

Space Weather Highlights
01 April - 07 April 2019

SWPC PRF 2275
08 April 2019

Solar activity was very low throughout the period. Region 2737 (N12, L=63, class/area-Cao/40 on 02 Apr) was inactive before decaying to plage on 04 April. Region 2738 (N06, L=298, class/area-Hsx/300 on 07 Apr) produced low level B-class activity after rotating around the east limb. No Earth-directed coronal mass ejections (CMEs) were observed.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit reached high levels on 05-07 April with moderate levels observed throughout the remainder of the reporting period.

Geomagnetic field activity reached active levels on 01 and 03 April with unsettled levels on 02, 04-06 April due to coronal hole high-speed stream (CH HSS) influence. Quiet conditions were observed on 07 April.

Space Weather Outlook
08 April - 04 May 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 reach high levels on 08-12 April and 02-04 May with normal to moderate levels expected throughout the remainder of the outlook period.

Geomagnetic field activity is expected to reach unsettled levels on 24-25, 27-28, 30 April and 01-02 May. Quiet conditions 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
01 April	69	17	30	A0.0	0	0	0	0	0	0	0	0
02 April	71	18	40	A0.0	0	0	0	0	0	0	0	0
03 April	71	17	10	A0.0	0	0	0	0	0	0	0	0
04 April	70	0	0	A0.0	0	0	0	0	0	0	0	0
05 April	72	0	0	A0.0	0	0	0	0	0	0	0	0
06 April	74	0	0	A2.1	0	0	0	0	0	0	0	0
07 April	77	11	300	A6.8	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
01 April	6.7e+05	1.7e+04	3.5e+03		3.9e+06	
02 April	5.8e+05	1.7e+04	3.6e+03		5.0e+06	
03 April	6.4e+05	1.8e+04	3.8e+03		1.1e+07	
04 April	4.2e+05	1.7e+04	3.8e+03		6.9e+06	
05 April	7.4e+05	1.8e+04	3.6e+03		1.9e+08	
06 April	8.2e+05	1.8e+04	4.0e+03		5.7e+08	
07 April	8.7e+05	1.9e+04	3.7e+03		9.4e+08	

Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
01 April	6	2-1-2-3-2-1-1-0	22	1-1-5-6-4-3-1-0	8	2-2-2-4-2-2-1-0
02 April	5	1-0-0-1-1-1-3-3	2	1-0-0-0-2-1-1-1	6	1-1-1-1-1-1-3-3
03 April	12	2-4-3-2-2-2-2-3	24	2-3-4-5-6-2-1-2	12	3-4-3-2-3-2-2-3
04 April	8	2-2-2-2-2-3-2-1	15	2-2-2-5-3-4-2-1	10	3-2-2-3-2-3-2-1
05 April	10	3-3-2-2-2-3-2-2	20	2-3-3-5-5-3-2-2	14	3-3-3-2-3-3-2-3
06 April	7	2-3-2-2-2-1-1-1	5	2-2-2-3-1-1-0-0	7	2-3-2-2-1-1-2-1
07 April	5	0-2-2-1-2-2-1-2	4	1-1-1-2-3-1-0-0	3	1-2-1-1-2-1-1-2

