

**Space Weather Highlights**  
**12 August - 18 August 2019**

**SWPC PRF 2294**  
**19 August 2019**

Solar activity was very low. The visible disk was spotless with no Earth-directed CMEs observed.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit was at high levels on 12-17 Aug with moderate levels on 18 Aug. A maximum flux of 5,340 pfu was observed at 13/1725 UTC.

Geomagnetic field activity was at predominately quiet levels with isolated unsettled intervals observed midday on 16 Aug and early on 18 Aug. Solar wind parameters reflected a nominal environment through the period.

**Space Weather Outlook**  
**19 August - 14 September 2019**

Solar activity is expected to continue at very low levels through the outlook period.

No proton events are expected at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to be normal to moderate levels on 19 - 31 Aug. Flux readings are expected to increase to moderate to high levels on 01 - 14 Sep. due to recurrent CH HSS influence.

Geomagnetic field activity is expected to reach unsettled levels on 20 - 22 Aug, 26 - 28 Aug and 06 - 07 Sep due to recurrent CH HSS activity. Active to G1 (minor) storm conditions are likely on 01 - 02 Sep due to recurrent CH HSS activity.



### ***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 |
| 12 August | 67     | 0    | 0                        | A6.2       | 0 | 0      | 0 | 0 | 0       | 0 | 0 | 0 | 0 |
| 13 August | 67     | 0    | 0                        | A6.1       | 0 | 0      | 0 | 0 | 0       | 0 | 0 | 0 | 0 |
| 14 August | 67     | 0    | 0                        | A6.2       | 0 | 0      | 0 | 0 | 0       | 0 | 0 | 0 | 0 |
| 15 August | 67     | 0    | 0                        | A6.2       | 0 | 0      | 0 | 0 | 0       | 0 | 0 | 0 | 0 |
| 16 August | 68     | 0    | 0                        | A6.0       | 0 | 0      | 0 | 0 | 0       | 0 | 0 | 0 | 0 |
| 17 August | 68     | 0    | 0                        | A6.0       | 0 | 0      | 0 | 0 | 0       | 0 | 0 | 0 | 0 |
| 18 August | 68     | 0    | 0                        | A5.9       | 0 | 0      | 0 | 0 | 0       | 0 | 0 | 0 | 0 |

### ***Daily Particle Data***

| Date      | Proton Fluence<br>(protons/cm <sup>2</sup> -day -sr) |         |          | Electron Fluence<br>(electrons/cm <sup>2</sup> -day -sr) |       |        |
|-----------|--|---------|----------|--|-------|--------|
|           | >1 MeV   | >10 MeV | >100 MeV | >0.6 MeV   | >2MeV | >4 MeV |
|           |  |         |          |  |       |        |
| 12 August | 9.5e+05  | 2.1e+04 | 3.8e+03  | 2.0e+08  |       |        |
| 13 August | 8.7e+05  | 2.1e+04 | 3.9e+03  | 2.0e+08  |       |        |
| 14 August | 6.1e+05  | 2.1e+04 | 4.0e+03  | 2.2e+08  |       |        |
| 15 August | 9.7e+05  | 2.0e+04 | 3.5e+03  | 2.4e+08  |       |        |
| 16 August | 6.3e+05  | 2.0e+04 | 3.7e+03  | 1.3e+08  |       |        |
| 17 August | 7.8e+05  | 2.1e+04 | 3.9e+03  | 6.8e+07  |       |        |
| 18 August | 5.6e+05  | 2.1e+04 | 4.0e+03  | 3.2e+07  |       |        |

### ***Daily Geomagnetic Data***

| Date      | Middle Latitude<br>Fredericksburg |                 | High Latitude<br>College |                 | Estimated<br>Planetary |                 |
|-----------|-----------------------------------|-----------------|--------------------------|-----------------|------------------------|-----------------|
|           | A                                 | K-indices       | A                        | K-indices       | A                      | K-indices       |
|           |                                   |                 |                          |                 |                        |                 |
| 12 August | 7                                 | 1-2-1-2-3-2-1-2 | 4                        | 1-2-1-0-1-1-2-1 | 5                      | 1-1-1-2-2-1-1-2 |
| 13 August | 8                                 | 2-2-2-2-3-2-2-2 | 8                        | 2-1-1-4-2-2-1-2 | 7                      | 2-2-1-2-2-2-1-2 |
| 14 August | 5                                 | 1-2-1-1-2-2-1-1 | 4                        | 1-1-2-3-2-0-0-0 | 5                      | 2-1-1-2-1-1-1-1 |
| 15 August | 4                                 | 0-1-1-1-2-1-2-1 | 2                        | 0-1-0-1-2-0-1-1 | 4                      | 0-1-1-1-1-1-1-2 |
| 16 August | 6                                 | 1-1-2-3-2-2-1-1 | 8                        | 1-1-1-5-1-1-0-0 | 5                      | 1-1-2-3-1-1-1-1 |
| 17 August | 6                                 | 1-2-1-1-3-2-1-1 | 2                        | 1-1-1-2-1-0-0-0 | 4                      | 1-2-1-1-1-1-0-1 |
| 18 August | 7                                 | 2-2-2-2-3-2-1-1 | 4                        | 2-2-2-2-0-0-0-0 | 12                     | 3-2-2-1-1-1-1-1 |

