Solar Bulletin

THE AMERICAN ASSOCIATION OF VARIABLE STAR OBSERVERS - SOLAR DIVISION

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Volume 56 Number 8 **August 2000**

Table I. Mean Sunspot Numbers for August

Da	Raw	s.d.	K-corrected	s.d.
1	125	4.9	107	3.7
2	124	4.9	107	2.9
3	129	6.6	107	4.3
4	131	5.0	108	3.5
5	166	7.0	144	5.7
6	179	6.7	159	4.8
7	187	7.2	162	5.7
8	167	6.6	144	4.6
9	143	6.9	122	4.9
10	171	7.6	138	4.9
11	170	7.5	148	6.2
12	180	8.3	160	5.1
13	193	9.3	166	5.9
14	218	9.6	181	5.6
15	206	10.4	167	7.0
16	184	9.9	154	7.0
17	166	9.0	141	5.7
18	154	7.9	131	4.6
19	139	6.1	118	3.9
20	115	4.6	103	3.0
21	89	4.5	75	2.6
22	77	2.5	68	2.0
23	82	3.2	67	2.2
24	89	3.3	74	2.3
25	96	2.7	84	2.1
26	103	4.2	87	3.1
27	136	5.8	112	5.1
28	160	5.8	144	4.4
29	173	8.1	146	5.1
30	171	7.3	147	5.1
31	177	6.4	157	4.4

Means: 148.5 **126.8**

No. of Observations: 1287

No. of Observers: 68

Table II. August Observers

13	AAP P.Abbott	29	KAPJ J.Kaplan
3	ANDE E.Anderson	13	LERM M.Lerman
30	ATAT T.Atak	11	LEVM M.Leventhal
15	ATON A.Attanasio	7	LUBT T.Lubbers
19	BARH H.Barnes	22	MALK K.Malde
19	BATR R.Battiola	20	MARE E.Mariani
19	BEB R.Berg	31	MARJ J.Maranon
9	BLAJ J.Blackwell	18	MCE E.Mochizuki
16	BMF M.Boshcat	3	MCHL L.McHenry
23	BOSB B.Bose	5	MILJ J.Miller
30	BRAB B.Branchett	28	MMI M.Moeller
23	BRAD D.Branchett	12	MUDG G.Mudry
29	BRAR R.Branch	11	NILB B.Nilson
19	CARJ J.Carlson	30	NYLH H.Nylander
28	CHAG G.Morales	19	OBSO IPS Obs.
31	CKB B.Cudnick	5	RADS S.Radabah
4	CLZ C.Laurent	1	RANT T.Randall
13	COLB B.Collins	24	RICE E.Richardson
24	COMT T.Compton	25	RITA A.Ritchie
31	CORA A.Coroas	29	SCGL G.Schott
25	CR T.Cragg	10	SCHG G.Scholl
25	DRAJ J.Dragesco	11	SIMC C.Simpson
30	ELR E.Reed	21	STEF G.Stefanopoulis
23	FEEC C.Feehrer	30	STEM G.Stemmler
28	FLET T.Fleming	31	STQ N.Stoikidis
2	GALM M.Gallo	29	SUZM M.Suzuki
25	GIOR R.Giovannoni	9	SZAK K.Szatkowski
11	GOTS S.Gottschalk	17	TESD D.Teske
11	HALB B.Halls	16	THR R.Thompson
19	HAYK K.Hay	25	URBP P.Urbanksi
20	IBRA A.Ibrahim	22	VALD D.delValle
26	JAMD D.James	26	VARG A.Vargas
9	JEFT T.Jeffrey	25	WILW W.Wilson
14	JENJ J.Jenkins		
6	JENS S.Jenner		

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

Table III. Raw Mean Estimates of Sunspot Groups from January to August 2000

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
1	4.4	5.8	9.3	14.3	6.9	6.9	11.8	8.6
2	4.2	5.9	3.7	12.6	6.6	6.3	10.9	8.9
3	4.8	7.6	9.5	14.1	6.9	6.0	10.4	9.7
4	6.3	8.7	7.9	12.8	5.8	6.3	8.8	9.3
5	6.2	8.9	7.8	11.4	5.0	7.5	9.6	10.4
6	6.7	10.6	9.1	9.2	3.2	8.1	9.6	11.4
7	6.9	10.3	10.0	8.5	4.8	8.1	9.9	11.5
8	6.5	8.6	10.6	7.8	4.9	8.4	10.4	10.2
9	6.9	9.0	9.6	8.5	6.8	8.3	11.2	8.7
10	5.3	10.7	9.5	7.8	7.7	8.9	12.7	10.9
11	6.8	10.3	10.2	8.3	8.1	11.1	12.8	10.9
12	8.8	9.4	9.5	8.7	8.2	10.8	12.3	11.8
13	10.4	10.2	8.0	10.2	9.2	11.6	11.8	12.8
14	10.2	9.9	7.7	9.9	10.8	12.9	10.6	13.9
15	10.7	10.6	6.9	9.1	11.3	11.7	8.9	11.6
16	9.8	10.0	6.7	8.9	10.6	10.5	5.4	10.0
17	8.6	8.8	6.2	8.8	8.7	10.1	14.5	9.0
18	8.5	8.4	6.7	8.3	7.4	9.9	14.7	9.5
19	8.4	5.7	8.5	9.3	7.6	9.8	16.5	9.1
20	7.8	5.5	9.0	10.9	8.4	11.7	14.8	8.7
21	7.4	6.7	8.8	11.7	8.1	9.8	14.2	6.5
22	7.6	8.1	10.4	11.9	7.8	10.6	14.4	5.4
23	6.9	7.1	13.0	11.5	9.1	10.6	12.3	5.6
24	7.0	9.0	14.5	11.0	9.6	10.4	10.6	6.4
25	6.9	10.5	13.5	9.6	8.9	9.7	10.9	6.8
26	6.1	10.7	12.1	8.4	8.5	11.2	10.1	6.9
27	5.3	11.0	11.5	7.8	8.0	9.6	11.3	8.3
28	4.8	10.5	11.4	8.1	8.7	8.5	10.2	9.1
29	5.2	11.6	11.2	7.1	8.3	10.2	10.0	10.0
30	5.0		11.5	6.8	6.1	10.7	10.0	9.2
31	5.6		12.1		4.3		8.5	11.4
Min.	4.2	5.5	3.7	6.8	3.2	6.0	5.4	5.4
Avg.	7.0	9.0	9.6	9.8	7.6	9.5	11.3	9.4
Max.	10.7	11.6	14.5	14.3	11.3	12.9	16.5	13.9

