Solar Bulletin

THE AMERICAN ASSOCIATION OF VARIABLE STAR OBSERVERS
SOLAR SECTION

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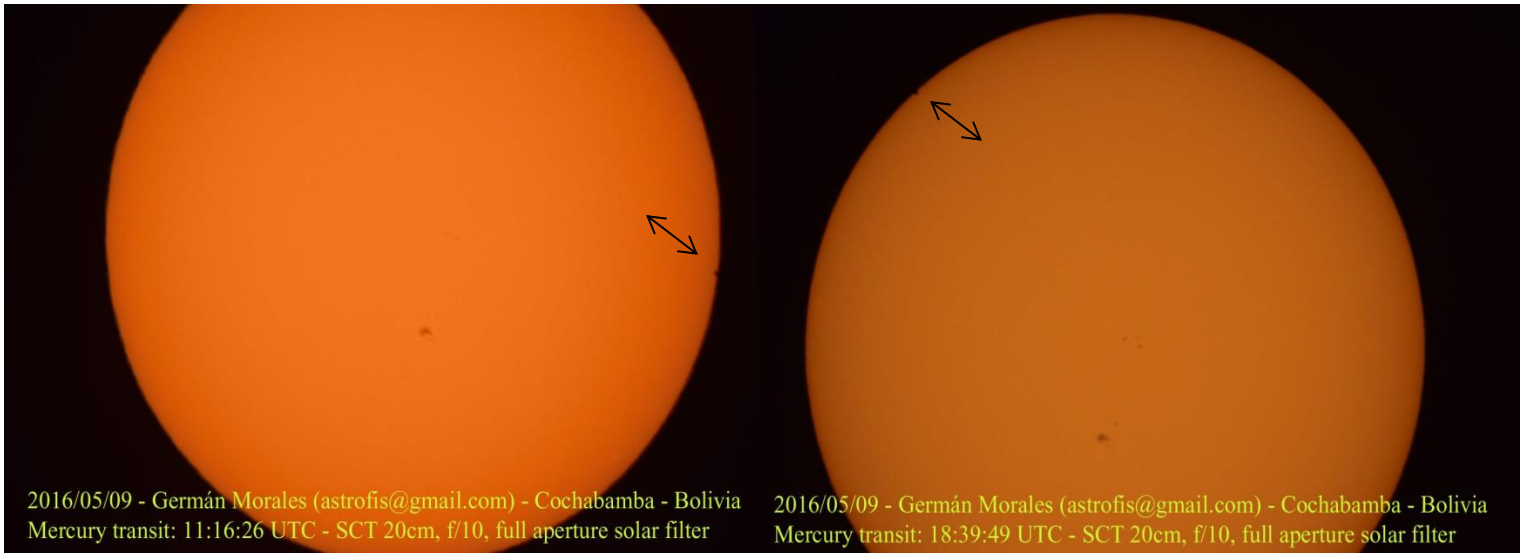


Here are two Mercury Transit images from German Morales (CHAG) where Mercury is shown at ingress (left, near far right limb) and egress (right, near the upper left). Mercury is very small! However, German records the times for these events, which is most important for calculating the solar radii, see table here: http://www.astronomia.org.bo/astro/215-TransitoDeMercurio.pdf
Two of our solar observers; Santanu Basu (BSAB) and Gonzalo Vargas (VARG), respectively calculate the solar radius their way, using German Morales' Mercury Transit images and times; Santanu writes:

$(T_3 - T_2 / 2V_{rel}) + R_{Mercury} = 936.81''$ (degrees)

