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1990年2-3月

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# DAILY RELATIVE SUNSPOT NUMBERS AND SUNSPOT AREAS

FEBRUARY 1990

| Day  | Relative-Numbers |      |      | Sunspot Areas |       |              |        |      |      |      |
|------|------------------|------|------|---------------|-------|--------------|--------|------|------|------|
|      | Gro.             | M.H. | S.H. | Drawing       |       | Photographic |        |      |      |      |
|      |                  |      |      | M.H.          | S.H.  |              | Sum    | M.H. | S.H. | Sum  |
| 1    | 14               | 120  | 57   | 177           | 859   | 1376         | 2235   | 810  | 1472 | 2282 |
| 2    | 13               | 101  | 59   | 160           | 1008  | 1211         | 2219   | 474  | 1231 | 1705 |
| 3    | 13               | 82   | 59   | 141           | 914   | 792          | 1706   | 728  | 447  | 1175 |
| 4    | 9                | 88   | 16   | 104           | 872   | 181          | 1053   | 492  | 70   | 562  |
| 5    | 11               | 88   | 34   | 122           | 831   | 89           | 920    | 410  | 22   | 432  |
| 6    | 5                | 52   | 26   | 78            | 443   | 66           | 509    | 308  | 34   | 342  |
| 7    | 7                | 47   | 30   | 77            | 403   | 71           | 474    | 324  | 25   | 349  |
| 8    | 9                | 52   | 35   | 87            | 750   | 129          | 879    |      |      |      |
| 9    | 10               | 47   | 41   | 88            | 595   | 198          | 793    |      |      |      |
| 10   | 8                | 51   | 32   | 83            | 577   | 66           | 643    | 539  | 61   | 600  |
| 11   | 7                | 47   | 22   | 69            | 570   | 64           | 634    | 487  | 54   | 541  |
| 12   | 7                | 60   | 23   | 83            | 507   | 42           | 549    | 510  | 27   | 537  |
| 13   | 7                | 68   | 21   | 89            | 540   | 14           | 554    |      |      |      |
| 14   | 7                | 62   | 19   | 81            | 564   | 15           | 579    |      |      |      |
| 15   | 8                | 60   | 29   | 89            | 478   | 17           | 495    | 594  | 0    | 594  |
| 16   | 8                | 56   | 29   | 85            | 542   | 16           | 558    |      |      |      |
| 17   | 9                | 49   | 35   | 84            | 534   | 154          | 688    |      |      |      |
| 18   | 8                | 34   | 31   | 65            | 441   | 263          | 704    |      |      |      |
| 19   | 10               | 35   | 55   | 90            | 394   | 389          | 783    |      |      |      |
| 20   | 12               | 42   | 77   | 119           | 285   | 1144         | 1429   |      |      |      |
| 21   | 10               | 51   | 77   | 128           | 304   | 1079         | 1383   |      |      |      |
| 22   | 14               | 59   | 122  | 181           | 755   | 993          | 1748   |      |      |      |
| 23   | 14               | 64   | 150  | 214           | 730   | 1002         | 1732   | 1051 | 1286 | 2337 |
| 24   | 16               | 101  | 180  | 281           | 991   | 1295         | 2286   | 882  | 1236 | 2118 |
| 25   | 13               | 56   | 108  | 164           | 729   | 1303         | 2032   | 684  | 948  | 1632 |
| 26   | 14               | 82   | 139  | 221           | 616   | 1413         | 2029   | 749  | 1454 | 2203 |
| 27   | 14               | 82   | 103  | 185           | 888   | 1319         | 2207   | 621  | 844  | 1465 |
| 28   | 13               | 66   | 114  | 180           | 893   | 1275         | 2168   | 1207 | 1342 | 2549 |
| Mean |                  | 64.4 | 61.5 | 125.9         | 643.3 | 570.6        | 1213.9 |      |      |      |

# DAILY RELATIVE SUNSPOT NUMBERS AND SUNSPOT AREAS

MARCH 1990

| Day  | Gro. | Relative-Numbers |      |       | Sunspot Areas |       |        |      |      |      |
|------|------|------------------|------|-------|---------------|-------|--------|------|------|------|
|      |      | Drawing          |      | Sum   | Photographic  |       |        |      |      |      |
|      |      | N.H.             | S.H. |       | N.H.          | S.H.  | Sum    |      |      |      |
| 1    | 12   | 53               | 98   | 151   | 950           | 1187  | 2137   | 1151 | 1240 | 2391 |
| 2    | 13   | 63               | 90   | 153   | 911           | 1089  | 2000   |      |      |      |
| 3    | 14   | 73               | 107  | 180   | 914           | 1014  | 1928   | 1047 | 1486 | 2533 |
| 4    | 9    | 56               | 53   | 109   | 560           | 1130  | 1690   | 852  | 1260 | 2112 |
| 5    | 7    | 63               | 48   | 111   | 465           | 596   | 1061   | 591  | 700  | 1291 |
| 6    | 9    | 48               | 79   | 127   | 273           | 657   | 930    | 311  | 521  | 832  |
| 7    | 9    | 48               | 75   | 123   | 261           | 677   | 938    | 324  | 710  | 1034 |
| 8    | 5    | 32               | 40   | 72    | 402           | 703   | 1105   | 427  | 977  | 1404 |
| 9    | 10   | 49               | 65   | 114   | 379           | 698   | 1077   | 422  | 835  | 1257 |
| 10   | 11   | 37               | 79   | 116   | 541           | 508   | 1049   | 757  | 571  | 1328 |
| 11   | 9    | 40               | 53   | 93    | 581           | 344   | 925    | 450  | 298  | 748  |
| 12   | 7    | 56               | 22   | 78    | 472           | 204   | 676    | 649  | 242  | 891  |
| 13   | 10   | 65               | 42   | 107   | 621           | 174   | 795    | 479  | 0    | 479  |
| 14   | 9    | 64               | 32   | 96    | 559           | 161   | 720    | 530  | 180  | 710  |
| 15   | 10   | 67               | 33   | 100   | 626           | 145   | 771    | 606  | 212  | 818  |
| 16   | 10   | 85               | 31   | 116   | 694           | 327   | 1021   | 715  | 261  | 976  |
| 17   | 9    | 57               | 43   | 100   | 595           | 387   | 982    | 674  | 488  | 1162 |
| 18   | 13   | 105              | 49   | 154   | 860           | 451   | 1311   | 793  | 463  | 1256 |
| 19   | 16   | 89               | 109  | 198   | 637           | 937   | 1574   | 532  | 645  | 1177 |
| 20   | 14   | 80               | 122  | 202   | 563           | 1633  | 2196   |      |      |      |
| 21   | 14   | 70               | 131  | 201   | 384           | 1574  | 1958   |      |      |      |
| 22   | 13   | 48               | 135  | 183   | 90            | 1530  | 1620   |      |      |      |
| 23   | 14   | 51               | 171  | 222   | 35            | 1600  | 1635   |      |      |      |
| 24   | 15   | 64               | 180  | 244   | 159           | 1429  | 1588   |      |      |      |
| 25   | 13   | 63               | 151  | 214   | 279           | 1876  | 2155   |      |      |      |
| 26   | 14   | 59               | 198  | 257   | 184           | 1374  | 1558   |      |      |      |
| 27   | 15   | 56               | 151  | 207   | 185           | 1391  | 1576   |      |      |      |
| 28   |      |                  |      |       |               |       |        |      |      |      |
| 29   | 12   | 41               | 83   | 124   | 166           | 940   | 1106   | 102  | 795  | 897  |
| 30   | 12   | 33               | 87   | 120   | 228           | 651   | 879    | 123  | 871  | 994  |
| 31   | 11   | 42               | 71   | 113   | 599           | 409   | 1008   | 843  | 368  | 1211 |
| Mean |      | 58.6             | 87.6 | 146.2 | 472.4         | 859.9 | 1332.3 |      |      |      |

# DAILY SUNSPOT OBSERVATIONS

FEBRUARY 1990

| Day Group |     | CMP    |     |      |     | Corre. Area |       |      |             |
|-----------|-----|--------|-----|------|-----|-------------|-------|------|-------------|
| Mo-Day    | Lat | L      | CMD | Type | r/R | Sd          | Whole | Max  | See Remarks |
| <hr/>     |     |        |     |      |     |             |       |      |             |
| 1.19      | 46  | 1-27.4 | -9  | 343  | 59W | FKI 0.85    | 1068  | 1016 | 560 2       |
|           | 53  | 1-30.0 | 11  | 308  | 28W | HHX 0.54    | 400   | 237  | 237 2       |
|           | 58  | 1-26.3 | 13  | 356  | 82W | HSX 0.99    | 13    | 42   | 42 2        |
|           | 59  | 1-28.7 | -12 | 325  | 47W | DSI 0.72    | 210   | 152  | 98 2        |
|           | 60  | 1-28.7 | 24  | 325  | 44W | ESI 0.79    | 273   | 224  | 107 2       |
|           | 61  | 1-29.2 | -15 | 319  | 36W | DAI 0.59    | 336   | 208  | 125 2       |
|           | 66  | 1-30.6 | 13  | 301  | 23W | BXI 0.49    | 250   | 15   | 2 2         |
|           | 67  | 2- 1.0 | 30  | 281  | 2W  | AXX 0.60    | 8     | 5    | 3 2         |
|           | 69  | 2- 2.2 | 23  | 266  | 13E | CSI 0.53    | 214   | 126  | 124 2       |
|           | 70  | 1-26.7 | 40  | 352  | 75W | BXO 0.99    | 8     | 28   | 14 2        |
|           | 73  | 2- 3.4 | 8   | 261  | 28E | DSI 0.52    | 151   | 88   | 49 2        |
|           | 74  | 1-27.2 | 11  | 345  | 66W | DRI 0.93    | 55    | 75   | 29 2        |
|           | 75  | 2- 3.1 | 15  | 244  | 24E | CRI 0.52    | 21    | 12   | 10 2        |
|           | 76  | 2- 4.8 | 18  | 231  | 48E | AXX 0.79    | 8     | 7    | 7 2         |
| <hr/>     |     |        |     |      |     |             |       |      |             |
| 2.07      | 46  |        |     |      | 68W | FKI 0.92    | 694   | 883  | 605 3       |
|           | 53  |        |     |      | 39W | HHX 0.68    | 311   | 212  | 212 3       |
|           | 59  |        |     |      | 59W | DSI 0.85    | 168   | 160  | 132 3       |
|           | 60  |        |     |      | 56W | ESI 0.89    | 240   | 257  | 126 3       |
|           | 61  |        |     |      | 47W | DSI 0.74    | 210   | 155  | 124 3       |
|           | 66  |        |     |      | 34W | DRI 0.63    | 67    | 43   | 19 3        |
|           | 67  |        |     |      | 14W | BXO 0.61    | 8     | 5    | 3 3         |
|           | 69  |        |     |      | 2E  | CSO 0.49    | 202   | 116  | 114 3       |
|           | 73  |        |     |      | 17E | DSI 0.38    | 282   | 152  | 86 3        |
|           | 74  |        |     |      | 76W | DRD 0.98    | 46    | 108  | 79 3        |
|           | 75  |        |     |      | 13E | DRI 0.40    | 210   | 115  | 55 3        |
|           | 77  | 1-31.9 | -9  | 283  | 15W | BXO 0.26    | 13    | 7    | 4 3         |
|           | 78  | 2- 5.1 | -23 | 228  | 40E | AXX 0.68    | 8     | 6    | 3 3         |
| <hr/>     |     |        |     |      |     |             |       |      |             |
| 3.06      | 46  |        |     |      | 75W | DKC 0.95    | 400   | 666  | 666 3       |
|           | 53  |        |     |      | 53W | HHX 0.82    | 273   | 236  | 236 3       |
|           | 59  |        |     |      | 69W | BXO 0.93    | 8     | 12   | 6 3         |
|           | 60  |        |     |      | 67W | ESO 0.95    | 114   | 189  | 119 3       |
|           | 61  |        |     |      | 60W | CSI 0.86    | 97    | 95   | 83 3        |
|           | 66  |        |     |      | 47W | BXI 0.77    | 34    | 26   | 7 3         |
|           | 69  |        |     |      | 11W | CSI 0.52    | 210   | 123  | 118 3       |
|           | 71  | 2- 4.0 | -13 | 242  | 13E | CRO 0.25    | 17    | 9    | 7 3         |
|           | 73  |        |     |      | 4E  | DSI 0.25    | 231   | 120  | 72 3        |
|           | 75  |        |     |      | 0W  | DAI 0.34    | 412   | 220  | 96 3        |
|           | 77  |        |     |      | 27W | AXX 0.45    | 4     | 2    | 2 3         |
|           | 78  |        |     |      | 28E | AXX 0.53    | 8     | 5    | 2 3         |

# DAILY SUNSPOT OBSERVATIONS

FEBRUARY 1990

| CMP       |        | Corre. Area |     |          |              |     |       |     |             |
|-----------|--------|-------------|-----|----------|--------------|-----|-------|-----|-------------|
| Day Group | Mo-Day | Lat         | L   | CMD Type | r/R          | Sd  | Whole | Max | See Remarks |
| 79        | 2- 6.5 | -15         | 209 | 46E      | AXX 0.71     | 4   | 3     | 3   | 3           |
| 4.03      | 46     |             |     | 87W      | HSX 0.99     | 29  | 97    | 97  | 3           |
|           | 53     |             |     | 65W      | HSX 0.92     | 135 | 171   | 171 | 3           |
|           | 60     |             |     | 75W      | HSX 0.98     | 25  | 59    | 59  | 3           |
|           | 61     |             |     | 73W      | CSO 0.95     | 50  | 84    | 77  | 3           |
|           | 66     |             |     | 61W      | DRI 0.90     | 151 | 171   | 95  | 3           |
|           | 69     |             |     | 24W      | CSO 0.62     | 185 | 118   | 115 | 3           |
|           | 73     |             |     | 10W      | DAI 0.29     | 336 | 176   | 132 | 3           |
|           | 75     |             |     | 12W      | DAI 0.41     | 311 | 171   | 104 | 3           |
|           | 80     | 1-29.9      | 6   | 310      | 68W AXX 0.93 | 4   | 6     | 6   | 3           |
|           |        |             |     |          |              |     |       |     |             |
| 5.06      | 53     |             |     | 78W      | HSX 0.99     | 55  | 181   | 181 | 3           |
|           | 61     |             |     | 86W      | HSX 0.99     | 17  | 56    | 56  | 3           |
|           | 66     |             |     | 75W      | DRI 0.98     | 55  | 128   | 69  | 3           |
|           | 69     |             |     | 37W      | CSI 0.74     | 160 | 118   | 109 | 3           |
|           | 73     |             |     | 24W      | DAI 0.46     | 240 | 135   | 114 | 3           |
|           | 75     |             |     | 26W      | DAI 0.54     | 378 | 225   | 90  | 3           |
|           | 77     |             |     | 56W      | AXX 0.83     | 4   | 4     | 4   | 3           |
|           | 78     |             |     | OW       | CRI 0.28     | 50  | 26    | 20  | 3           |
|           | 80     |             |     | 80W      | HRX 0.99     | 8   | 28    | 28  | 3           |
|           | 81     | 1-31.4      | 20  | 290      | 62W BXO 0.92 | 13  | 16    | 11  | 3           |
| 6.06      | 82     | 2- 7.7      | -12 | 193      | 35E AXX 0.57 | 4   | 3     | 3   | 3           |
|           |        |             |     |          |              |     |       |     |             |
|           | 69     |             |     | 50W      | CSI 0.84     | 114 | 104   | 100 | 3           |
|           | 73     |             |     | 38W      | CAI 0.64     | 252 | 165   | 146 | 3           |
|           | 75     |             |     | 39W      | DAI 0.69     | 252 | 174   | 70  | 3           |
|           | 78     |             |     | 14W      | DRI 0.36     | 114 | 61    | 38  | 3           |
|           | 83     | 2- 4.2      | -21 | 239      | 24W BXO 0.46 | 8   | 5     | 2   | 3           |
|           |        |             |     |          |              |     |       |     |             |
|           | 69     |             |     | 67W      | HSX 0.95     | 67  | 112   | 112 | 3           |
|           | 73     |             |     | 54W      | CAI 0.83     | 147 | 131   | 112 | 3           |
| 7.34      | 75     |             |     | 56W      | DSI 0.85     | 160 | 152   | 52  | 3           |
|           | 78     |             |     | 31W      | CRI 0.57     | 84  | 51    | 49  | 3           |
|           | 83     |             |     | 41W      | BXI 0.68     | 8   | 6     | 3   | 3           |
|           | 84     | 2- 3.6      | 29  | 248      | 50W BXO 0.86 | 8   | 8     | 4   | 3           |
|           | 85     | 2-11.3      | -26 | 146      | 51E BXI 0.79 | 17  | 14    | 7   | 3           |
|           |        |             |     |          |              |     |       |     |             |
|           | 69     |             |     | 80W      | HSX 0.99     | 17  | 56    | 56  | 4           |
|           | 73     |             |     | 68W      | CSI 0.93     | 93  | 12    | 86  | 4           |
|           | 75     |             |     | 69W      | DRI 0.94     | 76  | 70113 | 25  | 4           |
|           | 78     |             |     | 44W      | CRI 0.72     | 21  | 15    | 12  | 4           |

# DAILY SUNSPOT OBSERVATIONS

FEBRUARY 1990

| Day Group | CMP    |        | Lat | L   | CMD | Type | r/R  | Sd  | Corre. Area |     | See Remarks |
|-----------|--------|--------|-----|-----|-----|------|------|-----|-------------|-----|-------------|
|           | Mo-Day |        |     |     |     |      |      |     | Whole       | Max |             |
| 9.04      | 83     |        |     |     | 55W | DRI  | 0.82 | 42  | 36          | 11  | 4           |
|           | 85     |        |     |     | 40E | DRI  | 0.69 | 114 | 78          | 41  | 4           |
|           | 86     | 2-12.8 | 30  | 126 | 58E | CRO  | 0.91 | 21  | 25          | 15  | 4           |
|           | 87     | 2-14.0 | 31  | 111 | 71E | HRX  | 0.98 | 21  | 49          | 49  | 4           |
|           | 88     | 2-14.0 | 19  | 111 | 71E | HHX  | 0.97 | 198 | 380         | 380 | 4           |
|           | 73     |        |     |     | 76W | HSX  | 0.98 | 42  | 99          | 99  | 3           |
|           | 75     |        |     |     | 76W | CRO  | 0.98 | 17  | 39          | 30  | 3           |
| 10.05     | 78     |        |     |     | 48W | AXX  | 0.76 | 4   | 3           | 3   | 3           |
|           | 83     |        |     |     | 64W | DSI  | 0.89 | 109 | 117         | 50  | 3           |
|           | 85     |        |     |     | 31E | DRI  | 0.59 | 63  | 39          | 13  | 3           |
|           | 86     |        |     |     | 49E | BXO  | 0.84 | 17  | 15          | 8   | 3           |
|           | 87     |        |     |     | 63E | HRX  | 0.94 | 25  | 38          | 38  | 3           |
|           | 88     |        |     |     | 63E | HHX  | 0.92 | 311 | 396         | 396 | 3           |
|           | 89     | 2-11.7 | 12  | 140 | 37E | BXO  | 0.66 | 13  | 8           | 6   | 3           |
|           | 90     | 2-15.1 | -13 | 96  | 78E | HRX  | 0.98 | 17  | 39          | 39  | 3           |
|           | 73     |        |     |     | 78W | BXI  | 0.97 | 8   | 16          | 8   | 4           |
|           | 85     |        |     |     | 17E | CRI  | 0.44 | 29  | 16          | 7   | 4           |
| 11.09     | 86     |        |     |     | 37E | AXX  | 0.76 | 13  | 10          | 6   | 4           |
|           | 87     |        |     |     | 50E | HRX  | 0.87 | 17  | 17          | 13  | 4           |
|           | 88     |        |     |     | 50E | CHI  | 0.82 | 505 | 437         | 433 | 4           |
|           | 89     |        |     |     | 22E | CRO  | 0.47 | 46  | 26          | 21  | 4           |
|           | 90     |        |     |     | 66E | CRO  | 0.91 | 42  | 50          | 35  | 4           |
|           | 91     | 2-13.2 | 4   | 121 | 44E | DRI  | 0.70 | 101 | 71          | 24  | 4           |
|           | 85     |        |     |     | 3E  | BXO  | 0.33 | 13  | 7           | 4   | 4           |
|           | 86     |        |     |     | 24E | AXX  | 0.66 | 4   | 3           | 3   | 4           |
|           | 87     |        |     |     | 36E | HRX  | 0.78 | 17  | 13          | 13  | 4           |
|           | 88     |        |     |     | 37E | CKI  | 0.69 | 744 | 514         | 502 | 4           |
| 12.06     | 89     |        |     |     | 8E  | CRI  | 0.34 | 29  | 16          | 11  | 4           |
|           | 90     |        |     |     | 53E | CRI  | 0.78 | 71  | 57          | 27  | 4           |
|           | 91     |        |     |     | 29E | CRO  | 0.51 | 42  | 24          | 22  | 4           |
|           | 85     |        |     |     | 10W | BXO  | 0.38 | 8   | 5           | 2   | 4           |
|           | 86     |        |     |     | 10E | AXX  | 0.61 | 8   | 5           | 3   | 4           |
|           | 87     |        |     |     | 24E | HRX  | 0.69 | 29  | 20          | 20  | 4           |
|           | 88     |        |     |     | 24E | CHI  | 0.56 | 728 | 440         | 428 | 4           |
| 13.06     | 89     |        |     |     | 4W  | BXI  | 0.31 | 29  | 15          | 4   | 4           |
|           | 90     |        |     |     | 40E | CRI  | 0.61 | 59  | 37          | 24  | 4           |
|           | 91     |        |     |     | 15E | CRI  | 0.31 | 50  | 27          | 22  | 4           |
|           | 85     |        |     |     | 23W | BXO  | 0.46 | 8   | 5           | 2   | 4           |
|           |        |        |     |     |     |      |      |     |             |     |             |

