

**Space Weather Highlights**  
**04 November - 10 November 2019**

**SWPC PRF 2306**  
**11 November 2019**

Solar activity was very low. The solar disk was spotless throughout the period. No Earth-directed CMEs were observed.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit reached high levels on 04-06, 08 Nov and moderate levels on 07, 09-10 Nov.

Geomagnetic field activity reached unsettled levels on 06 Nov and quiet levels throughout the remainder of the period, under a nominal solar wind regime.

**Space Weather Outlook**  
**11 November - 07 December 2019**

Solar activity is expected to be at very low levels 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 12-17, 21-30 Nov and 01-03 Dec, with moderate levels on 11, 18-20 Nov and 04-07 Dec, in response to CH HSS influence.

Geomagnetic field activity is expected to reach G1 (Minor) storm levels on 21-22 Nov, with active levels on 11, 20, 23-24 Nov, due to recurrent CH HSS activity. Quiet to unsettled conditions are anticipated throughout the remainder of the outlook period.



### *Daily Solar Data*

| Date        | Radio Flux<br>10.7cm | Sun spot<br>No. | Sunspot Area<br>(10 <sup>-6</sup> hemi.) | X-ray Background<br>Flux | Flares |   |   |         |   |   |   |   |
|-------------|----------------------|-----------------|--|--------------------------|--------|---|---|---------|---|---|---|---|
|             |                      |                 |  |                          | X-ray  |   |   | Optical |   |   |   |   |
|             |                      |                 |  |                          | C      | M | X | S       | 1 | 2 | 3 | 4 |
| 04 November | 71                   | 0               | 0  | A6.6                     | 0      | 0 | 0 | 0       | 0 | 0 | 0 | 0 |
| 05 November | 70                   | 0               | 0  | A6.7                     | 0      | 0 | 0 | 0       | 0 | 0 | 0 | 0 |
| 06 November | 69                   | 0               | 0  | A6.7                     | 0      | 0 | 0 | 0       | 0 | 0 | 0 | 0 |
| 07 November | 70                   | 0               | 0  | A6.7                     | 0      | 0 | 0 | 0       | 0 | 0 | 0 | 0 |
| 08 November | 70                   | 0               | 0  | A6.9                     | 0      | 0 | 0 | 0       | 0 | 0 | 0 | 0 |
| 09 November | 70                   | 0               | 0  | A6.9                     | 0      | 0 | 0 | 0       | 0 | 0 | 0 | 0 |
| 10 November | 71                   | 0               | 0  | A7.0                     | 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  |
|             | 04 November  |         | 3.9e+05  | 2.2e+04  | 3.8e+03 |         |
| 05 November |  | 3.9e+05 | 2.2e+04  | 3.9e+03  |         | 7.2e+07 |
| 06 November |  | 4.1e+05 | 2.2e+04  | 3.8e+03  |         | 4.6e+07 |
| 07 November |  | 3.0e+05 | 2.1e+04  | 3.7e+03  |         | 4.1e+07 |
| 08 November |  | 4.6e+05 | 2.2e+04  | 3.9e+03  |         | 4.9e+07 |
| 09 November |  | 4.0e+05 | 2.2e+04  | 4.0e+03  |         | 4.1e+07 |
| 10 November |  | 4.0e+05 | 2.2e+04  | 4.0e+03  |         | 3.9e+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       |
|             | 04 November                       | 4               | 1-1-2-1-2-1-1-0          | 0               | 0-0-0-0-0-0-0-0        | 4               |
| 05 November | 2                                 | 1-0-0-1-1-1-1-1 | 2                        | 0-0-0-0-2-2-1-0 | 5                      | 2-1-1-1-1-2-2-2 |
| 06 November | 4                                 | 1-1-0-0-2-1-1-3 | 0                        | 0-0-0-0-0-0-0-0 | 5                      | 2-1-0-1-2-1-1-3 |
| 07 November | 3                                 | 2-1-1-1-1-1-1-0 | 0                        | 0-0-0-0-0-0-0-0 | 5                      | 2-2-1-1-0-1-1-1 |
| 08 November | 2                                 | 0-1-0-1-1-1-1-0 | 0                        | 0-0-0-0-0-0-0-0 | 3                      | 1-0-0-1-1-1-1-1 |
| 09 November | 3                                 | 2-1-0-0-1-1-1-1 | 1                        | 0-0-0-1-1-0-0-0 | 4                      | 2-2-0-0-1-1-1-2 |
| 10 November | 2                                 | 0-0-2-1-0-1-1-0 | 0                        | 0-0-2-1-1-0-0-0 | 5                      | 1-1-2-1-1-0-0-0 |