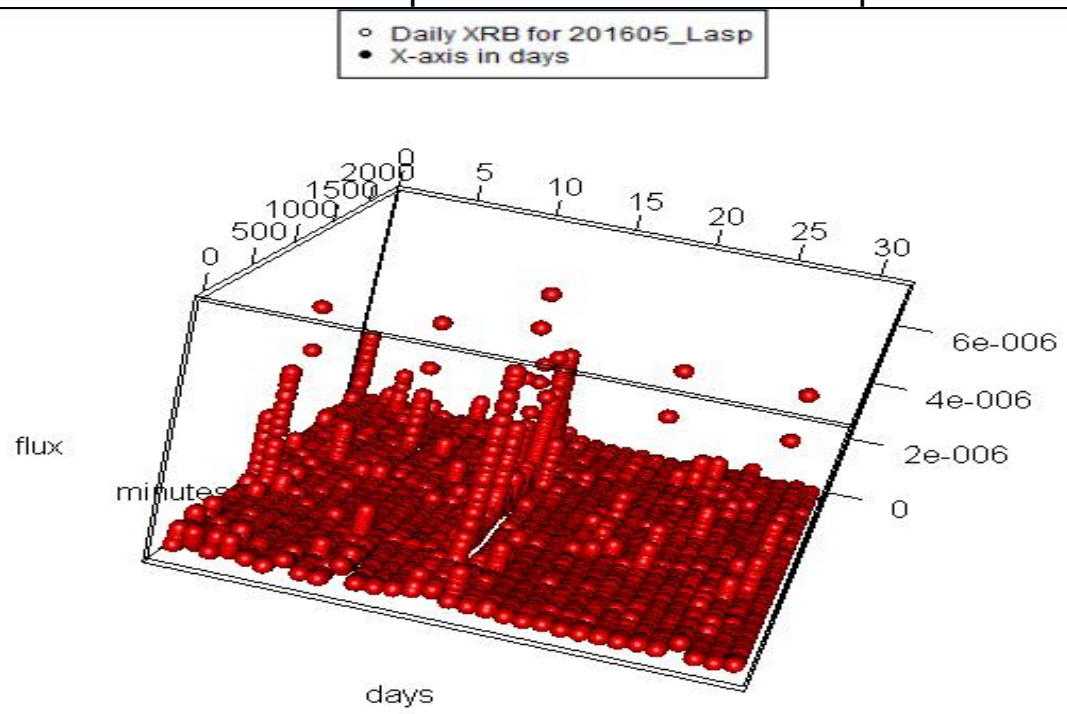
Where, T_3 = egress UT, T2 = ingress UT; Vrel = velocity of Mercury during May = .07 arc seconds, and R = Mercury radius ~ 6.05 seconds **

Gonzalo writes: Mercury from the sun distance for May 9 and according JPL ephemeris; this was 0.55885 A.U., so apparent diameter was arc tan (4879/0.55885 AU) and final result was arc tan 0,003357159 degrees or 0 degrees, 0 minutes and 12.1 seconds... Mercury radius is 6.05 seconds: Delta time for the final picture time 18h39m49s minus first picture time 11h16m26s; so Delta Time = 07h 23m 23 s that is 26603 seconds!! Solar Radii then becomes ~ 26603*0.07/2 +6.05 that is: 937.15¨ (degrees).

Also, recognize that Mercury's transit is on a chord across the solar disc and not on the equator, so there are many more calculations that need to be done to accurately determine the solar radius.

****The Sun Recorded Through History,** J. M. Vaquero Universidad Extremadura, C´aceres Spain. M. V´azquez Instituto de Astrof´ısica de Canarias, Tenerife Spain, Springer ISBN 978-0-387-92789-3 e-ISBN 978-0-387-92790-9

