

Space Weather Highlights
25 March - 31 March 2019

SWPC PRF 2274
01 April 2019

Solar activity was very low throughout the period. Region 2736 (N08, L=284, class/area-Eki/420 on 22 Mar) produced low level B-class flare activity after its rotation around the west limb. Region 2737 (N12, L=059, class/area-Bxo/10 on 31 Mar) emerged on the disk but was inactive. No Earth-directed coronal mass ejections (CME) were observed.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit was at moderate levels throughout the reporting period.

Geomagnetic field activity reached active levels on 31 March and unsettled levels on 26-28 March due to influence from multiple, negative polarity coronal hole high-speed streams (CH HSS). Quiet conditions were observed on 25, 29-30 March.

Space Weather Outlook
01 April - 27 April 2019

Solar activity is expected to be very low on 01-05 and 20-27 April. Low levels are expected between 06-19 April due to the return of Region 2736.

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 01-07 April with normal to moderate levels expected throughout the remainder of the outlook period.

Geomagnetic field activity is expected to reach active levels on 12 April due to influence from a recurrent, negative-polarity CH HSS. Quiet to unsettled levels 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
25 March	71	0	0	A7.2	0	0	0	0	0	0	0	0
26 March	69	0	0	A0.0	0	0	0	0	0	0	0	0
27 March	69	0	0	A0.0	0	0	0	0	0	0	0	0
28 March	68	0	0	A0.0	0	0	0	0	0	0	0	0
29 March	69	0	0	A0.0	0	0	0	0	0	0	0	0
30 March	69	0	0	A0.0	0	0	0	0	0	0	0	0
31 March	70	14	10	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
25 March	5.3e+05	1.8e+04	3.6e+03	1.8e+07		
26 March	5.3e+05	1.7e+04	3.4e+03	3.7e+06		
27 March	4.9e+05	1.8e+04	3.7e+03	4.3e+06		
28 March	5.6e+05	1.7e+04	3.7e+03	2.2e+06		
29 March	5.0e+05	1.7e+04	3.5e+03	1.2e+07		
30 March	6.5e+05	1.8e+04	3.7e+03	3.9e+07		
31 March	5.5e+05	1.7e+04	3.4e+03	9.5e+06		

Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
25 March	5	2-2-0-1-1-2-1-2	1	1-0-0-0-0-1-0-1	5	2-2-1-1-1-2-1-2
26 March	5	2-2-0-1-2-1-1-2	2	2-1-0-0-1-0-0-1	6	3-3-1-1-1-0-0-2
27 March	8	2-2-3-3-2-1-2-1	14	0-1-4-5-4-1-0-0	8	2-2-3-3-2-1-2-1
28 March	10	1-3-3-2-3-2-2-2	14	1-3-3-2-5-3-1-1	11	1-3-3-2-3-2-2-3
29 March	6	1-2-2-2-2-2-1-1	11	1-2-3-5-2-1-1-1	7	2-2-2-2-1-2-2-1
30 March	3	2-1-1-0-2-1-0-0	2	1-1-1-1-1-0-0-0	4	2-1-0-1-1-0-0-0
31 March	9	3-3-3-1-2-2-2-1	15	2-3-4-2-4-4-1-1	12	3-4-3-2-2-2-3-1

