

Solar activity was at low levels on 28 March due to an isolated C2 flare from Region 2524 (N15, L=277, class/area Eho/340 on 19 March) at 0228 UTC. The rest of the period was dominated by very low levels as Region 2526 (S05, L=178, class/area, Cso/200 on 29 Mar) was the only spot group on the disk until the emergence of new flux on 03 April. No Earth-directed coronal mass ejections 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 to moderate levels throughout the period.

Geomagnetic field activity ranged from quiet to major storm levels (G2-Moderate) during the period. From 28-31 March, solar wind parameters indicated the influence of a positive polarity coronal hole high speed stream (CH HSS). Solar wind speeds increased from near 450 km/s at the beginning of the period to around 590 km/s by early on 30 March before declining to a low around 330 km/s by 02 April. Total field slowly declined from 8 nT early in the period to 3 nT by 01 April. The geomagnetic field responded with quiet to active levels on 28 and 30 March with quiet to unsettled levels on 29 and 31 March. Quiet conditions were observed on 01 April through midday on 02 April. At approximately 02/1344 UTC, a solar sector boundary crossing occurred into a negative (towards) sector followed by an increase in total field to a maximum of 18 nT at 02/1406 UTC while Bz reached a maximum negative deflection of -14 nT at 02/1522 UTC. Solar wind speed increased to near 540 km/s around 02/2131 UTC indicating the arrival of a co-rotating interaction region followed by another CH HSS. The geomagnetic field responded with unsettled to major storm levels (G2-Moderate) during the second half of 02 April. By 03 April, solar wind speed was in decline to around 400 km/s while total field measurements were near 6 nT. Quiet to active levels were observed on 03 April.

Space Weather Outlook **04 April - 30 April 2016**

Solar activity is expected to be at very low to low levels for the forecast period.

No proton events are expected at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to be at normal to moderate levels with high levels on 04, 06-10, 14-18, and 26-29 April in response to recurrent CH HSS activity.

Geomagnetic field activity is expected to be at unsettled to active levels from 05-08, 11-15, 24-27, and 30 April with (G1) minor storm levels likely on 13-14 and 30 April and (G2) moderate storm levels likely on 12 April due to recurrent CH HSS activity.



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	
28 March	88	23	250	A7.4	1	0	0	0	1	0	0	0	0
29 March	88	13	200	A7.5	0	0	0	0	0	0	0	0	0
30 March	84	12	190	A5.6	0	0	0	0	0	0	0	0	0
31 March	82	11	200	A3.7	0	0	0	0	0	0	0	0	0
01 April	82	11	180	A3.7	0	0	0	0	0	0	0	0	0
02 April	82	11	190	A3.5	0	0	0	0	0	0	0	0	0
03 April	82	38	170	A4.3	0	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
	28 March	3.1e+05	1.3e+04	3.4e+03	3.1e+06	
29 March	3.0e+05	1.3e+04	3.3e+03	6.5e+06		
30 March	2.4e+05	1.3e+04	3.1e+03	6.3e+06		
31 March	2.0e+05	1.3e+04	3.0e+03	1.8e+07		
01 April	4.0e+05	1.3e+04	3.0e+03	2.6e+07		
02 April	6.2e+05	1.3e+04	3.1e+03	1.1e+07		
03 April	2.9e+05	1.2e+04	3.2e+03	8.2e+06		

Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	28 March	9	2-4-1-1-2-2-2-2	6	1-3-1-2-1-1-2-2	10
29 March	8	3-3-2-2-2-2-1-1	22	3-2-3-6-5-2-1-1	11	3-3-3-3-2-2-1-1
30 March	10	3-1-2-1-3-3-3-2	21	2-1-2-5-6-3-2-1	12	3-2-2-2-4-2-3-2
31 March	5	3-2-2-1-1-1-0-1	4	2-1-1-2-2-1-1-0	7	3-3-2-1-1-1-0-1
01 April	2	1-0-0-0-1-1-1-1	0	1-0-0-0-0-0-0-0	3	1-0-0-0-0-0-1-1
02 April	15	1-0-0-1-3-4-4-5	17	2-0-0-0-2-6-3-4	22	2-1-0-1-3-5-4-6
03 April	13	4-3-3-3-2-1-1-3	20	3-4-4-5-2-3-1-3	32	4-3-3-3-1-2-2-4

