

# Solar Bulletin

THE AMERICAN ASSOCIATION OF VARIABLE STAR OBSERVERS - SOLAR COMMITTEE

Carl E. Feehrer, Editor  
9 Gleason Rd.  
Bedford, MA 01730



Email: cfeehrer@hotmail.com

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

Day	N	Raw	s.d.	Ra	s.d.	s.e.
1	27	95	4.8	75	2.6	0.50
2	24	100	4.5	74	1.9	0.39
3	28	101	4.7	77	3.1	0.59
4	19	96	5.9	76	3.8	0.87
5	23	116	6.2	83	3.3	0.69
6	25	116	6.4	90	4.5	0.90
7	30	116	4.3	89	2.9	0.53
8	22	130	7.7	102	3.6	0.77
9	27	141	9.8	109	5.0	0.96
10	22	134	9.0	98	3.8	0.81
11	26	97	8.5	66	3.9	0.76
12	29	103	6.4	73	3.1	0.58
13	25	111	6.1	82	3.6	0.72
14	21	171	9.4	124	4.7	1.03
15	29	179	9.9	136	3.2	0.59
16	25	194	9.9	142	4.8	0.96
17	20	211	13.2	<b>156</b>	5.8	1.30
18	25	196	9.6	152	5.0	1.00
19	23	189	11.1	148	6.1	1.27
20	21	222	19.4	151	6.6	1.44
21	30	172	9.2	128	3.9	0.71
22	27	148	7.3	110	3.1	0.60
23	22	116	9.2	86	4.2	0.90
24	21	81	6.3	61	2.5	0.55
25	26	51	2.8	40	1.8	0.35
26	26	44	2.6	33	1.5	0.29
27	23	42	2.3	33	1.6	0.33
28	32	36	2.6	<b>27</b>	1.3	0.23
29	20	47	3.0	36	2.7	0.60
30	22	39	3.5	29	1.4	0.30
31	30	47	3.1	35	1.7	0.31

Means: 25    117.4    **87.7**

Total No. of Observers: 66

Total No. of Observations: 770

**Table II. December Observers**

16 AAP P.Abbott	15 MALK K.Malde
1 ANDE E.Anderson	4 MARE E.Mariani
12 ARAG G.Araujo	19 MARJ J.Maranon
11 BARH H.Barnes	18 MCE E.Mochizuki
6 BEB R.Berg	4 MILJ J.Miller
4 BERJ J.Berdejo	13 MMI M.Moeller
18 BMF M.Boschat	12 OBSO IPS Observatory
10 BOJP P.Bojda	3 RICE E.Richardson
29 BOSB B.Bose	12 RITA A.Ritchie
20 BRAB B.Branchett	8 SCGL G.Schott
5 BRAD D.Branchett	1 SDP D.Sharples
14 BROB R.Brown	1 SIMC C.Simpson
2 BURS S.Burgess	9 STEM G.Stemmler
8 CAMP P.Campbell	8 STQ N.Stoikidis
15 CARJ J.Carlson	23 SUZM M.Suzuki
26 CHAG G.Morales	17 TESD D.Teske
19 CKB B.Cudnik	9 THR R.Thompson
6 CLZ C.Laurent	7 TJV J.Temprano
4 COMT T.Compton	14 URBP P.Urbanski
31 CORA A.Coroas	13 VALD D.delValle
30 CR T.Cragg	13 VARG A.Vargas
4 DELS S.Delaney	5 VELM M.Velea
16 DGP G.Dyck	7 VIDD D.Vidican
10 DRAJ J.Dragesco	10 WILW W.Wilson
24 ELR E.Reed	
10 FEEC C.Feehrer	
11 FERJ J.Fernandes	
20 FLET T.Fleming	
19 FUJK K.Fujimori	
19 GIOR R.Giovanoni	
2 GOEM M.Goetz	
5 GOTS S.Gottschalk	
3 HAYK K.Hay	
4 HRUT T.Hrutkay	
5 JEFT T.Jeffrey	
13 KAPJ J.Kaplan	
23 KHAR R.Khan	
19 KNJS J&S Knight	
1 KROL L.Krozel	
6 LARJ J.Larriba	
4 LERM M.Lerman	
20 LEVM M.Leventhal	

