Space Weather Highlights
29 April - 05 May 2019

SWPC PRF 2279
06 May 2019

Solar activity was at very low to low levels. New Region 2740 (N08, L=307, class/area Dho/280 on 05 May) produced a pair of C-class flares, the largest a C2/Sf observed at 04/2243 UTC. No Earth-directed CMEs were observed in available coronograph imagery.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit was at normal levels on 29 Apr - 01 May and reached high levels on 02-05 May. The maximum electron flux was 6,160 pfu observed at 03/1930 UTC.

Geomagnetic field activity ranged from quiet to active levels through the period. Quiet levels were observed on 29-30 Apr under a nominal solar wind regime. Late on 01 May through midday on 02 May, unsettled to active levels were observed under an enhanced solar wind environment due to influence from a negative polarity CH HSS. During this time frame, wind speeds peaked at near 565 km/s, total field reached 11 nT, while the Bz component reached a maximum southward extent of -10 nT. On 03-04 May, field conditions were at quiet to unsettled levels as negative polarity CH HSS influence continued. By 05 May, quiet conditions were observed under waning CH HSS influence.

Space Weather Outlook
06 May - 01 June 2019

Solar activity is expected to be at very low levels, with low levels likely through 20 May due to activity from Region 2740 and the return of old Region 2739 (N06, L=266). Very low conditions are anticipated after 20 May.

No proton events are expected at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to be at moderate to high levels on 06-12 May, and again on 29 May - 01 Jun, due to CH HSS influence. Normal to moderate levels are expected on 13-28 May.

Geomagnetic field activity is expected to range from quiet to active levels. Unsettled to active conditions are expected on 06-07 May and again on 28-31 May. Both enhancements in geomagnetic activity are due to recurrent, negativity polarity CH HSSs. The remainder of the outlook period is expected to be at quiet levels.

Daily Solar Data

Date	Radio Flux 10.7cm	Sun spot No.	Sunspot Area (10^{-6} hemi.)	X-ray Background		Flares						
						X-ray			Optical				
						C	M	X	S	1	2	3	4
29 April	67	0	0	A5.9	0	0	0	0	0	0	0	0	0
30 April	69	0	0	A5.7	0	0	0	0	0	0	0	0	0
01 May	68	0	0	A5.9	0	0	0	0	0	0	0	0	0
02 May	69	0	0	A6.5	0	0	0	0	0	0	0	0	0
03 May	70	11	260	A7.7	1	0	0	0	0	0	0	0	0
04 May	72	12	270	B1.2	1	0	0	1	0	0	0	0	0
05 May	74	14	280	B1.0	0	0	0	5	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
29 April	4.2e+05	1.9e+04	3.6e+03	2.5e+06		
30 April	4.9e+05	1.8e+04	3.9e+03	2.6e+06		
01 May	7.9e+05	1.9e+04	3.7e+03	1.8e+06		
02 May	9.2e+05	1.9e+04	3.8e+03	6.2e+07		
03 May	5.1e+05	2.0e+04	3.5e+03	1.7e+08		
04 May	6.8e+05	1.8e+04	3.5e+03	4.3e+07		
05 May	9.2e+05	1.9e+04	3.7e+03	4.7e+07		

