

Space Weather Highlights
27 November - 03 December 2017

SWPC PRF 2205
04 December 2017

Solar activity was at very low levels. The only spotted region on the disk, Region 2689 (N13, L=108, class/area Cao/060 on 26 Nov), was quiet and stable. No Earth-directed CMEs were detected.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit was at moderate flux levels throughout the period. A maximum flux of 602 pfu was observed at 27/1435 UTC.

Geomagnetic field activity was at predominately quiet levels through the period. Isolated unsettled and active periods were observed on 28 and 30 Nov and again on 01-02 Dec due to waning, negative polarity CH HSS influence. Solar wind speed averaged about 425 km/s through the period with a peak speed of 525 km/s observed midday on 30 Nov and again early on 01 Dec.

Space Weather Outlook
04 December - 30 December 2017

Solar activity is expected to be at very 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 05-10, 12-17 and 19-21 Dec due to recurrent CH HSS influence. Normal to moderate levels are expected for the remainder of the outlook period.

Geomagnetic field activity is expected to be at G1 (Minor) levels on 04-06 Dec and 18 Dec with G2 (Moderate) levels expected on 04-05 Dec due to recurrent CH HSS effects. Unsettled to active levels are expected on 07-08, 11-14, 17-21 and 27-28 Dec due to recurrent CH HSS effects. Mostly quiet levels are expected for 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
27 November	74	15	60	A5.2	0	0	0	0	0	0	0	0
28 November	72	14	60	A4.6	0	0	0	0	0	0	0	0
29 November	73	12	40	A4.5	0	0	0	0	0	0	0	0
30 November	72	11	40	A4.2	0	0	0	0	0	0	0	0
01 December	70	0	0	A4.0	0	0	0	0	0	0	0	0
02 December	72	0	0	A3.8	0	0	0	0	0	0	0	0
03 December	70	0	0	A3.4	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
	27 November		4.7e+07	1.6e+04	3.5e+03	
28 November		5.2e+06	1.6e+04	3.8e+03		5.8e+06
29 November		2.8e+07	1.6e+04	3.5e+03		6.5e+06
30 November		5.3e+07	1.4e+04	3.2e+03		3.6e+06
01 December		8.4e+06	1.5e+04	3.5e+03		7.0e+06
02 December		5.8e+07	1.6e+04	3.7e+03		7.7e+06
03 December		2.4e+07	1.6e+04	3.8e+03		7.5e+06

Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	27 November	4	1-1-2-0-2-1-2-1	1	0-0-0-0-1-0-1-0	5
28 November	6	3-2-1-1-2-1-1-1	11	2-1-1-5-4-0-1-0	8	4-2-2-2-2-1-1-1
29 November	4	1-1-2-1-0-1-1-2	3	0-0-3-1-0-0-0-1	5	1-1-2-1-0-1-1-2
30 November	9	2-4-1-1-2-2-2-2	11	1-2-0-3-4-4-1-1	11	2-4-1-1-3-3-2-3
01 December	5	0-3-1-1-1-2-2-1	5	1-1-1-1-3-2-1-0	8	2-3-2-1-1-3-2-1
02 December	2	0-0-0-0-1-2-1-1	3	0-0-1-0-0-3-1-0	4	1-0-1-1-0-3-1-1
03 December	1	0-0-0-0-0-1-0-1	0	0-0-0-1-0-0-0-0	2	0-0-0-1-0-0-0-1

