

Solar Bulletin

THE AMERICAN ASSOCIATION OF VARIABLE STAR OBSERVERS
SOLAR SECTION



Rodney Howe, Editor, Chairperson
c/o AAVSO, 49 Bay State Rd
Cambridge, MA 02138

Web: <http://www.aavso.org/solar-bulletin>

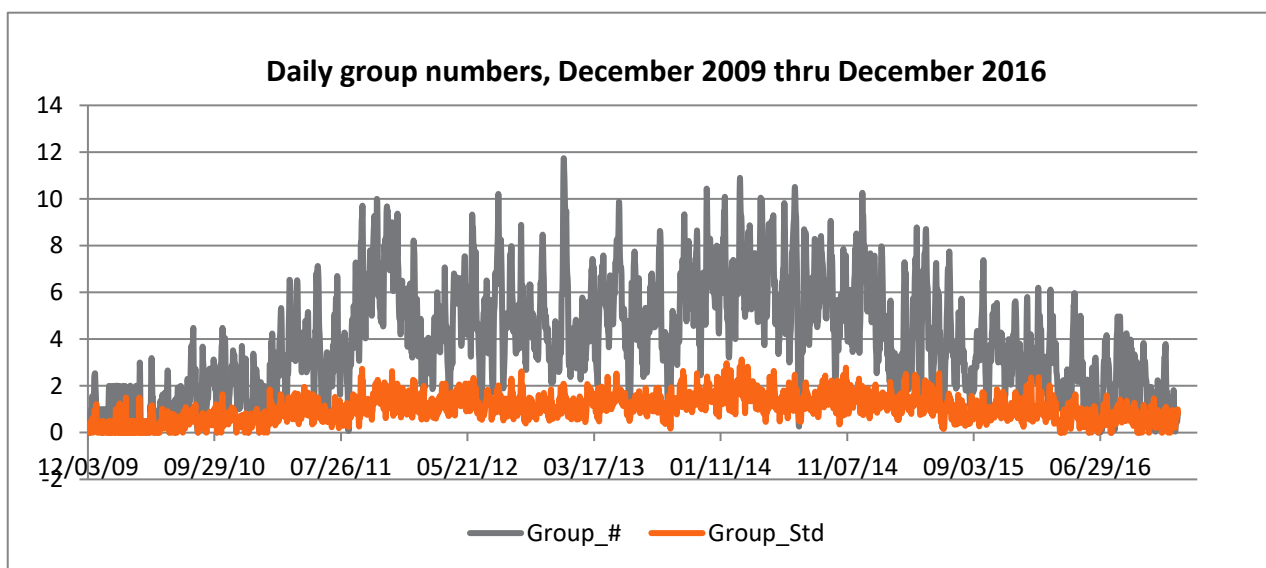
Email: solar@aavso.org

ISSN 0271-8480

Volume 72 Number 12

December – 2016

Now that the sun is approaching solar minimum, there will be fewer groups and sunspots to count. But it might be nice to look at the group counts averaged from all the AAVSO solar observers, in a report from December, 2009 to December, 2016 (approximately the beginning and end of cycle 24):

