Solar Bulletin

THE AMERICAN ASSOCIATION OF VARIABLE STAR OBSERVERS
SOLAR COMMITTEE

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ISSN 0271-8480

Volume 69 Number 11 November 2013

Dan Vidican (VIDD) writes how he counts sunspots and captures images of the sun.

Hardware:
Images are taken with a Philips TU-cam, (a camera used at the computer for surveillance). Around 10 years ago, in ROMANIA the market was such that I could buy this CCD camera (without cooling), with a CCD area of 640X480 pixels and the ability to take out the objective. The mount connection to 1.25" (back end of a refractor with objective: 70 mm diameter, f/d = 10) was manufactured in a workshop. I have used a Mylar filter in front of the refractor objective. The camera is in the focus of the refractor. This is the reason that I could not obtain a general view of the Sun. The images are taken on a Notebook using IRIS program.

For visual sunspots observations, I use a special penta-prism and two polarization filters (to adjust the light) in front of the eyepiece (Clave f=16mm). For orientation, I installed a cross of thin strings in the focus of the eyepiece.

Procedures:
The solar refractor is on a homemade equatorial mount, provided with fine hand slow motion control and is approximately polar aligned. Usually, I make first visual observation at the sunspots (Wolf number, and a sketch of the group's position and group's class). After that:

1. I put Mylar filter in front of the objective, take out penta-prism (with Polarized filters and eyepiece), adjust the extension of the eyepiece (support), install the small camera and connection to the notebook, and turn on the IRIS program (on preview mode).

In this condition, I adjust (by hand) the slow motion control until I have the image on the screen. I perform focusing sometime using a magnifying lens, for better evaluation of the image quality, (of course within the limits of sky turbulence). From time to time, I adjust in ascension and declination, to keep the image on the screen and in proper position. When I am satisfied, I use the "Image capture" (normally, I leave IRIS program on automatic control - the program gives, in this condition a luminosity on CCD capturing at a rate of 15 images per second). I make AVI movies of 10 seconds (normal 3 to 6 movies is enough for areas of interest, but also for seeing conditions). Luminosity and contrast are established previously by trial and error. Here I use a trick: during capture I rotate smoothly and slowly the knob of hand slow-motion control (to adjust the misalignment of the images to be as small as possible). If I fail, I take another movie. These movies represent the base for the following process.

2. When I have time, I take every film and analyze it with the program: AVI2BMP. I take every image from the film (around 150), and evaluate it if they are acceptable and clear, or not. I select only acceptable images in a series of BMP images. The most difficult problems appear to be turbulence, where the effect is different on different areas of the image (or, emphasize from time to time different details on the same area). All these BMP series are stored in separate folders.

3. I continue with ASTROSTAK program (first version); to Align, Stack, Un-sharp Mask and De-convolution (groups of 12 to 16 images, from the same BMP series. I read the resolution and increase the Square Root of the number of the used images; the program will accept up to 40 images, but because it produces an average image, I appreciate that 16 are sufficient). I save the results in the same folders as BMP series. I consider all images to be "average". The program permits refinement of the RMS calculation (giving each image the "good", or "the best" quality). However, I find there is not too much improvement and it's a long time consuming task.

4. Finally, I obtain for every BMP series, the good images processed. They are coded as: VDSR20131104UT 0826v3 (VD – Vidican Dan; SR – Sun; 20131104- year, month day; UT – Universal Time (Greenwich); 0826 – 8 hour, 26 minutes; v3 – version 3 / Could be 2, up to 8 images).

5. Following step is to compare final imagine, select the best one and transform it from BMP to JPG (eventually I have to "clean" from the image, some traces of dust on the CCD) to be sent. (The final code of selected image, receive an "f": VDSR20131104UT 0826fv3).

