Solar Bulletin

THE AMERICAN ASSOCIATION OF VARIABLE STAR OBSERVERS
SOLAR SECTION

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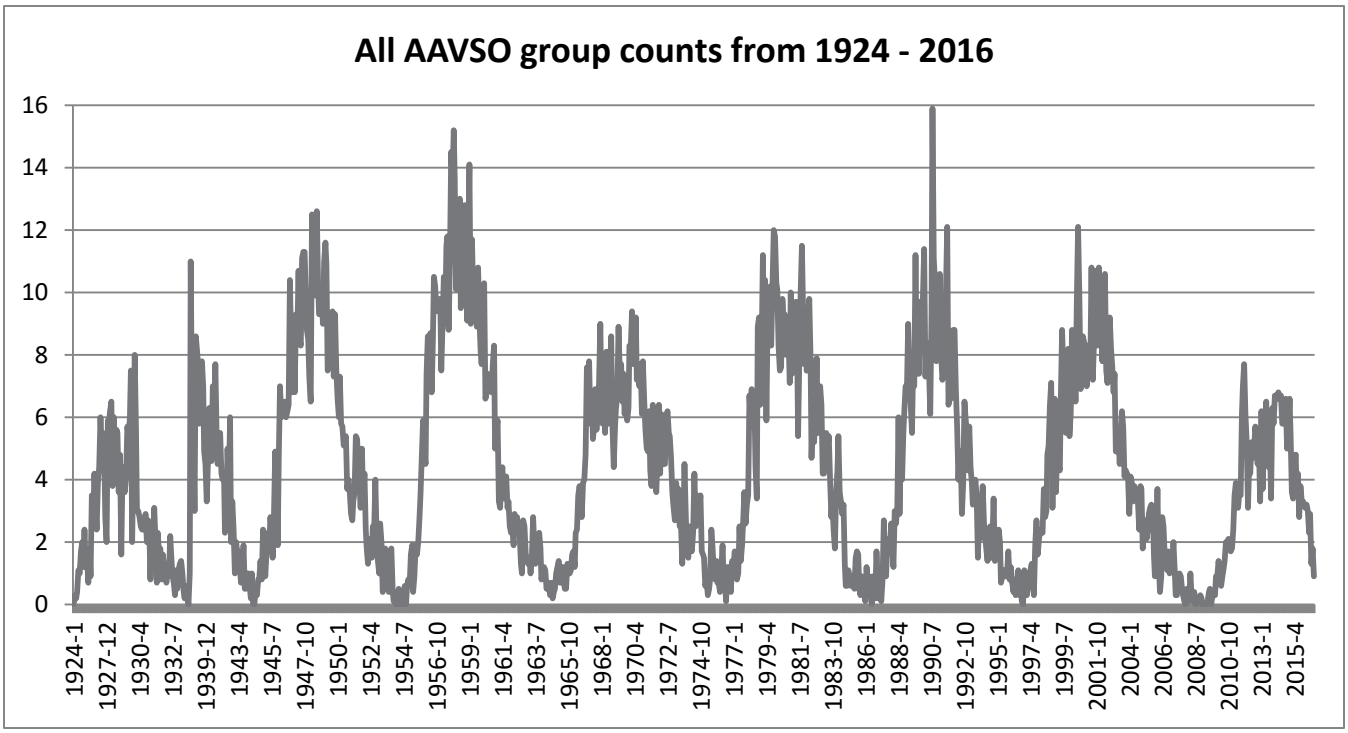
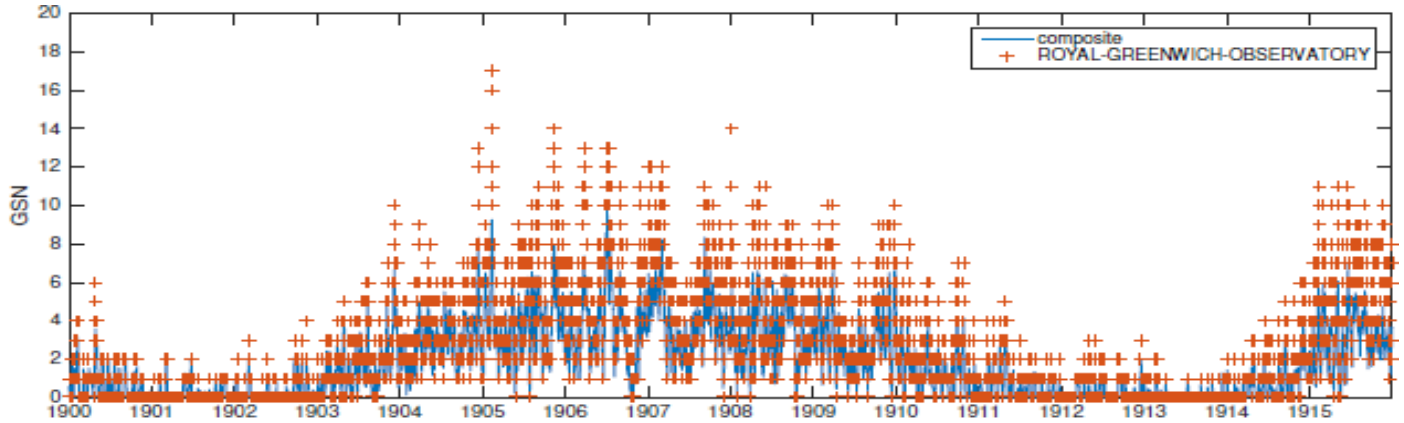
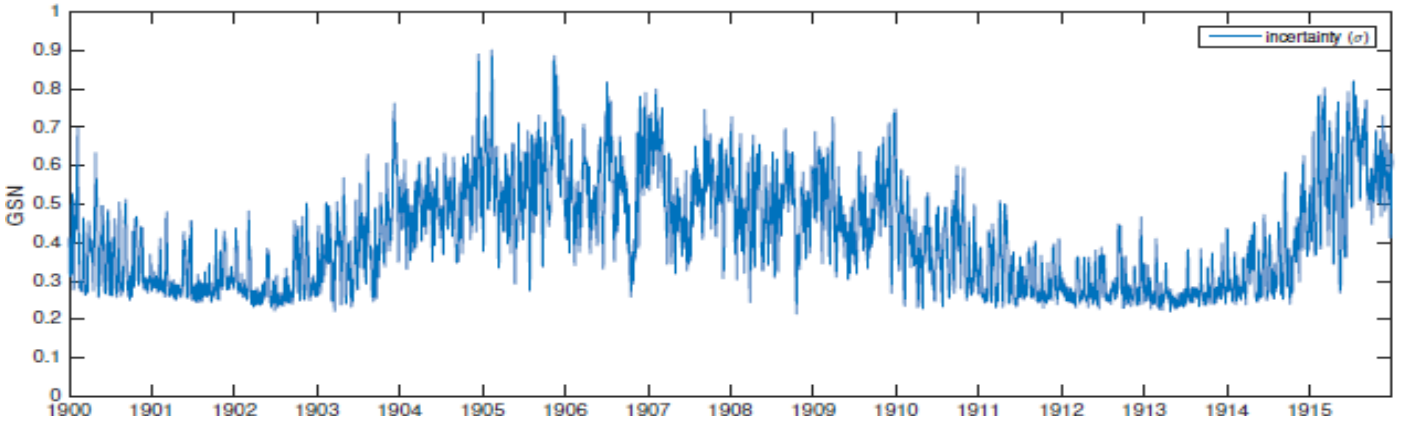


