

Solar Bulletin

THE AMERICAN ASSOCIATION OF VARIABLE STAR OBSERVERS - SOLAR DIVISION

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February 2002

Table I. Mean Sunspot Numbers (Ra) for February 2002 [boldface = maximum, minimum]

Day	N	Raw	s.d.	K-corrected	s.d.	s.e.
1	28	170	8.4	128	3.5	0.66
2	35	199	9.1	143	3.9	0.66
3	27	212	7.9	170	3.5	0.67
4	36	220	9.2	165	3.9	0.65
5	29	203	9.3	159	3.8	0.71
6	31	174	10.5	128	4.6	0.83
7	28	152	6.6	109	3.2	0.60
8	38	149	6.6	113	3.9	0.63
9	36	157	7.8	118	4.1	0.68
10	32	150	6.9	117	3.1	0.55
11	33	168	6.8	125	3.2	0.56
12	33	153	7.8	115	3.7	0.64
13	27	153	7.7	114	2.9	0.56
14	44	131	7.4	98	3.5	0.53
15	32	124	8.6	95	4.1	0.72
16	37	110	8.1	85	3.3	0.54
17	30	114	7.3	90	3.4	0.62
18	39	104	7.3	80	3.2	0.51
19	32	106	5.5	79	2.4	0.42
20	29	126	8.0	91	2.9	0.54
21	25	120	10.6	81	5.0	1.00
22	31	114	6.1	86	3.3	0.59
23	40	126	5.3	95	2.4	0.38
24	43	148	5.4	115	2.9	0.44
25	35	189	6.7	143	4.7	0.79
26	30	164	8.1	126	4.8	0.88
27	27	149	10.2	115	4.4	0.85
28	31	138	7.8	109	4.5	0.81
29	---	---	---	---	---	---
30	---	---	---	---	---	---
31	---	---	---	---	---	---

Table II. February Observers

12 AAP P. Abbott	21 JAMD D. James
7 ANDE E. Anderson	21 JEFT T. Jeffrey
14 BARH H. Barnes	2 JENS S. Jenner
3 BATR R. Battaiola	24 KHAR R. Khan
7 BEB R. Berg	10 KNJS J&S Knight
10 BERJ J. Berdejo	9 LERM M. Lerman
11 BMF M. Boschat	11 LEVM M. Leventhal
23 BOSB B. Bose	6 LUBT T. Lubbers
23 BRAB B. Branchett	26 MARJ J. Maranon
8 BRAD D. Branchett	20 MCE E. Mochizuki
23 BRAR R. Branch	21 MMI M. Moeller
21 BROB R. Brown	4 MUDG G. Mudry
2 BURS S. Burgess	13 OBSO IPS Observatory
3 CAMP P. Cambell	2 RAMJ J. Ramsey
13 CARJ J. Carlson	15 RICE E. Richardson
25 CHAG G. Morales	18 RITA A. Ritchie
16 CKB B. Cudnik	18 SCGL G. Schott
11 COMT T. Compton	10 SCHG G. Scholl
28 CORA A. Coroas	8 SIMC C. Simpson
22 CR T. Cragg	7 STAB B. Gordon-States
5 CVJ J. Carvajal	5 STEF G. Stefanopolis
12 DELS S. Delaney	11 STEM G. Stemmler
3 DEMF F. Dempsey	18 STQ N. Stoikidis
23 DGP G. Dyck	19 SUZM M. Suzuki
15 DRAJ J. Dragesco	13 SZUM M. Szulc
13 DUBF F. Dubois	15 TESD D. Teske
24 ELR E. Reed	11 THR R. Thompson
12 FEEC C. Feehrer	9 TJV J. Temprano
11 FERJ J. Fernandez	17 URBP P. Urbanski
22 FLET T. Fleming	10 VALD D. delValle
20 FUJK K. Fujimori	5 VARG A. Vargas
19 GIOR R. Giovanoni	10 WILW W. Wilson
8 GOTS S. Gottschalk	6 WITL L. Witkowski
8 GUNM M. Gundlach	3 WKW K. Watts
3 HALB B. Halls	18 YESH H. Yesilyaprak
2 HAYK K. Hay	

