

**Space Weather Highlights**  
**17 February - 23 February 2020**

**SWPC PRF 2321**  
**24 February 2020**

Solar activity was very low. No active regions with sunspots were observed and no apparent earth-directed CMEs were detected this period.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit reached moderate levels on 17-19 Feb and high levels on 20-23 Feb.

Geomagnetic field activity reached active levels on 18 Feb and active to G1 (Minor) geomagnetic storm levels on 19 Feb. The enhanced geomagnetic field activity on 18-19 Feb were attributed to the passage of a transient solar wind feature. Active conditions were once again observed on 21 Feb due to negative polarity CH HSS influence. Generally quiet or quiet to unsettled conditions were observed throughout the remainder of the week.

**Space Weather Outlook**  
**24 February - 21 March 2020**

Solar activity is expected to be very low throughout the outlook period.

No proton events are expected at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to reach high levels on 24 Feb-01 Mar, 05-09 Mar, and 19-21 Mar. Normal or normal to moderate levels are expected to prevail throughout the remainder of the outlook period.

Geomagnetic field activity is expected to reach active levels on 26 Feb, 04-05 Mar, and 19 Mar due to the influences of multiple recurrent CH HSSs. Generally quiet or quiet to unsettled conditions are expected to prevail throughout the rest of the outlook period under a nominal solar wind regime.



### *Daily Solar Data*

Date	Radio Flux 10.7cm	Sun spot No.	Sunspot Area (10 <sup>-6</sup> hemi.)	X-ray Background Flux	Flares							
					X-ray			Optical				
					C	M	X	S	1	2	3	4
17 February	71	0	0	A0.0	0	0	0	0	0	0	0	0
18 February	71	0	0	A0.0	0	0	0	0	0	0	0	0
19 February	71	0	0	A0.0	0	0	0	0	0	0	0	0
20 February	71	0	0	A0.0	0	0	0	0	0	0	0	0
21 February	71	0	0	A0.0	0	0	0	0	0	0	0	0
22 February	72	0	0	A0.0	0	0	0	0	0	0	0	0
23 February	70	0	0	A0.0	0	0	0	0	0	0	0	0

### *Daily Particle Data*

Date	Proton Fluence (protons/cm <sup>2</sup> -day -sr)		Electron Fluence (electrons/cm <sup>2</sup> -day -sr)	
	>1 MeV	>10 MeV	>2MeV	
	17 February	3.9e+05	4.7e+04	8.4e+06
18 February	2.3e+06	4.6e+04	1.8e+06	
19 February	7.3e+04	4.5e+04	7.2e+06	
20 February	8.9e+04	4.5e+04	4.1e+07	
21 February	1.2e+05	4.5e+04	6.3e+07	
22 February	5.9e+04	4.6e+04	7.9e+07	
23 February	5.8e+04	4.6e+04	1.4e+08	

### *Daily Geomagnetic Data*

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	17 February	5	1-0-2-1-1-2-2-2	3	0-0-1-0-2-2-1-2	7
18 February	11	0-2-4-2-3-2-3-2	36	0-3-4-5-6-6-4-2	14	1-3-4-2-3-3-3-3
19 February	10	2-4-3-3-1-1-1-1	25	2-4-5-6-4-2-1-0	14	2-5-4-4-2-1-1-2
20 February	5	2-2-2-0-1-1-2-2	11	1-3-1-4-3-3-2-1	8	2-3-2-1-2-1-2-3
21 February	10	3-2-2-3-2-3-1-2	23	3-3-4-6-2-3-3-2	14	4-3-3-3-2-3-2-3
22 February	7	2-2-1-2-2-2-2-2	9	2-1-2-3-3-3-2-1	9	3-3-2-2-2-2-3-2
23 February	4	0-0-1-1-1-2-2-2	2	0-0-1-0-0-1-1-1	3	1-0-1-1-1-1-2-2