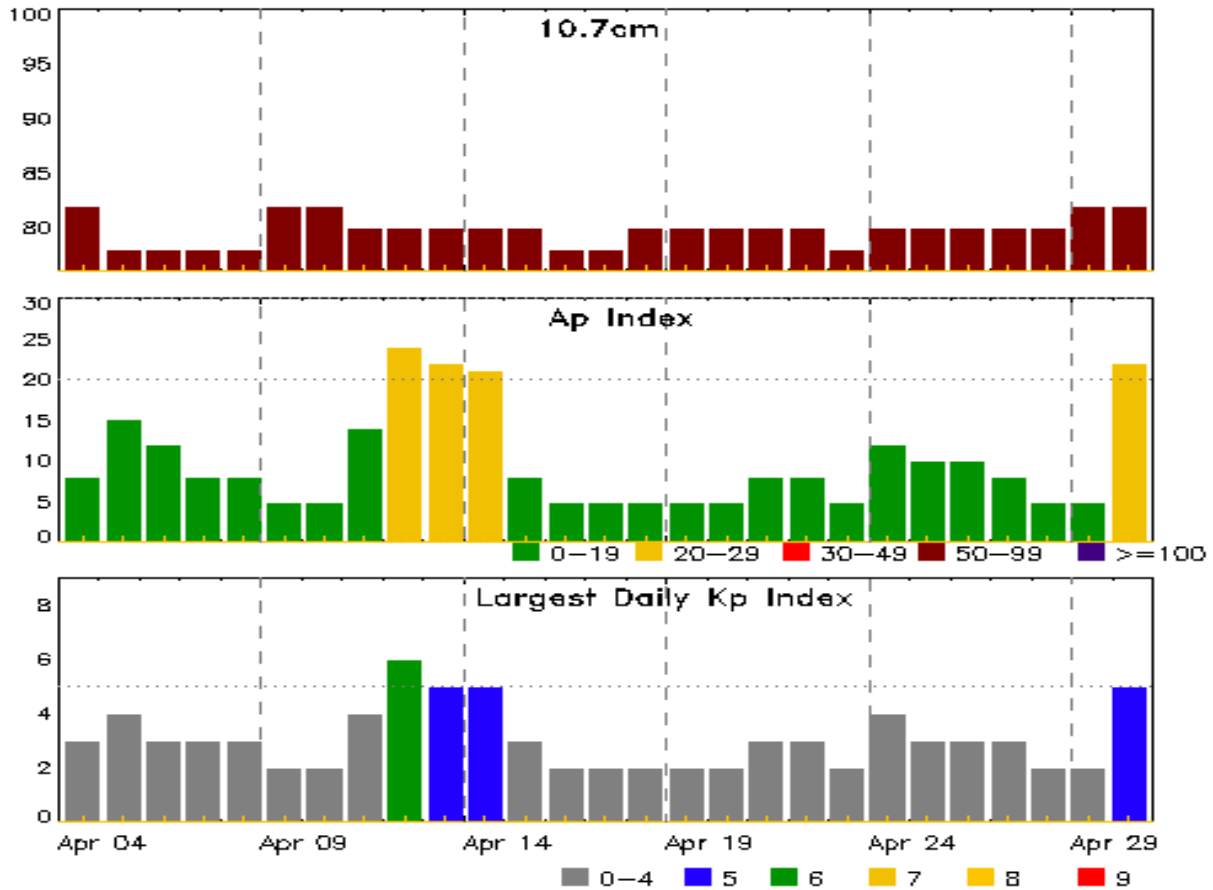


Alerts and Warnings Issued

Date & Time of Issue UTC	Type of Alert or Warning	Date & Time of Event UTC
28 Mar 0438	ALERT: Geomagnetic K = 4	28/0438
28 Mar 0855	EXTENDED WARNING: Geomagnetic K = 4	27/1716 - 28/1800
29 Mar 0153	WARNING: Geomagnetic K = 4	29/0152 - 0600
30 Mar 1259	WARNING: Geomagnetic K = 4	30/1258 - 1800
30 Mar 1500	ALERT: Geomagnetic K = 4	30/1459
30 Mar 1846	WATCH: Geomagnetic Storm Category G1 predicted	
01 Apr 1357	WATCH: Geomagnetic Storm Category G2 predicted	
02 Apr 1411	WARNING: Geomagnetic K = 5	02/1410 - 2359
02 Apr 1411	WARNING: Geomagnetic K = 4	02/1410 - 03/0700
02 Apr 1626	ALERT: Geomagnetic K = 4	02/1621
02 Apr 1726	ALERT: Geomagnetic K = 5	02/1724
02 Apr 1834	EXTENDED WARNING: Geomagnetic K = 5	02/1410 - 03/0600
02 Apr 1834	WARNING: Geomagnetic K = 6	02/1835 - 2359
02 Apr 2248	ALERT: Geomagnetic K = 5	02/2247
03 Apr 0004	ALERT: Geomagnetic K = 6	02/2359
03 Apr 0545	EXTENDED WARNING: Geomagnetic K = 4	02/1410 - 03/1300
03 Apr 1108	WATCH: Geomagnetic Storm Category G1 predicted	
03 Apr 2144	WARNING: Geomagnetic K = 4	03/2144 - 04/0800
03 Apr 2236	ALERT: Geomagnetic K = 4	03/2235



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 Apr	82	8	3	18 Apr	80	5	2
05	78	15	4	19	80	5	2
06	78	12	3	20	80	5	2
07	78	8	3	21	80	8	3
08	78	8	3	22	80	8	3
09	82	5	2	23	78	5	2
10	82	5	2	24	80	12	4
11	80	14	4	25	80	10	3
12	80	24	6	26	80	10	3
13	80	22	5	27	80	8	3
14	80	21	5	28	80	5	2
15	80	8	3	29	82	5	2
16	78	5	2	30	82	22	5
