

Space Weather Highlights
26 July - 01 August 2010

SWPC PRF 1822
03 August 2010

Solar activity was at very low to low levels during the period. Isolated C-class flares were observed during 27-28 July from Region 1089 (S24, L=202, class/area Cao/140, on 29 July). Isolated B-class flares occurred from 29-31 July with Region 1089 rotating off the disk as plage on 31 July. On 01 August, Region 1092 (N13, L=79, class/area Hkx/290, on 01 August) produced a long duration C3/Sf flare at 01/0826 UTC. The flare was associated with a Type IV radio sweep, an 890 sfu Tenflare, and an Earth-directed full-halo coronal mass ejection (CME). There was also a disappearing solar filament (DSF) during 01/0750 – 0811 UTC centered near N37W32 with an Earth directed partial-halo CME.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit was at normal levels during 26-27 July. Fluxes increased to high levels for the rest of the period.

Geomagnetic field activity was at quiet to major storm levels during the period. Geomagnetic field activity was at quiet levels on 26 July. Activity increased to quiet to active levels on 27 July due to a recurrent coronal hole high-speed (CH HSS). Quiet to active levels, with minor to major periods at high latitudes, occurred on 28 July as the CH HSS continued. Activity decreased to quiet to unsettled levels on 30 July. Activity on 31 July through 01 August was mostly quiet.

Space Weather Outlook
04 August – 30 August 2010

Solar activity is expected to be at very low to low levels. However, there is a slight chance for an M-class flare through 10 August, when Region 1092 rotates off the disk.

No proton events are expected at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to be at high levels during 04 – 06 August. Flux levels are expected to decrease to normal to moderate levels during 07 – 24 August. Flux levels are expected to increase to moderate to high levels for the remainder of the period.

Geomagnetic field activity is expected to be at active to minor storm levels with a slight chance for major storm levels on 04-05 August. Activity is due to the waning effects of the CME observed on 01 August, as well as the arrival of the second slower CME, a DSF, also observed on 01 August. Quiet to unsettled levels are expected on 06-07 August, as the effects of the DSF wane. Quiet conditions are expected on 08-09 August. Quiet to unsettled levels are expected on 10-12 August due to a recurrent CH HSS. Quiet levels are expected during 13-21 August. Quiet to unsettled levels, with isolated active levels, are expected on 22 August, due to a recurrent CH HSS. Activity is expected to decrease to quiet to unsettled levels on 23-25 August, due to the continuation of the CH HSS. Quiet conditions are expected for the remainder of the period (26-30 August).



Daily Solar Data

Date	Radio Flux 10.7 cm	Sun spot No.	Sunspot Area (10 ⁻⁶ hemi.)	X-ray Background	Flares						
					X-ray Flux			Optical			
					C	M	X	S	1	2	3 4
26 July	84	39	100	B1.4	0	0	0	0	0	0	0 0
27 July	83	15	70	B1.4	1	0	0	2	0	0	0 0
28 July	85	31	270	B1.4	1	0	0	1	0	0	0 0
29 July	85	31	350	B1.5	0	0	0	0	0	0	0 0
30 July	83	29	210	B2.0	0	0	0	2	0	0	0 0
31 July	82	12	230	B1.4	0	0	0	1	0	0	0 0
01 August	80	13	290	B1.3	1	0	0	1	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	>.6 MeV	>2MeV	>4 MeV
26 July	2.8e+05	1.5e+04	3.3e+03		1.6e+06	
27 July	6.8e+05	1.5e+04	3.5e+03		3.4e+06	
28 July	1.1e+06	1.5e+04	3.4e+03		8.1e+07	
29 July	7.2e+05	1.4e+04	3.4e+03		4.1e+08	
30 July	6.9e+05	1.4e+04	3.5e+03		3.9e+08	
31 July	5.2e+05	1.4e+04	3.3e+03		2.3e+08	
01 August	8.7e+05	1.5e+04	3.6e+03		2.4e+08	

Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
26 July	5	2-2-1-1-1-1-2-2	3	2-2-1-0-0-1-1-1	6	2-2-1-1-1-2-1-3
27 July	11	2-3-3-2-2-2-3-3	23	3-5-4-4-4-4-2-2	19	3-3-4-4-3-3-4-3
28 July	10	4-2-2-2-2-2-2-2	25	4-3-3-6-5-2-2-1	14	4-3-3-3-3-2-3-3
29 July	5	1-2-2-2-2-1-1-1	9	2-2-2-4-3-1-1-1	7	2-3-2-2-2-1-1-2
30 July	5	2-1-0-1-1-2-2-2	8	2-2-1-4-2-2-1-1	7	2-1-1-2-1-2-2-3
31 July	4	2-1-0-1-2-2-1-0	7	3-2-0-2-3-2-1-1	6	2-1-1-1-2-2-2-2
01 August	2	0-0-1-0-1-1-1-2	4	1-1-1-2-1-1-1-1	4	0-1-1-1-1-1-1-2

