

**Space Weather Highlights**  
**06 -12 April 1998**

Activity declined from moderate to very low levels. Region 8195 (S27, L = 027, class/area Cso/060 on 07 April) produced an M1/2F flare at 06/1648UT. This region was one of a complex of regions that rotated into view on 04 April (see SWO PRF 1179). Activity dropped to low levels during 07 - 11 April with isolated C-class subflares observed. Activity declined to very low levels on 12 April.

Solar wind data were available from the ACE and WIND spacecraft during most of the period (magnetic field data were available for 06 - 09 April). Velocities ranged from 280 - 400 km/sec. Densities were mostly in the 01 - 05 p/cc range, but briefly increased to 13 p/cc late on 07 April. Bz ranged from plus to minus 10 nT (GSM). Solar sector orientation was away (phi angle near 135 degrees) through late 07 April, then shifted to a toward condition (phi angle near 315 degrees) during 08 - 09 April.

There were no significant proton enhancements observed at geosynchronous altitude.

The greater than 2 MeV electron flux at geosynchronous altitude was at normal levels through 11 April, then increased to moderate levels on 12 April.

The geomagnetic field was quiet to unsettled. A sudden impulse (12 nT) was detected by the Boulder USGS magnetometer at 07/1750UT, but was followed by unsettled levels.

**Space Weather Forecast**  
**15 April 1998 -11 May 1998**

Solar activity is expected to range from low to moderate. Isolated M-class flares are expected.

No significant proton enhancements are expected at geosynchronous altitude.

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

The geomagnetic field is expected to be at quiet to unsettled levels during most of the period. No significant disturbances are expected.



### Daily Solar Data

| Date     | Radio Flux | Sun spot                    | Sunspot Area | X-ray Background | X-ray Flux |   |   | Flares |   |   |   |   |
|----------|------------|-----------------------------|--------------|------------------|------------|---|---|--------|---|---|---|---|
|          | 10.7 cm    | No. (10 <sup>6</sup> hemi.) |              |                  | C          | M | X | S      | 1 | 2 | 3 | 4 |
| 06 April | 133        | 082                         | 650          | C1.0             | 6          | 1 | 0 | 2      | 0 | 1 | 0 | 0 |
| 07 April | 135        | 120                         | 830          | B6.6             | 7          | 0 | 0 | 0      | 0 | 0 | 0 | 0 |
| 08 April | 141        | 131                         | 940          | B5.6             | 5          | 0 | 0 | 10     | 1 | 0 | 0 | 0 |
| 09 April | 140        | 192                         | 840          | B4.7             | 3          | 0 | 0 | 9      | 0 | 0 | 0 | 0 |
| 10 April | 130        | 145                         | 890          | B4.8             | 4          | 0 | 0 | 4      | 0 | 0 | 0 | 0 |
| 11 April | 128        | 132                         | 660          | B4.1             | 5          | 0 | 0 | 2      | 0 | 0 | 0 | 0 |
| 12 April | 117        | 111                         | 570          | B3.5             | 0          | 0 | 0 | 2      | 0 | 0 | 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 |
| 06 April | 5.8E+5  | 3.8E+4 | 4.0E+3  |   | 4.9E+5 |       |
| 07 April | 7.1E+5  | 3.5E+4 | 4.0E+3  |   | 6.7E+5 |       |
| 08 April | 7.0E+5  | 2.7E+4 | 3.8E+3  |   | 5.3E+5 |       |
| 09 April | 5.6E+5  | 2.2E+4 | 3.2E+3  |   | 8.5E+5 |       |
| 10 April | 2.2E+6  | 2.1E+4 | 3.1E+3  |   | 7.8E+5 |       |
| 11 April | 4.4E+5  | 1.8E+4 | 3.3E+3  |   | 1.4E+6 |       |
| 12 April | 2.6E+5  | 1.6E+4 | 3.0E+3  |   | 1.8E+7 |       |

### Daily Geomagnetic Data

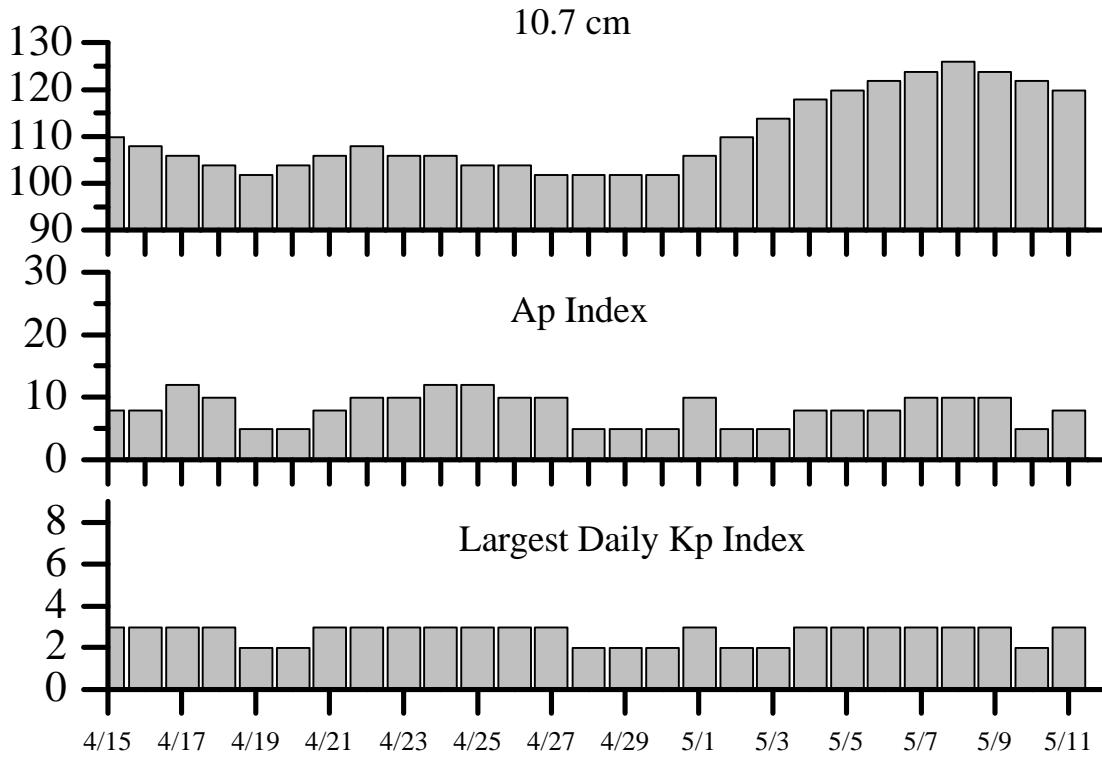
| Date     | Middle Latitude |                 | High Latitude |                   | Estimated |                 |
|----------|-----------------|-----------------|---------------|-------------------|-----------|-----------------|
|          | Fredericksburg  |                 | College       |                   | Planetary |                 |
|          | A               | K-indices       | A             | K-indices         | A         | K-indices       |
| 06 April | 4               | 1-0-0-1-2-1-2-2 | 6             | 0-0-0-4-3-0-1-0   | 4         | 1-0-0-2-2-2-2-1 |
| 07 April | 8               | 2-2-2-0-2-2-3-3 | 4             | 2-1-1-0-0-1-2-2   | 8         | 2-2-2-1-2-3-3-3 |
| 08 April | 6               | 3-1-2-0-0-1-3-2 | *             | *_*_*_*_*_*_*_*   | 8         | 3-2-2-2-2-2-3-2 |
| 09 April | 6               | 2-2-2-2-2-1-2-2 | *             | 1-2-2-2-3-*_*_*   | 9         | 2-2-3-2-3-3-3-2 |
| 10 April | 8               | 2-2-2-1-2-3-3-2 | *             | 3-2-4-6-2-4-3-*   | 11        | 2-2-2-3-2-4-3-3 |
| 11 April | 8               | 3-1-2-2-2-2-2-2 | *             | *-1-3-3-3-*_*-2-* | 12        | 3-2-3-4-3-3-2-3 |
| 12 April | 4               | 2-2-1-2-1-0-1-2 | *             | *_*_*_*_*_*_*_*   | 9         | 3-3-2-2-2-2-2-2 |