17	78	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	Imp/ Brtns	Optical Location Lat CMD	Optical Rgn #
	Begin	Max	End				
28 Mar	0218	0228	0232	C2.1			2524
28 Mar	0254	0259	0304	B3.3			2526
28 Mar	0752	0757	0810	B3.7	SF	S06E27	2526
28 Mar	1838	1844	1900	B3.4			2524
28 Mar	2341	2347	2356	B2.4			2524
29 Mar	0347	0359	0409	B2.6			2524
29 Mar	1448	1456	1510	B3.5			2524
30 Mar	1604	1611	1616	B1.5			2526
01 Apr	0250	0254	0256	B1.1			2526
01 Apr	0300	0304	0307	B1.3			2526
01 Apr	0338	0341	0344	B1.0			2526
02 Apr	1211	1217	1222	B2.1			2524
03 Apr	1335	1338	1341	B2.2			2528
03 Apr	2352	0006	0017	B3.1			2528



Region Summary

Date	Location		Sunspot Characteristics				Flares																
	Lat CMD	Helio Lon	Area 10 ⁶ hemi.	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical												
								C	M	X	S	1	2	3	4								
Region 2524																							
16 Mar	N14E69	284	70	2	Hsx	1	A																
17 Mar	N14E63	277	210	12	Eao	6	B																
18 Mar	N15E49	278	230	11	Eao	7	B						1										
19 Mar	N15E36	277	340	12	Eho	5	B																
20 Mar	N15E21	278	240	12	Eso	4	B						1										
21 Mar	N15E09	278	200	12	Eso	4	B																
22 Mar	N15W03	277	240	12	Eso	3	B																
23 Mar	N15W16	277	210	13	Eso	4	B	1															
24 Mar	N14W29	277	190	11	Eso	4	B																
25 Mar	N13W44	278	100	11	Eso	3	B																
26 Mar	N14W61	282	80	3	Hsx	1	A																
27 Mar	N14W75	283	80	3	Hsx	1	A																
28 Mar	N14W88	283	60	2	Hsx	1	A	1															
								2	0	0		2	0	0	0	0	0	0					

