

Space Weather Highlights
28 January - 03 February 2013

SWPC PRF 1953
04 February 2013

Solar activity was at very low to low levels for the past week. The largest flares of the period were a C8/Sn flare at 03/0610 UTC from region 1667 (N22, L=197, class/area Dsi/160 on 03 February) and two C2/Sf flares at 02/1958 UTC and 03/0224 UTC, also from region 1667. An asymmetric, partial-halo Coronal Mass Ejection (CME) was observed in SOHO/LASCO C2 coronagraph imagery around 31/0800 UTC with an estimated plane-of-sky speed of 550 km/s. The event appeared to originate from a filament eruption on the southeast limb. No further earth-directed CMEs 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. Moderate levels were observed on 29-31 January and again on 02-03 February.

Geomagnetic field activity was quiet to unsettled except for a short period of active to minor storm levels at high latitudes on 02 February. Solar wind speeds began the period at about 430 km/s and gradually decreased to around 300 km/s by 30/2300 UTC. By 01/2115 UTC, an increase in solar wind speed and temperature was observed indicative of a negative polarity coronal hole high speed stream. Total field (Bt) increased from 4 nT to 11 nT while the Bz component of the interplanetary magnetic field varied between +/- 9 nT. The geomagnetic field responded with quiet to unsettled conditions through 02 February with periods of active to minor storming at high latitudes. By 03 February, solar wind speeds were in decline as effects from the coronal hole high speed stream began to wane. The geomagnetic field was quiet on 03 February. Solar wind speeds ended the period at approximately 400 km/s. At 03/1130 UTC, the lower energy particle flux reported by the EPAM instrument aboard the ACE spacecraft rose sharply and then leveled off while some of the lower energy channels declined. This was likely indicative of the passage of the 31 January CME, however there was no clear shock signature associated with it.

Space Weather Outlook
04 February - 02 March 2013

Solar activity is expected to be at very low to low levels with a slight chance for M-class flares until region 1667 rotates around the west limb on 14 February. Very low to low levels are expected for the rest of the forecast period, barring significant active region emergence or development.

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 throughout the forecast period with possible high levels on 06-07, 11-12, and 24-25 February due to coronal hole high speed stream effects.

The geomagnetic field is expected to be quiet to unsettled with a chance for active periods on



09-10, 22-23 February, and again 01-02 March due to recurrent coronal hole high speed stream activity. Otherwise, mostly quiet conditions are expected.



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 January	98	52	150	B1.4	1	0	0	0	0	0	0	0
29 January	95	63	430	B1.0	0	0	0	0	0	0	0	0
30 January	97	56	330	B1.0	0	0	0	0	0	0	0	0
31 January	103	47	260	B1.4	1	0	0	1	0	0	0	0
01 February	104	65	260	B1.8	0	0	0	3	0	0	0	0
02 February	112	54	350	B2.2	2	0	0	1	0	0	0	0
03 February	111	79	400	B2.9	3	0	0	8	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 January	1.4e+05	1.2e+04	2.8e+03		4.4e+06	
29 January	8.9e+04	1.1e+04	2.8e+03		6.8e+06	
30 January	9.5e+04	1.2e+04	2.9e+03		9.3e+06	
31 January	3.0e+05	1.1e+04	2.8e+03		1.6e+07	
01 February	3.6e+05	1.1e+04	2.8e+03		2.1e+06	
02 February	3.4e+05	1.2e+04	2.7e+03		3.1e+06	
03 February	8.1e+05	1.2e+04	2.8e+03		1.5e+07	

Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
28 January	3	0-1-2-0-1-1-2-1	3	0-1-1-0-1-3-1-0	4	1-1-1-0-1-1-2-2
29 January	2	1-0-1-0-1-1-0-0	2	1-1-1-1-0-1-0-0	2	1-0-1-0-1-0-0-0
30 January	2	0-0-1-0-1-1-1-0	0	0-0-0-0-0-0-0-0	2	0-0-1-0-0-0-0-0
31 January	1	0-0-0-0-1-1-0-0	0	0-0-0-0-0-0-0-0	1	0-0-0-0-0-0-1-1
01 February	4	1-0-0-1-2-1-2-2	3	0-0-0-3-2-1-0-0	4	1-0-0-1-1-1-1-2
02 February	9	2-3-2-2-2-2-3-1	19	1-3-3-5-4-4-2-2	9	2-3-2-2-1-2-3-1
03 February	6	3-1-1-2-2-1-1-1	2	0-0-0-1-2-1-0-0	4	2-1-1-1-1-1-1-1

