

Solar Bulletin

THE AMERICAN ASSOCIATION OF VARIABLE STAR OBSERVERS - SOLAR DIVISION

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July 2001

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

Day	N	Raw	s.d.	K-corrected	s.d.	s.e.
1	40	100	4.0	81	1.7	0.27
2	43	112	3.7	87	1.9	0.29
3	40	101	4.2	79	2.0	0.32
4	42	100	3.0	82	1.9	0.29
5	43	83	4.6	64	2.3	0.35
6	45	57	2.3	48	1.8	0.27
7	39	56	3.4	45	1.8	0.29
8	40	77	3.7	62	2.0	0.32
9	46	98	3.9	78	2.2	0.32
10	44	93	4.0	74	1.7	0.26
11	40	103	4.3	81	2.8	0.44
12	44	122	3.8	101	2.8	0.42
13	45	145	4.8	118	2.9	0.43
14	48	131	5.4	106	2.4	0.35
15	43	140	5.4	111	2.0	0.30
16	43	147	4.9	122	3.2	0.49
17	39	159	7.0	126	3.8	0.61
18	43	155	6.5	126	4.1	0.63
19	34	160	7.1	129	3.6	0.62
20	42	139	7.3	111	3.7	0.57
21	41	130	5.0	105	2.7	0.42
22	43	137	5.2	108	2.4	0.37
23	47	130	4.9	106	2.1	0.31
24	41	113	5.5	94	2.7	0.42
25	37	102	5.1	83	2.4	0.39
26	37	77	3.0	64	2.1	0.35
27	44	81	2.4	64	1.8	0.27
28	39	76	3.5	61	3.0	0.48
29	41	58	2.6	47	1.6	0.25
30	41	68	2.2	55	1.8	0.28
31	46	73	2.8	60	1.6	0.24

Means: 107.2 86.5

Total No. of Observers: 68

Total No. of Observations: 1300

Table II. July Observers

17	AAP	P. Abbott	20	KAPJ	J. Kaplan
7	ANDE	E. Anderson	18	KHAR	R. Khan
22	ATON	A. Attanasio	15	KNJS	J&S Knight
17	BARH	H. Barnes	17	KUZM	M. Kuzmin
21	BATR	R. Battaiola	7	LERM	M. Lerman
24	BEB	R. Berg	16	LEVM	M. Leventhal
21	BEGM	M. Begbie	20	LIZT	T. Lizak
21	BMF	M. Boschat	20	MALK	K. Malde
15	BOSB	B. Bose	25	MARJ	J. Maranon
28	BRAB	B. Branchett	14	MAV	D. Matsnev
28	BRAR	R. Branch	27	MCE	E. Mochizuki
15	BROB	R. Brown	7	MILJ	J. Miller
5	CAMP	P. Campbell	30	MMI	M. Moeller
25	CARJ	J. Carlson	24	MUDG	G. Mudry
29	CHAG	G. Morales	7	OBSO	IPS Obs.
21	CKB	B. Cudnik	15	RICE	E. Richardson
8	CLZ	L. Corp	25	RITA	A. Ritchie
25	COMT	T. Compton	29	SCGL	G. Schott
31	CORA	A. Coroas	12	SCHG	G. Scholl
23	CR	T. Cragg	19	SIMC	C. Simpson
6	DEMF	F. Dempsey	17	STEF	G. Stefanopoulos
26	DRAJ	J. Dragesco	27	STEM	G. Stemmler
31	ELR	E. Reed	29	STQ	N. Stoikidis
23	FEEC	C. Feehrer	28	SUZM	M. Suzuki
28	FLET	T. Fleming	17	SZUM	M. Szulc
27	FUJK	K. Fujimori	24	TESD	D. Teske
14	GOTS	S. Gottschalk	15	THR	R. Thompson
12	HALB	B. Halla	24	URBP	P. Urbanski
3	HAYK	K. Hay	18	VARG	A. Vargas
24	HSF	C. Hossfield	25	VIDD	D. Vidican
5	IMPR	R. Imperi	21	WILW	W. Wilson
26	JAMD	D. James	9	WITL	L. Witkowski
11	JEFT	T. Jeffrey	30	YESH	H. Yesilyaprak
7	JENJ	J. Jenkins			
3	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 or (407) 482-3963

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

Day	RG	S:G	Day	RG	S:G	Day	RG	S:G	Day	RG	S:G
1	8.1	2.4	9	5.9	6.6	17	10.2	5.6	25	6.0	7.0
2	8.8	2.7	10	6.0	5.5	18	10.7	4.5	26	4.7	6.4
3	7.7	3.1	11	7.0	4.7	19	11.2	4.3	27	5.1	5.9
4	7.6	3.2	12	8.6	4.2	20	9.2	5.1	28	5.1	4.9
5	6.3	3.2	13	9.8	4.8	21	7.8	6.7	29	4.0	4.5
6	4.2	3.6	14	7.9	6.6	22	7.9	7.3	30	4.7	4.5
7	3.5	6.0	15	8.8	5.9	23	7.4	7.6	31	4.6	5.9
8	4.6	6.7	16	9.3	5.8	24	6.9	6.4	Mn.	7.1	5.2