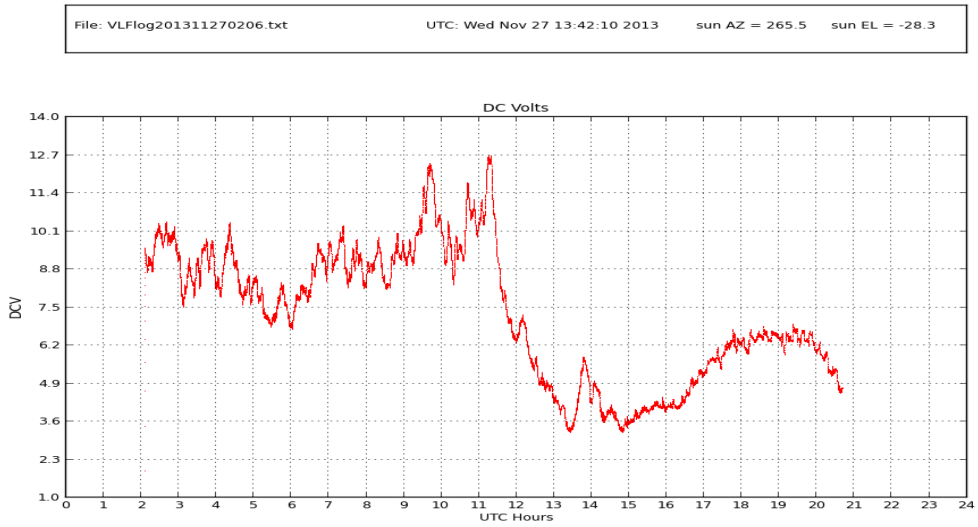
I recognize that this processing could be a time consuming activity, but I am a retired engineer (70 years old) and I like it. Of course, I try also to understand sunspots appearance and development. In my education I had three good professors: Matei Alexescu (Bacau Romania), a professional astronomer, Professor Jean Dragesco (Saint-Clement de Riviere / France), and mechanical engineer Boico Vladimir (Bucharest / Romania), an old amateur astronomer. Matei Alexescu and Jean Dragesco were AAVSO / Solar long term collaborators with sun-spots reports.

For visual observation, I use the optical system received from Professor Jean Dragesco fifteen years ago. Then I asked him "how could I perform some usable astronomical observation".
Also, I know that the sun is a huge thermonuclear reactor and our observations could help us in understanding the practical use of this energy (at one moment in the future).

Season's Greetings, and a Happy New Year.
Yours faithfully

Dan Vidican.
(Bacau / Romania)

Sudden Ionospheric Disturbance Report



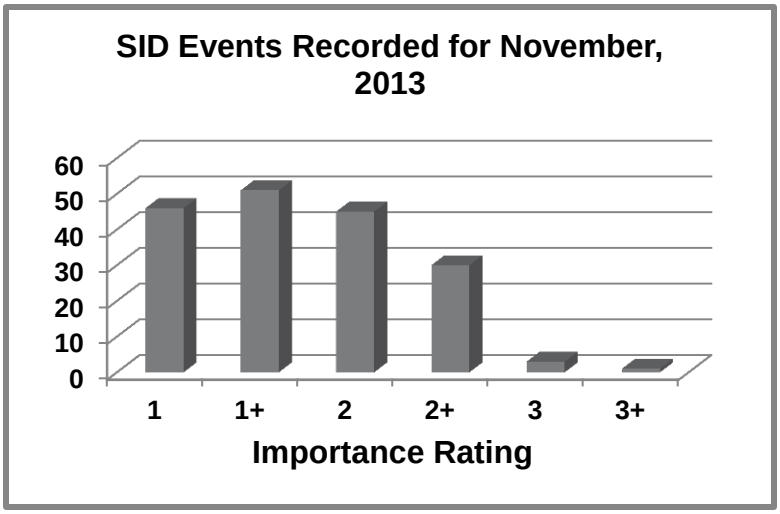
Here's graph from the 24.8 kHz (NLK) station for one of November's quieter days.

Sudden Ionospheric Disturbances (SID) Records During November, 2013

Date	Max	Imp	Date	Max	Imp	Date	Max	Imp
131101	0602	1	131105	1158	1	131108	1330	2
131101	2313	2	131105	2212	2	131108	0247	1+
131101	1009	1+	131105	2230	2	131108	0939	1+
131101	1953	1+	131105	1812	1+	131108	1100	1+
131101	2133	2+	131105	2112	1+	131108	0445	2+
131102	0446	2	131105	0458	2+	131110	0924	1
131102	0820	2	131105	2336	2+	131110	1252	1
131102	1301	2	131106	1110	1	131110	0342	2
131102	0939	1+	131106	1353	1	131110	0513	1+
131102	2220	1+	131106	0740	2	131110	1400	2+
131103	0518	2	131106	1344	2	131111	1327	1
131103	0534	2	131106	2234	2	131111	1108	1+
131103	1630	2	131106	2353	1+	131111	0048	2+
131103	0402	1+	131106	0002	2+	131111	0956	2+
131104	0544	1	131107	0155	2	131111	2132	2+
131104	1005	1	131107	0211	2	131112	2311	2
131104	1356	1	131107	1424	2	131112	2234	3
131104	0851	1+	131107	0341	1+	131112	2140	2+
131104	1108	1+	131107	1228	1+	131113	1012	1
131104	1149	1+	131107	1849	1+	131113	1159	1
131104	1503	1+	131108	0928	1	131113	1518	1+
131105	0818	1	131108	0756	2	131113	1739	2+

