

Solar activity reached high levels during the period. The week began with activity at low levels due to isolated C-class subflares. Activity increased to moderate levels on 21 November due to an M1/Sn flare at 21/1921 UTC from Region 9231 (S23, L = 058, class/area Fki/410 on 20 November). Activity decreased to low levels on 22 November with occasional C-class subflares from Region 9236 (N20, L = 352, class/area Eki/600 on 26 November), which showed rapid development in area and magnetic complexity. Activity increased to moderate levels on 23 November due to an M1/Sf flare from Region 9236 at 23/2328 UTC associated with a Type II radio sweep. Activity increased to high levels during the remainder of the period as Region 9236 produced a series of X-class flares, three of which occurred on 24 November. The first was an X2/3b at 24/0502 UTC associated with a 2200 sfu Tenflare, a Type II radio sweep, a halo CME, and a solar proton event (see the discussion below). This was followed by an X2/2b at 24/1513 UTC which was accompanied by a Type II sweep and a halo CME. The third was an X1/2n at 24/2159 UTC associated with a CME. Region 9240 (N09, L = 296, class/area Dho/300 on 26 November) added to the major flare count with an M8/2n at 25/0131 UTC associated with an 11,000 sfu tenflare, and Type II and IV radio sweeps. Region 9236 produced an X1/2b flare at 25/1844 UTC associated with an 1100 sfu Tenflare, Type II radio sweep, and a halo CME. Region 9236 appeared to stabilize on 26 November as a large, magnetically complex F-type group, but managed to produce an X4/2b flare at 26/1648 UTC associated with a 700 sfu Tenflare and a Type II sweep. Region 9236 began to show signs of gradual decay as the period ended, but it remained large and magnetically complex.

Data were available from the Advanced Composition Explorer (ACE) spacecraft for most of the period. There were no significant disturbances observed in the solar wind during 20 - 23 November. A short-lived high speed stream was detected during 24 November with maximum velocities of 560 km/sec. A CME shock front passed the ACE spacecraft at about 26/0500 UTC accompanied by an abrupt increase in velocities and densities with peaks to 660 km/sec and 47 p/cc, respectively. IMF Bz initially turned northward following the shock, then turned southward with deflections to minus 13 nT (GSM). The source for this shock was likely the halo CME associated with the X2/3B at 24/0502 UTC.

Solar proton events were associated with the major flare activity from Region 9236. A greater than 10 MeV proton event at geosynchronous orbit began at 24/1520 UTC, reached a maximum of 942 pfu at 26/2030 UTC, and continued as the summary period ended. A greater than 100 MeV proton event began at 24/1720 UTC, reached a maximum of 1.1 pfu at 24/1810 UTC, and ended at 24/1820 UTC. A second greater than 100 MeV proton event began at 26/1640 UTC, reached a peak of 1.2 pfu at 26/1650 UTC, and ended at 26/2040 UTC. This second 100 MeV event occurred as the result of shock accelerated particles.

The greater than 2 MeV electron flux at geosynchronous orbit briefly reached high levels on 26 November.

The geomagnetic field was at quiet to unsettled levels during 20 - 25 November. Field activity increased to active to major storm levels on 26 November following a sudden impulse at 26/1158 UTC (29 nT, as measured by the Boulder USGS magnetometer).



## **Space Weather Outlook**

### **29 November - 25 December 2000**

Solar activity is expected to be at low to moderate levels during most of the period. However, there will be a chance for another major flare from Region 9236 before it crosses the west limb on 29 November. Region 9240 could also produce an isolated major flare before it departs the visible disk on 05 December.

The greater than 10 MeV proton event that began on 24 November is expected to end late on 28 November. However, there will be a chance for another proton event from Region 9236 before it crosses the west limb on 29 November. There will also be a slight chance for a proton event from Region 9240 before it crosses the west limb on 05 December.

The greater than 2 MeV electron flux at geosynchronous orbit may reach moderate to high levels during 10 - 11 December. Otherwise, normal to moderate fluxes are expected.

Geomagnetic field activity is expected to be at unsettled to minor storm levels during 29 - 30 November due to recent CME activity. Active levels will be possible around 09 November due to coronal hole effects. Quiet to unsettled levels are expected during the rest of the period, barring an Earth-directed CME.



### Daily Solar Data

| Date        | Radio Flux<br>10.7 cm | Sun spot<br>No. | Sunspot Area<br>(10 <sup>6</sup> hemi.) | X-ray Background | Flares     |   |   |         |   |   |   |   |
|-------------|-----------------------|-----------------|---|------------------|------------|---|---|---------|---|---|---|---|
|             |                       |                 |   |                  | X-ray Flux |   |   | Optical |   |   |   |   |
|             |                       |                 |   |                  | C          | M | X | S       | 1 | 2 | 3 | 4 |
| 20 November | 174                   | 168             | 1160                                    | C1.8             | 5          | 0 | 0 | 7       | 0 | 0 | 0 | 0 |
| 21 November | 185                   | 160             | 1160                                    | B8.7             | 10         | 1 | 0 | 5       | 0 | 0 | 0 | 0 |
| 22 November | 195                   | 136             | 1150                                    | C1.0             | 15         | 0 | 0 | 12      | 2 | 0 | 0 | 0 |
| 23 November | 205                   | 141             | 1280                                    | C1.4             | 11         | 1 | 0 | 15      | 3 | 0 | 0 | 0 |
| 24 November | 197                   | 134             | 1180                                    | C1.9             | 6          | 0 | 3 | 13      | 0 | 2 | 1 | 0 |
| 25 November | 202                   | 110             | 1150                                    | C2.1             | 4          | 2 | 1 | 5       | 0 | 3 | 0 | 0 |
| 26 November | 202                   | 95              | 1120                                    | B8.7             | 4          | 1 | 1 | 7       | 1 | 1 | 0 | 0 |

### Daily Particle Data

| Date        | Proton Fluence<br>(protons/cm <sup>2</sup> -day-sr) |        |         | Electron Fluence<br>(electrons/cm <sup>2</sup> -day-sr) |        |        |
|-------------|---|--------|---------|---|--------|--------|
|             | >1MeV   | >10MeV | >100MeV | >.6MeV  | >2MeV  | >4MeV  |
|             | 20 November   | 5.8E+5 | 7.3E+4  | 3.0E+3  |        | 9.4E+6 |
| 21 November | 3.3E+5  | 6.5E+4 | 2.4E+3  |   | 2.5E+6 |        |
| 22 November | 4.6E+5  | 6.0E+4 | 2.4E+3  |   | 3.4E+6 |        |
| 23 November | 3.9E+5  | 4.1E+4 | 2.1E+3  |   | 2.8E+6 |        |
| 24 November | 9.9E+6  | 1.8E+6 | 2.7E+4  |   | 4.6E+6 |        |
| 25 November | 2.1E+7  | 1.6E+6 | 9.3E+3  |   | 3.3E+6 |        |
| 26 November | 1.6E+8  | 1.8E+7 | 3.7E+4  |   | 1.5E+7 |        |

