Space Weather Highlights
04 March - 10 March 2019

SWPC PRF 2271
11 March 2019

Solar activity reached low levels. Region 2734 (N09, Lo=60, class/area Cao/20 on 07 Mar) produced the strongest flare of the period, a C1 at 08/0319 UTC followed by a secondary X-ray enhancement to C1, which peaked shortly after. Two separate CME signatures, a western directed CME first seen in LASCO C2 at 08/0428 UTC and an eastern directed CME first seen in LASCO C2 at 08/0438 UTC, were associated with the C1 flare activity. No other Earth-directed CMEs were observed in available coronagraph imagery. The region produced two other weaker B class flares during the period.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit reached high levels throughout the highlight period due to influence from a negative polarity CH HSS prior to the period combined with influence from a second negative polarity CH HSS on 06 and 07 Mar.

Geomagnetic field activity ranged from quiet to unsettled conditions. Intermittent increases to unsettled periods occurred on 04 Mar, and 06-08 Mar due to slight enhancements in the solar wind environment and CH HSS effects.

Space Weather Outlook
11 March - 06 April 2019

Solar activity is expected to be at very low to 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 range from normal to very high levels. Very high levels are expected on 29/30 Mar; high levels are expected on 11 Mar, 14-19 Mar, 27-28 Mar, and 31 Mar - 06 Apr; moderate levels are expected on 12/13 Mar and 20-22 Mar; mostly normal levels are expected 23-26 Mar. All elevated levels of electron flux are anticipated due to influence from multiple, recurrent CH HSSs.

Geomagnetic field activity is expected to range from quiet to G1 (Minor) geomagnetic storm levels. G1 conditions are expected 11 Mar due to possible glancing blows from the 8 Mar CMEs. Active conditions are expected 12 Mar - 15 Mar due to waning CME activity followed by HSS effects from a negative polarity CH. Unsettled to quiet conditions are expected 16-17 Mar as CH effects wane.

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
04 March	71	0	0	A0.0	0	0	0	0	0	0	0	0		0
05 March	72	14	20	A0.0	0	0	0	0	0	0	0	0		0
06 March	73	17	30	A0.0	0	0	0	0	0	0	0	0		0
07 March	71	14	20	A0.0	0	0	0	0	0	0	0	0		0
08 March	72	11	10	A0.0	1	0	0	1	0	0	0	0		0
09 March	71	11	10	A0.0	0	0	0	1	0	0	0	0		0
10 March	71	11	10	A0.0	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
04 March	6.4e+05	1.7e+04	3.8e+03	9.8e+08		
05 March	5.5e+05	1.6e+04	3.5e+03	6.4e+08		
06 March	7.0e+05	1.6e+04	3.5e+03	4.2e+08		
07 March	1.1e+06	1.7e+04	3.6e+03	1.9e+08		
08 March	7.0e+05	1.8e+04	4.0e+03	9.1e+07		
09 March	7.4e+05	1.7e+04	3.9e+03	1.2e+08		
10 March	8.0e+05	1.7e+04	3.7e+03	1.0e+08		

