

Space Weather Highlights
03-09 November 1997

Solar activity ranged from very low to high. Region 8100 (S20, L = 352, class/area FKc/1000 on 04 Nov.) produced the first two X-class flares of Cycle 23. The period began with activity at moderate levels with Region 8100 producing M-class flares, an M1/1B at 03/0910UT associated with a 130 SFU Tenflare and Types II and IV radio sweeps; and an impulsive M4 (no optical) at 03/1029UT accompanied by a 230 SFU Tenflare, Type IV radio sweep, moderate centimetric radio bursts, and a halo-type coronal mass ejection (CME). This activity occurred as Region 8100 exhibited dramatic growth in size and magnetic complexity. Other events of interest on 03 Nov. included a C8/SB flare at 03/0438UT associated with Types II and IV radio sweeps and a Type IV radio sweep during 03/1213 - 1757UT which was not optically correlated. Activity rose to high levels on 04 Nov. with Region 8100 producing an X2/2B flare at 04/0558UT which was associated with a 690 SFU Tenflare, Types II and IV radio sweeps, and an Earth-directed halo CME. Growth continued in Region 8100, but at a reduced rate following the major flare. The region also produced two M-class flares on 04 Nov.. Activity dropped to low levels on 05 Nov. with Region 8100 producing several C-class flares while remaining large and magnetically complex. Activity again rose to high levels on 06 Nov. with Region 8100 producing an X9/2B flare at 06/1155UT accompanied by a 3300 SFU Tenflare, a Type IV radio sweep, and a CME off the West limb. Region 8100 began to simplify following the X9 with decreased penumbral area and magnetic complexity. Activity dropped to low to very low levels during the remainder of the period with Region 8100 quietly crossing the West limb during 08 Nov.

Solar wind data were received from the WIND spacecraft a few hours per day. Velocities varied from about 300 - 400 km/sec through most of 06 Nov. Velocities abruptly increased from 330 - 470 km/sec late on 06 Nov., then gradually decreased to 360 km/sec during the remainder of the period. Solar wind particle densities were in the 03 - 15 p/cc range during most of the period, but increased to near 30 p/cc late on 06 Nov. Bz ranged from plus 08 to minus 08 nT (GSM) through 06 Nov.. Bz varied from minus 14 to plus 16 nT during 07 Nov., then ranged from minus 05 to plus 10 nT for the rest of the period. Solar sector orientation was mostly toward (phi angle near 315 degrees) through late 03 Nov., then shifted to away conditions through 05 Nov. Orientation was not discernible for the rest of the period.

The greater than 10 MeV proton flux at geosynchronous altitude reached event levels following the X-class flare activity mentioned above. The event began at 06/1305UT, reached a peak of 490 PFU at 07/0250UT, and ended at 09/1205UT. A greater than 100 MeV proton event occurred as well, beginning at 06/1245UT, reaching a peak of 051 PFU at 06/1640UT, and ending at 08/0250UT. A ground-level event was also detected (a rare event - only a few observed in any given solar cycle). It began at 06/1220UT, peaked at about 10 percent above background at 06/1355UT, and ended at 06/2000UT.

The greater than 2 MeV electron flux at geosynchronous altitude reached high levels on 03 Nov.

The geomagnetic field was mostly quiet to unsettled through most of 06 Nov.. A sudden storm commencement (SSC) of 36 nT was observed by the Boulder USGS magnetometer at 06/2252UT. Major to severe storm levels occurred during 07/0000 - 0600UT, declining to active to minor storm levels during 07/0600 - 1800UT. Conditions declined to mostly quiet levels after 07/1800UT and persisted through the rest of the period with active to minor storm levels observed at high latitudes after 09/2100UT.

Space Weather Forecast
12 November 1997 - 08 December 1997

Solar activity is expected to range from low to moderate. M-class flare activity may occur during 23 Nov. - 05 December as old Region 8100 returns to the visible disk. Chances for energetic proton events or enhancements at geosynchronous altitude may increase during 23 Nov. - 05 December with the return of old Region 8100.

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

The geomagnetic field is expected to be mostly quiet to unsettled.



Daily Solar Data

| Date | Radio | Sun | Sunspot | X-ray | X-ray Flux | | | Flares | | | | |
|-------------|-----------------|-----------------------------|---------|------------|------------|---|---|--------|---|---|---|---|
| | Flux 10.7 cm | spot No. (10^6 hemi.) | Area | Background | C | M | X | S | 1 | 2 | 3 | 4 |
| 03 November | 110 | 66 | 660 | B2.6 | 15 | 3 | 0 | 16 | 2 | 0 | 0 | 0 |
| 04 November | 118 | 68 | 1030 | C1.6 | 13 | 2 | 1 | 27 | 2 | 1 | 0 | 0 |
| 05 November | 114 | 51 | 940 | B9.1 | 7 | 0 | 0 | 17 | 1 | 0 | 0 | 0 |
| 06 November | 105 | 60 | 840 | C1.0 | 3 | 0 | 1 | 6 | 1 | 1 | 0 | 0 |
| 07 November | 94 | 60 | 690 | B2.4 | 2 | 0 | 0 | 4 | 0 | 0 | 0 | 0 |
| 08 November | 90 | 61 | 580 | B2.2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 09 November | 86 | 40 | 40 | B1.4 | 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 |
| 03 November | 3.7E+5 | 2.1E+4 | 4.8E+3 | | 3.3E+7 | |
| 04 November | 5.4E+6 | 1.8E+6 | 6.5E+4 | | 1.2E+7 | |
| 05 November | 1.4E+7 | 8.6E+5 | 1.1E+4 | | 1.8E+6 | |
| 06 November | 2.6E+7 | 8.5E+6 | 1.4E+6 | | 5.0E+5 | |
| 07 November | 9.7E+7 | 2.1E+7 | 6.3E+5 | | 8.7E+5 | |
| 08 November | 2.1E+7 | 3.0E+6 | 3.8E+4 | | 2.2E+6 | |
| 09 November | 1.3E+7 | 7.8E+5 | 8.0E+3 | | 6.7E+6 | |