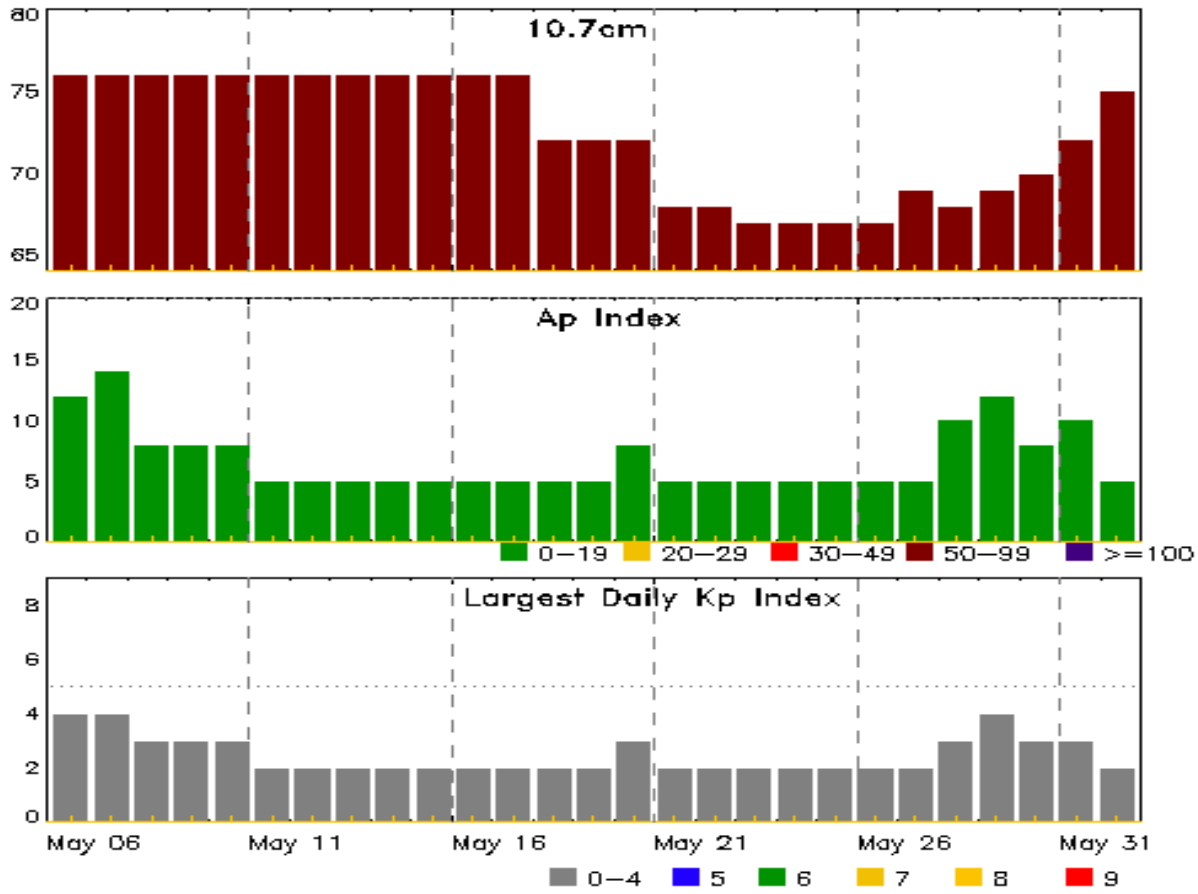
Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
29 April	6	2-2-0-1-3-2-1-1	3	1-1-0-1-2-2-0-0	5	2-2-0-1-1-2-1-1
30 April	4	1-1-0-1-3-1-1-1	5	1-1-0-1-3-2-1-1	5	2-1-0-1-2-1-2-1
01 May	8	0-2-2-1-3-1-3-3	10	1-2-2-3-3-2-2-3	11	1-2-2-2-2-2-3-4
02 May	13	4-3-3-2-3-2-3-1	19	3-4-4-4-4-2-3-1	12	4-4-3-2-2-2-2-2
03 May	8	2-2-2-1-3-1-2-3	9	2-2-3-3-2-1-2-2	7	2-2-2-1-2-1-2-3
04 May	9	1-2-3-3-3-2-2-1	22	1-3-4-5-5-4-1-1	10	1-2-3-3-3-2-2-2
05 May	4	2-1-0-1-2-1-1-1	2	1-1-0-0-1-1-0-0	6	2-1-0-0-1-1-0-1

Alerts and Warnings Issued

Date & Time of Issue UTC	Type of Alert or Warning	Date & Time of Event UTC
01 May 1907	WARNING: Geomagnetic K = 4	01/1907 - 02/0600
01 May 2223	ALERT: Geomagnetic K = 4	01/2222
02 May 0547	EXTENDED WARNING: Geomagnetic K = 4	01/1907 - 02/1200
02 May 1708	ALERT: Electron 2MeV Integral Flux >= 1000pfu	02/1645
03 May 1310	CONTINUED ALERT: Electron 2MeV Integral Flux >= 1000pfu	02/1645
05 May 1730	ALERT: Electron 2MeV Integral Flux >= 1000pfu	05/1715