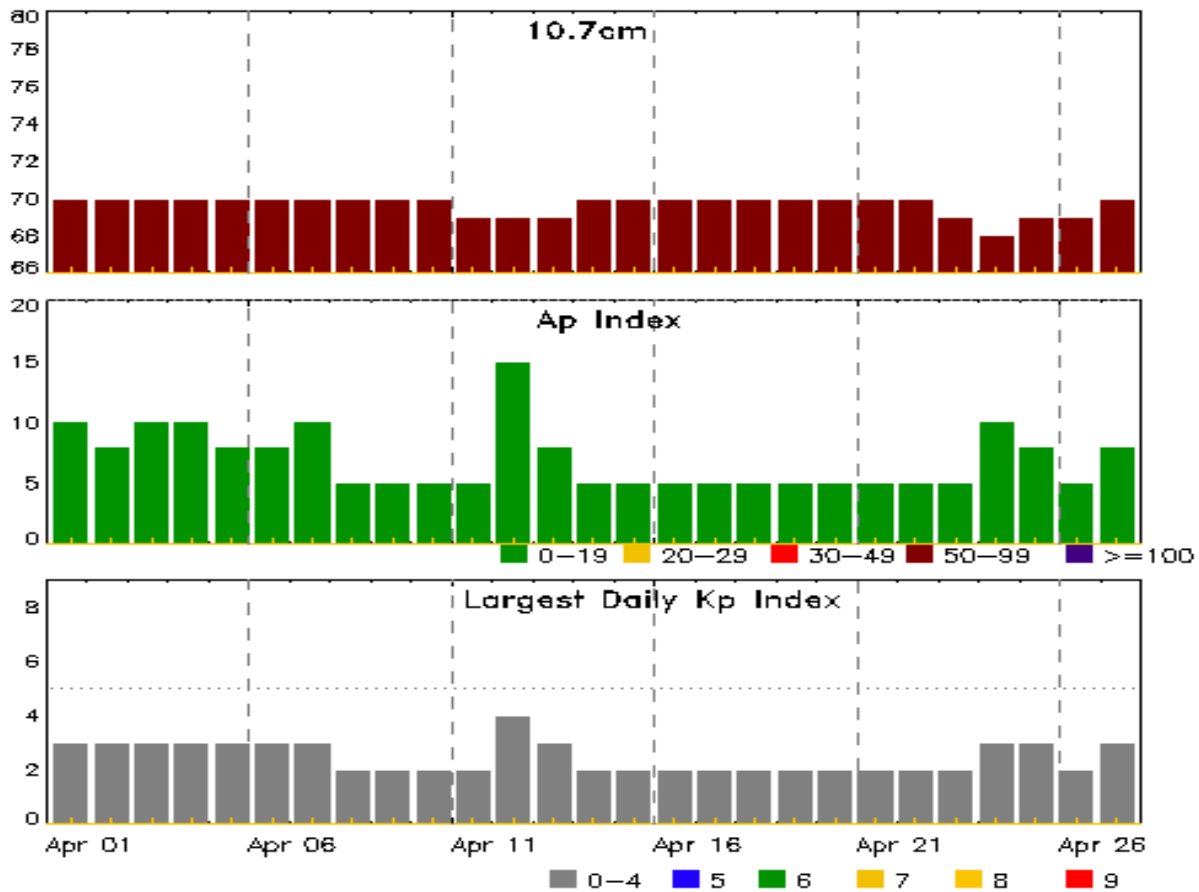


Alerts and Warnings Issued

Date & Time of Issue UTC	Type of Alert or Warning	Date & Time of Event UTC
28 Mar 0626	WARNING: Geomagnetic K = 4	28/0630 - 1500
31 Mar 0329	WARNING: Geomagnetic K = 4	31/0330 - 1200
31 Mar 0600	ALERT: Geomagnetic K = 4	31/0559



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
01 Apr	70	10	3	15 Apr	70	5	2
02	70	8	3	16	70	5	2
03	70	10	3	17	70	5	2
04	70	10	3	18	70	5	2
05	70	8	3	19	70	5	2
06	70	8	3	20	70	5	2
07	70	10	3	21	70	5	2
08	70	5	2	22	70	5	2
09	70	5	2	23	69	5	2
10	70	5	2	24	68	10	3
11	69	5	2	25	69	8	3
12	69	15	4	26	69	5	2
13	69	8	3	27	70	8	3
14	70	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			X-ray Class	Optical		
	Begin	Max	End		Imp/ Brtns	Location Lat CMD	Rgn #
25 Mar	0607	0615	0627	B1.5			2736
25 Mar	0652	0723	0727	B2.2			2736
25 Mar	0942	0947	0953	B1.3			2736
25 Mar	1129	1134	1144	B1.7			2736
25 Mar	1308	1410	1435	B3.6			2736
25 Mar	1803	1811	1825	B4.1			2736
25 Mar	2126	2148	2223	B3.4			2736
31 Mar	1200	1201	1202	A1.1			



Region Summary

Location		Sunspot Characteristics					Flares							
Date	Lat CMD	Helio	Area	Extent	Spot	Spot	Mag	X-ray			Optical			
	Lon	10 ⁻⁶ hemi.	(helio)	Class	Count	Class	C	M	X	S	1	2	3	4

