

Solar Bulletin

THE AMERICAN ASSOCIATION OF VARIABLE STAR OBSERVERS - SOLAR DIVISION

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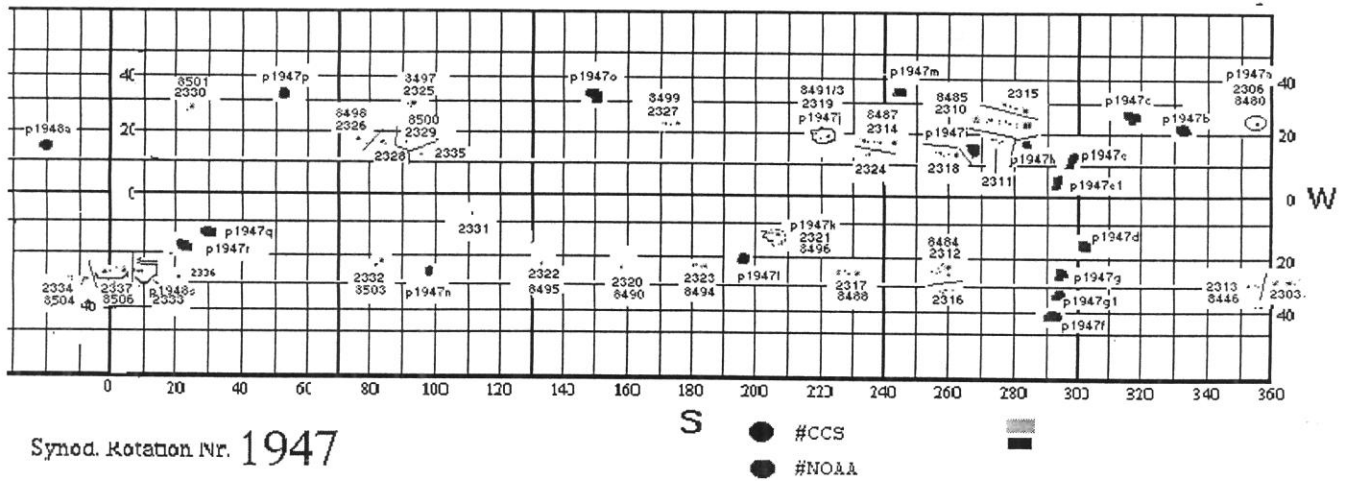
April 1999

Daily Mean Sunspot Numbers, R_a for April 1999
(computational analysis performed by Grant Foster, AAVSO Headquarters)

Day	simple average		k-corrected	
	R_a avg	Std. Dev.	R_a k	Std. Dev.
1	51	2.8	43	1.6
2	52	2.5	42	1.4
3	70	4.2	59	3.5
4	81	4.4	71	2.9
5	99	5.8	84	3.5
6	107	5.2	88	3.0
7	102	4.1	84	2.5
8	109	6.0	86	3.9
9	127	7.1	106	4.3
10	109	4.4	89	2.6
11	100	4.9	85	2.5
12	101	5.2	83	3.6
13	92	4.5	74	2.5
14	87	3.9	74	2.2
15	84	4.0	70	1.5
16	82	5.9	69	3.7
17	91	4.0	72	2.3
18	60	2.8	50	2.0
19	66	2.4	55	1.6
20	66	3.3	53	2.0
21	54	2.6	47	1.5
22	56	3.1	47	1.8
23	52	3.3	45	2.0
24	42	3.0	37	2.1
25	51	2.5	42	1.7
26	61	2.2	51	1.2
27	72	3.5	60	2.0
28	73	3.8	61	2.2
29	77	3.4	63	2.3
30	84	4.4	68	2.7
31	-	-	-	-

