

Space Weather Highlights
12 June - 18 June 2017

SWPC PRF 2181
19 June 2017

Solar activity was very low throughout the period. Regions 2661 (N06, L=211, class/area=Dao/200 on 02 Jun) and 2663 (N12, L=095, class/area=Dso/100 on 17 Jun) were the most prominent regions this period, but only produced low and mid-level B-class flare activity. No Earth-directed CMEs were observed during the period.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit was at normal levels on 12-16 Jun with moderate levels observed on 17-18 Jun.

Geomagnetic field activity reached G1 (Minor) geomagnetic storm levels on 16 Jun and active levels on 17 Jun due to the influence of a recurrent negative polarity CH HSS. Geomagnetic field activity was at quiet or quiet to unsettled levels throughout the remainder of the period.

Space Weather Outlook
19 June - 15 July 2017

Solar activity is expected to be very low throughout the outlook period with a slight chance for C-class flare activity.

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 19-22 and 25-27 Jun with normal and moderate flux levels expected throughout the remainder of the period.

Geomagnetic field activity is likely to reach G1 (Minor) geomagnetic storm levels on 13 Jul with active levels likely on 23-24 Jun, and 14 Jul due to the influence of multiple, recurrent CH HSSs. Generally quiet and quiet to unsettled activity is expected throughout the remainder of the period as a nominal solar regime prevails.



Daily Solar Data

| Date | Radio Flux 10.7cm | Sun spot No. | Sunspot Area (10 ⁻⁶ hemi.) | X-ray Background Flux | | Flares | | | | | | |
|---------|-------------------------|--------------------|---|-----------------------------|---|--------|---|---|---------|---|---|---|
| | | | | | | X-ray | | | Optical | | | |
| | | | | | | C | M | X | S | 1 | 2 | 3 |
| 12 June | 75 | 0 | 0 | A7.2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 13 June | 75 | 11 | 170 | A6.2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 14 June | 74 | 11 | 160 | A6.3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15 June | 77 | 28 | 150 | A7.0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 16 June | 74 | 28 | 140 | A5.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 17 June | 75 | 28 | 170 | A5.6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 18 June | 75 | 27 | 160 | A5.9 | 0 | 0 | 0 | 1 | 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 |
| | 12 June | 5.5e+05 | 1.7e+04 | 3.6e+03 | 8.8e+05 | |
| 13 June | 3.7e+05 | 1.7e+04 | 3.5e+03 | 2.0e+06 | | |
| 14 June | 4.4e+05 | 1.7e+04 | 3.5e+03 | 3.7e+06 | | |
| 15 June | 8.3e+05 | 1.8e+04 | 3.6e+03 | 5.6e+06 | | |
| 16 June | 8.0e+05 | 1.7e+04 | 3.6e+03 | 1.0e+06 | | |
| 17 June | 9.0e+05 | 1.6e+04 | 3.4e+03 | 1.5e+07 | | |
| 18 June | 4.7e+05 | 1.6e+04 | 3.4e+03 | 2.2e+07 | | |

Daily Geomagnetic Data

| Date | Middle Latitude Fredericksburg | | High Latitude College | | Estimated Planetary | |
|---------|-----------------------------------|-----------------|--------------------------|-----------------|------------------------|-----------------|
| | A | K-indices | A | K-indices | A | K-indices |
| | 12 June | 6 | 1-1-1-1-3-2-2-2 | 9 | 1-2-1-1-4-3-2-2 | 8 |
| 13 June | 6 | 2-2-1-3-2-1-1-1 | 7 | 2-1-1-4-1-2-1-1 | 8 | 3-2-1-3-1-2-2-1 |
| 14 June | 6 | 1-1-2-2-2-2-1-2 | 7 | 0-2-1-3-4-1-0-0 | 5 | 0-1-2-2-2-2-1-1 |
| 15 June | 5 | 2-1-1-2-2-2-1-0 | 3 | 1-1-0-2-0-0-2-0 | 4 | 2-1-1-1-1-1-1-0 |
| 16 June | 18 | 2-2-4-3-4-3-3-4 | 30 | 0-2-4-5-6-5-3-3 | 25 | 1-2-4-3-5-4-3-5 |
| 17 June | 12 | 3-4-1-2-2-2-3-3 | 17 | 4-4-2-3-4-3-2-2 | 15 | 4-4-2-2-2-2-4-3 |
| 18 June | 9 | 3-2-1-2-3-2-2-2 | 20 | 4-4-3-5-4-2-1-2 | 18 | 3-3-2-2-3-2-2-2 |

