Solar Bulletin

THE AMERICAN ASSOCIATION OF VARIABLE STAR OBSERVERS - SOLAR DIVISION

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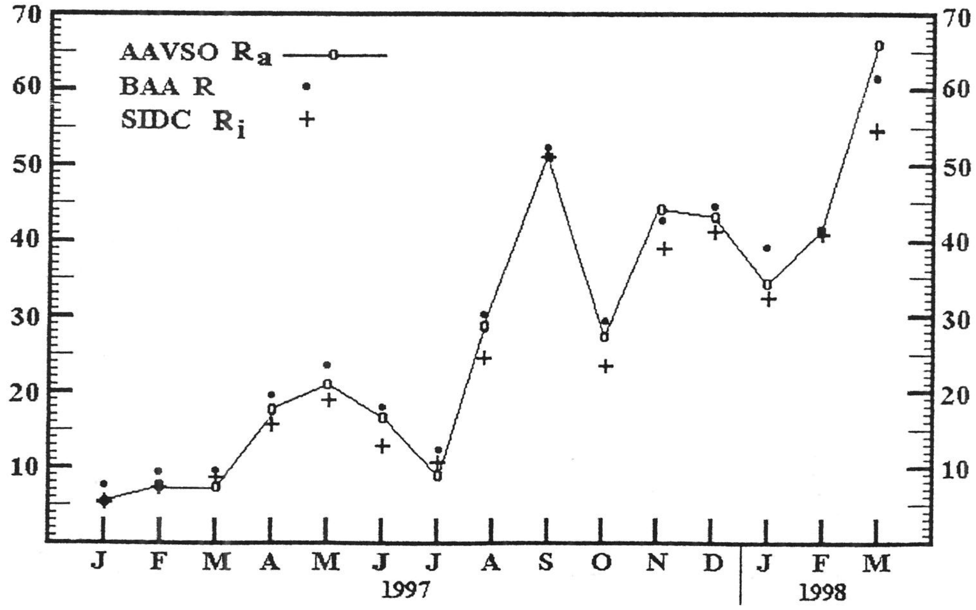
American Relative Sunspot Numbers, R_a, for April 1998

Date	R_a Final		Date	R_a Final		Date	R_a Final
1	62		11	106		21	35
2	64		12	81		22	27
3	57		13	72		23	20
4	54		14	70		24	14
5	66		15	72		25	16
6	69		16	60		26	15
7	106		17	40		27	15
8	111		18	28		28	31
9	116		19	35		29	34
10	109		20	32		30	50

Monthly Mean = 55.6

(Based on 1008 observations contributed by 62 observers.)

A Comparison of Published Monthly Sunspot Means From Three Sources



Although there is some overlap in the input, this diagram shows that there is no significant difference between the handling of the observations among these groups. (BAA = British Astronomical Association, SIDC = Sunspot Index Data Center. SIDC numbers from Oct. 1997 through the present are "provisional".)

Flares noted by sunspot observers during April 1998. (all times are UT)

Date	Beginning or "in progress"	Maximum	End	Intensity	Observer
4	0:24	0:27	0:40	1	Cragg
6	6:55	7:02	(lost)	1+	Cragg
8	1:55	2:07	2:18	1	Cragg
11	15:05	na	na	na	Teske
29	5:39	5:41	5:45	1	Cragg

ON COUNTING THE NUMBER OF SUNSPOT GROUPS

Is it possible to refine our rules for counting the number of groups? Our counts of spots are close to one another, given the same date and approximate time. But the counts of numbers of groups vary quite a bit, a variability that increases with the number of spots. If you have any good rules that you use or would like to recommend or suggest, please send them to Michel Lerman who has kindly volunteered to moderate this “forum”. A summary or commentary will appear in the next *Solar Bulletin.*