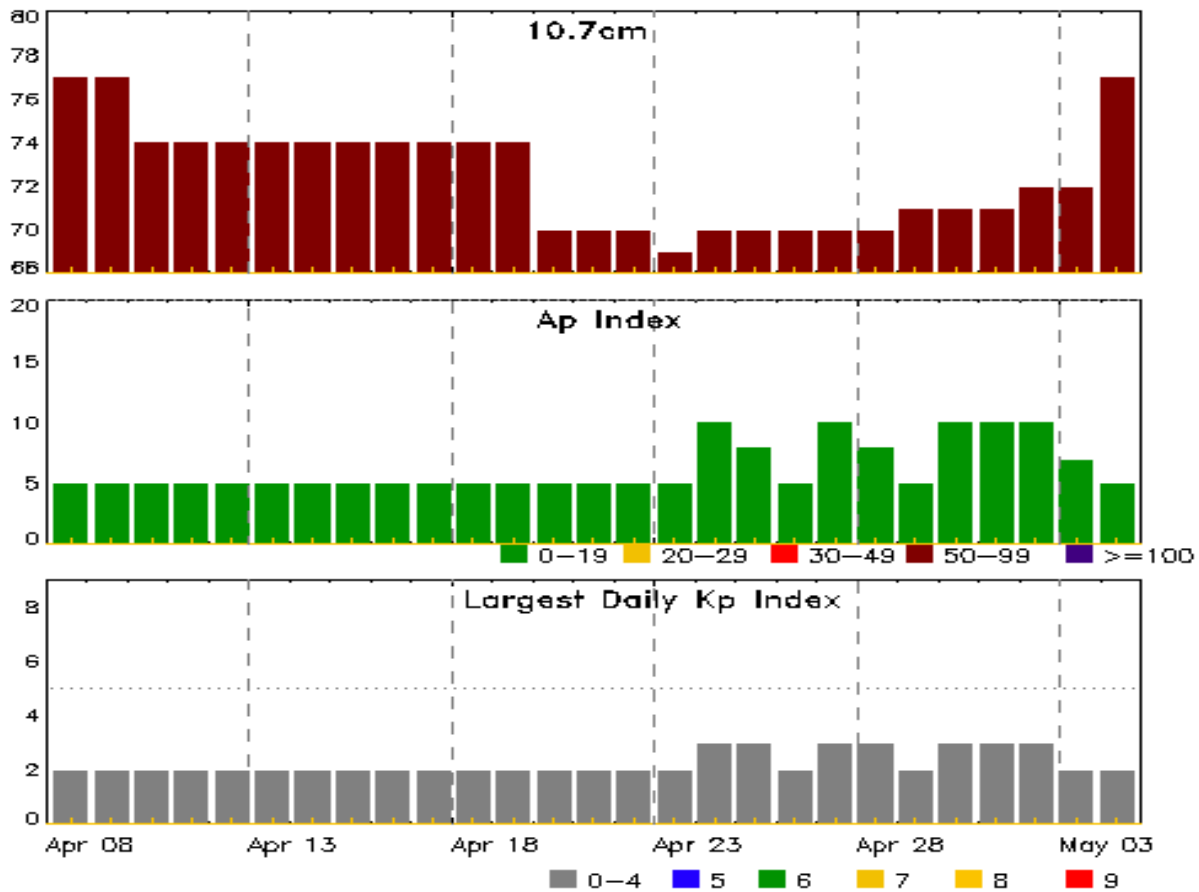


Alerts and Warnings Issued

Date & Time of Issue UTC	Type of Alert or Warning	Date & Time of Event UTC
01 Apr 1105	WARNING: Geomagnetic K = 4	01/1104 - 1800
01 Apr 1202	ALERT: Geomagnetic K = 4	01/1159
03 Apr 0400	WARNING: Geomagnetic K = 4	03/0400 - 1200
03 Apr 0601	ALERT: Geomagnetic K = 4	03/0559
04 Apr 1655	WARNING: Geomagnetic K = 4	04/1655 - 2359
05 Apr 0354	WARNING: Geomagnetic K = 4	05/0355 - 1200
05 Apr 1432	ALERT: Electron 2MeV Integral Flux \geq 1000pfu	05/1400
06 Apr 0901	CONTINUED ALERT: Electron 2MeV Integral Flux \geq 1000pfu	05/1400
07 Apr 0900	CONTINUED ALERT: Electron 2MeV Integral Flux \geq 1000pfu	05/1400



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
08 Apr	77	5	2	22 Apr	70	5	2
09	77	5	2	23	69	5	2
10	74	5	2	24	70	10	3
11	74	5	2	25	70	8	3
12	74	5	2	26	70	5	2
13	74	5	2	27	70	10	3
14	74	5	2	28	70	8	3
15	74	5	2	29	71	5	2
16	74	5	2	30	71	10	3
17	74	5	2	01 May	71	10	3
18	74	5	2	02	72	10	3
19	74	5	2	03	72	7	2
20	70	5	2	04	77	5	2
21	70	5	2				



