

Space Weather Highlights
30 January - 05 February 2017

SWPC PRF 2162
06 February 2017

Solar activity was very low through the period with only two B-class flares observed from Regions 2631 (S05, L=113, class/area Bxo/010 on 31 January) and 2632 (N14, L=085, class/area Dao/060 on 02 February) on 04 February. No Earth-directed coronal mass ejections were observed.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit was at normal to moderate levels on 31 January and reached high levels on 30 January and again on 01-05 February. The largest flux of the period was 22,414 pfu observed at 04/1820 UTC.

Geomagnetic field activity ranged from quiet to G1 (Minor) geomagnetic storm conditions. The period began with solar wind speeds near 400 km/s. By 30/1138 UTC, total field and solar wind speed began to increase indicating the arrival of a co-rotating interaction region followed by a negative polarity coronal hole high speed stream (CH HSS). By 31/1153, total field reached a maximum of 17.2 nT while the solar wind speed reached a peak of 796 km/s at 31/2041 UTC. By 31/1600 UTC, total field had decreased to 5-6 nT while the solar wind speed began to decline early on 02 February until early on 05 February when another increase to near 630 km/s was observed. The geomagnetic field responded with quiet to unsettled levels on 30 January and 04 February, quiet to active levels on 02-03 and 05 February, and unsettled to G1 (Minor) storm levels on 31 January through 01 February.

Space Weather Outlook
06 February - 04 March 2017

Solar activity is expected to be very low levels throughout the period with a chance for C-class flares on 11-24 February with the return of old Region 2628 (N12, L=174).

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 likely on 06-13, 16-19, 22-26 and 28 February - 04 March due to recurrent CH HSS influence.

Geomagnetic field activity is expected to be quiet with unsettled to active levels expected on 06-09,14-18, 22-25 and 27 February - 04 March with G1 (Minor) geomagnetic storms likely on 27 February and 01-02 March and G2 (Moderate) geomagnetic storm levels likely on 28 February 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	
30 January	77	35	80	A7.7	0	0	0	0	0	0	0	0	0
31 January	76	42	60	A7.4	0	0	0	0	0	0	0	0	0
01 February	76	28	90	A7.9	0	0	0	0	0	0	0	0	0
02 February	75	40	110	A7.7	0	0	0	0	0	0	0	0	0
03 February	75	39	80	A7.3	0	0	0	0	0	0	0	0	0
04 February	74	22	40	A8.0	0	0	0	0	0	0	0	0	0
05 February	73	22	20	A7.3	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
	30 January		1.0e+06	1.6e+04	3.6e+03	
31 January		2.8e+06	1.4e+04	3.2e+03		7.9e+06
01 February		5.0e+06	1.5e+04	3.6e+03		3.0e+08
02 February		3.6e+06	1.4e+04	3.5e+03		6.8e+08
03 February		2.6e+06	1.4e+04	3.3e+03		6.8e+08
04 February		1.4e+06	1.5e+04	3.4e+03		8.4e+08
05 February		1.6e+06	1.5e+04	3.6e+03		4.8e+08

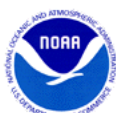
Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	30 January	5	0-1-0-1-3-2-1-2	5	0-0-0-3-2-3-1-1	6
31 January	16	2-2-3-4-3-3-3-4	32	2-2-3-5-4-6-5-4	24	3-3-3-4-3-4-4-5
01 February	19	4-3-3-2-4-4-2-4	47	4-3-5-4-6-7-3-4	29	5-4-3-3-4-5-3-5
02 February	18	4-3-4-3-2-2-3-4	28	3-3-5-5-4-4-4-3	21	4-4-4-3-3-3-4-4
03 February	14	3-3-4-2-2-3-3-2	33	3-3-5-4-5-6-3-3	18	3-4-4-2-3-3-3-3
04 February	8	2-3-3-2-2-1-1-2	15	2-2-5-3-3-3-1-2	11	3-3-3-2-2-2-2-3
05 February	11	2-3-3-2-3-3-2-2	26	2-3-2-5-5-5-4-2	15	3-4-3-2-3-3-3-2



