Solar Bulletin

THE AMERICAN ASSOCIATION OF VARIABLE STAR OBSERVERS - SOLAR DIVISION

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American Relative Sunspot Numbers, R_a, for June 1998

Date	R_a Final		Date	R_a Final		Date	R_a Final
1	51		11	72		21	58
2	54		12	88		22	57
3	59		13	84		23	51
4	75		14	63		24	50
5	83		15	57		25	71
6	73		16	54		26	91
7	68		17	68		27	113
8	75		18	56		28	114
9	86		19	60		29	117
10	85		20	65		30	120

Monthly Mean = 73.9
(Based on 900 observations contributed by 55 observers)

THE AMERICAN RELATIVE SUNSPOT NUMBERS

Before refining our way of counting groups it would be wise to review our existing rules for counting spots and groups.

Like Rudolph Wolf we count the number of spots and add that number to 10 times the number of groups. The spots that we count are really there. They are definitely visible. We do not count pores nor do we count the "elusives," those spots that seem to come and go during an observing session. A lone spot counts as a group. One working definition of a spot group used by the AAVSO in the past has been that a spot or cluster of spots within three solar degrees of one another constitutes a group. And two or more clusters within three solar degrees of one another constitute one group. However, this three degree definition is sometimes certainly too small. (We do NOT count very faint spots or pores nor do we factor in a quantity to reflect the size and/or intensity of a penumbra as Wolf's followers did.)

Whenever there is a question you should trust your own judgment. And above all, always count just what you see – never what you think you should see. Do not be intimidated by "observer constants," if you know what yours is; actually we no longer use them. If you have been computing your own "observer constant," don't.

Betty Stephenson, Chair
AAVSO Solar Division

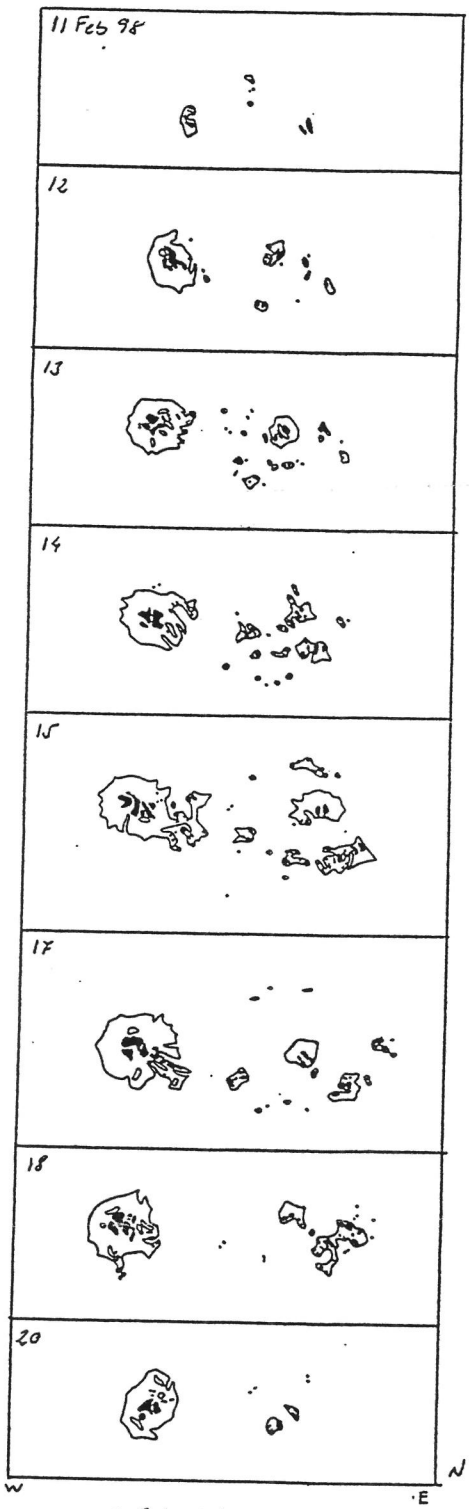
HELIOGRAPHIC COORDINATES

While reporting spot and group numbers by hemisphere is optional, the data below are provided for the convenience of those observers who choose to do so. (From *The Astronomical Almanac for 1998.*)