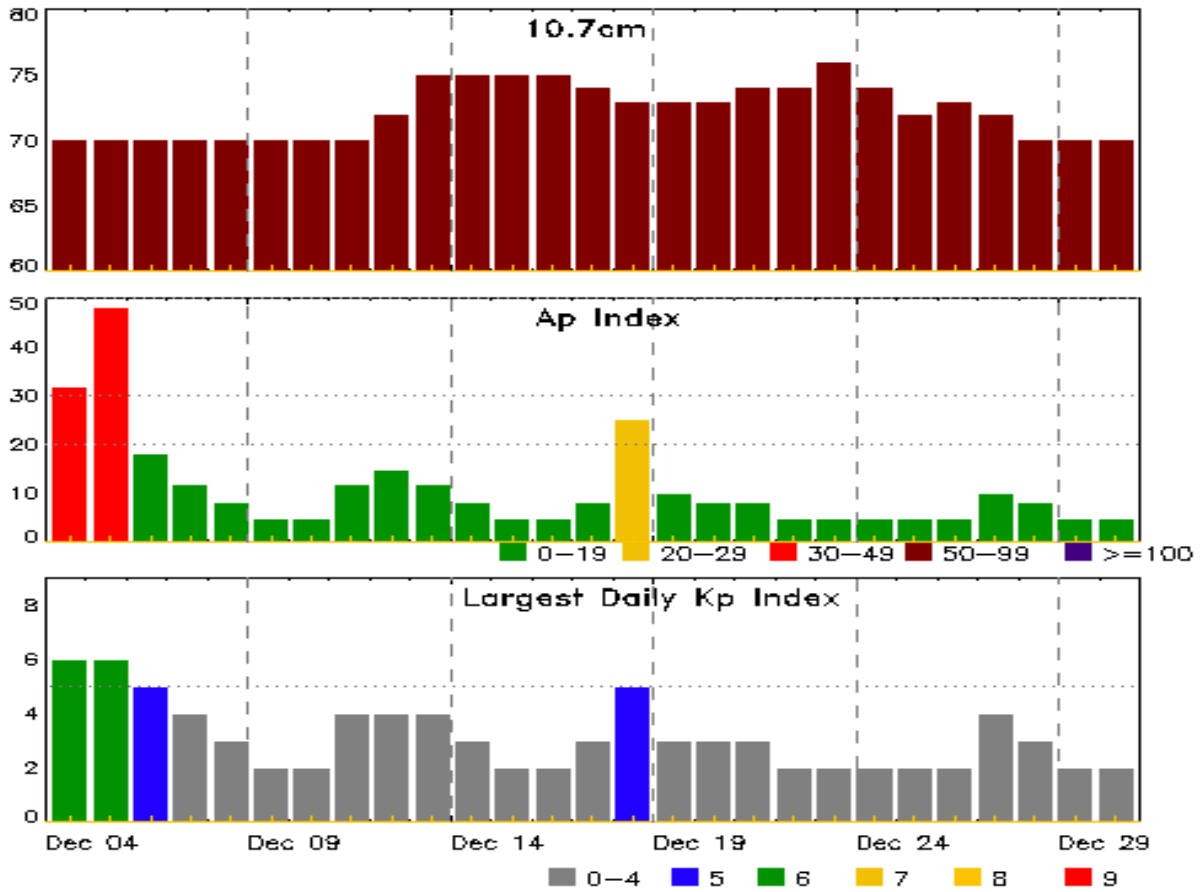


Alerts and Warnings Issued

Date & Time of Issue UTC	Type of Alert or Warning	Date & Time of Event UTC
28 Nov 0216	WARNING: Geomagnetic K = 4	28/0215 - 1500
28 Nov 0300	ALERT: Geomagnetic K = 4	28/0259
30 Nov 0344	WARNING: Geomagnetic K = 4	30/0343 - 1200
30 Nov 0420	ALERT: Geomagnetic K = 4	30/0420
01 Dec 2154	WATCH: Geomagnetic Storm Category G1 predicted	
02 Dec 1621	WATCH: Geomagnetic Storm Category G2 predicted	
03 Dec 2158	WATCH: Geomagnetic Storm Category G2 predicted	



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
04 Dec	70	32	6	18 Dec	73	25	5
05	70	48	6	19	73	10	3
06	70	18	5	20	73	8	3
07	70	12	4	21	74	8	3
08	70	8	3	22	74	5	2
09	70	5	2	23	76	5	2
10	70	5	2	24	74	5	2
11	70	12	4	25	72	5	2
12	72	15	4	26	73	5	2
13	75	12	4	27	72	10	4
14	75	8	3	28	70	8	3
15	75	5	2	29	70	5	2
16	75	5	2	30	70	5	2
17	74	8	3				



Energetic Events

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

No Events Observed

Flare List

Date	Time			X-ray Class	Optical			Rgn #
	Begin	Max	End		Imp/ Brtns	Location Lat CMD		
27 Nov	1106	1117	1125	B2.9				2689
01 Dec	1407	1410	1412	B1.0				2689



