

Solar activity was at very low levels on 31 Dec - 05 Jan and increased to low levels on 06 Jan due to an isolated C1 flare at 06/1051 UTC from Region 2732 (N09, L=215, class/area Cao/090 on 03 Jan). No Earth-directed CMEs were observed during the period.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit was at normal levels on 05 Jan and normal to moderate levels on 01-04 Jan. High levels were observed on 31 Dec and 06 Jan due to enhancements associated with recurrent coronal hole high speed streams (CH HSS). The largest flux of the period was 2,020 pfu observed at 31/1930 UTC.

Geomagnetic field activity ranged from quiet to G1 (Minor) storm levels. Solar wind parameters began the period under a waning positive polarity CH HSS. Solar wind speed decreased from approximately 520 km/s on 31 Dec to 290 km/s by 03 Jan with total field at or below 6 nT. The geomagnetic field was at quiet to unsettled levels on 31 Dec - 01 Jan while quiet levels were observed on 02-03 Jan. At approximately 04/0420 UTC, total field began to increase to a maximum of 13 nT at 04/1705 UTC which was indicative of the arrival of a CIR preceding a negative polarity CH HSS. The Bz component reached a maximum southward deflection of -9 nT at 05/0200 UTC. Solar wind speed increased to a maximum of 565 km/s at 06/1350 UTC. The geomagnetic field responded with mostly unsettled periods late on 04 Jan, quiet to G1 (Minor) storm levels on 05 Jan, and quiet to unsettled levels on 06 Jan.

### **Space Weather Outlook** **07 January - 02 February 2019**

Solar activity is expected to be at very low levels on 07-19 Jan with a chance for C-flare activity on 20 Jan - 02 Feb due to the return of old Region 2732 (N09, L=215).

No proton events are expected at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to be at high levels on 07-12 Jan, 25-27 Jan and again on 02 Feb due to recurrent CH HSS influence.

Geomagnetic field activity is expected to reach unsettled levels on 07, 26 and 31 Jan. Unsettled to active levels are expected on 16 Jan, 24-25 Jan and 01-02 Feb. G1 (Minor) levels are likely on 24 Jan. Levels of elevated geomagnetic activity are anticipated due to recurrent CH HSS effects.



### ***Daily Solar Data***

Date	Radio Flux 10.7cm	Sun spot No.	Sunspot Area (10 <sup>-6</sup> hemi.)	X-ray Background Flux	Flares							
					X-ray			Optical				
					C	M	X	S	1	2	3	4
31 December	69	0	0	A1.0	0	0	0	0	0	0	0	0
01 January	72	13	10	A1.0	0	0	0	0	0	0	0	0
02 January	75	16	30	A1.9	0	0	0	1	0	0	0	0
03 January	73	16	90	A2.3	0	0	0	0	0	0	0	0
04 January	72	13	50	A1.5	0	0	0	0	0	0	0	0
05 January	71	13	10	A1.8	0	0	0	0	0	0	0	0
06 January	72	12	10	A2.5	1	0	0	0	0	0	0	0

### ***Daily Particle Data***

Date	Proton Fluence (protons/cm <sup>2</sup> -day -sr)			Electron Fluence (electrons/cm <sup>2</sup> -day -sr)		
	>1 MeV	>10 MeV	>100 MeV	>0.6 MeV	>2MeV	>4 MeV
31 December		9.5e+05	1.6e+04	3.8e+03		8.5e+07
01 January		5.6e+05	1.7e+04	4.1e+03		3.7e+07
02 January		6.5e+05	1.7e+04	3.9e+03		3.4e+07
03 January		7.2e+05	1.6e+04	3.8e+03		3.2e+07
04 January		1.9e+06	1.7e+04	3.8e+03		1.6e+07
05 January		1.1e+06	1.6e+04	3.6e+03		1.0e+06
06 January		8.5e+05	1.6e+04	3.6e+03		3.7e+07

