

## 目 录

1998 年 3 月

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# 《太阳地球物理资料》各表表头内容说明

注:各表按目录顺序依次说明,若各表内容有相同的则只作一次说明。

## 太阳黑子相对数与面积数表

|                        |               |                  |                                       |
|------------------------|---------------|------------------|---------------------------------------|
| Day:                   | 每天观测日期        | H $\alpha$ 太阳耀斑表 |                                       |
| Gro:                   | 每天在日面上的黑子群总数  | Sta:             | 台站                                    |
| Relative—Num—<br>bers: | 每天的黑子相对数值     | Start (UT):      | 耀斑开始时间(UT 为世界<br>时,其中“E”为小于此时间。)      |
| N. H.:                 | 每天北半球的黑子相对数   | Max (UT):        | 耀斑的极大时间(“U”为接<br>近此时间,不确定。)           |
| S. H.:                 | 每天南半球的黑子相对数   | End (UT):        | 耀斑的结束时间(“D”为大<br>于此时间。)               |
| Sum:                   | 南、北半球黑子相对数的总和 | Cen              | 日心距,即 $r/R$ 。                         |
| Sunspot Areas:         | 太阳黑子面积数值      | Dist:            |                                       |
| Drawing:               | 手描的           | Area             | 耀斑极大时的面积( $S_d$ 为视<br>面积,单位为太阳圆面积的    |
| N. H.:                 | 每天北半球黑子面积     | Measurement      | $10^{-6}$ ; $S_q$ 为校正面积,以平<br>方度为单位。) |
| S. H.:                 | 每天南半球黑子面积     | Appar Corr       |                                       |
| Sum:                   | 南、北半球黑子面积的总和  | (sd) (sq):       | 耀斑的级别                                 |

## 太阳黑子观测表

|         |                   |        |                    |
|---------|-------------------|--------|--------------------|
| Group:  | 在日面上的黑子群号         | Imp:   | 耀斑的资料类型            |
| CMP     | 黑子群过日面中心经圈日期,     | Obs    |                    |
| Mo—Day: | 用月—日表示。           | Type:  |                    |
| Lat:    | 黑子群在日面上的纬度        | A. R.: | 耀斑所在活动区的黑子群号       |
| L:      | 黑子群在日面上的卡林顿经<br>度 | Rem:   | 备注(记录耀斑发生时<br>的形态) |

|       |                           |
|-------|---------------------------|
| CMD:  | 黑子群在日面上的中经距               |
| Type: | 黑子群的 McIntosh 类型          |
| r/R:  | 黑子群在日面上的日心距(以<br>太阳半径为 1) |

|                                 |                                                                         |
|---------------------------------|-------------------------------------------------------------------------|
| Corre. Area $S_d$<br>whole Max: | 黑子群在日面上所占的面积<br>( $S_d$ 为视面积,Whole 为校正<br>后的全群面积,Max 为校正<br>后的最大黑子的面积。) |
|---------------------------------|-------------------------------------------------------------------------|

|          |                                                                    |
|----------|--------------------------------------------------------------------|
| See:     | 观测时大气视宁静度                                                          |
| Remarks: | 备注(空白表示云南天文台的<br>观测资料,注明 PLAT 的为北<br>京天文馆资料,PURP 为南京<br>紫金山天文台资料。) |

## 太阳黑子相对数的平滑值预报表

|       |              |
|-------|--------------|
| Time: | 预报的时间        |
| R':   | 月平滑黑子相对数的预报值 |
| E':   | 预报误差         |

|                    |             |
|--------------------|-------------|
| H $\alpha$ 耀斑巡视时间表 |             |
| From:              | 耀斑照相巡视开始时间  |
| To:                | 耀斑照相巡视的结束时间 |

|                 |                      |
|-----------------|----------------------|
| 太阳活动区磁场和速度场的观测表 |                      |
| L $_0$ :        | 每天的日面中心经度            |
| Huairou         | 北京天文台怀柔观测站的<br>活动区编号 |
| Region:         | 取得的磁场资料类型            |
| Data:           |                      |

|                |                                                                                                                                 |
|----------------|---------------------------------------------------------------------------------------------------------------------------------|
| 太阳射电辐射通量及巡视时间表 |                                                                                                                                 |
| BEIJ           | 每天的太阳在 2840 MHz 的<br>流量密度(北台 0400 UT 测<br>量,以 $10^{-22} \cdot \text{瓦} \cdot \text{米}^{-2} \cdot$<br>赫 $^{-1}$ (s. f. u.) 为单位。) |
| 2840:          |                                                                                                                                 |
| PURP           | 每天的太阳在 2700 MHz 的<br>流量密度(紫台 0400 UT 测)                                                                                         |
| 2700:          |                                                                                                                                 |
| BEIJ           | 北京天文台 2840 MHz 频率                                                                                                               |

|                |                        |                             |                      |
|----------------|------------------------|-----------------------------|----------------------|
| From To        | 巡视时间                   | 突然电离层扰动(D 层)表               |                      |
| 2840 :         |                        | Imp :                       | 级别(最小为 1—级,最大为 3+级。) |
| PURP           | 紫金山天文台 2700 MHz 频率     | SPA :                       | 相位突然异常               |
| From To        | 巡视时间                   | LF—SPA :                    | 低频相位突然异常             |
| 2700 :         |                        | VLF—SPA :                   | 甚低频相位突然异常            |
| 太阳射电辐射显著事件表    |                        | LF—SFA :                    | 低频场强突然异常             |
| Freq :         | 观测频率                   | 地磁活动指数 K 和 A <sub>K</sub> 表 |                      |
| Type :         | 射电爆发的型别                | 第一行 :                       | 以三小时为时段的 K 指数        |
| Duration :     | 射电爆发的持续时间(以分钟为单位)      | Sum :                       | 总和                   |
| Flux Density : | 射电爆发的流量密度              | A <sub>K</sub> :            | A <sub>K</sub> 指数    |
| Peak :         | 射电爆发流量的峰值增值            | 磁暴表                         |                      |
| Rel :          | 射电爆发峰值流量与爆发前流量之比值      | Time of Magnetic            | 磁暴时间                 |
| Mean :         | 流量密度的增值对时间求积分再除以爆发持续时间 | tic :                       |                      |

#### 宇宙线强度表

这部分共有三个表和宇宙线强度图。其中第 1 个表是“中子堆数据表”,它给出的值是记数率与 1500 的差;第 2 个表是“ $\mu$  介子垂直分量表”它给出的值是记数率与 3000 的差;第 3 个表是“ $\mu$  介子数据表”,它列出的是相对强度与 1000 的差。这三个表的第一行数据是 1—24 小时。

|        |        |
|--------|--------|
| Mean : | 日均值    |
| N :    | 记录的小时数 |
| Day :  | 日期     |

最后四行是仪器全天工作天数的月平均日变化与相应的月均值的差。宇宙线强度图说明请参见每年第 1 期说明。

|                            |        |
|----------------------------|--------|
| Beginning :                | 开始时间   |
| Ending :                   | 终止时间   |
| h :                        | 小时     |
| m :                        | 分钟     |
| Type :                     | 类型     |
| Sudden Com. Amplitude      | 急始变幅   |
| D' HnT ZnT :               |        |
| Deg. of Acti. :            | 活动程度   |
| Maximum Acti. on K-scale : | 最大活动程度 |
| 3 hour Int. :              | 三小时时段  |
| K Index :                  | K 指数   |
| Maximum Range              | 最大幅度   |
| D' HnT ZnT :               |        |

详细说明请见每年第一期。

Explanation of data reports can be found in the first issue of the year.

## DAILY RELATIVE SUNSPOT NUMBERS AND SUNSPOT AREAS

MARCH 1998

| Day  | Gro. | Relative-Numbers |      |      | Sunspot Areas |                 |       |
|------|------|------------------|------|------|---------------|-----------------|-------|
|      |      | N.H.             | S.H. | Sum  | N.H.          | Drawing<br>S.H. | Sum   |
| 1    | 5    | 20               | 36   | 56   | 38            | 136             | 174   |
| 2    | 6    | 20               | 60   | 80   | 64            | 328             | 392   |
| 3    | 4    | 7                | 49   | 56   | 2             | 376             | 378   |
| 4    | 3    | 10               | 28   | 38   | 11            | 534             | 545   |
| 5    | 3    | 20               | 19   | 39   | 23            | 665             | 688   |
| 6    | 2    | 11               | 13   | 24   | 40            | 786             | 826   |
| 7    | 5    | 21               | 27   | 48   | 98            | 266             | 364   |
| 8    | 3    | 9                | 25   | 34   | 27            | 43              | 70    |
| 9    | 3    | 7                | 23   | 30   | 30            | 45              | 75    |
| 10   | 4    | 7                | 37   | 44   | 26            | 144             | 170   |
| 11   | 5    | 7                | 44   | 51   | 19            | 194             | 213   |
| 12   | 6    | 8                | 72   | 80   | 18            | 244             | 262   |
| 13   | 6    | 8                | 60   | 68   | 10            | 248             | 258   |
| 14   | 6    | 7                | 67   | 74   | 7             | 272             | 279   |
| 15   | 6    | 7                | 82   | 89   | 4             | 767             | 771   |
| 16   | 3    | 0                | 79   | 79   | 0             | 918             | 918   |
| 17   | 5    | 7                | 70   | 77   | 5             | 889             | 894   |
| 18   | 6    | 7                | 67   | 74   | 20            | 887             | 907   |
| 19   | 5    | 10               | 58   | 68   | 99            | 855             | 954   |
| 20   | 5    | 23               | 48   | 71   | 35            | 1032            | 1067  |
| 21   | 7    | 15               | 60   | 75   | 22            | 1241            | 1263  |
| 22   | 7    | 20               | 53   | 73   | 20            | 1460            | 1480  |
| 23   | 6    | 15               | 57   | 72   | 64            | 1188            | 1252  |
| 24   | 4    | 17               | 44   | 61   | 85            | 616             | 701   |
| 25   | 6    | 30               | 41   | 71   | 215           | 565             | 780   |
| 26   | 5    | 20               | 51   | 71   | 188           | 581             | 769   |
| 27   | 6    | 20               | 58   | 78   | 205           | 474             | 679   |
| 28   | 6    | 19               | 58   | 77   | 167           | 485             | 652   |
| 29   | 5    | 21               | 49   | 70   | 152           | 563             | 715   |
| 30   | 4    | 8                | 36   | 44   | 5             | 590             | 595   |
| 31   | 3    | 0                | 44   | 44   | 0             | 583             | 583   |
| Mean |      | 12.9             | 48.9 | 61.8 | 54.8          | 579.8           | 634.6 |

# DAILY SUNSPOT OBSERVATIONS

MARCH 1998

| Day  | Group | CMP    |     | Lat | L   | CMD | Type | r/R | Sd  | Corre. Area |     | See. | Remarks |
|------|-------|--------|-----|-----|-----|-----|------|-----|-----|-------------|-----|------|---------|
|      |       | Mo-Day |     |     |     |     |      |     |     | Whole       | Max |      |         |
| 1.08 | 41    | 2-25.1 | 15  | 278 | 54W | CRI | 0.85 | 38  | 36  | 28          | 4   |      |         |
|      | 43    | 2-26.3 | -26 | 262 | 33W | BXO | 0.59 | 8   | 5   | 3           | 4   |      |         |
|      | 44    | 2-24.7 | -19 | 283 | 62W | CSO | 0.87 | 67  | 69  | 65          | 4   |      |         |
|      | 45    | 2-28.2 | -23 | 237 | 9W  | CAI | 0.32 | 118 | 62  | 47          | 4   |      |         |
|      | 46    | 3- 2.3 | 22  | 209 | 17E | AXX | 0.53 | 4   | 2   | 2           | 3   | PLAT |         |
| 2.06 | 41    |        |     |     | 69W | CSO | 0.94 | 38  | 57  | 44          | 4   |      |         |
|      | 43    |        |     |     | 46W | BXI | 0.72 | 17  | 12  | 6           | 4   |      |         |
|      | 44    |        |     |     | 76W | CSI | 0.97 | 67  | 129 | 113         | 4   |      |         |
|      | 45    |        |     |     | 22W | DAI | 0.45 | 315 | 176 | 122         | 4   |      |         |
|      | 46    |        |     |     | 3E  | BXI | 0.48 | 13  | 7   | 2           | 4   |      |         |
|      | 47    | 3- 7.2 | -16 | 145 | 69E | AXX | 0.92 | 8   | 11  | 5           | 4   |      |         |
| 3.07 | 43    |        |     |     | 57W | BXI | 0.83 | 8   | 7   | 4           | 4   |      |         |
|      | 45    |        |     |     | 36W | EAI | 0.62 | 572 | 365 | 207         | 4   |      |         |
|      | 46    |        |     |     | 10W | AXX | 0.51 | 4   | 2   | 2           | 4   |      |         |
|      | 47    |        |     |     | 55E | AXX | 0.80 | 4   | 4   | 4           | 4   |      |         |
| 4.09 | 45    |        |     |     | 50W | EAI | 0.75 | 707 | 531 | 206         | 4   |      |         |
|      | 46    |        |     |     | 24W | BXO | 0.61 | 17  | 11  | 5           | 4   |      |         |
|      | 47    |        |     |     | 41E | AXX | 0.66 | 4   | 3   | 3           | 4   |      |         |
| 5.06 | 45    |        |     |     | 63W | EKI | 0.87 | 648 | 665 | 346         | 4   |      |         |
|      | 46    |        |     |     | 37W | CRI | 0.71 | 29  | 21  | 12          | 4   |      |         |
|      | 48    | 3- 6.9 | 12  | 149 | 24E | AXX | 0.51 | 4   | 2   | 2           | 4   |      |         |
| 6.06 | 45    |        |     |     | 76W | EHI | 0.95 | 471 | 786 | 449         | 4   |      |         |
|      | 46    |        |     |     | 51W | CRO | 0.85 | 42  | 40  | 32          | 4   |      |         |
| 7.06 | 45    |        |     |     | 83W | HHX | 0.98 | 105 | 247 | 237         | 4   |      |         |
|      | 46    |        |     |     | 64W | BXO | 0.93 | 21  | 29  | 12          | 4   |      |         |
|      | 49    | 3-10.7 | -17 | 98  | 48E | BXO | 0.74 | 17  | 12  | 6           | 4   |      |         |
|      | 50    | 3-13.0 | 45  | 68  | 71E | HSX | 0.98 | 29  | 69  | 69          | 4   |      |         |
|      | 51    | 3-13.2 | -39 | 65  | 75E | AXX | 0.95 | 4   | 7   | 7           | 4   |      |         |
| 8.22 | 49    |        |     |     | 33E | CAO | 0.55 | 55  | 33  | 25          | 3   | PLAT |         |
|      | 50    |        |     |     | 55E | HSX | 0.95 | 17  | 27  | 27          | 3   | PLAT |         |
|      | 51    |        |     |     | 61E | BXO | 0.90 | 8   | 10  | 5           | 3   | PLAT |         |
| 9.06 | 49    |        |     |     | 21E | DRI | 0.38 | 50  | 27  | 18          | 3   |      |         |