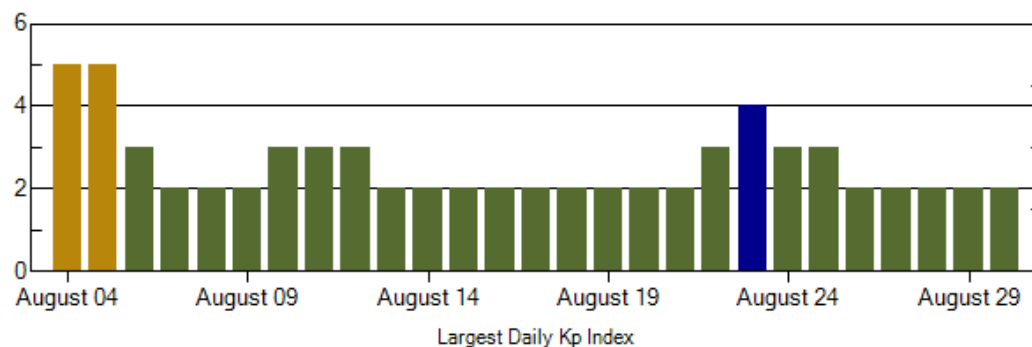
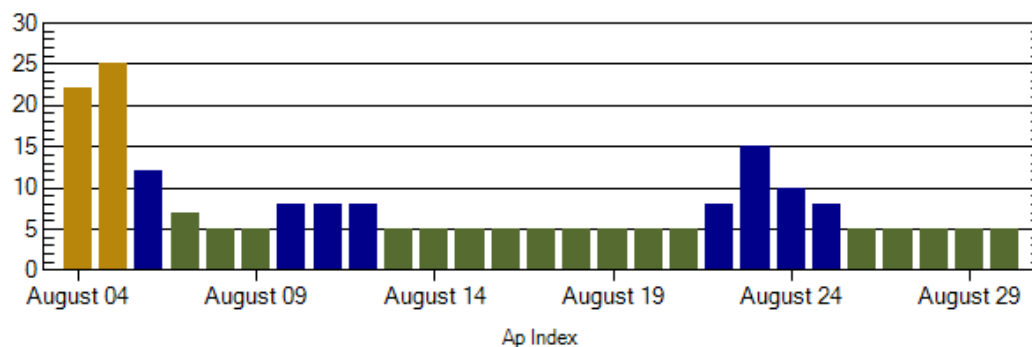
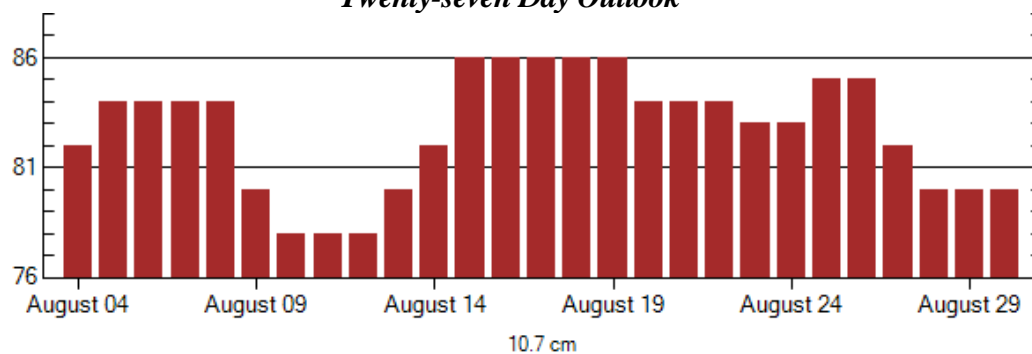


Alerts and Warnings Issued

Date & Time of Issue	Type of Alert or Warning	Date & Time of Event UTC
27 Jul 0337	WARNING: Geomagnetic K = 4	27 Jul 0340 - 1600
27 Jul 0740	ALERT: Geomagnetic K = 4	27 Jul 0739
27 Jul 1544	EXTENDED WARNING: Geomagnetic K = 4	27 Jul 0340 - 28/0000
27 Jul 2251	EXTENDED WARNING: Geomagnetic K = 4	27 Jul 0340 - 28/1600
28 Jul 0137	WARNING: Geomagnetic K = 5	28 Jul 0140 - 0600
28 Jul 0143	ALERT: Geomagnetic K = 5	28 Jul 0141
28 Jul 1424	ALERT: Electron 2MeV Integral Flux \geq 1000pfu	28 Jul 1325
29 Jul 0744	CONTINUED ALERT: Electron 2MeV Integral Flux \geq 1000pfu	28 Jul 1325
30 Jul 0508	CONTINUED ALERT: Electron 2MeV Integral Flux \geq 1000pfu	28 Jul 1325
31 Jul 0632	CONTINUED ALERT: Electron 2MeV Integral Flux \geq 1000pfu	28 Jul 1325
01 Aug 0505	CONTINUED ALERT: Electron 2MeV Integral Flux \geq 1000pfu	28 Jul 1325
01 Aug 0838	ALERT: Type IV Radio Emission	01 Aug 0808
01 Aug 1216	SUMMARY: 10cm Radio Burst	01 Aug 0812 - 1040
01 Aug 1218	SUMMARY: 10cm Radio Burst	01 Aug 1003 - 1045



