

Space Weather Highlights
19 January - 25 January 2009

SWO PRF 1743
27 January 2009

Solar activity was very low. No significant flare activity was observed. Region 1011 (S12, L305, class/area Bxo/010 on 20 January) formed on the disk on 19 January and decayed to spotless plage by 20 January.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit was at normal levels.

Geomagnetic field activity was at mostly quiet levels during the period. A single active period was observed at all latitudes early on 19 January. This activity was due to a recurrent coronal hole. A 12 nT sudden impulse was detected at Boulder at 25/2225 UTC. During the early part of the summary period, ACE solar wind velocities ranged from a high of 501 km/sec at 19/1931 UTC to a low of 265 km/sec at 25/1056 UTC. The Bz component of the IMF ranged primarily between -4 nT to +3 nT. At the beginning of the summary period, the Bz component varied between -10 nT to +8 nT. At the end of the period, the Bz component ranged between -7nT to +4 nT. The Bt varied from 0-13 nT during the entire summary period.

Space Weather Outlook
28 January - 23 February 2009

Solar activity is expected to be at very low levels.

No proton events are expected at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to be at normal levels.

The geomagnetic field is expected to be at quiet to unsettled levels on 28 January. Activity is expected to decrease to quiet levels during 29 January - 14 February. Activity is expected to increase to quiet to unsettled levels on 15 February, with isolated active levels due to a recurrent coronal hole high-speed stream (CH HSS). Activity is expected to decrease to quiet levels during 16-21 February as the HSS subsides. Activity is expected to increase to quiet to unsettled levels with isolated active levels on 22 February. Activity is expected to decrease to mostly quiet levels on 23 February.



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 |
| 19 January | 71 | 13 | 10 | <A1.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20 January | 70 | 0 | 0 | <A1.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 21 January | 69 | 0 | 0 | <A1.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 22 January | 69 | 0 | 0 | <A1.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 23 January | 70 | 0 | 0 | <A1.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 24 January | 69 | 0 | 0 | <A1.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 25 January | 70 | 0 | 0 | <A1.0 | 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 |
| | 19 January | 9.8E+5 | 1.8E+4 | 3.8E+3 | | 5.9E+4 |
| 20 January | 7.6E+5 | 1.8E+4 | 4.0E+3 | | 7.7E+4 | |
| 21 January | 7.3E+5 | 1.8E+4 | 4.0E+3 | | 7.6E+4 | |
| 22 January | 7.6E+5 | 1.8E+4 | 4.0E+3 | | 9.1E+4 | |
| 23 January | 6.3E+5 | 1.9E+4 | 4.4E+3 | | 7.5E+4 | |
| 24 January | 9.0E+5 | 1.9E+4 | 4.3E+3 | | 9.2E+4 | |
| 25 January | 8.8E+5 | 1.9E+4 | 4.3E+3 | | 9.8E+4 | |