# DAILY SUNSPOT OBSERVATIONS

FEBRUARY 1990

| CMP       |        |     |     |          |          | Corre. Area |       |     |     |         |
|-----------|--------|-----|-----|----------|----------|-------------|-------|-----|-----|---------|
| Day Group | Mo-Day | Lat | L   | CMD Type | r/R      | Sd          | Whole | Max | See | Remarks |
| 87        |        |     |     | 12E      | CRO 0.64 | 21          | 14    | 11  | 4   |         |
| 88        |        |     |     | 12E      | CHI 0.47 | 799         | 453   | 424 | 4   |         |
| 89        |        |     |     | 18W      | CRI 0.43 | 84          | 46    | 28  | 4   |         |
| 90        |        |     |     | 26E      | BXO 0.43 | 17          | 9     | 5   | 4   |         |
| 91        |        |     |     | 2E       | CRI 0.18 | 42          | 21    | 15  | 4   |         |
| 92        | 2-15.3 | 36  | 93  | 31E      | AXX 0.76 | 8           | 6     | 3   | 4   |         |
| 14.35     |        |     |     | 5W       | HRX 0.61 | 21          | 13    | 13  | 3   |         |
| 88        |        |     |     | 5W       | CHI 0.45 | 770         | 430   | 407 | 3   |         |
| 89        |        |     |     | 34W      | DSI 0.61 | 177         | 111   | 53  | 3   |         |
| 90        |        |     |     | 9E       | BXO 0.18 | 13          | 6     | 2   | 3   |         |
| 91        |        |     |     | 15W      | AXX 0.30 | 8           | 4     | 2   | 3   |         |
| 92        |        |     |     | 15E      | AXX 0.68 | 8           | 6     | 3   | 3   |         |
| 93        | 2-18.5 | -13 | 52  | 63E      | BXO 0.89 | 8           | 9     | 5   | 3   |         |
| 15.09     |        |     |     | 16W      | AXX 0.66 | 17          | 11    | 8   | 3   |         |
| 88        |        |     |     | 15W      | CHI 0.49 | 580         | 334   | 322 | 3   |         |
| 89        |        |     |     | 45W      | DSI 0.74 | 160         | 118   | 53  | 3   |         |
| 90        |        |     |     | 0W       | BXO 0.09 | 13          | 6     | 2   | 3   |         |
| 92        |        |     |     | 3E       | AXX 0.69 | 8           | 6     | 3   | 3   |         |
| 93        |        |     |     | 52E      | AXX 0.77 | 8           | 7     | 3   | 3   |         |
| 94        | 2-14.3 | -11 | 106 | 10W      | BXI 0.29 | 8           | 4     | 2   | 3   |         |
| 95        | 2-20.0 | 15  | 32  | 60E      | AXX 0.90 | 8           | 9     | 5   | 3   |         |
| 16.13     |        |     |     | 27W      | BXO 0.69 | 8           | 6     | 3   | 3   |         |
| 88        |        |     |     | 27W      | CHI 0.60 | 694         | 433   | 407 | 3   |         |
| 89        |        |     |     | 58W      | DSI 0.86 | 88          | 87    | 41  | 3   |         |
| 90        |        |     |     | 9W       | BXI 0.20 | 13          | 6     | 2   | 3   |         |
| 92        |        |     |     | 10W      | AXX 0.64 | 8           | 5     | 3   | 3   |         |
| 93        |        |     |     | 38E      | AXX 0.60 | 8           | 5     | 3   | 3   |         |
| 94        |        |     |     | 25W      | BXI 0.45 | 8           | 5     | 2   | 3   |         |
| 95        |        |     |     | 49E      | AXX 0.80 | 13          | 11    | 7   | 3   |         |
| 17.06     |        |     |     | 40W      | BXO 0.80 | 8           | 7     | 4   | 3   |         |
| 88        |        |     |     | 39W      | CHI 0.72 | 601         | 436   | 427 | 3   |         |
| 89        |        |     |     | 71W      | CSI 0.94 | 46          | 69    | 57  | 3   |         |
| 90        |        |     |     | 22W      | BXI 0.38 | 8           | 5     | 2   | 3   |         |
| 93        |        |     |     | 25E      | BXI 0.41 | 8           | 5     | 2   | 3   |         |
| 95        |        |     |     | 37E      | AXX 0.68 | 13          | 9     | 6   | 3   |         |
| 96        | 2-19.2 | -10 | 43  | 33E      | AXX 0.54 | 8           | 5     | 2   | 3   |         |
| 97        | 2-22.3 | 10  | 1   | 70E      | AXX 0.94 | 8           | 13    | 6   | 3   |         |
| 98        | 2-23.4 | -10 | 346 | 83E      | HSX 0.99 | 42          | 139   | 139 | 3   |         |

# DAILY SUNSPOT OBSERVATIONS

FEBRUARY 1990

CMP

| Day Group | Mo-Day | Lat    | L   | CMD | Type | r/R  | Sd   | Corre. Area |             |
|-----------|--------|--------|-----|-----|------|------|------|-------------|-------------|
|           |        |        |     |     |      |      |      | Whole       | Max         |
|           |        |        |     |     |      |      |      |             | See Remarks |
| 18.11     | 87     |        |     | 51W | BXO  | 0.87 | 8    | 9           | 4           |
|           | 88     |        |     | 52W | CHI  | 0.84 | 454  | 417         | 410         |
|           | 95     |        |     | 25E | AXX  | 0.55 | 4    | 3           | 3           |
|           | 97     |        |     | 56E | AXX  | 0.84 | 13   | 12          | 8           |
|           | 98     |        |     | 69E | HSX  | 0.92 | 122  | 155         | 155         |
|           | 99     | 2-23.9 | -13 | 340 | 75E  | AXX  | 0.95 | 8           | 14          |
|           | 100    | 2-24.6 | -36 | 331 | 77E  | BXI  | 0.97 | 13          | 24          |
|           | 101    | 2-24.8 | -12 | 328 | 83E  | HSX  | 0.99 | 21          | 70          |
|           |        |        |     |     |      |      |      | 70          | 3           |
| 19.05     | 88     |        |     | 64W | CHI  | 0.92 | 286  | 364         | 358         |
|           | 95     |        |     | 12E | AXX  | 0.41 | 4    | 2           | 2           |
|           | 97     |        |     | 44E | HRX  | 0.72 | 25   | 18          | 15          |
|           | 98     |        |     | 58E | HSX  | 0.84 | 109  | 100         | 100         |
|           | 99     |        |     | 65E | AXX  | 0.90 | 4    | 5           | 5           |
|           | 100    |        |     | 68E | BXI  | 0.92 | 29   | 37          | 5           |
|           | 101    |        |     | 75E | HSX  | 0.97 | 84   | 162         | 162         |
|           | 102    | 2-19.0 | -35 | 45  | 1W   | AXX  | 0.48 | 4           | 2           |
|           | 103    | 2-21.6 | 3   | 11  | 34E  | CRO  | 0.57 | 17          | 10          |
|           | 104    | 2-25.9 | -16 | 314 | 86E  | BXI  | 0.99 | 25          | 83          |
|           |        |        |     |     |      |      |      | 28          | 4           |
| 20.06     | 88     |        |     | 77W | CHI  | 0.97 | 59   | 113         | 97          |
|           | 93     |        |     | 21W | AXX  | 0.37 | 8    | 5           | 2           |
|           | 97     |        |     | 30E | AXX  | 0.56 | 4    | 3           | 3           |
|           | 98     |        |     | 45E | HSX  | 0.70 | 177  | 124         | 124         |
|           | 99     |        |     | 52E | BXI  | 0.77 | 8    | 7           | 3           |
|           | 100    |        |     | 56E | ESC  | 0.85 | 223  | 212         | 48          |
|           | 101    |        |     | 62E | HSX  | 0.89 | 130  | 140         | 140         |
|           | 102    |        |     | 15W | AXX  | 0.51 | 4    | 2           | 2           |
|           | 103    |        |     | 19E | DRO  | 0.37 | 71   | 38          | 20          |
|           | 104    |        |     | 76E | DAC  | 0.97 | 341  | 654         | 162         |
|           | 105    | 2-19.9 | 24  | 33  | 2W   | AXX  | 0.52 | 4           | 2           |
|           | 106    | 2-26.1 | 16  | 311 | 78E  | DAI  | 0.97 | 67          | 129         |
|           |        |        |     |     |      |      |      | 73          | 4           |
| 21.05     | 96     |        |     | 25W | CRI  | 0.41 | 13   | 7           | 5           |
|           | 98     |        |     | 32E | HSX  | 0.52 | 214  | 125         | 125         |
|           | 99     |        |     | 37E | BXO  | 0.60 | 8    | 5           | 3           |
|           | 100    |        |     | 43E | ESC  | 0.75 | 299  | 225         | 66          |
|           | 101    |        |     | 49E | HSX  | 0.74 | 219  | 161         | 161         |
|           | 103    |        |     | 7E  | BXI  | 0.22 | 38   | 19          | 4           |
|           | 104    |        |     | 60E | EKC  | 0.86 | 564  | 556         | 290         |
|           | 105    |        |     | 13W | AXX  | 0.56 | 4    | 3           | 3           |

# DAILY SUNSPOT OBSERVATIONS

FEBRUARY 1990

| Day   | Group | CMP    |     | L   | CMD | Type | r/R  | Sd   | Corre. Area |     |  | See | Remarks |
|-------|-------|--------|-----|-----|-----|------|------|------|-------------|-----|--|-----|---------|
|       |       | Mo-Day | Lat |     |     |      |      |      | Whole       | Max |  |     |         |
| 106   |       |        |     |     | 69E | DSI  | 0.94 | 185  | 277         | 94  |  | 3   |         |
| 107   |       | 2-22.5 | 19  | 359 | 20E | AXX  | 0.54 | 8    | 5           | 2   |  | 3   |         |
| 22.11 | 95    |        |     |     | 22W | AXX  | 0.55 | 4    | 3           | 3   |  | 3   |         |
|       | 96    |        |     |     | 39W | BXI  | 0.63 | 8    | 5           | 3   |  | 3   |         |
|       | 98    |        |     |     | 20E | CSI  | 0.30 | 248  | 130         | 128 |  | 3   |         |
|       | 99    |        |     |     | 23E | BXO  | 0.37 | 8    | 5           | 2   |  | 3   |         |
|       | 100   |        |     |     | 30E | ESC  | 0.64 | 269  | 176         | 60  |  | 3   |         |
|       | 101   |        |     |     | 36E | CSO  | 0.57 | 185  | 113         | 108 |  | 3   |         |
|       | 103   |        |     |     | 8W  | DKI  | 0.22 | 799  | 409         | 205 |  | 3   |         |
|       | 104   |        |     |     | 46E | EKC  | 0.71 | 744  | 531         | 360 |  | 3   |         |
|       | 106   |        |     |     | 52E | ESC  | 0.83 | 374  | 333         | 75  |  | 3   |         |
|       | 107   |        |     |     | 5E  | BXI  | 0.44 | 8    | 5           | 2   |  | 3   |         |
|       | 108   | 2-19.5 | -16 | 38  | 34W | BXI  | 0.56 | 8    | 5           | 3   |  | 3   |         |
|       | 109   | 2-22.5 | -3  | 359 | 5E  | CRI  | 0.11 | 29   | 15          | 8   |  | 3   |         |
|       | 110   | 2-26.9 | 21  | 301 | 64E | AXX  | 0.92 | 4    | 5           | 5   |  | 3   |         |
|       | 111   | 2-27.3 | -8  | 296 | 73E | BXO  | 0.94 | 8    | 13          | 6   |  | 3   |         |
| 23.07 | 96    |        |     |     | 53W | AXX  | 0.78 | 8    | 7           | 3   |  | 4   |         |
|       | 98    |        |     |     | 5E  | HSX  | 0.09 | 172  | 87          | 87  |  | 4   |         |
|       | 99    |        |     |     | 9E  | BXO  | 0.17 | 8    | 4           | 2   |  | 4   |         |
|       | 100   |        |     |     | 18E | ESI  | 0.55 | 282  | 169         | 106 |  | 4   |         |
|       | 101   |        |     |     | 22E | CSI  | 0.37 | 227  | 122         | 120 |  | 4   |         |
|       | 103   |        |     |     | 20E | DKI  | 0.39 | 597  | 324         | 164 |  | 4   |         |
|       | 104   |        |     |     | 34E | EKC  | 0.56 | 828  | 501         | 366 |  | 4   |         |
|       | 106   |        |     |     | 40E | EKC  | 0.70 | 547  | 383         | 189 |  | 4   |         |
|       | 107   |        |     |     | 10W | BXI  | 0.44 | 34   | 19          | 9   |  | 4   |         |
|       | 108   |        |     |     | 47W | AXX  | 0.72 | 4    | 3           | 3   |  | 4   |         |
|       | 109   |        |     |     | 8W  | CRI  | 0.15 | 80   | 40          | 19  |  | 4   |         |
|       | 110   |        |     |     | 50E | AXX  | 0.83 | 4    | 4           | 4   |  | 4   |         |
|       | 111   |        |     |     | 60E | BXO  | 0.84 | 42   | 39          | 8   |  | 4   |         |
|       | 112   | 3- 1.4 | -17 | 267 | 85E | HRX  | 0.98 | 13   | 30          | 20  |  | 4   |         |
| 24.06 | 96    |        |     |     | 63W | AXX  | 0.89 | 8    | 9           | 5   |  | 4   |         |
|       | 98    |        |     |     | 7W  | CSI  | 0.11 | 248  | 125         | 123 |  | 4   |         |
|       | 99    |        |     |     | 2W  | BXI  | 0.10 | 13   | 6           | 2   |  | 4   |         |
|       | 100   |        |     |     | 6E  | ESI  | 0.49 | 160  | 92          | 17  |  | 4   |         |
|       | 101   |        |     |     | 11E | CSI  | 0.20 | 181  | 92          | 90  |  | 4   |         |
|       | 103   |        |     |     | 35W | ESI  | 0.59 | 336  | 208         | 135 |  | 4   |         |
|       | 104   |        |     |     | 23E | EKC  | 0.40 | 1215 | 664         | 372 |  | 4   |         |
|       | 106   |        |     |     | 27E | EKC  | 0.57 | 1152 | 704         | 283 |  | 4   |         |
|       | 107   |        |     |     | 22W | DSO  | 0.53 | 118  | 69          | 37  |  | 4   |         |

# DAILY SUNSPOT OBSERVATIONS

FEBRUARY 1990

| Day   | Group | CMP    |     | L   | CMD | Type | r/R  | Sd   | Corre. Area |     |     | Remarks |
|-------|-------|--------|-----|-----|-----|------|------|------|-------------|-----|-----|---------|
|       |       | Mo-Day | Lat |     |     |      |      |      | Whole       | Max | See |         |
| 108   |       |        |     |     | 58W | AXX  | 0.84 | 4    | 4           | 4   | 4   |         |
| 109   |       |        |     |     | 20W | BXI  | 0.36 | 34   | 18          | 2   | 4   |         |
| 110   |       |        |     |     | 37E | AXX  | 0.71 | 4    | 3           | 3   | 4   |         |
| 111   |       |        |     |     | 48E | ESI  | 0.72 | 101  | 73          | 40  | 4   |         |
| 112   |       |        |     |     | 74E | CSI  | 0.95 | 126  | 210         | 203 | 4   |         |
| 113   |       | 2-21.6 | -10 | 10  | 32W | AXX  | 0.52 | 4    | 2           | 2   | 4   |         |
| 114   |       | 2-24.2 | 21  | 336 | 2E  | BXI  | 0.47 | 13   | 7           | 2   | 4   |         |
| 25.05 | 98    |        |     |     | 20W | HSX  | 0.34 | 193  | 103         | 103 | 4   |         |
|       | 100   |        |     |     | 6W  | ERI  | 0.48 | 59   | 34          | 2   | 4   |         |
|       | 101   |        |     |     | 3W  | HSX  | 0.10 | 168  | 85          | 85  | 4   |         |
|       | 103   |        |     |     | 50W | ESI  | 0.77 | 265  | 208         | 138 | 4   |         |
|       | 104   |        |     |     | 11E | EKC  | 0.23 | 1476 | 758         | 594 | 4   |         |
|       | 106   |        |     |     | 14E | EKC  | 0.46 | 866  | 488         | 230 | 4   |         |
|       | 107   |        |     |     | 35W | ERO  | 0.67 | 42   | 28          | 17  | 4   |         |
|       | 109   |        |     |     | 36W | BXO  | 0.59 | 8    | 5           | 3   | 4   |         |
|       | 111   |        |     |     | 32E | EAI  | 0.53 | 151  | 89          | 74  | 4   |         |
|       | 112   |        |     |     | 59E | HSX  | 0.84 | 164  | 151         | 151 | 4   |         |
|       | 114   |        |     |     | 10W | BXI  | 0.48 | 8    | 5           | 2   | 4   |         |
|       | 115   | 2-26.6 | -22 | 305 | 24E | BXO  | 0.46 | 8    | 5           | 2   | 4   |         |
|       | 116   | 3- 3.2 | -20 | 244 | 72E | HSX  | 0.97 | 38   | 73          | 73  | 4   |         |
| 26.08 | 98    |        |     |     | 32W | HSX  | 0.54 | 177  | 105         | 105 | 4   | PLAT    |
|       | 100   |        |     |     | 19W | BXI  | 0.53 | 80   | 47          | 2   | 4   | PLAT    |
|       | 101   |        |     |     | 15W | CSI  | 0.26 | 240  | 124         | 120 | 4   | PLAT    |
|       | 103   |        |     |     | 66W | CAI  | 0.92 | 160  | 203         | 171 | 4   | PLAT    |
|       | 104   |        |     |     | 4W  | EKC  | 0.17 | 1274 | 647         | 555 | 4   | PLAT    |
|       | 106   |        |     |     | 1W  | FAI  | 0.39 | 698  | 379         | 210 | 4   | PLAT    |
|       | 107   |        |     |     | 49W | BXI  | 0.80 | 13   | 11          | 4   | 4   | PLAT    |
|       | 109   |        |     |     | 47W | CAO  | 0.72 | 55   | 40          | 30  | 4   | PLAT    |
|       | 111   |        |     |     | 14E | CAO  | 0.25 | 214  | 111         | 93  | 4   | PLAT    |
|       | 112   |        |     |     | 44E | CAO  | 0.69 | 303  | 209         | 203 | 4   | PLAT    |
|       | 115   |        |     |     | 9E  | BXO  | 0.29 | 34   | 18          | 2   | 4   | PLAT    |
|       | 116   |        |     |     | 68E | HAX  | 0.92 | 88   | 112         | 112 | 4   | PLAT    |
|       | 117   | 3- 2.1 | 12  | 259 | 56E | BXO  | 0.84 | 21   | 19          | 4   | 4   | PLAT    |
|       | 118   | 3- 2.1 | 24  | 258 | 54E | AXX  | 0.87 | 4    | 4           | 4   | 4   | PLAT    |
| 27.18 | 98    |        |     |     | 48W | HSX  | 0.74 | 168  | 124         | 124 | 3   |         |
|       | 100   |        |     |     | 30W | CRO  | 0.64 | 25   | 16          | 11  | 3   |         |
|       | 101   |        |     |     | 31W | HSX  | 0.49 | 193  | 111         | 111 | 3   |         |
|       | 103   |        |     |     | 81W | HSX  | 0.99 | 42   | 139         | 139 | 3   |         |
|       | 104   |        |     |     | 17W | DKC  | 0.33 | 1363 | 723         | 277 | 3   |         |

# DAILY SUNSPOT OBSERVATIONS

FEBRUARY 1990

| Day      | Group  | CMP    |     | L | CMD Type | r/R  | Sd   | Corre. Area |     | See | Remarks |
|----------|--------|--------|-----|---|----------|------|------|-------------|-----|-----|---------|
|          |        | Mo-Day | Lat |   |          |      |      | Whole       | Max |     |         |
| 106      |        |        |     |   | 15W EKC  | 0.48 | 664  | 379         | 247 | 3   |         |
| 107      |        |        |     |   | 65W BXO  | 0.93 | 8    | 12          | 6   | 3   |         |
| 109      |        |        |     |   | 64W BXO  | 0.89 | 13   | 14          | 5   | 3   |         |
| 111      |        |        |     |   | 1E DAI   | 0.02 | 135  | 67          | 42  | 3   |         |
| 112      |        |        |     |   | 30E HAX  | 0.51 | 240  | 139         | 139 | 3   |         |
| 115      |        |        |     |   | 8W AXX   | 0.29 | 8    | 4           | 2   | 3   |         |
| 116      |        |        |     |   | 52E CSO  | 0.79 | 147  | 121         | 117 | 3   |         |
| 117      |        |        |     |   | 40E DSI  | 0.69 | 126  | 87          | 32  | 3   |         |
| 119      | 3- 3.9 | 31     | 235 |   | 61E DAI  | 0.93 | 198  | 271         | 156 | 3   |         |
| 28.06 98 |        |        |     |   | 61W HSX  | 0.86 | 126  | 124         | 124 | 3   |         |
| 100      |        |        |     |   | 42W BXI  | 0.75 | 8    | 6           | 3   | 3   |         |
| 101      |        |        |     |   | 42W HSX  | 0.66 | 135  | 89          | 89  | 3   |         |
| 104      |        |        |     |   | 28W EKC  | 0.48 | 1186 | 677         | 245 | 3   |         |
| 106      |        |        |     |   | 27W EKI  | 0.60 | 538  | 336         | 283 | 3   |         |
| 109      |        |        |     |   | 75W BXO  | 0.95 | 8    | 14          | 7   | 3   |         |
| 111      |        |        |     |   | 11W DSI  | 0.20 | 147  | 75          | 45  | 3   |         |
| 112      |        |        |     |   | 18E CAI  | 0.34 | 282  | 150         | 146 | 3   |         |
| 115      |        |        |     |   | 20W BXI  | 0.41 | 13   | 7           | 5   | 3   |         |
| 116      |        |        |     |   | 40E HSX  | 0.64 | 172  | 113         | 113 | 3   |         |
| 117      |        |        |     |   | 28E DAI  | 0.54 | 189  | 112         | 60  | 3   |         |
| 119      |        |        |     |   | 50E DAI  | 0.87 | 433  | 445         | 130 | 3   |         |
| 120      | 2-22.0 | -26    | 6   |   | 80W BXI  | 0.98 | 8    | 20          | 10  | 3   |         |