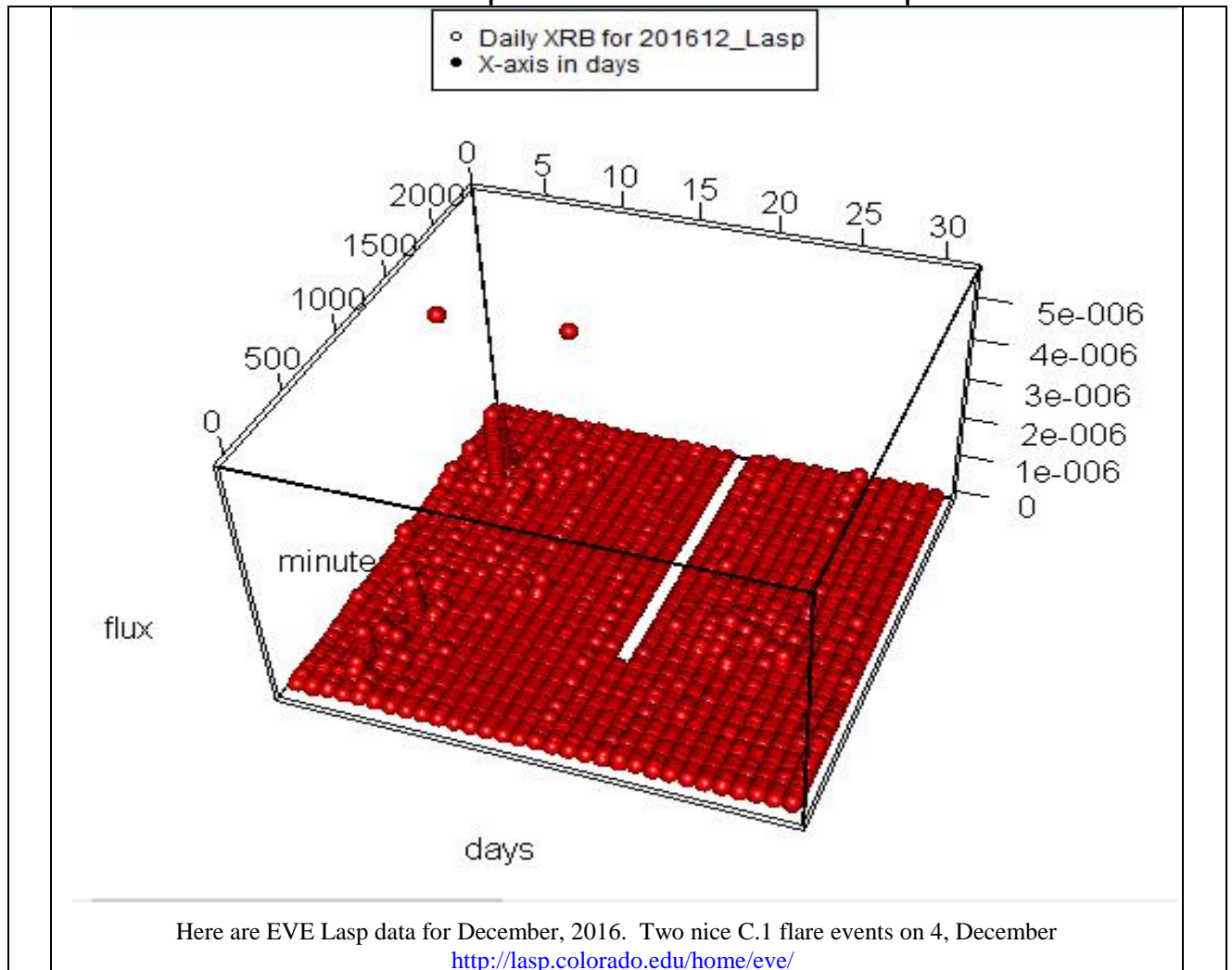


And here are all the observers and their number of observations for the last 6 years, recording 78,294 observations!

Obs	#Obs	Name	Obs	#Obs	Name
AAP	301	A. Patrick Abbott	BOSB	65	Biswajit Bose
AAX	1153	Alexandre Amorim	BRAB	2309	Brenda Branchett
AJV	1439	J. Alonso	BRAF	1125	Raffaello Braga
AMG	33	Margarete J. Amorim	BRAM	1	Mark Bradbury
ANGR	8	Raymund Ang	BROB	1952	Robert Brown
ARAG	2374	Gema Araujo	BSAB	1030	Santanu Basu
ASA	1558	Salvador Aguirre	BURS	7	Scott Burgess
BARH	717	Howard Barnes	BVC	212	Alan Buck
BATR	227	Roberto Battaiola	BXD	640	Alexandru Burda
BDDA	512	Diego Bastiani	CADA	18	Adair Cardoso
BEB	332	Ray Berg	CAJA	10	Ashley Cooper
BERJ	1163	Jose Alberto Berdejo	CFO	78	Jean F. Coliac
BLAJ	62	John A. Blackwell	CHAG	2257	German Morales Chavez
BMF	1123	Michael Boschat	CIOA	630	Ioannis Chouinavas
			CKB	1718	Brian Cudnik