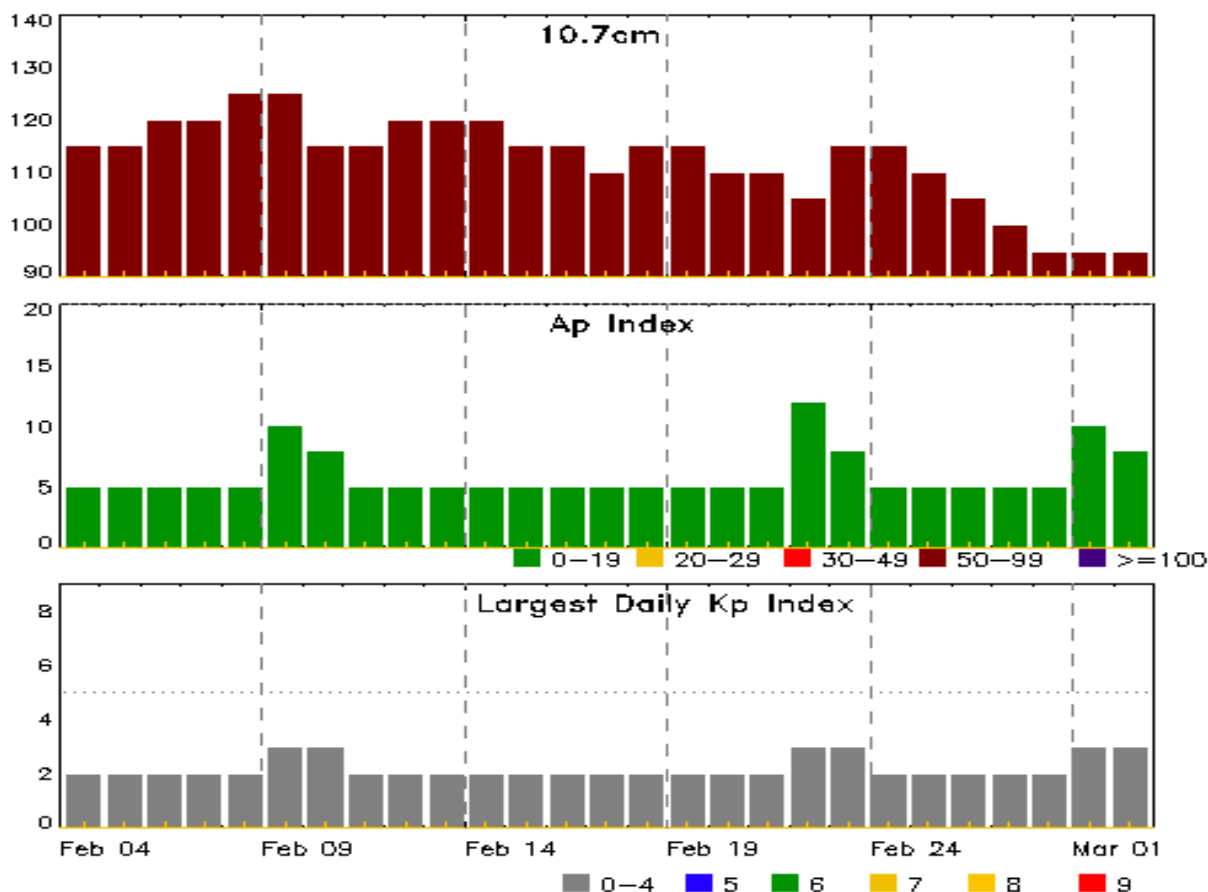


Alerts and Warnings Issued

Date & Time of Issue UTC	Type of Alert or Warning	Date & Time of Event UTC
02 Feb 1904	WARNING: Geomagnetic K = 4	02/1930 - 03/0300



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 Feb	115	5	2	18 Feb	115	5	2
05	115	5	2	19	115	5	2
06	120	5	2	20	110	5	2
07	120	5	2	21	110	5	2
08	125	5	2	22	105	12	3
09	125	10	3	23	115	8	3
10	115	8	3	24	115	5	2
11	115	5	2	25	110	5	2
12	120	5	2	26	105	5	2
13	120	5	2	27	100	5	2
14	120	5	2	28	95	5	2
15	115	5	2	01 Mar	95	10	3
16	115	5	2	02	95	8	3
17	110	5	2				



