Solar Bulletin

THE AMERICAN ASSOCIATION OF VARIABLE STAR OBSERVERS - SOLAR DIVISION

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Volume 57 Number 5 **May 2001**

Table I. Mean Sunspot Numbers for May 2001
[boldface = maximum, minimum]

Day	N	Raw	s.d.	K-corrected	s.d.	s.e.
1	42	148	6.9	123	4.6	0.71
2	39	152	6.5	127	3.8	0.61
3	40	155	8.1	128	6.1	0.96
4	36	173	7.8	**140**	4.7	0.78
5	37	153	7.3	125	5.3	0.87
6	37	117	5.5	94	3.7	0.61
7	42	94	3.8	77	2.9	0.45
8	39	75	2.2	**62**	1.4	0.22
9	40	80	3.2	64	1.9	0.30
10	44	81	2.6	66	1.7	0.26
11	43	104	3.7	86	3.5	0.53
12	48	114	4.4	92	3.6	0.52
13	44	121	5.0	94	4.5	0.68
14	42	130	7.3	107	4.6	0.71
15	40	131	7.4	103	4.9	0.77
16	38	129	6.4	103	4.8	0.78
17	33	127	5.4	105	3.2	0.56
18	33	123	6.8	101	5.7	0.99
19	39	113	4.8	90	3.3	0.53
20	39	104	4.5	85	2.8	0.45
21	28	127	4.3	101	2.8	0.53
22	35	157	5.9	131	3.2	0.54
23	37	161	7.3	132	4.8	0.79
24	35	157	8.0	128	5.1	0.86
25	35	142	6.2	113	3.8	0.64
26	35	156	9.1	125	5.4	0.91
27	25	142	8.3	113	5.5	1.10
28	29	132	6.3	106	4.4	0.82
29	43	105	5.0	86	4.2	0.64
30	39	88	3.2	72	2.2	0.35
31	38	87	4.5	72	3.4	0.55

Means: **125.0** **101.6**

Total No. of Observers: 69

Total No. of Observations: 1174

Table II. May Observers

3	ANDE	E.Anderson
5	ATON	A.Attanasio
10	BARH	H.Barnes
15	BATR	R.Battaiola
17	BEB	R.Berg
8	BEDJ	J.Bedient
17	BEGM	M.Begbie
5	BERJ	J.Berdejo
14	BLAJ	J.Blackwell
17	BMF	M.Boschat
27	BOSB	B.Bose
29	BRAB	B.Branchett
27	BRAR	R.Branch
30	BROB	R.Brown
11	CAMP	P.Campbell
20	CARJ	J.Carlson
29	CKB	B.Cudnik
8	CLZ	L.Corp
18	COMT	T.Compton
10	DEMF	F.Dempsey
18	DRAJ	J.Dragesco
25	DUBF	F.Dubois
28	ELR	E.Reed
17	FEEC	C.Feehrer
26	FLET	T.Fleming
22	FUJK	K.Fujimori
24	GIOR	R.Giovanoni
10	GOTS	S.Gottschalk
9	HAYK	K.Hay
10	IMPR	R.Imperi
25	JAMD	D.James
15	JEFT	T.Jeffrey
15	JENJ	J.Jenkins
5	JENS	S.Jenner
20	KAPJ	J.Kaplan
27	KHAR	R.Khan
21	KNJS	J&S Knight
2	KUZM	M.Kuzmin
12	LARJ	J.Larriba
18	LERM	M.Lerman
20	LEVM	M.Leventhal
23	LIZT	T.Lizak
23	MALK	K.Malde
13	MARE	E.Mariani
20	MCE	E.Mochizuki
9	MILJ	J.Miller
18	MMI	M.Moeller
10	MUDG	G.Mudry
21	OBSO	IPS Obs.
22	RICE	E.Richardson
8	RITA	A.Ritchie
27	SCGL	G.Schott
17	SCHG	G.Scholl
9	SIMC	C.Simpson
9	STEF	G.Stefanopoulis
24	STEM	G.Stemmler
16	STQ	N.Stoikidis
21	SUZM	M.Suzuki
5	SZAD	D.Szady
18	SZAK	K.Szatkowski
23	SZUM	M.Szulc
26	TESD	D.Teske
13	THR	R.Thompson
19	VALD	D.del Valle
18	VARG	A.Vargas
13	VIDD	D.Vidican
19	WILW	W.Wilson
11	WITL	L.Witkowski
30	YESH	H.Yesilyaprak