Alerts and Warnings Issued

Date & Time of Issue UTC	Type of Alert or Warning	Date & Time of Event UTC
30 Jan 1237	CONTINUED ALERT: Electron 2MeV Integral Flux \geq 1000pfu	26/1350
31 Jan 0755	WARNING: Geomagnetic K = 4	31/0755 - 1800
31 Jan 1001	ALERT: Geomagnetic K = 4	31/1000
31 Jan 1455	WARNING: Geomagnetic K = 5	31/1455 - 2359
31 Jan 1455	EXTENDED WARNING: Geomagnetic K = 4	31/0755 - 01/0600
31 Jan 2340	EXTENDED WARNING: Geomagnetic K = 5	31/1455 - 01/0600
01 Feb 0001	ALERT: Geomagnetic K = 5	31/2359
01 Feb 0303	ALERT: Geomagnetic K = 5	01/0259
01 Feb 0521	EXTENDED WARNING: Geomagnetic K = 4	31/0755 - 01/1800
01 Feb 1246	ALERT: Electron 2MeV Integral Flux \geq 1000pfu	01/1240
01 Feb 1529	WARNING: Geomagnetic K = 5	01/1528 - 2359
01 Feb 1529	EXTENDED WARNING: Geomagnetic K = 4	31/0755 - 02/0600
01 Feb 1610	ALERT: Geomagnetic K = 5	01/1610
01 Feb 2205	WATCH: Geomagnetic Storm Category G1 predicted	
01 Feb 2206	ALERT: Geomagnetic K = 5	01/2206
01 Feb 2338	EXTENDED WARNING: Geomagnetic K = 5	01/1528 - 02/0600
02 Feb 0500	CONTINUED ALERT: Electron 2MeV Integral Flux \geq 1000pfu	01/1240
02 Feb 0540	EXTENDED WARNING: Geomagnetic K = 4	31/0755 - 02/1800
02 Feb 1753	EXTENDED WARNING: Geomagnetic K = 4	31/0755 - 03/0300
02 Feb 2236	WARNING: Geomagnetic K = 5	02/2236 - 03/0300
03 Feb 0230	EXTENDED WARNING: Geomagnetic K = 4	31/0755 - 03/1200
03 Feb 0501	CONTINUED ALERT: Electron 2MeV Integral Flux \geq 1000pfu	01/1240
03 Feb 0741	WARNING: Geomagnetic K = 5	03/0741 - 1200
04 Feb 0508	CONTINUED ALERT: Electron 2MeV Integral Flux \geq 1000pfu	01/1240
04 Feb 0535	WARNING: Geomagnetic K = 4	04/0535 - 1200
05 Feb 0436	WARNING: Geomagnetic K = 4	05/0435 - 1200
05 Feb 0438	ALERT: Geomagnetic K = 4	05/0438