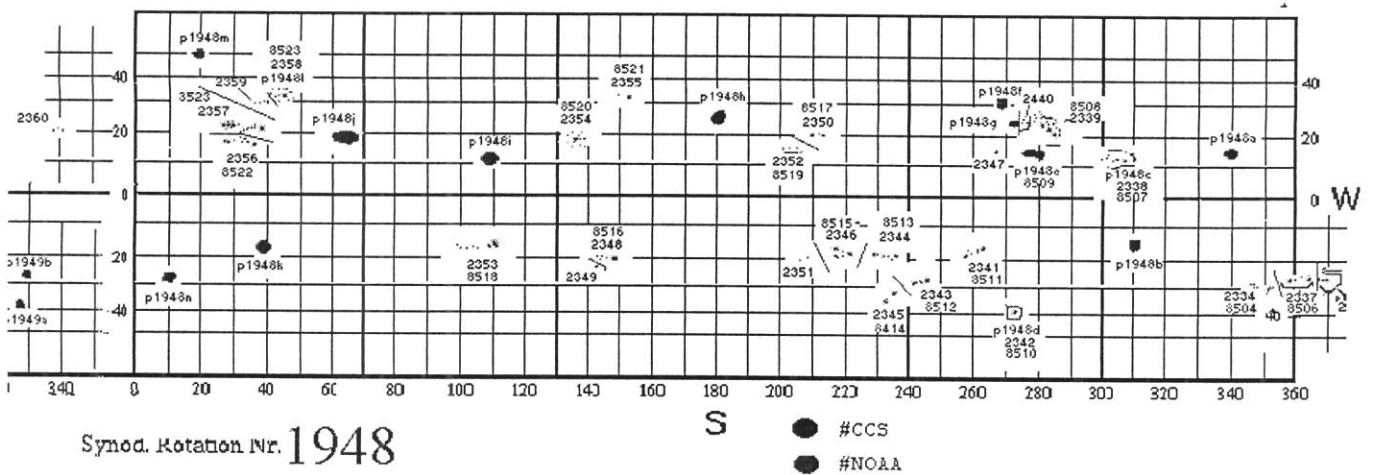
Monthly Mean R_a avg = 78.6
Monthly Mean R_a k = 65.2

Observer	Code	Country	Days Obs.
Abbott, P	AAP	Canada	15
Anderson, E	ANDE	USA, NY	7
Atac, T	ATAT	Turkey	27
Atkinson, G	ATKG	USA, MA	13
Barnes, H	BARH	New Zealand	12
Barton, W	BARW	England	2
Battaola, R	BATR	Italy	16
Berdett, J	BERJ	Spain	16
Blackwell, J	BLAJ	USA, NH	16
Boschat, M	BMF	Canada	14
Bose, B	BOSB	India	30
Branchett, B	BRAB	USA, FL	25
Branch, R	BRAR	USA, CA	20
Carlson, J	CARJ	USA, MA	25
Morales, G	CHAG	Bolivia	20
Cudnik, B	CKB	USA, TX	16
Clemens, C	CLEC	USA, PA	12
Compton, T	COMT	USA, MI	16
Conlin, G	CONG	USA, WA	17
Cragg, T	CR	Australia	27
Dempsey, F	DEMF	Canada	14
Dyck, G	DYCG	USA, MA	21
Dragesco, J	DRAJ	France	20
Dubois, F	DUBF	Belgium	23
Eleizalde, G	ELEG	Venezuela	26
Reed, E	ELR	USA, TX	25
Feehrer, C	FEEC	USA, MA	25
Ruiz, J	FERJ	Spain	21
Fleming, T	FLET	USA, TX	22
Giovanoni, R	GIOR	USA, MD	24
Gottschalk, S	GOTS	USA, IA	15
Halls, B	HALB	England	3
Hay, K	HAYK	Canada	17
Hrutkay, T	HRUT	USA, PA	15
Imperi, R	IMPR	USA, OH	16
Iskum, J	ISKJ	Hungary	9
Janssens, J	JANJ	USA, TX	2
Jeffrey, T	JEFT	USA, CA	19
Jenkins, J	JENJ	USA, IL	12
Kaplan, J	KAPJ	USA, MN	17
Knight, J	KNJS	South Africa	18
Lawrence, J	LAWJ	USA, IN	11
Lerman, M	LERM	Canada	12
Leventhal, M	LEV M	Australia	17
Lizak, T	LIZT	USA, RI	22
Lubbers, T	LUBT	USA, MN	7
Lohvinenko, T	LWT	Canada	8
Malde, K	MALK	Norway	22
Mariani, E	MARE	Italy	9
Jarboles, J	MARJ	Spain	29
Mochizuki, E	MCE	Japan	16
McHenry, L	MCHL	USA, PA	4
Miller, J	MILJ	USA	14
Moeller, M	MMI	Germany	18
Mudry, G	MUDG	Canada	6
Prestage, N	OB SO	Australia	14
Randall, T	RANT	USA, NY	11
Richardson, E	RICE	England	17
Schott, G	SCGL	Germany	23
Scholl, G	SCHG	USA, NY	8
Stefanopoulos, G	STEF	Greece	10
Stoikidis, N	STQ	Greece	25
Suzuki, M	SUZM	Japan	21
Teske, D	TESD	USA, MS	25
Thompson, R	THR	Canada	14
Vargas, G	VARG	Bolivia	16
Vardaxoglou, P	VARP	Greece	17
Vazquez, C	VAZC	Argentina	14
Wilson, W	WILW	USA, TN	15
Witkowski, L	WITL	USA, FL	21