Crossed West Limb.
 Absolute heliographic longitude: 277

Region 2526																							
24 Mar	S05E72	176	120	2	Hsx	1	A																
25 Mar	S04E59	175	180	3	Hsx	1	A						1										
26 Mar	S04E45	176	190	3	Hsx	2	A						1										
27 Mar	S04E30	178	190	3	Hsx	2	A						1										
28 Mar	S04E18	177	190	3	Hsx	2	A						1										
29 Mar	S05E04	178	200	3	Cso	3	B																
30 Mar	S05W09	178	190	3	Hsx	2	A																
31 Mar	S05W22	178	200	3	Hsx	1	A																
01 Apr	S05W36	178	180	3	Hsx	1	A																
02 Apr	S05W48	177	190	2	Hsx	1	A																
03 Apr	S05W61	177	160	2	Hsx	1	A																
								0	0	0		4	0	0	0	0	0						

Still on Disk.
 Absolute heliographic longitude: 178

Region 2527																							
03 Apr	N14W16	132	0	1	Axx	2	A																
								0	0	0		0	0	0	0	0	0						

Still on Disk.
 Absolute heliographic longitude: 132



Region Summary - continued

Date	Location		Sunspot Characteristics				Flares										
	Lat	CMD	Helio Lon	Area 10 ⁻⁶ hemi.	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical					
									C	M	X	S	1	2	3	4	
<i>Region 2528</i>																	
03 Apr	N06E06		110	10	5	Bxo	5	B	0	0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 110

