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说　　明
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《太阳地球物理资料》(简称 CSGD) 刊登来自北京天文台 (简称北台或 BEIJ)、空间科学与应用研究中心、北京地磁台 (BGMO)、北京天文馆 (北馆或 PLAT)、陕西天文台 (陕台或 LINT)、紫金山天文台 (紫台或 PURP)、乌鲁木齐天文工作站 (乌站或 URUM) 和云南天文台 (云台或 YUNN) 等八个单位的有关观测结果。内容包括下列十个部分：

1. 太阳黑子相对数与面积数值表、太阳黑子观测表 (由紫金山天文台编辑)
2. 太阳黑子相对数的平滑值预报
3. 怀柔站太阳活动区磁场与速度场观测表
4. 太阳耀斑表、耀斑巡视时间表
5. 太阳射电辐射流量表、太阳射电辐射显著事件表、太阳射电辐射巡视时间表和太阳射电辐射显著事件图
6. 宇宙线强度表 (由空间科学与应用研究中心编辑)
7. 突然电离层扰动 (D 层) 表
8. 地磁活动指数 K 和 A_K表
9. 磁暴表 (由北京地磁台编辑)
10. 不定期刊登有关论文

以上各种数据表均利用计算机 (VAX　11/780) 存取、作必要的计算和检验以及提供照相印刷的正本。

内容简介

1. 与黑子有关的表格中所列的由目视观测 (手描) 获得的数据，以云台的观测为主。云台缺测时，则用其它台站的结果，并在备注栏内注明台站简称。黑子照相面积由北台提供。"太阳黑子观测" 表中的群号为综合各台站观测记录后的统一编号。(See) 栏给出观测时大气视宁静度的优劣评分，"5" 为最佳；"1" 为最差。

2. 黑子相对数的平滑值预报给出近一年的预报值 R′和置信度为 90%的预报误差 E′。预报方法参见 1989 年 1 月 CSGD 的论文部分。

3. 黑子表和耀斑表中的日面位置指卡林顿 (Carrington) 坐标。中经距 (CMD) 指黑子或耀斑所在经圈与日面中心经圈之经度差，以度表示。 E、W 分别表示在日面中心经圈之东、西。日心距 (r/R) 指太阳圆面上的黑子或耀斑相对于日面中心之距离，以太阳半径为单位。视面积 (Sd) 指其在太阳圆面上的表观面积，以太阳圆面积的 10^{-6}为单位。校正面积 (Sp 或 Sq) 指经过投影改正后，黑子或耀斑在太阳球面上的真正面积，分别以太阳半球面积的 10^{-6}或平方度为单位。黑子型别 (Type) 按 McIntosh 分型。详见附录 1。

4. 在怀柔站太阳磁场、速度场观测表中，发表怀柔太阳观测站的观测日期，日面中心的日面经度 (L_0)，所观测的太阳活动区的怀柔站编号 (Huairou Region)、卡林顿坐标 (L 表示经度，Lat 表示纬度，括号内的数字是参考值) 及所获得的以英文字母表示的观测资料类型。所

用字母的含义是：

S 或 T—单色像

D—多卜勒（Doppler）速度场观测波长上的单色像

L—纵向磁场观测资料

Q 及 U—横向磁场观测资料

V—多卜勒（Doppler）速度场观测资料

5—使用 Fe I λ5324.19 Å 谱线观测资料（光球）

4—使用 H_β λ4861.34 Å 谱线观测资料（色球）

在表的最后给出太阳极区（NPL 表示北极区，SPL 表示南极区）纵向磁场观测日期。

5. 太阳耀斑表列出北台、紫台、乌站、云台等单位用色球望远镜（通过 H_α 单色光）观测到的耀斑和亚耀斑（用 S 表示）。表中列出耀斑发生的时刻，极大（Max）表示耀斑亮度极大时刻，面积（Area）为极大时刻的面积。视面积（Sd）和校正面积（Sq）按下列关系换算：

$$Sq = Sd \times \frac{1}{\sqrt{1-(r/R)^2}} \times 0.020626$$

耀斑级别（Imp）以两个字符表示，第一个字符由耀斑在极大时刻的面积决定，第二个字符表示耀斑亮度，由各观测台站根据经验确定。其中 B 表示"亮"、N 表示"中等"、F 表示"弱"。当耀斑日心距 r/R ＜0.906 时，即耀斑日心角 θ（指耀斑和观测者在日心处的张角）＜65° 时，其级别按"校正面积 Sq"定级，如下表所示：

	耀斑级别		
校正面积 Sq	弱(F)	中等(N)	亮(B)
≤2.0	SF	SN	SB
2.1—5.1	1F	1N	1B
5.2—12.4	2F	2N	2B
12.5—24.7	3F	3N	3B
＞24.7	4F	4N	4B

当耀斑日心距 r/R ≥0.906 时，即耀斑日心角≥65° 时，其级别按"视面积 Sd"定级，如下表所示：

	耀斑级别			
日心距 r/R	S	1	2	3
.906—.939	Sd＜90	90—279	280—599	Sd≥600
.940—.984	75	75—239	240—499	500
985— 999	50	50—179	180—349	350
1.000	45	45—169	170—299	300

耀斑表中资料栏内各字母分别表示：

C：全部或绝大部分过程有照相观测。

P：部分或很少部分过程有照相观测。

V：目视观测。

备注栏内的各字母的意义详见附录 2。

6. 耀斑巡视时间表仅包括照相巡视，目视和照相间隔小于 5 分钟时，看作连续巡视时段用（From—To）表示。

7. 太阳射电辐射流量表，给出在各固定单频上每天太阳辐射总流量在当地太阳中天前后(一般北台、紫台在 0400 UT 左右；乌站、云台在 0500 UT 左右)的以 10^{-22}・瓦・米$^{-2}$・赫(s. f. u.)为单位的实测值，并均已归算到日一地平均距离 1 AU 处的数值。

8. 在太阳射电显著事件表中列出的各栏参数有国内外约定的意义。在流量密度（Flux Density）栏内，峰值（Peak）表示峰时流量的增值；相对值（Rel）表示峰值流量与爆发前流量之比值，平均值（Mean）表示流量密度的增值对时间求积分，除以爆发持续时间，频率单位为兆赫（MHz），持续时间（Duration）单位为分，峰值及平均值单位为 s. f. u. 。

太阳射电爆发的分型详见附录 3。分型中 1 S，2 S/F，3 S，4 S/F，5 S，20 GRF，21 GRF 22 GRF，23 GRF，41 F，45 C，46 C，47 GB 型爆发只适用于频率 f>600 MHz 的射电爆发．而 6 S，7 C，27 RF，42 SER，43 NS，44 NS，48 C，49 GB 型爆发只适用于 f<600 MHz 的爆发；28 PRE，29 PBI，30 PBI，31 ABS 不能单独存在。

请使用者注意，为了描述简单起见，在附录 3“太阳射电爆发分型”的定义中，取了流量密度的绝对值（原始值以 s. f. u. 为单位）与持续时间的绝对值（原始值以分为单位）进行大小比较（两个量进行比较时均为无量纲量）。

9. 对于峰值流量较大，而且记录质量较好的爆发，在太阳射电显著事件图中给出爆发曲线。图中右上方给出日期、频率、观测台站，横坐标为时间（UT），纵坐标为爆发流量（FLUX）。

10. 太阳射电巡视时间表为各单频射电望远镜实际巡视时间（不计入小于半小时的停顿）。连续巡视时段用（From—To）表示。

11. 宇宙线强度表中分别给出 18－NM－64 超中子堆（SUPER NEUTRON MONITOR)记录的中子数和 ACK－1 大游离室（ION CHAMBER）记录的μ介子（MESON）相对强度以及μ介子多方向望远镜（MESON MULTI－DIRECTIONAL TELESCOPE)垂直分量的记数。每小时的数据都已作了气压校正。中子堆数据表内给出的值是记数率与 1500 的差，求实际值时还需乘以定标因子 256 。μ介子垂直分量（VERTICAL COMPONENT）表内给出的值是记数率与 3000 的差，求实际值时还需乘以定标因子 128 。 μ介子数据表列出的是相对强度与 1000 的差，单位是 0.1% 。表中的空格“ ”和“……”表示没有数据。表中最后两列分别给出日均值(Mean)和有记录的小时数（N)。还给出了月均值（Monthly Mean)。最后四行是仪器全天工作天数的月平均日变化（Monthly Mean Daily Variation） 与相应的月均值的差，以及按世界时（U. T. ）和北京时（B. T. ）的调和分量（Harmonic Components)。从第一阶取到第四阶。表中给出各阶（Order）的正弦(SIN)、余弦（COS)、幅值(Amplitude）和极大值的时间(Max. —Hr)。

宇宙线强度图是以 Bartels 太阳旋转周 (Solar Rotation) 为周期，分别给出北京宇宙线台的中子和μ介子以及广州宇宙线台μ介子多方向望远镜的垂直分量 (V)、南北 (S—N) 和东西 (E—W) 各向异性每小时强度变化曲线。两条横线之间的距离表示强度变化为 5%，垂直线表示世界时 0^h。

北京宇宙线台中子堆的地理坐标：40.08° N、116.26° E；海拔高度：47 米。游离室的地理坐标：40.0° N、116.2° E；海拔高度：43 米。广州宇宙线台的地理坐标：23.1° N、113.29° E；海拔高度：21 米。

12. 突然电离层扰动 (D 层)（简称 SID）表给出了对罗兰 C 100 kHz 低频信号和奥米加 10.2 kHz 甚低频信号传播的观测所得到的相位突然异常 (SPA) 和场强突然异常 (SFA) 的数据。SPA 和 SFA 属突然电离层扰动中的两种表现形式，是电离层 D 层状态突然改变所导致的。这里，低频相位突然异常 (LF—SPA) 数据由陕台和云台提供，而甚低频相位突然异常 (VLF—SPA) 数据和低频场强突然异常 (LF—SFA) 数据则仅由陕台提供。(VLF—SPA) 一般为奥米加导航系统 E 台 10.2 kHz 信号的结果。若接受其它台站信号时，将在相应的数据后面用括号内的字母表明。

表中所列的 LF—SPA 数值（以微秒为单位）是对实测值进行了太阳天顶角改正后的结果，所用的分析和计算表达式如下：

$$\Delta\varphi_C = \left(\frac{5.0}{1.6 + 3.4\cos Z(h_m)}\right) \times \Delta\varphi'$$

$$+ \begin{cases} 7.3 \times [\cos Z(h_m - \cos Z(h_S)], & \text{当 } h_m \leqslant 12 \text{ 和 } Z(h_m) \leqslant 80° \\ 0, & \text{当 } 12 < h_m < 13 \\ 7.3 \times [\cos Z(h_m - 1) - \cos Z(h_S - 1)], & \text{当 } h_m \geqslant 13 \text{ 和 } Z(h_m) \leqslant 80° \end{cases}$$

这里 $\Delta\varphi'$（以微秒为单位）是 LF—SPA 的实测值，而 $\Delta\varphi_0$（以微秒为单位）是将 $\Delta\varphi'$ 统一归算到太阳天顶角为零的改正结果。式中，h_S和 h_m是 SPA 传播路径中点的开始和极大时间，用地方平太阳时表示；Z 是相应的太阳天顶角。VLF—SPA（以微秒为单位）是未经任何改正的实测值。LF—SFA 给出以分贝为单位的幅度变化，其中，正、负号分别表示幅度的增加和减少。如果对同一 LF—SFA 事件给出一负一正两个值，则表示幅度先减少，后增加；符号“0”表示幅度无变化。另外，所列值后面的字母 E 表示真实值小于所列值；字母 D 表示真实值大于所列值；字母 U 则代表观测结果不太确定。SID 的级别是根据 $\Delta\varphi_0$值所确定的（最小 1— 级，最大 3+ 级），其对应关系如下表所示：

$\Delta\varphi_0$	(0,-1]	(-1,-2]	(-2,-3]	(-3,-4]	(-4,-5]	(-5,-6]	(-6,-7]	(-7,-8]	(<-8)
级别	1—	1	1+	2—	2	2+	3—	3	3+

13. 地磁活动指数 K 和 A_K 表中日期后有 Q 者表示当月五天地磁最平静日；有 D 者表示当月五天地磁最扰动日。三小时时段的 K 指数由各时段地磁水平强度 H 的时均值消去正常日变化后的变化磁场值决定。就中、低纬度地区而言，其对应关系如下：