Energetic Events

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

No Events Observed

Flare List

Date	Time			X-ray Class	Optical		
	Begin	Max	End		Imp/ Brtns	Location Lat CMD	Rgn #
07 Apr	0351	0355	0358	B1.6			2738
07 Apr	0831	0840	0853	B5.3			2738
07 Apr	1047	1100	1126	B7.6			2738
07 Apr	1904	1911	1918	B1.3			2738
07 Apr	2004	2008	2015	B1.2			2738



Region Summary

Sunspot Characteristics and Flares															
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

Region 2737

31 Mar	N12E43	59	10	33	Bxo	4	B								
01 Apr	N12E29	61	30	6	Cro	7	B								
02 Apr	N12E14	63	40	8	Cao	8	B								
03 Apr	N13E02	61	10	6	Bxo	7	B								
04 Apr	N13W12	61	plage												
05 Apr	N13W26	63	plage												
06 Apr	N11W37	61	plage												
07 Apr	N11W51	62	plage												
								0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 61

Region 2738

07 Apr	N06E72	298	300	3	Hsx	1	A								
								0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 298

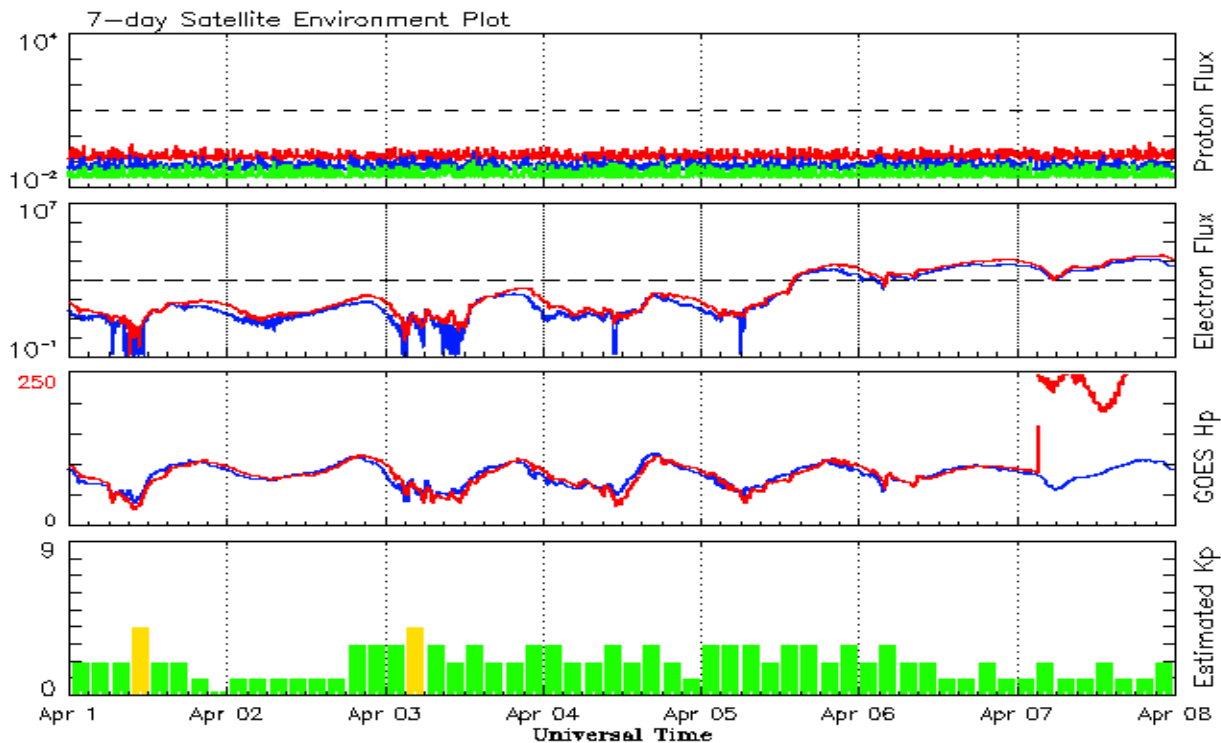


Recent Solar Indices (preliminary)
Observed monthly mean values

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	4.3	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	4.0	69.1	70.0	10	7.3
September	5.7	2.0	0.35	8.7	4.0	68.3	70.1	9	7.3
October	6.9	2.9	0.42			69.5		7	
November	7.3	2.9	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	5.7	0.39			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 01 April 2019*