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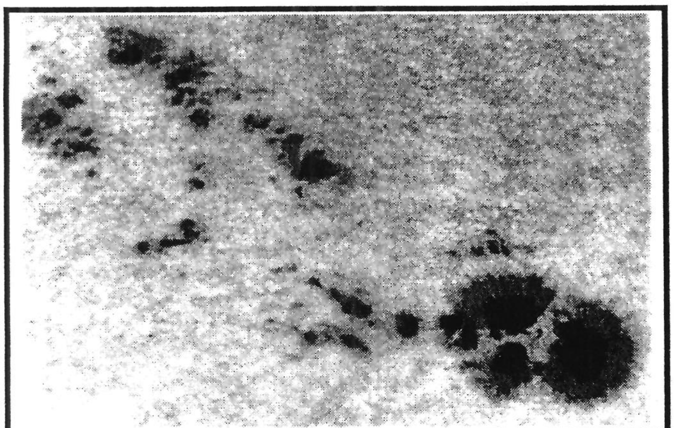
Penetanguishene, Ontario, CANADA L9M 1A
(or email: lermanma@csolve.net)

PHOTOGRAPHS

The photographs below were taken by Art Whipple using a 4.5-inch refractor through a narrow-bandpass continuum filter.

N

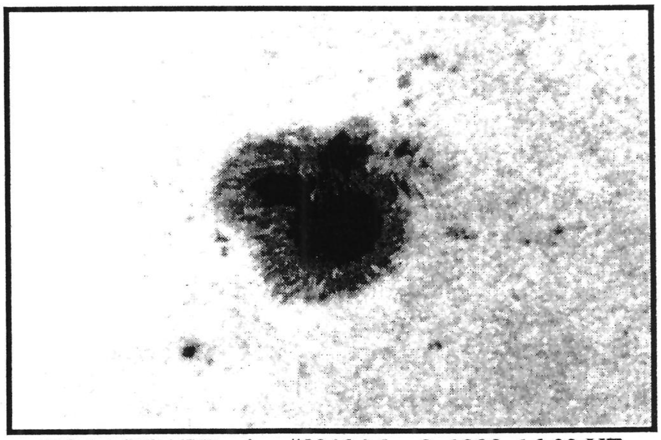
E



NOAA/USAF Region #8214 May 3, 1998, 16:13 UT

N

W



NOAA/USAF Region #8210 May 3, 1998, 16:03 UT

Betty Stephenson

Sudden Ionospheric Disturbance Report

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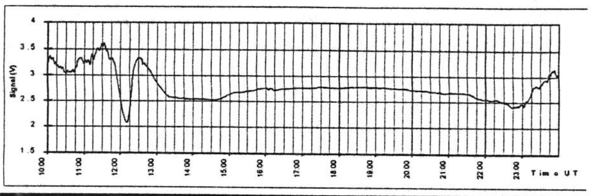

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Sudden Ionospheric Disturbances Recorded During April 1998

Date	Start	Importance	Date	Start	Importance	Date	Start	Importance
980401	1359	1	980405	2136	2	980415	1222	2+
980401	1528	2	980406	0700	2	980415	1501	2+
980402	1425	1	980406	1630	2	980423	0536	2
980404	0744	2+	980408	2135	1+	980424	0840	2+
980404	1820	1+	980409	1813	2	980425	1417	3
980404	2048	2	980409	1937	1	980425	1803	1+
980405	1308	2	980410	1748	1	980427	0846	3
980405	1616	2+	980414	1905	2	980429	1618	2
980405	1811	1+	980415	0743	2	980430	2120	2+

The following observers submitted reports and/or charts for April:
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-78 Van Allen, Idaho * A-81 Landry, New Hampshire
A-82 Lawrence, Indiana * A-84 Moos, Switzerland * A-87 Hill, Massachusetts
A-89 Dormann, Washington.