Sudden Ionospheric Disturbance Report

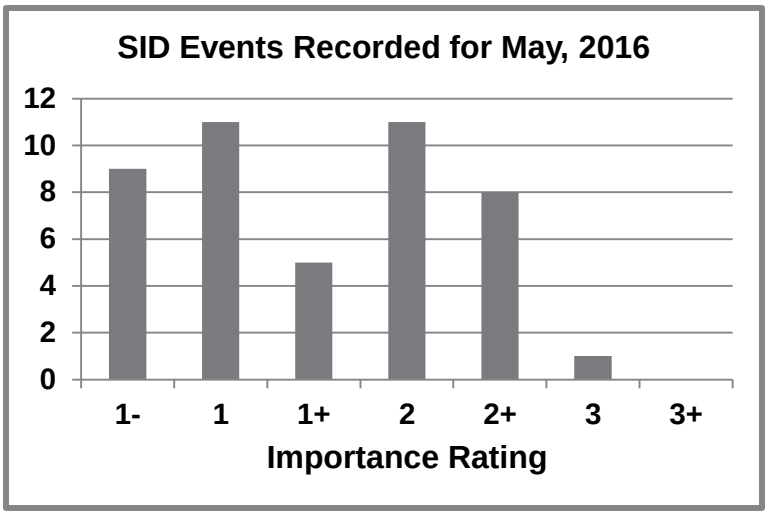


Here are EVE Lasp data for May, 2016. May 15 had the most C class flare events for the month.
http://lasp.colorado.edu/home/eve/

Sudden Ionospheric Disturbances (SID) Records During May, 2016

Date	Max	Imp	Date	Max	Imp	Date	Max	Imp
160501	921	1	160514	1521	2	160516	1525	1
160501	2327	2	160515	400	2+	160517	408	2
160502	842	1+	160515	410	2	160517	1351	2+
160503	1535	1	160515	503	1	160517	1402	1+
160505	918	2	160515	824	1	160521	1400	1+
160507	1113	2	160515	831	2	160524	1021	1
160507	1715	1	160515	930	2	160524	1521	1
160514	932	2	160515	930	2	160524	1521	1
160514	940	2+	160515	953	-1	160529	640	3
160514	1135	2+				160530	738	-1