Synod. Rotation Nr. 1947

S ● #CCS
○ #NOAA



Synod. Rotation Nr. 1948

S ● #CCS
○ #NOAA

Synoptic Chart for Carrington Rotations 1947 - 1948 provided by Gontran Eleizalde, Venezuela

SUNKEY.EXE Sunspot Data Entry Program Available

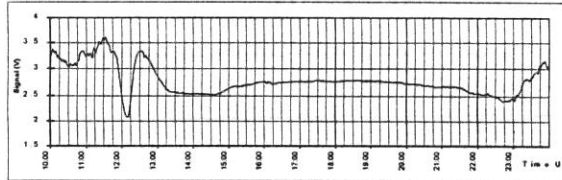
Sunspot observers who submit their monthly reports by e-mail are encouraged to use the new data entry software which uses the format required by the AAVSO Sunspot Database. SUNKEY.EXE is a QuickBASIC program written by AAVSO staff member Grant Foster to key enter all sunspot reports and prepare them for processing the daily mean sunspot numbers. The program prompts the user for his name, observer code, and daily sunspot results. An output file is saved in formatted text which can be e-mailed as an attached file to the solar division chairman each month. The software may be downloaded from the AAVSO software webpage <http://www.aavso.org/software.stm> along with a readme.txt documentation file. With the recent resignation of Grant Foster from his position at AAVSO headquarters, the burden of sunspot data entry has fallen entirely upon the solar division chairman. Please remember the chairman is an unpaid volunteer observer appointed by the AAVSO Director. Approximately 70 observers report close to 800 observations each month. Nearly half of these sunspot observers submit e-mail reports. If these e-mail reports were sent in the format provided by SUNKEY, the chairman's data entry burden would be minimized. Hardcopy reports from observers who don't have e-mail access are welcome, but still require manual data entry by the chairman. Please write legibly and include UT time of observation and observer code identifiers on all hardcopy submissions.

Editor's Note: The March 1999 Solar Bulletin described the SPOTPLOT program developed by Joseph Lawrence. Unfortunately, the URL address to download the program was accidentally dropped from the article. The overwhelming interest in the utility to display and print Stonyhurst disk patterns prompted many suggested improvements in the software. The latest version is available at <http://www.aavso.org/software.stm>. The program now accommodates resizing the solar disk pattern and provides a help screen to explain printing steps.

JDL

Sudden Ionospheric Disturbance Report

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Sudden Ionospheric Disturbances (SID) Recorded During April 1999 (correlation analysis performed by Joseph Lawrence, SID Analyst)

Date	Max	Imp	Date	Max	Imp	Date	Max	Imp	Date	Max	Imp
990402	0815	2+	990404	2152	1	990425	1228	1-	990429	1715	1
990402	1621	1-	990405	1913	1+	990427	2025	2	990429	1742	2+
990403	1345	1	990405	2311	1+	990428	1507	1-	990429	1954	2+
990403	1501	1+	990407	1532	1+	990428	1905	1	990429	2054	1+
990403	2053	2+	990408	1315	2	990428	2033	2	990430	1217	2
990403	2215	1+	990408	1722	1+	990429	0830	1-	-	-	-
990403	2310	2+	990413	1753	2+	990429	1210	1	-	-	-
990404	0520	1	990424	1917	2+	990429	1545	2	-	-	-