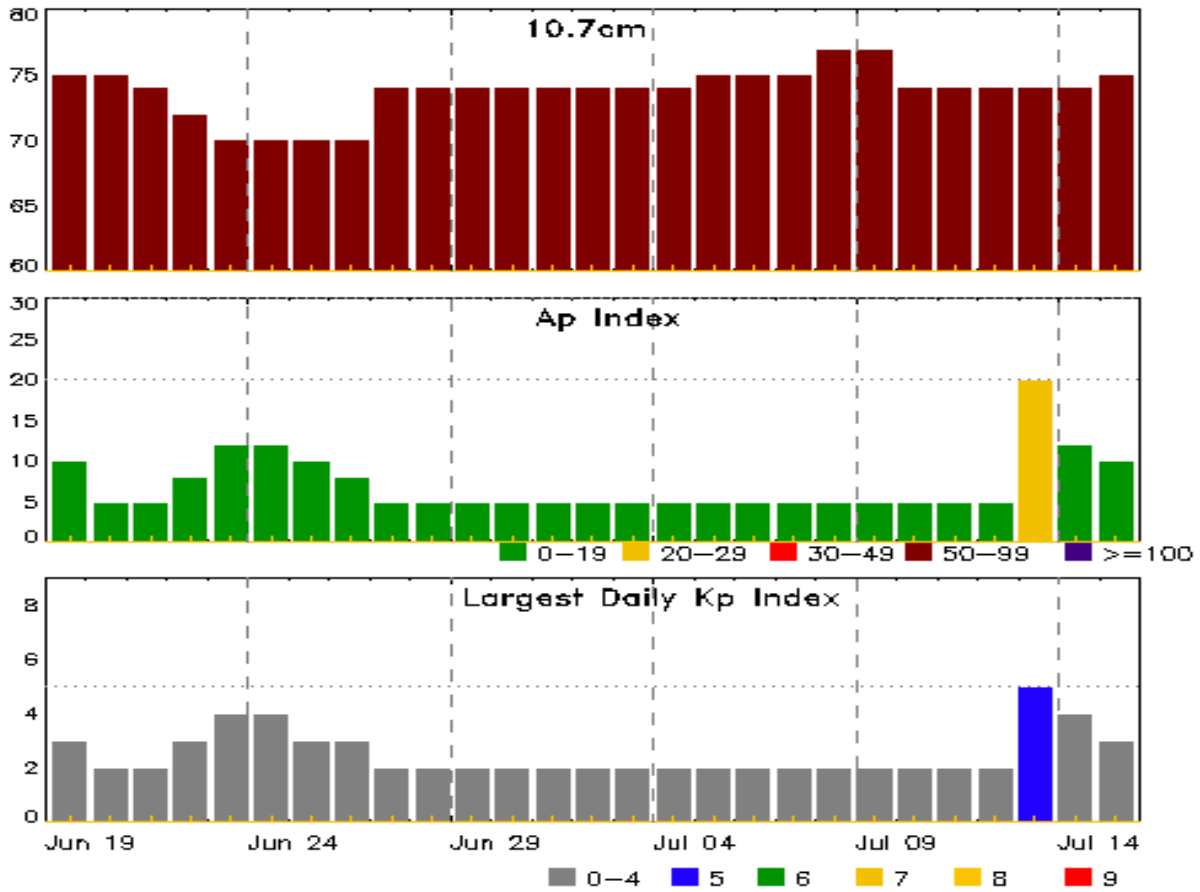


Alerts and Warnings Issued

| Date & Time of Issue UTC | Type of Alert or Warning | Date & Time of Event UTC |
|---|--|---|
| 12 Jun 0544 | EXTENDED WARNING: Geomagnetic K = 4 | 11/1434 - 12/1400 |
| 15 Jun 1934 | WATCH: Geomagnetic Storm Category G1 predicted | |
| 16 Jun 0324 | WARNING: Geomagnetic K = 4 | 16/0323 - 2100 |
| 16 Jun 0843 | WARNING: Geomagnetic K = 5 | 16/0843 - 1500 |
| 16 Jun 0844 | ALERT: Geomagnetic K = 4 | 16/0844 |
| 16 Jun 1456 | EXTENDED WARNING: Geomagnetic K = 5 | 16/0843 - 2359 |
| 16 Jun 1456 | EXTENDED WARNING: Geomagnetic K = 4 | 16/0323 - 2359 |
| 16 Jun 1500 | ALERT: Geomagnetic K = 5 | 16/1458 |
| 16 Jun 2117 | EXTENDED WARNING: Geomagnetic K = 5 | 16/0843 - 17/0900 |
| 16 Jun 2128 | EXTENDED WARNING: Geomagnetic K = 4 | 16/0323 - 17/1200 |
| 16 Jun 2321 | ALERT: Geomagnetic K = 5 | 16/2320 |
| 17 Jun 2051 | WARNING: Geomagnetic K = 4 | 17/2051 - 18/0300 |
| 17 Jun 2055 | ALERT: Geomagnetic K = 4 | 17/2055 |
| 18 Jun 0235 | EXTENDED WARNING: Geomagnetic K = 4 | 17/2051 - 18/1400 |



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 |
|--------|----------------------|----------------------|---------------------|--------|----------------------|----------------------|---------------------|
| 19 Jun | 75 | 10 | 3 | 03 Jul | 74 | 5 | 2 |
| 20 | 75 | 5 | 2 | 04 | 74 | 5 | 2 |
