Solar Bulletin

THE AMERICAN ASSOCIATION OF VARIABLE STAR OBSERVERS— SOLAR DIVISION

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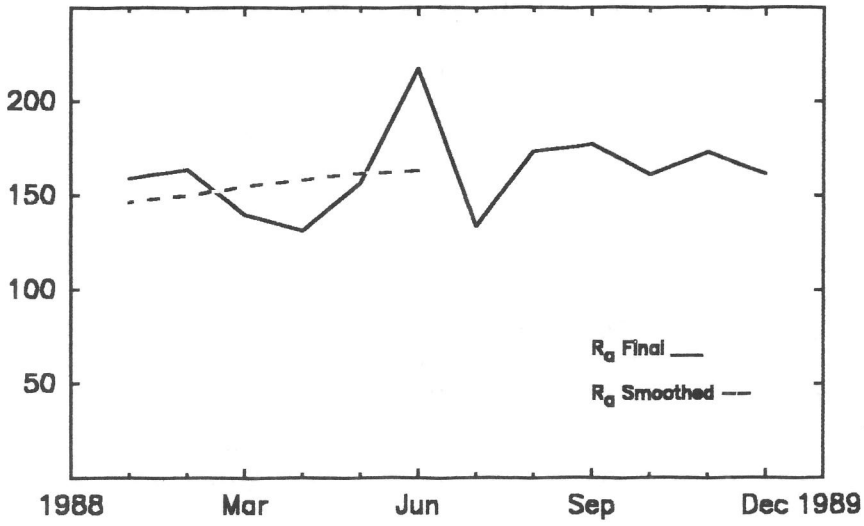
American Relative Sunspot Numbers for December

	R_a Final	
1) 180	11) 99	21) 104
2) 199	12) 105	22) 159
3) 195	13) 110	23) 185
4) 192	14) 103	24) 189
5) 204	15) 90	25) 206
6) 171	16) 103	26) 225
7) 205	17) 126	27) 232
8) 193	18) 110	28) 218
9) 163	19) 121	29) 196
10) 142	20) 113	30) 181
		31) 192

Mean = 161.6



The smoothed-mean American Relative Sunspot Number for June 1989 is 163.1. One-hundred members of the international network of American sunspot program collaborators submitted reports for December. Solar activity was moderate and low during the first three weeks of the month, when only thirteen M-level flares occurred. The strongest of these was an M5.6/1B event from **SESC** Region 5806 (N17, L035, DKO on 5 December) as it neared the western limb on the 5th. The geomagnetic field experienced major to severe storm conditions early in the month, as a result of the X2.6/3B flare from Region 5800 on 30 November.

The fourth week of December saw a considerable increase in the Sun's activity. Eighteen solar flares of M-level intensity were recorded. The most intense of these events was an M9.7/2B flare from Region 5852 (S26, L029, EKC on 28 December) early on the 28th. This region was the largest on the visible disk during December with a maximum area on the 29th of 1500 millionths solar hemisphere (~1.76 *billion* square-miles). The month's only X-level, x-ray flares occurred on the 30th and 31st. The first, an X1.0/1N event, was spawned by Region 5858 (S18, L342, DAI on 30 December) as the group began to decay. Region 5852 produced the second flare, which was rated, X2.8/2B. The geomagnetic field again experienced major storm conditions at middle latitudes on the 29th and 30th, but the cause was uncertain because of the large increase in flare activity.

A total of thirty-seven M-class, and two X-level flares were recorded during December, lower than November's totals. However, cycle twenty-two continues to increase in strength as it rises to a predicted maximum sometime during the next several months. The solar 10.7 centimeter radio flux and background x-radiation levels were at 246 and C1.8 at year's end.

The *estimated* American Sunspot Number for 1-16 January is *147*. The Sun's activity has again declined during this period. Just twelve M-class x-ray solar flares have occurred thus far during January, mainly at the low-end of the intensity scale. Flux and background levels have decreased accordingly, to below 200 and high B-level on 15 January.