Region Summary

Date	Location		Sunspot Characteristics				Flares											
	Lat CMD	Lon	Helio 10 ⁻⁶	Area hemi.	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical						
									C	M	X	S	1	2	3	4		
<i>Region 2689</i>																		
25 Nov	N13W08	108	20	5	Cso	3	B											
26 Nov	N13W21	108	60	6	Cao	5	B											
27 Nov	N13W34	108	60	5	Cso	5	B											
28 Nov	N12W49	110	60	4	Cao	4	B											
29 Nov	N12W65	113	40	2	Hax	2	A											
30 Nov	N13W78	112	40	2	Hrx	1	A											
01 Dec	N13W92	113	plage															

0 0 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 108

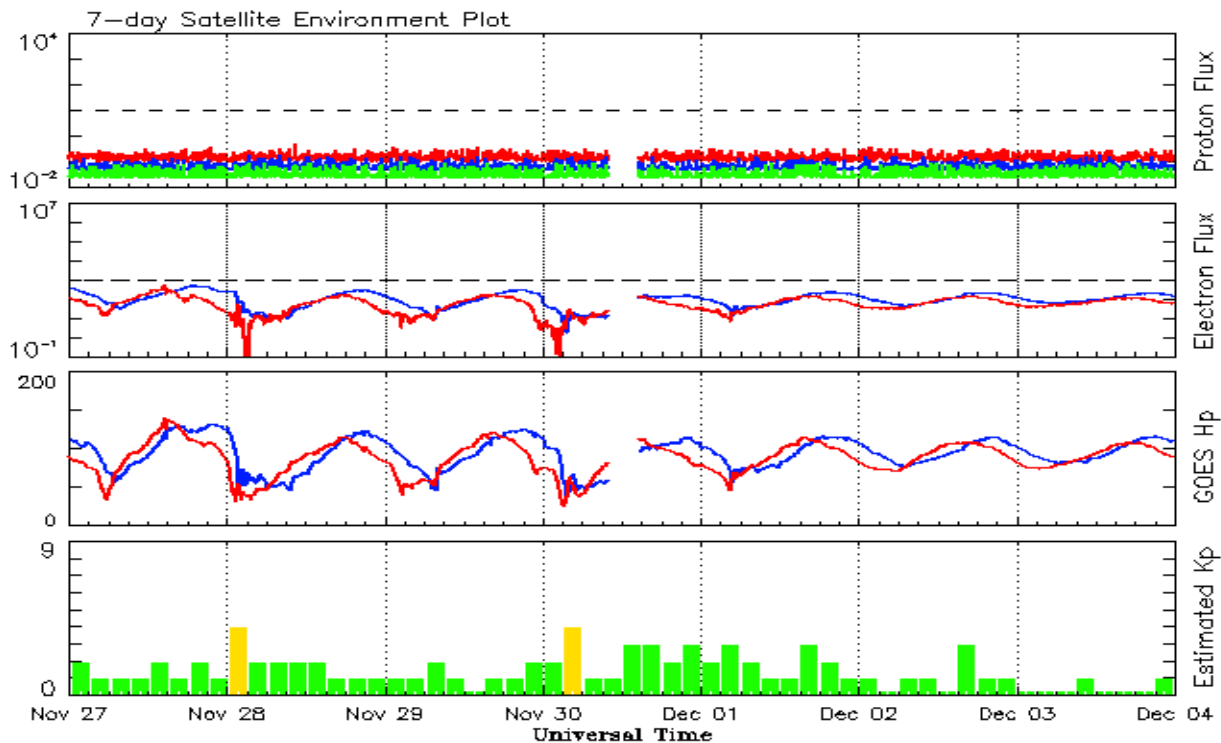


Recent Solar Indices (preliminary)
Observed monthly mean values

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
2015									
December	54.1	34.8	0.64	55.1	34.7	112.8	102.5	15	12.5
2016									
January	50.4	34.2	0.67	51.4	32.6	103.5	99.9	10	12.3
February	56.0	33.8	0.61	49.6	31.5	103.5	98.1	10	12.0
March	40.9	32.5	0.80	47.7	30.2	91.6	96.6	11	11.8
April	39.2	22.7	0.58	45.0	28.7	93.4	95.3	10	11.8
May	48.9	30.9	0.64	42.1	26.9	93.1	93.2	12	11.7