Table IV. Mean Monthly RaK Values for Feb. & Mar. 2000

	Preliminary	Final
February	113.8	116.8
March	148.6	148.7

Smoothed Mean Sunspot Number (Rsm) for February 2000: 122.0

Editor's Notes

Mean Estimates of Sunspot Groups

Several observers have indicated that they found the mean estimates of sunspot groups in the July Bulletin to be useful and have requested that these continue to be printed each month. On the assumption that some observers might want to conduct more comprehensive comparisons with their own results, Table III has been prepared. This table includes all of the daily means from the first of this year through August. Please remember that these values have not received any statistical treatment that would normalize observing conditions, equipment, or experience. As a result, your personal estimates might vary from those shown in the table.

Delivery of Observer Reports for Early 2000

Reports that were sent by observers to the former editor early in the year have finally reached AAVSO Hq., where they have been analyzed and combined with reports already in hand. The resulting RaK values for February and March are sufficiently different from those published earlier to warrant updating. Table IV summarizes the original and revised values. Table III, the smoothed mean (Rsm) value for February 2000, and the Figures incorporate these revisions.

In this regard, I want to thank Arthur Ritchie (RITA), a volunteer at AAVSO headquarters, for his willingness to share in the task of keying in the large quantity of forwarded data so that it could be analyzed in time for this month's Bulletin.

Comparison of SIDC and American Relative Sunspot Numbers

Some earlier editors of the Bulletin have, from time to time, presented comparisons of the International Sunspot Numbers published by the Sunspot Index Data Center (SIDC) in Belgium with the k-adjusted American numbers. This seems to me to be a worthwhile practice, particularly around the time of solar maximum, when estimates might be expected to vary considerably.

Figures 1 and 2 present comparisons of the two indices for the months of July and August. Note that the maximum estimate during July is associated with AAVSO, whereas the maximum in August is associated with SIDC. The product-moment correlation coefficients (r) between the two indices are 0.983 and 0.969 for July and August, respectively.

Figure 3 presents monthly averages of the two indices from January to August 2000. The correlation coefficient here equals 0.963.

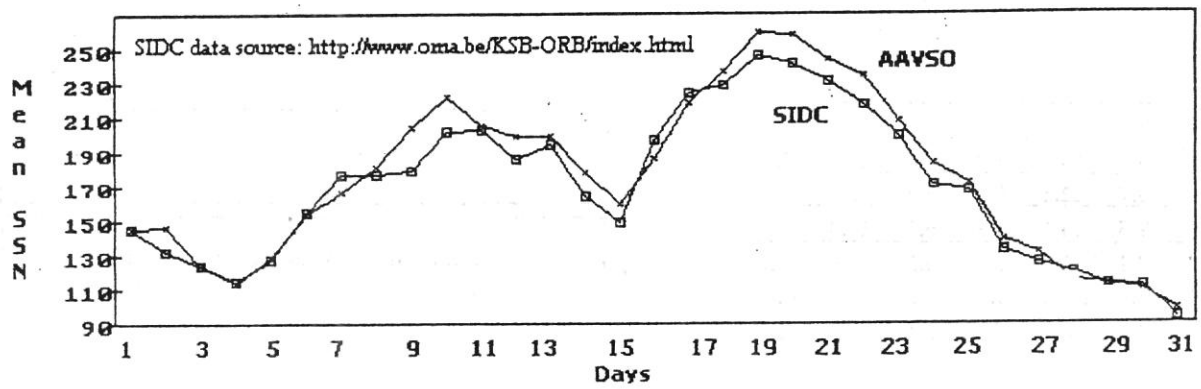


Fig. 1. Comparison of SIDC provisional and AAVSO sunspot numbers for July.