Energetic Events

Date	Time			X-ray		Optical Information			Peak		Sweep Freq	
	Begin	Max	Half	Class	Integ Flux	Imp/ Brtns	Location Lat CMD	Rgn #	Radio Flux		Intensity	
			Max						245	2695	II	IV

No Events Observed

Flare List

Date	Time			X-ray Class	Optical			Rgn #
	Begin	Max	End		Imp/ Brtns	Location Lat CMD		
28 Jan	0518	0533	0543	B9.3				1660
28 Jan	1047	1102	1107	B3.9				
28 Jan	1727	1734	1737	B3.1				
28 Jan	1820	1834	1906	C1.1				1660
30 Jan	0958	1002	1007	B1.7				1665
30 Jan	1020	1027	1035	B2.3				1665
30 Jan	2207	2210	2212	B1.6				1665
31 Jan	0310	0314	0316	B1.8				
31 Jan	0430	0434	0437	C1.1	SF	S11W08		1663
31 Jan	0506	0510	0516	B3.0				1663
31 Jan	0536	0540	0548	B2.1				1663
31 Jan	0609	0615	0618	B2.6				
31 Jan	2227	2234	2241	B5.8				
01 Feb	0334	0342	0346	B6.9	SF	N14E38		1665
01 Feb	0912	0913	0918		SF	N25E75		1667
01 Feb	1345	1349	1354	B3.6	SF	N14E33		1665
02 Feb	0502	0511	0515	C1.2				1665
02 Feb	0956	1000	1003	B4.4				1667
02 Feb	1948	1958	2007	C2.9	SF	N21E61		1667
03 Feb	0151	0156	0203	B6.9	SF	N22E55		1667
03 Feb	0216	0224	0229	C2.2	SF	N22E55		1667
03 Feb	0427	0440	0514	B9.3	SF	N23E53		1667
03 Feb	0556	0610	0615	C8.4	SN	N23E53		1667
03 Feb	0743	0818	0853	C1.5	SF	N23E53		1667
03 Feb	0836	0837	0838		SF	N23E53		1667
03 Feb	0851	0851	0854		SF	N23E53		1667
03 Feb	B0948	0953	A0956		SF	N23E53		1667
03 Feb	1439	1448	1459	B7.5				1667



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 1661

22 Jan	N13E60	336	20		Hrx	1	A								
23 Jan	N13E56	333	20	1	Cso	1	B								
24 Jan	N17E33	336	20	1	Dso	2	B								
25 Jan	N15E20	337	30	3	Cro	3	B								
26 Jan	N15E08	337	30	5	Cro	5	B								
27 Jan	N15W06	337	30	5	Cro	5	B								
28 Jan	N13W21	339	0	1	Axx	1	A								
29 Jan	N13W35	340	plage												
30 Jan	N13W49	341	plage												
31 Jan	N13W63	342	plage												
01 Feb	N13W77	343	plage												
								0	0	0	0	0	0	0	0

Died on Disk.

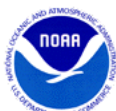
Absolute heliographic longitude: 337

Region 1662

23 Jan	N26E64	319	60	1	Hsx	1	A								
24 Jan	N33E54	316	60	2	Hsx	1	A								
25 Jan	N28E41	316	50	2	Hsx	1	A								
26 Jan	N28E28	317	50	2	Hsx	1	A								
27 Jan	N28E14	317	50	2	Hsx	2	A								
28 Jan	N27E01	317	60	1	Hsx	1	A								
29 Jan	N28W12	317	70	2	Hsx	1	A								
30 Jan	N27W25	317	50	1	Hsx	1	A								
31 Jan	N27W39	317	50	1	Hsx	1	A								
01 Feb	N27W51	317	60	1	Hsx	1	A								
02 Feb	N27W65	317	40	2	Hsx	1	A								
03 Feb	N27W79	318	20	2	Hsx	2	A								
								0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 317



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
Region 1663															
26 Jan	S10E46	299	10	3	Bxo	3	B								
27 Jan	S10E33	298	40	7	Dso	7	B								
28 Jan	S11E19	298	80	8	Dso	8	B								
29 Jan	S11E05	299	120	9	Dso	9	B								
30 Jan	S09W11	302	80	2	Hsx	1	A								
31 Jan	S09W24	302	50	4	Cso	2	B	1				1			
01 Feb	S10W36	302	50	6	Hsx	6	A								
02 Feb	S09W52	303	30	5	Cao	2	B								
03 Feb	S09W65	304	0	1	Axx	1	A								
								1	0	0		1	0	0	0

Still on Disk.