June	19.3	12.3	0.65	39.0	24.9	81.9	90.4	9	11.4
July	36.8	19.4	0.53	36.5	23.1	85.9	87.7	10	11.2
August	50.4	30.1	0.60	34.2	21.6	85.0	85.5	10	11.2
September	37.4	26.8	0.72	32.1	19.9	87.8	83.7	16	11.3
October	30.0	20.0	0.67	31.1	18.9	86.1	82.5	16	11.6
November	22.4	12.8	0.57	29.4	17.9	78.7	81.1	10	11.6
December	17.6	11.1	0.64	28.1	17.1	75.1	80.0	10	11.4
2017									
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	15.5	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			74.8		7	
July	18.8	11.0	0.59			77.7		9	
August	25.0	19.9	0.80			77.9		12	
September	42.2	26.2	0.62			92.0		19	
October	16.0	7.9	0.49			76.4		11	
November	7.7	3.4	0.44			72.1		11	

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 27 November 2017*

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.

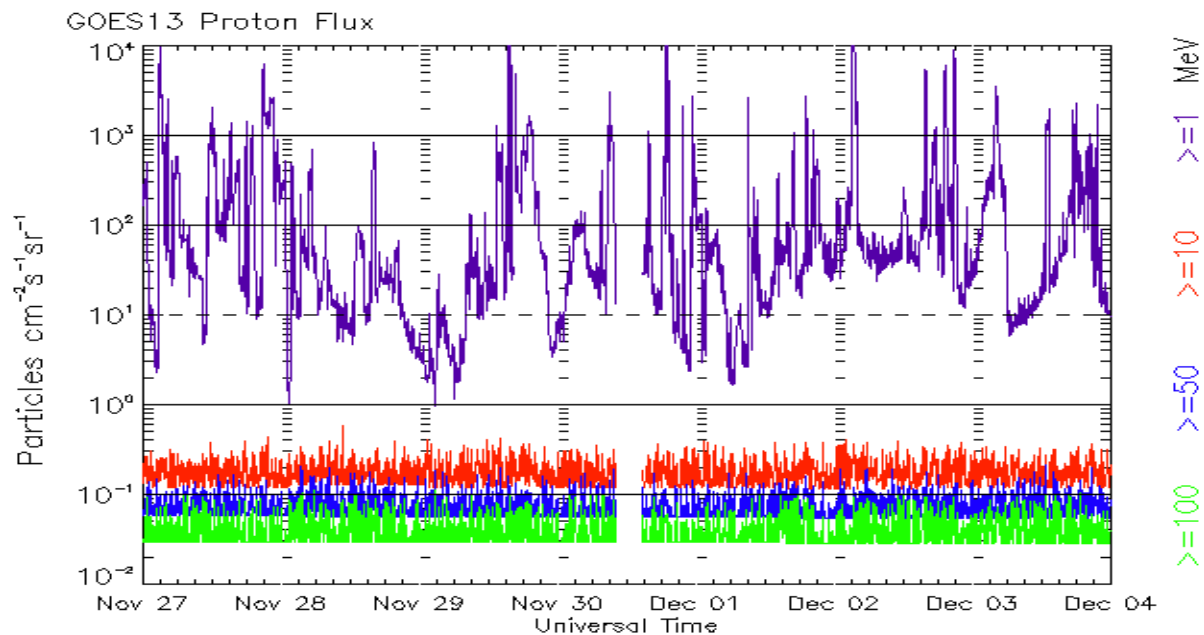
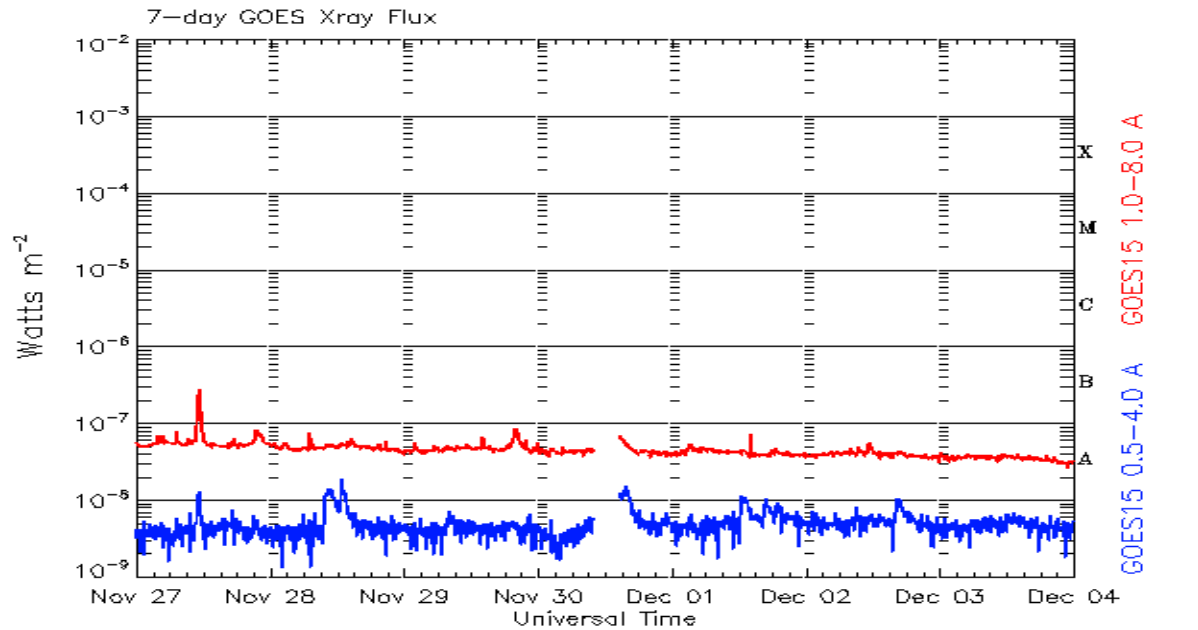
The electron flux plot contains the five-minute averaged integral electron flux (electrons/cm²-sec -sr) with energies greater than 2 MeV by the SWPC Primary GOES satellite.

