000pfu	28/1710
16 Mar 2147	WARNING: Geomagnetic K = 4	16/2147 - 17/0600
16 Mar 2238	ALERT: Geomagnetic K = 4	16/2228
17 Mar 0245	WARNING: Geomagnetic K = 5	17/0244 - 0600
17 Mar 0248	ALERT: Geomagnetic K = 5	17/0245
17 Mar 0539	EXTENDED WARNING: Geomagnetic K = 4	16/2147 - 17/1200
17 Mar 1058	EXTENDED WARNING: Geomagnetic K = 4	16/2147 - 17/2359



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
18 Mar	69	8	3	01 Apr	71	5	2
19	69	5	2	02	71	8	3
20	69	10	3	03	71	8	3
21	69	5	2	04	71	5	2
22	69	5	2	05	71	5	2
23	69	5	2	06	71	5	2
24	69	5	2	07	71	5	2
25	69	5	2	08	71	5	2
26	69	12	4	09	71	5	2
27	69	30	5	10	70	5	2
28	69	28	5	11	69	5	2
29	70	15	4	12	69	15	4
30	71	8	3	13	69	5	2
31	71	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	Optical		
	Begin	Max	End		Class	Imp/ Brtns	Location Lat CMD
16 Mar	1408	1409	1410		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 2734															
05 Mar	N08E27	59	20	3	Cro	4	B								
06 Mar	N09E13	60	30	4	Cro	7	B								
07 Mar	N09W01	60	20	5	Cao	4	B								
08 Mar	N08W17	63	10	1	Hax	1	A	1			1				
09 Mar	N08W30	63	10	1	Hsx	1	A				1				
10 Mar	N08W44	64	10	1	Axx	1	A								
11 Mar	N08W59	66	10	1	Axx	1	A								
12 Mar	N08W72	65	10	1	Axx	1	A								
13 Mar	N08W85	66	plage												
14 Mar	N08W99	66	plage												
								1	0	0	2	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 60

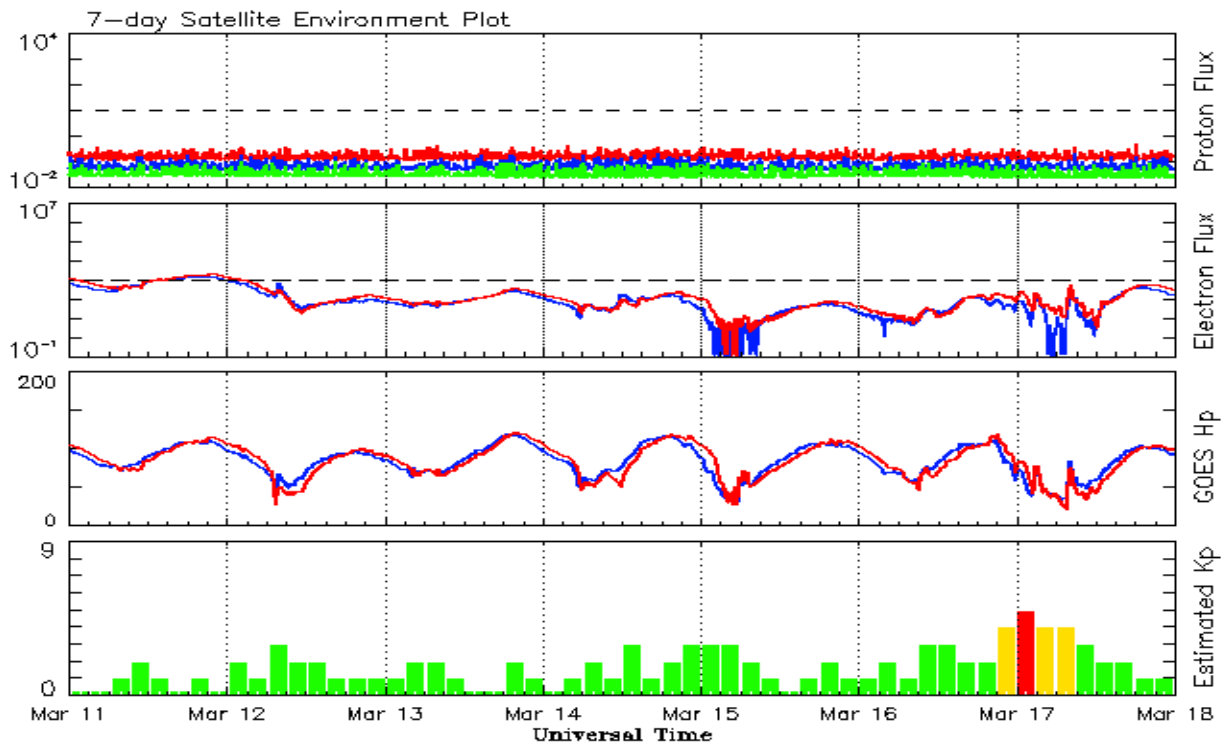


Recent Solar Indices (preliminary)
Observed monthly mean values

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									
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	9.1	4.4	72.5	70.0	7	7.4
July	1.3	1.0	0.77	9.4	4.3	69.7	70.0	6	7.3
August	10.0	5.2	0.53	9.0	4.1	69.1	70.0	10	7.3
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	
December	5.6	1.9	0.34			70.0		7	
2019									
January	16.0	4.7	0.29			71.6		6	
February		0.5				70.6		7	