## Reporting Addresses

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

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

Table III. Means of Raw Group Counts (RG) and Ratios of Spots to Groups (S:G) in December 2002

Day	RG	S:G	Day	RG	S:G	Day	RG	S:G	Day	RG	S:G
1	5.3	7.9	9	10.2	3.8	17	9.2	12.9	25	4.2	2.1
2	5.5	8.2	10	8.8	5.2	18	9.4	10.9	26	3.5	2.6
3	6.3	6.0	11	5.8	6.7	19	9.3	10.3	27	3.3	2.7
4	5.9	6.3	12	6.7	5.4	20	8.9	14.9	28	2.8	2.9
5	7.6	5.3	13	6.8	6.3	21	8.1	11.2	29	3.5	3.4
6	7.8	4.9	14	9.3	8.4	22	7.3	10.3	30	2.6	5.0
7	8.1	4.3	15	9.1	9.7	23	6.5	7.9	31	3.2	4.7
8	9.8	3.3	16	8.6	12.6	24	5.6	4.5	<b>Mn.</b>	<b>6.74</b>	<b>6.8</b>

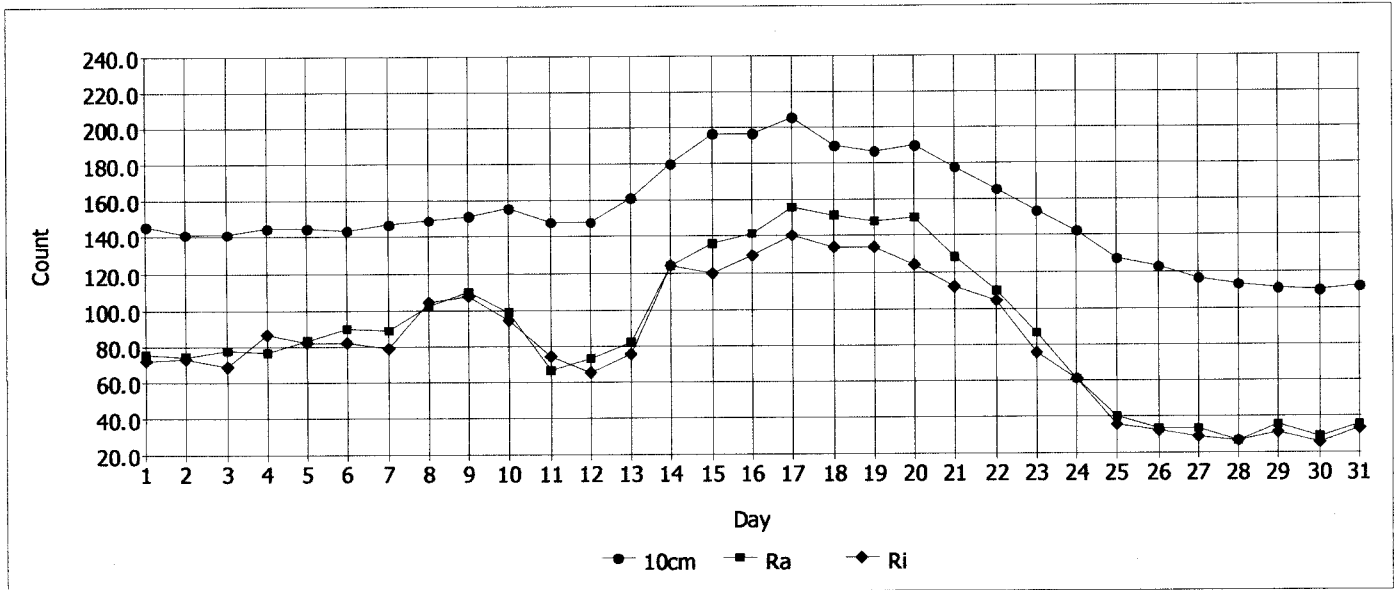


Fig. 1. 10 cm Solar Flux and Comparison of Ri (provisional) with Ra Estimates for December 2002 [ $r = 0.986$ ]