# DAILY SUNSPOT OBSERVATIONS

MARCH 1990

| CMP       |        | Corre. Area |     |          |     |          |       |     |     |         |
|-----------|--------|-------------|-----|----------|-----|----------|-------|-----|-----|---------|
| Day Group | Mo-Day | Lat         | L   | CMD Type | r/R | Sd       | Whole | Max | See | Remarks |
| 1.05      | 98     | 2-23.4      | -10 | 346      | 74W | HSX 0.95 | 80    | 133 | 133 | 3       |
|           | 100    | 2-24.6      | -36 | 331      | 54W | CSI 0.83 | 93    | 82  | 67  | 3       |
|           | 101    | 2-24.8      | -12 | 328      | 55W | HSX 0.80 | 88    | 74  | 74  | 3       |
|           | 104    | 2-25.9      | -16 | 314      | 41W | EKC 0.63 | 892   | 575 | 247 | 3       |
|           | 106    | 2-26.1      | 16  | 311      | 41W | EAI 0.74 | 492   | 363 | 323 | 3       |
|           | 111    | 2-27.3      | -8  | 296      | 25W | CAO 0.40 | 130   | 71  | 69  | 3       |
|           | 112    | 3- 1.4      | -17 | 167      | 5E  | DAI 0.20 | 278   | 142 | 116 | 3       |
|           | 115    |             |     |          | 37E | AXX 0.51 | 8     | 5   | 2   | 3       |
|           | 116    | 3- 3.2      | -20 | 244      | 27E | HSX 0.48 | 172   | 98  | 98  | 3       |
|           | 117    | 3- 2.1      | 12  | 259      | 14E | DAI 0.39 | 244   | 132 | 50  | 3       |
|           | 119    | 3- 3.9      | 31  | 235      | 37E | DAI 0.77 | 580   | 455 | 224 | 3       |
|           | 121    | 3- 6.0      | -13 | 207      | 56E | BXO 0.82 | 8     | 7   | 4   | 3       |
| 2.08      | 100    |             |     |          | 66W | DSI 0.91 | 122   | 146 | 65  | 3       |
|           | 101    |             |     |          | 68W | HSX 0.92 | 80    | 102 | 102 | 3       |
|           | 104    |             |     |          | 54W | DKC 0.80 | 681   | 574 | 258 | 3       |
|           | 106    |             |     |          | 56W | CAO 0.86 | 324   | 319 | 315 | 3       |
|           | 111    |             |     |          | 39W | HSX 0.62 | 84    | 54  | 54  | 3       |
|           | 112    |             |     |          | 9W  | CAI 0.22 | 177   | 90  | 82  | 3       |
|           | 116    |             |     |          | 13E | CAI 0.31 | 181   | 95  | 91  | 3       |
|           | 117    |             |     |          | 0W  | DSI 0.33 | 139   | 74  | 38  | 3       |
|           | 119    |             |     |          | 23E | DAI 0.69 | 454   | 314 | 119 | 3       |
|           | 121    |             |     |          | 42E | BXI 0.67 | 13    | 8   | 6   | 3       |
|           | 122    | 3- 1.7      | 20  | 264      | 5W  | AXX 0.46 | 4     | 2   | 2   | 3       |
|           | 123    | 3- 7.7      | 28  | 185      | 73E | HSX 0.97 | 105   | 202 | 202 | 3       |
|           | 124    | 3- 8.2      | -11 | 178      | 81E | AXX 0.98 | 8     | 20  | 10  | 3       |
| 3.06      | 100    |             |     |          | 80W | DAO 0.98 | 38    | 89  | 39  | 4       |
|           | 101    |             |     |          | 82W | HSX 0.99 | 17    | 56  | 56  | 4       |
|           | 104    |             |     |          | 67W | DAI 0.91 | 479   | 572 | 316 | 4       |
|           | 106    |             |     |          | 69W | HAX 0.95 | 135   | 224 | 224 | 4       |
|           | 111    |             |     |          | 51W | HAX 0.77 | 25    | 20  | 16  | 4       |
|           | 112    |             |     |          | 20W | CAO 0.37 | 156   | 84  | 79  | 4       |
|           | 116    |             |     |          | 2E  | CAO 0.22 | 156   | 80  | 67  | 4       |
|           | 117    |             |     |          | 12W | CRI 0.38 | 59    | 32  | 7   | 4       |
|           | 119    |             |     |          | 11E | DAI 0.62 | 463   | 295 | 212 | 4       |
|           | 121    |             |     |          | 29E | BXO 0.49 | 13    | 7   | 2   | 4       |
|           | 123    |             |     |          | 62E | CAO 0.93 | 265   | 363 | 340 | 4       |
|           | 124    |             |     |          | 70E | DAI 0.93 | 71    | 98  | 63  | 4       |
|           | 125    | 2-28.1      | -11 | 285      | 39W | AXX 0.63 | 4     | 3   | 3   | 4       |
|           | 126    | 3- 2.7      | -23 | 264      | 18W | AXX 0.40 | 8     | 5   | 2   | 4       |

# DAILY SUNSPOT OBSERVATIONS

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| Day Group | CMP<br>Mo-Day | Lat    | L   | CMD | Type | r/R  | Sd   | Corre. Area |     | See | Remarks |
|-----------|---------------|--------|-----|-----|------|------|------|-------------|-----|-----|---------|
|           |               |        |     |     |      |      |      | Whole       | Max |     |         |
| 4.10      | 104           |        |     | 81W | DAI  | 0.99 | 181  | 598         | 306 | 3   |         |
|           | 106           |        |     | 82W | HSX  | 0.99 | 13   | 42          | 42  | 3   |         |
|           | 111           |        |     | 66W | HSX  | 0.90 | 21   | 24          | 24  | 3   |         |
|           | 112           |        |     | 34W | CAI  | 0.57 | 130  | 80          | 80  | 3   |         |
|           | 116           |        |     | 12W | CSI  | 0.29 | 59   | 31          | 26  | 3   |         |
|           | 117           |        |     | 28W | BXI  | 0.57 | 13   | 8           | 3   | 3   |         |
|           | 119           |        |     | 3W  | DAI  | 0.63 | 324  | 209         | 138 | 3   |         |
|           | 123           |        |     | 48E | EKI  | 0.84 | 328  | 301         | 263 | 3   |         |
|           | 124           |        |     | 55E | DAI  | 0.80 | 471  | 397         | 188 | 3   |         |
| 5.04      | 112           |        |     | 46W | HSX  | 0.72 | 97   | 70          | 67  | 4   | PLAT    |
|           | 116           |        |     | 23W | AXX  | 0.44 | 13   | 7           | 2   | 4   | PLAT    |
|           | 117           |        |     | 42W | AXX  | 0.74 | 4    | 3           | 3   | 4   | PLAT    |
|           | 119           |        |     | 13W | DAI  | 0.63 | 273  | 176         | 133 | 4   | PLAT    |
|           | 123           |        |     | 36E | CAI  | 0.75 | 362  | 272         | 237 | 4   | PLAT    |
|           | 124           |        |     | 42E | EAI  | 0.67 | 774  | 519         | 241 | 4   | PLAT    |
|           | 127           | 3-10.9 | 11  | 143 | AXX  | 0.99 | 4    | 14          | 14  | 4   | PLAT    |
| 6.19      | 112           |        |     | 60W | HSX  | 0.86 | 21   | 21          | 21  | 3   |         |
|           | 117           |        |     | 52W | AXX  | 0.80 | 8    | 7           | 4   | 3   |         |
|           | 119           |        |     | 27W | DRI  | 0.70 | 84   | 59          | 29  | 3   |         |
|           | 121           |        |     | 2W  | BXI  | 0.11 | 8    | 4           | 2   | 3   |         |
|           | 123           |        |     | 20E | CKI  | 0.63 | 307  | 198         | 185 | 3   |         |
|           | 124           |        |     | 28E | DKI  | 0.46 | 1068 | 601         | 360 | 3   |         |
|           | 127           |        |     | 62E | BXO  | 0.90 | 8    | 9           | 5   | 3   |         |
|           | 128           | 3- 5.1 | -14 | 14W | BXI  | 0.28 | 50   | 26          | 2   | 3   |         |
|           | 129           | 3- 7.9 | -28 | 182 | BXI  | 0.47 | 8    | 5           | 2   | 3   |         |
| 7.17      | 112           |        |     | 73W | AXX  | 0.94 | 8    | 13          | 6   | 3   |         |
|           | 119           |        |     | 39W | CRD  | 0.80 | 71   | 60          | 35  | 3   |         |
|           | 123           |        |     | 7E  | CKI  | 0.59 | 311  | 192         | 187 | 3   |         |
|           | 124           |        |     | 16E | DKI  | 0.28 | 1014 | 527         | 311 | 3   |         |
|           | 127           |        |     | 49E | AXX  | 0.78 | 4    | 3           | 3   | 3   |         |
|           | 128           |        |     | 28W | DSI  | 0.48 | 227  | 130         | 34  | 3   |         |
|           | 129           |        |     | 10E | BXI  | 0.37 | 8    | 5           | 2   | 3   |         |
|           | 130           | 3- 5.5 | -32 | 214 | AXX  | 0.54 | 4    | 2           | 2   | 3   |         |
|           | 131           | 3- 8.4 | 31  | 176 | BXI  | 0.66 | 8    | 6           | 3   | 3   |         |
| 8.09      | 119           |        |     | 50W | CRD  | 0.87 | 21   | 22          | 13  | 3   | PLAT    |
|           | 123           |        |     | 4W  | CAO  | 0.57 | 349  | 213         | 206 | 3   | PLAT    |
|           | 124           |        |     | 2E  | EKI  | 0.08 | 854  | 428         | 333 | 3   | PLAT    |

# DAILY SUNSPOT OBSERVATIONS

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| Day Group |        | CMP |     | Mo-Day |     | Lat  | L   | CMD | Type | r/R | Sd   | Corre. Area |     | See Remarks |  |
|-----------|--------|-----|-----|--------|-----|------|-----|-----|------|-----|------|-------------|-----|-------------|--|
|           |        |     |     |        |     |      |     |     |      |     |      | Whole       | Max |             |  |
| 128       |        |     |     | 40W    | DAI | 0.64 | 421 | 275 | 184  | 3   | PLAT |             |     |             |  |
| 132       | 3-13.9 | 20  | 103 | 79E    | HSX | 0.99 | 50  | 167 | 167  | 3   | PLAT |             |     |             |  |
| 9.10 119  |        |     |     | 65W    | AXX | 0.95 | 4   | 7   | 7    | 3   |      |             |     |             |  |
| 121       |        |     |     | 38W    | BXI | 0.48 | 8   | 5   | 2    | 3   |      |             |     |             |  |
| 123       |        |     |     | 18W    | DAI | 0.63 | 294 | 190 | 122  | 3   |      |             |     |             |  |
| 124       |        |     |     | 12W    | DKI | 0.23 | 862 | 443 | 363  | 3   |      |             |     |             |  |
| 127       |        |     |     | 23E    | AXX | 0.51 | 4   | 2   | 2    | 3   |      |             |     |             |  |
| 128       |        |     |     | 54W    | DSI | 0.80 | 286 | 241 | 191  | 3   |      |             |     |             |  |
| 132       |        |     |     | 64E    | HSX | 0.92 | 139 | 177 | 177  | 3   |      |             |     |             |  |
| 133       | 3- 6.6 | -24 | 199 | 33W    | BXO | 0.59 | 8   | 5   | 3    | 3   |      |             |     |             |  |
| 134       | 3- 9.7 | -16 | 158 | 9E     | BXO | 0.20 | 8   | 4   | 2    | 3   |      |             |     |             |  |
| 135       | 3-11.7 | 4   | 132 | 34E    | AXX | 0.57 | 4   | 3   | 3    | 3   |      |             |     |             |  |
| 10.06 121 |        |     |     | 43W    | AXX | 0.67 | 8   | 6   | 3    | 4   |      |             |     |             |  |
| 123       |        |     |     | 30W    | DSI | 0.70 | 189 | 133 | 91   | 4   |      |             |     |             |  |
| 124       |        |     |     | 25W    | CKI | 0.41 | 656 | 360 | 328  | 4   |      |             |     |             |  |
| 128       |        |     |     | 67W    | CAI | 0.91 | 101 | 120 | 110  | 4   |      |             |     |             |  |
| 132       |        |     |     | 52E    | HSX | 0.84 | 227 | 209 | 209  | 4   |      |             |     |             |  |
| 133       |        |     |     | 41W    | AXX | 0.66 | 8   | 6   | 3    | 4   |      |             |     |             |  |
| 134       |        |     |     | 10W    | AXX | 0.20 | 8   | 4   | 2    | 4   |      |             |     |             |  |
| 136       | 3-13.2 | -23 | 113 | 40E    | BXO | 0.67 | 8   | 6   | 3    | 4   |      |             |     |             |  |
| 137       | 3-13.7 | -8  | 106 | 50E    | AXX | 0.75 | 8   | 6   | 3    | 4   |      |             |     |             |  |
| 138       | 3-14.1 | 26  | 101 | 52E    | AXX | 0.86 | 4   | 4   | 4    | 4   |      |             |     |             |  |
| 139       | 3-16.1 | 32  | 75  | 78E    | HSX | 0.99 | 59  | 195 | 195  | 4   |      |             |     |             |  |
| 11.12 121 |        |     |     | 48W    | AXX | 0.84 | 8   | 8   | 4    | 4   |      |             |     |             |  |
| 123       |        |     |     | 44W    | DSI | 0.82 | 135 | 116 | 65   | 4   |      |             |     |             |  |
| 124       |        |     |     | 38W    | CKI | 0.62 | 505 | 322 | 316  | 4   |      |             |     |             |  |
| 132       |        |     |     | 36E    | CSO | 0.70 | 252 | 177 | 174  | 4   |      |             |     |             |  |
| 133       |        |     |     | 54W    | AXX | 0.80 | 4   | 4   | 4    | 4   |      |             |     |             |  |
| 136       |        |     |     | 27E    | BXO | 0.51 | 8   | 5   | 2    | 4   |      |             |     |             |  |
| 137       |        |     |     | 35E    | BXO | 0.56 | 8   | 5   | 3    | 4   |      |             |     |             |  |
| 138       |        |     |     | 37E    | BXI | 0.75 | 8   | 6   | 3    | 4   |      |             |     |             |  |
| 139       |        |     |     | 62E    | CAI | 0.93 | 206 | 282 | 254  | 4   |      |             |     |             |  |
| 12.05 123 |        |     |     | 53W    | DSO | 0.87 | 76  | 78  | 52   | 4   |      |             |     |             |  |
| 124       |        |     |     | 52W    | DKI | 0.43 | 366 | 202 | 181  | 4   |      |             |     |             |  |
| 127       |        |     |     | 15W    | BXI | 0.39 | 13  | 7   | 2    | 4   |      |             |     |             |  |
| 132       |        |     |     | 25E    | HSX | 0.59 | 269 | 166 | 166  | 4   |      |             |     |             |  |
| 137       |        |     |     | 22E    | AXX | 0.34 | 4   | 2   | 2    | 4   |      |             |     |             |  |
| 138       |        |     |     | 25E    | BXI | 0.64 | 8   | 5   | 3    | 4   |      |             |     |             |  |

# DAILY SUNSPOT OBSERVATIONS

MARCH 1990

| Day Group | CMP<br>Mo-Day | Lat | L   | CHD | Type | r/R  | Sd  | Corre. Area |     | See Remarks |
|-----------|---------------|-----|-----|-----|------|------|-----|-------------|-----|-------------|
|           |               |     |     |     |      |      |     | Whole       | Max |             |
| 139       |               |     |     | 49E | DAI  | 0.87 | 210 | 216         | 160 | 4           |
| 13.10     | 123           |     |     | 68W | CRI  | 0.95 | 21  | 35          | 28  | 4           |
| 124       |               |     |     | 66W | CSI  | 0.90 | 143 | 161         | 133 | 4           |
| 127       |               |     |     | 29W | CSI  | 0.55 | 84  | 50          | 23  | 4           |
| 132       |               |     |     | 12E | CSO  | 0.49 | 299 | 172         | 169 | 4           |
| 138       |               |     |     | 13E | BXO  | 0.57 | 8   | 5           | 3   | 4           |
| 139       |               |     |     | 38E | DKI  | 0.80 | 421 | 354         | 269 | 4           |
| 140       | 3-11.6        | 19  | 134 | 20W | BXO  | 0.54 | 8   | 5           | 2   | 4           |
| 141       | 3-11.9        | -18 | 130 | 16W | BXI  | 0.32 | 8   | 4           | 2   | 4           |
| 142       | 3-13.1        | -9  | 114 | 0W  | BXI  | 0.03 | 8   | 4           | 2   | 4           |
| 143       | 3-15.5        | -21 | 82  | 32E | BXO  | 0.55 | 8   | 5           | 3   | 4           |
| 14.06     | 124           |     |     | 78W | HSX  | 0.97 | 38  | 73          | 73  | 3           |
| 127       |               |     |     | 43W | CRO  | 0.70 | 38  | 27          | 24  | 3           |
| 132       |               |     |     | 2W  | CSI  | 0.45 | 353 | 198         | 193 | 3           |
| 139       |               |     |     | 24E | CKI  | 0.71 | 429 | 306         | 276 | 3           |
| 141       |               |     |     | 24W | AXX  | 0.44 | 8   | 5           | 2   | 3           |
| 144       | 3-8.8         | 16  | 171 | 70W | AXX  | 0.95 | 4   | 7           | 7   | 3           |
| 145       | 3-19.6        | 5   | 28  | 73E | HSX  | 0.95 | 13  | 21          | 21  | 3           |
| 146       | 3-20.3        | -19 | 19  | 80E | AXX  | 0.98 | 4   | 10          | 10  | 3           |
| 147       | 3-20.4        | -34 | 17  | 80E | CSI  | 0.97 | 38  | 73          | 48  | 3           |
| 15.06     | 127           |     |     | 55W | BXO  | 0.84 | 8   | 8           | 4   | 3           |
| 132       |               |     |     | 14W | CSI  | 0.49 | 322 | 191         | 189 | 3           |
| 139       |               |     |     | 12E | DKI  | 0.66 | 530 | 351         | 228 | 3           |
| 141       |               |     |     | 36W | AXX  | 0.60 | 4   | 3           | 3   | 3           |
| 145       |               |     |     | 60E | HRX  | 0.86 | 34  | 33          | 33  | 3           |
| 146       |               |     |     | 67E | CSO  | 0.91 | 29  | 35          | 30  | 3           |
| 147       |               |     |     | 67E | DSI  | 0.91 | 88  | 105         | 65  | 3           |
| 148       | 3-17.4        | -18 | 57  | 29E | AXX  | 0.48 | 4   | 2           | 2   | 3           |
| 149       | 3-19.3        | 43  | 32  | 50E | BXI  | 0.91 | 13  | 15          | 5   | 3           |
| 150       | 3-21.5        | 17  | 3   | 80E | BXO  | 0.99 | 8   | 28          | 14  | 3           |
| 16.07     | 127           |     |     | 68W | AXX  | 0.93 | 8   | 12          | 6   | 4           |
| 132       |               |     |     | 26W | HSX  | 0.60 | 278 | 173         | 173 | 4           |
| 139       |               |     |     | 0W  | DKI  | 0.62 | 496 | 316         | 174 | 4           |
| 145       |               |     |     | 45E | HSX  | 0.72 | 29  | 21          | 21  | 4           |
| 146       |               |     |     | 54W | HSX  | 0.79 | 50  | 41          | 41  | 4           |
| 147       |               |     |     | 55E | EAI  | 0.82 | 328 | 284         | 142 | 4           |
| 148       |               |     |     | 16E | AXX  | 0.32 | 4   | 2           | 2   | 4           |
| 149       |               |     |     | 37E | DSI  | 0.84 | 105 | 97          | 62  | 4           |

## DAILY SUNSPOT OBSERVATIONS

MARCH 1990

| Day Group | CMP    |     | Lat | L | CMD | Type | r/R  | Sd  | Corre. Area |     | See Remarks |
|-----------|--------|-----|-----|---|-----|------|------|-----|-------------|-----|-------------|
|           | Mo-Day | Mo  |     |   |     |      |      |     | Whole       | Max |             |
| 150       |        |     |     |   | 66E | CRI  | 0.93 | 50  | 69          | 35  | 4           |
| 151       | 3-17.7 | 29  | 53  |   | 24E | AXX  | 0.67 | 8   | 6           | 3   | 4           |
| 17.06 132 |        |     |     |   | 40W | HSX  | 0.72 | 278 | 201         | 201 | 4           |
| 139       |        |     |     |   | 14W | EKI  | 0.67 | 429 | 288         | 243 | 4           |
| 145       |        |     |     |   | 32E | HRX  | 0.56 | 34  | 20          | 20  | 4           |
| 146       |        |     |     |   | 42E | HSX  | 0.66 | 46  | 31          | 31  | 4           |
| 147       |        |     |     |   | 43E | ESI  | 0.74 | 446 | 329         | 180 | 4           |
| 148       |        |     |     |   | 4E  | AXX  | 0.18 | 4   | 2           | 2   | 4           |
| 149       |        |     |     |   | 23E | CRD  | 0.80 | 55  | 46          | 42  | 4           |
| 150       |        |     |     |   | 53E | CAI  | 0.85 | 42  | 40          | 24  | 4           |
| 152       | 3-22.7 | -11 | 347 |   | 73E | HSX  | 0.94 | 17  | 25          | 25  | 4           |
| 18.10 132 |        |     |     |   | 52W | HSX  | 0.84 | 269 | 247         | 247 | 4           |
| 139       |        |     |     |   | 31W | DKI  | 0.72 | 694 | 503         | 479 | 4           |
| 145       |        |     |     |   | 18E | CRD  | 0.37 | 42  | 23          | 20  | 4           |
| 146       |        |     |     |   | 31E | HRX  | 0.53 | 46  | 27          | 25  | 4           |
| 147       |        |     |     |   | 32E | ESI  | 0.63 | 429 | 277         | 182 | 4           |
| 149       |        |     |     |   | 12E | CAI  | 0.75 | 71  | 54          | 47  | 4           |
| 150       |        |     |     |   | 39E | BXI  | 0.68 | 29  | 20          | 3   | 4           |
| 151       |        |     |     |   | 5W  | AXX  | 0.60 | 4   | 3           | 3   | 4           |
| 152       |        |     |     |   | 61E | HSX  | 0.85 | 34  | 32          | 32  | 4           |
| 153       | 3-19.2 | 23  | 34  |   | 14E | AXX  | 0.54 | 4   | 2           | 2   | 4           |
| 154       | 3-22.8 | 18  | 346 |   | 56E | BXO  | 0.84 | 8   | 8           | 4   | 4           |
| 155       | 3-23.7 | -13 | 334 |   | 80E | AXX  | 0.98 | 4   | 10          | 10  | 4           |
| 156       | 3-24.4 | -31 | 325 |   | 83E | CSI  | 0.97 | 55  | 105         | 89  | 4           |
| 19.05 132 |        |     |     |   | 66W | HSX  | 0.93 | 130 | 179         | 179 | 4           |
| 139       |        |     |     |   | 40W | DAI  | 0.79 | 400 | 328         | 97  | 4           |
| 143       |        |     |     |   | 54W | BXO  | 0.82 | 8   | 7           | 4   | 4           |
| 145       |        |     |     |   | 7E  | CSO  | 0.24 | 46  | 24          | 22  | 4           |
| 146       |        |     |     |   | 16E | AXX  | 0.33 | 17  | 9           | 4   | 4           |
| 147       |        |     |     |   | 18E | EAI  | 0.53 | 664 | 391         | 216 | 4           |
| 149       |        |     |     |   | 3E  | CSI  | 0.76 | 59  | 45          | 42  | 4           |
| 150       |        |     |     |   | 30E | BXI  | 0.59 | 46  | 29          | 5   | 4           |
| 151       |        |     |     |   | 16W | AXX  | 0.61 | 8   | 5           | 3   | 4           |
| 152       |        |     |     |   | 48E | HSX  | 0.74 | 67  | 50          | 50  | 4           |
| 154       |        |     |     |   | 49E | AXX  | 0.80 | 8   | 7           | 7   | 4           |
| 155       |        |     |     |   | 66E | AXX  | 0.90 | 8   | 9           | 9   | 4           |
| 156       |        |     |     |   | 71E | ESI  | 0.93 | 160 | 219         | 86  | 4           |
| 157       | 3-19.2 | -32 | 33  |   | 2E  | BXI  | 0.43 | 8   | 5           | 2   | 4           |
| 158       | 3-24.6 | 15  | 322 |   | 76E | BXO  | 0.98 | 8   | 20          | 10  | 4           |