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.

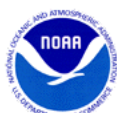




Weekly GOES Satellite X-ray and Proton Plots
Week Beginning 27 November 2017

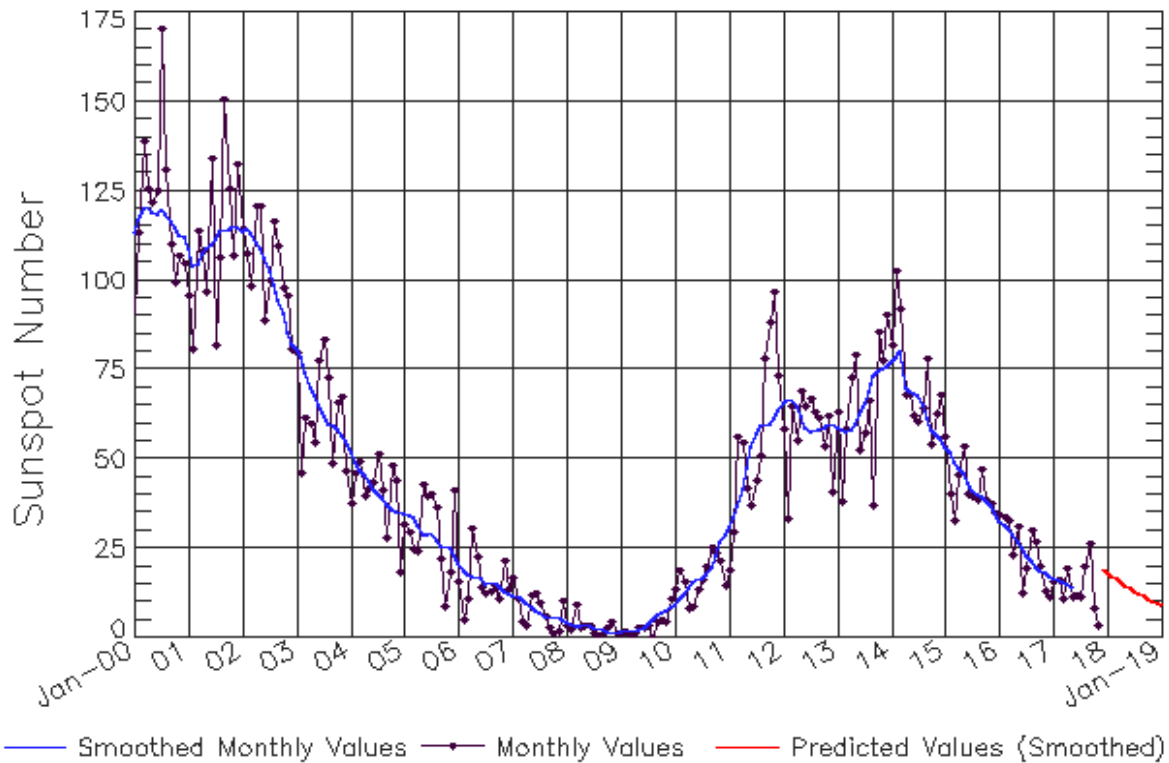
The x-ray plots contains five-minute averages x-ray flux (Watt/ m^2) as measure by the SWPC primary GOES X-ray satellite, usually at West 105 longitude, in two wavelength bands, 0.05 - 0.4 and 0.1 - 0.8 nm. The letters A, B, C, M and X refer to x-ray event levels for the 0.1 - 0.8 nm band.