### Daily Geomagnetic Data

| Date        | Middle Latitude<br>Fredericksburg |                 | High Latitude<br>College |                 | Estimated<br>Planetary |                 |
|-------------|-----------------------------------|-----------------|--------------------------|-----------------|------------------------|-----------------|
|             | A                                 | K-indices       | A                        | K-indices       | A                      | K-indices       |
|             | 20 November                       | 7               | 1-1-4-2-2-2-1-0          | 16              | 0-1-3-4-4-5-2-0        | 9               |
| 21 November | 7                                 | 2-2-2-2-2-2-2-1 | *                        | 3-1-4-*-3-4-3-1 | 9                      | 3-2-2-2-3-3-3-2 |
| 22 November | 7                                 | 1-2-2-2-3-2-1-1 | 17                       | 2-0-1-4-5-5-1-1 | 7                      | 2-1-1-2-3-3-2-2 |
| 23 November | 4                                 | 0-2-0-2-2-1-1-0 | 10                       | 1-2-1-4-4-2-2-0 | 7                      | 1-3-1-2-3-3-2-1 |
| 24 November | 9                                 | 0-2-1-3-1-3-3-3 | 8                        | 0-1-2-3-1-1-2-4 | 9                      | 1-2-2-2-1-3-3-3 |
| 25 November | 4                                 | 3-2-0-0-0-1-2-0 | 3                        | 2-2-0-0-0-1-1-1 | 7                      | 3-3-0-1-1-2-3-2 |
| 26 November | 19                                | 1-2-3-2-4-4-3-5 | 28                       | 0-0-4-3-4-6-4-5 | 22                     | 1-1-3-2-4-4-5-5 |



### *Alerts and Warnings Issued*

| Date & Time of Issue | Type of Alert or Warning                | Date & Time of Event UT |
|----------------------|---|-------------------------|
| 21 Nov 0047          | 5 - 245 MHz Bursts                      | 20 Nov                  |
| 22 Nov 0027          | 1 - 245 MHz Bursts                      | 21 Nov                  |
| 22 Nov 0027          | 245 MHz Radio Noise Storm               | 21 Nov                  |
| 22 Nov 1700          | Type II Radio Emission                  | 22 Nov 1621             |
| 22 Nov 1725          | 10cm Radio Burst 500 F.U.               | 22 Nov 1619             |
| 23 Nov 0018          | 10 - 245 MHz Bursts                     | 22 Nov                  |
| 23 Nov 0018          | 245 MHz Noise Storm                     | 22 Nov                  |
| 23 Nov 0600          | K= 4 Observed                           | 23 Nov 03 - 06          |
| 23 Nov 1558          | A >=20 Watch for                        | 26 Nov                  |
| 23 Nov 2341          | Type II Radio Emission                  | 23 Nov 2331             |
| 24 Nov 0036          | 9 - 245 MHz Bursts                      | 23 Nov                  |
| 24 Nov 0036          | 245 MHz Radio Noise Storm               | 23 Nov                  |
| 24 Nov 0507          | K= 4 Warning                            | 24 Nov 0510 - 1200      |
| 24 Nov 0514          | X-Ray event X2/3b/N20W06                | 24 Nov 0455             |
| 24 Nov 0535          | 10cm Radio Burst 2200 F.U.              | 24 Nov 0458             |
| 24 Nov 0540          | Type II Radio Emission                  | 24 Nov 0503             |
| 24 Nov 0643          | CANCELLED K = 4 Warning                 | 24 Nov 0510 - 1200      |
| 24 Nov 0726          | Proton Event >10MeV >=10pfu Warning     | 24 Nov 0800 - 2359      |
| 24 Nov 1525          | Type II Radio Emission                  | 24 Nov 1507             |
| 24 Nov 1531          | X-Ray event X2.3/2B N22W06              | 24 Nov 1451             |
| 24 Nov 1538          | Protons Event >10 MeV >=10pfu           | 24 Nov 1520             |
| 24 Nov 1650          | 10cm Radio Burst 1400 F.U.              | 24 Nov 1455             |
| 24 Nov 1719          | Proton event >100 MeV >1pfu Warning     | 24/1730 - 25/0000 Nov   |
| 24 Nov 1739          | Proton event >100 MeV >1pfu             | 24 Nov 1720             |
| 24 Nov 1804          | K = 4 Warning                           | 24/1804 - 25/1200 Nov   |
| 24 Nov 1806          | K = 4 Observed                          | 24 Nov 15 - 18          |
| 24 Nov 2214          | X-Ray event X1.8/2n/N21W14              | 24 Nov 2143             |
| 24 Nov 0035          | 9 - 245 MHz Bursts                      | 23 Nov                  |
| 24 Nov 0035          | 245 MHz Noise Storms                    | 23 Nov                  |
| 25 Nov 0041          | ENDED Proton event >100 MeV >1pfu       | 24 Nov 1720             |
| 25 Nov 0058          | CONTINUED Protons Event >10 MeV >=10pfu | 24 Nov 1520             |
| 25 Nov 0104          | 6 - 245 MHz Bursts                      | 24 Nov                  |
| 25 Nov 0104          | 245 MHz Noise Storms                    | 24 Nov                  |
| 25 Nov 0138          | Type II Radio Emission                  | 25 Nov 0103             |
| 25 Nov 0153          | Type IV Radio Emission                  | 25 Nov 0107             |
| 25 Nov 0210          | X-Ray event M8.2/2N/N07E50              | 25 Nov 0059             |
| 25 Nov 0248          | A>=50 Watch                             | 26 Nov                  |
| 25 Nov 0249          | A>=50 Watch                             | 27 Nov                  |
| 25 Nov 0309          | 10cm Radio Burst 11000 F.U.             | 25 Nov 0058             |
| 25 Nov 0650          | Proton Event >10MeV >=10pfu Warning     | 25 Nov 0650 - 1500      |
| 25 Nov 1414          | CONTINUED Proton Warning >10MeV >=10pfu | 25/0650 - 26/0000 Nov   |
| 25 Nov 1900          | X-Ray event X1.9/2B N18W24              | 25 Nov 1833             |
| 25 Nov 1959          | 10cm Radio Burst 2300 F.U.              | 25 Nov 1937             |
| 25 Nov 2004          | 10cm Radio Burst 1100 F.U.              | 25 Nov 1836             |