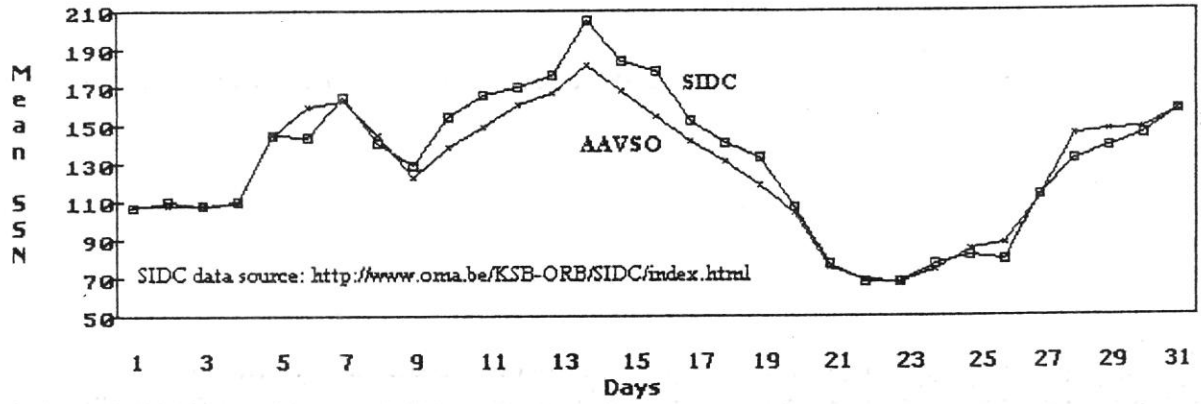


Fig. 2. Comparison of SIDC provisional and AAVSO sunspot numbers for August

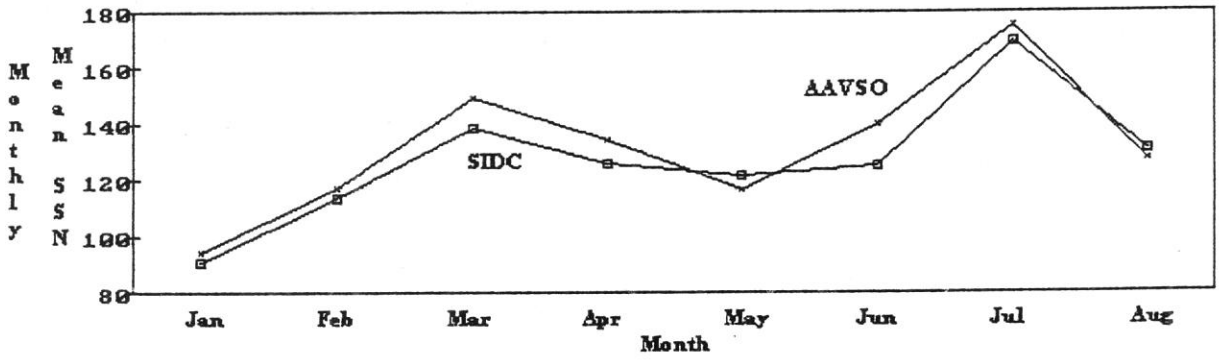


Fig. 3. Comparison of SIDC and AAVSO monthly means. (SIDC data source as in Figs. 1,2)

SID Report Format

In the July Bulletin, Mike Hill mentioned the need for SID observers to pay close attention to the format in which they report their data. Beginning in October, the format of a report submitted for inclusion in the monthly analyses must correspond to that discussed in SID Technical Bulletin 3, 4, 1992. Although Rustrak tapes or other unanalyzed traces may accompany an analyzed report--particularly in cases where these might prove useful in illustrating flare events of unusual character--they will not routinely be analyzed for purposes of producing the monthly report. Such traces may also be sent to Casper Hossfield for possible inclusion in his supplement.

A reprint of the instructions for analyzing and formatting SID records is included in this issue of the Bulletin and will posted on the AAVSO/Solar Division website. Observers who do not use MS-DOS can create an equivalent, character-oriented text file with the aid of the Technical Bulletin.

SID Report Format (cont'd.)
Where possible, observers are requested to email their analyzed reports to Mike rather than sending them via regular mail. This will aid in maximizing the amount of time available for preparation of the monthly summary and in reducing the likelihood of data entry errors.

AAVSO Data at NOAA/NGDC
I discovered during July that, contrary to expectation, the daily and monthly American Relative Sunspot Numbers have not been posted on the NOAA/NGDC website since mid-1998 despite the fact that they have routinely been emailed to the organization for that purpose. After some discussion of the issue, it was requested that I recompile the data from that time to the present and resend it. Those tasks have been completed, and NGDC's website is now in the process of being updated.

Solar Bulletin Mailing List
AAVSO Headquarters is in the process of updating its mailing lists. In the next two months, subscribers will receive a letter asking whether or not they wish to continue to receive the Solar Bulletin. All AAVSO/Solar Division members will continue to receive it at no cost, as will non-members who have submitted at least one sunspot or SID report within the last 20 months. Non-members who don't file reports, as well as some institutions, will be charged a fee if they wish to continue to receive the publication. Note that, if your interest is primarily in the data contained in the Bulletin, both sunspot and SID numbers are now routinely posted on the AAVSO/Solar Division website.

Correct Addresses for Sunspot and SID Reports
Some observers continue to send their reports either to Joseph Lawrence or to the regular AAVSO email address. Please be certain that you send your report to the appropriate address printed on the front page of the Bulletin in order to assure that your observations will receive attention soon enough to be included in the monthly data analyses.

Final Note
Yesterday, September 11, my scope came up empty. I saw no spots on the sun at all! After cleaning and checking my equipment, I decided that maybe there really weren't any there to *be* seen!! Today an item arrived via email from *Space Weather News* (http://www.spaceweather.com) suggesting that an "extraordinary event" had occurred and containing an image from SOHO that, in *SPW*'s words, "was practically blank."

"Does this mean that Solar Max is over?", they ask. "Not at all. In fact, the maximum phase of solar activity is expected to persist for at least another year. This week's plunging sunspot number is merely one of the normal ups and downs of the ongoing solar cycle." Stay tuned!

