

Solar Bulletin

THE AMERICAN ASSOCIATION OF VARIABLE STAR OBSERVERS— SOLAR DIVISION

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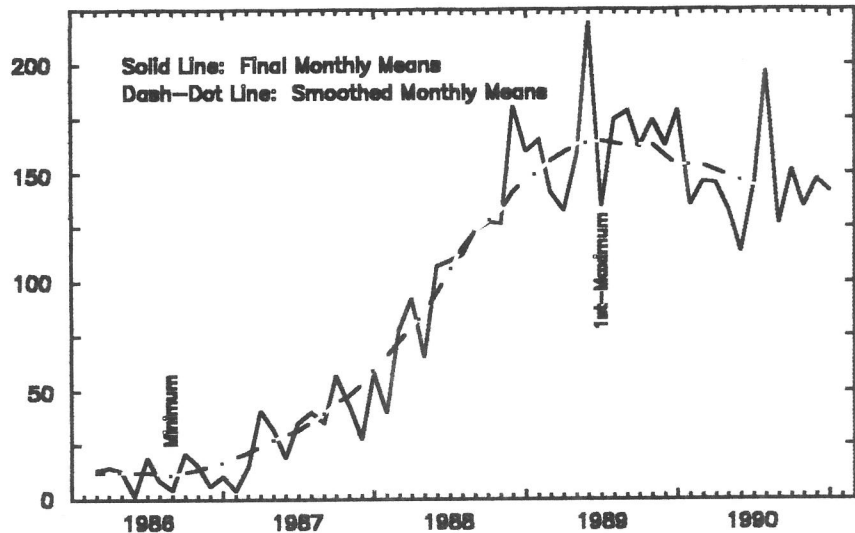


Volume 47 Number 1

January 1991

American Relative Sunspot Numbers for January

		R _a Final	
1) 140	11) 119	21) 112	
2) 111	12) 123	22) 101	
3) 105	13) 142	23) 127	
4) 101	14) 122	24) 143	
5) 105	15) 129	25) 154	
6) 129	16) 140	26) 195	
7) 118	17) 124	27) 225	
8) 105	18) 132	28) 231	
9) 90	19) 108	29) 247	
10) 104	20) 95	30) 253	
		31) 232	
Mean: 140.7			
Number of contributors: 100			



Flare activity was low and very low during the first four days of the new year, but increased during the following week. Seven solar flares attained M-level x-ray intensity during the period. The strongest of these, a M4.6/1B, took place on the 11th in SESC Region 6447 (S06, L348, Fko on 12 January), which also produced a M2.2/1N earlier in the day. Region 6444 (N16, L021, Fko on 11 January) dominated the disk during early January, reaching an area of ~1600 millionths solar hemisphere. This transit marks at least the third appearance of this region, which was previously numbered 6368 and 6412.

Activity was low between 12 and 18 January with the exceptions of the 17th, when Region 6455 (S14, L336, Dai on 17 January) spawned a major flare, and the 18th after the occurrence of two lower-level M-class events. The flare on the 17th was rated M6.9/1B, and was accompanied by a 350 s.f.u. Tenflare and Type II burst. (Type II radio bursts are indicative of a shock wave moving through the solar atmosphere.) The largest group on the visible hemisphere continued to be Region 6444, which declined slightly in size during the period but produced numerous flares at the C-level and below.

Solar activity ranged from low to high from the 19th to the 25th. Eleven M-level events were detected; one of which was a major flare (M5 or greater x-ray intensity). The latter event, a M6.1/2N, took place on the 21st in Region 6455. This spot-group also produced a majority of the remaining M-level flares, although Region 6462 (S17, L206, Fko on 23 January), also contributed several strong events. In general, these were caused by the interaction between Region 6462 and Region 6466 (S09, L200, Fki on 24 January). A M3.2/SN Tenflare which occurred on the 24th resulted from nearly simultaneous flares of similar magnitude in both groups.

On the 24th, loops, strong surging and an eruptive prominence on the southeast limb heralded the arrival of Region 6471 (S11, L144, Fki on 27 January), which promptly spawned the most intense x-ray flare to occur since the powerful X13.0/4B produced in old Region 5747 (S26, L211) on 19 October 1989. This event, a X10.8/SF Tenflare accompanied by strong radio bursts, occurred early on the 25th.

Solar activity was moderate and high during the remainder of January. On the 27th, Region 6471 spawned its second X-level flare, a long-duration X1.9/1B accompanied by strong radio bursts. Region 6466 followed with a X1.0/2B on the 30th, and activity in Regions 6462 and 6469 (S13, L184, Fki on 31 January) added another (X1.3/2B) on the 31st. As January ended, no large-scale geomagnetic storms had occurred as a result of the X-level events, although a >10 MeV proton event reached maximum on the 31st and a polar cap absorption was in progress as the month ended; both occurrences were attributable to this activity.