Twenty-seven Day Outlook



Date	Radio Flux 10.7 cm	Planetary A Index	Largest Kp Index	Date	Radio Flux 10.7 cm	Planetary A Index	Largest Kp Index
04 Aug	82	22	5	18 Aug	86	5	2
05	84	25	5	19	86	5	2
06	84	12	3	20	84	5	2
07	84	7	2	21	84	5	2
08	84	5	2	22	84	8	3
09	80	5	2	23	83	15	4
10	78	8	3	24	83	10	3
11	78	8	3	25	85	8	3
12	78	8	3	26	85	5	2
13	80	5	2	27	82	5	2
14	82	5	2	28	80	5	2
15	86	5	2	29	80	5	2
16	86	5	2	30	80	5	2
17	86	5	2				



Energetic Events

Date	Time		X-ray		Optical Information			Peak		Sweep Freq	
	$\frac{1}{2}$		Integ		Imp/	Location	Rgn	Radio Flux		Intensity	
	Begin	Max	Max	Class	Brtns	Lat CMD	#	245	2695	II	IV

No Events Observed

Flare List

Date	Time			X-ray Class.	Imp / Brtns	Optical		Rgn
	Begin	Max	End			Location Lat CMD		
26 July	0032	0036	0038	B2.7				
	0411	0415	0418	B3.8				
	0454	0457	0459	B2.3				
	0610	0614	0621	B2.1				
	1137	1141	1145	B3.3				
	1506	1510	1515	B3.1				
	1625	1632	1637	B4.7				
	1824	1829	1833	B5.8				
27 July	0100	0107	0118	B5.5				
	0120	0120	0126		SF	S23W23		1089
	0353	0415	0448	B8.0	SF	S23W23		1089
	0412	0424	0434	C2.2				
	0945	0954	1029	B4.2				
	1914	1931	1939	B6.0				
	2354	2358	0001	B3.8				
	0955	1002	1011	B5.3				
28 July	1304	1307	1315	B8.1	SF	S24W42		1089
	2033	2042	2049	C2.8				
	0050	0138	0157	B6.0				
29 July	1827	1843	1851	B7.5				
	0106	0109	0112	B2.7				
30 July	0227	0228	0244	B9.0	SF	N17E64		1092
	0751	0752	0802		SF	N16E58		1092
	0811	0918	1012	B8.1				
	2021	2025	2032	B4.7				
	2232	2237	2242	B4.1				
31 July	0340	0400	0419	B4.7				
	0519	0526	0532	B4.8	SF	N10E41		1092
	0832	0840	0856	B3.1				
	1301	1307	1317	B2.8				
	1832	1909	1926	B7.4				
01 August	0338	0350	0355	B4.5				
	0756	0826	0946	C3.2	SF	N20E36		1092
	1606	1625	1638	B4.1				



Region Summary

Date	Location		Sunspot Characteristics					Flares							
	(° Lat ° CMD)	Helio	Area (10 ⁻⁶ hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical				
		Lon						C	M	X	S	1	2	3	4
Region 1089															
19 Jul	S23E70	203	130	7	CSO	4	B								
20 Jul	S24E58	201	150	10	DAO	9	B	1				5			
21 Jul	S24E46	200	310	9	DSI	16	B					16	1		
22 Jul	S23E33	200	240	9	DSI	29	B					3			
23 Jul	S24E20	200	200	11	ESI	35	B					2			
24 Jul	S23E06	201	160	11	ESI	20	B					1			
25 Jul	S24W08	202	140	9	DSI	16	B								
26 Jul	S24W21	201	100	9	DSI	7	B								
27 Jul	S24W35	202	70	9	DSO	5	B	1				2			
28 Jul	S24W48	202	90	12	EAO	9	B	1				1			
29 Jul	S24W62	202	140	10	CAO	9	B								
30 Jul	S23W73	200	40	8	BXO	5	B								
31 Jul	S23W85	200													
								3	0	0	30	1	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 201

<i>Region 1090</i>															
24 Jul	N23E58	149		1	AXX	1	A								
25 Jul	N23E43	151	10	5	BXO	3	B								
26 Jul	N22E29	151		1	AXX	1	A								
27 Jul	N22E16	151													
28 Jul	N22E03	151													
29 Jul	N22W10	151													
30 Jul	N22W23	151													
31 Jul	N22W36	151													
01 Aug	N22W49	151													
								0	0	0	0	0	0	0	0

Still on Disk.