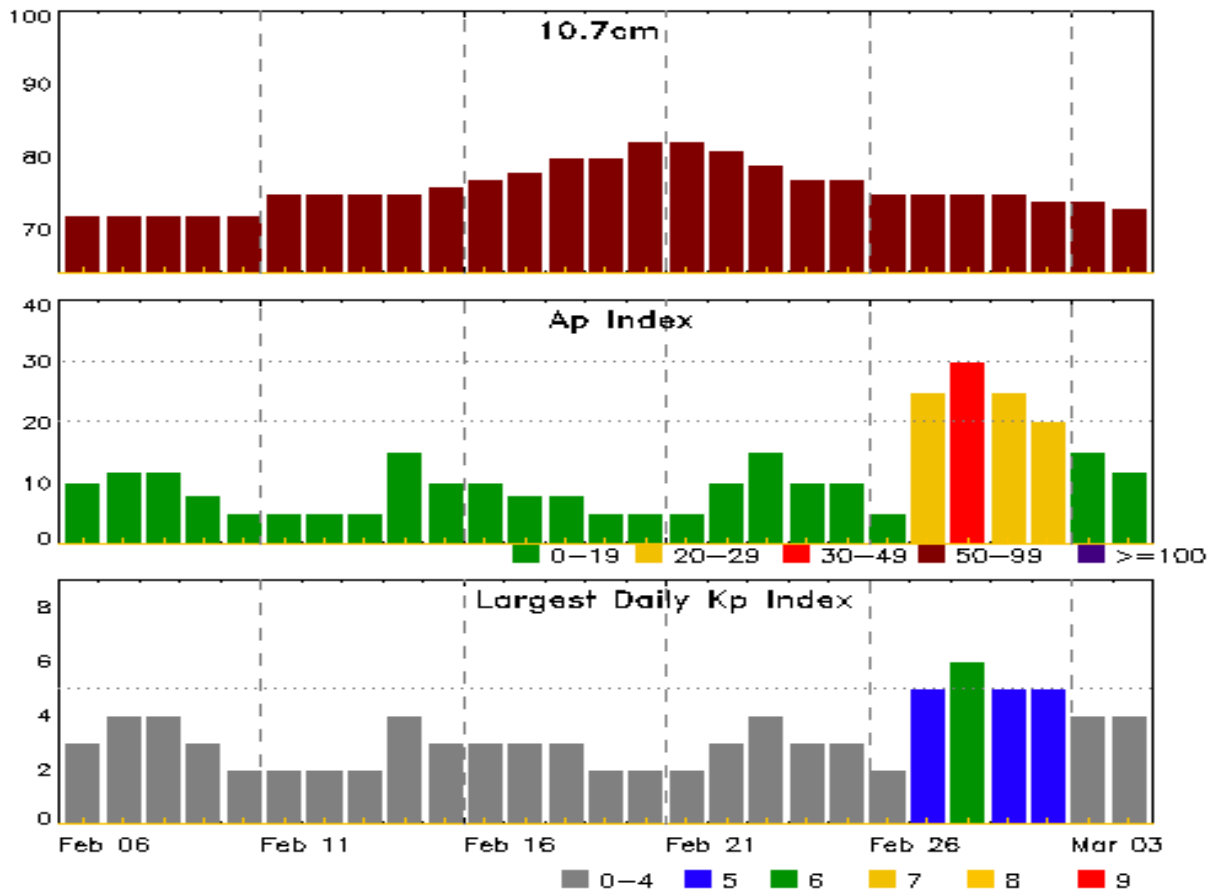


Alerts and Warnings Issued

Date & Time of Issue UTC	Type of Alert or Warning	Date & Time of Event UTC
05 Feb 0501	CONTINUED ALERT: Electron 2MeV Integral Flux \geq 1000pfu	01/1240
05 Feb 1950	WARNING: Geomagnetic K = 4	05/1949 - 2359



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 Feb	72	10	3	20 Feb	82	5	2
07	72	12	4	21	82	5	2
08	72	12	4	22	81	10	3
09	72	8	3	23	79	15	4
10	72	5	2	24	77	10	3
11	75	5	2	25	77	10	3
12	75	5	2	26	75	5	2
13	75	5	2	27	75	25	5
14	75	15	4	28	75	30	6
15	76	10	3	01 Mar	75	25	5
16	77	10	3	02	74	20	5
17	78	8	3	03	74	15	4
18	80	8	3	04	73	12	4
19	80	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			Rgn #
	Begin	Max	End		Imp/ Brtns	Location Lat CMD		
04 Feb	0557	0600	0604	B1.2				2631
04 Feb	1259	1312	1345	B1.6				2632



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 2628																				
20 Jan	N12E49		171	20	1	Bxo	4	B					8							
21 Jan	N12E36		171	120	9	Dai	8	BG	6				5	1						
22 Jan	N12E21		173	210	9	Dao	8	BG												
23 Jan	N12E07		174	220	9	Dso	8	B												
24 Jan	N13W05		172	210	11	Eao	6	B												
25 Jan	N12W22		175	180	10	Cao	7	B												
26 Jan	N11W34		175	120	13	Cao	5	B												
27 Jan	N12W48		175	110	12	Cso	5	B												
28 Jan	N12W64		179	110	4	Hsx	3	A												
29 Jan	N11W79		181	110	2	Hsx	1	A												
									6	0	0	13	1	0	0	0	0			

Crossed West Limb.