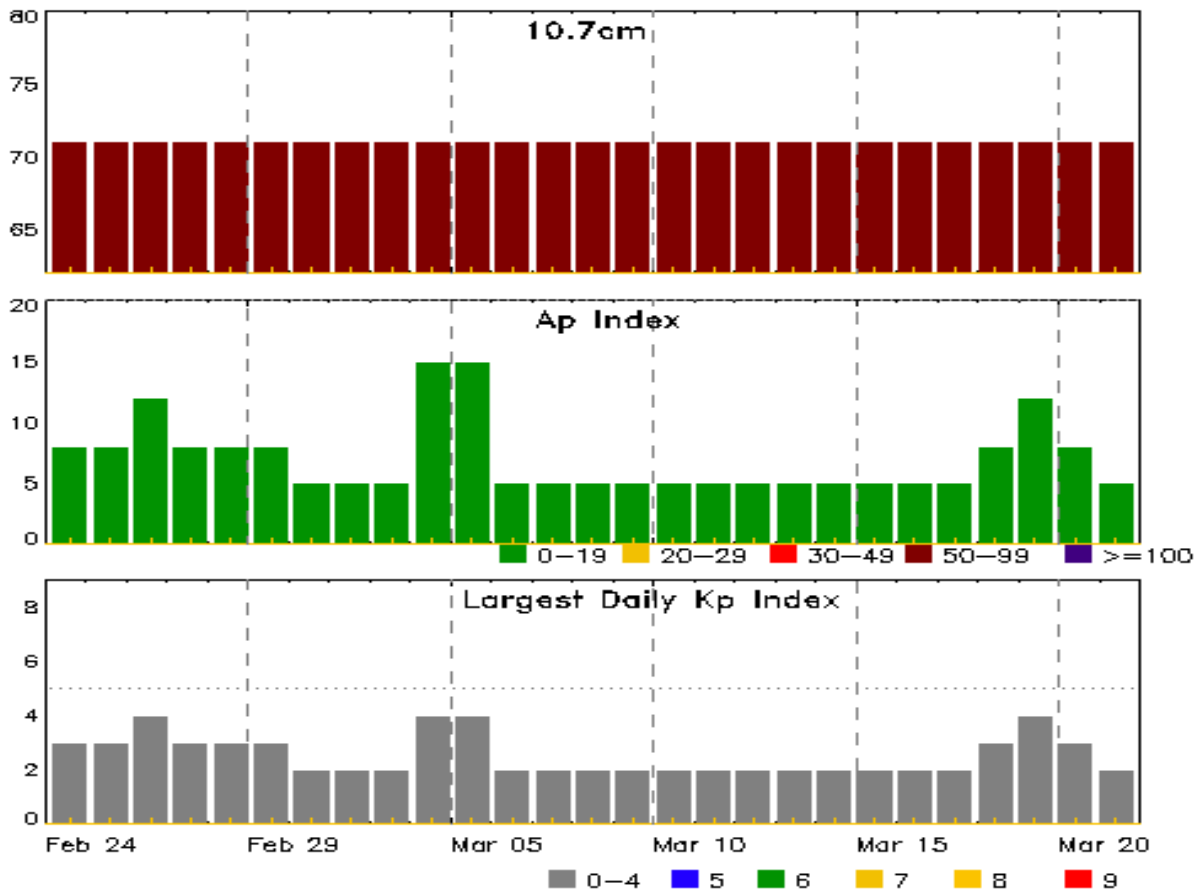


### *Alerts and Warnings Issued*

Date & Time of Issue UTC	Type of Alert or Warning	Date & Time of Event UTC
18 Feb 0652	WARNING: Geomagnetic K = 4	18/0651 - 1200
18 Feb 0730	ALERT: Geomagnetic K = 4	18/0729
18 Feb 1306	WARNING: Geomagnetic K = 4	18/1305 - 2100
18 Feb 1337	WARNING: Geomagnetic K = 5	18/1400 - 2100
18 Feb 1809	WATCH: Geomagnetic Storm Category G1 predicted	
18 Feb 1814	EXTENDED WARNING: Geomagnetic K = 4	18/1305 - 19/0900
18 Feb 1815	EXTENDED WARNING: Geomagnetic K = 5	18/1400 - 19/0600
19 Feb 0359	ALERT: Geomagnetic K = 4	19/0358
19 Feb 0600	EXTENDED WARNING: Geomagnetic K = 5	18/1400 - 19/0900
19 Feb 0600	ALERT: Geomagnetic K = 5	19/0559
19 Feb 0843	EXTENDED WARNING: Geomagnetic K = 4	18/1305 - 19/1800
20 Feb 1643	ALERT: Electron 2MeV Integral Flux $\geq$ 1000pfu	20/1625
21 Feb 0017	WARNING: Geomagnetic K = 4	21/0015 - 0900
21 Feb 0119	ALERT: Geomagnetic K = 4	21/0115
21 Feb 1259	CONTINUED ALERT: Electron 2MeV Integral Flux $\geq$ 1000pfu	20/1625
22 Feb 1333	CONTINUED ALERT: Electron 2MeV Integral Flux $\geq$ 1000pfu	20/1625
23 Feb 0957	CONTINUED ALERT: Electron 2MeV Integral Flux $\geq$ 1000pfu	20/1625



