

Space Weather Highlights
01 July - 07 July 2019

SWPC PRF 2288
08 July 2019

Solar activity was at very low levels throughout the reporting period. Region 2744 (S27, Lo=207 class/area=Bxo/20 on 07 Jul) only produced several low-level B-class events and appears to have a reverse polarity magnetic configuration.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit was at normal background levels.

Geomagnetic field activity transitioned from unsettled early on 01 Jul to quiet for the remainder of the reporting period. A weak enhancement in the solar wind on 01 Jul was obscured by intermittent mag data from L1.

Space Weather Outlook
08 July - 03 August 2019

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 moderate levels from 11-14 Jul due to influence from a positive polarity CH HSS. The remainder of the outlook period is expected to be at normal background levels.

Geomagnetic field activity is expected to range from quiet to active. Active levels are expected from 09-11 Jul in response to influence from an anticipated positive polarity CH HSS. Unsettled levels are likely on 28 Jul due to a SSBC. The remainder of the outlook period is expected to be at quiet levels under a nominal solar wind regime.



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
01 July	68	0	0	A7.0	0	0	0	0	0	0	0	0
02 July	67	0	0	A7.0	0	0	0	0	0	0	0	0
03 July	67	0	0	A7.1	0	0	0	0	0	0	0	0
04 July	68	0	0	A7.0	0	0	0	0	0	0	0	0
05 July	67	0	0	A6.8	0	0	0	0	0	0	0	0
06 July	67	0	0	A6.9	0	0	0	0	0	0	0	0
07 July	67	12	20	A6.9	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 July	1.8e+05	1.9e+04	3.6e+03	1.8e+06	
02 July	2.4e+05	1.9e+04	3.8e+03	1.8e+06		
03 July	3.4e+05	1.9e+04	3.9e+03	1.8e+06		
04 July	3.5e+05	2.0e+04	3.9e+03	1.8e+06		
05 July	3.8e+05	1.9e+04	3.8e+03	1.8e+06		
06 July	4.0e+05	2.0e+04	4.0e+03	1.9e+06		
07 July	4.1e+05	2.0e+04	4.0e+03	1.9e+06		

Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	01 July	10	3-4-2-2-2-1-2-2	13	2-4-4-3-3-1-1-1	9
02 July	5	1-1-1-1-2-2-2-2	8	2-1-1-4-3-2-1-0	5	2-1-1-1-1-2-2-1
03 July	6	1-0-2-3-2-2-2-1	2	0-0-1-2-1-1-1-0	5	0-1-2-2-1-2-1-1
04 July	8	1-1-1-1-3-2-3-3	6	0-0-0-0-3-4-1-1	5	0-1-1-1-2-2-2-2
05 July	6	2-1-1-2-3-1-2-1	3	2-1-1-2-1-1-0-0	5	2-1-1-2-2-1-0-1
06 July	5	1-2-1-1-2-2-1-2	2	1-1-1-1-0-0-0-1	3	1-2-1-1-1-1-0-1
07 July	5	1-1-2-2-2-1-1-2	4	0-1-1-3-1-0-1-1	3	1-1-2-1-1-1-1-2

