Solar Bulletin

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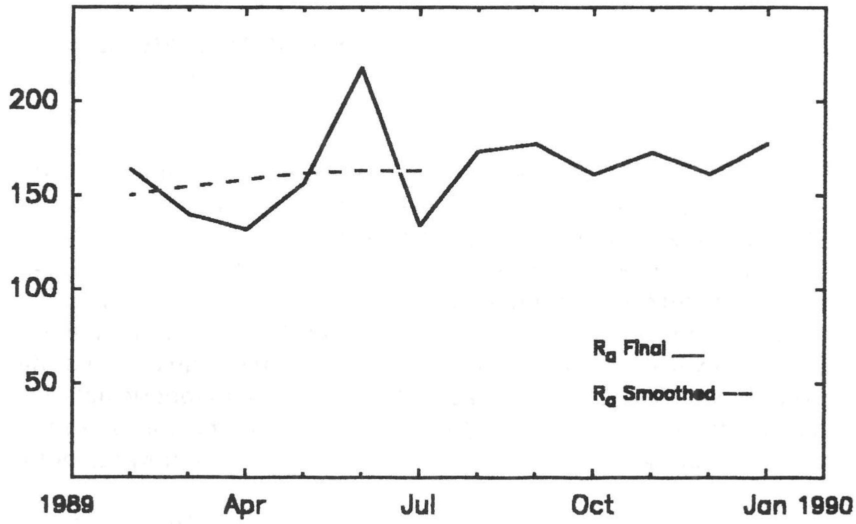
American Relative Sunspot Numbers for January

R_a Final

1) 174	11) 161	21) 222
2) 151	12) 169	22) 196
3) 160	13) 165	23) 218
4) 169	14) 133	24) 235
5) 140	15) 159	25) 225
6) 133	16) 147	26) 220
7) 131	17) 183	27) 203
8) 135	18) 179	28) 209
9) 117	19) 201	29) 213
10) 134	20) 233	30) 192
		31) 198

Mean = 177.6



The smoothed-mean American Relative Sunspot Number for July 1989 is 163.2. One-hundred two members of the international network of American sunspot program collaborators submitted reports for January. Solar activity began the year in the low to moderate range with just two flares of M-level or greater intensity recorded between 1 and 4 January, both from SESC Region 5854 (N23, L009, DKI on 1 January). Activity remained in the low and moderate range from the 5th through the 18th; eleven M-level solar flares were observed. Region 5871 (S23, L232, DAO on 10 January) produced four of these events. Region 5852, which yielded an X-level flare last rotation, returned to the visible disk on 16/17 January and was renumbered 5892 (S29, L026, EAO on 18 January). However, this spot group was less active this passage than it was during its previous appearance.

Solar activity increased to the moderate and high range during the following week. Ten solar flares of M-level intensity were recorded. Eight of these were spawned by Region 5890 (S11, L042, EAO on 22 January) and Region 5892. However, the largest region on the visible disk during the period was Region 5900 (S10, L339, FKI on 25 January), which grew to encompass an area of 1180 millionths solar hemisphere on the 25th. The principal preceding spot of Region 5900 was visible by naked-eye on some days. Between thirteen and eighteen separate sunspot groups could be seen on the Sun during this period. Most were simple magnetically, although Regions 5892 and 5900 both attained a beta-gamma structure.

Solar activity again fell to a low level during the remainder of January. Only two solar flares of M-level intensity were recorded, bringing the total for January to twenty-five. The strong surge in the numbers of spots which took place during the latter half of the month allowed the smoothed-mean sunspot number for July 1989 to slightly exceed the June level of 163.1. The solar 10.7 centimeter radio flux and background x-radiation levels were 213 and C1.0 on 31 January.

The estimated mean American sunspot number for 1-17 February is 110. Solar flare activity has been very low thus far during February; just two events of M-level or greater intensity have been recorded. The strongest of these was an M6.9/2F from Region 5900 early on 3 February. The solar 10.7 radio flux fell to its lowest point (138) since December 1988 on the 11th, and the background x-radiation level dropped to B4.0 on the 13th.

Reference: SESC PRF, Numbers 749-54.