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 May	76	12	4	20 May	72	8	3
07	76	14	4	21	68	5	2
08	76	8	3	22	68	5	2
09	76	8	3	23	67	5	2
10	76	8	3	24	67	5	2
11	76	5	2	25	67	5	2
12	76	5	2	26	67	5	2
13	76	5	2	27	69	5	2
14	76	5	2	28	68	10	3
15	76	5	2	29	69	12	4
16	76	5	2	30	70	8	3
17	76	5	2	31	72	10	3
18	72	5	2	01 Jun	75	5	2
19	72	5	2				

Energetic Events

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

No Events Observed

Flare List

	Time				Optical		
Date	Begin	Max	End	X-ray Class	Imp/ Brtns	Location Lat CMD	Rgn #
29 Apr	0544	0545	0547	A7.1			
03 May	1420	1449	1507	B3.9			2740
03 May	2249	2331	2349	C1.0			2740
04 May	1300	1308	1315	B2.2			2740
04 May	2203	2210	2223	B2.7			2740
04 May	2228	2243	2257	C2.1	SF	N07E72	2740
05 May	0637	0642	0644	B2.3	SF	N06E63	2740
05 May	0930	0933	0936	B1.8			2740
05 May	1145	1149	1151	B7.5			2740
05 May	1336	1342	1345	B9.8	SF	N05E58	2740
05 May	1350	1353	1355	B1.8			
05 May	1451	1454	1500	B1.6			2740
05 May	1655	1657	1659		SF	N07E60	2740
05 May	2121	2143	2152	B6.4	SF	N07E60	2740
05 May	2227	2230	2232	B4.4			2740
05 May	2331	2332	2338		SF	N07E60	2740

Region Summary

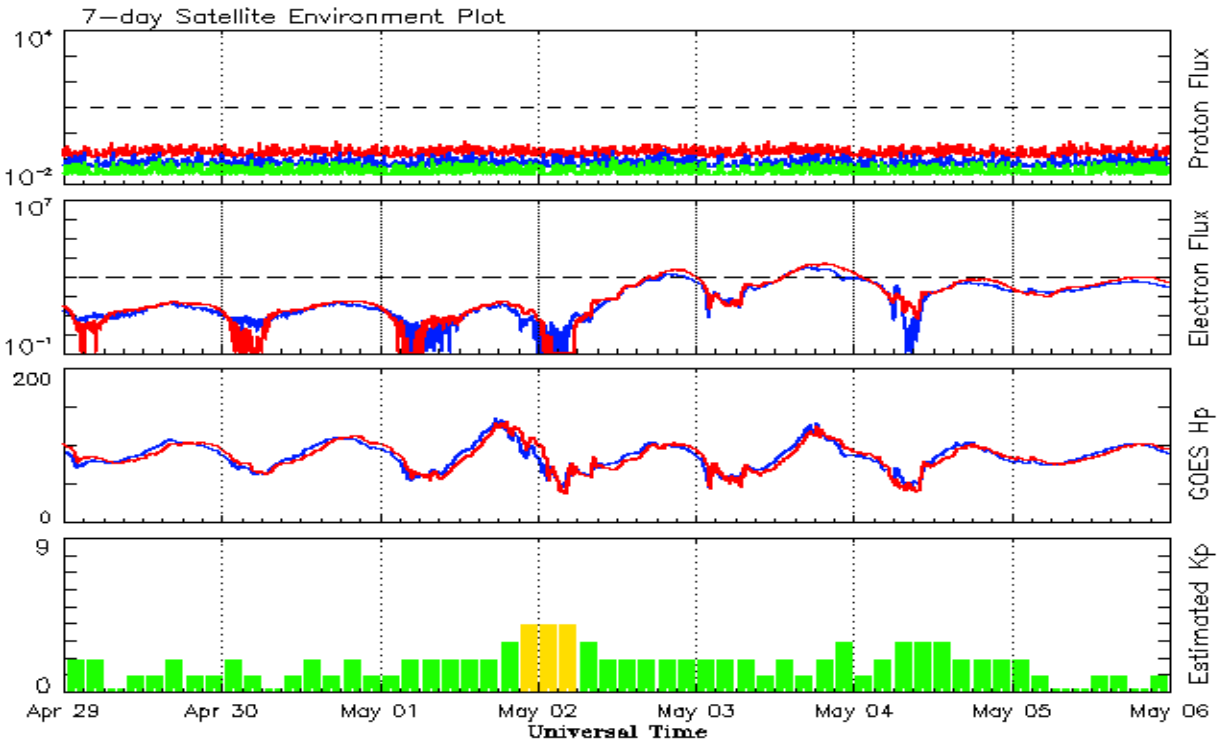
	Location		Sunspot Characteristics					Flares							
		Helio	Area	Extent	Spot	Spot	Mag	X-ray			Optical				
Date	Lat CMD	Lon	10^{-6} hemi.	(helio)	Class	Count	Class	C	M	X	S	1	2	3	4
		Region 2740													
03 May	N12E80	307	260	4	Hhx	1	A	1							
04 May	N09E67	307	270	4	Hhx	2	A	1			1				
05 May	N08E54	307	280	4	Dho	4	BD				5				
								2	0	0	6	0	0	0	0