Absolute heliographic longitude: 151



Region Summary (Cont)

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

Region 1091

26 Jul	N12W73	253		1	AXX	1	A								
27 Jul	N12W86	253													

0 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 253

Region 1092

28 Jul	N16E76	78	180	6	CSO	2	B								
29 Jul	N14E63	77	210	9	CSO	2	B								
30 Jul	N15E49	79	170	7	CSO	4	B				2				
31 Jul	N13E35	79	230	3	HKX	2	A				1				
01 Aug	N13E21	79	290	4	HKX	3	A	1			1				

1 0 0 4 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 79



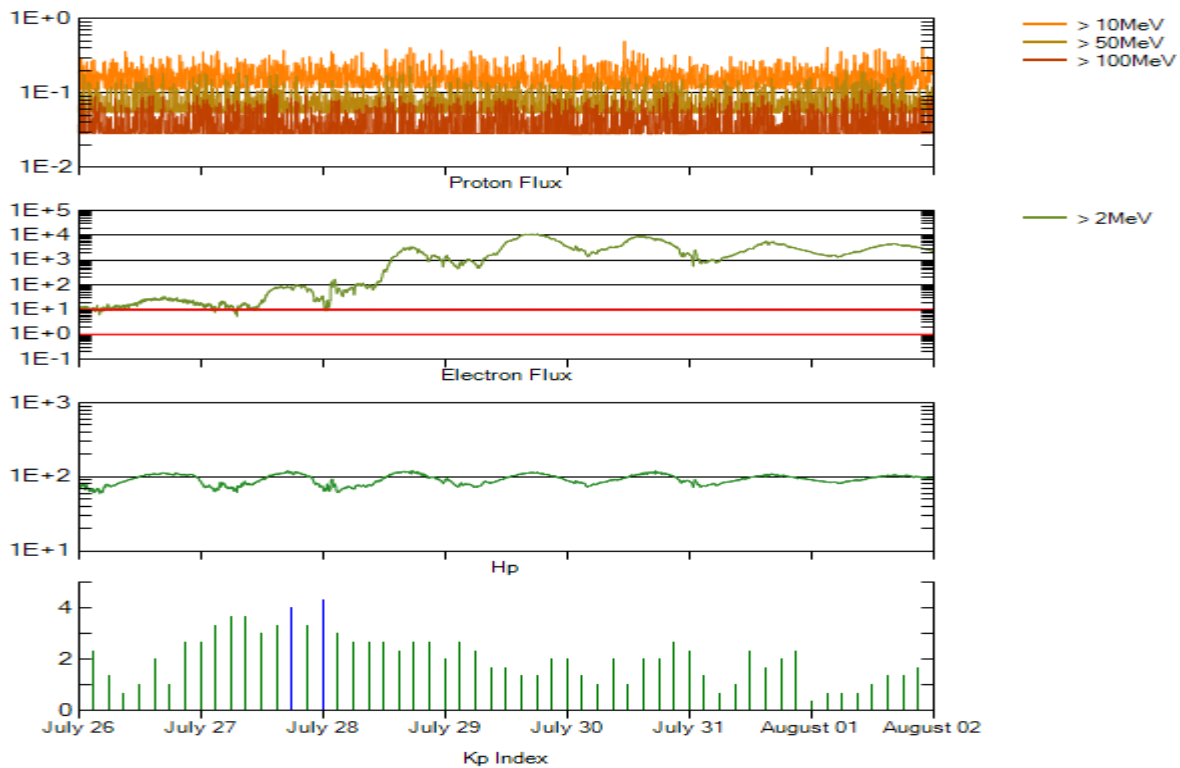
Recent Solar Indices (preliminary)
Of the observed monthly mean values