Daily Geomagnetic Data

| Date | Middle Latitude Fredericksburg | | High Latitude College | | Estimated Planetary | |
|-------------|-----------------------------------|-----------------|--------------------------|-----------------|------------------------|-----------------|
| | A | K-indices | A | K-indices | A | K-indices |
| 03 November | 3 | 1-0-0-0-1-1-2-2 | 0 | 0-0-0-1-0-0-0-0 | 3 | 0-0-0-0-1-2-2-2 |
| 04 November | 7 | 1-2-3-1-2-2-2-2 | 12 | 1-1-3-4-5-1-1-0 | 9 | 1-3-3-2-3-3-1-2 |
| 05 November | 8 | 0-2-1-3-4-2-1-1 | 11 | 0-0-2-4-5-2-0-0 | 9 | 0-1-2-4-4-3-1-0 |
| 06 November | 13 | 1-3-2-2-2-2-2-5 | 8 | 0-3-2-1-3-3-0-2 | 12 | 0-3-3-2-2-3-3-4 |
| 07 November | 28 | 5-6-5-2-2-3-3-2 | 39 | 5-7-5-4-4-3-1-0 | 45 | 5-7-6-4-4-4-3-1 |
| 08 November | 6 | 1-2-1-1-2-3-2-1 | 2 | 0-1-0-0-1-2-1-0 | 4 | 0-1-0-1-1-2-2-1 |
| 09 November | 12 | 2-3-3-2-2-1-3-4 | 2 | 1-1-0-0-0-1-2-2 | 9 | 2-2-3-2-1-1-3-3 |



Alerts and Warnings Issued

| Date and Time of Issue (UT) | Type of Alert or Warning | Date and Time of Event (UT) |
|-----------------------------|--|-----------------------------|
| 03 Nov 0006 | >2MeV Electron Event in Progress ≥ 1000 pfu | 02 Nov |
| 03 Nov 0523 | Type II Radio Emission | 03 Nov 0438 |
| 03 Nov 0523 | Type IV Radio Emission | 03 Nov 0442 |
| 03 Nov 0936 | 2695MHz Radio Burst 120 s.f.u. | 03 Nov 0907 |
| 03 Nov 0947 | Type II Radio Emission | 03 Nov 0910 |
| 03 Nov 0957 | Type IV Radio Emission | 03 Nov 0928 |
| 03 Nov 1120 | Type II Radio Emission | 03 Nov 1029 |
| 03 Nov 1318 | Type IV Radio Emission | 03 Nov 1213 |
| 03 Nov 1356 | 2695MHz Radio Burst 230 s.f.u. | 03 Nov 1022 |
| 03 Nov 1915 | $A \geq 20$ Watch | 06 Nov |
| 03 Nov 2043 | Type IV Radio Emission | 03 Nov 2012 |
| 04 Nov 0007 | >2MeV Electron Event in Progress ≥ 1000 pfu | 03 Nov |
| 04 Nov 0630 | X-ray event | 04 Nov 0552 |
| 04 Nov 0701 | Proton Event Warning ≥ 10 pfu ≥ 10 MeV | 04 Nov 1051 |
| 04 Nov 0826 | 2695MHz Radio Burst 690 s.f.u. | 04 Nov 0555 |
| 04 Nov 0831 | Type IV Radio Emission | 04 Nov 0611 |
| 04 Nov 0842 | Type II Radio Emission | 04 Nov 0608 |
| 04 Nov 0851 | Proton Event ≥ 10 pfu ≥ 10 MeV | 04 Nov 0845 |
| 04 Nov 1252 | Type IV Radio Emission | 04 Nov 1143 |
| 04 Nov 1521 | Proton Event >1 pfu @ ≥ 100 MeV | 04 Nov 0725 |
| 04 Nov 1815 | K= 4 Observed | 04 Nov 15 -18 |
| 04 Nov 2109 | $A \geq 50$ Watch | 07 Nov |
| 04 Nov 2112 | $A \geq 30$ Watch | 08 Nov |
| 04 Nov 2134 | Type II Radio Emission | 04 Nov 2035 |
| 04 Nov 2222 | Type IV Radio Emission | 04 Nov 2052 |
| 05 Nov 0014 | 2- 245 MHz Radio Bursts | 04 Nov |
| 05 Nov 0014 | 245 MHz Radio Noise Storm | 04 Nov |
| 06 Nov 0043 | 8- 245 MHz Radio Bursts | 05 Nov |
| 06 Nov 0043 | 245 MHz Radio Noise Storm | 04 Nov |
| 06 Nov 0408 | Type II Radio Emission | 06 Nov 0325 |
| 06 Nov 1215 | Proton Event Warning ≥ 10 pfu @ ≥ 10 MeV | 06 Nov 1255 |
| 06 Nov 1231 | X-Ray event X9/3B/S19W61 | 06 Nov 1149 |
| 06 Nov 1323 | Proton Event ≥ 10 pfu @ ≥ 10 MeV | 06 Nov 1305 |
| 06 Nov 1333 | Proton Event >1 pfu @ ≥ 100 MeV | 06 Nov 1245 |
| 06 Nov 1411 | 2695MHz Radio Burst 3300 s.f.u. | 06 Nov 1997 1151 |
| 06 Nov 1422 | Type IV Radio Emission | 06 Nov 1997 1152 |
| 06 Nov 2308 | Sudden Impulse observed at Boulder | 06 Nov 2252 |

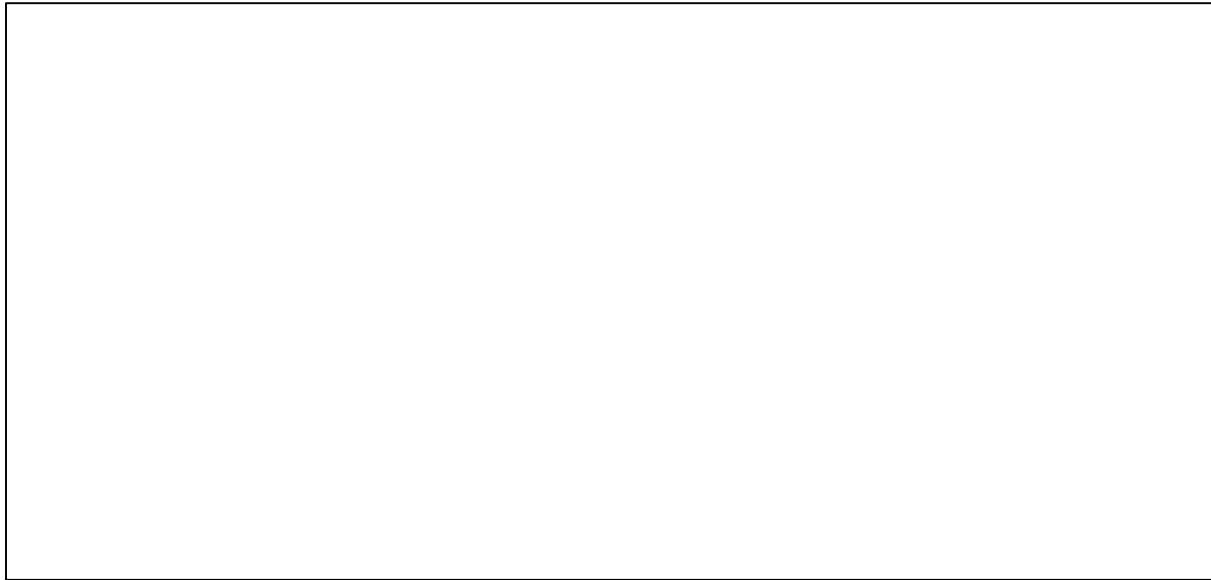


Alerts and Warnings Issued - Continued.