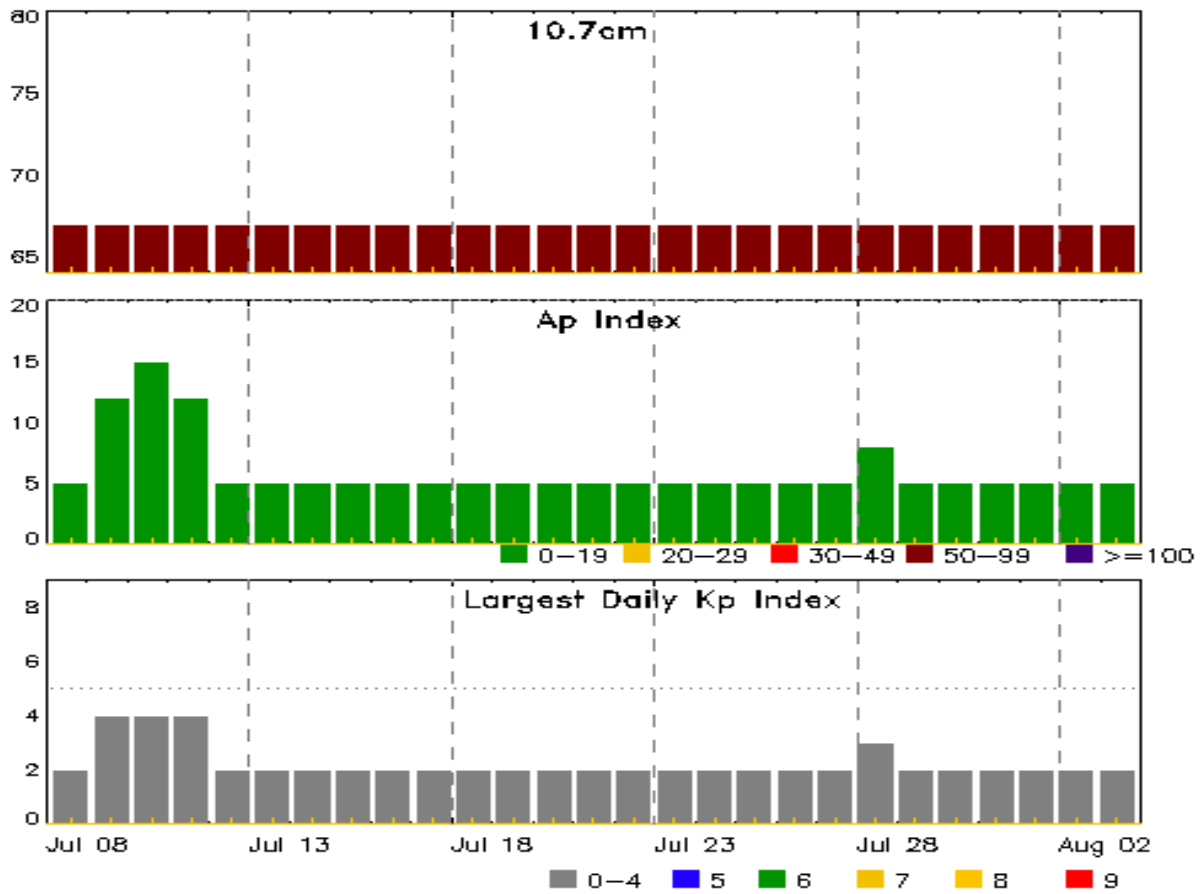


Alerts and Warnings Issued

Date & Time of Issue UTC	Type of Alert or Warning	Date & Time of Event UTC
01 Jul 0514	WARNING: Geomagnetic K = 4	01/0511 - 1200



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 Jul	67	5	2	22 Jul	67	5	2
09	67	12	4	23	67	5	2
10	67	15	4	24	67	5	2
11	67	12	4	25	67	5	2
12	67	5	2	26	67	5	2
13	67	5	2	27	67	5	2
14	67	5	2	28	67	8	3
15	67	5	2	29	67	5	2
16	67	5	2	30	67	5	2
17	67	5	2	31	67	5	2
18	67	5	2	01 Aug	67	5	2
19	67	5	2	02	67	5	2
20	67	5	2	03	67	5	2
21	67	5	2				



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		
	Begin	Max	End		Imp/ Brtns	Location Lat CMD	Rgn #
06 Jul	0608	0609	0610	A1.1			
06 Jul	1715	1719	1721	B1.3			
06 Jul	1947	1950	1952	B1.1			
06 Jul	2117	2121	2124	B3.6			
07 Jul	0059	0102	0104	B1.5			
07 Jul	0825	0832	0839	B1.2			



