

# Solar Bulletin

THE AMERICAN ASSOCIATION OF VARIABLE STAR OBSERVERS— SOLAR DIVISION

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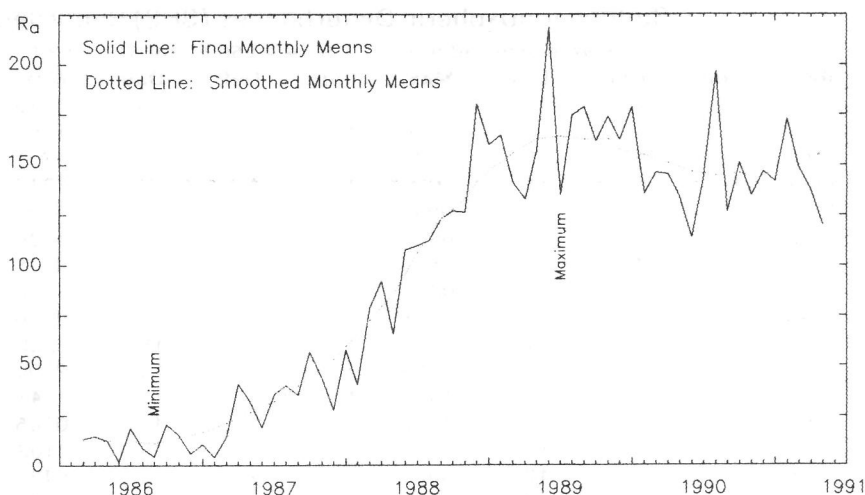
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## American Relative Sunspot Numbers for May

		R <sub>a</sub> Final			
1)	92	11)	131	21)	97
2)	90	12)	124	22)	116
3)	91	13)	116	23)	121
4)	98	14)	117	24)	115
5)	103	15)	105	25)	128
6)	104	16)	109	26)	150
7)	102	17)	116	27)	153
8)	128	18)	120	28)	150
9)	139	19)	121	29)	141
10)	138	20)	110	30)	138
				31)	138

Mean: 119.4  
 Number of reports: 100



Activity was low and moderate from the 1st to the 8th. Four solar flares attained an X-ray intensity which placed them within the M-level category. Three occurred in the largest spot-group on the disk during this interval, SESC Region 6615 (S10, L349, EKI on 7 May), and the fourth in Region 6621 (N09, L262, EAO on 8 May). A second large cluster, Region 6619 (N28, L273, DK1 on 7 May), was also present on the visible hemisphere, but failed to produce any strong flares during this period.

Solar activity ranged from low to high between the 9th and 16th. Eleven M-class events were detected, two of which were ranked as major flares. These included an optically un-correlated M8.2 from behind the southwest limb on the 13th that may have occurred in Region 6615, and a M8.9/2B Tenflare on the 16th in Region 6619. Occasional periods of major geomagnetic storm conditions were reported at high-latitude sites. Two sudden impulses were recorded at Boulder; a 52 nanotesla event on the 13th, and a 44 nanotesla SI on the 16th.

From the 17th to the 23rd, activity varied between high and very low. The strongest flare to be recorded in nearly two months (X2.8/2B) occurred on the 18th in Region 6619, as the group passed over the Sun's western limb. A 5600 s.f.u. Tenflare and eruptive prominence accompanied the event. In addition to the X-flare, two M-class events were detected during the first few days of the period. Thereafter activity declined, with no magnetically complex spot-groups present among the ten clusters on the disk as the week ended.