| Date and Time of Issue (UT) | Type of Alert or Warning | Date and Time of Event (UT) |
|-----------------------------|---------------------------|-----------------------------|
| 07 Nov 0054 | 11- 245 MHz Radio Bursts | 06 Nov |
| 07 Nov 0054 | 245 MHz Radio Noise Storm | 06 Nov |
| 07 Nov 0019 | K= 4 Observed | 06 Nov 21- 24 |
| 07 Nov 0307 | A \geq 20 Observed | 07 Nov 0300 |
| 07 Nov 0307 | K= 6 Observed | 07 Nov 00 - 03 |
| 07 Nov 1512 | A \geq 30 Observed | 07 Nov 1500 |
| 09 Nov 0157 | 3- 245 MHz Radio Bursts | 08 Nov |
| 09 Nov 0157 | 245 MHz Radio Noise Storm | 08 Nov |



Twenty-seven Day Outlook



Bar Graph not available

| Date | Radio Flux 10.7 cm | Planetary A Index | Largest Kp Index | Date | Radio Flux 10.7 cm | Planetary A Index | Largest Kp Index |
|--------|-----------------------|----------------------|---------------------|--------|-----------------------|----------------------|---------------------|
| 12 Nov | 82 | 5 | 2 | 25 | 96 | 8 | 3 |
| 13 | 82 | 5 | 2 | 26 | 100 | 8 | 3 |
| 14 | 80 | 5 | 2 | 27 | 104 | 5 | 2 |
| 15 | 80 | 5 | 2 | 28 | 108 | 5 | 2 |
| 16 | 80 | 5 | 2 | 29 | 110 | 5 | 2 |
| 17 | 80 | 5 | 2 | 30 | 110 | 8 | 3 |
| 18 | 80 | 5 | 2 | 01 Dec | 108 | 10 | 3 |
| 19 | 80 | 8 | 3 | 02 | 104 | 10 | 3 |
| 20 | 80 | 13 | 3 | 03 | 100 | 15 | 3 |
| 21 | 82 | 15 | 3 | 04 | 96 | 15 | 3 |
| 22 | 84 | 15 | 3 | 05 | 92 | 10 | 3 |
| 23 | 88 | 13 | 3 | 06 | 88 | 8 | 3 |
| 24 | 92 | 10 | 3 | 07 | 84 | 8 | 3 |
| | | | | 08 | 82 | 8 | 3 |



Energetic Events

| Date | Time (UT) | | | X-ray | | Optical Information | | | Peak | | Sweep Freq | | |
|--------|-----------|------|------|-------|------------|---------------------|----------|------|-------|------------|------------|-----------|----|
| | Begin | Max | ½ | Class | Integ Flux | Imp Brtns | Location | | Rgn # | Radio Flux | | Intensity | |
| | | | Max | | | | Lat | CMD | | 245 | 2695 | II | IV |
| 03 Nov | 0903 | 0910 | 0913 | M1.4 | .004 | 1B | S20W15 | 8100 | 23000 | 130 | 3 | 3 | |
| 03 Nov | 1018 | 1029 | 1034 | M4.2 | .001 | | | | 40000 | 230 | 2 | 2 | |
| 03 Nov | 1955 | 2016 | 2036 | M1.0 | .014 | SF | S19W20 | 8100 | | | 3 | | |
| 04 Nov | 0127 | 0135 | 0140 | M1.3 | .007 | 1N | S20W24 | 8100 | | | | | |
| 04 Nov | 0232 | 0242 | 0303 | M4.1 | .005 | 1F | S20W25 | 8100 | | | | | |
| 04 Nov | 0552 | 0558 | 0602 | X2.1 | .005 | 2B | S14W33 | 8100 | 9800 | 690 | 3 | 3 | |
| 06 Nov | 1149 | 1155 | 1201 | X9.4 | .036 | 2B | S18W63 | 8100 | 54000 | 3300 | 3 | | |

Flare List

| Date | Time | | | X-ray Class. | Imp / Brtns | Location Lat CMD | Rgn # |
|-------------|-------|-------|-------|--------------|-------------|------------------|-------|
| | Begin | Max | End | | | | |
| 03 November | 0038 | 0039 | 0056 | B6.2 | SF | S20W11 | 8100 |
| | 0117 | 0121 | 0124 | | SF | S20W11 | 8100 |
| | 0148 | 0152 | 0213 | C1.0 | SF | S20W11 | 8100 |
| | 0434 | 0437 | 0502 | C8.6 | SB | S20W13 | 8100 |
| | 0600 | 0612 | 0625 | C2.0 | | | |
| | 0650 | 0655 | 0703 | B7.8 | | | |
| | 0816 | 0817 | 0828 | C4.6 | SF | S20W15 | 8100 |
| | B0832 | U0832 | A0841 | | SF | S18W19 | 8100 |
| | 0906 | 0909 | 0923 | M1.4 | 1B | S20W15 | 8100 |
| | 1018 | 1029 | 1034 | M4.2 | | | |
| | 1222 | 1223 | A1233 | C1.6 | SF | S18W20 | 8100 |
| | 1244 | 1251 | 1258 | C2.4 | | | |
| | 1322 | 1326 | 1330 | B8.6 | | | |
| | 1349 | 1351 | 1355 | C1.9 | SF | S18W22 | 8100 |
| | 1435 | 1438 | 1445 | B6.9 | | | |
| | 1452 | 1458 | 1504 | C1.3 | | | |
| | 1704 | 1706 | 1713 | C1.9 | SF | S17W28 | 8100 |
| | 1809 | 1810 | 1850 | C4.3 | SF | S19W20 | 8100 |
| | 1901 | 1907 | 1922 | C3.9 | SF | S20W21 | 8100 |
| | 1955 | 2008 | 2109 | M1.0 | SF | S19W20 | 8100 |
| 2114 | 2147 | 2203 | C3.9 | SF | S19W22 | 8100 | |
| 2220 | 2249 | 2255 | C8.6 | SN | S19W23 | 8100 | |
| 2255 | 2301 | 2330 | C8.0 | 1N | S20W23 | 8100 | |
| 2336 | 2342 | 2352 | C3.2 | SF | S20W23 | 8100 | |
| 2356 | 2358 | 0001 | | SF | S20W23 | 8100 | |
| 04 November | 0040 | 0043 | 0050 | | SF | S20W24 | 8100 |
| | 0056 | 0118 | 0121 | C3.7 | SF | S20W24 | 8100 |
| | 0128 | 0132 | 0201 | M1.3 | 1N | S20W24 | 8100 |
| | 0216 | 0221 | 0225 | C5.4 | | | |
| | 0303 | 0328 | 0500 | M4.1 | 1F | S20W25 | 8100 |



