

Space Weather Highlights
16 - 22 July 2001

SWO PRF 1351
24 July 2001

Solar activity ranged from very low to moderate levels. Activity was moderate at the start of the period due to an isolated M1/1n flare at 16/0320 UTC from Region 9539 (S18, L = 165, Eai/220 on 17 July), which was in a gradual growth phase at the time of the flare. Region 9539 began to gradually decay on 17 July and was relatively quiet for the rest of the period. Activity dropped to low levels during 17 - 18 July with isolated B- and C-class X-ray flares. Activity returned to moderate levels on 19 July by virtue of an isolated M1/1b flare from Region 9537 (S08, L = 166, class/area Dso/070 on 16 July), which was in a gradual decay phase prior to the flare. Activity dropped to low to very low levels during the rest of the period with isolated B- and C-class subflares, mostly from Region 9543 (S23, L = 077, class/area Eai/380 on 22 July). This region began a gradual development phase on 19 July that continued as the period ended.

Data were available from the Advanced Composition Explorer (ACE) spacecraft for most of the period. A high speed stream was observed during 16 - 20 July associated with a positive-polarity coronal hole. Velocities gradually increased during 16 - 18 July with peaks as high as 760 km/sec detected on 18 July. Coronal hole effects gradually subsided during 18 - 20 July. There were no significant disturbances observed during the rest of the period.

There were no proton events during the period.

The greater than 2 MeV electron flux at geosynchronous orbit reached high levels during 19 - 21 July.

Geomagnetic field activity was at quiet to active levels during 16 - 17 July due to coronal hole effects. Activity decreased to quiet to unsettled levels for the rest of the period.

Space Weather Outlook
25 July - 20 August 2001

Solar activity is expected to range from low to moderate levels. Isolated M-class flares will be possible during the period. There will be a slight chance for a major flare during the period.

There will be a slight chance for a proton event during the period.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to be at normal to moderate levels during most of the period. However, high flux levels will be possible around 15 - 16 August.

The geomagnetic field is expected to be at quiet to unsettled levels during most of the period, barring an Earth-directed CME. However, brief active periods will be possible during 25 - 26 July and 12 - 13 August due to coronal hole effects.



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 |
| 16 July | 150 | 179 | 1100 | B4.3 | 7 | 1 | 0 | 11 | 1 | 0 | 0 | 0 |
| 17 July | 146 | 191 | 1150 | B5.0 | 4 | 0 | 0 | 5 | 0 | 0 | 0 | 0 |
| 18 July | 143 | 193 | 1020 | B4.8 | 3 | 0 | 0 | 6 | 0 | 0 | 0 | 0 |
| 19 July | 142 | 180 | 950 | B3.8 | 2 | 1 | 0 | 4 | 1 | 0 | 0 | 0 |
| 20 July | 143 | 193 | 980 | B3.4 | 3 | 0 | 0 | 2 | 0 | 0 | 0 | 0 |
| 21 July | 139 | 153 | 670 | B4.0 | 2 | 0 | 0 | 4 | 0 | 0 | 0 | 0 |
| 22 July | 140 | 153 | 910 | B3.6 | 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) | | |
|---------|---|--------|---------|---|--------|-------|
| | >1MeV | >10MeV | >100MeV | >.6MeV | >2MeV | >4MeV |
| 16 July | 4.4E+4 | 1.2E+4 | 2.7E+3 | | 1.7E+6 | |
| 17 July | 7.7E+4 | 1.1E+4 | 2.6E+3 | | 6.6E+6 | |
| 18 July | 2.0E+5 | 1.2E+4 | 2.8E+3 | | 2.8E+7 | |
| 19 July | 1.4E+5 | 1.2E+4 | 2.7E+3 | | 6.2E+7 | |
| 20 July | 1.4E+5 | 1.2E+4 | 2.5E+3 | | 1.1E+8 | |
| 21 July | 1.5E+5 | 1.2E+4 | 2.8E+3 | | 1.1E+8 | |
| 22 July | 8.2E+4 | 1.1E+4 | 2.7E+3 | | 6.6E+6 | |

Daily Geomagnetic Data

| Date | Middle Latitude Fredericksburg | | High Latitude College | | Estimated Planetary | |
|---------|-----------------------------------|-----------------|--------------------------|-----------------|------------------------|-----------------|
| | A | K-indices | A | K-indices | A | K-indices |
| 16 July | 11 | 2-3-1-2-3-2-2-4 | 17 | 2-4-2-4-3-4-2-3 | 17 | 3-4-3-3-3-4-3-4 |
| 17 July | 11 | 4-3-2-2-3-2-1-2 | 31 | 5-5-2-4-5-5-3-2 | 17 | 4-4-3-3-3-3-3-3 |
| 18 July | 8 | 2-3-3-1-2-2-1-1 | 18 | 2-5-5-2-2-3-1-2 | 11 | 2-3-3-2-2-3-3-3 |
| 19 July | 6 | 1-2-2-2-2-2-2-1 | 7 | 1-2-1-3-3-2-1-1 | 9 | 1-2-2-2-2-4-3-2 |
| 20 July | 8 | 2-2-2-2-3-2-2-1 | 9 | 2-2-2-3-2-4-1-0 | 8 | 2-2-2-3-3-3-2-2 |
| 21 July | 3 | 1-2-0-1-1-0-1-2 | 6 | 3-2-0-0-3-2-1-1 | 8 | 1-2-0-2-3-3-3-3 |
| 22 July | 6 | 1-2-1-2-2-2-2-2 | 14 | 2-4-3-4-3-2-2-2 | 11 | 2-3-2-3-3-3-3-3 |