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

Observer	Code	Station(s) Monitored
Winkler, J	A-50	NAA, NPM
Overbeek, D	A-52	NAA, NSW, NPM
Toldo, D	A-52	NAA, NSW, NPM
Stokes, A	A-62	NAA
Witkowski, L	A-72	NAA
King, P	A-80	FTA
Landry, A	A-81	NAA
Lawrence, J	A-82	NAA
Moos, W	A-84	FTA, GBZ, ICV
Dormann, M	A-89	NPM
Mandaville, J	A-90	NAA, NPM

Importance	Duration (min)
1-	< 19
1	19 - 25
1+	26 - 32
2	33 - 45
2+	46 - 85
3	86 - 125
3+	> 125

All SID observers are reminded to use the format established by the National Geophysical Data Center when reporting results. Several e-mail reports submitted for April observations required extensive 'massaging' to accomplish the correlation processing. A line from Art Stokes' (A62) report is offered as an example of the correct format:

40 990403 1453 1520 1459 1+ 5AA24 A62

↑ line left justified ↑ begin ↑ end ↑ peak time ↑ importance ↑ definition ↑ station ↑ freq. ↑ observer code

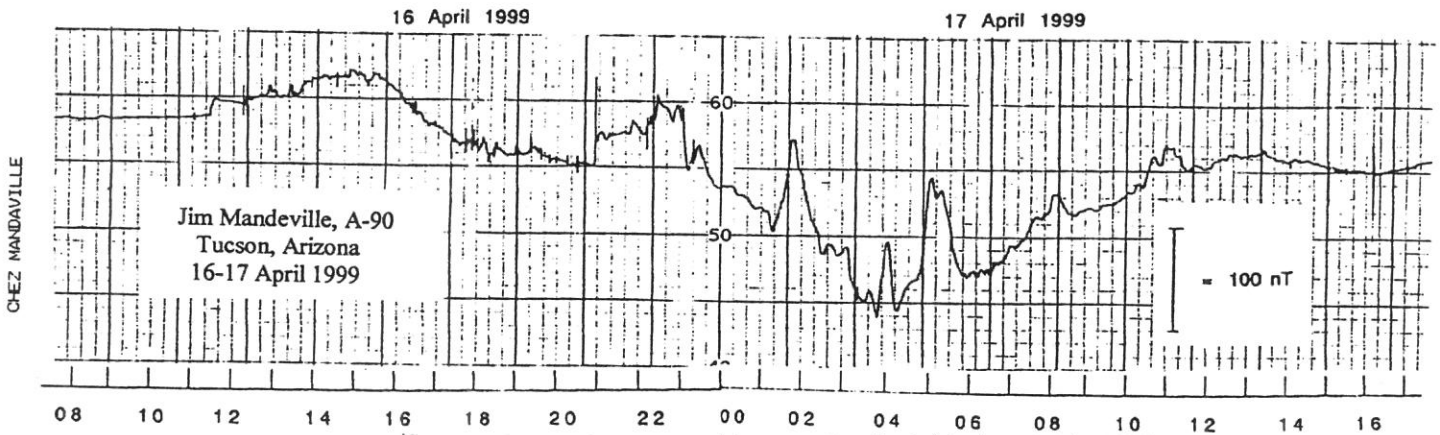
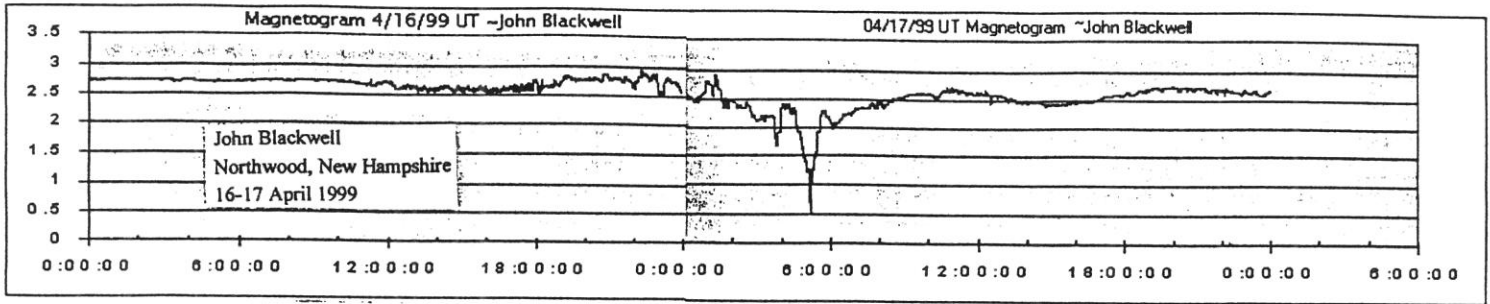
Specifically note the definition, station ID, and frequency are not separated. The importance rating covers only two character spaces and is separated from the definition value. Adhering to the established format will make the correlation analysis to generate the combined observer report easier to process.