# DAILY SUNSPOT OBSERVATIONS

MARCH 1990

| Day   | Group | CMP    | Lat | L   | CMD | Type | r/R  | Sd   | Corre. Area |     | See | Remarks |
|-------|-------|--------|-----|-----|-----|------|------|------|-------------|-----|-----|---------|
|       |       | Mo-Day |     |     |     |      |      |      | Whole       | Max |     |         |
| 159   |       | 3-25.2 | -18 | 314 | 81E | CSI  | 0.98 | 105  | 247         | 237 | 4   |         |
| 20.05 | 132   |        |     |     | 79W | HSX  | 0.99 | 59   | 195         | 195 | 4   |         |
|       | 139   |        |     |     | 52W | DSI  | 0.87 | 282  | 289         | 86  | 4   |         |
|       | 145   |        |     |     | 6W  | CRI  | 0.23 | 34   | 17          | 11  | 4   |         |
|       | 146   |        |     |     | 3E  | AXX  | 0.22 | 13   | 6           | 4   | 4   |         |
|       | 147   |        |     |     | 5E  | FAI  | 0.47 | 917  | 520         | 215 | 4   |         |
|       | 149   |        |     |     | 10W | AXX  | 0.77 | 13   | 10          | 3   | 4   |         |
|       | 150   |        |     |     | 17E | CRI  | 0.51 | 63   | 37          | 10  | 4   |         |
|       | 152   |        |     |     | 34E | HSX  | 0.55 | 55   | 33          | 33  | 4   |         |
|       | 155   |        |     |     | 51E | BXI  | 0.76 | 17   | 13          | 3   | 4   |         |
|       | 156   |        |     |     | 60E | FAI  | 0.86 | 311  | 307         | 133 | 4   |         |
|       | 157   |        |     |     | 11W | BXI  | 0.46 | 8    | 5           | 2   | 4   |         |
|       | 158   |        |     |     | 63E | BXI  | 0.91 | 13   | 15          | 5   | 4   |         |
|       | 159   |        |     |     | 69E | CAI  | 0.92 | 139  | 177         | 155 | 4   |         |
| 160   |       | 3-25.8 | -6  | 307 | 79E | FKO  | 0.98 | 244  | 572         | 454 | 4   |         |
| 21.05 | 139   |        |     |     | 65W | DSI  | 0.95 | 160  | 267         | 147 | 3   |         |
|       | 145   |        |     |     | 19W | BXO  | 0.39 | 8    | 5           | 2   | 3   |         |
|       | 146   |        |     |     | 10W | AXX  | 0.26 | 8    | 4           | 4   | 3   |         |
|       | 147   |        |     |     | 7W  | FAI  | 0.46 | 1039 | 586         | 178 | 3   |         |
|       | 149   |        |     |     | 23W | AXX  | 0.78 | 8    | 7           | 3   | 3   |         |
|       | 150   |        |     |     | 6E  | DSI  | 0.41 | 168  | 92          | 32  | 3   |         |
|       | 152   |        |     |     | 21E | HSX  | 0.37 | 42   | 23          | 23  | 3   |         |
|       | 155   |        |     |     | 37E | BXI  | 0.59 | 25   | 16          | 5   | 3   |         |
|       | 156   |        |     |     | 46E | FAI  | 0.72 | 357  | 259         | 98  | 3   |         |
|       | 157   |        |     |     | 25W | BXI  | 0.56 | 8    | 5           | 3   | 3   |         |
|       | 158   |        |     |     | 49E | AXX  | 0.79 | 8    | 7           | 3   | 3   |         |
|       | 159   |        |     |     | 55E | CAI  | 0.79 | 231  | 190         | 176 | 3   |         |
| 160   |       |        |     |     | 66E | FKO  | 0.89 | 458  | 492         | 343 | 3   |         |
| 161   |       | 3-23.8 | 21  | 332 | 31E | BXI  | 0.69 | 8    | 6           | 3   | 3   |         |
| 22.04 | 139   |        |     |     | 78W | CRO  | 0.99 | 13   | 42          | 28  | 3   |         |
|       | 145   |        |     |     | 30W | BXO  | 0.53 | 8    | 5           | 2   | 3   |         |
|       | 146   |        |     |     | 23W | AXX  | 0.44 | 8    | 5           | 2   | 3   |         |
|       | 147   |        |     |     | 20W | FAC  | 0.55 | 1022 | 613         | 194 | 3   |         |
|       | 150   |        |     |     | 7W  | CRI  | 0.41 | 59   | 32          | 23  | 3   |         |
|       | 152   |        |     |     | 9E  | HRX  | 0.10 | 13   | 6           | 6   | 3   |         |
|       | 155   |        |     |     | 23E | CAI  | 0.38 | 101  | 55          | 41  | 3   |         |
|       | 156   |        |     |     | 32E | EAI  | 0.60 | 446  | 278         | 108 | 3   |         |
|       | 157   |        |     |     | 39W | AXX  | 0.69 | 8    | 6           | 3   | 3   |         |
| 158   |       |        |     |     | 36E | BXI  | 0.67 | 8    | 6           | 3   | 3   |         |

# DAILY SUNSPOT OBSERVATIONS

MARCH 1990

| CMP       |        | Corre. Area |     |              |      |     |                       |
|-----------|--------|-------------|-----|--------------|------|-----|-----------------------|
| Day Group | Mo-Day | Lat         | L   | CMD Type     | r/R  | Sd  | Whole Max See Remarks |
| 159       |        |             |     | 41E CAI 0.66 | 189  | 125 | 114 3                 |
| 160       |        |             |     | 52E FKO 0.76 | 576  | 442 | 278 3                 |
| 161       |        |             |     | 18E BXO 0.54 | 8    | 5   | 2 3                   |
| 23.05     | 145    |             |     | 43W AXX 0.70 | 8    | 6   | 3 4                   |
| 146       |        |             |     | 36W AXX 0.59 | 8    | 5   | 3 4                   |
| 147       |        |             |     | 32W FAC 0.63 | 871  | 562 | 166 4                 |
| 150       |        |             |     | 20W BXI 0.48 | 25   | 14  | 5 4                   |
| 152       |        |             |     | 4W AXX 0.09  | 8    | 4   | 2 4                   |
| 155       |        |             |     | 9E DAI 0.18  | 387  | 197 | 68 4                  |
| 156       |        |             |     | 19E EAI 0.49 | 437  | 252 | 87 4                  |
| 157       |        |             |     | 51W AXX 0.80 | 8    | 7   | 4 4                   |
| 158       |        |             |     | 21E AXX 0.51 | 8    | 5   | 2 4                   |
| 159       |        |             |     | 27E CSI 0.48 | 122  | 70  | 46 4                  |
| 160       |        |             |     | 38E FKO 0.60 | 791  | 493 | 325 4                 |
| 161       |        |             |     | 9E BXI 0.51  | 8    | 5   | 2 4                   |
| 162       | 3-19.1 | -11         | 35  | 52W BXI 0.78 | 13   | 10  | 3 4                   |
| 163       | 3-22.0 | 26          | 357 | 14W AXX 0.59 | 8    | 5   | 3 4                   |
| 24.05     | 145    |             |     | 56W BXI 0.83 | 8    | 7   | 4 3                   |
| 147       |        |             |     | 46W FAI 0.76 | 694  | 533 | 178 3                 |
| 150       |        |             |     | 33W BXI 0.63 | 8    | 5   | 3 3                   |
| 152       |        |             |     | 17W AXX 0.29 | 8    | 4   | 4 3                   |
| 155       |        |             |     | 5W EAI 0.16  | 433  | 219 | 81 3                  |
| 156       |        |             |     | 5E FAI 0.40  | 357  | 195 | 60 3                  |
| 157       |        |             |     | 65W AXX 0.91 | 4    | 5   | 5 3                   |
| 158       |        |             |     | 8E AXX 0.39  | 8    | 5   | 2 3                   |
| 159       |        |             |     | 14E CSI 0.31 | 88   | 46  | 24 3                  |
| 160       |        |             |     | 23E FKO 0.38 | 770  | 416 | 236 3                 |
| 161       |        |             |     | 3W CSI 0.47  | 97   | 55  | 50 3                  |
| 162       |        |             |     | 66W BXO 0.92 | 8    | 11  | 5 3                   |
| 164       | 3-25.7 | 18          | 308 | 24E AXX 0.55 | 4    | 3   | 3 3                   |
| 165       | 3-29.6 | 11          | 256 | 72E AXX 0.95 | 8    | 14  | 7 3                   |
| 166       | 3-30.3 | 25          | 247 | 82E HXK 0.99 | 21   | 70  | 70 3                  |
| 25.06     | 147    |             |     | 59W FAI 0.86 | 479  | 473 | 149 4                 |
| 150       |        |             |     | 46W BXI 0.76 | 8    | 6   | 3 4                   |
| 152       |        |             |     | 30W AXX 0.48 | 8    | 5   | 5 4                   |
| 155       |        |             |     | 18W EAC 0.32 | 1030 | 544 | 133 4                 |
| 156       |        |             |     | 9W EAI 0.43  | 290  | 160 | 70 4                  |
| 158       |        |             |     | 6W BXI 0.39  | 13   | 7   | 2 4                   |
| 159       |        |             |     | 2E ESI 0.20  | 139  | 71  | 26 4                  |

MARCH 1990

| Day Group | CMP<br>Mo-Day | Lat | L   | CMD | Type | r/R  | Sd   | Corre. Area |     | See Remarks |
|-----------|---------------|-----|-----|-----|------|------|------|-------------|-----|-------------|
|           |               |     |     |     |      |      |      | Whole       | Max |             |
| 160       |               |     |     | 10E | FKO  | 0.15 | 1178 | 595         | 442 | 4           |
| 161       |               |     |     | 17W | CSI  | 0.54 | 88   | 52          | 42  | 4           |
| 162       |               |     |     | 79W | AXX  | 0.99 | 8    | 28          | 14  | 4           |
| 165       |               |     |     | 59E | BXO  | 0.86 | 13   | 12          | 4   | 4           |
| 166       |               |     |     | 70E | CSO  | 0.95 | 118  | 196         | 189 | 4           |
| 167       | 3-28.9        | 18  | 265 | 43E | AXX  | 0.75 | 8    | 6           | 3   | 4           |
| 26.06 147 |               |     |     | 70W | FAI  | 0.92 | 139  | 177         | 75  | 4           |
| 152       |               |     |     | 43W | AXX  | 0.67 | 4    | 3           | 3   | 4           |
| 155       |               |     |     | 31W | EAC  | 0.52 | 875  | 511         | 143 | 4           |
| 156       |               |     |     | 22W | ERI  | 0.52 | 109  | 64          | 20  | 4           |
| 158       |               |     |     | 17W | BXI  | 0.44 | 13   | 7           | 2   | 4           |
| 159       |               |     |     | 10W | CAI  | 0.26 | 214  | 111         | 94  | 4           |
| 160       |               |     |     | 4W  | FKO  | 0.10 | 908  | 457         | 376 | 4           |
| 161       |               |     |     | 30W | BXI  | 0.63 | 17   | 11          | 3   | 4           |
| 164       |               |     |     | 5W  | AXX  | 0.44 | 4    | 2           | 2   | 4           |
| 165       |               |     |     | 47E | AXX  | 0.76 | 4    | 3           | 3   | 4           |
| 166       |               |     |     | 56E | CSI  | 0.89 | 147  | 158         | 149 | 4           |
| 167       |               |     |     | 30E | AXX  | 0.61 | 4    | 3           | 3   | 4           |
| 168       | 3-25.9        | -37 | 305 | 2W  | AXX  | 0.51 | 4    | 2           | 2   | 4           |
| 169       | 3-31.7        | -12 | 228 | 75E | HSX  | 0.95 | 29   | 49          | 49  | 4           |
| 27.09 147 |               |     |     | 79W | DSI  | 0.97 | 67   | 129         | 81  | 3           |
| 155       |               |     |     | 45W | EAC  | 0.69 | 673  | 465         | 116 | 3           |
| 156       |               |     |     | 33W | CKI  | 0.62 | 273  | 174         | 158 | 3           |
| 158       |               |     |     | 33W | BXO  | 0.63 | 8    | 5           | 3   | 3           |
| 159       |               |     |     | 25W | CAI  | 0.45 | 311  | 174         | 153 | 3           |
| 160       |               |     |     | 20W | FKO  | 0.34 | 711  | 379         | 345 | 3           |
| 161       |               |     |     | 43W | BXI  | 0.78 | 17   | 13          | 3   | 3           |
| 165       |               |     |     | 33E | AXX  | 0.59 | 8    | 5           | 3   | 3           |
| 166       |               |     |     | 42E | CSO  | 0.78 | 189  | 152         | 142 | 3           |
| 167       |               |     |     | 19E | BXO  | 0.48 | 8    | 5           | 2   | 3           |
| 168       |               |     |     | 20W | AXX  | 0.56 | 8    | 5           | 3   | 3           |
| 169       |               |     |     | 61E | HSX  | 0.86 | 59   | 58          | 58  | 3           |
| 170       | 3-26.3        | 12  | 300 | 11W | BXO  | 0.37 | 8    | 5           | 2   | 3           |
| 171       | 3-26.6        | -26 | 295 | 6W  | BXI  | 0.33 | 8    | 4           | 2   | 3           |
| 172       | 3-26.7        | -40 | 294 | 5W  | AXX  | 0.55 | 4    | 3           | 3   | 3           |
| 28.00     | Not Available |     |     |     |      |      |      |             |     |             |
| 29.28 155 |               |     |     | 72W | EKI  | 0.94 | 299  | 447         | 352 | 2           |
| 156       |               |     |     | 61W | DAI  | 0.87 | 118  | 121         | 60  | 2           |

# DAILY SUNSPOT OBSERVATIONS

MARCH 1990

|     |       | CMP    |     |   |     |      |     |    |       | Corre. Area |  | See Remarks |
|-----|-------|--------|-----|---|-----|------|-----|----|-------|-------------|--|-------------|
| Day | Group | Mo-Day | Lat | L | CMD | Type | r/R | Sd | Whole | Max         |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |
|     |       |        |     |   |     |      |     |    |       |             |  |             |

## SMOOTHED ( PREDICTED ) SUNSPOT NUMBERS

DECEMBER 1989 - NOVEMBER 1990

| Time | 89.12 | 90.01 | 90.02 | 90.03 | 90.04 | 90.05 | 90.06 | 90.07 | 90.08 | 90.09 | 90.10 | 90.11 |
|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| R    | 156.6 | 155.2 | 153.2 | 150.9 | 148.3 | 145.7 | 143.1 | 140.6 | 138.1 | 135.8 | 133.6 | 131.5 |
| E    | 3.1   | 3.1   | 6.1   | 12.1  | 13.3  | 17.5  | 22.9  | 22.5  | 26.2  | 25.8  | 28.1  | 26.3  |

## H-ALPHA SOLAR FLARES

FEBRUARY 1990

| Day | Sta  | T i m e |       |       | Lat | L   | CMD | Area Measurement |       |      | Obs |      | A.R. | Rem |
|-----|------|---------|-------|-------|-----|-----|-----|------------------|-------|------|-----|------|------|-----|
|     |      | Start   | Max   | End   |     |     |     | Cen              | Appar | Corr |     |      |      |     |
|     |      | (UT)    | (UT)  | (UT)  |     |     |     | Dist             | (Sd)  | (Sq) | Imp | Type |      |     |
| 1   | BEIJ | 0604E   | 0604U | 0614  | N10 | 350 | W72 | .954             | 42    |      | SB  | P    | 74   | D   |
| 1   | YUNN | 0604E   | 0608  | 0612  | N11 | 349 | W71 | .956             | 39    |      | SN  | P    | 74   |     |
| 1   | YUNN | 0625    | 0629  | 0642  | N14 | 303 | W25 | .527             | 47    | 0.6  | SN  | C    | 66   | E   |
| 1   | YUNN | 0801    | 0806  | 0840  | S16 | 316 | W39 | .637             | 31    | 0.4  | SN  | C    | 61   |     |
| 3   | BEIJ | 0110    | 0113  | 0120  | S10 | 332 | W77 | .988             | 92    |      | 1N  | P    | 46   | D   |
| 9   | YUNN | 0154    | 0156  | 0200  | S10 | 86  | E89 | 1.               |       |      |     | C    | 90   | A   |
| 9   | YUNN | 0734    | 0737  | 0828D | S27 | 146 | E26 | .527             | 24    | 0.3  | SN  | P    | 85   |     |
| 10  | YUNN | 0123    | 0132  | 0150  | N10 | 251 | W89 | 1.               |       |      |     | C    | 73   | A   |
| 12  | YUNN | 0209E   | 0211U | 0227D | N12 | 140 | W 4 | .328             | 79    | 0.9  | SN  | P    | 89   |     |
| 13  | YUNN | 0103E   | 0104  | 0127  | N21 | 113 | E10 | .489             | 63    | 0.8  | SN  | P    | 88   |     |
| 22  | YUNN | 0641E   | 0641U | 0645D | N 4 | 13  | W11 | .269             | 126   | 1.4  | SN  | P    | 103  | F   |
| 22  | YUNN | 0716    | 0717  | 0733  | S37 | 332 | E29 | .641             | 110   | 1.5  | SN  | C    | 100  | F   |
| 22  | YUNN | 0851E   | 0851U | 0856  | N16 | 308 | E52 | .833             | 63    | 1.2  | SN  | P    | 106  |     |
| 22  | YUNN | 0851E   | 0851U | 0856D | N 5 | 6   | W 6 | .236             | 79    | 0.8  | SN  | P    | 103  |     |
| 23  | BEIJ | 0405    | 0410  | 0415  | S 9 | 287 | E63 | .885             | 84    | 1.9  | SN  | P    | 111  | DG  |
| 24  | YUNN | 0147E   | 0148  | 0152  | S19 | 317 | E21 | .410             | 47    | 0.5  | SN  | P    | 104  |     |
| 24  | BEIJ | 0320    | 0321  | 0326  | S 8 | 288 | E49 | .724             | 50    | 0.8  | SF  | P    | 111  | D   |
| 24  | BEIJ | 0512    | 0513  | 0521  | N15 | 311 | E25 | .552             | 168   | 2.1  | 1B  | P    | 106  | E   |
| 24  | YUNN | 0738E   | 0740  | 0747  | S19 | 319 | E16 | .330             | 55    | 0.6  | SN  | P    | 104  |     |
| 25  | BEIJ | 0102    | 0103  | 0104  | S11 | 292 | E33 | .517             | 84    | 1.0  | SF  | P    | 111  | D   |
| 25  | BEIJ | 0514    | 0516  | 0520  | S11 | 292 | E31 | .517             | 126   | 1.5  | SN  | P    | 111  | D   |
| 26  | BEIJ | 0553    | 0554  | 0600  | S 4 | 5   | W55 | .839             | 168   | 3.2  | 1N  | C    |      | D   |
| 26  | BEIJ | 0721    | 0722  | 0727  | S19 | 311 | W 2 | .218             | 92    | 1.0  | SF  | C    | 104  | D   |
| 27  | YUNN | 0659    | 0715U | 0720  | S19 | 315 | W20 | .382             | 47    | 0.5  | SN  | P    | 104  | E   |
| 27  | YUNN | 0836    | 0838  | 0905  | S18 | 314 | W19 | .364             | 157   | 1.7  | SN  | C    | 104  |     |
| 28  | YUNN | 0630E   | 0630U | 0717  | N29 | 235 | E48 | .855             | 126   | 2.5  | 1F  | P    | 119  |     |