CLZ	187	Laurent Corp	MGAA	154	Gael Mariani
CNT	800	Dean Chantiles	MILJ	968	Jay Miller
CPAB	9	Paul Coliac	MJAF	440	Juan Antonio Moreno Quesada
CR	110	Thomas Cragg	MJHA	1458	John McCammon
CVJ	667	Jose Carvajal	MJOC	1	Joseph Michail
DANB	10	Anderson Dantas	MMAE	12	Aaron McNeely
DELS	180	Susan Delaney	MMI	1286	Michael Moeller
DEMF	274	Frank Dempsey	MUDG	531	George Mudry
DGP	1216	Gerald Dyck	MWU	273	Walter Maluf
DJOB	751	Jorge del Rosario	OATS	876	Susan Oatney
DOGA	75	Ozkan Dogan	OBSO	1077	IPS Observatory
DUBF	1774	Franky Dubois	OJMA	69	Juha Ojanpera
FAM	450	Fabio Mariuzza	ONJ	353	John O'Neill
FERJ	1400	Javier Ruiz Fernandez	RICE	464	E. C. Richardson
FIST	17	Seda Fitikci	RLM	563	Mat Raymonde
FJAE	60	Dr.John Alan Freeman	RO	4	John Rousom
FLET	1859	Tom Fleming	RRO	41	Ralph Rogge
FLF	1028	Fredirico Luiz Funari	SCGL	1387	Gerd-Lutz Schott
FTAA	450	Tadeusz Figiel	SDOH	1826	Solar Dynamics Obs - HMI
FUJK	1688	K. Fujimori	SDP	16	Dolores Sharples
HALB	368	Brian Halls	SIAK	47	Iakovos Marios Strikis
HAYK	1181	Kim Hay	SIMC	678	Clyde Simpson
HMQ	279	Mark Harris	SMNA	111	Michael Stephanou
HOWR	1752	Rodney Howe	SNE	46	Neil Simmons
HRUT	351	Timothy Hrutkay	SONA	789	Andries Son
JASK	1067	Krystyna Wirkus	SPIA	132	Piotr Skorupski
JDAC	389	David Jackson	SSSA	1	Sueli Sousa Sepetiba
JEFT	17	Thomas Jeffrey	STAB	1457	Brian Gordon-States
JENJ	37	Jamey Jenkins	STEF	2	George Stefanopoulos
JENS	19	Simon Jenner	STEM	24	Gerhard Stemmler
JGE	408	Gerardo Jimenez Lopez	STQ	322	Nick Stoikidis
JJK	85	Jerry Klotz	STVA	1	Togo Vaz Sepetiba
JJMA	367	Jessica M.Johnson	SUZM	1645	Miyoshi Suzuki
KAND	1423	Kandilli Observatory	TESD	1819	David Teske
KAPJ	1561	John Kaplan	TJV	92	Javier Temprano
KNJS	1900	James & Shirley Knight	URBP	1523	Piotr Urbanski
KQR	1	Richard Kinne	VARG	1748	A. Gonzalo Vargas
KROL	1305	Larry Krozel	VIDD	822	Daniel Vidican
KUZM	3	Mikhail Kuzmin	VRUA	73	Ruben Verboven
LEVM	1389	Monty Leventhal	WAU	82	Artur Wargin
LKR	759	Kristine Larsen	WGI	54	Guido Wollenhaupt
LRLA	10	Richard Lovison	WILW	1693	William M. Wilson
LRRR	503	Robert Little	WIRP	64	Piotr Wirkus
MARE	659	Enrico Mariani	WKM	47	Michael Wiskirken
MCE	913	Etsuiku Mochizuki	WRP	174	Russell Wheeler
MENM	27	Miguel Menegotto	YESH	214	Hulya Yesilyaprak