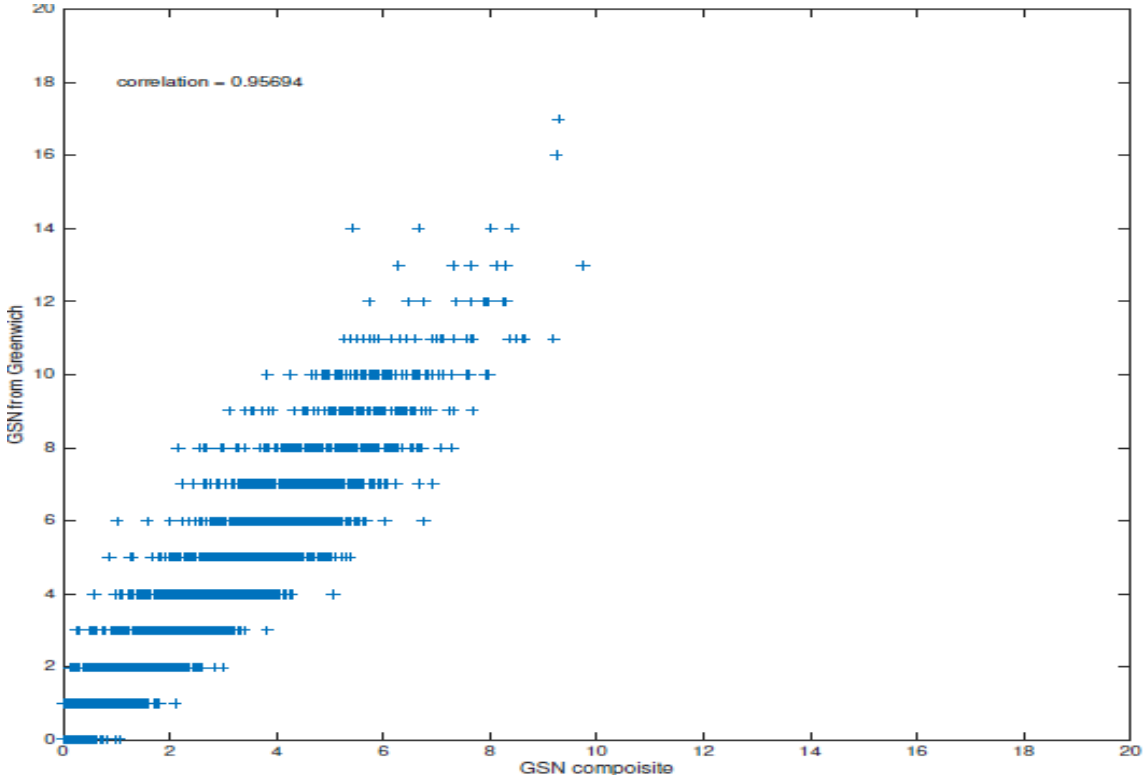
There is discussion among the solar scientists about adopting a revised Group Number index which goes back to Galileo (1612). This is because there are sunspot (group) observations that are continuous back to that time, 400+ years ago. This paper has been accepted for publication: "A Revised Collection of Sunspot Group Numbers", Vaquero et al. (SOLA-D-15-00259R1), here you can see a reference to the paper:
https://www.researchgate.net/publication/248382154_Revised_Group_Sunspot_Number_Values_for_1640_1652_and_1741