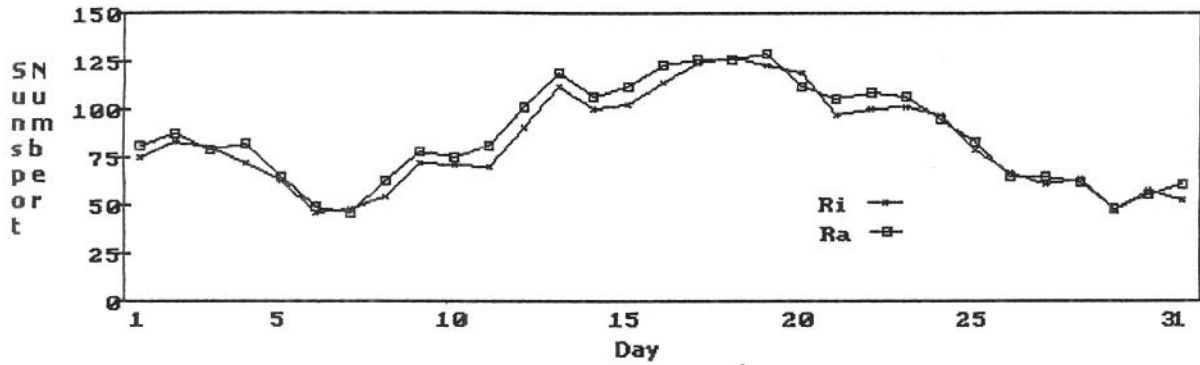


Fig. 1. Comparison of Ri (provisional) and Ra estimates for July.
(Ri Source: <http://sidc.oma.be/index.php3>)

Smoothed Mean Sunspot Number (Rsm) for January 2001: 114.7

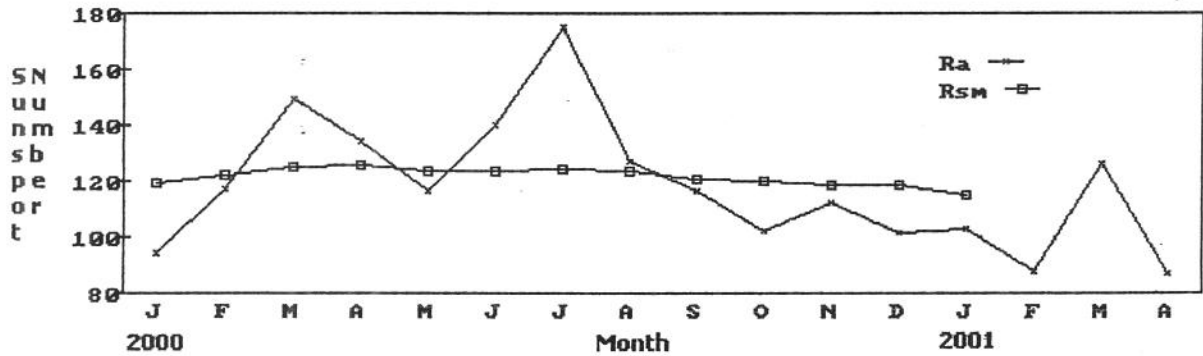


Fig. 2. Monthly Ra and Smoothed Mean Sunspot Numbers (Waldmeier method).

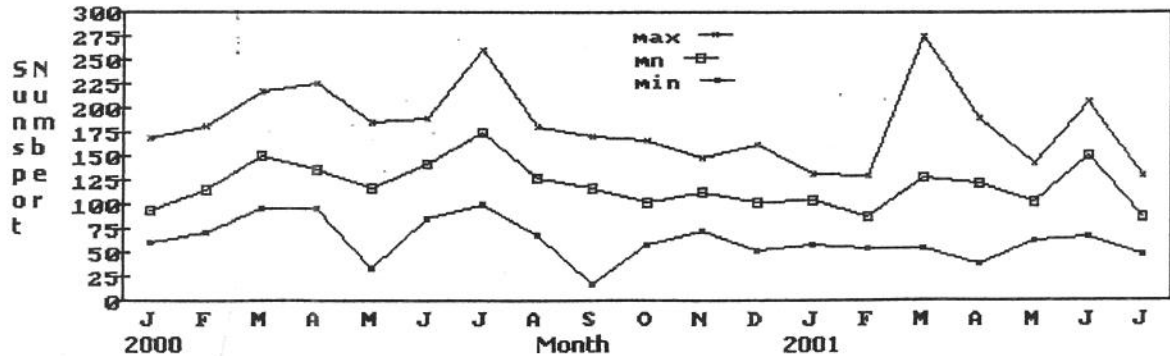


Fig 3. Maximum, mean, and minimum Ra Values for Each Month from January 2000 to Present.