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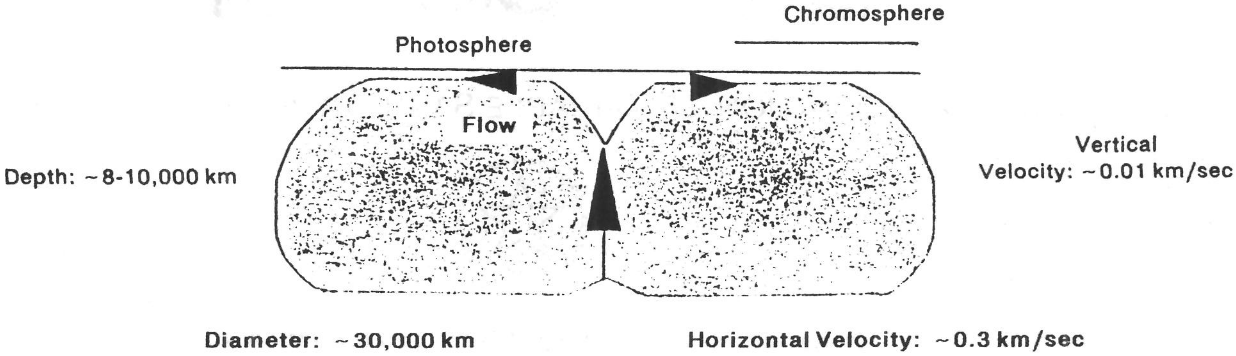
(**Note:** Network collaborators should utilize these reporting facilities whenever possible.)



SUPER-GRANULAR CELL GEOMETRY

Thomas G. Compton

In 1962 Leighton, Noyes and Simon suggested that the chromospheric magnetic network might result from a pattern of material flow in the supergranulation. Each of these phenomena has a similar scale, although their lifetimes differ: the network typically has a lifetime measured in days, while the supergranulation changes over a shorter time frame. Even though it has long been thought that super-granular cells are the driving force behind the enhanced network, it remains to be actually proven that this is the case (Zirin, 1988).

According to the Leighton et al. scenario, the supergranulation is a large-scale convective pattern. Material flows outward from the center of each granule, carrying magnetic concentrations along with it, to the cell boundaries. Almost all of the aspects of the chromospheric network coincide with the supergranulation, and Zirin has shown that the magnetic fields should indeed be carried to the cell's edges. However, since both polarities would be carried to the boundaries, it is still not clear how the network is actually generated.

References

Leighton, R.B., R.W. Noyes and G.W. Simon 1962, Astrophysical Journal, **13**, 471.
Zirin, H. 1988, *Astrophysics of the Sun*, Cambridge University Press, Cambridge, England.

Sudden Ionospheric Disturbances Recorded During December

Records were received from A1,19,46,50,52,59,61,62,63,64,65.

Day	Max	I/D	Day	Max	I/D	Day	Max	I/D	Day	Max	I/D	Day	Max	I/D
1	03:15	1/1	7	16:00	2/5	17	18:17	1/5	24	08:45	2/1	28	07:01	1+/3
1	09:37	1-/1	7	21:03	2+/5	18	08:45	2+/5	25	04:35	1+/3	28	07:25	1+/3
1	18:05	1+/5	8	07:46	1/1	18	17:26	1+/5	25	05:18	2/2	28	07:57	2/3
1	18:57	1/5	8	15:50	2/5	19	05:40	2+/4	25	07:30	2/2	28	09:05	1/2
1	19:33	2+/5	8	19:00	2/5	19	18:48	1+/5	25	08:05	1/2	28	10:04	1+/2
2	03:50	1-/1	8	20:28	2/5	19	19:45	1-/5	25	08:45	1/1	28	15:15	1/5
2	05:10	1/1	9	05:17	1+/1	20	19:05	2/5	25	10:50	2/2	28	17:37	1-/5
2	06:30	2+/3	9	08:40	2+/5	22	03:10	2+/3	25	16:43	2+/5	28	21:16	2/5
2	07:13	1/4	10	06:32	1+/1	22	08:26	2/2	25	18:28	2/5	29	06:42	1/1
2	09:00	1/2	11	18:15U	3/5	22	18:05	1+/5	25	20:23	2+/5	29	08:00	2+/2
2	15:52	1-/5	12	03:25	1/1	23	08:18	1+/3	26	05:21	2+/2	29	15:50	2+/5
2	16:40	1+/5	12	19:08	2/5	23	08:56	2/3	26	06:35	3/5	29	18:25	2+/5
3	04:35	2+/2	14	02:13	2/1	23	09:38	2+/3	26	07:49	2+/5	29	20:17	2/5
4	14:55	2/5	16	05:04	2/2	23	10:48	1/1	26	09:50	2/1	30	02:35	2+/3
4	19:38	2+/5	16	06:40	2+/1	23	13:22	1+/5	26	15:33	2/5	30	04:23	2+/5
5	02:44	1+/1	16	07:00	1/1	23	19:02	1+/5	26	18:14	2+/5	30	07:30	2+/4
5	15:38	2+/5	16	17:48	1+/5	23	20:55	2/5	26	20:12	2/5	31	06:42	2+/2
6	08:20	1-/1	16	18:20	1/5	24	03:29	2+/1	28	03:20	2/5	31	09:38	2+/3
6	18:02	2/5	17	17:45	1+/5	24	07:23	2+/2	28	05:15	2/4	31	19:50	1+/5
7	08:40	2+/5												

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Note: Observer A59 was inadvertently omitted from the October and November station listings.