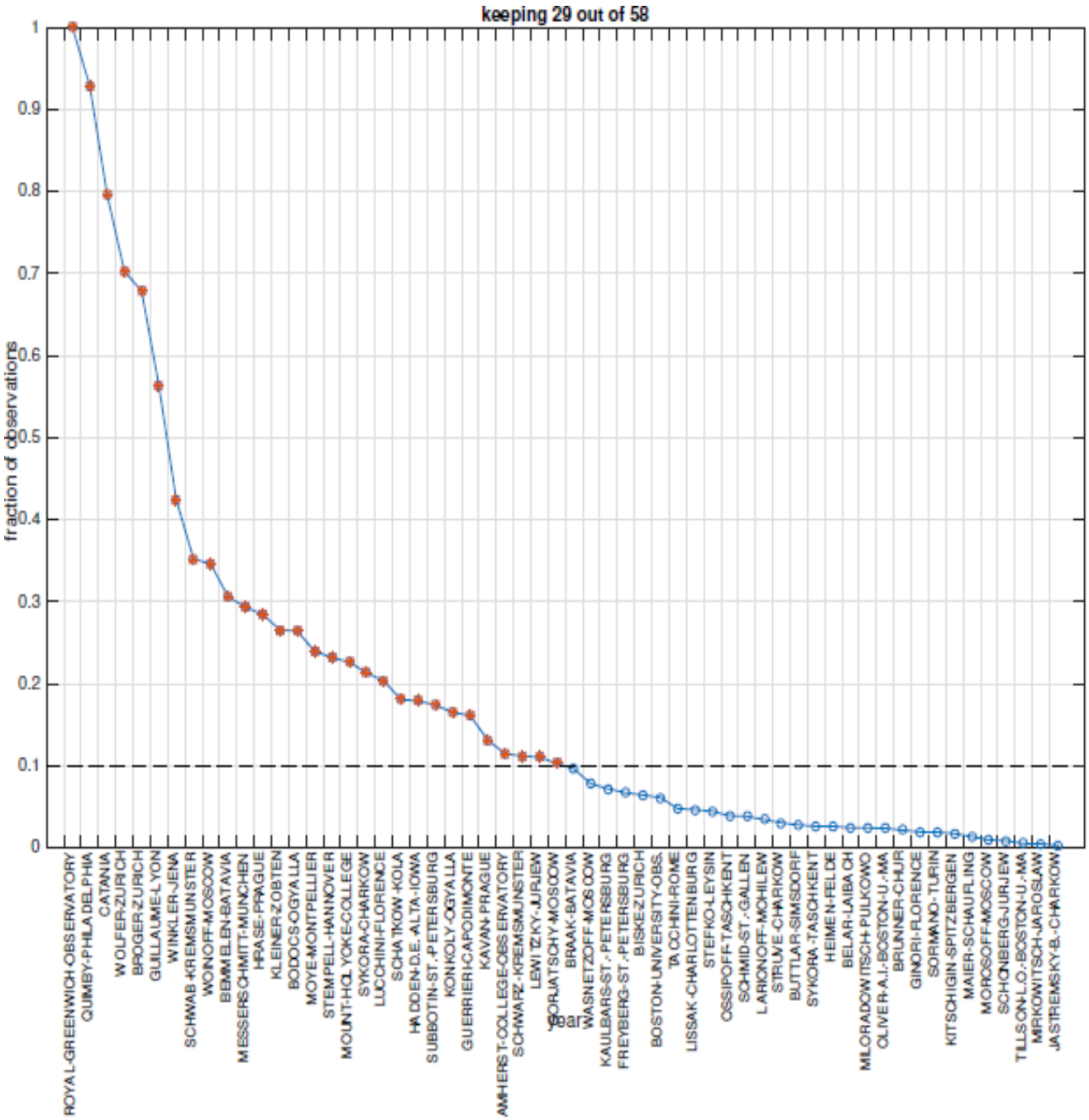
For the AAVSO, since 1949, Alan Shapley abandoned the .6 k – factor for aligning to the Zurich data (i.e. long Wolf series), and gave Zurich a k – factor ~ 1, such that it matched up to the 23 AAVSO observers and their k – factors between 1947 - 1949. (The explanation for how the AAVSO began the American Relative index (Ra) is in this Shapley article (Shapley, 1949: http://adsabs.harvard.edu/full/1949PASP...61...13S) The American Ra index, however, includes a daily count of sunspots in order to calculate the Wolf number, where the Wolf number is used to calculate the Ra. So, a question for AAVSO would be, should we contribute to the Group Number database and index (GSN) in addition to keeping the American Relative index?