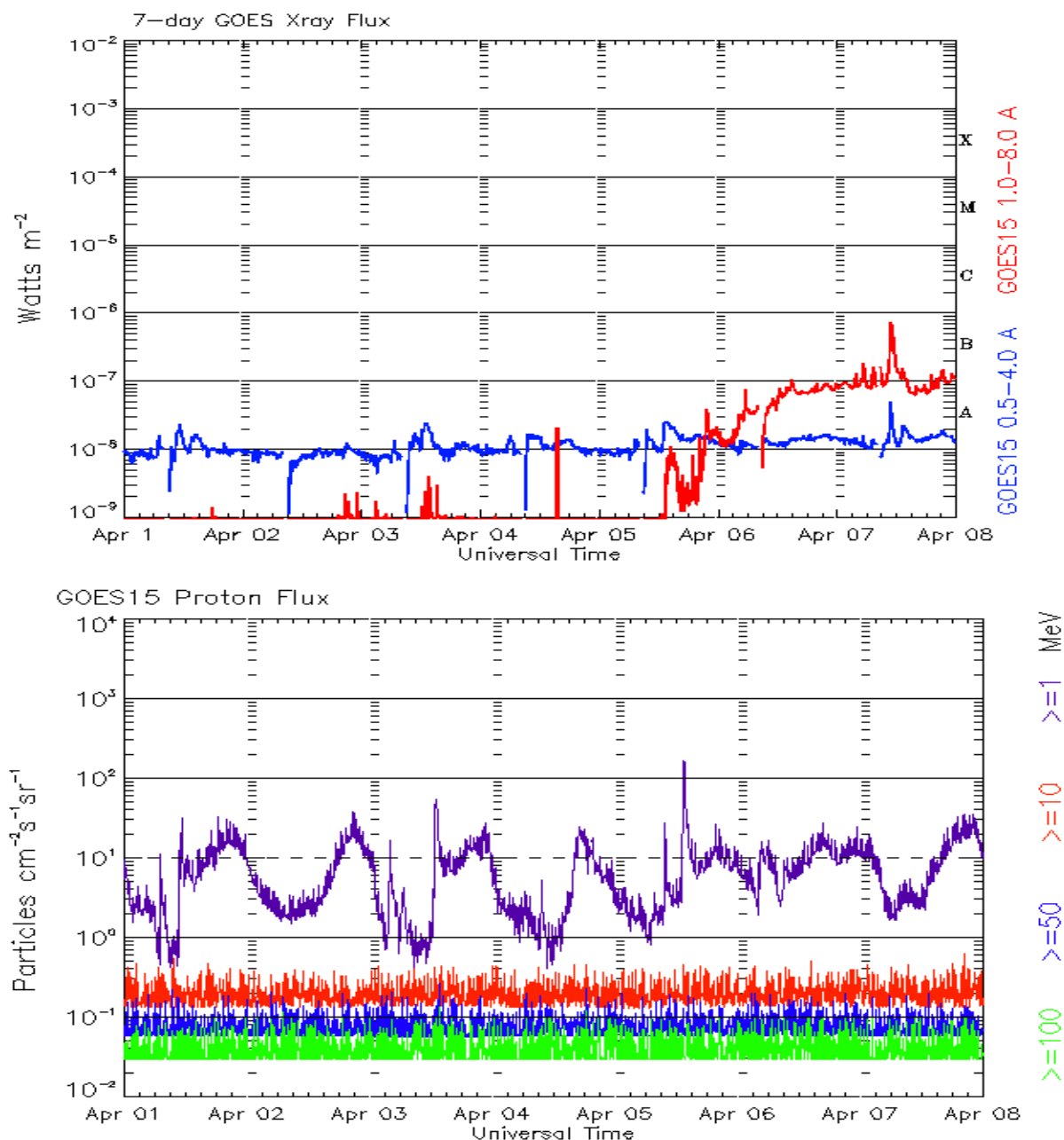
The proton flux plot contains the five-minute averaged integral proton flux (protons/cm²-sec -sr) as measured by the SWPC Primary GOES satellite, near West 75, for each of three energy thresholds: greater than 10, 50, and 100 MeV.