References: **SESC** PRF, Numbers 744-50; **SESC** SDF, Numbers 015-017, (1990).

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(**Note:** Network collaborators should utilize these reporting facilities whenever possible.)

Final American Relative Sunspot Numbers for 1989

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
01)	150	132	135	117	109	163	139	161	149	144	155	180
02)	149	148	125	131	121	171	153	184	168	146	173	199
03)	135	169	113	148	98	168	134	205	198	161	201	195
04)	116	152	99	132	109	168	122	219	220	186	230	192
05)	142	127	92	100	108	173	110	243	223	190	230	204
06)	146	127	112	145	129	150	131	244	243	193	228	171
07)	176	127	99	163	160	143	153	226	275	201	208	205
08)	189	150	118	175	178	169	144	222	260	177	204	193
09)	170	158	143	146	153	199	112	241	284	190	201	163
10)	195	200	160	118	149	214	115	205	284	196	188	142
11)	200	201	161	107	138	238	145	218	254	191	169	99
12)	197	216	158	92	124	232	123	204	272	161	154	105
13)	206	207	179	85	110	280	114	204	252	157	145	110
14)	189	221	185	101	142	274	111	175	213	177	139	103
15)	187	187	201	120	164	295	96	187	205	188	130	90
16)	170	191	191	138	174	288	105	172	192	209	125	103
17)	154	192	193	151	175	257	111	189	155	195	140	126
18)	151	156	183	134	195	244	126	197	144	180	142	110
19)	132	152	162	159	217	252	146	210	147	160	152	121
20)	113	174	164	168	222	244	160	216	120	142	149	113
21)	114	152	150	159	189	220	181	189	102	167	181	104
22)	151	132	152	163	174	219	217	156	106	149	160	159
23)	154	126	171	134	198	227	215	138	110	141	134	185
24)	130	163	146	130	217	242	169	147	85	133	172	189
25)	157	191	136	133	187	248	135	102	83	104	180	206
26)	156	169	127	134	172	265	108	82	86	98	184	225
27)	166	147	107	133	178	231	98	78	104	102	199	232
28)	172	121	94	118	151	201	88	68	113	123	176	218
29)	168	---	96	109	140	195	112	74	131	138	179	196
30)	149	---	79	105	142	155	130	97	149	152	160	181
31)	148	---	102	---	124	---	144	125	---	141	---	192
Mean	159.1	163.9	139.8	131.6	156.4	217.5	133.8	173.5	177.6	161.0	172.9	161.6

Yearly mean for 1989: 162.4

Sudden Ionospheric Disturbances Recorded During November

Records were received from A1,3,9,19,46,50,52,61,62,63,64,65.

Day	Max	Imp	Day	Max	Imp	Day	Max	Imp	Day	Max	Imp	Day	Max	Imp
1	15:14	1	7	16:59	2+	9	15:58	2+	12	13:07	1+	20	14:28	2+
1	16:18	1	7	18:40	2	9	17:03	2	12	17:42	1	20	21:35	2+
2	12:52	2	7	19:32	2	9	17:49	2+	12	19:19	1+	21	13:46	2
3	19:58	2+	7	20:33	2+	9	18:59	2	13	20:14	2+	22	13:38	1+
4	17:30	2+	8	14:19	1-	9	19:31	2+	15	19:33	2+	26	18:15	3+
4	21:21	1+	8	17:33	2	9	20:55	1+	16	13:20	2+	27	16:18	2
5	13:33	1+	8	18:35	2+	10	15:59	1-	17	17:03	1+	27	17:10	1
6	13:46	2+	8	19:10	2+	10	16:15	1+	17	17:53	1-	27	17:38	2+
6	18:46	2	9	12:40	1-	10	16:52	3	18	16:15	3+	28	16:29	1+
6	20:46	2+	9	14:04	2	10	19:47	2	19	16:14	2	28	18:26	1+
7	14:59	2	9	14:55	2+	11	18:32	2+						

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