Region Summary

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

Region 2744

07 Jul	S27E38	209	20	4	Bxo	2	B	0	0	0	0	0	0	0	0	0
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Still on Disk.

Absolute heliographic longitude: 209

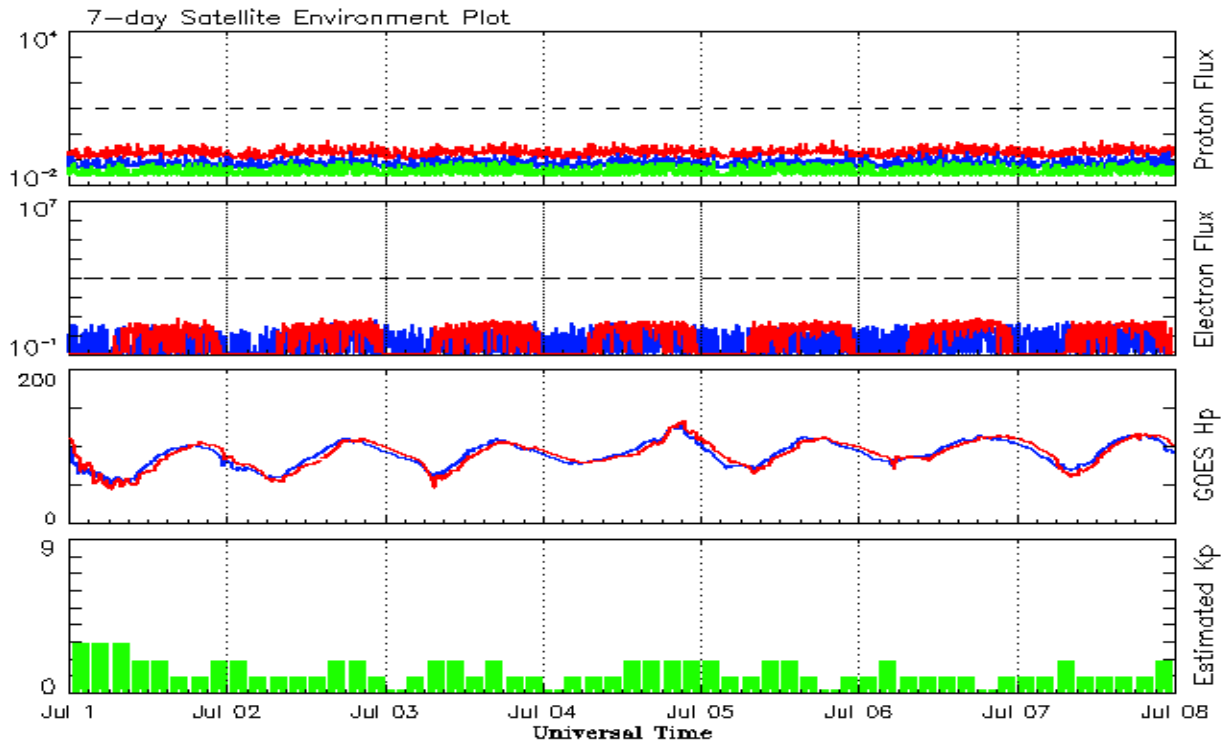


Recent Solar Indices (preliminary)
Observed monthly mean values

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										
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	4.2	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	3.9	68.3	70.1	9	7.3	
October	6.9	2.9	0.42	9.2	4.1	69.5	70.3	7	7.1	
November	7.3	2.9	0.48	9.5	4.0	68.9	70.4	6	7.0	
December	5.6	1.9	0.34	9.3	3.6	70.0	70.3	7	6.9	
2019										
January	16.0	4.6	0.29			71.6		6		
February		0.5				70.6		7		
March	14.8	5.6	0.39			71.5		6		
April	11.5	5.5	0.48			72.4		6		
May	18.1	6.1	0.34			71.3		7		
June	11.6	0.7	0.06			68.1		5		

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 July 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.