Absolute heliographic longitude: 172

Region 2629																				
24 Jan	N15E59		109	70	5	Cao	3	B					3							
25 Jan	N15E44		110	220	6	Dao	7	B					6							
26 Jan	N15E31		110	150	8	Dao	6	B					2							
27 Jan	N15E18		110	160	8	Dao	8	B												
28 Jan	N15E05		110	130	6	Dso	5	B												
29 Jan	N15W10		112	120	6	Cso	3	B												
30 Jan	N15W22		111	60	3	Hsx	1	A												
31 Jan	N15W38		113	40	1	Hax	1	A												
01 Feb	N15W51		113	40	1	Hax	1	A												
02 Feb	N16W65		114	40	1	Hax	1	A												
03 Feb	N16W78		114	40	1	Hax	1	A												
04 Feb	N16W92		115	30	1	Hax	1	A												
									0	0	0	11	0	0	0	0	0			

Crossed West Limb.

Absolute heliographic longitude: 110



Region Summary - continued

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

Region 2630

30 Jan	N16E54	35	10	1	Axx	1	A										
31 Jan	N16E39	36	plage														
01 Feb	N16E25	37	plage														
02 Feb	N16E11	38	plage														
03 Feb	N16W03	39	plage														
04 Feb	N16W17	40	plage														
05 Feb	N16W31	41	plage														
									0	0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 39

Region 2631

30 Jan	S04W24	113	10	2	Bxo	3	B										
31 Jan	S05W38	113	10	4	Bxo	5	B										
01 Feb	S04W52	114	plage														
02 Feb	S04W67	116	plage														
03 Feb	S04W82	118	plage														
									0	0	0	0	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 113

Region 2632

31 Jan	N14W08	83	10	4	Bxo	6	B										
01 Feb	N14W22	84	50	5	Dao	7	B										
02 Feb	N14W36	85	60	7	Dao	6	B										
03 Feb	N16W50	86	30	8	Cao	6	B										
04 Feb	N16W64	87	10	1	Axx	1	A										
05 Feb	N14W76	86	10	1	Axx	1	A										
									0	0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 83

Region 2633

02 Feb	N14W51	100	10	2	Bxo	3	B										
03 Feb	N15W64	100	10	8	Bxo	2	B										
04 Feb	N15W78	101	plage														
									0	0	0	0	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 100



Region Summary - continued

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	4	
<i>Region 2634</i>																
05 Feb	N02E70	300	10		Axx	1	A	0	0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 300