### Alerts and Warnings Issued

| Date and Time of Issue (UT) | Type of Alert or Warning           | Date and Time of Event (UT) |
|-----------------------------|------------------------------------|-----------------------------|
| 07 Apr 0200                 | 1- 245 MHz Burst                   | 06 Apr                      |
| 07 Apr 0200                 | 245 MHz Noise Storm                | 06 Apr                      |
| 07 Apr 0114                 | Type II Radio Emission             | 06 Apr 0455                 |
| 07 Apr 1822                 | Sudden Impulse observed at Boulder | 07 Apr 1750                 |
| 08 Apr 0158                 | 6- 245 MHz Bursts                  | 07 Apr                      |
| 10 Apr 1800                 | K= 4                               | 10 Apr 15 48                |



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 |
|--------|-----------------------|----------------------|---------------------|--------|-----------------------|----------------------|---------------------|
| 15 Apr | 110                   | 8                    | 3                   | 29     | 102                   | 5                    | 2                   |
| 16     | 108                   | 8                    | 3                   | 30     | 102                   | 5                    | 2                   |
| 17     | 106                   | 12                   | 3                   | 01 May | 106                   | 10                   | 3                   |
| 18     | 104                   | 10                   | 3                   | 02     | 110                   | 5                    | 2                   |
| 19     | 102                   | 5                    | 2                   | 03     | 114                   | 5                    | 2                   |
| 20     | 104                   | 5                    | 2                   | 04     | 118                   | 8                    | 3                   |
| 21     | 106                   | 8                    | 3                   | 05     | 120                   | 8                    | 3                   |
| 22     | 108                   | 10                   | 3                   | 06     | 122                   | 8                    | 3                   |
| 23     | 106                   | 10                   | 3                   | 07     | 124                   | 10                   | 3                   |
| 24     | 106                   | 12                   | 3                   | 08     | 126                   | 10                   | 3                   |
| 25     | 104                   | 12                   | 3                   | 09     | 124                   | 10                   | 3                   |
| 26     | 104                   | 10                   | 3                   | 10     | 122                   | 5                    | 2                   |
| 27     | 102                   | 10                   | 3                   | 11     | 120                   | 8                    | 3                   |
| 28     | 102                   | 5                    | 2                   |        |                       |                      |                     |



**Energetic Events**

| Date   | Time (UT) |      |      | X-ray |      | Optical Information |          |     | Peak     |            | Sweep Freq |           |    |
|--------|-----------|------|------|-------|------|---------------------|----------|-----|----------|------------|------------|-----------|----|
|        | Begin     | Max  | Max  | Class | Flux | Imp<br>Brtns        | Location |     | Rgn<br># | Radio Flux |            | Intensity |    |
|        |           |      |      |       |      |                     | Lat      | CMD |          | 245        | 2695       | II        | IV |
| 06 Apr | 1623      | 1648 | 1655 | M1.1  | .015 | 2F                  | S30E78   |     | 8195     |            |            |           |    |

**Flare List**

| Date     | Time  |      |      | X-ray<br>Class. | Imp /<br>Brtns | Optical<br>Location<br>Lat CMD | Rgn<br># |
|----------|-------|------|------|-----------------|----------------|--------------------------------|----------|
|          | Begin | Max  | End  |                 |                |                                |          |
| 06 April | 0652  | 0701 | 0743 | C4.7            |                |                                |          |
|          | 0946  | 1014 | 1032 | C2.5            |                |                                |          |
|          | 1206  | 1211 | 1216 | C1.8            |                |                                |          |
|          | 1459  | 1504 | 1515 | C1.2            |                |                                |          |
|          | 1630  | 1634 | 1707 | M1.1            | 2F             | S30E78                         | 8195     |
|          | 1715  | 1720 | 1748 | C3.4            | SF             | S18E64                         | 8194     |
|          | 1842  | 1842 | 1853 | C2.4            | SF             | S29E68                         | 8195     |
| 07 April | 0107  | 0110 | 0112 | C1.3            |                |                                |          |
|          | 0133  | 0138 | 0142 | C1.2            |                |                                |          |
|          | 0409  | 0412 | 0422 | C1.2            |                |                                |          |
|          | 0446  | 0459 | 0507 | C1.3            |                |                                |          |
|          | 0657  | 0702 | 0706 | C1.1            |                |                                |          |
|          | 1340  | 1347 | 1349 | C1.1            |                |                                |          |
|          | 2048  | 2059 | 2105 | C1.2            |                |                                |          |
| 08 April | 0003  | 0009 | 0014 | B9.8            |                |                                |          |
|          | 0344  | 0406 | 0428 | C2.1            |                |                                |          |
|          | 0848  | 0858 | 0936 | C1.1            |                |                                |          |
|          | 1741  | 1743 | 1748 |                 | SF             | S33E65                         | 8198     |
|          | 1802  | 1802 | 1804 |                 | SF             | S25E42                         | 8194     |
|          | 1929  | 1936 | 1948 | C1.3            | SF             | S30E38                         | 8195     |
|          | 1929  | 1936 | 2005 |                 | SF             | S24E44                         | 8194     |
|          | 1949  | 1950 | 2007 | C1.9            | SF             | S30E38                         | 8195     |
|          | 2011  | 2013 | 2021 |                 | SF             | S30E38                         | 8195     |
|          | 2013  | 2017 | 2021 |                 | SF             | S21E36                         | 8194     |
|          | 2136  | 2136 | 2149 | C5.7            | 1F             | S24E43                         | 8194     |
|          | 2241  | 2245 | 2248 |                 | SF             | S31E61                         | 8198     |
|          | 2252  | 2254 | 2259 |                 | SF             | S31E61                         | 8198     |
| 2353     | 2354  | 0002 |      | SF              | S31E60         | 8198                           |          |
| 09 April | 0005  | 0005 | 0010 |                 | SF             | S31E60                         | 8198     |
|          | 0022  | 0024 | 0033 |                 | SF             | S30E36                         | 8195     |
|          | 0404  | 0408 | 0414 | B8.6            |                |                                |          |
|          | 0422  | 0430 | 0437 | C2.4            |                |                                |          |
|          | 1417  | 1422 | 1431 | B8.9            |                |                                |          |
|          | 1708  | 1713 | 1724 |                 | SF             | S22E08                         |          |
|          | 1740  | 1742 | 1746 |                 | SF             | S22E08                         | 8200     |
|          | 1802  | 1804 | 1808 |                 | SF             | S22E08                         | 8200     |
| 1814     | 1815  | 1821 | C2.9 | SF              | S29E47         | 8198                           |          |



*Flare List – continued.*

| Date     | Time     |       |      | X-ray<br>Class. | Optical        |                     | Rgn<br># |
|----------|----------|-------|------|-----------------|----------------|---------------------|----------|
|          | Begin    | Max   | End  |                 | Imp /<br>Brtns | Location<br>Lat CMD |          |
| 09 April | 1937     | 1942  | 1955 | C1.3            | SF             | S22E05              | 8200     |
|          | 2155     | 2155  | 2200 |                 | SF             | S30E44              | 8198     |
|          | 2234     | 2237  | 2240 |                 | SF             | S29E40              | 8198     |
|          | 2324     | 2327  | 2330 | B8.5            |                |                     |          |
| 10 April | 0051     | 0057  | 0109 | C1.1            |                |                     |          |
|          | 0111     | 0114  | 0116 | C1.5            |                |                     |          |
|          | 0201     | 0215  | 0241 | C2.3            |                |                     |          |
|          | 0623     | 0627  | 0637 | B9.1            |                |                     |          |
|          | 1013     | 1017  | 1019 | B7.9            |                |                     |          |
|          | B1046    | U1047 | 1128 | C1.2            | SF             | S26W34              | 8199     |
|          | 1929     | 1930  | 1932 |                 | SF             | S28E40              | 8202     |
|          | 1933     | 1938  | 1944 |                 | SF             | S24E44              | 8202     |
| 11 April | 2144     | 2145  | 2147 |                 | SF             | S22W06              | 8200     |
|          | 0426     | 0455  | 0531 | C3.0            |                |                     |          |
|          | 0428     | 0443  | 0446 | C2.1            |                |                     |          |
|          | 0813     | 0844  | 0923 | C4.5            |                |                     |          |
|          | 0909     | 0912  | 0949 | C3.6            |                |                     |          |
|          | 1513     | 1513  | 1527 | C1.8            | SF             | S20E06              | 8194     |
|          | 1529     | 1530  | 1536 |                 | SF             | S21E07              | 8194     |
|          | 12 April | 0524  | 0527 | 0529            | B5.7           |                     |          |
| 0620     |          | 0628  | 0644 | B9.8            | SF             | S23E25              | 8202     |
| 1212     |          | 1236  | 1253 | B9.0            |                |                     |          |
| 1624     |          | 1626  | 1629 | B5.4            | SF             | S23E19              | 8202     |