Still on Disk.
Absolute heliographic longitude: 307

Recent Solar Indices (preliminary)
Observed monthly mean values

	Sunspot Numbers					Radio Flux		Geomagnetic	
	Observed values		Ratio	Smooth values		Penticton	Smooth	Planetary	Smooth
Month	SEC	RI	RI/SEC	SEC	RI	10.7 cm	Value	Ap	Value
				2017					
May	18.1	11.3	0.62	23.1	14.0	73.5	77.7	9	11.3
June	18.0	11.5	0.64	22.0	13.3	74.8	77.3	7	11.3
July	18.8	10.7	0.59	20.8	12.6	77.7	76.8	9	11.0
August	25.0	19.6	0.80	19.7	11.8	77.9	76.3	12	10.7
September	42.2	26.2	0.62	18.6	11.0	92.0	75.9	19	10.3
October	16.0	7.9	0.49	16.8	10.0	76.4	75.1	11	9.8
November	7.7	3.4	0.44	15.7	9.2	72.1	74.6	11	9.5
December	7.6	4.9	0.64	15.7	9.1	71.5	74.4	8	9.4
				2018					
January	7.8	4.1	0.51	15.0	8.5	70.0	74.0	6	9.3
February	16.0	6.4	0.40	13.7	7.6	72.0	73.3	7	9.1
March	6.0	1.5	0.25	11.5	5.9	68.4	71.9	8	8.6
April	7.0	5.3	0.76	9.6	4.7	70.0	70.6	7	8.0
May	15.0	7.9	0.53	9.2	4.5	70.9	70.2	8	7.6
June	19.7	9.4	0.48	9.1	4.3	72.5	70.0	7	7.4
July	1.3	1.0	0.77	9.4	4.3	69.7	70.0	6	7.3
August	10.0	5.2	0.53	9.0	4.0	69.1	70.0	10	7.3
September	5.7	2.0	0.35	8.7	4.0	68.3	70.1	9	7.3
October	6.9	2.9	0.42	9.2	4.1	69.5	70.3	7	7.1
November	7.3	2.9	0.48			68.9		6	
December	5.6	1.9	0.34			70.0		7	
				2019					
January	16.0	4.7	0.29			71.6		6	
February		0.5				70.6		7	
March	14.8	5.7	0.39			71.5		6	
April	11.5	5.5	0.48			72.4		6	