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 01 April 2019*

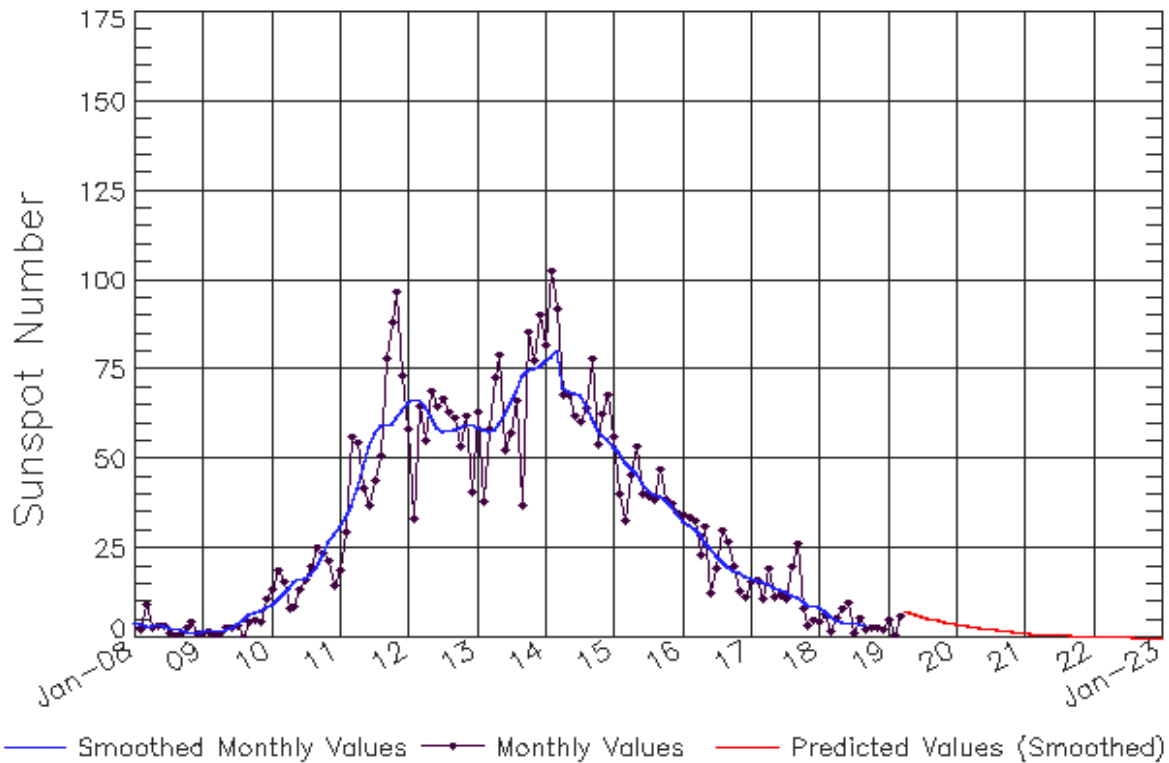
The x-ray plots contains five-minute averages x-ray flux (Watt/m²) as measure by the SWPC primary GOES X-ray satellite, usually at West 105 longitude, in two wavelength bands, 0.05 - 0.4 and 0.1 - 0.8 nm. The letters A, B, C, M and X refer to x-ray event levels for the 0.1 - 0.8 nm band.

The proton plot contains the five-minute averaged integral flux units (pfu = protons/cm² -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.