## 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 8188

|        |        |     |      |    |     |     |   |  |  |  |  |  |  |  |  |  |                 |
|--------|--------|-----|------|----|-----|-----|---|--|--|--|--|--|--|--|--|--|-----------------|
| 25 Mar | N29E56 | 200 | 0000 | 00 | AXX | 001 | A |  |  |  |  |  |  |  |  |  |                 |
| 26 Mar | N30E41 | 202 | 0010 | 00 | AXX | 001 | A |  |  |  |  |  |  |  |  |  |                 |
| 27 Mar | N30E30 | 200 | 0000 | 00 | AXX | 001 | A |  |  |  |  |  |  |  |  |  |                 |
| 28 Mar | N30E19 | 198 | 0010 | 05 | BXO | 005 | B |  |  |  |  |  |  |  |  |  |                 |
| 29 Mar | N30E06 | 197 | 0020 | 05 | BXO | 003 | B |  |  |  |  |  |  |  |  |  |                 |
| 30 Mar | N30W10 | 200 | 0000 | 00 | AXX | 001 | A |  |  |  |  |  |  |  |  |  |                 |
| 31 Mar | N30W23 | 200 |      |    |     |     |   |  |  |  |  |  |  |  |  |  |                 |
| 01 Apr | N29W33 | 197 | 0010 | 04 | BXO | 002 | B |  |  |  |  |  |  |  |  |  |                 |
| 02 Apr | N29W46 | 197 |      |    |     |     |   |  |  |  |  |  |  |  |  |  |                 |
| 03 Apr | N29W59 | 197 |      |    |     |     |   |  |  |  |  |  |  |  |  |  |                 |
| 04 Apr | N29W72 | 197 |      |    |     |     |   |  |  |  |  |  |  |  |  |  |                 |
|        |        |     |      |    |     |     |   |  |  |  |  |  |  |  |  |  | 0 0 0 0 0 0 0 0 |

Died on Disk.

Absolute heliographic longitude: 197

### Region 8190

|        |        |     |      |    |     |     |    |   |  |  |  |  |  |  |  |  |                   |
|--------|--------|-----|------|----|-----|-----|----|---|--|--|--|--|--|--|--|--|-------------------|
| 29 Mar | S20E66 | 137 | 0090 | 08 | DSO | 004 | B  |   |  |  |  |  |  |  |  |  |                   |
| 30 Mar | S20E56 | 134 | 0100 | 09 | DSO | 005 | B  |   |  |  |  |  |  |  |  |  | 1                 |
| 31 Mar | S22E36 | 141 | 0100 | 13 | ESI | 009 | B  | 3 |  |  |  |  |  |  |  |  | 9                 |
| 01 Apr | S21E25 | 139 | 0230 | 12 | EAI | 021 | BG | 4 |  |  |  |  |  |  |  |  | 5                 |
| 02 Apr | S19E10 | 141 | 0130 | 10 | DAI | 016 | BG | 3 |  |  |  |  |  |  |  |  | 6                 |
| 03 Apr | S20W03 | 141 | 0140 | 11 | CSO | 018 | B  | 1 |  |  |  |  |  |  |  |  | 2 1               |
| 04 Apr | S20W17 | 141 | 0070 | 11 | CSO | 012 | B  |   |  |  |  |  |  |  |  |  | 6                 |
| 05 Apr | S20W30 | 141 | 0060 | 10 | CSO | 008 | B  |   |  |  |  |  |  |  |  |  |                   |
| 06 Apr | S20W48 | 146 | 0040 | 01 | HSX | 001 | A  |   |  |  |  |  |  |  |  |  |                   |
| 07 Apr | S21W60 | 145 | 0030 | 02 | HSX | 001 | A  |   |  |  |  |  |  |  |  |  |                   |
| 08 Apr | S21W72 | 144 | 0040 | 01 | HSX | 001 | A  |   |  |  |  |  |  |  |  |  |                   |
| 09 Apr | S22W86 | 144 | 0020 | 00 | HSX | 001 | A  |   |  |  |  |  |  |  |  |  |                   |
|        |        |     |      |    |     |     |    |   |  |  |  |  |  |  |  |  | 11 0 0 29 1 0 0 0 |

Crossed West Limb.

Absolute heliographic longitude: 141



*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 8191</i> |                |       |                                |                   |               |               |              |       |   |   |         |   |   |   |   |   |
| 31 Mar             | S20E52         | 125   | 0030                           | 04                | CSO           | 005           | B            |       |   |   |         |   |   |   |   |   |
| 01 Apr             | S21E34         | 130   | 0030                           | 05                | CSO           | 003           | B            |       |   |   |         |   |   |   |   |   |
| 02 Apr             | S19E21         | 130   | 0030                           | 04                | CSO           | 007           | B            | 1     |   |   | 2       |   |   |   |   |   |
| 03 Apr             | S20E09         | 129   | 0040                           | 04                | CSO           | 008           | BG           |       |   |   |         | 1 |   |   |   |   |
| 04 Apr             | S22W05         | 129   | 0030                           | 05                | BXO           | 010           | B            |       |   |   | 1       |   |   |   |   |   |
| 05 Apr             | S21W19         | 130   | 0010                           | 05                | BXO           | 004           | B            |       |   |   |         |   |   |   |   |   |
| 06 Apr             | S20W31         | 129   | 0010                           | 04                | BXO           | 004           | B            |       |   |   |         |   |   |   |   |   |
| 07 Apr             | S20W44         | 129   |                                |                   |               |               |              |       |   |   |         |   |   |   |   |   |
| 08 Apr             | S20W57         | 129   |                                |                   |               |               |              |       |   |   |         |   |   |   |   |   |
| 09 Apr             | S20W70         | 129   |                                |                   |               |               |              |       |   |   |         |   |   |   |   |   |
| 10 Apr             | S20W83         | 129   |                                |                   |               |               |              |       |   |   |         |   |   |   |   |   |
|                    |                |       |                                |                   |               |               |              |       | 1 | 0 | 0       | 3 | 1 | 0 | 0 | 0 |

Crossed West Limb.

Absolute heliographic longitude: 129

*Region 8193*

|        |        |     |      |    |     |     |   |   |   |   |   |    |   |   |   |   |
|--------|--------|-----|------|----|-----|-----|---|---|---|---|---|----|---|---|---|---|
| 04 Apr | S22E42 | 082 | 0030 | 06 | CSO | 007 | B |   |   |   | 8 |    |   |   |   |   |
| 05 Apr | S22E28 | 083 | 0250 | 09 | DSI | 016 | B | 1 |   |   | 2 |    |   |   |   |   |
| 06 Apr | S22E14 | 084 | 0280 | 10 | DKI | 020 | B |   |   |   |   |    |   |   |   |   |
| 07 Apr | S23E02 | 083 | 0290 | 12 | EAO | 021 | B |   |   |   |   |    |   |   |   |   |
| 08 Apr | S23W12 | 084 | 0260 | 11 | EKO | 018 | B |   |   |   |   |    |   |   |   |   |
| 09 Apr | S23W24 | 082 | 0240 | 12 | EAO | 020 | B |   |   |   |   |    |   |   |   |   |
| 10 Apr | S23W38 | 083 | 0210 | 11 | ESO | 010 | B |   |   |   |   |    |   |   |   |   |
| 11 Apr | S23W52 | 084 | 0160 | 10 | ESO | 007 | B |   |   |   |   |    |   |   |   |   |
| 12 Apr | S22W64 | 083 | 0140 | 11 | ESO | 003 | B |   |   |   |   |    |   |   |   |   |
|        |        |     |      |    |     |     |   |   | 1 | 0 | 0 | 10 | 0 | 0 | 0 | 0 |

Still on Disk.