Absolute heliographic longitude: 299

Region 1664

27 Jan	N29W52	23	30	5	Cro	6	B								
28 Jan	N29W65	23	10	4	Bxo	2	B								
29 Jan	N28W79	24	10	1	Bxo	1	B								
								0	0	0	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 23

Region 1665

29 Jan	N12E61	243	220	2	Hax	1	A								
30 Jan	N11E49	242	180	3	Dso	2	B								
31 Jan	N11E37	242	150	2	Hax	3	A								
01 Feb	N12E23	242	120	4	Cao	4	B				2				
02 Feb	N10E09	242	140	6	Cao	6	B	1							
03 Feb	N10W04	242	190	4	Cso	5	B								
								1	0	0	2	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 242



Region Summary - continued

Date	Location	Sunspot Characteristics						Flares							
	Lat CMD	Helio	Area	Extent	Spot	Spot	Mag	X-ray			Optical				
		Lon	10 ⁻⁶ hemi.	(helio)	Class	Count	Class	C	M	X	S	1	2	3	4
Region 1666															
29 Jan	S23E61	244	10	1	Axx	1	A								
30 Jan	S24E48	244	10	1	Hsx	1	A								
31 Jan	S24E34	244	10	1	Hrx	1	A								
01 Feb	S24E22	243	0		Hrx	1	A								
02 Feb	S24E08	244	plage												
03 Feb	S24W06	245	plage												
								0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 245

Region 1667

01 Feb	N24E62	204	30	2	Cao	3	B				1				
02 Feb	N23E49	202	140	9	Dao	5	B	1			1				
03 Feb	N22E42	197	160	5	Dsi	14	B	3			8				
								4	0	0	10	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 197