Observer Notes: Jim Mandeville (A90) in Arizona noted an additional VLF source transmitting at 25.0 kHz during portions of April. It is suspected that the new transmitter is a VLF station located in LaMoure, North Dakota. Originally, the station was proposed to transmit at 25.4 kHz, but Mandeville's finely tuned receiver caught the signal at 25.0 kHz. The Technical Representative at Pacific-Sierra Research, the company which builds and maintains most NATO VLF stations, will be contacted for confirmation of the operational status and station identifier for the LaMoure site.

Peter King (A80) in England noted erratic transmissions from VLF station FTA (16.8 kHz) during the first half of April. By the month's end, FTA was operational again and A80 captured several of the SIDs on April 29. According to Jim Ellerbe (A63) in Spain, VLF station ICV (20.27 kHz) is operational again and perhaps transmitting at higher effective radiated power. This observation is consistent with information provided by the Technical Representative from Pacific-Sierra Research. Upgrades to ICV's transmitter were scheduled for early 1999.

Sudden Ionosphere Disturbances Recorded during April

Prepared by
Casper H. Hossfield



Horizontal component (H) at Oro Valley, Arizona (geographic 32° 23.4'N, 110° 56.8'W; magnetic latitude 40° N), 16-17 April 1999. Torsion variometer; observer J. Mandaville. Time scale in hours UTC.

The event begins at approx. 1125 UTC, 16 Apr 99, with a positive phase characterized by numerous small amplitude variations. A strong negative phase was entered at 2300 UTC, and H plunged 200 nT over the following five hours.

Original vertical scale: 1 mm = 5 nT. Calibration checked 17 April 99.

The positive offset at approx. 2055 hrs 16 April may be due to local parking vehicle disturbance; it was not graphically corrected because there was no obvious negative offset of the same magnitude.

April was a rather quiet month. It produced fewer sudden ionospheric disturbances than might be expected this far into cycle 23. A coronal mass ejection did produce a strong magnetic storm, however. Two excellent recordings of the storm are reproduced above. The top recording is by John Blackwell who only recently finished building his magnetometer. This was his first chance to record a magnetic storm. He built his magnetometer from plans in the September 1998 Solar Bulletin. This was an article written by Jim Mandaville, A-90, describing his magnetometer that made the second magnetogram above. Jim provided detailed drawings of his magnetometer and enough instructions so anyone interested could build one.

John made his instrument from a kit I have available for anyone interested. He also built an A/D converter from the kit that is available from Solar Division Chairman, Joseph Lawrence, A-84. Joseph provides free software John used to record his magnetogram on a computer. He plots the data in Excel and sends it to me by e-mail as a Word document I can print and is ready to go in the Solar Bulletin. John's web site is <<http://www.mv.com/ipusers/regulus/images/041699_magnetogram.gif>>. The chart above was downloaded from the web site

The basic design is the classic magnetometer designed by Al McWilliams, a physics professor at the University of Saint Cloud in Minnesota over 20 years ago. Its beauty is its simplicity, a torsion balanced magnet that moves a shadow vane above a pair of half-shaded Radio Shack photocells. The resistance of the Cadmium Sulfide photo cells varies with the amount of light they are exposed to. The cells make up half of a Wheatstone bridge that is unbalanced by movement of the shadow vane attached to the magnet that is suspended on a steel guitar string. The unbalanced bridge creates a voltage that is recorded on a strip chart recorder by A-90 and on a computer by Blackwell. The magnetic storm produced an aurora that John observed in New Hampshire.