Editor's Notes

Loss of a Valued Observer

In mid-July, I was saddened to learn of the unexpected death of Michiel Daniel ("Danie") Overbeek (OB, A52), a resident of Edenvale, Republic of South Africa and a member of the AAVSO since 1953. Over the course of his long career, Danie contributed in excess of 287,000 observations on variable stars. He also reported on sunspot activity and, along with his colleague, Domenic Toldo, contributed a large number of SID observations. Recently, the Overbeek-Toldo team was able to detect the occurrence of a soft gamma-ray repeater (SGR) and a suspected gamma-ray burst (GRB) using a modified SID receiver, thereby validating the use of this equipment in the pursuit of these infrequent events. More information on his technical accomplishments can be found in Casper Hossfield's supplement to this issue of the *Bulletin*.

In 1986 Danie was presented with the AAVSO's 26th Merit Award in recognition of his variable star work, his guidance of observers in South Africa and his service on the AAVSO Council. He received a second award in 1999, this time in recognition of his contributions to the work of the Solar Division.

Danie was truly a dedicated observer in the very best tradition of the AAVSO. He will be sorely missed.

SolObs Program

Several observers who have downloaded and tried the SolObs program have asked how to enter the locations of groups and spots in the program. The answer is that the program is not currently able to hold that information, and a note has now been added to the website to advise users of the limitation. If the program proves otherwise attractive to potential users, that capability will be added. In the meantime, please continue to use SUNKEY or its related text version in order to enter spot/group locations if you typically collect this information.

Related note: Although monthly spot/group location information is not reported in the *Bulletin* or on the website, these data are archived along with the other data contained in observers reports so that they remain available for later analyses if desired.

Website Photo Gallery

In earlier years, photos contributed by observers were occasionally published in the *Bulletin*, and a number of observers have recently indicated an interest in continuing the tradition. The AAVSO/Solar Division website provides what I regard to be an ideal medium for such contributions because it affords better image quality than can be achieved with photocopying, does not inflate the costs of producing and mailing the *Bulletin*, and enables the material to reach a wider audience.

Accordingly, we have begun a new section on the website called the "Photo Gallery, which this month contains a fine set of disk and flare images that were contributed by Jean Dragesco (DRAJ). A photo of the disk, contributed somewhat earlier by A. Gonzalo Vargas (VARG), is also included on the Solar Division page.

I encourage all observers who enjoy photographing the sun and who are able to achieve good results to send their images for posting to the website. Although I cannot promise that all contributions will appear there, I will do my best to incorporate as many as possible.

Photos may be sent either electronically or in print form. All submissions should contain, at a minimum, annotations indicating the day and UT of the exposures. Additional information that may be of interest to others interested in taking solar photographs (film/speed, special filters, etc.) may be included. Photos sent electronically should be scanned at 300 dpi, formatted as JPG or GIF documents, and transmitted to the solar@aavso.org address. Prints should be sent to the AAVSO headquarters in Cambridge, MA.

New Observer

This month I want to welcome Dimitri Matsnev (MAV) of Moscow, Russia to the corps of solar observers. Dimitri has been a member of the AAVSO since 1991 and, although he reports spending most of his time observing variable stars, he has recently renewed his interest in solar observations at the urging of his colleague, Mikhail Kuzmin (KUZM).

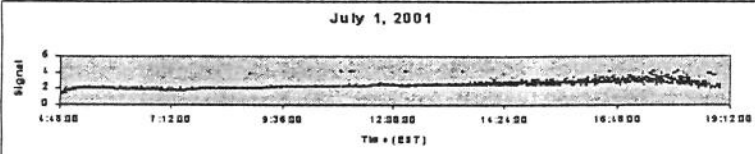
Welcome to the AAVSO's Solar Division, Dimitri. We look forward to receiving your monthly reports.

Clear Skies,

-CEF

Sudden Ionospheric Disturbance Report

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



Sudden Ionospheric Disturbances (SID) Recorded During July 2001

(Analysis performed by Michael Hill, SID Analyst)

Date	Max	Imp	Date	Max	Imp	Date	Max	Imp
010708	1147	2						
010708	1350	2						
010708	1618	2						
010708	2037	2						
010709	0745	2+						
010711	1708	2+						
010714	1800	1						
010714	2132	2+						
010715	0700	3+						
010715	1410	2						
010719	1010	2						
010728	1350	2+						
010730	0836	2						
010730	2044	2+						
010731	1212	2						
010731	1725	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 definiteness rating = 5
- 3) Reported by overseas observers with high definiteness rating