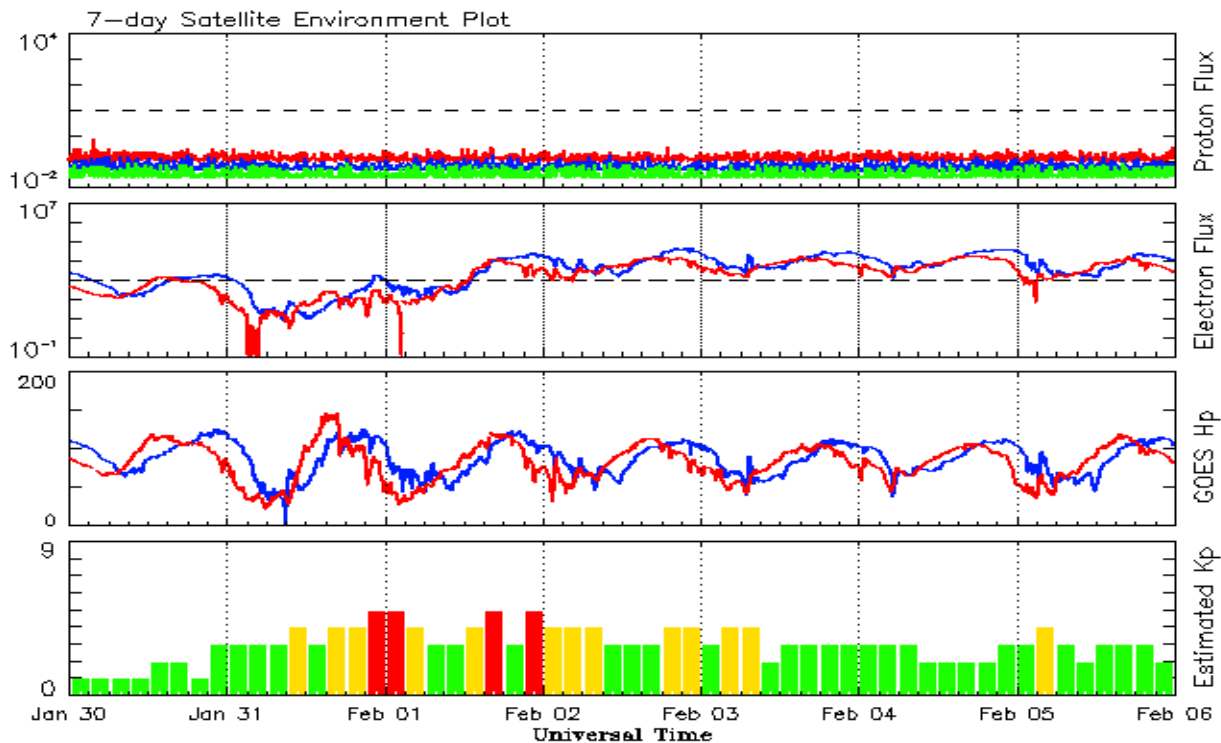


Recent Solar Indices (preliminary)
Observed monthly mean values

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									
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	39.5	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	36.7	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	34.2	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	23.2	85.9	87.7	10	11.2
August	50.4	30.1	0.60			85.0		10	
September	37.4	26.8	0.72			87.8		16	
October	30.0	20.2	0.67			86.1		16	
November	22.4	12.8	0.57			78.7		10	
December	17.6	11.3	0.64			75.1		10	
2017									
January	28.1	15.5	0.55			77.4		10	

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 January 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.

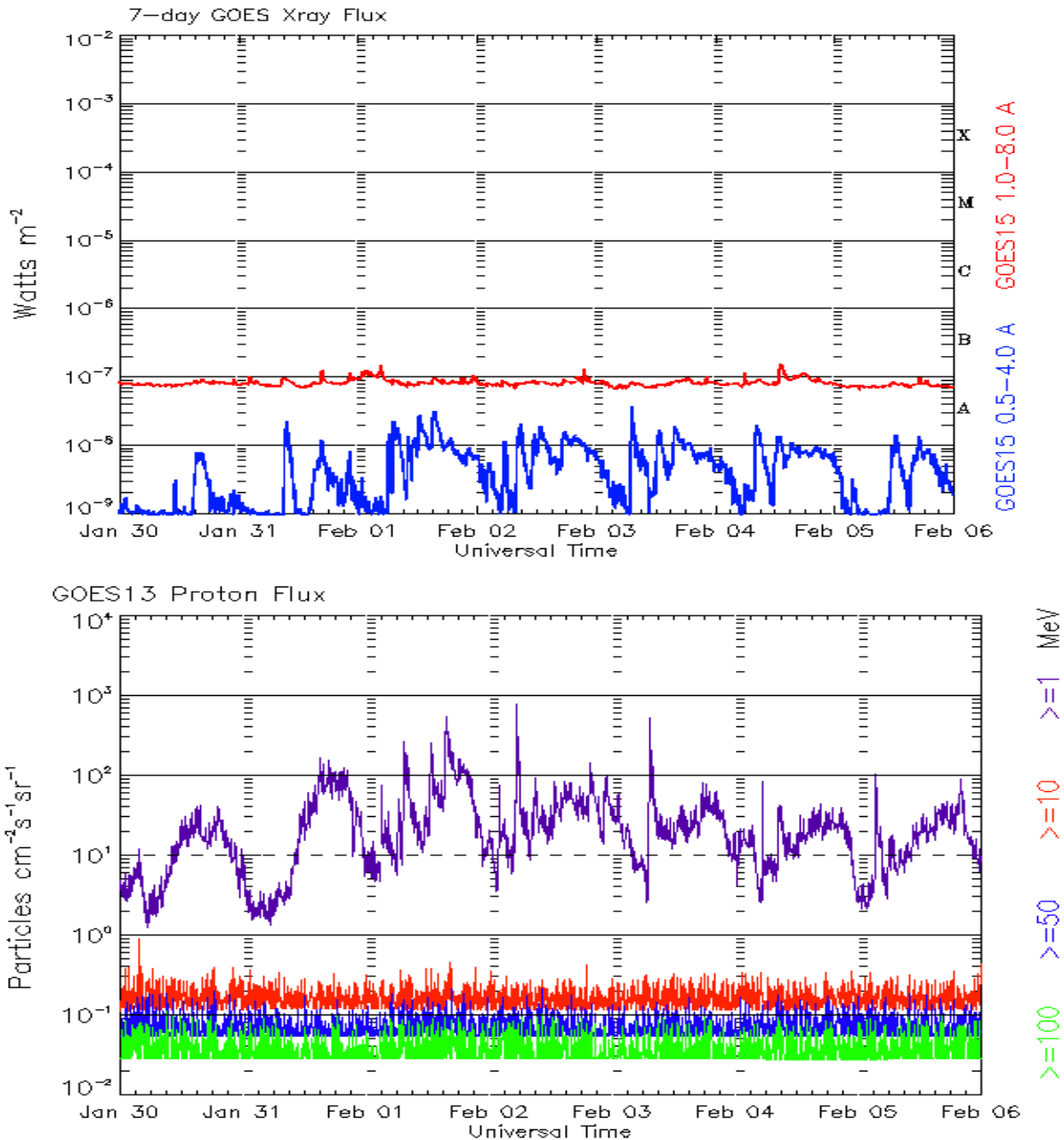
The electron flux plot contains the five-minute averaged integral electron flux (electrons/cm²-sec -sr) with energies greater than 2 MeV by the SWPC Primary GOES satellite.

