## Space Weather Highlights
## 10-16 Aug 1998

Solar activity ranged from low to moderate during the period. Region 8293 (S22, L = 263, class/area Fac/580 on 09 August) slowly decayed during the period, but produced an M3/1N flare at 14/0828UT with an associated Type II radio sweep. This region also produced a C7/SF flare as it crossed the west limb on 15 August. Region 8299 (N16, L = 192, class/area Cko/520 on 12 August) increased in magnetic complexity during 13 August and produced a C9/SF flare at 13/1756UT, but was otherwise stable. An optically uncorrelated M3 x-ray burst with associated Types II and IV radio sweeps occurred at 16/1821UT. Note: new Region 8307 (N30E90 on 17 August) produced two X-class flares on 17 August. The region was still rotating into view at issue time. Details will be provided in next week's issue.

Real-time solar wind data were available from the Advanced Composition Explorer (ACE) spacecraft during most of the period. No significant transient or recurrent structures were detected.

There were no significant proton enhancements detected at geosynchronous altitude.

The greater than 2 MeV electron flux at geosynchronous altitude was at normal levels during most of the period.

The geomagnetic field was quiet to unsettled with brief, localized active to minor storm levels detected at some high latitude stations.

## Space Weather Forecast
## 19 August 1998 -14 September 1998

Solar activity is expected to be moderate to high. New Region 8307 is expected to produce M-class flares and may also produce additional major flares before it departs the visible disk around 01 September.

Chances for a proton event at geosynchronous altitude are expected to increase during the first half of the period given the proven major flare capability of Region 8307.

The greater than 2 MeV electron flux at geosynchronous altitude is expected to be at moderate to high levels during 21 - 26 August. Otherwise, normal to moderate fluxes are expected.

The geomagnetic field is expected to be at quiet to unsettled levels during most of the period. However, active to minor storm levels are possible during 20 - 23 August due principally to a favorably located extension of the northern polar crown coronal hole.

## *Daily Solar Data*

| Date | Radio Flux 10.7 cm | Sun spot No. | Sunspot Area ($10^{-6}$ hemi.) | X-ray Background | Flares: X-ray Flux C | M | X | Flares: Optical S | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 August | 149 | 136 | 1740 | B4.9 | 4 | 0 | 0 | 14 | 0 | 0 | 0 | 0 |
| 11 August | 150 | 144 | 1550 | B5.8 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 |
| 12 August | 147 | 137 | 1540 | B4.8 | 2 | 0 | 0 | 3 | 0 | 0 | 0 | 0 |
| 13 August | 137 | 109 | 1270 | B4.5 | 6 | 0 | 0 | 10 | 0 | 0 | 0 | 0 |
| 14 August | 137 | 80 | 1060 | B4.9 | 4 | 1 | 0 | 8 | 1 | 0 | 0 | 0 |
| 15 August | 133 | 106 | 1070 | B4.6 | 6 | 0 | 0 | 4 | 0 | 0 | 0 | 0 |
| 16 August | 140 | 90 | 1170 | B6.5 | 2 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |

## *Daily Particle Data*

| Date | Proton Fluence (protons/cm$^2$-day-sr) >1MeV | >10MeV | >100MeV | Electron Fluence (electrons/cm$^2$-day-sr) >.6MeV | >2MeV | >4MeV |
|---|---|---|---|---|---|---|
| 10 August | 1.0E+6 | 1.6E+4 | 3.4E+3 | | 2.5E+7 | |
| 11 August | 4.4E+5 | 1.5E+4 | 3.4E+3 | | 1.1E+7 | |
| 12 August | 1.7E+5 | 1.5E+4 | 3.5E+3 | | 4.6E+6 | |
| 13 August | 3.3E+5 | 1.5E+4 | 3.5E+3 | | 7.5E+6 | |
| 14 August | 2.4E+5 | 1.6E+4 | 3.5E+3 | | 7.2E+6 | |
| 15 August | 5.4E+4 | 1.6E+4 | 3.5E+3 | | 3.1E+6 | |
| 16 August | 4.3E+4 | 1.6E+4 | 3.7E+3 | | 3.2E+6 | |

