

**Space Weather Highlights**  
**15 July - 21 July 2019**

**SWPC PRF 2290**  
**22 July 2019**

Solar activity was very low on 15-21 July. No spotted regions were observed on the visible disk.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit reached high levels on 15-21 July.

Geomagnetic field activity was at quiet levels on 16-20 July. Quiet to unsettled levels were observed on 15 and 21 July.

**Space Weather Outlook**  
**22 July - 17 August 2019**

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

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 22, 27-30 July and 06-17 August. Normal to moderate levels are expected for the remainder of the forecast period.

Geomagnetic field activity is expected to be at unsettled to active levels on 05-06 August due to recurrent coronal hole high speed stream influences. Quiet to unsettled levels are expected for the remainder of the forecast period.



### *Daily Solar Data*

Date	Radio	Sun	Sunspot	X-ray		Flares							
	Flux	spot	Area	Background		X-ray			Optical				
	10.7cm	No.	(10 <sup>-6</sup> hemi.)	Flux		C	M	X	S	1	2	3	4
15 July	67	0	0	A6.7	0	0	0	0	0	0	0	0	0
16 July	67	0	0	A6.5	0	0	0	0	0	0	0	0	0
17 July	68	0	0	A6.4	0	0	0	0	0	0	0	0	0
18 July	67	0	0	A6.5	0	0	0	0	0	0	0	0	0
19 July	67	0	0	A6.3	0	0	0	0	0	0	0	0	0
20 July	67	0	0	A6.3	0	0	0	0	0	0	0	0	0
21 July	68	0	0	A6.5	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	>100 MeV	>0.6 MeV	>2MeV	>4 MeV
15 July	3.2e+05	2.0e+04	3.8e+03		9.5e+07	
16 July	3.5e+05	2.1e+04	4.0e+03		1.0e+08	
17 July	3.3e+05	2.0e+04	4.0e+03		7.3e+07	
18 July	4.4e+05	2.0e+04	4.0e+03		9.2e+07	
19 July	4.3e+05	2.0e+04	4.1e+03		9.8e+07	
20 July	4.8e+05	2.2e+04	4.0e+03		9.5e+07	
21 July	6.4e+05	2.1e+04	4.1e+03		6.7e+07	

### *Daily Geomagnetic Data*

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
15 July	8	3-2-1-3-3-2-1-0	11	1-1-0-5-3-3-1-0	7	3-2-1-3-2-1-2-0
16 July	5	1-1-2-1-2-1-2-1	6	1-1-2-2-3-1-2-0	4	0-1-1-1-1-1-1-1
17 July	8	1-3-2-2-3-1-1-2	9	2-3-3-2-3-1-1-2	6	1-2-2-2-2-1-1-2
18 July	4	1-1-1-1-2-1-1-1	1	0-0-0-1-1-0-0-0	3	0-1-1-1-1-1-0-1
19 July	3	1-0-0-2-2-1-1-1	1	1-0-0-1-1-0-0-0	4	1-1-0-2-1-1-1-1
20 July	5	1-1-1-1-2-2-2-1	0	0-0-1-0-0-0-0-0	3	0-0-1-1-1-1-1-1
21 July	9	0-1-1-3-1-2-4-3	6	0-1-2-3-1-1-2-2	3	1-1-1-2-1-2-3-3