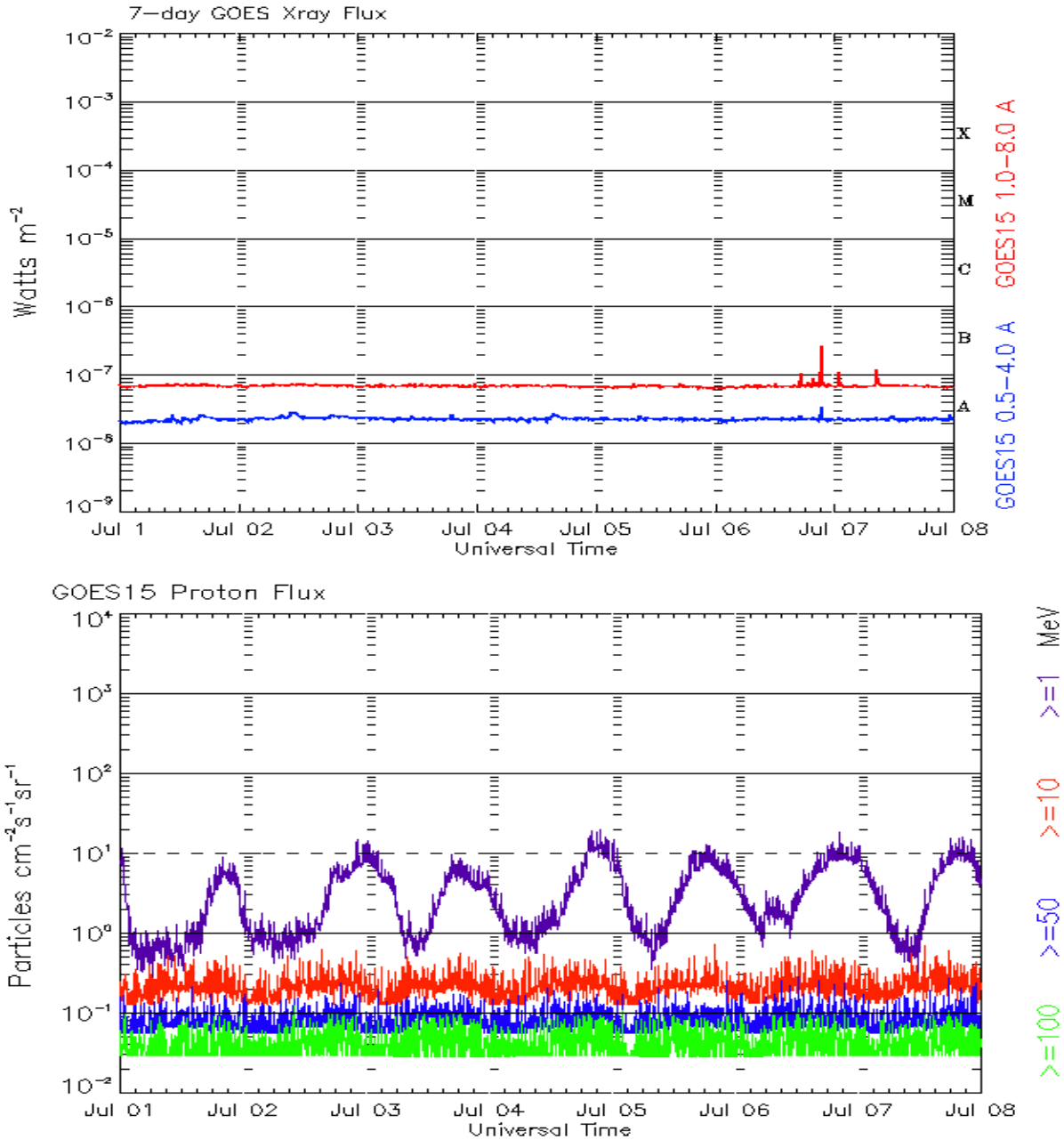
The electron flux plot contains the five-minute averaged integral electron flux (electrons/cm²-sec -sr) with energies greater than 2 MeV by the SWPC Primary GOES satellite.