*Alerts and Warnings Issued – continued.*

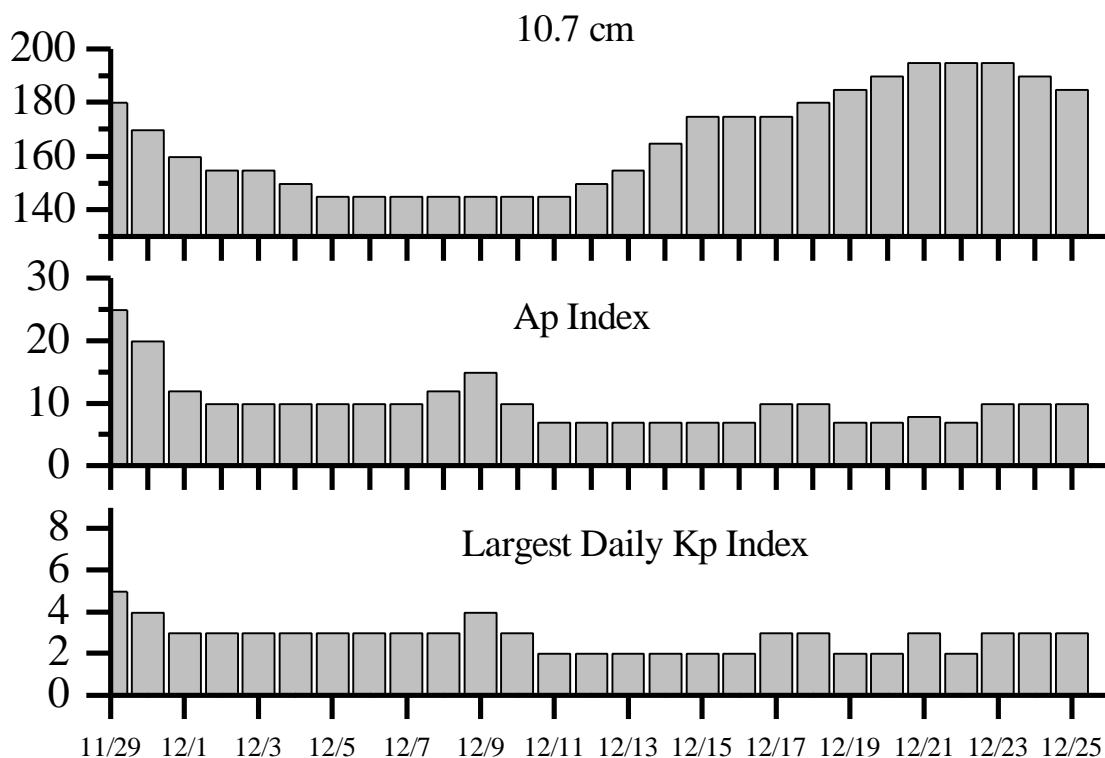
---

| Date & Time of Issue | Type of Alert or Warning                     | Date & Time of Event UT |
|----------------------|--|-------------------------|
| 25 Nov 2155          | A $\geq$ 30 Watch                            | 28 Nov                  |
| 25 Nov 2312          | CONTINUED Proton Warning >10MeV $\geq$ 10pfu | 25/0650 – 27/0000 Nov   |
| 26 Nov 0017          | CONTINUED Protons Event >10 MeV $\geq$ 10pfu | 24 Nov 1520             |
| 26 Nov 0051          | 7 - 245 MHz Bursts                           | 25 Nov                  |
| 26 Nov 0051          | 245 MHz Noise Storms                         | 25 Nov                  |
| 26 Nov 0101          | Type II Radio Emission                       | 25 Nov 1845             |
| 26 Nov 1218          | Sudden Impulse observed at Boulder           | 26 Nov 1158             |
| 26 Nov 1353          | CONTINUED Proton Warning >10MeV $\geq$ 10pfu | 25/0650 – 28/0000 Nov   |
| 26 Nov 1415          | Proton event >100 MeV >1pfu Warning          | 26/1415 – 27/0000 Nov   |
| 26 Nov 1539          | K= 4 Warning                                 | 26/1545 - 27/1200 Nov   |
| 26 Nov 1622          | K= 5 Warning                                 | 26/1630 - 27/1500 Nov   |
| 26 Nov 1659          | Proton event >100 MeV >1pfu                  | 26 Nov 1640             |
| 26 Nov 1706          | X-Ray event X4.0/2b/N18W38                   | 26 Nov 1634             |
| 26 Nov 1721          | Type II Radio Emission                       | 26 Nov 1655             |
| 26 Nov 1802          | K= 5 Observed                                | 26 Nov 15 – 18          |
| 26 Nov 1835          | 10cm Radio Burst 700 F.U.                    | 26 Nov 1637             |
| 26 Nov 2159          | ENDED Proton event >100 MeV >1pfu            | 26 Nov 1640             |

---



## Twenty-seven Day Outlook



| Date   | Radio Flux<br>10.7 cm | Planetary<br>A Index | Largest<br>Kp Index | Date   | Radio Flux<br>10.7 cm | Planetary<br>A Index | Largest<br>Kp Index |
|--------|-----------------------|----------------------|---------------------|--------|-----------------------|----------------------|---------------------|
| 29 Nov | 180                   | 25                   | 5                   | 13 Dec | 155                   | 7                    | 2                   |
| 30     | 170                   | 20                   | 4                   | 14     | 165                   | 7                    | 2                   |
| 01 Dec | 160                   | 12                   | 3                   | 15     | 175                   | 7                    | 2                   |
| 02     | 155                   | 10                   | 3                   | 16     | 175                   | 7                    | 2                   |
| 03     | 155                   | 10                   | 3                   | 17     | 175                   | 10                   | 3                   |
| 04     | 150                   | 10                   | 3                   | 18     | 180                   | 10                   | 3                   |
| 05     | 145                   | 10                   | 3                   | 19     | 185                   | 7                    | 2                   |
| 06     | 145                   | 10                   | 3                   | 20     | 190                   | 7                    | 2                   |
| 07     | 145                   | 10                   | 3                   | 21     | 195                   | 8                    | 3                   |
| 08     | 145                   | 12                   | 3                   | 22     | 195                   | 7                    | 2                   |
| 09     | 145                   | 15                   | 4                   | 23     | 195                   | 10                   | 3                   |
| 10     | 145                   | 10                   | 3                   | 24     | 190                   | 10                   | 3                   |
| 11     | 150                   | 7                    | 2                   | 25     | 185                   | 10                   | 3                   |
| 12     | 155                   | 7                    | 2                   |        |                       |                      |                     |



### *Energetic Events*

| Date   | Time  |      | X-ray         |       | Optical Information |          |        | Peak     |            | Sweep Freq |           |      |
|--------|-------|------|---------------|-------|---------------------|----------|--------|----------|------------|------------|-----------|------|
|        | Begin | Max  | $\frac{1}{2}$ | Integ | Imp/<br>Brtns       | Location |        | Rgn<br># | Radio Flux |            | Intensity |      |
|        |       |      | Max           |       |                     | Class    | Flux   |          | Lat        | CMD        | 245       | 2695 |
| 21 Nov | 1913  | 1921 | 1927          | M1.6  | .008                | SN       | N15W71 |          | 9237       | 32         |           |      |
| 23 Nov | 2318  | 2328 | 2337          | M1.0  | .009                | 1N       | N22W03 |          | 9236       | 980        | 120       | 2    |
| 24 Nov | 0455  | 0502 | 0508          | X2.0  | .083                | 3B       | N20W05 |          | 9236       | 7200       | 2200      | 3    |
| 24 Nov | 1451  | 1513 | 1521          | X2.3  | .160                | 2B       | N22W07 |          | 9236       | 690        | 1400      | 3    |
| 24 Nov | 2143  | 2159 | 2212          | X1.8  | .160                | 2N       | N21W14 |          | 9236       | 1100       | 110       |      |
| 25 Nov | 0059  | 0131 | 0201          | M8.2  | .210                | 2N       | N07E50 |          | 9240       | 880        | 11000     | 3 2  |
| 25 Nov | 0906  | 0920 | 0940          | M3.5  | .045                | 2N       | N18W24 |          | 9236       | 960        | 100       |      |
| 25 Nov | 1833  | 1844 | 1855          | X1.9  | .150                | 2B       | N20W23 |          | 9236       | 17000      | 1100      | 3    |
| 26 Nov | 0247  | 0308 | 0320          | M2.2  | .026                | 1F       | N19W30 |          | 9236       | 68         | 60        |      |
| 26 Nov | 1634  | 1648 | 1656          | X4.0  | .280                | 2B       | N18W38 |          | 9236       | 3200       | 700       | 2    |