Above is an example of data from the Group Number (GN) database from 1900 thru 1915, compared to matched data from the Royal Greenwich Observatory (RGO) for those years. Below is a scatter gram of the RGO and GN series showing the correlation of the two data sets. (Data are from Vaquero et al., SOLA-D-15-00259R1, and the graphs are from Thierry Dudok DeWit.)

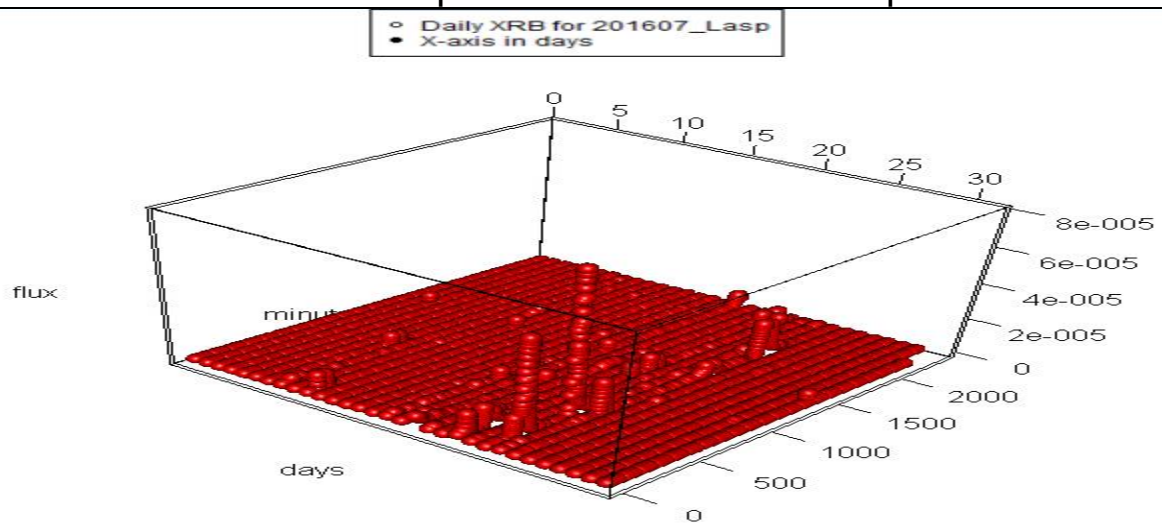




Most stations have less than 10% coverage, and this generates instabilities in the interpolation. To overcome that, the above plot shows those 29 (red dots) out of 58 observers with greater than 10% coverage, and so the composite of all observers can be built and interpolated, where the mean GSN comes from the 29 observers. However, all stations are finally used in building the composite.

The AAVSO raw group counts from select observers can contribute to the GN database for years starting from 1924 to present. As the AAVSO digitizes more of the old solar bulletin raw counts the greater may be the contribution to the GN database. The GN database will be housed at SILSO.

Sudden Ionospheric Disturbance Report

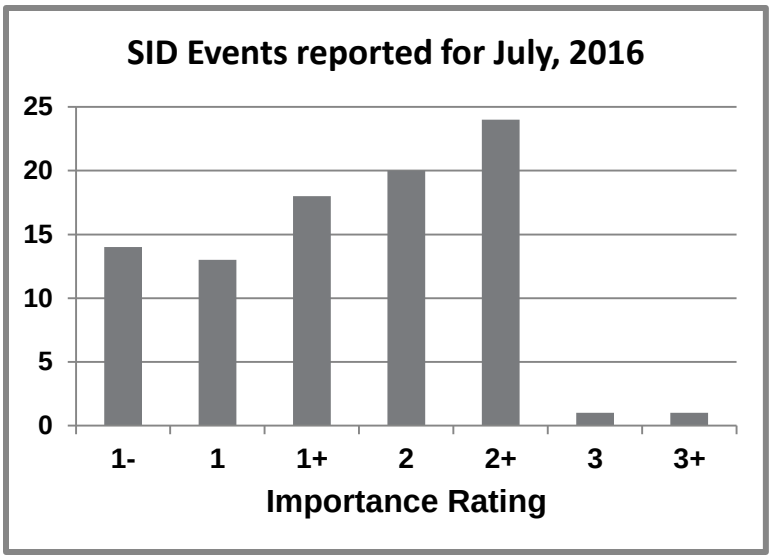


Here are EVE Lasp data for July, 2016. July 21, 23, and 24 had the most flare events this month.
http://lasp.colorado.edu/home/eve/

