

Solar Bulletin

THE AMERICAN ASSOCIATION OF VARIABLE STAR OBSERVERS
SOLAR SECTION



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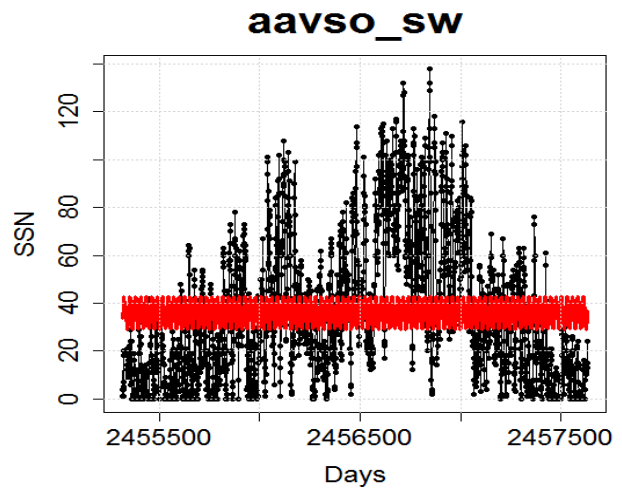
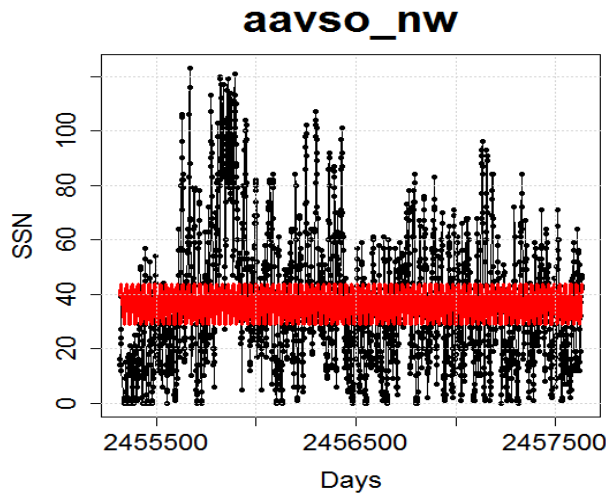
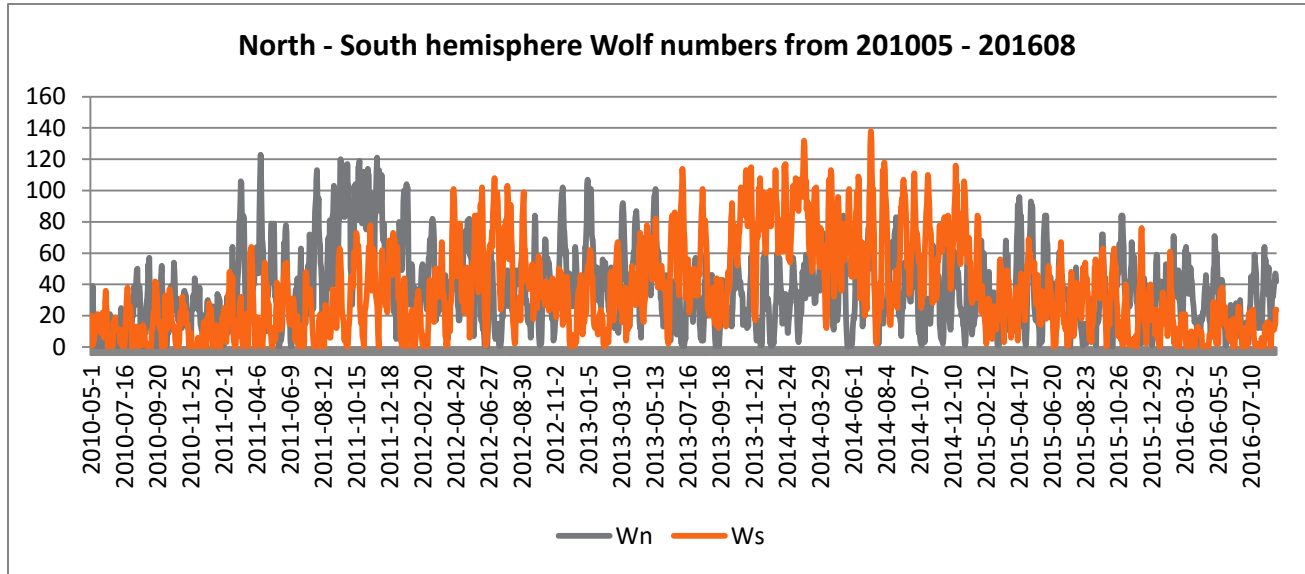
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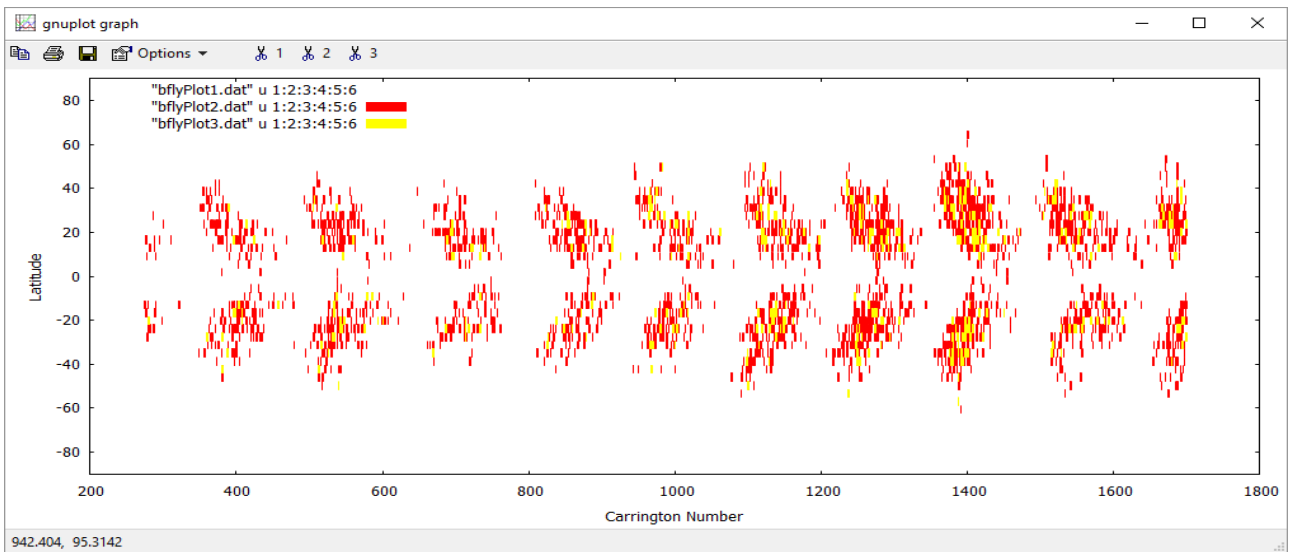
August, 2016