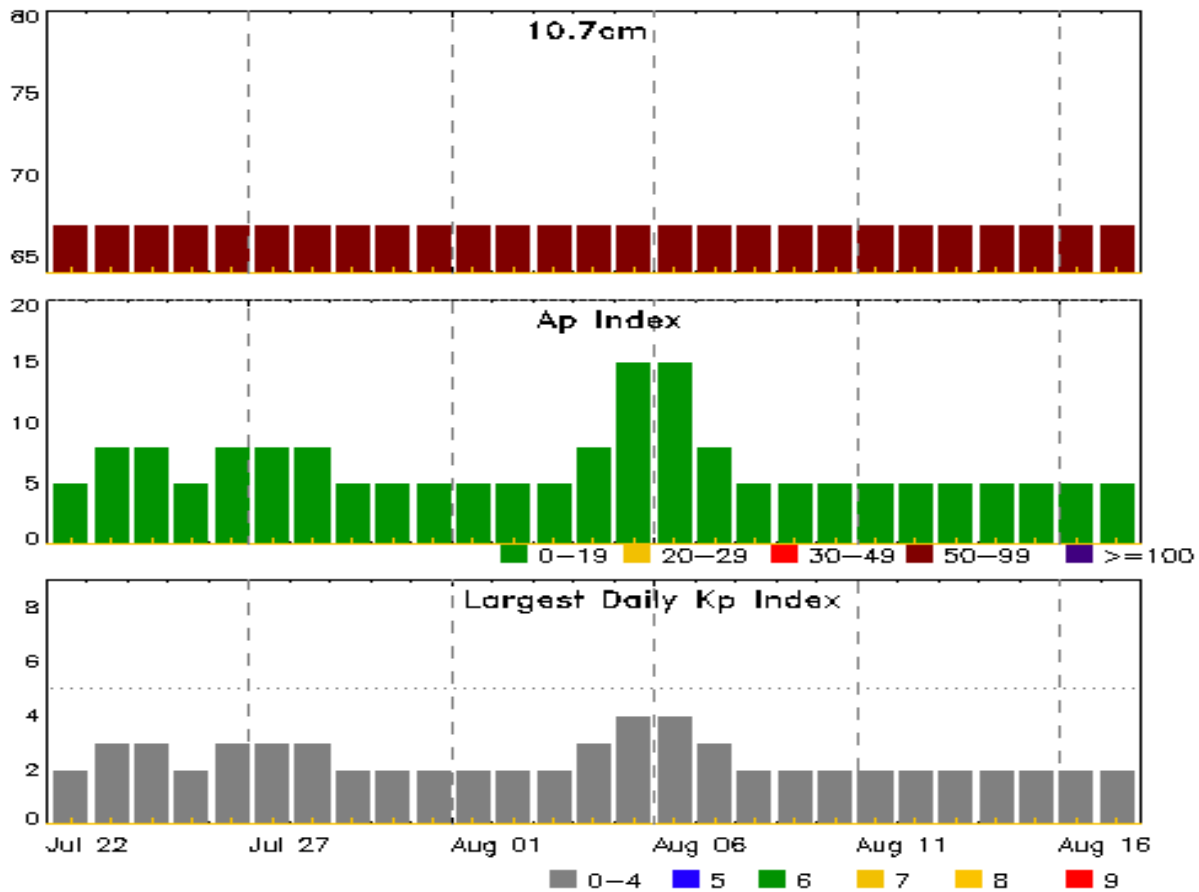


### *Alerts and Warnings Issued*

<b>Date &amp; Time of Issue UTC</b>	<b>Type of Alert or Warning</b>	<b>Date &amp; Time of Event UTC</b>
15 Jul 1340	CONTINUED ALERT: Electron 2MeV Integral Flux $\geq$ 1000pfu	10/1230
16 Jul 1316	CONTINUED ALERT: Electron 2MeV Integral Flux $\geq$ 1000pfu	10/1230
17 Jul 1411	CONTINUED ALERT: Electron 2MeV Integral Flux $\geq$ 1000pfu	10/1230
18 Jul 1219	CONTINUED ALERT: Electron 2MeV Integral Flux $\geq$ 1000pfu	10/1230
19 Jul 1141	CONTINUED ALERT: Electron 2MeV Integral Flux $\geq$ 1000pfu	10/1230
20 Jul 1158	CONTINUED ALERT: Electron 2MeV Integral Flux $\geq$ 1000pfu	10/1230
21 Jul 1546	CONTINUED ALERT: Electron 2MeV Integral Flux $\geq$ 1000pfu	10/1230
21 Jul 2308	WARNING: Geomagnetic K = 4	21/2307 - 22/0300



## 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
22 Jul	67	5	2	05 Aug	67	15	4
23	67	8	3	06	67	15	4
24	67	8	3	07	67	8	3
25	67	5	2	08	67	5	2
26	67	8	3	09	67	5	2
27	67	8	3	10	67	5	2
28	67	8	3	11	67	5	2
29	67	5	2	12	67	5	2
30	67	5	2	13	67	5	2
31	67	5	2	14	67	5	2
01 Aug	67	5	2	15	67	5	2
02	67	5	2	16	67	5	2
03	67	5	2	17	67	5	2
04	67	8	3				

### ***Energetic Events***

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

**No Events Observed**

### ***Flare List***

Date	Time			Optical			
	Begin	Max	End	X-ray Class	Imp/ Brtns	Location Lat CMD	Rgn #
15 Jul	1140	1141	1142	A1.1			
19 Jul	1551	1552	1553	A1.1			