### *Flare List*

| Date        | Time  |       |       | X-ray<br>Class. | Optical        |                     | Rgn  |
|-------------|-------|-------|-------|-----------------|----------------|---------------------|------|
|             | Begin | Max   | End   |                 | Imp /<br>Brtns | Location<br>Lat CMD |      |
| 20 November | 0006  | 0022  | 0115  |                 | SF             | S20W24              | 9231 |
|             | 0116  | 0116  | 0122  |                 | SF             | N14E22              | 9235 |
|             | 0607  | 0621  | 0628  | C1.9            |                |                     |      |
|             | 0812  | 0839  | 0856  | C1.6            |                |                     |      |
|             | 0905  | 0907  | 0920  | C1.9            | SF             | S24W16              | 9231 |
|             | 0934  | 0935  | 0946  | C2.2            | SN             | S26W13              | 9231 |
|             | 1306  | 1317  | A1354 | C2.1            | SF             | S24W18              | 9231 |
|             | 1600  | 1603  | 1629  |                 | SF             | N11W40              | 9237 |
|             | 2332  | 2333  | 2339  |                 | SF             | S25W21              | 9231 |
| 21 November | 0447  | 0454  | 0507  | C1.4            |                |                     |      |
|             | 0519  | 0519  | 0526  | C1.6            | SF             | S24W28              | 9231 |
|             | 0628  | 0632  | 0636  | C1.4            |                |                     |      |
|             | 0728  | 0733  | 0738  | C1.3            |                |                     |      |
|             | 0913  | 0925  | 0932  | C1.1            |                |                     |      |
|             | 1258  | 1300  | 1310  | C1.7            | SF             | N15W67              | 9237 |
|             | 1424  | 1426  | 1449  | C2.4            | SF             | N13W69              | 9237 |
|             | 1536  | 1537  | 1545  | C1.4            | SF             | N13W70              | 9237 |
|             | 1639  | 1648  | 1655  | C1.1            |                |                     |      |
| 22 November | 1917  | U1917 | 1949  | M1.6            | SN             | N15W71              | 9237 |
|             | 2140  | 2147  | 2150  | C5.4            |                |                     |      |
|             | 0151  | 0151  | 0201  | C2.9            | SF             | S19E49              |      |
|             | 0335  | 0341  | 0416  | C1.6            | SF             | N09W63              | 9237 |
|             | 0357  | 0401  | 0404  | C2.0            |                |                     | 9237 |
|             | 0446  | 0453  | 0457  | C1.7            | SF             | N18E25              | 9236 |
|             | 0627  | 0630  | 0634  | C2.1            | SF             | N17E23              | 9236 |
|             | 0702  | 0704  | 0709  | C1.7            | SF             | N18E21              | 9236 |
|             | 0805  | 0811  | 0818  | C2.7            | 1F             | N20E27              | 9236 |



*Flare List – continued.*

| Date        | Time  |      |      | X-ray<br>Class. | Imp /<br>Brtns | Optical             | Rgn  |
|-------------|-------|------|------|-----------------|----------------|---------------------|------|
|             | Begin | Max  | End  |                 |                | Location<br>Lat CMD |      |
| 22 November | 0827  | 0831 | 0836 | C2.4            | SF             | N11E80              | 9240 |
|             | 0845  | 0847 | 0850 |                 | SF             | N18E19              | 9236 |
|             | 1042  | 1045 | 1047 | C1.5            |                |                     | 9236 |
|             | 1238  | 1241 | 1244 | C1.9            | SF             | N17E18              | 9236 |
|             | 1320  | 1325 | 1328 | C1.6            |                |                     |      |
|             | 1619  | 1620 | 1627 | C7.0            | 1N             | N16E17              | 9236 |
|             | 1632  | 1635 | 1643 | C2.6            | SF             | N17E16              | 9236 |
|             | 1906  | 1908 | 1917 | C1.6            | SF             | S24W44              | 9231 |
|             | 1917  | 1918 | 1921 |                 | SF             | N08E77              | 9240 |
|             | 2253  | 2254 | 2257 | C2.5            | SF             | S24W46              | 9231 |
| 23 November | 0234  | 0238 | 0252 | C3.3            | SF             | S25W47              | 9231 |
|             | 0409  | 0409 | 0416 | C2.9            | SF             | S25W49              | 9231 |
|             | 0536  | 0548 | 0615 | C5.4            | 1F             | S26W40              | 9238 |
|             | 0611  | 0611 | 0619 |                 | SF             | S26W49              | 9231 |
|             | 0826  | 0831 | 0842 | C2.5            | SF             | S25W51              | 9231 |
|             | 0923  | 0924 | 0929 | C2.4            | SF             | S25W50              | 9231 |
|             | 0938  | 0939 | 0944 | C2.5            | SF             | S24W56              | 9231 |
|             | 1006  | 1007 | 1013 |                 | SF             | S23W55              | 9231 |
|             | 1303  | 1303 | 1308 | C2.6            | SF             | S22W59              | 9231 |
|             | 1421  | 1423 | 1432 | C7.5            | 1N             | S24W55              | 9231 |
|             | 1430  | 1435 | 1447 |                 | SF             | N22E05              | 9236 |
|             | 1652  | 1657 | 1706 | C2.0            | SF             | N22E04              | 9236 |
|             | 1811  | 1811 | 1815 |                 | SF             | N19E07              | 9236 |
|             | 1821  | 1822 | 1830 | C2.3            | SF             | N22E00              | 9236 |
|             | 1917  | 2043 | 2109 | C7.9            |                |                     | 9239 |
|             | 1938  | 1943 | 1950 |                 | SF             | N08E64              | 9240 |
|             | 2004  | 2006 | 2015 |                 | SF             | S21W60              | 9231 |
|             | 2320  | 2328 | 2357 | M1.0            | 1N             | N22W03              | 9236 |
| 2359        | 0000  | 0004 |      | SF              | N22W03         | 9236                |      |
| 24 November | 0016  | 0017 | 0020 |                 | SF             | S21E48              | 9239 |
|             | 0217  | 0220 | 0228 | C5.9            | SF             | N23W04              | 9236 |
|             | 0407  | 0407 | 0422 | C4.1            | SF             | N23W05              | 9236 |
|             | 0456  | 0456 | 0500 |                 | SF             | N10E60              | 9240 |
|             | 0457  | 0501 | 0535 | X2.0            | 3B             | N20W05              | 9236 |
|             | 0728  | 0738 | 0805 | C4.2            | SF             | N21W08              | 9236 |
|             | 0759  | 0759 | 0804 |                 | SF             | S26W64              | 9231 |
|             | 1136  | 1140 | 1149 | C2.4            | SF             | N22W04              | 9236 |
|             | 1316  | 1318 | 1325 | C2.6            | SF             | S24W69              | 9231 |
|             | 1501  | 1516 | 1557 | X2.3            | 2B             | N22W07              | 9236 |
| 1544        | 1551  | 1558 |      | SF              | S22W71         | 9231                |      |