### ***Daily Geomagnetic Data***

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
31 December	7	3-2-2-2-2-1-1-1	14	1-1-1-5-5-1-0-1	7	3-2-2-2-2-1-0-1
01 January	5	1-1-3-1-2-1-1-0	14	0-0-3-5-5-1-0-0	6	1-1-3-2-2-1-0-1
02 January	1	0-0-0-0-1-1-0-0	0	0-0-0-0-0-0-0-0	2	0-0-0-0-0-1-0-1
03 January	2	1-0-0-1-1-1-0-0	1	0-0-0-1-1-0-0-0	2	1-0-0-1-1-0-0-1
04 January	7	1-1-1-2-2-2-2-3	11	0-0-3-3-3-4-2-2	9	1-1-1-2-2-3-3-3
05 January	11	4-3-2-2-2-2-2-2	17	3-5-2-3-4-3-1-1	15	5-4-2-2-2-2-2-3
06 January	9	1-3-2-2-2-2-3-2	14	1-2-2-4-4-3-3-2	6	2-3-2-2-2-2-3-2

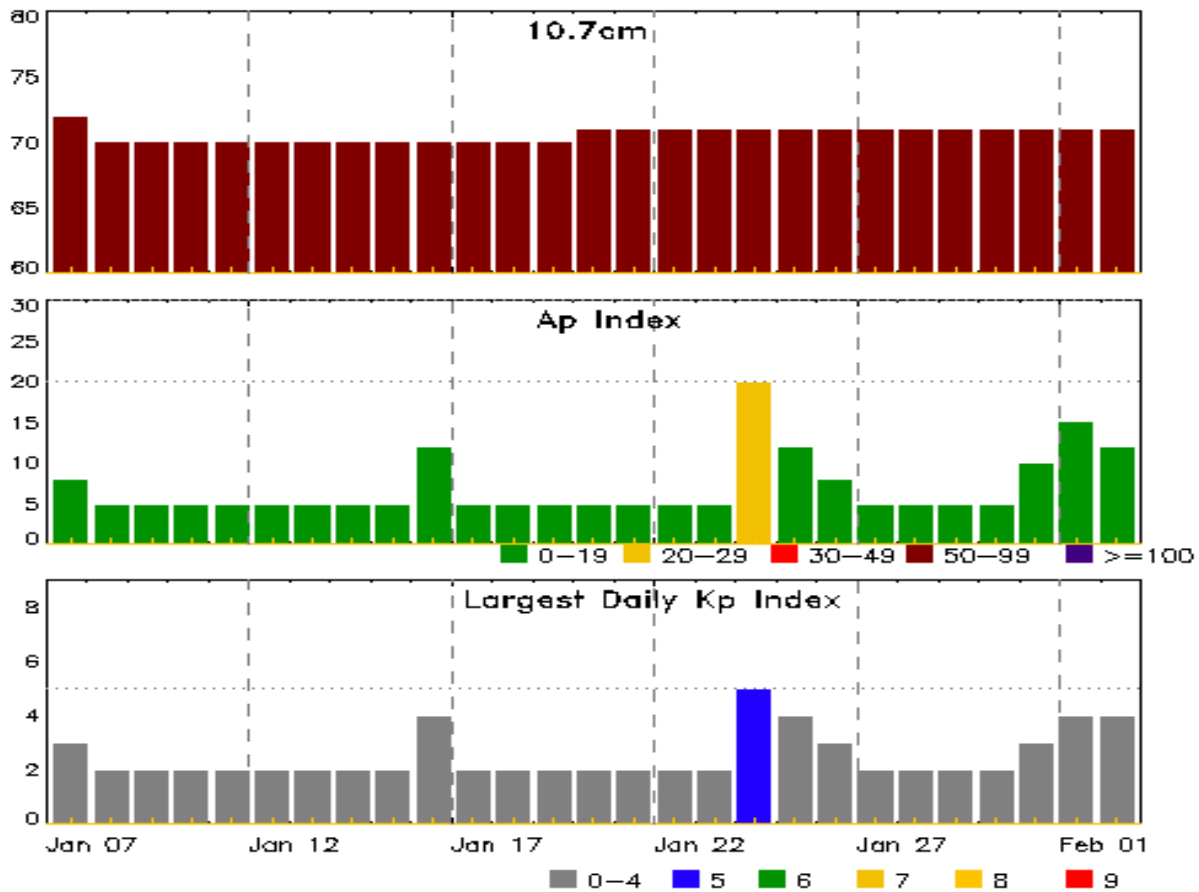


### *Alerts and Warnings Issued*

<b>Date &amp; Time of Issue UTC</b>	<b>Type of Alert or Warning</b>	<b>Date &amp; Time of Event UTC</b>
31 Dec 0137	WARNING: Geomagnetic K = 4	31/0140 - 0900
31 Dec 1506	CONTINUED ALERT: Electron 2MeV Integral Flux $\geq$ 1000pfu	29/1615
02 Jan 2221	WATCH: Geomagnetic Storm Category G1 predicted	
04 Jan 2327	WARNING: Geomagnetic K = 4	04/2327 - 05/1200
05 Jan 0055	ALERT: Geomagnetic K = 4	05/0055
05 Jan 0113	WARNING: Geomagnetic K = 5	05/0113 - 0900
05 Jan 0137	ALERT: Geomagnetic K = 5	05/0137
05 Jan 1155	EXTENDED WARNING: Geomagnetic K = 4	04/2327 - 05/2359
05 Jan 2159	WARNING: Geomagnetic K = 4	05/2159 - 06/0900
06 Jan 1846	ALERT: Electron 2MeV Integral Flux $\geq$ 1000pfu	06/1830