Flare List – continued.

| Date | Time | | | X-ray Class. | Optical | | Rgn # |
|-------------|-------|------|------|-----------------|----------------|---------------------|----------|
| | Begin | Max | End | | Imp / Brtns | Location Lat CMD | |
| 04 November | 0355 | 0402 | 0406 | C5.5 | | | |
| | 0412 | 0416 | 0419 | C8.0 | | | |
| | 0509 | 0509 | 0516 | | SF | N20E23 | 8100 |
| | 0522 | 0528 | 0541 | C4.2 | | | |
| | 0547 | 0548 | 0600 | | SF | N19E21 | 8103 |
| | 0554 | 0559 | 0713 | X2.1 | 2B | S14W33 | 8100 |
| | 0627 | 0630 | 0632 | C8.8 | | | |
| | 0637 | 0640 | 0644 | C7.3 | | | |
| | 0649 | 0652 | 0658 | | SF | N19E21 | 8103 |
| | 0715 | 0716 | 0728 | C3.0 | SF | S20W27 | 8100 |
| | 0806 | 0808 | 0827 | C3.4 | SF | S20W28 | 8100 |
| | 0948 | 0951 | 0954 | C2.6 | | | |
| | 1021 | 1025 | 1028 | C1.8 | | | |
| | 1124 | 1131 | 1151 | | SF | N22E14 | 8100 |
| | 1247 | 1249 | 1256 | | SF | S20W29 | 8100 |
| | 1257 | 1303 | 1308 | | SF | S19W29 | 8100 |
| | 1449 | 1449 | 1453 | | SF | S19W31 | 8100 |
| | 1455 | 1457 | 1500 | | SF | N21E16 | 8103 |
| | 1523 | 1527 | 1534 | | SF | N21E17 | 8103 |
| | 1536 | 1540 | 1542 | | SF | N21E17 | 8103 |
| | 1604 | 1612 | 1625 | | SF | N21E16 | 8103 |
| | 1730 | 1736 | 1739 | C2.5 | SF | S19W32 | 8100 |
| | 1759 | 1800 | 1804 | | SF | S19W35 | 8100 |
| | 1806 | 1807 | 1810 | | SF | S18W37 | 8100 |
| | 1814 | 1815 | 1820 | | SF | S18W37 | 8100 |
| | 1837 | 1839 | 1855 | | SF | S18W37 | 8100 |
| | 1847 | 1848 | 1854 | | SF | N21E15 | 8103 |
| | 1855 | 1903 | 1906 | | SF | N21E14 | 8103 |
| | 1928 | 1928 | 1935 | | SF | S19W36 | 8100 |
| | 2026 | 2037 | 2047 | | SF | S19W36 | 8100 |
| | 2101 | 2101 | 2105 | | SF | S18W38 | 8100 |
| | 2107 | 2118 | 2252 | C5.9 | SF | S18W38 | 8100 |
| | 2326 | 2330 | 2339 | | SF | S18W39 | 8100 |
| 05 November | 0157 | 0201 | 0207 | | SF | S20W38 | 8100 |
| | 0208 | 0208 | 0212 | | SF | S13W47 | 8100 |
| | 0218 | 0229 | 0234 | | SF | S12W48 | 8100 |
| | 0234 | 0238 | 0240 | | SF | S13W47 | 8100 |
| | 0247 | 0251 | 0258 | | SF | N21E08 | 8103 |
| | 0337 | 0338 | 0344 | | SF | S11W47 | 8100 |
| | 0346 | 0348 | 0357 | | SF | S11W48 | 8100 |
| | 0405 | 0407 | 0414 | | SF | S16W38 | 8100 |



Flare List – continued.

| Date | Time | | | X-ray Class. | Optical | | Rgn # | |
|-------------|-------------|-------|-------|-----------------|----------------|---------------------|----------|------|
| | Begin | Max | End | | Imp / Brtns | Location Lat CMD | | |
| 05 November | 0418 | 0419 | 0428 | | SF | S20W40 | 8100 | |
| | 0622 | 0637 | 0713 | C7.0 | 1N | S13W49 | 8100 | |
| | 0803 | 0803 | 0815 | | SF | S20W42 | 8100 | |
| | 0917 | 0921 | 0923 | C3.0 | | | | |
| | 1000 | 1006 | 1012 | C8.1 | | | | |
| | 1130 | 1140 | 1155 | C6.8 | | | | |
| | 1523 | 1530 | A1556 | | SF | S20W45 | 8100 | |
| | 1631 | 1631 | 1637 | C1.4 | SF | S19W46 | 8100 | |
| | 1739 | 1744 | 1750 | C1.2 | | | | |
| | 1841 | 1842 | 1916 | C2.3 | SF | N22W02 | 8103 | |
| | 1923 | 1925 | 1932 | | SF | S19W50 | 8100 | |
| | 1937 | 1942 | 1944 | | SF | S19W49 | 8100 | |
| | 2012 | 2016 | 2028 | | SF | S19W51 | 8100 | |
| | 2323 | 0012 | 0017 | | SF | N22W03 | 8103 | |
| | 06 November | 0052 | 0059 | 0118 | | SF | S20W51 | 8100 |
| | | 0119 | 0122 | 0136 | | SF | N22W05 | 8103 |
| | | 0219 | 0221 | 0223 | | SF | S20W52 | 8100 |
| 0246 | | 0249 | 0252 | C1.1 | | | | |
| 0314 | | 0317 | 0331 | C1.9 | 1F | S15W56 | 8100 | |
| 0522 | | 0531 | 0546 | | SF | N22W05 | 8103 | |
| 0929 | | 0931 | 0946 | | SF | S15W59 | 8100 | |
| B1122 | | 1156 | 1244 | X9.4 | 2B | S18W63 | 8100 | |
| 1131 | | 1136 | 1144 | C4.7 | | | 8100 | |
| 1415 | | 1417 | 1419 | | SF | S19W60 | 8100 | |
| 2043 | | 2051 | 2102 | B7.7 | | | | |
| 07 November | | 0013 | 0013 | 0023 | B8.7 | SF | S15W67 | 8100 |
| | | 0919 | 0925 | 0939 | C1.0 | SF | N22W21 | 8103 |
| | B1125 | U1125 | 1145 | | SF | N29E79 | | |
| | 1329 | 1330 | 1337 | | SF | N29E80 | | |
| | 1828 | 1833 | 1839 | B6.1 | | | | |
| 08 November | 2103 | 2109 | 2115 | C1.1 | | | | |
| | 0748 | 0819 | 0833 | C1.7 | | | | |
| | 1948 | 2105 | 2126 | B7.0 | | | | |
| 09 November | 2311 | 2319 | 2327 | B7.8 | | | | |
| | 0748 | 0752 | 0800 | B1.5 | | | | |
| | 1622 | 1623 | 1643 | B4.3 | SF | N21W53 | 8103 | |