Region 1668

03 Feb	N12W16	255	30	4	Dao	7	B								
								0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 255

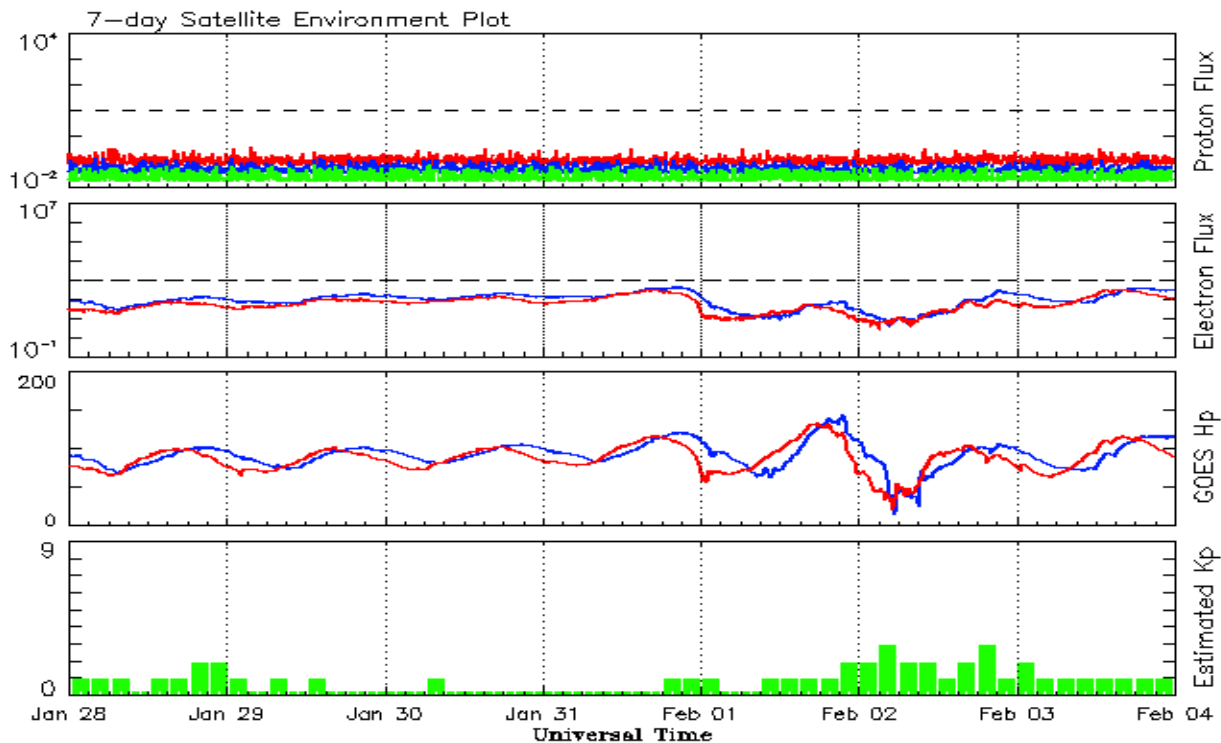


Recent Solar Indices (preliminary)
Observed monthly mean values

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
2011									
February	53.2	29.6	0.55	50.6	33.4	94.5	92.7	6	6.8
March	81.0	55.8	0.69	55.2	36.9	115.3	95.8	7	7.2
April	81.7	54.4	0.67	61.5	41.8	112.6	100.4	9	7.5
May	61.4	41.6	0.68	69.0	47.6	95.9	105.6	9	7.5
June	55.5	37.0	0.67	76.5	53.2	95.8	110.9	8	7.4
July	67.0	43.8	0.66	82.5	57.3	94.2	115.4	9	7.3
August	66.1	50.6	0.77	84.9	59.0	101.7	117.9	8	7.4
September	106.4	78.0	0.73	84.6	59.5	134.5	118.4	13	7.7
October	116.8	88.0	0.75	84.6	59.9	137.2	118.4	7	8.0
November	133.1	96.7	0.73	86.3	61.1	153.1	119.5	3	8.0
December	106.3	73.0	0.69	89.2	63.4	141.2	121.6	3	8.0
2012									
January	91.3	58.3	0.64	92.0	65.5	133.1	124.4	6	8.3
February	50.1	32.9	0.66	94.2	66.9	106.7	126.7	7	8.4
March	77.9	64.3	0.82	94.1	66.8	115.1	126.8	14	8.1
April	84.4	55.2	0.65	91.3	64.6	113.1	125.8	9	8.0
May	99.5	69.0	0.69	87.7	61.7	121.5	123.8	8	8.2
June	88.6	64.5	0.73	83.9	58.9	120.5	121.1	10	8.3
July	99.6	66.5	0.67	82.4	57.7	135.6	119.5	13	8.3
August	85.8	63.0	0.74			115.7		7	
September	84.0	61.4	0.73			123.2		8	
October	73.5	53.3	0.73			123.3		9	
November	89.2	61.4	0.69			120.9		6	
December	60.4	40.8	0.68			108.4		3	
2013									
January	99.8	62.9	0.63			127.1		4	

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 January 2013*

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.

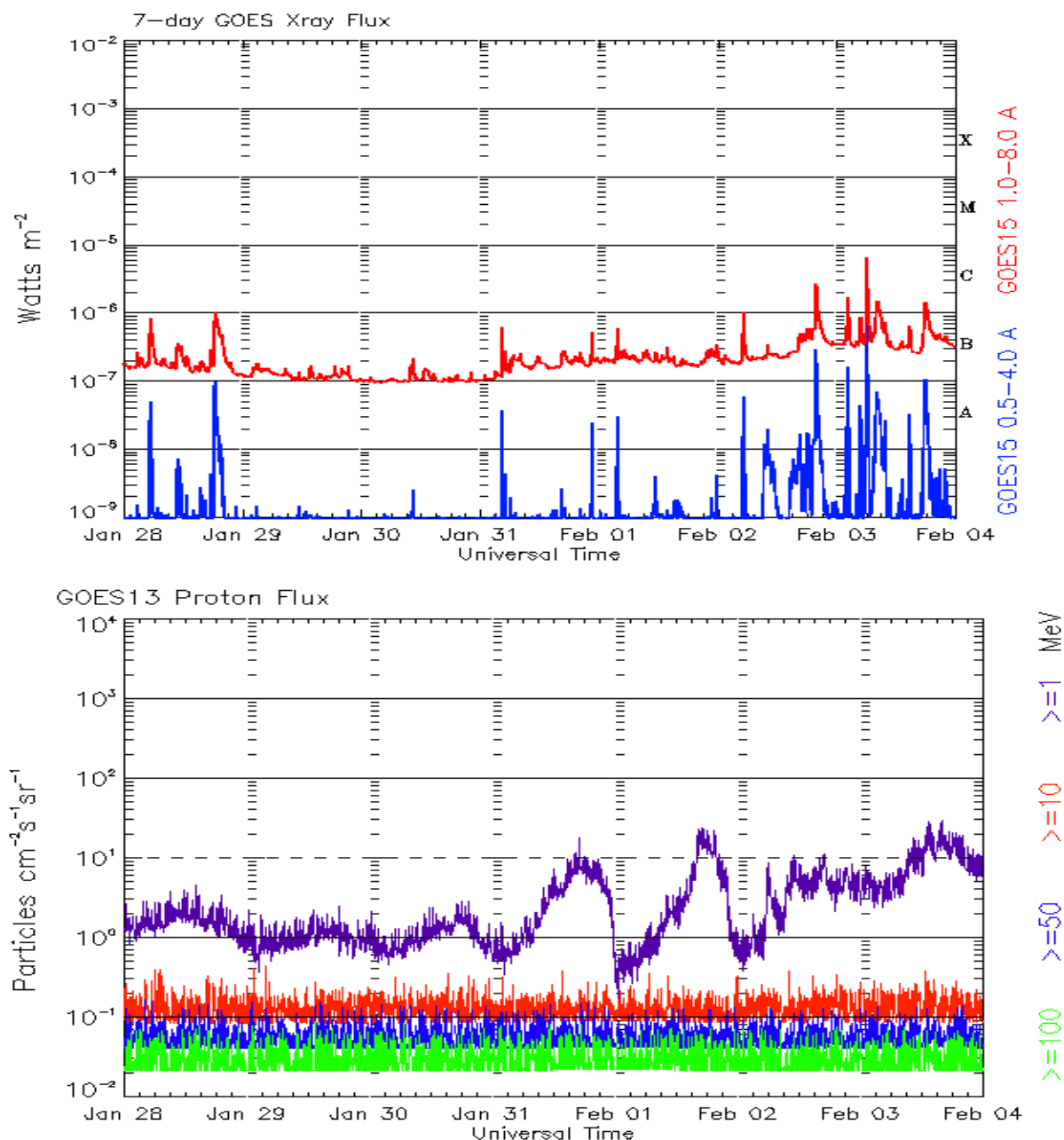
The electron flux plot contains the five-minute averaged integral electron flux (electrons/cm²-sec -sr) with energies greater than 2 MeV by the SWPC Primary GOES satellite.