Date		Position Angle of Axis P	Heliographic Latitude B_0	Heliographic Longitude L_0
		°	°	°
July	1	− 2.79	+ 2.86	54.41
	2	2.34	2.97	41.17
	3	1.89	3.07	27.93
	4	1.43	3.18	14.70
	5	0.98	3.29	1.46
	6	− 0.53	+ 3.40	348.23
	7	− 0.07	3.50	334.99
	8	+ 0.38	3.61	321.76
	9	0.83	3.71	308.52
	10	1.28	3.82	295.29
	11	+ 1.73	+ 3.92	282.05
	12	2.18	4.02	268.82
	13	2.63	4.12	255.58
	14	3.08	4.22	242.35
	15	3.52	4.31	229.12
	16	+ 3.96	+ 4.41	215.88
	17	4.40	4.51	202.65
	18	4.84	4.60	189.42
	19	5.28	4.69	176.19
	20	5.72	4.78	162.96
	21	+ 6.15	+ 4.87	149.73
	22	6.58	4.96	136.50
	23	7.01	5.05	123.27
	24	7.43	5.14	110.04
	25	7.86	5.22	96.81
	26	+ 8.28	+ 5.30	83.58
	27	8.69	5.39	70.35
	28	9.11	5.47	57.12
	29	9.52	5.55	43.90
	30	9.92	5.62	30.67
	31	+ 10.33	+ 5.70	17.44
Aug.	1	10.73	5.77	4.22
	2	11.12	5.84	350.99
	3	11.52	5.92	337.77
	4	11.91	5.98	324.54
	5	+ 12.29	+ 6.05	311.32
	6	12.67	6.12	298.09
	7	13.05	6.18	284.87
	8	13.43	6.25	271.65
	9	13.80	6.31	258.42
	10	+ 14.16	+ 6.37	245.20
	11	14.52	6.42	231.98
	12	14.88	6.48	218.76
	13	15.23	6.53	205.54
	14	15.58	6.58	192.32
	15	+ 15.92	+ 6.63	179.10
Aug.	16	+ 16.26	+ 6.68	165.88
	17	16.60	6.73	152.67
	18	16.93	6.77	139.45
	19	17.25	6.82	126.23
	20	17.57	6.86	113.02
	21	+ 17.89	+ 6.90	99.80
	22	18.20	6.93	86.59
	23	18.50	6.97	73.37
	24	18.80	7.00	60.16
	25	19.10	7.03	46.95

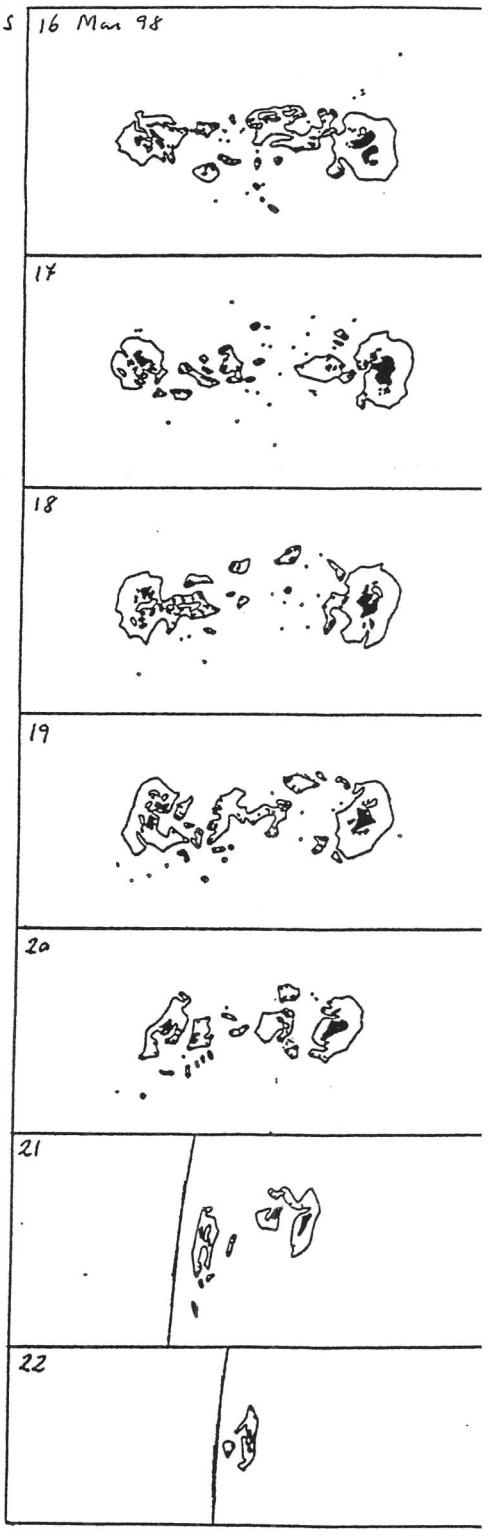
DRAWINGS

The drawings below were sent in by Javier Ruiz Fernandes of Santander, Spain.