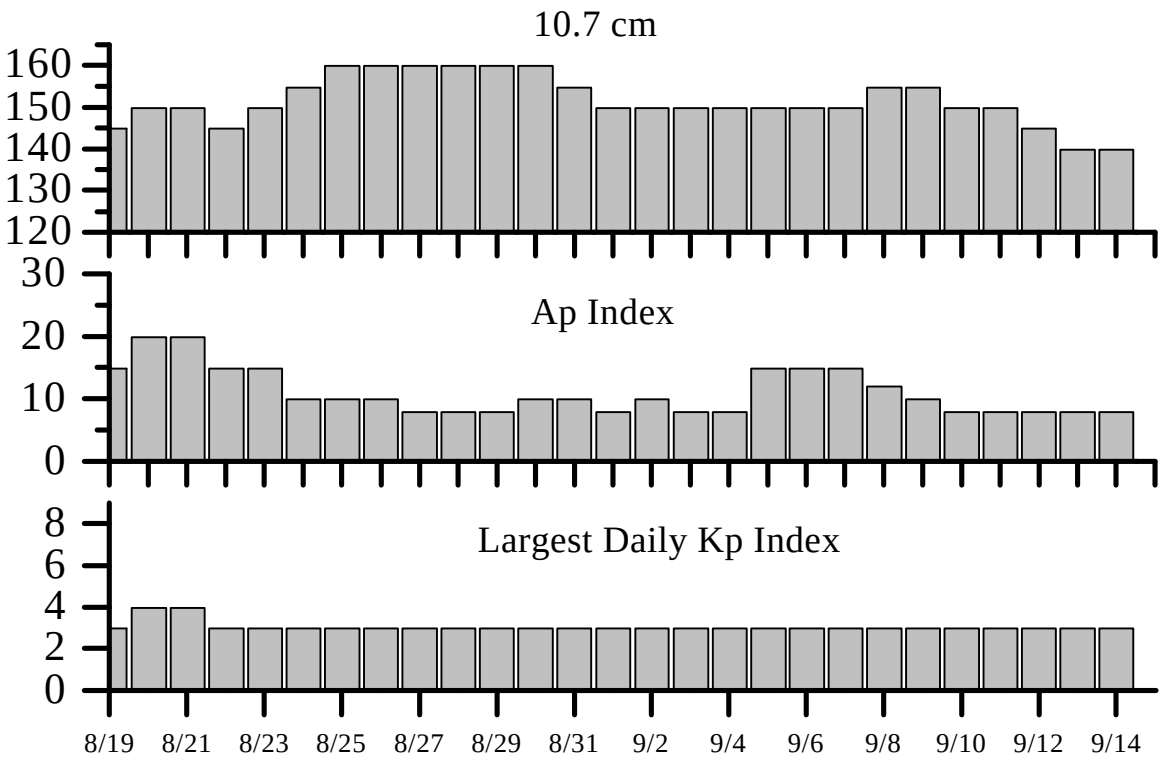
## *Daily Geomagnetic Data*

| Date | Middle Latitude Fredericksburg A | K-indices | High Latitude College A | K-indices | Estimated Planetary A | K-indices |
|---|---|---|---|---|---|---|
| 10 August | 13 | 3-2-4-1-4-1-2-2 | 25 | 2-3-4-1-6-5-2-2 | 14 | 3-3-4-2-4-3-3-3 |
| 11 August | 4 | 2-1-1-1-1-1-2-2 | 8 | 2-1-1-2-4-1-1-2 | 9 | 3-1-1-2-3-3-3-3 |
| 12 August | 5 | 2-2-2-1-1-2-0-2 | 8 | 4-3-2-0-0-0-1-2 | 10 | 3-3-3-1-2-2-2-3 |
| 13 August | 5 | 2-2-2-2-1-1-2-0 | 14 | 2-2-3-6-1-1-0-0 | 9 | 3-3-3-3-2-2-2-1 |
| 14 August | 5 | 1-0-2-1-2-2-2-1 | 22 | 1-1-1-1-6-6-2-0 | 7 | 1-1-2-2-3-3-2-1 |
| 15 August | 5 | 1-1-0-1-2-2-2-2 | 8 | 0-1-0-3-1-2-4-1 | 6 | 1-1-1-2-2-3-3-2 |
| 16 August | 1 | 1-1-0-0-0-1-0-0 | 2 | 0-1-1-0-0-2-0-0 | 5 | 1-1-1-1-1-2-2-2 |

## *Alerts and Warnings Issued*

| Date and Time of Issue (UT) | Type of Alert or Warning | Date and Time of Event (UT) |
|---|---|---|
| 10 Aug 0112 | Sudden Impulse observed | 10 Aug 0047 |
| 14 Aug 0845 | 2695MHz Radio Burst 250 s.f.u. | 14 Aug 0844 |
| 14 Aug 0900 | Type II Radio Emission | 14 Aug 0831 |
| 15 Aug 0001 | 2-245 MHz Radio Bursts | 14 Aug |
| 16 Aug 2208 | Type II Radio Emission | 16 Aug 1747 |
| 16 Aug 2208 | Type IV Radio Emission | 16 Aug 1800 |

*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 |
|---|---|---|---|---|---|---|---|
| 19 Aug | 145 | 15 | 3 | 02 Sep | 150 | 8 | 3 |
| 20 | 150 | 20 | 4 | 03 | 150 | 10 | 3 |
| 21 | 150 | 20 | 4 | 04 | 150 | 8 | 3 |
| 22 | 145 | 15 | 3 | 05 | 150 | 8 | 3 |
| 23 | 150 | 15 | 3 | 06 | 150 | 15 | 3 |
| 24 | 155 | 10 | 3 | 07 | 150 | 15 | 3 |
| 25 | 160 | 10 | 3 | 08 | 155 | 12 | 3 |
| 26 | 160 | 10 | 3 | 09 | 155 | 10 | 3 |
| 27 | 160 | 8 | 3 | 10 | 150 | 8 | 3 |
| 28 | 160 | 8 | 3 | 11 | 150 | 8 | 3 |
| 29 | 160 | 8 | 3 | 12 | 145 | 8 | 3 |
| 30 | 160 | 10 | 3 | 13 | 140 | 8 | 3 |
| 31 | 155 | 10 | 3 | 14 | 140 | 8 | 3 |
| 01 Sep | 150 | 10 | 3 | | | | |

## *Energetic Events*

| Date | Time (UT) | | | X-ray | | Optical Information | | | | Peak Radio Flux | | Sweep Freq Intensity | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Begin | Max | ½ Max | Class | Integ Flux | Imp Brtns | Location Lat | CMD | Rgn # | 245 | 2695 | II | IV |
| 14 Aug | 0819 | 0828 | 0832 | M3.1 | .010 | 1N | S23W74 | | 8293 | 1500 | 250 | 2 | |
| 16 Aug | 1737 | 1821 | 1859 | M3.1 | .100 | | | | | | 99 | 3 | 3 |