Daily Geomagnetic Data

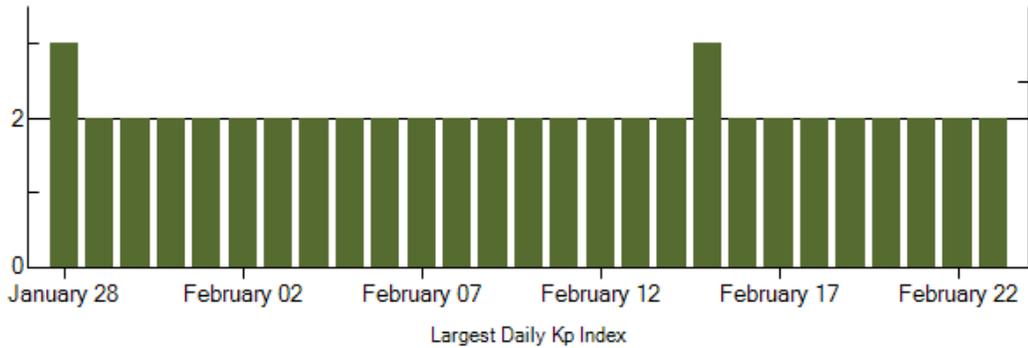
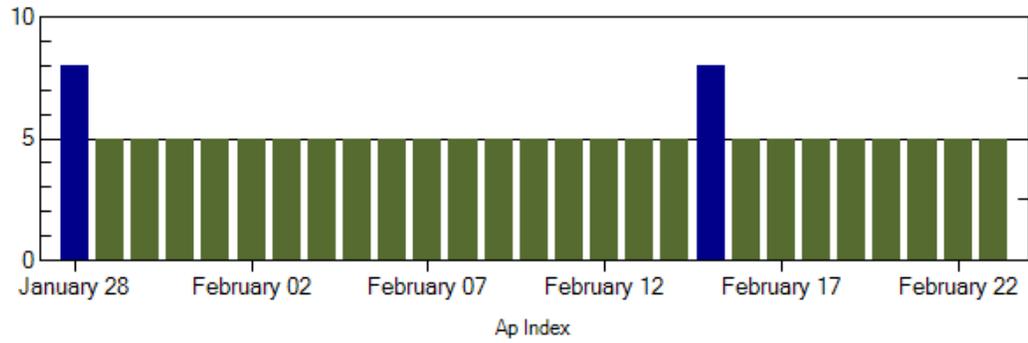
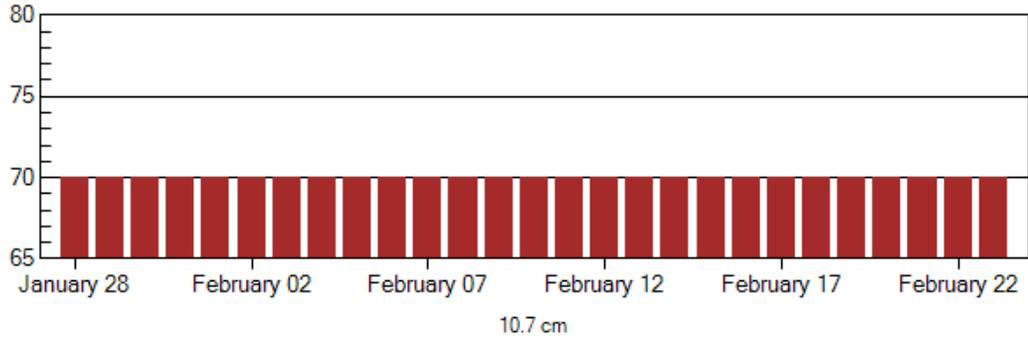
| Date | Middle Latitude Fredericksburg | | High Latitude College | | Estimated Planetary | |
|------------|-----------------------------------|-----------------|--------------------------|-----------------|------------------------|-----------------|
| | A | K-indices | A | K-indices | A | K-indices |
| | 19 January | 7 | 4-2-2-0-1-1-1-2 | 4 | 2-1-2-2-0-1-0-1 | 9 |
| 20 January | 1 | 1-0-1-0-0-0-1-0 | 1 | 2-1-0-0-0-0-0-0 | 3 | 2-0-0-0-0-0-1-1 |
| 21 January | 2 | 0-0-0-1-0-2-1-0 | 2 | 0-0-0-2-1-1-0-0 | 2 | 0-0-0-1-0-1-1-1 |
| 22 January | 0 | 0-0-0-0-0-0-1-0 | 0 | 0-0-0-1-0-0-0-0 | 1 | 0-0-0-0-0-0-0-1 |
| 23 January | 1 | 0-0-1-0-1-0-0-0 | 0 | 0-0-0-0-0-0-0-0 | 1 | 0-0-0-0-0-0-0-1 |
| 24 January | 1 | 1-1-0-0-0-0-0-1 | 0 | 0-0-0-0-0-0-0-0 | 1 | 1-0-0-0-0-0-0-1 |
| 25 January | 1 | 0-0-0-0-0-0-0-2 | 1 | 0-0-0-0-2-0-0-0 | 1 | 0-0-0-0-0-0-0-2 |