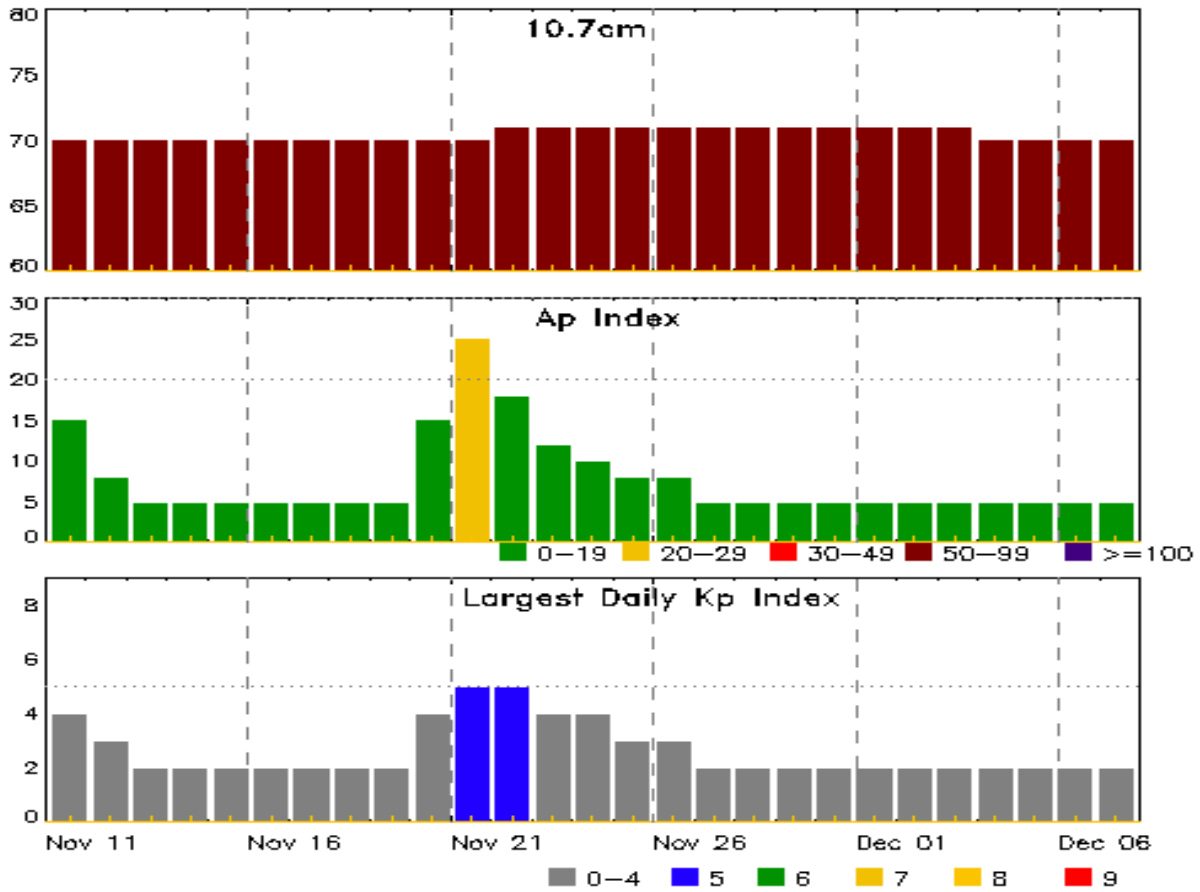


### *Alerts and Warnings Issued*

| <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> |
|---|--|---|
| 04 Nov 1140                             | CONTINUED ALERT:<br>Electron 2MeV Integral Flux $\geq$ 1000pfu | 01/1250                                 |
| 05 Nov 1236                             | CONTINUED ALERT:<br>Electron 2MeV Integral Flux $\geq$ 1000pfu | 01/1250                                 |
| 06 Nov 1516                             | CONTINUED ALERT:<br>Electron 2MeV Integral Flux $\geq$ 1000pfu | 01/1250                                 |
| 08 Nov 1937                             | ALERT: Electron 2MeV Integral Flux $\geq$ 1000pfu              | 08/1750                                 |