## *Flare List*

| Date | Time | | | X-ray | Optical | | |
|---|---|---|---|---|---|---|---|
| | Begin | Max | End | Class. | Imp / Brtns | Location Lat CMD | Rgn # |
| 10 August | 0705 | 0706 | 0710 | | SF | N15E43 | 8299 |
| | 0814 | 0814 | 0823 | B8.4 | SF | N15E51 | 8299 |
| | 0835 | 0840 | 0854 | B7.6 | SF | S23W18 | 8293 |
| | 1040 | 1041 | 1048 | | SF | N15E50 | 8299 |
| | 1101 | 1103 | 1114 | C1.6 | SF | N15E49 | 8299 |
| | 1109 | 1110 | 1124 | | SF | S24W26 | 8293 |
| | 1216 | 1216 | 1221 | | SF | S22W18 | 8293 |
| | 1339 | 1340 | 1347 | | SF | N13E38 | 8299 |
| | 1356 | 1358 | 1406 | | SF | S25W28 | 8293 |
| | 1455 | 1456 | 1503 | C1.0 | SF | S24W28 | 8293 |
| | 1627 | 1656 | 1706 | C1.7 | SF | N27E33 | 8297 |
| | 1716 | 1721 | 1730 | | SF | S23W30 | 8293 |
| | 1802 | 1802 | 1806 | | SF | N20W22 | 8298 |
| | 1931 | 1934 | 1936 | B8.3 | | | |
| | 2111 | 2113 | 2116 | C1.1 | SF | N21W22 | 8298 |
| 11 August | 0047 | 0051 | 0054 | B9.6 | | | |
| | 0302 | 0321 | 0343 | C1.4 | | | |
| | 0454 | 0459 | 0509 | C1 | | | |
| | 0902 | 0905 | 0912 | | SF | N19W30 | 8298 |
| | 1109 | 1109 | 1113 | | SF | S23W39 | 8293 |
| 12 August | 1155 | 1201 | 1206 | C1.0 | SF | S23W51 | 8293 |
| | 1308 | 1311 | 1314 | B7.0 | | | |
| | 1515 | 1516 | 1519 | B6.9 | SF | S23W53 | 8293 |
| | 1736 | 1759 | 1808 | C1.3 | | | |
| | 1821 | 1822 | 1841 | | SF | N33W04 | 8297 |
| 13 August | 0534 | 0538 | 0601 | | SF | N33W10 | 8297 |
| | 0744 | 0745 | 0749 | B9.0 | SF | N14W02 | 8299 |
| | 0930 | 0931 | 0939 | | SF | N19E05 | 8299 |
| | 1015 | 1016 | 1038 | C1.5 | SF | N16E06 | 8299 |
| | 1118 | 1122 | 1127 | B9.0 | | | |
| | 1336 | 1338 | 1350 | C1.3 | SF | N15E04 | 8299 |
| | 1407 | 1410 | 1425 | C1.3 | SF | N16E04 | 8299 |
| | 1504 | 1509 | 1512 | C1.5 | | | |
| | 1542 | 1549 | 1602 | | SF | S24W61 | 8293 |
| | 1754 | 1756 | 1806 | C9.5 | SF | S25W61 | 8293 |

## *Flare List-continued*

| Date | Time | | | X-ray | Optical | | Rgn |
|---|---|---|---|---|---|---|---|
| | Begin | Max | End | Class. | Imp / Brtns | Location Lat CMD | # |
| 13 August | 1923 | 1924 | 1926 | C1.8 | SF | S23W66 | 8293 |
| | 2205 | 2205 | 2211 | B9.8 | SF | S31W51 | 8300 |
| 14 August | 0043 | 0047 | 0049 | C1.8 | | | |
| | 0055 | 0101 | 0105 | C1.5 | | | |
| | 0123 | 0123 | 0126 | | SF | S23W70 | 8293 |
| | 0351 | 0413 | 0440 | B8.7 | SF | N14W14 | 8299 |
| | 0500 | 0501 | 0536 | C1.2 | SF | N29W19 | 8297 |
| | 0557 | 0559 | 0608 | C1.9 | SF | S23W73 | 8293 |
| | 0608 | 0608 | 0611 | | SF | N14W15 | 8299 |
| | 0826 | 0826 | 0842 | M3.1 | 1N | S23W74 | 8293 |
| | 0858 | 0900 | 0903 | | SF | S23W75 | 8293 |
| | 0922 | 0923 | 0926 | | SF | S23W75 | 8293 |
| | 2155 | 2155 | 2200 | B9.5 | SF | N15W13 | 8299 |
| 15 August | 0026 | 0038 | 0045 | C3.3 | | | |
| | 0116 | 0120 | 0124 | B9.7 | | | |
| | 0236 | 0244 | 0257 | C1.0 | | | |
| | 0624 | 0626 | 0659 | C7.6 | SF | S24W83 | 8293 |
| | 0852 | 0852 | 0858 | | SF | S23W88 | 8293 |
| | 1150 | 1201 | 1209 | C2.4 | | | |
| | 1630 | 1632 | 1658 | | SF | N23W31 | 8297 |
| | B1632 | U1635 | 1643 | C1.2 | SF | N16W25 | 8299 |
| | 2327 | 2331 | 2341 | C1.3 | | | |
| 16 August | 1003 | 1012 | 1025 | C1.2 | | | |
| | 1157 | 1159 | 1201 | | SF | N17W32 | 8299 |
| | 1456 | 1500 | 1505 | C1.1 | | | |
| | 1737 | 1821 | 1859 | M3.1 | | | |

## *Region Summary*

| Date | Location ( ° Lat ° CMD) | Helio Lon | Area ($10^{-6}$ hemi) | Extent (helio) | Spot Class | Spot Count | Mag Class | Flares X-ray C | M | X | Optical S | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *Region 8288* | | | | | | | | | | | | | | |
| 30 Jul | S26E62 | 315 | 0010 | 00 | HRX | 001 | A | | | | | | | | |
| 31 Jul | S27E48 | 316 | 0000 | 00 | AXX | 001 | A | | | | | 1 | | | |
| 01 Aug | S27E35 | 315 | 0020 | 01 | HAX | 001 | A | | | | | 1 | | | |
| 02 Aug | S28E22 | 315 | 0010 | 01 | AXX | 002 | A | | | | | | | | |
| 03 Aug | S28E11 | 313 | 0000 | 00 | AXX | 001 | A | | | | | | | | |
| 04 Aug | S28W02 | 313 | | | | | | | | | | | | | |
| 05 Aug | S28W15 | 313 | | | | | | | | | | | | | |
| 06 Aug | S28W25 | 310 | 0000 | 01 | AXX | 002 | A | | | | | | | | |
| 07 Aug | S28W38 | 310 | | | | | | | | | | | | | |
| 08 Aug | S28W51 | 310 | | | | | | | | | | | | | |
| 09 Aug | S28W64 | 310 | | | | | | | | | | | | | |
| 10 Aug | S28W77 | 310 | | | | | | | | | | | | | |
| 11 Aug | S28W90 | 310 | | | | | | | | | | | | | |
| | | | | | | | | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 |