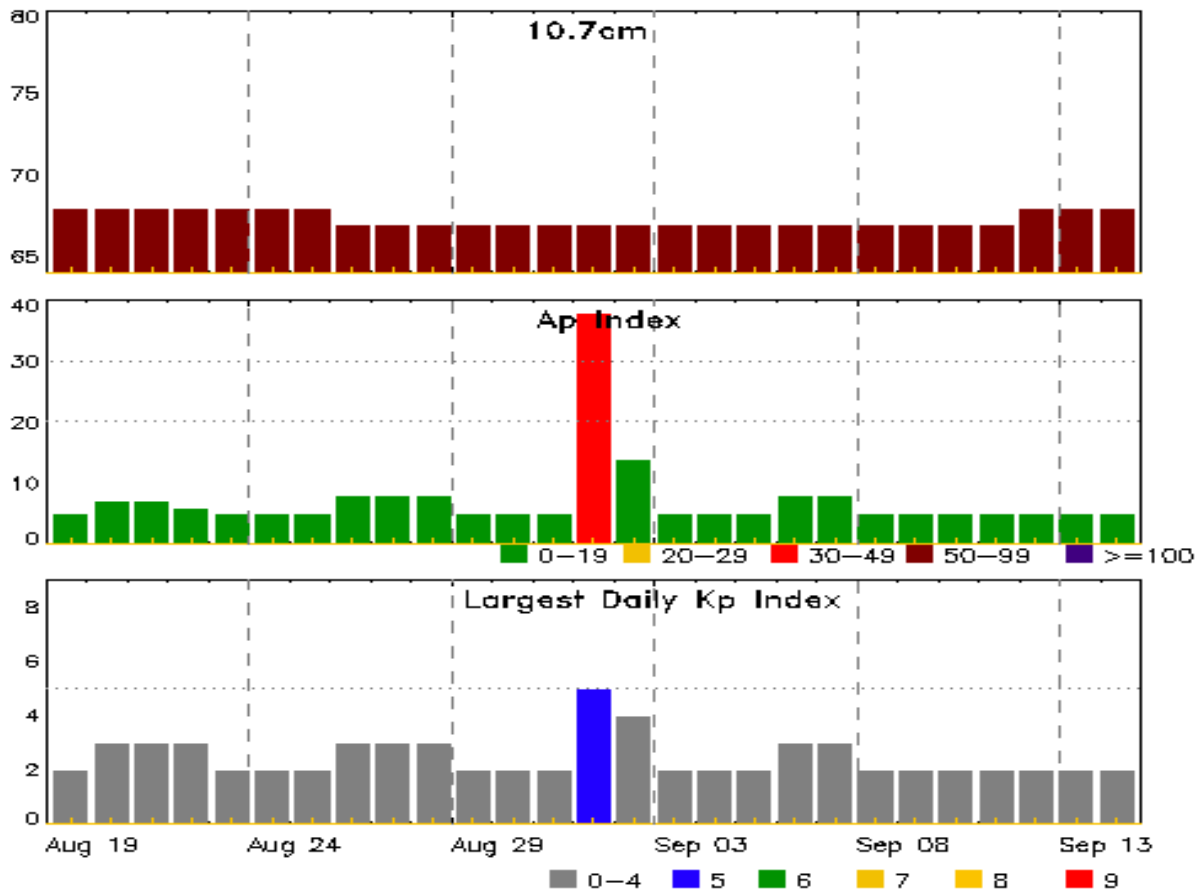


### *Alerts and Warnings Issued*

| <b>Date &amp; Time<br/>of Issue UTC</b> | <b>Type of Alert or Warning</b>                                | <b>Date &amp; Time<br/>of Event UTC</b> |
|---|--|---|
| 12 Aug 1135                             | CONTINUED ALERT:<br>Electron 2MeV Integral Flux $\geq$ 1000pfu | 06/1015                                 |
| 13 Aug 1118                             | CONTINUED ALERT:<br>Electron 2MeV Integral Flux $\geq$ 1000pfu | 06/1015                                 |
| 14 Aug 0859                             | CONTINUED ALERT:<br>Electron 2MeV Integral Flux $\geq$ 1000pfu | 06/1015                                 |
| 15 Aug 0900                             | CONTINUED ALERT:<br>Electron 2MeV Integral Flux $\geq$ 1000pfu | 06/1015                                 |
| 16 Aug 1006                             | CONTINUED ALERT:<br>Electron 2MeV Integral Flux $\geq$ 1000pfu | 06/1015                                 |
| 17 Aug 1350                             | CONTINUED ALERT:<br>Electron 2MeV Integral Flux $\geq$ 1000pfu | 06/1015                                 |



## Twenty-seven Day Outlook



| Date   | Radio Flux<br>10.7cm | Planetary<br>A Index | Largest<br>Kp Index | Date   | Radio Flux<br>10.7cm | Planetary<br>A Index | Largest<br>Kp Index |
|--------|----------------------|----------------------|---------------------|--------|----------------------|----------------------|---------------------|
| 19 Aug | 68                   | 5                    | 2                   | 02 Sep | 67                   | 14                   | 4                   |
| 20     | 68                   | 7                    | 3                   | 03     | 67                   | 5                    | 2                   |
| 21     | 68                   | 7                    | 3                   | 04     | 67                   | 5                    | 2                   |
| 22     | 68                   | 6                    | 3                   | 05     | 67                   | 5                    | 2                   |
| 23     | 68                   | 5                    | 2                   | 06     | 67                   | 8                    | 3                   |
| 24     | 68                   | 5                    | 2                   | 07     | 67                   | 8                    | 3                   |