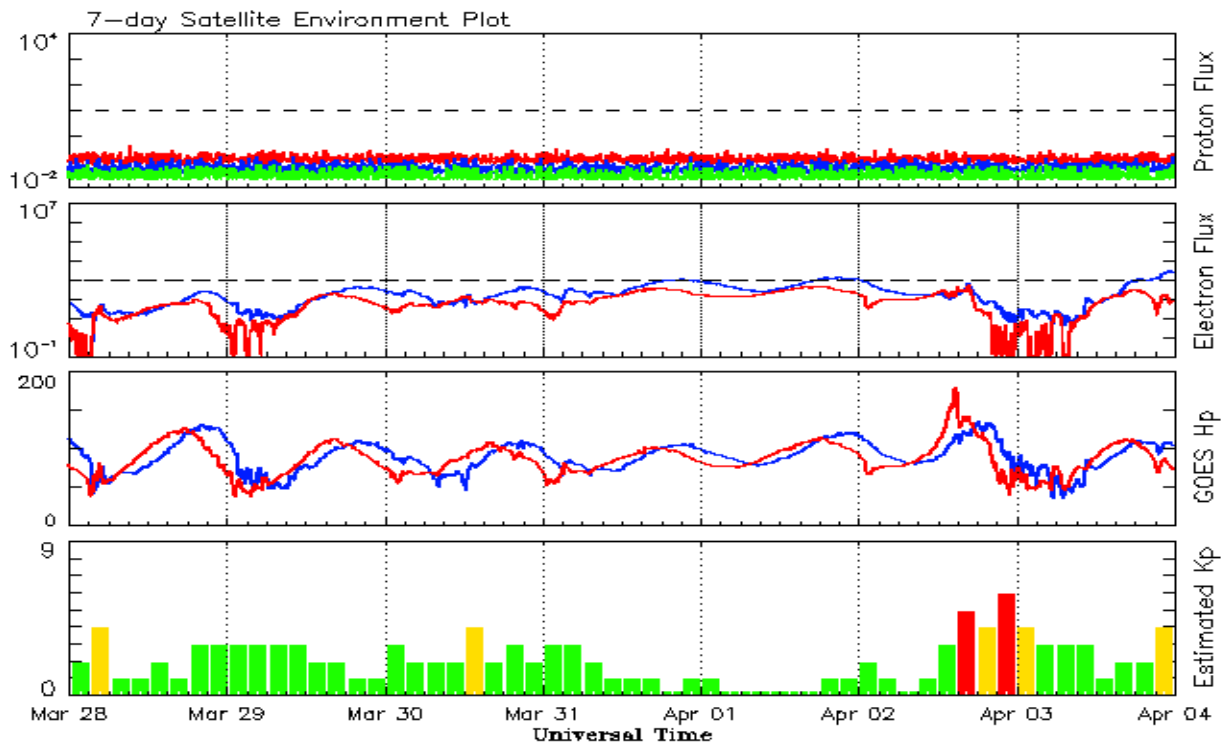


Recent Solar Indices (preliminary)
Observed monthly mean values

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									
April	130.5	67.5	0.65	124.8	69.8	144.3	143.5	9	7.5
May	116.8	67.5	0.64	122.3	69.0	130.0	144.7	7	7.9
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
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			104.1		15	
November	61.8	37.3	0.61			109.6		13	
December	54.1	34.8	0.64			112.8		15	
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	

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 28 March 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.

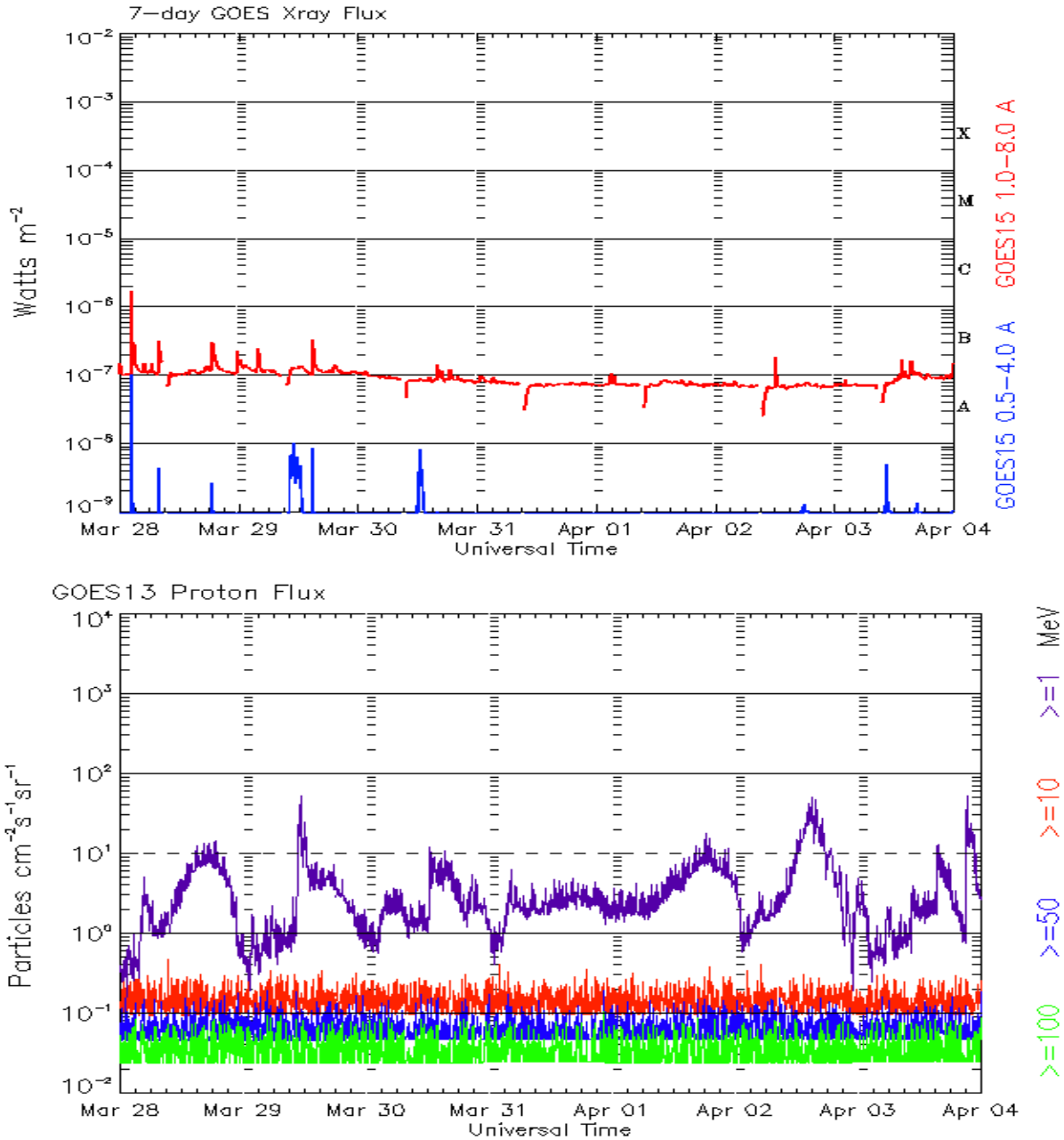
The electron flux plot contains the five-minute averaged integral electron flux (electrons/cm²-sec -sr) with energies greater than 2 MeV by the SWPC Primary GOES satellite.