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
2008									
August	0.0	0.5	**	4.4	2.7	66.3	68.6	5	6.3
September	1.5	1.1	0.73	3.7	2.3	67.1	68.4	6	5.8
October	5.2	2.9	0.56	2.9	1.8	68.3	68.2	7	5.4
November	6.8	4.1	0.60	2.7	1.7	68.6	68.3	4	5.1
December	1.3	0.8	0.62	2.7	1.7	69.2	68.5	4	4.9
2009									
January	2.8	1.3	0.46	3.0	1.8	69.8	68.7	4	4.7
February	2.5	1.4	0.56	3.1	1.9	70.0	68.8	5	4.7
March	0.7	0.7	1.00	3.4	2.0	69.2	69.0	5	4.6
April	1.2	0.8	1.00	3.7	2.2	69.7	69.3	4	4.3
May	3.9	2.9	0.74	3.8	2.3	70.5	69.7	4	4.1
June	6.6	2.9	0.39	4.4	2.7	68.6	70.2	4	4.0
July	5.0	3.2	0.70	5.8	3.6	68.2	71.0	4	3.9
August	0.3	0.0	0.00	7.7	4.8	67.4	72.1	5	3.8
September	6.6	4.3	0.64	9.9	6.2	70.5	73.3	4	3.8
October	7.0	4.8	0.66	11.3	7.1	72.3	74.1	3	4.1
November	7.7	4.1	0.55	12.4	7.6	73.6	74.5	3	4.5
December	15.7	10.8	0.68	13.6	8.3	76.8	74.9	2	4.8
2010									
January	21.3	13.2	0.62	14.8	9.3	81.1	75.5	3	5.0
February	31.0	18.8	0.60			84.7		5	
March	24.7	15.4	0.62			83.3		5	
April	11.2	7.9	0.71			75.9		10	
May	19.9	8.8	0.44			73.8		8	
June	17.9	13.5	0.75			72.6		7	
July	23.1	16.1	0.70			79.9		6	

NOTE: Values are final except for the most recent 6 months which are considered preliminary. Cycle 23 started in May 1996 with an RI=8.0. Cycle 23 maximum was April 2000 with an RI=120.8.

** SWPC sunspot number was zero, so a ratio could not be computed.





Weekly Geosynchronous Satellite Environment Summary
Week Beginning 26 July 2010

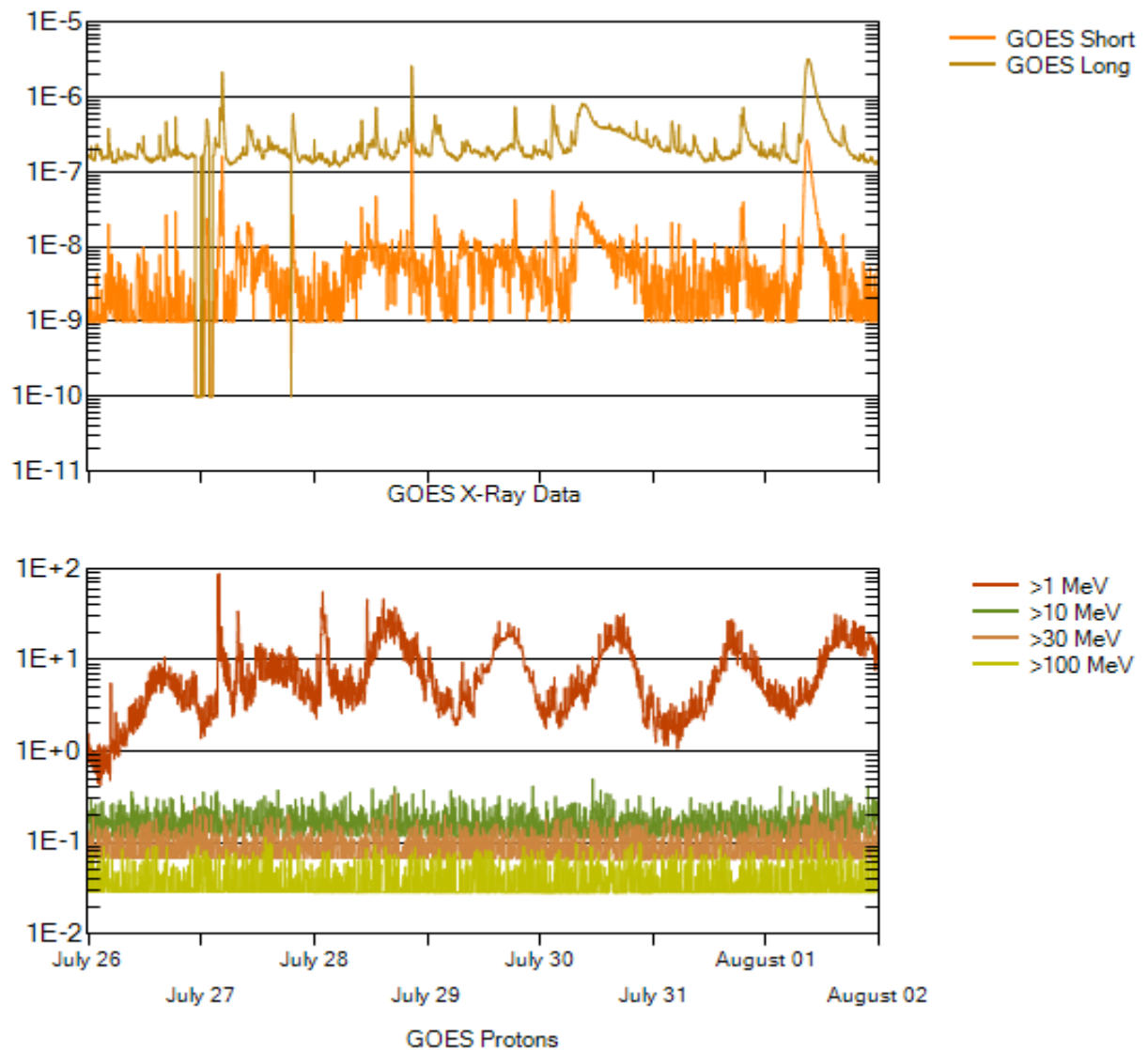
The proton flux plot contains the five-minute averaged integral proton flux (protons/cm²–sec–sr) as measured by GOES-13 (W75) for each of three energy thresholds: greater than 10, 50, and 100 MeV. The electron flux plot contains the five-minute averaged integral electron flux (electrons/cm²–sec–sr) with energies greater than 2 MeV at GOES-13.