# DAILY SUNSPOT OBSERVATIONS

MARCH 1998

| CMP       |        | L   | CMD | Type | r/R  | Sd   | Corre. Area |                  |
|-----------|--------|-----|-----|------|------|------|-------------|------------------|
| Day Group | Mo-Day |     |     |      |      |      | Whole       | Max See. Remarks |
| 50        |        |     | 46E | HSX  | 0.91 | 25   | 30          | 30 3             |
| 51        |        |     | 50E | CRI  | 0.82 | 21   | 18          | 11 3             |
| 10.06     | 49     |     | 9E  | CRI  | 0.24 | 46   | 24          | 15 4             |
| 50        |        |     | 34E | HSX  | 0.87 | 25   | 26          | 26 4             |
| 51        |        |     | 38E | DRI  | 0.74 | 97   | 71          | 34 4             |
| 52        | 3-16.5 | -17 | 23  | 84E  | HSX  | 0.98 | 21          | 49 4             |
| 11.04     | 49     |     | 4W  | BXO  | 0.21 | 34   | 17          | 13 4             |
| 50        |        |     | 22E | HRX  | 0.84 | 21   | 19          | 19 4             |
| 51        |        |     | 26E | DRI  | 0.64 | 118  | 77          | 33 4             |
| 52        |        |     | 71E | HSX  | 0.93 | 67   | 92          | 92 4             |
| 53        | 3-15.7 | -21 | 33  | 59E  | BXO  | 0.85 | 8           | 4 4              |
| 12.06     | 49     |     | 18W | BXO  | 0.34 | 17   | 9           | 7 5              |
| 50        |        |     | 12E | CRD  | 0.80 | 21   | 18          | 14 5             |
| 51        |        |     | 13E | EAI  | 0.56 | 177  | 107         | 33 5             |
| 52        |        |     | 58E | HSX  | 0.83 | 126  | 112         | 112 5            |
| 53        |        |     | 46E | BXI  | 0.72 | 8    | 6           | 3 5              |
| 54        | 3-16.3 | -28 | 25  | 51E  | BXI  | 0.79 | 13          | 10 3 5           |
| 13.06     | 49     |     | 32W | AXX  | 0.53 | 13   | 7           | 7 4              |
| 50        |        |     | 1W  | AXX  | 0.79 | 13   | 10          | 7 4              |
| 51        |        |     | 2E  | EAI  | 0.54 | 189  | 112         | 30 4             |
| 52        |        |     | 44E | HSX  | 0.69 | 164  | 113         | 113 4            |
| 53        |        |     | 33E | BXI  | 0.57 | 13   | 8           | 3 4              |
| 54        |        |     | 39E | BXI  | 0.66 | 13   | 8           | 3 4              |
| 14.06     | 49     |     | 45W | AXX  | 0.70 | 8    | 6           | 6 4              |
| 50        |        |     | 13W | AXX  | 0.80 | 8    | 7           | 7 4              |
| 51        |        |     | 9W  | ERI  | 0.56 | 189  | 115         | 25 4             |
| 52        |        |     | 31E | HSX  | 0.52 | 198  | 115         | 115 4            |
| 53        |        |     | 19E | CRI  | 0.40 | 50   | 28          | 7 4              |
| 54        |        |     | 28E | BXO  | 0.57 | 13   | 8           | 5 4              |
| 15.06     | 49     |     | 58W | AXX  | 0.85 | 4    | 4           | 4 5              |
| 50        |        |     | 24W | AXX  | 0.84 | 4    | 4           | 4 5              |
| 51        |        |     | 20W | ESI  | 0.62 | 156  | 99          | 54 5             |
| 52        |        |     | 18E | HSX  | 0.34 | 261  | 139         | 139 5            |
| 53        |        |     | 8E  | EKC  | 0.29 | 997  | 520         | 270 5            |

# DAILY SUNSPOT OBSERVATIONS

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| Day   | Group | CMP    |     | Lat | L | CMD | Type | r/R  | Sd   | Corre. Area |     | See. | Remarks |
|-------|-------|--------|-----|-----|---|-----|------|------|------|-------------|-----|------|---------|
|       |       | Mo-Day |     |     |   |     |      |      |      | Whole       | Max |      |         |
|       | 54    |        |     |     |   | 15E | BXO  | 0.44 | 8    | 5           | 2   | 5    |         |
| 16.12 | 51    |        |     |     |   | 29W | CAO  | 0.67 | 84   | 56          | 42  | 3    | PLAT    |
|       | 52    |        |     |     |   | 5E  | HAX  | 0.17 | 273  | 139         | 139 | 3    | PLAT    |
|       | 53    |        |     |     |   | 5W  | EAC  | 0.26 | 1396 | 723         | 349 | 3    | PLAT    |
| 17.06 | 50    |        |     |     |   | 48W | AXX  | 0.92 | 4    | 5           | 5   | 4    |         |
|       | 51    |        |     |     |   | 43W | CSI  | 0.76 | 67   | 52          | 42  | 4    |         |
|       | 52    |        |     |     |   | 8W  | HSX  | 0.22 | 231  | 119         | 119 | 4    |         |
|       | 53    |        |     |     |   | 18W | EKC  | 0.39 | 1312 | 713         | 274 | 4    |         |
|       | 54    |        |     |     |   | 10W | AXX  | 0.39 | 8    | 5           | 2   | 4    |         |
| 18.06 | 51    |        |     |     |   | 54W | BXO  | 0.84 | 13   | 12          | 8   | 3    |         |
|       | 52    |        |     |     |   | 20W | HSX  | 0.37 | 202  | 109         | 109 | 3    |         |
|       | 53    |        |     |     |   | 31W | EKC  | 0.54 | 1245 | 740         | 317 | 3    |         |
|       | 55    | 3-14.6 | -23 | 48  |   | 46W | AXX  | 0.72 | 8    | 6           | 3   | 3    |         |
|       | 56    | 3-23.3 | 21  | 292 |   | 72E | AXX  | 0.98 | 8    | 20          | 20  | 3    |         |
|       | 57    | 3-24.5 | -20 | 276 |   | 80E | HRX  | 0.98 | 8    | 20          | 20  | 4    | PURP    |
| 19.06 | 51    |        |     |     |   | 65W | AXX  | 0.92 | 8    | 11          | 5   | 4    |         |
|       | 52    |        |     |     |   | 33W | HSX  | 0.54 | 97   | 57          | 57  | 4    |         |
|       | 53    |        |     |     |   | 43W | EKC  | 0.69 | 1123 | 775         | 337 | 4    |         |
|       | 55    |        |     |     |   | 59W | BXI  | 0.84 | 13   | 12          | 4   | 4    |         |
|       | 56    |        |     |     |   | 57E | CSI  | 0.87 | 97   | 99          | 95  | 4    |         |
| 20.06 | 52    |        |     |     |   | 46W | CSO  | 0.70 | 84   | 59          | 56  | 4    |         |
|       | 53    |        |     |     |   | 56W | EKC  | 0.82 | 1110 | 961         | 357 | 4    |         |
|       | 55    |        |     |     |   | 72W | BXI  | 0.93 | 8    | 12          | 6   | 4    |         |
|       | 56    |        |     |     |   | 43E | CRI  | 0.76 | 38   | 29          | 13  | 4    |         |
|       | 58    | 3-19.2 | 34  | 346 |   | 11W | BXO  | 0.67 | 8    | 6           | 3   | 4    |         |
| 21.05 | 52    |        |     |     |   | 58W | HSX  | 0.84 | 55   | 50          | 50  | 4    |         |
|       | 53    |        |     |     |   | 69W | EKC  | 0.92 | 824  | 1049        | 407 | 4    |         |
|       | 55    |        |     |     |   | 81W | AXX  | 0.98 | 13   | 30          | 20  | 4    |         |
|       | 56    |        |     |     |   | 30E | BXI  | 0.64 | 34   | 22          | 14  | 4    |         |
|       | 57    |        |     |     |   | 46E | BXI  | 0.71 | 34   | 24          | 15  | 4    |         |
|       | 59    | 3-25.9 | -25 | 259 |   | 63E | AXX  | 0.89 | 4    | 5           | 5   | 4    |         |
|       | 60    | 3-28.1 | -25 | 229 |   | 83E | HSX  | 0.99 | 25   | 83          | 83  | 4    |         |
| 22.10 | 52    |        |     |     |   | 73W | HSX  | 0.94 | 25   | 38          | 38  | 4    |         |

# DAILY SUNSPOT OBSERVATIONS

MARCH 1998

|       |        | CMP    |     |     |     |      |      | Corre. Area |       |     |              |
|-------|--------|--------|-----|-----|-----|------|------|-------------|-------|-----|--------------|
| Day   | Group  | Mo-Day | Lat | L   | CMD | Type | r/R  | Sd          | Whole | Max | See. Remarks |
| 53    |        |        |     |     | 79W | EHO  | 0.95 | 479         | 800   | 295 | 4            |
| 56    |        |        |     |     | 16E | BXI  | 0.54 | 25          | 15    | 5   | 4            |
| 57    |        |        |     |     | 32E | CSO  | 0.55 | 50          | 30    | 25  | 4            |
| 59    |        |        |     |     | 50E | AXX  | 0.77 | 4           | 3     | 3   | 4            |
| 60    |        |        |     |     | 74E | FSC  | 0.95 | 353         | 589   | 147 | 4            |
| 61    | 3-21.3 |        | 10  | 319 | 11W | BXO  | 0.36 | 8           | 5     | 2   | 4            |
| 23.08 | 52     |        |     |     | 83W | HSX  | 0.99 | 21          | 70    | 70  | 4            |
|       | 53     |        |     |     | 84W | DHI  | 0.99 | 147         | 487   | 376 | 4            |
|       | 56     |        |     |     | 3E  | DSI  | 0.47 | 114         | 64    | 33  | 4            |
|       | 57     |        |     |     | 19E | CSO  | 0.39 | 59          | 32    | 27  | 4            |
|       | 59     |        |     |     | 38E | AXX  | 0.64 | 4           | 3     | 3   | 4            |
|       | 60     |        |     |     | 62E | FHC  | 0.87 | 580         | 596   | 207 | 4            |
| 24.05 | 56     |        |     |     | 10W | CAI  | 0.49 | 147         | 85    | 68  | 4            |
|       | 57     |        |     |     | 6E  | CSI  | 0.25 | 59          | 30    | 26  | 4            |
|       | 59     |        |     |     | 25E | AXX  | 0.51 | 4           | 2     | 2   | 4            |
|       | 60     |        |     |     | 49E | FKC  | 0.76 | 761         | 584   | 265 | 4            |
| 25.06 | 56     |        |     |     | 23W | DAI  | 0.60 | 328         | 205   | 157 | 4            |
|       | 57     |        |     |     | 6W  | BXO  | 0.24 | 17          | 9     | 4   | 4            |
|       | 59     |        |     |     | 11E | AXX  | 0.34 | 8           | 4     | 2   | 4            |
|       | 60     |        |     |     | 36E | FKC  | 0.62 | 866         | 552   | 335 | 4            |
|       | 62     | 3-25.7 | 22  | 261 | 8E  | AXX  | 0.49 | 4           | 2     | 2   | 4            |
|       | 63     | 3-30.1 | 30  | 202 | 71E | AXX  | 0.97 | 4           | 8     | 8   | 4            |
| 26.24 | 56     |        |     |     | 39W | DAI  | 0.71 | 257         | 183   | 141 | 4            |
|       | 57     |        |     |     | 21W | AXX  | 0.39 | 8           | 5     | 2   | 4            |
|       | 59     |        |     |     | 5W  | AXX  | 0.33 | 8           | 4     | 2   | 4            |
|       | 60     |        |     |     | 22E | FKC  | 0.52 | 980         | 572   | 418 | 4            |
|       | 63     |        |     |     | 54E | AXX  | 0.89 | 4           | 5     | 5   | 4            |
| 27.06 | 56     |        |     |     | 50W | DAI  | 0.83 | 227         | 202   | 172 | 5            |
|       | 57     |        |     |     | 31W | AXX  | 0.53 | 8           | 5     | 2   | 5            |
|       | 59     |        |     |     | 16W | AXX  | 0.41 | 8           | 5     | 2   | 5            |
|       | 60     |        |     |     | 12E | FHI  | 0.39 | 841         | 457   | 354 | 5            |
|       | 63     |        |     |     | 40E | AXX  | 0.79 | 4           | 3     | 3   | 5            |
|       | 64     | 3-26.8 | -27 | 247 | 4W  | BXO  | 0.34 | 13          | 7     | 2   | 5            |
| 28.06 | 56     |        |     |     | 63W | CSI  | 0.92 | 126         | 161   | 134 | 4            |

# DAILY SUNSPOT OBSERVATIONS

MARCH 1998

|       |       | CMP    |     | L   | CMD Type | r/R  | Sd  | Corre. Area |     |      | Remarks |
|-------|-------|--------|-----|-----|----------|------|-----|-------------|-----|------|---------|
| Day   | Group | Mo-Day | Lat |     |          |      |     | Whole       | Max | See. |         |
| 57    |       |        |     |     | 46W AXX  | 0.74 | 8   | 6           | 3   | 4    |         |
| 59    |       |        |     |     | 30W AXX  | 0.56 | 8   | 5           | 3   | 4    |         |
| 60    |       |        |     |     | 1E FHI   | 0.32 | 866 | 458         | 382 | 4    |         |
| 63    |       |        |     |     | 28E AXX  | 0.70 | 8   | 6           | 3   | 4    |         |
| 64    |       |        |     |     | 17W BXI  | 0.44 | 29  | 16          | 7   | 4    |         |
| 29.08 | 56    |        |     |     | 76W CSI  | 0.98 | 59  | 138         | 118 | 4    |         |
|       | 60    |        |     |     | 12W FHI  | 0.33 | 749 | 397         | 364 | 4    |         |
|       | 63    |        |     |     | 15E BXI  | 0.63 | 21  | 14          | 8   | 4    |         |
|       | 64    |        |     |     | 30W BXI  | 0.57 | 13  | 8           | 3   | 4    |         |
|       | 65    | 4- 3.6 | -21 | 143 | 80E CSO  | 0.98 | 67  | 158         | 138 | 4    |         |
| 30.07 | 60    |        |     |     | 24W CHI  | 0.47 | 723 | 410         | 391 | 4    |         |
|       | 63    |        |     |     | 1E AXX   | 0.59 | 8   | 5           | 3   | 4    |         |
|       | 64    |        |     |     | 44W BXO  | 0.72 | 13  | 9           | 3   | 4    |         |
|       | 65    |        |     |     | 68E DSO  | 0.92 | 135 | 171         | 91  | 4    |         |
| 31.35 | 60    |        |     |     | 39W FHI  | 0.64 | 749 | 489         | 404 | 5    |         |
|       | 64    |        |     |     | 64W AXX  | 0.90 | 4   | 5           | 5   | 5    |         |
|       | 65    |        |     |     | 48E FSI  | 0.75 | 118 | 89          | 41  | 5    |         |

## PREDICTED SMOOTHED SUNSPOT NUMBERS

OCTOBER 1997 — SEPTEMBER 1998

| Date | Oct 97 | Nov 97 | Dec 97 | Jan 98 | Feb 98 | Mar 98 |
|------|--------|--------|--------|--------|--------|--------|
| R'   | 32.0   | 34.9   | 38.5   | 43.0   | 47.3   | 50.6   |
| E'   | 1.0    | 1.7    | 2.7    | 5.2    | 7.1    | 8.6    |
| Date | Apr 98 | May 98 | Jun 98 | Jul 98 | Aug 98 | Sep 98 |
| R'   | 53.5   | 57.3   | 61.1   | 65.0   | 68.9   | 72.4   |
| E'   | 10.2   | 12.0   | 17.1   | 18.8   | 22.0   | 21.7   |

R': The predicted value of monthly smoothed sunspot numbers.