Clear Skies,

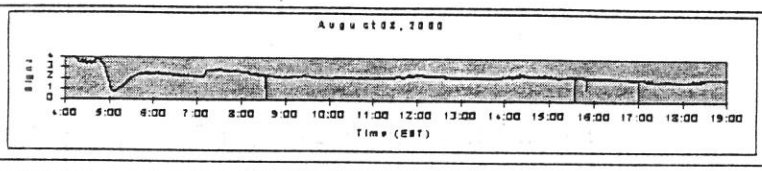
-CEF

AAVSO Sunspot Observer Codes
as of August 2000

AAP	A. Patrick Abbott
ANDE	Eric Anderson
ATAT	Tamer Atac
ATHE	Nat. Obs. Athens
ATKG	Gerald Atkinson
ATON	Antonio Attanasio
BARH	Howard Barnes
BARW	Bill Barton
BATR	Roberto Battaiola
BEB	Ray Berg
BERJ	Jose Alberto Berdejo
BLAB	Bill Black
BLAJ	John A. Blackwell
BMF	Michael Boschat
BOSB	Biswajit Bose
BRAB	Brenda Branchett
BRAD	David Branchett
BRAR	Robert Branch
BROB	Robert Brown
BROR	Rodney Brooks
BURS	Scott Burgess
CARJ	James Carlson
CHAG	German Chavas Morales
CHOJ	John Chouinavas
CJL	Jeff Charles
CKB	Brian Cudnik
CLEC	Carl Clemens
CLZ	Corp Laurent
COLB	Bill Collins
COMT	Thomas Compton
CONG	Gregory Conlin
CORA	Angel Coroas
CR	Thomas Cragg
DAVT	Thomas F. Davis
DEMF	Frank Dempsey
DRAJ	Jean Dragesco
DUBF	Franky Dubois
DGP	Gerald P. Dyck
ELEG	Gontran Eleizalde
ELLJ	Jaime Ellerbe
ELR	Ed L. Reed
EVAC	Charles Evans
FEEC	Carl Feehrer
FERJ	Javier Ruiz Fernandez
FLEN	Nicolas A. Fleming
FLET	Tom Fleming
FUJK	K. Fujimori
GALE	Enrique Galvez Ferreyros
GALM	Mauro Gallo
GIOR	Richard Giovanoni
GOTS	Steve Gottschalk
GUNM	Marcelo Mojica Gundlach
GUTD	David Montes Gutierrez
HALB	Brian Halls
HANS	Stanley Hanna
HAYK	Kim Hay
HRUT	Timothy Hrutkay
HSF	Casper Hossfield
IBAJ	Jose Manuel Oporto Ibanez
IBRA	A. Ibrahim
IMPR	Ruth Imperi
ISKJ	Jozsef Iskum
ISLJ	John E. Isles
JACT	Thomas Jacobsson
JAMD	David W. James
JANJ	Jan Janssens
JEFT	Thomas Jeffrey
JENJ	James Jenkins
JENS	Simon Jenner
JENV	Vernon Jennings
KAPJ	John Kaplan
KIRS	Istanbul Univ. Obs.
KNJS	James & Shirley Knight
KOS	Attila Kosa-Kiss
KUEK	Kevin Kuehl
LARJ	Jose Larriba
LAWJ	Joseph D. Lawrence
LERM	Michel Lerman
LEVM	Monty Leventhal
LGN	Gennaro Lopriore
LIZT	Tom Lizak
LOPJ	Jerry Lop
LUBT	Thomas Lubbers
LUNH	Hugh Lund
LWT	Todd Lohvinenko
MALK	Kjell Inge Malde
MARE	Enrico Mariani
MARH	Hubert Martin
MARJ	Javier Jarboles Maranon
MCE	E. Mochizuki
MCHL	Larry McHenry
MILJ	Jay Miller
MMI	Michael Moeller
MOJH	Hector Mojica
MUDG	George Mudry
NILB	Brian Nilsson
NYLH	Heikki Nylander
OBSO	IPS Observatory
PAIM	Marie-Therese Pain
PARN	Norm Parker
PEAC	Penteli Astro. Center
PENG	Gerry Pennington
QUAG	George R. Qualley
RADS	Selby Radabah
RANT	Thomas Randall
REYD	Darryl Reynolds
RICC	Charles Ricker
RICE	E. C. Richardson
RITA	Arthur Ritchie
RMAJ	Jim Ramsey
RMAS	Sharon Ramsey
ROSG	George Rosenberg
SCGL	Gerd-Lutz Schott
SCHG	Gregg Scholl
SIMC	Clyde Simpson
SPEP	Pam Spence
SPER	Robert Spellman
STAB	Brian Gordon-States
STEE	Elizabeth Stephenson
STEF	George Stefanopoulis
STEM	Gerhard Stemmler
STQ	Nick Stoikidis
SUZM	M. Suzuki
SZAK	K. Szatkowski
TAKH	H. Takuma
TESD	David Teske
THR	Raymond Thompson
TORM	Marcello Torsoli
URBP	Piotr Urbanski
VALD	Daniel del Valle
VARG	A.Gonzalo Vargas
VARP	Paraskhos Vardaxoglou
VART	T. Vartsos
VAZC	Carlos E. A.Vazquez
VIDD	Daniel Vidican
WHIM	Matthew Whitehouse
WILW	William M. Wilson
WISM	Michael Wiskirken
WITL	Leonard Witkowski
WKW	Kenneth Watts
WYDK	Krzysztof Wydra
YESH	Hulya Yesilyaprak