Crossed West Limb.
Absolute heliographic longitude: 313

| Date | Location ( ° Lat ° CMD) | Helio Lon | Area ($10^{-6}$ hemi) | Extent (helio) | Spot Class | Spot Count | Mag Class | Flares X-ray C | M | X | Optical S | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *Region 8290* | | | | | | | | | | | | | | |
| 31 Jul | N16E63 | 301 | 0010 | 00 | AXX | 002 | A | | | | | | | | |
| 01 Aug | N16E49 | 301 | 0010 | 01 | AXX | 002 | A | | | | | | | | |
| 02 Aug | N16E36 | 301 | 0010 | 01 | AXX | 002 | A | | | | | | | | |
| 03 Aug | N16E24 | 300 | 0000 | 01 | AXX | 001 | A | | | | | | | | |
| 04 Aug | N16E11 | 300 | | | | | | | | | | | | | |
| 05 Aug | N16W02 | 300 | | | | | | | | | | | | | |
| 06 Aug | N16W15 | 300 | | | | | | | | | | | | | |
| 07 Aug | N16W28 | 300 | | | | | | | | | | | | | |
| 08 Aug | N16W41 | 300 | | | | | | | | | | | | | |
| 09 Aug | N16W54 | 300 | | | | | | | | | | | | | |
| 10 Aug | N16W67 | 300 | | | | | | | | | | | | | |
| 11 Aug | N16W80 | 300 | | | | | | | | | | | | | |
| | | | | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Crossed West Limb.
Absolute heliographic longitude: 300

## *Region Summary-continued*

| Date | Location ( ° Lat ° CMD) | Helio Lon | Sunspot Characteristics Area ($10^{-6}$ hemi) | Extent (helio) | Spot Class | Spot Count | Mag Class | Flares X-ray C | X-ray M | X-ray X | Optical S | Optical 1 | Optical 2 | Optical 3 | Optical 4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | *Region 8293* | | | | | | | | | | | | |
| 02 Aug | S20E69 | 268 | 0080 | 04 | HSX | 001 | A | | | | | | | | |
| 03 Aug | S20E60 | 264 | 0200 | 16 | FSO | 006 | B | | | | | | | | |
| 04 Aug | S22E48 | 263 | 0250 | 16 | FAO | 010 | B | | | | | | | | |
| 05 Aug | S22E39 | 259 | 0330 | 17 | FAC | 026 | BG | 5 | | | | | | | |
| 06 Aug | S22E22 | 263 | 0470 | 17 | FKC | 028 | BGD | 3 | | | | | | | |
| 07 Aug | S22E09 | 262 | 0470 | 18 | FKC | 034 | BG | 3 | | | | | | | |
| 08 Aug | S22W05 | 263 | 0500 | 18 | FKC | 037 | BG | 2 | | | | | | | |
| 09 Aug | S23W18 | 262 | 0580 | 20 | FAC | 062 | BG | 1 | | | | | | | |
| 10 Aug | S23W30 | 261 | 0580 | 21 | FAC | 047 | BG | 2 | | | | | | | |
| 11 Aug | S22W44 | 262 | 0420 | 20 | FAC | 038 | BG | | | | | | | | |
| 12 Aug | S23W58 | 262 | 0390 | 19 | FAC | 021 | B | 1 | | | | | | | |
| 13 Aug | S22W70 | 261 | 0220 | 19 | FAC | 014 | BG | 2 | 1 | | | 1 | | | |
| 14 Aug | S23W78 | 256 | 0080 | 13 | ESO | 008 | B | 1 | 1 | | | 1 | | | |
| | | | | | | | | 20 | 2 | 0 | 0 | 2 | 0 | 0 | 0 |

Crossed West Limb.
Absolute heliographic longitude: 263

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | *Region 8294* | | | | | | | | | | | | |
| 02 Aug | N18E16 | 321 | 0010 | 00 | BXO | 003 | B | | | | | | | | |
| 03 Aug | N17E03 | 321 | 0020 | 05 | BXO | 007 | B | | | | | | | | |
| 04 Aug | N17W12 | 323 | 0030 | 06 | CRO | 008 | B | | | | | | | | |
| 05 Aug | N17W25 | 323 | | | | | | | | | | | | | |
| 06 Aug | N16W37 | 322 | 0010 | 05 | BXO | 003 | B | | | | | | | | |
| 07 Aug | N16W50 | 321 | | | | | | | | | | | | | |
| 08 Aug | N16W63 | 321 | | | | | | | | | | | | | |
| 09 Aug | N16W76 | 321 | | | | | | | | | | | | | |
| 10 Aug | N16W89 | 321 | | | | | | | | | | | | | |
| | | | | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Crossed West Limb.
Absolute heliographic longitude: 321

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | *Region 8295* | | | | | | | | | | | | |
| 03 Aug | N13E01 | 323 | 0000 | 02 | BXO | 002 | B | | | | | | | | |
| 04 Aug | N13W13 | 324 | 0040 | 05 | DAO | 008 | B | | | | | | | | |
| 05 Aug | N14W26 | 324 | 0030 | 06 | CSO | 007 | B | | | | | | | | |
| 06 Aug | N13W39 | 324 | 0010 | 05 | BXO | 009 | B | 1 | | | | | | | |
| 07 Aug | N13W52 | 323 | 0010 | 06 | BXO | 005 | B | 1 | | | | | | | |
| 08 Aug | N13W66 | 324 | 0010 | 07 | BXO | 004 | B | | | | | | | | |
| 09 Aug | N13W79 | 324 | | | | | | | | | | | | | |
| | | | | | | | | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Crossed West Limb.
Absolute heliographic longitude: 323