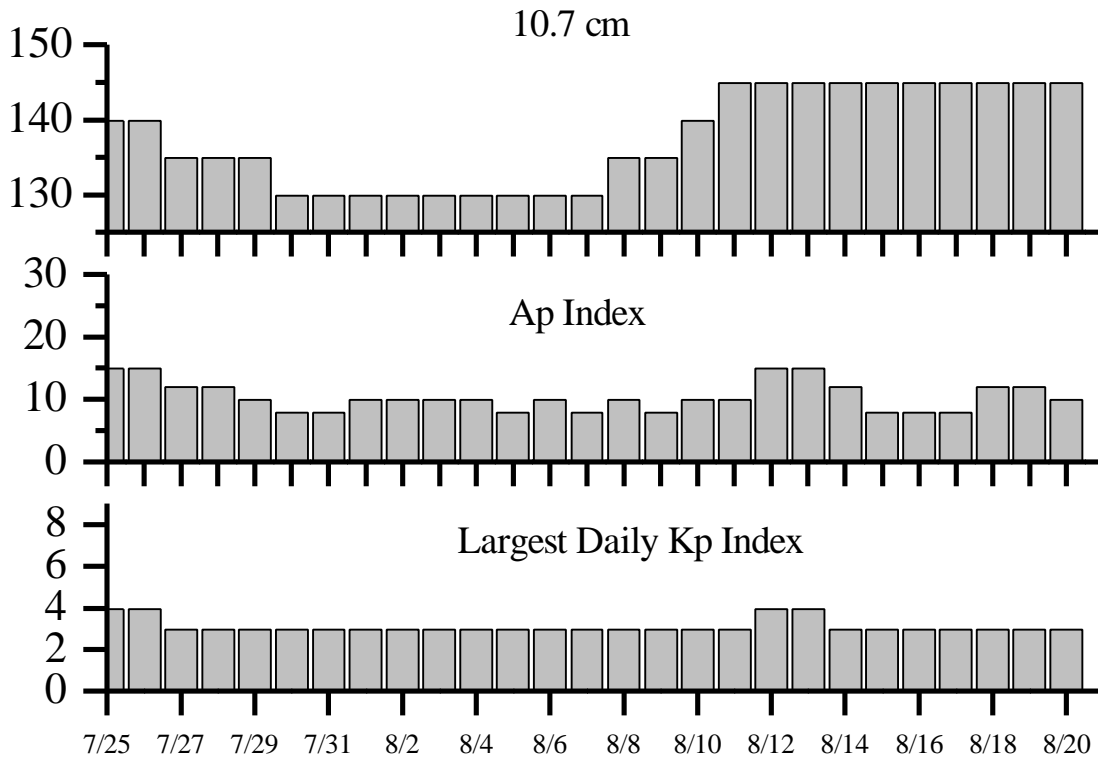


Alerts and Warnings Issued

| Date & Time of Issue | Type of Alert or Warning | Date & Time of Event UT |
|----------------------|---|---------------------------|
| 16 Jul 0014 | 1 - 245 MHz Bursts | 15 Jul |
| 16 Jul 0558 | K = 4 Observed | 16 Jul 0300 - 0600 |
| 16 Jul 2103 | K = 4 Warning | 16 Jul 2100 - 17 Jul 1200 |
| 16 Jul 2106 | K = 4 Observed | 16 Jul 1800 - 2100 |
| 17 Jul 0032 | 2 - 245 MHz Bursts | 16 Jul |
| 17 Jul 0802 | A \geq 20 Watch | 17 Jul |
| 17 Jul 1526 | K= 4 Warning | 17 Jul 1530 - 18 Jul 1200 |
| 19 Jul 1200 | 10cm Radio Burst 370 F.U. | 19 Jul 1012 |
| 19 Jul 1517 | Electron Event $>2\text{MeV}$ $\geq 1000\text{pfu}$ | 19 Jul 1455 |
| 20 Jul 0017 | 3 - 245 MHz Bursts | 19 Jul |
| 20 Jul 0100 | CONTINUED Electron Event $>2\text{MeV}$ $\geq 1000\text{pfu}$ | 19 Jul 1455 |
| 21 Jul 0137 | CONTINUED Electron Event $>2\text{MeV}$ $\geq 1000\text{pfu}$ | 19 Jul 1455 |
| 22 Jul 0100 | CONTINUED Electron Event $>2\text{MeV}$ $\geq 1000\text{pfu}$ | 19 Jul 1455 |



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 |
|---------|-----------------------|----------------------|---------------------|--------|-----------------------|----------------------|---------------------|
| 25 July | 140 | 15 | 4 | 08 Aug | 135 | 10 | 3 |
| 26 | 140 | 15 | 4 | 09 | 135 | 8 | 3 |
| 27 | 135 | 12 | 3 | 10 | 140 | 10 | 3 |
| 28 | 135 | 12 | 3 | 11 | 145 | 10 | 3 |
| 29 | 135 | 10 | 3 | 12 | 145 | 15 | 4 |
| 30 | 130 | 8 | 3 | 13 | 145 | 15 | 4 |
| 31 | 130 | 8 | 3 | 14 | 145 | 12 | 3 |
| 01 Aug | 130 | 10 | 3 | 15 | 145 | 8 | 3 |
| 02 | 130 | 10 | 3 | 16 | 145 | 8 | 3 |
| 03 | 130 | 10 | 3 | 17 | 145 | 8 | 3 |
| 04 | 130 | 10 | 3 | 18 | 145 | 12 | 3 |
| 05 | 130 | 8 | 3 | 19 | 145 | 12 | 3 |
| 06 | 130 | 10 | 3 | 20 | 145 | 10 | 3 |
| 07 | 130 | 8 | 3 | | | | |



Energetic Events

| Date | Time | | X-ray | | Optical Information | | | Peak | | Sweep Freq | | |
|-----------|-------|------|----------|-------|---------------------|---------------|----------|------|------------|------------|-----------|----|
| | Begin | Max | ½ Max | Class | Integ Flux | Imp/ Brtns | Location | | Radio Flux | | Intensity | |
| | | | | | | | Lat | CMD | 245 | 2695 | II | IV |
| 16 Jul 01 | 0313 | 0320 | 0329 | M1.2 | .008 | 1N | S18W20 | 9539 | | | 47 | |
| 19 Jul 01 | 0952 | 1004 | 1017 | M1.8 | .017 | 1B | S08W62 | 9537 | 200 | | 370 | |