Activity was moderate and high after the 26th of May. One X-level, and twenty-two M-class solar flares occurred, exceeding the total number of M-level events recorded earlier in May. The lone X-class flare, a X1.0/2B Tenflare, took place on the 29th in Region 6654 (N07, L347, EA1 on 29 May), which also produced fifteen of the M-class events. Two of the latter flares were major events: a M5.3/1B on the 28th, and M8.2/1F Tenflare on 30 May. A majority of the additional M-level flares were spawned by Region 6652 (S09, L356, DKO on 29 May). One of the more interesting of these events occurred on the 29th. Its description by SESC includes the following remark: 'This flare was characterized by a "Y" shaped ribbon of bright plage which extended to Region 6654 on the opposite side of the solar equator.' One M-class flare was credited to the largest group on the disk during the period, northern Region 6644. The major geomagnetic storm conditions which occurred at high-latitudes around the 25th were attributed to coronal hole effects, and a satellite level proton event which reached maximum on the 31st may have resulted from flare activity on the 29th. The smoothed monthly-mean American Relative Sunspot Number for November 1990 declined to a value of 143.9.

The estimated mean American Relative Sunspot Number for 1-15 June is 178. Solar activity has been high during this interval. Five flares have occurred which equaled or exceeded the capacity of the GOES sensors (X12), along with one at the X10 level and several major M-class flares.

[A portion of this information was obtained from the SELDADS data base.]

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 JULY ECLIPSE NOTE: The editor will be viewing the eclipse from La Paz, Baja. We will be staying at the La Concha Resort and will be happy to meet personally with any current collaborators or others interested in the work of the Solar Division.  
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 (Note: Network collaborators should utilize these reporting facilities whenever possible.)

## Notes on the Observatory K-factor

A recent issue of the SIDC-NEWS (1991, No. 3) contains some interesting information concerning the computation of observatory K-factors at Royal Observatory of Belgium. Since (as Dr Koeckelenbergh points out) questions regarding the determination of this statistic often occur, we provide the following equation which is used to derive the K-factors for Solar Division sunspot observers:

$$a_i = \log K_i = 1/N \left( \sum_{j=1}^N \log R_{sj} - \sum_{j=1}^N \log R_{ij} \right).$$

$R_s$  represents a series of previously-reduced daily values used as a standard for comparison: in our case, the set of final American Relative Sunspot Numbers.  $R_i$  consists of a matching set of estimates from a selected contributor in the form dictated by Wolf ( $R = 10g + s$ ), and  $N$  represents the number of data pairs which are used. For our reductions, at least 100 observations made when seeing is rated as good or better are required. Stations are re-evaluated semi-annually, when monthly-mean sunspot numbers regularly exceed 100. -- editor --

### Sudden Ionospheric Disturbances (SES) Recorded During April 1991

Records were received from A1,3,9,19,40,50,52,59,61,62,63,64,65,66,67,68,69,70,71,72.

