

Space Weather Highlights
08 September - 14 September 2008

SEC PRF 1724
16 September 2008

Solar activity was very low. No flares were detected. The visible disk was spotless during most of the period. Region 1001 (N06, L = 179, class/area Bxo/020 on 11 September) emerged on 11 September, but quickly decayed to plage.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit reached high levels throughout the period.

Geomagnetic field activity was at quiet to unsettled levels during 08 - 09 September with active to minor storm periods observed at high latitudes on 08 September. Activity decreased to quiet levels at all latitudes during 10 - 13 September. Activity increased to active levels late on 14 September. ACE solar wind measurements indicated a subsiding coronal hole high-speed stream (CH HSS) was in progress at the start of the period with a peak velocity of 603 km/sec observed at 08/0711 UTC. Velocities gradually decreased during 08 - 14 September with a minimum velocity of 277 km/sec observed at 14/0304 UTC. A co-rotating interaction region (CIR) in advance of a recurrent CH HSS was observed during the latter half of 14 September. Solar wind changes associated with the CIR included increased velocities (peak 395 km/sec at 14/2229 UTC), increased densities (peak 18 p/cc at 14/2231 UTC), increased IMF Bt (peak 10 nT at 14/2049 UTC), and intermittent periods of southward IMF Bz (minimum -14 nT at 14/2039 UTC).

Space Weather Outlook
17 September - 13 October 2008

Solar activity is expected to be very low.

No proton events are expected at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to reach high levels during 17 - 22 September and again during 01 - 13 October.

Quiet geomagnetic conditions are expected during 17 - 29 September. Activity is expected to increase to unsettled levels on 30 September. A further increase to active to minor storm levels is expected during 01 - 02 October with major storm levels possible at high latitudes due to a recurrent coronal hole high-speed stream. Activity is expected to decrease to unsettled levels during 03 - 05 October as the high-speed stream subsides. Quiet conditions are expected during 06 - 11 October. Activity is expected to increase to active levels on 12 October due to a recurrent coronal hole high-speed stream. Activity is expected to decrease to mostly quiet levels during 13 October as the high-speed stream subsides.



Daily Solar Data

| Date | Radio Flux 10.7 cm | Sun spot No. | Sunspot Area (10 ⁻⁶ hemi.) | X-ray Background | Flares | | | | | | | | |
|--------------|-----------------------|-----------------|--|------------------|------------|---|---|---------|---|---|---|---|---|
| | | | | | X-ray Flux | | | Optical | | | | | |
| | | | | | C | M | X | S | 1 | 2 | 3 | 4 | |
| 08 September | 67 | 0 | 0 | <A1.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 09 September | 67 | 0 | 0 | <A1.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10 September | 67 | 0 | 0 | <A1.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11 September | 67 | 12 | 20 | <A1.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12 September | 66 | 0 | 0 | <A1.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 13 September | 66 | 0 | 0 | <A1.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 14 September | 67 | 0 | 0 | <A1.0 | 0 | 0 | 0 | 0 | 0 | 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 | >.6 MeV | >2MeV | >4 MeV |
| | 08 September | 2.2E+6 | 1.7E+4 | 3.9E+3 | | 1.6E+8 |
| 09 September | 1.8E+6 | 1.8E+4 | 3.8E+3 | | 3.6E+8 | |
| 10 September | 1.3E+6 | 1.8E+4 | 4.1E+3 | | 1.7E+8 | |
| 11 September | 1.6E+6 | 1.8E+4 | 4.3E+3 | | 1.8E+8 | |
| 12 September | 1.4E+6 | 1.9E+4 | 4.3E+3 | | 1.7E+8 | |
| 13 September | 2.3E+6 | 1.8E+4 | 4.3E+3 | | 1.9E+8 | |
| 14 September | 2.9E+6 | 1.9E+4 | 4.2E+3 | | 1.0E+8 | |