Flare List

| Date | Time | | | X-ray Class. | Optical Imp / Brtns | Location Lat CMD | Rgn |
|---------|-------|-------|-------|-----------------|---------------------------|---------------------|------|
| | Begin | Max | End | | | | |
| 16 July | 0316 | 0319 | 0349 | M1.2 | 1N | S18W20 | 9539 |
| | 0630 | 0636 | 0657 | C2.5 | SF | S19W17 | 9539 |
| | 0708 | 0708 | 0718 | C1.1 | SF | S09W54 | 9533 |
| | 0848 | 0854 | 0902 | C2.2 | SF | S18W23 | 9539 |
| | 0918 | 0919 | 0935 | C2.3 | SF | N10E30 | 9545 |
| | B1041 | U1041 | 1046 | C1.8 | SF | S17W22 | 9539 |
| | 1343 | 1345 | 1429 | C1.0 | SF | S20W26 | 9539 |
| | 1453 | 1459 | 1513 | B6.4 | SF | S18W25 | 9539 |
| | 1559 | 1606 | 1623 | B9.2 | SF | N09E27 | 9545 |
| | 1726 | 1732 | 1752 | B9.7 | SF | S18W22 | 9539 |
| | 2150 | 2156 | 2204 | C1.0 | | | |
| | 2206 | U2026 | 2235 | | SF | N09E23 | 9545 |
| | 2337 | U2338 | 2354 | | SF | S25E59 | 9543 |
| 17 July | 0005 | 0007 | 0012 | C1.3 | SF | S26E58 | 9543 |
| | 0728 | 0730 | 0742 | C1.3 | SF | S26E56 | 9543 |
| | 1021 | 1024 | 1037 | C2.4 | SF | S18W37 | 9539 |
| | 1411 | 1413 | 1422 | B6.9 | SF | S21W35 | 9539 |
| | 1926 | 1926 | 1931 | B8.8 | SF | S18W41 | 9539 |
| | 2306 | 2311 | 2314 | C3.0 | | | |
| 18 July | 0022 | 0024 | 0037 | B8.0 | SF | N09E07 | 9545 |
| | 0530 | 0532 | 0541 | B6.4 | SF | N09E04 | 9545 |
| | 1213 | 1214 | 1218 | | SF | N16E57 | |
| | 2003 | 2005 | 2012 | B9.4 | SF | S18E33 | 9546 |
| | 2032 | 2037 | 2044 | C2.0 | | | |
| | 2054 | 2102 | 2109 | C2.4 | | | |
| | 2135 | 2141 | 2154 | C5.4 | SF | S17E32 | 9546 |
| 19 July | 2154 | 2156 | 2202 | | SF | S18E31 | 9546 |
| | 0225 | 0231 | 0235 | B7.6 | | | |
| | 0625 | 0626 | 0631 | | SF | N09E21 | 9542 |
| | 0956 | 0959 | 1053 | M1.8 | 1B | S08W62 | 9537 |
| | 1435 | 1442 | 1455 | | SF | S18E23 | 9546 |
| | 1858 | 1859 | 1918 | C1.2 | SF | S23E27 | 9543 |
| | 2343 | 2345 | A2349 | C1.2 | SF | S18E18 | 9546 |



Flare List- continued

| Date | Time | | | X-ray Class. | Imp / Brtns | Optical | Rgn |
|---------|-------|------|-------|-----------------|----------------|---------------------|------|
| | Begin | Max | End | | | Location Lat CMD | |
| 20 July | 0024 | 0025 | 0035 | B4.9 | SF | N08E11 | 9542 |
| | 0315 | 0328 | 0339 | B7.6 | | | |
| | 2101 | 2114 | 2132 | C2.1 | SF | S21E11 | 9543 |
| | 2236 | 2247 | 2307 | C1.4 | | | |
| | 2336 | 2345 | 2351 | C3.0 | | | |
| 21 July | 0518 | 0519 | 0552 | C6.6 | SF | S22E06 | 9543 |
| | 0714 | 0717 | 0749 | B9.6 | SF | N21W29 | 9541 |
| | 0900 | 0905 | A0932 | C1.0 | SF | S22E03 | 9543 |
| | 1310 | 1310 | 1313 | | SF | N10W37 | 9538 |
| | 1331 | 1335 | 1341 | B6.9 | | | |
| 22 July | 0215 | 0308 | 0427 | B7.6 | | | |
| | 0801 | 0806 | 0812 | B5.9 | | | |
| | 1425 | 1425 | 1444 | B6.0 | SF | S20W15 | 9543 |

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 | 1 | 2 | 3 | 4 |
| <i>Region 9531</i> | | | | | | | | | | | | | | | |
| 08 Jul | S06E19 | 223 | 0050 | 07 | DAO | 013 | BG | 3 | | | 4 | | | | |
| 09 Jul | S06E07 | 222 | 0150 | 08 | DAI | 025 | BG | 3 | | | 5 | | | | |
| 10 Jul | S06W08 | 223 | 0140 | 07 | DAO | 016 | BG | | | | 1 | | | | |
| 11 Jul | S06W20 | 222 | 0100 | 07 | DAO | 010 | B | 1 | | | 1 | | | | |
| 12 Jul | S06W33 | 222 | 0060 | 06 | DAO | 007 | B | | | | | | | | |
| 13 Jul | S06W47 | 223 | 0050 | 07 | DAO | 005 | B | | | | | | | | |
| 14 Jul | S06W61 | 224 | 0020 | 05 | BXO | 002 | B | | | | | | | | |
| 15 Jul | S06W74 | 224 | 0000 | | | | | | | | | | | | |
| 16 Jul | S06W87 | 224 | 0000 | | | | | | | | | | | | |
| | | | | | | | | 7 | 0 | 0 | 11 | 0 | 0 | 0 | 0 |

Crossed West Limb.