| 25     | 68                   | 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     | 68                   | 5                    | 2                   |
| 30     | 67                   | 5                    | 2                   | 13     | 68                   | 5                    | 2                   |
| 31     | 67                   | 5                    | 2                   | 14     | 68                   | 5                    | 2                   |
| 01 Sep | 67                   | 38                   | 5                   |        |                      |                      |                     |

### ***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<br>Class | Imp/<br>Brtns | Location<br>Lat CMD | Rgn<br># |
| 18 Aug | 1856  | 1856 | 1856 | A0.0           |               |                     |          |
| 18 Aug | 2234  | 2235 | 2236 | A1.1           |               |                     |          |



## ***Region Summary***

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

### ***Region 2745***

|        |        |     |       |   |     |   |   |   |   |   |   |   |   |   |   |
|--------|--------|-----|-------|---|-----|---|---|---|---|---|---|---|---|---|---|
| 22 Jul | N02W35 | 84  | 0     | 1 | Axx | 1 | A |   |   |   |   |   |   |   |   |
| 23 Jul | N02W50 | 85  | plage |   |     |   |   |   |   |   |   |   |   |   |   |
| 24 Jul | N02W65 | 87  | plage |   |     |   |   |   |   |   |   |   |   |   |   |
| 25 Jul | N02W78 | 87  | plage |   |     |   |   |   |   |   |   |   |   |   |   |
| 05 Aug | S05E08 | 219 | 10    | 1 | Bxo | 2 | B |   |   |   |   |   |   |   |   |
|        |        |     |       |   |     |   |   | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Died on Disk.

Absolute heliographic longitude: 219

### ***Region 2746***

|        |        |     |       |  |  |  |  |   |   |   |   |   |   |   |   |
|--------|--------|-----|-------|--|--|--|--|---|---|---|---|---|---|---|---|
| 06 Aug | S05W07 | 217 | plage |  |  |  |  |   |   |   |   |   |   |   |   |
| 07 Aug | S05W22 | 219 | plage |  |  |  |  |   |   |   |   |   |   |   |   |
| 08 Aug | S05W37 | 221 | plage |  |  |  |  |   |   |   |   |   |   |   |   |
| 09 Aug | S05W52 | 223 | plage |  |  |  |  |   |   |   |   |   |   |   |   |
| 10 Aug | S05W67 | 224 | plage |  |  |  |  |   |   |   |   |   |   |   |   |
| 11 Aug | S05W82 | 226 | plage |  |  |  |  |   |   |   |   |   |   |   |   |
|        |        |     |       |  |  |  |  | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Crossed West Limb.