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.





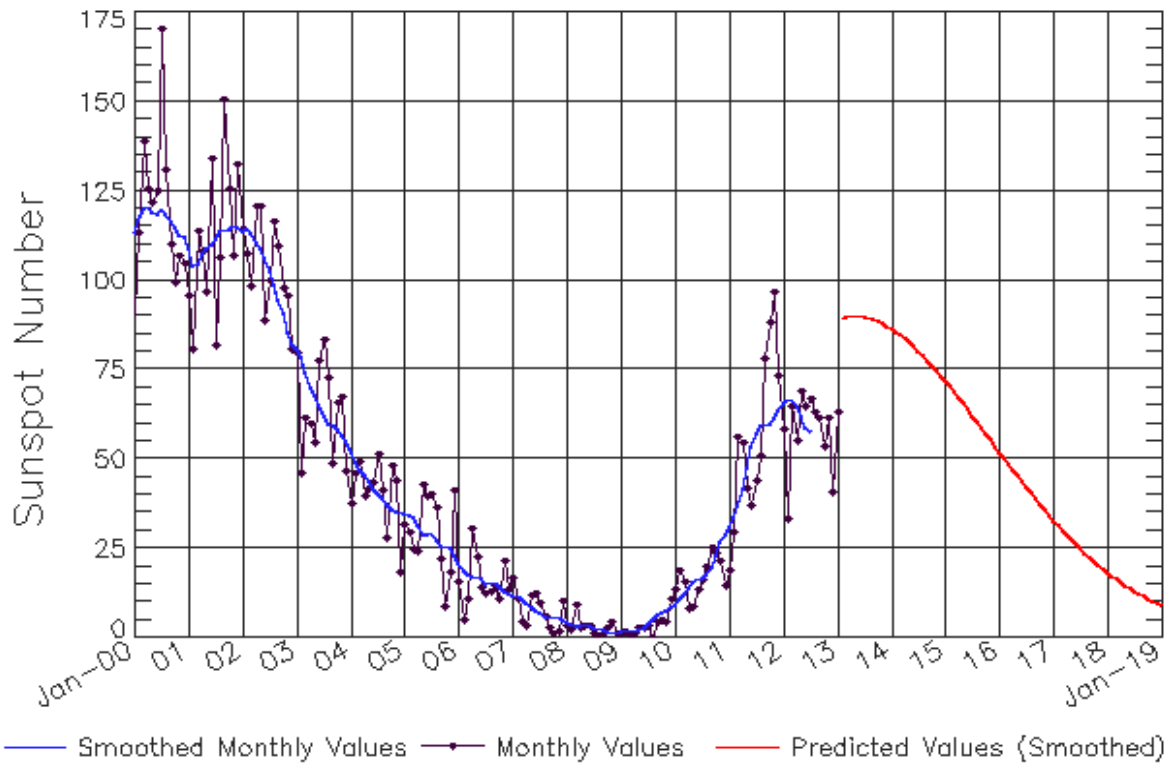
*Weekly GOES Satellite X-ray and Proton Plots
Week Beginning 28 January 2013*