E': The error of the predicted value.

# H-ALPHA SOLAR FLARES

MARCH 1998

| 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   | URUM | 0210    | 0217 | 0224  | S19 | 284 | W59 | .852             | 16    | 0.3  | SN  | C    | 44   | D   |
| 2   | URUM | 0232    | 0238 | 0248  | S25 | 236 | W25 | .498             | 80    | 1.0  | SB  | C    | 45   | E   |
| 2   | URUM | 0641E   | 0641 | 0649  | S22 | 238 | W29 | .521             | 48    | 0.6  | SB  | P    | 45   | D   |
| 13  | URUM | 0413    | 0420 | 0428  | S19 | 141 | W76 | .962             | 32    |      | SB  | C    | 49   | G   |
| 14  | URUM | 0441    | 0445 | 0452  | S25 | 33  | E18 | .422             | 32    | 0.4  | SN  | C    | 53   | D   |
| 15  | URUM | 0500    | 0511 | 0515  | S24 | 28  | E10 | .333             | 32    | 0.4  | SN  | C    | 53   | E   |
| 18  | URUM | 1105    | 1120 | 1124D | S26 | 25  | W30 | .562             | 273   | 3.4  | 1B  | P    | 53   | E   |
| 19  | URUM | 0416E   | 0416 | 0420  | S21 | 35  | W49 | .755             | 32    | 0.5  | SN  | P    | 53   | D   |
| 19  | URUM | 0513    | 0517 | 0517D | N21 | 290 | E55 | .876             | 48    | 1.0  | SB  | P    | 56   | D   |
| 26  | URUM | 0250    | 0254 | 0254D | N22 | 290 | W35 | .702             | 32    | 0.5  | SN  | P    | 56   | D   |
| 31  | URUM | 0313E   | 0313 | 0317  | S26 | 238 | W50 | .779             | 32    | 0.5  | SN  | P    | 60   | D   |
| 31  | URUM | 0313E   | 0313 | 0325  | S22 | 142 | E47 | .738             | 32    | 0.5  | SF  | P    | 65   | D   |
| 31  | URUM | 0325E   | 0325 | 0329  | S24 | 231 | W42 | .698             | 32    | 0.5  | SN  | P    | 60   | D   |
| 31  | URUM | 0329    | 0333 | 0344  | S26 | 235 | W47 | .748             | 48    | 0.8  | SB  | C    | 60   | D   |
| 31  | URUM | 0341    | 0344 | 0344D | S26 | 237 | W49 | .773             | 32    | 0.5  | SF  | P    | 60   | D   |

Late Data for January 1998

|    |      |       |       |       |     |     |     |      |     |     |    |   |  |   |
|----|------|-------|-------|-------|-----|-----|-----|------|-----|-----|----|---|--|---|
| 04 | URUM | 0307  | 0317  | 0317D | S29 | 245 | W 3 | .442 | 161 | 1.8 | SB | P |  | G |
| 06 | URUM | 0239E | 0239U | 0239D | N10 | 175 | E40 | .671 | 96  | 1.3 | SN | P |  | G |

# INTERVALS OF H-ALPHA FLARE PATROL OBSERVATION

MARCH 1998

| Day | From | To   | From | To   | From | To  | From | To | From | To | From | To |
|-----|------|------|------|------|------|-----|------|----|------|----|------|----|
| 1   | 210  | 539  |      |      |      |     |      |    |      |    |      |    |
| 2   | 209  | 649  |      |      |      |     |      |    |      |    |      |    |
| 3   | 353  | 445  |      |      |      |     |      |    |      |    |      |    |
| 4   |      |      |      |      |      |     |      |    |      |    |      |    |
| 5   |      |      |      |      |      |     |      |    |      |    |      |    |
| 6   |      |      |      |      |      |     |      |    |      |    |      |    |
| 7   |      |      |      |      |      |     |      |    |      |    |      |    |
| 8   | 417  | 450  |      |      |      |     |      |    |      |    |      |    |
| 9   | 144  | 331  |      |      |      |     |      |    |      |    |      |    |
| 10  | 327  | 541  |      |      |      |     |      |    |      |    |      |    |
| 11  |      |      |      |      |      |     |      |    |      |    |      |    |
| 12  | 339  | 542  | 818  | 913  |      |     |      |    |      |    |      |    |
| 13  | 249  | 513  |      |      |      |     |      |    |      |    |      |    |
| 14  | 325  | 500  |      |      |      |     |      |    |      |    |      |    |
| 15  | 105  | 519  |      |      |      |     |      |    |      |    |      |    |
| 16  |      |      |      |      |      |     |      |    |      |    |      |    |
| 17  |      |      |      |      |      |     |      |    |      |    |      |    |
| 18  | 125  | 516  | 742  | 1124 |      |     |      |    |      |    |      |    |
| 19  | 405  | 517  | 800  | 840  |      |     |      |    |      |    |      |    |
| 20  |      |      |      |      |      |     |      |    |      |    |      |    |
| 21  | 109  | 140  |      |      |      |     |      |    |      |    |      |    |
| 22  | 113  | 303  |      |      |      |     |      |    |      |    |      |    |
| 23  | 712  | 812  |      |      |      |     |      |    |      |    |      |    |
| 24  | 920  | 1013 |      |      |      |     |      |    |      |    |      |    |
| 25  |      |      |      |      |      |     |      |    |      |    |      |    |
| 26  | 116  | 254  | 352  | 510  | 844  | 944 |      |    |      |    |      |    |
| 27  | 156  | 227  |      |      |      |     |      |    |      |    |      |    |
| 28  |      |      |      |      |      |     |      |    |      |    |      |    |
| 29  | 138  | 538  | 757  | 838  |      |     |      |    |      |    |      |    |
| 30  | 110  | 520  | 826  | 900  |      |     |      |    |      |    |      |    |
| 31  | 044  | 438  |      |      |      |     |      |    |      |    |      |    |

Combined reports from the observatories listed below:

URUM

# OBSERVATION OF MAGNETIC AND VELOCITY FIELDS OF SOLAR ACTIVE REGIONS

MARCH 1998

HUAIROU ST. BEIJING OBS.

| Day | LO    | Huairou<br>Region | Lat   | L     | Data                             |
|-----|-------|-------------------|-------|-------|----------------------------------|
| 1   | 226.3 | 26                | 11    | 276   | S4 L4 D4 V4 S5 L5 D5 V5          |
|     |       | 27                | -31   | 265   | S4 L4 D4 V4 S5 L5 D5 V5 T5 Q5 U5 |
|     |       | 28                | -26   | 264   | S4 L4 D4 V4 S5 L5 D5 V5 T5 Q5 U5 |
|     |       | 29                | -20   | 237   | S4 L4 D4 V4 S5 L5 D5 V5 T5 Q5 U5 |
| 2   | 213.1 | 26                |       |       | S5 L5                            |
|     |       | 27                |       |       | S5 L5                            |
|     |       | 28                |       |       | S5 L5                            |
|     |       | 29                |       |       | S5 L5                            |
| 6   | 160.4 | 29                |       |       | S4 L4 D4 V4 S5 L5 D5 V5 T5 Q5 U5 |
|     |       | 30                | (22)  | (209) | S4 L4 D4 V4 S5 L5 D5 V5 T5 Q5 U5 |
| 7   | 147.2 | 29                |       |       | S5 L5                            |
|     |       | 30                |       |       | S5 L5                            |
|     |       | 31                | -16   | 102   | S5 L5                            |
|     |       | 32                | -38   | 67    | S5 L5                            |
| 8   | 134.0 | 31                |       |       | S5 L5                            |
|     |       | 32                |       |       | S5 L5                            |
| 9   | 120.9 | 31                |       |       | S5 L5                            |
|     |       | 32                |       |       | S5 L5                            |
| 11  | 94.5  | 31                |       |       | S5 L5                            |
|     |       | 32                |       |       | S5 L5                            |
|     |       | 33                | (-21) | 33    | S5 L5                            |
|     |       | 34                | -18   | 23    | S5 L5                            |
| 12  | 81.3  | 31                |       |       | D4 V4 S5 L5 D5 V5 T5 Q5 U5       |
|     |       | 32                |       |       | D4 V4 S5 L5 D5 V5 T5 Q5 U5       |
|     |       | 33                |       |       | D4 V4 S5 L5 D5 V5 T5 Q5 U5       |
|     |       | 34                |       |       | D4 V4 S5 L5 D5 V5 T5 Q5 U5       |
| 13  | 68.2  | 31                |       |       | S5 L5                            |
|     |       | 32                |       |       | D4 V4 S5 L5 D5 V5 T5 Q5 U5       |
|     |       | 33                |       |       | D4 V4 S5 L5 D5 V5 T5 Q5 U5       |
|     |       | 34                |       |       | D4 V4 S5 L5 D5 V5 T5 Q5 U5       |
| 14  | 55.0  | 31                |       |       | S5 L5                            |

# OBSERVATION OF MAGNETIC AND VELOCITY FIELDS OF SOLAR ACTIVE REGIONS

MARCH 1998

HUAIROU ST. BEIJING OBS.

| Day | L0    | Huairou<br>Region | Lat | L     | Data                             |
|-----|-------|-------------------|-----|-------|----------------------------------|
|     |       | 32                |     |       | D4 V4 S5 L5 D5 V5 T5 Q5 U5       |
|     |       | 33                |     |       | S4 L4 D4 V4 S5 L5 D5 V5 T5 Q5 U5 |
|     |       | 34                |     |       | S4 L4 D4 V4 S5 L5 D5 V5 T5 Q5 U5 |
| 15  | 41.8  | 32                |     |       | S5 L5                            |
|     |       | 33                |     |       | S4 L4 D4 V4 S5 L5 D5 V5 T5 Q5 U5 |
|     |       | 34                |     |       | S4 L4 D4 V4 S5 L5 D5 V5 T5 Q5 U5 |
| 16  | 28.6  | 32                |     |       | L4 V4 S5 L5 V5 Q5 U5             |
|     |       | 33                |     |       | S4 L4 D4 V4 S5 L5 D5 V5 T5 Q5 U5 |
|     |       | 34                |     |       | S4 L4 D4 V4 S5 L5 D5 V5 T5 Q5 U5 |
| 17  | 15.4  | 33                |     |       | S5 L5                            |
|     |       | 34                |     |       | S5 L5                            |
| 19  | 349.1 | 33                |     |       | S5 L5                            |
|     |       | 34                |     |       | S5 L5                            |
|     |       | 35                | 22  | 288   | S5 L5                            |
| 20  | 335.9 | 33                |     |       | S5 L5                            |
|     |       | 34                |     |       | S5 L5                            |
|     |       | 35                |     |       | S5 L5                            |
| 21  | 322.7 | 33                |     |       | S4 L4 D4 V4 S5 L5 D5 V5 T5 Q5 U5 |
|     |       | 34                |     |       | S4 L4 D4 V4 S5 L5 D5 V5 T5 Q5 U5 |
|     |       | 35                |     |       | S4 L4 D4 V4 S5 L5 D5 V5 T5 Q5 U5 |
|     |       | 36                | -24 | (259) | S4 L4 D4 V4 S5 L5 D5 V5 T5 Q5 U5 |
|     |       | 37                | -29 | (229) | S4 L4 D4 V4 S5 L5 D5 V5 T5 Q5 U5 |
| 22  | 309.5 | 33                |     |       | D4 V4 S5 L5 D5 V5 T5 Q5 U5       |
|     |       | 34                |     |       | D4 V4 S5 L5 D5 V5 T5 Q5 U5       |
|     |       | 35                |     |       | S4 L4 D4 V4 S5 L5 D5 V5 T5 Q5 U5 |
|     |       | 36                |     |       | S4 L4 D4 V4 S5 L5 D5 V5 T5 Q5 U5 |
|     |       | 37                |     |       | S4 L4 D4 V4 S5 L5 D5 V5 T5 Q5 U5 |
| 23  | 296.3 | 33                |     |       | S5 L5                            |
|     |       | 34                |     |       | S5 L5                            |
|     |       | 35                |     |       | S4 L4 D4 V4 S5 L5 D5 V5 T5 Q5 U5 |
|     |       | 36                |     |       | S4 L4 D4 V4 S5 L5 D5 V5 T5 Q5 U5 |

# OBSERVATION OF MAGNETIC AND VELOCITY FIELDS OF SOLAR ACTIVE REGIONS

MARCH 1998

HUAIROU ST. BEIJING OBS.

| Day | L0    | Huairou<br>Region | Lat   | L     | Data                             |
|-----|-------|-------------------|-------|-------|----------------------------------|
|     |       | 37                |       |       | S4 L4 D4 V4 S5 L5 D5 V5 T5 Q5 U5 |
| 24  | 283.1 | 35                |       |       | S4 D4 V4 S5 L5 D5 V5 T5 Q5 U5    |
|     |       | 36                |       |       | S4 L4 D4 V4 S5 L5 D5 V5 T5 Q5 U5 |
|     |       | 37                |       |       | S4 L4 D4 V4 S5 L5 D5 V5 T5 Q5 U5 |
| 25  | 270.0 | 35                |       |       | S5 L5                            |
|     |       | 36                |       |       | S5 L5                            |
|     |       | 37                |       |       | S5 L5                            |
| 29  | 217.2 | 35                |       |       | S5 L5                            |
|     |       | 36                |       |       | S5 L5                            |
|     |       | 37                |       |       | S5 L5 T5 Q5 U5                   |
|     |       | 38                | (-27) | (247) | S5 L5 T5 Q5 U5                   |
|     |       | 39                | (21)  | 293   | S5 L5 T5 Q5 U5                   |
| 30  | 204.0 | 37                |       |       | S5 L5                            |
|     |       | 38                |       |       | S5 L5                            |
|     |       | 39                |       |       | S5 L5                            |

