

Space Weather Highlights
27 June - 03 July 2016

SWPC PRF 2131
04 July 2016

Solar activity was very low. The disk was spotless for the entire period with no measurable flare activity.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit was at high levels from 27-30 Jun and dropped to normal to moderate levels for the remainder of the period.

Geomagnetic field activity was quiet to unsettled on 27-28 Jun due to diminishing negative polarity CH HSS effects. Mostly quiet conditions were observed on 29 Jun. Quiet to unsettled conditions were observed for the remainder of the week with an isolated active period on 02/2100-2400 UTC due to effects from a series of coronal holes.

Space Weather Outlook
04 July - 30 July 2016

Solar activity is expected to be very low throughout the forecast 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 04-07, 16-19, and 22-26 Jul following recurrent CH HSS events.

Geomagnetic field activity is expected to be at quiet to unsettled levels early on 04 Jul followed by quiet conditions through 07 Jul. Quiet to unsettled conditions are expected to return from 08-15 Jul with active periods likely on 11-12 Jul due to effects from a series of recurrent coronal holes. Quiet conditions are expected to return from 16-18 Jul. Another recurrent CH HSS is expected to cause quiet to unsettled conditions from 19-23 Jul with isolated active periods likely on 19 Jul. Mostly quiet levels are expected for the remainder of the period with unsettled periods possible on 28 and 30 Jul due to recurrent coronal holes.



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 June	75	0	0	A7.2	0	0	0	1	0	0	0	0	0
28 June	73	0	0	A6.5	0	0	0	0	0	0	0	0	0
29 June	74	0	0	A6.0	0	0	0	0	0	0	0	0	0
30 June	73	0	0	A5.5	0	0	0	0	0	0	0	0	0
01 July	72	0	0	A5.3	0	0	0	0	0	0	0	0	0
02 July	71	0	0	A5.3	0	0	0	0	0	0	0	0	0
03 July	72	0	0	A7.2	0	0	0	1	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 June	4.1e+05	1.3e+04	3.0e+03	4.4e+07	
28 June	3.9e+05	1.3e+04	3.4e+03	7.7e+07		
29 June	4.4e+05	1.3e+04	3.2e+03	8.5e+07		
30 June	5.9e+05	1.3e+04	3.3e+03	6.8e+07		
01 July	1.7e+05	1.3e+04	3.1e+03	6.3e+06		
02 July	1.8e+05	1.3e+04	3.2e+03	7.3e+06		
03 July	2.9e+05	1.4e+04	3.3e+03	7.8e+05		

Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	27 June	16	3-3-3-1-2-2-5-3	9	3-3-3-0-3-2-1-1	10
28 June	6	3-2-1-1-2-2-1-1	12	3-3-3-3-4-1-1-1	7	3-2-1-2-2-1-1-1
29 June	4	1-1-1-1-1-2-2-1	3	2-1-1-1-0-1-1-0	4	2-1-1-1-1-1-1-1
30 June	7	1-1-1-1-2-2-3-3	4	0-1-0-3-0-1-1-2	6	1-1-1-1-1-2-3-3
01 July	9	2-3-3-3-2-1-1-1	11	2-3-4-4-2-1-0-0	7	3-2-3-3-1-1-0-1
02 July	11	1-2-2-2-3-2-3-4	8	2-2-1-3-3-2-1-2	9	1-2-1-1-2-2-3-4
03 July	9	2-2-2-2-2-3-2-3	10	3-3-2-3-1-2-2-2	15	3-2-2-2-1-2-2-3