*Flare List – continued.*

| Date        | Time  |       |       | X-ray<br>Class. | Optical        |                     | Rgn  |
|-------------|-------|-------|-------|-----------------|----------------|---------------------|------|
|             | Begin | Max   | End   |                 | Imp /<br>Brtns | Location<br>Lat CMD |      |
| 24 November | 1559  | 1600  | 1606  |                 | SF             | S22W73              | 9231 |
|             | 1639  | 1639  | 1650  |                 | SF             | S22W74              | 9231 |
|             | 1928  | 1939  | 2003  |                 | SF             | S23W74              | 9231 |
|             | 2113  | 2116  | 2118  | C2.4            |                |                     |      |
|             | 2146  | 2154  | 2249  | X1.8            | 2N             | N21W14              | 9236 |
|             | 2254  | 2255  | 2301  |                 | SF             | N19W16              | 9236 |
| 25 November | 0100  | 0106  | 0324  | M8.2            | 2N             | N07E50              | 9240 |
|             | 0909  | 0918  | A1015 | M3.5            | 2N             | N18W24              | 9236 |
|             | 1416  | 1420  | 1425  | C2.1            |                |                     |      |
|             | 1532  | 1535  | 1542  | C3.3            | SF             | N24W21              | 9236 |
|             | 1555  | 1556  | 1559  | C1.9            | SF             | N23W21              | 9236 |
|             | 1714  | 1717  | 1721  | C3.2            | SF             | N22W25              | 9236 |
|             | 1728  | 1729  | 1734  |                 | SF             | N21W26              | 9236 |
|             | 1836  | 1841  | 2018  | X1.9            | 2B             | N20W23              | 9236 |
|             | 2107  | 2107  | 2112  |                 | SF             | N20W27              | 9236 |
| 26 November | B0253 | U0314 | A0338 | M2.2            | 1F             | N19W30              | 9236 |
|             | 0619  | 0846  | 1030  | C3.6            |                |                     |      |
|             | 0951  | 0953  | 1001  |                 | SF             | N19W34              | 9236 |
|             | 1136  | 1138  | 1148  | C2.8            | SF             | N21W33              | 9236 |
|             | 1233  | 1239  | 1317  | C3.4            | SF             | N20W33              | 9236 |
|             | 1511  | 1511  | 1517  | C2.2            | SF             | N22W34              | 9236 |
|             | 1537  | 1538  | 1545  |                 | SF             | N19W35              | 9236 |
|             | 1638  | 1657  | 1732  | X4.0            | 2B             | N18W38              | 9236 |
|             | 1745  | 1755  | 1817  |                 | SF             | N18W36              | 9236 |
|             | 1830  | 1834  | 1836  |                 | SF             | N21W39              | 9236 |



### Region Summary

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

#### Region 9229

|                 |     |      |    |     |     |   |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------|-----|------|----|-----|-----|---|--|--|--|--|--|--|--|--|--|--|--|--|
| 10 Nov N04E70   | 098 | 0080 | 02 | HAX | 002 | A |  |  |  |  |  |  |  |  |  |  |  |  |
| 11 Nov N05E58   | 097 | 0080 | 02 | HSX | 002 | A |  |  |  |  |  |  |  |  |  |  |  |  |
| 12 Nov N06E45   | 097 | 0060 | 02 | HAX | 003 | A |  |  |  |  |  |  |  |  |  |  |  |  |
| 13 Nov N06E31   | 097 | 0070 | 02 | HSX | 003 | A |  |  |  |  |  |  |  |  |  |  |  |  |
| 14 Nov N05E17   | 098 | 0070 | 03 | HAX | 003 | A |  |  |  |  |  |  |  |  |  |  |  |  |
| 15 Nov N06E05   | 097 | 0070 | 02 | HAX | 003 | A |  |  |  |  |  |  |  |  |  |  |  |  |
| 16 Nov N06W09   | 098 | 0080 | 02 | HSX | 002 | A |  |  |  |  |  |  |  |  |  |  |  |  |
| 17 Nov N07W22   | 098 | 0060 | 02 | CSO | 004 | B |  |  |  |  |  |  |  |  |  |  |  |  |
| 18 Nov N08W35   | 098 | 0050 | 03 | CSO | 003 | B |  |  |  |  |  |  |  |  |  |  |  |  |
| 19 Nov N07W49   | 099 | 0040 | 02 | HAX | 001 | A |  |  |  |  |  |  |  |  |  |  |  |  |
| 20 Nov N08W62   | 099 | 0030 | 01 | HAX | 001 | A |  |  |  |  |  |  |  |  |  |  |  |  |
| 21 Nov N08W76   | 100 | 0010 | 01 | HSX | 001 | A |  |  |  |  |  |  |  |  |  |  |  |  |
| 22 Nov N08W89   | 100 |      |    |     |     |   |  |  |  |  |  |  |  |  |  |  |  |  |
| 0 0 0 0 0 0 0 0 |     |      |    |     |     |   |  |  |  |  |  |  |  |  |  |  |  |  |

Crossed West Limb.

Absolute heliographic longitude: 097

#### Region 9231

|                   |     |      |    |     |     |    |   |   |  |    |   |  |  |  |  |  |  |  |
|-------------------|-----|------|----|-----|-----|----|---|---|--|----|---|--|--|--|--|--|--|--|
| 13 Nov S23E72     | 056 | 0140 | 09 | DAO | 006 | B  |   |   |  |    |   |  |  |  |  |  |  |  |
| 14 Nov S24E56     | 059 | 0250 | 11 | EAI | 014 | B  | 6 |   |  | 10 |   |  |  |  |  |  |  |  |
| 15 Nov S24E44     | 058 | 0320 | 14 | EAI | 022 | B  | 1 |   |  | 2  |   |  |  |  |  |  |  |  |
| 16 Nov S23E30     | 059 | 0370 | 20 | FAC | 032 | B  | 1 |   |  | 1  |   |  |  |  |  |  |  |  |
| 17 Nov S24E19     | 057 | 0330 | 18 | FAI | 034 | BG | 2 |   |  | 2  | 1 |  |  |  |  |  |  |  |
| 18 Nov S24E05     | 058 | 0200 | 18 | FAI | 037 | BG | 5 | 1 |  | 6  |   |  |  |  |  |  |  |  |
| 19 Nov S24W10     | 060 | 0270 | 20 | FAI | 040 | BG | 1 |   |  | 2  |   |  |  |  |  |  |  |  |
| 20 Nov S24W23     | 060 | 0410 | 20 | FKI | 039 | BG | 3 |   |  | 5  |   |  |  |  |  |  |  |  |
| 21 Nov S23W36     | 060 | 0360 | 22 | FKI | 026 | BG | 1 |   |  | 1  |   |  |  |  |  |  |  |  |
| 22 Nov S24W50     | 061 | 0330 | 22 | FAI | 022 | BG | 2 |   |  | 2  |   |  |  |  |  |  |  |  |
| 23 Nov S23W62     | 060 | 0320 | 21 | FAI | 020 | BG | 7 |   |  | 9  | 1 |  |  |  |  |  |  |  |
| 24 Nov S24W74     | 058 | 0250 | 24 | FKI | 010 | B  | 1 |   |  | 6  |   |  |  |  |  |  |  |  |
| 25 Nov S20W91     | 062 | 0080 | 03 | CAO | 002 | B  |   |   |  |    |   |  |  |  |  |  |  |  |
| 30 1 0 46 2 1 0 0 |     |      |    |     |     |    |   |   |  |    |   |  |  |  |  |  |  |  |

Crossed West Limb.