Absolute heliographic longitude: 083

*Region 8194*

|        |        |     |      |    |     |     |   |   |   |   |   |    |   |   |   |   |
|--------|--------|-----|------|----|-----|-----|---|---|---|---|---|----|---|---|---|---|
| 05 Apr | S18E71 | 040 | 0150 | 09 | CSO | 003 | B |   | 1 |   | 4 |    |   |   |   |   |
| 06 Apr | S18E60 | 038 | 0260 | 09 | DSO | 005 | B | 1 |   |   | 1 |    |   |   |   |   |
| 07 Apr | S18E49 | 036 | 0310 | 10 | DSO | 005 | B |   |   |   |   |    |   |   |   |   |
| 08 Apr | S19E36 | 036 | 0280 | 09 | DSO | 007 | B | 1 |   |   | 3 | 1  |   |   |   |   |
| 09 Apr | S18E24 | 034 | 0300 | 10 | DHO | 010 | A |   |   |   |   |    |   |   |   |   |
| 10 Apr | S17E10 | 035 | 0300 | 12 | CHO | 007 | B |   |   |   |   |    |   |   |   |   |
| 11 Apr | S19W03 | 035 | 0280 | 14 | EHO | 010 | B | 1 |   |   | 2 |    |   |   |   |   |
| 12 Apr | S19W17 | 036 | 0250 | 13 | ESO | 006 | B |   |   |   |   |    |   |   |   |   |
|        |        |     |      |    |     |     |   |   | 3 | 1 | 0 | 10 | 1 | 0 | 0 | 0 |

Still on Disk.

Absolute heliographic longitude:

035



*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 8195</i>                   |                |       |                                |                   |               |               |              |       |   |   |         |   |   |   |   |   |   |   |
| 05 Apr                               | S26E75         | 036   | 0030                           | 02                | AXX           | 001           | A            |       |   |   |         |   |   |   |   |   |   |   |
| 06 Apr                               | S27E62         | 036   | 0060                           | 01                | HAX           | 002           | A            | 1     | 1 |   |         | 1 |   |   |   |   |   |   |
| 07 Apr                               | S27E52         | 033   | 0060                           | 06                | CSO           | 003           | B            |       |   |   |         |   |   |   |   |   |   |   |
| 08 Apr                               | S27E38         | 034   | 0060                           | 02                | HSX           | 003           | A            | 2     |   |   |         | 3 |   |   |   |   |   |   |
| 09 Apr                               | S27E27         | 031   | 0020                           | 06                | CAO           | 006           | B            |       |   |   |         | 1 |   |   |   |   |   |   |
| 10 Apr                               | S25E18         | 027   | 0020                           | 10                | CRO           | 013           | B            |       |   |   |         |   |   |   |   |   |   |   |
| 11 Apr                               | S27E05         | 027   | 0030                           | 10                | CRO           | 010           | B            |       |   |   |         |   |   |   |   |   |   |   |
| 12 Apr                               | S26W09         | 028   | 0010                           | 07                | BXO           | 005           | B            |       |   |   |         |   |   |   |   |   |   |   |
|                                      |                |       |                                |                   |               |               |              | 3     | 1 | 0 |         | 5 | 0 | 1 | 0 | 0 | 0 |   |
| Still on Disk.                       |                |       |                                |                   |               |               |              |       |   |   |         |   |   |   |   |   |   |   |
| Absolute heliographic longitude: 027 |                |       |                                |                   |               |               |              |       |   |   |         |   |   |   |   |   |   |   |
| <i>Region 8196</i>                   |                |       |                                |                   |               |               |              |       |   |   |         |   |   |   |   |   |   |   |
| 07 Apr                               | N18W61         | 146   | 0010                           | 04                | BXO           | 003           | B            |       |   |   |         |   |   |   |   |   |   |   |
| 08 Apr                               | N18W72         | 144   | 0010                           | 01                | AXX           | 001           | A            |       |   |   |         |   |   |   |   |   |   |   |
| 09 Apr                               | N18W91         | 149   | 0010                           | 00                | AXX           | 001           | A            |       |   |   |         |   |   |   |   |   |   |   |
|                                      |                |       |                                |                   |               |               |              | 0     | 0 | 0 |         | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Crossed West Limb.                   |                |       |                                |                   |               |               |              |       |   |   |         |   |   |   |   |   |   |   |
| Absolute heliographic longitude: 146 |                |       |                                |                   |               |               |              |       |   |   |         |   |   |   |   |   |   |   |
| <i>Region 8197</i>                   |                |       |                                |                   |               |               |              |       |   |   |         |   |   |   |   |   |   |   |
| 07 Apr                               | N32E48         | 037   | 0020                           | 03                | BXO           | 002           | B            |       |   |   |         |   |   |   |   |   |   |   |
| 08 Apr                               | N32E34         | 038   | 0010                           | 01                | AXX           | 001           | A            |       |   |   |         |   |   |   |   |   |   |   |
| 09 Apr                               | N32E21         | 037   | 0010                           | 05                | BXO           | 002           | B            |       |   |   |         |   |   |   |   |   |   |   |
| 10 Apr                               | N32E08         | 037   |                                |                   |               |               |              |       |   |   |         |   |   |   |   |   |   |   |
| 11 Apr                               | N32W05         | 037   |                                |                   |               |               |              |       |   |   |         |   |   |   |   |   |   |   |
| 12 Apr                               | N32W18         | 037   |                                |                   |               |               |              |       |   |   |         |   |   |   |   |   |   |   |
|                                      |                |       |                                |                   |               |               |              | 0     | 0 | 0 |         | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Still on Disk.                       |                |       |                                |                   |               |               |              |       |   |   |         |   |   |   |   |   |   |   |
| Absolute heliographic longitude: 037 |                |       |                                |                   |               |               |              |       |   |   |         |   |   |   |   |   |   |   |
| <i>Region 8198</i>                   |                |       |                                |                   |               |               |              |       |   |   |         |   |   |   |   |   |   |   |
| 07 Apr                               | S28E74         | 011   | 0060                           | 01                | HSX           | 001           | A            |       |   |   |         |   |   |   |   |   |   |   |
| 08 Apr                               | S28E60         | 012   | 0170                           | 07                | DAO           | 010           | BG           |       |   |   |         | 4 |   |   |   |   |   |   |
| 09 Apr                               | S28E49         | 009   | 0070                           | 10                | DAO           | 013           | B            | 1     |   |   |         | 4 |   |   |   |   |   |   |
| 10 Apr                               | S28E36         | 009   | 0060                           | 08                | CAO           | 018           | B            |       |   |   |         |   |   |   |   |   |   |   |
| 11 Apr                               | S28E23         | 009   | 0030                           | 07                | BXO           | 013           | B            |       |   |   |         |   |   |   |   |   |   |   |
| 12 Apr                               | S28E09         | 009   | 0030                           | 09                | BXO           | 012           | B            |       |   |   |         |   |   |   |   |   |   |   |
|                                      |                |       |                                |                   |               |               |              | 1     | 0 | 0 |         | 8 | 0 | 0 | 0 | 0 | 0 | 0 |
| Still on Disk.                       |                |       |                                |                   |               |               |              |       |   |   |         |   |   |   |   |   |   |   |
| Absolute heliographic longitude: 009 |                |       |                                |                   |               |               |              |       |   |   |         |   |   |   |   |   |   |   |