| 21 | 74 | 5 | 2 | 05 | 75 | 5 | 2 |
| 22 | 72 | 8 | 3 | 06 | 75 | 5 | 2 |
| 23 | 70 | 12 | 4 | 07 | 75 | 5 | 2 |
| 24 | 70 | 12 | 4 | 08 | 77 | 5 | 2 |
| 25 | 70 | 10 | 3 | 09 | 77 | 5 | 2 |
| 26 | 70 | 8 | 3 | 10 | 74 | 5 | 2 |
| 27 | 74 | 5 | 2 | 11 | 74 | 5 | 2 |
| 28 | 74 | 5 | 2 | 12 | 74 | 5 | 2 |
| 29 | 74 | 5 | 2 | 13 | 74 | 20 | 5 |
| 30 | 74 | 5 | 2 | 14 | 74 | 12 | 4 |
| 01 Jul | 74 | 5 | 2 | 15 | 75 | 10 | 3 |
| 02 | 74 | 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 # | Radio Flux 245 | Radio Flux 2695 | Intensity II |

No Events Observed

Flare List

| Date | Time | | | X-ray Class | Imp/ Brtns | Location Lat CMD | Rgn # |
|--------|-------|------|------|-------------|------------|------------------|-------|
| | Begin | Max | End | | | | |
| 13 Jun | 1845 | 1940 | 2022 | B3.8 | | | 2661 |
| 14 Jun | 1859 | 1907 | 1912 | B1.9 | | | |
| 15 Jun | 0515 | 0518 | 0520 | B1.6 | | | 2663 |
| 15 Jun | 0626 | 0629 | 0631 | B1.4 | | | 2663 |
| 15 Jun | 0730 | 0733 | 0735 | B1.8 | | | 2663 |
| 15 Jun | 0903 | 0906 | 0908 | B2.1 | | | 2663 |
| 15 Jun | 1657 | 1700 | 1706 | B2.9 | SF | N14E06 | 2663 |
| 17 Jun | 0251 | 0257 | 0301 | B1.4 | | | 2663 |
| 18 Jun | 0910 | 0921 | 0932 | B2.5 | | | 2663 |
| 18 Jun | 1235 | 1240 | 1259 | B1.4 | | | 2663 |
| 18 Jun | 1333 | 1344 | 1354 | B2.9 | SF | N14W38 | 2663 |
| 18 Jun | 2130 | 2140 | 2148 | B2.1 | | | 2663 |