Sudden Ionospheric Disturbance Report

Michael Hill, SID Analyst
114 Prospect St
Marlborough, MA 01752 USA
noatak@aol.com



Sudden Ionospheric Disturbances (SID) Recorded During August 2000

(Analysis performed by Michael Hill, SID Analyst)

Date	Max	Imp	Date	Max	Imp	Date	Max	Imp
000802	1403	2						
000802	1457	1						
000802	1545	1+						
000802	1633	1+						
000802	1940	2						
000803	1845	1+						
000806	1534	2						
000811	1340	1-						
000808	1113	2+						
000819	1927	1+						
000825	1426	2+						
000827	1733	2+						

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

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

Observer	Code	Station(s) monitored
Jerry Winkler	A50	NAA, NPM
Art Stokes	A62	NAA
James Ellerbe	A63	ICV – No events
Peter King	A80	ICV – No events
Alex Panzer	A83	NAA
Mike Hill	A87	NAA

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

Solar Events

August has proven to be a very slow month as far as flare activity is concerned. There have been no X class flares, only three M class flares and six C class flares with a rating of C4 and higher. There was still an abundance of lower intensity flares throughout the month, but most too small to be detected by our receivers. Of the 135 measured X-Ray flares this month, only 9 of them were very significant. All Observers measured most of these 9 events. As a crude estimate I would say our lowest regularly observed class of flare is about C4. It should be a challenge to all of us to lower this average as much as possible with time. The more finely we tune our systems with a narrow bandwidth and higher gain the greater our sensitivity to those smaller flares. If we all strive to this end now, we should be well prepared for the solar minimum in four years when most months will pale with activity as did this month, unusual as it was for being in the midst of the current solar maximum.

I have looked over the data backlog that has built up in the absence of an active SID Analyst and will be properly crediting each of you that sent in data. It will be some time before I have done the analysis on all this data, especially since none of it is in electronic format. Listed below is a summary of contributing observers and stations monitored. If you sent in data and are not on this list, let me know and we will see what we can do. Sorry no data was given to me for January. It seems to be the lost month.

February

A52	D Overbeek	NAA, NSW, ???
A62	A Stokes	NAA
A63	J Ellerbe	ICV
A72	L Witkowski	NAA
A81	A Landry	NAA
A87	M Hill	NAA
A92	C Feehrer	NAA

March

A62	A Stokes	NAA
A63	J Ellerbe	ICV
A72	L Witkowski	NAA
A80	P King	FTA
A83	A Panzer	NAA
A84	W Moos	FTA,GZB,ICV
A87	M Hill	NAA

April

A40	???	???
A52	D Overbeek	NAA,NSW, ???
A62	A Stokes	NAA
A63	J Ellerbe	ICV
A72	L Witkowski	NAA
A80	P King	FTA
A83	A Panzer	NAA
A84	W Moos	FTA,GZB,ICV
A87	M Hill	NAA

May

A40	???	???
A63	J Ellerbe	ICV
A72	L Witkowski	NAA
A83	A Panzer	NAA
A84	W Moos	FTA,GZB,ICV

June

A52	D Overbeek	NAA,NSW, NPM
A63	J Ellerbe	ICV
A72	L Witkowski	NAA
A83	A Panzer	NAA
A84	W Moos	FTA,GZB,ICV

All submitals of observations will be recorded in the observer records database.

I have included the instructions below as an aid to the use of the SIDPLOT program which should be used for data entry if possible

Operating Instructions – SIDPLOT Data Entry Program

------ Manual data entry -------

Run DOS program SIDPLOT from Win95 or DOS
After startup:

- Set CAPS ON
- Enter Observer ID
- Enter Station call letters
- Enter Station frequency
- Enter Year - 4 digits
- Enter Month (as a number)
- Enter Day (first day of valid observation)

Press [ENTER] after each entry - Do not hit TAB

At this or any other point in running SIDPLOT you may change any of the above entries by pressing the RED Highlighted letter for that entry. Enter the new information and press [ENTER].

Data Entry:

- Press appropriate RED Highlighted letter for Begin, Peak, End
- Enter relevant UT Time followed by [ENTER] - Do not hit TAB
- These may be entered in any order and reentered as described above if you notice a mistake.
- Press [R] to enter Rating followed by [ENTER]
- The observation is ACCEPTED at this point, and written to the file.

- Reenter another observation for same day OR
- Press [D] to enter a new day number and then enter new observations.

Press [Q] to quit.
File will be in same directory as the SIDPLOT program called by the observer ID and station monitored i.e. { A87NAA.DAT }

------ Using Graph ------

If you have data from the Logger program provided by AAVSO which reads up to 4 channels and stores each channel into a separate file, you can use the graph facility to extract the time of events. After the initialization data has been entered press [F] to enter the name of a data file. It must be in same directory as the SIDPLOT program. After pressing [ENTER], The contents of the data file will be displayed on screen. You may now use the Left and Right arrow keys to scroll through the data. A cursor indicates where you are on the graph and the time and output voltage are displayed above the graph.

Position the cursor over an event, the press [B], [P], or [E] and enter the time listed. Convert to UT first if your data is in standard time. After you press enter you may then scroll to the next event time and so on.

NOTE: You cannot scroll while the cursor is in one of the time fields. Enter the data and press [ENTER] to start scrolling again.