In addition to the X-flares, eleven M-class events were recorded between 26 and 31 January. Several also took place in Region 6471, although it is interesting to note that one was produced in Region 6479, a small B-type sunspot group. On

(continued)

the 30th, Region 6471 grew to encompass an area of 2230 millionths solar hemisphere (~6800 million km²) and the solar 10.7 centimeter radio flux climbed to a value of 367. According to SESC, this flux level is the highest to occur since November 1979 (also 367), during the maximum of cycle 21.

As expected, the final smoothed-mean American Relative Sunspot Number for July 1990 continued to decline, falling to a value of 143.4. On the other hand, solar flare production during January was quite high. A total of four X-class, and thirty-two M-level events were detected during the month and the number of sudden ionospheric disturbances which were recorded by program contributors was the highest for any month during solar cycle twenty-two.

The estimated mean American Relative Sunspot Number for 1-14 February is 160. The Sun has been very active during much of early to mid-February. Thirty-eight solar flares have attained M-level x-ray intensity; four of them major flares. Thirty-three of these events were detected during the first eight days of February.

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

Sudden Ionospheric Disturbances Recorded During December 1990

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

Day	Max	Imp	Def	Day	Max	Imp	Def	Day	Max	Imp	Def	Day	Max	Imp	Def
1	0600	2+	4	8	2316	2+	4	13	1359	1	5	20	0940	2+	5
1	1406	1	4	9	0824	2	5	13	1629	2+	5	20	1213	1+	4
1	1614	1+	4	9	0926	1+	5	13	1746	2	5	20	1423	1+	5
1	1645	1	4	9	1424	2	5	13	1908	2+	5	20	2043	1	5
1	1708	1	4	9	2005	1	5	13	2315	2	4	21	0326	2	5
2	1244	1	4	10	0748	3	5	14	0845	1+	5	21	1500	1	5
2	1546	1-	5	10	0944	2	4	14	1124	1+	5	21	1630	2+	5
2	1600	1-	5	10	1000	1-	4	14	1152	1-	5	21	1827	1	4
2	1614	1-	4	10	1314	2	4	14	1250	1-	5	21	1855	1-	4
2	1856	2+	4	10	1520	2	5	14	1335	1+	5	21	2233	2+	4
2	2055	1+	4	10	1800	2+	5	14	1407	1+	5	22	0330	2+	4
3	1713	1	5	10	1947	1-	4	14	1450	1-	5	22	0637	2	4
3	1737	1+	5	10	2209	2	4	14	1643	1	5	22	1545	2+	5
3	1825	1-	4	11	0512	2+	3	14	1950	1	5	22	2039	2+	5
3	1923	2	5	11	1816	2+	5	14	2116	1	4	22	2240	2+	4
3	2016	1+	5	11	2053	3	5	15	0545	2	5	22	2317	2	4
4	0215	2	4	11	2309	2+	5	15	1244	1	5	23	0945	2+	5
4	0735	1+	4	12	0340	3	4	15	1607	1-	4	23	2008	2	5
4	1252	3	4	12	0708	1	4	15	1917	1-	4	24	1244	1+	5
4	1434	2	5	12	0800	2+	5	15	2011	1+	4	24	1326	2+	5
5	1515	1	4	12	1103	2+	4	16	0448	2	4	24	1540	2+	5
5	1730	1	4	12	1253	1+	5	17	1529	2+	5	24	2300	2	5
5	1823	3+	4	12	1337	1	4	18	0302	2	4	25	0952	1+	5
5	1837	1-	4	12	1408	2+	5	18	0525	2+	3	25	1109	2	5
5	2112	3	5	12	1547	1+	5	18	1030	1+	5	25	1430	1	5
7	1321	1	4	12	1653	2	5	18	1650	2+	4	25	2202	1+	5
7	1400	1-	4	12	1821	1	5	18	2047	2+	5	26	1401	2+	5
7	1411	2	5	12	1900	1-	5	19	0435	3	4	27	1747	2	5
7	1427	1-	4	12	1933	2+	5	19	1509	2+	5	28	0736	1	4
7	1819	2+	4	12	2021	2	4	19	1725	2	5	30	1146	2	5
7	1954	1-	4	13	0128	1+	4	19	1814	2+	5	30	1320	2+	5
8	0959	1	4	13	0208U	2+	4	20	0515	2	4	30	1515	2	5
8	1831	2	5	13	0418	2	3	20	0720	3	4	30	1832	2	5
												31	2000	1	4

U = Maximum undefined after listed time.

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