The Hp plot contains the five minute averaged Hp magnetic field component in nanoteslas (nT) as measured by GOES-13. The Hp component is parallel to the spin axis of the satellite, which is nearly parallel to the Earth's rotation axis.

Kp plot contains the estimated planetary 3-hour K-index (derived by the Air Force Weather Agency) in real time from magnetometers at Meanook, Canada; Sitka, AK; Glenlea, Canada; St. Johns, Canada; Ottawa, Canada; Newport, WA; Fredericksburg, VA; Boulder, CO; Fresno, CA and Hartland, UK. These data are made available through cooperation from the Geological Survey of Canada (GSC), British Geological Survey (BGS) and the US Geological Survey. These may differ from the final Kp values derived from a more extensive network of magnetometers.

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

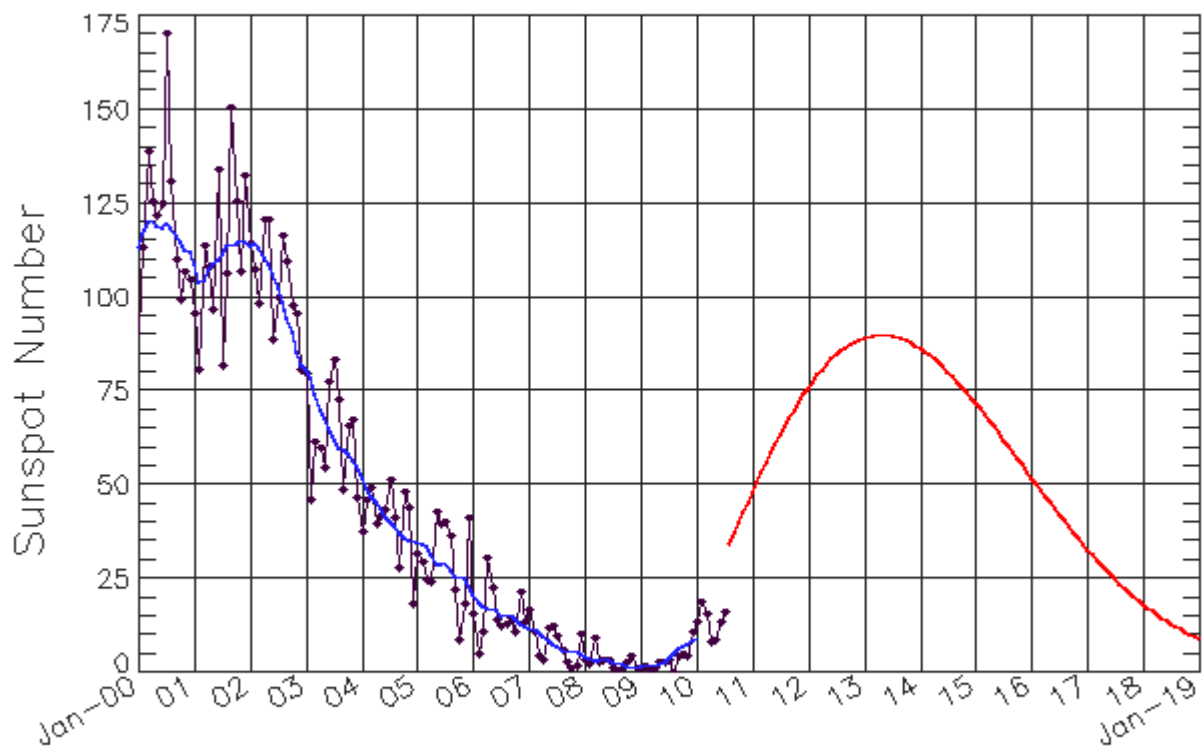
The x-ray plot contains five-minute averaged x-ray flux (Watts/m^2) as measured by GOES 14 (W105) in two wavelength bands, 0.05 - 0.4 and 0.1 - 0.8 nm. The letters A, B, C, M and X refer to x-ray event levels for the 0.1 - 0.8 nm band.