H=	3	6	12	24	40	70	120	200	300	(单位为 nT)
K=0	1	2	3	4	5	6	7	8	9	

每日等效幅度 A_k 是当日 8 个三小时时段等效幅度 a_K 的平均。K 指数与 a_K 的对应关系如下：

K=0	1	2	3	4	5	6	7	8	9	
a_k=0	3	7	15	27	48	80	140	240	400	(单位为 1.2 nT)

14. 在磁暴表中，SC 表示急始磁暴；SC* 表示先有一小负脉冲然后继以主要脉冲的急始磁暴，在量 SC* 的急始幅度时，仅量取主要脉冲幅度；GC 表示缓始磁暴。活动程度栏中以 m、ms、s 分别表示中常、中烈和强烈磁暴。即分别对应于 K=5，6—7，8—9 的磁暴。

北京地磁台的地理坐标：40.0° N、 116.2° E； 地磁坐标：28.9° N、 186.1° E； 海拔高度：43 米。

以上所有图表中的时间一律采用世界时（UT）。由世界时转换到北京时间（东经 120° 标准时）应加上八小时。例如 2300—2400（UT）即相当于北京时间次日上午 0700—0800。

15. 为鼓励观测和资料处理人员尽快发表他们的较有价值的新的观测资料和反应他们的资料及技术工作的成果，为尽快交流研究工作的新进展，本刊不定期刊登短文，内容包括观测报告、附有说明的照片或图像、资料处理和技术报告以及研究方法和新成果的介绍等。短文限在 1000 字以内，包括图表不得超过 4 页，来稿须有英文译文，文责自负。

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附录 1　McIntosh 黑子分型法

黑子的分型由三个字母组成。第一个字母为修正的 Zürich 分型，第二个字母为黑子群中最大的半影情况，第三个字母为黑子群中黑子的分布情况，现将各型分述如下：

(1)　修正的 Zürich 分型

A　无半影单极群。长度上与 B 型群无明确界线。

B　无半影双极群。大多数长度<10°，在老的群中长度可达 20°。黑子间距>3° 者视为双极群。

C　一个极性中有半影的双极群，当半影径向跨度>5° 时，则划为 D 型。C 型长度无限制。

D　二个极性中均有半影的双极群，其径向跨度<10°。

E　二个极性中均有半影的双极群，其径向跨度达 10°－15°。

F　二个极性中均有半影的双极群，其径向跨度>15°。

H　有半影的单极群，伴随黑子距主黑子半影<3°。其主要黑子几乎总是原双极群中的前导黑子。当半影径向跨度>5° 时，则划为密集 D 型。

(2)　最大黑子的半影情况

x　无半影（黑子周围灰区宽度>3″ 时才能视为半影）。

r　不成熟和不规则半影，其宽度～3″，比正常半影亮，半影结构为颗粒状而非纤维状。

s　对称和近于圆型半影，其结构为纤维状，黑子直径<2.5°，本影密集于半影中央。这种黑子变化缓慢。

a　不对称或复杂的半影，其结构为纤维状，黑子直径<2.5°，不对称半影的轮廓不规则或明显变长（不圆），半影中有二个以上本影。这种黑子往往逐日变化。

h　大的对称半影，其直径>2.5°。除了尺度较大外，其余特征与 s 相同。

k　大的不对称半影，其直径>2.5°。除了尺度较大外，其余特征与 a 相同。当半影的径向跨度>5° 时，几乎可肯定半影中有二种极性，从而黑子群成为 Dkc 或 Ekc 或 Fkc 型。

(3)　群中的黑子分布

x　单个黑子。

o　开放型分布。前导与后随黑子之间无黑子，黑子群可明确划分为二部分相反极性。开放型分布暗示极性变换线附近的磁场梯度较小。

i　中间型分布。前导与后随黑子之间有一些黑子，但它们均无半影。

c　密集型分布。前导与后随黑子之间有很多黑子，其中至少一个有半影。密集型分布的极端情况是整群黑子处在连续的半影区中。密集型分布暗示极性变换线附近的磁场梯度很大。

注：Zürich 分型中的 G 型与 J 型，在 McIntosh 分型法的第一个字母中已不再出现。

Zürich 分型中的 G 型现对应 McIntosh 分型法中的 Ero、Eso、Eao、Eho、Eko 和 Fro、Fso、Fao、Fho、Fko。

Zürich 分型中的 J 型现对应 McIntosh 分型法中的：Hrx、Hsx、Hax。

附录 2

耀斑表中备注栏内各字母的意义（IAU 系统）

A＝底部位于中经距小于 90°区域的爆发日珥

B＝可能是一个比较大的耀斑的尾声

C＝十分钟以前还看不见

D＝一个亮点

E＝两个或多个亮点

F＝有几个爆发中心

G＝在邻近区域无可见黑子

H＝有高速暗条半随的耀斑

I＝活动区的范围很大

J＝耀斑前或后谱斑亮度有明显变化

K＝有好几个亮度极大

L＝现存暗条有突然活动的迹象

M＝白光耀斑

N＝耀斑连续光谱出现各种偏振效应

O＝用 Ca Ⅱ 的 H 或 K 线对耀斑进行了观测

P＝耀斑有 HeD_3发射

Q＝耀斑的巴尔麦连续区呈现发射

R＝耀斑的 H_α线显著不对称表明有高速物质抛射

S＝暗条消失以后在同一位置有增亮现象发生

T＝整天活动的区域

U＝平行型（//）或会聚型（Y）的双亮带耀斑

V＝有爆发相的事件：在大约一分钟内，耀斑面积扩展有伴随或不伴随亮度的急剧增大.

W＝强度极大后，耀斑面积突增。

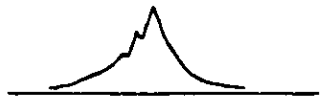
X＝耀斑的 H_α线很宽

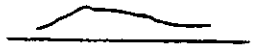
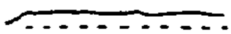
Y＝环形日珥系统

Z＝大的黑子本影为耀斑所掩盖

附录 3

太 阳 射 电 爆 发 分 型

类 型	定 义	图 形
1 S	持续时间和峰值流量均小于 10。	
2 S/F	1 S 型爆发上叠有起伏。	
3 S	峰值流量的绝对值大于持续时间的绝对值，且峰值流量大于 10。	
4 S/F	3 S 爆发上叠有起伏。	
5 S	不符合其它简单型爆发定义，且峰值流量的绝对值大于持续时间的绝对值的爆发。	
6 S	持续时间为 1 或 2 分钟的简单上升和下降的爆发。	
7 C	持续时间为几秒，峰值流量小于 10 的复杂型爆发。	
8 S	迅速上升又迅速下降、持续时间接近或小于 1 分钟，且峰值流量大于 10 的简单爆发。	

类　型		定　　义	图　　型
20	GRF	持续时间从 10 分钟到几小时，峰值流量的绝对值小于持续时间的绝对值，且流量值不超过 50。	
21	GRF	20 GRF 型爆发上叠加有清晰的可分别列出的爆发。	
22	GRF	20 GRF 型爆发上有可分别列出的起伏。	
23	GRF	20 GRF 型爆发上有可分别列出的起伏及爆发。	
24	R	持续时间为 5 到 30 分钟流量持续上升，且在上升后数小时内不伴随下降。“持续时间”附有字母 D。	
25	R	24 R 型爆发上叠加有爆发。	
26	FAL	持续时间为 5 到 30 分种（指图中斜的部分）中等强度的流量下降，下降前数小时无流量上升。	
27	RF	有或多或少规律的连续谱上升和下降，持续时间为分到小时。	

类 型	定 义	图 型
28 PRE	在主爆发之前，流量逐渐上升地（时间大于 10 分钟）增强，先兆的结束取在斜率突变的时刻。	
29 PBI	爆发后，流量在逐渐下降时（时间大于 10 分钟）仍有明显的增强，增强的开始取在斜率突变的时刻。	
30 PBI	在 29 PBI 型爆发上叠加有爆发。	
31 ABS	爆发后流量密度逐渐下降后又回到事件前水平。	
32 ABS	流量密度逐渐下降后又回到事件前水平。	
40 F	流量密度有一系列迅速又无规则的变化，各峰无法明显区别，各次峰强度小于主峰的 15％。	
41 F	彼此接近的一群小爆发，每个小爆发均下降至爆发前水平，每两个爆发的时间间隔小于或等于 5 分钟。	

类型		定义	图型
42	SER	具有显著时间间隔的一系列爆发，每个爆发均降至爆发前水平。	
43	NS	噪爆开始。“持续时间”带有字母 D。	
44	NS	进行中的噪爆。“开始时间”带有字母 E，“持续时间”带有字母 D。	
45	C	几个或多个简单爆发的合成。	
46	C	45 C 型爆发上有起伏。	
47	GB	峰值流量密度>500 的爆发。	
48	C	有大振幅、复杂变化的复杂型爆发。	
49	GB	持续时间大于 10 分钟、流量有较大增强的爆发。	

CHINESE SOLAR GEOPHYSICAL DATA (CSGD)
EXPLANATION OF DATA REPORTS

(1993)

Introduction

The solar geophysical data contained in " Chinese Solar Geophysical Data " (CSGD) are collected by Beijing Astronomical Observatory (BEIJ), Center for Space Science and Applied Research, Beijing Geomagnetic Observatory (BGMO), Beijing Planetarium (PLAT), Purple Mountain Observatory (PURP), Shaanxi Observatory (LINT), Urumqi Astronomical Station (URUM) and Yunnan Observatory (YUNN). The data in CSGD consist of the following ten parts:

1. Daily Relative Sunspot Numbers and Sunspot Areas, Daily Sunspot Observations compiled by Purple Mountain Observatory
2. Predicted Smoothed Sunspot Numbers
3. Observations of Magnetic and Velocity Fields of Solar Active Regions at Huairou Station, Beijing Astronomical Observatory
4. H-Alpha Solar Flares and Time Intervals of H-Alpha Flare Patrol Observations
5. Solar Radio Emission Fluxes and Solar Radio Emission Outstanding Occurrences, Intervals of Solar Radio Emission Patrol Observations and Time Profiles Solar Radio Emission Bursts
6. Cosmic Ray Meson and Neutron Intensity compiled by Center for Space Science and Applied Research
7. Sudden Ionospheric Disturbances (D-Region) (SID)
8. Geomagnetic Indices K and A_k
9. Magnetic Storms compiled by Beijing Geomagnetic Observatory
10. Nonperiodically Published Special Issues for the Data Corresponding Solar-Terrestrial Effects and Preliminary Analyses of Some Selected Events

All the data mentioned above are stored in a VAX 11/780 computer.

Brief Explanation of the Main Contents

1. There are two kinds of sunspot tables in which the visual data mainly come from the observations of Yunnan Observatory while photographic results of spot areas are supplied by Beijing Astronomical Observatory. When there are gaps in these observations the table will be filled by observations made on the same day by other observatories whose names will appear in the column of remarks. Sunspot group numbers in the table of " Daily Sunspot Observations " are standardized after collecting all sunspot observations from different observatories. The estimated Seeing Conditions are given in the column " See " on a 5-level scale from best (5) to worst (1).

2. The predicted values of R' with the errors E' referred to the confidance 90 % are given for a year in the table of " Predicted Smoothed Sunspot Numbers ". The method of prediction may be found in the CSGD January 1989, P.27 .

3. In the table of " Daily Sunspot Observations " and the table of " H-Alpha Solar Flares ", Carrington coordinates are used for the position measurement of sunspot groups

or flares. Central Meridian Distance shows the distance in degrees between the central meridian and the meridian where a sunspot group or flare is located. E and W indicate that the sunspot group or flare lies to the east or to the west of the central meridian, respectively. Heliocentric Distance measured in units of disk radius represents the distance from the centre of gravity of the sunspot group or flare on the disk to the centre of the disk. Apparent Areas Sd is the area projected on the disk in millionths of the disk and the Corrected Area Sp is the real area of the sunspot group or flare occupied on the solar surface in millionths of the hemisphere after the projecting correction. McIntosh classification is used for the classification of sunspot groups.

4. In the table of observations of solar magnetic and velocity fields, the date, the Carrington longitude of the solar disk center (L0), the number (under Huairou Region) and Carrington coordinates (L: Longitude, Lat: Latitude; in bracket is the reference position from sunspot measurement) of an observed active region and data types obtained at Fe I λ 5324.19Å and/or $H_\beta\lambda$ 4861.34 Å at Huairou Station of Beijng Astronomical Observatory are given. Meanings of letters in the table are as follows:

S (or T) — monochromatic image
D — monochromatic image at the wave length used in a Doppler field observation
L — data of longitudinal fields
Q and U — data of transverse fields
V — data of Doppler velocity fields
5 — observation at Fe I λ 5324.19Å
4 — observation at $H_\beta\lambda$ 4861.34 Å

In the last part of the table the observation date of the longitudinal fields of solar poles (NPL: +90.0, 0.0; SPL: -90.0, 0.0) is given.