Absolute heliographic longitude: 058



**Region Summary-continued**

| Date               | Location       |       | Sunspot Characteristics        |                   |               |               | Flares       |       |   |   |         |   |   |   |   |  |  |
|--------------------|----------------|-------|--------------------------------|-------------------|---------------|---------------|--------------|-------|---|---|---------|---|---|---|---|--|--|
|                    | ( ° Lat ° CMD) | Helio | Area<br>(10 <sup>6</sup> hemi) | Extent<br>(helio) | Spot<br>Class | Spot<br>Count | Mag<br>Class | X-ray |   |   | Optical |   |   |   |   |  |  |
|                    |                | Lon   |                                |                   |               |               |              | C     | M | X | S       | 1 | 2 | 3 | 4 |  |  |
| <i>Region 9232</i> |                |       |                                |                   |               |               |              |       |   |   |         |   |   |   |   |  |  |
| 13 Nov             | N26E76         | 052   | 0120                           | 08                | DAO           | 003           | B            |       |   |   |         |   |   |   |   |  |  |
| 14 Nov             | N24E61         | 054   | 0130                           | 10                | DSO           | 005           | B            |       |   |   |         |   |   |   |   |  |  |
| 15 Nov             | N24E48         | 054   | 0110                           | 11                | EAO           | 006           | B            |       |   |   |         |   |   |   |   |  |  |
| 16 Nov             | N26E35         | 054   | 0070                           | 12                | CAO           | 009           | B            |       |   |   |         |   |   |   |   |  |  |
| 17 Nov             | N24E22         | 054   | 0040                           | 07                | CAO           | 007           | B            |       |   |   |         |   |   |   |   |  |  |
| 18 Nov             | N23E07         | 056   | 0020                           | 05                | CSO           | 005           | B            |       |   |   |         |   |   |   |   |  |  |
| 19 Nov             | N23W06         | 056   | 0010                           | 02                | HRX           | 004           | A            |       |   |   |         |   |   |   |   |  |  |
| 20 Nov             | N22W19         | 056   | 0020                           | 03                | CSO           | 005           | B            |       |   |   |         |   |   |   |   |  |  |
| 21 Nov             | N25W31         | 055   | 0020                           | 04                | CRO           | 004           | B            |       |   |   |         |   |   |   |   |  |  |
| 22 Nov             | N24W45         | 056   | 0010                           | 02                | AXX           | 002           | A            |       |   |   |         |   |   |   |   |  |  |
| 23 Nov             | N25W58         | 056   | 0000                           | 00                | AXX           | 001           | A            |       |   |   |         |   |   |   |   |  |  |
| 24 Nov             | N25W71         | 056   |                                |                   |               |               |              |       |   |   |         |   |   |   |   |  |  |
| 25 Nov             | N25W84         | 056   |                                |                   |               |               |              |       |   |   |         |   |   |   |   |  |  |

0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 056

|                    |        |     |      |    |     |     |   |  |  |  |  |  |  |   |  |  |  |
|--------------------|--------|-----|------|----|-----|-----|---|--|--|--|--|--|--|---|--|--|--|
| <i>Region 9233</i> |        |     |      |    |     |     |   |  |  |  |  |  |  |   |  |  |  |
| 14 Nov             | N13E76 | 039 | 0050 | 02 | HSX | 002 | A |  |  |  |  |  |  |   |  |  |  |
| 15 Nov             | N12E63 | 039 | 0050 | 02 | HSX | 001 | A |  |  |  |  |  |  |   |  |  |  |
| 16 Nov             | N13E54 | 035 | 0060 | 07 | CAO | 005 | B |  |  |  |  |  |  | 1 |  |  |  |
| 17 Nov             | N12E39 | 037 | 0050 | 02 | HSX | 001 | A |  |  |  |  |  |  |   |  |  |  |
| 18 Nov             | N11E22 | 041 | 0010 | 01 | HAX | 001 | A |  |  |  |  |  |  |   |  |  |  |
| 19 Nov             | N11E09 | 041 | 0010 | 01 | HSX | 001 | A |  |  |  |  |  |  |   |  |  |  |
| 20 Nov             | N12W05 | 042 | 0010 | 01 | HSX | 001 | A |  |  |  |  |  |  |   |  |  |  |
| 21 Nov             | N14W21 | 045 | 0010 | 00 | AXX | 002 | A |  |  |  |  |  |  |   |  |  |  |
| 22 Nov             | N14W27 | 038 |      |    |     |     |   |  |  |  |  |  |  |   |  |  |  |
| 23 Nov             | N15W41 | 039 | 0070 | 03 | CSO | 003 | B |  |  |  |  |  |  |   |  |  |  |
| 24 Nov             | N15W55 | 039 | 0060 | 03 | CSO | 004 | B |  |  |  |  |  |  |   |  |  |  |
| 25 Nov             | N15W70 | 041 | 0050 | 04 | CSO | 002 | B |  |  |  |  |  |  |   |  |  |  |
| 26 Nov             | N15W83 | 041 |      |    |     |     |   |  |  |  |  |  |  |   |  |  |  |

0 0 0 1 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 042





**Region Summary-continued**

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

*Region 9237*

|        |        |     |      |    |     |     |   |   |   |   |   |   |   |   |   |   |   |   |
|--------|--------|-----|------|----|-----|-----|---|---|---|---|---|---|---|---|---|---|---|---|
| 18 Nov | N10W19 | 082 | 0020 | 02 | CSO | 004 | B |   |   |   |   |   |   |   |   |   |   |   |
| 19 Nov | N10W33 | 083 | 0040 | 06 | DRO | 012 | B |   |   |   |   |   | 1 |   |   |   |   |   |
| 20 Nov | N09W46 | 083 | 0040 | 07 | CSO | 008 | B |   |   |   |   |   | 1 |   |   |   |   |   |
| 21 Nov | N10W61 | 085 | 0040 | 08 | CRO | 007 | B | 3 | 1 |   |   |   | 4 |   |   |   |   |   |
| 22 Nov | N09W73 | 084 | 0030 | 04 | CRO | 002 | B | 2 |   |   |   |   | 1 |   |   |   |   |   |
| 23 Nov | N09W86 | 084 |      |    |     |     |   |   |   |   |   |   |   |   |   |   |   |   |
|        |        |     |      |    |     |     |   | 5 | 1 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Crossed West Limb.

Absolute heliographic longitude: 082

*Region 9238*

|        |        |     |      |    |     |     |   |   |   |   |   |   |   |   |   |   |   |   |
|--------|--------|-----|------|----|-----|-----|---|---|---|---|---|---|---|---|---|---|---|---|
| 20 Nov | S23W08 | 045 | 0010 | 03 | CRO | 003 | B |   |   |   |   |   |   |   |   |   |   |   |
| 21 Nov | S22W21 | 045 | 0020 | 03 | CSO | 004 | B |   |   |   |   |   |   |   |   |   |   |   |
| 22 Nov | S22W35 | 046 | 0010 | 01 | HRX | 001 | A |   |   |   |   |   |   |   |   |   |   |   |
| 23 Nov | S22W48 | 046 |      |    |     |     |   | 1 |   |   |   |   | 1 |   |   |   |   |   |
| 24 Nov | S22W61 | 046 |      |    |     |     |   |   |   |   |   |   |   |   |   |   |   |   |
| 25 Nov | S22W74 | 046 |      |    |     |     |   |   |   |   |   |   |   |   |   |   |   |   |
| 26 Nov | S22W87 | 046 |      |    |     |     |   |   |   |   |   |   |   |   |   |   |   |   |
|        |        |     |      |    |     |     |   | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |

Still on Disk.

Absolute heliographic longitude: 045

*Region 9239*

|        |        |     |      |    |     |     |   |   |   |   |   |   |   |   |   |   |   |   |
|--------|--------|-----|------|----|-----|-----|---|---|---|---|---|---|---|---|---|---|---|---|
| 21 Nov | S23E73 | 311 | 0100 | 03 | HSX | 001 | A |   |   |   |   |   |   |   |   |   |   |   |
| 22 Nov | S21E63 | 308 | 0110 | 02 | HAX | 001 | A |   |   |   |   |   |   |   |   |   |   |   |
| 23 Nov | S21E49 | 309 | 0140 | 02 | HSX | 001 | A | 1 |   |   |   |   |   |   |   |   |   |   |
| 24 Nov | S20E36 | 308 | 0120 | 02 | HSX | 001 | A |   |   |   |   |   | 1 |   |   |   |   |   |
| 25 Nov | S21E24 | 307 | 0140 | 03 | HSX | 001 | A |   |   |   |   |   |   |   |   |   |   |   |
| 26 Nov | S21E10 | 308 | 0150 | 04 | CSO | 003 | B |   |   |   |   |   |   |   |   |   |   |   |
|        |        |     |      |    |     |     |   | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Still on Disk.