Solar Events

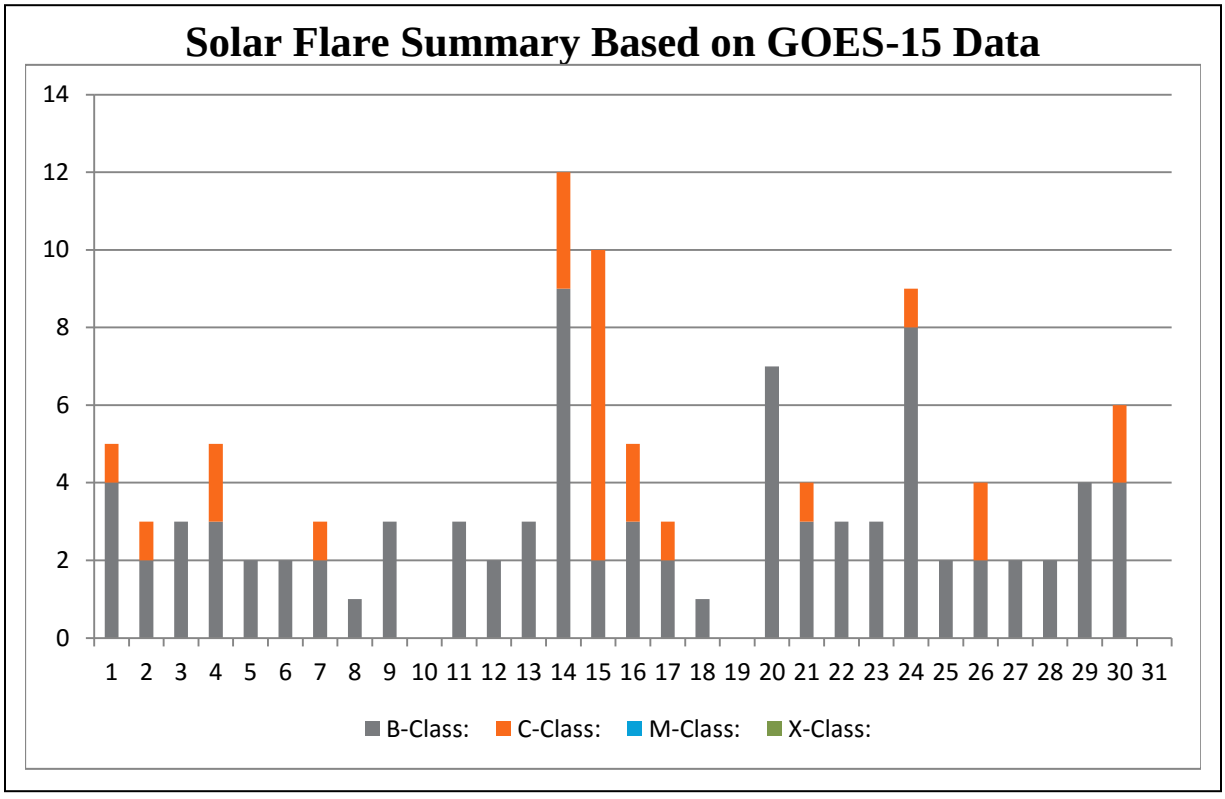


Importance rating: Duration (min)	1-: <19	1: 19-25	1+: 26-32	2: 33-45	2+: 46-85	3: 86-125	3+: 125

Sudden Ionospheric Disturbances (SID) Observers During May, 2016

Observer	Code	Station(s) monitored	Observer	Code	Station(s) monitored
A McWilliams	A94	NML	J Karlovsky	A131	DHO NSY
R Battaiola	A96	None	R Green	A134	NWC
			R Mrllak	A136	GQD NSY
J Wallace	A97	NAA	S Aguirre	A138	None
L Loudet	A118	DHO	G Silvis	A141	NAA NLK NPM
J Godet	A119	GBZ GQD ICV	I Ryumshin	A142	DHO GQD
B Terrill	A120	NWC	R Rogge	A143	DHO GQD ICV
F Adamson	A122	NWC	K Menzies	A146	NAA
S Oatney	A125	NLK	D Russel	A147	NAA

There were 112 solar flares measured by GOES-15 for May, 2016: Twenty five C class and 87 B class flares. Not as much flaring this month compared to last month. There were 17 AAVSO SID observers who submitted reports this month.

