

Solar activity ranged from very low to low levels. Low activity was observed on 30 May with a pair of C1/Sf flares observed from Region 2550 (N15, L=114, class/area Cro/020 on 31 May). Very low levels were observed on 31 May and 01-05 Jun. Of note, the first spotless day since 17 Jul 2014 was observed on 03 Jun.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit was at high levels on 30 May - 04 Jun with moderate levels observed on 05 Jun.

Geomagnetic field activity ranged from quiet to minor storm (G1-Minor) levels. Quiet to active levels were observed on 30-31 May due to negative polarity coronal hole high speed stream (CH HSS) influence. During this time frame, wind speeds peaked at about 575 km/s early on 30 May while the Bz component of the interplanetary magnetic field reached a maximum southward of extent of -6 nT late on 31 May. Quiet conditions were observed on 01 Jun through midday on 05 Jun. Active to G1 storm levels were observed through the remainder of 05 Jun due to effects from another negative polarity CH HSS. Late on 05 Jun, wind speeds approached 650 km/s, total field reached 19 nT while the Bz component briefly hit a maximum southward extent of -15 nT.

### **Space Weather Outlook** **06 June - 02 July 2016**

Solar activity is expected to be at very low levels with C-class activity possible 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 07-09, 12-16, 26-30 Jun and 01 Jul. Normal to moderate levels are expected throughout the remainder of the outlook period.

Geomagnetic field activity is likely to reach G1 (Minor) levels on 06 Jun and 02 Jul with unsettled to active levels expected on 12-15, 17-18, 23-24 and 26-27 Jun, all due to the influence of multiple recurrent CH HSSs. Quiet to unsettled conditions are expected throughout the remainder of the outlook period under a nominal solar wind regime.



### *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
30 May	86	56	80	B1.4	2	0	0	6	0	0	0	0
31 May	87	40	60	B1.5	0	0	0	0	0	0	0	0
01 June	86	30	70	B1.4	0	0	0	0	0	0	0	0
02 June	85	27	100	B1.6	0	0	0	0	0	0	0	0
03 June	83	0	0	B1.3	0	0	0	0	0	0	0	0
04 June	80	0	0	B1.1	0	0	0	0	0	0	0	0
05 June	79	0	0	B1.0	0	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
	30 May	4.1e+05	1.3e+04	3.0e+03	3.4e+07	
31 May	3.5e+05	1.3e+04	3.1e+03	5.0e+07		
01 June	1.7e+05	1.3e+04	3.3e+03	5.3e+07		
02 June	1.8e+05	1.3e+04	3.4e+03	6.2e+07		
03 June	2.5e+05	1.4e+04	3.6e+03	7.1e+07		
04 June	3.9e+05	1.4e+04	3.3e+03	7.4e+07		
05 June	3.2e+05	1.3e+04	3.1e+03	1.0e+06		

### *Daily Geomagnetic Data*

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	30 May	9	3-2-3-2-2-2-1-2	19	4-3-5-4-2-3-1-2	11
31 May	10	2-1-3-3-2-2-2-3	15	2-2-5-3-2-4-1-2	10	2-2-3-2-1-3-3-3
01 June	7	2-1-1-1-2-3-2-2	5	2-1-1-2-2-2-1-1	6	2-1-2-1-2-2-2-2
02 June	5	1-1-1-2-2-2-1-1	3	0-2-1-3-0-0-0-0	4	1-1-1-1-1-1-0-1
03 June	5	1-1-0-1-2-3-2-1	0	1-0-0-0-0-0-0-0	3	1-1-0-1-1-1-1-1
04 June	5	1-1-0-1-2-2-2-2	2	1-1-1-0-0-0-0-1	4	1-1-1-1-1-1-1-2
05 June	23	2-2-3-4-4-4-4-5	31	2-2-2-4-6-6-4-3	6	2-2-2-4-5-5-5-5