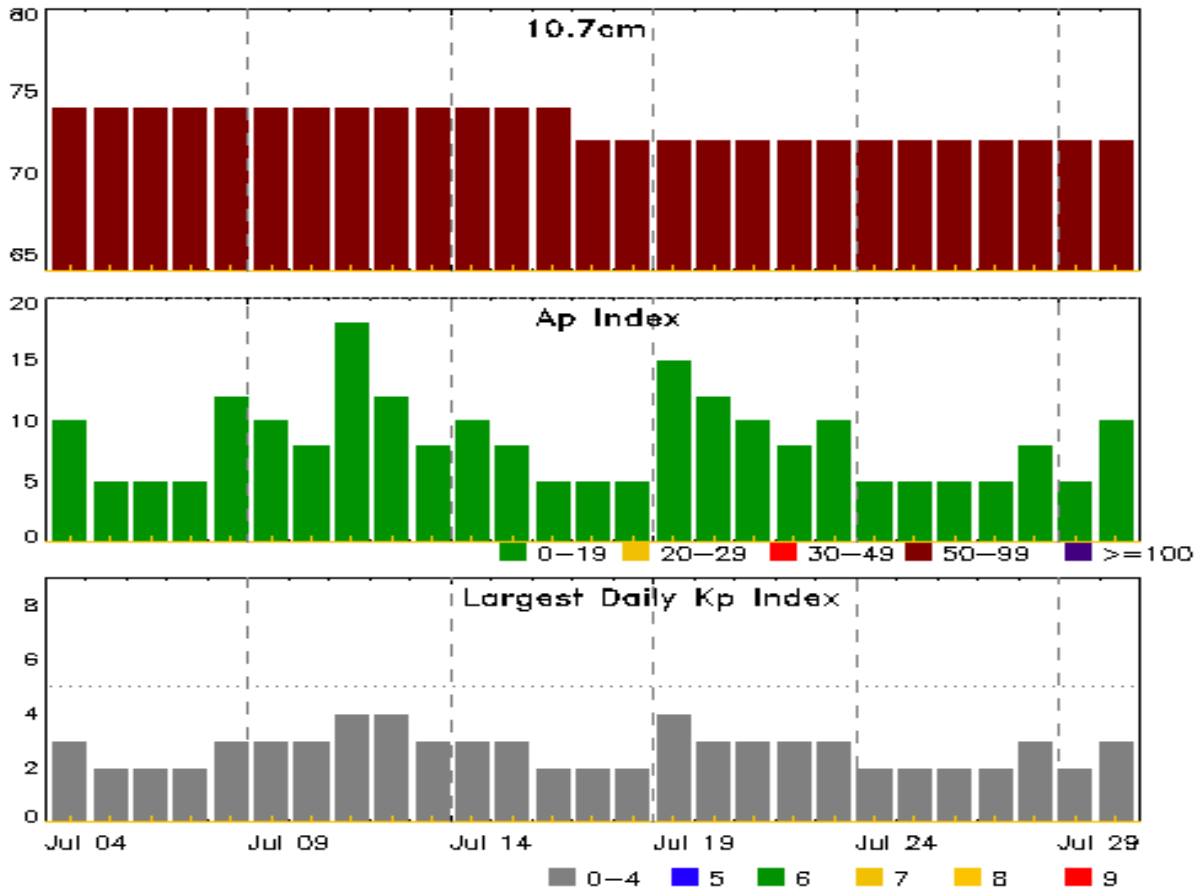


Alerts and Warnings Issued

Date & Time of Issue UTC	Type of Alert or Warning	Date & Time of Event UTC
27 Jun 0555	EXTENDED WARNING: Geomagnetic K = 4	26/2330 - 27/1300
27 Jun 1451	CONTINUED ALERT: Electron 2MeV Integral Flux >= 1000pfu	25/1325
28 Jun 1236	CONTINUED ALERT: Electron 2MeV Integral Flux >= 1000pfu	25/1325
29 Jun 1121	CONTINUED ALERT: Electron 2MeV Integral Flux >= 1000pfu	25/1325
29 Jun 2206	WATCH: Geomagnetic Storm Category G1 predicted	
30 Jun 1206	CONTINUED ALERT: Electron 2MeV Integral Flux >= 1000pfu	25/1325
30 Jun 1345	WATCH: Geomagnetic Storm Category G1 predicted	
30 Jun 2001	WARNING: Geomagnetic K = 4	30/2000 - 01/0300
01 Jul 0245	EXTENDED WARNING: Geomagnetic K = 4	30/2000 - 01/1300
02 Jul 2106	WARNING: Geomagnetic K = 4	02/2105 - 03/0600
02 Jul 2329	ALERT: Geomagnetic K = 4	02/2329
03 Jul 0555	EXTENDED WARNING: Geomagnetic K = 4	02/2105 - 03/1300