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

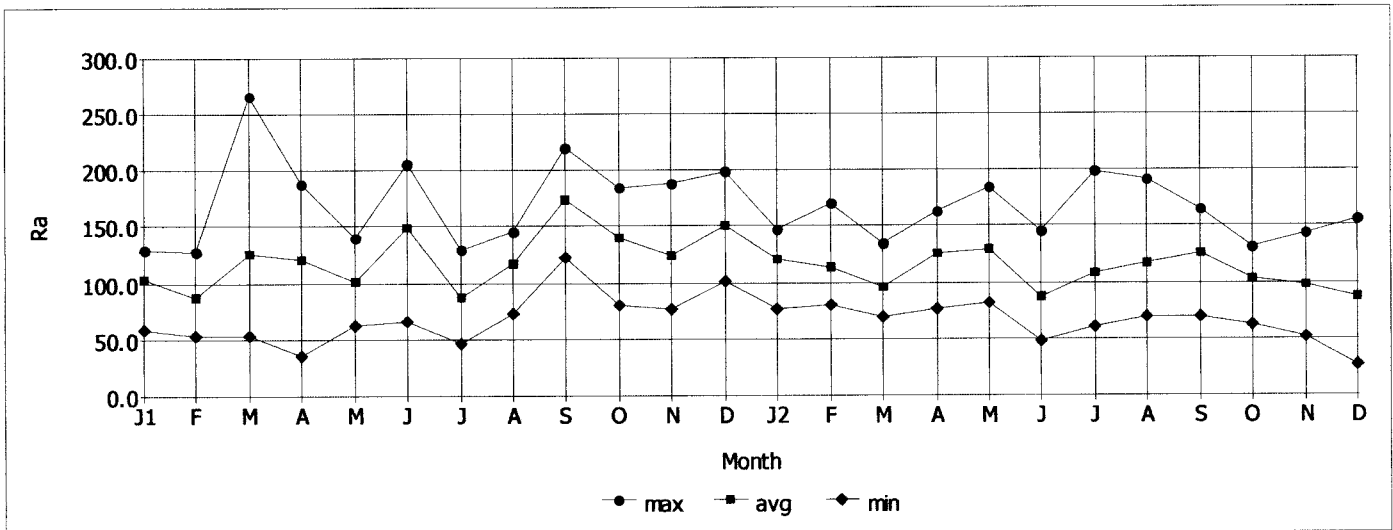


Fig. 2. Maximum, Mean, and Minimum Values of Ra for Each Month from January 2001 to Present.