ISES Solar Cycle Sunspot Number Progression

Observed data through Mar 2019



Updated 2019 Apr 8

NOAA/SWPC Boulder, CO USA

Smoothed Sunspot Number Prediction

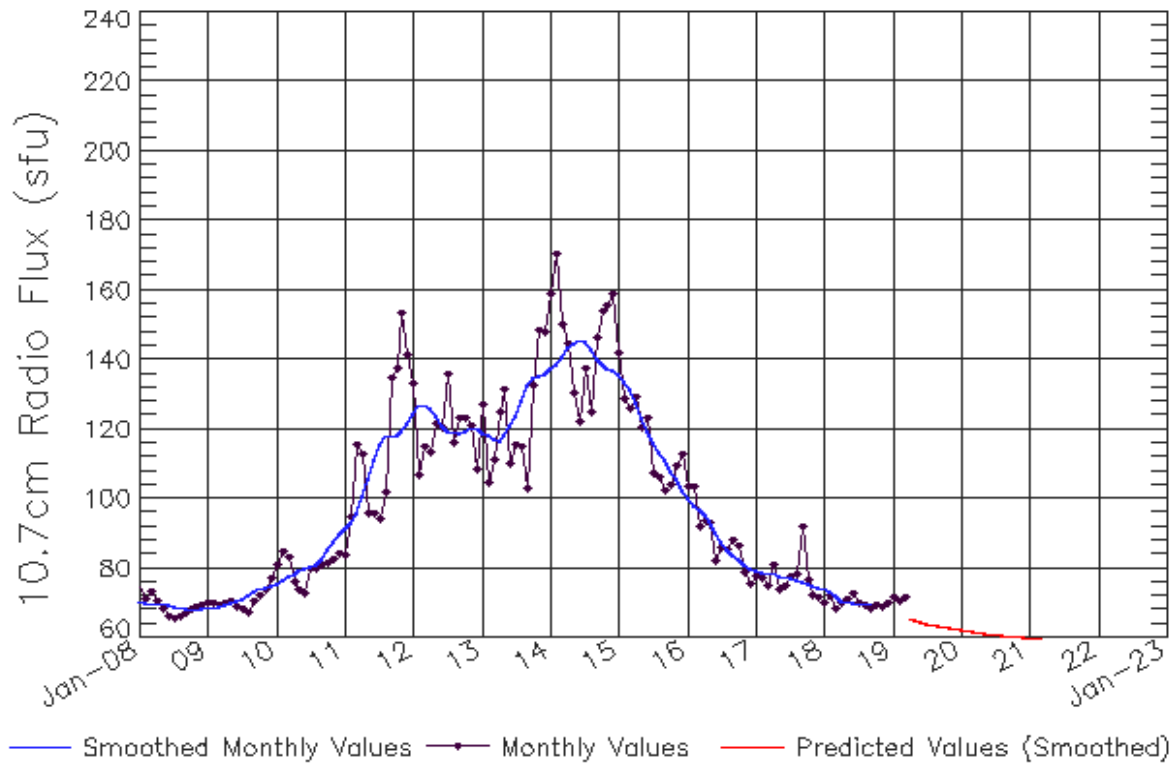
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2010	7 (1)	9 (2)	11 (3)	13 (5)	14 (5)	16 (6)	17 (7)	17 (7)	20 (8)	23 (9)	27 (9)	29 (10)
2011	19 (10)	30 (10)	56 (10)	54 (10)	42 (10)	37 (10)	44 (10)	51 (10)	78 (10)	88 (10)	97 (10)	73 (10)
2012	58 (10)	33 (10)	64 (10)	55 (10)	69 (10)	65 (10)	67 (10)	63 (10)	61 (10)	53 (10)	62 (10)	41 (10)
2013	63 (10)	38 (10)	58 (10)	72 (10)	79 (10)	53 (10)	57 (10)	66 (10)	37 (10)	86 (10)	78 (10)	90 (10)
2014	82 (10)	102 (10)	92 (10)	68 (10)	68 (10)	62 (10)	60 (10)	64 (10)	78 (10)	54 (10)	62 (10)	68 (10)
2015	56 (10)	40 (10)	33 (10)	45 (10)	53 (10)	40 (10)	40 (10)	39 (10)	47 (10)	38 (10)	37 (10)	35 (10)
2016	34 (10)	34 (10)	33 (10)	23 (10)	31 (10)	12 (10)	19 (10)	30 (10)	27 (10)	20 (10)	13 (10)	11 (10)
2017	16 (10)	16 (10)	11 (10)	19 (10)	11 (10)	12 (10)	11 (10)	20 (10)	26 (10)	8 (10)	3 (10)	5 (10)
2018	4 (10)	6 (10)	2 (10)	5 (10)	8 (10)	9 (10)	1 (10)	5 (10)	2 (10)	3 (10)	3 (10)	2 (10)
2019	5 (10)	1 (10)	6 (10)	7 (10)	7 (10)	6 (10)	6 (10)	6 (10)	5 (10)	5 (10)	4 (10)	4 (10)
2020	4 (10)	4 (10)	3 (10)	3 (10)	3 (10)	3 (10)	2 (10)	2 (10)	2 (10)	2 (10)	2 (10)	2 (10)
2021	2 (10)	1 (10)	1 (10)	1 (10)	1 (10)	1 (10)	1 (10)	1 (10)	1 (10)	1 (10)	1 (10)	1 (10)
2022	1 (10)	0 (10)	0 (10)	0 (10)	0 (10)	0 (10)	0 (10)	0 (10)	0 (10)	0 (10)	0 (10)	0 (10)
2023	0 (10)	0 (10)	0 (10)	0 (10)	0 (10)	0 (10)	0 (10)	0 (10)	0 (10)	0 (10)	0 (10)	0 (10)