## 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
07 Jan	72	8	3	21 Jan	71	5	2
08	70	5	2	22	71	5	2
09	70	5	2	23	71	5	2
10	70	5	2	24	71	20	5
11	70	5	2	25	71	12	4
12	70	5	2	26	71	8	3
13	70	5	2	27	71	5	2
14	70	5	2	28	71	5	2
15	70	5	2	29	71	5	2
16	70	12	4	30	71	5	2
17	70	5	2	31	71	10	3
18	70	5	2	01 Feb	71	15	4
19	70	5	2	02	71	12	4
20	71	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			Optical			
	Begin	Max	End	X-ray Class	Imp/ Brtns	Location Lat CMD	Rgn #
02 Jan	0144	0150	0155	B2.8	SF	N10W21	2732
02 Jan	1832	1838	1844	B1.2			
03 Jan	1640	1714	1733	B1.9			
04 Jan	1104	1135	1146	B4.2			2732
06 Jan	0156	0201	0209	B3.1			2732
06 Jan	0335	0341	0347	B1.3			2732
06 Jan	0423	0452	0514	B2.1			2732
06 Jan	0532	0551	0601	B8.6			2732
06 Jan	0835	0840	0848	B1.4			2732
06 Jan	1031	1051	1100	C1.6			2732
06 Jan	1333	1337	1339	B1.6			2732



## ***Region Summary***

Location		Sunspot Characteristics						Flares							
Date	Lat CMD	Helio	Area	Extent	Spot	Spot	Mag	X-ray			Optical				
		Lon	10 <sup>-6</sup> hemi.	(helio)	Class	Count	Class	C	M	X	S	1	2	3	4
Region 2732															
01 Jan	N10W20	215	10	4	Bxo	3	B								
02 Jan	N09W33	214	30	6	Dro	6	B				1				
03 Jan	N09W47	215	90	8	Cao	6	B								
04 Jan	N10W59	215	50	8	Cao	3	B								
05 Jan	N09W74	216	10	9	Bxo	3	B								
06 Jan	N09W85	213	10	5	Bxo	2	B	1							
								1	0	0	1	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 215