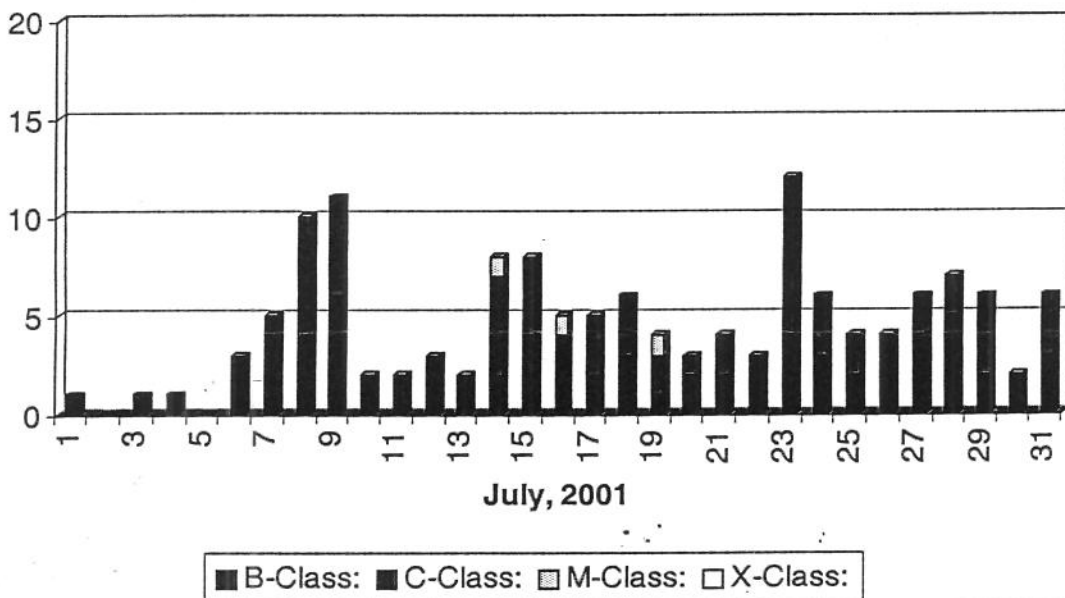
Observer	Code	Station(s) monitored
Jerry Winkler	A50	NAA,NPM, 25.2khz (TBD)
Art Stokes	A62	NAA
James Ellerbe	A63	ICV
Peter Kink	A80	FTA
Walter Moos	A84	FTA,GBZ, ICV
Mike Hill	A87	NAA
Guglielmo DiFilippo	A93	HWU
Ted Poulos	A95	NAA
Roberto Battaola	A96	HWU
Mike King	A99	GYA

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

Solar Events

July was a very slow month for SID Observers, especially as compared to some of the last few months of this year. There were 139 flares detected by the GOES-8 Satellite but, as can be seen from the chart below, many of these were lower B-Class flares. There were only 3 M-Class flares and no X-Class. This all resulted in few SIDs being detected. Only sixteen for that matter. Most were medium intensity events with an importance rating of 2 or 2+. We are starting to head down the path to Solar Minimum so months like this can be expected more and more as time goes on. Now is the time to get those high-Q capacitors and fine tune your receiving systems. There is a new Q&A section on the AAVSO web site in the SID section that contains some interesting material to this end. It was generated based on some questions by a potential observer but I think brought up some good points that could be of help to even those of us who are already up and running. Check it out and see if any of the info can be of help to you.

Solar Flare Summary Based on Goes-8 Data



SUDDEN IONOSPHERIC DISTURBANCES SUPPLEMENT

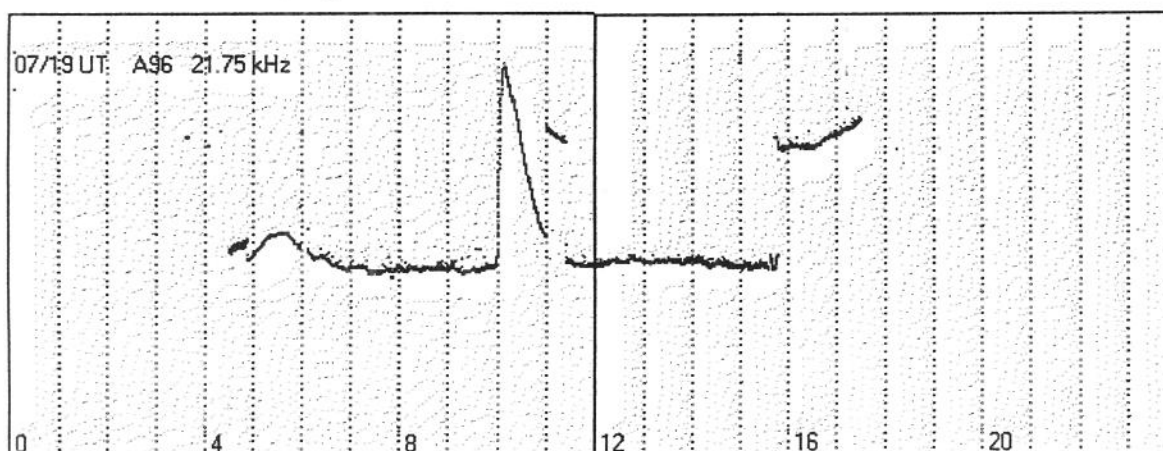
Casper H. Hossfield, SID Sup. Editor
PO Box 23
New Milford, NY 10959, USA