## H-ALPHA SOLAR FLARES

MARCH 1990

| Day | Sta  | T i m e    |          |          | Lat | L   | CMD | Area Measurement |            |           | Obs  | A.R. | Rem |
|-----|------|------------|----------|----------|-----|-----|-----|------------------|------------|-----------|------|------|-----|
|     |      | Start (UT) | Max (UT) | End (UT) |     |     |     | Cen Dist         | Appar (Sd) | Corr (Sq) |      |      |     |
| 1   | BEIJ | 0300E      | 0302U    | 0330     | N32 | 239 | E32 | .759             | 84         | 1.3       | SB P | 119  | E   |
| 1   | YUNN | 0307E      | 0307U    | 0334D    | N33 | 237 | E34 | .782             | 94         | 1.6       | SN P | 119  |     |
| 1   | BEIJ | 0342       | 0344     | 0405     | N29 | 234 | E37 | .770             | 378        | 6.1       | 2B P | 119  | E   |
| 1   | BEIJ | 0528       | 0531     | 0531D    | N30 | 234 | E36 | .782             | 168        | 2.8       | 1B P | 119  | D   |
| 1   | YUNN | 0641E      | 0641U    | 0657     | N30 | 237 | E32 | .752             | 94         | 1.5       | SN P | 119  |     |
| 1   | YUNN | 0707       | 0708     | 0714     | N31 | 236 | E33 | .763             | 47         | 0.8       | SF C | 119  |     |
| 1   | YUNN | 0724       | 0742U    | 0755     | N33 | 237 | E32 | .768             | 157        | 2.5       | 1F P | 119  |     |
| 1   | YUNN | 0826       | 0831     | 0859     | N32 | 236 | E32 | .760             | 220        | 3.5       | 1B C | 119  |     |
| 2   | YUNN | 0140E      | 0145     | 0305     | N29 | 235 | E24 | .676             | 314        | 4.4       | 1N P | 119  |     |
| 2   | YUNN | 0701E      | 0702U    | 0707     | S20 | 266 | W10 | .275             | 47         | 0.5       | SN P | 112  |     |
| 2   | YUNN | 0834E      | 0834U    | 0836     | N31 | 233 | E22 | .692             | 79         | 1.1       | SN P | 119  |     |
| 4   | PURP | 0214E      | 0214U    | 0224     | S21 | 244 | W12 | .316             | 41         | 0.5       | SF P | 116  |     |
| 6   | YUNN | 0431       | 0442U    | 0443D    | S15 | 221 | W16 | .300             | 110        | 1.2       | SN P | 128  |     |
| 6   | BEIJ | 0442       | 0446     | 0500     | S14 | 220 | W15 | .287             | 189        | 2.0       | 1B P | 128  | D   |
| 6   | YUNN | 0748       | 0802U    | 0826     | S14 | 221 | W18 | .322             | 110        | 1.2       | SN P | 128  |     |
| 6   | PURP | 0750E      | 0800U    | 0813     | S13 | 220 | W17 | .311             | 226        | 2.5       | 1N P | 128  | E   |
| 7   | BEIJ | 0648       | 0654     | 0657     | S13 | 221 | W31 | .517             | 147        | 1.8       | SB C | 128  | D   |
| 7   | YUNN | 0820       | 0830     | 0833D    | S14 | 221 | W32 | .531             | 79         | 1.0       | SB P | 128  |     |
| 7   | BEIJ | 0903       | 0916     | 0918D    | S10 | 176 | E13 | .230             | 252        | 2.7       | 1B P | 124  | E   |
| 8   | PURP | 0736       | 0738     | 0745D    | N28 | 186 | W 9 | .589             | 75         | 1.0       | SB C | 123  | E   |
| 9   | YUNN | 0705E      | 0711U    | 0724D    | S11 | 175 | W11 | .205             | 189        | 2.0       | 1N P | 124  |     |
| 11  | YUNN | 0042E      | 0043     | 0046     | N20 | 104 | E37 | .717             | 79         | 1.2       | SN P | 132  |     |
| 12  | BEIJ | 0051       | 0058     | 0108     | N31 | 73  | E55 | .885             | 294        | 6.5       | 2B P | 139  | D   |
| 12  | BEIJ | 0428       | 0431     | 0437     | N31 | 81  | E45 | .839             | 294        | 5.6       | 2B C | 139  | E   |
| 12  | BEIJ | 0447       | 0455     | 0505     | N31 | 73  | E53 | .885             | 63         | 1.4       | SB P | 139  | D   |
| 12  | BEIJ | 0530       | 0537     | 0545     | N31 | 73  | E53 | .885             | 42         | 0.9       | SB C | 139  | D   |
| 12  | BEIJ | 0600       | 0605     | 0613     | N31 | 71  | E54 | .885             | 63         | 1.4       | SB P | 139  | D   |
| 13  | YUNN | 0243E      | 0243U    | 0249D    | N32 | 74  | E40 | .815             | 393        | 7.0       | 2N P | 139  |     |
| 14  | BEIJ | 0100       | 0111     | 0115     | N32 | 71  | E30 | .724             | 84         | 1.3       | SF C | 139  | D   |
| 14  | BEIJ | 0106       | 0108     | 0112     | S32 | 17  | E84 | .988             | 139        |           | 1B C | 147  | D   |

## H-ALPHA SOLAR FLARES

MARCH 1990

| Day | Sta  | T i m e |       |       | Lat | L   | CMD | Area<br>Measurement |       |      | Imp | Obs<br>Type | A.R. | Rem |
|-----|------|---------|-------|-------|-----|-----|-----|---------------------|-------|------|-----|-------------|------|-----|
|     |      | Start   | Max   | End   |     |     |     | Cen                 | Appar | Corr |     |             |      |     |
|     |      | (UT)    | (UT)  | (UT)  |     |     |     | Dist                | (Sd)  | (Sq) |     |             |      |     |
| 14  | BEIJ | 0342    | 0402  | 0555  | N32 | 73  | E28 | .747                | 126   | 2.0  | SN  | C           | 139  | D   |
| 14  | BEIJ | 0342    | 0505  | 0555  | N32 | 73  | E26 | .724                | 315   | 4.7  | 1N  | C           | 139  | E   |
| 14  | BEIJ | 0529    | 0533  | 0540  | S32 | 19  | E80 | .988                | 139   |      | 1B  | C           | 147  | D   |
| 14  | BEIJ | 0723    | 0726  | 0735  | S32 | 19  | E79 | .988                | 139   |      | 1B  | C           | 147  | D   |
| 14  | BEIJ | 0839E   | 0852  | 0912  | N33 | 73  | E24 | .736                | 105   | 1.6  | SN  | C           | 139  | D   |
| 15  | PURP | 0744    | 0750  | 0752D | N42 | 35  | E49 | .908                | 48    |      | SF  | C           | 149  |     |
| 16  | BEIJ | 0453    | 0458  | 0506  | S35 | 16  | E57 | .862                | 126   | 2.6  | 1N  | P           | 147  | E   |
| 18  | BEIJ | 0510    | 0515  | 0530  | N29 | 76  | W30 | .724                | 126   | 1.9  | SN  | P           | 139  | E   |
| 19  | BEIJ | 0440    | 0457  | 0612  | N34 | 73  | W40 | .828                | 294   | 5.4  | 2B  | C           | 139  | E   |
| 19  | PURP | 0507E   | 0510U | 0641  | N33 | 72  | W39 | .800                | 528   | 9.1  | 2B  | C           | 139  |     |
| 19  | PURP | 0507E   | 0510U | 0520  | S35 | 318 | E75 | .944                | 302   |      | 2B  | C           | 156  | H   |
| 20  | YUNN | 0337E   | 0337U | 0342D | S25 | 8   | E13 | .511                | 63    | 0.8  | SN  | P           | 147  |     |
| 21  | PURP | 0225    | 0255  | 0323D | S32 | 16  | W 8 | .456                | 151   | 1.8  | SN  | C           | 147  |     |
| 21  | YUNN | 0225    | 0243  | 0409  | S34 | 14  | W 6 | .462                | 314   | 3.7  | 1N  | C           | 147  |     |
| 21  | PURP | 0242    | 0306  | 0323  | S14 | 331 | E37 | .589                | 189   | 2.4  | 1N  | C           | 155  |     |
| 21  | YUNN | 0242    | 0302  | 0343  | S13 | 330 | E38 | .610                | 94    | 1.2  | SN  | C           | 155  |     |
| 21  | YUNN | 0440E   | 0448U | 0450  | S34 | 13  | W 6 | .466                | 173   | 2.0  | 1F  | P           | 147  |     |
| 22  | YUNN | 0412    | 0417  | 0425  | S35 | 328 | E26 | .601                | 220   | 2.8  | 1B  | C           | 156  |     |
| 23  | YUNN | 0130E   | 0130U | 0145  | N24 | 357 | W15 | .567                | 157   | 2.0  | SB  | P           | 163  |     |
| 23  | YUNN | 0309    | 0319  | 0329  | S34 | 326 | E15 | .505                | 94    | 1.1  | SN  | C           | 156  |     |
| 23  | YUNN | 0623E   | 0623U | 0640D | S33 | 16  | W36 | .679                | 267   | 3.8  | 1B  | P           | 147  |     |
| 24  | YUNN | 0259    | 0300  | 0306  | S 6 | 311 | E17 | .292                | 204   | 2.2  | 1B  | C           | 160  |     |
| 24  | YUNN | 0259    | 0300  | 0306  | S35 | 325 | E 3 | .473                | 204   | 2.4  | 1N  | C           | 156  |     |
| 26  | YUNN | 0050    | 0053  | 0106  | S36 | 5   | W62 | .897                | 47    | 1.1  | SN  | C           | 147  |     |
| 26  | BEIJ | 0153    | 0158  | 0205  | S 5 | 312 | W10 | .173                | 147   | 1.5  | SN  | C           | 160  | E   |
| 26  | YUNN | 0220E   | 0220U | 0230  | S 7 | 296 | E 6 | .109                | 31    | 0.3  | SN  | P           | 160  |     |
| 27  | YUNN | 0757E   | 0757U | 0802  | S17 | 313 | W27 | .427                | 94    | 1.1  | SN  | P           | 159  |     |
| 30  | YUNN | 0737E   | 0740U | 0748D | S15 | 328 | W81 | .983                |       |      | S   | P           | 155  |     |

# INTERVALS OF H-ALPHA FLARE PATROL OBSERVATION

FEBRUARY 1990

| Day | From | To  | From | To  | From | To  | From | To   | From | To  | From | To  |
|-----|------|-----|------|-----|------|-----|------|------|------|-----|------|-----|
| 1   | 46   | 850 |      |     |      |     |      |      |      |     |      |     |
| 2   | 129  | 212 | 223  | 645 | 716  | 800 |      |      |      |     |      |     |
| 3   | 113  | 647 |      |     |      |     |      |      |      |     |      |     |
| 4   | 136  | 710 |      |     |      |     |      |      |      |     |      |     |
| 5   | 51   | 737 |      |     |      |     |      |      |      |     |      |     |
| 6   | 126  | 133 | 145  | 740 | 820  | 835 |      |      |      |     |      |     |
| 7   | 307  | 415 | 740  | 755 | 859  | 950 |      |      |      |     |      |     |
| 8   | 849  | 908 |      |     |      |     |      |      |      |     |      |     |
| 9   | 35   | 214 | 222  | 302 | 458  | 540 | 642  | 646  | 659  | 725 | 734  | 744 |
|     | 812  | 828 | 839  | 845 |      |     |      |      |      |     |      | 800 |
| 10  | 27   | 33  | 47   | 56  | 123  | 227 | 235  | 302  | 437  | 541 | 607  | 745 |
|     |      |     |      |     |      |     |      |      |      |     |      | 802 |
| 11  | 230  | 324 | 330  | 421 | 428  | 711 | 820  | 845  |      |     |      |     |
| 12  | 42   | 45  | 100  | 107 | 123  | 126 | 135  | 239  | 248  | 510 | 541  | 609 |
|     | 710  | 753 |      |     |      |     |      |      |      |     |      | 646 |
| 13  | 103  | 135 | 151  | 229 | 242  | 253 | 305  | 312  |      |     |      | 651 |
| 14  | 449  | 600 | 909  | 936 |      |     |      |      |      |     |      |     |
| 15  | 207  | 258 | 430  | 700 |      |     |      |      |      |     |      |     |
| 16  | 304  | 315 |      |     |      |     |      |      |      |     |      |     |
| 17  | 34   | 112 |      |     |      |     |      |      |      |     |      |     |
| 18  | 46   | 137 | 145  | 157 | 853  | 919 |      |      |      |     |      |     |
| 19  | 556  | 559 | 610  | 711 |      |     |      |      |      |     |      |     |
| 20  | 155  | 245 | 257  | 336 | 452  | 616 | 721  | 1002 |      |     |      |     |
| 21  | 322  | 517 | 737  | 857 | 938  | 955 |      |      |      |     |      |     |
| 22  | 636  | 647 | 713  | 735 | 851  | 856 |      |      |      |     |      |     |
| 23  | 115  | 550 |      |     |      |     |      |      |      |     |      |     |
| 24  | 129  | 150 | 201  | 220 | 227  | 303 | 320  | 600  | 738  | 747 |      |     |
| 25  | 100  | 310 | 500  | 830 |      |     |      |      |      |     |      |     |
| 26  | 40   | 730 |      |     |      |     |      |      |      |     |      |     |
| 27  | 614  | 735 | 802  | 805 | 830  | 911 |      |      |      |     |      |     |
| 28  | 101  | 122 | 129  | 217 | 255  | 312 | 336  | 342  | 352  | 358 | 624  | 813 |

Combined reports from the observatories listed below:

BEIJ PURP YUNN URUM

# INTERVALS OF H-ALPHA FLARE PATROL OBSERVATION

MARCH 1990

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| Day | From | To | From | To | From | To | From | To | From | To | From | To |
|-----|------|----|------|----|------|----|------|----|------|----|------|----|
|-----|------|----|------|----|------|----|------|----|------|----|------|----|

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|    |     |     |      |      |     |     |     |     |     |     |     |     |
|----|-----|-----|------|------|-----|-----|-----|-----|-----|-----|-----|-----|
| 1  | 302 | 540 | 641  | 729  | 740 | 859 |     |     |     |     |     |     |
| 2  | 140 | 346 | 404  | 417  | 701 | 713 | 721 | 727 |     |     |     |     |
| 3  | 58  | 137 | 210  | 647  |     |     |     |     |     |     |     |     |
| 4  | 35  | 930 |      |      |     |     |     |     |     |     |     |     |
| 5  | 17  | 829 |      |      |     |     |     |     |     |     |     |     |
| 6  | 55  | 714 | 732  | 813  |     |     |     |     |     |     |     |     |
| 7  | 100 | 918 |      |      |     |     |     |     |     |     |     |     |
| 8  | 38  | 331 | 400  | 601  | 609 | 635 | 642 | 700 | 709 | 831 |     |     |
| 9  | 34  | 38  | 59   | 323  | 340 | 826 |     |     |     |     |     |     |
| 10 | 22  | 32  | 114  | 130  | 159 | 200 | 217 | 221 | 232 | 246 | 430 | 700 |
| 11 | 23  | 930 | 2325 | 2400 |     |     |     |     |     |     |     |     |
| 12 | 0   | 817 |      |      |     |     |     |     |     |     |     |     |
| 13 | 114 | 122 | 243  | 249  | 906 | 939 |     |     |     |     |     |     |
| 14 | 20  | 915 |      |      |     |     |     |     |     |     |     |     |
| 15 | 15  | 758 |      |      |     |     |     |     |     |     |     |     |
| 16 | 100 | 735 | 749  | 825  |     |     |     |     |     |     |     |     |
| 17 | 50  | 710 |      |      |     |     |     |     |     |     |     |     |
| 18 | 55  | 805 |      |      |     |     |     |     |     |     |     |     |
| 19 | 28  | 831 |      |      |     |     |     |     |     |     |     |     |
| 20 | 56  | 118 | 125  | 143  | 149 | 342 | 424 | 523 | 541 | 618 | 628 | 842 |
| 21 | 27  | 555 | 600  | 900  |     |     |     |     |     |     |     |     |
| 22 | 23  | 100 | 349  | 519  |     |     |     |     |     |     |     |     |
| 23 | 112 | 412 | 419  | 640  |     |     |     |     |     |     |     |     |
| 24 | 14  | 34  | 58   | 123  | 143 | 202 | 223 | 245 | 259 | 306 | 515 | 545 |
| 25 | 7   | 58  | 114  | 251  | 713 | 719 |     |     |     |     |     |     |
| 26 | 51  | 109 | 120  | 140  | 150 | 200 | 220 | 310 | 630 | 701 |     |     |
| 27 | 212 | 327 | 654  | 802  | 842 | 852 | 908 | 912 |     |     |     |     |
| 28 |     |     |      |      |     |     |     |     |     |     |     |     |
| 29 | 315 | 352 | 535  | 605  | 644 | 700 | 715 | 720 | 745 | 807 | 857 | 900 |
| 30 | 113 | 625 | 631  | 637  | 652 | 702 | 710 | 730 | 737 | 753 | 851 | 909 |
| 31 | 49  | 109 | 118  | 215  | 317 | 330 |     |     |     |     |     |     |

Combined reports from the observatories listed below:

BEIJ PURP YUNN

# OBSERVATION OF MAGNETIC AND VELOCITY FIELDS OF SOLAR ACTIVE REGIONS

FEBRUARY 1990

HUAIROU ST. BEIJING OBS.

| Day | L0    | Huairou<br>Region | Lat | L     | Data                       |
|-----|-------|-------------------|-----|-------|----------------------------|
| 1   | 281.8 | 27                | 25  | (325) | S5                         |
| 2   | 268.7 | 23                | - 9 | 346   | S5, L5, D4, V4             |
|     |       | 28                | 21  | (266) | S5, L5                     |
|     |       | 31                | 10  | (251) | S5, L5, D4, V4, T5, Q5, U5 |
|     |       | 26                | 16  | 305   | S5, L5, D4, V4, T5, Q5, U5 |
|     |       | 27                |     |       | S5, L5                     |
| 3   | 255.5 | 23                |     |       | S5, L5, D4, V4             |
|     |       | 28                |     |       | T5, Q5, U5, S5, L5, D4, V4 |
|     |       | 31                |     |       | S5, L5, T5, Q5, U5, D4, V4 |
|     |       | 26                |     |       | S5, L5, D4, V4             |
|     |       | 27                |     |       | S5, L5, D4, V4             |
| 4   | 242.3 | 23                |     |       | S5, L5, D4, V4             |
|     |       | 28                |     |       | S5, L5, D4, V4             |
|     |       | 31                |     |       | S5, L5, T5, Q5, U5, D4, V4 |
|     |       | 26                |     |       | S5, L5, D4, V4             |
| 5   | 229.2 | 28                |     |       | S5, L5, D4, V4             |
|     |       | 31                |     |       | S5, L5, D4, V4             |
| 6   | 216.0 | 28                |     |       | D4, V4, S5, L5             |
|     |       | 31                |     |       | D4, V4, S5, L5             |
|     |       | 32                | -21 | 229   | S5, L5, D4, V4             |
| 11  | 150.2 | 33                | 8   | (140) | S5, L5                     |
|     |       | 34                | 31  | (111) | S5, L                      |
|     |       | 35                | 3   | 116   | S5, L5                     |
|     |       | 36                | 19  | 107   | S5, L5                     |
|     |       | 37                | - 9 | 98    | S5, L5                     |
| 12  | 137.0 | 33                |     |       | S5, L5, D4, V4             |
|     |       | 34                |     |       | S5, L5, D4, V4             |
|     |       | 36                |     |       | S5, L5, D4, V4             |
| 19  | 44.8  | 36                |     |       | S5, L5                     |
|     |       | 38                | 15  | 30    | S5, L5                     |
|     |       | 39                | -12 | 345   | S5, L5, D4                 |
|     |       | 41                | -39 | 328   | S5, L5, D4, V4             |
| 23  | 352.1 | 39                |     |       | S5, L5                     |

# OBSERVATION OF MAGNETIC AND VELOCITY FIELDS OF SOLAR ACTIVE REGIONS

FEBRUARY 1990

HUAIROU ST. BEIJING OBS.

| Day | LO    | Huairou<br>Region | Lat | L     | Data                               |
|-----|-------|-------------------|-----|-------|------------------------------------|
|     |       | 40                | -19 | (314) | S5, L5                             |
|     |       | 46                | 16  | 311   | S5, L5, D4, V4, T5, Q5, U5         |
|     |       | 47                | -17 | 315   | S5, L5, D4, V4, T5, Q5, U5         |
| 24  | 339.0 | 46                |     |       | S5, L5, D4, V4, T4, Q4, T5, Q5, U5 |
|     |       | 47                |     |       | S5, L5, D4, V4, T5, Q5, U5         |
| 25  | 325.8 | 46                |     |       | S5, L5, D4, V4, T5, U5, Q5         |
|     |       | 47                |     |       | S5, L5, D4, V4, T5, Q5, U5         |
|     |       | 39                |     |       | S5, L5, D4, V4                     |
| 26  | 312.6 | 46                |     |       | S5, L5, T5, U5, Q5, D4, V4         |
|     |       | 47                |     |       | S5, L5, T5, Q5, U5, D4, V4, V5     |
|     |       | 48                | - 9 | 293   | S5, L5                             |
|     |       | 43                | -10 | 342   | S5, L5                             |
|     |       | 49                | -18 | (267) | S5, L5                             |
|     |       | 50                | -24 | 302   | S5, L5, D4, V4                     |
|     |       | 52                | 11  | (259) | S5, L5                             |
| 28  | 286.3 | 47                |     |       | S5, L5                             |
|     |       | 43                |     |       | S5, L5                             |
|     |       | 54                | 26  | (235) | S5, L5, D4, V4                     |

NPL      SPL

2   3   4   5   12   23   24   25   26

# OBSERVATION OF MAGNETIC AND VELOCITY FIELDS OF SOLAR ACTIVE REGIONS

MARCH 1990

HUIROU ST. BEIJING OBS.

| Day | L0    | Huairou<br>Region          | Lat                           | L                                   | Data                                                                                                                         |
|-----|-------|----------------------------|-------------------------------|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| 1   | 273.1 | 46<br>47<br>49<br>53<br>54 | 16<br>-17<br>-18<br>-22<br>26 | 311<br>315<br>(267)<br>246<br>(235) | S5, L5<br>S5, L5<br>S5, L5<br>S5, L5<br>S5, L5                                                                               |
| 2   | 259.9 | 46<br>54                   |                               |                                     | S5, L5<br>S5, L5                                                                                                             |
| 3   | 246.8 | 47<br>54<br>56             |                               |                                     | D4, V4, S5, L5<br>S5, L5, D4, V4, T5, Q5, U5, V5<br>S5, L5, D4, V4                                                           |
| 4   | 233.6 | 54<br>56                   | -10                           | (178)                               | S5, L5, T5, Q5, U5, D4, V4, V5, L4<br>S5, L5, T5, U5, Q5, D4, V4, L4, S4, V5, T4                                             |
| 5   | 220.4 | 54<br>56                   |                               |                                     | S5, L5, D4, V4, T5, Q5, U5, D5, V5, S4, L4<br>S5, L5, D4, V4, T5, Q5, U5, D5, V5, S4, L4                                     |
| 6   | 207.2 | 54<br>55<br>56             | 26                            | (185)                               | S5, L5, D4, V4, V5, T5, Q5, U5, L4<br>S5, L5, D4, V4, V5, T5, Q5, U5<br>S5, L5, D4, V4, T5, Q5, U5, V5, L4, V4               |
| 7   | 194.1 | 54<br>55<br>56<br>58       | -12                           | 218                                 | S5, L5, D4, V4<br>S5, L5, D4, V4, T5, Q5, U5, V5<br>S5, L5, D4, V4, T5, U5, Q5, V5<br>S5, L5, D4, V4, T5, Q5, U5, V5, S4, L4 |
| 8   | 108.9 | 54<br>55<br>56<br>58       |                               |                                     | S5, L5<br>S5, L5<br>S5, L5, T5, Q5, U5, D4, V4<br>S5, L5, T5, U5, Q5                                                         |
| 9   | 167.7 | 54<br>55<br>56<br>58       |                               |                                     | S5, L5, D4, V4<br>S5, L5, T5, Q5, U5, D4, V4<br>S5, L5, T5, U5, Q5, D4, V4, L4<br>S5, L5, D4, V4                             |
| 10  | 154.5 | 55<br>56<br>58             |                               |                                     | S5, L5<br>S5, L5, D4, V4<br>S5, L5                                                                                           |