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 July 2019*

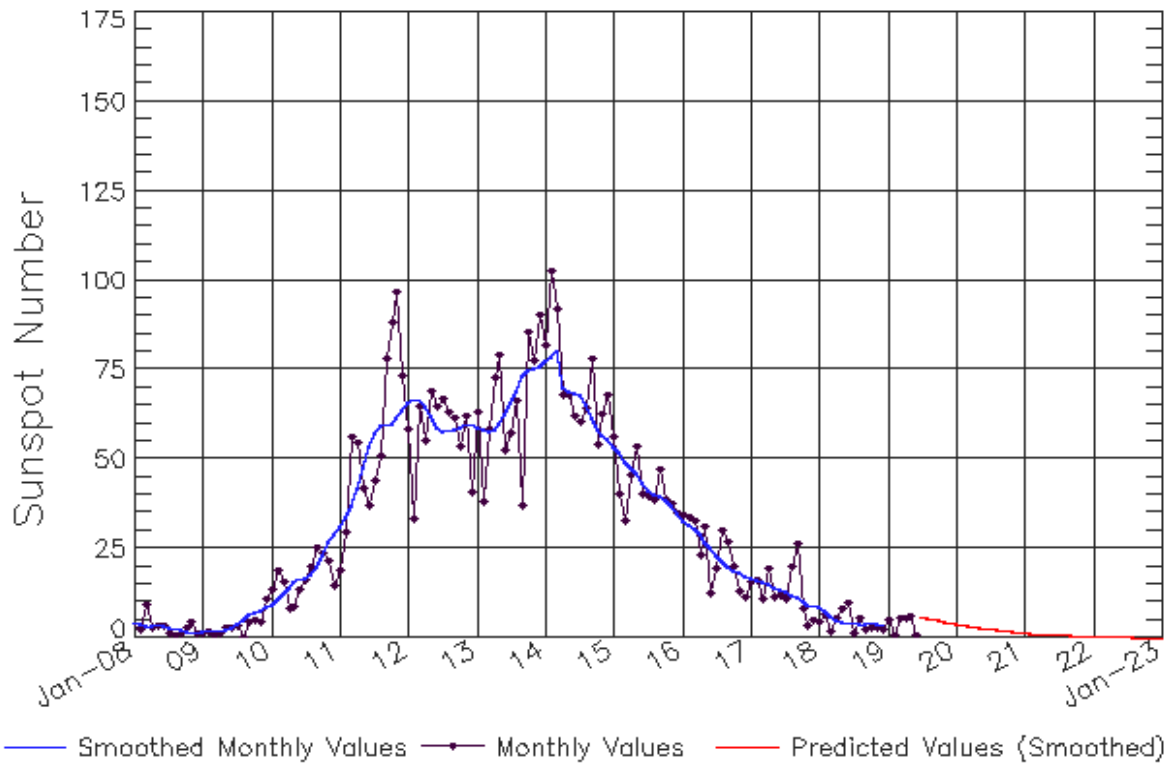
The x-ray plots contains five-minute averages x-ray flux (Watt/m²) as measure by the SWPC primary GOES X-ray satellite, usually at West 105 longitude, in two wavelength bands, 0.05 - 0.4 and 0.1 - 0.8 nm. The letters A, B, C, M and X refer to x-ray event levels for the 0.1 - 0.8 nm band.

The proton plot contains the five-minute averaged intergral 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 Jun 2019



Updated 2019 Jul 8

NOAA/SWPC Boulder, CO USA

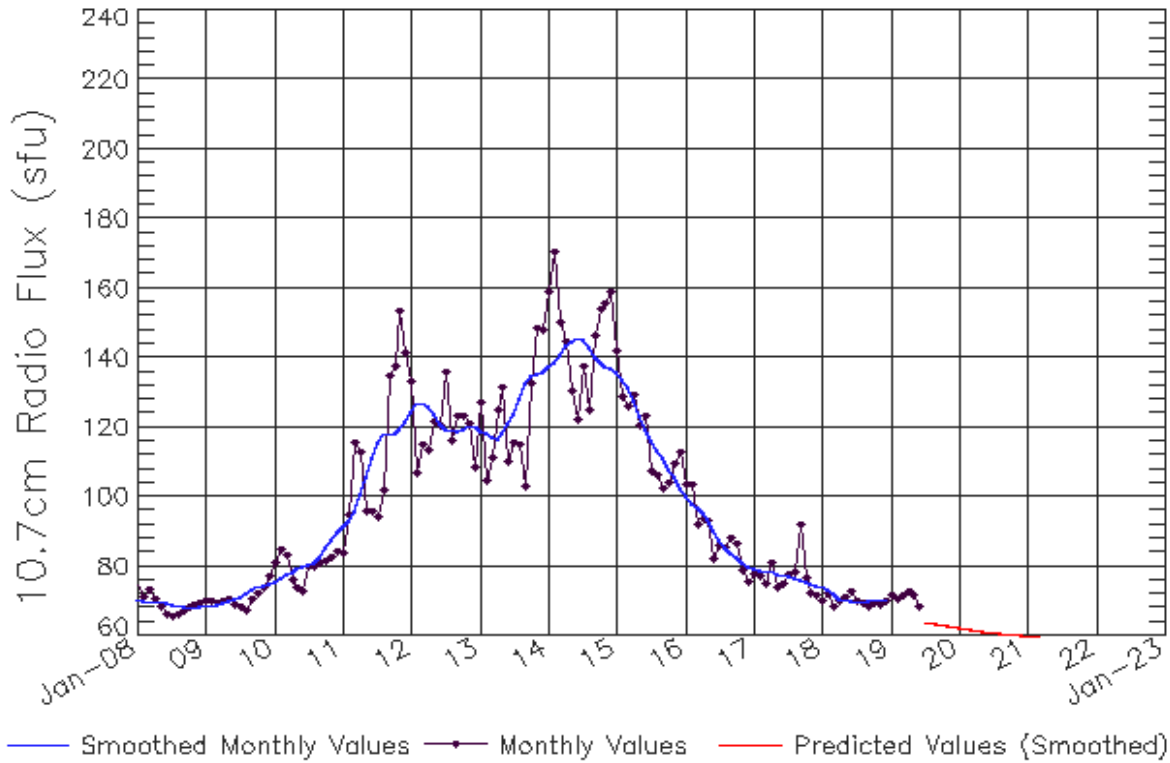
Smoothed Sunspot Number Prediction

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)	6 (10)	6 (10)	1 (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)