## 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 |
|--------|----------------------|----------------------|---------------------|--------|----------------------|----------------------|---------------------|
| 11 Nov | 70                   | 15                   | 4                   | 25 Nov | 71                   | 8                    | 3                   |
| 12     | 70                   | 8                    | 3                   | 26     | 71                   | 8                    | 3                   |
| 13     | 70                   | 5                    | 2                   | 27     | 71                   | 5                    | 2                   |
| 14     | 70                   | 5                    | 2                   | 28     | 71                   | 5                    | 2                   |
| 15     | 70                   | 5                    | 2                   | 29     | 71                   | 5                    | 2                   |
| 16     | 70                   | 5                    | 2                   | 30     | 71                   | 5                    | 2                   |
| 17     | 70                   | 5                    | 2                   | 01 Dec | 71                   | 5                    | 2                   |
| 18     | 70                   | 5                    | 2                   | 02     | 71                   | 5                    | 2                   |
| 19     | 70                   | 5                    | 2                   | 03     | 71                   | 5                    | 2                   |
| 20     | 70                   | 15                   | 4                   | 04     | 70                   | 5                    | 2                   |
| 21     | 70                   | 25                   | 5                   | 05     | 70                   | 5                    | 2                   |
| 22     | 71                   | 18                   | 5                   | 06     | 70                   | 5                    | 2                   |
| 23     | 71                   | 12                   | 4                   | 07     | 70                   | 5                    | 2                   |
| 24     | 71                   | 10                   | 4                   |        |                      |                      |                     |



### ***Energetic Events***

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

**No Events Observed**

### ***Flare List***

| Date   | Time  |      |      | X-ray Class | Optical    |                  |       |
|--------|-------|------|------|-------------|------------|------------------|-------|
|        | Begin | Max  | End  |             | Imp/ Brtns | Location Lat CMD | Rgn # |
| 05 Nov | 0558  | 0611 | 0624 | B1.3        |            |                  |       |



## *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 |

### *Region 2750*

|        |        |     |       |   |     |   |   |  |   |   |   |   |   |   |   |   |   |
|--------|--------|-----|-------|---|-----|---|---|--|---|---|---|---|---|---|---|---|---|
| 01 Nov | S28E25 | 116 | 10    | 1 | Axx | 1 | A |  |   |   |   |   |   |   |   |   |   |
| 02 Nov | S28E11 | 117 | plage |   |     |   |   |  |   |   |   |   |   |   |   |   |   |
| 03 Nov | S28W03 | 118 | plage |   |     |   |   |  |   |   |   |   |   |   |   |   |   |
| 04 Nov | S28W17 | 119 | plage |   |     |   |   |  |   |   |   |   |   |   |   |   |   |
| 05 Nov | S28W31 | 120 | plage |   |     |   |   |  |   |   |   |   |   |   |   |   |   |
| 06 Nov | S28W45 | 121 | plage |   |     |   |   |  |   |   |   |   |   |   |   |   |   |
| 07 Nov | S28W59 | 121 | plage |   |     |   |   |  |   |   |   |   |   |   |   |   |   |
| 08 Nov | S28W73 | 122 | plage |   |     |   |   |  |   |   |   |   |   |   |   |   |   |
| 09 Nov | S28W87 | 123 | plage |   |     |   |   |  |   |   |   |   |   |   |   |   |   |
|        |        |     |       |   |     |   |   |  | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Crossed West Limb.

Absolute heliographic longitude: 118

### *Region 2751*

|        |        |     |       |   |     |   |   |  |   |   |   |   |   |   |   |   |   |
|--------|--------|-----|-------|---|-----|---|---|--|---|---|---|---|---|---|---|---|---|
| 02 Nov | N05W26 | 154 | 10    | 1 | Bxo | 3 | B |  |   |   |   |   |   |   |   |   |   |
| 03 Nov | N06W41 | 156 | plage |   |     |   |   |  |   |   |   |   |   |   |   |   |   |
| 04 Nov | N06W56 | 158 | plage |   |     |   |   |  |   |   |   |   |   |   |   |   |   |
| 05 Nov | N06W71 | 160 | plage |   |     |   |   |  |   |   |   |   |   |   |   |   |   |
| 06 Nov | N06W86 | 162 | plage |   |     |   |   |  |   |   |   |   |   |   |   |   |   |
|        |        |     |       |   |     |   |   |  | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Crossed West Limb.