*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 8199</i>                   |                |       |                                |                   |               |               |              |       |   |   |         |   |   |   |   |   |  |  |
| 07 Apr                               | S26W02         | 087   | 0050                           | 03                | DAO           | 004           | B            |       |   |   |         |   |   |   |   |   |  |  |
| 08 Apr                               | S27W16         | 088   | 0110                           | 05                | DAO           | 010           | B            |       |   |   |         |   |   |   |   |   |  |  |
| 09 Apr                               | S27W29         | 087   | 0100                           | 06                | DAO           | 013           | B            |       |   |   |         |   |   |   |   |   |  |  |
| 10 Apr                               | S28W42         | 087   | 0100                           | 07                | DAO           | 006           | B            | 1     |   |   |         | 1 |   |   |   |   |  |  |
| 11 Apr                               | S27W54         | 086   | 0020                           | 10                | BXO           | 007           | B            |       |   |   |         |   |   |   |   |   |  |  |
| 12 Apr                               | S27W68         | 087   | 0020                           | 06                | BXO           | 003           | B            |       |   |   |         |   |   |   |   |   |  |  |
|                                      |                |       |                                |                   |               |               |              | 1     | 0 | 0 | 1       | 0 | 0 | 0 | 0 | 0 |  |  |
| Still on Disk.                       |                |       |                                |                   |               |               |              |       |   |   |         |   |   |   |   |   |  |  |
| Absolute heliographic longitude: 087 |                |       |                                |                   |               |               |              |       |   |   |         |   |   |   |   |   |  |  |
| <i>Region 8200</i>                   |                |       |                                |                   |               |               |              |       |   |   |         |   |   |   |   |   |  |  |
| 09 Apr                               | S21E06         | 052   | 0040                           | 04                | CRO           | 009           | B            | 1     |   |   |         | 3 |   |   |   |   |  |  |
| 10 Apr                               | S22W07         | 052   | 0180                           | 05                | DSI           | 010           | B            |       |   |   |         | 1 |   |   |   |   |  |  |
| 11 Apr                               | S22W21         | 053   | 0120                           | 08                | DSO           | 008           | B            |       |   |   |         |   |   |   |   |   |  |  |
| 12 Apr                               | S21W34         | 053   | 0100                           | 07                | CSO           | 006           | B            |       |   |   |         |   |   |   |   |   |  |  |
|                                      |                |       |                                |                   |               |               |              | 1     | 0 | 0 | 4       | 0 | 0 | 0 | 0 | 0 |  |  |
| Still on Disk.                       |                |       |                                |                   |               |               |              |       |   |   |         |   |   |   |   |   |  |  |
| Absolute heliographic longitude: 052 |                |       |                                |                   |               |               |              |       |   |   |         |   |   |   |   |   |  |  |
| <i>Region 8201</i>                   |                |       |                                |                   |               |               |              |       |   |   |         |   |   |   |   |   |  |  |
| 09 Apr                               | N19E62         | 356   | 0010                           | 01                | AXX           | 002           | A            |       |   |   |         |   |   |   |   |   |  |  |
| 10 Apr                               | N19E49         | 356   |                                |                   |               |               |              |       |   |   |         |   |   |   |   |   |  |  |
| 11 Apr                               | N19E36         | 356   |                                |                   |               |               |              |       |   |   |         |   |   |   |   |   |  |  |
| 12 Apr                               | N19E23         | 356   |                                |                   |               |               |              |       |   |   |         |   |   |   |   |   |  |  |
|                                      |                |       |                                |                   |               |               |              | 0     | 0 | 0 | 0       | 0 | 0 | 0 | 0 | 0 |  |  |
| Still on Disk.                       |                |       |                                |                   |               |               |              |       |   |   |         |   |   |   |   |   |  |  |
| Absolute heliographic longitude: 356 |                |       |                                |                   |               |               |              |       |   |   |         |   |   |   |   |   |  |  |
| <i>Region 8202</i>                   |                |       |                                |                   |               |               |              |       |   |   |         |   |   |   |   |   |  |  |
| 09 Apr                               | S21E56         | 002   | 0020                           | 08                | BXO           | 005           | B            |       |   |   |         |   |   |   |   |   |  |  |
| 10 Apr                               | S21E43         | 002   | 0020                           | 11                | BXO           | 011           | B            |       |   |   |         | 2 |   |   |   |   |  |  |
| 11 Apr                               | S21E29         | 003   | 0020                           | 06                | BXO           | 007           | B            |       |   |   |         |   |   |   |   |   |  |  |
| 12 Apr                               | S23E17         | 002   | 0020                           | 08                | BXO           | 006           | B            |       |   |   |         | 2 |   |   |   |   |  |  |
|                                      |                |       |                                |                   |               |               |              | 0     | 0 | 0 | 4       | 0 | 0 | 0 | 0 | 0 |  |  |
| Still on Disk.                       |                |       |                                |                   |               |               |              |       |   |   |         |   |   |   |   |   |  |  |
| Absolute heliographic longitude: 002 |                |       |                                |                   |               |               |              |       |   |   |         |   |   |   |   |   |  |  |



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

| Month       | Sunspot Numbers |              |                 |               | Radio Flux   |                        | Geomagnetic     |                 |                 |
|-------------|-----------------|--------------|-----------------|---------------|--------------|------------------------|-----------------|-----------------|-----------------|
|             | Observed<br>SWO | values<br>RI | Ratio<br>RI/SWO | Smooth<br>SWO | values<br>RI | **Penticton<br>10.7 cm | Smooth<br>Value | Planetary<br>Ap | Smooth<br>Value |
| <b>1996</b> |                 |              |                 |               |              |                        |                 |                 |                 |
| 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         | 72.1                   | 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          | 08.4         | 69.4                   | 72.3            | 15              | 09.3            |
| October     | 02.3            | 00.9         | 0.39            | 14.0          | 08.8         | 69.2                   | 72.6            | 13              | 09.1            |
| November    | 26.7            | 17.9         | 0.67            | 15.4          | 09.8         | 78.7                   | 73.0            | 08              | 09.1            |
| December    | 21.1            | 13.3         | 0.63            | 16.2          | 10.4         | 77.8                   | 73.3            | 07              | 09.3            |
| <b>1997</b> |                 |              |                 |               |              |                        |                 |                 |                 |
| January     | 09.0            | 05.7         | 0.63            | 16.5          | 10.5         | 74.0                   | 73.4            | 09              | 09.3*           |
| February    | 11.3            | 07.6         | 0.67            | 17.4          | 11.0         | 73.8                   | 73.7            | 11              | 09.2*           |
| March       | 14.4            | 08.7         | 0.60            | 20.4          | 13.5*        | 73.5                   | 75.1*           | 08              | 08.9*           |
| April       | 24.5            | 15.5         | 0.63            | 24.0          | 16.5*        | 74.5                   | 76.8*           | 10              | 08.6*           |
| May         | 28.6            | 18.5         | 0.65            | 26.4          | 18.4*        | 74.6                   | 78.4*           | 08              | 08.6*           |
| June        | 22.1            | 12.7         | 0.57            | 29.0          | 20.4*        | 71.7                   | 80.1*           | 07              | 08.7*           |
| July        | 17.0            | 10.5*        | 0.62*           | 32.4          | 22.7*        | 71.1                   | 81.8*           | 06*             | 08.5*           |
| August      | 36.7            | 24.7*        | 0.67*           | 35.9          | 25.2*        | 79.0                   | 83.4*           | 08*             | 08.3*           |
| September   | 58.2            | 51.3*        | 0.88*           | 40.5          | 28.5*        | 96.2                   | 85.7*           | 10*             | 08.2*           |
| October     | 33.6            | 23.3*        | 0.69*           |               |              | 84.9*                  |                 | 11*             |                 |
| November    | 53.5            | 39.3*        | 0.73*           |               |              | 99.5*                  |                 | 11*             |                 |
| December    | 57.9            | 41.5*        | 0.72*           |               |              | 98.8*                  |                 | 05*             |                 |
| <b>1998</b> |                 |              |                 |               |              |                        |                 |                 |                 |
| January     | 51.8            | 32.3*        | 0.62*           |               |              | 93.5*                  |                 | 07*             |                 |
| February    | 54.4            | 40.7*        | 0.75*           |               |              | 93.6*                  |                 | 07*             |                 |
| March       | 81.1            | 54.8*        | 0.67*           |               |              | 109.4*                 |                 | 11*             |                 |

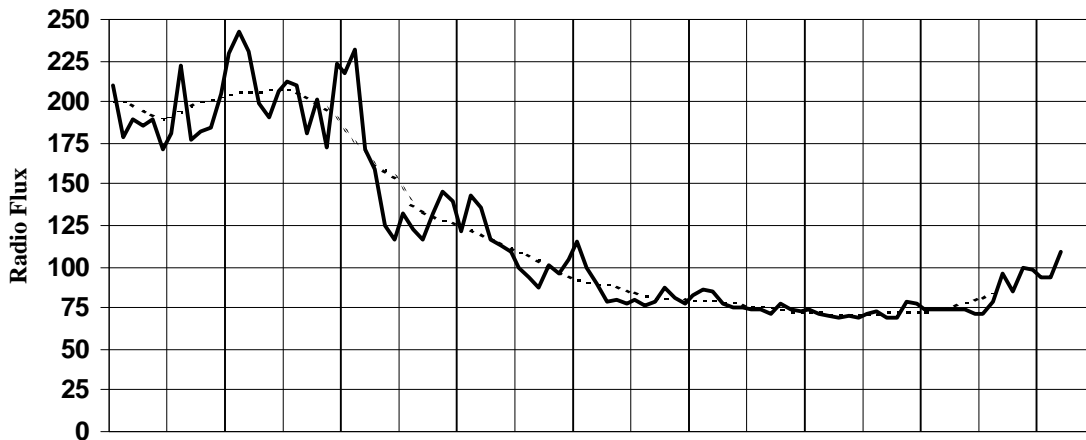
\*Preliminary estimates.

The lowest smoothed sunspot indices number for Cycle 22, RI = 8.0, occurred in May 1996. The highest smoothed sunspot number for Cycle 22, RI=158.5 occurred July 1989.