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 28 March 2016*

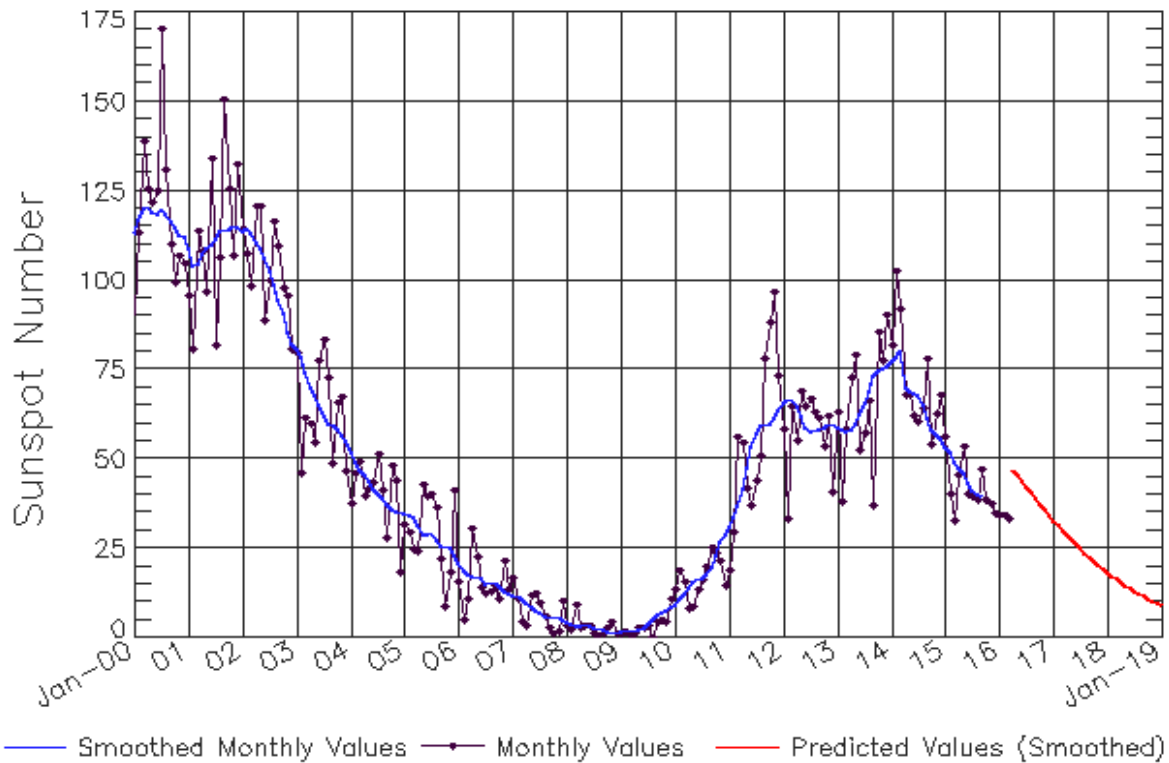
The x-ray plots contains five-minute averages x-ray flux (Watt/m²) as measure by the SWPC primary GOES X-ray satellite, usually at West 105 longitude, in two wavelength bands, 0.05 - 0.4 and 0.1 - 0.8 nm. The letters A, B, C, M and X refer to x-ray event levels for the 0.1 - 0.8 nm band.