# OBSERVATION OF MAGNETIC AND VELOCITY FIELDS OF SOLAR ACTIVE REGIONS

MARCH 1990

HUAIROU ST. BEIJING OBS.

| Day | LO    | Huairou<br>Region | Lat  | L    | Data                                   |
|-----|-------|-------------------|------|------|----------------------------------------|
|     |       | 59                | 21   | 104  | S5, L5                                 |
| 11  | 141.4 | 55                |      |      | S5, L5, D4, V4                         |
|     |       | 56                |      |      | S5, L5, D4, V4                         |
|     |       | 59                |      |      | S5, L5, D4, V4                         |
|     |       | 60                | 33   | 73   | S5, L5                                 |
| 12  | 128.2 | 56                |      |      | S5, L5, D4, V4, T5, Q5, U5             |
|     |       | 59                |      |      | S5, L5, D4, V4                         |
| 14  | 101.8 | 59                |      |      | S5, L5                                 |
|     |       | 60                |      |      | S5, L5, D4, V4                         |
|     |       | 62                | 14   | 143  | S5, L5                                 |
|     |       | 63                | -32  | (17) | S5, L5                                 |
|     |       | 64                | -16  | 19   | S5, L5                                 |
|     |       | 65                | 8    | 30   | S5, L5                                 |
| 15  | 88.6  | 59                |      |      | S5, L5, D4, V4                         |
|     |       | 60                |      |      | S5, L5, T5, Q5, U5, D4, V4, L4         |
|     |       | 63                |      |      | S5, L5, D4, V4                         |
|     |       | 66                | (43) | 31   | S5, L5, D4, V4                         |
| 16  | 75.5  | 59                |      |      | S5, L5, D4, V4                         |
|     |       | 60                |      |      | S5, L5, T5, Q5, U5, V5, D4, V4, L4     |
|     |       | 63                |      |      | S5, L5, T5, Q5, U5, D4, V4, L4, V5     |
|     |       | 66                |      |      | S5, L5, T5, U5, Q5, V5, D4, V4         |
| 17  | 62.3  | 59                |      |      | S5, L5, D4, V4                         |
|     |       | 60                |      |      | S5, L5, T5, Q5, D4, V4                 |
|     |       | 63                |      |      | S5, L5, T5, Q5, U5, D4, V4             |
|     |       | 66                |      |      | S5, L5                                 |
| 18  | 49.1  | 59                |      |      | S5, L5, D4, V4                         |
|     |       | 60                |      |      | S5, L5, T5, Q5, U5, D4, V4, L4         |
|     |       | 63                |      |      | S5, L5, D4, V4, T5, Q5, U5, V5, L4, S4 |
|     |       | 64                |      |      | S5, L5                                 |
|     |       | 65                |      |      | S5, L5                                 |
|     |       | 66                |      |      | S5, L5                                 |
|     |       | 67                | 14   | (3)  | S5, L5                                 |
|     |       | 68                | -9   | 337  | S5, L5                                 |
|     |       | 69                | -29  | 328  | S5, L5                                 |

# OBSERVATION OF MAGNETIC AND VELOCITY FIELDS OF SOLAR ACTIVE REGIONS

MARCH 1990

HUAIROU ST. BEIJING OBS.

| Day | L0    | Huairou<br>Region | Lat   | L     | Data                                   |
|-----|-------|-------------------|-------|-------|----------------------------------------|
| 19  | 35.9  | 63                |       |       | S5, L5, T5, Q5, U5, D4, V4             |
|     |       | 64                |       |       | S5, L5                                 |
|     |       | 69                |       |       | S5, L5                                 |
| 20  | 22.7  | 63                |       |       | S5, L5                                 |
| 24  | 330.0 | 63                |       |       | S5, L5                                 |
|     |       | 69                |       |       | S5, L5, D4                             |
|     |       | 71                | -9    | 312   | S5, L5, D4, V4, T5, Q5, U5, L4, S4     |
| 25  | 316.8 | 69                |       |       | S5, L5, U5, Q5, D4, V4, T5, L4, S4     |
|     |       | 71                |       |       | S5, L5, T5, Q5, U5, D4, V4, L4, S4, V5 |
|     |       | 72                | (-18) | 309   | S5, L5                                 |
|     |       | 73                | (-31) | 325   | S5, L5                                 |
|     |       | 74                | - 9   | 299   | S5, L5                                 |
|     |       | 75                | (11)  | 260   | S5, L5                                 |
|     |       | 76                | 26    | (247) | S5, L5                                 |
| 26  | 303.6 | 69                |       |       | S5, L5                                 |
|     |       | 71                |       |       | S5, L5                                 |
| 29  | 264.1 | 69                |       |       | S5, L5, D4, V4, T5, Q5, U5             |
|     |       | 71                |       |       | S5, L5, T5, U5, Q5, D4, V4             |
|     |       | 76                |       |       | S5, L5                                 |
| 30  | 250.9 | 69                |       |       | S5, L5, D4, V4                         |
|     |       | 71                |       |       | S5, L5, D4, V4                         |
| 31  | 237.7 | 69                |       |       | S5, L5                                 |
|     |       | 71                |       |       | S5, L5                                 |
|     |       | 73                |       |       | S5, L5                                 |
|     |       | 75                |       |       | S5, L5                                 |
|     |       | 76                |       |       | S5, L5                                 |
|     |       | 77                | -14   | (228) | S5, L5                                 |
|     |       | 79                | 20    | (265) | S5, L5                                 |
|     |       | 80                | 16    | (165) | S5, L5, D4, V4                         |

NPL      SPL

3   4   5   6   7   9   11   12   15   16   17   29   30   31

# SOLAR RADIO EMISSION FLUX

FEBRUARY 1990

| Day  | BEIJ<br>2840 | PURP<br>2700 | URUM<br>9375 | YUNN<br>2840 |
|------|--------------|--------------|--------------|--------------|
| 1    | 220          |              | 347          | 192          |
| 2    | 192          |              | 327          | 175          |
| 3    | 174          |              | 349          | 166          |
| 4    | 165          |              | 321          | 157          |
| 5    | 157          |              | 309          | 145          |
| 6    | 149          |              | 312          | 144          |
| 7    | 150          |              | 309          | 137          |
| 8    | 145          |              | 299          | 134          |
| 9    | 139          |              | 303          | 136          |
| 10   | 142          |              | 302          | 132          |
| 11   | 140          |              | 299          | 133          |
| 12   | 141          |              | 300          | 134          |
| 13   | 147          |              | 302          | 137          |
| 14   | 151          |              | 308          | 136          |
| 15   | 150          |              | 304          | 143          |
| 16   | 148          |              | 299          | 143          |
| 17   | 150          |              | 300          | 142          |
| 18   | 154          |              | 323          | 148          |
| 19   | 166          |              | 326          | 163          |
| 20   | 178          |              | 341          | 168          |
| 21   | 189          |              | 349          | 182          |
| 22   | 214          |              | 340          | 195          |
| 23   | 237          |              | 343          | 194          |
| 24   | 254          |              | 353          | 208          |
| 25   | 241          |              | 348          | 202          |
| 26   | 224          |              | 335          | 200          |
| 27   | 226          |              | 340          | 196          |
| 28   | 233          |              | 352          | 219          |
| Mean | 177.7        |              | 322.9        | 162.9        |

# SOLAR RADIO EMISSION FLUX

MARCH 1990

| Day  | BEIJ<br>2840 | PURP<br>2700 | URUM<br>9375 | YUNN<br>2840 |
|------|--------------|--------------|--------------|--------------|
| 1    | 222          |              | 350          | 205          |
| 2    | 214          |              | 337          | 185          |
| 3    | 191          |              | 324          | 169          |
| 4    | 189          |              | 318          | 168          |
| 5    | 175          |              | 318          | 156          |
| 6    | 171          |              | 319          | 153          |
| 7    | 176          |              | 320          | 157          |
| 8    | 176          |              | 317          | 158          |
| 9    | 162          |              | 310          | 148          |
| 10   | 150          |              | 313          | 143          |
| 11   | 151          |              | 312          | 143          |
| 12   | 149          |              | 307          | 138          |
| 13   | 145          |              | 305          | 140          |
| 14   | 143          |              | 318          | 143          |
| 15   | 160          |              | 315          | 143          |
| 16   | 179          |              | 317          | 163          |
| 17   | 184          |              | 314          | 167          |
| 18   | 195          |              | 326          | 176          |
| 19   | 202          |              | 341          | 202          |
| 20   | 203          |              | 346          | 200          |
| 21   | 221          |              | 352          | 202          |
| 22   | 230          |              | 343          | 213          |
| 23   | 245          |              | 360          | 211          |
| 24   | 229          |              | 358          | 215          |
| 25   | 228          |              | 342          | 194          |
| 26   | 252          |              | 357          | 215          |
| 27   | 225          |              | 342          | 207          |
| 28   | 213          |              | 348          | 198          |
| 29   | 193          |              | 340          | 179          |
| 30   |              |              | 326          | 172          |
| 31   | 178          |              | 330          | 171          |
| Mean | 191.7        |              | 329.8        | 175.3        |

## SOLAR RADIO EMISSION OUTSTANDING OCCURRENCES

FEBURARY 1990

| Day | Freq | Sta  | Type   | Start<br>(UT) | Time of<br>Maximum<br>(UT) | Duration<br>(Min) | Flux<br>Peak | Density<br>Rel Mean |
|-----|------|------|--------|---------------|----------------------------|-------------------|--------------|---------------------|
| 01  | 2840 | BEIJ | 40 F   | 0152.0        | 0203.4                     | 27.0              | 53.4         | 24.3                |
| 01  | 9375 | URUM | 3 S    | 0351.5        | 0354.7                     | 21.0              | 54.8         | 15.8                |
| 02  | 9375 | URUM | 2 S/F  | 0354.0        | 0354.5                     | 3.0               | 7.2          | 2.2                 |
| 03  | 9375 | URUM | 46 C   | 0456.0        | 0458.7                     | 3.0               | 40.9         | 11.7                |
| 03  | 2840 | BEIJ | 47 GB  | 0107.0        | 0108.0                     | 5.0               | 675.0        | 388.0               |
| 03  | 2840 | YUNN | 47 GB  | 0107.8        | 0108.8                     | 8.3               | 576.6        |                     |
| 03  | 2840 | BEIJ | 29 PBI | 0112.0        |                            | 33.0              | 3.2          | 1.9                 |
| 04  | 2840 | BEIJ | 20 GRF | 0648.0        | 0706.2                     | 38.0              | 5.3          | 3.2                 |
| 04  | 2840 | BEIJ | 1 S    | 0154.0        | 0156.5                     | 3.0               | 5.3          | 3.2                 |
| 11  | 2840 | BEIJ | 1 S    | 0545.0        | 0548.1                     | 7.0               | 13.3         | 9.5                 |
| 11  | 2840 | YUNN | 1 S    | 0548.3        | 0548.9                     | 1.1               | 10           |                     |
| 13  | 2840 | YUNN | 46 C   | 0136.6        | 0140                       | 4.4               | 97.5         |                     |
| 13  | 2840 | YUNN | 47 GB  | 0044.4        | 0045.3                     | 4.1               | 524          |                     |
| 13  | 2840 | YUNN | 3 S    | 0053.8        | 0055.2                     | 2.2               | 28.7         |                     |
| 13  | 2840 | YUNN | 8 S    | 0134.6        | 0134.8                     | 0.6               | 33.7         |                     |
| 13  | 2840 | YUNN | 4 S/F  | 0058.8        | 0059.4                     | 1.2               | 485          |                     |
| 14  | 2840 | BEIJ | 45 C   | 0642.0        | 0651.3                     | 16.0              | 470.6        | 311.6               |
| 14  | 9375 | URUM | 46 C   | 0646.0        | 0652.4                     | 19.0              | 72.5         | 23.5                |
| 16  | 9375 | URUM | 3 S    | 0833.0        | 0834.0                     | 20.0              | 12.2         | 4.1                 |
| 16  | 2840 | YUNN | 1 S    | 0832.8        | 0833.4                     | 1.2               | 7.2          |                     |
| 19  | 9375 | URUM | 1 S    | 0834.8        | 0835.0                     | 4.7               | 8.3          | 2.5                 |
| 20  | 9375 | URUM | 23 GRF | 0403.0        | 0405.2                     | 17.0              | 21.9         | 6.4                 |
| 20  | 2840 | YUNN | 4 S/F  | 0737.2        | 0738.5                     | 5                 | 18.3         |                     |
| 20  | 9375 | URUM | 4 S/F  | 0738.0        | 0739.5                     | 3.0               | 17.1         | 5.0                 |
| 24  | 2840 | BEIJ | 20 GRF | 0220.0        | 0358.0                     | 150.0D            | 34.0         | 13.4                |
| 24  | 9375 | URUM | 3 S    | 0850.0        | 0850.5                     | 2.5               | 15.1         | 4.3                 |
| 24  | 9375 | URUM | 4 S/F  | 0431.5        | 0432.3                     | 6.0               | 22.7         | 6.4                 |
| 26  | 2840 | YUNN | 3 S    | 0848.2        | 0849.6                     | 3.4               | 26.4         |                     |
| 26  | 2840 | YUNN | 4 S/F  | 0426          | 0431.5                     | 8                 | 19.4         |                     |
| 26  | 9375 | URUM | 4 S/F  | 0824.0        | 0826.0                     | 26.0              | 22.1         | 6.6                 |
| 26  | 9375 | URUM | 4 S/F  | 0505.0        | 0506.2                     | 3.5               | 90.5         | 27.0                |
| 26  | 2840 | YUNN | 4 S/F  | 0624.3        | 0625.3                     | 3.7               | 35.2         |                     |
| 27  | 9375 | URUM | 45 C   | 0838.0        | 0839.5                     | 23.0              | 35.2         | 10.3                |
| 27  | 9375 | URUM | 4 S/F  | 0706.0        | 0706.5                     | 6.0               | 117.8        | 34.6                |
| 28  | 9375 | URUM | 46 C   | 0456.0        | 0501.3                     | 122.0             | 104.9        | 30.0                |
| 28  | 2840 | YUNN | 21 GRF | 0457.8        | 0500.5                     | 39                | 65.1         |                     |

# SOLAR RADIO EMISSION OUTSTANDING OCCURRENCES

MARCH 1990

| Day | Freq | Sta  | Type   | Start<br>(UT) | Time of<br>Maximum<br>(UT) | Duration<br>(Min) | Flux<br>Peak | Density<br>Rel | Mean |
|-----|------|------|--------|---------------|----------------------------|-------------------|--------------|----------------|------|
| 01  | 2840 | YUNN | 21 GRF | 0338.4        | 0339.4                     | 10.6              | 221.6        |                |      |
| 01  | 9375 | URUM | 23 GRF | 0339.0        | 0345.0                     | 69.0              | 94.9         | 27.1           |      |
| 01  | 2840 | YUNN | 21 GRF | 0400          | 0410.8                     | 18.7              | 35.5         |                |      |
| 01  | 9375 | URUM | 21 GRF | 0528.0        | 0534.0                     | 29.0              | 11.4         | 3.3            |      |
| 01  | 9375 | URUM | 3 S    | 0830.0        | 0831.0                     | 9.0               | 35.2         | 10.1           |      |
| 02  | 9375 | URUM | 3 S    | 0825.0        | 0827.0                     | 75.0              | 170.0        | 50.8           |      |
| 06  | 2840 | YUNN | 20 GRF | 0633          | 0642.5                     | 36                | 22.9         |                |      |
| 08  | 2840 | YUNN | 30 PBI | 0254          | 0300                       | 26                | 133          |                |      |
| 08  | 2840 | BEIJ | 3 S    | 0254.0        | 0300.7                     | 15.0              | 167.8        | 95.4           |      |
| 08  | 9375 | URUM | 4 S/F  | 0300.0        | 0302.0                     | 19.0              | 68.9         | 21.7           |      |
| 08  | 2840 | YUNN | 29 PBI | 0530          | 0531.2                     | 17                | 19.5         |                |      |
| 08  | 2840 | BEIJ | 5 S    | 0530.0        | 0531.0                     | 14.0              | 26.5         | 15.0           |      |
| 08  | 2840 | BEIJ | 1 S    | 0732.0        | 0734.6                     | 8.0               | 13.0         | 7.4            |      |
| 08  | 9375 | URUM | 4 S/F  | 0735.0        | 0737.5                     | 19.0              | 30.2         | 9.5            |      |
| 10  | 2840 | YUNN | 20 GRF | 0645          | 0656.5                     | 40                | 19.9         |                |      |
| 10  | 2840 | BEIJ | 1 S    | 0652.0        | 0656.6                     | 9.0               | 8.5          | 5.7            |      |
| 12  | 9375 | URUM | 3 S    | 0430.0        | 0431.6                     | 3.0               | 19.7         | 6.4            |      |
| 12  | 9375 | URUM | 1 S    | 0836.5        | 0837.5                     | 6.5               | 10.3         | 3.3            |      |
| 12  | 9375 | URUM | 4 S/F  | 0925.5        | 0927.0                     | 20.0              | 25.7         | 8.4            |      |
| 13  | 2840 | BEIJ | 1 S    | 0712.0        | 0714.0                     | 3.0               | 7.7          | 5.3            |      |
| 13  | 2840 | YUNN | 4 S/F  | 0714.1        | 0715.6                     | 2.8               | 20           |                |      |
| 15  | 2840 | BEIJ | 1 S    | 0554.0        | 0556.4                     | 6.0               | 10.4         | 6.5            |      |
| 15  | 2840 | YUNN | 3 S    | 0556.7        | 0558                       | 6.1               | 7            |                |      |
| 19  | 2840 | BEIJ | 5 S    | 0331.0        | 0334.5                     | 5.0               | 115.9        | 57.4           |      |
| 19  | 2840 | YUNN | 3 S    | 0332.5        | 0334.6                     | 7                 | 99           |                |      |
| 19  | 9375 | URUM | 28 PRE | 0335.0        | 0336.5                     | 63.0              |              |                |      |
| 19  | 2840 | BEIJ | 30 PBI | 0336.0        |                            | 57.0              | 26.5         | 13.1           |      |
| 19  | 2840 | YUNN | 29 PBI | 0339.5        | 0356.5                     | 42                | 25           |                |      |
| 19  | 2840 | BEIJ | 45 C   | 0351.0        | 0355.7                     | 12.0              | 35.3         | 17.5           |      |
| 19  | 2840 | BEIJ | 47 GB  | 0433.0        | 0453.7                     | 41.0              | 1451.9       | 718.8          |      |
| 19  | 2840 | YUNN | 45 C   | 0435.7        | 0453.8                     | 100               | 1321         |                |      |
| 19  | 9375 | URUM | 47 GB  | 0438.0        | 0447.0                     | 182.0             | 1200.00      | 350.00         |      |
| 19  | 2840 | BEIJ | 45 C   | 0515.0        | 0532.7                     | 46.0              | 429.5        | 212.6          |      |
| 19  | 9375 | URUM | 30 PBI | 0530.0        | 0540.0                     | 130.0             |              |                |      |
| 22  | 9375 | URUM | 4 S/F  | 0324.0        | 0325.0                     | 2.0               | 26.0         | 7.6            |      |
| 22  | 2840 | YUNN | 3 S    | 0415.1        | 0415.8                     | 2                 | 48           |                |      |
| 22  | 9375 | URUM | 4 S/F  | 0416.0        | 0417.0                     | 3.0               | 63.0         | 18.4           |      |
| 24  | 2840 | BEIJ | 45 C   | 0253.0E       | 0254.6                     |                   | 109.3        | 47.7           |      |
| 24  | 2840 | BEIJ | 45 C   |               | 0256.2                     | 12.00             | 138.1        | 60.3           |      |
| 24  | 2840 | YUNN | 45 C   | 0254          | 0255                       | 7                 | 97           |                |      |
| 24  | 9375 | URUM | 46 C   | 0353.5        | 0357.0                     | 11.5              | 42.0         | 11.7           |      |
| 24  | 9375 | URUM | 3 S    | 0424.7        | 0425.0                     | 1.3               | 25.0         | 7.0            |      |

# SOLAR RADIO EMISSION OUTSTANDING OCCURRENCES

MARCH 1990

| Day | Freq | Sta  | Type   | Start<br>(UT) | Time of<br>Maximum<br>(UT) | Duration<br>(Min) | Flux<br>Peak | Density<br>Rel<br>Mean |
|-----|------|------|--------|---------------|----------------------------|-------------------|--------------|------------------------|
| 24  | 2840 | YUNN | 46 C   | 0456.6        | 0503.3                     | 15                | 112          |                        |
| 24  | 9375 | URUM | 4 S/F  | 0639.0        | 0640.0                     | 10.0              | 24.0         | 6.7                    |
| 24  | 9375 | URUM | 4 S/F  | 1014.0        | 1015.0                     | 15.0              | 47.0         | 13.0                   |
| 25  | 2840 | BEIJ | 5 S    | 0642.0        | 0643.4                     | 2.0               | 17.7         | 7.7                    |
| 25  | 9375 | URUM | 1 S    | 0932.5        | 0933.0                     | 1.0               | 10.0         | 2.9                    |
| 26  | 9375 | URUM | 47 GB  | 0336.0        | 0339.0                     | 18.0              | 776.9        | 217.5                  |
| 26  | 2840 | YUNN | 4 S/F  | 0336.3        | 0338.8                     | 14                | 365          |                        |
| 26  | 2840 | BEIJ | 5 S    | 0337.0E       | 0338.5                     | 7.0D              | 54.9         | 21.8                   |
| 26  | 9375 | URUM | 21 GRF | 0441.0        | 0558.0                     | 109.0             | 58.0         | 17.0                   |
| 26  | 2840 | BEIJ | 3 S    | 0504.0        | 0506.8                     | 10.0              | 46.4         | 18.4                   |
| 26  | 2840 | BEIJ | 5 S    | 0605.0        | 0612.6                     | 17.0              | 9.6          | 3.8                    |
| 27  | 2840 | YUNN | 41 F   | 0356.5        | 0356.8                     | 2.5               | 25           |                        |
| 27  | 2840 | YUNN | 3 S    | 0414          | 0415                       | 2                 | 20           |                        |
| 28  | 2840 | BEIJ | 28 PRE | 0710.0        | 0715.3                     | 20.0              | 10.4         | 4.9                    |
| 28  | 2840 | YUNN | 46 C   | 0728.3        | 0740.5                     | 31.7              | 285          |                        |
| 28  | 2840 | BEIJ | 45 C   | 0730.0        | 0739.3                     | 24.0              | 313.6        | 147.2                  |
| 28  | 9375 | URUM | 46 C   | 0730.0        | 0743.5                     | 210 D             | 438.0        | 125.9                  |
| 28  | 2840 | BEIJ | 30 PBI | 0754.0        |                            | 65.0              | 29.6         | 13.9                   |
| 28  | 2840 | BEIJ | 1 S    | 0845.0        | 0845.5                     | 3.0               | 8.8          | 4.2                    |
| 28  | 9375 | URUM | 3 S    | 0846.0        | 0846.5                     | 4.0               | 17.5         | 5.0                    |
| 28  | 9375 | URUM | 1 S    | 0940.5        | 0941.5                     | 3.0               | 9.0          | 2.6                    |
| 29  | 2840 | YUNN | 3 S    | 0821.7        | 0822.5                     | 1.5               | 26           |                        |
| 30  | 2840 | YUNN | 3 S    | 0158.2        | 0158.9                     | 15                | 91           |                        |