Reporting Addresses

Sunspot Reports **-- email:** solar@aavso.org
postal mail: AAVSO, 25 Birch St. Cambridge, MA 02138
FAX *(AAVSO):* (617) 354-0665

SES Reports **-- email:** noatak@aol.com
postal mail: Mike Hill
114 Prospect St. Marlboro, MA 01752

Magnetometer Reports **-- email:** capaavso@aol.com
postal mail: Casper Hossfield
PO Box 23, New Milford, NY 10959
FAX: (973) 853-2588 or (407) 482-3963

Table III. Means of Raw Group Counts (RG) and Ratios of Spots to Groups (S:G) in May

Day	RG	S:G	Day	RG	S:G	Day	RG	S:G	Day	RG	S:G
1	8.0	8.5	9	5.9	3.6	17	7.1	7.9	25	8.5	6.7
2	8.2	8.5	10	5.9	3.7	18	7.5	6.4	26	10.3	5.1
3	8.1	9.1	11	6.5	6.0	19	7.6	4.9	27	9.8	4.5
4	8.3	10.8	12	5.9	9.3	20	7.1	4.6	28	9.1	4.5
5	8.5	8.0	13	5.8	10.9	21	8.4	5.1	29	7.5	4.0
6	7.3	6.0	14	6.2	11.0	22	10.1	5.5	30	6.4	3.8
7	6.8	3.8	15	6.4	10.5	23	9.7	6.6	31	6.4	3.6
8	5.7	3.2	16	6.7	9.3	24	8.7	8.0	Mn.	7.6	6.6

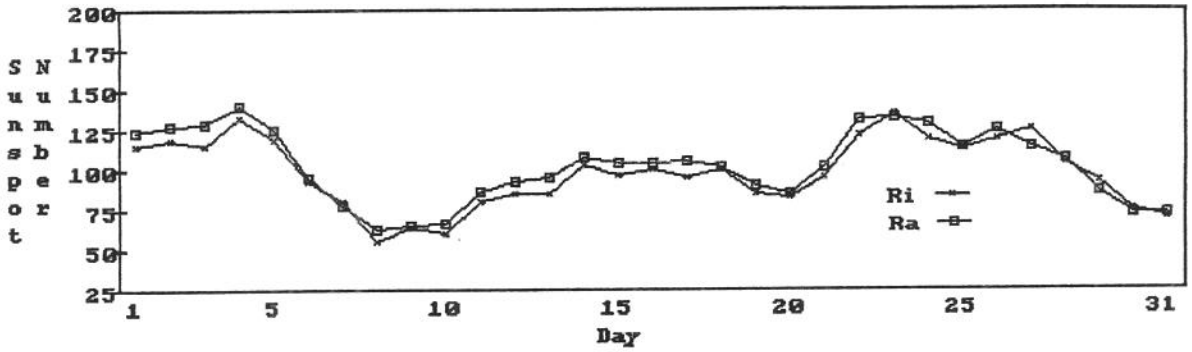

Fig. 1. Comparison of Ri (provisional) and Ra estimates for May.
(Ri Source:http://sidc..oma.be/index.php3)