Alerts and Warnings Issued

| Date & Time of Issue | Type of Alert or Warning | Date & Time of Event UTC |
|----------------------|-------------------------------------|--------------------------|
| 19 Jan 0219 | ALERT: Geomagnetic K = 4 | 19 Jan 0218 |
| 25 Jan 2231 | SUMMARY: Geomagnetic Sudden Impulse | 25 Jan 2225 |



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 |
|--------|-----------------------|----------------------|---------------------|--------|-----------------------|----------------------|---------------------|
| 28 Jan | 70 | 8 | 3 | 11 Feb | 70 | 5 | 2 |
| 29 | 70 | 5 | 2 | 12 | 70 | 5 | 2 |
| 30 | 70 | 5 | 2 | 13 | 70 | 5 | 2 |
| 31 | 70 | 5 | 2 | 14 | 70 | 5 | 2 |
| 01 Feb | 70 | 5 | 2 | 15 | 70 | 8 | 3 |
| 02 | 70 | 5 | 2 | 16 | 70 | 5 | 2 |
| 03 | 70 | 5 | 2 | 17 | 70 | 5 | 2 |
| 04 | 70 | 5 | 2 | 18 | 70 | 5 | 2 |
| 05 | 70 | 5 | 2 | 19 | 70 | 5 | 2 |
| 06 | 70 | 5 | 2 | 20 | 70 | 5 | 2 |
| 07 | 70 | 5 | 2 | 21 | 70 | 5 | 2 |
| 08 | 70 | 5 | 2 | 22 | 70 | 5 | 2 |
| 09 | 70 | 5 | 2 | 23 | 70 | 5 | 2 |
| 10 | 70 | 5 | 2 | | | | |



Energetic Events

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

No Events Observed

Flare List

| Date | Time | | | X-ray Class. | Imp / Brtns | Location Lat CMD | Rgn |
|--------|--------------------|-----|-----|-----------------|----------------|---------------------|-----|
| | Begin | Max | End | | | | |
| 19 Jan | No Flares Observed | | | | | | |
| 20 Jan | No Flares Observed | | | | | | |
| 21 Jan | No Flares Observed | | | | | | |
| 22 Jan | No Flares Observed | | | | | | |
| 23 Jan | No Flares Observed | | | | | | |
| 24 Jan | No Flares Observed | | | | | | |
| 25 Jan | No Flares Observed | | | | | | |

Region Summary

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

Region 1011

| | | | | | | | | | | | | | | | | | |
|--------|--------|-----|------|----|-----|-----|---|--|--|--|--|--|--|--|--|--|--|
| 19 Jan | S12W25 | 305 | 0010 | 03 | Bxo | 003 | B | | | | | | | | | | |
| 20 Jan | S12W38 | 305 | | | | | | | | | | | | | | | |
| 21 Jan | S12W51 | 305 | | | | | | | | | | | | | | | |
| 22 Jan | S12W64 | 305 | | | | | | | | | | | | | | | |
| 23 Jan | S12W77 | 305 | | | | | | | | | | | | | | | |
| 24 Jan | S12W90 | 305 | | | | | | | | | | | | | | | |