# INTERVALS OF SOLAR RADIO EMISSION PATROL OBSERVATION

FEBRUARY 1990

| Day | BEIJ    | PURP    | URUM    | YUMN    |
|-----|---------|---------|---------|---------|
|     | From To | From To | From To | From To |
|     | 2840    | 2700    | 9375    | 2840    |

|    |           |           |           |           |
|----|-----------|-----------|-----------|-----------|
| 1  | 0055 0754 | 0158 1003 | 0030 0930 | 0030 0930 |
| 2  | 0053 0750 | 0200 0942 | 0030 0930 | 0030 0820 |
| 3  | 0047 0718 | 0201 0957 | 0130 0500 | 0030 0820 |
| 4  | 0055 0750 | 0201 0945 | 0030 0900 |           |
| 5  | 0137 0741 | 0200 1004 |           |           |
| 6  | 0054 0745 | 0200 0940 | 0050 0905 |           |
| 7  | 0045 0739 | 0211 1000 |           |           |
| 8  | 0047 0745 | 0202 1010 |           |           |
| 9  | 0046 0738 | 0201 1017 | 0040 0915 |           |
| 10 | 0047 0715 | 0201 1010 | 0040 0810 |           |
| 11 | 0035 0700 | 0220 1024 | 0200 0900 |           |
| 12 | 0105 0750 | 0204 1019 | 0030 0915 |           |
| 13 | 0327 0750 | 0201 1017 | 0040 0915 |           |
| 14 | 0050 0750 | 0205 1040 |           |           |
| 15 | 0104 0750 | 0213 0933 | 0200 0900 |           |
| 16 | 0014 0750 | 0205 1028 | 0030 0915 |           |
| 17 | 0045 0720 | 0205 0703 | 0025 0810 |           |
| 18 | 0029 0605 | 0207 1027 | 0040 0640 |           |
| 19 | 0055 0750 | 0208 1011 | 0030 0920 |           |
| 20 | 0050 0520 | 0204 1020 | 0030 0930 |           |
| 21 | 0050 0750 | 0200 1030 | 0020 0930 |           |
| 22 | 0220 0750 | 0211 1027 | 0030 0920 |           |
| 23 | 0043 0750 | 0200 1010 | 0030 0920 |           |
| 24 | 0042 0720 | 0200 1030 | 0030 0810 |           |
| 25 | 0045 0823 | 0209 0709 | 0230 0900 |           |
| 26 | 0016 0735 | 0153 1030 | 0020 0910 |           |
| 27 |           | 0215 1015 |           |           |
| 28 |           | 0203 1025 | 0100 0905 |           |

# INTERVALS OF SOLAR RADIO EMISSION PATROL OBSERVATION

MARCH 1990

| Day | BEIJ    | PURP    | URUM    | YUNN    |
|-----|---------|---------|---------|---------|
|     | From To | From To | From To | From To |
|     | 2840    | 2700    | 9375    | 2840    |

|    |           |           |
|----|-----------|-----------|
| 1  | 0202 1030 | 0030 0900 |
| 2  | 0204 1045 | 0030 0900 |
| 3  | 0200 1045 | 0030 0900 |
| 4  | 0156 1026 | 0130 0800 |
| 5  | 0204 1045 | 0020 0930 |
| 6  | 0200 1050 | 0020 0930 |
| 7  | 0200 1029 | 0020 0930 |
| 8  | 0240 1041 | 0020 0930 |
| 9  | 0240 1045 | 0020 0930 |
| 10 | 0204 1045 | 0020 0810 |
| 11 | 0249 1035 | 0030 0915 |
| 12 | 0233 1050 | 0010 0920 |
| 13 | 0240 1040 | 0015 0930 |
| 14 | 0204 1045 | 0020 0901 |
| 15 | 0202 1051 | 0020 0915 |
| 16 | 0220 1100 | 0010 0915 |
| 17 | 0202 1038 | 0030 0800 |
| 18 | 0210 1040 | 0200 0800 |
| 19 | 0224 1054 | 0100 0920 |
| 20 | 0204 1051 | 0030 0923 |
| 21 | 0230 1100 | 0016 0917 |
| 22 | 0205 1054 | 0011 0922 |
| 23 | 0202 1052 | 0006 0910 |
| 24 | 0209 1053 | 0055 0801 |
| 25 | 0205 1040 | 0155 0800 |
| 26 | 0206 1101 | 0020 0910 |
| 27 | 0203 1058 | 0025 0905 |
| 28 | 0159 1100 | 0035 0900 |
| 29 | 0202 1057 | 0020 0912 |
| 30 | 0158 1134 | 0020 0900 |
| 31 | 0204 1050 | 0030 0954 |

# SUDDEN IONOSPHERIC DISTURBANCES (D REGION)

FEBRUARY 1990

| Day | Sta  | Start<br>(UT) | Max<br>(UT) | End<br>(UT) | Imp | SPA   |     | SFA<br>LF   |
|-----|------|---------------|-------------|-------------|-----|-------|-----|-------------|
|     |      |               |             |             |     | LF    | VLF |             |
| 01  | LINT | 0158          | 0211        | 0316        | 2-  | - 3.1 | 0   | + 2.8       |
| 01  | LINT | 0354          | 0400        | 0448        | 1   | - 1.2 | 0   | - 0.6       |
| 01  | LINT | 0704          | 0707        | 0718        | 1-  | - 0.6 | 0   | 0           |
| 02  | LINT | 0354          | 0359        | 0444        | 1   | - 1.1 | 0   | - 2.4       |
| 03  | LINT | 0645          | 0655        | 0722        | 1+  | - 2.1 | 0   | 0           |
| 03  | YUNN | 0652          | 0656        | 0736        | 1+  | - 2.3 |     |             |
| 04  | LINT | 0106          | 0114        | 0130U       | 1-  | - 0.9 | 0   | 0           |
| 04  | YUNN | 0125          | 0132        | 0152        | 1+  | - 2.5 |     |             |
| 04  | LINT | 0132          | 0140        | 0146U       | 1-  | - 0.7 | 0   | 0           |
| 04  | LINT | 0214          | 0221        | 0248        | 1-  | - 0.8 | 0   | - 2.8       |
| 04  | YUNN | 0256          | 0257        | 0317        | 1   | - 1.1 |     |             |
| 06  | YUNN | 0153          | 0159        | 0219        | 2-  | - 3.1 |     |             |
| 06  | LINT | 0222          | 0230        | 0240U       | 1-  | - 0.4 | 0   | 0           |
| 06  | YUNN | 0326          | 0327        | 0354        | 1-  | - 1.0 |     |             |
| 06  | LINT | 0329          | 0337        | 0358        | 1-  | - 0.5 | 0   | - 0.7       |
| 06  | LINT | 0438          | 0445        | 0510        | 1-  | - 0.4 | 0   | - 1.3       |
| 06  | YUNN | 0557          | 0600        | 0610        | 1   | - 1.4 |     |             |
| 06  | LINT | 0643          | 0650        | 0656        | 1-  | - 0.7 | 0   | - 2.2       |
| 06  | YUNN | 0652          | 0659        | 0722        | 2-  | - 3.6 |     |             |
| 06  | LINT | 0656          | 0704        | 0740U       | 2-  | - 3.4 | 0   | + 2.8       |
| 06  | YUNN | 0722          | 0725        | 0745        | 1   | - 1.2 |     |             |
| 09  | LINT | 0019          | 0024        | 0122        | 3   | - 8.0 | 0   | -12.5,+11.4 |
| 09  | YUNN | 0301          | 0302        | 0312        | 1   | - 1.6 |     |             |
| 09  | YUNN | 0500          | 0502        | 0517        | 1   | - 1.9 |     |             |
| 09  | YUNN | 0722          | 0724        | 0739        | 1   | - 1.5 |     |             |
| 11  | LINT | 0515          | 0517        | 0530        | 1-  | - 0.9 | 0   | 0           |
| 11  | YUNN | 0818          | 0820        | 0835        | 1   | - 1.8 |     |             |
| 12  | LINT | 0430          | 0433        | 0441U       | 1-  | - 0.5 | 0   | 0           |
| 13  | LINT | 0047          | 0052        | 0056D       | 1   | - 1.8 | 0   | - 1.6,+ 1.0 |
| 13  | LINT | 0056          | 0100        | 0114        | 1-  | - 0.4 | 0   | 0           |
| 13  | LINT | 0822U         | 0828        | 0858U       | 2-  | - 3.4 | 0   | + 4.4U      |
| 18  | LINT | 0427          | 0432        | 0452        | 1-  | - 0.8 | - 5 | - 1.0       |
| 19  | LINT | 0640          | 0645        | 0658        | 1-  | - 0.7 | - 1 | 0           |
| 20  | LINT | 0021          | 0024        | 0040U       | 1-  | - 0.6 | 0   | - 1.1       |
| 20  | YUNN | 0125          | 0128        | 0153        | 2-  | - 3.4 |     |             |
| 20  | YUNN | 0406          | 0408        | 0416        | 1-  | - 1.0 |     |             |
| 20  | LINT | 0405          | 0415        | 0518U       | 2-  | - 3.3 | -15 | - 8.7,+ 3.8 |
| 20  | LINT | 0740          | 0743        | 0810        | 1   | - 1.3 | - 5 | 0           |
| 20  | YUNN | 0740          | 0744        | 0759        | 2-  | - 3.1 |     |             |
| 22  | LINT | 0838          | 0844        | 0900U       | 2-  | - 3.4 | -12 | - 4.7,+ 1.2 |
| 23  | LINT | 0306          | 0318        | 0340U       | 1-  | - 0.5 | 0   | - 0.8       |
| 23  | LINT | 2341          | 2344        | 2348D       | 1-  | - 1.0 | 0   | 0           |

# SUDDEN IONOSPHERIC DISTURBANCES (D REGION)

FEBRUARY 1990

| Day | Sta  | Start<br>(UT) | Max<br>(UT) | End<br>(UT) | Imp | SPA   |     | SFA<br>LF    |
|-----|------|---------------|-------------|-------------|-----|-------|-----|--------------|
|     |      |               |             |             |     | LF    | VLF |              |
| 24  | LINT | 0250          | 0255        | 0306D       | 1-  | - 0.3 | 0   | - 0.7        |
| 24  | LINT | 0306          | 0310        | 0318D       | 1-  | - 0.6 | - 3 | - 1.2        |
| 24  | YUHN | 0318          | 0321        | 0424        | 2   | - 4.3 |     |              |
| 24  | LINT | 0318          | 0324        | 0430        | 2   | - 4.2 | -20 | - 7.9, + 3.0 |
| 24  | LINT | 0505          | 0518        | 0601        | 2-  | - 3.2 | -16 | - 3.9        |
| 24  | LINT | 0826          | 0828        | 0840        | 1-  | - 0.9 | - 4 | - 1.0        |
| 25  | LINT | 0140          | 0144        | 0152        | 1-  | - 0.3 | 0   | - 0.8        |
| 25  | LINT | 0158          | 0202        | 0210        | 1-  | - 0.5 | - 3 | - 1.4        |
| 25  | LINT | 0514          | 0518        | 0534        | 1-  | - 0.4 | - 2 | - 1.5        |
| 26  | LINT | 0430          | 0434        | 0515        | 1   | - 1.4 | - 6 | - 3.2        |
| 26  | LINT | 0554          | 0558        | 0618        | 1-  | - 0.5 | - 3 | - 1.0        |
| 26  | LINT | 0722          | 0729        | 0750        | 1   | - 1.1 | - 4 | - 1.8        |
| 27  | LINT | 0142          | 0159        | 0236        | 1+  | - 2.2 | -14 | - 6.8        |
| 27  | YUHN | 0705          | 0708        | 0743        | 2-  | - 3.4 |     |              |
| 27  | LINT | 0706          | 0712        | 0807        | 2   | - 4.5 | -21 | - 5.1        |
| 27  | LINT | 0840          | 0845        | 0900D       | 2-  | - 3.9 | -17 | + 6.3        |
| 28  | LINT | 0216          | 0220        | 0230        | 1-  | - 0.9 | - 2 | - 0.8        |
| 28  | LINT | 0239          | 0243        | 0302        | 1-  | - 0.4 | - 2 | - 0.9        |
| 28  | LINT | 0323          | 0332        | 0336D       | 1-  | - 1.0 | 0   | - 2.3        |
| 28  | LINT | 0336          | 0344        | 0356        | 1-  | - 0.8 | - 2 | - 1.4        |
| 28  | YUHN | 0455          | 0500        | 0515        | 2-  | - 3.9 |     |              |
| 28  | LINT | 0457          | 0520        | 0700D       | 3   | - 7.5 | -47 | + 7.6        |
| 28  | LINT | 0738          | 0753        | 0802        | 3   | - 7.1 | 0   | -15.8        |
| 28  | YUHN | 0758          | 0804        | 0904        | 2-  | - 3.7 |     |              |

# SUDDEN IONOSPHERIC DISTURBANCES (D REGION)

MARCH 1990

| Day | Sta  | Start<br>(UT) | Max<br>(UT) | End<br>(UT) | Imp | SPA   |     | SFA<br>LF   |
|-----|------|---------------|-------------|-------------|-----|-------|-----|-------------|
|     |      |               |             |             |     | LF    | VLF |             |
| 01  | LINT | 0303          | 0310        | 0331        | 1-  | - 0.8 | - 6 | - 3.6       |
| 01  | LINT | 0340          | 0348        | 0500D       | 3   | - 7.3 | -36 | -10.8,+17.1 |
| 01  | LINT | 0405          | 0412        | 0425        | 1-  | - 0.4 | -11 | + 1.3       |
| 01  | LINT | 0829          | 0834        | 0900        | 2-  | - 3.9 | -19 | - 3.6       |
| 01  | LINT | 0905          | 0910        | 0920D       | 2+  | - 5.5 | -25 | + 8.5       |
| 02  | YUNN | 0115          | 0118        | 0143        | 2-  | - 4.4 |     |             |
| 02  | YUNN | 0323          | 0326        | 0406        | 2   | - 4.2 |     |             |
| 02  | YUNN | 0516          | 0517        | 0532        | 1   | - 1.2 |     |             |
| 02  | YUNN | 0558          | 0600        | 0635        | 1   | - 1.3 |     |             |
| 02  | LINT | 0801          | 0804        | 0816        | 1-  | - 0.3 | - 2 | - 1.1       |
| 02  | LINT | 0822          | 0837        | 0910D       | 2+  | - 5.5 | -16 | - 1.5       |
| 02  | YUNN | 0846          | 0853        | 0938        | 3   | - 7.3 |     |             |
| 03  | LINT | 0518          | 0523        | 0540U       | 1-  | - 0.5 | 0   | - 1.0       |
| 04  | LINT | 0108          | 0120        | 0138U       | 1   | - 1.4 | - 4 | - 3.2       |
| 04  | LINT | 0141          | 0147        | 0214        | 1-  | - 0.9 | 0   | - 2.6       |
| 04  | YUNN | 0400          | 0405        | 0412        | 1+  | - 3.0 |     |             |
| 04  | YUNN | 0413          | 0414        | 0424        | 1   | - 1.1 |     |             |
| 04  | YUNN | 0500          | 0502        | 0510        | 1   | - 1.5 |     |             |
| 04  | YUNN | 0610          | 0612        | 0622        | 1   | - 1.1 |     |             |
| 04  | YUNN | 0716          | 0718        | 0801        | 3-  | - 6.1 |     |             |
| 04  | YUNN | 0802          | 0807        | 0857        | 2+  | - 5.2 |     |             |
| 04  | YUNN | 0918          | 0921        | 0931        | 2-  | - 3.9 |     |             |
| 04  | LINT | 0354          | 0410        | 0456        | 1   | - 2.0 | - 8 | - 3.9       |
| 05  | LINT | 0331          | 0341        | 0400U       | 1-  | - 0.7 | 0   | - 1.0       |
| 05  | YUNN | 0717          | 0720        | 0732        | 1   | - 1.6 |     |             |
| 06  | LINT | 0443          | 0450        | 0510        | 1-  | - 0.7 | - 4 | - 2.6       |
| 06  | LINT | 0800          | 0808        | 0830        | 1+  | - 2.4 | -12 | - 5.2       |
| 07  | LINT | 0651          | 0654        | 0714        | 1   | - 1.2 | - 7 | - 2.0       |
| 07  | LINT | 0735          | 0739        | 0758        | 1   | - 1.1 | - 5 | - 1.4       |
| 07  | LINT | 0826          | 0832        | 0852        | 2   | - 4.7 | -16 | - 7.0       |
| 08  | LINT | 0004          | 0009        | 0020        | 1+  | - 2.2 | 0   | - 2.1       |
| 08  | LINT | 0259          | 0308        | 0334        | 1   | - 1.3 | - 5 | - 7.4       |
| 08  | YUNN | 0309          | 0312        | 0327        | 2+  | - 5.4 |     |             |
| 08  | LINT | 0401          | 0410        | 0440        | 1-  | - 0.7 | - 2 | - 2.3       |
| 08  | LINT | 0735          | 0741        | 0816        | 1+  | - 2.9 | -16 | - 3.1       |
| 09  | LINT | 0704          | 0711        | 0738        | 1   | - 1.4 | - 7 | - 2.6       |
| 10  | YUNN | 0214          | 0224        | 0244        | 1   | - 1.2 |     |             |
| 10  | LINT | 0347          | 0402        | 0438        | 1-  | - 0.9 | - 2 | - 2.3       |
| 10  | YUNN | 0536          | 0538        | 0548        | 1   | - 1.9 |     |             |
| 10  | YUNN | 0548          | 0555        | 0625        | 3-  | - 6.7 |     |             |
| 10  | YUNN | 0625          | 0631        | 0638        | 2-  | - 3.3 |     |             |
| 10  | LINT | 0658          | 0706        | 0740        | 1   | - 1.3 | - 6 | - 2.3       |

# SUDDEN IONOSPHERIC DISTURBANCES (D REGION)

MARCH 1990

| Day | Sta  | Start<br>(UT) | Max<br>(UT) | End<br>(UT) | Imp | SPA   |     | SFA<br>LF   |
|-----|------|---------------|-------------|-------------|-----|-------|-----|-------------|
|     |      |               |             |             |     | LF    | VLF |             |
| 10  | YUNN | 0704          | 0711        | 0721        | 1-  | - 0.9 |     |             |
| 10  | YUNN | 0759          |             | 0841        | 3+  | -10.9 |     |             |
| 11  | YUNN | 0356          | 0400        | 0450        | 1+  | - 2.1 |     |             |
| 11  | LINT | 0348          | 0403        | 0530        | 2-  | - 3.6 | -15 | - 6.0       |
| 11  | YUNN | 0514          | 0516        | 0536        | 1-  | - 1.0 |     |             |
| 11  | YUNN | 1004          | 1005        | 1020        | 1-  | - 1.0 |     |             |
| 12  | LINT | 0326          | 0335        | 0358        | 1-  | - 0.4 | - 2 | - 3.3       |
| 12  | YUNN | 0431          | 0433        | 0523        | 1   | - 2.0 |     |             |
| 12  | LINT | 0430          | 0436        | 0522        | 1+  | - 2.9 | -11 | - 1.5       |
| 12  | LINT | 0746          | 0753        | 0820        | 1   | - 1.5 | - 7 | - 2.3       |
| 12  | LINT | 0834          | 0842        | 0900D       | 2-  | - 3.7 | -13 | - 3.4,+ 2.5 |
| 13  | YUNN | 0215          | 0224        | 0259        | 2   | - 4.1 |     |             |
| 13  | LINT | 0217          | 0230        | 0320        | 2   | - 4.6 | -10 | -10.6       |
| 13  | YUNN | 0342          | 0343        | 0348        | 1   | - 1.3 |     |             |
| 13  | YUNN | 0348          | 0353        | 0358        | 1+  | - 2.3 |     |             |
| 13  | YUNN | 0358          | 0415        | 0419        | 3+  | - 9.0 |     |             |
| 13  | YUNN | 0419          | 0431        | 0442        | 1+  | - 2.8 |     |             |
| 13  | LINT | 0651          | 0704        | 0714D       | 1+  | - 2.8 | -12 | - 3.1       |
| 13  | LINT | 0714          | 0721        | 0740U       | 1   | - 1.2 | -10 | + 3.7       |
| 13  | YUNN | 0720          | 0722        | 0737        | 1   | - 1.9 |     |             |
| 14  | YUNN | 0109          | 0115        | 0130        | 3   | - 7.3 |     |             |
| 14  | LINT | 0240          | 0245        | 0300U       | 1-  | - 0.4 | - 3 | - 2.4       |
| 14  | LINT | 0340          | 0428        | 0510D       | 2   | - 5.0 | -26 | - 7.6,+ 4.5 |
| 14  | YUNN | 0705          | 0711        | 0725        | 3-  | - 6.5 |     |             |
| 14  | LINT | 0724          | 0730        | 0746        | 1-  | - 1.0 |     | - 2.1       |
| 14  | YUNN | 0725          | 0730        | 0743        | 2-  | - 3.2 |     |             |
| 14  | YUNN | 0758          | 0802        | 0822        | 1   | - 1.6 |     |             |
| 14  | YUNN | 1022          | 1026        | 1041        | 1+  | - 2.3 |     |             |
| 15  | LINT | 0515          | 0526        | 0546D       | 1   | - 1.7 | - 4 | - 6.0       |
| 15  | LINT | 0558          | 0624        | 0738        | 1+  | - 2.4 | -10 | - 2.3,+ 0.4 |
| 16  | LINT | 0224          | 0234        | 0250D       | 2-  | - 3.1 | - 7 | + 9.6       |
| 16  | LINT | 0251          | 0254        | 0309        | 1-  | - 0.3 | - 3 | - 1.1       |
| 16  | LINT | 0410          | 0414        | 0434        | 1-  | - 0.6 | - 3 | - 1.7       |
| 16  | LINT | 0457          | 0504        | 0540        | 1-  | - 0.9 | - 4 | - 3.6       |
| 16  | LINT | 0634          | 0640        | 0708        | 1   | - 1.1 | - 4 | - 1.6       |
| 16  | YUNN | 0637          | 0641        | 0659        | 1   | - 2.0 |     |             |
| 16  | YUNN | 0717          | 0722        | 0822        | 1+  | - 2.9 |     |             |
| 16  | LINT | 0716          | 0730        | 0800D       | 2-  | - 3.3 | -21 | - 2.1       |
| 16  | YUNN | 0909          | 0912        | 0932        | 2   | - 4.6 |     |             |
| 17  | YUNN | 0056          | 0100        | 0115        | 2-  | - 3.2 |     |             |
| 17  | YUNN | 0328          | 0330        | 0350        | 1-  | - 1.0 |     |             |
| 17  | LINT | 0325          | 0332        | 0350        | 1-  | - 0.5 | 0   | - 1.3       |

