Solar Bulletin

THE AMERICAN ASSOCIATION OF VARIABLE STAR OBSERVERS— SOLAR DIVISION

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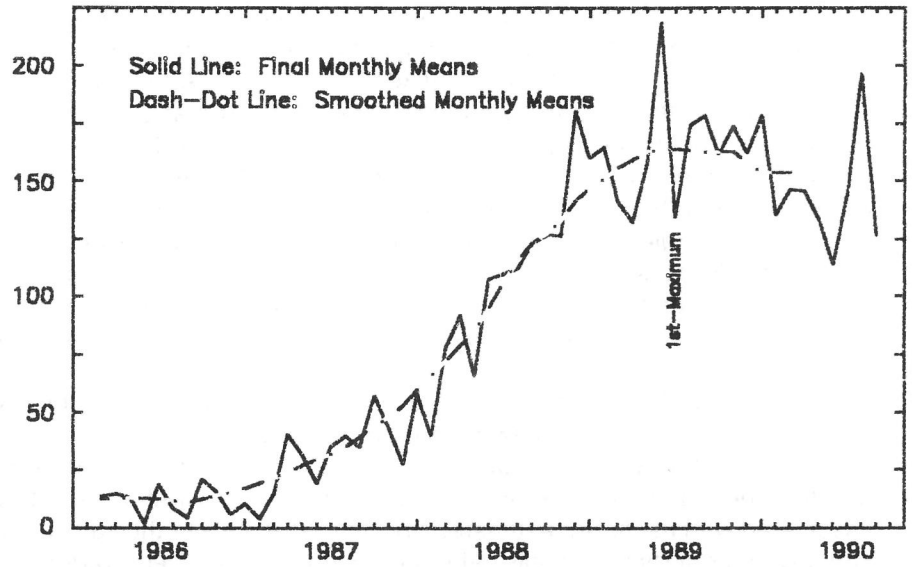
American Relative Sunspot Numbers for September

	R_a Final		
1)	125	11) 113	21) 138
2)	124	12) 127	22) 133
3)	135	13) 139	23) 113
4)	141	14) 164	24) 101
5)	119	15) 158	25) 97
6)	114	16) 162	26) 98
7)	107	17) 144	27) 95
8)	104	18) 138	28) 119
9)	112	19) 143	29) 127
10)	118	20) 142	30) 118

Mean: 125.6
Number of contributors: 105



Activity was primarily in the moderate range during the first week of September; a result of the occurrence of about one M-level flare per day. In the main these events had energy outputs at the lower end of the M-class X-ray scale. **SESC** Region 6233 (N12, L034, Eki on 1 Sep) spawned at least four of the five recorded M-level flares before rotating off the visible hemisphere on 4/5 September. The remaining event was an uncorrelated M1.9 burst late on the 6th, which may also have been produced by Region 6233.

The Sun was relatively quiet for most of week two, although activity climbed into the moderate range on the 14th. Four flares attained M-level intensity during the period, three of which occurred on the final day. The strongest of these events was a M3.5/SF which erupted from just behind the southeast limb on the 14th. As many as sixteen spot clusters were present on the disk during some days of the week, but most were magnetically simple.

Activity was mainly low and moderate between the 15th and 21st, with one interval at the high level. Four solar flares with X-ray intensities in the M-range were recorded. A major flare occurred on the 17th; a M5.3/1B event in Region 6272 (S12, L104, Dko on 17 Sep). Region 6272 was the largest sunspot group on the visible hemisphere during the week, growing to encompass a maximum area of ~510 millionths solar hemisphere (msh) on the 17th. Region 6280 (N13, L026, Eao on 21 Sep) rotated over the Sun's eastern limb on the 18th in a location near that of old Region 6233. However Region 6280 was relatively quiet during its passage, and yielded only one M-class event.

The Sun's activity level was predominately low during the remainder of the month. Three solar flares reached M-level intensity at the beginning of the fourth week, bringing the total number for September to sixteen. The strongest of these flares was an optically uncorrelated M2.7 event on the 23rd, which may have been associated with departing Region 6267 (S13, L147, Cao on 23 Sep). Daily solar X-ray background radiation levels dropped to the B4 level late in the month, so that some flares in the mid-B range were detected by the *GOES* spacecraft. Relative sunspot numbers also declined from those which were experienced during mid-September. Region 6283 (S07, L355, Eki on 30 Sep) was the largest region to appear on the visible hemisphere during the month. Boulder measured its area as ~600 msh (1800 million km^2) on the 23rd. The smoothed monthly-mean American Relative Sunspot Number for March 1990 decreased to a value of 152.6.

The estimated mean American sunspot number for 1-14 October is 165. Activity has been in the low and moderate range during the first half of October. Just four solar flares have attained an X-ray intensity which would place them within the M-class range.