Smoothed Mean Sunspot Number (Rsm) for November 2000: 118.2

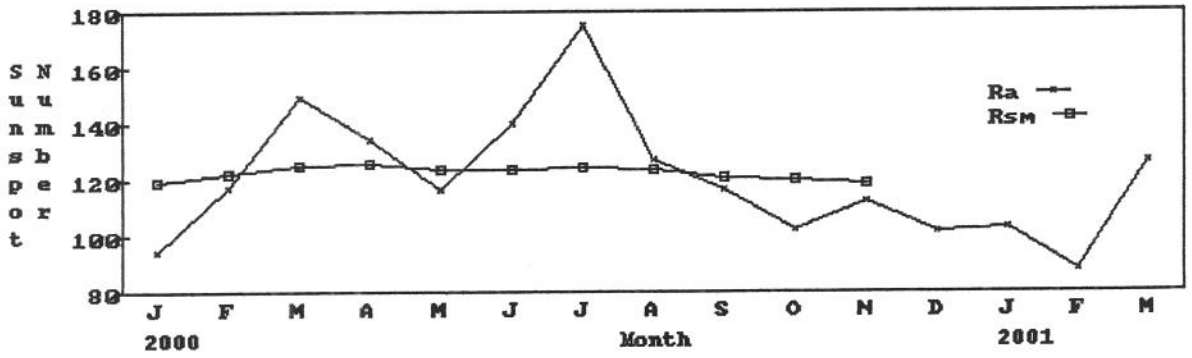

Fig. 2. Monthly Ra and Smoothed Mean Sunspot Numbers (Waldmeier method).

Editor's Notes

New Reporting Software

Version 1 of the new reporting software is now available on the AAVSO/Solar Division website. Observers may find this software easier to use than the old DOS-based SUNKEY program or its text-based equivalent , both of which have been on the website for some time. Called SolObs and written by Len Abbey, the program incorporates the SPOTPLOT program authored earlier by Joseph Lawrence, which may be particularly useful to those who project the sun's image. Len and I would be pleased to receive comments from observers who try the program.

New Contributors

I am pleased to acknowledge the contributions of three new observers this month. Paul Campbell (A100, CAMP) from Edmonton, Alberta, who has been sending sunspot reports for several months, has contributed his first SID report. Mikhail Kuzmin (KUZM), an experienced observer in Moscow, and Daryl Szady (SZAD) of Brewer, Maine, have sent their initial reports. Thank you all for your work and for helping the Solar Division grow!

Clear Skies,

CEF

Sudden Ionospheric Disturbance Report

Michael Hill, SID Analyst
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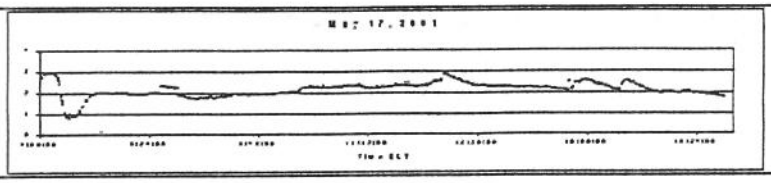
noatak@aol.com



Sudden Ionospheric Disturbances (SID) Recorded During May 2001

(Analysis performed by Michael Hill, SID Analyst)

Date	Max	Imp	Date	Max	Imp	Date	Max	Imp
010501	1443	1-	010514	1227	1	010520	1440	2
010501	1510	2	010515	0848	2	010520	1940	2
010501	1735	2+	010515	1332	1+	010524	1940	3
010501	1910	3	010516	0640	1-	010528	1555	1
010502	0041	2+	010516	1042	2	010531	1913	1
010502	0630	3	010516	1445	2			
010502	1715	2+	010516	1550	2			
010502	1935	2	010516	1841	2			
010503	2142	2	010517	0657	1-			
010504	1500	2+	010517	1004	1			
010504	1925	2+	010517	1350	1+			
010505	1820	2+	010517	1440	1+			
010506	1949	2	010517	1642	2			
010506	2010	3	010517	1653	3			
010507	1217	2	010517	1955	2+			
010508	1620	1+	010517	2050	2+			
010510	1515	2+	010517	2145	2+			
010511	2023	2	010518	0643	1+			
010512	1006	1+	010518	1502	2			
010512	1418	1+	010518	1544	2+			
010512	1448	2+	010518	1834	3			
010512	1723	1	010519	1440	2+			
010513	0825	2	010520	0603	3+			
010513	1407	2	010520	0922	1			
010513	1920	1+	010520	1140	1+			