Reducing Data Gathered By VLF Monitoring Systems

(Extracted from SID Technical Bulletin Vol. 3, Number 4, Oct. 1992)

The reduction process is quite simple, and consists of the steps which follow. First, the universal time for each of three event-phases must be measured for each SID. Examples are indicated on the recording at the end of this report.

Event Start: The moment when an event begins. Be aware that the amplitude of different events varies considerably, and some may appear in inverted form. If it is obvious that an event began before the first definable start time, an 'E' (before) is appended to the recorded time.

Event End: Of the three times, the end time is the most difficult to determine. It is defined as the moment when the trace returns to the diurnal trend line, or is interrupted by the onset of a new event. In the latter situation, the letter 'D' (after) is appended to that time, which in turn becomes the start time for the following event.

Event Maximum: The moment when the ascending (descending in the case of inverted events) branch slows its sharp rise. Note that this generally does not coincide with the event's peak amplitude.

If the trace goes off-scale as maximum is approached, or is interfered with in some other manner such as the onset of sunset, device failure, etc., we append a 'U' (uncertain) to the last identifiable time. For example, if the SID maximum occurs somewhere off-scale and the last determinable time is fourteen hours, ten minutes (1410), the time is recorded as 1410U.

After each of these times have been recorded, the event's 'Importance' and 'Definiteness' ratings can be determined. **Importance** generally refers to the length of an event, found by subtracting the start time from the end time. The table at right associates the Importance rating with event duration.

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

With respect to the observer's typical daily trace, a class 1 SID is an event with small intensity change and a relatively short duration. Class 2 is a moderate intensity event with a fairly long duration, and a class 3 describes a SID with a 'great' change in intensity and long duration.

Definition is a subjective estimate of an observer's confidence in the event. Normally, the events which are included in our reports have Definitions equal to 3 or greater. Use the righthand scale as a guide to Definition. Careful study and experience teaches observers how to recognize false SID events caused by man-made interference. Beginners should not hesitate to assign high Definition values to those events which are not correlated with known noise sources. Other observers' results will be compared to eliminate suspect events before a final report is submitted to the NGDC.

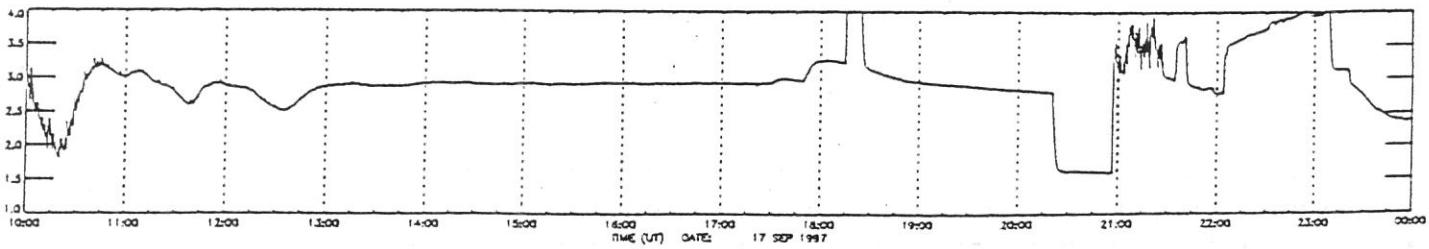
Confidence	Definition
Questionable	0
Possible	1
Fair	2
Reasonable	3
Reasonably Definite	4
Definite	5

E-Mail Format For SID Event Reports

The format prescribed by the NGDC always begins with the '40' NOAA SID identifier code. The AAVSO SID Coordinator assigns observer codes after the station is operating correctly and data is received regularly from that observer.

Column	Description
1-2	Data code; always 40
3-5	Blank
6-7	Year
8-9	Month
10-11	Day
12-13	Blank
14-17	Start time; UT hours and minutes event began
18	Start time qualifier; D = after, E = before, U = uncertain
19-22	End time; UT hours and minutes event ended
23	End time qualifier; D, E, U
24-27	Maximum time; UT hours and minutes of event maximum
28	Maximum time qualifier; D, E, U
29-44	Blank
45-46	SID Importance; sign in column 46
47-50	Blank
51	Definiteness
52-55	Code for monitored transmitter. The field consists of the final two station call letters and the two numbers which represent the frequency (kHz). The latter is rounded to the nearest integer. Example; the code for NSS at 21.4 kHz is recorded as SS21.
56-69	Blank
70-72	Observer code; Example A82

SID Sample Trace and Analysis

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40    970917   1727 1752D1732                1     5AA24              A82
40    970917   1752 1915 1756                2+    5AA24              A82
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SUDDEN IONOSPHERIC DISTURBANCES SUPPLEMENT