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 Jul	74	10	3	18 Jul	72	5	2
05	74	5	2	19	72	15	4
06	74	5	2	20	72	12	3
07	74	5	2	21	72	10	3
08	74	12	3	22	72	8	3
09	74	10	3	23	72	10	3
10	74	8	3	24	72	5	2
11	74	18	4	25	72	5	2
12	74	12	4	26	72	5	2
13	74	8	3	27	72	5	2
14	74	10	3	28	72	8	3
15	74	8	3	29	72	5	2
16	74	5	2	30	72	10	3
17	72	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 #	245	2695	II

No Events Observed

Flare List

Date	Time			X-ray Class	Imp/ Brtns	Optical		Rgn #
	Begin	Max	End			Location Lat CMD	Rgn #	
27 Jun	0405	0420	0428	B3.2				
27 Jun	0942	0958	1024	B5.8	SF	N14E40		
29 Jun	0239	0256	0313	B2.2				
02 Jul	0400	0405	0410	B1.6				
03 Jul	0952	0958	1003	B1.6	SF	N15W04		



Region Summary

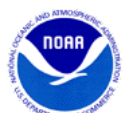
Date	Location		Sunspot Characteristics				Flares								
	Lat CMD	Lon	Helio 10 ⁻⁶ hemi.	Area	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical			
									C	M	X	S	1	2	3

Region 2556

17 Jun	N05E72	132	30	1	Hsx	1	A										
18 Jun	N05E57	134	30	1	Hsx	1	A										
19 Jun	N06E43	135	30	2	Hsx	1	A										
20 Jun	N06E29	136	40	1	Hax	1	A										
21 Jun	N06E16	136	10	1	Hax	1	A										
22 Jun	N05E03	135	10	1	Hsx	1	A										
23 Jun	N05W12	137	plage														
24 Jun	N05W27	139	plage														
25 Jun	N05W42	141	plage														
26 Jun	N05W57	142	plage														
27 Jun	N05W72	144	plage														
									0	0	0	0	0	0	0	0	0

Died on Disk.