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

1) Reported in at least two observer reports
2) Visually analyzed with definiteness rating = 5
3) Reported by overseas observers with high definiteness rating

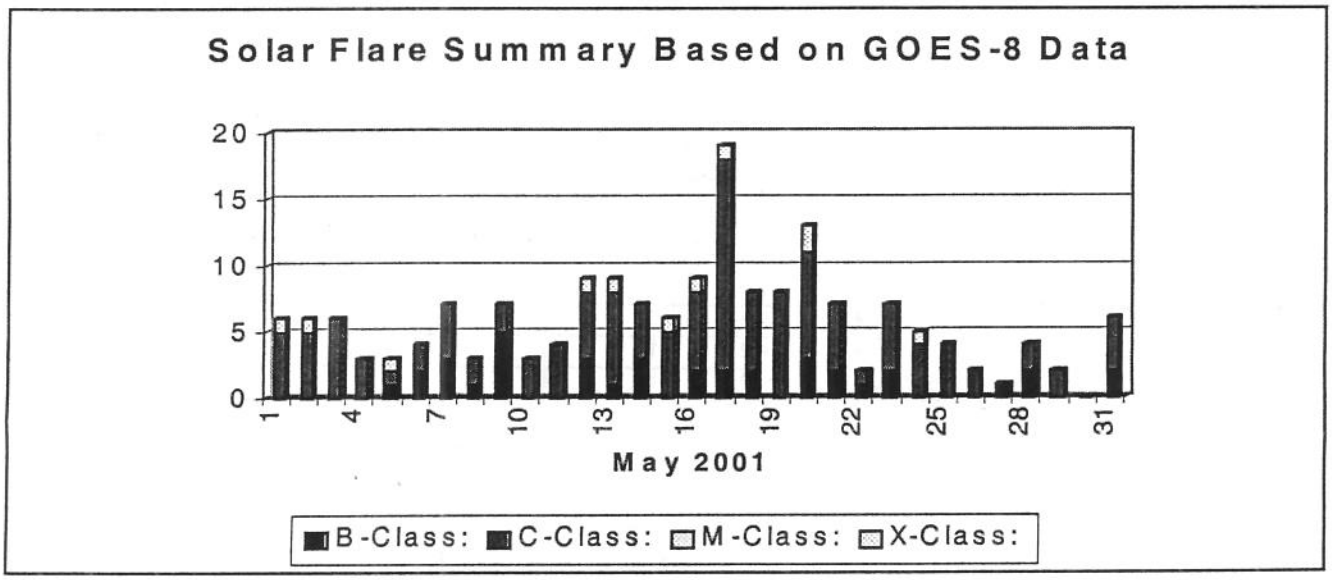
Observer	Code	Station(s) monitored
A Clerkin	A29	NAA
J Winkler	A50	NAA, TBD
D Toldo, D Overbeek	A52	NWC, NAA
A Stokes	A62	NAA
J Ellerbe	A63	ICV
P King	A80	FTA
W Moos	A84	FTA, ICV, BGZ
M Hill	A87	NAA
J Mandaville	A90	NPM, NAA
T Poulos	A95	NAA
R Battiola	A96	HWU
J Wallace	A97	NAA
P Campbell	A100	NLK

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

Solar Events

Solar activity slowed a bit in May but there were a couple of active days that made things interesting. The 17th and 20th were the most active days, as is quite evident in the graph below. There was a total of 169 X-Ray flares recorded by the Goes – 8 Satellite. Eleven of them were M-class and the rest B and C. There were no major X-class flares. Observers measured 55 coordinated SID events, most of them of moderate duration.

This month a request was made for our data by an organization in England that does ionospheric research using a facility named IRIS located in the Netherlands. They have expressed interest in the data listed in the database section of the AAVSO SID page and have been given permission to use the data, presumably to correlate with their measurements. This is very exciting, and I hope that the data that we collectively gather can be of help to them. More information about their research can be found on the web site http://www.dcs.lancs.ac.uk/iono/iris/ Take a look and see where the fruits of your labor may be going.