## ***Region Summary***

Location		Sunspot Characteristics						Flares							
Date	Lat CMD	Helio	Area	Extent	Spot	Spot	Mag	X-ray			Optical				
		Lon	10 <sup>-6</sup> hemi.	(helio)	Class	Count	Class	C	M	X	S	1	2	3	4
		<i>Region 2744</i>													
07 Jul	S27E38	209	20	4	Bxo	2	B								
08 Jul	S27E24	210	plage												
09 Jul	S27E10	211	plage												
10 Jul	S27W04	211	plage												
11 Jul	S27W18	212	plage												
12 Jul	S27W32	213	plage												
13 Jul	S27W46	214	plage												
14 Jul	S27W60	214	plage												
15 Jul	S27W74	215	plage												
16 Jul	S27W88	216	plage												
								0	0	0	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude: 211

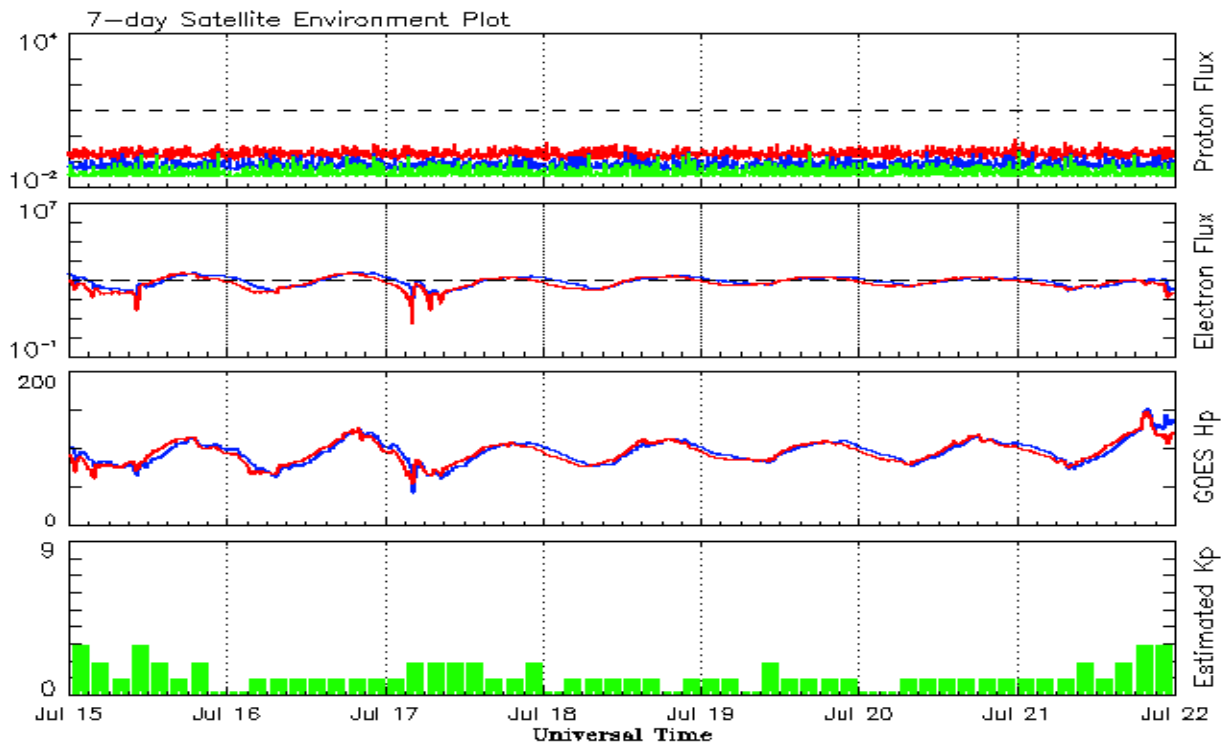


**Recent Solar Indices (preliminary)**  
**Observed monthly mean values**

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>2017</b>									
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
<b>2018</b>									
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	4.2	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			71.6		6	
February		0.5				70.6		7	
March	14.8	5.6	0.39			71.5		6	
April	11.5	5.5	0.48			72.4		6	
May	18.1	6.1	0.34			71.3		7	
June	11.6	0.7	0.06			68.1		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.





*Weekly Geosynchronous Satellite Environment Summary  
Week Beginning 15 July 2019*

The proton flux plot contains the five-minute averaged integral proton flux (protons/cm<sup>2</sup>-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.