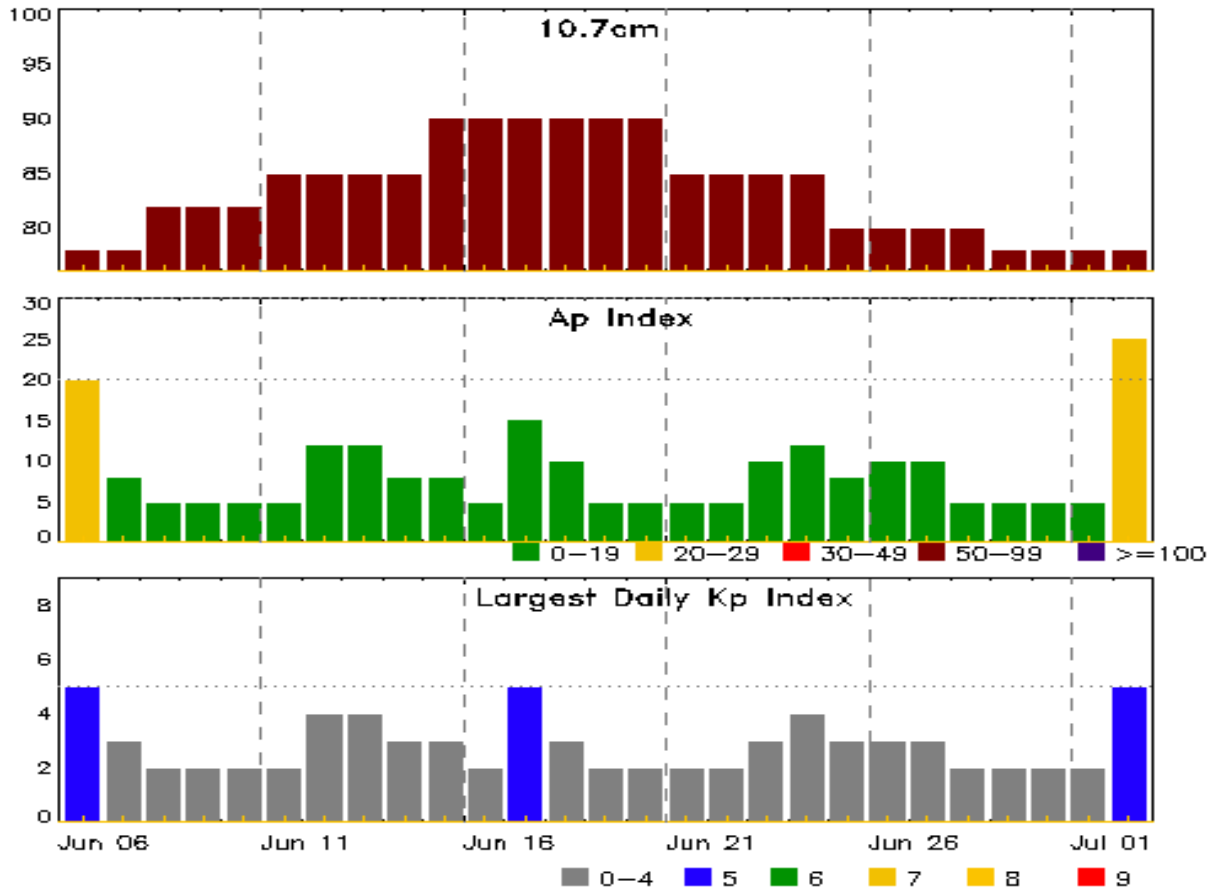


### *Alerts and Warnings Issued*

Date & Time of Issue UTC	Type of Alert or Warning	Date & Time of Event UTC
30 May 0006	WARNING: Geomagnetic K = 4	30/0005 - 1000
30 May 0137	ALERT: Geomagnetic K = 4	30/0135
30 May 1603	ALERT: Electron 2MeV Integral Flux $\geq$ 1000pfu	30/1520
31 May 1357	CONTINUED ALERT: Electron 2MeV Integral Flux $\geq$ 1000pfu	30/1520
31 May 2232	WARNING: Geomagnetic K = 4	31/2235 - 01/0600
01 Jun 1258	CONTINUED ALERT: Electron 2MeV Integral Flux $\geq$ 1000pfu	30/1520
01 Jun 1541	WATCH: Geomagnetic Storm Category G1 predicted	
01 Jun 1544	WATCH: Geomagnetic Storm Category G2 predicted	
01 Jun 1547	CANCELLATION: Geomagnetic Storm Category G1 predicted	
02 Jun 1329	WATCH: Geomagnetic Storm Category G2 predicted	
02 Jun 1503	CONTINUED ALERT: Electron 2MeV Integral Flux $\geq$ 1000pfu	30/1520
03 Jun 1241	CONTINUED ALERT: Electron 2MeV Integral Flux $\geq$ 1000pfu	30/1520
04 Jun 1201	CONTINUED ALERT: Electron 2MeV Integral Flux $\geq$ 1000pfu	30/1520
05 Jun 1130	WARNING: Geomagnetic K = 4	05/1130 - 1800
05 Jun 1132	ALERT: Geomagnetic K = 4	05/1131
05 Jun 1250	WARNING: Geomagnetic K = 5	05/1251 - 2200
05 Jun 1458	ALERT: Geomagnetic K = 5	05/1457
05 Jun 1508	WARNING: Geomagnetic K = 6	05/1505 - 2200
05 Jun 1508	EXTENDED WARNING: Geomagnetic K = 4	05/1130 - 06/0600
05 Jun 1541	WATCH: Geomagnetic Storm Category G1 predicted	
05 Jun 1738	ALERT: Geomagnetic K = 5	05/1738
05 Jun 1956	ALERT: Geomagnetic K = 5	05/1955
05 Jun 2054	EXTENDED WARNING: Geomagnetic K = 5	05/1251 - 06/0800
05 Jun 2054	EXTENDED WARNING: Geomagnetic K = 4	05/1130 - 06/1200