SUDDEN IONOSPHERIC DISTURBANCES
RECORDED DURING July, 2001

capavso@aol.com
Fax 973 853 2588

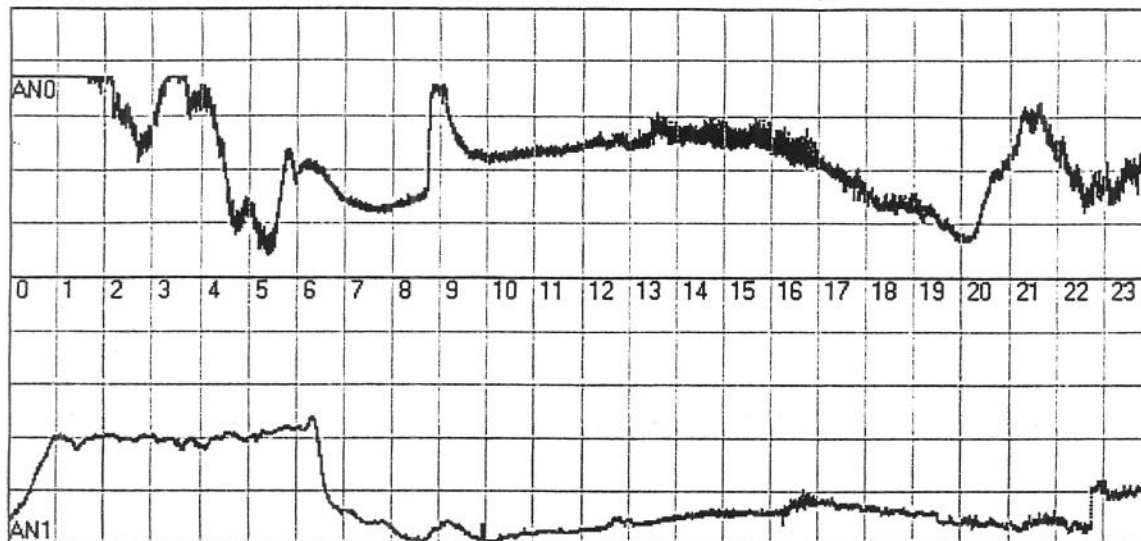
There is sad news to report this month. We have lost Danie Overbeek, A-52, in South Africa. Danie died unexpectedly of heart failure on 19 July. Danie was one of our most successful SID observers. He is the only one who ever recorded a Gamma ray burst, GRB, and he also recorded a soft gamma ray repeater, SGR, in 1998. Danie was an air force veteran and after World War II went to work for South African Airlines where he worked most of his life. I got to know Danie through his letters in Variable Views and when he transferred to the New York office of SAA I visited him where he lived then, near Kennedy International Airport. Besides being a famous AAVSO variable star observer, Danie also like to build homemade scientific instruments so I had no difficulty convincing him he should build an SES receiver to record SIDs. He soon had it working and I assigned him A-52. He recorded the signal strength of Navy VLF station, NSS, in Annapolis, MD which was a very sensitive propagation path at his distance from the NSS transmitter. When Danie retired from SAA he returned to his home in Eadenvale near Johannesburg, South Africa. Danie had upgraded his SES receiver by adding a remote loop antenna preamplifier so he had no difficulty recording NWC in Northwest Cape, West Australia at a distance of ~5000 miles East of Johannesburg to cover the early UT hours AAVSO observers, most of whom were in the USA, were not able to cover. Danie also built a McWilliams torsion balance magnetometer and many of his magnetograms have appeared in the Solar Bulletin. Another scientific instrument Danie was very proud of was his homemade seismograph which easily detected earthquakes of magnitude 6 or greater anywhere in the world. It included a homemade seismograph drum that recorded the earthquakes on paper with a ball point pen. As an amateur seismologist Danie was an active member of the Public Seismic Network, an amateur seismologist group that several other SID observers belong to. We will miss Danie but his A-52 station will continue to report and search for GRBs. It will be kept in operation by Danie's good friend Domenic Toldo who built the three superheterodyne SES receivers used to produce the multiplexed charts of three signals that recorded the GRB and the SGR. These receiver's are down-converting superhets of Domenic's own design tuned to NWC in West Australia, GBR in England and NAA in Cutler, Maine, USA. The three signals multiplexed on a single Rustrak chart made it possible to reliably identify the GRB and SGR because all three signals were enhanced at the exact time the events occurred.

Below is a computer recorded chart that Roberto, Battaiola, A-96, made in Italy by recording the signal strength of VLF station, HWU in LeBlanc, France transmitting on 21.75 kHz. It shows an SES starting at 1000 UT and lasting over an hour. This chart was sent electronically for publication in the Solar Bulletin. Roberto also sent a list of VLF stations transmitting on frequencies below 150 kHz. The last two pages of this supplement show stations below 100 kHz which are the ones useful for detecting solar flares by the SID method. This list was compiled by Klaus Betke << Klaus.betke@epost.de >> No call letters are given for the station on 25.2 kHz which AAVSO sometimes calls TBD. Al McWilliams called this station in La Moure, ND on the phone and was told that no call letters have been issued for this Navy VLF station which uses the antenna of what was formally an Omega navigation system transmitter.