Absolute heliographic longitude: 222



Region Summary - continued.

| 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 | 4 | | |
| <i>Region 9533</i> | | | | | | | | | | | | | | | | | |
| 09 Jul | S09E29 | 200 | 0040 | 04 | CSO | 003 | B | | | | | | | | | | |
| 10 Jul | S09E17 | 198 | 0040 | 06 | DAO | 006 | B | | | | | | | | | | |
| 11 Jul | S09E03 | 199 | 0020 | 06 | DSO | 005 | B | | | | | | | | | | |
| 12 Jul | S09W12 | 201 | 0030 | 07 | CSO | 007 | B | | | | | | | | | | |
| 13 Jul | S09W26 | 202 | 0030 | 06 | CSO | 005 | B | | | | | | 1 | | | | |
| 14 Jul | S09W40 | 203 | 0050 | 06 | DAO | 008 | B | | | | | | | | | | |
| 15 Jul | S08W54 | 203 | 0040 | 07 | DSO | 008 | B | | | | | | | 1 | | | |
| 16 Jul | S09W67 | 203 | 0050 | 08 | DSO | 005 | B | 1 | | | | | 1 | | | | |
| 17 Jul | S09W81 | 204 | 0030 | 08 | CRO | 005 | B | | | | | | | | | | |
| | | | | | | | | 1 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | |

Crossed West Limb.

Absolute heliographic longitude: 199

| <i>Region 9534</i> | | | | | | | |
|--------------------|--------|-----|------|----|-----|-----|---|
| 10 Jul | N18E68 | 147 | 0020 | 04 | BXO | 002 | B |
| 11 Jul | N15E55 | 147 | | | | | |
| 12 Jul | N15E42 | 147 | | | | | |
| 13 Jul | N15E29 | 147 | | | | | |
| 14 Jul | N15E16 | 147 | | | | | |
| 15 Jul | N15E03 | 147 | | | | | |
| 16 Jul | N15W10 | 147 | | | | | |
| 19 Jul | N15W49 | 147 | | | | | |
| 20 Jul | N15W62 | 147 | | | | | |
| 21 Jul | N15W75 | 147 | | | | | |

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Still on Disk.

Absolute heliographic longitude: 147



Region Summary - continued.

| 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 | 4 | | | | | | | |
| <i>Region 9535</i> | | | | | | | | | | | | | | | | | | | | | | |
| 10 Jul | N10E76 | 139 | 0090 | 03 | HAX | 001 | A | | | | | | | | | | | | | | | |
| 11 Jul | N06E63 | 139 | 0120 | 02 | HSX | 001 | A | | | | | | | | | | | | | | | |
| 12 Jul | N08E48 | 141 | 0120 | 02 | HSX | 001 | A | | | | | | | | | | | | | | | |
| 13 Jul | N05E35 | 141 | 0130 | 02 | HSX | 001 | A | | | | | | | | | | | | | | | |
| 14 Jul | N06E22 | 141 | 0130 | 03 | HSX | 001 | A | | | | | | | | | | | | | | | |
| 15 Jul | N06E08 | 141 | 0160 | 02 | HSX | 001 | A | | | | | | | | | | | | | | | |
| 16 Jul | N06W05 | 141 | 0140 | 02 | HSX | 001 | A | | | | | | | | | | | | | | | |
| 17 Jul | N06W18 | 141 | 0120 | 02 | HSX | 001 | A | | | | | | | | | | | | | | | |
| 18 Jul | N06W31 | 141 | 0100 | 02 | HSX | 001 | A | | | | | | | | | | | | | | | |
| 19 Jul | N06W44 | 141 | 0110 | 02 | HSX | 001 | A | | | | | | | | | | | | | | | |
| 20 Jul | N06W58 | 142 | 0120 | 02 | HSX | 001 | A | | | | | | | | | | | | | | | |
| 21 Jul | N07W72 | 142 | 0090 | 02 | HSX | 001 | A | | | | | | | | | | | | | | | |
| 22 Jul | N06W85 | 142 | 0090 | 03 | HAX | 001 | A | | | | | | | | | | | | | | | |

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Still on Disk.

Absolute heliographic longitude: 141

| <i>Region 9536</i> | | | | | | | |
|--------------------|--------|-----|------|----|-----|-----|---|
| 11 Jul | N11E40 | 162 | 0030 | 04 | CSO | 004 | B |
| 12 Jul | N12E23 | 166 | 0020 | 02 | CSO | 005 | B |
| 13 Jul | N11E09 | 167 | 0020 | 02 | CSO | 004 | B |
| 14 Jul | N11W03 | 166 | 0010 | 03 | CRO | 004 | B |
| 15 Jul | N11W16 | 166 | | | | | |
| 16 Jul | N11W29 | 166 | | | | | |
| 17 Jul | N11W42 | 166 | | | | | |
| 18 Jul | N11W55 | 166 | | | | | |
| 19 Jul | N11W68 | 166 | | | | | |

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Crossed West Limb.

Absolute heliographic longitude: 166



Region Summary - continued.

| 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 | | | |
| <i>Region 9537</i> | | | | | | | | | | | | | | | | | | |
| 11 Jul | S07E39 | 163 | 0030 | 03 | CRO | 006 | B | | | | | | | | | | | |
| 12 Jul | S06E25 | 164 | 0060 | 06 | DAO | 010 | B | | | | | | | | | | | |
| 13 Jul | S08E11 | 165 | 0060 | 07 | DAO | 014 | B | | | | | | | | | | | |
| 14 Jul | S08W03 | 166 | 0040 | 07 | DAO | 010 | B | | | | | | | | | | | |
| 15 Jul | S08W16 | 165 | 0030 | 05 | DSO | 009 | B | | | | | | | | | | | |
| 16 Jul | S08W28 | 164 | 0070 | 06 | DSO | 008 | B | | | | | | | | | | | |
| 17 Jul | S07W42 | 165 | 0070 | 05 | DAO | 010 | B | | | | | | | | | | | |
| 18 Jul | S08W54 | 164 | 0050 | 03 | CAO | 004 | B | | | | | | | | | | | |
| 19 Jul | S08W66 | 163 | 0030 | 01 | CSO | 002 | B | | 1 | | | | 1 | | | | | |
| 20 Jul | S08W82 | 166 | 0030 | 01 | HRX | 001 | A | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |

Crossed West Limb.