## 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
06 Jun	78	20	5	20 Jun	90	5	2
07	78	8	3	21	85	5	2
08	82	5	2	22	85	5	2
09	82	5	2	23	85	10	3
10	82	5	2	24	85	12	4
11	85	5	2	25	80	8	3
12	85	12	4	26	80	10	3
13	85	12	4	27	80	10	3
14	85	8	3	28	80	5	2
15	90	8	3	29	78	5	2
16	90	5	2	30	78	5	2
17	90	15	5	01 Jul	78	5	2
18	90	10	3	02	78	25	5
19	90	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	2695	Intensity II

**No Events Observed**

### *Flare List*

Date	Time			X-ray Class	Imp/ Brtns	Optical		Rgn #
	Begin	Max	End			Location Lat CMD	Rgn #	
30 May	0410	0414	0422	B2.1				
30 May	0733	0737	0742	C1.4	SF	N13W21	2550	
30 May	1054	1058	1115		SF	N13W23	2550	
30 May	1206	1212	1217	B3.0				
30 May	1318	1324	1328	C1.0	SF	N15W24	2550	
30 May	1502	1507	1511	B4.1	SF	N15W24	2550	
30 May	1703	1710	1712	B4.1	SF	N15W25	2550	
30 May	1746	1746	1753		SF	N15W25	2550	
31 May	1934	1941	1947	B2.9			2551	
31 May	2234	2237	2243	B1.8			2551	
01 Jun	1433	1437	1441	B1.8			2551	
01 Jun	1615	1619	1623	B2.3			2551	
01 Jun	2220	2235	2257	B7.9				



## Region Summary

Date	Location		Sunspot Characteristics				Flares																
	Lat CMD	Helio Lon	Area 10 <sup>6</sup> hemi.	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical												
								C	M	X	S	1	2	3	4								
<b>Region 2548</b>																							
24 May	N13W08	170	10	4	Bxo	3	B																
25 May	N13W22	171	50	6	Dao	6	B						1										
26 May	N13W36	172	120	8	Dso	9	B	1					4										
27 May	N13W49	171	130	8	Dsi	9	B																
28 May	N11W62	170	120	8	Cso	8	B																
29 May	N14W78	174	60	2	Hsx	2	A						1										
30 May	N13W91	174	40	2	Hsx	1	A																
								1	0	0		6	0	0	0	0	0						