## *Region Summary-continued*

| Date | Location ( ° Lat ° CMD) | Helio Lon | Area ($10^{-6}$ hemi) | Extent (helio) | Spot Class | Spot Count | Mag Class | Flares X-ray C | X-ray M | X-ray X | Optical S | Optical 1 | Optical 2 | Optical 3 | Optical 4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | *Region 8296* | | | | | | | | | | | | |
| 05 Aug | N16E70 | 228 | 0020 | 01 | HSX | 001 | A | 1 | | | | | | | |
| 06 Aug | N17E58 | 227 | 0020 | 01 | HRX | 001 | A | 1 | | | | | | | |
| 07 Aug | N16E44 | 227 | 0010 | 03 | BXO | 002 | B | 1 | | | | | | | |
| 08 Aug | N16E31 | 227 | | | | | | | | | | | | | |
| 09 Aug | N16E18 | 227 | | | | | | | | | | | | | |
| 10 Aug | N16E05 | 227 | | | | | | | | | | | | | |
| 11 Aug | N16W08 | 227 | | | | | | | | | | | | | |
| 12 Aug | N16W21 | 227 | | | | | | | | | | | | | |
| 13 Aug | N17W36 | 227 | | | | | | | | | | | | | |
| 14 Aug | N17W50 | 228 | | | | | | | | | | | | | |
| 15 Aug | N17W63 | 228 | | | | | | | | | | | | | |
| 16 Aug | N17W76 | 228 | | | | | | | | | | | | | |
| | | | | | | | | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Still on Disk.
Absolute heliographic longitude: 227

| Date | Location ( ° Lat ° CMD) | Helio Lon | Area ($10^{-6}$ hemi) | Extent (helio) | Spot Class | Spot Count | Mag Class | Flares X-ray C | X-ray M | X-ray X | Optical S | Optical 1 | Optical 2 | Optical 3 | Optical 4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | *Region 8297* | | | | | | | | | | | | |
| 06 Aug | N30E73 | 212 | 0220 | 04 | HSX | 001 | A | | | | | | | | |
| 07 Aug | N30E59 | 212 | 0330 | 04 | HHX | 002 | A | | | | | | | | |
| 08 Aug | N29E49 | 209 | 0400 | 13 | CKO | 005 | B | 1 | | | | | | | |
| 09 Aug | N30E35 | 209 | 0470 | 06 | CKO | 006 | B | | | | | | | | |
| 10 Aug | N31E22 | 209 | 0450 | 06 | CKO | 008 | B | 1 | | | | | | | |
| 11 Aug | N28E12 | 206 | 0400 | 11 | CKO | 009 | B | | | | | | | | |
| 12 Aug | N29E00 | 204 | 0400 | 12 | CKO | 012 | B | | | | | | | | |
| 13 Aug | N32W16 | 207 | 0370 | 07 | CHO | 009 | BG | 1 | | | | | | | |
| 14 Aug | N31W29 | 207 | 0350 | 07 | CHO | 006 | B | 1 | | | | | | | |
| 15 Aug | N31W40 | 205 | 0350 | 10 | CKO | 011 | B | | | | | | | | |
| 16 Aug | N31W54 | 206 | 0320 | 07 | CAO | 005 | B | | | | | | | | |
| | | | | | | | | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Still on Disk.
Absolute heliographic longitude: 204

## *Region Summary-continued*

| Date | Location ( ° Lat ° CMD) | Helio Lon | Area ($10^{-6}$ hemi) | Extent (helio) | Spot Class | Spot Count | Mag Class | Flares X-ray C | X-ray M | X-ray X | Optical S | Optical 1 | Optical 2 | Optical 3 | Optical 4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | *Region 8298* | | | | | | | | | | | | |
| 07 Aug | N19E16 | 255 | 0000 | 03 | BXO | 002 | B | | | | | | | | |
| 08 Aug | N18E03 | 255 | 0010 | 04 | BXO | 004 | B | 1 | | | | | | | |
| 09 Aug | N18W11 | 255 | 0030 | 05 | CSO | 009 | B | | | | | | | | |
| 10 Aug | N19W24 | 255 | 0030 | 06 | BXO | 006 | B | 1 | | | | | | | |
| 11 Aug | N20W38 | 256 | 0060 | 08 | CAO | 015 | B | | | | | | | | |
| 12 Aug | N20W51 | 255 | 0060 | 08 | CAO | 014 | B | | | | | | | | |
| 13 Aug | N18W66 | 257 | 0010 | 05 | BXO | 007 | B | | | | | | | | |
| 14 Aug | N18W79 | 257 | | | | | | | | | | | | | |
| | | | | | | | | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Crossed West Limb.
Absolute heliographic longitude: 255

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | *Region 8299* | | | | | | | | | | | | |
| 07 Aug | N17E74 | 197 | 0130 | 02 | HAX | 003 | A | 1 | | | | | | | |
| 08 Aug | N16E64 | 194 | 0320 | 08 | CKO | 010 | B | 4 | 2 | | | 1 | 1 | | |
| 09 Aug | N15E52 | 192 | 0460 | 11 | CKO | 013 | B | | 2 | | | 1 | 1 | | |
| 10 Aug | N15E40 | 191 | 0480 | 11 | EKO | 009 | B | | | | | | | | |
| 11 Aug | N15E26 | 192 | 0460 | 12 | CKO | 013 | B | | | | | | | | |
| 12 Aug | N16E14 | 190 | 0520 | 12 | CKO | 013 | B | 1 | | | | | | | |
| 13 Aug | N16W01 | 192 | 0510 | 08 | CKO | 013 | BGD | 1 | | | | | | | |
| 14 Aug | N16W13 | 191 | 0510 | 11 | CKO | 012 | BGD | 1 | | | | | | | |
| 15 Aug | N16W26 | 191 | 0490 | 11 | CKO | 015 | BGD | 1 | | | | | | | |
| 16 Aug | N17W40 | 192 | 0490 | 10 | CAO | 013 | B | | | | | | | | |
| | | | | | | | | 9 | 4 | 0 | 0 | 2 | 2 | 0 | 0 |