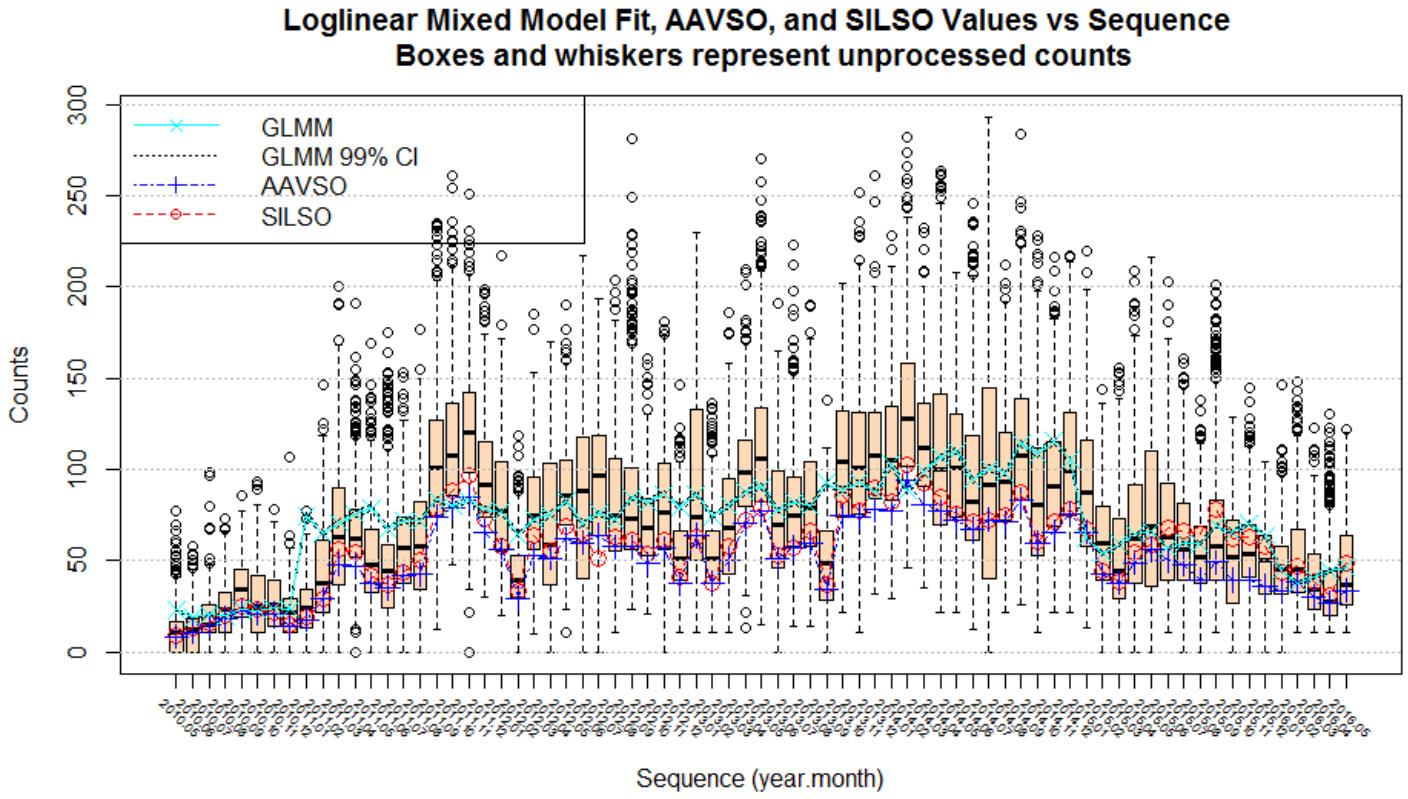


American Relative Sunspot Numbers (Ra) for May, 2016 [**boldface = maximum, minimum**]