NPL : 1

# SOLAR RADIO EMISSION FLUX AND INTERVALS OF PATROL OBSERVATION

MARCH 1998

| Day | BEIJ | PURP | BEIJ | PURP |
|-----|------|------|------|------|
|     | 2840 | 2700 | 2840 | 2700 |
|     | From | From | From | From |
|     | To   | To   | To   | To   |

|    |     |     |           |           |
|----|-----|-----|-----------|-----------|
| 1  | 92  | 122 | 0000 0946 | 0038 0803 |
| 2  | 94  | 126 | 2336 2400 | 0038 0231 |
| 3  | 93  | 120 | 2339 2400 | 0428 0805 |
| 4  | 93  | 118 | 2338 2400 | 0320 0800 |
| 5  | 93  | 124 | 2352 2400 | 0050 0800 |
| 6  | 91  | 116 | 0000 0942 | 0032 0805 |
| 7  | 92  | 118 | 2350 2400 | 0126 0800 |
| 8  | 87  | 113 | 2358 2400 | 0050 0600 |
| 9  | 86  | 91  | 2327 2400 | 0046 0800 |
| 10 | 87  | 118 | 2333 2400 | 0028 0805 |
| 11 | 94  | 137 | 0001 0935 | 0032 0807 |
| 12 | 99  | 132 | 2318 2400 | 0026 0806 |
| 13 | 97  | 133 | 2323 2400 | 0024 0806 |
| 14 | 103 | 142 | 2348 2400 | 0033 0805 |
| 15 | 121 | 159 | 2329 2400 | 0031 0807 |
| 16 | 123 | 174 | 2345 2400 | 0056 0800 |
| 17 | 122 | 168 | 2342 2400 | 0046 0800 |
| 18 | 120 | 171 | 2336 2400 | 0039 0810 |
|    |     |     | 2332 2400 |           |

# SOLAR RADIO EMISSION FLUX AND INTERVALS OF PATROL OBSERVATION

MARCH 1998

| Day  | BEIJ  | PURP  | BEIJ      | PURP      |
|------|-------|-------|-----------|-----------|
|      | 2840  | 2700  | 2840      | 2700      |
|      | From  | From  | From      | From      |
|      | To    | To    | To        | To        |
|      |       |       |           |           |
| 19   | 116   | 165   | 0000 0945 | 0038 0805 |
|      |       |       | 2342 2400 |           |
|      |       |       | 0000 0948 |           |
| 20   | 118   |       | 2234 2400 |           |
|      |       |       |           |           |
| 21   | 123   | 177   | 0000 0947 | 0313 0804 |
|      |       |       | 2235 2400 |           |
|      |       |       | 0000 0953 |           |
| 22   | 122   | 176   | 2234 2400 | 0032 0802 |
|      |       |       | 0000 0956 |           |
| 23   | 127   | 168   | 2342 2400 | 0045 0810 |
|      |       |       | 0000 1002 |           |
| 24   | 117   |       | 2325 2400 | 0044 0810 |
|      |       |       | 0000 0957 |           |
| 25   | 117   |       | 2333 2400 | 0047 0808 |
|      |       |       | 0000 0948 |           |
| 26   | 114   | 129   | 2229 2400 | 0108 0808 |
|      |       |       | 0000 0946 |           |
| 27   | 107   | 138   | 2332 2400 | 0304 0809 |
|      |       |       | 0000 0950 |           |
| 28   | 106   | 143   | 2320 2400 | 0043 0800 |
|      |       |       | 0000 0925 |           |
| 29   | 101   | 140   | 2317 2400 | 0042 0426 |
|      |       |       | 0000 1003 |           |
| 30   | 98    | 134   | 0000 0750 | 0050 0806 |
|      |       |       |           |           |
| 31   | 113   |       |           | 0042 0800 |
| Mean | 105.4 | 138.9 |           |           |

## SOLAR RADIO EMISSION OUTSTANDING OCCURRENCES

MARCH 1998

| Day | Freq | Sta | Type | Start<br>(UT) | Time of<br>Maximum<br>(UT) | Duration<br>(Min) | Peak<br>Flux | Rel<br>Density | Mean |
|-----|------|-----|------|---------------|----------------------------|-------------------|--------------|----------------|------|
|-----|------|-----|------|---------------|----------------------------|-------------------|--------------|----------------|------|

|    |      |      |        |        |        |       |      |      |      |
|----|------|------|--------|--------|--------|-------|------|------|------|
| 02 | 2840 | BEIJ | 1 S    | 0610.0 | 0613.5 | 5.0   | 3.4  | 3.6  | 3.6  |
| 03 | 2840 | BEIJ | 3 S    | 0153.0 | 0154.9 | 10.0  | 3.9  | 3.9  | 3.9  |
| 03 | 2840 | BEIJ | 3 S    | 0715.0 | 0718.0 | 5.0   | 3.9  | 4.2  | 4.2  |
| 04 | 2840 | BEIJ | 5 S    | 0553.0 | 0555.8 | 18.0  | 3.6  | 3.9  | 3.9  |
| 05 | 2840 | BEIJ | 1 S    | 0810.0 | 0812.3 | 4.0   | 3.7  | 4.1  | 4.1  |
| 14 | 2700 | PURP | 2 S/F  | 0744.3 | 0745.6 | 8.7   | 5.0  |      |      |
| 16 | 2840 | BEIJ | 41 F   | 0056.0 | 0105.9 | 18.0  | 17.9 | 14.6 |      |
| 16 | 2840 | BEIJ | 1 S    | 0450.0 | 0453.5 | 9.0   | 5.4  | 5.3  | 5.3  |
| 16 | 2840 | BEIJ | 1 S    | 0520.0 | 0526.2 | 8.0   | 3.7  | 3.0  | 3.0  |
| 17 | 2840 | BEIJ | 5 S    | 0026.0 | 0032.1 | 24.0  | 7.2  | 5.9  | 5.9  |
| 17 | 2840 | BEIJ | 5 S    | 0419.0 | 0423.0 | 16.0  | 4.7  | 3.8  | 3.8  |
| 17 | 2840 | BEIJ | 1 S    | 0522.0 | 0524.8 | 8.0   | 9.0  | 7.4  | 7.4  |
| 18 | 2840 | BEIJ | 1 S    | 0034.0 | 0036.8 | 5.0   | 4.7  | 3.9  | 3.9  |
| 18 | 2840 | BEIJ | 20 GRF | 0209.0 | 0258.4 | 218.0 | 8.7  | 7.3  | 7.3  |
| 19 | 2840 | BEIJ | 45 C   | 0115.0 | 0126.5 | 22.0  | 23.8 | 20.5 |      |
| 19 | 2700 | PURP | 3 S    | 0121.7 | 0126.3 | 8.6   | 32.0 |      |      |
| 19 | 2840 | BEIJ | 5 S    | 0137.0 | 0144.5 | 23.0  | 10.9 | 9.4  | 9.4  |
| 19 | 2840 | BEIJ | 1 S    | 0510.0 | 0515.2 | 8.0   | 4.0  | 3.4  | 3.4  |
| 20 | 2840 | BEIJ | 1 S    | 0443.0 | 0446.1 | 6.0   | 2.1  | 1.8  | 1.8  |
| 21 | 2700 | PURP | 3 S    | 0720.8 | 0721.4 | 6.6   | 46.0 |      |      |
| 22 | 2840 | BEIJ | 4 S/F  | 0651.0 | 0657.5 | 36.0  | 57.9 | 47.4 |      |
| 22 | 2700 | PURP | 5 S    | 0652.3 | 0657.0 | 10.5  | 80.0 |      |      |
| 23 | 2840 | BEIJ | 1 S    | 0250.0 | 0259.0 | 18.0  | 13.2 | 10.4 |      |
| 24 | 2840 | BEIJ | 1 S    | 0146.0 | 0148.0 | 5.0   | 4.4  | 3.5  | 3.5  |
| 24 | 2840 | BEIJ | 1 S    | 0441.0 | 0443.0 | 4.0   | 9.2  | 7.3  | 7.3  |
| 24 | 2840 | BEIJ | 41 F   | 0745.0 | 0748.0 | 5.0   | 5.5  | 4.4  | 4.4  |
| 25 | 2840 | BEIJ | 1 S    | 0216.0 | 0218.0 | 4.0   | 2.9  | 2.5  | 2.5  |
| 25 | 2840 | BEIJ | 2 S/F  | 2356.0 | 0001.0 | 11.0  | 4.4  | 3.9  | 3.9  |
| 26 | 2840 | BEIJ | 5 S    | 0050.0 | 0053.0 | 7.0   | 3.7  | 3.2  | 3.2  |
| 27 | 2840 | BEIJ | 20 GRF | 0544.0 | 0552.0 | 16.0  | 2.9  | 2.8  | 2.8  |
| 27 | 2840 | BEIJ | 1 S    | 0848.0 | 0849.0 | 3.0   | 2.5  | 2.4  | 2.4  |
| 28 | 2840 | BEIJ | 1 S    | 0128.0 | 0131.0 | 6.0   | 7.6  | 7.2  | 7.2  |
| 28 | 2840 | BEIJ | 2 S/F  | 0131.5 | 0131.7 | 3.0   | 13.9 | 13.1 | 13.1 |
| 28 | 2840 | BEIJ | 1 S    | 0704.0 | 0710.0 | 7.0   | 8.9  | 8.4  | 8.4  |
| 28 | 2840 | BEIJ | 5 S    | 0711.0 | 0713.0 | 29.0  | 14.3 | 13.5 | 13.5 |
| 31 | 2840 | BEIJ | 5 S    | 0451.0 | 0503.5 | 28.0  | 5.5  | 4.9  | 4.9  |
| 31 | 2840 | BEIJ | 5 S    | 0535.0 | 0546.2 | 28.0  | 6.7  | 5.9  | 5.9  |
| 31 | 2840 | BEIJ | 1 S    | 0655.0 | 0657.6 | 7.0   | 3.6  | 3.2  | 3.2  |

# COSMIC RAY NEUTRON INTENSITY Real Counts: 256 Times (Tabulated Counts Plus 1500)

MAR 1998

U.T. Hours at End of Interval

| Day | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  | 11  | 12  | 13  | 14  | 15  | 16  | 17  | 18  | 19  | 20  | 21  | 22  | 23    | 24    | Mean  |       |    |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|-------|-------|-------|----|
| 1   | 520 | 524 | 513 | 504 | 514 | 508 | 503 | 504 | 513 | 509 | 514 | 507 | 503 | 509 | 516 | 522 | 515 | 517 | 515 | 517 | 515 | 516 | 518   | 522   | 513.3 |       |    |
| 2   | 519 | 521 | 515 | 499 | 520 | 514 | 512 | 515 | 520 | 517 | 516 | 507 | 512 | 509 | 516 | 511 | 519 | 516 | 520 | 516 | 520 | 515 | 518   | 528   | 515.6 |       |    |
| 3   | 525 | 527 | 524 | 522 | 528 | 521 | 524 | 518 | 519 | 525 | 523 | 515 | 512 | 519 | 511 | 518 | 515 | 517 | 523 | 518 | 521 | 515 | 527   | 532   | 520.8 |       |    |
| 4   | 526 | 522 | 525 | 522 | 517 | 518 | 512 | 513 | 513 | 508 | 519 | 524 | 528 | 526 | 524 | 527 | 524 | 534 | 531 | 528 | 537 | 527 | 523.0 | 24    |       |       |    |
| 5   | 512 | 520 | 510 | 507 | 507 | 513 | 506 | 511 | 514 | 502 | 507 | 508 | 500 | 504 | 508 | 518 | 514 | 513 | 511 | 519 | 512 | 509 | 502   | 522   | 510.4 |       |    |
| 6   | 518 | 517 | 512 | 509 | 513 | 506 | 517 | 503 | 505 | 494 | 511 | 510 | 509 | 508 | 501 | 512 | 505 | 511 | 508 | 521 | 512 | 517 | 517   | 520   | 510.7 |       |    |
| 7   | 517 | 519 | 515 | 502 | 509 | 510 | 514 | 508 | 509 | 515 | 509 | 507 | 517 | 513 | 509 | 516 | 521 | 518 | 503 | 508 | 525 | 513 | 515   | 515   | 512.8 |       |    |
| 8   | 512 | 504 | 504 | 517 | 511 | 507 | 511 | 505 | 510 | 503 | 510 | 514 | 504 | 519 | 504 | 520 | 505 | 509 | 516 | 503 | 516 | 509 | 515   | 511   | 520   | 510.6 |    |
| 9   | 515 | 506 | 504 | 522 | 520 | 518 | 520 | 527 | 528 | 528 | 533 | 534 | 528 | 518 | 526 | 532 | 530 | 534 | 540 | 537 | 530 | 540 | 542   | 536   | 527.1 |       |    |
| 10  | 538 | 530 | 526 | 520 | 518 | 529 | 532 | 529 | 546 | 532 | 526 | 545 | 531 | 535 | 531 | 542 | 548 | 555 | 553 | 552 | 551 | 568 | 555   | 544.9 | 24    |       |    |
| 11  | 553 | 543 | 541 | 543 | 545 | 550 | 541 | 543 | 552 | 536 | 550 | 537 | 546 | 537 | 540 | 550 | 549 | 548 | 534 | 546 | 546 | 545 | 548   | 555   | 544.9 | 24    |    |
| 12  | 553 | 548 | 550 | 545 | 548 | 552 | 552 | 543 | 540 | 536 | 543 | 536 | 527 | 540 | 534 | 540 | 539 | 530 | 534 | 532 | 540 | 550 | 553   | 557   | 542.6 | 24    |    |
| 13  | 552 | 541 | 545 | 554 | 559 | 551 | 551 | 537 | 545 | 537 | 534 | 537 | 547 | 547 | 533 | 533 | 532 | 534 | 542 | 530 | 539 | 544 | 548   | 551   | 542.6 | 24    |    |
| 14  | 556 | 556 | 566 | 564 | 554 | 555 | 551 | 555 | 549 | 540 | 546 | 553 | 544 | 538 | 533 | 556 | 546 | 547 | 553 | 557 | 551 | 565 | 560   | 553   | 559   | 552.1 | 24 |
| 15  | 565 | 553 | 556 | 550 | 544 | 545 | 550 | 547 | 546 | 555 | 555 | 550 | 549 | 558 | 559 | 565 | 559 | 549 | 558 | 554 | 555 | 562 | 562   | 573   | 555.4 | 24    |    |
| 16  | 562 | 563 | 563 | 565 | 566 | 561 | 565 | 565 | 558 | 551 | 555 | 550 | 548 | 544 | 553 | 551 | 555 | 567 | 554 | 557 | 551 | 568 | 555   | 557   | 557.6 | 24    |    |
| 17  | 553 | 553 | 544 | 541 | 544 | 542 | 544 | 544 | 542 | 544 | 535 | 540 | 536 | 537 | 546 | 545 | 538 | 540 | 545 | 545 | 552 | 540 | 545   | 545   | 544.1 | 24    |    |
| 18  | 548 | 545 | 542 | 533 | 550 | 553 | 549 | 542 | 545 | 547 | 552 | 538 | 547 | 547 | 544 | 549 | 553 | 564 | 548 | 535 | 554 | 550 | 545   | 559   | 547.9 | 24    |    |
| 19  | 576 | 573 | 574 | 550 | 565 | 582 | 578 | 574 | 563 | 573 | 565 | 576 | 573 | 553 | 548 | 569 | 573 | 564 | 561 | 559 | 568 | 558 | 559   | 582   | 566.9 | 24    |    |
| 20  | 568 | 569 | 565 | 558 | 565 | 562 | 553 | 552 | 545 | 541 | 543 | 538 | 546 | 537 | 534 | 545 | 546 | 558 | 548 | 552 | 556 | 551 | 554   | 549   | 547   | 550.7 | 24 |
| 21  | 550 | 543 | 538 | 538 | 541 | 546 | 542 | 550 | 545 | 544 | 553 | 550 | 557 | 559 | 562 | 566 | 569 | 561 | 543 | 554 | 552 | 544 | 548   | 545   | 547   | 549.5 | 24 |
| 22  | 540 | 538 | 537 | 555 | 553 | 549 | 545 | 547 | 545 | 551 | 526 | 533 | 532 | 531 | 525 | 533 | 528 | 539 | 538 | 523 | 525 | 537 | 532   | 548   | 537.9 | 24    |    |
| 23  | 537 | 538 | 526 | 538 | 541 | 550 | 536 | 538 | 541 | 546 | 541 | 537 | 531 | 536 | 526 | 523 | 530 | 532 | 528 | 532 | 525 | 536 | 541   | 538   | 535.3 | 24    |    |
| 24  | 545 | 542 | 536 | 542 | 535 | 537 | 534 | 533 | 525 | 525 | 528 | 533 | 535 | 524 | 538 | 539 | 531 | 534 | 532 | 537 | 533 | 537 | 540   | 548   | 535.1 | 24    |    |
| 25  | 547 | 545 | 534 | 522 | 521 | 513 | 510 | 510 | 521 | 516 | 519 | 530 | 531 | 530 | 532 | 537 | 527 | 522 | 519 | 527 | 521 | 523 | 520   | 514   | 524.6 | 24    |    |
| 26  | 509 | 507 | 515 | 518 | 520 | 507 | 508 | 501 | 498 | 506 | 512 | 511 | 509 | 518 | 520 | 510 | 512 | 513 | 523 | 510 | 516 | 516 | 513   | 530   | 512.6 | 24    |    |
| 27  | 515 | 512 | 519 | 520 | 530 | 516 | 513 | 520 | 529 | 524 | 516 | 520 | 512 | 512 | 510 | 515 | 515 | 503 | 509 | 512 | 504 | 514 | 517   | 517   | 515.6 | 24    |    |
| 28  | 514 | 519 | 517 | 514 | 516 | 517 | 515 | 516 | 509 | 513 | 513 | 524 | 521 | 514 | 515 | 516 | 515 | 514 | 515 | 511 | 517 | 513 | 511   | 512   | 515.1 | 24    |    |
| 29  | 523 | 525 | 517 | 521 | 524 | 518 | 517 | 526 | 524 | 523 | 519 | 523 | 519 | 515 | 519 | 524 | 519 | 524 | 521 | 521 | 525 | 527 | 520   | 525   | 521.6 | 24    |    |
| 30  | 523 | 526 | 521 | 524 | 517 | 523 | 524 | 513 | 529 | 519 | 517 | 527 | 528 | 528 | 530 | 537 | 526 | 530 | 527 | 531 | 527 | 531 | 521   | 535   | 525.2 | 24    |    |
| 31  | 531 | 528 | 532 | 534 | 546 | 538 | 537 | 534 | 527 | 527 | 535 | 539 | 534 | 540 | 537 | 536 | 548 | 547 | 551 | 545 | 543 | 538 | 536   | 554   | 538.3 | 24    |    |