**Table IV. Sunspot and SID Observers Who Contributed Solar Reports During 2002.**

<b>Sunspot Observers</b>			<b>SID Observers</b>		
AAP	Patrick Abbott	Canada	MARJ	Jose Maranon	Spain
ANDE	Eric Anderson	USA	MAV	Dimitri Matsnev	Russia
ARAG	Gema Araujo	India	MCE	Etsuiku Mochizuki	Japan
ATON	Antonio Attanasio	Italy	MILJ	Jay Miller	USA
BARH	Howard Barnes	New Zealand	MMI	Michael Moeller	Germany
BATR	Roberto Battaiola	Italy	MUDG	George Mudry	Canada
BEB	Ray Berg	USA	NYLH	Heikki Nylander	Finland
BEDJ	James Bedient	USA	OBBS	IPS Observatory	Australia
BERJ	Jose Berdejo	Spain	OTEG	George Otero	Uruguay
BEU	Edward Blankenship	USA	PARN	Norman Parker	USA
BLAJ	John Blackwell	USA	RAMJ	James Ramsey	USA
BMF	Michael Boschat	Canada	RICE	E. C. Richardson	England
BOJP	Piotr Bojda	Poland	RITA	Arthur Ritchie	USA
BOSB	Biswajit Bose	India	SCGL	Gerd Lutz Schott	Germany
BRAB	Brenda Branchett	USA	SCHG	Greg Scholl	USA
BRAD	David Branchett	USA	SDP	Diane Sharples	USA
BRAR	Robert Branch	USA	SIMC	Clyde Simpson	USA
BROB	Bob Brown	USA	STAB	Brian Gordon-States	England
BURS	Scott Burgess	USA	STEF	George Stefanopoulos	Greece
CAMP	Paul Campbell	Canada	STEM	Gerhard Stemmler	Germany
CARJ	Jim Carlson	USA	STQ	Nick Stoikidis	Greece
CHAG	German Morales	Bolivia	SUZM	Miyoshi Suzuki	Japan
CKB	Brian Cudnik	USA	SZAK	Kryzstoff Szatkowski	Poland
CLZ	Laurent Corp	France	SZUM	Mieczyslaw Szulc	Poland
COMT	Thomas Compton	USA	TESD	David Teske	USA
CORA	Angel Coroas	Cuba	THR	Raymond Thompson	Canada
CR	Tom Cragg	Australia	TJV	Javier Temprano	Spain
CVJ	Jose Carvajal	Spain	URBP	Piotr Urbanski	Poland
DEL	Susan Delaney	USA	VALD	Daniel del Valle	Puerto Rico
DEMF	Frank Dempsey	Canada	VARG	Alberto Vargas	Bolivia
DGP	Gerald Dyck	USA	VELM	Maria Vela	Romania
DRAJ	Jean Dragesco	France	VIDD	Daniel Vidican	Romania
DUBF	Franky Dubois	Belgium	WILW	William Wilson	USA
ELR	Ed Reed	USA	WITL	Len Witkowski	USA
ERRA	Adriana Errico	Spain	WKW	William Watts	USA
FEEC	Carl Feehrer	USA	YESH	Hulya Yesilyaprak	Turkey
FERJ	Jose Fernandez	Spain			
FLET	Tom Fleming	USA	A-05	Casper Hossfield	USA
FUJK	Kenichi Fujimori	Japan	A-09	Werner Scharlach	USA
GARE	Eduardo Garcia	Uruguay	A-29	Andy Clerkin	USA
GIOR	Richard Giovanoni	USA	A-50	Jerry Winkler	USA
GOEM	Martin Goetz	Germany	A-52	Domenic Toldo	South Africa
GOTS	Steve Gottschalk	USA	A-59	Steve Hansen	USA
GUNM	Marcello Gundlach	Bolivia	A-63	James Ellerbe	Spain
HALB	Brian Halls	England	A-80	Peter King	England
HAYK	Kim Hayk	Canada	A-83	Alex Panzer	USA
HRUT	Timothy Hrutkay	USA	A-84	Walter Moos	Switzerland
JAMD	David James	USA	A-87	Mike Hill	USA
JEFT	Thomas Jeffrey	USA	A-93	Guglielmo Di Fillipo	Italy
JENJ	Jamey Jenkins	USA	A-95	Ted Poulos	USA
JENS	Simon Jenner	England	A-96	Roberto Battaiola	Italy
KAPJ	John Kaplan	USA	A-97	Jon Wallace	USA
KHAR	Rana Khan	India	A-98	William Anthony	USA
KNJS	James Knight	South Africa	A-99	Michael King	England
KROL	Larry Krozel	USA	A-100	Paul Campbell	Canada
KUZM	Mikhail Kuzmin	Russia	A-101	Giorgio Bressan	Italy
LARJ	Jose Larriba	Spain	A-102	Francois Steyn	South Africa
LERM	Michel Lerman	Canada	A-104	Doug Welch	Canada
LEVM	Monty Leventhal	Australia	A-105	Erik Smith	Belgium
LIZT	Tom Lizak	USA	A-107	Larissa Observatory	Greece
LUBT	Thomas Lubbers	USA			
MALK	Kjell Malde	Norway			
MANV	Victor Manero	Spain			
MARE	Enrico Mariani	Italy			

## **Editor's Notes**

### **New Editor of SID/GRB Bulletin**

Doug Welch (A-104) of McMaster University, Hamilton, Ontario, who has setup the AAVSO's GRB and SID networks has assumed the responsibility for editing a stand-alone version of the *SID Supplement* that was formerly published along with the *Solar Bulletin* until Casper Hossfield's death in October. Initially at least, the new bulletin will be published in electronic form on a bi-monthly basis, and it will be able to be accessed via the AAVSO website (see next section). Observers who are interested in the emerging technology of detecting GRBs and other phenomena with SID equipment are encouraged to visit the site (<http://sid.physics.mcmaster.com>) in order to access the *SID/GRB Bulletin*, which will be published for the first time in January or February. Thank you, Doug, for being willing to take on this task.