Jerry Winkler, A-50, has been experimenting with an ADR2000 A/D converter. Below are recordings he made of NAA and NPM. The recording of NAA in Cutler, Maine transmitting on 24 kHz show an SES starting at ~0845 UT. The NPM chart does not show this SES because its sunrise pattern has not finished at that time and the Houston, Texas to Hawaii propagation path is not sensitive to SIDs yet.

NAA--NPM 7/28/01 12:00:02 AM 10 point filter 1 sec/scan 3 of 5 days



Kriss Larson wrote a very interesting article in the August issue of "the Lowdown", a publication of the Longwave Club of America about his visit to Navy VLF station NLK in Jim Creek, Washington, USA that transmits on 24.8 Khz. Kriss was not allowed on the military reservation but he did manage to talk to the duty radio technician in charge and learned some interesting facts about NLK. The antenna is three long wires strung between three pairs of towers on two 3000 foot high ridges 1.5 miles apart. The cables that span the valley between the ridges are 8000 feet long with downleads to the transmitter attached to the centers of the three heavy cables. Only the center 4000 feet of each cable is used as an antenna. Terminal insulators are located about half way between the centerpoint and the towers so the whole horizontal line is not energized. These cables spanning the valley are a serious flying hazard and are clearly marked as such on aeronautical sectional charts.

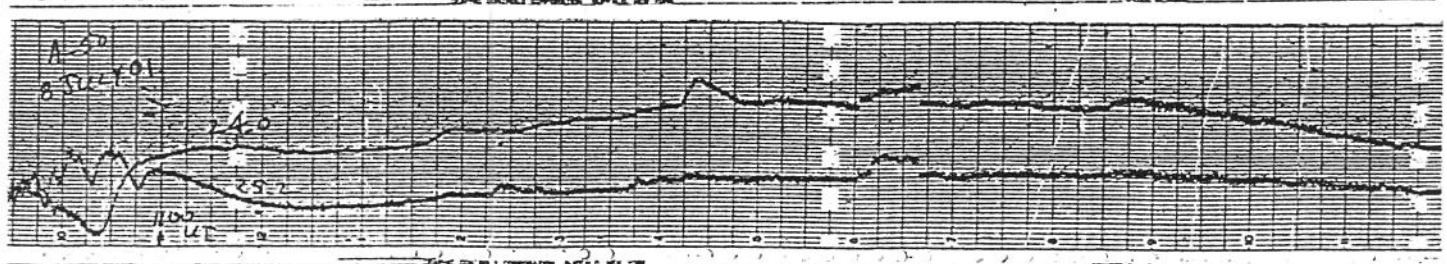
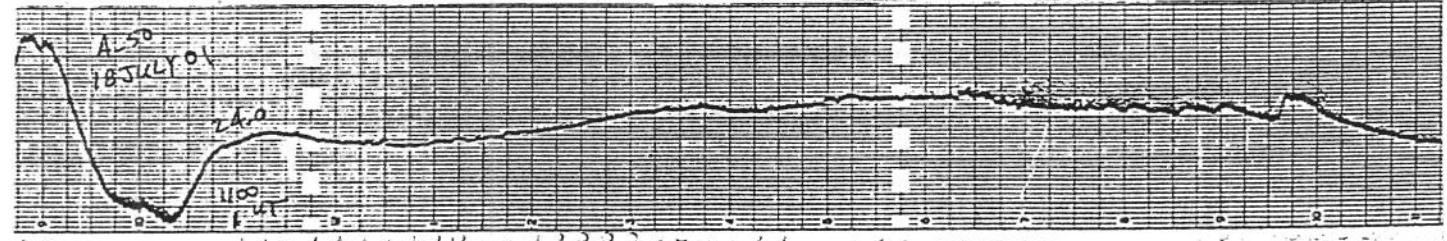
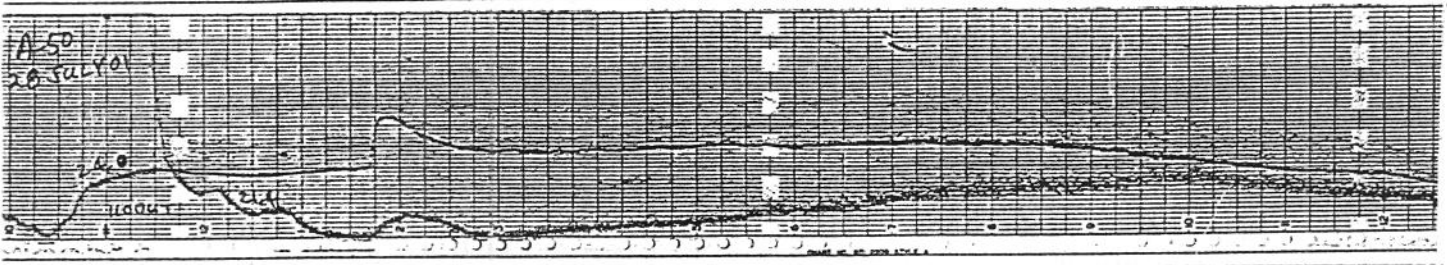
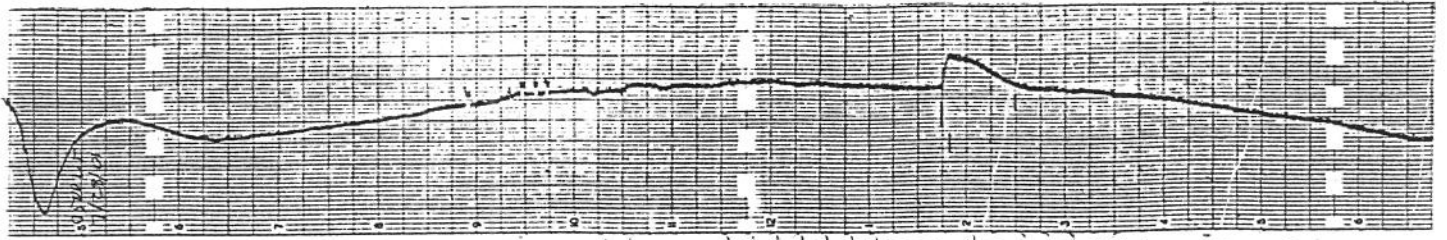
The NLK transmitter is rated at 1.5 megawatts but actual effective radiated power or antenna efficiency was secret information. Other information in The Lowdown tells how back in the '50s the Jim Creek antenna was tried out as an Omega navigation system transmitter antenna but its efficiency was disappointing so the Omega station was moved to Hawaii where the antenna spanned a mile-wide volcano crater. The ~ 10 kHz Omega transmitter there was an Alexanderson alternator, a high frequency alternator with its AC output fed directly to the antenna. Several SID observers belong to the Longwave Club of America and receive "The Lowdown". There is much of interest, both historical and technical, to be found in this monthly publication you can subscribe to for \$18/year. The publisher is Bill Oliver, 45 Wildflower Road, Levittown, PA 19057 in case you are interested.