Region 2735

18 Mar	N03E17	257	10	3	Bxo	3	B				2				
19 Mar	N03E02	259	20	5	Cro	5	B								
20 Mar	N02W12	260	10	1	Axx	2	A								
21 Mar	N02W25	260	10	1	Axx	1	A								
22 Mar	N02W39	261	plage												
23 Mar	N02W54	262	plage												
24 Mar	N02W69	264	plage												
25 Mar	N02W84	266	plage												
								0	0	0	2	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 259

Region 2736

20 Mar	N09W35	283	50	5	Dac	6	B	1			6	1			
21 Mar	N09W48	283	210	9	Dac	28	BGD	5			4	1			
22 Mar	N08W62	284	420	11	Eki	17	BG	6			17	1			
23 Mar	N08W77	285	280	12	Eki	12	B				11				
24 Mar	N08W88	283	60	7	Dso	4	B				4				
								12	0	0	42	3	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 283

Region 2737

31 Mar	N12E43	59	10	33	Bxo	4	B								
								0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 59

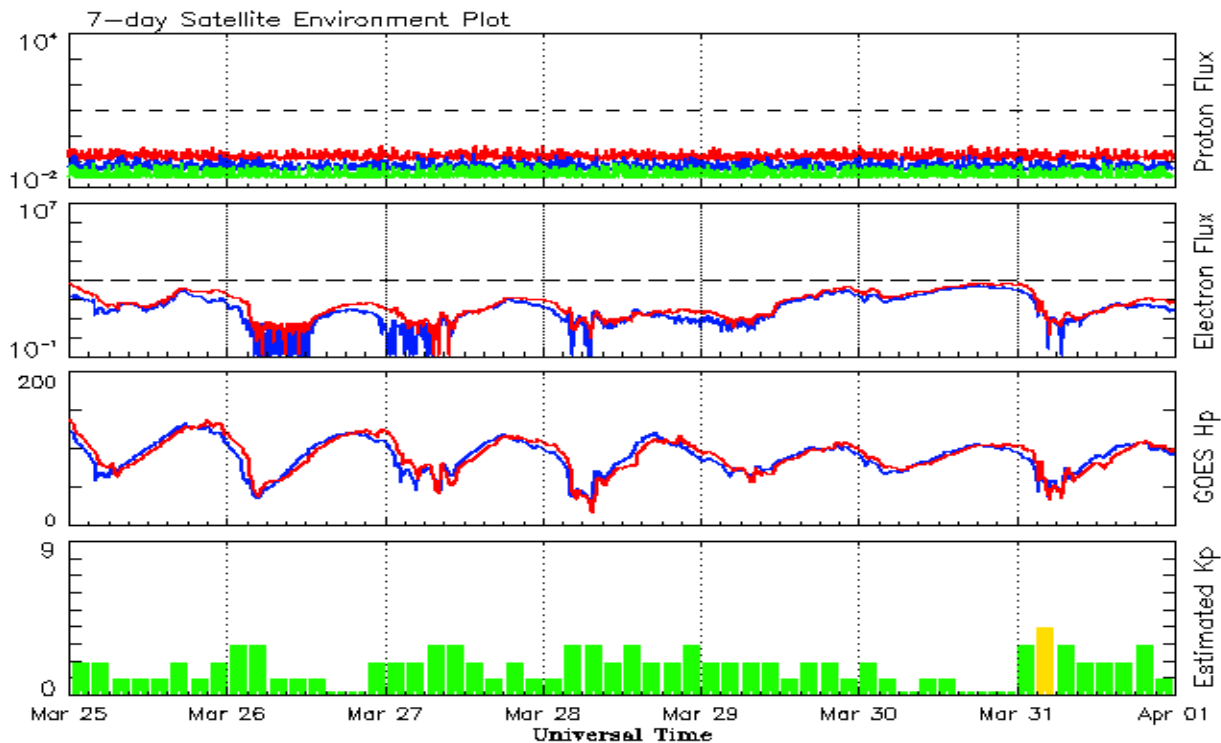


Recent Solar Indices (preliminary)
Observed monthly mean values

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									
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	8.7		68.3	70.1	9	7.3
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	
March	14.8					71.5		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 25 March 2019*