MONTHLY MEAN=532.247

MONTHLY MEAN DAILY VARIATION FOR 31 COMPLETE DAYS DEVIATIONS FROM AVERAGE:532.247

|         |       |       |       |       |      |       |       |       |       |       |       |       |
|---------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|-------|-------|
| (1-12)  | 3.95  | 1.85  | -0.02 | -1.89 | 1.14 | -0.05 | -0.92 | -2.57 | -2.12 | -2.38 | -2.34 | -1.80 |
| (13-24) | -2.76 | -3.96 | -1.92 | 0.82  | 0.82 | 0.11  | 0.69  | 0.17  | 2.30  | 1.78  | 8.40  |       |

HARMONIC COMPONENTS (ORDER, COS, SIN, AMPLITUDE, MAX.-HR)

U.T.=(1 2.69 -0.83 2.82 22.86) (2 0.50 -0.03 0.50 11.88) (3 1.16 -0.12 1.16 7.87) (4 0.91 -0.85 1.25 5.28)  
L.T.=(1 -0.63 2.75 2.82 6.86) (2 -0.28 -0.42 0.50 7.88) (3 1.16 -0.12 1.16 7.87) (4 0.26 1.22 1.25 1.28)

# COSMIC RAY MESON INTENSITY VERTICAL COMPONENT

Real Counts: 128 Times (Tabulated Counts Plus 3000)

MAR 1998

U.T. Hours at End of Interval

| Day | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  | 11  | 12  | 13  | 14  | 15  | 16  | 17  | 18  | 19  | 20  | 21  | 22  | 23  | 24  | Mean  | n     |    |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|-------|----|
| 1   | 179 | 192 | 183 | 182 | 197 | 186 | 180 | 177 | 177 | 190 | 183 | 178 | 183 | 193 | 171 | 179 | 187 | 184 | 187 | 182 | 176 | 177 | 181 | 173 | 182.3 | 24    |    |
| 2   | 191 | 182 | 182 | 189 | 179 | 178 | 169 | 192 | 176 | 171 | 190 | 185 | 184 | 171 | 178 | 173 | 183 | 169 | 185 | 184 | 181 | 178 | 181 | 187 | 180.8 | 24    |    |
| 3   | 194 | 186 | 202 | 186 | 190 | 198 | 181 | 171 | 196 | 191 | 199 | 195 | 184 | 187 | 183 | 181 | 180 | 180 | 171 | 179 | 184 | 171 | 195 | 183 | 186.1 | 24    |    |
| 4   | 207 | 202 | 215 | 206 | 203 | 195 | 194 | 183 | 182 | 179 | 177 | 184 | 195 | 195 | 179 | 195 | 196 | 193 | 186 | 192 | 185 | 212 | 192 | 203 | 193.8 | 24    |    |
| 5   | 194 | 177 | 191 | 173 | 192 | 189 | 173 | 190 | 169 | 161 | 163 | 171 | 167 | 182 | 180 | 165 | 182 | 183 | 183 | 186 | 170 | 191 | 172 | 173 | 178.2 | 24    |    |
| 6   | 181 | 179 | 170 | 179 | 179 | 172 | 174 | 178 | 167 | 160 | 168 | 167 | 162 | 180 | 167 | 163 | 163 | 164 | 172 | 173 | 182 | 170 | 176 | 172 | 171.0 | 24    |    |
| 7   | 170 | 169 | 170 | 171 | 168 | 175 | 172 | 150 | 163 | 158 | 167 | 154 | 164 | 156 | 168 | 161 | 168 | 164 | 155 | 172 | 174 | 176 | 170 | 179 | 166.0 | 24    |    |
| 8   | 171 | 167 | 169 | 160 | 174 | 156 | 165 | 156 | 157 | 148 | 158 | 164 | 157 | 163 | 171 | 169 | 163 | 174 | 157 | 163 | 171 | 180 | 171 | 160 | 164.3 | 24    |    |
| 9   | 155 | 169 | 169 | 175 | 165 | 170 | 157 | 161 | 166 | 144 | 161 | 152 | 148 | 159 | 164 | 169 | 163 | 167 | 162 | 186 | 174 | 184 | 188 | 181 | 166.2 | 24    |    |
| 10  | 190 | 175 | 184 | 176 | 166 | 188 | 195 | 185 | 196 | 191 | 175 | 166 | 190 | 174 | 173 | 189 | 188 | 202 | 193 | 187 | 179 | 196 | 206 | 198 | 186.8 | 24    |    |
| 11  | 181 | 196 | 201 | 196 | 182 | 187 | 203 | 193 | 186 | 193 | 180 | 188 | 180 | 164 | 187 | 184 | 194 | 194 | 194 | 193 | 187 | 199 | 196 | 192 | 190.2 | 24    |    |
| 12  | 197 | 188 | 193 | 198 | 191 | 200 | 204 | 198 | 190 | 207 | 186 | 177 | 184 | 180 | 166 | 182 | 168 | 178 | 177 | 195 | 184 | 197 | 190 | 209 | 189.1 | 24    |    |
| 13  | 190 | 203 | 192 | 200 | 210 | 196 | 212 | 189 | 180 | 175 | 188 | 173 | 172 | 193 | 170 | 161 | 169 | 169 | 170 | 152 | 172 | 172 | 169 | 173 | 181.3 | 24    |    |
| 14  | 179 | 186 | 198 | 184 | 191 | 187 | 176 | 181 | 183 | 181 | 154 | 171 | 184 | 175 | 172 | 165 | 173 | 175 | 166 | 177 | 180 | 183 | 182 | 182 | 178.6 | 24    |    |
| 15  | 186 | 179 | 188 | 181 | 185 | 175 | 177 | 164 | 171 | 167 | 168 | 172 | 173 | 157 | 172 | 162 | 168 | 160 | 160 | 159 | 153 | 168 | 169 | 178 | 170.5 | 24    |    |
| 16  | 185 | 185 | 171 | 182 | 180 | 186 | 169 | 181 | 168 | 157 | 152 | 169 | 151 | 158 | 159 | 180 | 177 | 178 | 175 | 169 | 162 | 160 | 167 | 169 | 171.2 | 24    |    |
| 17  | 159 | 166 | 171 | 164 | 163 | 177 | 158 | 151 | 155 | 157 | 159 | 158 | 161 | 154 | 148 | 168 | 167 | 172 | 149 | 161 | 161 | 171 | 167 | 161 | 161.2 | 24    |    |
| 18  | 163 | 168 | 160 | 171 | 167 | 152 | 165 | 173 | 162 | 164 | 158 | 156 | 148 | 165 | 165 | 160 | 161 | 160 | 164 | 144 | 168 | 162 | 140 | 156 | 160.5 | 24    |    |
| 19  | 153 | 154 | 153 | 149 | 147 | 145 | 146 | 146 | 176 | 140 | 136 | 149 | 151 | 155 | 147 | 145 | 152 | 158 | 157 | 146 | 149 | 148 | 150 | 152 | 141   | 153.5 | 24 |
| 20  | 148 | 126 | 141 | 163 | 160 | 146 | 146 | 146 | 164 | 176 | 140 | 136 | 149 | 151 | 155 | 147 | 145 | 152 | 158 | 167 | 151 | 160 | 153 | 138 | 141   | 150.5 | 24 |
| 21  | 152 | 168 | 154 | 165 | 170 | 181 | 173 | 160 | 163 | 172 | 172 | 167 | 186 | 176 | 170 | 168 | 158 | 169 | 171 | 184 | 174 | 173 | 171 | 176 | 169.3 | 24    |    |
| 22  | 161 | 175 | 165 | 186 | 175 | 186 | 185 | 175 | 170 | 169 | 163 | 157 | 166 | 166 | 171 | 160 | 170 | 162 | 176 | 174 | 163 | 171 | 187 | 191 | 171.9 | 24    |    |
| 23  | 183 | 182 | 187 | 189 | 179 | 171 | 185 | 169 | 175 | 176 | 156 | 167 | 166 | 147 | 157 | 168 | 153 | 151 | 163 | 172 | 176 | 168 | 170 | 176 | 170.3 | 24    |    |
| 24  | 183 | 182 | 180 | 181 | 177 | 179 | 166 | 156 | 157 | 166 | 169 | 147 | 168 | 156 | 157 | 159 | 165 | 168 | 167 | 170 | 169 | 172 | 165 | 179 | 176   | 167.3 | 24 |
| 25  | 177 | 184 | 161 | 159 | 166 | 155 | 152 | 147 | 158 | 152 | 145 | 161 | 158 | 156 | 157 | 169 | 168 | 167 | 170 | 169 | 172 | 165 | 179 | 176 | 167.3 | 24    |    |
| 26  | 167 | 151 | 156 | 145 | 146 | 146 | 151 | 149 | 147 | 142 | 131 | 137 | 152 | 147 | 137 | 138 | 142 | 146 | 134 | 143 | 146 | 136 | 128 | 134 | 143.8 | 24    |    |
| 27  | 141 | 156 | 145 | 159 | 159 | 140 | 150 | 137 | 140 | 142 | 134 | 134 | 123 | 126 | 133 | 137 | 121 | 117 | 117 | 134 | 115 | 132 | 139 | 147 | 136.6 | 24    |    |
| 28  | 142 | 141 | 141 | 142 | 143 | 144 | 140 | 133 | 128 | 130 | 132 | 121 | 134 | 132 | 118 | 123 | 120 | 129 | 128 | 127 | 133 | 117 | 132 | 136 | 131.9 | 24    |    |
| 29  | 135 | 139 | 133 | 146 | 148 | 144 | 124 | 127 | 122 | 136 | 124 | 112 | 128 | 126 | 136 | 126 | 104 | 132 | 122 | 135 | 136 | 140 | 132 | 136 | 131.1 | 24    |    |
| 30  | 129 | 129 | 124 | 126 | 122 | 134 | 121 | 120 | 124 | 127 | 113 | 124 | 130 | 124 | 124 | 139 | 136 | 145 | 127 | 138 | 130 | 124 | 128 | 130 | 127.8 | 24    |    |
| 31  | 128 | 131 | 126 | 133 | 118 | 127 | 121 | 109 | 125 | 105 | 114 | 128 | 130 | 111 | 126 | 114 | 126 | 124 | 135 | 123 | 113 | 117 | 125 | 123 | 122.2 | 24    |    |

NORTHELY MEAN=164.949

NORTHELY MEAN DAILY VARIATION FOR 31 COMPLETE DAYS DEVIATIONS FROM AVERAGE:164.949

(1-12) 4.76 4.95 5.21 6.66 6.08 4.53 2.63 -1.40 -0.72 -2.76 -6.66 -5.01  
(13-24) -2.88 -2.72 -4.92 -3.37 -3.34 -1.63 -2.34 0.02 -1.01 0.86 0.47 2.47

HARMONIC COMPONENTS (ORDER, COS, SIN, AMPLITUDE, MAX.-HR)

U.T.=(1 4.15 2.56 4.88 2.11) (2 -0.70 1.47 1.63 3.85) (3 -0.42 -0.23 0.46 4.63) (4 0.19 0.31 0.37 0.97)  
L.T.=(1 -4.29 2.31 4.88 10.11) (2 1.63 -0.13 1.63 11.85) (3 -0.42 -0.23 0.48 4.63) (4 -0.37 0.01 0.37 2.97)