Region Summary

| Date | Location | | Sunspot Characteristics | | | | | Flares | | | | | | | | | | | | | | | |
|--------------------|----------|-----------|----------------------------|----------------|------------|------------|-----------|--------|---|---|---------|----|---|---|---|---|--|--|--|--|--|--|--|
| | Lat CMD | Helio Lon | Area 10 ⁶ hemi. | Extent (helio) | Spot Class | Spot Count | Mag Class | X-ray | | | Optical | | | | | | | | | | | | |
| | | | | | | | | C | M | X | S | 1 | 2 | 3 | 4 | | | | | | | | |
| Region 2661 | | | | | | | | | | | | | | | | | | | | | | | |
| 31 May | N06E79 | 213 | 30 | 4 | Hrx | 1 | A | 3 | | | | 3 | | | | | | | | | | | |
| 01 Jun | N05E64 | 214 | 60 | 4 | Cai | 8 | B | 6 | | | | 8 | | | | | | | | | | | |
| 02 Jun | N06E54 | 211 | 200 | 10 | Dao | 9 | B | 3 | | | | 10 | | | | | | | | | | | |
| 03 Jun | N06E39 | 213 | 180 | 12 | Eao | 12 | BG | 3 | | | | 1 | | | | | | | | | | | |
| 04 Jun | N06E26 | 213 | 130 | 12 | Eao | 13 | B | | | | | | | | | | | | | | | | |
| 05 Jun | N06E13 | 211 | 170 | 12 | Eao | 12 | BD | 1 | | | | 4 | | | | | | | | | | | |
| 06 Jun | N06W01 | 213 | 130 | 12 | Cao | 8 | B | | | | | 1 | | | | | | | | | | | |
| 07 Jun | N07W11 | 210 | 40 | 4 | Hax | 3 | A | 1 | | | | 1 | | | | | | | | | | | |
| 08 Jun | N07W22 | 207 | 10 | 2 | Axx | 2 | A | | | | | 1 | | | | | | | | | | | |
| 09 Jun | N07W37 | 210 | plage | | | | | | | | | | | | | | | | | | | | |
| 10 Jun | N07W52 | 212 | plage | | | | | | | | | | | | | | | | | | | | |
| 11 Jun | N07W67 | 213 | plage | | | | | | | | | | | | | | | | | | | | |
| 12 Jun | N07W82 | 215 | plage | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | 17 | 0 | 0 | 29 | 0 | 0 | 0 | 0 | 0 | | | | | | | |

Crossed West Limb.

Absolute heliographic longitude: 213

Region 2662

| | | | | | | | | | | | | | | | | | | | | | |
|--------|--------|----|-----|---|-----|---|---|---|---|---|---|---|---|---|---|---|---|---|--|--|--|
| 13 Jun | N12E70 | 50 | 170 | 2 | Hsx | 1 | A | | | | | | | | | | | | | | |
| 14 Jun | N12E55 | 51 | 160 | 2 | Hsx | 1 | A | | | | | | | | | | | | | | |
| 15 Jun | N12E42 | 50 | 100 | 2 | Hsx | 1 | A | | | | | | | | | | | | | | |
| 16 Jun | N12E28 | 51 | 50 | 1 | Hsx | 1 | A | | | | | | | | | | | | | | |
| 17 Jun | N11E15 | 52 | 70 | 2 | Hsx | 1 | A | | | | | | | | | | | | | | |
| 18 Jun | N12E02 | 52 | 80 | 2 | Hsx | 1 | A | | | | | | | | | | | | | | |
| | | | | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |

Still on Disk.