Sudden Ionospheric Disturbance Report

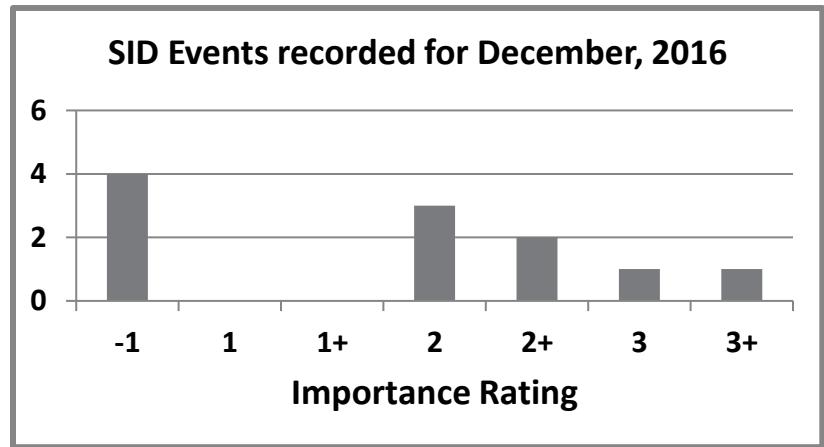


Sudden Ionospheric Disturbances (SID) Recordings During December, 2016

Date	Max	Imp
161204	1754	2
161204	1754	2
161207	1904	3+
161215	330	-1
161226	2137	-1
161230	133	-1
161231	350	2+

The -1 Importance Rating may be considered ‘noise’ in these VLF SID Event data, although, there were B class flares on those days for those times.

Solar Events

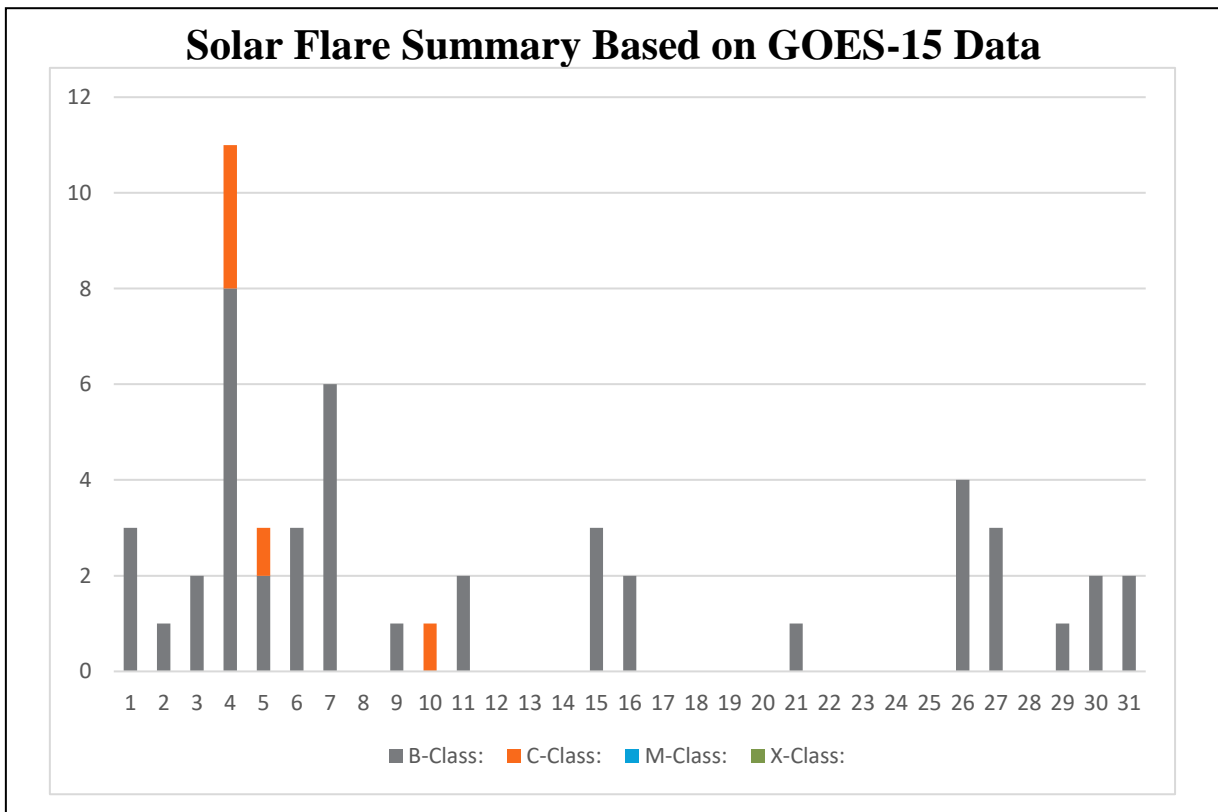


Importance rating: Duration (min)	1-: <19	1: 19-25	1+: 26-32	2: 33-45	2+: 46-85	3: 86-125	3+: 125
-----------------------------------	---------	----------	-----------	----------	-----------	-----------	---------