Day	Max	Imp	Def	Day	Max	Imp	Def	Day	Max	Imp	Def	Day	Max	Imp	Def
1	0648	2	4	10	2130	1+	5	15	1438	2+	5	18	0000	1	4
1	0713	1	4	10	2226	1-	4	15	1555	2+	5	18	0645	1	4
1	1200	1-	5	10	2243	2	5	15	1715	1-	5	18	1844	1+	5
1	1244	1-	4	11	0020	1	4	15	1818	1-	5	19	0500	2+	5
1	1704	3	5	11	0044	1	4	15	1831	1+	5	19	0658	2	5
1	1922	2+	5	11	0614	2+	5	15	1904	2+	5	19	1050	2+	5
1	2030	1+	4	11	0658	2	5	15	2015	2+	5	19	1156	1+	4
1	2130	2	5	11	0843	2+	5	15	2109	2	4	19	1302	2	5
1	2245	2+	4	11	1108	1-	4	15	2200	1	4	19	1429	1	5
2	0000	1-	4	11	1115	1	5	15	2222	1+	5	19	1624	1-	4
2	0843	2	5	11	1129	1	5	15	2300	2	4	19	1812	1	5
2	1017	2+	4	11	1335	1-	4	15	2343	1	5	19	1946	1-	5
2	1806	2	5	11	1438	1	5	16	0005	1-	4	19	1954	1-	4
2	2116	1+	5	11	1850	2+	5	16	0102	2	4	19	2114	1-	5
2	2308	3+	4	12	0030	3	4	16	0139	2+	4	19	2230	1-	4
3	2215	2+	4	12	0423	1	5	16	0347	1-	4	20	0029	1	4
5	0949	1-	4	12	0449	2+	5	16	0404	2+	5	20	0627	2	5
5	1748	2	5	12	2007	1	5	16	0520	2+	4	20	0844	2	5
6	0824	2+	5	12	2035	1+	5	16	0607	1-	5	20	0901	2+	5
6	1429	1	4	12	2201	1+	4	16	0621	1	4	20	1014	3	5
6	1530	1	4	12	2323	1-	4	16	0820	2	5	20	1227	1-	4
6	1620	2	5	12	2332	1	5	16	0857	1	4	20	1311	1	4
7	0031	1	4	13	0029	1	4	16	0946	1+	4	20	1637	1+	5
7	0602	1-	4	13	0524	2	5	16	1053	1-	5	20	2141	1-	4
7	0815	1+	5	13	0850	2+	5	16	1059	1-	4	20	2151	1+	5
7	1300	1-	4	13	1326	1-	4	16	1130	1-	4	21	0543	1+	5
7	1407	1-	4	13	1522	1	5	16	1145	1-	5	21	2116	1	5
7	1443	1-	4	13	1546	1-	4	16	1154	2+	5	21	2255	1	4
7	1503	2	4	13	1615	2	4	16	1329	1+	4	21	2319	2+	4
7	2010	2	4	13	1709	2+	5	16	1350	2	5	22	0715	1	4
7	2302	1-	4	13	1931	1	5	16	1402	1-	5	22	1838	1-	4
7	2353	1+	4	13	2150	2+	4	16	1449	1+	4	22	1951	2	4
8	0546	1	4	14	0354	2+	4	16	1552	1+	4	22	2200	2	4
8	1504	2+	5	14	0546	2	5	16	1601	1	5	23	1404	1	4
8	1644	1-	4	14	0845	1	4	16	1824	1	5	27	1344	1	5
8	1817	1	4	14	1305	1	5	16	1900	1+	4	27	1448	1-	4
8	1829	1	4	14	1506	1	5	16	2022	2	5	27	1657	1	4
9	0630	1-	4	14	1517	1-	5	16	2110	1+	4	27	1722	2+	5
9	0715	1+	5	14	1630	1+	5	16	2132	1-	4	27	1914	1-	4
9	0907	2	5	14	1650	1-	5	16	2222	1	5	27	2215	1+	4
9	1358	1	5	14	1702	2	5	16	2244	1+	5	27	2315	1	4
9	1514	2	4	14	1923	1	5	16	2332	1-	4	27	2338	2+	5
9	1540	2	5	14	2044	1	5	16	2358	2	5	28	0024	2	5
9	1847	2+	5	14	2245	1	4	17	0028	1	4	28	0559	1+	5
9	2247	2	4	14	2335	2+	4	17	0147	2	4	28	0753	2	5
10	0343	3	4	15	0620	1	4	17	0638	1	5	28	1430	1-	5
10	1253	2	5	15	0657	1-	4	17	0657	2+	5	28	1604	1	5
10	1310	1	4	15	0716	1	4	17	0950	1	4	28	2138	1	5
10	1349	1-	4	15	0823	1+	4	17	1201	1-	4	29	2141	2+	5
10	1512	1+	5	15	0920	1-	4	17	1320	1-	4	30	0727	1	4
10	1612	2+	5	15	0940	1+	5	17	1329	1-	4	30	0829	2+	4
10	1715	1	4	15	1014	2	5	17	1621	2	5	30	1230	1-	5
10	2017	1-	5	15	1158	1	5	17	1659	1+	4	30	1430	1	5
10	2030	2+	5	15	1332	1-	4	17	2243	1	4	30	1604	1+	4