Absolute heliographic longitude: 217

### ***Region 2747***

|        |        |     |       |  |     |   |   |   |   |   |   |   |   |   |   |
|--------|--------|-----|-------|--|-----|---|---|---|---|---|---|---|---|---|---|
| 06 Aug | N06E11 | 199 | 0     |  | Axx | 1 | A |   |   |   |   |   |   |   |   |
| 07 Aug | N06W03 | 199 | plage |  |     |   |   |   |   |   |   |   |   |   |   |
| 08 Aug | N06W18 | 202 | plage |  |     |   |   |   |   |   |   |   |   |   |   |
| 09 Aug | N06W33 | 204 | plage |  |     |   |   |   |   |   |   |   |   |   |   |
| 10 Aug | N06W48 | 205 | plage |  |     |   |   |   |   |   |   |   |   |   |   |
| 11 Aug | N06W63 | 207 | plage |  |     |   |   |   |   |   |   |   |   |   |   |
| 12 Aug | N06W78 | 209 | plage |  |     |   |   |   |   |   |   |   |   |   |   |
| 13 Aug | N06W93 | 211 | plage |  |     |   |   |   |   |   |   |   |   |   |   |
|        |        |     |       |  |     |   |   | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Crossed West Limb.

Absolute heliographic longitude: 199

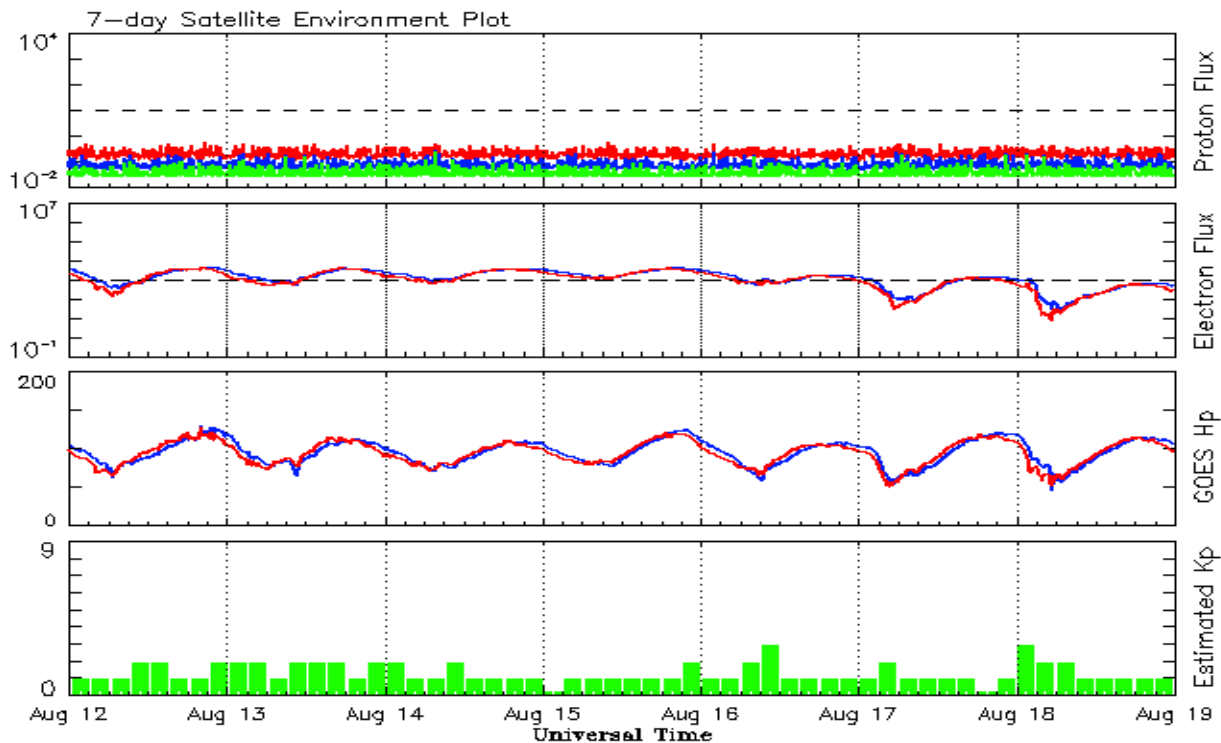


**Recent Solar Indices (preliminary)**  
**Observed monthly mean values**

| 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> |                 |      |        |               |      |            |        |             |        |
| 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   | 9.0           | 3.2  | 71.6       | 70.0   | 6           | 6.8    |
| 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           |        |
| July        | 1.6             | 0.5  | 0.31   |               |      | 67.1       |        | 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 12 August 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.