Sudden Ionospheric Disturbances (SID) Records During July, 2016

Date	Max	Imp	Date	Max	Imp	Date	Max	Imp
160704	1551	1+	160718	804	2+	160723	521	2+
160704	1612	2+	160718	822	2	160723	531	2+
160705	1047	2+	160719	1117	2+	160723	1257	1
160707	742	1+	160719	1410	1+	160723	1752	1+
160707	755	2+	160720	317	3	160723	2338	1+
160707	802	2	160720	1916	2+	160724	5	1
160708	59	1+	160720	2224	2+	160724	29	1+
160709	1511	1+	160721	46	2+	160724	53	1+
160709	1606	1+	160721	153	2	160724	619	2+
160710	105	1+	160721	413	3+	160724	800	-1
160714	1209	1	160721	945	-1	160724	1200	1
160715	1112	-1	160721	1120	1+	160724	1226	1
160715	1512	-1	160721	1159	-1	160724	1232	2
160715	1518	2+	160721	1254	2	160724	1302	-1
160716	35	2	160721	1333	-1	160724	1324	-1
160716	121	2	160721	2247	1+	160724	1339	1
160716	217	1+	160722	650	2	160724	1403	2
160716	303	1	160722	726	1	160724	1502	1
160716	323	2	160722	851	2+	160724	1533	2+
160716	545	-1	160722	2005	2	160724	1649	1
160716	705	2	160722	2021	2	160724	1740	2+
160716	717	2+	160722	2031	1+	160724	1744	2+
160716	824	-1	160722	2031	1+	160724	1754	2
160716	2335	2	160722	2246	1	160725	910	2
160717	141	1+	160723	206	2+	160725	945	1
160717	427	2+	160723	516	2	160725	1035	2+
160717	2338	2				160726	1534	1+

Solar Events

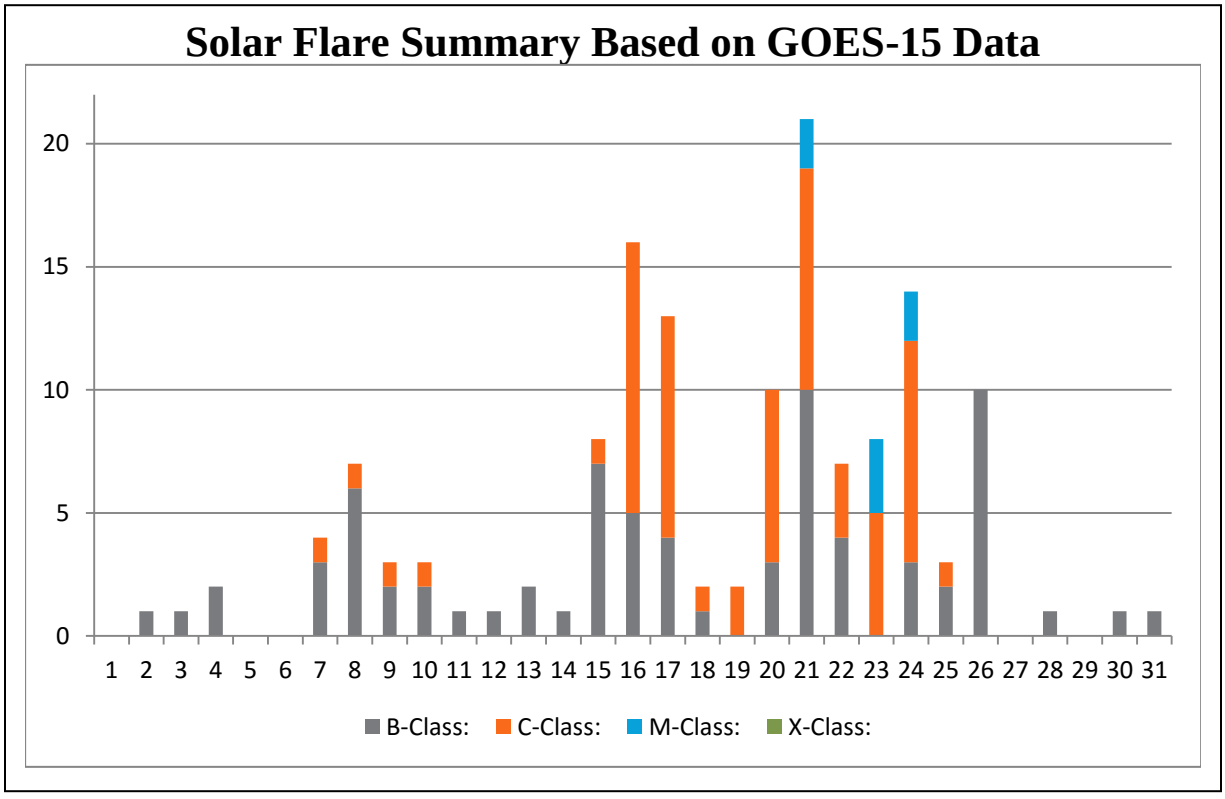


Importance rating: Duration (min)	1-: <19	1: 19-25	1+: 26-32	2: 33-45	2+: 46-85	3: 86-125	3+: 125