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SUDDEN IONOSPHERIC DISTURBANCES SUPPLEMENT

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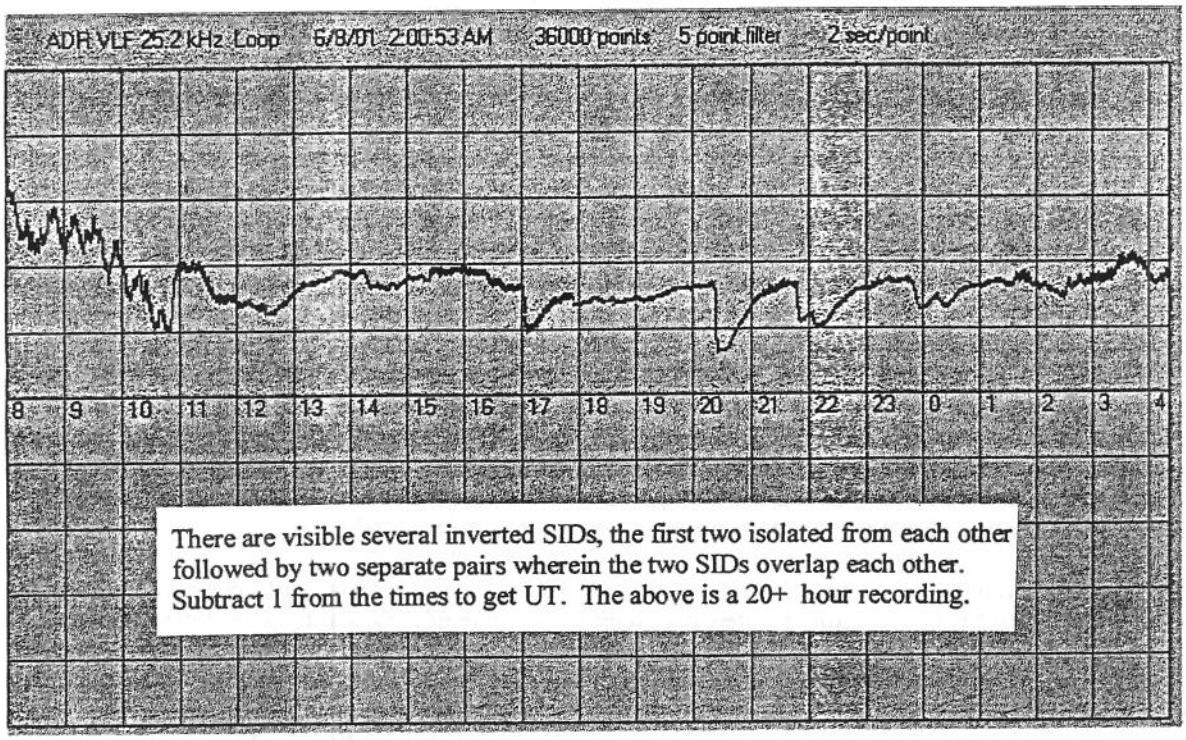
SUDDEN IONOSPHERIC DISTURBANCES RECORDED DURING MAY, 2001



The chart above was made by Al McWilliams, A-94, using an ADR2000A A/D converter. This converter has many advantages over the converter designed by former Solar Division Chairman Joseph Lawrence that many of us use to record SES on a computer. Although Lawrence's converter does a fine job and is adequate for making the monthly SID report and can produce Rustrak format strip chart recordings using the Piclogger plotting software it nevertheless falls far short of what can be done with the ADR2000A using software Al has written for it to produce the chart above. Most important is it can produce the chart above in real time and display it on the monitor. This gives it the same advantage people like about the Rustrak strip chart recorders, which is you can see the trace being made in real time. If you are nearby you can often see the beginning of the SES as it starts to rise and follow its development through maximum and decay in real time. The ADR2000A shows the same thing on the monitor. But there is an even greater advantage: You can use the computer for other purposes such as answering email and the ADR2000A continues making your SES chart without interruption. When you are finished with whatever you were using the computer for, just click on an icon an there is your SES recording again in real time with the part it made while you used the computer right there as if you hadn't used the computer at all.