# COSMIC RAY MESON INTENSITY Real Relative Intensity: 0.1% Times (Tabulated Value Plus 1000)

MAR 1998

U.T. Hours at End of Interval

| Day | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24   | Mean | M  |
|-----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|------|------|----|
| 1   | 34 | 36 | 40 | 37 | 37 | 36 | 35 | 38 | 36 | 34 | 35 | 33 | 34 | 38 | 36 | 33 | 35 | 37 | 37 | 35 | 37 | 36 | 36 | 35   | 35.8 | 24 |
| 2   | 37 | 37 | 39 | 37 | 37 | 36 | 36 | 38 | 37 | 34 | 36 | 34 | 35 | 39 | 36 | 36 | 37 | 37 | 39 | 35 | 37 | 37 | 39 | 39.3 | 24   | 24 |
| 3   | 41 | 42 | 44 | 40 | 40 | 41 | 38 | 38 | 40 | 40 | 37 | 39 | 38 | 40 | 39 | 38 | 37 | 39 | 39 | 39 | 37 | 37 | 39 | 39.0 | 24   | 24 |
| 4   | 39 | 38 | 36 | 37 | 36 | 39 | 36 | 34 | 38 | 35 | 35 | 33 | 35 | 39 | 36 | 36 | 37 | 39 | 39 | 39 | 37 | 37 | 39 | 39.0 | 24   | 24 |
| 5   | 39 | 38 | 37 | 37 | 36 | 36 | 36 | 34 | 33 | 32 | 33 | 33 | 34 | 35 | 35 | 33 | 35 | 37 | 37 | 36 | 37 | 37 | 39 | 39.0 | 24   | 24 |
| 6   | 35 | 35 | 36 | 36 | 36 | 36 | 35 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36.8 | 24   | 24 |
| 7   | 38 | 41 | 41 | 41 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39.1 | 24   | 24 |
| 8   | 38 | 37 | 37 | 37 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36.1 | 24   | 24 |
| 9   | 36 | 36 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37.2 | 24   | 24 |
| 10  | 41 | 43 | 44 | 44 | 44 | 45 | 45 | 43 | 40 | 38 | 39 | 39 | 36 | 40 | 40 | 39 | 38 | 38 | 38 | 40 | 40 | 39 | 39 | 38.5 | 24   | 24 |
| 11  | 43 | 45 | 47 | 47 | 46 | 46 | 46 | 44 | 44 | 43 | 42 | 44 | 44 | 45 | 45 | 44 | 44 | 46 | 46 | 48 | 48 | 47 | 47 | 46.5 | 24   | 24 |
| 12  | 39 | 38 | 38 | 40 | 38 | 36 | 32 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37.9 | 24   | 24 |
| 13  | 39 | 39 | 40 | 40 | 38 | 36 | 32 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 39.0 | 24   | 24 |
| 14  | 43 | 45 | 47 | 47 | 46 | 46 | 46 | 44 | 44 | 43 | 42 | 44 | 44 | 45 | 45 | 44 | 44 | 46 | 46 | 48 | 48 | 47 | 47 | 46.6 | 24   | 24 |
| 15  | 38 | 38 | 38 | 40 | 38 | 36 | 32 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37.1 | 24   | 24 |
| 16  | 36 | 36 | 37 | 37 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36.9 | 24   | 24 |
| 17  | 35 | 35 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36.9 | 24   | 24 |
| 18  | 35 | 35 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36.9 | 24   | 24 |
| 19  | 35 | 35 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36.9 | 24   | 24 |
| 20  | 35 | 35 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36.9 | 24   | 24 |
| 21  | 35 | 35 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36.9 | 24   | 24 |
| 22  | 35 | 35 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36.9 | 24   | 24 |
| 23  | 35 | 35 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36.9 | 24   | 24 |
| 24  | 35 | 35 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36.9 | 24   | 24 |

MONTHLY MEAN= 37.099

MONTHLY MEAN DAILY VARIATION FOR 31 COMPLETE DAYS DEVIATIONS FROM AVERAGE: 37.099

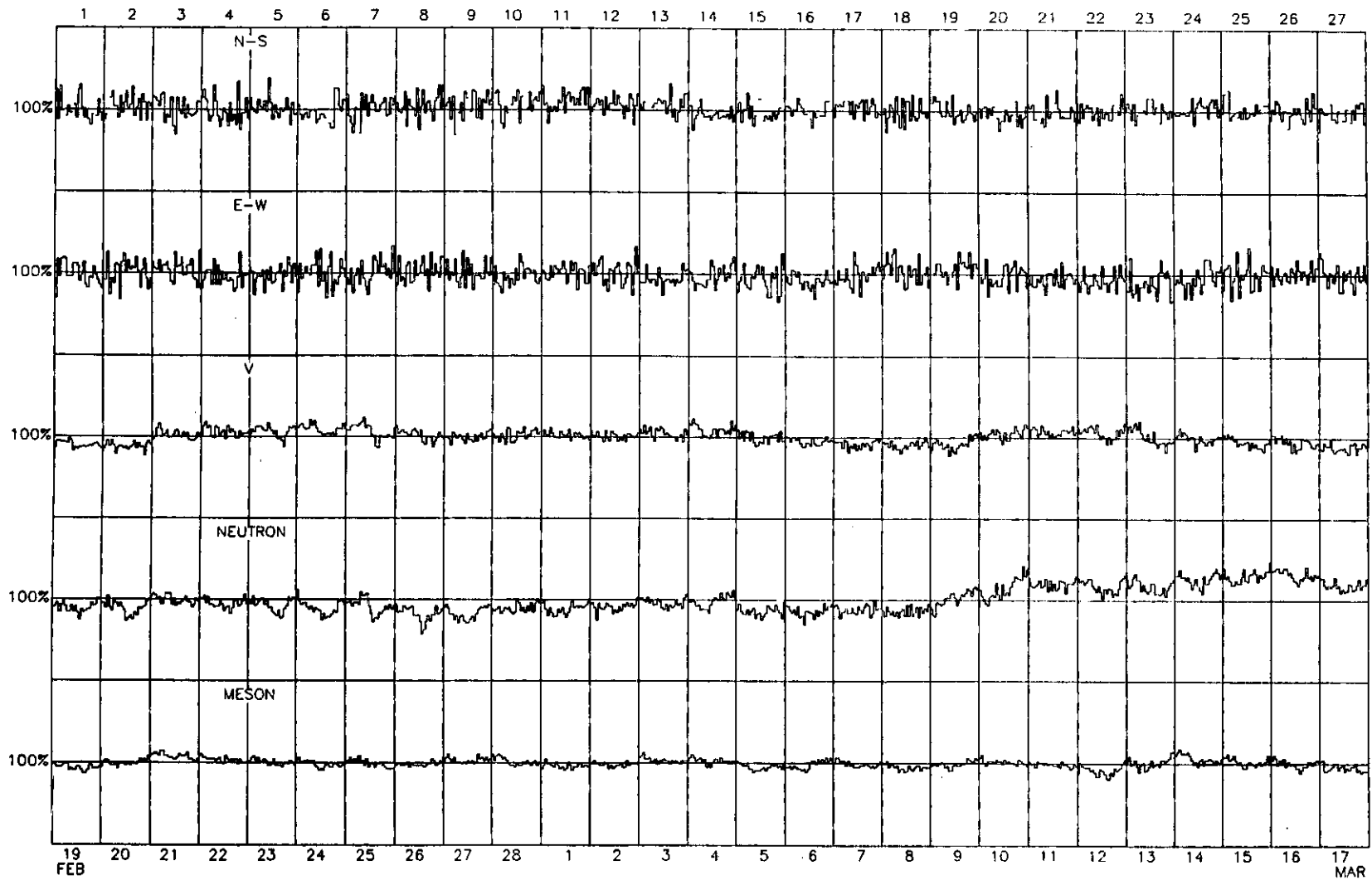
(1-12) 1.06 2.19 2.03 0.48 0.97 0.51 -0.20 -0.29 -0.55 -2.10 -1.84 -1.74  
 -0.49 -0.26 -0.91 -0.97 -0.33 0.09 0.51 0.13 -0.10 0.19 0.93 0.67

HARMONIC COMMENTS (ORDER, COS, SIN, AMPLITUDE, MAX, -HR)

U.T.=(1 1.24 0.12 1.24 0.38) (2 -0.07 0.51 0.52 3.27) (3 -0.01 0.02 0.03 2.45) (4 0.17 0.35 0.38 1.06)  
 L.T.=(1 -0.73 1.01 1.25 8.38) (2 0.48 -0.19 0.52 11.27) (3 -0.01 0.02 0.03 2.45) (4 -0.38 -0.03 0.38 3.06)

# COSMIC RAY INDICES

Bartels Rotation 2247(FEB 1998-MAR 1998)



# SUDDEN IONOSPHERIC DISTURBANCES (D REGION)

MARCH 1998

| Day | Sta | Start<br>(UT) | Max<br>(UT) | End<br>(UT) | Imp | LF | SPA<br>VLF | SFA<br>LF |
|-----|-----|---------------|-------------|-------------|-----|----|------------|-----------|
|-----|-----|---------------|-------------|-------------|-----|----|------------|-----------|

|    |      |      |      |       |    |       |              |              |
|----|------|------|------|-------|----|-------|--------------|--------------|
| 05 | LINT | 0016 | 0029 | 0200D | 3  | - 7.4 | - 5.1,+12.7  | - 3.8        |
| 06 | LINT | 0126 | 0133 | 0200  | 1  | - 1.6 | - 0.9        | - 1.0        |
| 06 | LINT | 0225 | 0238 | 0300  | 1- | - 0.3 | - 0.9        | - 3.1        |
| 07 | LINT | 0221 | 0231 | 0325  | 1  | - 1.2 | - 1.0        | - 3.1        |
| 11 | LINT | 0505 | 0522 | 0550  | 1- | - 0.6 | - 0.4        | - 3.1        |
| 15 | LINT | 0147 | 0153 | 0210  | 1- | - 0.5 | - 1.2        | - 1.2        |
| 16 | LINT | 0103 | 0133 | 0203D | 2+ | - 5.1 | - 12.0,+ 5.7 | - 3.2        |
| 16 | LINT | 0812 | 0824 | 0910  | 2  | - 4.2 | - 5.4        | - 5.4        |
| 17 | LINT | 0030 | 0046 | 0115U | 1- | - 0.7 | - 0.8        | - 0.8        |
| 17 | LINT | 0153 | 0200 | 0215U | 1- | - 0.4 | - 0.6        | - 0.6        |
| 17 | LINT | 0325 | 0331 | 0408  | 1  | - 1.1 | - 3.8        | - 3.8        |
| 17 | LINT | 0417 | 0433 | 0515  | 1- | - 0.6 | - 2.6        | - 2.6        |
| 18 | LINT | 0034 | 0046 | 0120  | 1  | - 1.1 | - 1.8        | - 1.8        |
| 18 | LINT | 0259 | 0307 | 0330U | 1- | - 0.5 | - 1.4        | - 1.4        |
| 19 | LINT | 0122 | 0135 | 0400D | 3+ | - 8.9 | - 11.3,+ 4.4 | - 11.3,+ 4.4 |
| 19 | LINT | 0207 | 0230 | 0400U | 2- | - 3.8 | + 7.4        | + 7.4        |
| 19 | LINT | 0514 | 0530 | 0645D | 3- | - 6.7 | - 8.8,+ 4.6  | - 8.8,+ 4.6  |
| 19 | LINT | 0647 | 0703 | 0750D | 1+ | - 2.6 | + 6.8        | + 6.8        |
| 19 | LINT | 0751 | 0755 | 0830  | 1  | - 1.1 | + 4.1        | + 4.1        |
| 20 | LINT | 0309 | 0316 | 0406  | 1+ | - 2.3 | - 5.7        | - 5.7        |
| 20 | LINT | 0445 | 0457 | 0600  | 2  | - 4.3 | - 6.0,+ 2.1  | - 6.0,+ 2.1  |
| 20 | LINT | 0643 | 0649 | 0716  | 1- | - 0.9 | 0            | 0            |
| 22 | LINT | 0655 | 0711 | 0800D | 3- | - 6.5 | - 5.0,+ 2.0  | - 5.0,+ 2.0  |
| 22 | LINT | 0833 | 0838 | 0908  | 1  | - 1.3 | - 0.9        | - 0.9        |
| 22 | LINT | 2358 | 0002 | 0020U | 1- | - 1.0 | 0            | 0            |
| 23 | LINT | 0150 | 0214 | 0238D | 1+ | - 2.9 | - 7.0        | - 7.0        |
| 23 | LINT | 0239 | 0311 | 0400D | 2- | - 3.6 | + 7.5        | + 7.5        |
| 24 | LINT | 0148 | 0156 | 0250  | 1  | - 2.0 | - 6.5        | - 6.5        |
| 24 | LINT | 0437 | 0457 | 0620  | 2+ | - 5.1 | - 7.1,+ 0.4  | - 7.1,+ 0.4  |
| 26 | LINT | 0250 | 0257 | 0610U | 1- | - 0.3 | - 2.6        | - 2.6        |
| 31 | LINT | 0233 | 0306 | 0359U | 1- | - 0.6 | - 2.8        | - 2.8        |

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

MARCH 1998

BGMO

| Day  | Three-Hourly Indices K |     |     |      |       |       |       |       | Sum  | A <sub>K</sub> |
|------|------------------------|-----|-----|------|-------|-------|-------|-------|------|----------------|
|      | 0-3                    | 3-6 | 6-9 | 9-12 | 12-15 | 15-18 | 18-21 | 21-24 |      |                |
| 1    | 2                      | 2   | 2   | 2    | 4     | 3     | 2     | 2     | 19   | 11             |
| 2    | 2                      | 2   | 3   | 3    | 3     | 2     | 4     | 3     | 22   | 14             |
| 3    | 2                      | 2   | 1   | 0    | 0     | 0     | 3     | 1     | 9    | 4              |
| 4    | 1                      | 1   | 1   | 2    | 5     | 5     | 3     | 2     | 20   | 17             |
| 5    | 2                      | 1   | 2   | 3    | 2     | 1     | 2     | 4     | 17   | 10             |
| 6    | 4                      | 4   | 3   | 2    | 3     | 2     | 2     | 1     | 21   | 14             |
| 7 Q  | 2                      | 1   | 2   | 2    | 2     | 0     | 0     | 0     | 9    | 4              |
| 8 Q  | 1                      | 1   | 1   | 1    | 1     | 1     | 1     | 1     | 8    | 3              |
| 9 Q  | 1                      | 2   | 2   | 2    | 2     | 0     | 0     | 0     | 9    | 4              |
| 10 D | 1                      | 2   | 4   | 5    | 4     | 5     | 4     | 5     | 30   | 29             |
| 11 D | 3                      | 4   | 5   | 3    | 4     | 4     | 1     | 3     | 27   | 22             |
| 12   | 2                      | 3   | 3   | 3    | 4     | 2     | 4     | 3     | 24   | 16             |
| 13   | 1                      | 3   | 2   | 3    | 3     | 4     | 2     | 3     | 21   | 13             |
| 14   | 0                      | 0   | 2   | 3    | 3     | 5     | 4     | 3     | 20   | 16             |
| 15 D | 1                      | 2   | 2   | 1    | 0     | 0     | 0     | 0     | 6    | 3              |
| 16   | 3                      | 3   | 3   | 3    | 4     | 3     | 1     | 2     | 22   | 14             |
| 17   | 2                      | 2   | 1   | 3    | 2     | 1     | 2     | 3     | 16   | 8              |
| 18 Q | 0                      | 1   | 0   | 1    | 1     | 1     | 2     | 1     | 7    | 3              |
| 19 Q | 1                      | 0   | 0   | 0    | 1     | 2     | 1     | 2     | 7    | 3              |
| 20   | 1                      | 1   | 2   | 3    | 2     | 3     | 2     | 2     | 16   | 8              |
| 21 D | 2                      | 2   | 3   | 6    | 5     | 6     | 5     | 2     | 31   | 37             |
| 22   | 3                      | 2   | 3   | 3    | 4     | 4     | 2     | 1     | 22   | 15             |
| 23   | 1                      | 2   | 2   | 1    | 2     | 2     | 1     | 2     | 13   | 6              |
| 24   | 1                      | 1   | 2   | 2    | 3     | 2     | 3     | 2     | 16   | 8              |
| 25   | 1                      | 1   | 2   | 4    | 5     | 5     | 4     | 3     | 25   | 22             |
| 26   | 1                      | 3   | 2   | 3    | 4     | 4     | 3     | 2     | 22   | 15             |
| 27   | 3                      | 3   | 3   | 4    | 4     | 4     | 2     | 2     | 25   | 18             |
| 28   | 2                      | 3   | 2   | 5    | 5     | 2     | 2     | 3     | 24   | 19             |
| 29 D | 3                      | 4   | 3   | 1    | 2     | 5     | 5     | 2     | 25   | 21             |
| 30   | 1                      | 2   | 3   | 3    | 2     | 3     | 1     | 1     | 16   | 9              |
| 31   | 3                      | 3   | 4   | 3    | 3     | 0     | 0     | 1     | 17   | 11             |
| Sum  |                        |     |     |      |       |       |       |       | 397  |                |
| Mean |                        |     |     |      |       |       |       |       | 12.8 |                |