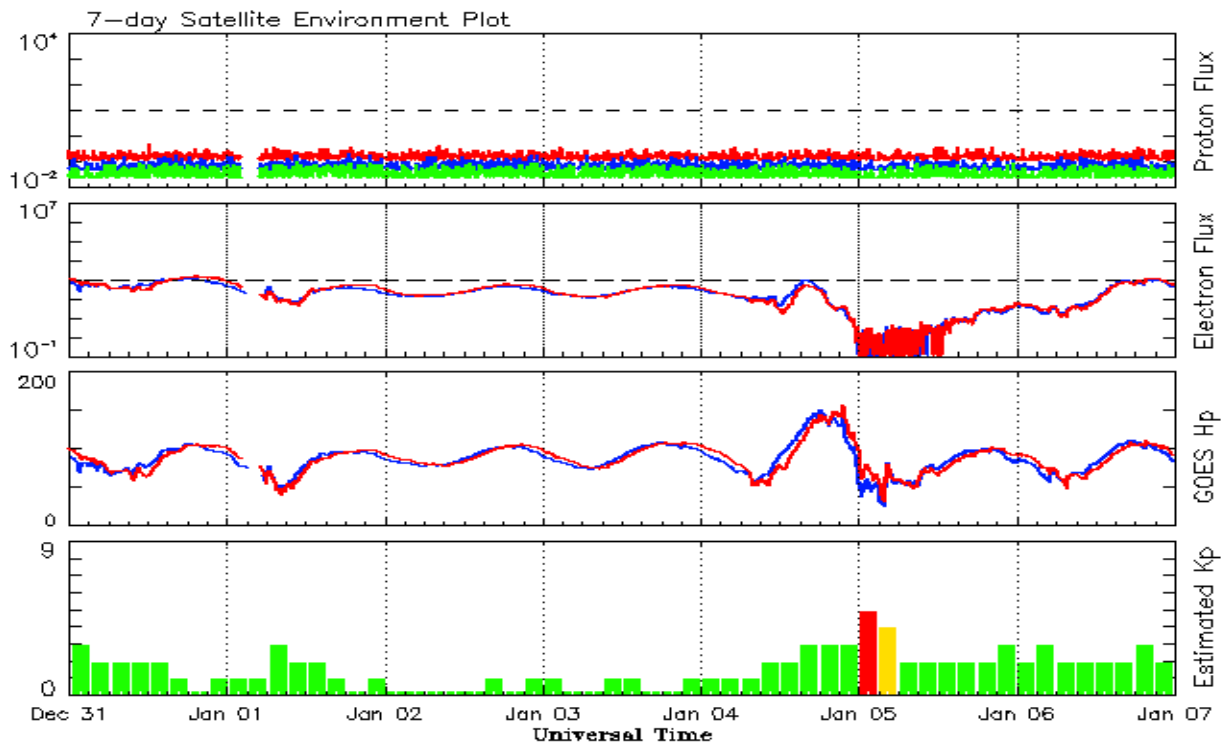


**Recent Solar Indices (preliminary)**  
**Observed monthly mean values**

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
<b>2017</b>									
January	28.1	15.7	0.55	27.3	16.7	77.4	79.4	10	11.3
February	22.0	15.8	0.71	25.5	15.9	76.9	78.7	10	11.3
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
<b>2018</b>									
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			69.7		6	
August	10.0	5.3	0.53			69.1		10	
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	

**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 31 December 2018*

The proton flux plot contains the five-minute averaged integral proton flux (protons/cm<sup>2</sup>-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.

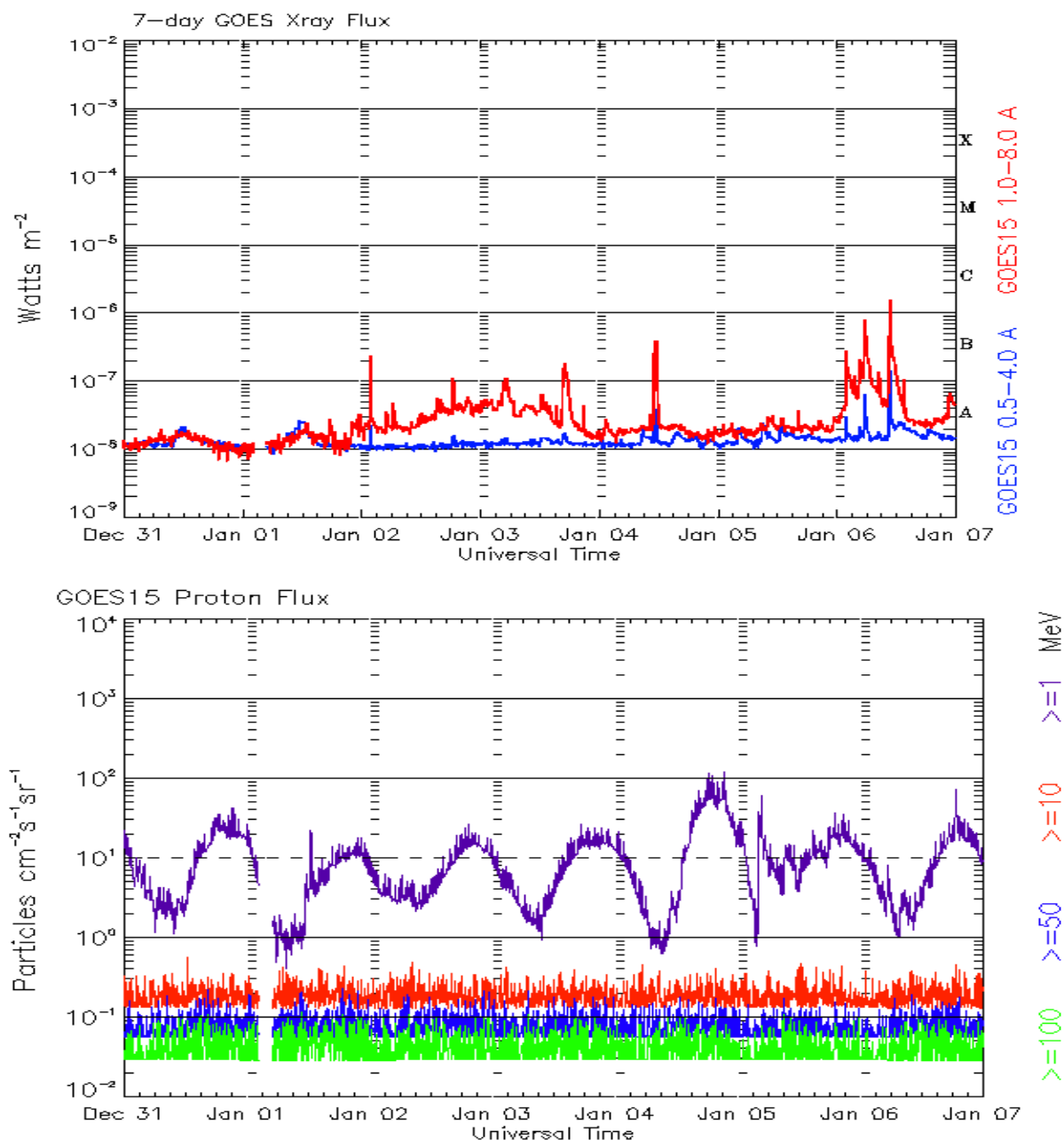
The electron flux plot contains the five-minute averaged integral electron flux (electrons/cm<sup>2</sup>-sec -sr) with energies greater than 2 MeV by the SWPC Primary GOES satellite.