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 | 4 | | | | | | |
| <i>Region 8099</i> | | | | | | | | | | | | | | | | | | | | | |
| 25 Oct | N20E64 | 021 | 0020 | 04 | CRO | 003 | B | | | | | | | | | | | | | | |
| 26 Oct | N19E52 | 020 | 0030 | 06 | CSO | 004 | B | | | | | | | | | | | | | | |
| 27 Oct | N19E37 | 022 | 0050 | 07 | CSO | 006 | B | | | | | 1 | | | | | | | | | |
| 28 Oct | N19E23 | 023 | 0060 | 09 | CSO | 010 | B | | | | | | | | | | | | | | |
| 29 Oct | N20E11 | 021 | 0010 | 10 | BXO | 006 | B | | | | | | | | | | | | | | |
| 30 Oct | N20W03 | 022 | 0030 | 11 | CRO | 009 | BG | | | | | | | | | | | | | | |
| 31 Oct | N18W17 | 023 | 0030 | 12 | CRO | 008 | BG | | | | | | | | | | | | | | |
| 01 Nov | N18W35 | 028 | 0010 | 07 | BXO | 003 | B | | | | | | | | | | | | | | |
| 02 Nov | N18W51 | 031 | 0000 | 01 | AXX | 001 | A | | | | | | | | | | | | | | |
| 03 Nov | N18W65 | 031 | 0000 | 00 | AXX | 001 | A | | | | | | | | | | | | | | |
| 04 Nov | N18W78 | 031 | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |

Crossed West Limb.

Absolute heliographic longitude: 22

| | | | | | | | | | | | | | | | | | | | | |
|--------------------|--------|-----|------|----|-----|-----|-----|----|---|---|----|---|----|---|---|----|---|---|---|---|
| <i>Region 8100</i> | | | | | | | | | | | | | | | | | | | | |
| 27 Oct | S21E67 | 352 | 0080 | 09 | CSO | 005 | B | | | | | | | | | | | | | |
| 28 Oct | S20E55 | 351 | 0130 | 09 | CAO | 009 | B | 2 | | | 1 | 1 | | | | | | | | |
| 29 Oct | S21E44 | 348 | 0200 | 10 | DAO | 015 | B | | | | | | | | | | | | | |
| 30 Oct | S19E30 | 349 | 0220 | 10 | DAO | 022 | B | | | | 2 | | | | | | | | | |
| 31 Oct | S20E15 | 351 | 0260 | 11 | EKI | 016 | B | | | | 1 | | | | | | | | | |
| 01 Nov | S19E01 | 352 | 0210 | 11 | EAI | 027 | BG | | | | 2 | | | | | | | | | |
| 02 Nov | S19W12 | 352 | 0290 | 14 | EKI | 036 | BG | 2 | | | 12 | | | | | | | | | |
| 03 Nov | S20W27 | 353 | 0660 | 16 | FKC | 034 | BGD | 11 | 2 | | 16 | 2 | | | | | | | | |
| 04 Nov | S21W39 | 352 | 1000 | 17 | FKC | 037 | BGD | 5 | 2 | 1 | 19 | 2 | 1 | | | | | | | |
| 05 Nov | S20W53 | 353 | 0900 | 19 | FKC | 019 | BGD | 2 | | | 14 | 1 | | | | | | | | |
| 06 Nov | S19W68 | 355 | 0760 | 19 | FKC | 021 | BG | 2 | | | 4 | 1 | 1 | | | | | | | |
| 07 Nov | S19W77 | 351 | 0630 | 13 | EKI | 017 | BG | | | | 1 | | | | | | | | | |
| 08 Nov | S20W90 | 350 | 0480 | 15 | EKI | 009 | B | | | | | | | | | | | | | |
| | | | | | | | | | | | | | 24 | 4 | 1 | 72 | 7 | 2 | 0 | 0 |

Crossed West Limb.

Absolute heliographic longitude: 352



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 8102</i> | | | | | | | | | | | | | | | | | | |
| 02 Nov | N30E12 | 328 | 0050 | 04 | CAO | 007 | B | | | | | | | | | | | |
| 03 Nov | N30E02 | 324 | 0000 | 00 | AXX | 001 | A | | | | | | | | | | | |
| 04 Nov | N30W12 | 325 | | | | | | | | | | | | | | | | |
| 05 Nov | N30W25 | 325 | | | | | | | | | | | | | | | | |
| 06 Nov | N30W38 | 325 | | | | | | | | | | | | | | | | |
| 07 Nov | N30W51 | 325 | | | | | | | | | | | | | | | | |
| 08 Nov | N30W64 | 325 | | | | | | | | | | | | | | | | |
| 09 Nov | N30W77 | 325 | | | | | | | | | | | | | | | | |

0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 324

| | | | | | | | | | | | | |
|--------------------|--------|-----|------|----|-----|-----|----|---|--|--|--|---|
| <i>Region 8103</i> | | | | | | | | | | | | |
| 04 Nov | N24E09 | 304 | 0030 | 04 | BXO | 011 | B | | | | | 8 |
| 05 Nov | N23W03 | 303 | 0040 | 07 | DRO | 012 | B | 1 | | | | 3 |
| 06 Nov | N22W17 | 304 | 0080 | 09 | CAO | 019 | B | | | | | 2 |
| 07 Nov | N22W33 | 307 | 0050 | 10 | CSO | 011 | BG | 1 | | | | 1 |
| 08 Nov | N23W42 | 302 | 0060 | 11 | CSO | 009 | B | | | | | |
| 09 Nov | N20W60 | 307 | 0020 | 05 | BXO | 006 | B | | | | | 1 |

2 0 0 15 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 303

| | | | | | | | | | | | | | | | | | | |
|--------------------|--------|-----|------|----|-----|-----|---|--|--|--|--|--|--|--|--|--|--|--|
| <i>Region 8104</i> | | | | | | | | | | | | | | | | | | |
| 07 Nov | N30E72 | 202 | 0010 | 00 | AXX | 002 | A | | | | | | | | | | | |
| 08 Nov | N28E55 | 205 | 0030 | 01 | AXX | 001 | A | | | | | | | | | | | |
| 09 Nov | N30E41 | 206 | 0010 | 00 | AXX | 001 | A | | | | | | | | | | | |

0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 206

| | | | | | | | | | | | | | | | | | | |
|--------------------|--------|-----|------|----|-----|-----|---|--|--|--|--|--|--|--|--|--|--|--|
| <i>Region 8105</i> | | | | | | | | | | | | | | | | | | |
| 08 Nov | S35E21 | 239 | 0010 | 03 | BXO | 002 | B | | | | | | | | | | | |
| 09 Nov | S29E14 | 233 | 0010 | 04 | BXO | 003 | B | | | | | | | | | | | |

0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 233



Region Summary- continued.