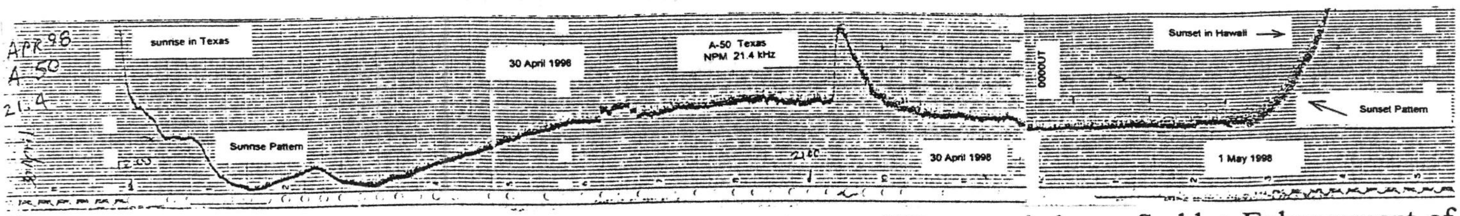
The events listed above meet at least one of the following criteria:

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

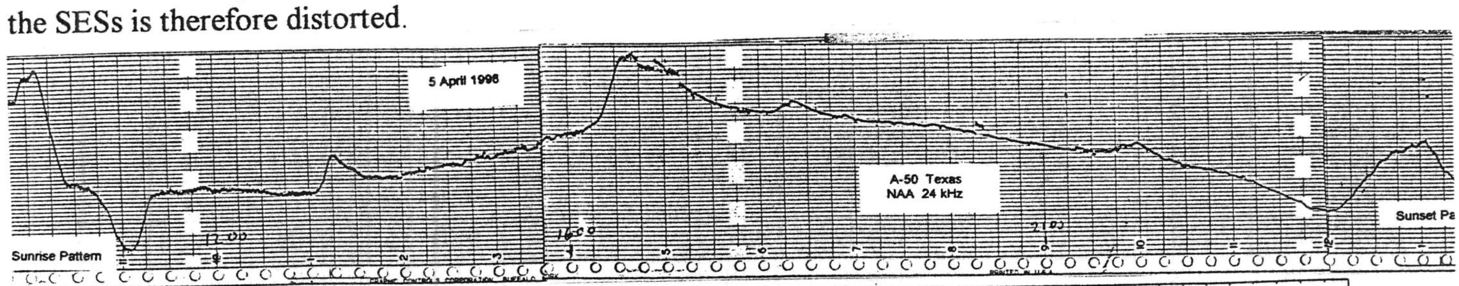
Solar Division Webpage

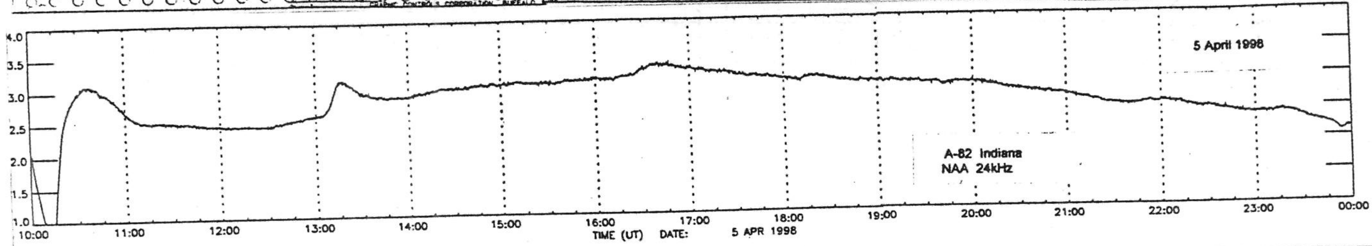
New pages, specific to the Solar Division and the SID observing program, have recently been added to the AAVSO home page. Observers interested in general information about the Solar Division and more specific details about the SID observing program should consult the following URL:

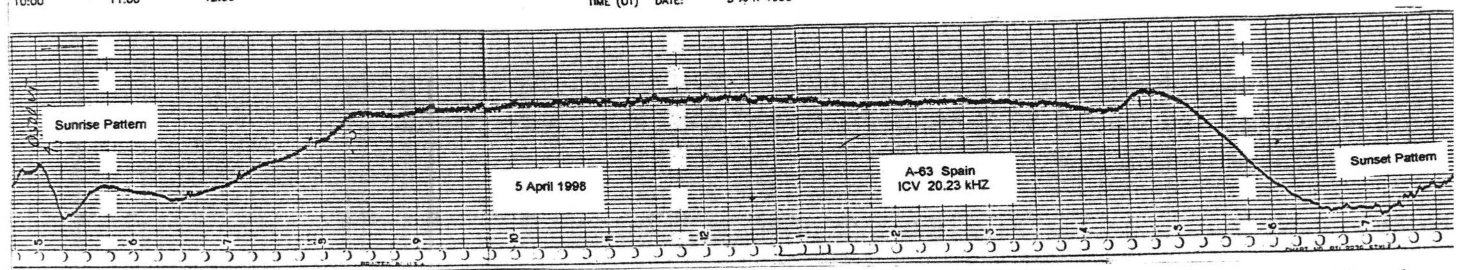
http://www.aavso.org/committees/solar.html



The above chart show a typical Sudden Ionospheric Disturbance, SID, recorded as a Sudden Enhancement of Signal, SES, by A-50 using a receiver of his own design. The SES has the typical shape, sudden rise, dwell at maximum for a few minutes followed by gradual decline. The receiver has sufficient dynamic range to produce a linear response across the full range of the recording. The SES is therefore not distorted in any way and shows its true shape. Below are charts made with receivers that lack sufficient dynamic range and the shape of the SESs is therefore distorted.



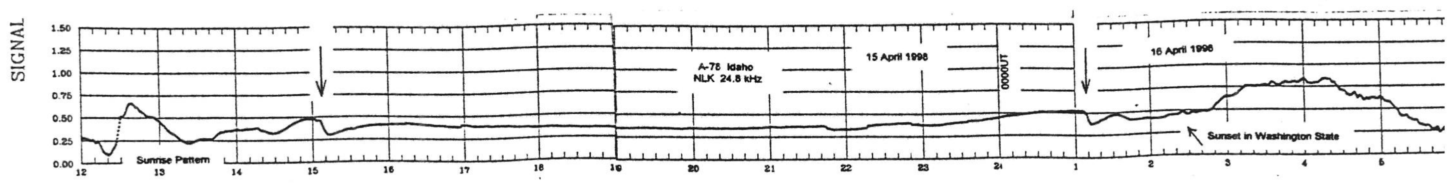




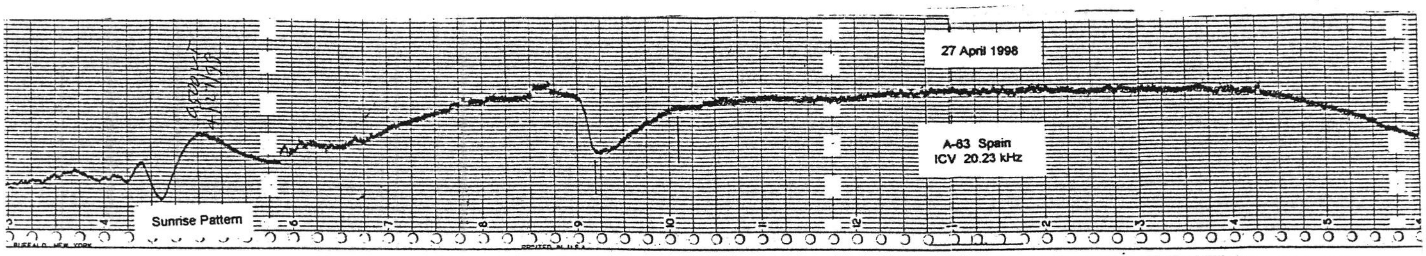
The upper chart shows four SESs recorded on 5 April with the biggest one starting at about 1620. The chart below hardly shows this SES because the chart is already near the limit of the receivers range. On the other hand, the SES starting at about 1307 shows the normal shape because it is recorded at a lower voltage where the receivers amplification is linear. In Spain, A-63 recorded the 1620 SES somewhat distorted but missed the 1307 SES completely because the trace was as high as it can possibly go.