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.



ISES Solar Cycle Sunspot Number Progression

Observed data through Nov 2017



Updated 2017 Dec 4

NOAA/SWPC Boulder, CO USA

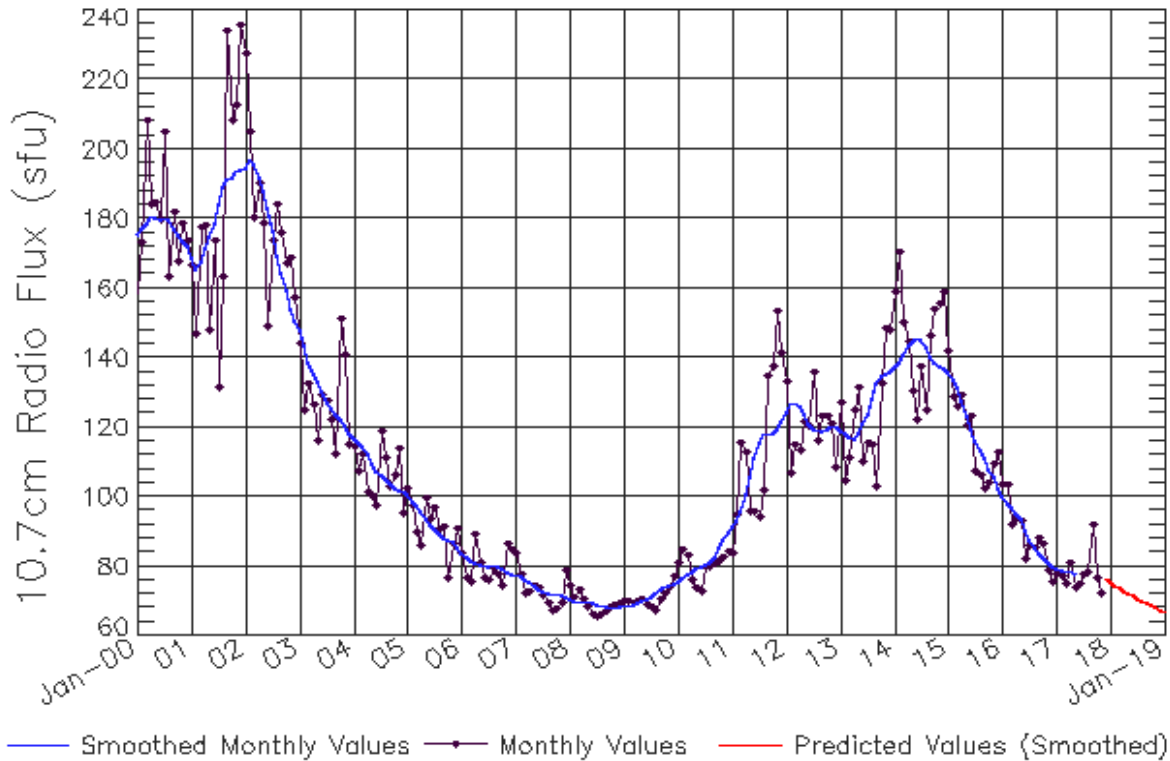
Smoothed Sunspot Number Prediction

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2010	9 (1)	10 (2)	11 (3)	13 (5)	15 (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)	19 (10)
2018	18 (10)	17 (10)	16 (10)	15 (10)	15 (10)	14 (10)	13 (10)	12 (10)	12 (10)	11 (10)	10 (10)	10 (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)