5. The table of " H-Alpha Solar Flares " gives H-Alpha flare (including subflares (by S)) patrol observations done at Beijing Astronomical Observatory,Purple Mountain Observatory, Urumqi Astronomical Station, and Yunnan Observatory. For each flare, the start time, end time, the time at which the flare shows its maximum brightness (Maxtime) and the area measured at the time of maximum brightness are given. For flares within 65° from the centre of the disk, the formula relating apparent area Sd and corrected area Sq is as follows:

$$S_q = S_d \times \frac{1}{\sqrt{1-(r/R)^2}} \times 0.020626$$

Two figures are assigned to each flare to show the importance of the flare. The first figure is defined by the area of the flare at the maximum phase and the second one is only a qualitative scale where each observatory uses its experience to decide if a flare is rather faint (F), normal (N), or rather bright(B). For flares within 65° from the centre of the disk, i.e., the heliocentric distance is less than 0.906, the first figure assigned to the flare importance is defined by the corrected area Sq according to the following table where areas are given in millionths of a solar hemisphere.

Corrected Area Sq in Square Degrees	Relative Intensity Evaluation		
	Faint (F)	Normal(N)	Brilliant(B)
≤ 2.0	SF	SN	SB
2.1 — 5.1	1F	1N	1B
5.2 — 12.4	2F	2N	2B
12.5 - 24.7	3F	3N	3B
24.7	4F	4N	4B

For flares which are at a distance equal to or greater than 65° from the centre of the disk, i. e., the heliocentric distance is equal to or greater than 0.906, the first figure assigned to the flare importance can be estimated by the apparent area Sd according to the following table where the areas are given in millionths of the disk.

Heliocentric Distance r/R	Importance			
	S	1	2	3
.906 - .939	Sd < 90	90 - 279	280 - 599	Sd ≥ 600
.940 - .984	75	75 - 239	240 - 499	500
.985 - .999	50	50 - 179	180 - 349	350
1 .000	45	45 - 169	170 - 299	300

The letters C, P, and V in the column marked " Observation Type " represent the nature and completeness of the observations, i.e.:

C — a complete or quasi-complete sequence of photographs is obtained

P — only one or a few photographs of the event are obtained due to an incomplete time coverage

V — the development of the flare was visually observed

The meaning of one or more letters of A to Z in the column marked " Remarks " follow the International Astronomical Union notation, in which each letter of the alphabet stands for a particular noteworthy condition, as shown in Appendix 1.

6. In the table of " Intervals of H-Alpha Flare Patrol Observations ", the Intervals of H-Alpha Flare Patrol Observations are given by " from to ". Flare patrol observations are considered to be continuous if the intervals of no flare patrol observations are less than five minutes.

7. The table of " Daily Solar Radio Emission Flux " gives the flux values of the sun calibrated in units of $10^{-22} \cdot W \cdot M^{-2} \cdot Hz^{-1}$ (s.f.u.) at the time around meridian transit (BEIJ, PURP : around 0400 UT; URUM, YUNN: around 0500 UT) every day at different fixed radio frequencies. All flux values are adjusted to mean sun-earth distance: 1 AU.

8. Each column in the table of " Solar Radio Emission Outstanding Occurrences " has its centain implication following an international implied consent. In the column of Flux Density, " Peak " represents the peak value of flux density of the event; " Rel " represents the relative value $\Delta S/S$, i.e., the ratio of the flux increment ΔS and the flux S before the burst; " Mean " represents the mean flux increment which is an integral of flux increment over the time of duration and divided by the duration. Both the peak flux density and the mean flux density are measured in " s.f.u. ", frequency in MHz and duration in minutes.

For the classification of bursts see Appendix 2. Among the types, 1 S, 2 S/F, 3 S, 4 S/F, 5 S, 20 GRF, 21 GRF, 22 GRF, 23 GRF, 41 F, 45 C, 46 C and 47 GB are used in the frequency range greater than 600 MHz, 6 S, 7 C, 27 RF, 42 SER, 43 NS, 44 NS, 48 C and 49 GB are used in the frequency range less than 600 MHz, and on the other hand, 28 PRE, 29 PBI, 30 PBI and 31 ABS are not independent types at all.

Finally, one must notice that, for simplicity, we use the absolute value of flux density (with original value in s.f.u.) and duration (with original value in minute) for the definition of classification in Appendix 2.

9. In the " Profiles Figure of Solar Radio Emission Outstanding Occurrences ", the date, peak fluxes, and frequencies of events are given on the right corner. The time is denoted on the abscissa axis and the amplitude in units of s.f.u. is denoted on the ordinate axis.

10. The table of " Intervals of Solar Radio Emission Patrol Observations " gives the time coverage of the patrol observations made with those radio telescopes that contribute the data. The data gaps less than half hour are not listed.

11. The intensities of cosmic ray neutrons, mesons and meson vertical component, which are respectively recorded with 18-NM-64 super neutron monitor (NM), ACK-1 large ion chamber (IC), and meson multi-directional telescope are monthly tabulated. The hourly mean values in the table are corrected for the atmospheric pressure. To get the real counting rates of cosmic ray neutrons one should and 1500 to the counting rates given in the table and multiplies by the scaling factor 256. The real counting rates of the vertical component of cosmic ray mesons are that the counting rates in the table plus 3000 and multiplies with the scaling factor 128. The relative intensity of cosmic ray mesons is that the tabulated values plus 1000 and in the units of 0.1 %. The space "   " and the dash " — " mean no data.

The gragh expresses the variations of cosmic ray intensity monitored with the NM and IC at the Beijing Cosmic Ray Observatory and the variations of the vertical component (V) and north-south (N-S) and east-west (E-W) anisotropies of cosmic ray mesons measured at the Guangzhou Cosmic Ray Observatory hourly. The abscissa is the cycle of the Bartels Solar Rotation. The intensity variation between two horizontal lines corresponds to 5%. The vertical lines indicate 0^h UT.

The neutron monitor is located at 40.08° N, 116.26° E geographic coordinates and elevation is 47 meters and 40.0° N, 116.2° E and 43 m for the ion chamber. The Guangzhou Cosmic Ray Observatory is located at 23.1° N, 113.29° E and has an elevation of 21 m.

12. The table of " Sudden Ionosphereic Disturbances (D-Region) " (SID) presents the information of the Sudden Phase Anomalies (SPA) and the Sudden Field Anomalies (SFA) based on the observations of the propagations of the Loran-C signals at 100 kHz (LF) and the Omega signals at 10.2 kHz (VLF), which are the particular types of the SID resulted from the sudden changes of the condition in the D-Region of the ionosphere. Here, the Sudden Phase Anomalies at low frequency (LF-SPA) are reported by both Shaanxi Observatory and Yunnan Observatory while the Sudden Phase Anomalies at very low frequency (VLF-SPA) and the Sudden Field Anomalies at low frequency (LF-SFA) are reported by Shaanxi Observatory only. (VLF-SPA) is generally obtained from the signal received at 10.2 kHz from Omega-E Station. Letter(s) will be given in the bracket

if other signal is used.

The values of the (LF-SPA) in μs listed in this table are the corrected results of the measurements for the solar zenith correction with following expression resulted from the analyses and calculation:

$$\Delta\phi_0 = \frac{5.0}{1.6 + 3.4\cos Z(h_m)} \times \Delta\phi' +$$

$$+\begin{cases} 7.3 \times [cosZ(h_m) - cosZ(h_s)], & when\ h_m \leq 12\ and\ Z(h_m) \leq 80°; \\ 0, & when\ 12 < h_m < 13; \\ 7.3 \times [cosZ(h_m - 1) - cosZ(h_s - 1)], & when\ h_m \geq 13\ and\ Z(h_m) \leq 80°; \end{cases}$$

where, $\Delta\phi'$ in μs is a measured value of (LF-SPA) , $\Delta\phi_0$ in μs is a corrected result of $\Delta\phi'$, i.e., a value normalized to the solar zenith angle of zero. h_s and h_m , in local mean solar time for the middle point of the propagation path are the SPA start time and the SPA maximum time, respectively, and Z is the corresponding solar zenith angle. The values of the (VLF-SPA) in μs are the measurement results without any correction and the listed values of (LF-SFA), in db, give the information of amplitude variation, where the signs " + " and " – " prefixed to the values indicate the increase and decrease of the amplitude, respectively. In case there are two values listed for the same (LF-SFA) event, one negative and the other positive, it means the amplitude decrease at first and increase afterwards. Sign " 0 " indicates that there is no amplitude change. Besides, " E " after the listed value means that the real value is less than the listed one; the letter " D " after the listed value indicates that the real value is greater than the listed one ; letter " U " denotes an uncertainty in measurement. As for the importance rating, based on a scale of 1–, the least, to 3+, the most important, is derived from the values of $\Delta\phi_0$, shown as the following table:

$\Delta\phi_0$	(0,-1]	(-1,-2]	(-2,-3]	(-3,-4]	(-4,-5]	(-5,-6]	(-6,-7]	(-7,-8]	(< -8)
IMP.	1–	1	1+	2–	2	2+	3–	3	3+

13. The data included in the table of " The Geomagnetic Activity Indices K and A_k " are: three-hourly K index, five quietest days of the month (Q) and five most disturbed days of the month (D). Three-hourly K index is determined by the H components measured in nT in each corresponding three-hourly period and subtracted by the diurnal normal changes of geomagnetic field. For mid and low latitude areas, the corresponding relation of H and K is as follows :

```
H =   3   6   12   24   40   70   120 200 300   (in nT)

K = 0   1   2   3   4   5   6   7   8   9
```

Daily effective A_k is the average of eight values of three-hourly index a_k , the corresponding relation of K and a_k is as follows :

K =	0	1	2	3	4	5	6	7	8	9	
a_k=	0	3	7	15	27	48	80	140	240	400	(in 1.2 nT)

14. Three kinds of geomagnetic storm are listed in the table of " The Magnetic Storms " : sudden commencement (SC), a small negative initial impulse followed by a main impulse (SC*) and gradual commencement (GC). Three degrees are used for the rating of geomagnetic storms, i.e.: moderate (m), moderate severe (ms) and severe (s) corresponding to K=5, K=6–7, and K=8–9, respectively.

Beijing Geomagnetic Observatory is located at 40.0°N, 116.2°E in geographic coordinates or 28.9°N, 186.1°E in geomagnetic coordinates, and 43 meters above sea level.

The time used in all these data reports is Universal Time (UT). To transform UT to Beijing Standard Time (120°E) one can simply add 8 hours to Universal Time. For instance, for a flare observed at 2230–2400 UT, the equivalent Beijing Standard Time is 0630–0800 next day.

15. To encourage a fast exchange of information about solar observations and studies, short articles including reports of observations, data treatments, observational technology and research work and photographs with a explanation are accepted and published in this data journal nonperiodically. Articles are limited within 1000 words and 4 pages including tables and figures.

Numbering of CSGD :

From the first issue of 1991 on, Issues of the Chinese Solar-Geophysical Data (CSGD) will be numbered. The first issue of 1991 of CSGD is numbered 213.

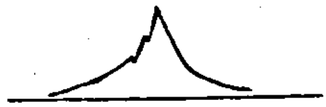
Address your inquires to our Editorial Group, please: CSGD Editorial Group, Beijing Astronomical Observatory, Beijing 100080 China . Telephone Number : 2567194, Telegram code : 9053, Telex : 22040 BAOAS CN.

Appendix 1

The International Astronomical Union Notation for H-Alpha Solar Flares

A = Eruptive prominence whose base is less than 90° from the central meridian.
B = Probably the end of a more important flare.
C = Invisible 10 minutes before.
D = Brilliant Point.
E = Two or more brilliant points.
F = Several eruptive centers.
G = No visible spots in the neighborhood.
H = Flare accompanied by a high speed dark filament.
I = Active region very extended.
J = Distinct variations of plage intensity before or after the flare.
K = Several intensity maxima.
L = Existing filaments show signs of sudden activity.
M = White-light flare.
N = Continuous spectrum shows effects of polarization.
O = Observations have been made in the calcium II lines H or K.
P = Flare shows helium D_3 in emission.
Q = Flare shows the Balmer continuum in emission.
R = Marked asymmetry in H-alpha line suggests ejection of high velocity material.
S = Brightness follows disappearance of filament (same position).
T = Region active all day.
U = Two bright branches, parallel (||) or converging (Y).
V = Occurrence of an explosive phase: important and abrupt expansion
in about a minute with or without important intensity increase.
W = Great increase in area after time of maximum intensity.
X = Unusually wide H-alpha line.
Y = System of loop-type prominences.
Z = Major sunspot umbra covered by flare.