Crossed West Limb.  
Absolute heliographic longitude: 170

<b>Region 2549</b>																							
28 May	S14E18	90	20	4	Dro	3	B						1										
29 May	S14E03	93	20	5	Cro	3	B																
30 May	S14W09	92	10	6	Bxo	5	B																
31 May	S13W24	93	0		Axx	1	A																
01 Jun	S13W38	94	plage																				
02 Jun	S13W52	95	plage																				
03 Jun	S13W66	96	plage																				
04 Jun	S13W80	96	plage																				
								0	0	0		1	0	0	0	0	0						

Crossed West Limb.  
Absolute heliographic longitude: 93

<b>Region 2550</b>																							
30 May	N15W31	114	20	4	Cro	6	B	2					6										
31 May	N15W45	114	20	8	Cro	4	B																
01 Jun	N15W58	114	10	5	Bxo	4	B																
02 Jun	N15W72	115	10	5	Bxo	4	B																
03 Jun	N15W86	116	plage																				
								2	0	0		6	0	0	0	0	0						

Crossed West Limb.  
Absolute heliographic longitude: 114



***Region Summary - continued***

Date	Location		Sunspot Characteristics				Flares														
	Lat CMD	Lon	Helio 10 <sup>-6</sup> hemi.	Area	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical									
									C	M	X	S	1	2	3	4					
<b><i>Region 2551</i></b>																					
30 May	N04W44	127	10	4	Bxo	4	B														
31 May	N04W58	127	40	5	Dso	5	B														
01 Jun	N04W71	127	60	7	Cso	6	B														
02 Jun	N04W85	128	90	8	Cso	3	B														
												0	0	0	0	0	0	0	0		

Crossed West Limb.  
 Absolute heliographic longitude: 127



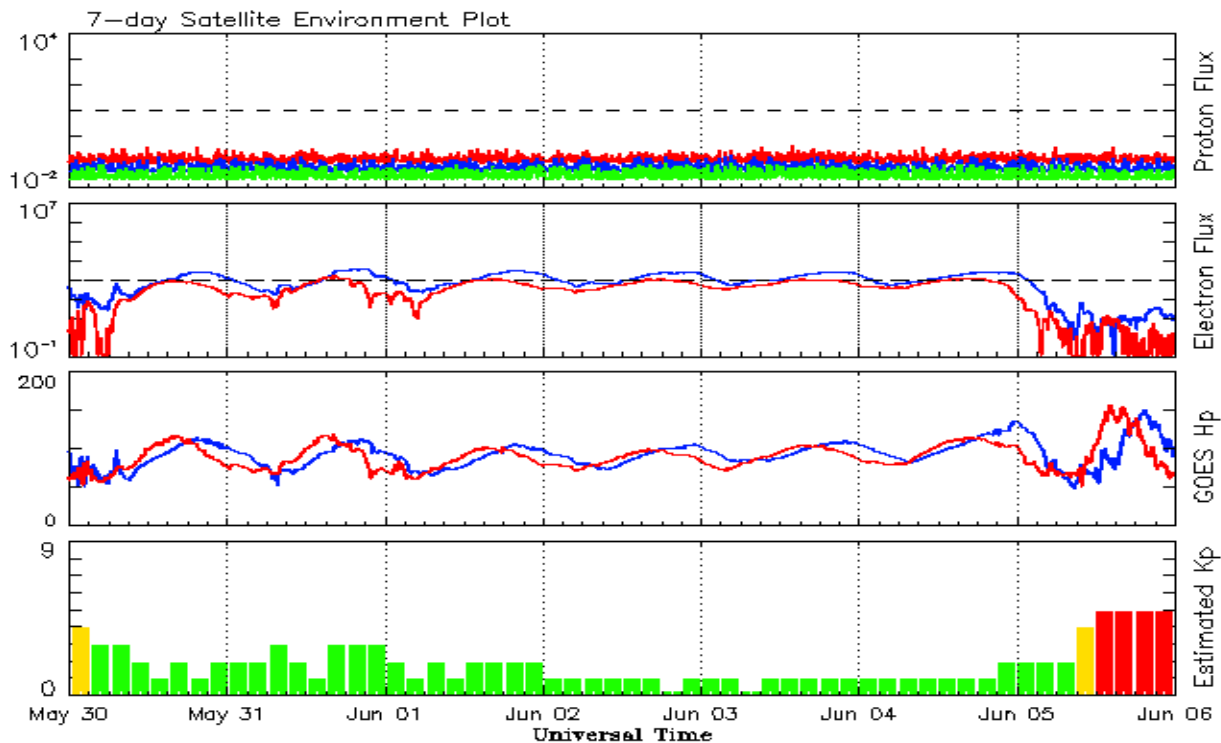
**Recent Solar Indices (preliminary)**  
**Observed monthly mean values**