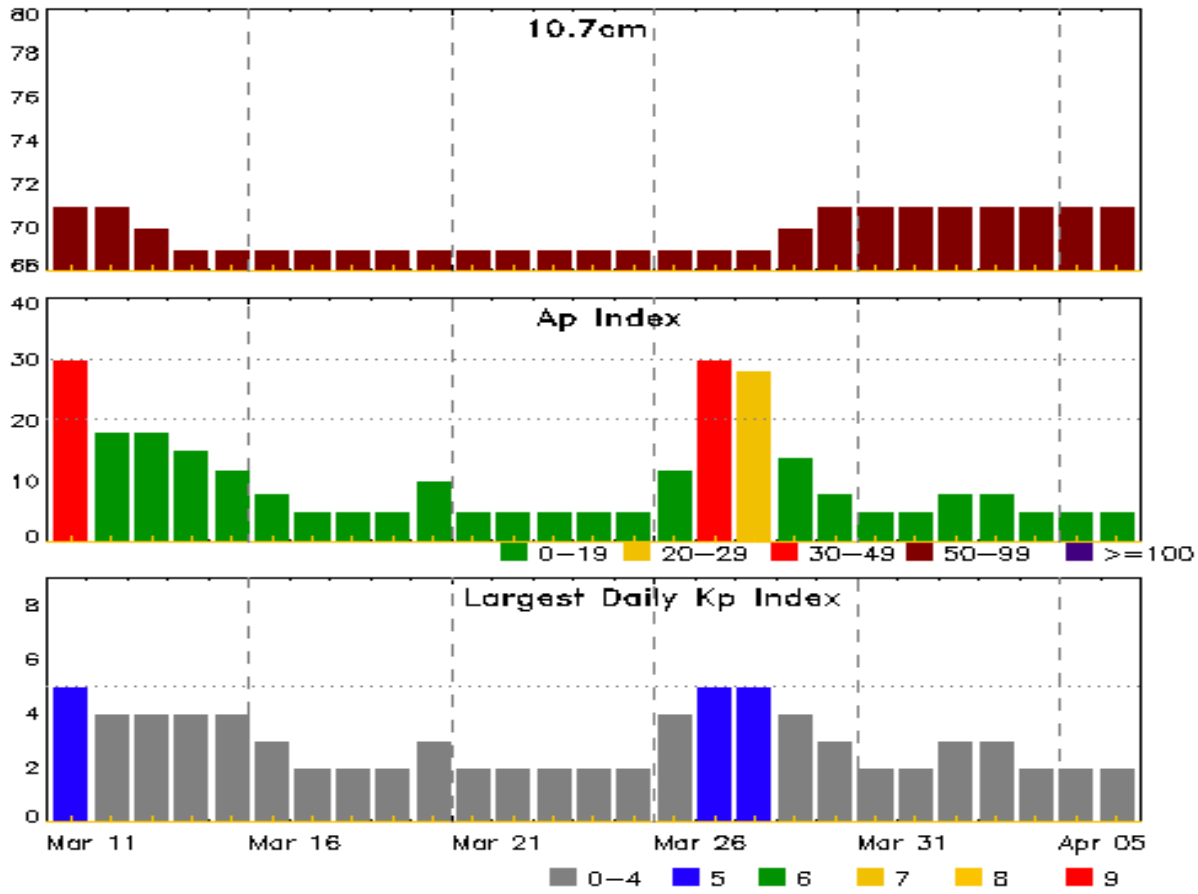
Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
04 March	7	2-3-2-2-2-1-1-1	21	1-3-3-6-5-2-0-1	7	2-3-2-2-2-1-1-2
05 March	4	2-1-1-1-1-1-1-2	3	1-1-0-0-2-2-0-1	5	2-2-1-1-1-1-1-2
06 March	7	1-1-3-1-2-2-2-2	7	1-1-3-0-4-1-1-0	8	1-1-3-2-2-1-2-2
07 March	5	1-0-1-0-3-1-2-2	11	0-0-0-0-5-4-2-2	8	1-1-1-1-3-2-3-3
08 March	3	2-0-1-1-0-1-1-1	8	1-0-2-5-1-0-0-1	5	3-1-2-2-0-0-1-2
09 March	4	1-0-1-1-2-2-1-2	7	0-0-1-3-4-2-1-1	5	1-0-1-2-2-1-1-2
10 March	3	2-2-1-0-1-1-1-0	2	0-2-1-1-0-0-0-0	9	2-2-1-0-1-0-1-0

Alerts and Warnings Issued

Date & Time of Issue UTC	Type of Alert or Warning	Date & Time of Event UTC
04 Mar 0859	CONTINUED ALERT: Electron 2MeV Integral Flux >= 1000pfu	28/1710
05 Mar 0859	CONTINUED ALERT: Electron 2MeV Integral Flux >= 1000pfu	28/1710
06 Mar 0744	WARNING: Geomagnetic K = 4	06/0745 - 1200
06 Mar 0900	CONTINUED ALERT: Electron 2MeV Integral Flux >= 1000pfu	28/1710
07 Mar 1038	CONTINUED ALERT: Electron 2MeV Integral Flux >= 1000pfu	28/1710
08 Mar 0459	ALERT: Type II Radio Emission	08/0315
08 Mar 1426	CONTINUED ALERT: Electron 2MeV Integral Flux >= 1000pfu	28/1710
08 Mar 2120	WATCH: Geomagnetic Storm Category G1 predicted	
09 Mar 1235	CONTINUED ALERT: Electron 2MeV Integral Flux >= 1000pfu	28/1710
10 Mar 1358	CONTINUED ALERT: Electron 2MeV Integral Flux >= 1000pfu	28/1710