Still on Disk.
Absolute heliographic longitude: 192

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | *Region 8300* | | | | | | | | | | | | |
| 09 Aug | S29W01 | 245 | 0010 | 05 | BXO | 004 | B | | | | | | | | |
| 10 Aug | S29W16 | 247 | 0010 | 05 | BXO | 004 | B | | | | | | | | |
| 11 Aug | S28W29 | 247 | 0020 | 06 | BXO | 006 | B | | | | | | | | |
| 12 Aug | S27W44 | 248 | 0000 | 05 | BXO | 002 | B | | | | | | | | |
| 13 Aug | S27W57 | 248 | | | | | | | | | | | | | |
| 14 Aug | S27W70 | 248 | | | | | | | | | | | | | |
| | | | | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Died on Disk.
Absolute heliographic longitude: 245

## *Region Summary-continued*

| Date | Location ( ° Lat ° CMD) | Helio Lon | Sunspot Characteristics Area ($10^{-6}$ hemi) | Extent (helio) | Spot Class | Spot Count | Mag Class | Flares X-ray C | X-ray M | X-ray X | Optical S | Optical 1 | Optical 2 | Optical 3 | Optical 4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | *Region 8301* | | | | | | | | | | | | |
| 09 Aug | S20E71 | 173 | 0120 | 03 | HSX | 001 | A | | | | | | | | |
| 10 Aug | S22E60 | 171 | 0190 | 15 | EAO | 002 | B | | | | | | | | |
| 11 Aug | S22E48 | 170 | 0190 | 12 | ESO | 003 | B | | | | | | | | |
| 12 Aug | S20E35 | 169 | 0160 | 14 | ESO | 003 | B | | | | | | | | |
| 13 Aug | S20E23 | 169 | 0150 | 14 | ESO | 002 | B | | | | | | | | |
| 14 Aug | S21E09 | 169 | 0120 | 12 | ESO | 002 | B | | | | | | | | |
| 15 Aug | S21W03 | 168 | 0120 | 12 | ESO | 002 | B | | | | | | | | |
| 16 Aug | S21W17 | 169 | 0160 | 13 | ESO | 003 | B | | | | | | | | |
| | | | | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Still on Disk.
Absolute heliographic longitude: 168

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | *Region 8302* | | | | | | | | | | | | |
| 12 Aug | S14E30 | 174 | 0010 | 03 | BXO | 002 | B | | | | | | | | |
| 13 Aug | S14E18 | 173 | 0010 | 04 | BXO | 004 | B | | | | | | | | |
| 14 Aug | S14E05 | 173 | | | | | | | | | | | | | |
| 15 Aug | S14W08 | 173 | | | | | | | | | | | | | |
| 16 Aug | S14W21 | 173 | | | | | | | | | | | | | |
| | | | | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Still on Disk.
Absolute heliographic longitude: 173

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | *Region 8303* | | | | | | | | | | | | |
| 14 Aug | N20E52 | 126 | 0000 | 03 | BXO | 002 | B | | | | | | | | |
| 15 Aug | N20E38 | 127 | 0000 | 00 | AXX | 001 | A | | | | | | | | |
| 16 Aug | N20E25 | 127 | | | | | | | | | | | | | |
| | | | | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Still on Disk.
Absolute heliographic longitude: 127

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | *Region 8304* | | | | | | | | | | | | |
| 15 Aug | S30E64 | 101 | 0090 | 02 | HSX | 001 | A | | | | | | | | |
| 16 Aug | S30E53 | 099 | 0100 | 11 | CSO | 002 | B | | | | | | | | |
| | | | | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Still on Disk.
Absolute heliographic longitude: 099

## *Region Summary-continued*

| Date | Location ( ° Lat ° CMD) | Helio Lon | Sunspot Characteristics Area ($10^{-6}$ hemi) | Extent (helio) | Spot Class | Spot Count | Mag Class | Flares X-ray C | M | X | Optical S | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *Region 8305* | | | | | | | | | | | | | |
| 15 Aug | S25E10 | 155 | 0010 | 03 | BXO | 004 | B | | | | | | | | |
| 16 Aug | S33W04 | 156 | 0040 | 05 | CRO | 006 | B | | | | | | | | |
| | | | | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Still on Disk.

Absolute heliographic longitude: 156

| Date | Location ( ° Lat ° CMD) | Helio Lon | Sunspot Characteristics Area ($10^{-6}$ hemi) | Extent (helio) | Spot Class | Spot Count | Mag Class | Flares X-ray C | M | X | Optical S | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *Region 8306* | | | | | | | | | | | | | |
| 15 Aug | N28E82 | 083 | 0010 | 02 | AXX | 002 | A | | | | | | | | |
| 16 Aug | N27E68 | 084 | 0060 | 02 | HSX | 001 | A | | | | | | | | |
| | | | | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