0 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 305



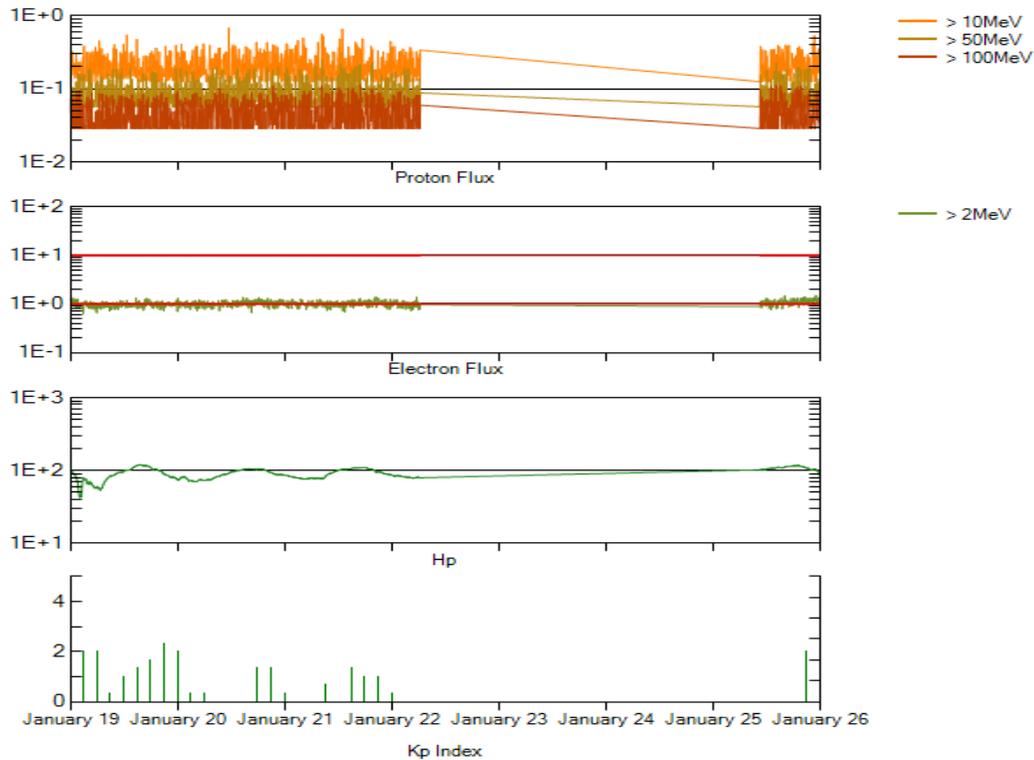
Recent Solar Indices (preliminary)
Of the observed monthly mean values

| Month | Sunspot Numbers | | | Radio Flux | | Geomagnetic | | | |
|-------------|-----------------|--------------|-----------------|---------------|--------------|-----------------------|-----------------|-----------------|-----------------|
| | Observed SEC | values RI | Ratio RI/SEC | Smooth SEC | values RI | *Penticton 10.7 cm | Smooth Value | Planetary Ap | Smooth Value |
| 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 | 5.3 | 3.3 | 72.9 | 69.5 | 10 | 7.4 |
| April | 4.9 | 2.9 | 0.59 | 5.3 | 3.3 | 70.3 | 69.6 | 9 | 7.1 |
| May | 5.7 | 2.9 | 0.51 | 5.7 | 3.5 | 68.4 | 69.7 | 6 | 6.9 |
| June | 4.2 | 3.1 | 0.74 | 5.2 | 3.2 | 65.9 | 69.2 | 7 | 6.8 |
| July | 1.0 | 0.5 | 0.50 | | | 65.8 | | 6 | |
| August | 0.0 | 0.5 | ** | | | 66.4 | | 5 | |
| September | 1.5 | 1.1 | 0.73 | | | 67.1 | | 5 | |
| October | 5.2 | 2.9 | 0.56 | | | 68.3 | | 6 | |
| November | 6.8 | 4.1 | 0.60 | | | 68.6 | | 3 | |
| December | 1.3 | 0.8 | 0.62 | | | 69.2 | | 2 | |

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 19 January 2009

GOES-11 designated Primary Electron Satellite and GOES-10 Secondary: December 1, 2008 the GOES-12 Electron sensor began experiencing periods of noise and sensor is unreliable.

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.