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 30 January 2017*

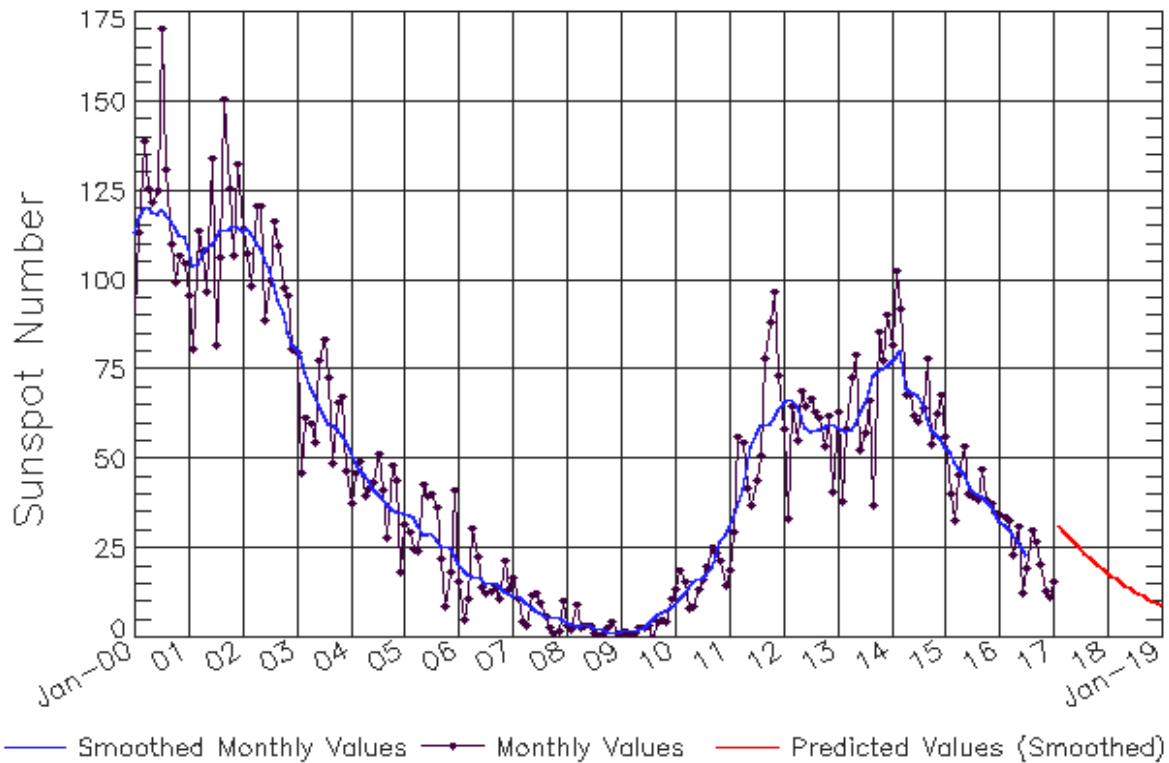
The x-ray plots contains five-minute averages x-ray flux (Watt/m²) as measure by the SWPC primary GOES X-ray satellite, usually at West 105 longitude, in two wavelength bands, 0.05 - 0.4 and 0.1 - 0.8 nm. The letters A, B, C, M and X refer to x-ray event levels for the 0.1 - 0.8 nm band.