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>2014</b>									
June	107.7	61.7	0.66	121.4	68.5	122.2	145.5	7	8.4
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
<b>2015</b>									
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			112.8		15	
<b>2016</b>									
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	

**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 30 May 2016*

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.

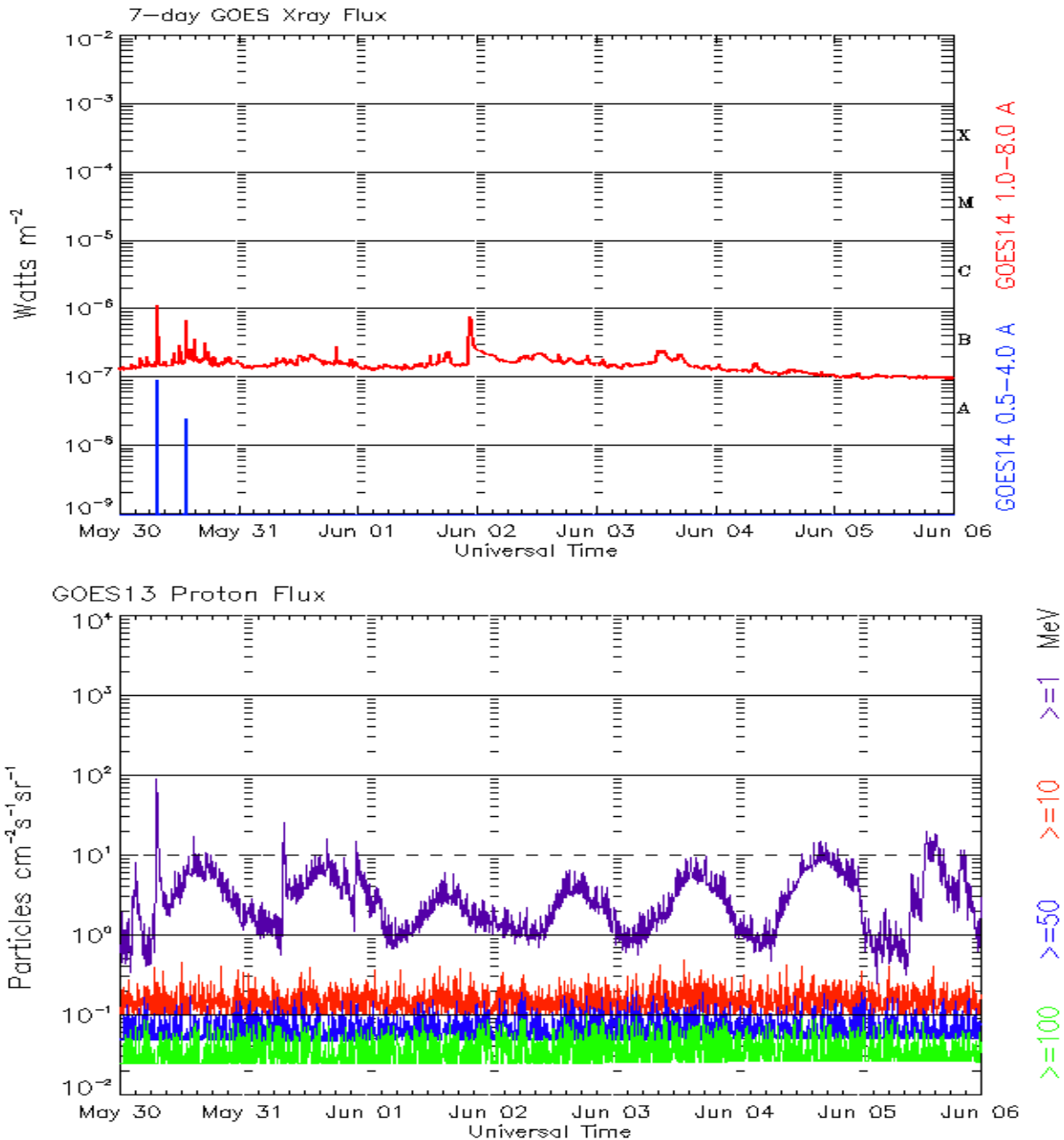
The electron flux plot contains the five-minute averaged integral electron flux (electrons/cm<sup>2</sup>-sec -sr) with energies greater than 2 MeV by the SWPC Primary GOES satellite.