Appendix 2
Classificatiom of Solar Radio Bursts

Type	Definition	Figure
1 S	Peak flux density (sfu) and duration (min) both less than 10.0.	
2 S/F	1 S with fluctuations.	
3 S	Peak flux density (sfu) greater than both the duration (min) and 10.0.	
4 S/F	3 S with fluctuations.	
5 S	Different from the simple events defined above, also peak flux density (sfu) greater than duration (min) of the burst.	
6 S	Simple rise and fall of minor burst with duration 1 or 2 min.	
7 C	Complex events with duration of several seconds and flux density (sfu) less than 10.0.	
8 S	An event which shows a rapid rise to a single peak, followed by a rapid fall to the pre-event level with a duration about one minute or less and flux density (sfu) greater than 10.0.	

20 GRF Bursts have duration in the range from 10 minutes to several hours and flux density (sfu) less than both the duration (min) and 50.0.

21 GRF 20 GRF type burst with superimposed distinct bursts to be able to list separately.

22 GRF 20 GRF type burst with fluctuations to be able to list separately.

23 GRF 20 GRF type burst with fluctuation and superimposed bursts both to be able to list separately.

24 R A moderate rise of flux from 5 to 30 minutes duration with no accompanying decline during the following hours and with symbol D.

25 R 24 R type bursts with superimposed bursts.

26 FA1 A moderate decline of flux from 5 to 30 minutes duration with no rise of flux during the foregoing hours and with symbol D.

27 RF The rise and fall of continuous spectrum more or less regularly with duration in the range from minutes to hours.

28 PRE — A precursive enhancement of the flux density level with duration greater than 10 min preceding the main burst if it is a gradual rise; the end of the precursor is taken at the time when the slope suddenly changes.

29 PBI — A post-burst enhancement of flux density level with duration greater than 10 min if it decreases gradually; the start of the enhancement is taken at the time when the slope suddenly changes.

30 PBI — 29 PBI type events with superimposed bursts.

31 ABS — After the burst a gradual decrease of the flux density with a subsequent return to the pre-event level.

32 ABS — A gradual decrease of the flux density with a subsequent return to the pre-event level.

40 F — A series of rapid irregular changes in the flux density level, with no distinct peak grouping into individual events; the intensity of each component is less than 15% of the main peak.

41 F — A number of single bursts occur in succession and the flux level returns to the pre-event level; the interval between each two bursts is equal to or less than 5 min.

42 SER — A series of bursts occur with considerable time intervals between bursts; the flux level of each burst returns to the pre-burst.

43 NS Onset of noise storm. Duration of events with symbol D.

44 NS Noise storm in progress. Starting time with symbol E, and duration with symbol D.

45 C Combination of a few or many simple bursts.

46 C 45 C burst with fluctuations.

47 GB Peak flux density of 500 sfu or more.

48 C A complex event with complex and large variation of amplitude.

49 GB Major increase of flux density, duration greater than 10 min.

《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

Gro：每天在日面上的黑子群总数

Relative—Numbers：每天的黑子相对数值

N. H.：每天北半球的黑子相对数

S. H.：每天南半球的黑子相对数

Sum：南、北半球黑子相对数的总和

Sunspot Areas：太阳黑子面积数值

Drawing：手描的

Photographic：照相的

N. H.：每天北半球黑子面积

S. H.：每天南半球黑子面积

Sum：南、北半球黑子面积的总和

太阳黑子观测表

Group：在日面上的黑子群号

CMP Mo—Day：黑子群过日面中心经圈日期，用月一日表示。

Lat：黑子群在日面上的纬度

L：黑子群在日面上的卡林顿经度

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(以太阳半径为 1)

Corre. Area Sd whole Max：黑子群在日面上所占的面积(Sd 为视面积，Whole 为校正后的全群面积，Max 为校正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观测资料，注明 PLAT 的为北京天文馆资料，PURP 为南京紫金山天文台资料。)

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

Hα 太阳耀斑表

Sta：台站

Start (UT)：耀斑开始时间(UT 为世界时，其中“E”为小于此时间。)

Max (UT)：耀斑的极大时间(“U”为接近此时间，不确定。)

End (UT)：耀斑的结束时间(“D”为大于此时间。)

Cen Dist：日心距，即 r/R。

Area Measurement Appar Corr (sd) (sq)：耀斑极大时的面积(Sd 为视面积，单位为太阳圆面积的 10^{-6}；Sq 为校正面积，以平方度为单位。)

Imp：耀斑的级别

Obs Type：耀斑资料类型

A. R.：耀斑所在活动区的黑子群号

Rem：备注(记录耀斑发生时的形态)

Hα 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 Region：北京天文台怀柔观测站的活动区编号

Data：取得的磁场资料类型

太阳射电辐射流量表

BEIJ 2840：每天的太阳在 2840 MHz 的流量密度(北台 0400 UT 测量，以 10^{-22} · 瓦 · 米$^{-2}$ · 赫$^{-1}$(s. f. u.)为单位。)

PURP 2700：每天的太阳在 2700 MHz 的流量密度(紫台 0400 UT 测)

URUM 9375：	每天的太阳在 9375 MHz 的流量密度(乌站 0500 UT 测)
YUNN 2840：	每天的太阳在 2840 MHz 的流量密度(云台 0500 UT 测)

太阳射电辐射显著事件表

Freq：	观测频率
Type：	射电爆发的型别
Duration：	射电爆发的持续时间(以分钟为单位)
Flux Density：	射电爆发的流量密度
Peak：	射电爆发流量的峰值增值
Rel：	射电爆发峰值流量与爆发前流量之比值
Mean：	流量密度的增值对时间求积分再除以爆发持续时间

太阳射电辐射巡视时间表

BEIJ	北京天文台 2840 MHz 频率
From To 2840：	巡视时间
PURP	紫金山天文台 2700 MHz 频率
From To 2700：	巡视时间
URUM	新疆乌鲁木齐天文站频率为
From To 9375：	9375 MHz 巡视时间
YUNN	云南天文台 2840 MHz 频率
From To 2840：	巡视时间

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“μ 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“μ 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 1992 年第 1 期说明。

突然电离层扰动(D 层)表

Imp：	级别(最小为 1—级，最大为 3+级。)
SPA：	相位突然异常
LF：	低频相位突然异常
VLF：	甚低频相位突然异常
SFA：	低频场强突然异常

地磁活动指数 K 和 A_K 表

第一行：	以三小时为时段的 K 指数
Sum：	总和
A_K：	A_K 指数

磁暴表

Time of Magnetic：	磁暴时间
Begining：	开始时间
Ending：	终止时间
h：	小时
m：	分钟
Type：	类型
Sudden Com. Amplitude D′ HnT ZnT：	急始变幅
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 D′ HnT ZnT：	最大幅度

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

JANUARY 1993

		Relative-Numbers			Sunspot Areas					
					Drawing			Photographic		
Day	Gro.	N.H.	S.H.	Sum	N.H.	S.H.	Sum	N.H.	S.H.	Sum
1	7	14	42	56	145	356	501			
2	4	7	25	32	58	336	394			
3	6	7	44	51	56	501	557			
4	5	15	29	44	10	567	577			
5	7	7	65	72	3	872	875			
6	8	7	78	85	5	770	775			
7	11	23	97	120	65	689	754			
8	9	32	76	108	72	484	556			
9	9	30	60	90	46	389	435			
10	10	32	77	109	114	381	495			
11	10	43	81	124	60	369	429			
12	10	44	79	123	46	470	516			
13	10	46	78	124	94	493	587			
14	7	26	59	85	39	423	462			
15	6	16	40	56	290	350	640			
16	7	24	41	65	322	354	676			
17	5	18	35	53	245	511	756			
18	5	17	35	52	217	290	507			
19	6	14	44	58	265	373	638			
20	4	7	37	44	230	201	431			
21	5	8	36	44	244	200	444			
22	4	8	26	34	208	111	319			
23	5	14	28	42	231	118	349			
24	5	24	23	47	208	117	325			
25	5	25	20	45	282	106	388			
26	5	24	20	44	230	69	299			
27	3	7	16	23	431	77	508			
28	5	7	36	43	5	213	218			
29	4	7	29	36	3	236	239			
30	4	0	36	36	0	225	225			
31	3	0	29	29	0	231	231			
Mean		17.8	45.8	63.7	136.3	351.0	487.3			

DAILY SUNSPOT OBSERVATIONS

JANUARY 1993

Day	Group	CMP Mo-Day	Lat	L	CMD	Type	r/R	Sd	Corre. Area Whole	Corre. Area Max	See Remarks
1.06	481	12-26.1	11	342	79W	AXX	0.98	4	10	10	4
	482	12-28.1	-10	316	53W	CRI	0.79	38	31	21	4
	484	12-28.1	4	316	55W	HSX	0.83	151	135	135	4
	486	12-28.1	-5	316	58W	AXX	0.85	4	4	4	4
	492	12-28.7	-15	308	40W	BXI	0.66	8	6	3	4
	1	1- 7.2	-23	182	80E	HSX	0.98	34	79	79	4
	2	1- 7.1	-5	184	82E	HSX	0.99	71	236	236	4
2.03	482				67W	BXO	0.92	13	16	11	3
	484				69W	HSX	0.93	42	58	58	3
	1				68E	CSO	0.93	50	69	52	3
	2				68E	HHX	0.92	198	251	251	3
3.06	482				80W	AXX	0.98	4	10	10	3
	484				82W	HSX	0.99	17	56	56	3
	493	1- 4.8	-18	214	23E	AXX	0.45	4	2	2	3
	1				55E	CSO	0.83	185	165	154	3
	2				54E	CHO	0.80	378	319	315	3
	3	12-31.8	-7	267	30W	BXO	0.51	8	5	2	3
4.08	1				40E	CSO	0.69	290	200	195	3
	2				40E	HHX	0.63	454	293	290	3
	3				45W	DRI	0.70	105	74	32	3
	4	1- 1.4	12	259	35W	AXX	0.62	8	5	3	3
	5	1- 6.6	12	191	33E	AXX	0.60	8	5	3	3
5.09	1				28E	CAI	0.55	311	187	182	4
	2				26E	CHI	0.44	597	332	327	4
	3				60W	DAI	0.86	210	207	129	4
	4				50W	AXX	0.78	4	3	3	4
	6	1- 6.2	-18	196	14E	BXI	0.34	21	11	4	4
	7	1-10.5	-8	139	71E	HRX	0.94	25	38	38	4
	8	1-11.0	-12	132	80E	HRX	0.99	29	97	83	4
6.08	1				15E	DSI	0.40	265	145	78	4
	2				13E	CHI	0.23	631	324	307	4
	3				74W	DSI	0.95	101	168	70	4
	4				61W	AXX	0.89	4	5	5	4
	6				1E	BXI	0.25	13	7	2	4

DAILY SUNSPOT OBSERVATIONS

JANUARY 1993

Day	Group	CMP Mo-Day	Lat	L	CMD	Type	r/R	Sd	Corre. Area Whole	Corre. Area Max	See Remarks
	7				59E	HRX	0.85	29	28	28	4
	8				67E	HSX	0.92	71	91	64	4
	9	1- 7.4	-16	179	20E	BXO	0.39	13	7	5	4
7.07	491	1- 3.4	10	233	49W	BXO	0.77	13	10	7	4
	1				2E	DAI	0.32	484	255	160	4
	2				0W	CHI	0.02	656	328	311	4
	3				85W	HRX	0.99	13	42	42	4
	6				13W	AXX	0.34	8	4	2	4
	7				45E	AXX	0.71	13	9	6	4
	8				53E	HSX	0.80	50	42	39	4
	9				5E	AXX	0.23	8	4	2	4
	10	1-10.1	-13	145	38E	AXX	0.62	8	5	3	4
	11	1-12.1	7	118	69E	AXX	0.93	4	6	6	4
	12	1-12.5	13	113	72E	HSX	0.95	29	49	49	4
8.07	491				64W	AXX	0.91	8	10	5	4
	1				9W	DAI	0.36	269	144	70	4
	2				13W	CHI	0.22	538	276	265	4
	7				32E	AXX	0.53	4	2	2	4
	8				40E	CSO	0.64	76	49	47	4
	9				6W	BXI	0.26	25	13	2	4
	11				55E	CRI	0.83	21	19	11	4
	12				58E	HSX	0.86	42	41	41	4
	13	1-10.0	8	145	26E	AXX	0.48	4	2	2	4
9.10	1				23W	DRI	0.48	101	58	34	4
	2				26W	CHI	0.44	471	262	257	4
	8				26E	HSX	0.45	59	33	33	4
	9				20W	CRI	0.41	59	32	9	4
	10				9E	AXX	0.17	4	2	2	4
	11				40E	BXI	0.67	17	11	3	4
	12				45E	HRX	0.74	38	28	28	4
	14	1- 8.9	-21	160	3W	AXX	0.29	4	2	2	4
	15	1-11.1	6	131	28E	AXX	0.49	13	7	5	4
10.06	1				35W	CRO	0.62	21	13	8	4
	2				39W	HHX	0.62	400	255	252	4
	7				6E	BXO	0.11	8	4	2	4
	8				13E	CSO	0.26	80	41	39	4