Absolute heliographic longitude: 52

Region 2663

| | | | | | | | | | | | | | | | | | | | | | |
|--------|--------|----|-----|---|-----|---|----|---|---|---|---|---|---|---|---|---|--|--|--|--|--|
| 15 Jun | N14W00 | 92 | 50 | 7 | Dso | 7 | BG | | | | | 1 | | | | | | | | | |
| 16 Jun | N13W14 | 93 | 90 | 8 | Dso | 7 | B | | | | | | | | | | | | | | |
| 17 Jun | N12W28 | 95 | 100 | 9 | Dso | 7 | B | | | | | | | | | | | | | | |
| 18 Jun | N12W41 | 95 | 80 | 9 | Dso | 6 | B | | | | | 1 | | | | | | | | | |
| | | | | | | | | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | | | | | |

Still on Disk.

Absolute heliographic longitude: 92

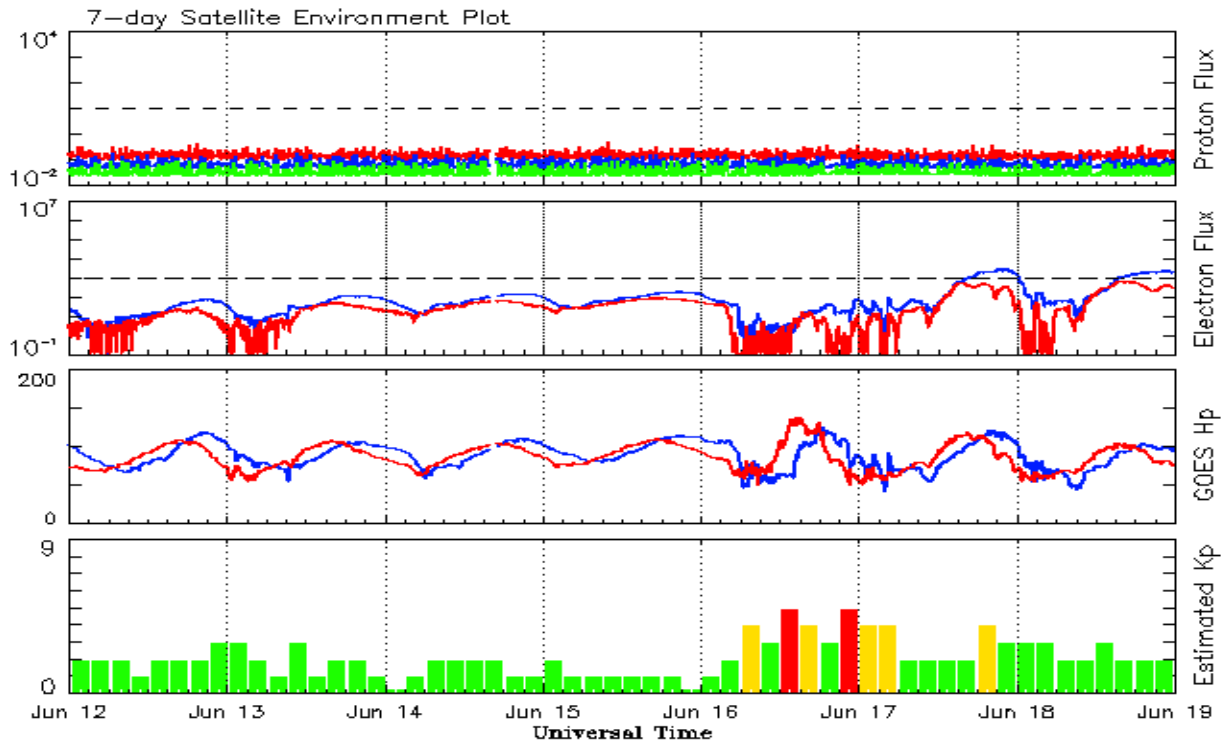


Recent Solar Indices (preliminary)
Observed monthly mean values

| 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 |
| 2015 | | | | | | | | | |
| June | 77.3 | 39.9 | 0.53 | 73.1 | 43.3 | 123.2 | 119.5 | 14 | 13.0 |
| July | 68.4 | 39.5 | 0.58 | 68.2 | 41.0 | 107.0 | 116.0 | 10 | 13.1 |
| August | 61.6 | 38.6 | 0.63 | 65.5 | 39.8 | 106.2 | 113.3 | 16 | 13.1 |
| September | 72.5 | 47.2 | 0.65 | 64.0 | 39.5 | 102.1 | 110.8 | 16 | 12.8 |
| October | 59.5 | 38.2 | 0.62 | 61.8 | 38.6 | 104.1 | 107.9 | 15 | 12.5 |
| November | 61.8 | 37.3 | 0.61 | 59.0 | 36.7 | 109.6 | 105.3 | 13 | 12.5 |
| December | 54.1 | 34.8 | 0.64 | 55.1 | 34.7 | 112.8 | 102.5 | 15 | 12.5 |