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 29 April 2019

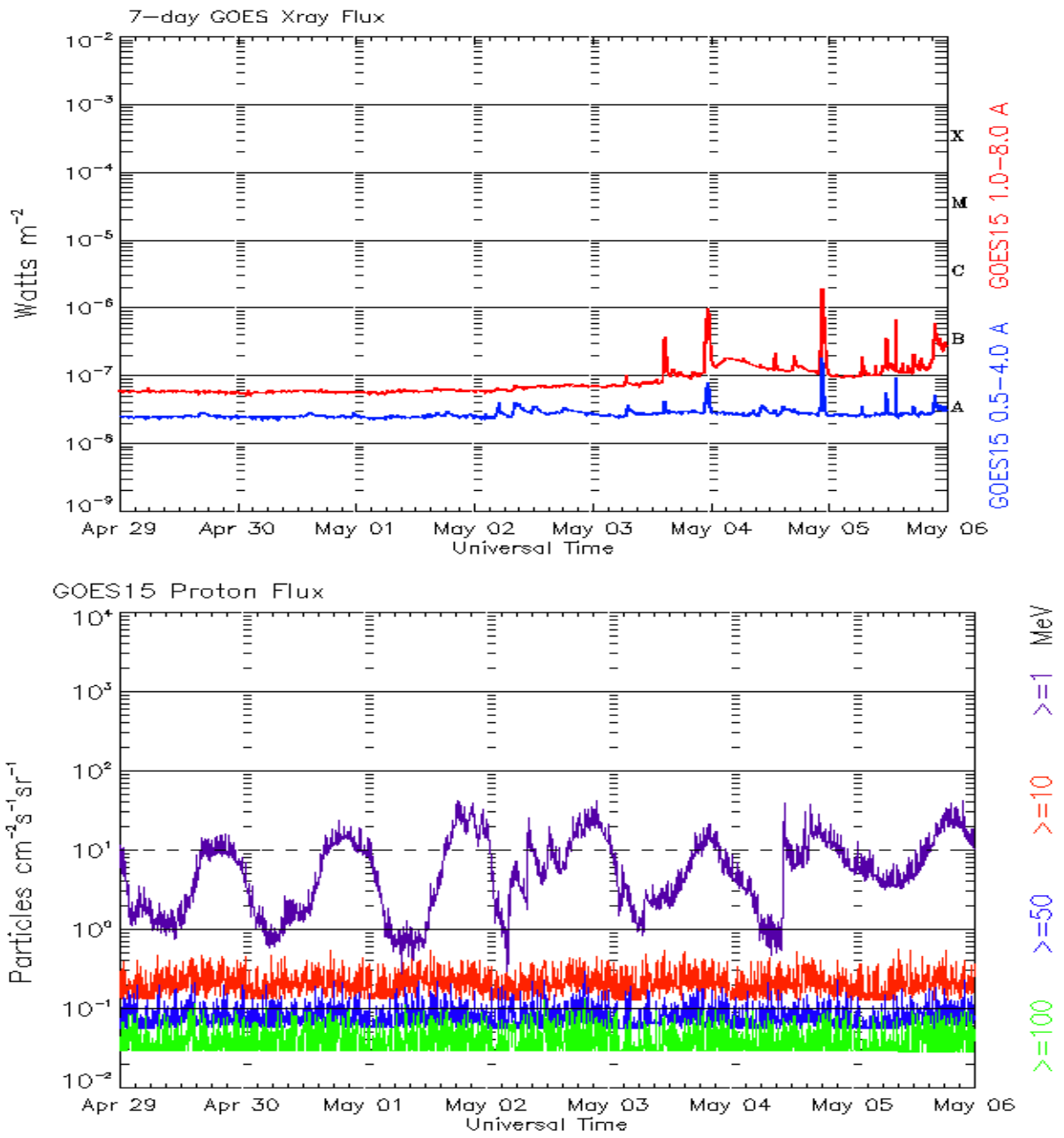
The proton flux plot contains the five-minute averaged integral proton flux (protons/cm^2-sec -sr) as measured by the SWPC Primary GOES satellite, near West 75, for each of three energy thresholds: greater than 10, 50, and 100 MeV.

The electron flux plot contains the five-minute averaged integral electron flux (electrons/cm^2-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.