ISES Solar Cycle F10.7cm Radio Flux Progression

Observed data through Nov 2017



Updated 2017 Dec 4

NOAA/SWPC Boulder, CO USA

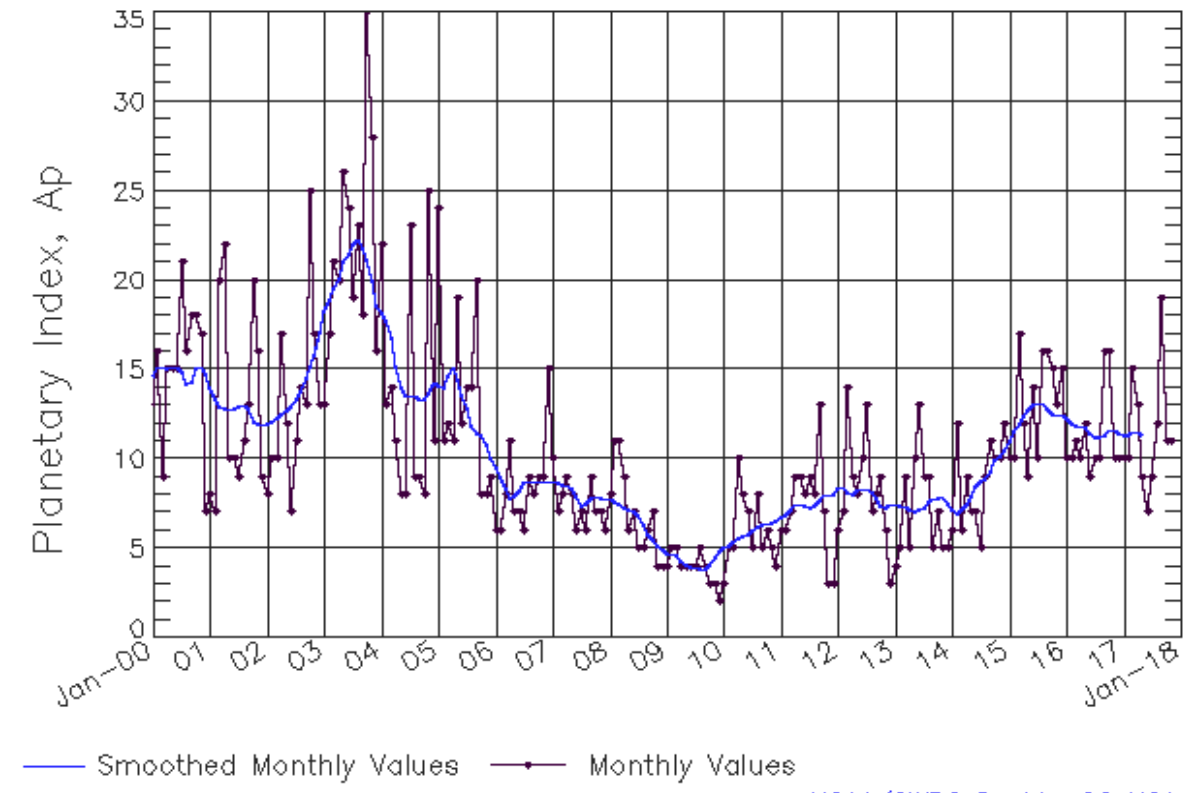
Smoothed F10.7cm Radio Flux Prediction

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 (***)	78 (1)	78 (1)	77 (2)	77 (3)	77 (4)	76 (4)	76 (5)
2018	76 (6)	75 (7)	74 (8)	73 (8)	72 (9)	71 (9)	71 (9)	70 (9)	69 (9)	69 (9)	68 (9)	67 (9)
2019	67 (9)	66 (9)	66 (9)	65 (9)	65 (9)	65 (9)	64 (9)	64 (9)	63 (9)	63 (9)	63 (9)	63 (9)



ISES Solar Cycle Ap Progression

Observed data through Nov 2017



Updated 2017 Dec 4

NOAA/SWPC Boulder, CO USA

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

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