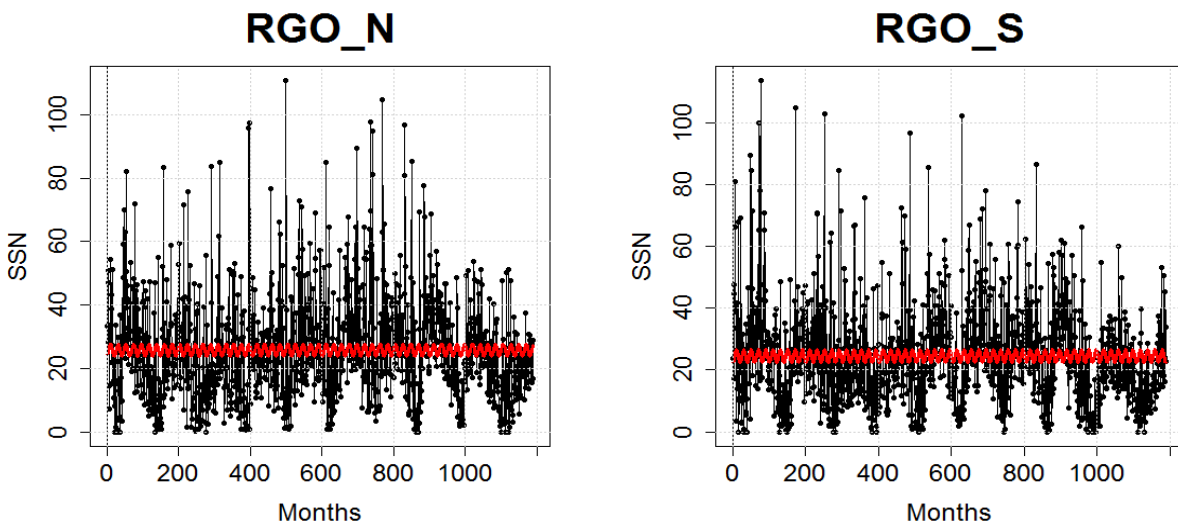
Period for north hemisphere = 28.1691 days. Period for south himisphere = 27.2021 days.