Absolute heliographic longitude: 154

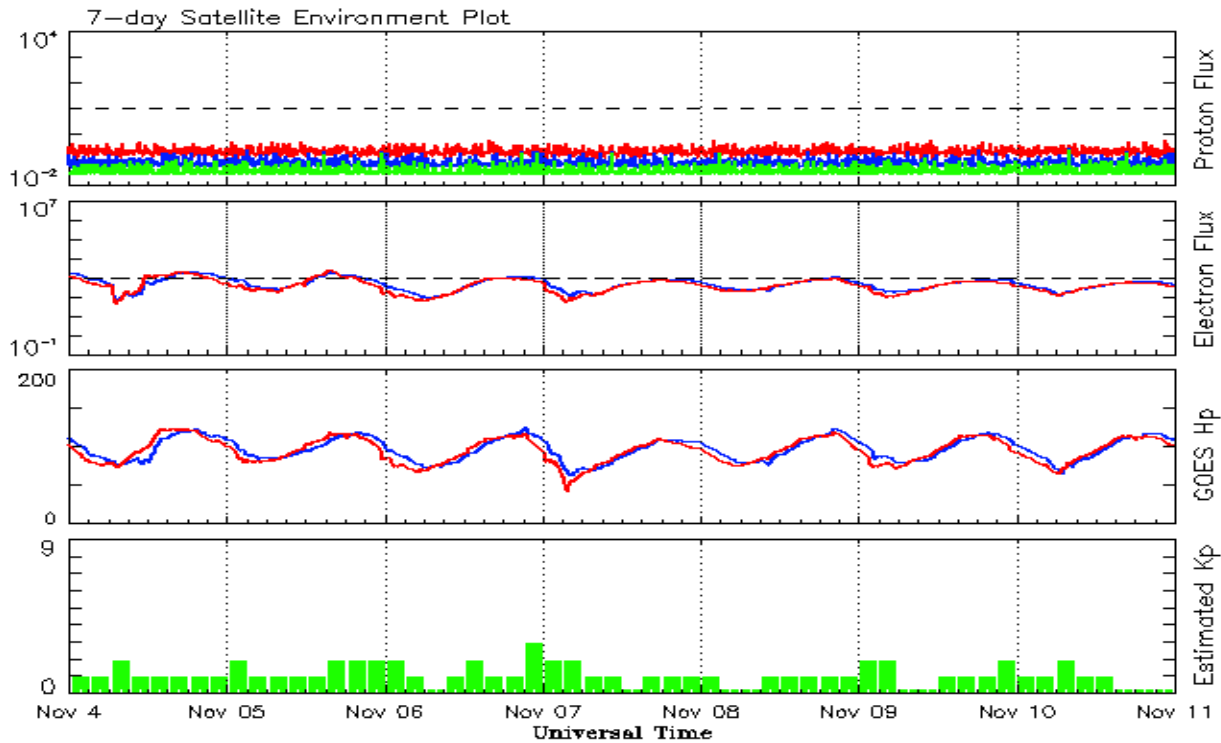


**Recent Solar Indices (preliminary)**  
**Observed monthly mean values**

| 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> |                 |     |        |               |     |            |        |             |        |  |
| 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 |        | 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   |               |     | 71.3       |        | 7           |        |  |
| June        | 11.6            | 0.7 | 0.06   |               |     | 68.1       |        | 5           |        |  |
| July        | 1.6             | 0.5 | 0.31   |               |     | 67.1       |        | 6           |        |  |
| August      | 2.5             | 0.4 | 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           |        |  |

**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 04 November 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.