# MAGNETIC STORMS

MARCH 1998

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 |
| 04               | 11 | 57 | 04  | 23 | SC          | 0.5 | 11  | 0    | m             | 04  | 5    | 5       | 5.0  | 53  | 7   |
| 21               | 04 |    | 21  | 23 | GC          |     |     |      | ms            | 21  | 4    | 6       | 12.9 | 120 | 36  |

# 1997 年 11 月太阳射电爆发\*

刘玉英

(中国科学院北京天文台)

1997 年 11 月太阳活动十分激烈, 是 23 太阳周开始以来的第一次强活动期, 从射电来看, 北京天文台 10 厘米波段每天测得的太阳射电辐射流量, 9 月月均值为 95.4 s.f.u., 10 月为 83.8 s.f.u., 11 月为 93.9 s.f.u., 11 月 4 日这天太阳射电流量为 110 s.f.u.。整个一个月共观测到 34 个太阳射电爆发 (1997 年 11 月 CSGD)。4 日观测到 6 个, 其中最大的一个在单频 2.84 GHz 是 0545 UT 开始, 0558 UT 达到极大, 持续了 35 分钟的 47 GB 复杂型大爆发。1—2 GHz 频谱仪和 2.6—3.8 GHz 频谱仪记录到这个射电爆发。并有 I、IV 型射电爆发相对应。光学耀斑在 0552 UT 开始, 0558 UT 极大, 0602 UT 结束, 伴有 X2.1/2B 级爆发。该爆发所属的 AR8100 活动区 10 月 27 日转到日面, 4 日黑子达最大面积, 从 11 月 1 日至 13 日 2.84 GHz 记录到 15 个太阳射电爆发, 4 日的射电爆发也是 23 太阳周开始以来的最大的爆发。各频段爆发参数见表 1。2.84 GHz 频段爆发曲线显示在图 1 中, 图 2 显示了 2.6—3.8 GHz 频谱仪在一个频段上观测的爆发, 上面的为左旋偏振图, 中间的为右旋偏振图, 下面的为偏振度图, 从图中可以看出偏振度约为 10% 左右。图 3 为 11 月 4 日 2.6—3.8 GHz 频谱仪在几个频段上观测的太阳射电爆发。图 4 为 1—2 GHz 频谱仪在一个频段上的太阳射电爆发。爆发期间还记录到快速精细结构现象。

11 月还有另外两个较活动的活动区, AR8108 活动区, 14 日—27 日通过日面, 在这期间北京天文台观测到太阳射电爆发 13 个, 17 日黑子面积达到极大, 射电流量也升高达到 90 s.f.u., 这天共产生了 3 个太阳射电爆发。AR8113 活动区, 26 日从东边缘转到日面, 28 日记录到 3 个太阳射电爆发, 其中一个是在 2.84 GHz 峰值流量为 189.5 s.f.u. 的复杂型爆发, 它开始于 0458 UT, 极大为 0503 UT, 持续 16 分钟。1—2 GHz, 2.6—3.8 GHz 也记录到这个爆发。在 0503 UT 对应 M6.8/2B 级耀斑。30 日也记录到 3 个射电爆发, 爆发参数见表 1。11 月 28 日 2.84 GHz 爆发曲线见图 5。图 6 为 11 月 28 日 2.6—3.8 GHz 频谱仪在一个频段上的太阳射电爆发, 从图中可以看出左旋和右旋的爆发图有显著的不同 (形态及强度), 偏振度约为 10% 左右。高能事件的参数显示在表 2。1997 年 11 月太阳高能事件共有 11 个, 在我们观测时段内有 5 个记录到的射电爆发分别与不同事件相对应。表 1, 表 2 见英文部分。

\* 收稿日期: 1998 年 4 月 1 日

# Solar Radio Bursts Observed in November, 1997

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The solar activity was very high in November 1997. This was the strongest solar activity period since the beginning of the Solar Cycle 23. The monthly mean of daily solar radio emission flux density obtained at 10 cm wavelength at Beijing Astronomical Observatory (BAO) was 94.5 s.f.u., 83.8 s.f.u. and 93.9 s.f.u. for September, October and November respectively. The solar radio flux density was 110 s.f.u. on November 4. 34 solar radio bursts were observed in the month. Among the six bursts were observed on November 4, a complex large radio burst of 47 GB type with a duration of 35 minutes at started at 0545 UT and peaked at 0558 UT at 2.84 GHz. Meanwhile the burst was observed with the radiospectrometer at 1 — 2 GHz and 2.6 — 3.8 GHz, associated with the recorded type II and type IV radio event. An X2.1/2B flare was observed and it started at 0552 UT, peaked at 0558 UT and ended at 0620 UT, in Active Region 8100. The region appeared on the solar disk on October 27. The area of the sunspot group got it's maximum on November 4. 15 solar radio bursts were recorded from 1 to 13 November at 2.84 GHz.

Table 1. The parameters of radio bursts

| Data       | Freq.<br>(GHz) | Type<br>(UT) | Start<br>(UT) | Max.<br>(UT) | End<br>(s.f.u.) | Peak Flux |
|------------|----------------|--------------|---------------|--------------|-----------------|-----------|
| 1997.11.4  | 2.84           | 47GB         | 0545.0        | 0558.0       | 0620.0          | 636.9     |
|            | 1.0—2.0        |              | 0549.0        |              | 0609.0          |           |
|            | 2.6—3.8        |              | 0555.0        |              | 0603.0          |           |
| 1997.11.28 | 2.84           | 46 C         | 0458.0        | 0503.0       | 0514.0          | 189.5     |
|            | 1.0—2.0        |              | 0500.0        |              | 0516.0          |           |
|            | 2.6—3.8        |              | 0500.0        |              | 0516.0          |           |

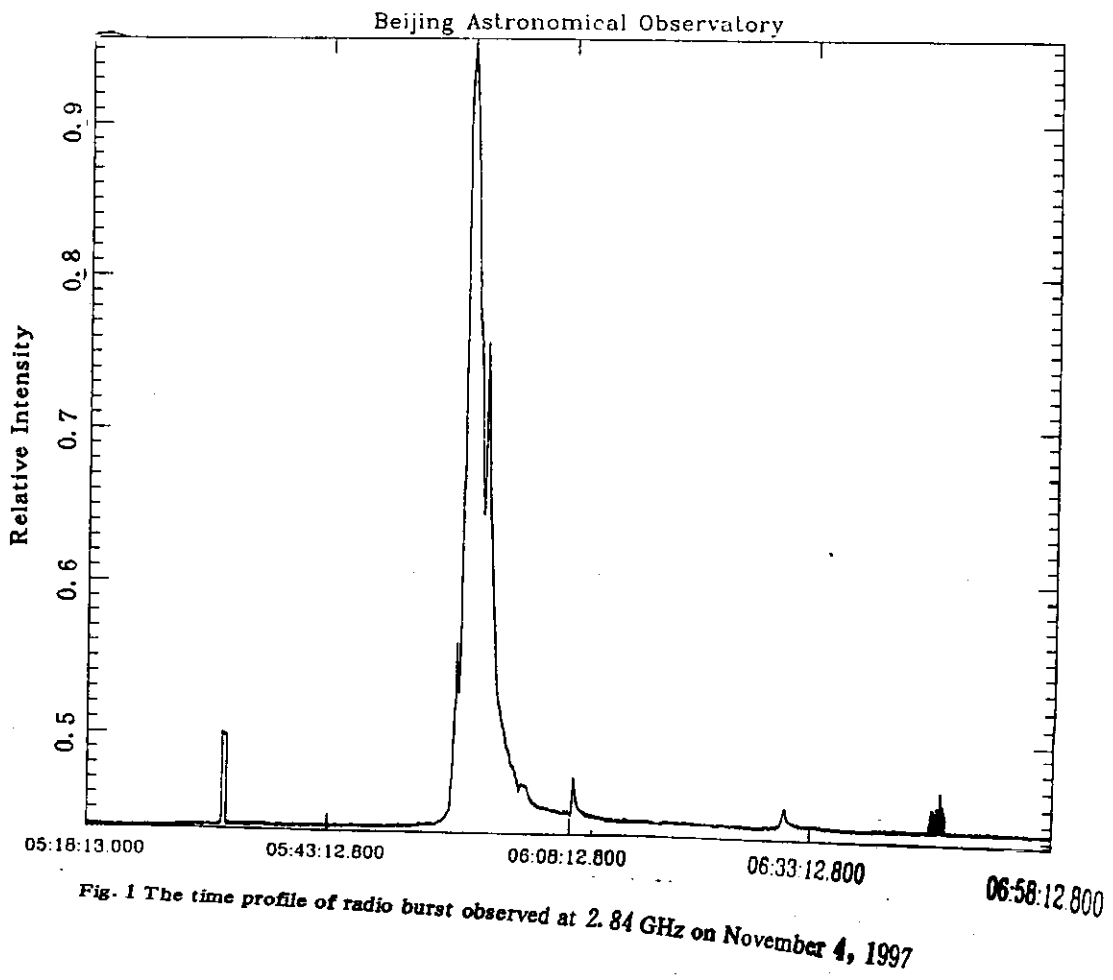
The profile of the November 4 solar radio burst is given in Figure 1, at 2.84 GHz. Figure 2 shows the burst at 2.6—3.8 GHz in one band, the left polarization at top, the middle is right polarization, the degree of the polarization at bottom. The degree of the polarization is about 10%. Figure 3 shows the burst recorded at 2.6 — 3.8 GHz by the spectrograph at several bands on November 4. Figure 4 shows the burst at 1 — 2 GHz in one band. A wealth of Fast Fine Structure was recorded during the burst.

There were another two active regions in November. Active Region 8108 passed the solar disk during the period from 14 to 27 November and 13 solar radio bursts from the region were observed at BAO. The area of the sunspot group showed a maximum, the radio flux increased and reached 90 s.f.u. and 3 solar radio bursts were observed on 17

November. Active Region 8113 appeared at east limb of the solar disk on November 26. 3 solar radio bursts were observed on November 28. Among these bursts a complex burst started at 0458 UT, peaked at 0503 UT and lasted for 16 minutes at 2.84 GHz, with a peak flux of 189.5 s.f.u.. The burst was observed by spectrometers in 1 — 2 GHz and 2.6 — 3.8 GHz. An M6.8/2B flare was observed at 0503 UT (SGD). Three solar radio bursts were observed on November 30. Parameters of some of these radio bursts are listed in Table 1. The time profile is given in Figure 5 at 2.84 GHz of the burst on November 28. Figure 6 is the burst at 2.6 — 3.8 GHz in one band on November 28. The parameters taken from SGD of high energy events in the same period are listed in Table 2. These radio bursts observed at BAO are respectively related to high energy events recorded by GOES.

Table 2. Solar High—Energy Events

| Data         | Start<br>(UT) | Max.<br>(UT) | End<br>(UT) | Place<br>Lat CMD | Active<br>Region | Class<br>Imp. |
|--------------|---------------|--------------|-------------|------------------|------------------|---------------|
| 1997. 11. 4  | 0552. 0       | 0558. 0      | 0602. 0     | S14 W33          | AR8100           | X2. 1/B       |
| 1997. 11. 28 | 0453. 0       | 0503. 0      | 0523. 0     | N15 E61          | AR8113           | M6. 8/2B      |