| 2016 | | | | | | | | | |
| January | 50.4 | 34.2 | 0.67 | 51.4 | 32.6 | 103.5 | 99.9 | 10 | 12.3 |
| February | 56.0 | 33.8 | 0.61 | 49.6 | 31.5 | 103.5 | 98.1 | 10 | 12.0 |
| March | 40.9 | 32.5 | 0.80 | 47.7 | 30.2 | 91.6 | 96.6 | 11 | 11.8 |
| April | 39.2 | 22.7 | 0.58 | 45.0 | 28.7 | 93.4 | 95.3 | 10 | 11.8 |
| May | 48.9 | 30.9 | 0.64 | 42.1 | 26.9 | 93.1 | 93.2 | 12 | 11.7 |
| June | 19.3 | 12.3 | 0.65 | 39.0 | 24.9 | 81.9 | 90.4 | 9 | 11.4 |
| July | 36.8 | 19.4 | 0.53 | 36.5 | 23.1 | 85.9 | 87.7 | 10 | 11.2 |
| August | 50.4 | 30.1 | 0.60 | 34.2 | 21.6 | 85.0 | 85.5 | 10 | 11.2 |
| September | 37.4 | 26.8 | 0.72 | 32.1 | 19.9 | 87.8 | 83.7 | 16 | 11.3 |
| October | 30.0 | 20.0 | 0.67 | 31.1 | 18.8 | 86.1 | 82.5 | 16 | 11.6 |
| November | 22.4 | 12.8 | 0.57 | 29.4 | 17.9 | 78.7 | 81.1 | 10 | 11.6 |
| December | 17.6 | 11.1 | 0.64 | | | 75.1 | | 10 | |
| 2017 | | | | | | | | | |
| January | 28.1 | 15.5 | 0.55 | | | 77.4 | | 10 | |
| February | 22.0 | 15.7 | 0.71 | | | 76.9 | | 10 | |
| March | 25.4 | 10.6 | 0.42 | | | 74.6 | | 15 | |
| April | 30.4 | 19.6 | 0.64 | | | 80.9 | | 13 | |
| May | 18.1 | 11.3 | 0.62 | | | 73.5 | | 9 | |

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 June 2017*

The proton flux plot contains the five-minute averaged integral proton flux (protons/cm²-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.