SWPC PR17 2275 08 April 2019



ISES Solar Cycle F10.7cm Radio Flux Progression

Observed data through Mar 2019



Updated 2019 Apr 8

NOAA/SWPC Boulder, CO USA

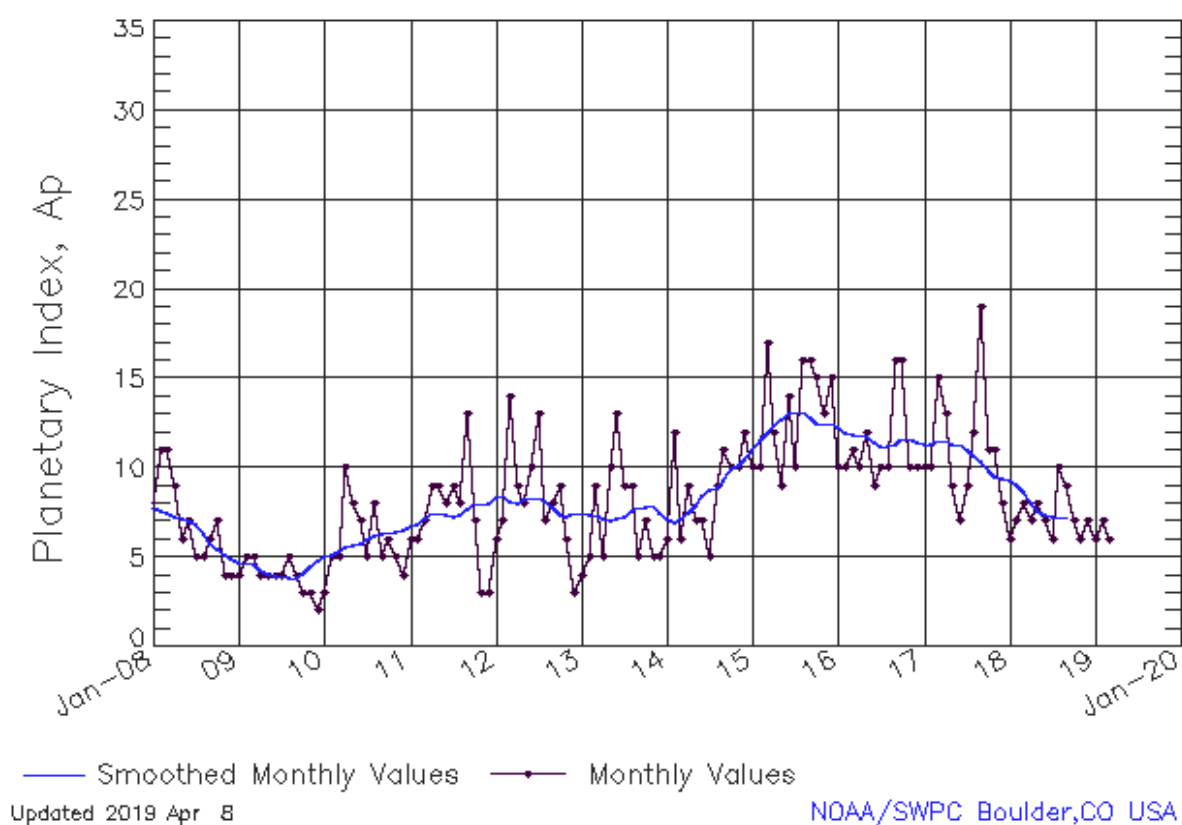
Smoothed F10.7cm Radio Flux Prediction

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2010	76 (***)	77 (***)	78 (***)	78 (***)	79 (***)	80 (***)	80 (***)	81 (***)	82 (***)	85 (***)	88 (***)	90 (***)
2011	91 (***)	93 (***)	96 (***)	100 (***)	106 (***)	111 (***)	115 (***)	118 (***)	118 (***)	118 (***)	120 (***)	122 (***)
2012	124 (***)	127 (***)	127 (***)	126 (***)	124 (***)	121 (***)	120 (***)	119 (***)	119 (***)	119 (***)	120 (***)	120 (***)
2013	119 (***)	118 (***)	117 (***)	117 (***)	118 (***)	121 (***)	124 (***)	128 (***)	132 (***)	135 (***)	135 (***)	136 (***)
2014	137 (***)	139 (***)	141 (***)	144 (***)	145 (***)	146 (***)	145 (***)	143 (***)	140 (***)	138 (***)	137 (***)	137 (***)
2015	136 (***)	134 (***)	131 (***)	127 (***)	123 (***)	120 (***)	116 (***)	113 (***)	111 (***)	108 (***)	105 (***)	103 (***)
2016	100 (***)	98 (***)	97 (***)	95 (***)	93 (***)	90 (***)	88 (***)	86 (***)	84 (***)	83 (***)	81 (***)	80 (***)