Sudden Ionospheric Disturbances (SID) Observers During July, 2016

Observer	Code	Station(s) monitored	Observer	Code	Station(s) monitored
A McWilliams	A94	NML	R Green	A134	NWC
J Wallace	A97	NAA	R Mrllak	A136	GQD NSY
L Loudet	A118	DHO GQD	D Koawl	A137	NPM
J Godet	A119	GQD ICV	S Aguirre	A138	NPM
B Terrill	A120	NWC	G Silvis	A141	NLK NML NPM
F Adamson	A122	NWC	I Ryumshin	A142	DHO GQD
S Oatney	A125	NML	R Rogge	A143	DHO GQD ICV
J Karlovsky	A131	DHO NSY	K Menzies	A146	NAA
			D Russel	A147	NML

There were 143 solar flares measured by GOES-15 for July, 2016: Seven M class, 62 C class and 74 B class flares. Twice the flaring this month compared to last month. There were 17 AAVSO SID observers who submitted reports this month.



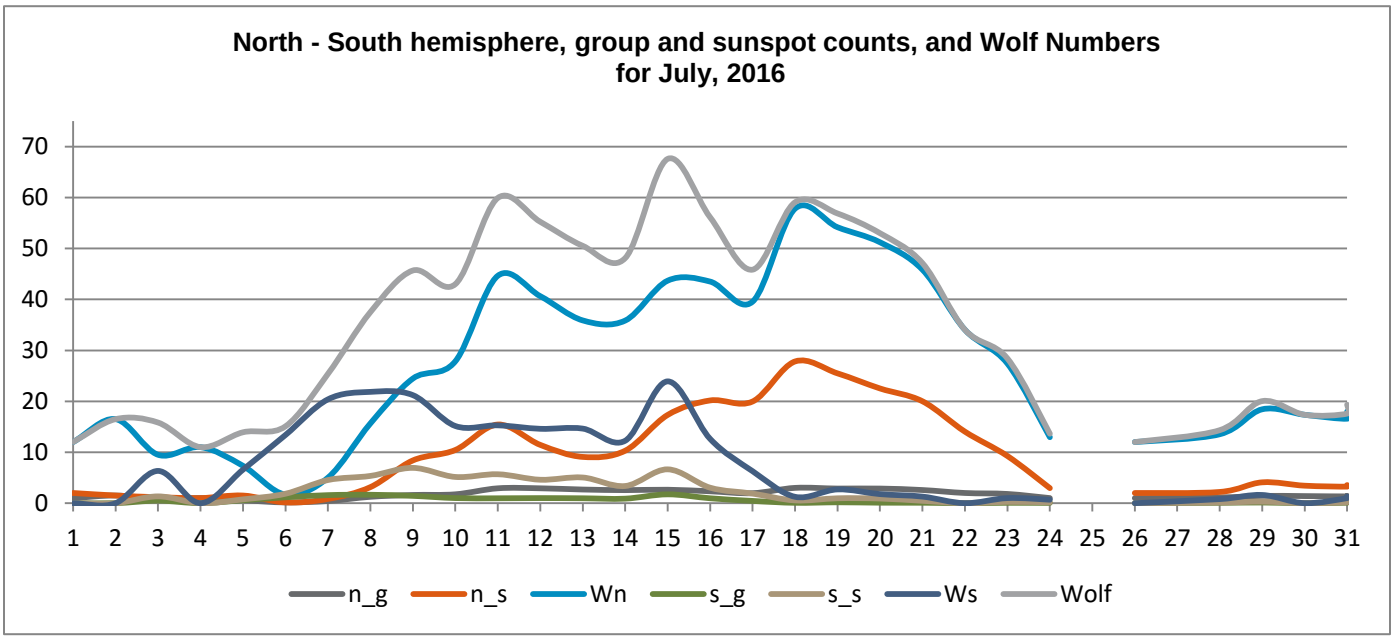
American Relative Sunspot Numbers (Ra) for July, 2016 [**boldface = maximum, minimum**]

DAY	NumObs	RAW	Ra
1	37	0	0
2	36	1	**0**
3	39	2	2
4	35	1	1
5	35	5	3
6	32	7	5
7	35	23	17
8	33	35	26
9	37	44	35
10	38	42	33
11	35	60	**48**
12	37	55	45
13	37	47	37
14	35	44	33
15	31	63	46
16	38	50	39
17	36	43	35
18	39	59	48
19	35	54	43
20	34	51	43
21	33	45	37
22	38	33	26
23	36	28	22
24	40	8	6
25	34	0	0
26	35	0	0
27	32	0	0
28	33	7	5
29	30	15	11
30	34	13	9
31	34	6	4
Average	**35.3**	**27.1**	**21.2**