Sudden Ionospheric Disturbances (SID) Observers During December, 2016

Observer	Code	Station(s) monitored	Observer	Code	Station(s) monitored
A McWilliams	A94	NML	J Karlovsky	A131	ICV
R Battaiola	A96	HWU	R Green	A134	NWC
J Wallace	A97	NAA	S Aguirre	A138	NPM
L Loudet	A118	GQD	G Silvis	A141	NAA NLK NPM
J Godet	A119	GQD	I Ryumshin	A142	GQD
B Terrill	A120	NWC	R Rogge	A143	DHO
F Adamson	A122	NWC	D Russel	A147	NPM
S Oatney	A125	NLK NML			

There were 49 solar flares measured by GOES-15 for December, 2016: Five C class and 44 B class flares. Less flaring this month compared to last month. There were 13 days this month with no GOES-15 reports of flares. There were 15 AAVSO SID observers who submitted reports this month.



American Relative Sunspot Numbers (Ra) for
December, 2016 [**boldface = maximum, minimum**]

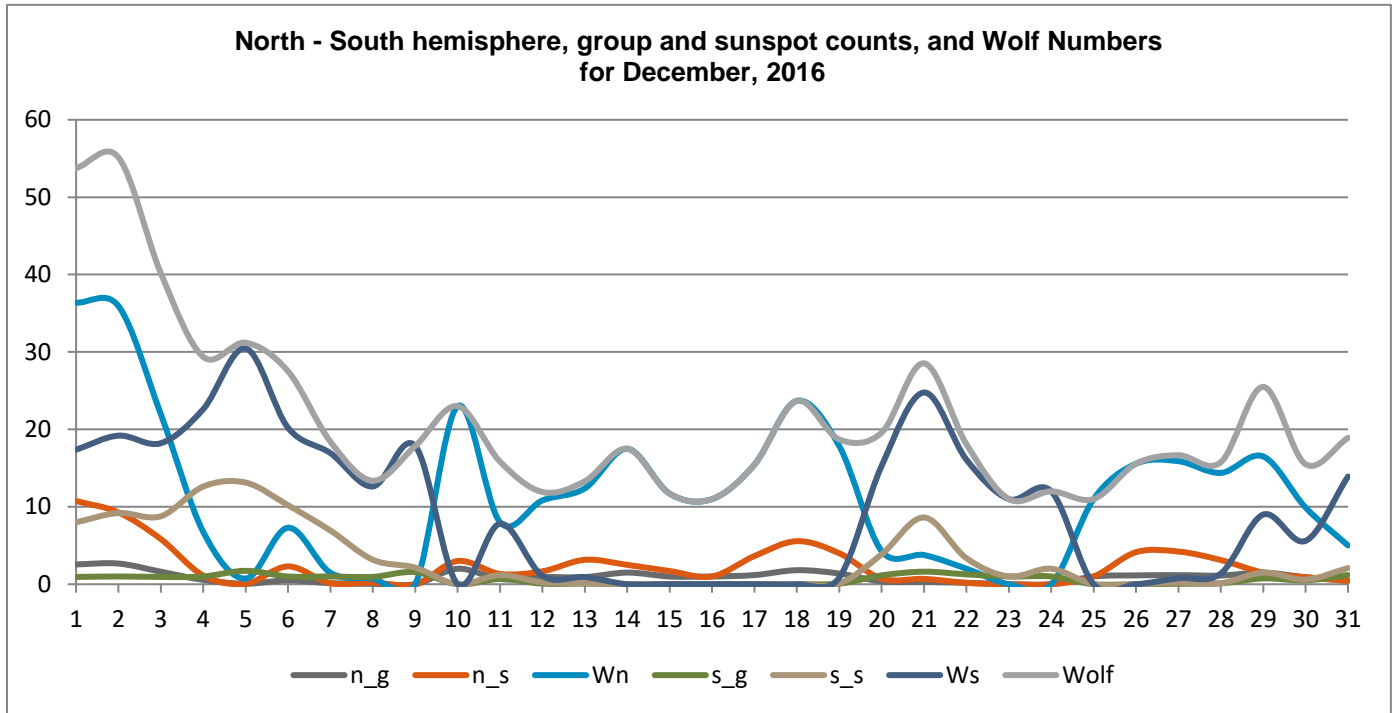
DAY	NumObs	RAW	Ra
1	26	55	43
2	26	55	42
3	27	42	32
4	26	30	23
5	26	29	22
6	30	26	20
7	25	18	14
8	27	14	11
9	28	8	5
10	30	0	0
11	27	4	3
12	24	11	9
13	21	12	10
14	22	13	9
15	24	9	7
16	22	0	0
17	25	8	6
18	32	19	13
19	28	12	9
20	26	15	11
21	21	27	19
22	26	11	7
23	30	1	1
24	32	0	0
25	30	0	0
26	27	4	2
27	35	13	9
28	28	6	3
29	27	3	1
30	29	7	5
31	31	8	6
Average	27	14.9	11.1