Daily Geomagnetic Data

| Date | Middle Latitude Fredericksburg | | High Latitude College | | Estimated Planetary | |
|--------------|-----------------------------------|-----------------|--------------------------|-----------------|------------------------|-----------------|
| | A | K-indices | A | K-indices | A | K-indices |
| | 08 September | 9 | 2-3-3-2-2-2-2-1 | 15 | 2-2-4-5-3-2-2-1 | 8 |
| 09 September | 4 | 1-2-2-1-1-0-1-2 | 3 | 1-2-2-1-0-0-0-1 | 6 | 1-2-2-1-0-1-1-3 |
| 10 September | 2 | 1-1-1-0-0-1-1-0 | 2 | 1-1-1-1-0-1-0-0 | 4 | 1-1-0-1-1-1-1-1 |
| 11 September | 1 | 0-1-0-0-0-0-0-1 | 1 | 1-1-0-0-0-0-0-0 | 2 | 0-1-0-0-0-0-1-2 |
| 12 September | 0 | 0-0-0-0-0-0-0-0 | 0 | 1-0-0-0-0-0-0-0 | 2 | 1-0-0-0-1-0-0-1 |
| 13 September | 0 | 0-0-0-0-0-0-0-0 | 0 | 0-0-0-0-0-0-0-0 | 0 | 0-0-0-0-0-0-0-0 |
| 14 September | 4 | 0-0-2-1-0-0-2-3 | 3 | 0-0-1-1-0-0-2-2 | 6 | 0-0-1-0-1-1-3-4 |

Alerts and Warnings Issued

| Date & Time of Issue | Type of Alert or Warning | Date & Time of Event UTC |
|----------------------|--|--------------------------|
| 08 Sep 0350 | ALERT: Geomagnetic K = 4 | 08 Sept 0345 |
| 08 Sep 1137 | ALERT: Electron 2MeV Integral Flux>1000pfu | 08 Sept 1120 |
| 09 Sep 0710 | ALERT: Electron 2MeV Integral Flux>1000pfu | 09 Sept 0520 |
| 10 Sep 0505 | ALERT: Electron 2MeV Integral Flux>1000pfu | 10 Sept 0500 |
| 11 Sep 0501 | ALERT: Electron 2MeV Integral Flux>1000pfu | 11 Sept 0500 |
| 12 Sep 0502 | ALERT: Electron 2MeV Integral Flux>1000pfu | 12 Sept 0500 |
| 13 Sep 0501 | ALERT: Electron 2MeV Integral Flux>1000pfu | 13 Sept 0500 |
| 14 Sep 1045 | ALERT: Electron 2MeV Integral Flux>1000pfu | 14 Sept 1015 |
| 14 Sep 2211 | WARNING: Geomagnetic K = 4 | 14 Sept 2215 - 15/1700 |