The proton plot contains the five-minute averaged integral proton flux ($\text{protons/cm}^2\text{-sec-sr}$) as measured by GOES-13 for each of the energy thresholds: >1, >10, >30 and >100 MeV. P10 event threshold is 10 pfu ($\text{protons/cm}^2\text{-sec-sr}$) at greater than 10 MeV.



ISES Solar Cycle Sunspot Number Progression

Observed data through Jul 2010



— Smoothed Monthly Values —●— Monthly Values — Predicted Values (Smoothed)

Updated 2010 Aug 3

NOAA/SWPC Boulder, CO USA

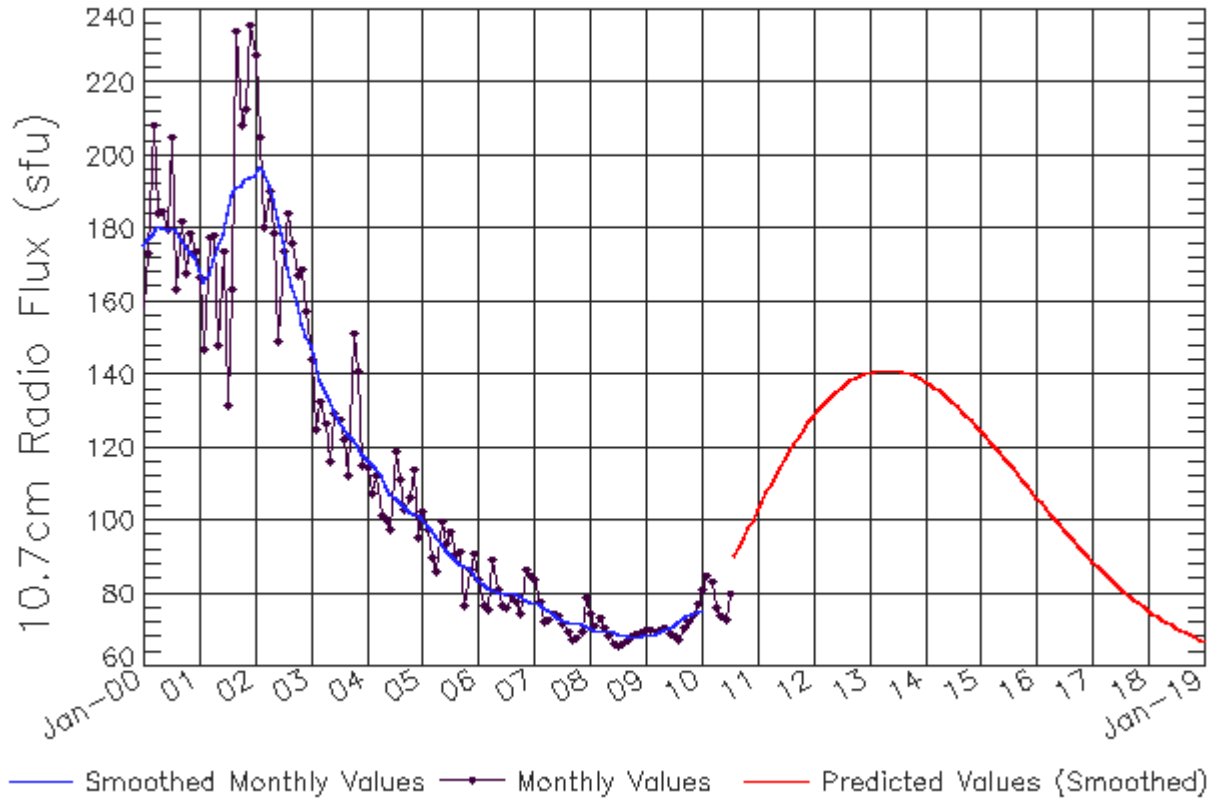
Smoothed Sunspot Number Prediction

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2009	2 (***)	2 (***)	2 (***)	2 (***)	2 (***)	3 (***)	4 (***)	5 (***)	6 (***)	7 (***)	8 (***)	8 (***)
2010	9 (***)	11 (1)	14 (2)	17 (3)	20 (5)	23 (5)	26 (6)	29 (7)	32 (7)	35 (8)	39 (9)	43 (9)
2011	47 (10)	51 (10)	53 (10)	56 (10)	59 (10)	61 (10)	63 (10)	66 (10)	68 (10)	70 (10)	72 (10)	74 (10)
2012	76 (10)	78 (10)	79 (10)	81 (10)	82 (10)	84 (10)	85 (10)	86 (10)	87 (10)	88 (10)	88 (10)	89 (10)
2013	89 (10)	90 (10)	90 (10)	90 (10)	90 (10)	90 (10)	90 (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 Jul 2010