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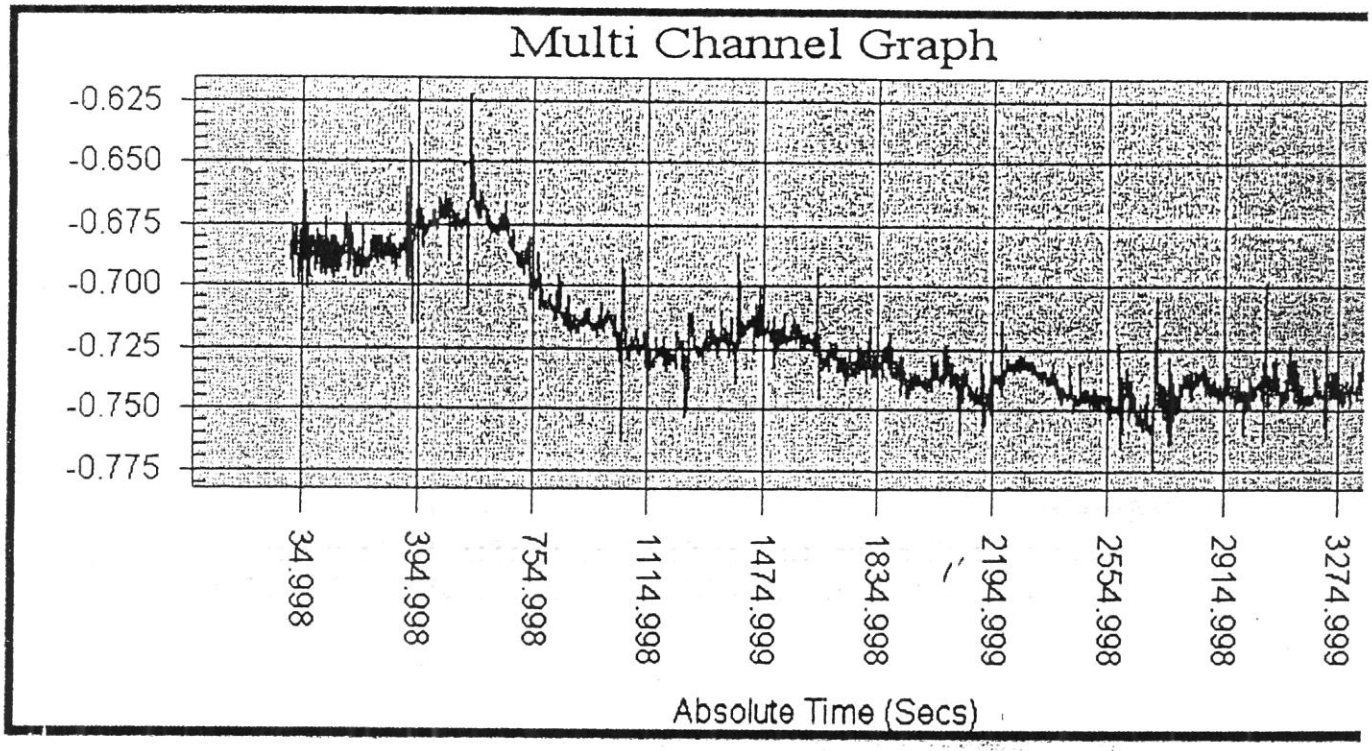
SUDDEN IONOSPHERIC DISTURBANCES RECORDED DURING AUGUST, 2000

The magnetogram below was made by Al McWilliams to show how a fluxgate magnetometer and trucks can detect cars passing by on a road 150 feet, 45m, from the magnetometer. More details are given in his letter below. Please notice that this recording was made with a top-of-the-line Keithley recording system that costs about US$1700+ so don't expect to do as well with the other systems that most of use. On the other hand, Joseph Lawrence's homemade system described below will make a pretty good recording of your magnetometer or SES receiver and it only costs about US$25 to build.



Many SID observers have had problems getting Joseph Lawrence's A/D converter kit and its associated software to work properly, if at all. I am one of those who never got mine to actually record SIDs. I therefore sent my kit and the software on a diskette to Al McWilliams who is an expert on such things. It turns out to be an excellent recording system for your SES receiver or a magnetometer if you treat it right. Below are letters from Al that explain how you should treat it to get the most out of it and precautions that need to be taken not to zap the Max 186 A/D converter integrated circuit chip. These precautions are not mentioned in the Technical Bulletin and may be the reason so many people couldn't get the system to work. The Tech Bulletin also says nothing about how to reconfigure the software. I should also mention that I used the software on a disk that Joseph sent me. It was also available on Joseph's web site but that site is now closed down. It is possible there is more information on my diskette than was available on the downloaded version. If so, and you can't refigure your software let me know and I'll send you a copy of the diskette Al used and was able to reconfigure for use in making 24-hour recordings of his magnetometer at a chart speed of ¼-inch/hr. Furthermore, if this all new to you and you would like to build this very nice A/D converter to record SESs or whatever on a computer I'll be glad to help you do that. Just send me your home address where I can mail the Technical Bulletin and the Diskette and I'll put them in the mail free of charge. I'd like to see people take advantage of this excellent recording system that you can build for about US$25.

Subj: **Some Comments about A/D 186**
Date: 9/7/00 1:19:26 AM Eastern Daylight Time
From: amcwill417@email.msn.com (amcwill417)
To: CapAAVSO@aol.com

Hi Cap,

Just a short note to mention a few points of interest.

(1) The Max186 as configured for the Logger can receive analog input voltages in the range 0 VDC to + 4 VDC (which I found out by looking at the data sheet at the Maxim Internet site). Otherwise permanent damage can happen to the M186.

(2) For SID work the rectified analog output voltage from the SID receiver will always be positive. Therefore there is no danger of feeding a negative voltage into the M186 provided one connects the wires correctly. However one needs to be careful that the receiver output does not exceed + 4 VDC.

(3) The magnetometer story is a little different. I assume that most magnetometers have a DC output voltage which can vary into both positive and negative territory. One usually sets the magnetometer so that the output is close to zero on a magnetically quiet day.

(4) Because of (3) and (1) one cannot attach the usual magnetometer to the Logger hardware. Instead one would have to offset the magnetometer output so that on a quiet day the output would be close to + 2 VDC. In addition one would have to be sure that the magnetometer output stayed between 0 VDC and 4 VDC during geomagnetic storms. Some external circuitry would be needed for this to ensure that the M186 is not damaged.