Date	Max	Imp	Date	Max	Imp	Date	Max	Imp
131114	0142	1	131117	0107	2+	131123	0228	2
131114	0757	1	131117	1143	2+	131123	0237	2
131114	0820	2	131118	1100	2	131123	0446	2
131114	0646	1+	131118	1409	2	131123	1212	2
131114	0904	1+	131118	0911	3	131123	1315	2
131114	0848	2+	131118	1331	1+	131123	1540	2
131115	0411	1	131118	1008	2+	131123	0335	1+
131115	1136	1	131119	0036	2	131123	1557	1+
131115	0404	2	131119	0526	1+	131123	1000	2+
131115	1400	3	131119	1021	2+	131124	0224	2
131115	0230	1+	131120	1225	1	131125	0034	1
131115	0504	1+	131120	1725	2	131125	1130	2+
131115	1004	1+	131120	1129	1+	131126	0128	1
131115	2305	1+	131120	0637	2+	131127	1250	2+
131115	1210	2+	131120	1607	2+	131127	0959	3+
131116	0602	1	131121	1105	2	131128	0912	1+
131116	1010	1	131121	1110	2	131129	0644	2
131116	1231	1	131121	1140	1+	131129	0637	1+
131116	1349	1	131121	0951	2+	131129	1206	2+
131116	0242	2	131121	0951	2+	131129	1350	2+
131116	0457	2	131121	1130	2+			
131116	0724	2	131122	1000	2			
131116	0623	1+	131122	1100	2			
131116	0750	1+	131123	1000	1			
131116	0820	1+	131123	1029	1			
131116	0940	1+	131123	1043	1			
131117	1310	1	131123	1257	1			
131117	1320	2						
131117	0123	1+						
131117	0513	1+						
131117	0758	1+						
131117	1049	1+						