Absolute heliographic longitude: 166

| | | | | | | | | | | | | | | | | | | |
|--------------------|--------|-----|------|----|-----|-----|---|--|---|---|---|---|---|---|---|---|---|---|
| <i>Region 9538</i> | | | | | | | | | | | | | | | | | | |
| 11 Jul | N17E86 | 116 | 0030 | 03 | HSX | 001 | A | | | | | | | | | | | |
| 12 Jul | N18E68 | 121 | 0140 | 03 | HAX | 001 | A | | | | | | | | | | | |
| 13 Jul | N16E56 | 120 | 0130 | 02 | HAX | 001 | A | | | | | | | | | | | |
| 14 Jul | N16E42 | 121 | 0180 | 03 | HAX | 001 | A | | | | | | | | | | | |
| 15 Jul | N16E28 | 121 | 0250 | 03 | HKX | 001 | A | | | | | | | | | | | |
| 16 Jul | N16E16 | 120 | 0190 | 03 | CSO | 001 | B | | | | | | | | | | | |
| 17 Jul | N16E03 | 120 | 0180 | 03 | HSX | 001 | A | | | | | | | | | | | |
| 18 Jul | N17W11 | 121 | 0180 | 03 | HAX | 001 | A | | | | | | | | | | | |
| 19 Jul | N17W23 | 120 | 0130 | 03 | HAX | 001 | A | | | | | | | | | | | |
| 20 Jul | N17W37 | 121 | 0130 | 03 | HAX | 001 | A | | | | | | | | | | | |
| 21 Jul | N16W51 | 121 | 0120 | 02 | HAX | 001 | A | | | | | | 1 | | | | | |
| 22 Jul | N16W64 | 121 | 0150 | 02 | HAX | 001 | A | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |

Still on Disk.

Absolute heliographic longitude: 120

| | | | | | | | | | | | | | | | | | | |
|--------------------|--------|-----|------|----|-----|-----|----|---|----|---|---|----|---|---|---|---|---|---|
| <i>Region 9539</i> | | | | | | | | | | | | | | | | | | |
| 12 Jul | S18E26 | 163 | 0030 | 07 | CSO | 005 | B | | | | | 1 | | | | | | |
| 13 Jul | S19E11 | 165 | 0050 | 11 | EAO | 009 | B | | | | | | | | | | | |
| 14 Jul | S18W02 | 165 | 0110 | 11 | EAI | 026 | BG | 4 | 1 | | | 6 | | | | | | |
| 15 Jul | S18W15 | 164 | 0110 | 12 | EAI | 021 | BG | 4 | | | | 3 | 1 | | | | | |
| 16 Jul | S18W28 | 164 | 0190 | 13 | EAI | 020 | BG | 4 | 1 | | | 6 | 1 | | | | | |
| 17 Jul | S18W43 | 166 | 0220 | 14 | EAI | 020 | BG | 1 | | | | 3 | | | | | | |
| 18 Jul | S19W58 | 168 | 0140 | 11 | CAO | 006 | B | | | | | | | | | | | |
| 19 Jul | S20W74 | 171 | 0110 | 03 | HAX | 001 | A | | | | | | | | | | | |
| 20 Jul | S20W92 | 176 | 0120 | 04 | HAX | 001 | A | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | 13 | 2 | 0 | 19 | 2 | 0 | 0 | 0 | 0 | 0 |

Crossed West Limb.



Absolute heliographic longitude: 165



Region Summary - continued.

| 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 | 4 | | | |
| <i>Region 9543</i> | | | | | | | | | | | | | | | | | | |
| 15 Jul | S24E71 | 078 | 0060 | 03 | HAX | 001 | A | | | | | 2 | | | | | | |
| 16 Jul | S24E62 | 074 | 0230 | 13 | ESO | 006 | B | 1 | | | | 1 | | | | | | |
| 17 Jul | S23E48 | 075 | 0250 | 14 | EAO | 013 | B | 1 | | | | 2 | | | | | | |
| 18 Jul | S23E34 | 076 | 0270 | 14 | EAI | 012 | B | | | | | | | | | | | |
| 19 Jul | S23E22 | 075 | 0230 | 15 | ESO | 013 | B | 1 | | | | 1 | | | | | | |
| 20 Jul | S23E07 | 077 | 0270 | 15 | EAI | 024 | BG | 1 | | | | 1 | | | | | | |
| 21 Jul | S23W06 | 076 | 0230 | 14 | EAI | 030 | BG | 2 | | | | 2 | | | | | | |
| 22 Jul | S22W19 | 076 | 0380 | 15 | EAI | 041 | BG | | | | | 1 | | | | | | |
| | | | | | | | | 6 | 0 | 0 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 |

Still on Disk.

Absolute heliographic longitude: 076

| | | | | | | | | | | | | | | | | | | |
|--------------------|--------|-----|------|----|-----|-----|---|---|---|---|---|---|---|---|---|---|---|---|
| <i>Region 9544</i> | | | | | | | | | | | | | | | | | | |
| 16 Jul | N13W14 | 150 | 0020 | 05 | BXO | 008 | B | | | | | | | | | | | |
| 17 Jul | N16W26 | 149 | 0010 | 05 | BXO | 008 | B | | | | | | | | | | | |
| 18 Jul | N15W38 | 148 | 0010 | 03 | BXO | 004 | B | | | | | | | | | | | |
| | | | | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Still on Disk.