Reporting Addresses

Sunspot Reports -- email: solar@aaavso.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

Means: 32.8 150.8 114.0

Total No. of Observers: 71

Total No. of Observations: 918

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

Day	RG	S:G	Day	RG	S:G	Day	RG	S:G	Day	RG	S:G
1	8.3	10.5	9	10.2	5.4	17	6.3	8.1	25	10.8	7.5
2	10.0	9.9	10	9.3	6.1	18	5.6	8.6	26	10.2	6.1
3	12.0	7.7	11	10.3	6.3	19	5.6	8.9	27	8.7	7.1
4	12.0	8.3	12	8.9	7.2	20	7.2	7.5	28	7.1	9.4
5	12.6	6.1	13	9.0	7.0	21	6.9	7.4	29	---	---
6	10.7	6.3	14	7.1	8.5	22	7.1	6.1	30	---	---
7	10.2	4.9	15	7.5	6.5	23	7.7	6.4	31	---	---
8	10.5	4.2	16	6.1	8.0	24	8.9	6.6	Mn.	8.8	7.2

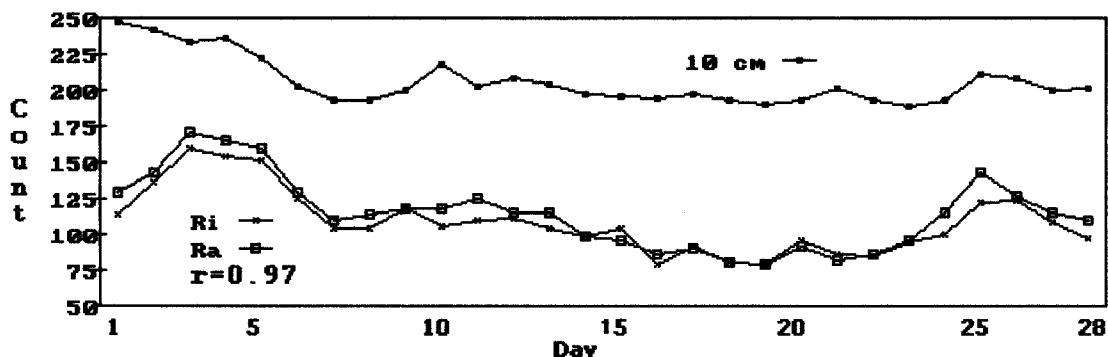


Fig. 1. 10 cm Solar Flux and Comparison of Ri (provisional) and Ra Estimates for February.

(Ri Source: <http://sidc.oma.be/index.php3>)
 (10cm Source: <http://www.drao.nrc.ca/icarus>)

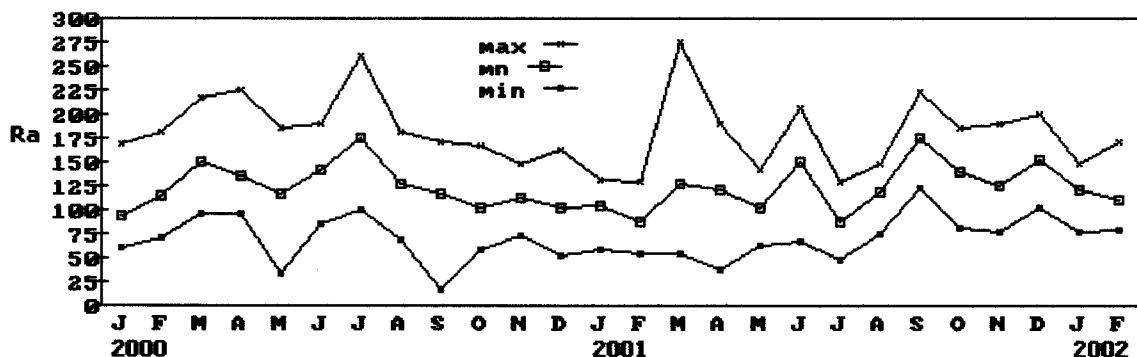


Fig. 2. Maximum, Mean, and Minimum Ra Values for Each Month from January 2000 to Present.