Absolute heliographic longitude: 135

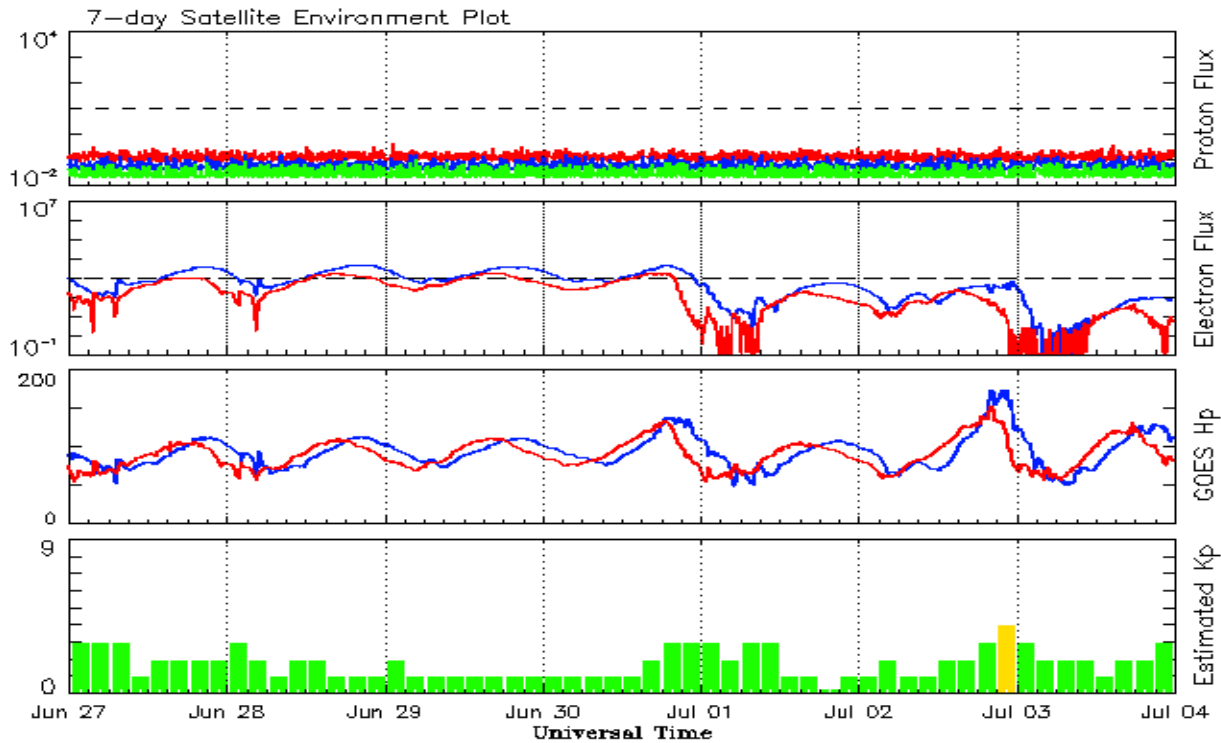


Recent Solar Indices (preliminary)
Observed monthly mean values

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
2014									
July	113.6	60.1	0.64	120.4	67.6	137.3	145.2	5	8.8
August	106.2	64.1	0.70	115.1	65.0	124.7	142.8	9	8.9
September	127.4	78.0	0.69	107.4	61.1	146.1	140.1	11	9.3
October	92.0	54.0	0.66	101.7	58.4	153.7	138.4	10	9.9
November	101.8	62.2	0.69	97.9	56.8	155.3	137.4	10	10.1
December	120.0	67.7	0.65	95.2	55.3	158.7	137.0	12	10.5
2015									
January	101.2	55.8	0.66	92.1	53.6	141.7	135.8	10	11.0
February	70.6	40.0	0.63	88.3	51.7	128.8	133.8	10	11.5
March	61.7	32.7	0.62	84.2	49.3	126.0	131.2	17	12.0
April	72.5	45.2	0.75	80.5	47.3	129.2	127.3	12	12.4
May	83.0	53.3	0.71	77.5	45.7	120.1	123.3	9	12.7
June	77.3	39.9	0.53	73.1	43.3	123.2	119.5	14	13.0
July	68.4	39.5	0.58	68.2	41.0	107.0	116.0	10	13.1
August	61.6	38.6	0.63	65.5	39.8	106.2	113.3	16	13.1
September	72.5	47.2	0.65	64.0	39.6	102.1	110.8	16	12.8
October	59.5	38.2	0.62	61.8	38.6	104.1	107.9	15	12.5
November	61.8	37.3	0.61	59.0	36.8	109.6	105.3	13	12.5
December	54.1	34.8	0.64	55.1	34.7	112.8	102.5	15	12.5
2016									
January	50.4	34.0	0.67			103.5		10	
February	56.0	34.3	0.61			103.5		10	
March	40.9	32.9	0.80			91.6		11	
April	39.2	22.8	0.58			93.4		10	
May	48.9	31.3	0.64			93.1		12	
June	19.3	12.5	0.65			81.9		9	

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 June 2016*

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.