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 31 December 2018*

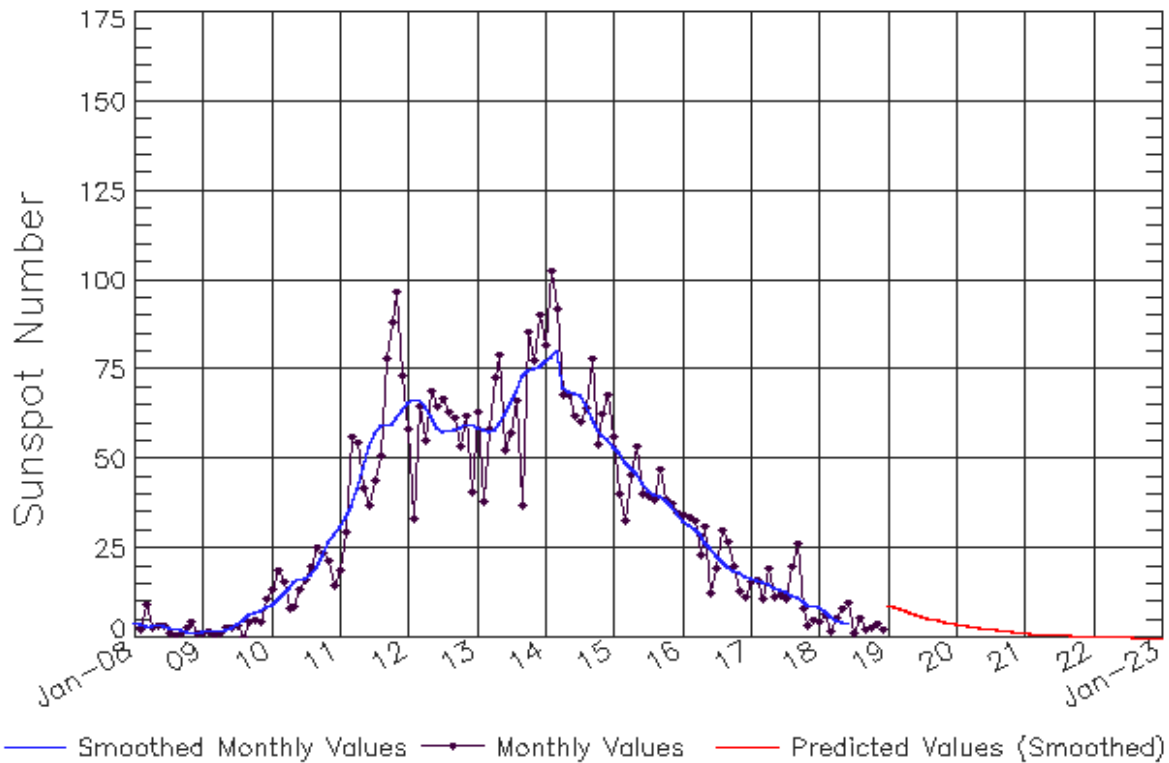
The x-ray plots contains five-minute averages x-ray flux ( $\text{Watt/m}^2$ ) as measure by the SWPC primary GOES X-ray satellite, usually at West 105 longitude, in two wavelength bands, 0.05 - 0.4 and 0.1 - 0.8 nm. The letters A, B, C, M and X refer to x-ray event levels for the 0.1 - 0.8 nm band.