(5) The Lawrence software includes a file called LOGGER.CFG which assigns values to some variables used by LOGGER.EXE. This CFG (configuration) file can be edited to change some of the values provided one knows how to read, edit and re-save a DOS file. For example, Lawrence has values set so that the SID data is gathered only between about 10 UT and 24 UT (if I remember correctly) - that is not during the nighttime. One can always change these times. For example if one wanted to record data for the entire day one can set these values to, say, 0 UT to 24 UT (but using the correct format). Therefore if one had two computers (as you suggested) then one could use two M186 loggers - one for SIDs and one for other things such as magnetometer data. One could record a full 24 hours of magnetometer data and have it display on the full SID chart which is part of Lawrence's software.

(6) You seem to require that magnetometer data be plotted so that 1 hour equals 1/4 inch. Why is this necessary? Why not expand it?

(7) Operating two computers 24 hours a day would mean perhaps 5 amperes or 5 x 120 = 600 watts. So you can expect your electric bill to increase accordingly. I.e., it would be equilavent to having a 600 watt light bulb burning all the time. Per day this gives 600 x 24/1000 = 14.4 kwh, or 30 x 14.4 = 432 kwh per month. And this does not include the monitor. (kwh = kilowatt-hour). For persons operating such a setup at their place of work (university, school, company) that would not be a personal factor but for private persons at home it could significantly increase their electric bills. So some persons may be reluctant to go this route.

(8) Lawrence's software was written using QuickBASIC. I do not have this form of BASIC although the form I do have (GW BASIC) may work to modify his LOGGER software. The diskette you sent apparently has both the source code (LOGGER.BAS) as well as the compiled code (LOGGER.EXE). So I probably could modify his program. I can view LOGGER.BAS so I can see the entire program in detail. So I suppose that I might try to modify the software so that when one plots data from a magnetometer data file then it would show on the screen so that 1/4 = 1 hour. Then perhaps one could use one computer for both SIDs and Magnetometer.

By the way, did you receive an email yesterday which I tried to send from that Sony Imagestation site? I have no verification if it went through OK.

Best wishes, Al

Hi Cap,

The cars & trucks going by at the rear of my property cause momentary deflections in the field which are detected by the fluxgate magnetometer. It takes a truck or car moving at 40 mph (they all break the speed limit which is 30 mph) only a few seconds to go by. A torsion magnetometer will not respond very rapidly to such disturbances (a plus) whereas the fluxgate magnetometer here responds very rapidly (hence all the little noises are picked up). I am presently scanning at one data point every 2.5 (i.e., 2 1/2) seconds and that is what is plotted on the graph you have seen. The Keithley instrument also allows one to set the "rate" which determines the integration time for a reading in terms of number of power line cycles. I am now using the MED rate which equals 1 power line cycle and this filters out some high frequency noise such as power line noise. Because of my slow sample rate (1 reading per 2.5 seconds) the sample rate is not compromised.

I went to Radio Shack and purchased a 9V, 300 mA, power adapter to supply power to the LOGGER. CAUTION, CAUTION, CAUTION! This device is furnished with a two position plug which allows one to change the polarity of the 9VDC output. In one position the center pin of the output plug is + whereas if the plug is reversed the center pin is - . As shown in Lawrence's circuit diagram one should have the center pin +.

For anyone who receives the Lawrence software the logger configuration file is available for reading assuming that it has been loaded into the computer from the Lawrence diskette. Assuming one is in the directory where the logger files are stored all you need do is type this after the C:\xxxxx\> prompt, where xxxxx is the name of the directory:

type logger.cfg | more

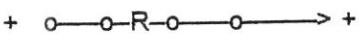
Note: a single space between type and logger. A period . between logger and cfg. A single space between cfg and |. A single space between | and more.

The file will then display on the screen one page at a time (you hit any key to get to the next page). The switch " | more" enables the single page reading. If you enter only "type logger.cfg" the whole file spits out and you end up seeing only the end of the file on the screen.

For input protection to the logger A/D converter I would suggest the following:

(a) Design the magnetometer electric circuit so only positive voltages are output from it. Then there is no need to worry about negative voltages AND all excursions of the magnetometer will be followed correctly.

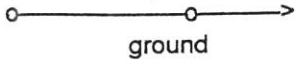
(b) One can use a Zener diode to protect the logger from positive overvoltage.



input from mag input

Z

to A/D



ground

ground

The Zener diode Z could be rated at, say, about 4 volts. Resistor R might be of the order of 2000 ohms. Then if the output from the magnetometer were to exceed 4 volts the Zener would conduct and act like a low valued resistor (say, 100 ohms) so that most of the input voltage would appear across R and not not appear at the A/D input which is across Z. For positive input voltages less than 4 volts the Zener would effectively act like an open circuit and the full input voltage would be fed to the A/D input. One can purchase Zener diodes with different voltage ratings so select one around 4 volts. The Zener has a polarity so be sure it is connected correctly. (In the figure it would be like a diode pointing upwards).

Additional Note: If a negative voltage came from the magnetometer the above arrangement would clip it since the Zener diode would then conduct in the same sense as any diode. So it would also protect the A/D from negative voltages Altogether: the above arrangement would clip incoming voltages in excess of +4 volts and clip incoming negative voltages as well. In all cases the power rating of the Zener should not be exceeded.

Best wishes, Al