MC = 15 Feb 98

P { $\bar{L}$ = 37°69 ; $\bar{B}$ = −24°74



MC: 15 Marzo 98

P { $\bar{L}$ = 38°62 ; $\bar{B}$ = −21°31

{ $\bar{L}$ = 27°15 ; $\bar{B}$ = −23°76

Sudden Ionospheric Disturbance Report

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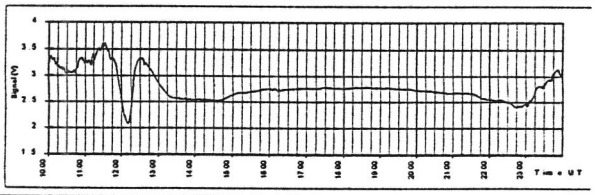

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Sudden Ionospheric Disturbances Recorded During June 1998

Date	Start	Importance	Date	Start	Importance	Date	Start	Importance
980607	1449	2	980620	2058	1+	980625	1835	1-
980608	1555	1	980620	2210	1+	980625	2045	1-
980611	0958	2	980621	0956	2+	980625	2058	1+
980612	2110	2	980621	1803	1-	980627	0845	1-
980612	2314	2	980621	2107	1	980627	1815	1+
980613	0909	2	980623	1922	1	980627	1900	1-
980613	1502	2+	980624	1130	1+	980628	1835	2+
980613	1725	1+	980624	1800	1-	980628	1950	2
980616	1810	3	980624	1909	2+			
980620	1418	2	980625	0810	1			

The following observers submitted reports and/or charts for June:
A-05 Hossfield, New York * A-09 Scharlach, Arizona * A-50 Winkler, Texas
A-52 Overbeek & Toldo, Republic of South Africa * A-62 Stokes, Ohio * A-63 Ellerbe, Spain
A-72 Witkowski, Florida * A-81 Landry, New Hampshire * A-82 Lawrence, Indiana
A-84 Moos, Switzerland.

The events listed above meet at least one of the following criteria:

1) reported in at least two observers' reports.
2) visually analyzed with definiteness rating = 5 on submitted charts
3) reported by overseas observers with high definiteness rating

New Book About VLF SID Detection

As anyone who has built a SID monitoring station knows, articles and books describing VLF receivers and SID event logging equipment are very scarce. A new book, *RadioScience Observing, Vol. 1* by Joseph Carr, has just been released by the Howard Sams Publishing Company. This book contains VLF propagation theory, schematics for useful SID detection systems, and detailed antenna theory. It gathers many of the practical VLF monitoring fundamentals in one book and would be invaluable to all SID observers. Modifications to the Stokes gyrator receiver circuit are included. The softbound book is registered by ISBN 0-7906-1127-9.

VERY LOW FREQUENCY RADIO STATIONS

Station Site	Station ID	Frequency (kHz)	Radiated Power (kW)
U.S. Navy			
Cutler, MA	NAA	24.0	1,000
Jim Creek, WA	NLK	24.8	250
Lualualei, HI	NPM	21.4	566
LaMoure, ND*	TBD	25.4	TBD
Aquada, Puerto Rico	NAU	40.75	100
Keflavik, Iceland	NRK	37.5	100
Niscemi, Italy	?	39.9	25
Harold E. Holt, Australia	NSW	19.8	1,000
Federal Republic of Germany			
Rhauderfehn	?	18.5	500
France			
Rosnay	HWU	15.1	400
St. Assie	FTA	16.8	23
India			
Bombay	?	15.1	---
Italy			
Tavolara	ICV	20.27	43
Japan			
Ebino Huyshu	?	23.4	---
Norway			
Noviken	JXN	16.4	45
Russia			
Arkhanghelsk	UGE	19.7	150 input
Batumi	UVA	14.6	100 input
Kaliningrad	UGKZ	30.3	100 input
Matotchkinchar	UFQE	18.1	100 input
Vladivostok	UIK	15.0	100 input
United Kingdom			
Anthorn	GQD	19.0	42
Criggons	GBZ	19.6	44
Rugby	GBR	16.0	45

* Expected operational mid 1999. All information courtesy of Bill Hopkins, Technical Representative for Pacific-Sierra Research Corp.

The list of suitable VLF stations for SID monitoring changes continually. Several lists have been published in amateur radio magazines and books in the last couple of years. None seem to be accurate in that they contradict one another and continue to list stations which haven't been transmitting for years. In an attempt to find an accurate list, the company which services and maintains many of the US Navy and NATO stations (Pacific-Sierra Research) was contacted. Mr. Bill Hopkins, a Technical Representative at PSR Corp. graciously volunteered to provide the list above. Information is current as of 06/01/98.