Obs	#Obs	Name
AAX	20	Alexandre Amorim
AJV	15	J. Alonso
ARAG	28	Gema Araujo
ASA	1	Salvador Aguirre
BARH	11	Howard Barnes
BATR	2	Roberto Battaiola
BDDA	10	Diego Bastiani
BERJ	9	Jose Alberto Berdejo
BRAB	31	Brenda Branchett
BRAF	9	Raffaello Braga

BROB	22	Robert Brown
BSAB	31	Santanu Basu
CHAG	27	German Morales Chavez
CKB	16	Brian Cudnik
CNT	9	Dean Chantiles
CVJ	20	Jose Carvajal
DEMF	2	Frank Dempsey
DJOB	7	Jorge del Rosario
DUBF	21	Franky Dubois
FERJ	25	Javier Ruiz Fernandez
FLET	17	Tom Fleming
FLF	20	Fredirico Luiz Funari
FTAA	4	Tadeusz Figiel
FUJK	23	K. Fujimori
HAYK	4	Kim Hay
HIVB	3	Ivan Hajdinjak
HMQ	8	Mark Harris
HOWR	22	Rodney Howe
JDAC	4	David Jackson
JGE	8	Gerardo Jimenez Lopez
KAND	21	Kandilli Observatory
KAPJ	10	John Kaplan
KNJS	30	James & Shirley Knight
KROL	19	Larry Krozel
LEVM	19	Monty Leventhal
LKR	3	Kristine Larsen
LRRR	24	Robert Little
MARE	12	Enrico Mariani
MCE	29	Etsuiku Mochizuki
MILJ	14	Jay Miller
MJAF	29	Juan Antonio Moreno Quesada
MJHA	29	John McCammon
MUDG	2	George Mudry
MWU	20	Walter Maluf
ONJ	2	John O'Neill
RLM	15	Mat Raymonde
SDOH	31	Jan Alvested (SDO)
SIMC	1	Clyde Simpson
SNE	2	Neil Simmons
SONA	3	Andries Son
SPIA	2	Piotr Skorupski
STAB	19	Brian Gordon-States
SUZM	27	Miyoshi Suzuki
TESD	22	David Teske
URBP	7	Piotr Urbanski
VARG	27	A. Gonzalo Vargas
VIDD	17	Dan Vidican

WILW 8 William M. Wilson
WRP 3 Russell Wheeler

Total Observers: 59
Total Observations: 876



There were 37 out of 59 observers who counted northern and southern hemisphere groups and sunspots this month. It looks like no hemisphere was predominant with days of crossover on the 4th, 9th, 20th, and 25th.

Reporting Addresses:

Sunspot Reports – Kim Hay solar@aavso.org

SID Solar Flare Reports – Rodney Howe ahowe@frii.com