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
11 Mar	71	30	5	25 Mar	69	5	2
12	71	18	4	26	69	12	4
13	70	18	4	27	69	30	5
14	69	15	4	28	69	28	5
15	69	12	4	29	70	14	4
16	69	8	3	30	71	8	3
17	69	5	2	31	71	5	2
18	69	5	2	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				

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 #
06 Mar	0517	0526	0531	A4.9			
08 Mar	0307	0319	0358	C1.3	SF	N09W03	2734
09 Mar	0428	0432	0438	B1.1			2734
09 Mar	1217	1226	1236	B6.1	SF	N11W19	2734

Region Summary

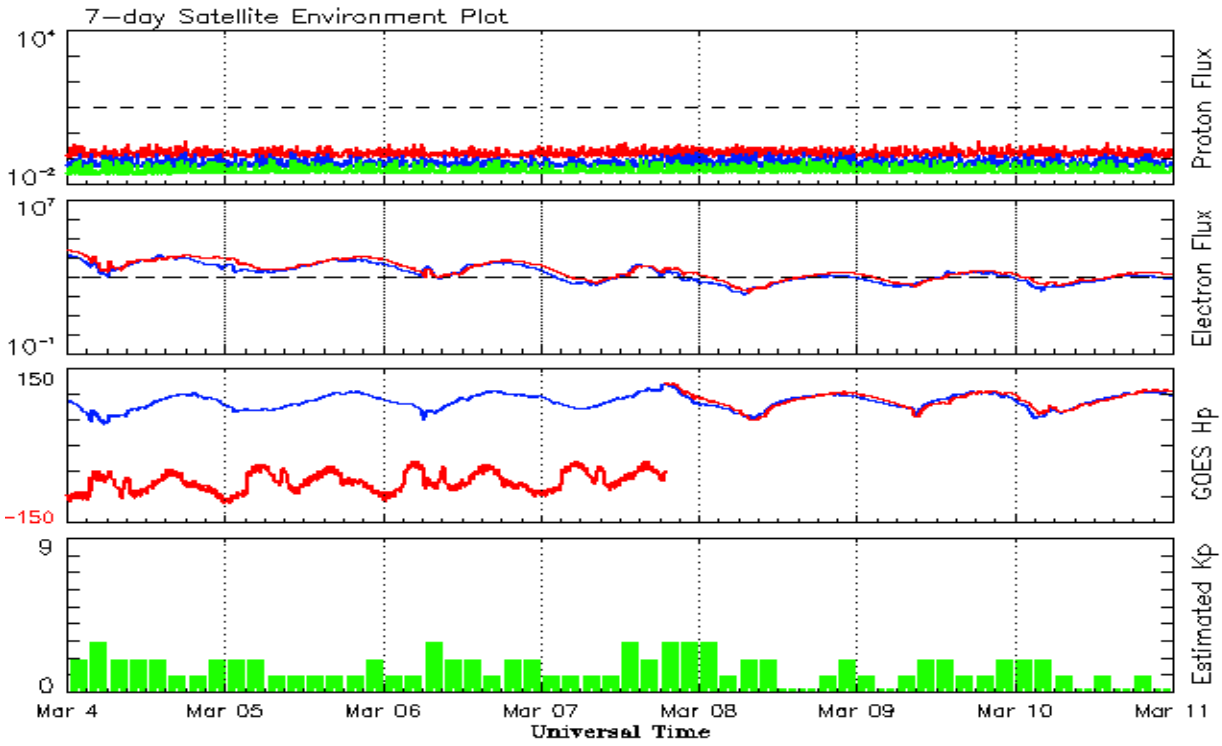
	Location		Sunspot Characteristics					Flares							
		Helio	Area	Extent	Spot	Spot	Mag	X-ray			Optical				
Date	Lat CMD	Lon	10^{-6} hemi.	(helio)	Class	Count	Class	C	M	X	S	1	2	3	4
		Region 2734													
05 Mar	N08E27	59	20	3	Cro	4	B								
06 Mar	N09E13	60	30	4	Cro	7	B								
07 Mar	N09W01	60	20	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	Hsx	1	A								
								1	0	0	2	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 60