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. 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 30 May 2016*

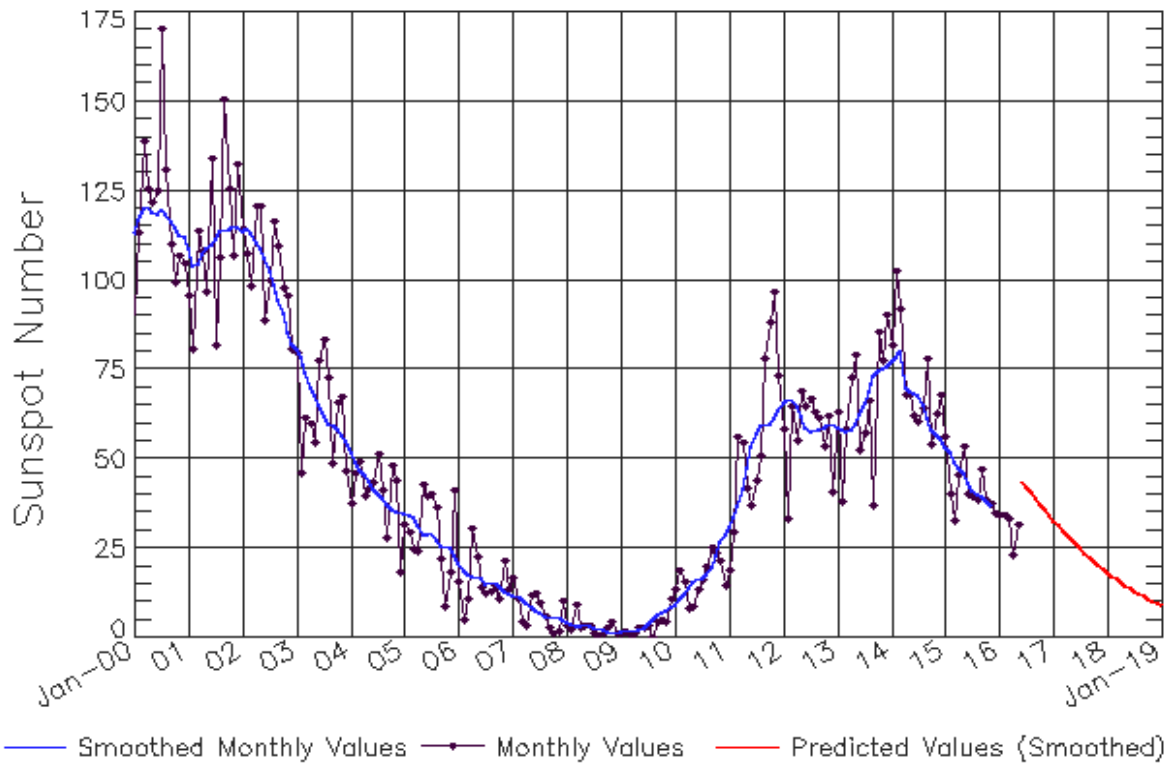
The x-ray plots contains five-minute averages x-ray flux (Watt/m<sup>2</sup>) as measure by the SWPC primary GOES X-ray satellite, usually at West 105 longitude, in two wavelength bands, 0.05 - 0.4 and 0.1 - 0.8 nm. The letters A, B, C, M and X refer to x-ray event levels for the 0.1 - 0.8 nm band.