Absolute heliographic longitude: 150

| | | | | | | | | | | | | | | | | | | |
|--------------------|--------|-----|------|----|-----|-----|----|---|---|---|---|---|---|---|---|---|---|---|
| <i>Region 9545</i> | | | | | | | | | | | | | | | | | | |
| 16 Jul | N09E22 | 114 | 0030 | 05 | DAO | 006 | BG | 1 | | | | 3 | | | | | | |
| 17 Jul | N09E08 | 115 | 0050 | 07 | DAO | 007 | BG | | | | | | | | | | | |
| 18 Jul | N09W08 | 118 | 0030 | 05 | CSO | 003 | B | | | | | 2 | | | | | | |
| 19 Jul | N08W22 | 119 | 0020 | 01 | AXX | 001 | A | | | | | | | | | | | |
| 20 Jul | N08W37 | 121 | 0010 | 01 | HRX | 001 | A | | | | | | | | | | | |
| 21 Jul | N09W43 | 113 | 0030 | 04 | DSO | 007 | B | | | | | | | | | | | |
| 22 Jul | N09W57 | 114 | 0070 | 07 | DSO | 016 | B | | | | | | | | | | | |
| | | | | | | | | 1 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 |

Still on Disk.

Absolute heliographic longitude: 115

| | | | | | | | | | | | | | | | | | | |
|--------------------|--------|-----|------|----|-----|-----|----|---|---|---|---|---|---|---|---|---|---|---|
| <i>Region 9546</i> | | | | | | | | | | | | | | | | | | |
| 16 Jul | S17E60 | 076 | 0050 | 06 | DSO | 004 | B | | | | | | | | | | | |
| 17 Jul | S17E46 | 077 | 0070 | 08 | DAO | 006 | B | | | | | | | | | | | |
| 18 Jul | S17E32 | 078 | 0060 | 10 | DSO | 006 | BG | 1 | | | | 3 | | | | | | |
| 19 Jul | S17E19 | 078 | 0090 | 12 | ESO | 009 | BG | 1 | | | | 2 | | | | | | |
| 20 Jul | S16E04 | 080 | 0040 | 12 | EAI | 010 | BG | | | | | | | | | | | |
| 21 Jul | S12W14 | 084 | 0020 | 04 | CRO | 004 | B | | | | | | | | | | | |
| 22 Jul | S15W28 | 085 | 0090 | 08 | DSO | 011 | B | | | | | | | | | | | |
| | | | | | | | | 2 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 |

Still on Disk.

Absolute heliographic longitude: 080



Region Summary - continued.

| 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 9547

| | | | | | | | | | | | | | | | | | |
|--------|--------|-----|------|----|-----|-----|---|--|--|--|--|--|--|--|--|--|--|
| 18 Jul | S16W22 | 132 | 0010 | 03 | CRO | 002 | B | | | | | | | | | | |
| 19 Jul | S16W35 | 132 | | | | | | | | | | | | | | | |
| 20 Jul | S16W48 | 132 | | | | | | | | | | | | | | | |
| 21 Jul | S16W61 | 132 | | | | | | | | | | | | | | | |
| 22 Jul | S16W74 | 132 | | | | | | | | | | | | | | | |

0 0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 132

Region 9548

| | | | | | | | | | | | | | | | | | |
|--------|--------|-----|------|----|-----|-----|---|--|--|--|--|--|--|--|--|--|--|
| 18 Jul | N17E50 | 060 | 0020 | 05 | CSO | 002 | B | | | | | | | | | | |
| 19 Jul | N18E36 | 061 | 0040 | 06 | CSO | 004 | B | | | | | | | | | | |
| 20 Jul | N17E24 | 060 | 0090 | 06 | DAO | 007 | B | | | | | | | | | | |
| 21 Jul | N16E09 | 061 | 0120 | 07 | DAO | 009 | B | | | | | | | | | | |
| 22 Jul | N17W04 | 061 | 0110 | 09 | DSO | 012 | B | | | | | | | | | | |

0 0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 061

Region 9549

| | | | | | | | | | | | | | | | | | |
|--------|--------|-----|------|----|-----|-----|---|--|--|--|--|--|--|--|--|--|--|
| 18 Jul | S04E57 | 053 | 0020 | 01 | AXX | 001 | A | | | | | | | | | | |
| 19 Jul | S04E45 | 052 | 0020 | 01 | HSX | 001 | A | | | | | | | | | | |
| 20 Jul | S04E32 | 052 | 0020 | 01 | AXX | 001 | A | | | | | | | | | | |
| 21 Jul | S05E16 | 054 | 0010 | 01 | HRX | 001 | A | | | | | | | | | | |
| 22 Jul | S05E03 | 054 | | | | | | | | | | | | | | | |

0 0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 054

Region 9550

| | | | | | | | | | | | | | | | | | |
|--------|--------|-----|------|----|-----|-----|---|--|--|--|--|--|--|--|--|--|--|
| 18 Jul | N08E38 | 072 | 0010 | 03 | BXO | 002 | B | | | | | | | | | | |
| 19 Jul | N07E24 | 073 | 0010 | 04 | BXO | 003 | B | | | | | | | | | | |
| 20 Jul | N07E11 | 073 | | | | | | | | | | | | | | | |
| 21 Jul | N07W02 | 073 | | | | | | | | | | | | | | | |
| 22 Jul | N07W15 | 073 | | | | | | | | | | | | | | | |

0 0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 073



Region Summary - continued.

| Location | | Sunspot Characteristics | | | | | Flares | | | | | | | |
|----------|----------------|-------------------------|--------------------------------|-------------------|---------------|---------------|--------------|-------|---|---|---------|---|---|---|
| Date | (° 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 9551

| | | | | | | | | | | | | | | | |
|--------|--------|-----|------|----|-----|-----|---|--|--|--|--|--|--|--|--|
| 19 Jul | N12W77 | 174 | 0040 | 02 | BXO | 002 | B | | | | | | | | |
| 20 Jul | N10W89 | 173 | 0040 | 09 | BXO | 003 | B | | | | | | | | |