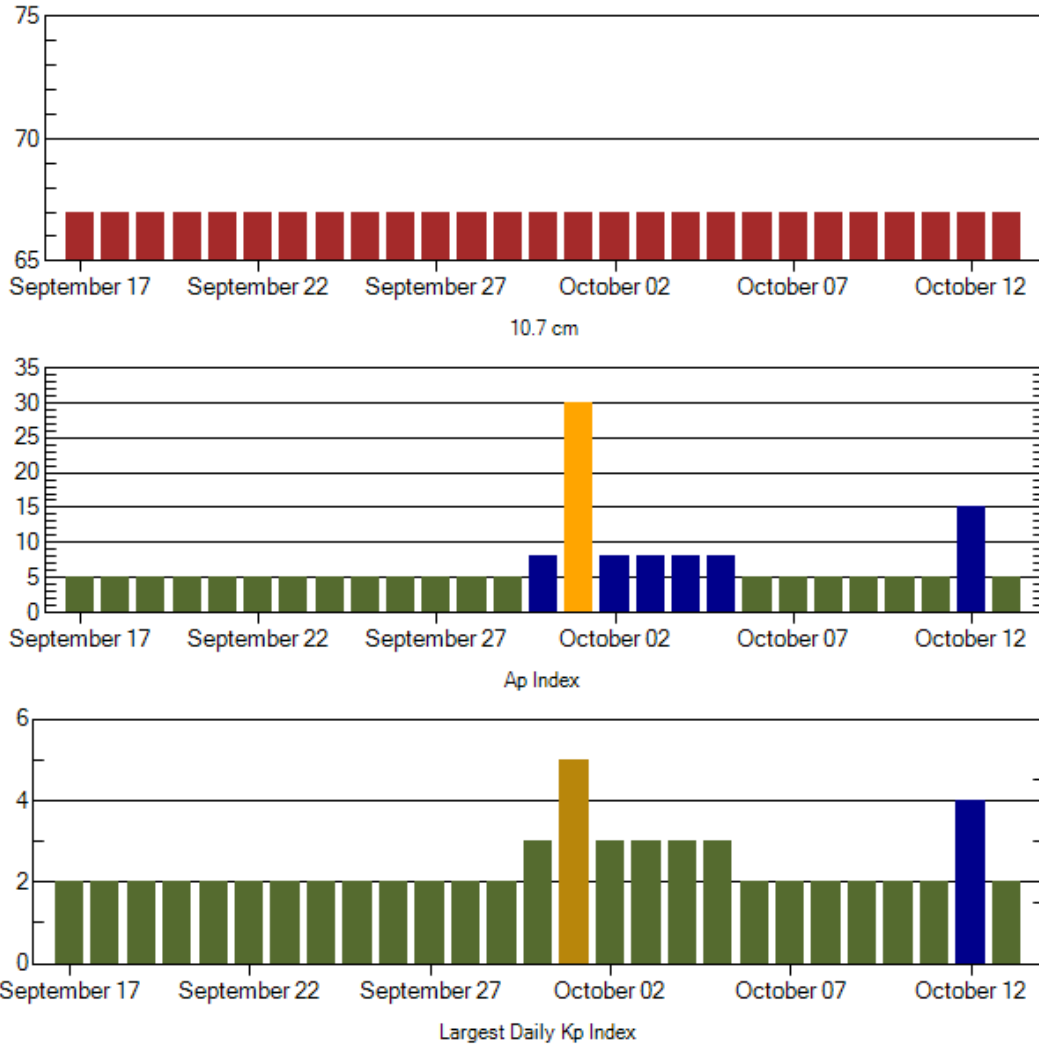


Alerts and Warnings Issued – continued.

| <u>Date & Time of Issue</u> | <u>Type of Alert or Warning</u> | <u>Date & Time of Event UTC</u> |
|---------------------------------|---------------------------------|-------------------------------------|
| 14 Sep 2319 | ALERT: Geomagnetic K = 4 | 14 Sept 2318 |



Twenty-seven Day Outlook



| Date | Radio Flux 10.7 cm | Planetary A Index | Largest Kp Index | Date | Radio Flux 10.7 cm | Planetary A Index | Largest Kp Index |
|---------|-----------------------|----------------------|---------------------|--------|-----------------------|----------------------|---------------------|
| 17 Sept | 67 | 5 | 2 | 01 Oct | 67 | 30 | 6 |
| 18 | 67 | 5 | 2 | 02 | 67 | 8 | 3 |
| 19 | 67 | 5 | 2 | 03 | 67 | 8 | 3 |
| 20 | 67 | 5 | 2 | 04 | 67 | 8 | 3 |
| 21 | 67 | 5 | 2 | 05 | 67 | 8 | 3 |
| 22 | 67 | 5 | 2 | 06 | 67 | 5 | 2 |
| 23 | 67 | 5 | 2 | 07 | 67 | 5 | 2 |
| 24 | 67 | 5 | 2 | 08 | 67 | 5 | 2 |
| 25 | 67 | 5 | 2 | 09 | 67 | 5 | 2 |
| 26 | 67 | 5 | 2 | 10 | 67 | 5 | 2 |
| 27 | 67 | 5 | 2 | 11 | 67 | 5 | 2 |
| 28 | 67 | 5 | 2 | 12 | 67 | 15 | 4 |
| 29 | 67 | 5 | 2 | 13 | 67 | 5 | 2 |
| 30 | 67 | 8 | 3 | | | | |