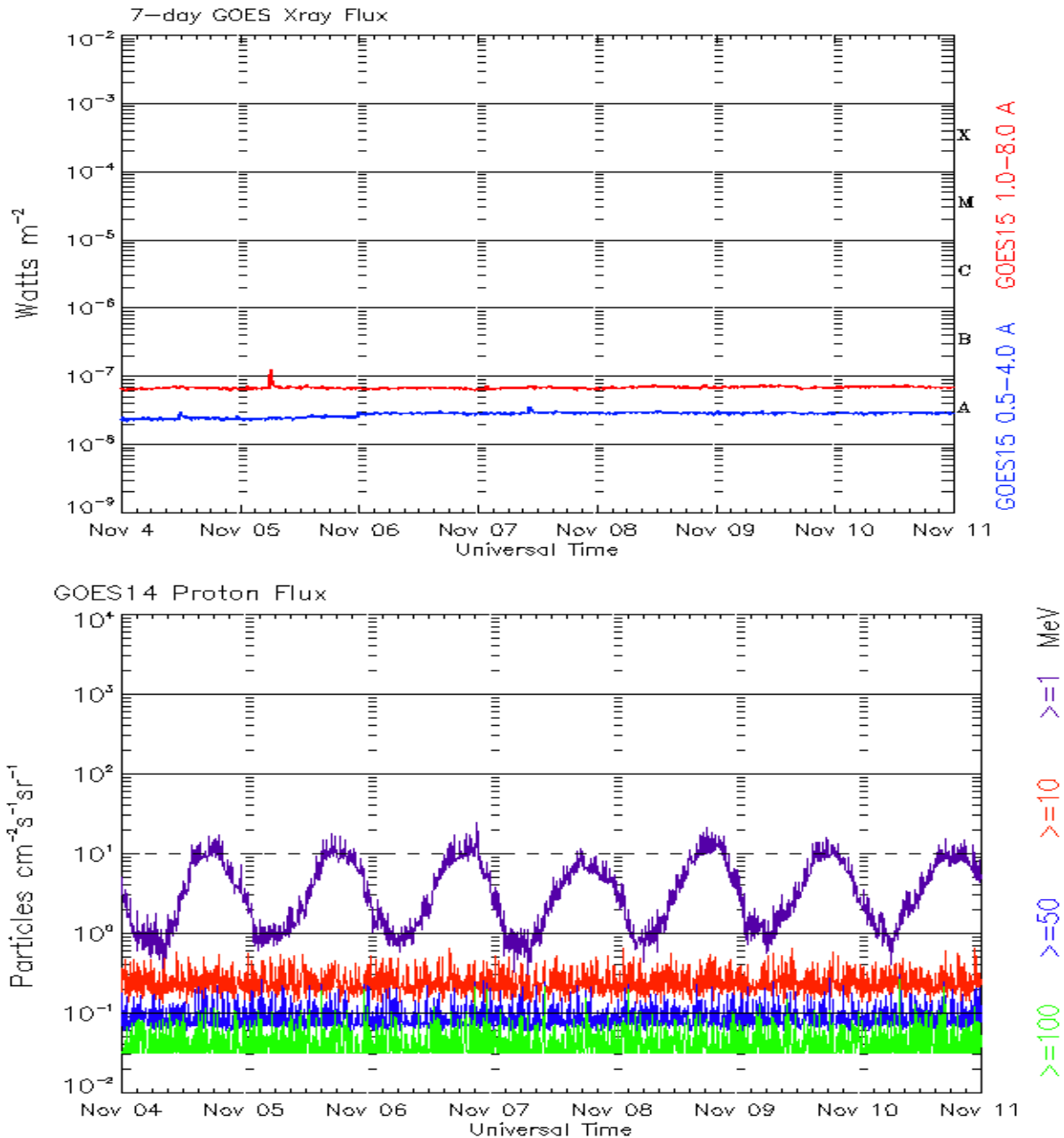
The Hp plot contains the five minute averaged Hp magnetic field component in nanoteslas (nT) as by the SWPC Primary GOES satellite. The Hp component is parallel to the spin axis of the satellite, which is nearly parallel to the Earth's rotation axis.

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 04 November 2019*

The x-ray plots contains five-minute averages x-ray flux (Watt/m<sup>2</sup>) 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<sup>2</sup> -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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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

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[http://spaceweather.gov/weekly/Usr\\_guide.pdf](http://spaceweather.gov/weekly/Usr_guide.pdf) -- User Guide