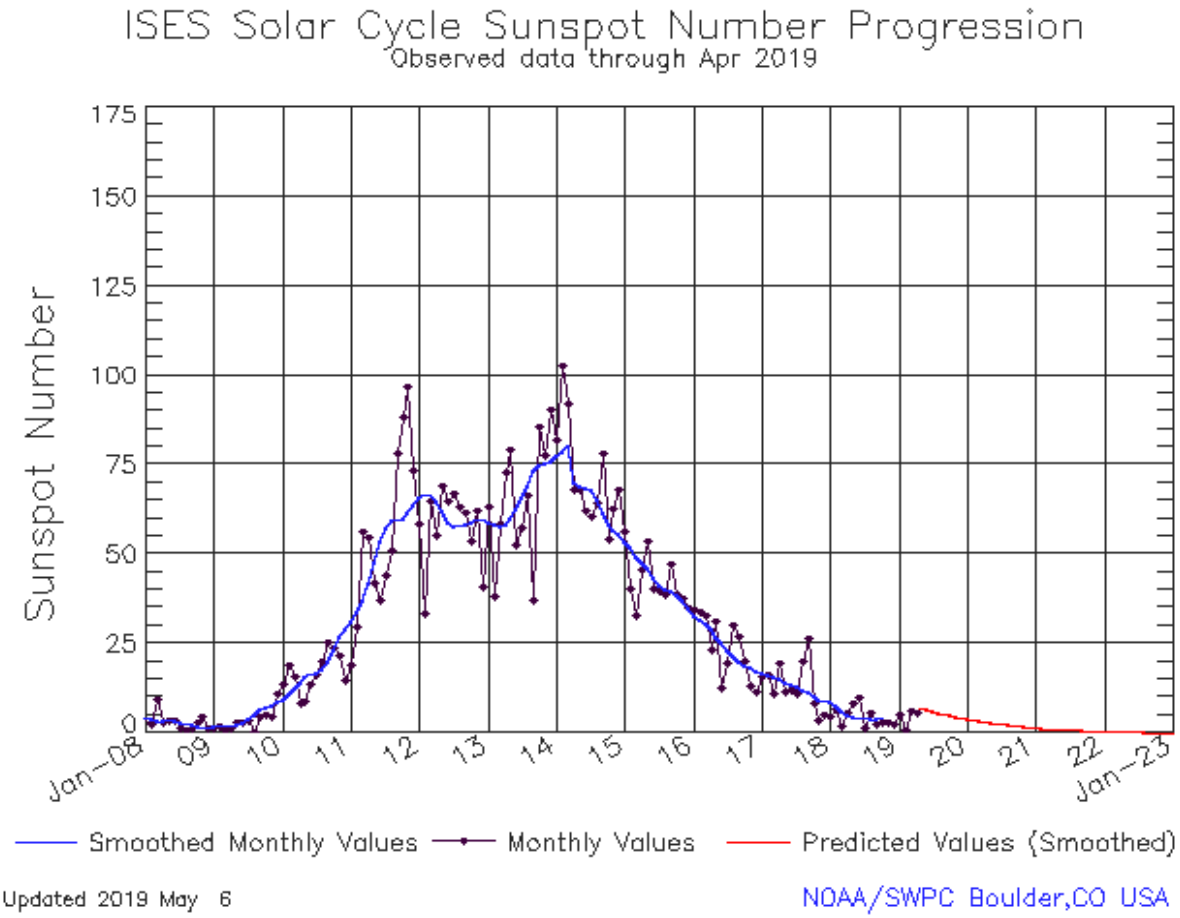
The data included here are those now available in real time at the SWPC and are incomplete in that they do not include the full set of parameters and energy ranges known to cause satellite operating anomalies. The proton and electron fluxes and Kp are 'global' parameters that are applicable to a first 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 29 April 2019