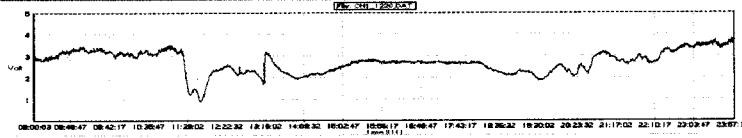
### **Reorganization of Sunspot and SID Website Pages**

By this time, most observers will have received notice that the AAVSO is making an effort to control costs by reducing the need for reproduction and mailing of its various products. Instead, it will rely on its website to make information available for viewing and downloading. Observers who do not have access to the Internet or who want to continue with postal mailings have been asked to indicate that preference by completing and returning an order form to AAVSO headquarters.

During the next three months, information on the solar pages of the website will be reorganized in order to make current products more accessible, to add links to the new *SID/GRB Bulletin*, etc. The *Solar Bulletin*, containing the monthly SID/flare analyses conducted by Mike Hill and the sunspot analyses will continue to appear in both \*.html and \*.pdf (Adobe) versions suitable for downloading. Paper versions of this document will be mailed only to those who specifically request hardcopy.

# Sudden Ionospheric Disturbance Report

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



## Sudden Ionospheric Disturbances (SID) Recorded During December 2002

(Analysis performed by Michael Hill, SID Analyst)

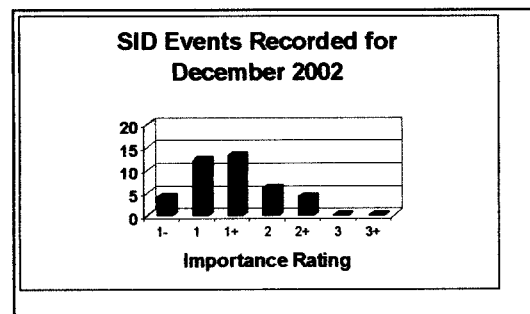
Date	Max	Imp	Date	Max	Imp	Date	Max	Imp
021201	1528	1+	021219	0732	1+			
021203	0818	1	021219	0820	1+			
021206	0856	1	021219	0944	1			
021208	0826	1-	021220	0543	2			
021210	0720	1	021220	0804	1			
021210	1228	1+	021220	0831	2			
021211	1408	1	021220	1255	1-			
021212	0817	1+	021220	1318	1+			
021212	1142	2	021221	0450	1-			
021212	1336	1+	021224	0527	2			
021213	0835	1	021225	0545	1-			
021213	1333	1	021225	0559	1+			
021213	1722	1+	021225	1756	2			
021215	1551	2						
021215	1804	1						
021216	1116	2+						
021217	0506	1+						
021217	0555	1						
021218	0637	2+						
021218	0643	2+						
021218	1148	1						
021219	0522	1						
021219	0555	1+						
021219	0602	2+						
021219	0655	1+						

Importance rating : Duration(min)	-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) Event reported by two or more observers within  $\pm 5$  minutes
- 2) Event matched to GOES-8 XRA event to within  $\pm 15$  minutes and event time < 1000 UT
- 3) reported by observer with a quality rating > 8 (scale 1-10)

Observer	Code	Station(s) monitored
A Clerkin	A29	NAA
D Toldo	A52	NAA NWC
S Hansen	A59	CFH NAA
Alex Panzer	A83	NAA
W Moos	A84	FTA
M Hill	A87	NAA
G DiFillipo	A93	HWU
T Poulos	A95	NAA
R Battaiola	A96	HWU
J Wallace	A97	NAA
M King	A99	HWU
P Campbell	A100	NLK
F Steyn	A102	NAA NWC
L Observatory	A107	DHO



# Solar Events

December was another slow month for flare activity although the middle of the month saw a significant increase in activity. The busiest time was from the 15<sup>th</sup> to the 20<sup>th</sup>. There were 188 X-Ray flare events recorded by the GOES-8 spacecraft. Of these only 8 were M-Class events and there were no X-Class events. Most observers had very few recorded SID events so can therefore confirm the fact that the activity level was indeed very low. There were a total of 39 Correlated events reported by observers. Most of them had an importance rating of 1 or 1+. There were four 2+ events, understandably during the high activity time during the middle of the month.