## 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
24 Feb	71	8	3	09 Mar	71	5	2
25	71	8	3	10	71	5	2
26	71	12	4	11	71	5	2
27	71	8	3	12	71	5	2
28	71	8	3	13	71	5	2
29	71	8	3	14	71	5	2
01 Mar	71	5	2	15	71	5	2
02	71	5	2	16	71	5	2
03	71	5	2	17	71	5	2
04	71	15	4	18	71	8	3
05	71	15	4	19	71	12	4
06	71	5	2	20	71	8	3
07	71	5	2	21	71	5	2
08	71	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 #	245	2695	II

**No Events Observed**

### ***Flare List***

Date	Time			X-ray Class	Optical		
	Begin	Max	End		Imp/ Brtns	Location Lat CMD	Rgn #
20 Feb	0530	0531	0532	A1.1			



## *Region Summary*

Location		Sunspot Characteristics					Flares							
Date	Lat CMD	Helio Lon	Area 10 <sup>-6</sup>	Extent hemi.	Spot (helio) Class	Spot Count	Mag Class	X-ray			Optical			
							C	M	X	S	1	2	3	4

No Active Regions



**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	
<b>2018</b>										
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	4.2	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	3.9	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	9.5	4.0	68.9	70.4	6	7.0	
December	5.6	1.9	0.34	9.3	3.6	70.0	70.3	7	6.9	
<b>2019</b>										
January	16.0	4.6	0.29	9.0	3.2	71.6	70.0	6	6.8	
February		0.5		8.7	3.0	70.6	69.8	7	6.7	
March	14.8	5.6	0.39	8.3	2.8	71.5	69.7	6	6.6	
April	11.5	5.5	0.48	7.9	2.6	72.4	69.6	6	6.7	
May	18.1	5.9	0.34	7.4	2.3	71.3	69.6	7	6.7	
June	11.6	0.7	0.06	7.3	2.2	68.1	69.6	5	6.5	
July	1.6	0.5	0.31	7.0	2.1	67.1	69.7	6	6.3	
August	2.5	0.3	0.16			67.0		7		
September	2.6	0.7	0.27			68.1		10		
October	1.8	0.2	0.11			67.4		8		
November	1.1	0.3	0.27			70.2		4		
December	7.2	1.0	0.14			70.9		4		
<b>2020</b>										
January	9.2	3.8	0.41			72.3		5		

**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.



## ***Preliminary Report and Forecast of Solar Geophysical Data (The Weekly)***

Published every Monday by the Space Weather Prediction Center.

U.S. Department of Commerce  
NOAA / National Weather Service  
Space Weather Prediction Center  
325 Broadway, Boulder CO 80305

**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.

<https://www.swpc.noaa.gov/products/weekly-highlights-and-27-day-forecast> --

Current

<ftp://ftp.swpc.noaa.gov/pub/warehouse> -- Online archive from 1997

<https://www.ngdc.noaa.gov/stp/satellite/goes-r.html> -- NCEI GOES data  
textarchive

<https://www.swpc.noaa.gov/products/solar-cycle-progression> -- Solar Cycle  
Progression web site

<https://www.swpc.noaa.gov/content/contact-us> -- Contact and Copyright  
information

[https://www.swpc.noaa.gov/sites/default/files/images/u2/Usr\\_guide.pdf](https://www.swpc.noaa.gov/sites/default/files/images/u2/Usr_guide.pdf) -- User  
Guide