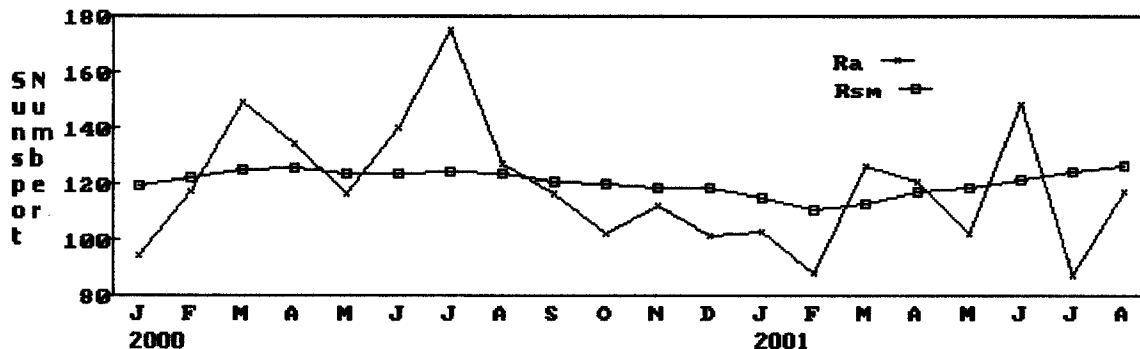


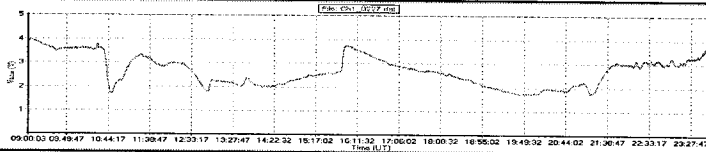
Fig. 3. Monthly Ra and Smoothed Sunspot Numbers (Waldmeier method).

Editor's Note:

This month I would like to welcome two returning sunspot observers, Brian Gordon-States (STAB), who is located in Guildford, Surrey, England, and Tom Lubbers (LUBT) who lives in Minnetonka, MN. Reports have also been received from two new observers, Susan Delaney (DELS) and Jose Carvajal (CVJ) who live Fairfield, CT and in Madrid, Spain, respectively. Also, a new observer, Francois Steyn (A102) from South Africa, has joined the group of contributors of SID data. Thank you all for your reports and for your interest in the Solar Division of the AAVSO.

Sudden Ionospheric Disturbance Report

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



Sudden Ionospheric Disturbances (SID) Recorded During February 2002

(Analysis performed by Michael Hill, SID Analyst)

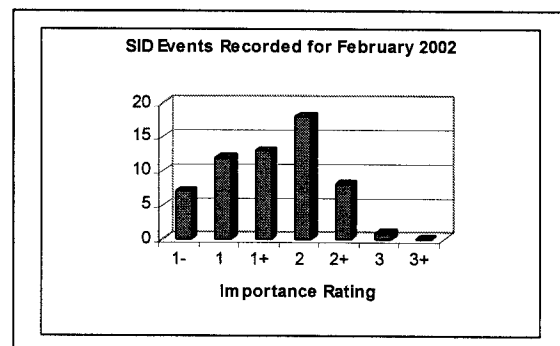
Date	Max	Imp	Date	Max	Imp	Date	Max	Imp
020301	2113	2	020317	1929	1	020325	1043	1
020302	1534	1	020317	2019	1+	020325	1209	2
020303	1516	2+	020319	1603	1-	020326	1030	2
020304	1027	2	020320	0256	1+	020326	1357	1
020304	1531	2+	020320	0612	2	020327	1303	2
020304	1906	2	020320	0759	1	020327	1347	1+
020306	1133	2	020320	1002	2	020327	1556	2+
020306	1745	1	020320	1110	1	020328	0928	1
020306	2015	1	020320	1140	1+	020328	1416	1-
020307	1340	1-	020320	1429	1-	020328	1911	2+
020308	1045	1-	020320	1626	2			
020310	1848	2	020320	1710	2+			
020310	1924	2	020320	2108	2+			
020312	1241	2	020321	0937	1+			
020312	1438	2	020321	1227	3			
020312	1622	1+	020321	1650	2			
020313	0712	2	020321	1815	2+			
020313	0858	1	020321	2036	1+			
020313	0946	1	020322	0631	2			
020314	1012	1-	020322	1828	2+			
020314	1108	1+	020323	1358	1+			
020314	1356	1+	020323	1434	1			
020315	0958	1-	020324	1445	1+			
020315	1735	2	020324	1538	1+			
020317	1900	1+	020324	2034	2			