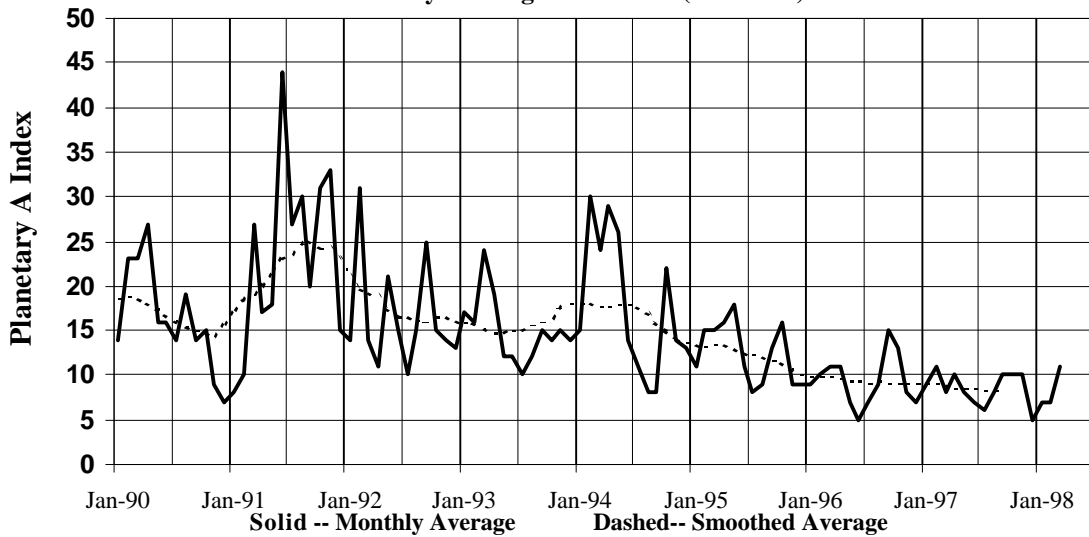
\*\* From June 1991 onward, the 10.7 cm radio flux data source is Penticton, B.C. Canada. Prior to that, it was Ottawa.



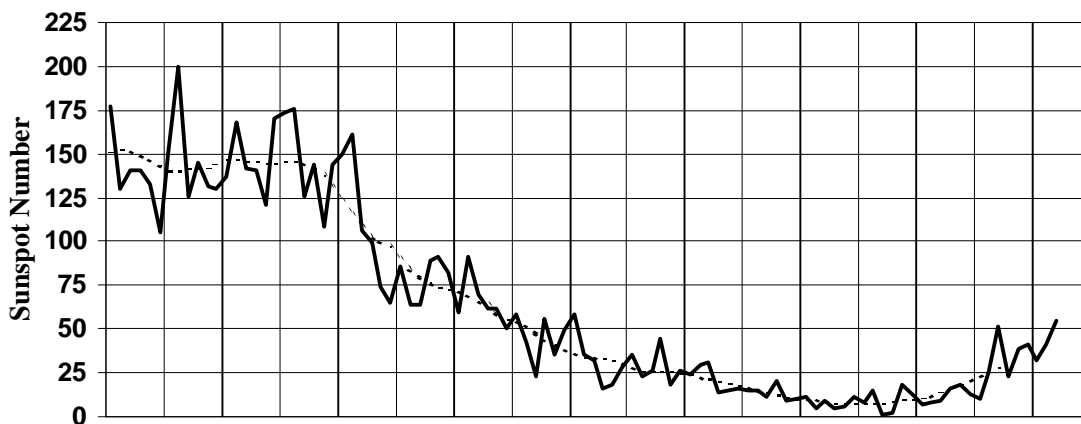
Penticton (DRAO) Radio Flux 2800MHz (10.7cm)

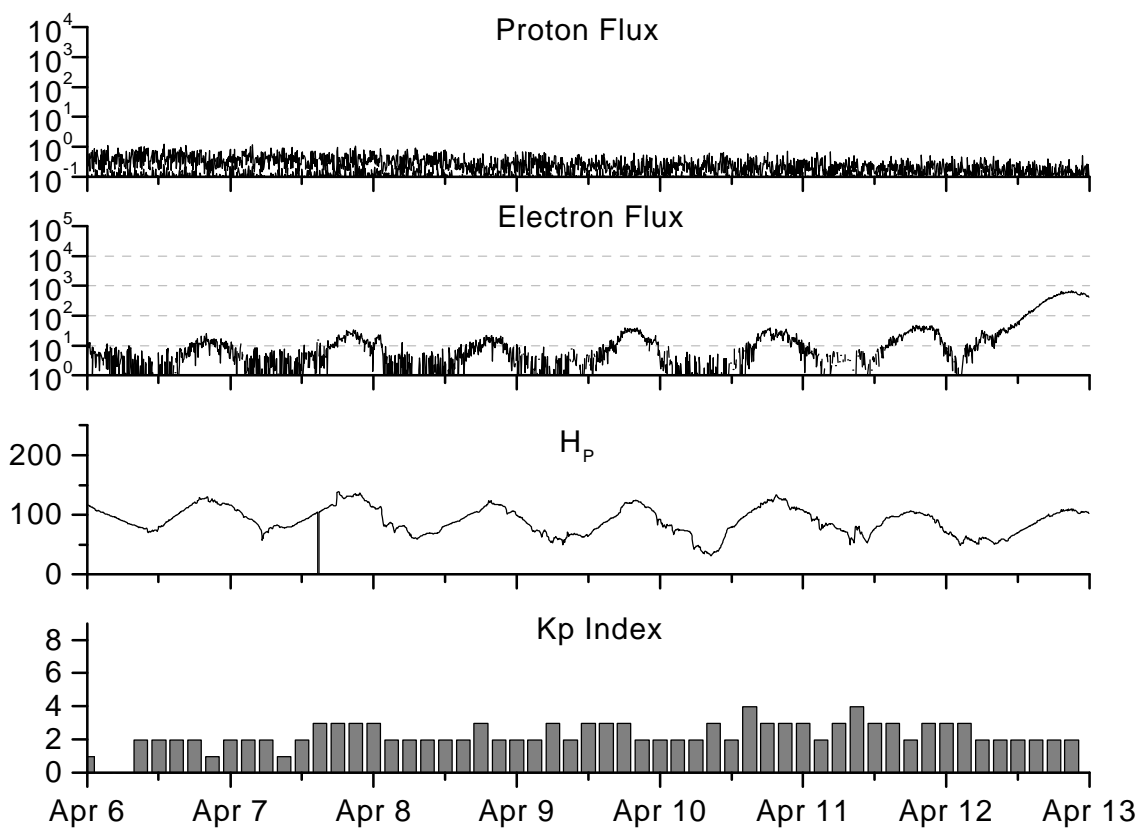


Planetary Geomagnetic A Index (Estimated)



International Sunspot Number





*Weekly Geosynchronous Satellite Environment Summary*  
*Week Beginning 06 April 1998*

*Protons* plot contains the five-minute averaged integral proton flux (protons/  $\text{cm}^2$ -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/  $\text{cm}^2$ -sec-sr) with energies greater than 2 MeV at GOES-9.

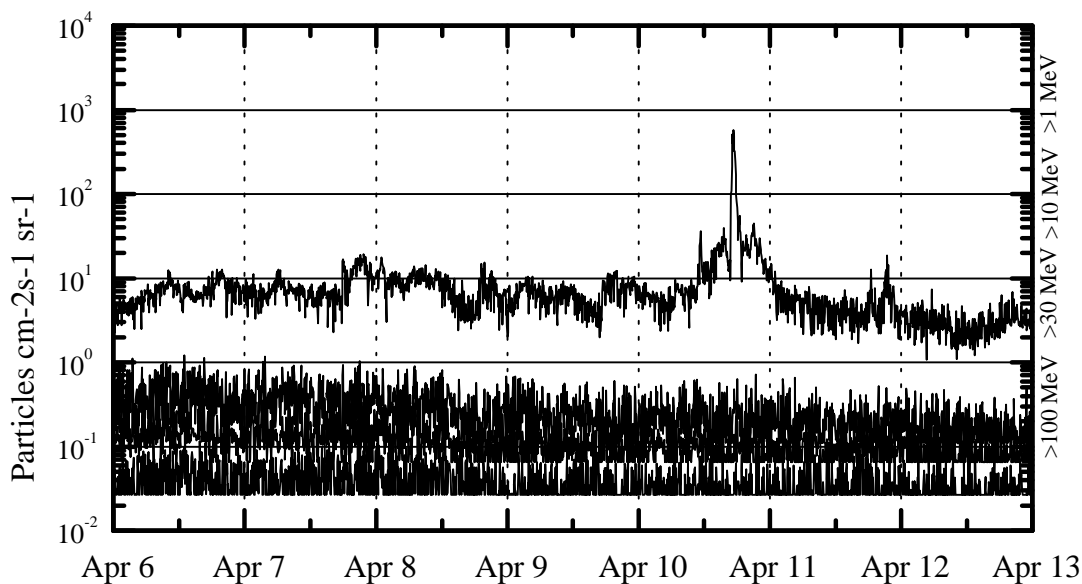
*H<sub>p</sub>* plot contains the five minute averaged magnetic field H component in nanoteslas (nT) as measured by GOES-9. The H component is parallel to the spin axis of the satellite, which is nearly parallel to the Earth's rotation axis.