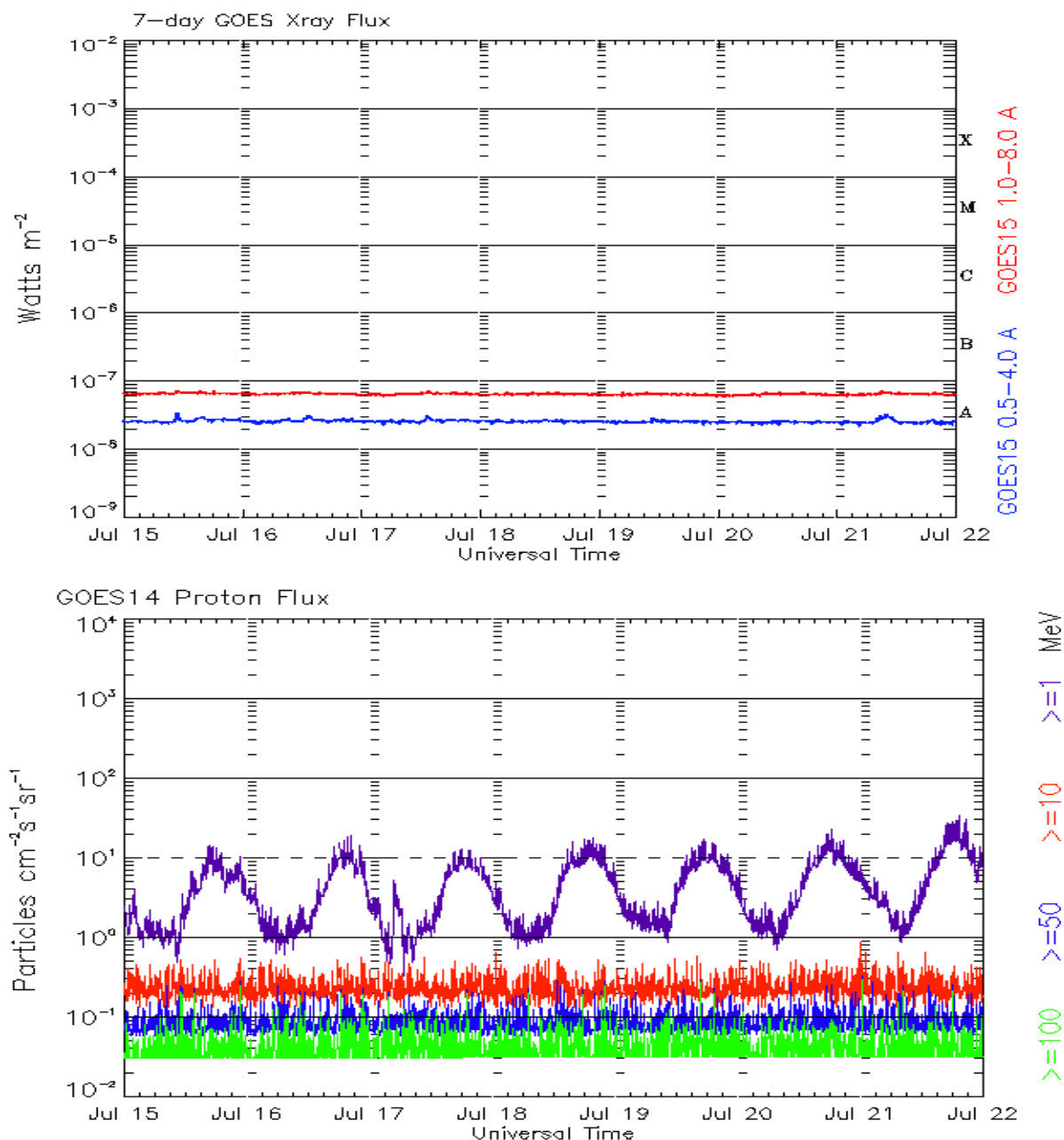
The electron flux plot contains the five-minute averaged integral electron flux (electrons/cm<sup>2</sup>-sec -sr) with energies greater than 2 MeV by the SWPC Primary GOES satellite.

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 15 July 2019*

The x-ray plots contains five-minute averages x-ray flux ( $\text{Watt/m}^2$ ) 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/ $\text{cm}^2$  -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.



## ***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](mailto:SWPC.Webmaster@noaa.gov)

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