Energetic Events

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

No Events Observed

Flare List

| Date | Time | | | X-ray Class. | Imp / Brtns | Optical | Rgn |
|---------|---------------------------|-----|-----|-----------------|----------------|---------------------|-----|
| | Begin | Max | End | | | Location Lat CMD | |
| 08 Sept | <i>No Flares Observed</i> | | | | | | |
| 09 Sept | <i>No Flares Observed</i> | | | | | | |
| 10 Sept | <i>No Flares Observed</i> | | | | | | |
| 11 Sept | <i>No Flares Observed</i> | | | | | | |
| 12 Sept | <i>No Flares Observed</i> | | | | | | |
| 13 Sept | <i>No Flares Observed</i> | | | | | | |
| 14 Sept | <i>No Flares Observed</i> | | | | | | |

Region Summary

| Date | Location | | Sunspot Characteristics | | | | Flares | | | | | | | |
|------|----------------|-------|---------------------------------|-------------------|---------------|---------------|--------------|-------|---|---|---------|---|---|---|
| | (° Lat ° CMD) | Helio | Area (10 ⁻⁶ hemi) | Extent (helio) | Spot Class | Spot Count | Mag Class | X-ray | | | Optical | | | |
| | | Lon | | | | | | C | M | X | S | 1 | 2 | 3 |