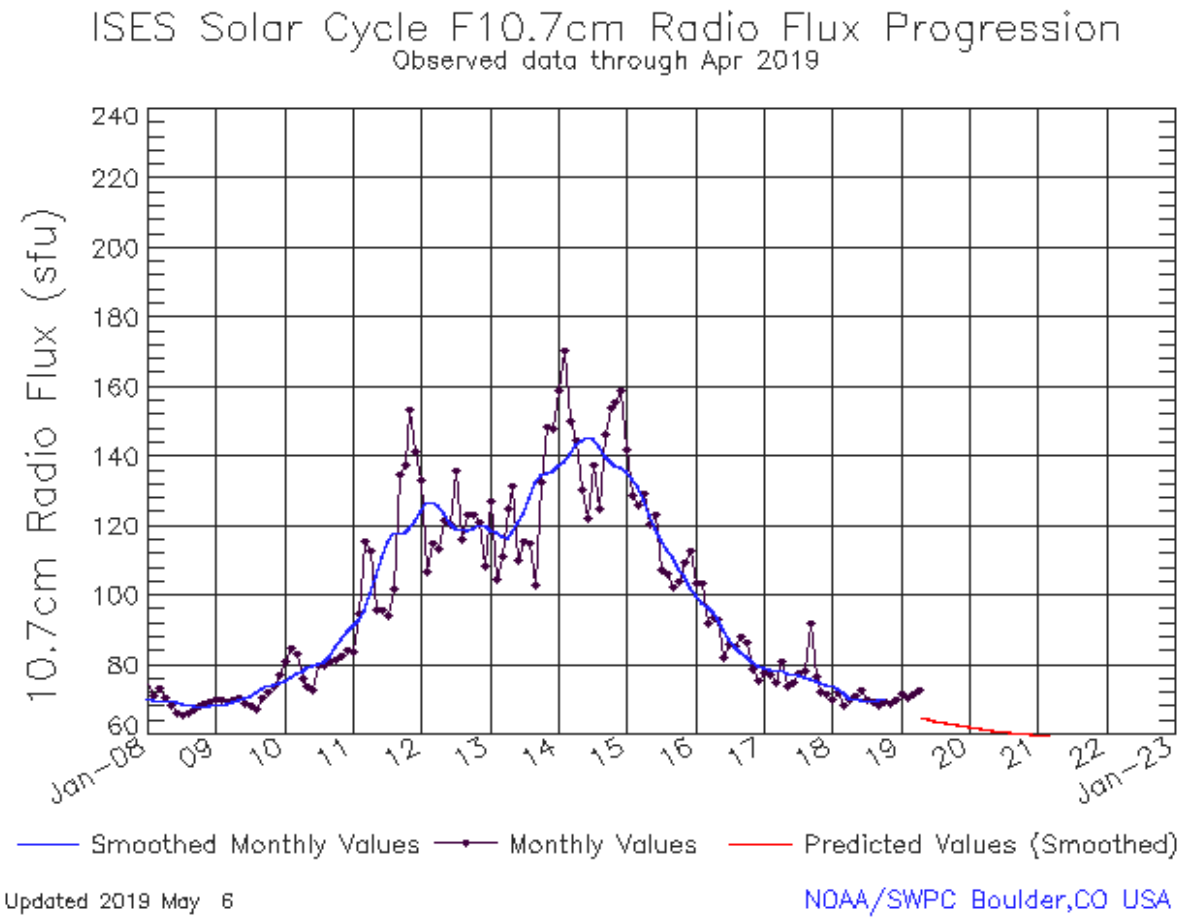
The x-ray plots contains five-minute averages x-ray flux (Watt/m^2) as measure by the SWPC primary GOES X-ray satellite, usually at West 105 longitude, in two wavelength bands, 0.05 - 0.4 and 0.1 - 0.8 nm. The letters A, B, C, M and X refer to x-ray event levels for the 0.1 - 0.8 nm band.

The proton plot contains the five-minute averaged intergral 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.