Importance rating : Duration	-1: <19	1: 19-25	1+: 26-32	2: 33-45	2+: 46-85	3: 86-125	3+: >125
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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, NPM
J Ellerbe	A63	ICV
P King	A80	FTA
A Panzer	A83	NAA
W Moos	A84	FTA, ICV
M Hill	A87	NAA
G Difillipo	A93	HWU
T Poulos	A95	NAA
R Battaiola	A96	HWU
J Wallace	A97	NAA
NJAA	A98	NAA
M King	A99	HWU
P Campbell	A100	NLK
F Steyn	A102	NWC

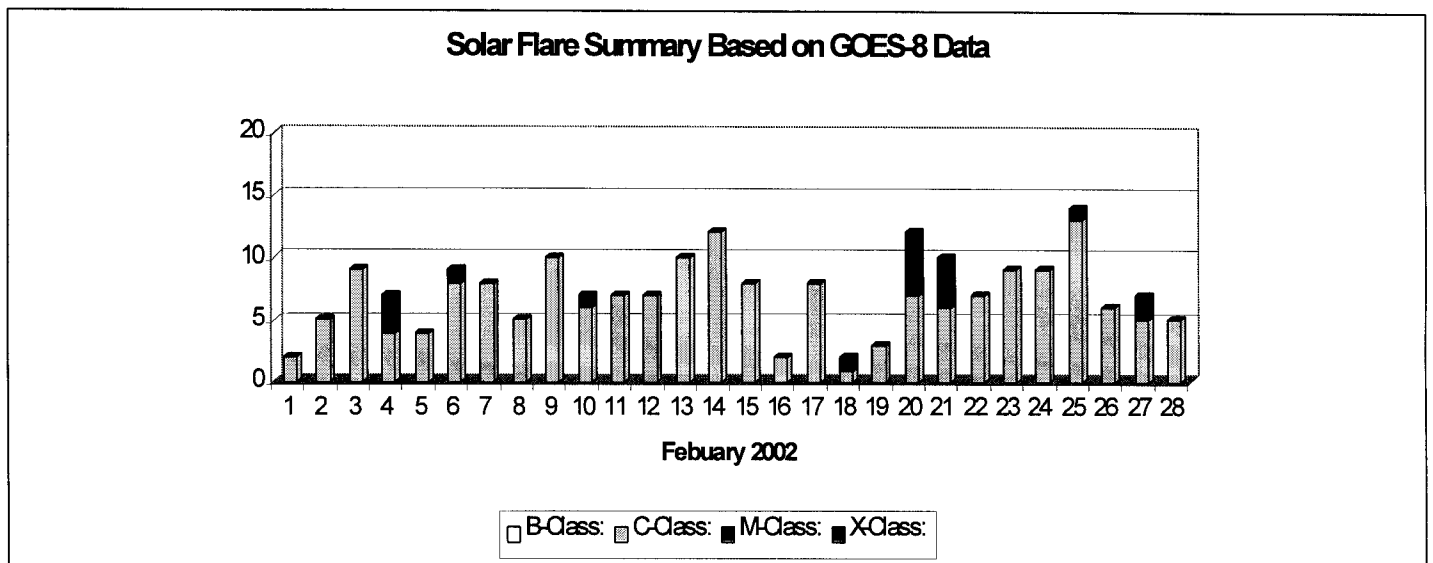


Solar Events

February was fairly active for solar flares and associated SID events. There were 200 solar flares recorded by the GOES-8 Spacecraft. Of these only 17 were M-Class. There were no X-Class flares. SID Observers recorded a total of 60 SID events. Five of these were not part of the GOES-8 data set. The most active day was certainly the 20th of February, with 12 X-Ray flares and 11 SID events. Most events were of medium duration, with only one with an importance rating of 3.