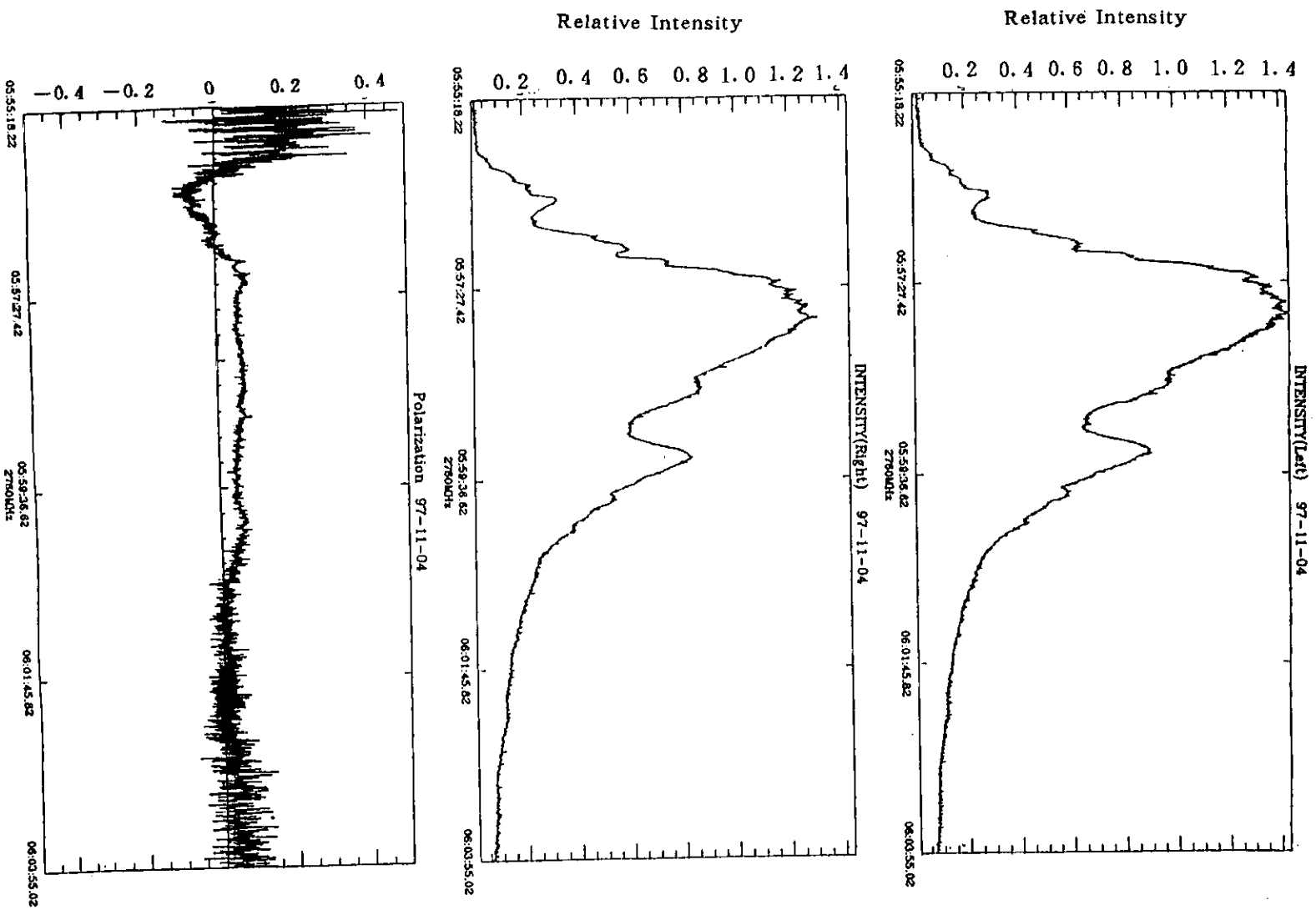
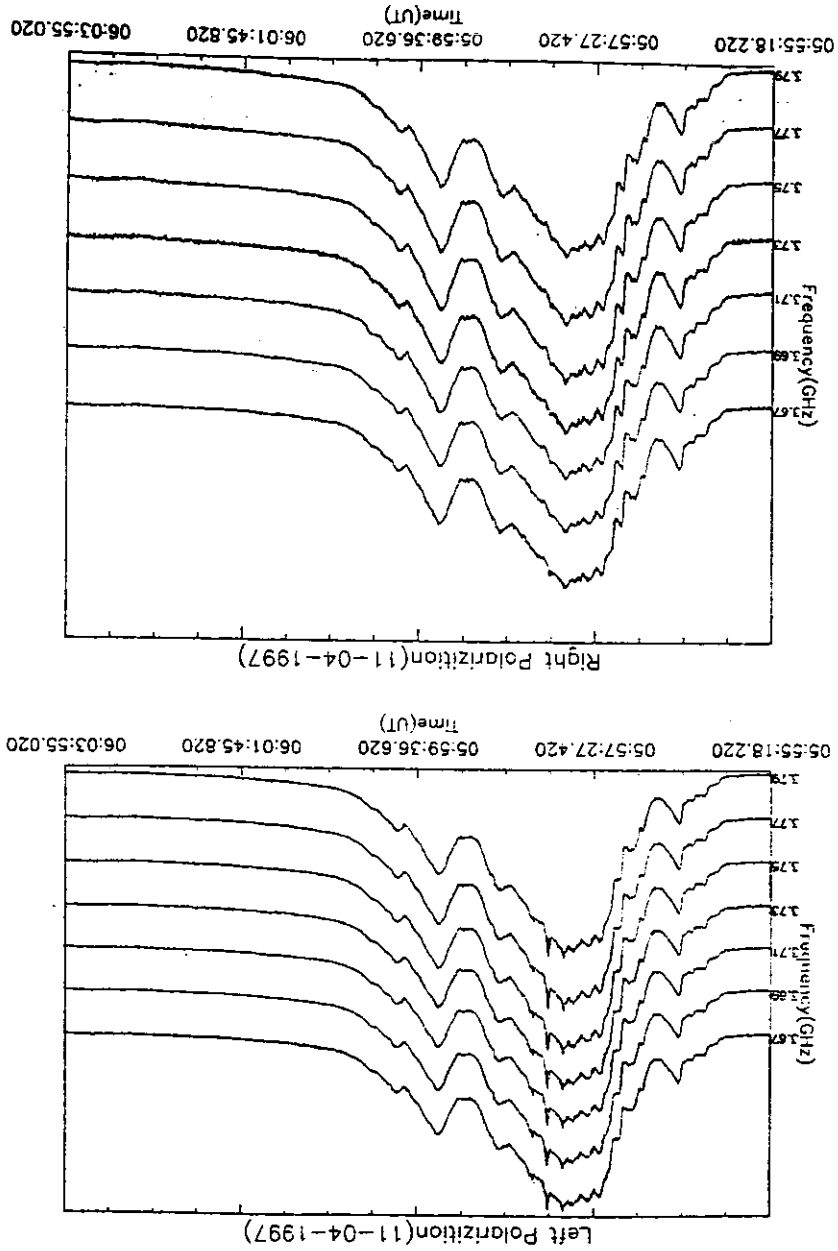


Fig. 2 The time profile of radio burst observed in one band of the at 2.6 — 3.8GHz spectrograph on November 4, 1997.

Fig. 3 The time profile of radio burst observed at 2.6 — 3.8 GHz in several bands on November 4, 1997



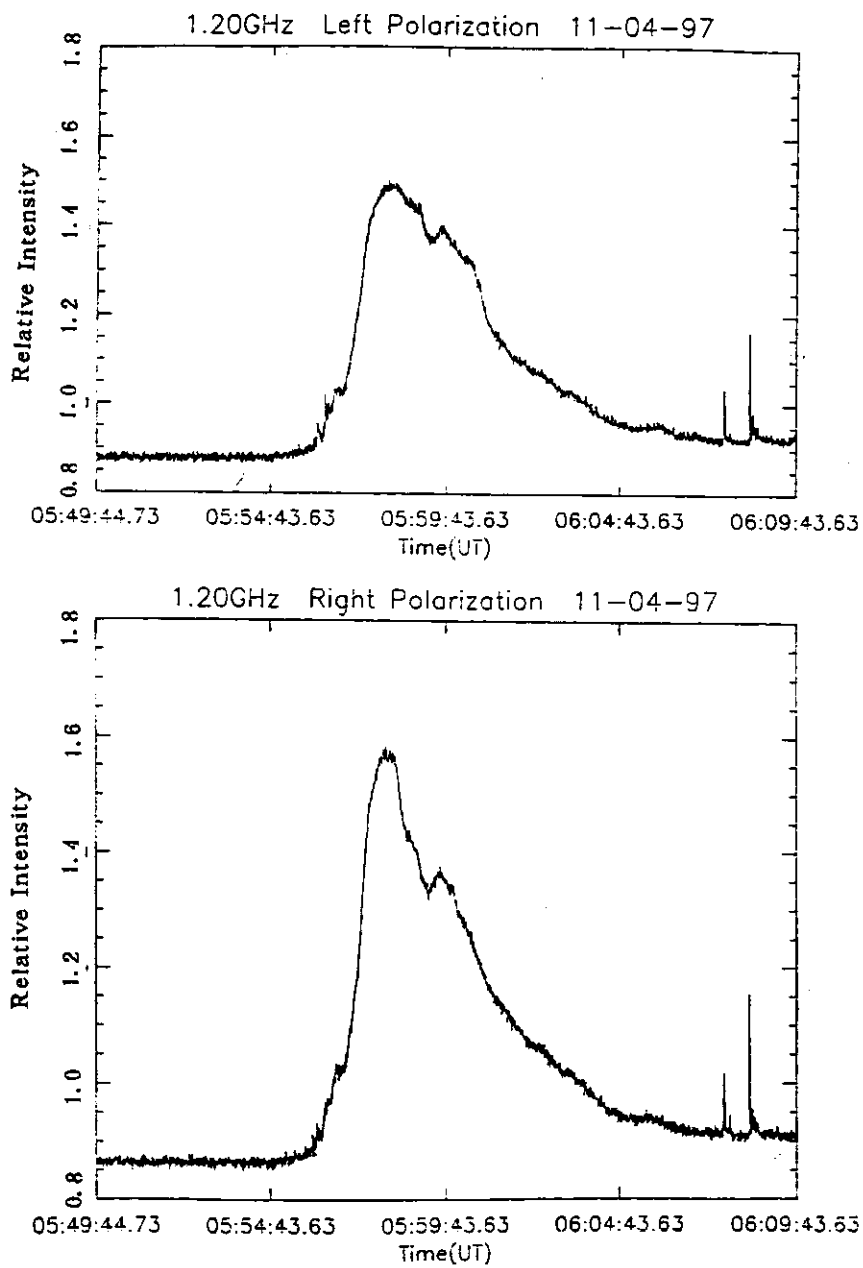
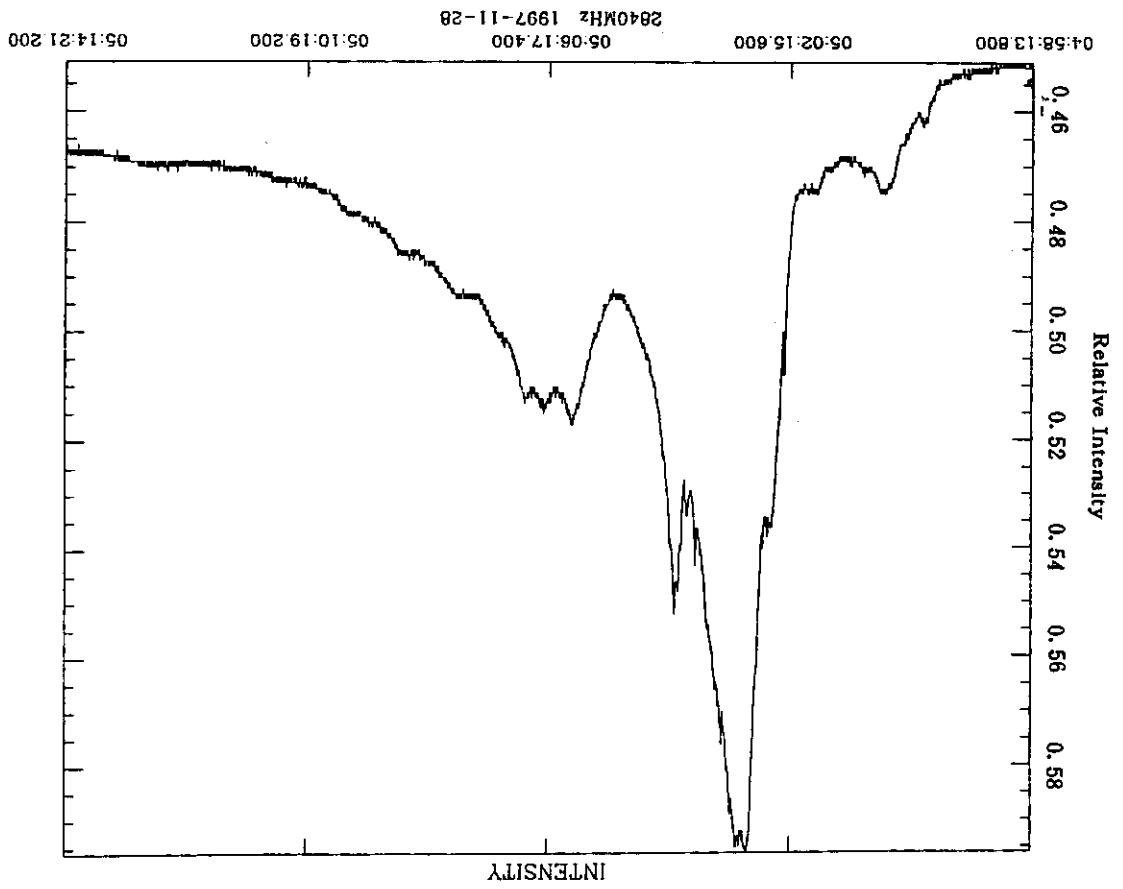


Fig. 4 The time profile of radio burst observed at 1.0 — 2.0GHz on November 4, 1997

Fig. 5 The time profile of radio burst observed at 2.84GHz on November 28, 1997



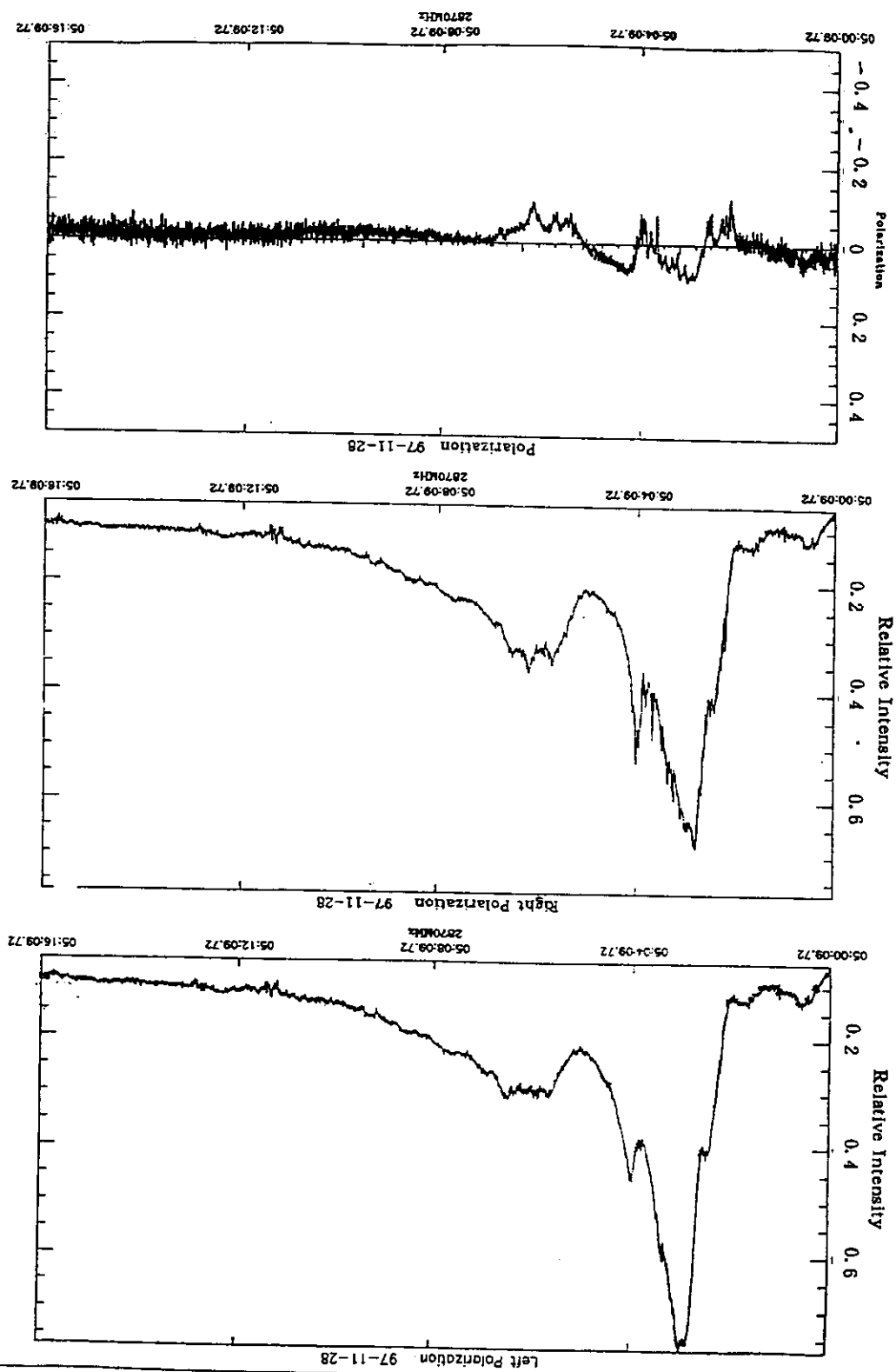


Fig. 6 The time profile of radio burst observed at 2.6 — 3.8GHz on November 28, 1997

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