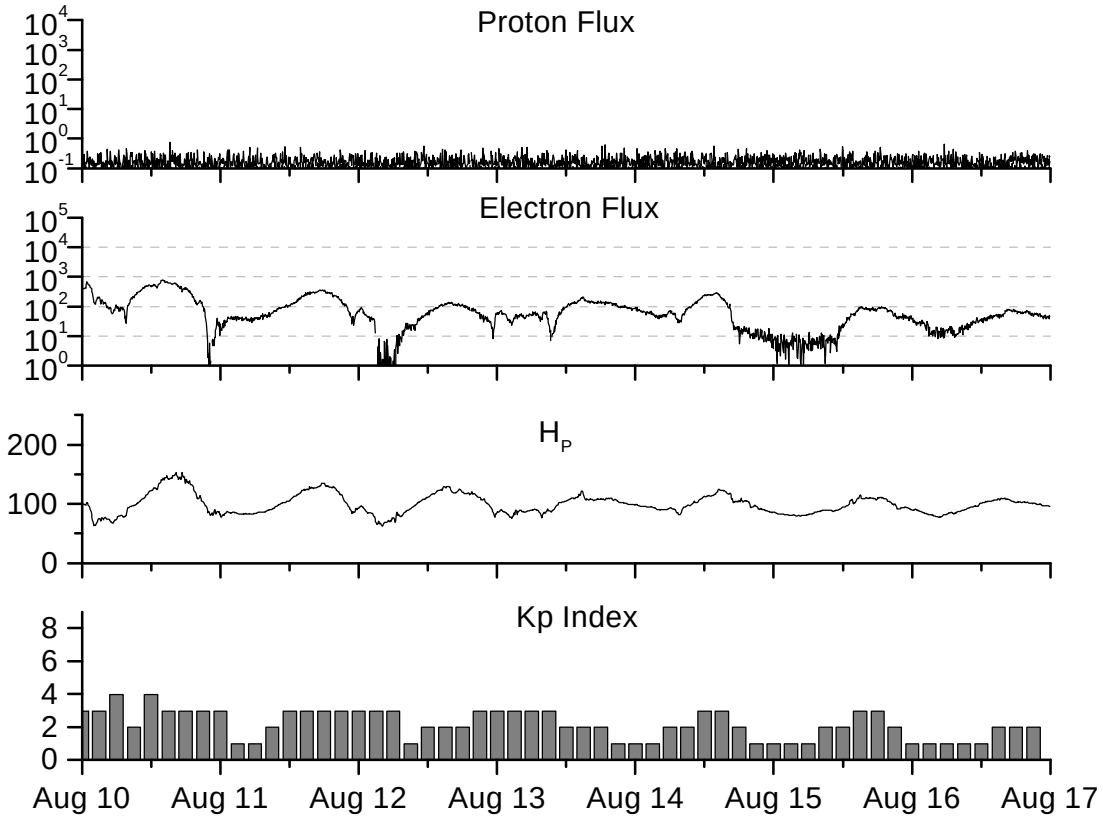
Still on Disk.

Absolute heliographic longitude: 084

***Recent Solar Indices (preliminary)***
***of the observed monthly mean values***

| | Sunspot Numbers | | | | | Radio Flux | | Geomagnetic | |
|---|---|---|---|---|---|---|---|---|---|
| | Observed values | | Ratio | Smooth values | | **Penticton | Smooth | Planetary | Smooth |
| Month | SWO | RI | RI/SWO | SWO | RI | 10.7 cm | Value | Ap | Value |
| | | | | | **1996** | | | | |
| August | 20.5 | 14.4 | 0.70 | 13.1 | 08.3 | 72.4 | 72.1 | 09 | 09.4 |
| September | 02.9 | 01.6 | 0.55 | 13.3 | 08.4 | 69.4 | 72.3 | 15 | 09.3 |
| October | 02.3 | 00.9 | 0.39 | 14.0 | 08.8 | 69.2 | 72.6 | 13 | 09.1 |
| November | 26.7 | 17.9 | 0.67 | 15.4 | 09.8 | 78.7 | 73.0 | 08 | 09.1 |
| December | 21.1 | 13.3 | 0.63 | 16.2 | 10.4 | 77.8 | 73.3 | 07 | 09.3 |
| | | | | | **1997** | | | | |
| January | 09.0 | 05.7 | 0.63 | 16.5 | 10.5 | 74.0 | 73.4 | 09 | 09.3 |
| February | 11.3 | 07.6 | 0.67 | 17.4 | 11.0 | 73.8 | 73.7 | 11 | 09.2 |
| March | 14.4 | 08.7 | 0.60 | 20.4 | 13.5 | 73.5 | 75.1 | 08 | 08.9 |
| April | 24.5 | 15.5 | 0.63 | 24.0 | 16.5 | 74.5 | 76.8 | 10 | 08.6 |
| May | 28.6 | 18.5 | 0.65 | 26.4 | 18.3 | 74.6 | 78.4 | 08 | 08.6 |
| June | 22.1 | 12.7 | 0.57 | 29.0 | 20.3 | 71.7 | 80.1 | 07 | 08.6 |
| July | 17.0 | 10.4 | 0.61 | 32.4 | 22.6* | 71.1 | 81.8* | 06 | 08.5 |
| August | 36.7 | 24.4 | 0.66 | 35.9 | 25.1* | 79.0 | 83.4* | 07 | 08.3 |
| September | 52.8 | 51.3 | 0.88 | 40.5 | 28.4* | 96.2 | 85.7* | 10 | 08.4 |
| October | 33.6 | 22.8 | 0.68 | 45.4 | 31.9* | 84.9 | 88.6* | 11 | 08.6 |
| November | 53.5 | 39.0 | 0.73 | 49.3 | 35.1* | 99.5 | 91.4* | 11 | 09.0 |
| December | 57.9 | 41.2 | 0.71 | 54.2 | 39.1* | 98.8 | 94.2* | 05 | 09.6* |
| | | | | | **1998** | | | | |
| January | 51.8 | 32.3* | 0.62* | 60.6 | 43.8* | 93.5* | 97.6* | 07 | 10.0* |
| February | 54.4 | 40.7* | 0.75* | | | 93.6* | | 07 | |
| March | 81.8 | 54.8* | 0.67* | | | 109.4* | | 11 | |
| April | 73.6 | 53.3* | 0.72* | | | 108.3* | | 10 | |
| May | 74.3 | 56.9* | 0.77* | | | 106.6* | | 18 | |
| June | 93.6 | 70.5* | 0.75* | | | 108.4* | | 11* | |
| July | 98.3 | 66.2* | 0.67* | | | 114.0* | | 12* | |

*Preliminary estimates.
The lowest smoothed sunspot indices number for Cycle 22, RI = 8.0, occurred in May 1996. The highest smoothed sunspot number for Cycle 22, RI=158.5 occurred July 1989.
** From June 1991 onward, the 10.7-cm radio flux data source is Penticton, B.C. Canada. Prior to that, it was Ottawa.