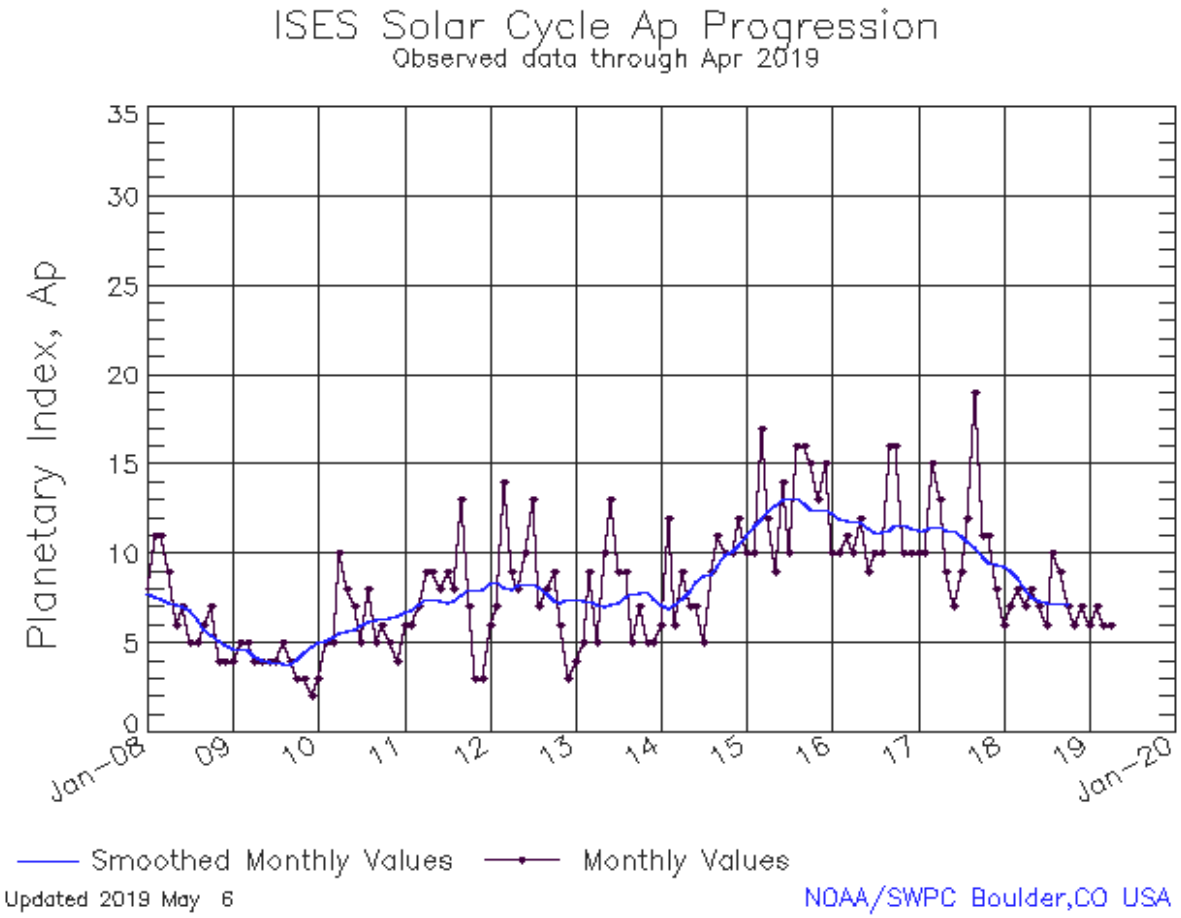
Smoothed Sunspot Number Prediction

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2010	7	9	11	13	14	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	16	11	19	11	12	11	20	26	8	3	5
	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)
2018	4	6	2	5	8	9	1	5	2	3	3	2
	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)
2019	5	1	6	6	7	6	6	6	5	5	4	4
	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)
2020	4	4	3	3	3	3	2	2	2	2	2	2
	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)
2021	2	1	1	1	1	1	1	1	1	1	1	1
	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)
2022	1	0	0	0	0	0	0	0	0	0	0	0
	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)



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	84	83	81	80
	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)
2017	79	79	79	78	78	77	77	76	76	75	75	74
	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)
2018	74	73	72	71	70	70	70	70	70	70	70	70
	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(1)	(1)
2019	69	69	68	68	67	67	66	65	64	64	63	63
	(2)	(3)	(4)	(4)	(5)	(6)	(7)	(8)	(8)	(9)	(9)	(9)
2020	62	62	62	62	61	61	61	61	61	60	60	60
	(9)	(9)	(9)	(9)	(9)	(9)	(9)	(9)	(9)	(9)	(9)	(9)
2021	60	60	60	60	60	60	60	59	59	59	59	59
	(9)	(9)	(9)	(9)	(9)	(9)	(9)	(9)	(9)	(9)	(9)	(9)
2022	59	59	59	59	59	59	59	59	59	59	59	59
	(9)	(9)	(9)	(9)	(9)	(9)	(9)	(9)	(9)	(9)	(9)	(9)



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
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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