Solar Events

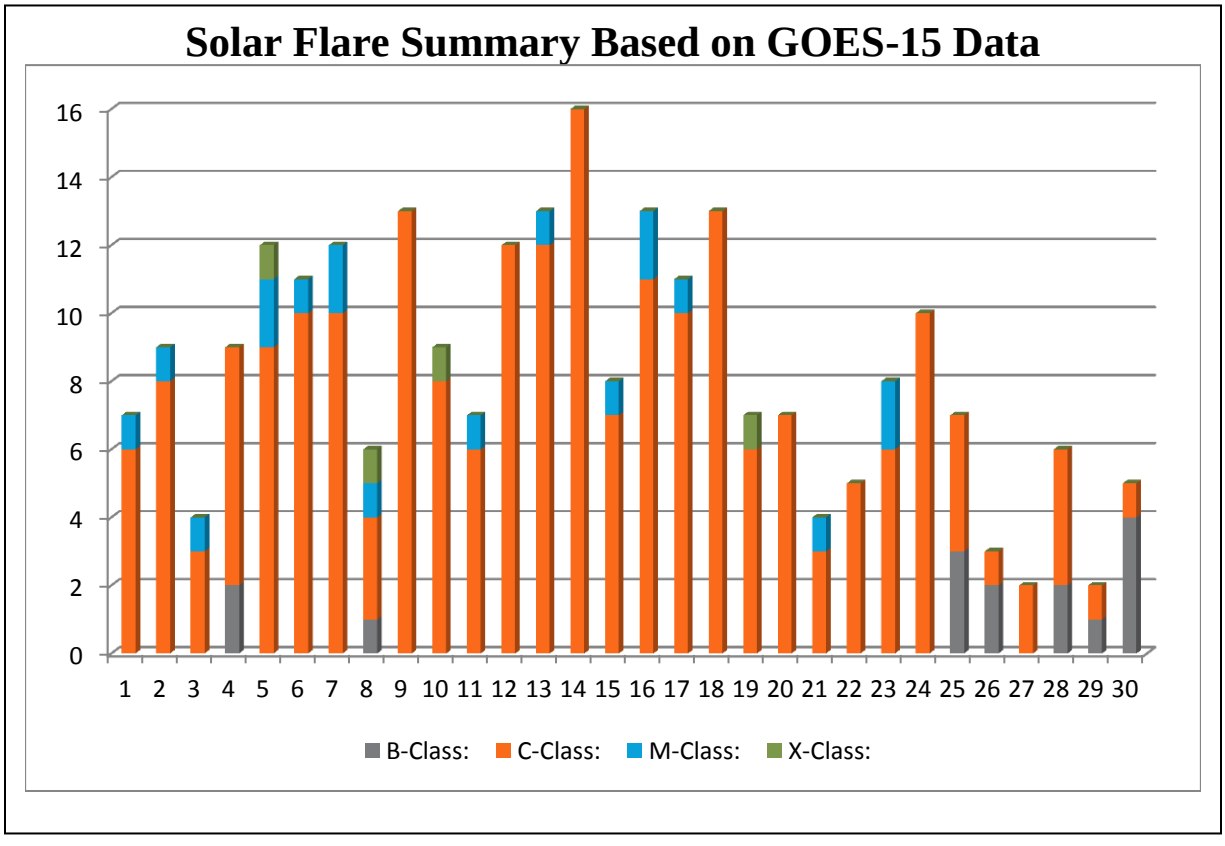


Importance rating: Duration (min)	1-: <19	1: 19-25	1+: 26-32	2: 33-45	2+: 46-85	3: 86-125	3+: >125

Sudden Ionospheric Disturbances (SID) Observers During November, 2013

Observer	Code	Station(s) monitored	Observer	Code	Station(s) monitored
A McWilliams	A94	NML	K Cotar	A129	DHO GBZ
R Battaiola	A96	HWU	J Karlovsky	A131	DHO
J Wallace	A97	NAA	R Green	A134	JJI NWC
L Loudet	A118	GQD NAA TBB	R Mrllak	A136	GQD NSY
J Godet	A119	GBZ GQD ICV	D Koawl	A137	NAA NML NPM
B Terrill	A120	NWC	S Aguirre	A138	NLK
F Adamson	A122	NWC	F Francione & C Re	A139	HWU NAA NSY
S Oatney	A125	NLK NML	L Corp	A140	DHO

There were 251 solar flares measured by GOES-15 for November, 2013, 4 X class, 17 M class, 215 C class and 15 B class flares. The sun was very active this month compared to last, very strong flaring. There were 16 AAVSO SID observers who submitted reports this month.



American Relative Sunspot Numbers (Ra) for November, 2013 [**boldface = maximum, minimum**]

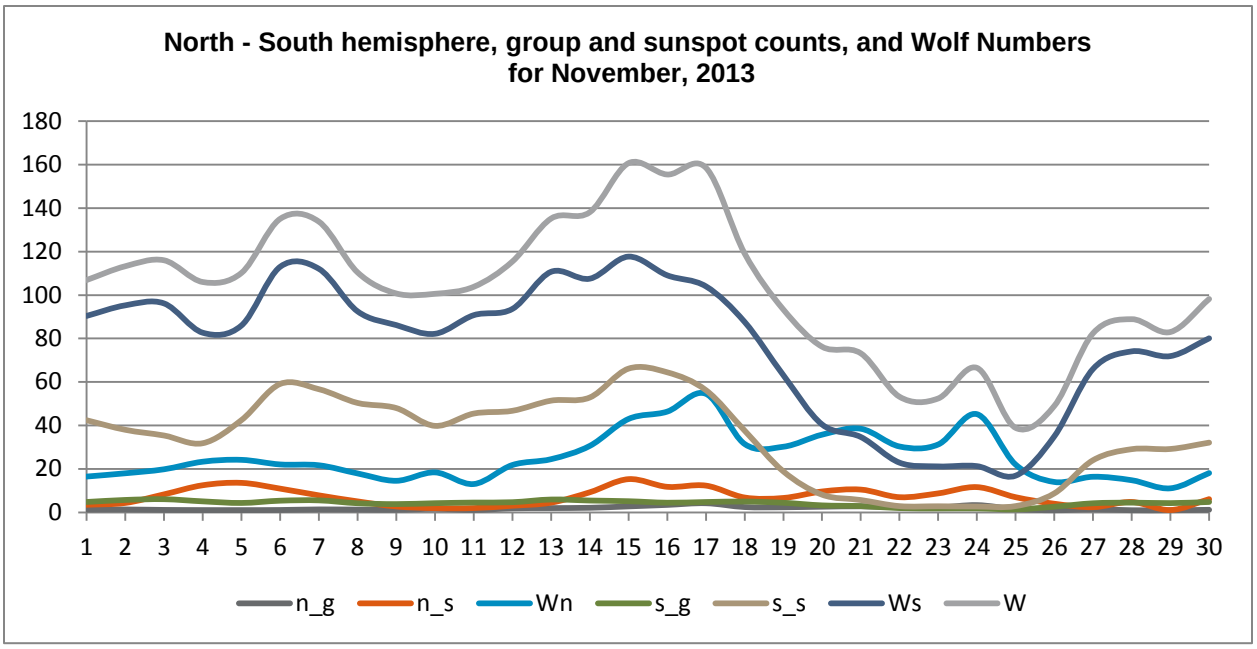
DAY	NumObs	RAW	Ra
1	27	94	71
2	28	92	71
3	33	108	81
4	27	109	86
5	32	112	85
6	31	133	96
7	25	130	100
8	29	120	88
9	27	90	69
10	33	91	68
11	39	101	77
12	30	111	90
13	36	127	99
14	32	136	102
15	27	154	122
16	27	153	120
17	17	163	112
18	28	119	89
19	31	87	67
20	29	74	56
21	20	69	48
22	22	55	42
23	25	48	34
24	29	61	44
25	22	33	26
26	22	37	27
27	26	71	52
28	26	89	68
29	27	79	58
30	27	89	69
Average	**27.8**	**97.9**	**73.9**