DAILY SUNSPOT OBSERVATIONS

JANUARY 1993

Day	Group	CMP Mo-Day	Lat	L	CMD	Type	r/R	Sd	Corre. Area Whole	Corre. Area Max	See Remarks	
	9				32W	DRI	0.56	88	53	31	4	
	10				0W	AXX	0.15	8	4	2	4	
	11				27E	DAI	0.49	177	102	85	4	
	12				32E	AXX	0.59	13	8	5	4	
	14				18W	BXI	0.40	21	11	2	4	
	15				15E	BXO	0.29	8	4	2	4	
11.06	1				50W	AXX	0.78	8	7	3	4	
	2				52W	HHX	0.78	252	202	182	4	
	7				8W	AXX	0.16	8	4	2	4	
	8				1W	CSO	0.14	59	30	28	4	
	9				46W	ERI	0.72	139	101	40	4	
	10				14W	BXO	0.29	13	7	4	4	
	11				14E	CRI	0.30	59	31	18	4	
	12				19E	BXI	0.44	25	14	5	4	
	14				32W	BXI	0.59	29	18	5	4	
	15				1E	BXI	0.16	29	15	2	4	
12.06	2				65W	HSX	0.91	139	166	161	4	
	7				20W	AXX	0.36	8	5	2	4	
	8				13W	DSI	0.25	126	65	30	4	
	9				60W	ESI	0.86	219	216	83	4	
	10				26W	AXX	0.46	8	5	2	4	
	11				1E	BXI	0.20	46	24	2	4	
	12				6E	BXI	0.32	13	7	2	4	
	14				45W	BXI	0.72	13	9	3	4	
	15				13W	BXI	0.29	29	15	4	4	
	16	1-12.8	-10	109	10E	BXO	0.20	8	4	2	4	
13.06	2				79W	HSX	0.98	88	207	207	3	
	8				26W	DSI	0.44	151	84	33	3	
	9				74W	ERI	0.94	105	157	76	3	
	10				40W	AXX	0.64	4	3	3	3	
	11				12W	CRI	0.26	63	33	15	3	
	12				7W	BXO	0.32	8	4	2	3	
	14				60W	AXX	0.85	8	8	4	3	
	15				26W	DRI	0.46	101	57	24	3	
	16				4W	BXI	0.13	13	6	2	3	
	17	1-19.3	-24	23	82E	AXX	0.99	8	28	14	3	
14.08	8				38W	CAI	0.62	109	70	40	3	PLAT

DAILY SUNSPOT OBSERVATIONS

JANUARY 1993

Day	Group	CMP Mo-Day	Lat	L	CMD	Type	r/R	Sd	Corre. Area Whole	Max	See	Remarks
	9				0	AXX	0.99	4	14	14	3	PLAT
	11				24W	BXI	0.45	34	19	2	3	PLAT
	15				40W	BXI	0.66	29	20	3	3	PLAT
	16				18W	DAI	0.30	349	183	112	3	PLAT
	17				67E	AXX	0.92	4	5	5	3	PLAT
	18	1-19.5	-11	21	75E	HSX	0.96	84	151	151	3	PLAT
15.11	8				52W	BXI	0.79	13	10	4	3	PLAT
	15				56W	BXI	0.84	13	12	4	3	PLAT
	16				31W	DAI	0.51	370	214	127	3	PLAT
	17				53E	AXX	0.82	4	4	4	3	PLAT
	18				58E	HAX	0.84	130	122	122	3	PLAT
	19	1-21.1	14	359	0	HAX	0.99	84	278	278	3	PLAT
16.07	8				66W	AXX	0.91	4	5	5	3	PLAT
	15				68W	BXO	0.93	8	11	6	3	PLAT
	16				44W	DAI	0.69	353	244	183	3	PLAT
	17				40E	BXO	0.69	8	6	3	3	PLAT
	18				44E	CSO	0.79	143	99	93	3	PLAT
	19				66E	HSX	0.92	240	306	306	3	PLAT
	20	1-13.9	13	94	26W	BXO	0.52	8	5	2	3	PLAT
17.08	16				56W	DAI	0.82	471	407	262	3	PLAT
	17				27E	AXX	0.54	13	8	5	3	PLAT
	18				31E	CAO	0.52	164	96	91	3	PLAT
	19				52E	HAX	0.82	273	236	236	3	PLAT
	20				40W	BXO	0.69	13	9	3	3	PLAT
18.08	16				68W	ESI	0.92	143	182	150	3	
	17				16E	BXO	0.41	13	7	5	3	
	18				19E	CAI	0.34	189	101	90	3	
	19				40E	HSX	0.69	303	209	209	3	
	20				55W	BXO	0.84	8	8	4	3	
19.13	16				80W	HSX	0.98	46	108	108	2	
	17				2E	BXI	0.33	17	9	4	2	
	18				6E	DAI	0.15	219	111	68	2	
	19				26E	HSX	0.53	395	233	233	2	
	20				72W	HRX	0.97	17	32	32	2	
	21	1-25.0	-14	308	77E	DRI	0.97	76	145	65	2	

DAILY SUNSPOT OBSERVATIONS

JANUARY 1993

Day	Group	CMP Mo-Day	Lat	L	CMD	Type	r/R	Sd	Corre. Whole	Area Max	See	Remarks
20.06	17				11W	BXO	0.37	17	9	5	2	
	18				7W	DAI	0.17	202	102	49	2	
	19				14E	HSX	0.40	421	230	230	2	
	21				64E	DRI	0.90	80	90	47	2	
21.20	17				25W	AXX	0.52	4	2	2	3	
	18				21W	DRI	0.37	55	29	11	3	
	19				1W	HSX	0.32	463	244	244	3	
	21				49E	DSI	0.75	168	127	66	3	
	22	1-27.4	-7	276	84E	HRX	0.99	13	42	42	3	
22.12	18				36W	AXX	0.59	8	5	3	4	
	19				13W	HSX	0.39	383	208	208	4	
	21				37E	DSI	0.61	88	56	40	4	
	22				70E	HRX	0.94	34	50	50	4	
23.34	18				51W	BXO	0.76	8	6	3	3	
	19				28W	HSX	0.56	378	229	229	3	
	21				21E	CSI	0.37	139	75	68	3	
	22				53E	HRX	0.78	46	37	34	3	
	23	1-21.6	30	353	20W	AXX	0.36	4	2	2	3	PLAT
24.08	19				37W	HSX	0.66	299	198	198	3	PLAT
	21				12E	CAI	0.24	176	91	84	3	PLAT
	22				43E	HSX	0.68	38	26	26	3	PLAT
	24	1-20.1	9	13	48W	AXX	0.77	4	3	3	3	PLAT
	25	1-24.3	17	317	3E	BXO	0.38	13	7	2	3	PLAT
25.22	19				53W	HSX	0.83	252	225	225	3	
	21				3W	CSI	0.16	177	89	85	3	
	22				29E	HRX	0.48	29	17	17	3	
	24				68W	CRO	0.94	34	50	44	3	
	25				11W	AXX	0.41	13	7	2	3	PLAT
26.08	19				62W	HSX	0.90	172	195	195	3	PLAT
	21				13W	CAI	0.25	126	65	54	3	PLAT
	22				18E	AXX	0.30	8	4	2	3	PLAT
	24				80W	AXX	0.99	8	28	28	3	PLAT
	25				23W	BXO	0.53	13	7	2	3	PLAT

DAILY SUNSPOT OBSERVATIONS

JANUARY 1993

Day	Group	CMP Mo-Day	Lat	L	CMD	Type	r/R	Sd	Corre. Whole	Area Max	See	Remarks
27.17	19				80W	HSX	0.99	130	431	431	3	
	21				29W	CSO	0.49	126	73	70	3	
	22				4E	AXX	0.07	8	4	2	3	
28.07	21				38W	HSX	0.62	122	78	78	3	PLAT
	22				7W	AXX	0.13	4	2	2	3	PLAT
	26	2- 1.8	11	206	62E	AXX	0.90	4	5	5	3	PLAT
	27	1-26.2	-10	292	24W	CSI	0.40	80	44	28	3	PLAT
	28	2- 2.9	-15	191	77E	CSO	0.97	46	89	81	3	PLAT
29.28	21				56W	HSX	0.83	59	52	52	3	
	26				49E	AXX	0.78	4	3	3	3	
	27				43W	DSI	0.68	198	134	112	3	
	28				60E	CSO	0.86	50	50	46	3	
30.10	21				67W	HSX	0.92	42	54	54	4	
	22				33W	AXX	0.54	4	2	2	4	
	27				53W	DSI	0.79	151	124	97	4	
	28				49E	CSO	0.76	59	45	42	4	
31.07	21				80W	HSX	0.99	17	56	56	4	
	27				66W	CSI	0.91	97	115	100	4	
	28				36E	CSI	0.60	97	60	52	4	

INTERVALS OF H-ALPHA FLARE PATROL OBSERVATION

JUNUARY 1993

Day	From	To	From	To	From	To	From	To	From	To	From	To	From	To
1	230	335												
2	246	349												
3	319	400												
4														
5														
6	242	322												
7														
8														
9	318	323												
10	300	308												
11	218	222												
12	310	328												
13														
14														
15														
16														
17														
18														
19														
20														
21	352	430												
22														
23														
24														
25														
26														
27														
28														
29														
30														
31														

Combined reports from the observatories listed below:

YUNN

OBSERVATION OF MAGNETIC AND VELOCITY FIELDS OF SOLAR ACTIVE REGIONS

JANUARY 1993 HUAIROU ST. BEIJING OBS.

Day	LO	Huairou Region	Lat	L	Data
1	264.2	229	-12	319	S5 L5
		230	5	313	S5 L5
		1	-7	183	S5 L5
		2	-26	189	S5 L5
2	251.0	229			S5 L5
		230			S5 L5
		1			D4 V4 S5 L5 D5 V5
		2			D4 V4 S5 L5 D5 V5
3	237.8	1			D4 V4 S5 L5 D5 V5 T5 Q5 U5
		2			S4 D4 V4 S5 L5 D5 V5 T5 Q5 U5
4	224.7	229			L5
		230			L5
		1			S4 L4 D4 V4 S5 L5 D5 V5 T5 Q5 U5
		2			S4 L4 D4 V4 S5 L5 D5 V5 T5 Q5 U5
		3	-10	269	S4 L4 D4 V4 S5 L5 D5 V5 T5 Q5 U5
5	211.5	1			S5 L5
		2			S5 L5
		3			S5 L5
9	158.8	1			D4 V4 S5 L5 D5 V5
		2			D4 V4 S5 L5 D5 V5
		4	(-16)	179	D4 V4 S5 L5 D5 V5
		5	-15	131	D4 V4 S5 L5 D5 V5
		6	6	115	D4 V4 S5 L5 D5 V5
11	132.5	1			S5 L5
		4			S5 L5
		5			S5 L5
		6			S5 L5
12	119.3	1			D4 V4 S5 L5 D5 V5
		4			D4 V4 S5 L5 D5 V5
		5			D4 V4 S5 L5 D5 V5
		6			D4 V4 S5 L5 D5 V5
		7	3	137	D4 V4 S5 L5 D5 V5

OBSERVATION OF MAGNETIC AND VELOCITY FIELDS OF SOLAR ACTIVE REGIONS

JANUARY 1993 — HUAIROU ST. BEIJING OBS.