*K<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.

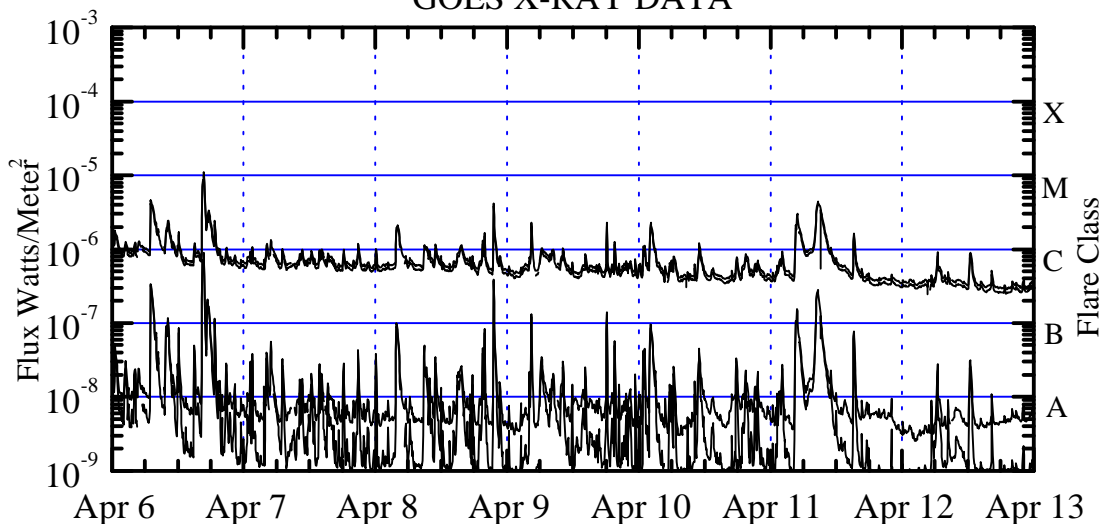
The data included here are those now available in real time at the SWO and are incomplete in that they do not include the full set of parameters and energy ranges known to cause satellite operating anomalies. The proton and electron fluxes and K<sub>p</sub> are "global" parameters that are applicable to a first order approximation over large areas. H<sub>p</sub>parallel is subject to a more localized phenomena and the measurements generally are applicable to within a few degrees of longitude of the measuring satellite.



## GOES PROTON FLUX



## GOES X-RAY DATA

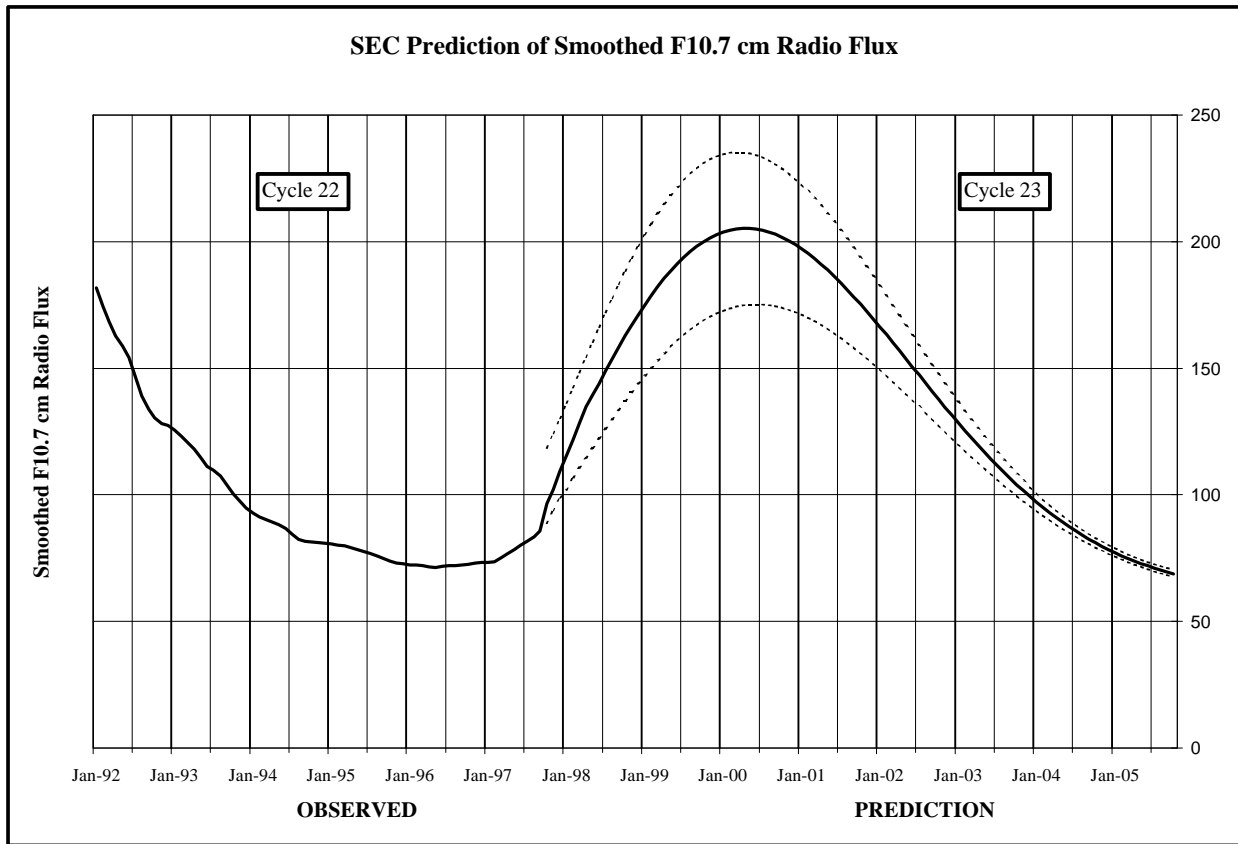


### *Weekly GOES Satellite X-ray and Proton Plots*

Proton plot contains the five minute averaged integral proton flux (protons/ $\text{cm}^2\text{-sec-sr}$ ) 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/ $\text{cm}^2\text{-sec-sr}$ ) at greater than 10 MeV.

X-ray plot contains five minute averaged x-ray flux (watts/ $\text{m}^2$ ) 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.

