

# Solar Bulletin

THE AMERICAN ASSOCIATION OF VARIABLE STAR OBSERVERS— SOLAR DIVISION

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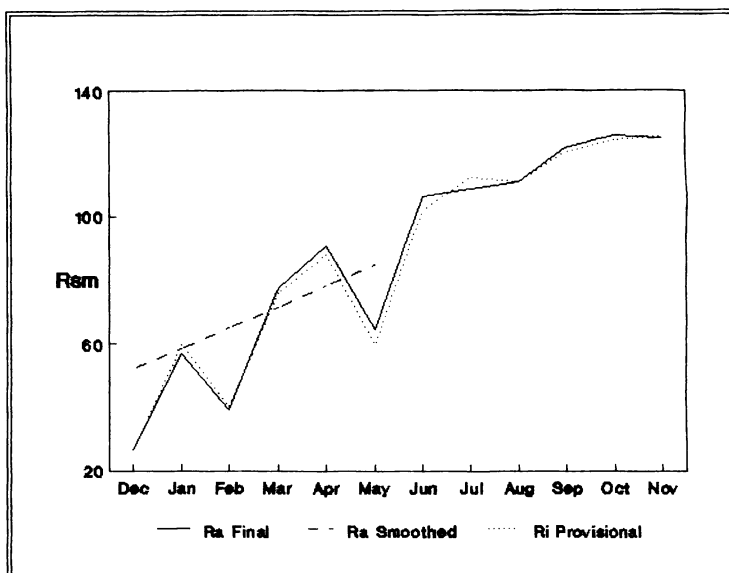
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## Relative Sunspot Numbers for November

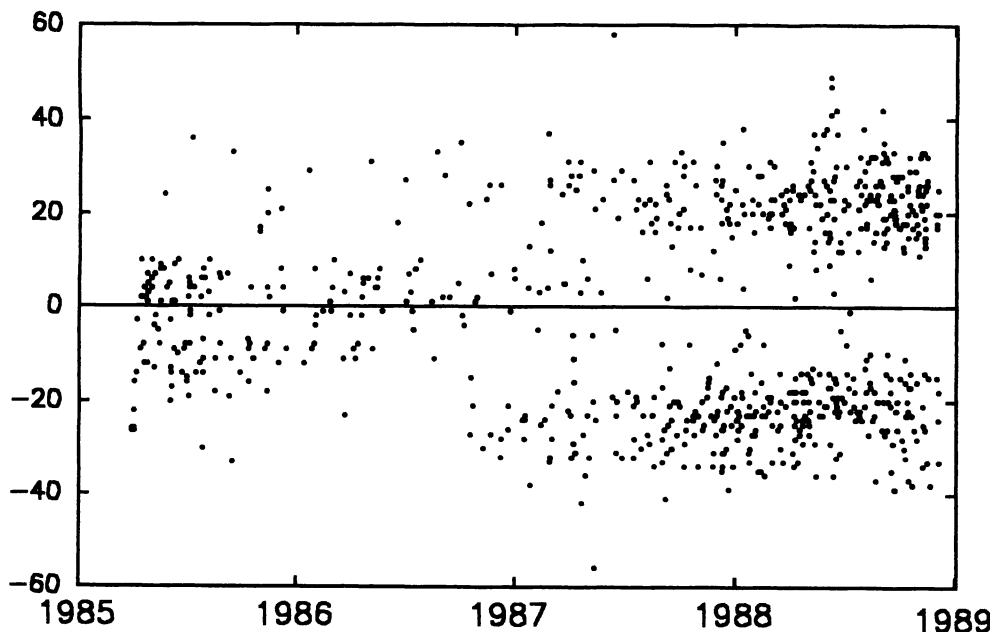
R <sub>a</sub> Final	
1) 127	11) 155
2) 103	12) 167
3) 122	13) 155
4) 113	14) 142
5) 128	15) 171
6) 132	16) 181
7) 113	17) 167
8) 98	18) 165
9) 118	19) 143
10) 137	20) 103
21) 139	22) 130
23) 120	24) 113
25) 84	26) 67
27) 73	28) 86
29) 99	30) 108

Mean = 125.3



=====  
 The smoothed mean American Relative Sunspot Number for May 1988 is 84.5. One hundred and four members of the international network of American Sunspot Program contributors submitted reports for November.

**Note:** The estimated mean American Sunspot Number for 1-19 December is 166. During this period, SESC Region 5278 (N27, L274) produced two X-level, x-ray flares on 15 and 16 December, and Region 5273 (S30, L324) contributed an additional X-level event on the 18th.



The diagram is a plot of the latitudes of all emerging sunspot groups compiled by National Oceanic and Atmospheric Administration from April 1985 through November 1988 (SESC PRF<sup>1</sup> and SGD<sup>2</sup>).