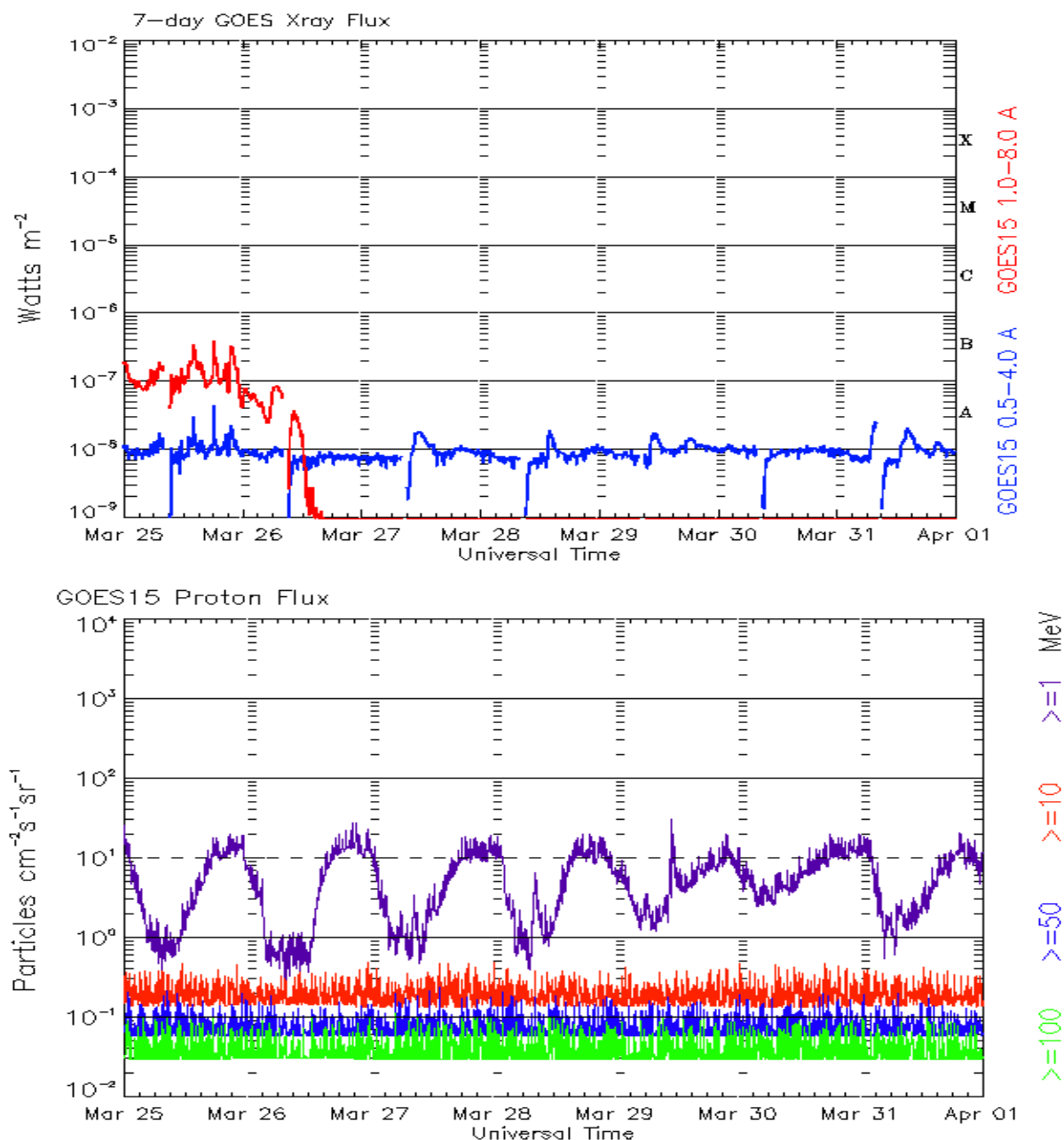
The proton flux plot contains the five-minute averaged integral proton flux (protons/cm²-sec -sr) as measured by the SWPC Primary GOES satellite, near West 75, for each of three energy thresholds: greater than 10, 50, and 100 MeV.

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. 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 25 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.



Preliminary Report and Forecast of Solar Geophysical Data (The Weekly)

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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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