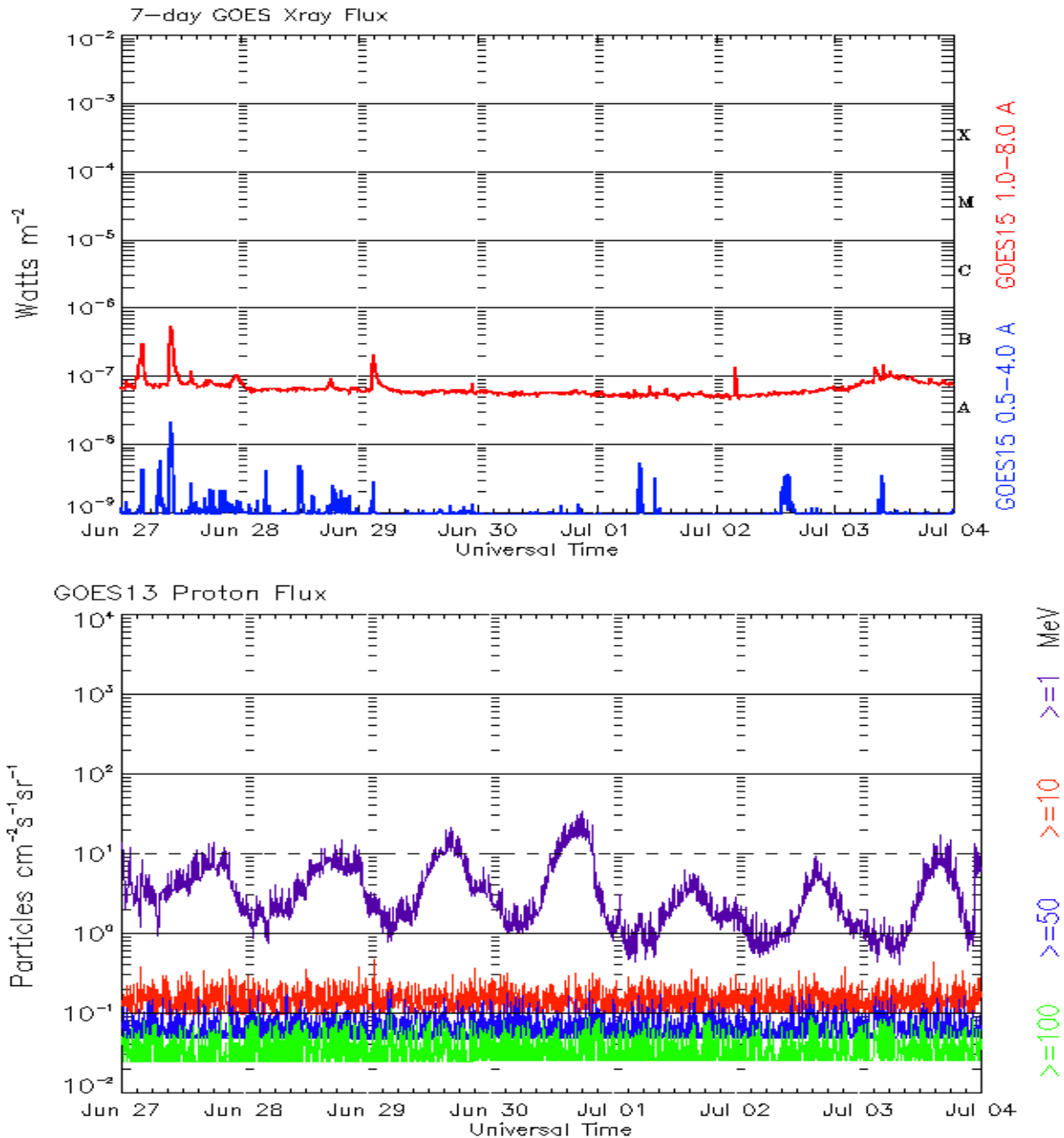
The electron flux plot contains the five-minute averaged integral electron flux (electrons/cm²-sec -sr) with energies greater than 2 MeV by the SWPC Primary GOES satellite.

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 June 2016*

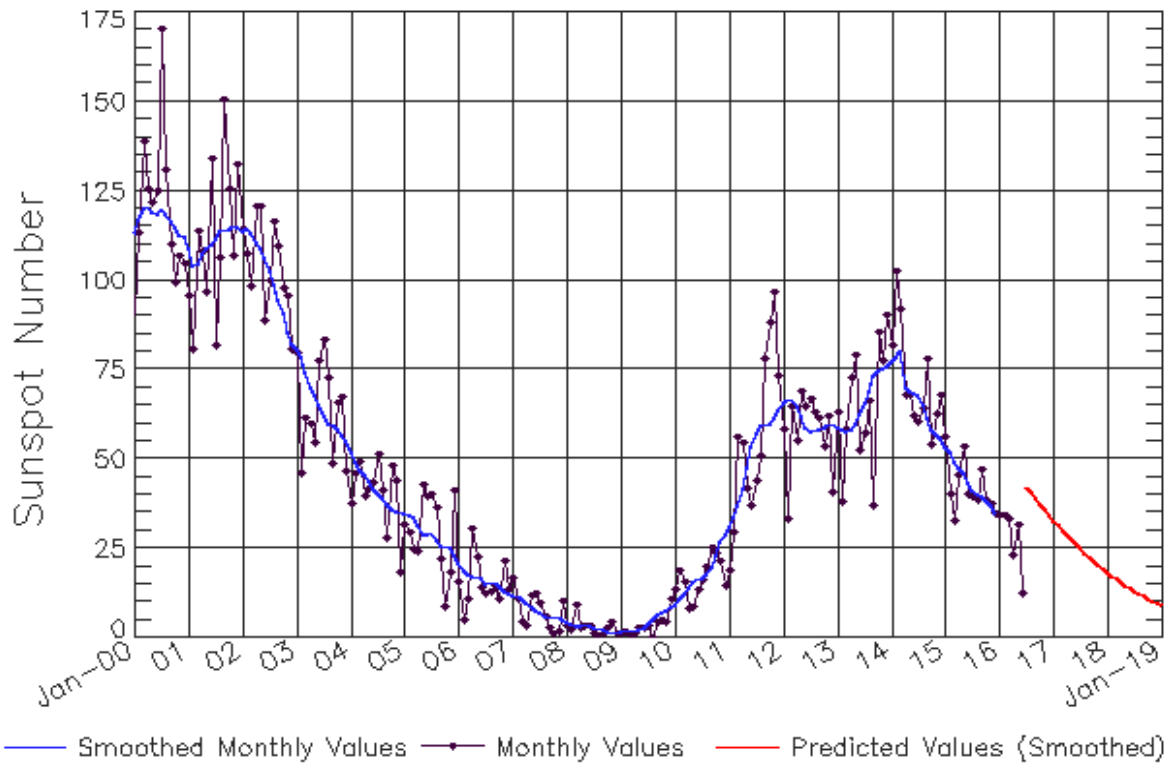
The x-ray plots contains five-minute averages x-ray flux (Watt/m²) as measure by the SWPC primary GOES X-ray satellite, usually at West 105 longitude, in two wavelength bands, 0.05 - 0.4 and 0.1 - 0.8 nm. The letters A, B, C, M and X refer to x-ray event levels for the 0.1 - 0.8 nm band.