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

Region 8101

| | | | | | | | | | | | | | | | | | | |
|--------|--------|-----|------|----|-----|-----|---|--|--|--|--|---|---|---|---|---|---|---|
| 31 Oct | S19W70 | 076 | 0000 | 00 | AXX | 001 | A | | | | | | | | | | | |
| 01 Nov | S18W83 | 076 | 0010 | 01 | BXO | 002 | B | | | | | | | | | | | |
| | | | | | | | | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Crossed West Limb.

Absolute heliographic longitude: 76

Region 8102

| | | | | | | | | | | | | | | | | | | |
|--------|--------|-----|------|----|-----|-----|---|--|--|--|--|---|---|---|---|---|---|---|
| 02 Nov | N30E12 | 328 | 0050 | 04 | CAO | 007 | B | | | | | | | | | | | |
| | | | | | | | | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Still on Disk.

Absolute heliographic longitude: 328



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

| Month | Sunspot Numbers | | | | | Radio Flux | | Geomagnetic | |
|-------------|-----------------|-------|--------|---------------|-------|------------|--------|-------------|--------|
| | Observed values | | Ratio | Smooth values | | Penticton | Smooth | Planetary | Smooth |
| | SWO | RI | RI/SWO | SWO | RI | 10.7 cm | Value | Ap | Value |
| 1995 | | | | | | | | | |
| November | 15.7 | 09.0 | 0.57 | 18.5 | 11.4 | 74.2 | 73.2 | 09 | 10.8 |
| December | 16.2 | 10.0 | 0.62 | 17.6 | 10.8 | 72.6 | 72.8 | 09 | 10.0 |
| 1996 | | | | | | | | | |
| January | 17.6 | 11.5 | 0.65 | 16.8 | 10.4 | 74.5 | 72.4 | 09 | 09.8 |
| February | 09.1 | 04.4 | 0.48 | 16.2 | 10.1 | 71.5 | 72.2 | 10 | 09.8 |
| March | 12.1 | 09.2 | 0.76 | 15.4 | 09.7 | 70.7 | 72.1 | 11 | 09.9 |
| April | 08.5 | 04.8 | 0.56 | 13.6 | 08.5 | 69.3 | 71.6 | 11 | 09.7 |
| May | 11.8 | 05.5 | 0.47 | 12.9 | 08.0 | 70.1 | 71.4 | 07 | 09.5 |
| June | 18.8 | 11.8 | 0.63 | 13.5 | 08.5 | 69.6 | 71.8 | 05 | 09.4 |
| July | 13.2 | 08.2 | 0.62 | 13.4 | 08.4* | 71.2 | 72.0 | 07 | 09.3 |
| 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 | 08.5* | 69.4 | 72.3 | 15 | 09.3 |
| October | 02.3 | 00.9 | 0.39 | 14.0 | 08.9* | 69.2 | 72.6 | 13 | 09.1 |
| November | 26.7 | 17.9 | 0.67 | 15.4 | 09.9* | 78.7 | 73.0 | 08 | 09.1 |
| December | 21.1 | 13.3 | 0.63 | 16.2 | 10.5* | 77.8 | 73.3 | 07 | 09.3 |
| 1997 | | | | | | | | | |
| January | 09.0 | 06.5* | 0.72* | 16.5 | 10.6* | 74.0 | 73.4 | 09 | 09.3* |
| February | 11.3 | 07.6* | 0.67* | 17.4 | 11.2* | 73.8 | 73.7 | 11 | 09.2* |
| March | 14.4 | 08.8* | 0.61* | 20.4 | 13.7* | 73.5 | 75.1* | 08 | 09.0* |
| April | 24.5 | 15.8* | 0.64* | 24.0 | 16.7* | 74.5 | 76.8* | 10 | 08.6* |
| May | 28.6 | 18.5* | 0.65* | | | 74.6 | | 08 | |
| June | 22.1 | 13.1* | 0.59* | | | 71.7 | | 07 | |
| July | 17.0 | 10.5* | 0.62* | | | 71.1 | | 06* | |
| August | 36.7 | 24.7* | 0.67* | | | 79.0 | | 08* | |
| September | 58.2 | 51.3* | 0.88* | | | 96.2* | | 10* | |
| October | 33.6 | 23.3* | 0.69* | | | 85.0* | | 10* | |

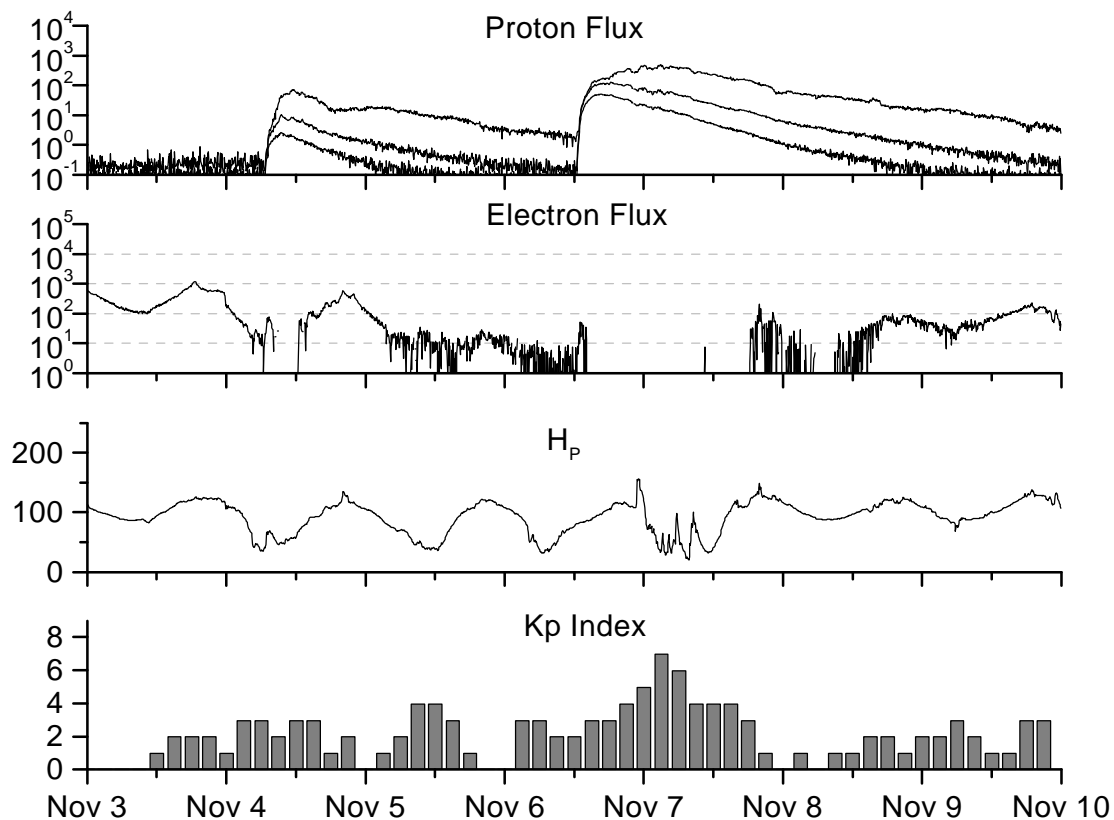
*Preliminary estimates.