The proton plot contains the five-minute averaged integral flux units (pfu = protons/ $\text{cm}^2$  -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.



# ISES Solar Cycle Sunspot Number Progression

Observed data through Dec 2018



Updated 2019 Jan 7

NOAA/SWPC Boulder, CO USA

## Smoothed Sunspot Number Prediction

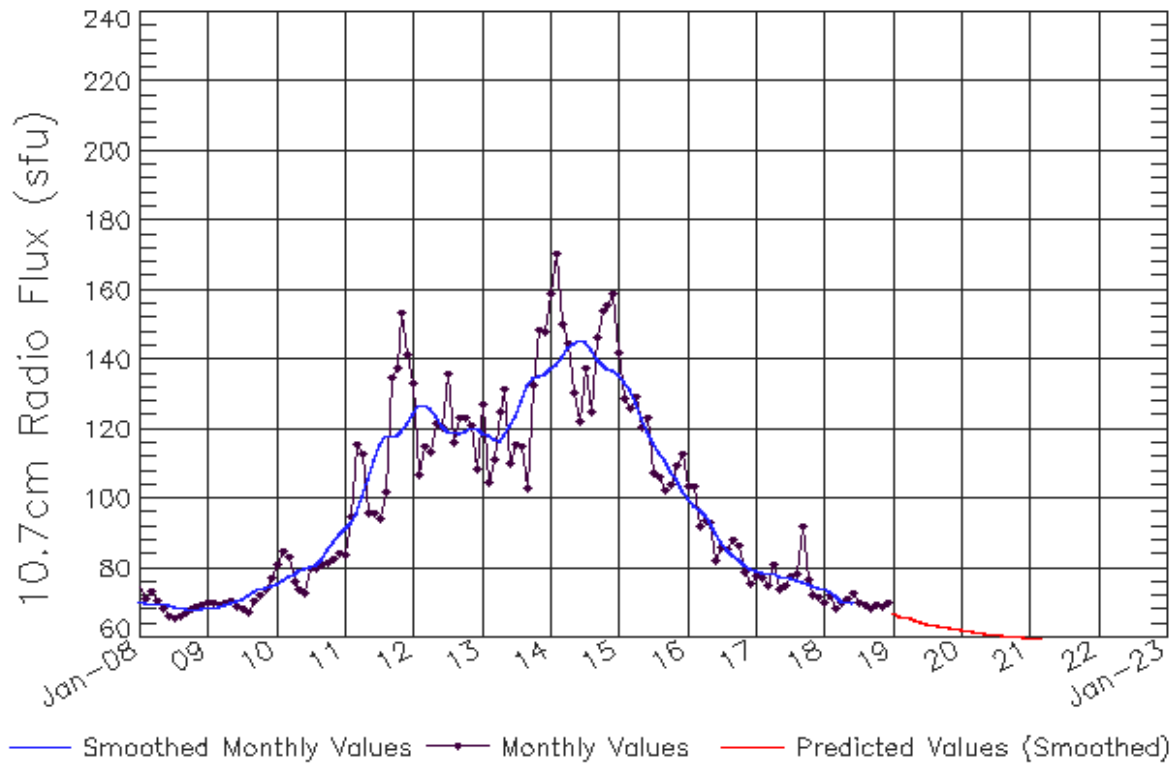
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2010	7 (1)	9 (2)	11 (3)	13 (5)	14 (5)	16 (6)	17 (7)	17 (7)	20 (8)	23 (9)	27 (9)	29 (10)
2011	19 (10)	30 (10)	56 (10)	54 (10)	42 (10)	37 (10)	44 (10)	51 (10)	78 (10)	88 (10)	97 (10)	73 (10)
2012	58 (10)	33 (10)	64 (10)	55 (10)	69 (10)	65 (10)	67 (10)	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)	4 (10)	2 (10)
2019	9 (10)	8 (10)	8 (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 PRE 2262 07 January 2019