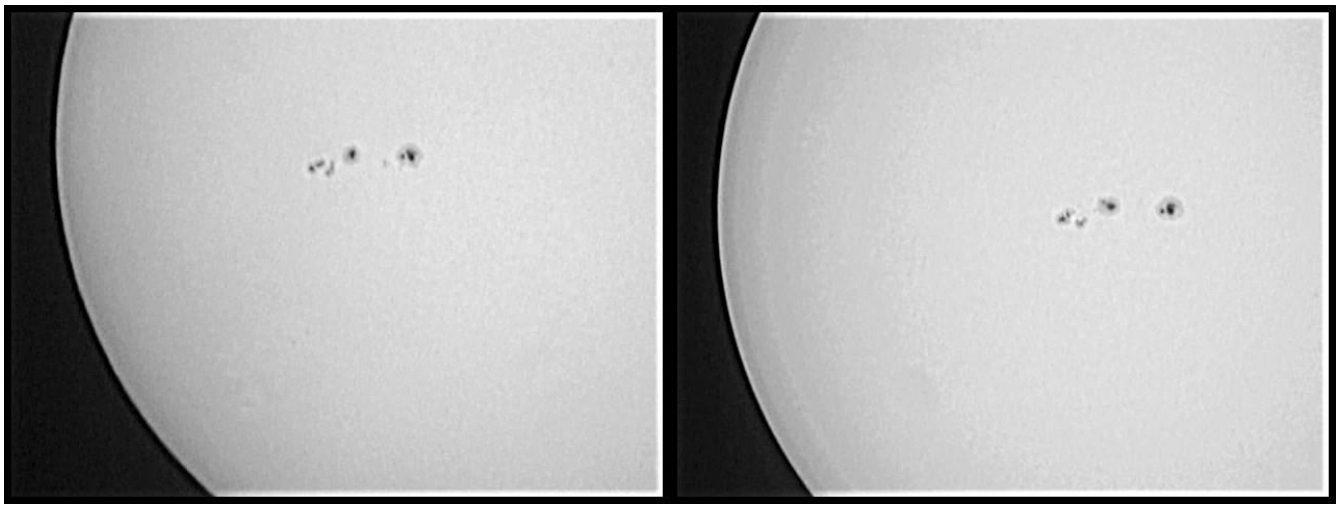
Obs	#Obs	Name
AJV	22	J. Alonso
ARAG	31	Gema Araujo
ASA	25	Salvador Aguirre
BDDA	7	Diego Bastiani
BERJ	20	Jose Alberto Berdejo
BRAB	31	Brenda Branchett
BRAF	25	Raffaello Braga
BROB	31	Robert Brown
BSAB	16	Santanu Basu
BXD	7	Alexandru Burda
CHAG	30	German Morales Chavez
CIOA	16	Ioannis Chouinavas
CKB	27	Brian Cudnik
CNT	9	Dean Chantiles
CVJ	19	Jose Carvajal
DEMF	11	Frank Dempsey
DJOB	17	Jorge del Roserio
DUBF	30	Franky Dubois
FERJ	21	Javier Ruiz Fernandez
FLET	29	Tom Fleming
FLF	13	Fredirico Luiz Funari
FTAA	5	Tadeusz Figiel
FUJK	20	K. Fujimori
HAYK	25	Kim Hay
HMQ	4	Mark Harris
HOWR	27	Rodney Howe
JDAC	18	David Jackson
JENS	9	Simon Jenner
JGE	11	Gerardo Jimenez Lopez
KAND	30	Kandilli Observatory
KAPJ	23	John Kaplan
KNJS	27	James & Shirley Knight
KROL	26	Larry Krozel
LEVM	18	Monty Leventhal
LKR	4	Kristine Larsen
LRRA	31	Robert LIttle
MARE	18	Enrico Mariani
MCE	19	Etsuiku Mochizuki
MILJ	24	Jay Miller
MJHA	31	John McCammon
MMAE	5	Aaron McNeely
MUDG	7	George Mudry
MWU	18	Walter Maluf
ONJ	12	John O'Neill
RLM	19	Mat Raymonde
SDOH	31	Jan Alvestad (SDO)
SIMC	12	Clyde Simpson
SNE	9	Neil Simmons
SONA	5	Andries Son
SPIA	4	Piotr Skorupski
STAB	31	Brian Gordon-States
SUZM	24	Miyoshi Suzuki
TESD	31	David Teske
URBP	30	Piotr Urbanski
VARG	30	A. Gonzalo Vargas
VIDD	20	Dan Vidican

WAU	1	Artur Wargin
WGI	9	Guido Wollenhaupt
WILW	30	William M. Wilson
WRP	6	Russell Wheeler