October 1996 has been selected as the start of Solar Cycle 23.

The highest smoothed sunspot number for Solar Cycle 22, RI=158.5 occurred in July 1989.

The highest smoothed 10.7cm Radio Flux value for Solar Cycle 22, of 213.1, occurred in June 1989.





Weekly Geosynchronous Satellite Environment Summary

Week Beginning 03 November 1997

Protons plot contains the five-minute averaged integral proton flux (protons/ cm^2 -sec-sr) as measured by GOES-9 (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/ cm^2 -sec-sr) with energies greater than 2 MeV at GOES-9.

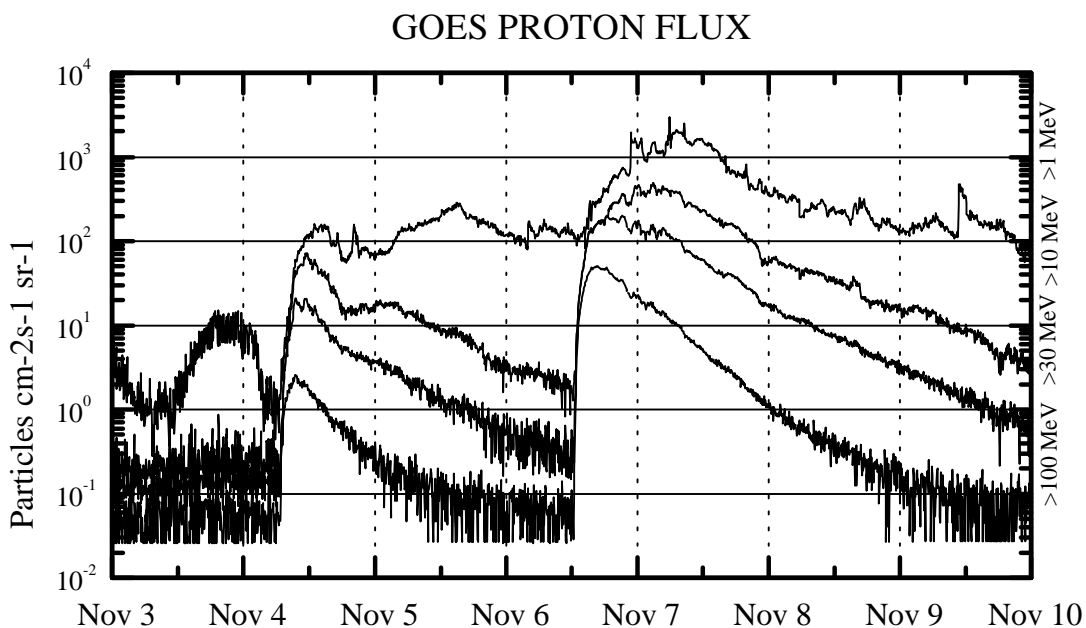
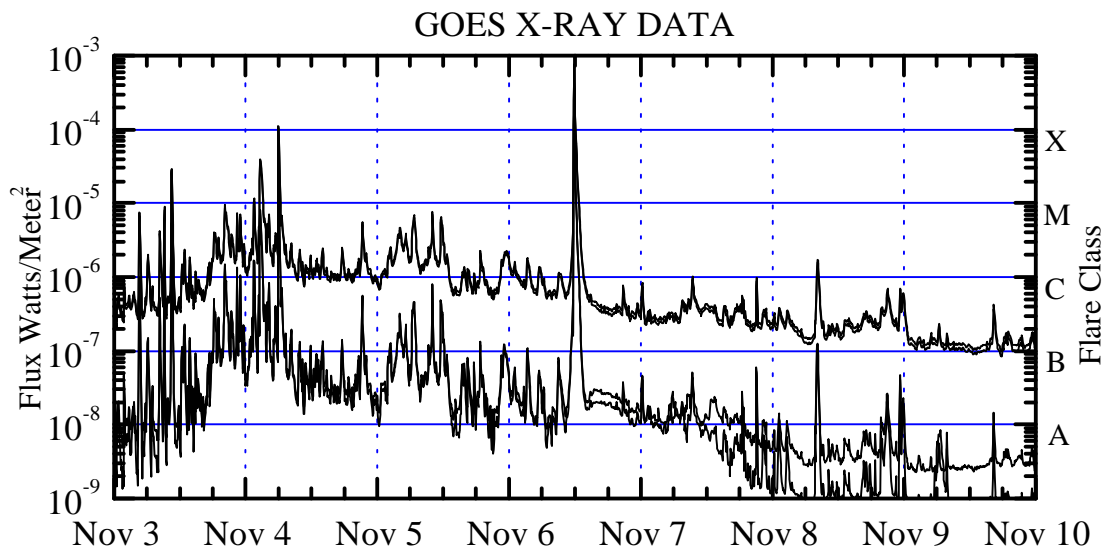
H_p plot contains the five minute averaged magnetic field H component in nanoteslas (nT) as measured by GOES-9. The H component is parallel to the spin axis of the satellite, which is nearly parallel to the Earth's rotation axis.

K_p plot contains the estimated planetary 3-hour K-index (derived by the USAF 55th 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 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 a more localized phenomena and the measurements generally are applicable to within a few degrees of longitude of the measuring satellite.



