

# Solar Bulletin

THE AMERICAN ASSOCIATION OF VARIABLE STAR OBSERVERS— SOLAR DIVISION

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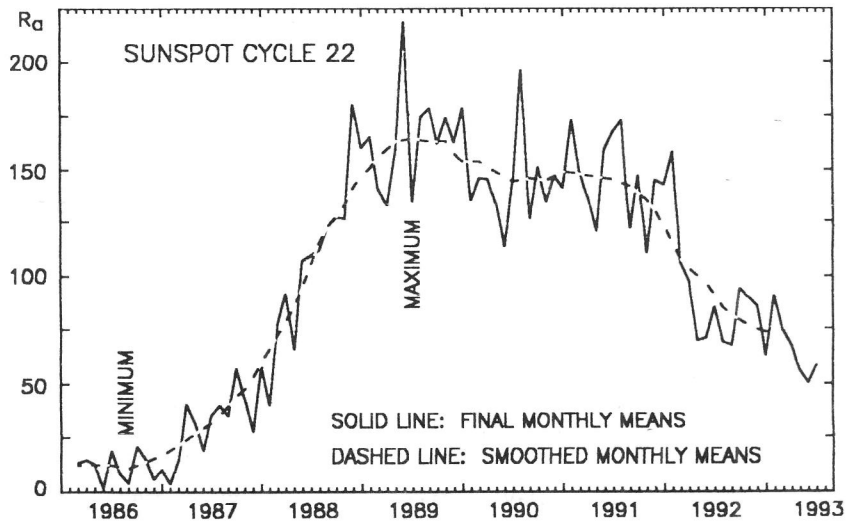
July 1993

## American Relative Sunspot Numbers for July

		R <sub>a</sub> Final			
1)	63	11)	34	21)	66
2)	61	12)	38	22)	62
3)	70	13)	52	23)	65
4)	73	14)	62	24)	65
5)	71	15)	68	25)	51
6)	54	16)	64	26)	58
7)	42	17)	65	27)	67
8)	45	18)	82	28)	53
9)	38	19)	77	29)	46
10)	33	20)	69	30)	41
				31)	45

Mean: 57.4

Number of reports: 99



**July Summary:** Solar activity was low on July 1st, then moderate on the 2nd after NOAA/USAF Region 7530 (S12, L031, DA1) spawned a M4.2/2B Tenflare. Activity remained at the moderate level during the following two days due to the occurrence of a lone class M flare on the 3rd and two on the 4th; again, all in Region 7530. As the month developed, these were to be the only class M flares to occur during July.

The geomagnetic field was mainly quiet to unsettled with brief periods of minor storm conditions at higher latitudes during the first week of July. Intervals of minor storming took place on the 2nd and 3rd and then diminished; a 31 nT sudden impulse was recorded at Boulder on the 6th, however, the situation rapidly returned to normal.

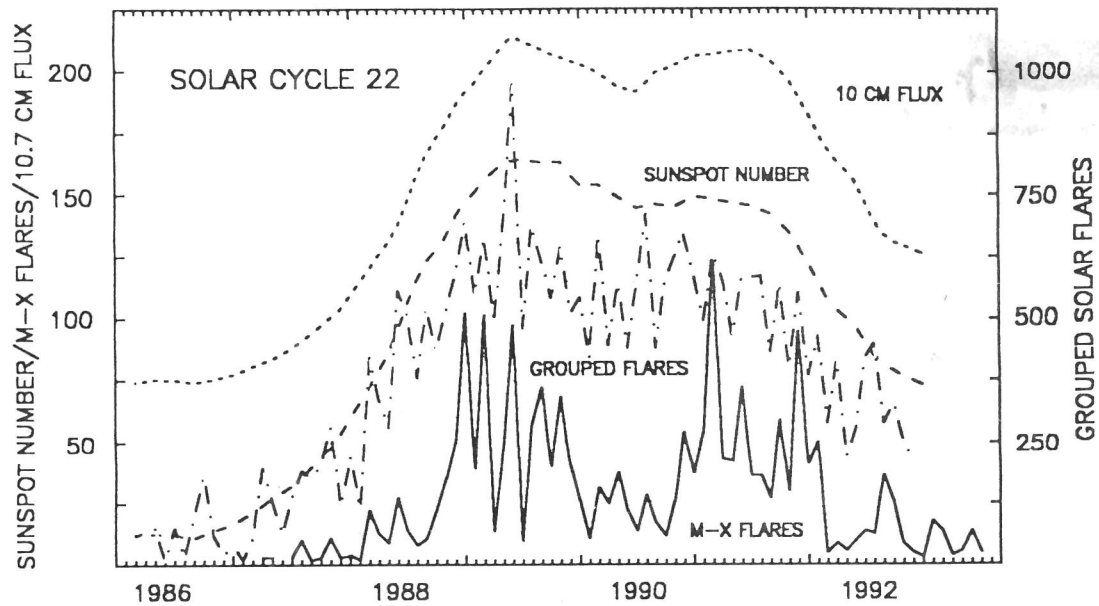
Activity was very low between the 8th and 16th; no solar flares were recorded which exceeded the class B intensity level. An active prominence was present on the Sun's NW limb on the 10th and 11th, and a large quiescent prominence could be seen on the NE limb on the 11th and 12th. In addition, filaments disappeared from the Southern Hemisphere on the 11th and 13th/14th. The geomagnetic field was mostly active decreasing to quiet. Occasional interludes of storm conditions occurred on the 11th; according to SESC the source of that disruption has not been determined.