Another interesting fact Kriss found out is all Navy VLF stations have monitoring stations where they can monitor their signal and all other Navy stations. The Jim Creek monitoring station uses a large buried loop antenna at its monitoring station in nearby Bangor, Washington. The 24.8 kHz signal penetrates rock for some distance and is used by miners to detect ore bearing structures. NLK's buried loop antenna at their monitoring station in Bangor, WA explains why AAVSO observers have had good luck with loop antennas in basements and sitting right on the ground outside. It would be an interesting experiment to build a large loop antenna and lay it out on the ground.

Free software and other information you can use to record SIDs or other data are available from a company called Radio-SkyPipe. Some of what they have to offer may be of interest if you like to experiment. Their web site describes a wide variety of hardware and software that can be used mostly for radio astronomy projects. They show a simple MAX187 A/D converter that might be easier to build than Joseph Lawrence's MAX186 converter. If you feel like experimenting You can find out more from this web site:

<http://www.radiosky.com/skypipeishere.html>

On the following page are SID recording of flares that occurred during July . The first chart was made by Jim Ellerbe, A-63, in Spain recording Italian VLF station ICV in Sardinia transmitting on 20.3 kHz. The others are Rustrak recordings made by Jerry Winkler, A-50.



Some radio signals below 150 kHz heard in Europe

kHz	Callsign	Station	Country	Mode	Remarks
0.082		Navy; near Murmansk	RUS	Very slow "RTTY"	received in Italy 2000/2001
11.905, 12.649, 14.881		RSDN-20 ("Alpha") navigation system	RUS	Pulses	
15.1		Unid		RTTY 100 Bd	9/2000
16.0	GBR	Navy Rugby	G	RTTY 75, 200 Bd	200 Baud as of 5/2000
16.3	VTX1	Navy Vijayanarayanam	IND	CW	rare; 11/2000
16.4	JXN	Navy Novik ("Helgeland")	NOR	RTTY 200 Bd	
16.8		Unid		RTTY	
17.0	VTX2	Navy Vijayanarayanam	IND	CW	rare; 10/2000 heard in NOR
17.2	SAQ	Grimeton	S	CW	historical transmitter, operating 1-2 x per year
18.1	RDL	Navy Krasnodar	RUS	RTTY 50 Bd, CW	& other locations
18.1	RKS	Navy Murmansk (?)	RUS	RTTY 50 Bd, CW	
18.1	RLO	Navy Ryazan (?)	RUS	RTTY 50 Bd, CW	
18.2	VTX3	Navy Vijayanarayanam	IND	CW	
18.3	HWU	Navy Le Blanc	F	RTTY 200 Bd	
18.9	RKS	Navy Murmansk (?)	RUS	RTTY 50 Bd, CW	rare
19.0	GBZ ?	Navy Criggion?	G	RTTY 100 Bd	
19.6	GBZ ?	Unid	G	RTTY	
20.3	ICV	Navy Tavolara, Sardinia	I	RTTY 100, 200 Bd	
20.6	3SA	Navy Changde	CHN	CW	
20.9	HWU	Navy Le Blanc	F	RTTY 200 Bd	
21.1	RDL	Russian Navy	RUS	RTTY 50 Bd, CW	Krasnodar & other locations
21.4		Unid		RTTY	
21.75	HWU	Navy Le Blanc	F	RTTY 200 Bd	
23.4	DHO38	Navy Ramsloh	D	RTTY 200 Bd	now DHJ58 ?
24.0	NAA	Navy Cutler, ME	USA	RTTY 200 Bd	
25.0	RJH63	Krasnodar TS	RUS	CW	
25.0	RJH66	Bishkek TS	KGZ	CW	ex USB2
25.0	RJH69	Molodecno TS	BLR	CW	ex UNW3
25.0	RJH77	Arkhangelsk TS	RUS	CW	ex UPD8
25.0	RJH99	Nizhny Novgorod TS	RUS	CW	ex UTR3
25.0	RAB99	Khabarovsk TS	RUS	CW	ex UQC3; never heard
25.2		Navy (?) La Moure, ND	USA	RTTY 200 Bd?	ex Omega navaid station
26.7	TBB	Navy Bafa	TUR	RTTY 50, 100 Bd	
27.4	RDL	Russian Navy	RUS	RTTY 50 Bd, CW	unknown location. Far East?
28.5		Unid	USA?	RTTY	
37.5	NRK	US Navy Keflavik	ISL	RTTY 200 Bd	Tx location Grindavik?
38.0	SHR/"SRC"	Navy Ruda	S	CW, RTTY (ITA-2) 50 Bd	