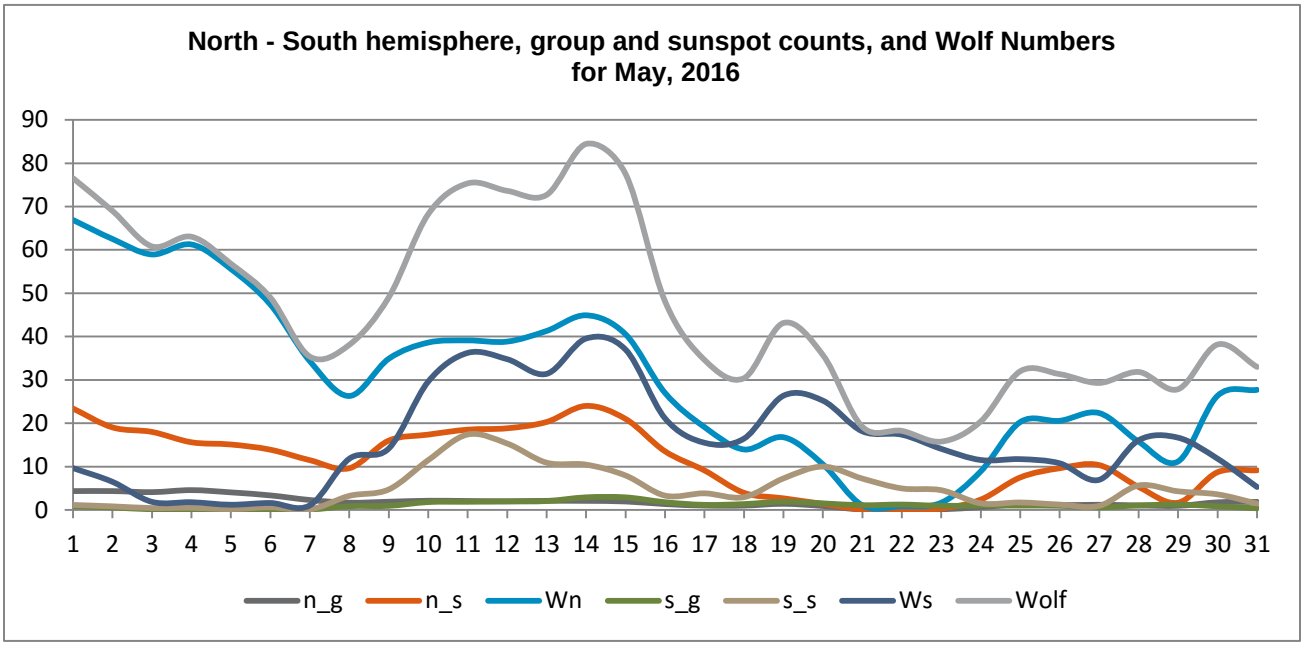
DAY	NumObs	RAW	Ra
1	33	75	60
2	33	63	49
3	31	60	46
4	35	59	45
5	32	52	39
6	33	42	31
7	33	31	23
8	31	34	26
9	33	44	36
10	29	62	51
11	32	71	57
12	32	72	57
13	31	71	56
14	32	82	**63**
15	32	74	58
16	34	44	35
17	32	32	25
18	30	28	22
19	33	38	30
20	34	32	24
21	31	18	15
22	31	17	13
23	33	15	**12**
24	33	20	15
25	25	30	23
26	31	30	23
27	32	24	18
28	35	29	23
29	33	24	19
30	28	32	25
31	33	31	25
Average	**31.9**	**43.1**	**33.7**

Obs	#Obs	Name
AJV	23	J. Alonso
ARAG	30	Gema Araujo
ASA	27	Salvador Aguirre
BARH	7	Howard Barnes
BATR	5	Roberto Battaiola
BERJ	19	Jose Alberto Berdejo
BRAB	29	Brenda Branchett
BRAF	15	Raffaello Braga
BROB	27	Robert Brown
BSAB	21	Santanu Basu
BXD	11	Alexandru Burda
CHAG	31	German Morales Chavez
CKB	16	Brian Cudnik
CNT	17	Dean Chantiles
DEMF	3	Frank Dempsey
DJOB	9	Jorge del Rosario
DUBF	29	Franky Dubois
FERJ	25	Javier Ruiz Fernandez
FLET	24	Tom Fleming
FLF	12	Fredirico Luiz Funari
FTAA	12	Tadeusz Figiel
FUJK	19	K. Fujimori
HALB	7	Brian Halls
HAYK	19	Kim Hay
HOWR	24	Rodney Howe
JDAC	18	David Jackson
JENS	4	Simon Jenner
JGE	5	Gerardo Jimenez Lopez
JJMA	2	Jessica M.Johnson
KAND	28	Kandilli Observatory
KAPJ	22	John Kaplan
KNJS	29	James & Shirley Knight
KROL	21	Larry Krozel
LEVM	24	Monty Leventhal
LKR	8	Kristine Larsen
LRRA	31	Robert LIttle
MARE	14	Enrico Mariani
MILJ	13	Jay Miller
MJAF	31	Juan Antonio Moreno
MJHA	14	John McCammon
MUDG	11	George Mudry
OATS	7	Susan Oatney
ONJ	10	John O'Neill
RLM	14	Mat Raymonde
SCGL	28	Gerd-Lutz Schott
SDOH	31	Jan Alvestad (SDO)
SIMC	8	Clyde Simpson
SONA	12	Andries Son
STAB	29	Brian Gordon-States
SUZM	21	Miyoshi Suzuki
TESD	28	David Teske
URBP	30	Piotr Urbanski
VARG	28	A. Gonzalo Vargas
VIDD	13	Dan Vidican
VRUA	9	Ruben Verboven
WAU	3	Artur Wargin
WILW	21	William M. Wilson