The proton plot contains the five-minute averaged intergral flux units (pfu = protons/cm<sup>2</sup> -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 May 2016



Updated 2016 Jun 6

NOAA/SWPC Boulder, CO USA

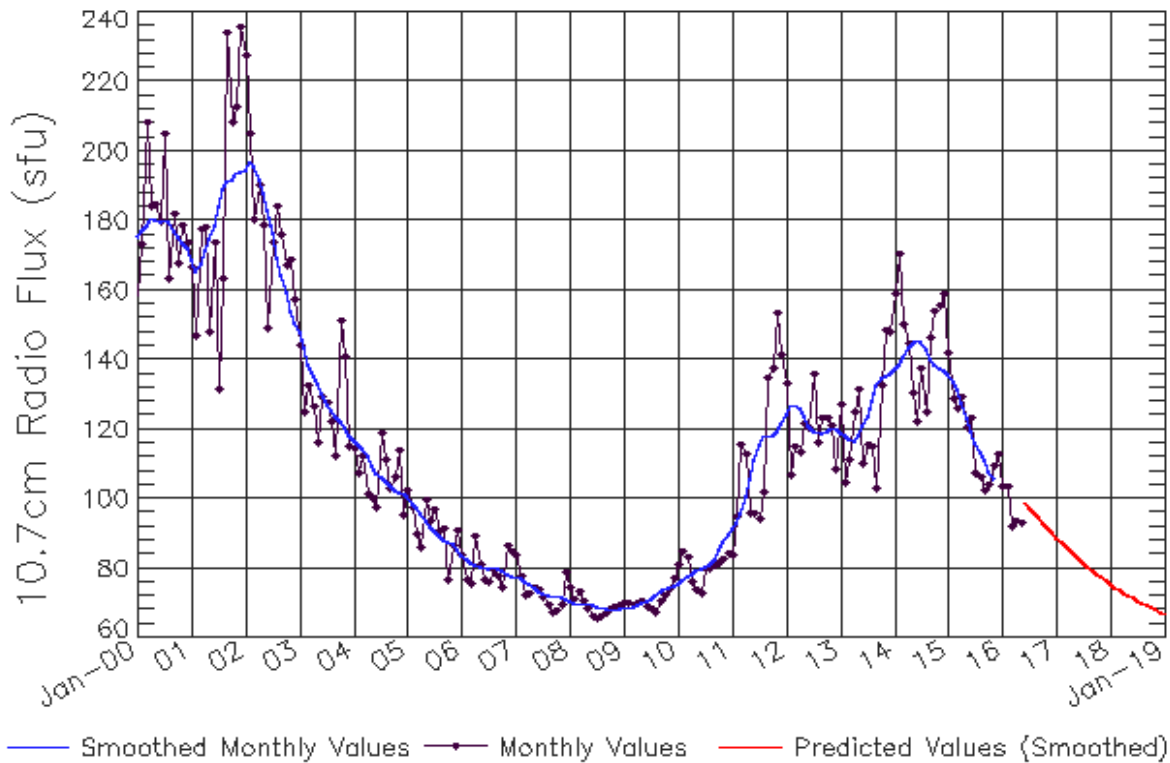
## Smoothed Sunspot Number Prediction

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2010	9	10	11	13	15	16	17	17	20	23	27	29
	(1)	(2)	(3)	(5)	(5)	(6)	(7)	(7)	(8)	(9)	(9)	(10)
2011	19	30	56	54	42	37	44	51	78	88	97	73
	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)
2012	58	33	64	55	69	65	67	63	61	53	62	41
	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)
2013	63	38	58	72	79	53	57	66	37	86	78	90
	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)
2014	82	102	92	68	68	62	60	64	78	54	62	68
	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)
2015	56	40	33	45	53	40	40	39	47	38	37	35
	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)
2016	34	34	33	23	31	44	42	40	39	37	36	34
	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)
2017	33	31	30	29	27	26	25	24	23	21	20	19
	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)
2018	18	17	16	15	15	14	13	12	12	11	10	10
	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)
2019	9	8	8	7	7	6	6	6	5	5	4	4
	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)