A portion of this information was obtained from: **SESC** PRF, Numbers 783-88 (1990).

Solar White-Light Flares Recorded During Sunspot Cycle Twenty-Two

Our collaborator Thomas G. Compton, reports that according to Dr. Donald F. Neidig of **Sacramento Peak Observatory** at least eleven solar *white-light* flares (WLFs) have occurred since cycle twenty-two began in September 1986. These events are listed below:

1. 1988 Jun 24 (reported by Alan Daroff, Philadelphia)
2. 1989 Jan 10
3. 1989 Jan 18 (reported by Yunnan Observatory, China)
4. 1989 Mar 7
5. 1989 Mar 8
6. 1989 Mar 9
7. 1989 Mar 10
8. 1989 Mar 11 (1540 UT)
9. 1989 Mar 11 (1938 UT)
10. 1989 Mar 16
11. 1989 Mar 17

According to Dr. Neidig, Event numbers 2 and 4-11 were observed with the Multi-Band Patrol (5-inch, f/18 system followed by 4X magnification reimaging optics) at Sacramento Peak, which happened to be operating in only two of its five bands - the ones centered at 3610 and 4275 Å. Additionally, Event numbers 2,4 and 5 were observed on CCD arrays at 5000 Å at the Vacuum Tower Telescope at Sacramento Peak. The highest time resolution (0.5 second) and most precise photometry (~1%) ever obtained on a WLF were achieved in the case of Event number 4. Event number 1 was observed with a 6-inch, f/30 system using a wide band filter at 5300 Å. Event number 3 was observed with a spectrograph instead of the usual imaging method. Eight of the events which are listed above occurred in a single spot group, **SESC** Region 5395 (N34, L256, Fkc on 1989 March 17). No other region is known to have produced so many. Thus far, Region 5395 is the largest group (~3500 millionths solar hemisphere) to appear on the Sun during cycle twenty-two. WLFs in addition to those which are listed above may also have taken place during this cycle; some may not be uncovered for years, after an examination of film archives.

The number of WLFs tends to reach a peak a year or so after sunspot cycle maximum. If any of the members of the international observer network believe that they have viewed such an event, they are urged to submit their observation directly to the Solar Bulletin Editor. Reports should be as detailed as possible, and include time and duration, heliographic location (or specific information with regard to position within the spot group which is associated with the flare), estimated brightness relative to the surrounding photosphere, type of filter employed and any other pertinent details. After an observation has been verified, the information will be sent to Dr. Neidig.

Sudden Ionospheric Disturbances Recorded During August 1990

Records were received from A1,9,19,40,50,52,61,62,63,64,65,66,67,68,69,70,71.

Day	Max	Imp	Def	Day	Max	Imp	Def	Day	Max	Imp	Def	Day	Max	Imp	De
1	2001	2+	5	12	2108	2+	4	21	0932	1+	4	27	2103	2+	5
1	2130	1+	5	13	0033	1	4	21	1605	2	5	28	0905	2+	5
2	0550	1-	5	13	0930	2+	5	22	1624	1+	5	28	1015	2	5
2	0617	1-	5	13	1329	3	5	22	1659	1+	5	28	1250	3	5
2	1515	1-	5	13	2230	1+	5	22	2205	1-	4	28	1500	1-	4
2	1535	1	5	14	1957	2	5	23	0905	2+	4	28	1634	1	4
2	1630	1-	5	15	1558	2+	5	23	2040	2	5	28	1713	1	4
3	1321	1	5	15	1946	2	5	24	0440	1-	5	28	1830	2+	5
3	1450	2	5	15	2305	1	4	25	0719	1-	4	28	2235	2+	5
3	1650	1-	5	17	1701	2+	5	25	1555	1-	5	29	0433	2	5
4	0648	1	5	17	1859	1-	4	25	1836	1-	4	29	0721	2	5
5	1935	1+	5	17	1928	1	4	25	2012	2+	5	29	0820	2+	4
8	1400	2+	5	17	2150	2	5	26	0736	2	5	29	1321	1	5
8	1809	2	5	17	2259	2+	5	26	1352	2+	5	29	1346	1	4
8	2234	1	5	17	2343	2+	5	26	1545	2	5	29	1500	2	5
8	2346	2	5	18	0520	2	4	26	1624	2+	5	29	2040	2+	5
9	0753	1-	5	18	0852	1	5	26	1816	1-	4	30	1315	2+	5
9	1530	1-	4	18	0914	2+	5	27	1613	3	5	31	0413	2	5
9	2032	1+	5	19	0007	1-	4	27	1831	2	5	31	1630	2+	5
10	1815	3	5	19	1719	1	4	27	1911	2+	5				

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