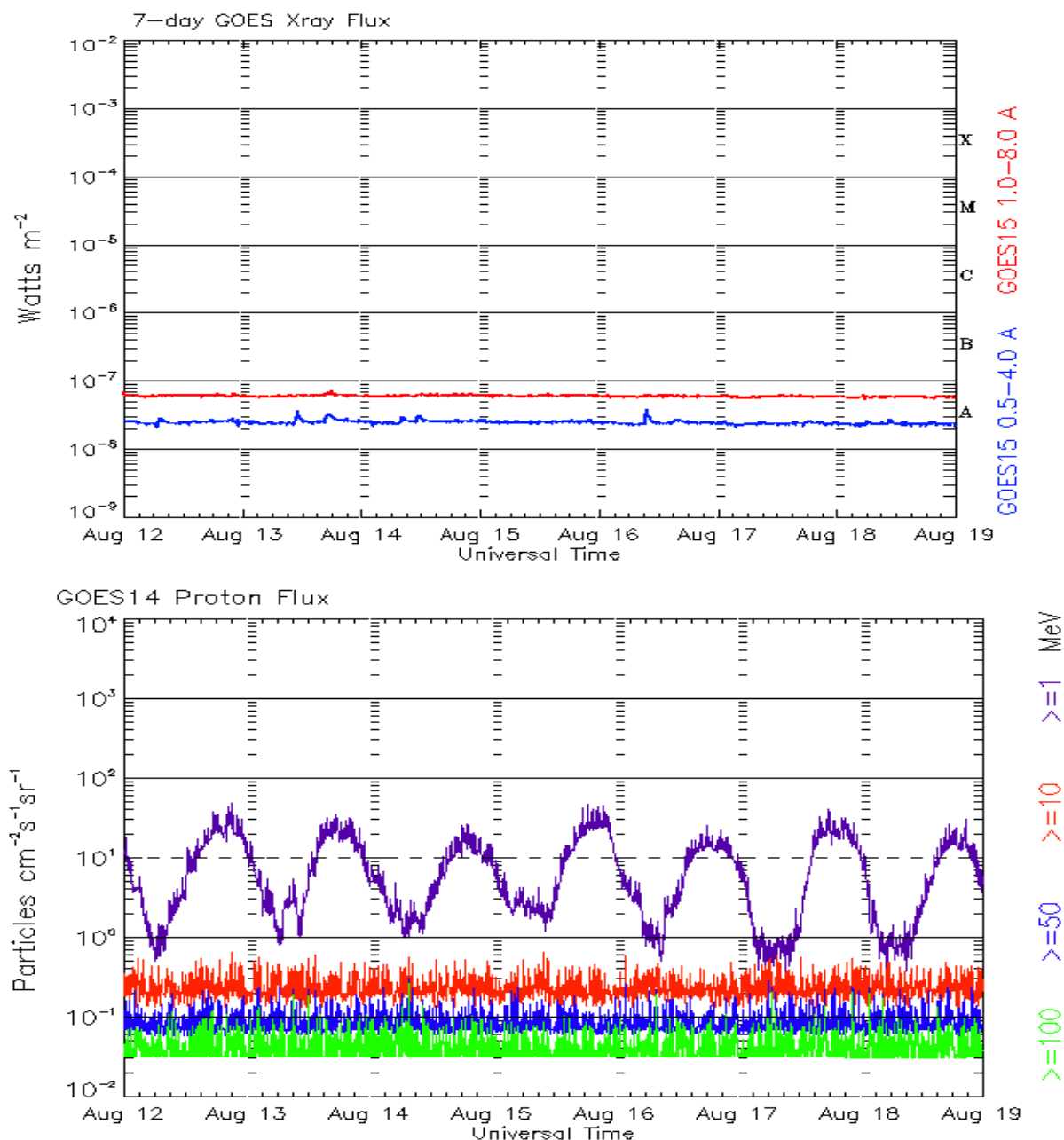
The electron flux plot contains the five-minute averaged integral electron flux (electrons/cm<sup>2</sup>-sec -sr) with energies greater than 2 MeV by the SWPC Primary GOES satellite.

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 12 August 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 intergral 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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NOAA / National Weather Service  
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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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