The Sun continued at the low and very low activity level through the end of July. Region 7518/7530, which spawned a number of class M flares during its two previous disk transits, did not return to the visible hemisphere in any substantive form. A single small spot did rotate into view which was located in the same area. That spot, Region 7553 (S12, L032, DAO), grew into a type D spot-group on the 26th/27th. The geomagnetic field experienced periods of minor storming related to a coronal hole at high-latitudes on the 21st, but otherwise conditions remained at the quiet or unsettled level. The smoothed mean American Relative Sunspot Number for January, 1993 is 72.2.

It appears that the sharp decline of solar cycle twenty-two has slowed during the past several months (see page two). Most sources continue to predict a cycle minimum to occur during 1996. However, the recent slowdown may cause that event to take place somewhat later than originally indicated.

The estimated mean American Relative Sunspot Number for 1-15 August is 45. Solar activity during the first half of August has been somewhat lower than for this interval in July. Only one class M solar flare has been recorded, a M1.5/SN in Region 7562 (N09, L256, DAO) on the 11th. Mt. Wilson Observatory notes that this region is a reverse polarity spot-group. The Sun's Southern Hemisphere was spotless on the 8th. The geomagnetic field has been mostly quiet with a few scattered periods of active or unsettled conditions.

### Indices of Solar Activity During Sunspot Cycle Twenty-two



### Sudden Ionospheric Disturbances (SES) Recorded During June 1993

Records were received from A9,40,50,59,61,62,63,65,66,67,68,69,70,71,72,73,74,75,76,77,78,79,80,81

Day	Max	Imp	Def	Day	Max	Imp	Def	Day	Max	Imp	Def	Day	Max	Imp	Def
1	0449	1	5	7	1833	1-	5	18	0621	1-	5	26	0945	2	5
1	2003	1-	5	7	1846	1+	5	18	0816	1-	5	26	1240	1+	5
1	2308	1-	5	8	0213	2+	5	18	1045	1-	5	26	1506	1+	5
2	1249	1	5	8	0440	2	5	19	2347	1	5	26	1540	1+	5
3	0242	1+	5	8	0730	1-	5	20	1142	1	5	26	1837	1-	5
3	0308	1+	5	8	1653	1-	5	21	1846	2	5	26	1926	2	5
3	1529	1	5	8	1855	2	5	22	1331	1	5	26	2130	2+	5
3	1555	2	5	8	2310	2+	5	22	1839	1	5	27	0037	1-	5
3	1656	1-	5	9	1430	1	5	23	2114	2+	5	27	0047	1-	5
3	2246	1	5	9	1833	2+	5	23	2253	2	5	27	0432	1	5
3	2330	1	5	9	2108	1+	5	24	0130	2+	5	27	1018	1	5
4	0950	1-	5	9	2206	2	5	24	0733	1	5	27	1123	2+	5
4	1131	1-	5	10	0608	2	5	24	0758	3	5	27	1448	1-	5
5	0816	2	5	10	1052	1+	5	24	1045	2	5	27	1656	1	5
6	0940	1	5	10	1218	1+	5	24	1501	2	5	27	1856	1-	5
6	1505	2	5	10	1419	1+	5	24	1612	1+	5	28	0017	1+	5
6	1649	2	5	10	1548	2+	5	24	1725	2+	5	28	0108	2+	5
6	1814	1	5	11	1020	1+	5	24	1817	2+	5	28	1300	2	5
6	1851	1	5	11	1401	1-	5	25	0320	2	5	28	1431	1-	5
6	2125	1+	5	11	1846	1	5	25	1029	1	5	28	1520	1	5
7	0547	1-	5	12	0414	1	5	25	1406	1-	5	28	1655	1-	5
7	0605	2+	5	12	0906	1+	5	25	1921	1-	5	28	2201	1	5
7	1400	1-	4	12	1409	1	5	25	1947	2	5	29	0754	1-	5
7	1420	3+	5	12	1617	2+	5	25	2033	2	5	30	2346	1-	5
7	1731	2+	5	17	1140	1-	5	26	0812	1	5				

**SID Analysts:** J Ellerbe; S Hansen; M Hayden; J Knight; A Okorogu; R Papp; C Ranft; A Stokes; M Taylor; P Taylor; L Witkowski  
 Frequencies recorded (kHz): 16.8; 18.3; 19.6; 21.4; 23.4; 24.0; 24.8; 28.5; 30.6; 48.5; 51.6; 73.6; 77.15

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