ISES Solar Cycle F10.7cm Radio Flux Progression

Observed data through Jun 2019



Updated 2019 Jul 8

NOAA/SWPC Boulder, CO USA

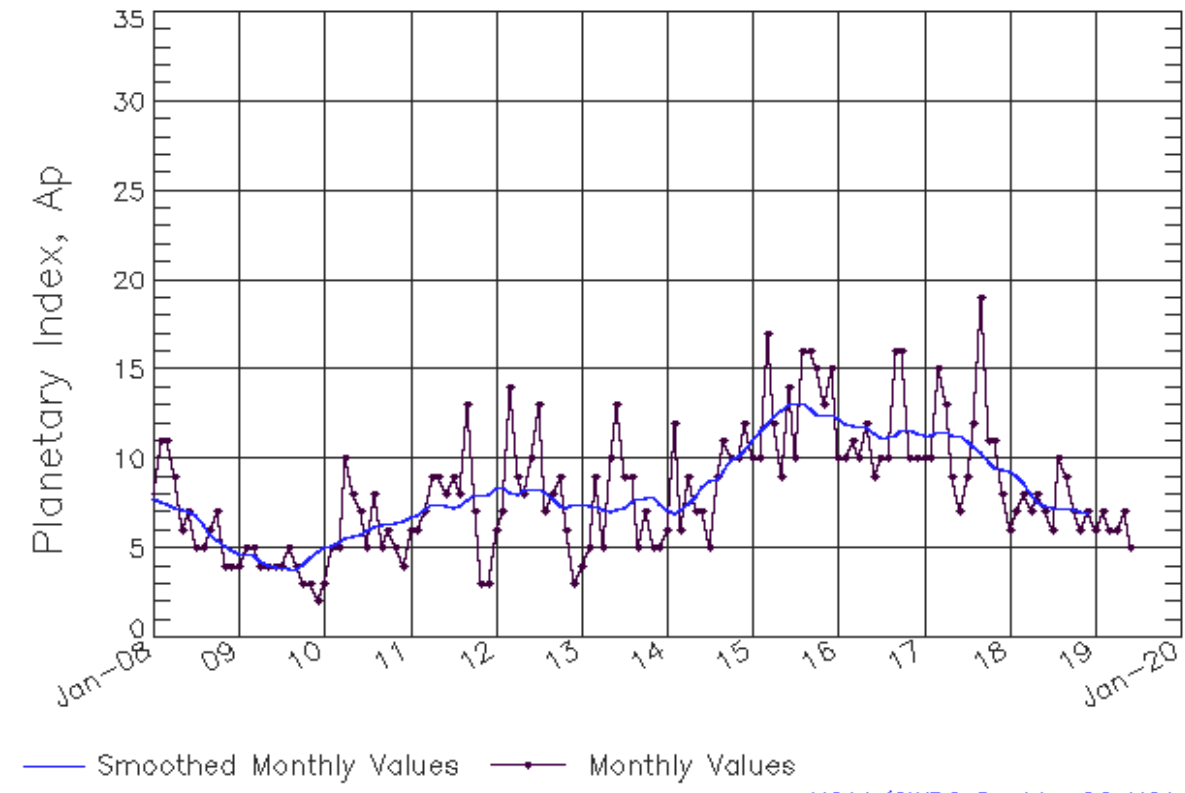
Smoothed F10.7cm Radio Flux Prediction

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 (***)	70 (***)	70 (***)
2019	70 (1)	69 (1)	69 (2)	69 (3)	68 (4)	67 (4)	67 (5)	66 (6)	65 (7)	64 (8)	64 (8)	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 Jun 2019



Updated 2019 Jul 8

NOAA/SWPC Boulder, CO USA

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

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<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