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 Mar 2016



Updated 2016 Apr 4

NOAA/SWPC Boulder, CO USA

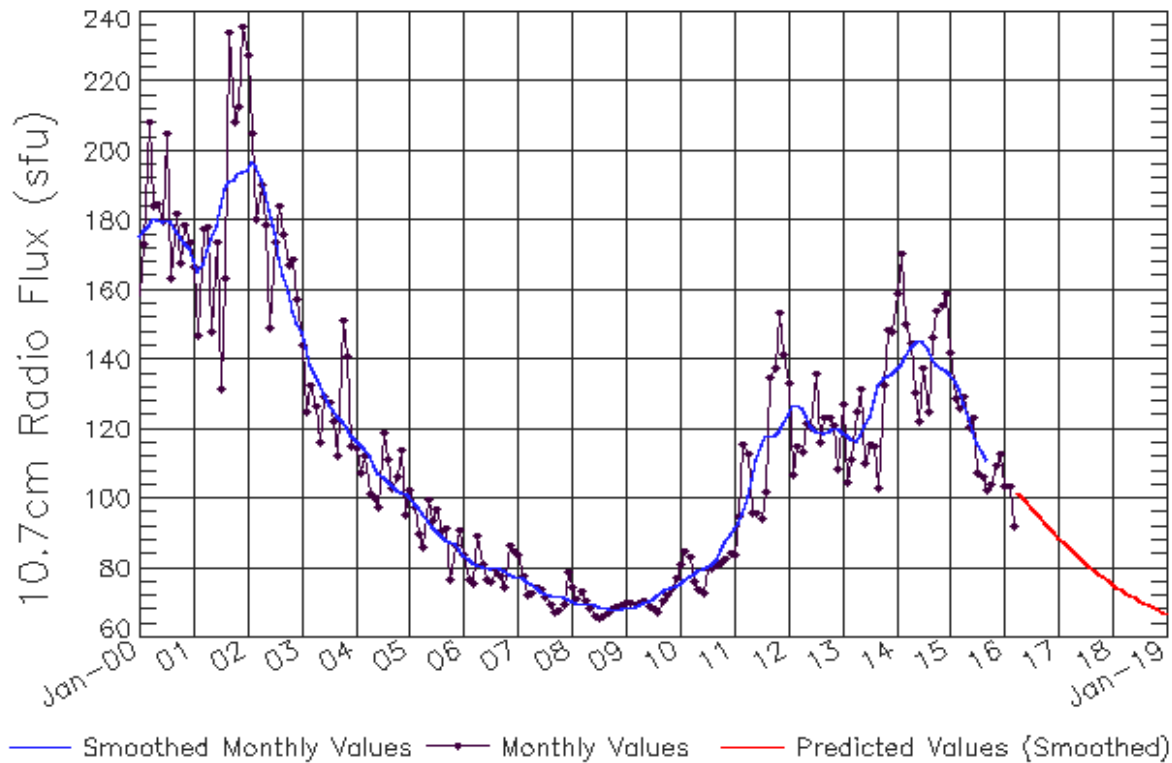
Smoothed Sunspot Number Prediction

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2010	9	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	47	45	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 Mar 2016