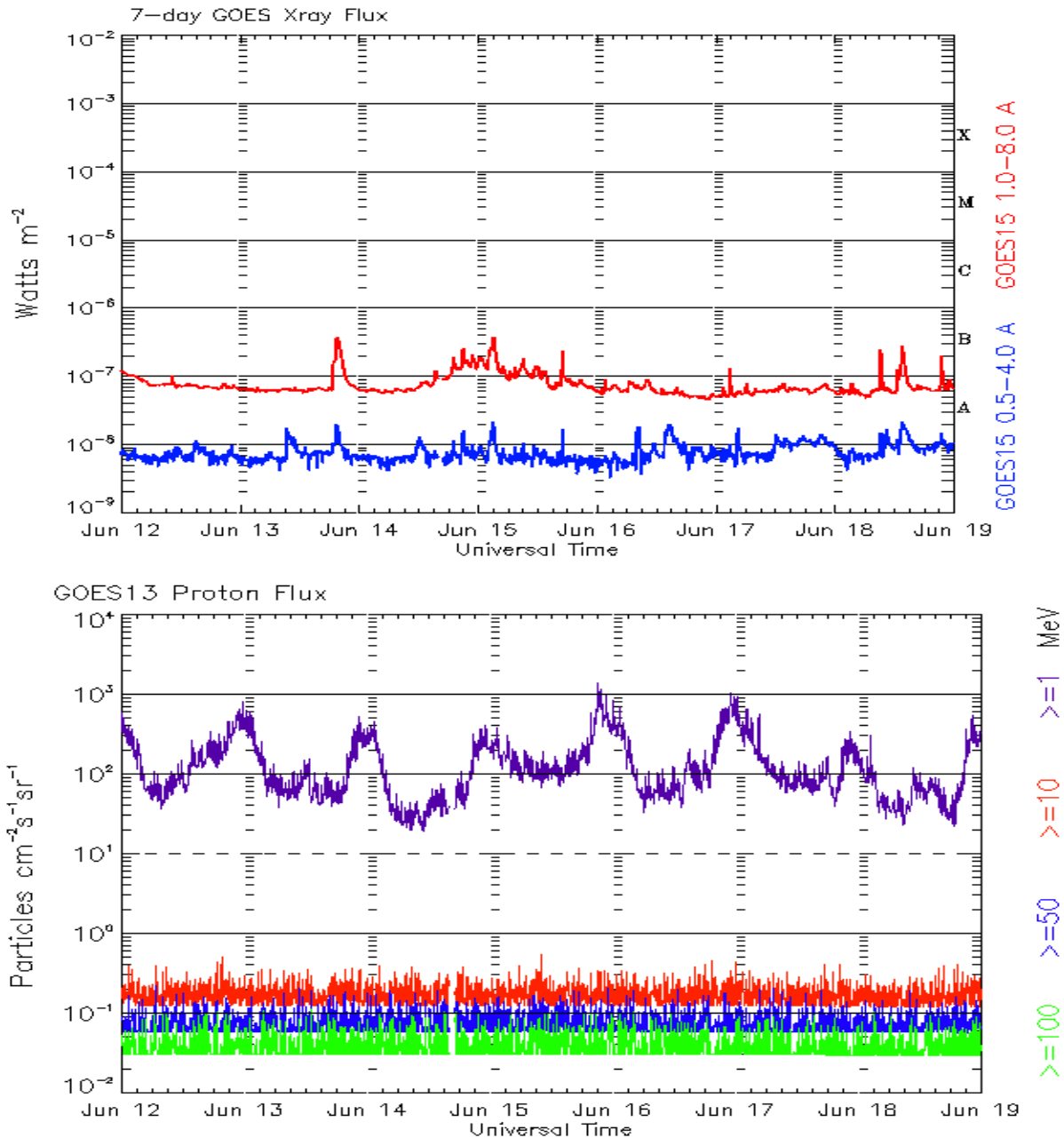
The electron flux plot contains the five-minute averaged integral electron flux (electrons/cm²-sec -sr) with energies greater than 2 MeV by the SWPC Primary GOES satellite.

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.

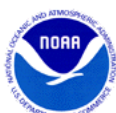




*Weekly GOES Satellite X-ray and Proton Plots
Week Beginning 12 June 2017*

The x-ray plots contains five-minute averages x-ray flux (Watt/m²) 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/cm² -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)

Published every Monday by the Space Weather Prediction Center.

U.S. Department of Commerce
NOAA / National Weather Service
Space Weather Prediction Center
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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.

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<http://spaceweather.gov/ftpmenu/> -- Some content as ascii text

<http://spaceweather.gov/SolarCycle/> -- Solar Cycle Progression web site

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http://spaceweather.gov/weekly/Usr_guide.pdf -- User Guide