Please note the new format of the previous page. I have moved the importance rating legend up to just below the SID Event listings. In its place, I have included a new graph of the SID Events grouped by importance. I don't know why I didn't think of this before. It just hit me this month as I was doing the analysis and it seemed like such a natural thing to include. I will, therefore, include this second graph every month from now on. If I can find the time, I will try to compile set of graphs for past months since I have been doing the analysis.

Last but not least, I would like to welcome a new SID Observer. His name is Francois Steyn (A102) and he is from South Africa. He is going to be a valuable asset, along with Domenic Toldo, in reporting the early hours that most of us in the USA and Western Europe do not get to record. Welcome Francois.



SUDDEN IONOSPHERIC DISTURBANCES SUPPLEMENT

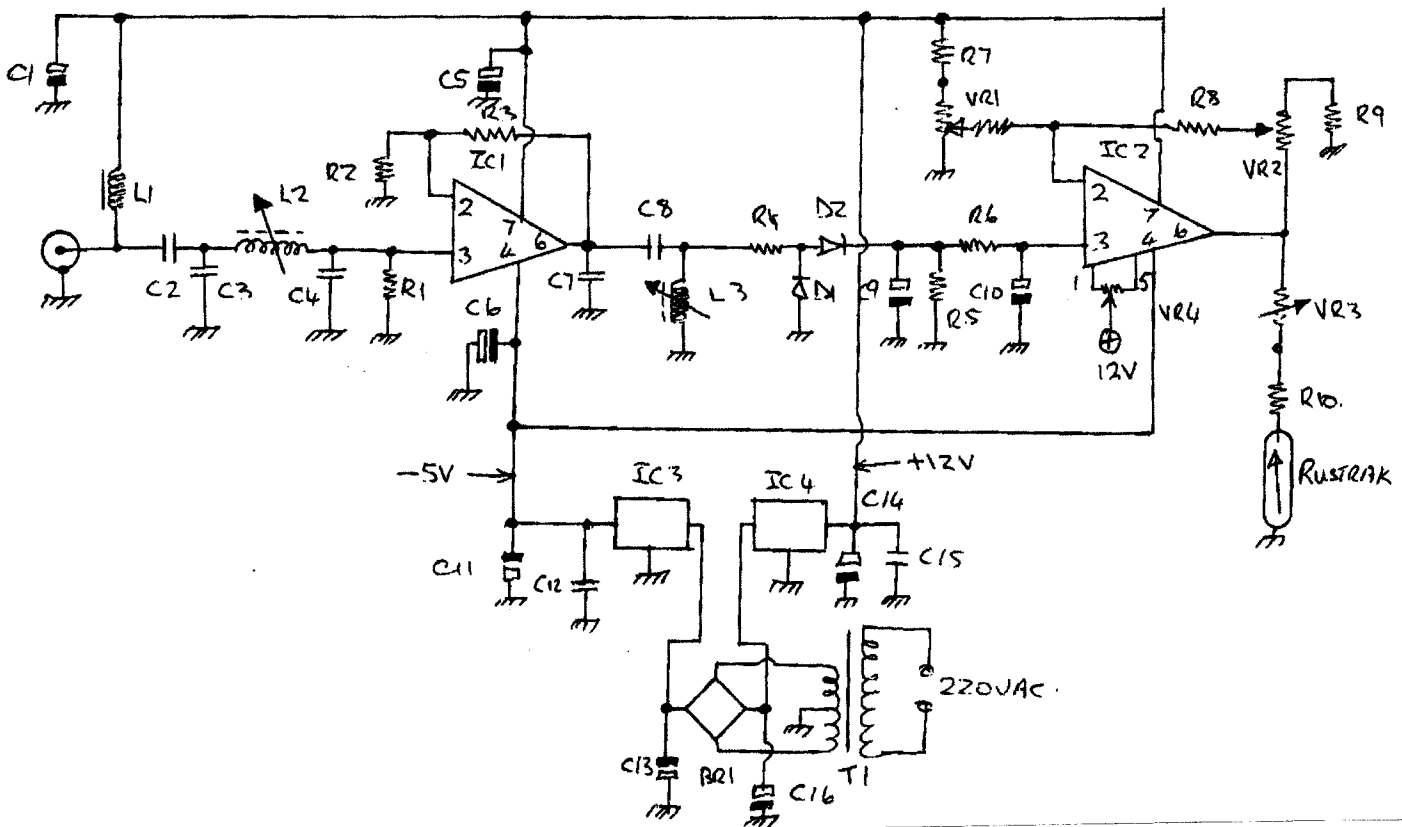
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There is good news to report. We have a new Sudden Ionospheric Disturbance, SID, observer in South Africa. He is Francois Steyn, A102, who lives in Villiersdorp about 100 km from Cape Town on the west coast. Francois first became interested in monitoring VLF radio signals to detect solar flares in 1974 when he met and got to know Walton de Villiers, a well known South African SEA observer. He built an SEA receiver then to detect flares as sudden enhancements of atmospherics, SEA, but only recently became interested again when he retired from working for TELKOM SA, the South African telephone service. He now runs a small electronics repair shop from his home and has time to pursue his other interests in radio. He is a ham radio operator, ZR1AIK, but mostly interested in experimenting and building things. He dusted off an old SEA receiver he had built long ago and tuned it to NWC in Norhwest Cape, West Australia transmitting on 19.8 kHz and about 8700 km east Villiersdorp. This receiver was used to make the Rustrak chart recording below of a Sudden Enhancement of signal, SES, in response to a solar flare.