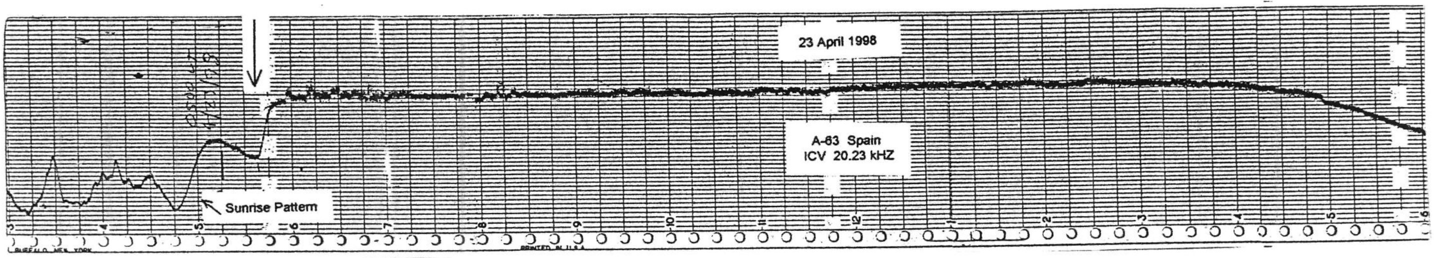
There are various reasons why some receivers are limited like this. In the case of the gyrator receiver its precision rectifier is an inherently high-impedance-output device that produces sufficient voltage but as soon as a load is attached to its output the voltage drops. An ordinary diode rectifier suffers from a similar problem. An easy way to fix the problem is to use a voltage follower such as a type 310 op amp to drive the recorder so the rectifier sees practically no load. I can supply a schematic and more details if you need them and would like to try this fix.

C. H. H.



The chart at the bottom of the previous page was made by A-78, a station at Northwest Nazarene College in Nampa, Idaho. This station was recently reactivated by Robert Van Allen, a student at the college. The chart is computer generated recording 18 hours of the day to show sunrise and sunset patterns. A morning SES on 15 April starting at about1507 UT is indicated by an arrow. It is inverted so is actually a Sudden Phase Anomaly, SPA, rather than an enhancement of the signal. Although it is an oversimplification, SPAs can be thought of as an interference pattern between two radio propagation modes, a ground and a sky wave. This usually occurs when the transmitter is less than about 1000 km from the receiver as is the case between Idaho and NLK on the Pacific coast. A late afternoon SPA is indicated by another arrow starting at about 0110 the next day shortly before the sun set on the propagation path to NPM. Additional recordings by A-63 in Spain are shown below. These record the signal from IVC in Sardinia and the distance is right to sometimes record inverted events, depending on the time of day.





The upper chart shows an inverted SPA event starting at 0900 UT. The chart's trace was about as high as it can go but the SPA is clearly recorded because it is a decrease in signal strength instead of an increase. The lower chart however, shows a normal SES starting at 1538 and reaching the maximum height about 10 minutes later where it stayed the rest of the day. This occurs soon after the sunrise pattern when normally it is hard to record an SES but this time it was a powerful X- 1.2 flare that could have easily sent the trace off scale if the receiver's response was linear to the full height of the chart. This linearity problem is a common one certainly not limited to A-82 and A-63. Many of our observers could improve the quality of their recordings by driving their recorder or A/D converter with a voltage follower that doesn't overload the output of the receiver.