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 Jan 2017



Updated 2017 Feb 6

NOAA/SWPC Boulder, CO USA

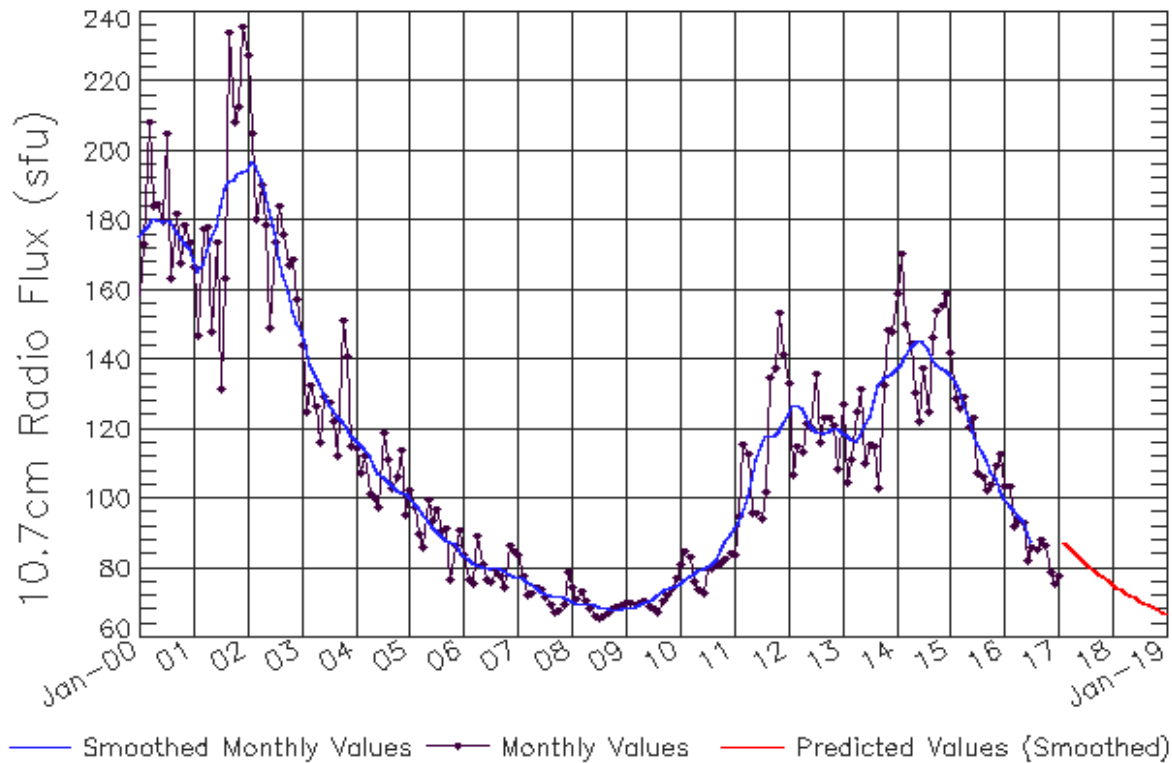
Smoothed Sunspot Number Prediction

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	12	19	30	27	20	13	11
	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)
2017	16	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 Jan 2017