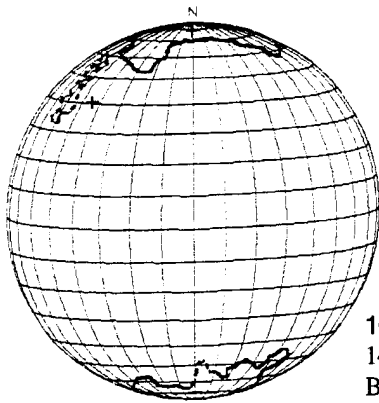


Weekly GOES Satellite X-ray and Proton Plots

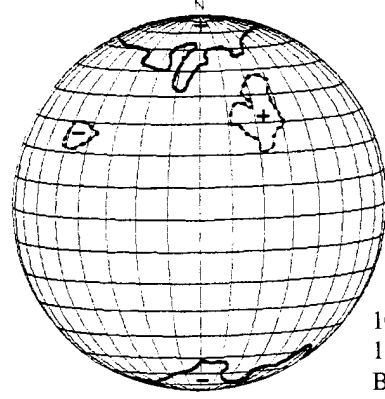
Proton plot contains the five minute averaged integral proton flux (protons/cm²-sec-sr) as measured by GOES-9 (W135) for each of the energy thresholds: >1 , >10 , >30 and >100 MeV. P10 event threshold is 10 pfu (protons/cm²-sec-sr) at greater than 10 MeV.

X-ray plot contains five minute averaged x-ray flux (watts/m²) as measured by GOES 8 and 9 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.

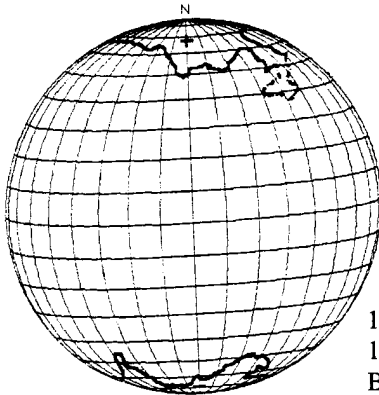




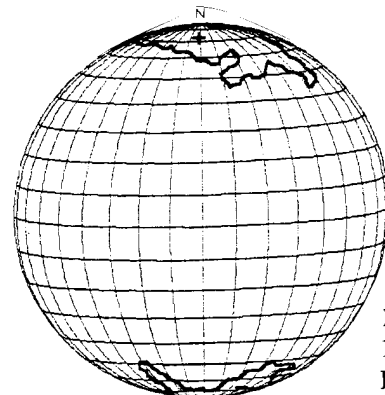
10/20/97
1459UT
B=+5°



10/23/97
1847UT
B=+5°



10/25/97
1456UT
B=+5°



10/26/97
1635UT
B=+5°

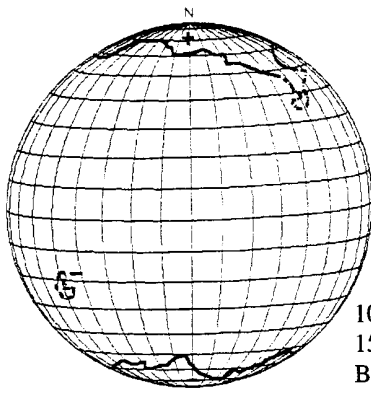
No Data-

10/21,10/22, 10/23, & 10,24.

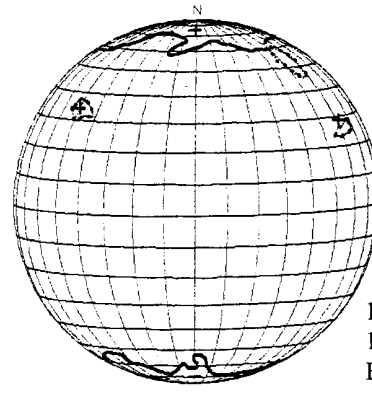
Coronal hole maps from the National Solar Observatory, Kitt Peak, Arizona

These maps are reproductions of the coronal hole contours as derived from the Kitt Peak 1083 nm raw data images. These are preliminary data, where solid (and dashed) lines are used to indicate more (and less) confidence in an inference and are printed whenever they are available at SWO.

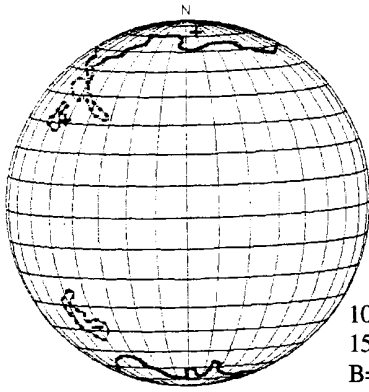




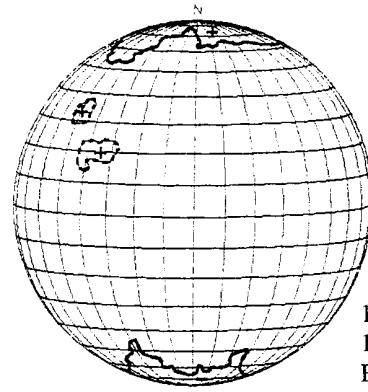
10/28/97
1553UT
B=+5°



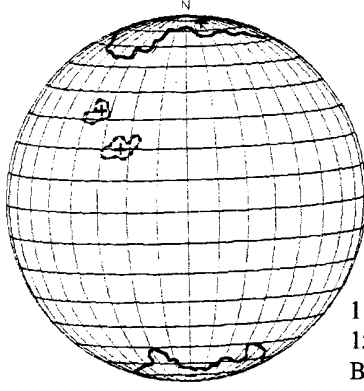
10/29/97
1559UT
B=+5°



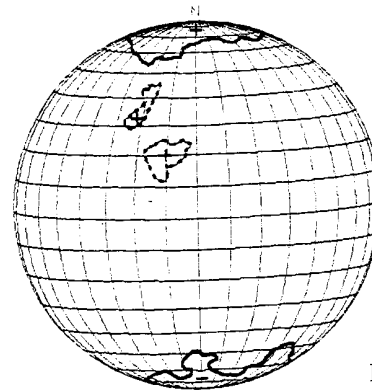
10/30/97
1558UT
B=+5°



10/31/97
1553UT
B=+4°



11/01/97
1532UT
B=+4°



11/02/97
1556UT
B=+4°

No Data - 10/27/97

Coronal hole maps from the National Solar Observatory, Kitt Peak, Arizona

These maps are reproductions of the coronal hole contours as derived from the Kitt Peak 1083 nm raw data images. These are preliminary data, where solid (and dashed) lines are used to indicate more (and less) confidence in an inference and are printed whenever they are available at SWO.