The x-ray plots contains five-minute averages x-ray flux (Watt/m^2) 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 integral flux units (pfu = protons/ cm^2 -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 2013

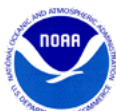


Updated 2013 Feb 4

NOAA/SWPC Boulder, CO USA

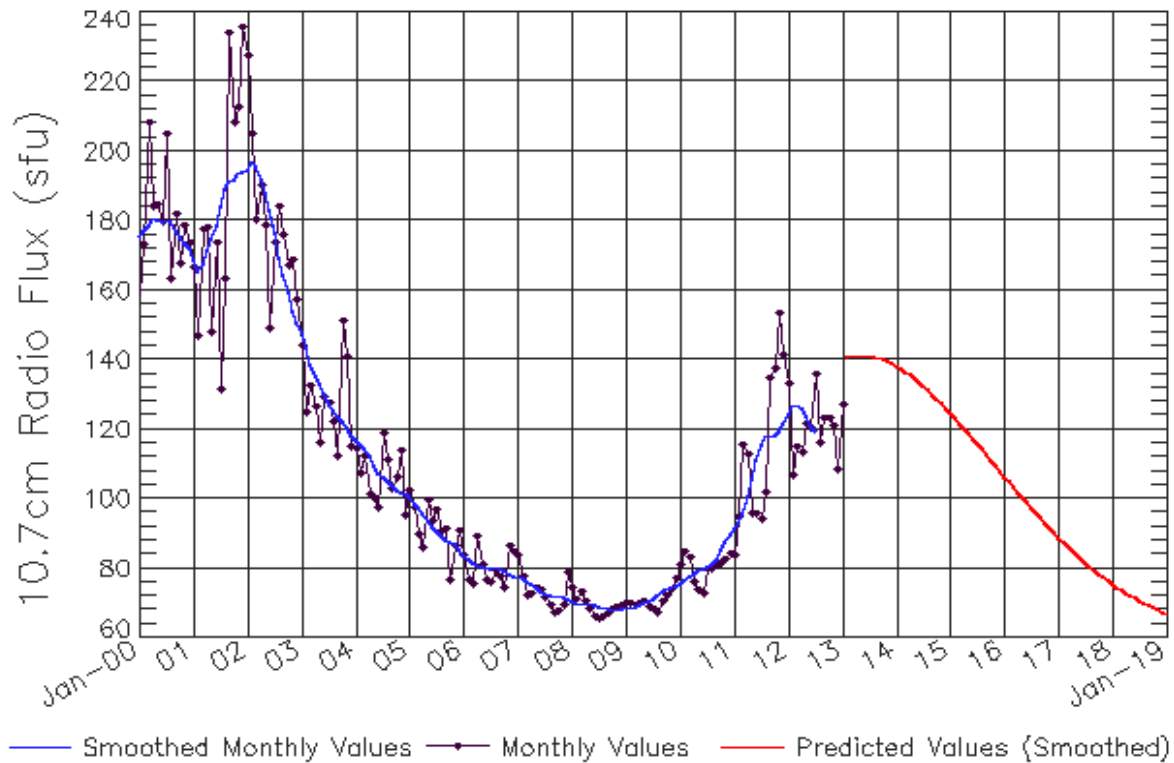
Smoothed Sunspot Number Prediction

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2010	9 (***)	11 (***)	12 (***)	14 (***)	16 (***)	16 (***)	17 (***)	17 (***)	20 (***)	23 (***)	27 (***)	29 (***)
2011	31 (***)	33 (***)	37 (***)	42 (***)	48 (***)	53 (***)	57 (***)	59 (***)	60 (***)	60 (***)	61 (***)	63 (***)
2012	66 (***)	67 (***)	67 (***)	65 (***)	62 (***)	59 (***)	58 (***)	60 (1)	64 (2)	66 (3)	69 (5)	71 (5)
2013	73 (6)	75 (7)	77 (7)	79 (8)	82 (9)	85 (9)	88 (10)	89 (10)	89 (10)	89 (10)	88 (10)	87 (10)
2014	86 (10)	86 (10)	85 (10)	84 (10)	83 (10)	81 (10)	80 (10)	79 (10)	78 (10)	76 (10)	75 (10)	73 (10)
2015	72 (10)	70 (10)	69 (10)	67 (10)	65 (10)	64 (10)	62 (10)	60 (10)	59 (10)	57 (10)	55 (10)	54 (10)
2016	52 (10)	50 (10)	49 (10)	47 (10)	45 (10)	44 (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 Jan 2013