*Weekly Geosynchronous Satellite Environment Summary*
*Week Beginning 10 August 1998*

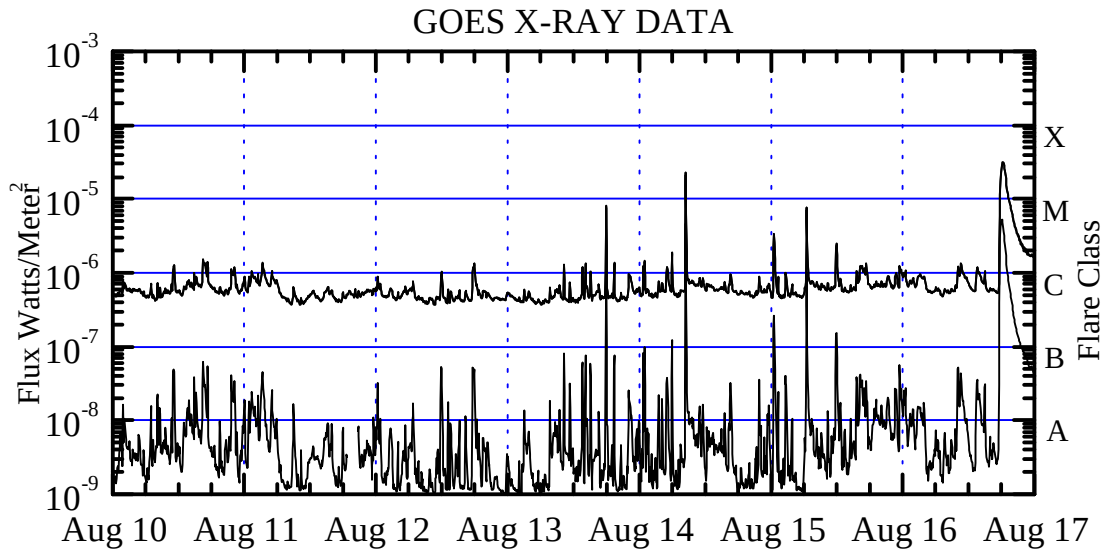
*Protons* plot contains the five-minute averaged integral proton flux (protons/ $cm^2$-sec-sr) as measured by GOES-8 (W75) for each of three energy thresholds: greater than 10, 50, and 100 MeV.

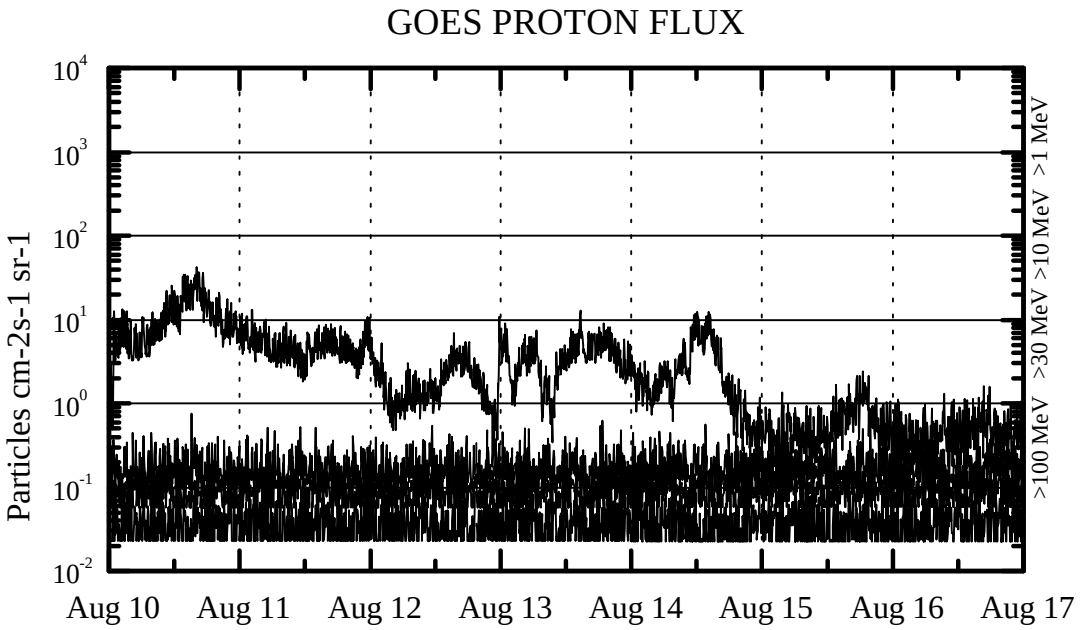
*Electrons* plot contains the five-minute averaged integral electron flux (electrons/ $cm^2$ -sec-sr) with energies greater than 2 MeV at GOES-8.

*Hp* plot contains the five minute averaged magnetic field H component in nanoteslas (nT) as measured by GOES-8. 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 USAF 55$^{th}$ Space Weather Squadron) 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 Heartland, UK. These data are made available through cooperation from the Geological Survey of Canada (GSC) 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 SWO 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. Hparallel is subject to a 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 8 and 10 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 (protons/$cm^2$-sec-sr) as measured by GOES-8 (W75) for each of the energy thresholds: >1, >10, >30 and >100 MeV. P10 event threshold is 10 pfu (protons/$cm^2$-sec-sr) at greater than 10 MeV.