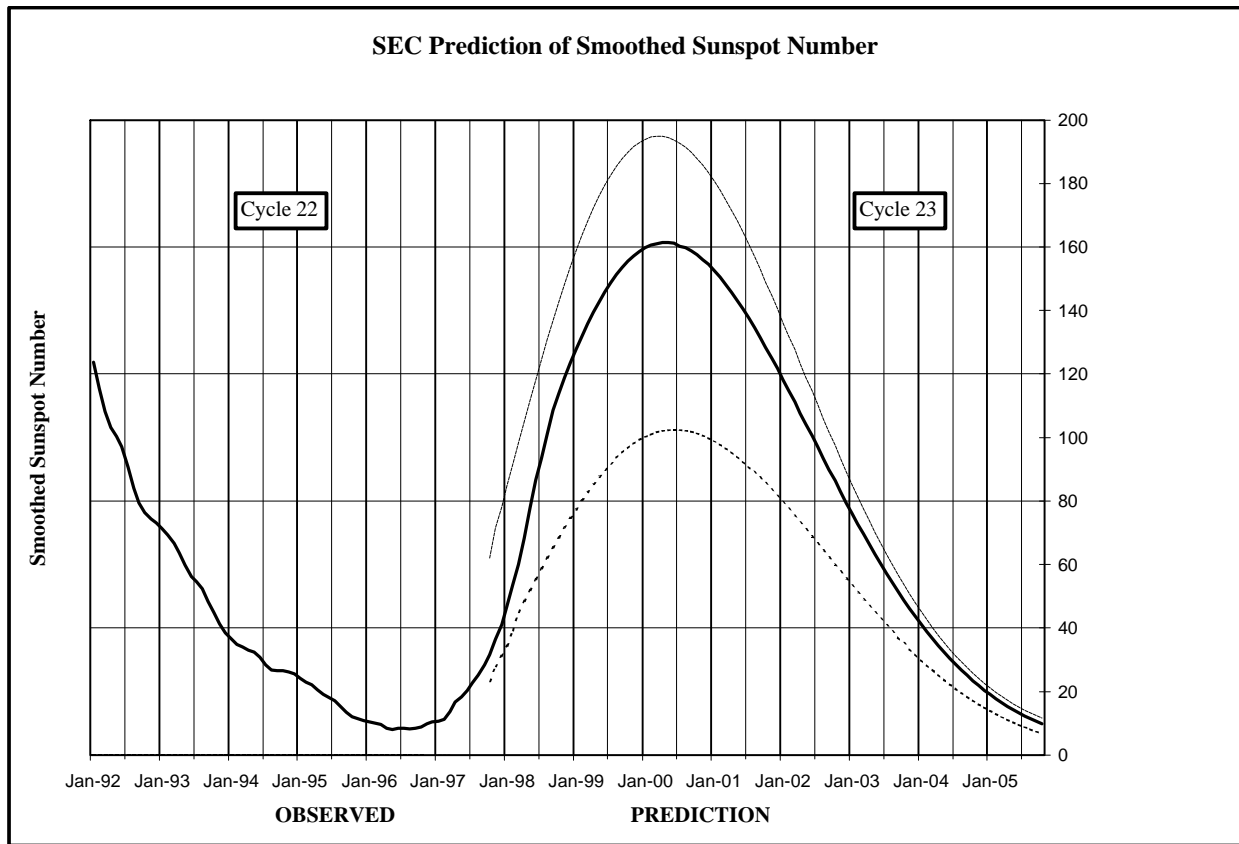




### SEC Prediction of Smoothed F10.7cm Radio Flux

|      | Jan         | Feb         | Mar         | Apr         | May         | Jun         | Jul         | Aug         | Sep         | Oct         | Nov         | Dec         |
|------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| 1996 | 72<br>(***) | 72<br>(***) | 72<br>(***) | 72<br>(***) | 71<br>(***) | 72<br>(***) | 72<br>(***) | 72<br>(***) | 72<br>(***) | 73<br>(***) | 73<br>(***) | 73<br>(***) |
| 1997 | 73<br>(***) | 74<br>(***) | 75<br>(***) | 77<br>(***) | 78<br>(***) | 80<br>(***) | 82<br>(***) | 83<br>(***) | 85<br>(***) | 97<br>(16)  | 102<br>(17) | 109<br>(18) |
| 1998 | 116<br>(18) | 122<br>(19) | 129<br>(20) | 135<br>(20) | 139<br>(21) | 144<br>(21) | 149<br>(22) | 154<br>(22) | 158<br>(23) | 163<br>(23) | 167<br>(23) | 171<br>(24) |
| 1999 | 175<br>(24) | 179<br>(25) | 182<br>(25) | 186<br>(25) | 189<br>(25) | 191<br>(26) | 194<br>(26) | 196<br>(26) | 198<br>(27) | 200<br>(27) | 202<br>(28) | 203<br>(28) |
| 2000 | 204<br>(30) | 205<br>(30) | 205<br>(30) | 205<br>(30) | 205<br>(30) | 205<br>(28) | 205<br>(27) | 204<br>(27) | 203<br>(26) | 202<br>(26) | 201<br>(26) | 199<br>(26) |
| 2001 | 197<br>(25) | 195<br>(25) | 193<br>(25) | 191<br>(25) | 189<br>(24) | 186<br>(24) | 184<br>(24) | 181<br>(24) | 178<br>(23) | 175<br>(23) | 173<br>(23) | 170<br>(22) |
| 2002 | 166<br>(22) | 163<br>(22) | 160<br>(21) | 157<br>(21) | 154<br>(21) | 151<br>(21) | 147<br>(20) | 144<br>(20) | 141<br>(19) | 138<br>(19) | 135<br>(18) | 132<br>(18) |
| 2003 | 129<br>(17) | 126<br>(17) | 123<br>(17) | 120<br>(16) | 117<br>(16) | 114<br>(15) | 112<br>(15) | 109<br>(15) | 106<br>(14) | 104<br>(14) | 102<br>(14) | 99<br>(13)  |
| 2004 | 97<br>(13)  | 95<br>(13)  | 93<br>(12)  | 91<br>(12)  | 89<br>(11)  | 87<br>(10)  | 86<br>(9)   | 84<br>(9)   | 83<br>(8)   | 81<br>(7)   | 80<br>(9)   | 78<br>(9)   |
| 2005 | 77<br>(8)   | 76<br>(8)   | 75<br>(8)   | 74<br>(7)   | 73<br>(7)   | 72<br>(7)   | 71<br>(7)   | 70<br>(6)   | 70<br>(6)   | 69<br>(2)   | 68<br>(2)   | 68<br>(2)   |





### SEC Prediction of Smoothed Sunspot Number

|      | Jan         | Feb         | Mar         | Apr         | May         | Jun         | Jul         | Aug         | Sep         | Oct         | Nov         | Dec         |
|------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| 1996 | 10<br>(***) | 10<br>(***) | 10<br>(***) | 9<br>(***)  | 8<br>(***)  | 9<br>(***)  | 9<br>(***)  | 8<br>(***)  | 9<br>(***)  | 9<br>(***)  | 10<br>(***) | 11<br>(***) |
| 1997 | 11<br>(***) | 11<br>(***) | 14<br>(***) | 17<br>(***) | 18<br>(***) | 20<br>(***) | 23<br>(***) | 25<br>(***) | 28<br>(***) | 32<br>(19)  | 37<br>(20)  | 41<br>(20)  |
| 1998 | 47<br>(21)  | 54<br>(22)  | 60<br>(22)  | 68<br>(23)  | 78<br>(24)  | 87<br>(24)  | 94<br>(25)  | 101<br>(25) | 109<br>(26) | 114<br>(26) | 119<br>(27) | 124<br>(27) |
| 1999 | 128<br>(27) | 132<br>(28) | 136<br>(28) | 139<br>(29) | 143<br>(29) | 146<br>(29) | 149<br>(29) | 151<br>(29) | 154<br>(29) | 156<br>(29) | 157<br>(29) | 159<br>(29) |
| 2000 | 160<br>(30) | 161<br>(30) | 161<br>(30) | 161<br>(30) | 161<br>(29) | 161<br>(29) | 160<br>(29) | 160<br>(29) | 159<br>(29) | 158<br>(29) | 156<br>(29) | 155<br>(28) |
| 2001 | 153<br>(28) | 151<br>(28) | 148<br>(28) | 146<br>(27) | 143<br>(27) | 141<br>(27) | 138<br>(27) | 135<br>(26) | 132<br>(26) | 128<br>(26) | 125<br>(25) | 122<br>(25) |
| 2002 | 119<br>(24) | 115<br>(24) | 111<br>(24) | 108<br>(23) | 104<br>(23) | 101<br>(22) | 97<br>(22)  | 94<br>(21)  | 90<br>(21)  | 86<br>(21)  | 83<br>(20)  | 80<br>(20)  |
| 2003 | 76<br>(19)  | 73<br>(19)  | 70<br>(18)  | 66<br>(18)  | 63<br>(17)  | 60<br>(17)  | 57<br>(17)  | 54<br>(16)  | 52<br>(16)  | 49<br>(15)  | 46<br>(15)  | 44<br>(14)  |
| 2004 | 41<br>(14)  | 39<br>(14)  | 37<br>(13)  | 35<br>(13)  | 32<br>(12)  | 31<br>(12)  | 29<br>(11)  | 27<br>(11)  | 25<br>(11)  | 23<br>(10)  | 22<br>(10)  | 20<br>(9)   |
| 2005 | 19<br>(9)   | 18<br>(9)   | 17<br>(8)   | 15<br>(8)   | 14<br>(8)   | 13<br>(8)   | 12<br>(7)   | 11<br>(7)   | 11<br>(7)   | 10<br>(6)   | 9<br>(5)    | 8<br>(4)    |