Updated 2010 Aug 3

NOAA/SWPC Boulder, CO USA

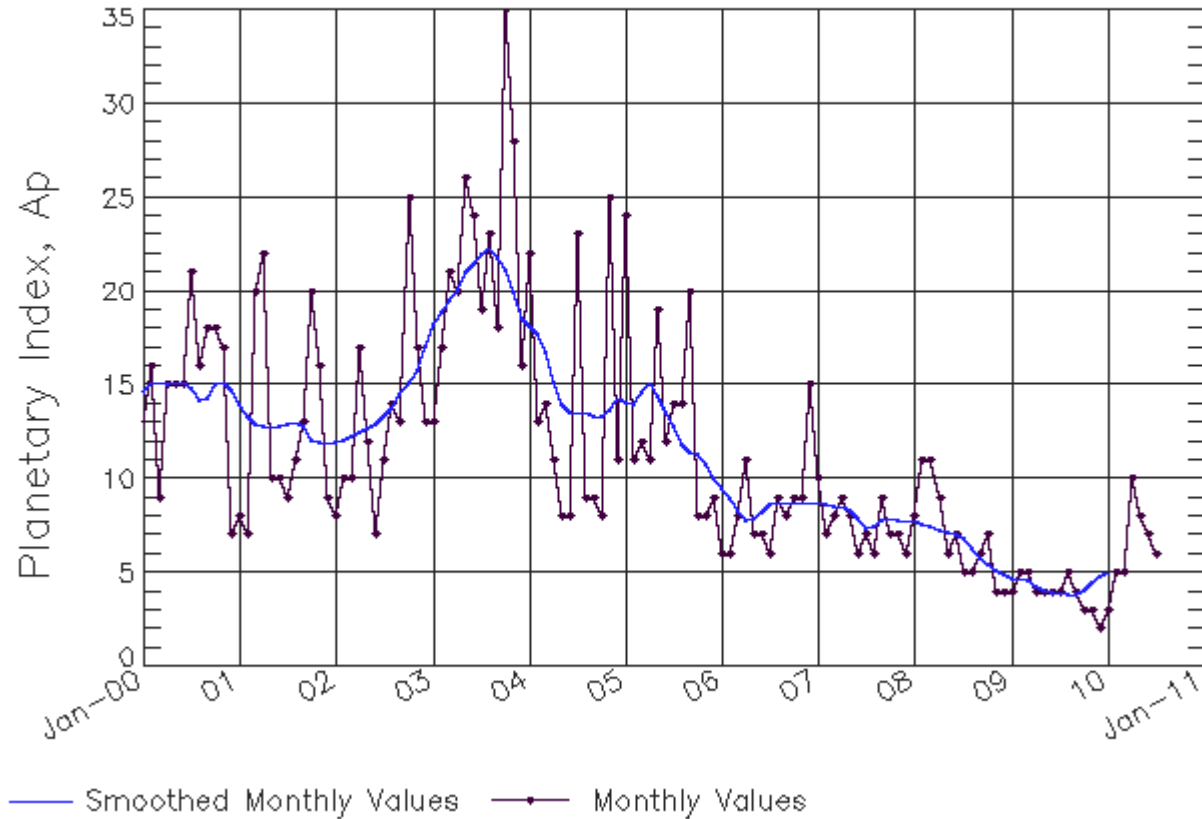
Smoothed F10.7cm Radio Flux Prediction

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2009	69 (***)	69 (***)	69 (***)	69 (***)	70 (***)	70 (***)	71 (***)	72 (***)	73 (***)	74 (***)	75 (***)	75 (***)
2010	76 (***)	77 (1)	79 (1)	81 (2)	83 (3)	85 (4)	87 (4)	88 (5)	90 (6)	93 (7)	96 (8)	99 (8)
2011	102 (9)	105 (9)	108 (9)	110 (9)	112 (9)	115 (9)	117 (9)	119 (9)	121 (9)	123 (9)	125 (9)	127 (9)
2012	128 (9)	130 (9)	132 (9)	133 (9)	134 (9)	135 (9)	136 (9)	137 (9)	138 (9)	139 (9)	140 (9)	140 (9)
2013	141 (9)	141 (9)	141 (9)	141 (9)	141 (9)	141 (9)	141 (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 Jul 2010



Updated 2010 Aug 3

NOAA/SWPC Boulder, CO USA

The Solar Cycle Comparison charts are temporarily unavailable. 2010 charts will be published at a later date. 02 Feb 2010