Francois's receiver is a very good design with many good features not the least of which is the remote outdoor loop antenna with its antenna amplifier which Francois has located 100m from his house. He uses an OP07A instrumentation amplifier to preamplify the signal from the untuned loop and 100m of coax to bring the preamplified signal to the indoor receiver. The coax connects the 12-Volt power supply to the preamp and is decoupled from the RF signal with RF chokes. A remote outdoor loop and amplifier is an excellent way eliminate much of the powerline interference that indoor loop antennas often suffer from. A schematic and parts list are shown below. The receiver is tunable over the VLF band using the tunable Ferrite pot-core coils which are similar to the Merrit 6319 slug-tuned Ferrite coils we used to use before they were discontinued. If you would like to know more about this receiver you can contact Francois at << fsteyn@worldonline.co.za >>.

FS. SID RECEIVER



Parts List for Receiver :

Capacitors:

- | | |
|-----------------------------|---------------------------|
| C1 : 47uF 16V | C2 : 150pF |
| C3 : 10nF (adjust to freq.) | C4 : 68nF |
| C5 : 47uF | C6 : 47uF |
| C7 : 68nF | C8 : 10nF (adj. to freq.) |
| C9 : 10uF Tant. 16V | C10: 10uF Tant. 16V |
| C11: 10uF 16V | C12 : 100nF |
| C13 : 470uF 25V | C14 : 10uF 16V |
| C15 : 100nF | C16 : 470uF 25V |

- | | |
|----------|-------------|
| R1 : 12k | R2 : 39 ohm |
| R3 : 6k8 | R4 : 6k8 |
| R5 : 10M | R6 : 1M |
| R7 : 3k9 | R8 : 22k |
| R9 : 1k | R10 : 100k |

- VR1 : 200 ohm multiturn (set zero) VR2 : 10k (set scale) VR3 : 100k
 VR4 : 47k preset (null DC amp.)

- IC 1 : LF356 IC2 : LF351 IC 3 : 79L05 IC4 : 78L12

- D1 & D2 : OA90 BR1 : 800mA Bridge Rectifier

- T1 : 12 + 12 volt output Input: 220VAC or 110 VAC

- L1 : 47mH choke L2 : 8mH Coil on potcore 18mm dia ;+/- 150 turns @ 35 SWG (from junkbox!)