Region 1001

11 Sep N06E14 179 0020 03 Bxo 002 B
 12 Sep N06E01 179
 13 Sep N06W12 179
 14 Sep N06W25 179

0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 179



Recent Solar Indices (preliminary)
Of the observed monthly mean values

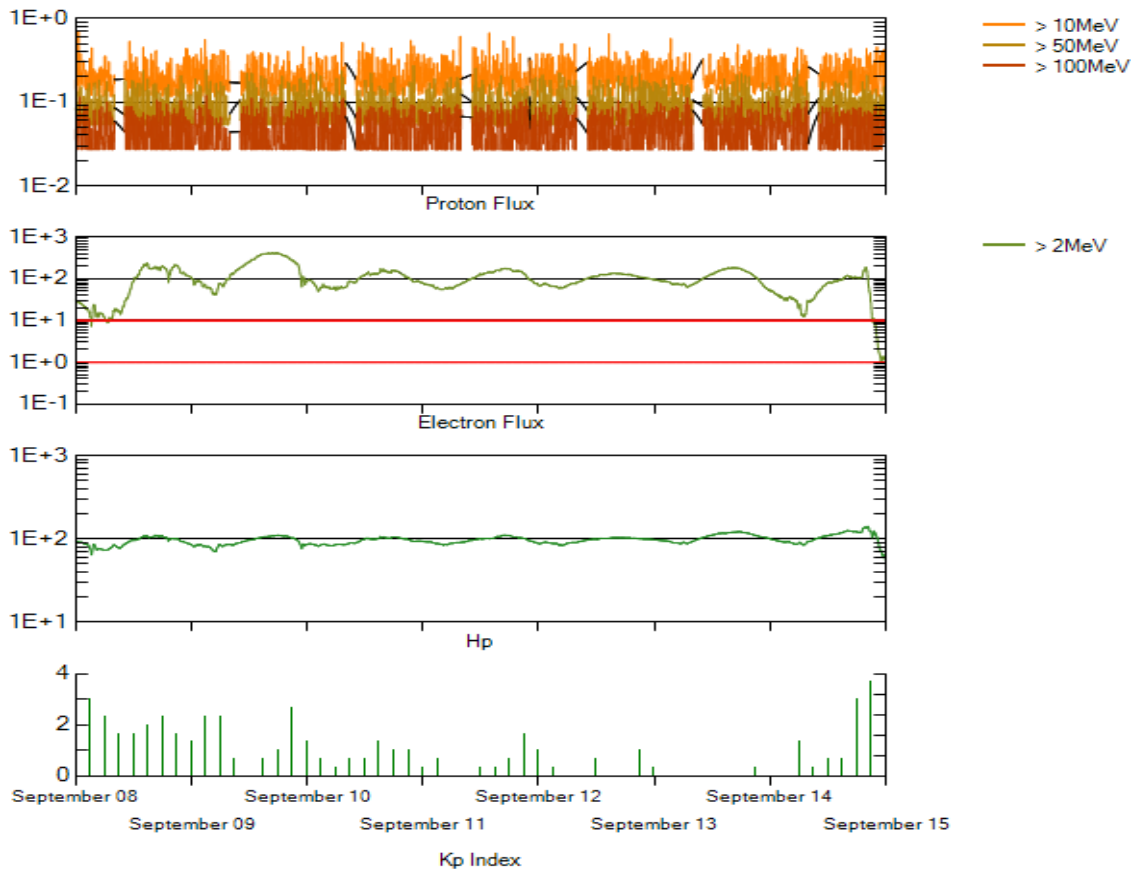
| Month | Sunspot Numbers | | | Smooth values | | Radio Flux | | Geomagnetic | |
|-------------|-----------------|--------------|-----------------|---------------|------|-----------------------|-----------------|-----------------|-----------------|
| | Observed SEC | values RI | Ratio RI/SEC | SEC | RI | *Penticton 10.7 cm | Smooth Value | Planetary Ap | Smooth Value |
| 2006 | | | | | | | | | |
| September | 25.2 | 14.5 | 0.58 | 27.7 | 15.6 | 77.8 | 80.2 | 8 | 8.7 |
| October | 15.7 | 10.4 | 0.66 | 25.2 | 14.2 | 74.3 | 79.4 | 8 | 8.6 |
| November | 31.5 | 21.5 | 0.68 | 22.3 | 12.7 | 86.4 | 78.5 | 9 | 8.5 |
| December | 22.2 | 13.6 | 0.61 | 20.7 | 12.1 | 84.3 | 77.9 | 15 | 8.5 |
| 2007 | | | | | | | | | |
| January | 26.6 | 16.9 | 0.64 | 19.7 | 12.0 | 83.5 | 77.5 | 6 | 8.4 |
| February | 17.2 | 10.6 | 0.62 | 18.9 | 11.6 | 77.8 | 76.9 | 6 | 8.4 |