0 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 174

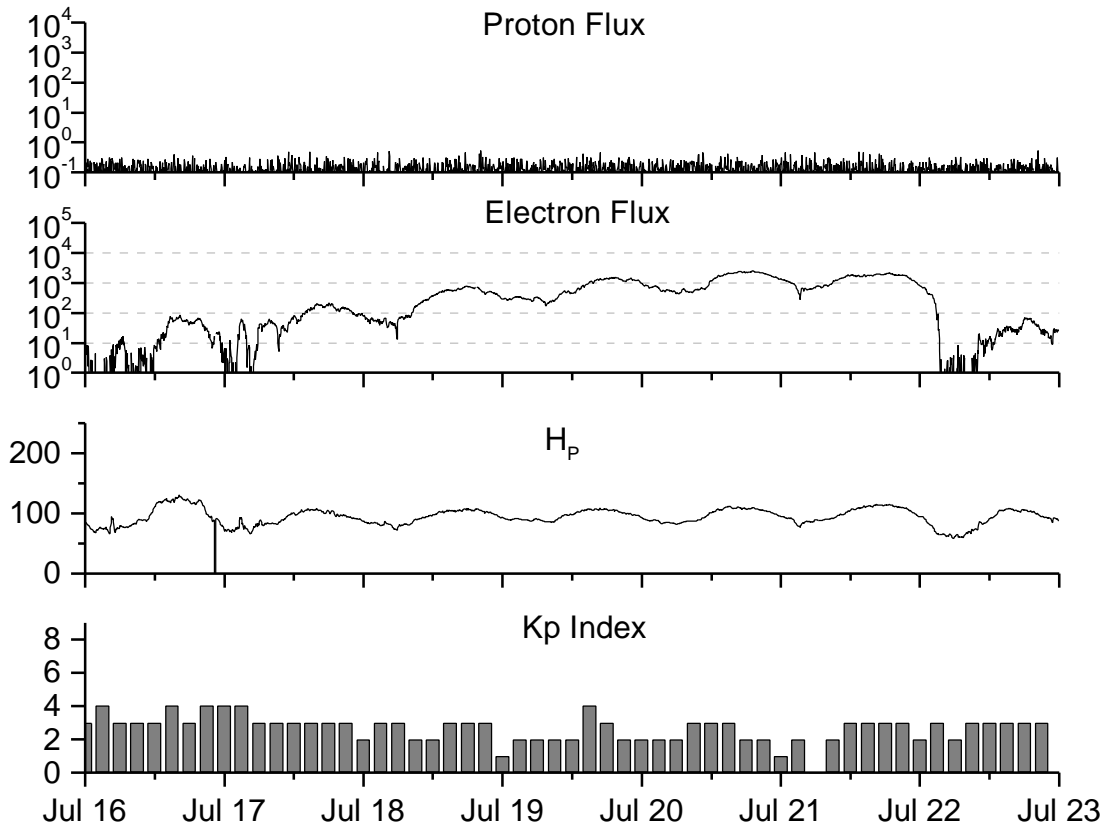


**Recent Solar Indices (preliminary)
of the observed monthly mean values**

| Month | Sunspot Numbers | | | Radio Flux | | Geomagnetic | | | |
|-------------|------------------------|-------------|-----------------|----------------------|---------------------|-----------------------|-----------------|-----------------|-----------------|
| | Observed values SWO | Ratio RI | Ratio RI/SWO | Smooth values SWO | Smooth values RI | *Penticton 10.7 cm | Smooth Value | Planetary Ap | Smooth Value |
| 1999 | | | | | | | | | |
| July | 169.2 | 113.5 | 0.67 | 138.0 | 94.3 | 165.6 | 154.4 | 10 | 12.6 |
| August | 136.1 | 93.7 | 0.69 | 142.8 | 97.5 | 170.8 | 156.3 | 15 | 12.9 |
| September | 107.4 | 71.5 | 0.67 | 150.0 | 102.3 | 135.7 | 161.0 | 19 | 12.8 |
| October | 167.7 | 116.7 | 0.70 | 158.5 | 107.8 | 164.8 | 167.2 | 19 | 12.7 |
| November | 199.3 | 133.2 | 0.67 | 164.7 | 110.0 | 191.5 | 171.5 | 14 | 13.1 |
| December | 123.5 | 86.4 | 0.69 | 165.9 | 111.1 | 169.8 | 173.4 | 10 | 13.8 |
| 2000 | | | | | | | | | |
| January | 140.8 | 90.1 | 0.64 | 168.0 | 112.9 | 158.1 | 175.5 | 13 | 14.5 |
| February | 161.9 | 112.9 | 0.70 | 172.1 | 116.7 | 173.2 | 176.8 | 15 | 15.0 |
| March | 203.6 | 138.5 | 0.68 | 175.4 | 119.9 | 208.2 | 178.4 | 09 | 15.0 |
| April | 193.4 | 125.5 | 0.65 | 176.3 | 120.8 | 184.2 | 180.5 | 15 | 15.0 |
| May | 188.8 | 121.6 | 0.64 | 173.1 | 119.0 | 184.5 | 180.0 | 15 | 15.0 |
| June | 190.3 | 124.9 | 0.66 | 172.0 | 118.7 | 179.8 | 179.7 | 15 | 15.1 |
| July | 236.7 | 169.1 | 0.71 | 173.0 | 119.7 | 204.7 | 180.2 | 21 | 14.8 |
| August | 166.6 | 130.5 | 0.78 | 171.8 | 118.6 | 163.1 | 179.5 | 16 | 14.2 |
| September | 157.9 | 109.9 | 0.70 | 169.0 | 116.2 | 182.1 | 177.1 | 18 | 14.2 |
| October | 138.9 | 100.1 | 0.72 | 166.2 | 114.4 | 167.7 | 175.6 | 18 | 14.6 |
| November | 149.9 | 106.5 | 0.71 | 162.7 | 112.7 | 178.8 | 173.6 | 17 | 14.6 |
| December | 146.4 | 104.5 | 0.71 | 160.8 | 112.1 | 173.6 | 172.0 | 08 | 14.4 |
| 2001 | | | | | | | | | |
| January | 142.7 | 95.1 | 0.67 | | | 166.7 | | 08 | |
| February | 131.0 | 80.1 | 0.61 | | | 147.3 | | 06 | |
| March | 166.7 | 114.2 | 0.69 | | | 177.7 | | 17 | |
| April | 163.6 | 108.2 | 0.66 | | | 178.3 | | 18 | |
| May | 135.1 | 97.3 | 0.72 | | | 148.7 | | 12 | |
| June | 196.7 | 134.0 | 0.68 | | | 173.7 | | 12 | |