Day	LO	Huairou Region	Lat	L	Data
14	93.0	6			S5 L5
		7			S5 L5
		8	-9	111	S4 L4 D4 V4 S5 L5 D5 V5 T5 Q5 U5
		9	-27	22	S4 L4 D4 V4 S5 L5 D5 V5 T5 Q5 U5
		10	-12	17	S4 L4 D4 V4 S5 L5 D5 V5 T5 Q5 U5
15	79.8	5			S5 L5
		6			S5 L5
		7			S5 L5
		8			D4 V4 S5 L5 D5 V5 T5 Q5 U5
		9			D4 V4 S5 L5 D5 V5 T5 Q5 U5
		10			D4 V4 S5 L5 D5 V5 T5 Q5 U5
16	66.6	5			L5
		7			S5 L5
		8			L4 D4 V4 S5 L5 D5 V5 T5 Q5 U5
		9			L4 D4 V4 S5 L5 D5 V5 T5 Q5 U5
		10			L4 D4 V4 S5 L5 D5 V5 T5 Q5 U5
		11	13	359	L4 D4 V4 S5 L5 D5 V5 T5 Q5 U5
17	53.5	8			S4 L4 D4 V4 S5 L5 D5 V5 T5 Q5 U5
		9			S4 L4 D4 V4 S5 L5 D5 V5 T5 Q5 U5
		10			S4 L4 D4 V4 S5 L5 D5 V5 T5 Q5 U5
		11			S4 L4 D4 V4 S5 L5 D5 V5 T5 Q5 U5
18	40.3	8			L4 D4 V4 S5 L5 D5 V5 T5 Q5 U5
		9			L4 D4 V4 S5 L5 D5 V5 T5 Q5 U5
		10			L4 D4 V4 S5 L5 D5 V5 T5 Q5 U5
		11			L4 D4 V4 S5 L5 D5 V5 T5 Q5 U5
		12	14	95	L4 D4 V4 S5 L5 D5 V5 T5 Q5 U5
19	27.1	8			S5 L5
		9			S5 L5
		10			D4 V4 S5 L5 D5 V5 T5 Q5 U5
		11			D4 V4 S5 L5 D5 V5 T5 Q5 U5
		12			D4 V4 S5 L5 D5 V5 T5 Q5 U5
		13	-14	308	D4 V4 S5 L5 D5 V5 T5 Q5 U5
20	14.0	9			S5 L5

OBSERVATION OF MAGNETIC AND VELOCITY FIELDS OF SOLAR ACTIVE REGIONS

JANUARY 1993 HUAIROU ST. BEIJING OBS.

Day	LO	Huairou Region	Lat	L	Data
		10			D4 V4 S5 L5 D5 V5 T5 Q5 U5
		11			D4 V4 S5 L5 D5 V5 T5 Q5 U5
		13			D4 V4 S5 L5 D5 V5 T5 Q5 U5
21	0.8	9			S5 L5
		10			S5 L5
		11			D4 V4 S5 L5 D5 V5 T5 Q5 U5
		13			D4 V4 S5 L5 D5 V5 T5 Q5 U5
22	347.6	10			S5 L5
		11			D4 V4 S5 L5 D5 V5 T5 Q5 U5
		13			D4 V4 S5 L5 D5 V5 T5 Q5 U5
		14	-7	(276)	D4 V4 S5 L5 D5 V5 T5 Q5 U5
23	334.5	11			D4 V4 S5 L5 D5 V5 T5 Q5 U5
		13			D4 V4 S5 L5 D5 V5 T5 Q5 U5
		14			D4 V4 S5 L5 D5 V5 T5 Q5 U5
24	321.3	11			D4 V4 S5 L5 D5 V5
		13			D4 V4 S5 L5 D5 V5
		14			D4 V4 S5 L5 D5 V5
25	308.1	11			S5 L5
		13			S5 L5
		14			S5 L5
26	295.0	11			D4 V4 S5 L5 D5 V5
		13			D4 V4 S5 L5 D5 V5
		14			D4 V4 S5 L5 D5 V5
27	281.8	11			D4 V4 S5 L5 D5 V5
		13			D4 V4 S5 L5 D5 V5 T5 Q5 U5
		14			D4 V4 S5 L5 D5 V5 T5 Q5 U5
28	268.6	13			D4 V4 S5 L5 D5 V5
		14			D4 V4 S5 L5 D5 V5
		15	-12	292	D4 V4 S5 L5 D5 V5 Q5 U5
		16	-14	193	D4 V4 S5 L5 D5 V5 Q5 U5
29	255.5	13			S5 L5

OBSERVATION OF MAGNETIC AND VELOCITY FIELDS OF SOLAR ACTIVE REGIONS

JANUARY 1993 HUAIROU ST. BEIJING OBS.

Day	LO	Huairou Region	Lat	L	Data
		14			S5 L5
		15			D4 V4 S5 L5 D5 V5 T5 Q5 U5
		16			D4 V4 S5 L5 D5 V5 T5 Q5 U5
30	242.3	15			D4 V4 S5 L5 D5 V5
		16			D4 V4 S5 L5 D5 V5
31	229.1	13			L5
		15			D4 V4 S5 L5 D5 V5
		16			D4 V4 S5 L5 D5 V5

NPL SPL: 16 17 18 29 31

SOLAR RADIO EMISSION FLUX

JANUARY 1993

Day	BEIJ 2840	PURP 2700	URUM 9375	YUNN 2840
1	97		290	
2	104		295	158
3	102		280	156
4	101		280	156
5	101		275	161
6	122		279	162
7	124		278	163
8	133		288	162
9	122		286	160
10	125		271	156
11	127		279	158
12	132		284	158
13	154		286	170
14	140		303	176
15	126		309	163
16	118		293	159
17	133		281	158
18	122		258	157
19	109		269	153
20	99			152
21	107			145
22	106			144
23	104			147
24	97			148
25	104			144
26	102			148
27	102			149
28	109			150
29	103			148
30	92			152
31	115			150
Mean	113.9			155.4

INTERVALS OF SOLAR RADIO EMISSION PATROL OBSERVATION

JANUARY 1993 1

Day	BEIJ From	BEIJ To	PURP From	PURP To	URUM From	URUM To	YUNN From	YUNN To
	2840		2700		9375		2840	
1	0000	0810			0330	1015		
2	0032	0743			0210	1000	0200	0800
3	0039	0833			0210	0930	0200	0830
	2350	2400						
4	0000	0834			0210	0700	0210	0850
	2358	2400						
5	0000	0813			0130	1000	0200	0800
6	0007	0836			0150	0930	0040	0810
	2353	2400						
7	0000	0830			0130	0950	0100	0925
8	0001	0800			0130	0950	0120	0900
	2351	2400						
9	0000	0823			0130	0900	0106	0900
	2357	2400						
10	0000	0811			0200	1015	0330	0630
11	0028	0728			0130	0945	0110	0910
	2350	2400						
12	0000	0820			0130	0950	0050	0925
	2350	2400						
13	0000	0813			0130	1000	0215	0925
14	0009	0841			0200	0930	0200	0630
	2351	2400						
15	0000	0850			0200	1000	0120	0650
	2348	2400						
16	0000	0857			0200	0930	0050	0640
	2351	2400						
17	0000	0858			0200	0940	0130	0800
	2351	2400						
18	0000	0815			0200	0740	0350	0730
19	0050	0654					0425	0730
20	0048	0854					0430	0740
	2351	2400						

INTERVALS OF SOLAR RADIO EMISSION PATROL OBSERVATION

JANUARY 1993 1

Day	BEIJ From To 2840	PURP From To 2700	URUM From To 9375	YUNN From To 2840
21	0000 0854			0420 0750
22	0003 0716			0330 0740
23	0030 0655			0415 0800
24	0028 0450			0420 0810
25	0021 0555			0300 0820
26	0042 0526			0400 0840
27	0007 0837 2358 2400			0330 0750
28	0000 0833 2352 2400			0400 0810
29	0000 0850 2346 2400			0400 0850
30	0000 0918 2345 2400			0200 0650
31	0000 0906 2341 2400			0300 0655

COSMIC RAY NEUTRON INTENSITY

Real Counts: 256 Times (Tabulated Counts Plus 1500)

JAN 1993

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	479	478	474	483	479	470	480	473	478	473	476	465	477	477	476	474	480	475	479	481	484	485	493	481	477.9	24
2	488	499	488	503	481	482	497	488	493	481	489	480	482	489	490	504	498	497	498	496	485	483	489	485	490.2	24
3	489	485	486	491	493	490	490	482	481	474	482	481	478	480	489	486	475	485	485	487	490	490	497	491	485.7	24
4	500	497	493	494	505	504	497	486	482	481	481	479	480	480	483	480	488	485	488	482	489	489	495	486	488.5	24
5	482	493	498	494	500	505	489	486	475	489	483	491	483	481	479	488	487	489	484	482	486	491	496	493	488.5	24
6	497	492	488	497	496	486	486	481	482	478	479	483	487	492	473	483	484	476	492	487	488	491	483	490	486.3	24
7	494	485	477	481	485	483	485	484	469	486	480	479	488	484	487	480	485	487	486	493	486	493	489	489	484.8	24
8	494	480	484	481	475	476	479	471	477	482	474	478	478	480	480	485	483	489	481	475	483	480	489	490	481.0	24
9	479	490	477	483	484	480	488	483	486	489	487	475	482	489	496	492	488	488	498	493	503	497	499	496	488.4	24
10	493	480	488	481	484	479	479	480	483	480	482	474	473	485	499	491	492	493	498	500	503	507	503	505	488.8	24
11	506	502	489	490	492	478	475	472	479	487	489	485	492	490	494	495	492	494	495	489	498	496	498	496	490.5	24
12	500	490	504	492	487	490	494	483	477	478	480	486	484	485	493	492	501	507	511	498	509	498	507	509	494.0	24
13	503	490	501	503	499	497	493	494	482	485	483	486	485	484	497	500	501	501	506	511	520	508	517	513	498.3	24
14	520	520	524	519	519	516	511	505	497	498	514	513	511	523	518	523	525	514	523	519	519	526	529	525	517.1	24
15	527	514	515	527	516	514	524	527	523	517	521	522	528	527	529	537	536	540	533	549	543	540	538	532	528.3	24
16	530	519	529	517	521	509	520	507	516	518	512	513	513	505	524	514	526	526	531	531	540	533	539	526	521.6	24
17	521	523	525	523	527	532	537	533	536	530	547	542	549	536	535	541	527	532	533	539	540	538	538	542	534.4	24
18	537	536	526	520	513	514	509	517	510	522	525	526	534	526	534	535	525	521	517	531	526	520	540	545	525.4	24
19	529	535	529	535	530	523	520	524	513	526	521	526	525	526	529	530	524	550	539	524	536	532	526	532	528.5	24
20	529	512	508	500	507	503	510	504	507	498	506	510	519	525	516	527	522	520	532	526	529	514	528	526	515.8	24
21	514	519	510	508	515	511	507	507	504	503	502	512	511	507	510	521	514	511	514	518	516	526	522	507	512.0	24
22	515	521	524	522	533	519	528	521	525	520	515	522	518	512	517	516	514	508	517	517	519	529	518	524	519.8	24
23	533	530	528	522	532	530	523	531	519	519	518	522	521	517	532	518	522	522	530	532	524	529	535	531	525.8	24
24	528	526	520	529	531	524	526	527	537	540	538	535	529	538	541	536	525	537	535	532	540	530	539	530	532.2	24
25	529	529	536	545	531	534	515	523	513	517	513	519	527	527	539	536	511	513	526	528	521	517	534	514	524.9	24
26	529	534	553	541	534	536	518	513	521	514	521	522	503	514	517	512	510	510	506	516	520	511	515	513	520.1	24
27	513	518	510	511	516	505	497	496	485	490	506	496	503	501	498	489	500	489	495	485	495	494	496	497	499.4	24
28	494	494	501	495	489	495	491	487	485	493	488	498	503	496	501	496	490	490	496	482	497	501	500	504	494.4	24
29	505	508	497	489	507	502	502	495	500	499	488	486	483	493	490	478	489	490	492	507	490	493	498	497	494.9	24
30	499	497	505	498	503	524	498	488	484	482	475	476	480	483	473	480	477	476	474	493	490	497	493	494	489.1	24
31	502	501	510	507	509	493	512	494	494	504	497	486	496	494	488	490	495	490	492	492	494	507	501	504	498.0	24