2017	79 (***)	79 (***)	79 (***)	78 (***)	78 (***)	77 (***)	77 (***)	76 (***)	76 (***)	75 (***)	75 (***)	74 (***)
2018	74 (***)	73 (***)	72 (***)	71 (***)	70 (***)	70 (***)	70 (***)	70 (***)	70 (***)	70 (1)	70 (1)	69 (2)
2019	68 (3)	68 (4)	68 (4)	67 (5)	67 (6)	66 (7)	65 (8)	65 (8)	64 (9)	63 (9)	63 (9)	63 (9)
2020	62 (9)	62 (9)	62 (9)	62 (9)	61 (9)	61 (9)	61 (9)	61 (9)	61 (9)	60 (9)	60 (9)	60 (9)
2021	60 (9)	60 (9)	60 (9)	60 (9)	60 (9)	60 (9)	60 (9)	59 (9)	59 (9)	59 (9)	59 (9)	59 (9)
2022	59 (9)	59 (9)	59 (9)	59 (9)	59 (9)	59 (9)	59 (9)	59 (9)	59 (9)	59 (9)	59 (9)	59 (9)



ISES Solar Cycle Ap Progression

Observed data through Mar 2019



Solar Cycle Comparison charts are temporarily unavailable.

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

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

<http://spaceweather.gov/weekly/> -- Current and previous year

<http://spaceweather.gov/ftpmenu/warehouse.html> -- Online archive from 1997

<http://spaceweather.gov/ftpmenu/> -- Some content as ascii text

<http://spaceweather.gov/SolarCycle/> -- Solar Cycle Progression web site

<http://spaceweather.gov/contacts.html> -- Contact and Copyright information

http://spaceweather.gov/weekly/Usr_guide.pdf -- User Guide