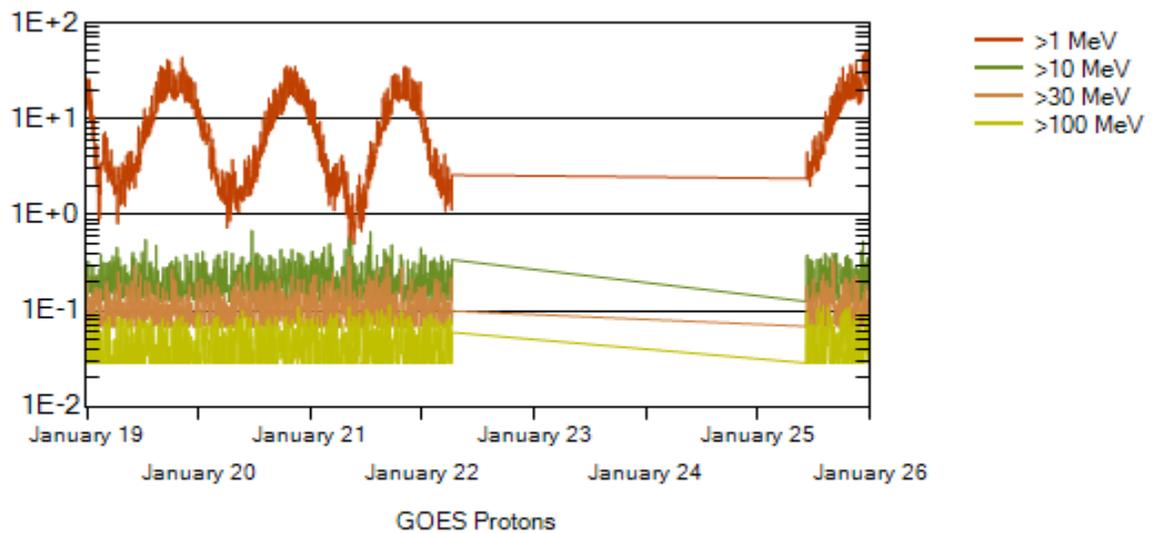
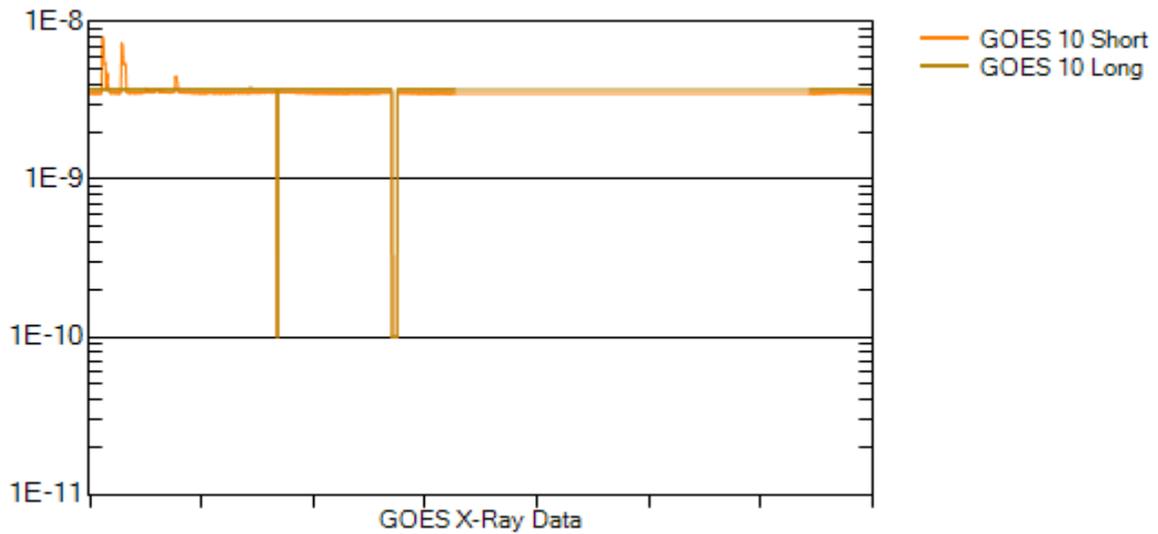
Electrons plot contains the five-minute averaged integral electron flux (electrons/cm²-sec -sr) with energies greater than 2 MeV at GOES-11 (W135).

Hp plot contains the five minute averaged magnetic field H - component in nanoteslas (nT) as measured by GOES-11. 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 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

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.