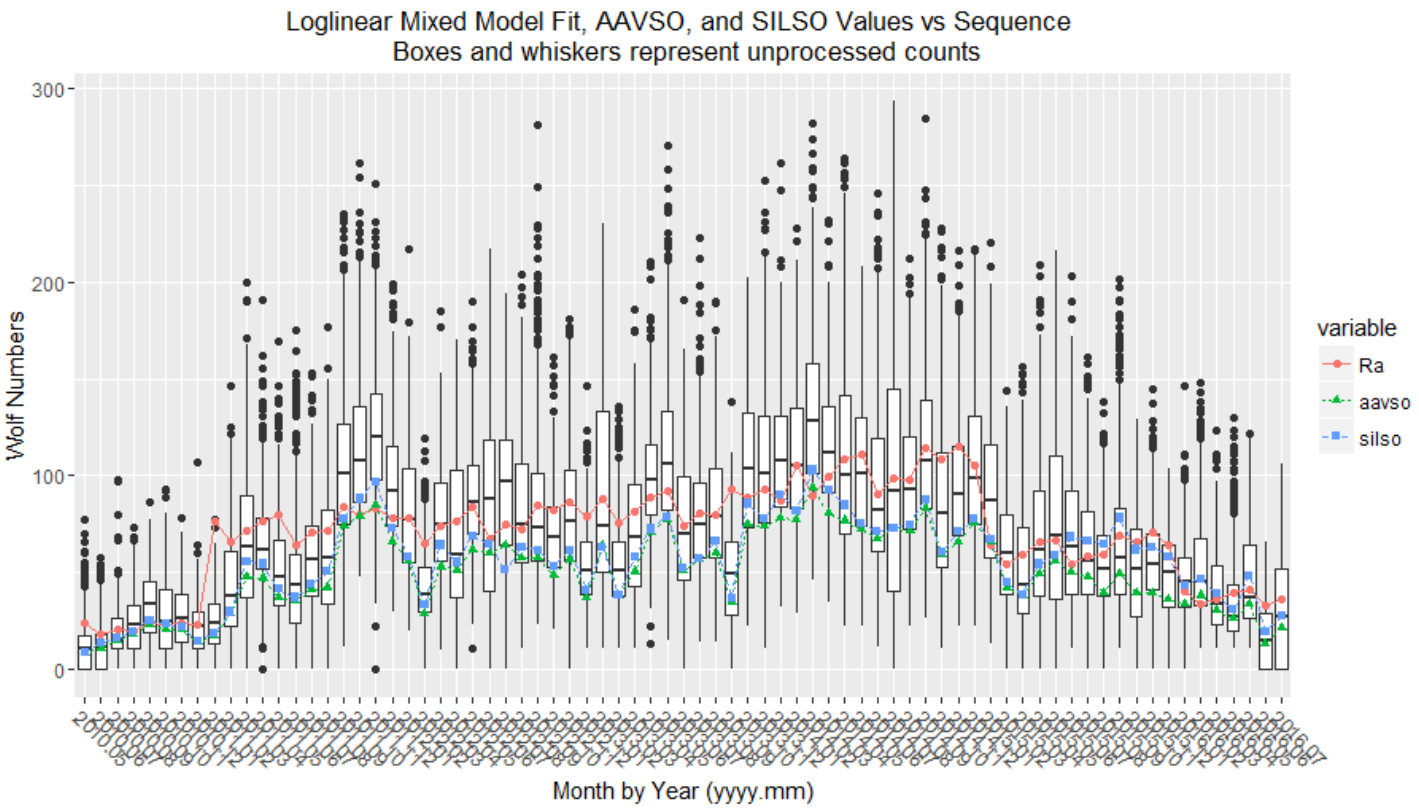
Total Observers: 60
Total Observations: 1141



There were 38 out of 60 observers who counted northern and southern hemisphere groups and sunspots this month. The northern hemisphere was somewhat predominant with days of crossover on the 5th, 9th, and 1 day with no sunspot counts at all. (These data include the SDO north/south hemisphere group and sunspot counts.)



Please find attached some pictures about a sunspots group development in July (W at right; N above): 16 July - A group of spots appeared at the E of the previous spot; the spot itself changed! (Image left), 17 July - Small changes of the group structure (Image right). Best regards, Dan Vidican



The above graph, made from raw AAVSO sunspot and group counts data, is developed by Dr. Jamie Riggs and shows the comparison of the SILSO International Sunspot Number (silso) along with the AAVSO American Relative (aavso) number, as well as her Generalized Log-linear Mixed Model (Ra). AAVSO data go back to the beginning of this solar cycle 24 (2010). A close look will show how the ISN and Ra numbers match up until July, 2015, when SILSO changed their method for calculating the ISN. https://www.aavso.org/silso-warning-major-changes-sunspot-number-reference-series http://www.sidc.be/silso/ Now the SILSO numbers are a closer match up to the AAVSO American Ra. Jamie's GLMM, which does not use the AAVSO k – factors, only raw daily counts is a little higher than either AAVSO or SILSO numbers. The SILSO relative mean sunspot number is 27.5 for July, 2016. (See last page of their July Solar Bulletin).
http://www.sidc.be/sunspots/bulletins/monthly/monthlybull201607.pdf

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