# ISES Solar Cycle F10.7cm Radio Flux Progression

Observed data through Dec 2018



Updated 2019 Jan 7

NOAA/SWPC Boulder, CO USA

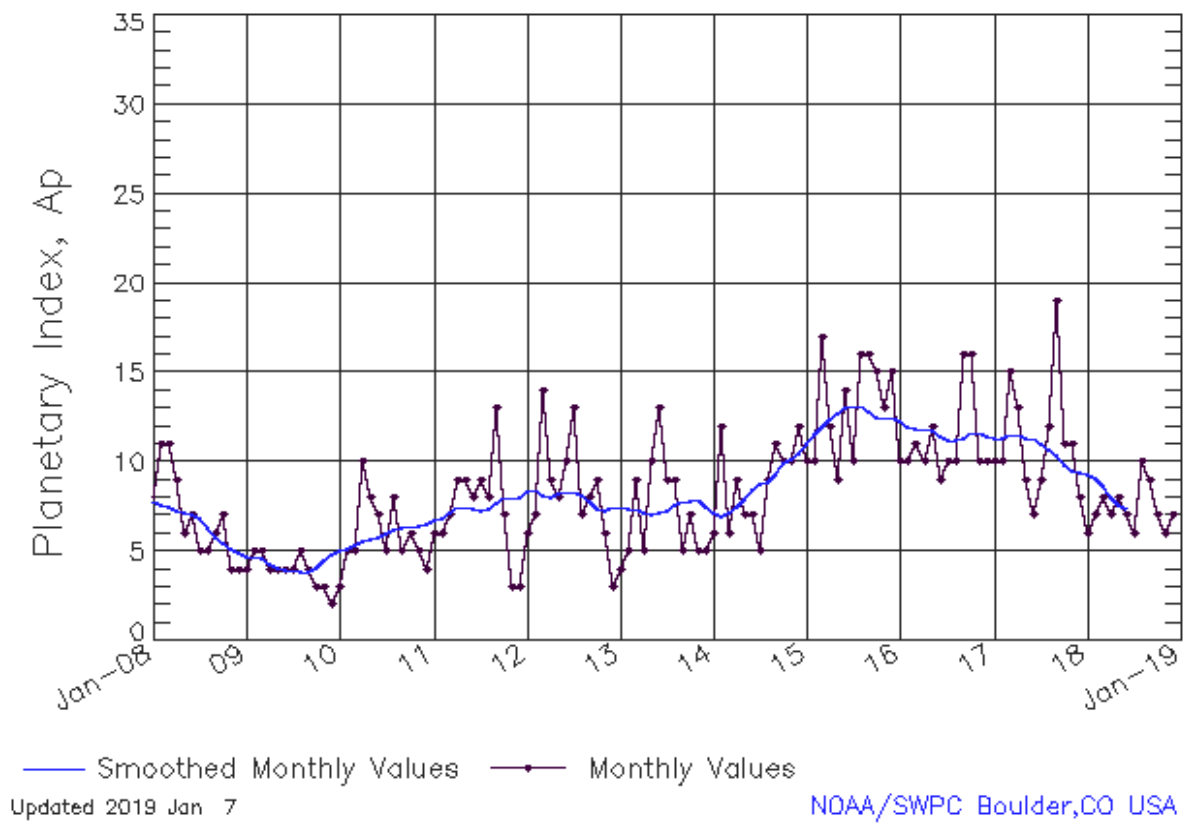
## Smoothed F10.7cm Radio Flux Prediction

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 (1)	69 (1)	69 (2)	69 (3)	68 (4)	68 (4)
2019	67 (5)	67 (6)	66 (7)	66 (8)	65 (8)	65 (9)	64 (9)	64 (9)	63 (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 Dec 2018



*Solar Cycle Comparison charts are temporarily unavailable.*

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

Published every Monday by the Space Weather Prediction Center.

U.S. Department of Commerce  
NOAA / National Weather Service  
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](mailto: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](http://spaceweather.gov/weekly/Usr_guide.pdf) -- User Guide