Updated 2016 Apr 4

NOAA/SWPC Boulder, CO USA

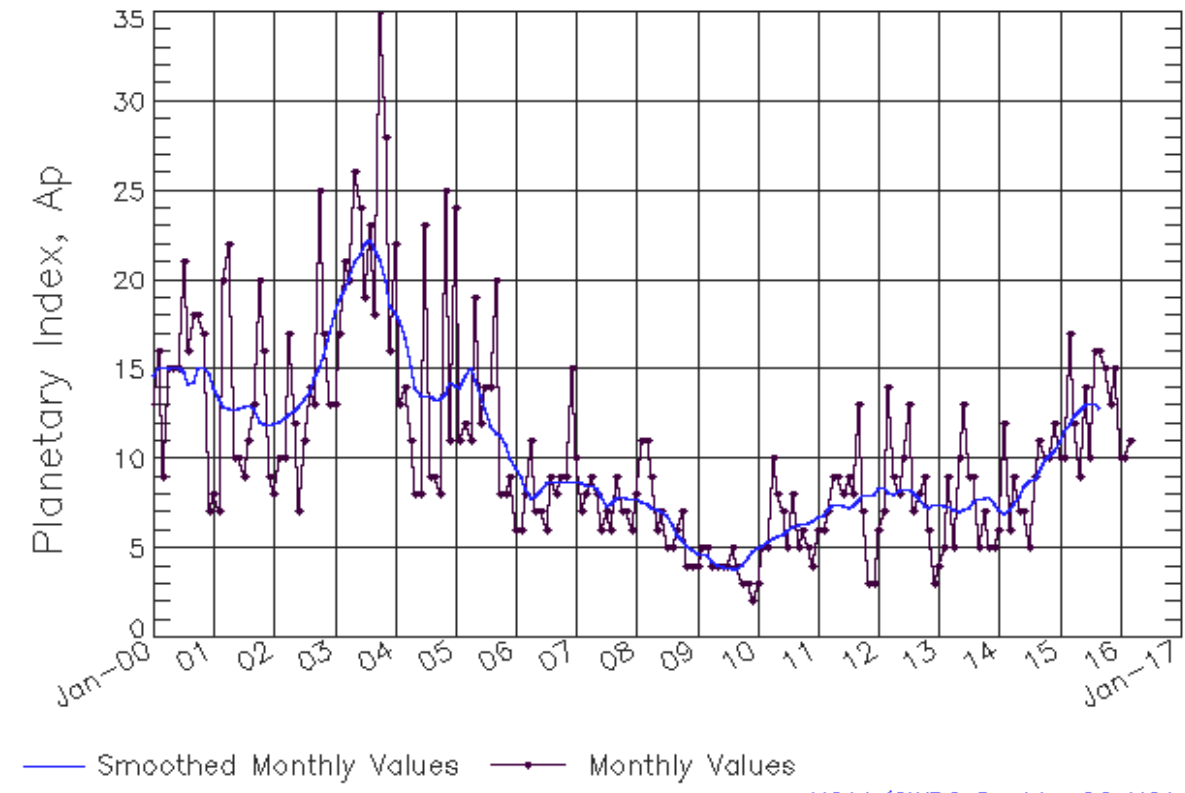
Smoothed F10.7cm Radio Flux Prediction

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 (1)	106 (1)	104 (2)
2016	103 (3)	102 (4)	101 (4)	101 (5)	99 (6)	98 (7)	96 (8)	95 (8)	94 (9)	93 (9)	92 (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 Mar 2016



Updated 2016 Apr 4

NOAA/SWPC Boulder, CO USA

Solar Cycle Comparison charts are temporarily unavailable.



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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 -- User Guide