Absolute heliographic longitude: 308

*Region 9240*

|        |        |     |      |    |     |     |   |   |   |   |   |   |   |   |   |   |   |   |
|--------|--------|-----|------|----|-----|-----|---|---|---|---|---|---|---|---|---|---|---|---|
| 22 Nov | N09E72 | 299 | 0120 | 08 | CAO | 004 | B | 1 |   |   |   |   | 2 |   |   |   |   |   |
| 23 Nov | N09E58 | 300 | 0250 | 07 | DSO | 005 | B |   |   |   |   |   | 1 |   |   |   |   |   |
| 24 Nov | N09E46 | 298 | 0180 | 06 | CAO | 004 | B |   |   |   |   |   | 1 |   |   |   |   |   |
| 25 Nov | N09E34 | 297 | 0220 | 06 | CHO | 004 | B |   | 1 |   |   |   |   |   | 1 |   |   |   |
| 26 Nov | N08E22 | 296 | 0300 | 10 | DHO | 015 | B |   |   |   |   |   |   |   |   |   |   |   |
|        |        |     |      |    |     |     |   | 1 | 1 | 0 | 4 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |

Still on Disk.

Absolute heliographic longitude: 296



***Region Summary-continued***

| Location |                | Sunspot Characteristics |                                |                   |               |               | Flares       |       |   |   |         |   |   |   |
|----------|----------------|-------------------------|--------------------------------|-------------------|---------------|---------------|--------------|-------|---|---|---------|---|---|---|
| Date     | ( ° Lat ° CMD) | Helio<br>Lon            | Area<br>(10 <sup>6</sup> hemi) | Extent<br>(helio) | Spot<br>Class | Spot<br>Count | Mag<br>Class | X-ray |   |   | Optical |   |   |   |
|          |                |                         |                                |                   |               |               | C            | M     | X | S | 1       | 2 | 3 | 4 |

*Region 9241*

|        |        |     |      |    |     |     |   |  |  |  |  |  |  |  |  |
|--------|--------|-----|------|----|-----|-----|---|--|--|--|--|--|--|--|--|
| 23 Nov | N21W19 | 017 | 0020 | 03 | DRO | 002 | B |  |  |  |  |  |  |  |  |
| 24 Nov | N21W33 | 017 | 0010 | 02 | BXO | 002 | B |  |  |  |  |  |  |  |  |
| 25 Nov | N16W46 | 017 |      |    |     |     |   |  |  |  |  |  |  |  |  |
| 26 Nov | N16W59 | 017 |      |    |     |     |   |  |  |  |  |  |  |  |  |

0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 017

*Region 9242*

|        |        |     |      |    |     |     |   |  |  |  |  |  |  |  |  |
|--------|--------|-----|------|----|-----|-----|---|--|--|--|--|--|--|--|--|
| 24 Nov | N22E68 | 276 | 0040 | 06 | BXO | 002 | B |  |  |  |  |  |  |  |  |
| 25 Nov | N21E57 | 274 | 0020 | 00 | AXX | 001 | A |  |  |  |  |  |  |  |  |
| 26 Nov | N19E39 | 279 | 0020 | 06 | BXO | 004 | B |  |  |  |  |  |  |  |  |