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
				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 04 March 2019

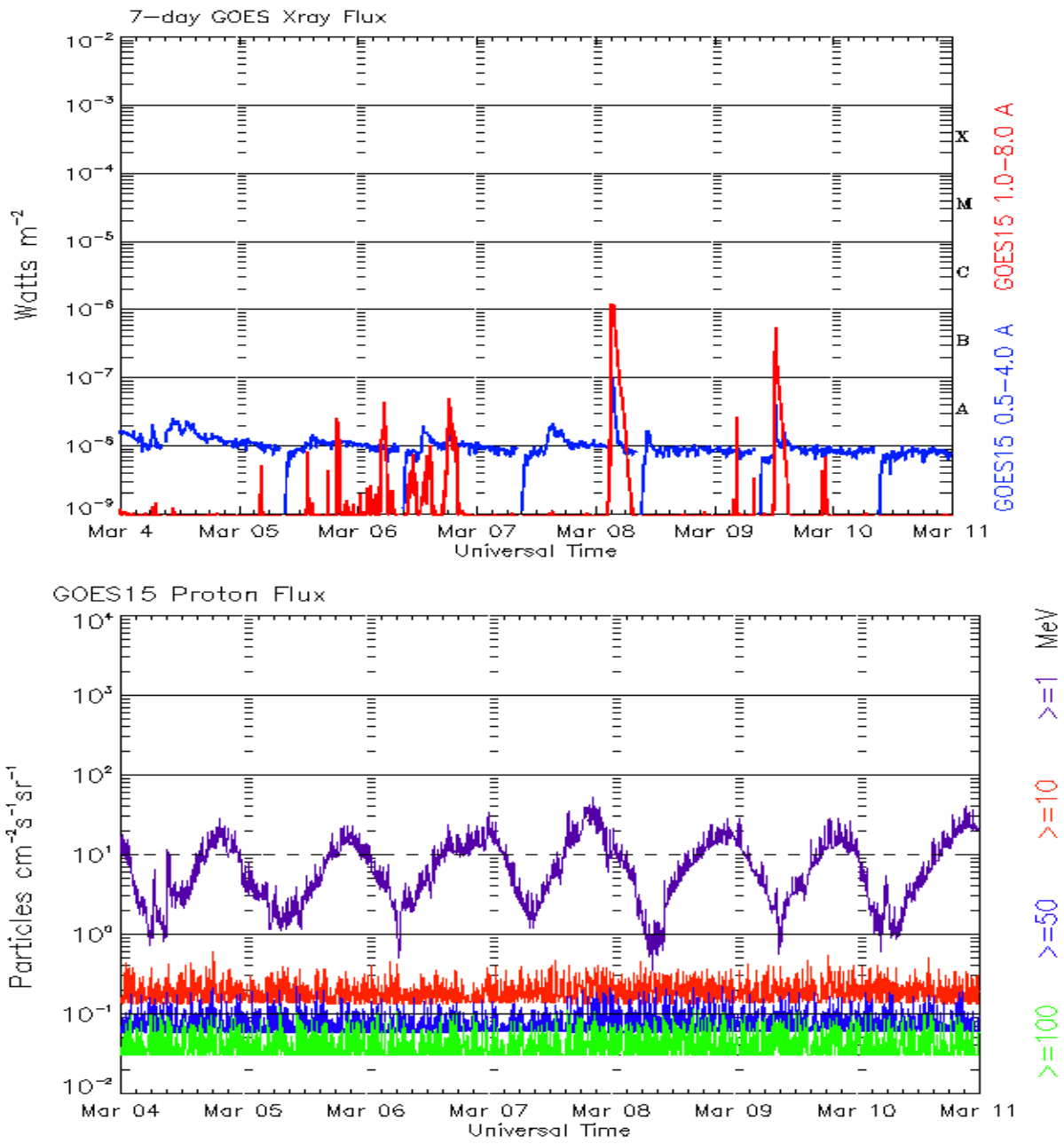
The proton flux plot contains the five-minute averaged integral proton flux (protons/cm^2-sec -sr) as measured by the SWPC Primary GOES satellite, near West 75, for each of three energy thresholds: greater than 10, 50, and 100 MeV.

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 04 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 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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Space Weather Prediction Center
325 Broadway, Boulder CO 80305

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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