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 2016



Updated 2016 Jul 4

NOAA/SWPC Boulder, CO USA

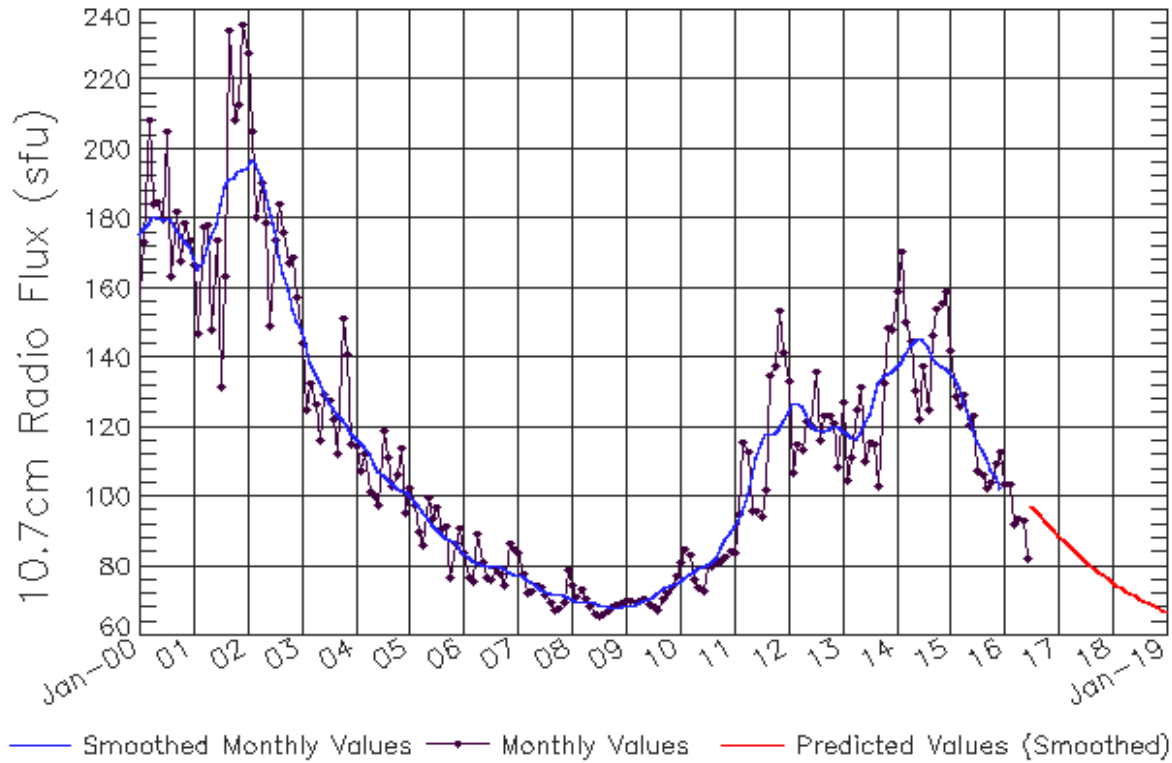
Smoothed Sunspot Number Prediction

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)	13 (10)	42 (10)	40 (10)	39 (10)	37 (10)	36 (10)	34 (10)
2017	33 (10)	31 (10)	30 (10)	29 (10)	27 (10)	26 (10)	25 (10)	24 (10)	23 (10)	21 (10)	20 (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 Jun 2016



