Solar Bulletin

THE AMERICAN ASSOCIATION OF VARIABLE STAR OBSERVERS— SOLAR DIVISION

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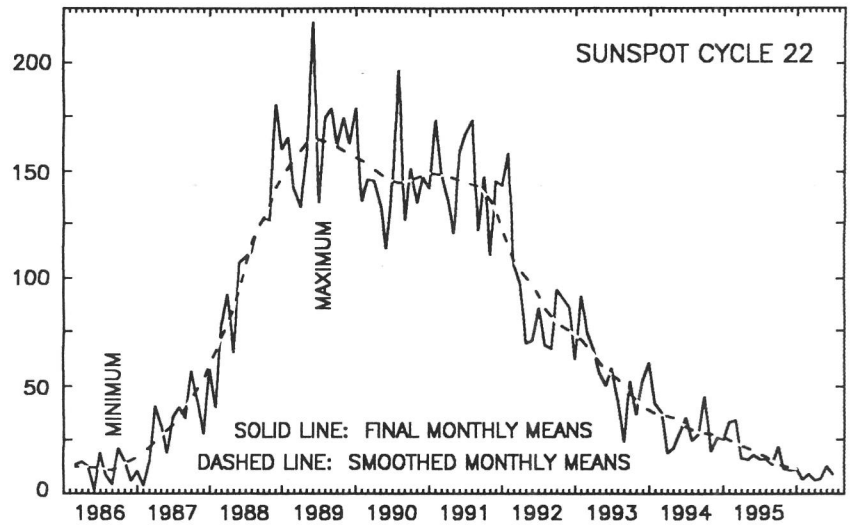
American Relative Sunspot Numbers for July

		R_a Final			
1)	8	11)	20	21)	0
2)	9	12)	13	22)	0
3)	8	13)	9	23)	0
4)	0	14)	0	24)	0
5)	7	15)	0	25)	0
6)	0	16)	0	26)	8
7)	17	17)	0	27)	9
8)	23	18)	0	28)	12
9)	28	19)	0	29)	16
10)	25	20)	0	30)	18
				31)	20

Mean: 8.1
Number of reports: 90



July Summary: Solar activity continued to be very low during the first week of July. However, the level rose to low on the 8th by virtue of a lone class C1 flare in **NOAA/USAF** Region 7978 (S11, L247, DAI), and to high on the 9th after this spot-group spawned the first class X flare (X2.6/1B) to be recorded since November 1992. This major flare was accompanied by a 10 centimeter radio burst, and a coronal mass ejection is believed to have occurred in conjunction with the event.

Region 7978 also produced a class M flare (M1.4/SF) just prior to the major flare and a second (M1.0/SF) early on the 10th, along with numerous events with lower X-ray intensity. This group was a fast-evolving region which developed into a beta-gamma-delta magnetic configuration while demonstrating a remarkably rapid increase in area. The geomagnetic field was mainly quiet with intervals of unsettled or active conditions during the first ten days of July. The daily >2 MeV electron fluence remained at near background levels.

After a short but event-filled appearance, Region 7978 rotated off-disk on the 13th/14th, producing a C4/1F flare as it neared the Sun's western limb on the 12th. A fading filament and other mass motions were also noted at this time. This group was also the likely source of a class C1 flare on the 14th which occurred after the group was behind the west limb. From the 14th through 18th the disk was spotless, and the observed 10 centimeter solar radio flux dropped to an exceptionally low value (see page 2). The geomagnetic field was mostly at quiet to unsettled levels, and the >2 MeV electron fluence remained in the normal range.

With the exception of the brief appearance on the 19th of spots in new cycle Region 7979 (S34, L037, AXX), the visible hemisphere continued to be spotless through the 25th. The geomagnetic field was quiet to unsettled, and the daily >2 MeV electron fluence was at background levels.

The likely return of Region 7978 rotated back onto the visible hemisphere on the 27th, and was re-numbered Region 7981 (S10, L259, ESI). Although still of some magnetic complexity, the group appeared to be stable and spawned only low level flares. Little other noteworthy activity occurred during the remainder of July. A sudden impulse (10 nT) with uncertain source was recorded at Boulder on the 28th, and geomagnetic field conditions rose to active at some sites. Otherwise, the field was mostly quiet. The smoothed mean American Relative Sunspot Number for January 1996 continued to decline, falling to a value of 10.7.

The estimated mean American Relative Sunspot Number for 1-15 August is 15. As Solar Cycle 22 declines to an expected end sometime during the next few months (as measured by the smoothed monthly-mean sunspot number), activity remains centered in the very low range.

[A Portion of the above information was obtained from **SELDADS**]

July's Extraordinarily-Low Solar Flux Measurement

On July 18, 1996, the observed value of the 10 centimeter solar radio flux dropped to a low of 64.9. In many textbooks, it is stated that the 10 cm solar flux can not go below a value of 67. For example, the formulae given in the June 1996 edition of the IPS Solar Geophysical Summary give 67.0 as the minimum value. So how is it possible for us to record a value of 64.9?