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 11 March 2019*

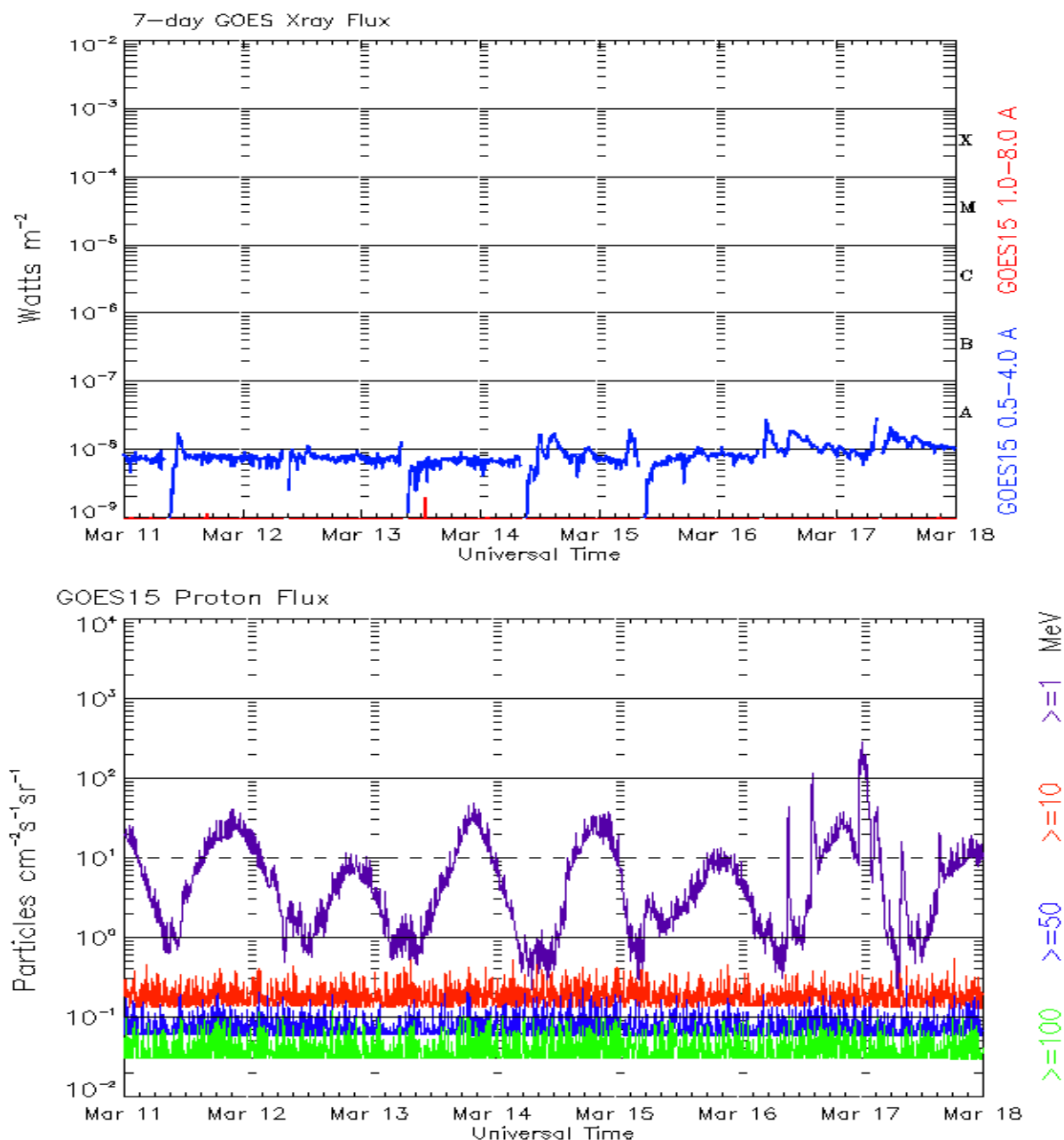
The proton flux plot contains the five-minute averaged integral proton flux (protons/cm²-sec -sr) as measured by the SWPC Primary GOES satellite, near West 75, for each of three energy thresholds: greater than 10, 50, and 100 MeV.

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 11 March 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 ($\text{pfu} = \text{protons/cm}^2\text{-sec -sr}$) 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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