Obs	#Obs	Name
AAP	1	A. Patrick Abbott
AAX	7	Alexandre Amorim
AJV	5	J. Alonso
ARAG	28	Gema Araujo
ASA	16	Salvador Aguirre
BARH	8	Howard Barnes
BDDA	16	Diego Bastiani
BERJ	14	Jose Alberto Berdejo
BMF	12	Michael Boschat
BRAB	23	Brenda Branchett
BRAF	11	Raffaello Braga
BROB	28	Robert Brown
BSAB	30	Santanu Basu
BXD	8	Alexandru Burda
CFO	10	Jean F. Coliac
CHAG	24	German Morales Chavez
CIOA	7	Ioannis Chouinavas
CKB	19	Brian Cudnik
CNT	6	Dean Chantiles
CVJ	6	Jose Carvajal
DGP	18	Gerald Dyck
DUBF	19	Franky Dubois
FAM	4	Fabio Mariuzza
FERJ	6	Javier Ruiz Fernandez
FLET	20	Tom Fleming
FLF	13	Fredirico Luiz Funari
FTAA	3	Tadeusz Figiel
FUJK	20	K. Fujimori
HALB	4	Brian Halls
HAYK	11	Kim Hay
HOWR	23	Rodney Howe
JASK	6	Krystyna Wirkus
JGE	7	Gerardo Jimenez Lopez
JJMA	13	Jessica M.Johnson
KAPJ	16	John Kaplan
KNJS	22	James & Shirley Knight
KROL	23	Larry Krozel
LEVM	19	Monty Leventhal
LKR	13	Kristine Larsen
MCE	22	Etsuiku Mochizuki
MGAA	8	Gael Mariani
MILJ	11	Jay Miller
MJHA	26	John McCammon
MMI	19	Michael Moeller
MUDG	3	George Mudry
OATS	8	Susan Oatney
OBSO	10	IPS Observatory
ONJ	2	John O'Neill
RICE	9	E. C. Richardson
RLM	3	Mat Raymonde
SCGL	15	Gerd-Lutz Schott
SDOH	30	Solar Dynamics Obs - HMI
SIMC	3	Clyde Simpson
SONA	7	Andries Son
STAB	25	Brian Gordon-States
SUZM	21	Miyoshi Suzuki
TESD	17	David Teske
URBP	6	Piotr Urbanski

VARG	17	A. Gonzalo Vargas
VIDD	11	Daniel Vidican
WILW	18	William M. Wilson
WKM	2	Michael Wiskirken
WRP	2	Russell Wheeler

Total Observers: 63
Total Observations: 834

37 of our 63 observers submitted data on the sunspot and group counts for the Sun's north and south hemispheres. It is interesting to note how the Wolf numbers of groups and Sunspots counts cross over on the 20th and 25th day this month; the southern hemisphere is predominant.



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