| March | 9.7 | 4.8 | 0.49 | 17.5 | 10.8 | 72.3 | 76.0 | 8 | 8.4 |
| April | 6.9 | 3.7 | 0.54 | 16.0 | 9.9 | 72.4 | 75.2 | 9 | 8.5 |
| May | 19.4 | 11.7 | 0.60 | 14.2 | 8.7 | 74.5 | 74.2 | 9 | 8.4 |
| June | 20.0 | 12.0 | 0.60 | 12.8 | 7.7 | 73.7 | 73.2 | 7 | 7.8 |
| July | 15.6 | 10.0 | 0.64 | 11.6 | 7.0 | 71.6 | 72.5 | 8 | 7.4 |
| August | 9.9 | 6.2 | 0.63 | 10.2 | 6.1 | 69.2 | 71.8 | 7 | 7.6 |
| September | 4.8 | 2.4 | 0.50 | 9.9 | 5.9 | 67.1 | 71.5 | 9 | 7.8 |
| October | 1.3 | 0.9 | 0.70 | 10.0 | 6.1 | 65.5 | 71.5 | 9 | 7.9 |
| November | 2.5 | 1.7 | 0.68 | 9.4 | 5.7 | 69.7 | 71.1 | 5 | 7.8 |
| December | 16.2 | 10.1 | 0.62 | 8.1 | 5.0 | 78.6 | 70.5 | 4 | 7.8 |
| 2008 | | | | | | | | | |
| January | 5.1 | 3.4 | 0.67 | 6.9 | 4.2 | 72.1 | 70.0 | 6 | 7.7 |
| February | 3.8 | 2.1 | 0.55 | 5.9 | 3.6 | 71.2 | 69.6 | 9 | 7.6 |
| March | 15.9 | 9.3 | 0.58 | | | 72.9 | | 10 | |
| April | 4.9 | 2.9 | 0.59 | | | 70.3 | | 9 | |
| May | 5.7 | 2.9 | 0.51 | | | 68.4 | | 6 | |
| June | 4.2 | 3.1 | 0.74 | | | 65.9 | | 7 | |
| July | 1.0 | 0.5 | 0.50 | | | 65.8 | | 6 | |
| August | 0.0 | 0.5 | ** | | | 66.4 | | 5 | |