0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 279

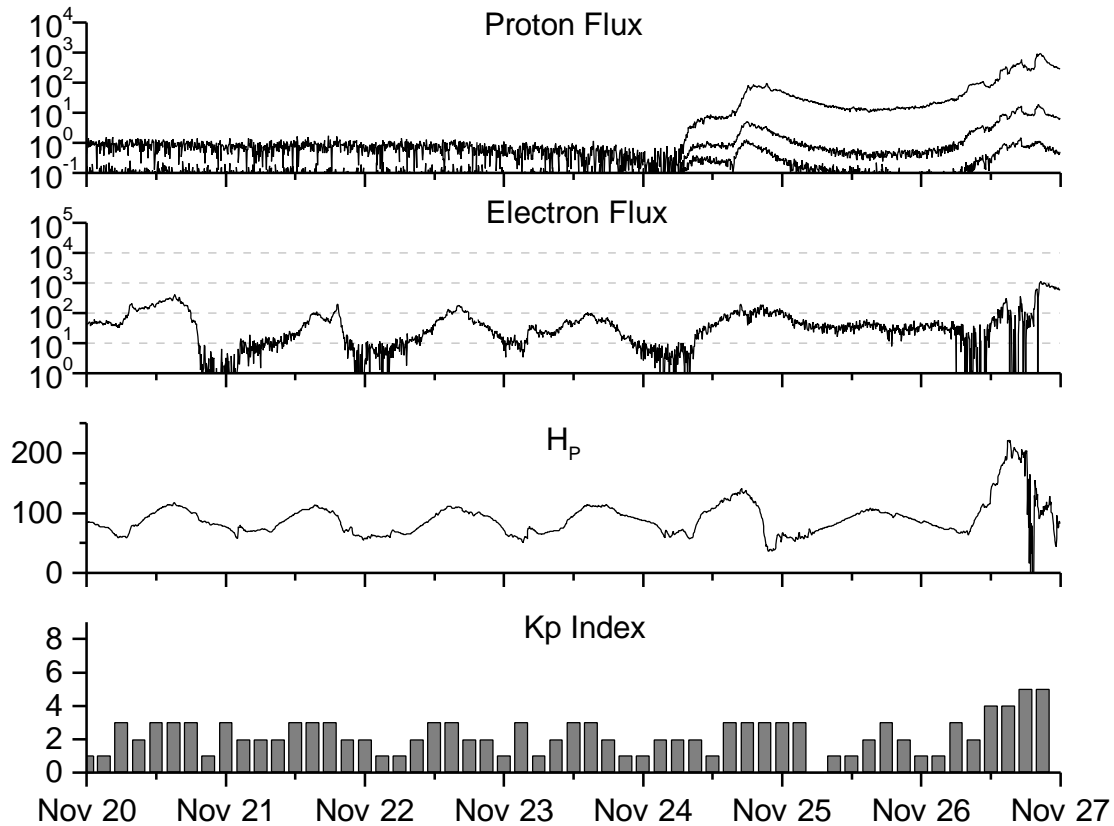


**Recent Solar Indices (preliminary)  
of the observed monthly mean values**

| 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  |
| <b>1998</b> |                 |       |        |               |            |            |             |           |        |
| November    | 99.5            | 74.0  | 0.74   | 101.3         | 73.0       | 140.2      | 130.0       | 16        | 12.4   |
| December    | 120.8           | 81.9  | 0.68   | 108.8         | 77.9       | 150.1      | 134.3       | 08        | 11.9   |
| <b>1999</b> |                 |       |        |               |            |            |             |           |        |
| January     | 94.3            | 62.0  | 0.66   | 116.5         | 82.6       | 142.6      | 139.0       | 10        | 11.7   |
| February    | 93.4            | 66.3  | 0.71   | 120.2         | 84.6       | 142.0      | 142.6       | 12        | 11.6   |
| March       | 100.5           | 68.8  | 0.68   | 120.5         | 83.8       | 126.3      | 144.0       | 14        | 11.7   |
| April       | 92.9            | 63.7  | 0.69   | 123.8         | 85.5       | 117.2      | 145.8       | 12        | 12.2   |
| May         | 140.5           | 106.4 | 0.76   | 131.7         | 90.5       | 148.6      | 149.9       | 08        | 12.4   |
| June        | 208.3           | 137.7 | 0.66   | 136.0         | 93.1       | 169.8      | 152.9       | 07        | 12.4   |
| 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         | 110.9      | 191.5      | 171.5       | 14        | 13.1   |
| December    | 123.5           | 86.4  | 0.69   | 165.9         | 111.0      | 169.8      | 173.4       | 10        | 13.8   |
| <b>2000</b> |                 |       |        |               |            |            |             |           |        |
| January     | 140.8           | 90.1  | 0.64   | 168.0         | 112.8      | 158.1      | 175.5       | 13        | 14.5   |
| February    | 161.9           | 112.9 | 0.70   | 172.1         | 116.6      | 173.2      | 176.8       | 15        | 15.1   |
| March       | 203.6           | 138.5 | 0.68   | 175.4         | 119.8      | 208.2      | 178.4       | 09        | 15.1   |
| April       | 193.4           | 125.3 | 0.65   | 176.3         | 120.7      | 184.2      | 180.5       | 15        | 14.9   |
| May         | 188.8           | 120.8 | 0.64   |               |            | 184.5      |             | 15        |        |
| June        | 190.3           | 124.9 | 0.66   |               |            | 179.8      |             | 15        |        |
| July        | 236.7           | 169.1 | 0.71   |               |            | 204.7      |             | 21        |        |
| August      | 166.6           | 130.5 | 0.78   |               |            | 163.1      |             | 18        |        |
| September   | 157.9           | 109.9 | 0.70   |               |            | 182.1      |             | 16        |        |
| October     | 138.9           | 100.1 | 0.72   |               |            | 167.8      |             | 16        |        |

**NOTE:** All smoothed values after September 1999 and monthly values after March 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 20 November 2000*

*Protons* plot contains the five-minute averaged integral proton flux (protons/cm<sup>2</sup>-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<sup>2</sup> -sec -sr) with energies greater than 2 MeV at GOES-8.

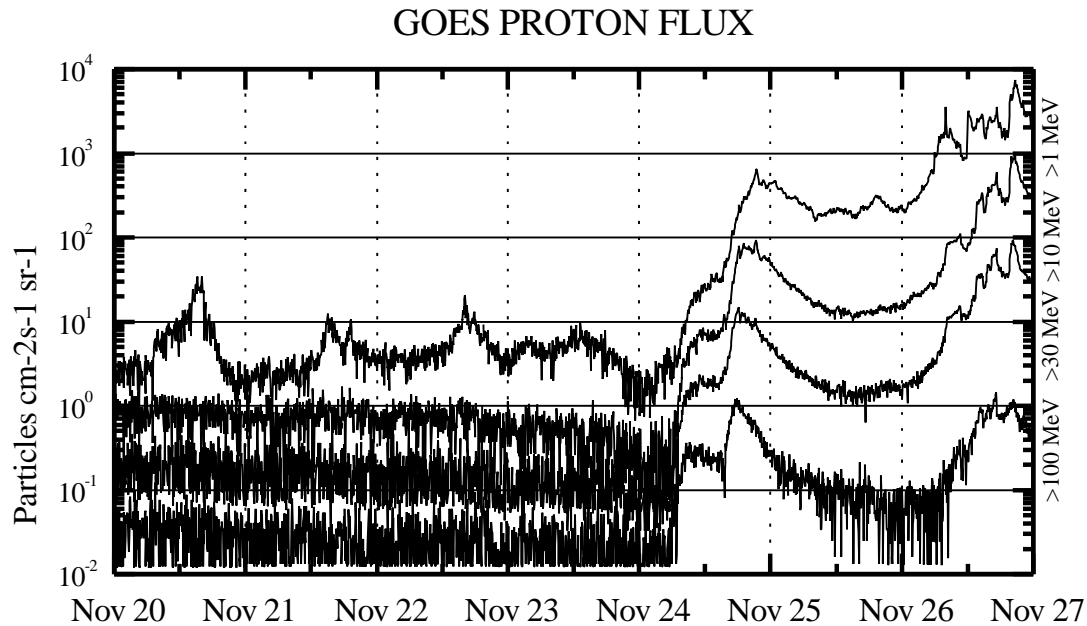
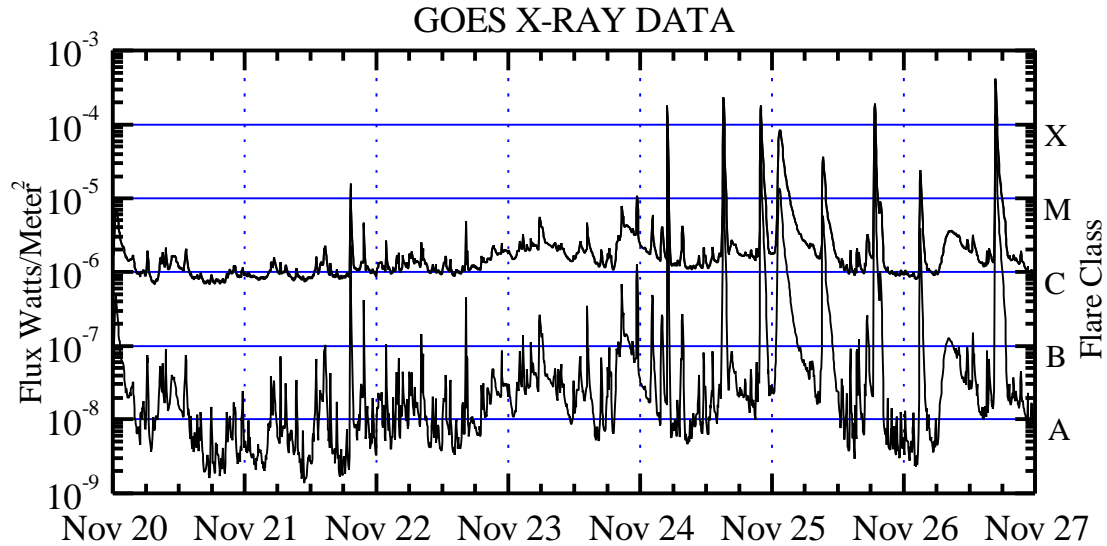
*H<sub>p</sub>* plot contains the five minute averaged magnetic field H - component in nanoteslas (nT) as measured by GOES-8. The H component is parallel to the spin axis of the satellite, which is nearly parallel to the Earth's rotation axis.

*K<sub>p</sub>* plot contains the estimated planetary 3-hour K-index (derived by the USAF 55<sup>th</sup> 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<sub>p</sub> 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<sub>p</sub> are " global " parameters that are applicable to a first order approximation over large areas. H<sub>p</sub> is subject to more localized phenomena and the measurements generally are applicable to within a few degrees of longitude of the measuring satellite.







*Weekly GOES Satellite X-ray and Proton Plots*

X-ray plot contains five-minute averaged x-ray flux (watts/m<sup>2</sup>) 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<sup>2</sup>–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<sup>2</sup>-sec-sr) at greater than 10 MeV.