40.4	SAS/"SRC"	Navy Varberg	S	CW, RTTY (ITA-2) 50 Bd	
42.5	SAS2/"SRC"	Navy Varberg	S	CW, RTTY (ITA-2) 50 Bd	
40.8	NAU	US Navy Aguada	PTR	RTTY 200 Bd	
44.2	"SRC"	Navy, unknown location	S	CW, RTTY (ITA-2) 50 Bd	apparently not Varberg
45.9	NSY	US Navy Niscemi	I	RTTY 200 Bd	
49.0		Unid	GRC?	RTTY 50 Bd, 200 Bd	
50.0	OMA	Praha TS	CZR	CW, PSK	QRT 31-DEC-1995
50.0	RTZ	Irkutsk TS	RUS	CW	heard in 2/2001
51.95	GYN1	Royal Navy Thurso	G	RTTY 50/75, 100 Bd	
53.0	DHJ59	Navy Wilhelmshaven	D	RTTY 75 Bd / 70 Hz	
53.4	TBG	Navy Canakkale	TUR	RTTY 100 Bd	
53.6	RTO	Moskva Meteo	RUS	FAX 90/120 rpm	now 53.8. Nil after 04/2000
56.4		Unid Royal Navy. Inskip?	G	RTTY 50/75	rare. Plain text in 9/1999
57.4		Unid		RTTY 75 Bd	
57.7	LBA	Navy Gossen/Trondheim	NOR	RTTY 75 Bd	
60.0	WWVB	Ft. Collins TS, CO	USA	CW	
60.0	MSF	Rugby TS	G	CW	
61.8	GIZ20 ?	Royal Navy Inskip	G	RTTY 50/85, 100 Bd	Two channels
62.6		Unid French Navy	F	RTTY 200 Bd	
63.8		Unid		RTTY 200 Bd	
64.6	GBV20 ?	Unid	G	RTTY 75 Bd	
65.8		Unid		RTTY 200 Bd	
66.7	RBU	Moskva TS	RUS	AM, CW	
68.0	GBY20 ?	Royal Navy	G	RTTY 50, 100 Bd	
68.9	DHJ58	Navy Glücksburg	D	RTTY 75 Bd	now DHO38 ?
73.2		Royal Navy	G	RTTY 50 Bd, 75 Bd	2 channels
73.6		Unid		RTTY 75 Bd	nighttime only
75.0	HBG	Nyon (Prangins) TS	SUI	CW	
77.5	DCF77	Mainflingen TS	D	CW & PSK	
78.2		Unid Royal Navy	G	RTTY 75 Bd	
81.0	GYN2	Royal Navy	G	RTTY 50 Bd	
82.8	MKL	RAF Kinloss	G	RTTY 75 Bd, CW	CW ceased 3/2001
87.0		Unid		RTTY 75 Bd	
87.8		Unid		RTTY 75 Bd	paired with 87.0?
90-110		LORAN Navigation			
111.3	SOA211	Warszawa Meteo	POL	RTTY (ITA-2) 50 Bd	QRT 1999
111.8		Unid	CZR	Unid data bursts	Mo-Fr day time. 1999/00 nil
118.8	GYE ?	Royal Navy	G	RTTY 100 Bd	
119.0	IDQ	Navy Roma	I	CW	last log 1994
119.8	SXA	Navy Spata Attikis	GRC	CW	QRT 1996
120.9		Unid		RTTY 75 Bd	
122.3	OUA	Navy Århus	DNK	RTTY 75 Bd	