NOTE: All smoothed values after September 2002 and monthly values after March 2003 are preliminary estimates. The lowest smoothed sunspot index number for Cycle 22, RI = 8.0, occurred in May 1996. The highest smoothed sunspot number for Cycle 23, RI= 120.8, occurred April 2000.

*After June 1991, the 10.7 cm radio flux data source is Penticton, B.C. Canada. Prior to that, it was Ottawa.

**SEC sunspot number was less than RI value, so a ratio could not be done.





*Weekly Geosynchronous Satellite Environment Summary
Week Beginning 08 September 2008*

Protons plot contains the five-minute averaged integral proton flux (protons/cm²-sec-sr) as measured by GOES-11 (W135) for each of three energy thresholds: greater than 10, 50, and 100 MeV.

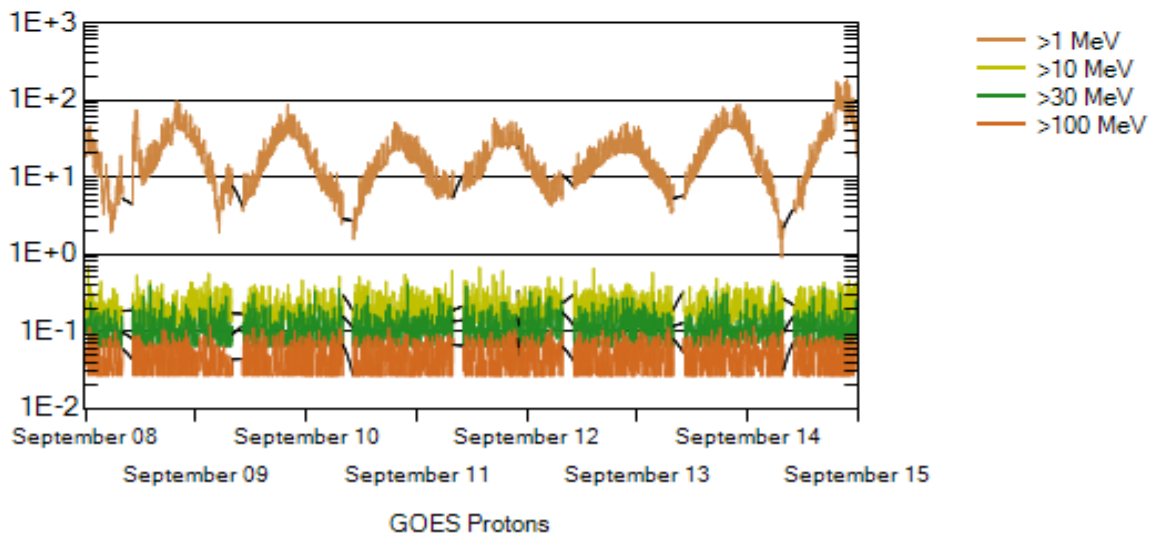
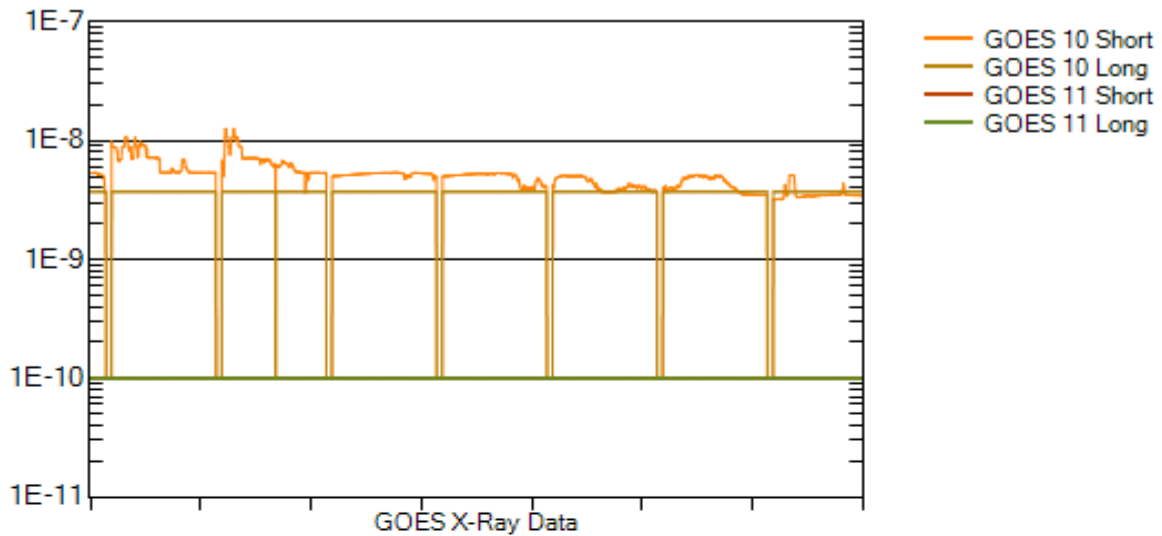
Electrons plot contains the five-minute averaged integral electron flux (electrons/cm²-sec-sr) with energies greater than 2 MeV at GOES-12 (W075).

Hp plot contains the five minute averaged magnetic field H - component in nanoteslas (nT) as measured by GOES-12. The H component is parallel to the spin axis of the satellite, which is nearly parallel to the Earth's rotation axis.

Kp plot contains the estimated planetary 3-hour K-index (derived by the Air Force Weather Agency) in real time from magnetometers at Meanook, Canada; Sitka, AK; Glenlea, Canada; St. Johns, Canada; Ottawa, Canada; Newport, WA; Fredericksburg, VA; Boulder, CO; Fresno, CA and Hartland, UK. These data are made available through cooperation from the Geological Survey of Canada (GSC), British Geological Survey (BGS) and the US Geological Survey. These may differ from the final Kp values derived from a more extensive network of magnetometers.

The data included here are those now available in real time at the SEC 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

X-ray plot contains five-minute averaged x-ray flux (watts/m^2) as measured by GOES 10 (W060) and GOES 11 (W135) in two wavelength bands, .05 - .4 and .1 - .8 nm. The letters A, B, C, M and X refer to x-ray event levels for the .1 - .8 nm band.

Proton plot contains the five-minute averaged integral proton flux ($\text{protons/cm}^2\text{-sec-sr}$) as measured by GOES-11 (W135) for each of the energy thresholds: >1, >10, >30 and >100 MeV. P10 event threshold is 10 pfu ($\text{protons/cm}^2\text{-sec-sr}$) at greater than 10 MeV.