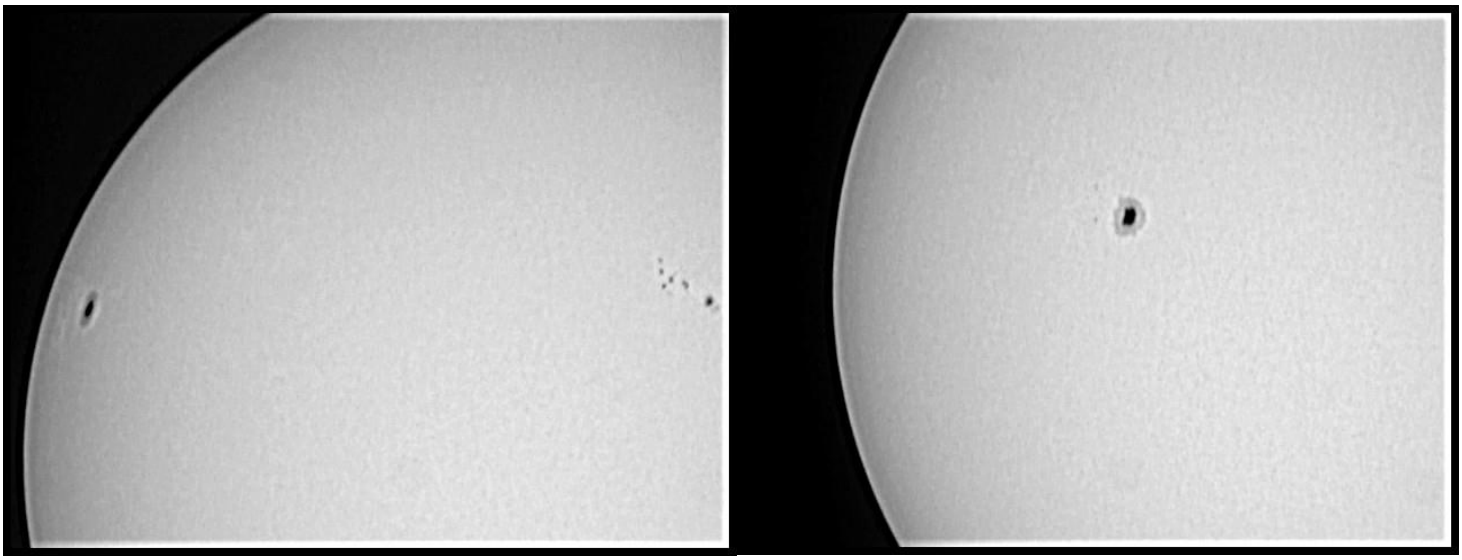
Total Observers: 58
Total Observations: 1030



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 (ISN) along with the AAVSO American Relative (Ra) number, as well as her Generalized Log-linear Mixed Model (GLMM). 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 once again match up Jamie's GLMM, which does not use the AAVSO k – factors, only raw daily counts. The SILSO relative mean sunspot number is 48.4 for May, 2016. (See last page of their May Solar Bulletin). http://www.sidc.be/sunspots/bulletins/monthly/monthlybull201605.pdf



There were 37 out of 58 observers who counted northern and southern hemisphere groups and sunspots this month. The northern hemisphere was somewhat predominant with days of crossover on the 18th, 24th, 28th.



Please find attached 2 images of a big sunspot AR 2546, from May 15 (left), 18 (right) 2016. N is up; W at right. Every picture is a combination of 13 images (the best selected from AVI films). In the focus of a refractor: D=70mm, F/10, using a Mylar filter. Best regards. Dan Vidican

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