Updated 2013 Feb 4

NOAA/SWPC Boulder, CO USA

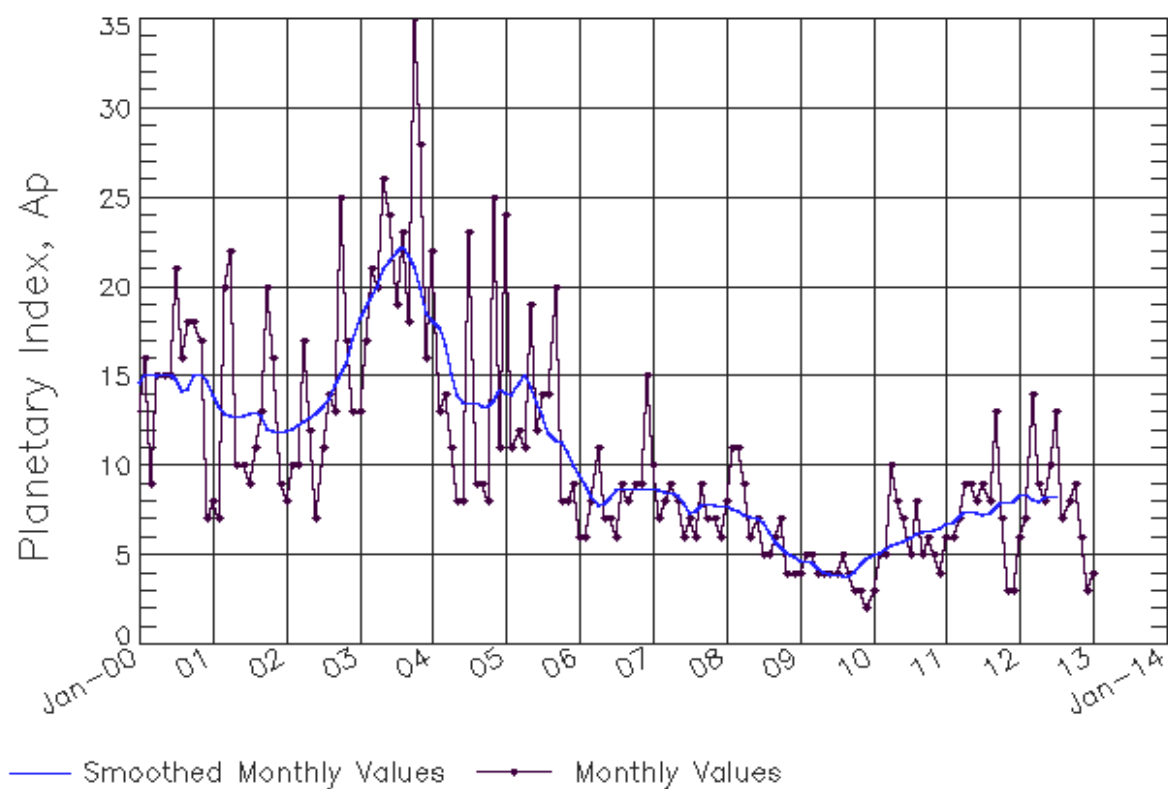
Smoothed F10.7cm Radio Flux Prediction

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 (***)	121 (1)	123 (1)	126 (2)	128 (3)	129 (4)
2013	130 (4)	132 (5)	133 (6)	135 (7)	136 (8)	138 (8)	140 (9)	141 (9)	140 (9)	140 (9)	139 (9)	139 (9)
2014	138 (9)	137 (9)	136 (9)	136 (9)	135 (9)	134 (9)	132 (9)	131 (9)	130 (9)	129 (9)	127 (9)	126 (9)
2015	125 (9)	123 (9)	122 (9)	120 (9)	119 (9)	117 (9)	116 (9)	114 (9)	113 (9)	111 (9)	110 (9)	108 (9)
2016	106 (9)	105 (9)	103 (9)	102 (9)	100 (9)	99 (9)	97 (9)	96 (9)	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 Jan 2013



Updated 2013 Feb 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