MONTHLY MEAN=504.023

MONTHLY MEAN DAILY VARIATION FOR 31 COMPLETE DAYS DEVIATIONS FROM AVERAGE:504.023

(1-12)	4.30	2.33	2.33	1.82	2.20	-0.67	-1.44	-5.25	-6.83	-5.54	-4.93	-5.06
(13-24)	-3.31	-2.54	0.07	0.14	-1.25	-0.64	1.98	2.27	4.46	3.88	7.07	4.59

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

U.T.=(1 4.54 -1.85 4.90 22.52) (2 0.36 0.76 0.84 2.15) (3 -0.46 -1.08 1.17 5.49) (4 -0.04 -0.40 0.40 4.40)

L.T.=(1 -0.67 4.86 4.90 6.52) (2 0.48 -0.69 0.84 10.15) (3 -0.46 -1.08 1.17 5.49) (4 0.37 0.16 0.40 0.40)

COSMIC RAY MESON INTENSITY
VERTICAL COMPONENT
Real Counts: 128 Times (Tabulated Counts Plus 3000)

JAN 1993

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	27	18	46	30	42	32	40	36	33	32	16	14	30	26	21	18	37	34	23	17	30	36	36	45	30.0	24
2	44	48	47	43	31	51	57	38	34	23	25	23	-5	29	13	27	22	50	21	32	34	47	42	33	33.7	24
3	34	29	42	37	27	49	43	24	38	28	15	26	24	18	22	8	23	30	20	32	29	28	16	34	28.2	24
4	44	43	39	54	61	61	55	36	45	31	18	20	19	18	22	29	33	29	31	34	30	39	30	34	35.6	24
5	39	50	52	64	58	54	63	63	57	36	42	30	38	30	25	20	25	24	31	24	26	25	32	24	38.8	24
6	48	30	45	52	57	57	44	44	46	41	39	31	35	20	24	34	34	27	30	36	23	38	44	42	38.4	24
7	34	39	36	49	39	43	32	29	34	29	28	22	26	27	9	35	22	27	28	22	42	23	20	28	30.1	24
8	30	24	52	34	30	29	49	21	20	23	28	19	30	49	17	22	33	28	17	35	18	31	24	22	28.5	24
9	13	34	15	24	22	22	17	21	28	32	29	21	33	34	21	25	31	40	21	40	24	34	32	34	27.0	24
10	30	29	24	28	21	25	19	11	9	6	-3	2	9	10	24	28	32	26	17	40	30	37	47	29	22.1	24
11	27	30	42	28	39	48	32	25	40	34	25	31	41	30	25	33	28	34	24	33	41	35	35	29	32.9	24
12	55	51	50	57	48	45	47	46	37	25	33	19	27	33	50	32	54	43	43	56	43	54	42	42	43.0	24
13	44	39	60	59	54	51	52	44	53	37	27	31	40	38	40	54	41	45	36	52	56	44	51	50	45.8	24
14	59	66	79	79	80	81	63	54	54	51	62	54	53	71	64	67	65	66	69	63	74	69	66	67	65.7	24
15	48	67	66	64	63	60	49	67	68	62	82	68	70	72	88	75	84	85	99	91	107	101	98	93	76.1	24
16	92	91	94	107	74	90	81	73	76	70	91	79	94	87	80	81	84	86	93	93	92	73	89	83	85.5	24
17	103	91	70	90	87	88	88	87	75	85	82	89	88	91	83	77	81	90	84	97	95	85	83	78	86.1	24
18	74	71	81	71	83	86	79	83	68	78	102	89	87	95	90	96	73	77	84	92	88	91	95	103	84.8	24
19	78	82	92	89	85	83	103	93	89	89	95	82	75	80	81	77	96	88	100	92	95	78	101	85	87.8	24
20	91	87	83	90	75	81	75	87	81	86	81	85	85	73	87	86	88	84	97	90	98	97	93	81	86.0	24
21	89	66	72	76	77	87	75	57	79	74	75	71	86	92	61	80	67	63	80	83	84	82	78	76	76.3	24
22	66	79	79	81	85	87	92	74	84	64	63	66	76	89	71	79	80	77	75	85	77	77	78	75	77.5	24
23	83	86	80	97	96	101	112	92	92	74	95	82	89	78	78	83	87	80	75	88	80	79	91	82	86.7	24
24	83	84	95	85	89	92	82	96	101	87	82	79	81	77	92	77	86	83	94	88	76	85	87	103	86.8	24
25	92	92	89	95	105	92	86	65	68	72	72	76	64	70	78	78	81	61	53	62	56	48	44	71	73.8	24
26	75	63	80	67	70	82	57	58	53	52	59	47	55	49	57	52	55	44	48	57	48	47	51	57	57.6	24
27	49	72	65	49	56	49	51	49	58	48	39	45	44	39	47	43	39	44	46	36	47	52	35	54	48.2	24
28	63	57	54	55	60	62	65	60	51	55	52	43	49	62	44	49	38	54	44	59	51	49	51	58	53.5	24
29	55	54	72	69	70	76	53	57	59	60	51	40	43	43	45	27	40	53	43	59	41	54	63	49	53.2	24
30	50	56	49	61	62	61	57	62	44	59	42	54	48	29	38	35	27	36	28	35	29	39	48	45	45.6	24
31	63	61	72	57	70	71	74	52	47	39	24	36	48	30	32	44	31	47	44	34	36	35	51	46	47.7	24

MONTHLY MEAN= 55.251

MONTHLY MEAN DAILY VARIATION FOR 31 COMPLETE DAYS DEVIATIONS FROM AVERAGE: 55.251

(1-12) 2.23 2.46 6.75 7.36 6.56 9.14 5.78 -0.28 0.26 -4.15 -4.57 -7.70

(13-24) -4.22 -3.99 -5.93 -4.57 -3.09 -1.86 -3.70 1.43 -0.41 -0.03 1.30 1.26

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

U.T.=(1 4.28 3.56 5.57 2.65) (2 -2.12 1.09 2.38 5.09) (3 -0.75 -0.81 1.10 5.05) (4 0.12 0.01 0.12 0.05)

L.T.=(1 -5.23 1.93 5.57 10.65) (2 2.00 1.29 2.38 1.09) (3 -0.75 -0.81 1.10 5.05) (4 -0.07 0.10 0.12 2.05)

COSMIC RAY MESON INTENSITY

Real Relative Intensity: 0.1% Times (Tabulated Value Plus 1000)

JAN 1993

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	37	38	39	39	38	36	35	33	32	34	33	34	36	36	38	36	33	36	39	40	35	37	37	37	36.2	24
2	39	38	41	40	40	40	41	38	38	37	38	36	38	39	37	38	41	41	44	45	45	42	45	43	40.2	24
3	44	44	46	47	46	48	43	43	46	45	42	42	44	44	45	46	45	45	46	47	45	44	44	42	44.7	24
4	44	45	48	49	49	52	45	46	42	45	42	42	41	42	41	41	42	40	42	41	42	41	41	42	43.5	24
5	43	48	46	46	45	43	43	44	41	41	45	43	40	40	39	41	41	40	42	38	38	41	41	40	42.0	24
6	43	42	45	46	43	45	42	42	43	41	38	41	38	38	42	41	42	42	41	43	43	40	42	43	41.9	24
7	43	42	42	43	43	42	42	42	44	43	42	41												46	42.7	13
8	44	47	48	45	44	44	43	43	43	44	43	46	43	41	42	43	43	41	42	43	44	45	47	46	43.9	24
9	45	45	44	43	44	44	46	45	43	44	46	45	46	45	46	46	45	46	47	46	45	46	48	49	45.4	24
10	47	47	46	46	44	45	44	44	47	43	40	41	45	46	47	47	47	46	46	44	47	47	46	46	45.3	24
11	51	50	49	45	46	45	46	43	47	42	42	43	44	44	46	45	47	45	42	42	43	42	42	46	44.9	24
12	46	48	46	44	44	47	44	42	40	43	45	42	43	43	45	44	47	47	46	45	46	47	46	50	45.0	24
13	50	47	51	50	48	48	45	46	46	47	48	49	50	50	52	51	51	53	49	51	52	51	52	54	49.6	24
14	56	56	58	59	59	55	55	56	55	54	55	55	54	55	58	54	57	57	55	54	53	56	53	56	55.6	24
15	59	57	56	57	59	53	53	54	54	54	55	53	57	56	58	57	56	58	56	57	56	54	54	55	55.8	24
16	52	58	56	55	55	50	53	51	50	53	52	54	51	53	56	56	54	55	57	57	55	55	55	55	54.1	24
17	58	56	59	56	57	56	59	60	57	58	56	59	60	58	60	56	60	61	57	55	55	54	55	57	57.5	24
18	58	55	54	57	52	53	52	54	52	52	52	53	54	55	52	50	50	53	52	51	51	51	52	52	52.8	24
19	53	56	55	54	53	51	52	51	48	52	52	55	53	55	51	52	53	58	54	55	55	50	50	54	53.0	24
20	52	57	55	55	51	51	52	48	49	50	52	51	52	52	53	51	53	51	51	53	51	54	53	48	51.9	24
21	49	50	50	52	50	47	50	50	48	47	50	49	47	47	44	44	45	47	48	47	49	47	46	46	47.9	24
22	49	51	48	45	47	47	45	49	48	48	48	47	46	45	44	47	44	44	46	48	48	48	49	47	47.0	24
23	48	50	54	54	53	50	51	49	48	51	49	47	49	49	51	47	49	48	49	46	49	45	45	48	49.1	24
24	47	49	49	51	51	49	47	47	46	52	49	46	48	48	45	49	45	47	51	48	46	48	47	47	48.0	24
25	48	50	52	52	47	50	47	48	45	46	46	51	46	44	45	47	46	49	48	51	52	49	48	49	48.2	24
26	51	52	54	54	50	49	49	50	51	52	55	55	52	51	49	51	50	51	51	48	49	48	49	47	50.8	24
27	47	47	51	52	51	50	48	46	46	43	46	44	43	45	40	39	42	41	43	43	41	43	40	39	44.6	24
28	41	41	43	44	41	44	41	42	39	40	42	41	42	38	40	38	38	38	38	38	39	39	40	39	40.3	24
29	39	42	42	44	42	43	42	42	39	39	38	38	36	32	32	29	32	34	36	37	36	34	36	34	37.4	24
30	32	35	38	36	37	37	36	34	36	34	34	33	36	34	31	29	29	32	34	41	39	41	40	42	35.4	24
31	43	47	44	43	43	43	44	42	44	42	41	42	42	43	39	39	39	39	41	42	43	41	41	42	42.0	24

MONTHLY MEAN= 46.396

MONTHLY MEAN DAILY VARIATION FOR 30 COMPLETE DAYS DEVIATIONS FROM AVERAGE: 46.463

(1-12)	0.70	1.80	2.44	2.20	1.17	0.70	-0.03	-0.40	-1.03	-0.70	-0.66	-0.56
(13-24)	-0.60	-0.86	-0.86	-1.33	-0.93	-0.30	-0.03	0.07	-0.06	-0.46	-0.33	0.04

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

U.T.=(1 0.94 0.62 1.13 2.21) (2 -0.05 0.55 0.55 3.16) (3 -0.45 0.39 0.59 3.08) (4 -0.02 0.15 0.15 1.62)