Updated 2016 Jul 4

NOAA/SWPC Boulder, CO USA

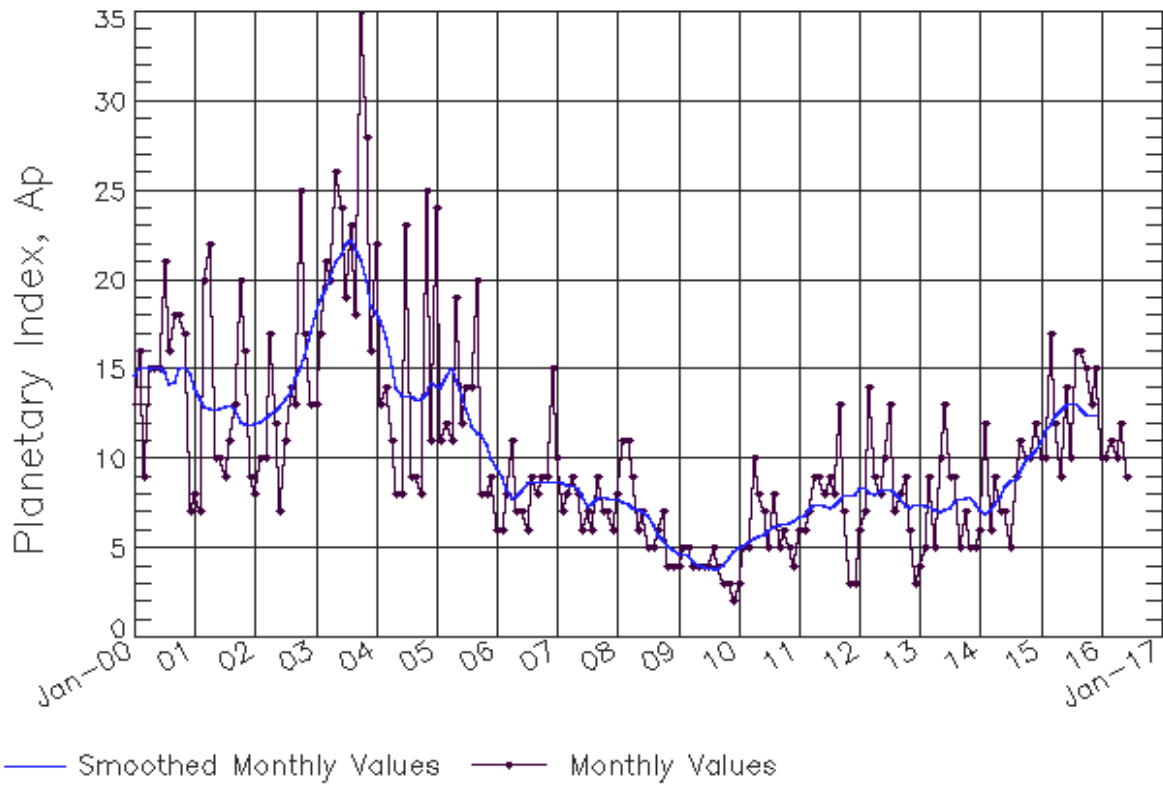
Smoothed F10.7cm Radio Flux Prediction

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 (1)	100 (1)	99 (2)	98 (3)	97 (4)	95 (4)	94 (5)	92 (6)	91 (7)	91 (8)	90 (8)	90 (9)
2017	89 (9)	88 (9)	86 (9)	85 (9)	84 (9)	83 (9)	82 (9)	80 (9)	79 (9)	78 (9)	77 (9)	76 (9)
2018	75 (9)	75 (9)	74 (9)	73 (9)	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 Jun 2016



Updated 2016 Jul 4

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/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