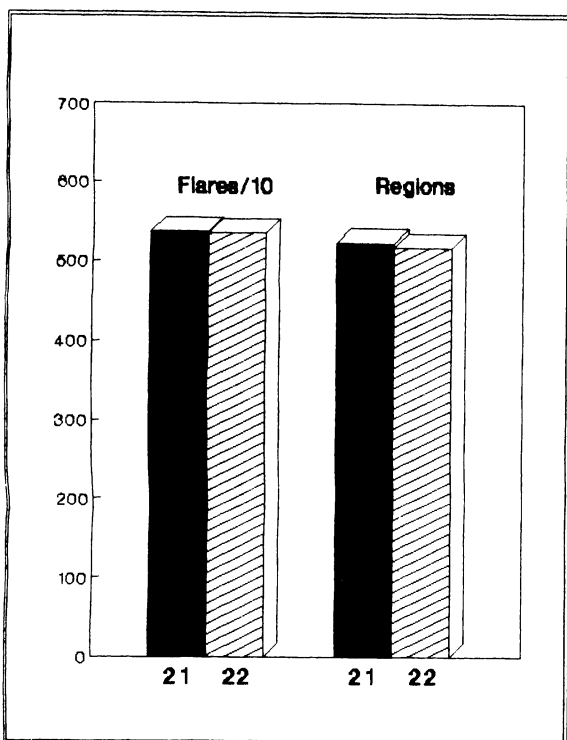
The early point shown at southern latitude -26° (open circle) represents SESC 4640, possibly the first group of cycle 22<sup>3</sup>. The sudden change in latitude of emerging sunspot groups between the old cycle (low latitude) and the new cycle (higher latitudes) can clearly be seen around cycle 21 minimum (September 1986). Note the two very high latitude groups that occurred during 1987 near North 58° and South 56°.

<sup>1</sup>Provisional Report & Forecast of Solar Geophysical Data, Nos. 679-692.

<sup>2</sup>Solar Geophysical Data, I, Nos. 490-530.

<sup>3</sup>Wilson, R. M. 1987, Solar Physics, Volume 111, 255.

### Comparison of Sunspot Cycles 21 and 22



Although the rate of rise continues to be quite rapid, and the cycle still has all the qualities for a very strong sunspot cycle, cycle 22 now appears to be falling behind the most intense cycle on record, cycle number 19.

The figure to the left compares the performance of cycles 21 and 22 during similar phases in their growth processes, according to two parameters: grouped flares and number of active regions. (When flares are grouped, a single event that is recorded by more than one station, is counted as one.) Flare totals are shown after division by ten.

The figure has been adapted from similar diagrams provided in SESC PRF<sup>4</sup>.

<sup>4</sup>Provisional Report & Forecast of Solar Geophysical Data, No. 693, 17.

#### R<sub>i</sub> Provisional

- |         |         |         |
|---------|---------|---------|
| 1) 126  | 11) 155 | 21) 145 |
| 2) 114  | 12) 159 | 22) 124 |
| 3) 121  | 13) 147 | 23) 117 |
| 4) 104  | 14) 139 | 24) 116 |
| 5) 129  | 15) 156 | 25) 96  |
| 6) 124  | 16) 181 | 26) 80  |
| 7) 114  | 17) 196 | 27) 69  |
| 8) 95   | 18) 175 | 28) 86  |
| 9) 110  | 19) 147 | 29) 92  |
| 10) 131 | 20) 112 | 30) 107 |

Mean = 125.6

Sunspot Bulletin, 1988, 11.

#### Predicted Smoothed American Sunspot Numbers

McNish - Lincoln Method<sup>5</sup>:

June 92; July 100; August 109;  
September 116; October 123; November 128.

According to Taylor<sup>6</sup>:

June 88 (9); July 95 (9); August 102 (10);  
September 108 (11); October 112 (11); November 116 (12).

<sup>5</sup>Solar Geophysical Data, 530, I, 14.

<sup>6</sup>J.A.A.V.S.O., in press.

#### Sudden Ionospheric Disturbances Recorded During October

Records were received from: A1,3,9,19,26,46,49,50,59.

Day	Max (UT)	Imp	Def	Day	Max (UT)	Imp	Def	Day	Max (UT)	Imp	Def
1	19:37	1-	5	7	18:20	2	5	19	19:10	2	5
2	15:18	1	5	8	22:01	2	5	20	15:28	1+	5
2	17:35	2	5	9	18:15	2+	4	22	18:28	1+	5
2	19:37	1	5	9	20:14	1	5	22	20:25	1	5
3	13:24	1+	5	9	23:50	2	5	23	15:04	1-	5
3	15:11	2	5	10	16:17	1+	5	23	15:26	1-	5
3	19:17	2	5	10	18:25	3	5	23	16:01	1-	5
3	21:00	1+	5	11	20:36	1-	5	23	16:33	1	5
3	22:40	2	5	13	20:34	2	5	24	16:02	1+	5
4	12:40	2	5	16	13:15	2	5	24	20:07	1+	5
4	13:56	2	5	16	15:25	2	5	24	21:19	2	5
4	17:03	1-	5	16	20:46	2	5	27	18:30	2+	5
5	14:22	1-	5	17	14:28	1+	5	29	13:03	1-	5
6	15:28	1	5	17	15:53	2	5	29	14:38	1+	5
6	16:42	2	5	17	20:15	1	5	29	15:32	1-	5
6	18:16	1-	5	18	15:55	2+	4	29	15:52	1-	5
7	14:10	2	5	19	16:41	1+	5	29	16:39	1	5

SID Analyst: Bruce Wingate

The American Sunspot Numbers and related information are available through the CompuServe Information Service, INFOPLEX, MCI mail, and through domestic and international Telex and Fax. Contact the Editor for details.