# ISES Solar Cycle F10.7cm Radio Flux Progression

Observed data through May 2016



Updated 2016 Jun 6

NOAA/SWPC Boulder, CO USA

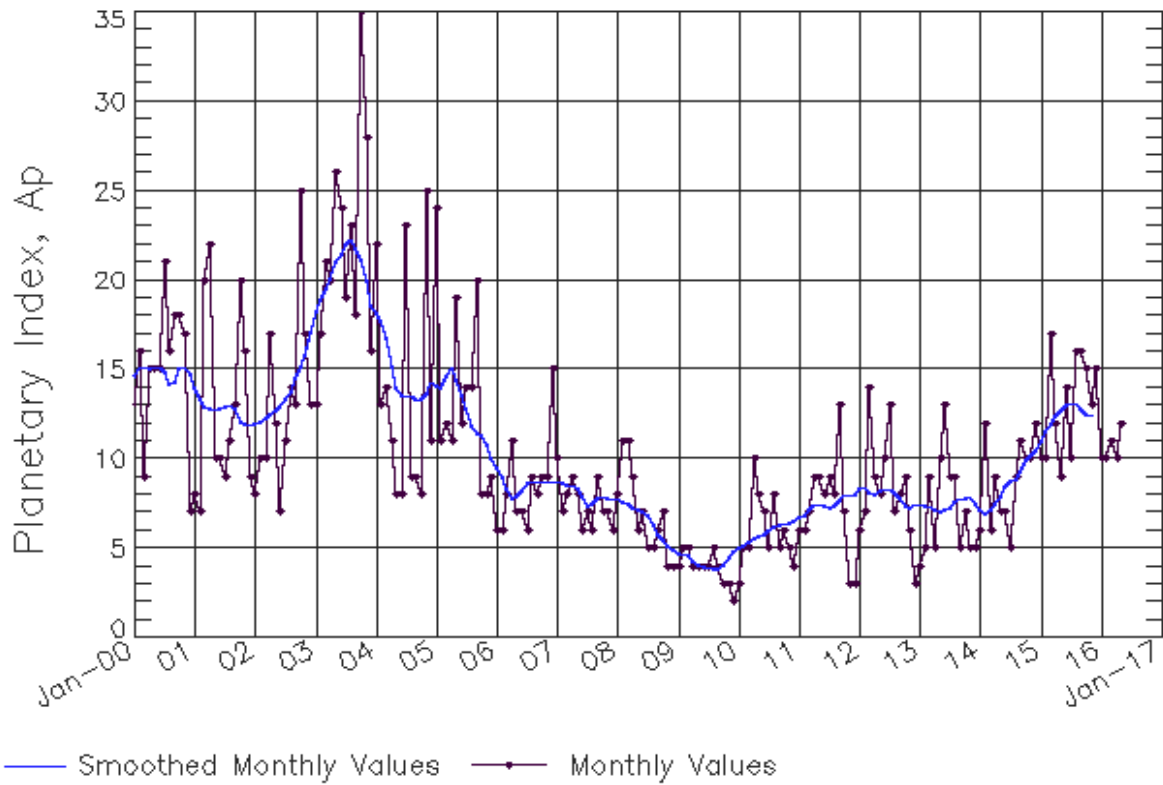
## *Smoothed F10.7cm Radio Flux Prediction*

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 (1)
2016	102 (1)	101 (2)	100 (3)	99 (4)	98 (4)	96 (5)	95 (6)	94 (7)	93 (8)	92 (8)	91 (9)	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 May 2016



Updated 2016 Jun 6

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

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