NOTE: All smoothed values after June 1999 and monthly values after December 2000 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 22, RI= 158.5, occurred July 1989. *After June 1991, 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 16 July 2001

Protons plot contains the five-minute averaged integral proton flux (protons/cm²-sec -sr) as measured by GOES-8 (W75) for each of three energy thresholds: greater than 10, 50, and 100 MeV.

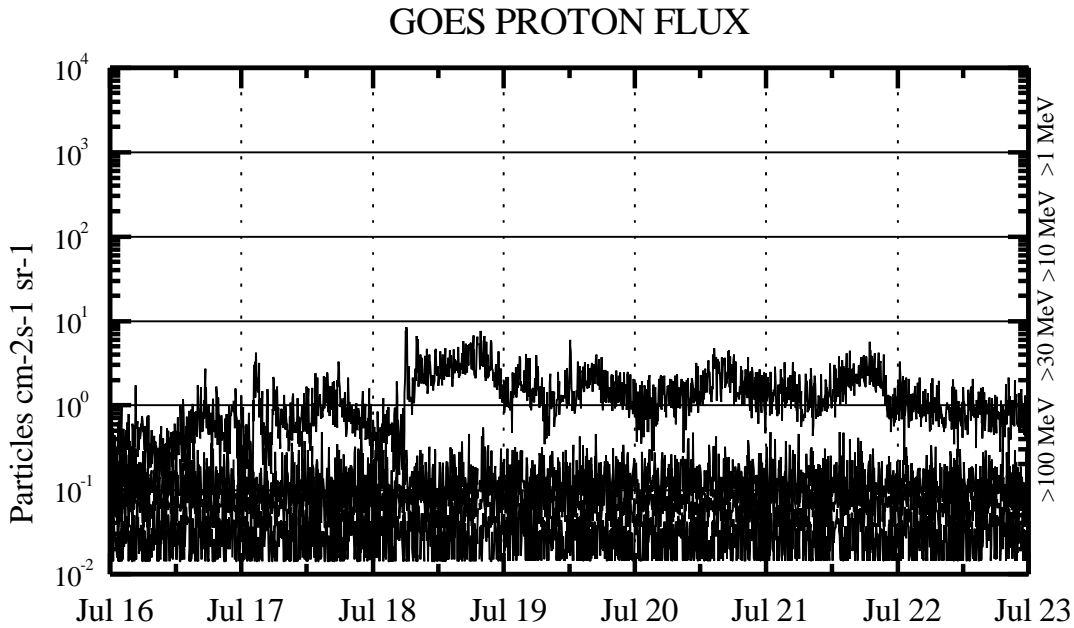
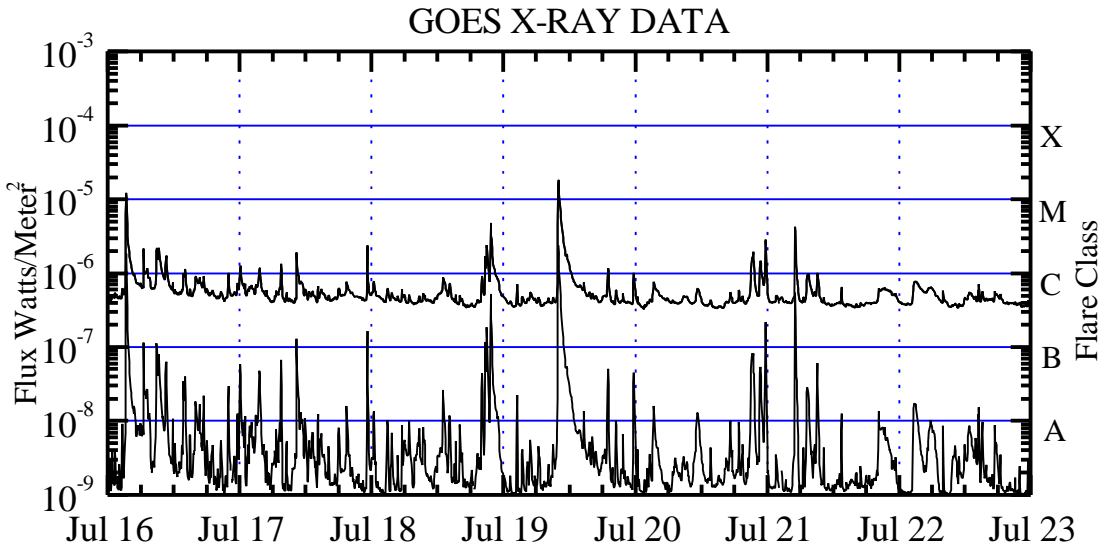
Electrons plot contains the five-minute averaged integral electron flux (electrons/cm²-sec -sr) with energies greater than 2 MeV at GOES-8.

H_p 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.

K_p 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 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 K_p 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 K_p are "global" parameters that are applicable to a first order approximation over large areas. H_p 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/m²) 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/cm²-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/cm²-sec-sr) at greater than 10 MeV.