As you can see from the above, the good news is you don't need a separate dedicated computer to make uninterrupted continuous 24-hour SES recordings. The bad news is the ADR2000A costs $265 (but still less than the cost of a new Rustrak strip-chart recorder). This is a lot of money but Al's software to run the ADR2000A is free and he continues to improve it. Then too there are all those many advantages plus additional nice things it can do described below. You will have to decide for yourself if you would want to spend the extra money, most of which is balanced out by not needing a separate dedicated computer. Below are excerpts from letters from Al McWilliams that give more details how his software works:

.....I am recording 25.2 kHz using a 4 x 8 feet loop antenna located in the basement of my home. Here is a recording of 25.2 kHz using the basement loop, ADR2000A, and my own software. The signal comes in very strong even with the loop in the basement. The basement loop is part of a preamp circuit whose output goes to the Gyrator II receiver. Only the loop is in the basement - all other stuff in the den including the preamp. I have all gains turned down to minimum. Still, the output of the Gyrator II is 6 volts DC so I have an additional pot between the Gyrator II and ADR2000A to further attenuate the signal. The ADR2000 has a range from -5 volts to + 5 volts and has +/- 15 volts overload protection built in. .....
.....This is a real-time-display chart which still continues while I write email. The text box at top shows the point number, the local DST time, the date, and then the voltage and time separated by a "@" symbol. This text box updates every

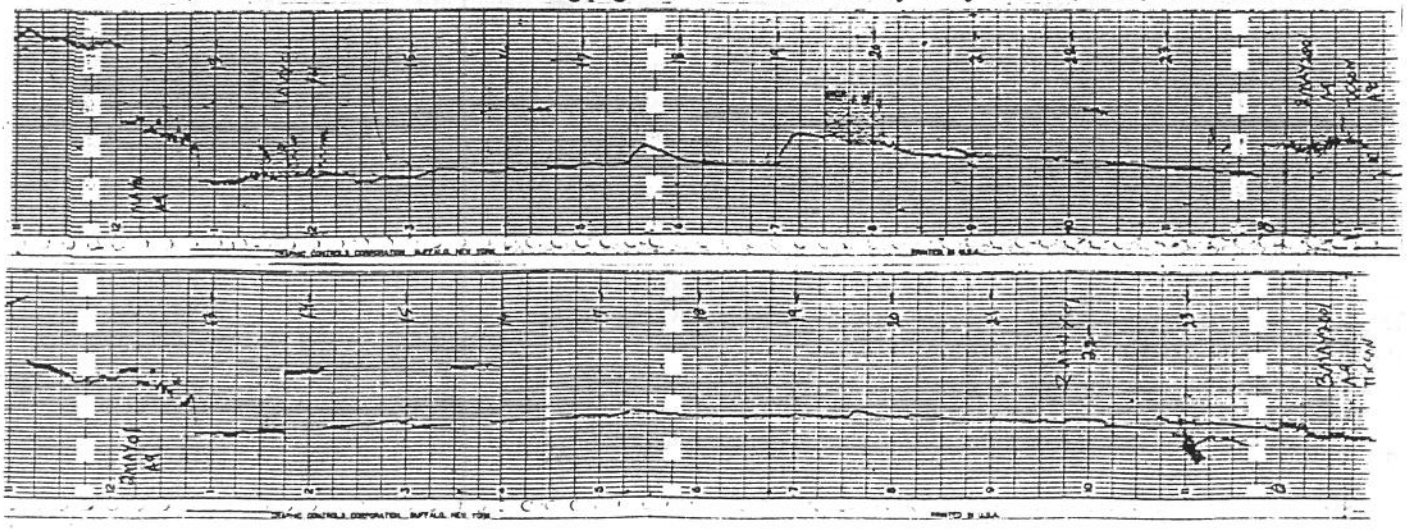
time a reading is made (every 2 seconds in this case). Note the inverted SESs. I edited out the bottom half of the chart where negative voltages would be displayed. The data are recorded in a file which later can also be converted to DAT form if a Rustrak type graph is desired. Each data line is the same as shown in the text box above (a little too much info but I can easily change that).....The label at top is entered automatically. Again, the times are off UT by one hour (yet to be fixed). The program allows one to save the current chart to Desktop at any time without stopping the program. The labeled time is central daylight savings time. I fixed the vertical time lines bug. The time width of the chart depends on how many points and time between points which one selects when starting the program. So the whole width could be, say, only one hour or 50 hours. The above chart will have 36000 points at 2 seconds per point which is 72000 seconds or 20 hours. The program will then stop and leave a data file on desktop as well as a picture on desktop. If one stops the program at any time the data file and picture are auto stored to desktop.....Here is a snapshot of my ADR2000A running program which shows 25.2 maintenance. I used Wincopy which allows one to copy any portion of one's computer screen and save it. Here I saved the entire top half of the ADR2000A program display while it was running. In the usual manner (mouse drag) one can move the graph to any part of one's screen while it is running. So the running real time graph can be moved almost entirely off screen while it is running in real time. Again, subtract 1 hour from the time numbers on the graph to get UT (so that 25.2 went down at 12 UT, for example). The automatically saved graph does not include the top portion (the parts in dark orange) which only display while the program is running. The fine print at the top of the graph depicts when the program was started (12:41:15 AM central daylight savings time), etc. and this entire fine print line is saved as a part of the graph. When the program ends it will have recorded 80,000 data points (this number was entered as an answer to a prompt when the program was started) and the 80,000th point will plot on the extreme right hand side of the graph..... As stated earlier all the ADs are listed at site http://www.ontrak.net/ together with prices and ordering information. The ADR7700 has only one analog input channel but 16 bit resolution. The ADR2000A has eight analog input channels and 12 bit resolution. The ADR112 has two analog input channels and also 12 bit resolution but presumeably can only take from 0 to +5V input so would not be the best for magnetometers. The ADR112 costs $129, the ADR2000A costs $265 and the ADR7700 costs $225. All come with a computer cable. A power adapter for ADR112 and ADR 2000A can be ordered for $12.95 (or one can get one at Radio Shack). I am not sure how the ADR7700 is powered. I feel pretty sure that all of Ontrak's ADs can be programmed using Visual Basic and will work with my program with at most minor modifications.