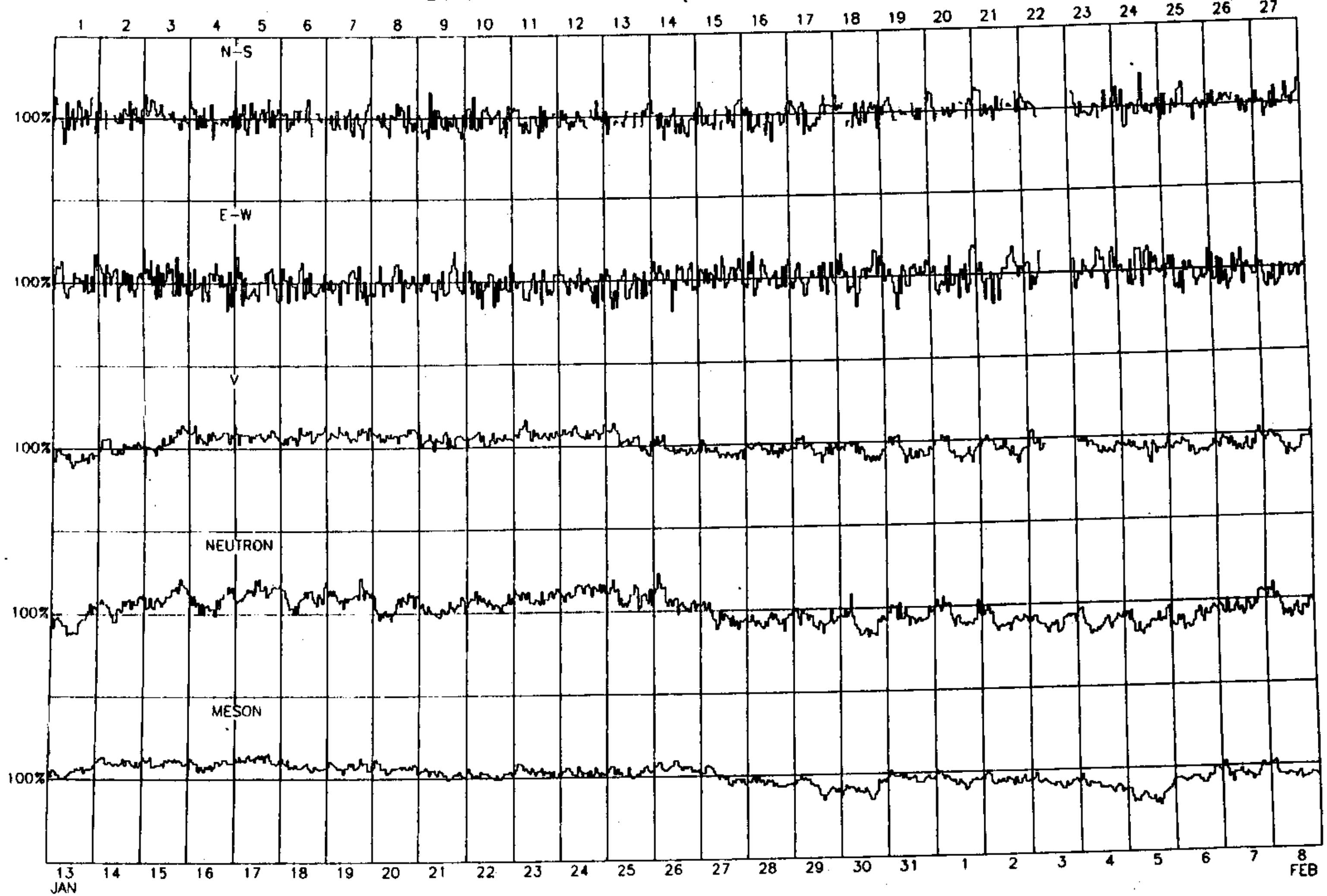
L.T.=(1 -1.00 0.51 1.13 10.21) (2 0.50 -0.23 0.55 11.16) (3 -0.45 0.39 0.59 3.08) (4 -0.12 -0.09 0.15 3.62)

COSMIC RAY INDICES

Bartels Rotation 2177(DEC 1992–JAN 1993)

COSMIC RAY INDICES

Bartels Rotation 2178(JAN 1993–FEB 1993)



SUDDEN IONOSPHERIC DISTURBANCES (D REGION)

JANUARY 1993

Day	Sta	Start (UT)	Max (UT)	End (UT)	Imp	SPA LF	SPA VLF	SFA LF
02	YUNN	0045	0047	0057	1	- 1.2		
02	YUNN	0113	0116	0125	1	- 2.0		
02	YUNN	0222	0228	0238	1	- 1.9		
02	YUNN	0423	0440	0459	3-	- 6.6		
02	LINT	0423	0434	0620	2+	- 5.7	-37	+ 1.5
04	LINT	0046	0057	0126	3+	-11.3	- 8	- 7.3
04	YUNN	0524	0526	0534	1-	- 0.8		
04	YUNN	0657	0700	0707	1-	- 0.6		
05	YUNN	0645	0647	0653	1	- 1.3		
06	YUNN	0626	0627	0635	1-	- 0.9		
06	YUNN	0903	0918	0941	3+	-15.9		
07	YUNN	0325	0327	0338	1	- 1.1		
08	YUNN	0147	0149	0201	1	- 1.8		
08	YUNN	0518	0521	0529	1-	- 0.7		
09	YUNN	0109	0111	0119	1+	- 2.2		
09	YUNN	0411	0413	0423	1	- 1.4		
09	YUNN	0548	0551	0600	1-	- 1.0		
10	YUNN	0113	0118	0130	1	- 1.9		
10	YUNN	0505	0507	0517	1-	- 1.0		
11	LINT	0040	0044	0052	1-	- 0.6	0	- 2.2
11	YUNN	0115	0119	0129	1	- 1.4		
11	LINT	0228	0232	0252	1	- 1.2	- 4	- 0.9
12	YUNN	0520	0523	0533	1	- 1.2		
12	LINT	0625	0631	0654	1-	- 1.0	- 3	- 2.1
13	YUNN	0410	0413	0420	1-	- 1.0		
13	YUNN	0625	0633	0639	1-	- 0.8		
14	YUNN	0324	0326	0333	1	- 1.4		
14	YUNN	0551	0553	0602	1-	- 0.9		
16	LINT	0125	0132	0150	1-	- 0.9	- 3	- 1.0
16	LINT	0752	0758	0820	1	- 1.5	- 7	- 1.9
17	YUNN	0732	0734	0741	1-	- 1.0		
19	YUNN	0837	0839	0848	1+	- 2.1		
22	YUNN	0300	0304	0312	2	- 4.1		
23	YUNN	0259	0305	0309	1	- 1.6		
24	YUNN	0434	0438	0444	1	- 1.2		
24	YUNN	0447	0450	0457	1	- 1.3		
26	YUNN	0508	0511	0518	1	- 1.4		
29	YUNN	0039	0042	0048	2-	- 3.3		
31	YUNN	0747	0750	0802	1	- 1.6		

GEOMAGNETIC ACTIVITY INDICES K AND A_K

JANUARY 1993 BGMO

Day	0-3	3-6	6-9	9-12	12-15	15-18	18-21	21-24	Sum	A_K
1	3	5	3	2	2	2	2	3	22	15
2 D	3	3	3	5	6	3	3	2	28	26
3 D	4	3	3	4	4	5	3	3	29	24
4 D	3	3	2	3	5	4	3	3	26	20
5	3	4	3	5	4	2	3	2	26	20
6	2	3	1	4	4	3	3	2	22	15
7	2	2	1	5	2	5	3	2	22	18
8	3	2	2	2	3	4	3	2	21	13
9	3	2	2	2	3	4	2	2	20	12
10 D	3	3	5	4	4	4	1	2	26	21
11	2	3	3	5	5	4	4	4	30	27
12	3	2	3	2	2	3	2	1	18	10
13	0	2	1	2	3	4	2	4	18	12
14	3	2	3	3	4	3	3	3	24	16
15	3	2	3	2	3	4	2	2	21	13
16	2	2	3	1	3	3	2	2	18	10
17	1	3	3	3	3	1	2	1	17	10
18	2	2	2	2	2	4	2	3	19	11
19	2	3	3	5	3	3	4	3	26	20
20	4	3	4	4	4	4	2	0	25	20
21 Q	1	1	0	3	3	3	1	1	13	7
22 Q	0	1	2	2	2	3	1	2	13	6
23 Q	1	1	1	0	2	1	1	2	9	4
24	1	2	3	4	3	3	3	2	21	13
25	1	2	3	5	6	5	4	3	29	30
26	4	3	4	3	3	5	3	2	27	21
27	2	3	3	4	3	3	2	1	21	13
28 Q	2	2	2	2	3	2	0	1	14	7
29 Q	0	1	1	2	1	3	1	2	11	5
30	3	3	2	2	3	3	3	2	21	12
31 D	3	3	6	5	6	5	5	5	38	48

Sum 499
Mean 16.1

MAGNETIC STORMS

JANUARY 1993 BGMO

Time of Magnetic Begining			Ending			Sudden Com. Amplitude			Deg. of	Maximum Acti. on K-scale			Maximum Range		
Day	h	m	Day	h	Type	D′	HnT	ZnT	Acti.	Day	3hour Int.	k Index	D′	HnT	ZnT
10	00		10	23	GC				m	10	3	5	5.7	75	13
11	05	23	12	21	SC	0.5	8	0	m	11	4	5	6.4	86	15
25	07		26	22	GC				ms	25	5	6	8.2	157	16
30	01	03	02	23	SC	0.2	10	0	ms	01	6	6	10.1	138	24

北京天文台 2840 MHz 太阳射电总流量密度校正因子

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北京天文台 2840 MHz 射电望远镜从 1980 年开始对太阳进行观测，每天都进行相对定标，每日的天线温度 $T_{\odot}$与渥太华 2800 MHz 的流量 $S_{\odot}$相关后求出校正因子，用以从每日观测的天线温度求出太阳射电流量。 1989 年 6 月后设备更新，用 1987—1988 年的数据重新计算校正因子为 0.1345 。但经过一段时间使用后，发现 2840 MHz 的流量比 2800 MHz 的流量高出不少，超出正常范围。 所以现在我们把有价值的数据进行重新计算，以便得出理想的校正因子值。

由于 1989 年 6 月到 1990 年 4 月仪器处于试观测阶段，不太稳定，观测数据也不太连贯，所以我们采用 1990 年 5 月到 1992 年 6 月的数据，且把其中不太可靠的去除，共得数据 718 个，即 n=718，月数为 26 个月，即 N=26。根据方程式 $S_{\odot}=aT_{\odot}$，$S_{\odot}$为渥太华 2800 MHz 的两天平均值，$T_{\odot}$为 2840 MHz 的天线温度。在这里，已经假定当 $T_{\odot}=0$ 时， $S_{\odot}=0$。 我们使用最小二乘法，按月份划分计算每个月的 a 值，所得结果见表一。 由表一数值可以看出 2840 MHz 是比较稳定的，因为数值最多的相差 2.9%左右。 所以，用全部 718 个数据计算， a = 0.1190 。根据公式：

$$R = \sqrt{\sum_{1}^{n} (a - a_n)^2 / N}$$

得出误差 R=0.0038，N 为月数。 这一校正因子与过去的基本一致 。 1987—1988 年间设备可能不正常，原因待查。

从 1993 年 1 月开始，北京天文台 2840 MHz 射电望远镜正式使用 a = 0.1190 为校正因子 。 已经发表的 1990 年 5 月 — 1992 年 12 月的 2840 MHz 每日流量值应乘以 0.885 (0.1190/0.1345) 加以改正。

表 一

月份	1	2	3	4	5	6
a	0.1195	0.1167	0.1192	0.1179	0.1186	0.1186
月份	7	8	9	10	11	12
a	0.1201	0.1190	0.1182	0.1169	0.1170	0.1192

本文于 1999 年 4 月 13 日收到

THE CALIBRATION FACTOR OF THE SOLAR RADIO TOTAL FLUX DENSITY AT 2840 MHz OF BEIJING ASTRONOMICAL OBSERVATORY

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The solar radio telescope at 2840 MHz at BAO has been put in operation since 1980, and a relative calibration is made daily. We get the calibration factor from the correlation of the daily antenna temperature of B.A.O at 2840 MHz and the flux density measured in Ottawa at 2800 MHz, and then we can obtain the daily solar radio flux density from the daily attenna temperature. Sine the radio telescope was renewed in June of 1989, with the data got during 1987-1988, the re-calculated calibration factor was 0.1345. After a period of observations, we find that the flux density at 2840 MHz deduced from our daily observations is higher than that of Ottawa at 2800 MHz. In order to have a better flux desity now we re-calculate the calibrition factor again with our new data.

From June of 1989 to April of 1990, the equipment was in testing- observations and was not quite stable, so we use the data from May of 1990 to June of 1992, excluding some unreliables. All together we get 718 data, that is n=718, in 26 months, that is N=26. We use the equation $S_\odot = aT_\odot$, here $S_\odot$ is the average of two consecutive days' (the day concerned and the next day) flux densities of Ottawa at 2840 MHz, $T_\odot$ is the daily antenna temperature of BAO at 2840 MHz, here, it is assumed that $S_\odot$ =0, when $T_\odot$ =0. According to least-square principle, we calculate the monthly a_N shown in table 1. The maximum difference is only about 2.9%, we use all the 718 data and get a=0.1190. According to the equation

$$R = \sqrt{\sum_1^n (a - a_n)^2 / N}$$

we get the error, R=0.0038. This calibration factor is consistant with the previous one before 1987. From 1987 to 1988, the equipment might have some abnormal, the reason will be investigated in future.

From January of 1993, a=0.1190 is used as the new calibration factor for the daily solar total flux density at 2840MHz of B.A.O. The daily flux density published from May of 1990 to December of 1992 should be multiplyed by a factor of 0.885 (0.1190/0.1345).