# SUDDEN IONOSPHERIC DISTURBANCES (D REGION)

MARCH 1990

| Day | Sta  | Start<br>(UT) | Max<br>(UT) | End<br>(UT) | Imp | SPA   |     | SFA<br>LF   |
|-----|------|---------------|-------------|-------------|-----|-------|-----|-------------|
|     |      |               |             |             |     | LF    | VLF |             |
| 18  | LINT | 0356          | 0401        | 0416        | 1-  | - 0.3 | 0   | - 1.9       |
| 18  | LINT | 0436          | 0445        | 0513        | 1   | - 2.0 | - 6 | - 8.3       |
| 18  | LINT | 0516          | 0528        | 0550        | 1-  | - 0.5 | 0   | 0           |
| 18  | YUNN | 0834          | 0841        | 0856        | 1+  | - 2.7 |     |             |
| 18  | YUNN | 1034          | 1039        | 1100        | 2+  | - 5.5 |     |             |
| 19  | LINT | 0026          | 0032        | 0040        | 1-  | - 0.6 | - 2 | - 2.0       |
| 19  | YUNN | 0334          | 0339        | 0443        | 2   | - 5.0 |     |             |
| 19  | LINT | 0334          | 0349        | 0438D       | 3-  | - 6.1 | -35 | -11.7,+12.2 |
| 19  | YUNN | 0443          | 0450        | 0543        | 2   | - 4.4 |     |             |
| 19  | LINT | 0438          | 0458        | 0600        | 2+  | - 6.0 | -64 | +13.7       |
| 20  | LINT | 0022          | 0040        | 0108        | 1   | - 1.9 | - 6 | - 4.2       |
| 20  | LINT | 0118          | 0130        | 0144        | 1-  | - 0.2 | - 5 | 0           |
| 20  | YUNN | 0613          | 0614        | 0629        | 1   | - 1.3 |     |             |
| 20  | LINT | 0611          | 0620        | 0650        | 1   | - 1.1 | - 6 | - 3.1       |
| 20  | YUNN | 0826          | 0833        | 0848        | 3+  | - 9.1 |     |             |
| 21  | LINT | 0221          | 0231        | 0238D       | 1-  | - 0.3 | - 2 | - 3.4       |
| 21  | LINT | 0239          | 0255        | 0300D       | 2-  | - 3.3 | - 7 | - 6.8       |
| 21  | LINT | 0300          | 0315        | 0346        | 1-  | - 0.8 | - 3 | + 0.6       |
| 21  | LINT | 0353          | 0404        | 0440        | 1-  | - 0.7 | - 5 | + 1.3       |
| 21  | LINT | 0447          | 0449        | 0508        | 1-  | - 0.7 | - 2 | + 0.4       |
| 21  | LINT | 0517          | 0538        | 0622        | 1-  | - 1.0 |     | - 1.4       |
| 21  | LINT | 0834          | 0840        | 0900U       | 1-  | - 0.8 | - 8 | - 2.5       |
| 22  | LINT | 0040          | 0045        | 0058        | 1-  | - 0.4 | - 2 | - 2.1       |
| 22  | LINT | 0130          | 0138        | 0150        | 1-  | - 0.2 | - 2 | - 1.2       |
| 22  | LINT | 0154          | 0159        | 0220        | 1-  | - 0.5 | - 6 | - 3.2       |
| 22  | LINT | 0226          | 0235        | 0250        | 1-  | - 0.8 | - 2 | - 5.0       |
| 22  | LINT | 0323          | 0327        | 0354        | 1   | - 1.8 | - 4 | - 9.8       |
| 22  | LINT | 0415          | 0422        | 0500D       | 2   | - 4.2 | -16 | -13.2,+ 4.7 |
| 22  | LINT | 0534          | 0548        | 0630D       | 2   | - 4.9 | -44 | + 4.2       |
| 23  | YUNN | 0023          | 0028        | 0058        | 2   | - 4.6 |     |             |
| 23  | LINT | 0023          | 0040        | 0130        | 2+  | - 5.2 | - 5 | -13.1       |
| 23  | LINT | 0223          | 0230        | 0240U       | 1-  | - 0.3 | - 2 | 0           |
| 23  | LINT | 0316          | 0321        | 0334        | 1   | - 1.2 | - 4 | - 3.9       |
| 23  | YUNN | 0317          | 0321        | 0336        | 1-  | - 0.9 |     |             |
| 23  | YUNN | 0618          | 0624        | 0658        | 1+  | - 2.6 |     |             |
| 23  | LINT | 0618          | 0628        | 0700        | 2   | - 4.3 | -35 | - 3.9,+ 0.4 |
| 23  | YUNN | 0830          | 0839        | 0945        | 2-  | - 3.5 |     |             |
| 23  | YUNN | 1046          | 1048        | 1100        | 1   | - 1.4 |     |             |
| 24  | YUNN | 0255          | 0256        | 0346        | 2-  | - 3.8 |     |             |
| 24  | LINT | 0255          | 0300        | 0420        | 2+  | - 5.2 | -18 | - 2.7,+ 9.5 |
| 24  | YUNN | 0457          | 0506        | 0556        | 2-  | - 3.7 |     |             |
| 24  | LINT | 0456          | 0511        | 0620D       | 2   | - 4.7 | -36 | - 1.1,+ 6.7 |

# SUDDEN IONOSPHERIC DISTURBANCES (D REGION)

MARCH 1990

| Day | Sta | Start (UT) | Max (UT) | End (UT) | Imp | LF | SPF | VLF | SFA | LF |
|-----|-----|------------|----------|----------|-----|----|-----|-----|-----|----|
|-----|-----|------------|----------|----------|-----|----|-----|-----|-----|----|

|    |      |      |      |       |    |       |     |              |  |       |
|----|------|------|------|-------|----|-------|-----|--------------|--|-------|
| 24 | LINT | 0641 | 0643 | 0704  | 1- | - 0.9 | - 8 | + 3.1        |  |       |
| 25 | YUNN | 0418 | 0422 | 0517  | 2- | - 3.1 |     |              |  |       |
| 25 | LINT | 0417 | 0428 | 0554  | 2  | - 4.5 | -19 | - 5.3, + 2.5 |  | - 6.0 |
| 25 | LINT | 0645 | 0654 | 0732  | 1+ | - 2.3 | - 9 |              |  |       |
| 25 | YUNN | 0815 | 0817 | 0837  | 1  | - 1.4 |     |              |  | - 4.9 |
| 25 | LINT | 0908 | 0914 | 0936  | 2- | - 3.4 | -10 |              |  | - 1.7 |
| 26 | LINT | 0017 | 0020 | 0029  | 1- | - 0.5 | 0   |              |  | - 6.6 |
| 26 | LINT | 0048 | 0055 | 0115  | 1  | - 1.2 | - 3 |              |  | -11.4 |
| 26 | YUNN | 0158 | 0200 | 0245  | 1  | - 1.5 | - 6 |              |  | - 4.4 |
| 26 | LINT | 0156 | 0201 | 0213  | 1  | - 1.6 | - 3 |              |  | - 1.9 |
| 26 | LINT | 0217 | 0223 | 0240U | 1- | - 1.0 | - 3 |              |  |       |
| 26 | LINT | 0320 | 0330 | 0340D | 1- | - 0.4 | - 2 |              |  |       |
| 26 | YUNN | 0336 | 0340 | 0415  | 2+ | - 5.9 |     |              |  |       |
| 26 | LINT | 0336 | 0342 | 0500D | 3  | - 7.3 | -47 | -13.8, +19.2 |  | + 2.1 |
| 26 | LINT | 0502 | 0512 | 0528  | 1- | - 0.7 | - 9 |              |  | + 2.8 |
| 26 | LINT | 0532 | 0537 | 0600  | 1- | - 0.5 | -12 |              |  | - 1.5 |
| 26 | YUNN | 0818 | 0821 | 0858  | 2- | - 3.2 | - 7 |              |  | - 3.8 |
| 26 | LINT | 0817 | 0823 | 0845  | 2- | - 3.1 | 0   |              |  | + 2.4 |
| 27 | LINT | 0146 | 0150 | 0204  | 1- | - 0.7 | -14 |              |  | - 8.4 |
| 27 | YUNN | 0416 | 0420 | 0430  | 1  | - 1.8 |     |              |  |       |
| 27 | LINT | 0416 | 0422 | 0522  | 2- | - 3.3 |     |              |  |       |
| 27 | LINT | 0736 | 0749 | 0830  | 1  | - 2.0 | - 4 |              |  |       |
| 27 | YUNN | 0752 | 0753 | 0803  | 1+ | - 2.6 |     |              |  |       |
| 27 | YUNN | 0821 | 0823 | 0833  | 2- | - 3.3 |     |              |  |       |
| 27 | YUNN | 0857 | 0859 | 0914  | 2  | - 4.4 | 0   |              |  |       |
| 28 | LINT | 0008 | 0013 | 0024  | 1- | - 0.4 |     |              |  | - 2.3 |
| 28 | LINT | 0108 | 0118 | 0130U | 1- | - 0.1 | - 2 |              |  | - 1.4 |
| 28 | YUNN | 0141 | 0145 | 0210  | 2- | - 3.2 |     |              |  |       |
| 28 | LINT | 0130 | 0151 | 0230D | 2- | - 3.7 | - 3 |              |  | - 9.5 |
| 28 | LINT | 0230 | 0235 | 0254  | 1- | - 0.4 | - 2 |              |  | 0     |
| 28 | LINT | 0347 | 0357 | 0431  | 1  | - 1.2 | - 3 |              |  | - 2.6 |
| 28 | LINT | 0652 | 0603 | 0642  | 1  | - 1.4 | - 6 |              |  | - 1.6 |
| 28 | YUNN | 0739 | 0745 | 0819  | 2- | - 4.0 | -65 |              |  | + 6.7 |
| 28 | LINT | 0735 | 0752 | 0920  | 3  | - 7.2 |     |              |  |       |
| 28 | YUNN | 1005 | 1008 | 1021  | 2- | - 3.2 |     |              |  |       |
| 29 | LINT | 0126 | 0134 | 0150  | 1- | - 0.8 | - 6 |              |  | - 4.3 |
| 29 | LINT | 0151 | 0200 | 0220  | 1- | - 0.3 | - 4 |              |  | - 2.2 |
| 29 | YUNN | 0254 | 0258 | 0318  | 1+ | - 2.8 |     |              |  |       |
| 29 | LINT | 0254 | 0300 | 0340  | 1+ | - 2.3 | - 5 |              |  | - 3.8 |
| 29 | LINT | 0513 | 0517 | 0534  | 1- | - 0.3 | 0   |              |  | - 0.8 |
| 29 | LINT | 0830 | 0836 | 0900  | 1  | - 1.7 | - 2 |              |  | - 3.2 |
| 30 | LINT | 0158 | 0203 | 0210  | 1  | - 1.8 | - 5 |              |  | - 9.3 |

# SUDDEN IONOSPHERIC DISTURBANCES (D-REGION)

MARCH 1990

| Day | Sta  | Start<br>(UT) | Max<br>(UT) | End<br>(UT) | Imp | SPA   |     | SFA<br>LF |
|-----|------|---------------|-------------|-------------|-----|-------|-----|-----------|
|     |      |               |             |             |     | LF    | VLf |           |
| 30  | LINT | 0210          | 0216        | 0310        | 2-  | - 3.7 | - 9 | + 5.6     |
| 30  | YUW  | 0728          | 0731        | 0808        | 1+  | - 2.4 |     |           |
| 30  | LINT | 0727          | 0732        | 0820        | 2-  | - 3.7 | -26 | - 2.7     |
| 31  | LINT | 2356          | 0001        | 0022        | 1-  | - 0.9 | 0   | - 2.9     |

# GEOMAGNETIC ACTIVITY INDICES K AND A<sub>K</sub>

FEBRUARY 1990

BGMO

## Three-Hourly Indices K

Day Sum A<sub>K</sub>

0-3 3-6 6-9 9-12 12-15 15-18 18-21 21-24

|      |   |   |   |   |   |   |   |   |      |      |
|------|---|---|---|---|---|---|---|---|------|------|
| 1    | 0 | 2 | 2 | 3 | 4 | 4 | 4 | 1 | 20   | 14   |
| 2    | 1 | 5 | 4 | 3 | 4 | 4 | 3 | 1 | 25   | 21   |
| 3    | 1 | 0 | 0 | 2 | 3 | 3 | 4 | 2 | 15   | 9    |
| 4    | 1 | 2 | 2 | 3 | 3 | 5 | 5 | 4 | 25   | 21   |
| 5    | 4 | 4 | 3 | 5 | 4 | 4 | 3 | 2 | 29   | 24   |
| 6    | 2 | 3 | 3 | 0 | 1 | 1 | 1 | 1 | 12   | 6    |
| 7    | 0 | 2 | 4 | 4 | 4 | 4 | 4 | 5 | 27   | 24   |
| 8 Q  | 2 | 2 | 1 | 0 | 0 | 1 | 1 | 0 | 7    | 3    |
| 9 Q  | 0 | 1 | 2 | 1 | 2 | 3 | 0 | 1 | 10   | 5    |
| 10 Q | 0 | 1 | 2 | 2 | 3 | 3 | 1 | 0 | 12   | 6    |
| 11   | 0 | 2 | 2 | 2 | 2 | 4 | 3 | 1 | 16   | 9    |
| 12 Q | 2 | 2 | 2 | 2 | 1 | 1 | 0 | 0 | 10   | 4    |
| 13 Q | 1 | 0 | 0 | 2 | 1 | 5 | 2 | 4 | 15   | 12   |
| 14   | 4 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 27   | 27   |
| 15   | 2 | 2 | 4 | 4 | 5 | 5 | 5 | 6 | 33   | 37   |
| 16 D | 5 | 5 | 4 | 3 | 5 | 4 | 3 | 3 | 32   | 30   |
| 17 D | 4 | 3 | 2 | 4 | 4 | 4 | 3 | 4 | 28   | 22   |
| 18   | 2 | 2 | 3 | 3 | 4 | 3 | 3 | 3 | 23   | 15   |
| 19 D | 2 | 3 | 2 | 3 | 5 | 3 | 5 | 3 | 26   | 21   |
| 20 D | 3 | 2 | 4 | 4 | 4 | 4 | 5 | 3 | 29   | 24   |
| 21   | 2 | 2 | 2 | 2 | 3 | 2 | 4 | 0 | 17   | 10   |
| 22   | 2 | 3 | 3 | 1 | 4 | 3 | 3 | 3 | 22   | 14   |
| 23 D | 3 | 2 | 3 | 4 | 4 | 5 | 4 | 3 | 28   | 23   |
| 24   | 3 | 3 | 3 | 4 | 3 | 4 | 4 | 4 | 28   | 21   |
| 25   | 2 | 3 | 3 | 5 | 3 | 3 | 3 | 3 | 25   | 18   |
| 26   | 2 | 2 | 2 | 3 | 3 | 1 | 4 | 3 | 20   | 12   |
| 27   | 1 | 3 | 4 | 5 | 5 | 1 | 3 | 1 | 23   | 20   |
| 28   | 3 | 5 | 2 | 3 | 3 | 2 | 4 | 2 | 24   | 18   |
|      |   |   |   |   |   |   |   |   | Sum  | 470  |
|      |   |   |   |   |   |   |   |   | Mean | 16.8 |

# GEOMAGNETIC ACTIVITY INDICES K AND A<sub>K</sub>

MARCH 1990

BGMO

## Three-Hourly Indices K

| Day  | 0-3 | 3-6 | 6-9 | 9-12 | 12-15 | 15-18 | 18-21 | 21-24 | Sum  | A <sub>K</sub> |
|------|-----|-----|-----|------|-------|-------|-------|-------|------|----------------|
| 1    | 4   | 3   | 3   | 4    | 3     | 3     | 2     | 1     | 23   | 16             |
| 2    | 3   | 3   | 3   | 3    | 2     | 3     | 3     | 2     | 22   | 13             |
| 3    | 2   | 2   | 2   | 2    | 3     | 2     | 3     | 0     | 16   | 8              |
| 4 Q  | 2   | 0   | 2   | 3    | 1     | 0     | 1     | 1     | 10   | 5              |
| 5    | 2   | 2   | 1   | 3    | 2     | 1     | 1     | 2     | 14   | 7              |
| 6    | 3   | 2   | 3   | 3    | 3     | 4     | 3     | 2     | 23   | 15             |
| 7    | 1   | 2   | 2   | 2    | 4     | 3     | 1     | 1     | 16   | 9              |
| 8    | 1   | 2   | 1   | 4    | 2     | 3     | 1     | 1     | 15   | 9              |
| 9    | 1   | 1   | 1   | 3    | 1     | 2     | 1     | 2     | 12   | 6              |
| 10 Q | 2   | 2   | 2   | 2    | 2     | 3     | 2     | 1     | 16   | 8              |
| 11   | 3   | 2   | 2   | 3    | 2     | 3     | 2     | 1     | 18   | 10             |
| 12 D | 1   | 3   | 2   | 3    | 2     | 5     | 6     | 6     | 28   | 32             |
| 13   | 4   | 4   | 3   | 3    | 3     | 3     | 3     | 5     | 28   | 22             |
| 14   | 4   | 3   | 4   | 4    | 3     | 4     | 3     | 1     | 26   | 20             |
| 15   | 2   | 1   | 1   | 1    | 3     | 2     | 2     | 0     | 12   | 6              |
| 16 Q | 0   | 0   | 1   | 2    | 2     | 2     | 2     | 2     | 11   | 5              |
| 17 Q | 0   | 1   | 2   | 1    | 0     | 0     | 0     | 0     | 4    | 2              |
| 18   | 1   | 2   | 3   | 4    | 5     | 5     | 3     | 3     | 26   | 22             |
| 19   | 4   | 2   | 0   | 2    | 1     | 2     | 1     | 1     | 13   | 7              |
| 20   | 3   | 2   | 2   | 3    | 4     | 4     | 3     | 6     | 27   | 24             |
| 21 D | 4   | 5   | 4   | 5    | 4     | 4     | 5     | 3     | 34   | 33             |
| 22   | 3   | 2   | 3   | 4    | 4     | 3     | 3     | 2     | 24   | 16             |
| 23   | 3   | 2   | 3   | 3    | 3     | 4     | 2     | 2     | 22   | 14             |
| 24   | 3   | 3   | 1   | 2    | 3     | 3     | 3     | 3     | 21   | 13             |
| 25 D | 3   | 4   | 1   | 5    | 5     | 5     | 4     | 5     | 32   | 33             |
| 26 D | 3   | 3   | 2   | 3    | 3     | 5     | 5     | 3     | 27   | 22             |
| 27   | 2   | 3   | 3   | 2    | 2     | 4     | 4     | 3     | 23   | 15             |
| 28   | 2   | 2   | 2   | 2    | 2     | 3     | 3     | 2     | 18   | 9              |
| 29   | 2   | 4   | 1   | 2    | 5     | 5     | 1     | 2     | 22   | 19             |
| 30 D | 2   | 3   | 7   | 7    | 5     | 5     | 3     | 2     | 34   | 53             |
| 31 Q | 2   | 2   | 1   | 1    | 2     | 1     | 1     | 2     | 12   | 5              |
|      |     |     |     |      |       |       |       |       | Sum  | 478            |
|      |     |     |     |      |       |       |       |       | Mean | 15.4           |

# MAGNETIC STORMS

FEBRUARY-MARCH 1990

BGMO

| Time of Magnetic |   |   |       | Sudden Com. |    |     | Deg. | Maximum Acti. |            |      | Maximum |       |     |     |
|------------------|---|---|-------|-------------|----|-----|------|---------------|------------|------|---------|-------|-----|-----|
| Beginning Ending |   |   |       | Amplitude   |    |     | of   |               | on K-scale |      |         | Range |     |     |
|                  |   |   |       |             |    |     |      |               | 3hour k    |      |         |       |     |     |
| Day              | h | m | Day h | Type        | D' | HnT | ZnT  | Acti.         | Day        | Int. | Index   | D'    | HnT | ZnT |

## FEBRUARY 1990

|    |    |    |    |    |  |    |     |    |   |    |    |   |   |      |     |    |
|----|----|----|----|----|--|----|-----|----|---|----|----|---|---|------|-----|----|
| 13 | 17 | 15 | 14 | 24 |  | SC | 1.0 | 44 | 3 | ms | 14 | 2 | 6 | 5.6  | 130 | 27 |
| 15 | 06 | 25 | 17 | 24 |  | SC | 0.2 | 10 | 1 | ms | 15 | 8 | 6 | 10.3 | 140 | 26 |

## MARCH 1990

|    |    |    |    |    |  |    |     |    |   |    |    |   |   |      |     |    |
|----|----|----|----|----|--|----|-----|----|---|----|----|---|---|------|-----|----|
| 12 | 15 | 03 | 13 | 19 |  | SC | 1.9 | 65 | 4 | ms | 12 | 8 | 6 | 19.3 | 203 | 30 |
| 18 | 02 |    | 19 | 06 |  | GC |     |    |   | m  | 18 | 6 | 5 | 9.9  | 124 | 53 |
| 20 | 22 | 43 | 24 | 06 |  | SC | 3.2 | 15 | 3 | ms | 20 | 8 | 6 | 13.6 | 154 | 37 |
| 30 | 07 | 19 | 31 | 18 |  | SC | 2.4 | 60 | 4 | ms | 30 | 3 | 7 | 10.9 | 268 | 57 |