The ADR2000A has other features which the ADR112 and ADR7700 do not have (such as two 12 bit analog outputs, one 16 bit event counter, and 8 digital I/O lines). Experimenters may want to use some of these additional features sometime. I should emphasize that my software is not general but includes only what I want to do with the ADR2000A at the present time. My next improvement will be to include more than one input channel. These boards will be most useful to those who are somewhat familiar with programming and who can therefore include features of their own interest at any time. There is not one single simple program which will run all possibilities for all features!!! (I believe that the ADR112 would be a minimal good replacement for the Lawrence system even though the ADR112 has only two analog input channels. The Lawrence software will not run it however. New software would have to be written using Visual Basic).

Best wishes, Al

The above excerpts from Al's letters are in response to questions I asked. Hopefully they will answer some of the questions you might wish to ask. If not you can email Al at << amcwill417@email.msn.com (amcwill417) >> for more information and his free software.

Below are two SES charts for the first and second of May made by Werner Scharlach A-9, in Tucson, Arizona recording NAA in Cutler, Maine on 24kHz. On the following page are SES charts made by Jerry Winkler, A-50, in Houston Texas.



Jerry's multiplexed charts below made on 2, 5, 6, 13, 19 and 20 May record the signal from NAA in Cutler, Maine transmitting on 24 kHz and the 25.2 kHz signal from the new station in La Moure, North Dakota. Jerry's 25.2 signal is scattered by lightning on some days. His 5 May chart shows the gradual build up of thunder storms that day very well. 25.2 kHz is also the signal recorded by Al McWilliams to make his chart on the first page of this SID supplement. Al lives in St. Cloud Minnesota and is much closer to North Dakota so his SESs are inverted The signal is stronger there and thunder storms fewer, so his chart does not show lightning scattering the recording points.