The answer is actually quite interesting -- it depends on the orbit of the Earth! The Earth's orbit is not perfectly circular, but is slightly elliptical. In July of each year we are a little farther than average from the Sun, and solar radiation, including the 10 cm flux, is very slightly weaker than average.

Thus the 10 cm flux will tend to be lower in July than, for example, during December, when the Earth is closer to the Sun than its average distance. In this case, the combination of the extra distance to the Sun and current solar minimum conditions acted together to produce the very low flux value.

It is a simple matter to correct for the Earth-Sun distance and, when this is done a value of 67.0 is obtained. This is the textbook value!

Measurements of the 10 cm radio flux are often given in two forms -- first as directly observed values, and second, as values corrected for the Earth-Sun distance variation.

The last time that the observed 10 cm flux was at a lower value was on July 26, 1964, when it stood at 64.8. The lowest value ever recorded occurred on July 2, 1954, with a value of 64.4.

-- *Richard Thompson* --
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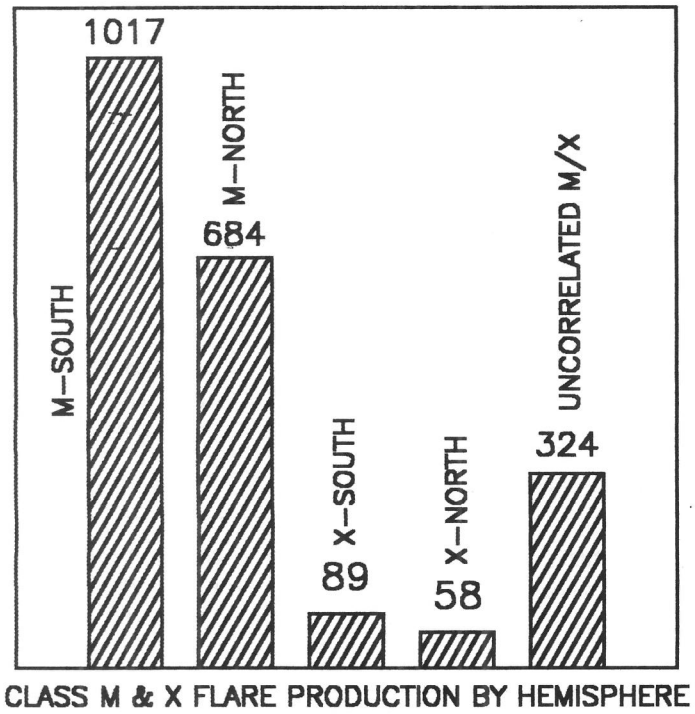
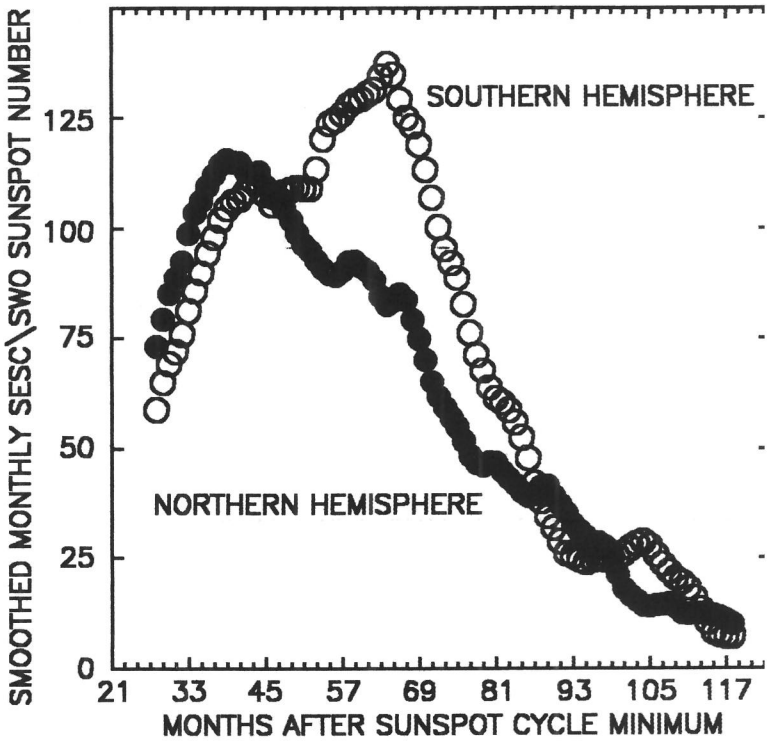
Solar Flare and Sunspot Activity by Hemisphere During Cycle 22





Sudden Ionospheric Disturbances (SES) Recorded During June 1996

Records were received from A9,40,50,61,62,63,68,69,70,71,72,73,74,75,76,77,78,80,81,82,83,84,85

Day	Max	Imp	Def	Day	Max	Imp	Def
9	1449	1-	4	23	2214	1	4

Analysts: J. Ellerbe; S. Hansen; M. Hayden; P. King; A. Landry; G. Rosenberg; A. Stokes; P. Taylor; L.Witkowski.

Frequencies recorded (kHz): 16.8; 18.3; 19.6; 20.3; 21.4; 23.4; 24.0; 24.8; 30.6; 48.5; 51.6.