Updated 2017 Feb 6

NOAA/SWPC Boulder, CO USA

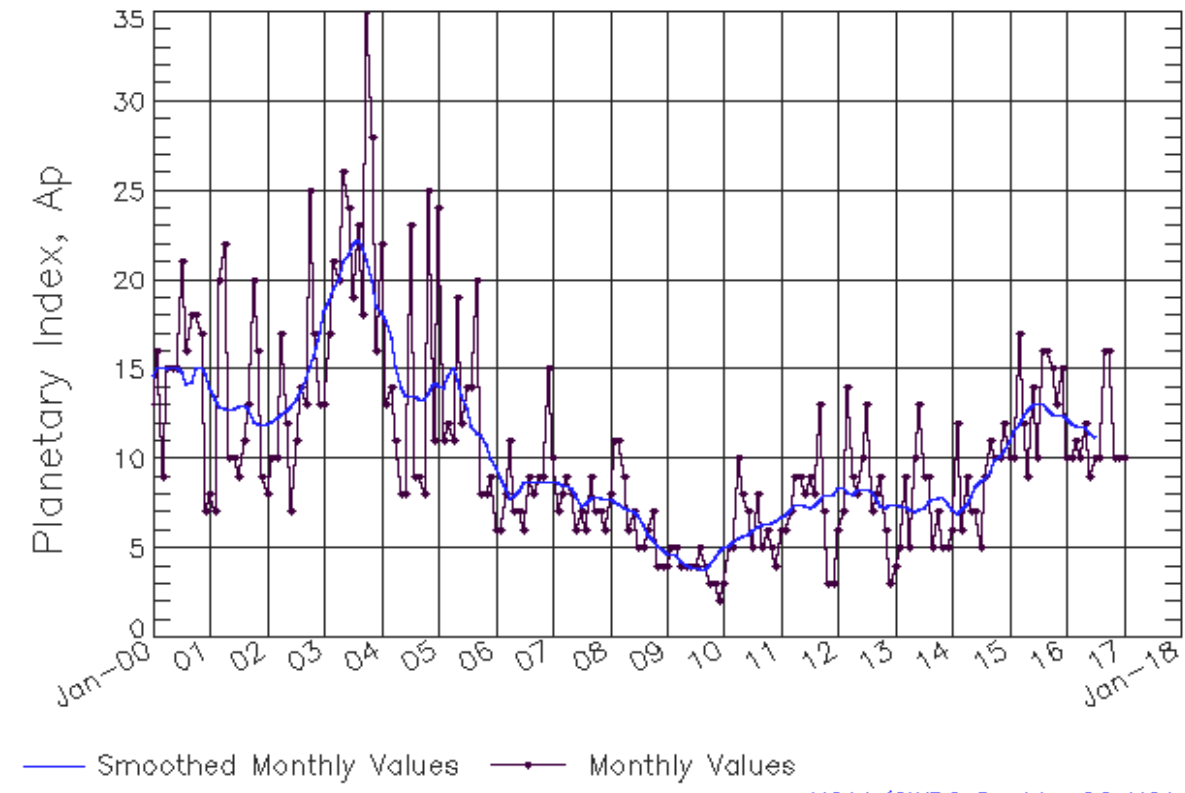
Smoothed F10.7cm Radio Flux Prediction

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 (***)
2016	100 (***)	98 (***)	97 (***)	95 (***)	93 (***)	90 (***)	88 (***)	86 (1)	85 (1)	85 (2)	84 (3)	83 (4)
2017	83 (4)	83 (5)	82 (6)	82 (7)	81 (8)	81 (8)	81 (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 Jan 2017



Updated 2017 Feb 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 -- User Guide