Above are AAVSO Wolf numbers for the northern and southern hemispheres from May, 2010 thru August, 2016. The sun is a 'differential rotator' meaning that the north and south poles rotate about 30 days, and the equator rotates about 26 days. So, the northern hemisphere period rotation of ~28 days means most of the active regions (groups and sunspots) are at mid to high latitudes. In the southern hemisphere most of the active regions rotate at a latitude closer to the equator, or at the average Carrington Rotation period of 27.2 days.

It's interesting to go back through the north – south hemisphere data from the Royal Greenwich Observatory (RGO), as there are consecutive umbra areas (group or active region) recorded from 1874 – 1981 , just over 100 years, which can be represented as a butterfly plot with Carrington Rotation periods from 200 to 1700 (the yellow are the umbra areas)
<http://solarscience.msfc.nasa.gov/greenwch/bflydata.txt> :



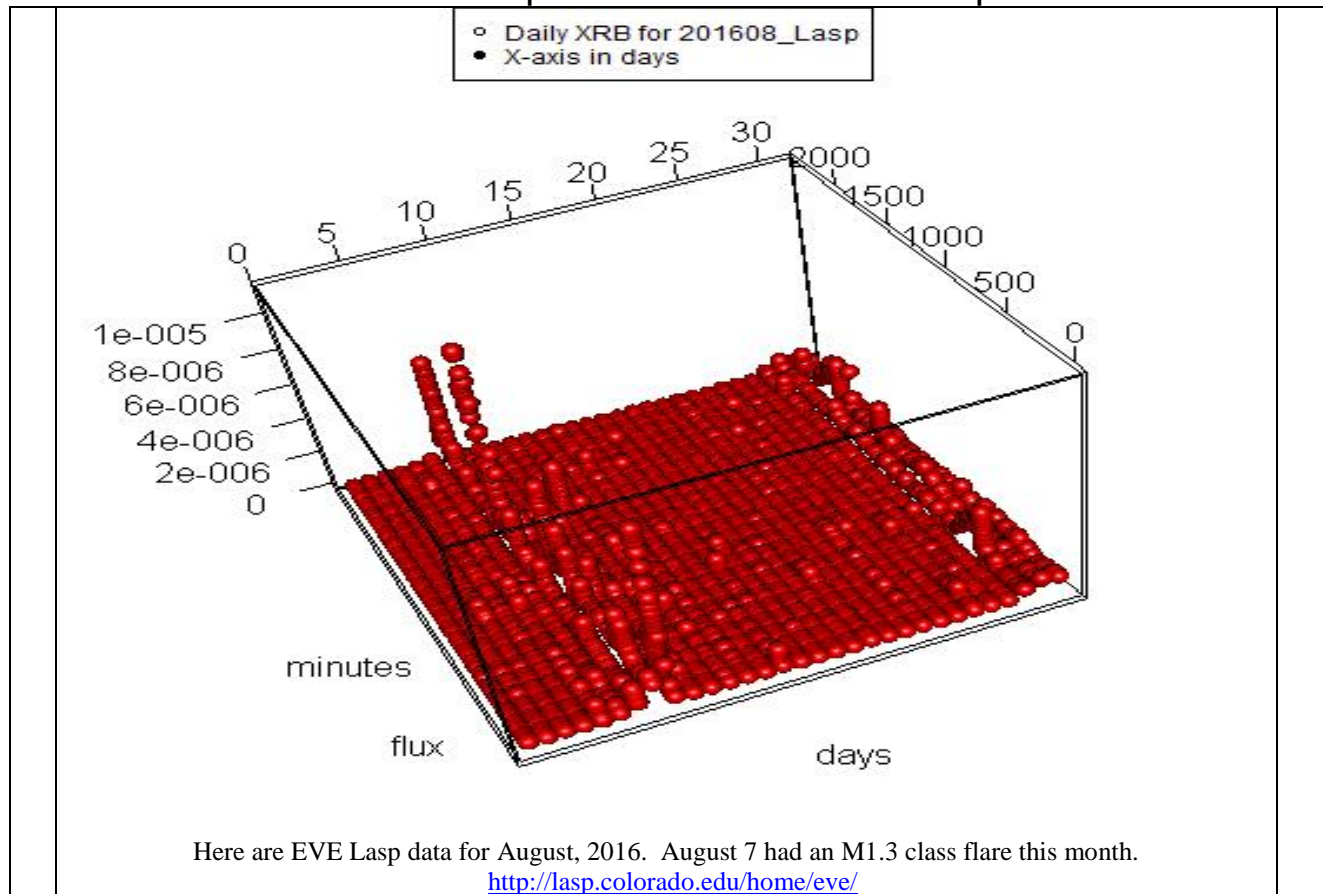
It looks as though there were two separate ‘light curves’ of solar cycles recorded in these RGO data. As with the north-south hemisphere AAVSO data it's possible to detect the sun's rotation periods:



Rotation period, north hemisphere = 26.2 days. Rotation period, south hemisphere = 22.0 days.

Perhaps the reason for the different Carrington Rotation periods in the RGO data, compared to the AAVSO data for this recent cycle 24, is that the AAVSO data are collected daily from around the globe, whereas the RGO data come from just one observatory, and because of that the north – south data have to be aggregated over monthly averages. The light curves use a least-squares fit before the Discrete Fourier Transform, which does a fair job of picking out the Carrington Rotations in both hemispheres. It may be just a limitation of using one observatory to track the north - south active region monthly aggregates rather than many individual observers, submitting daily observations.

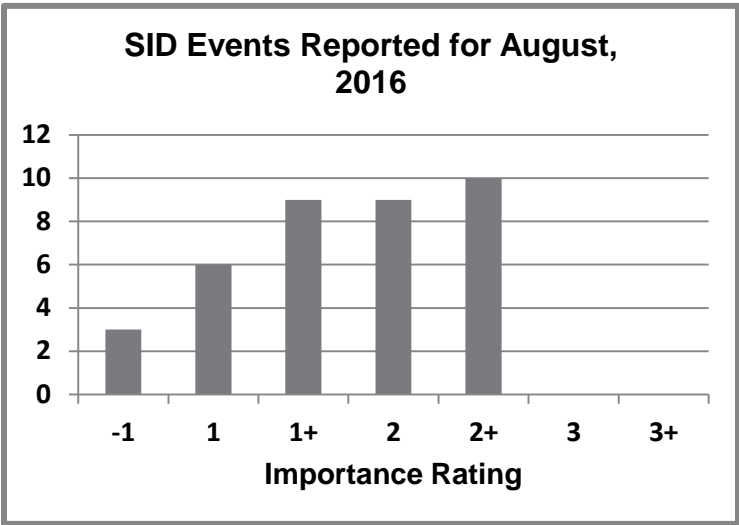
Sudden Ionospheric Disturbance Report



Sudden Ionospheric Disturbances (SID) Records During August, 2016

Date	Max	Imp	Date	Max	Imp	Date	Max	Imp
160804	1706	2+	160807	2232	1+	160809	854	1
160805	1014	-1	160807	2242	2	160811	1645	2
160805	1028	2+	160808	217	1+	160816	815	2+
160807	1025	1+	160808	259	2+	160819	915	1+
160807	1339	1+	160808	739	1	160819	1006	2+
160807	1444	1	160808	844	1	160819	1116	2+
160807	1509	2	160808	857	2	160819	1235	2+
160807	2149	1+	160808	921	2	160829	350	2+
160807	2200	1+	160808	1045	2+	160830	1425	2
			160809	45	2+	160830	1850	2
						160830	1850	2
						160831	2026	-1

Solar Events

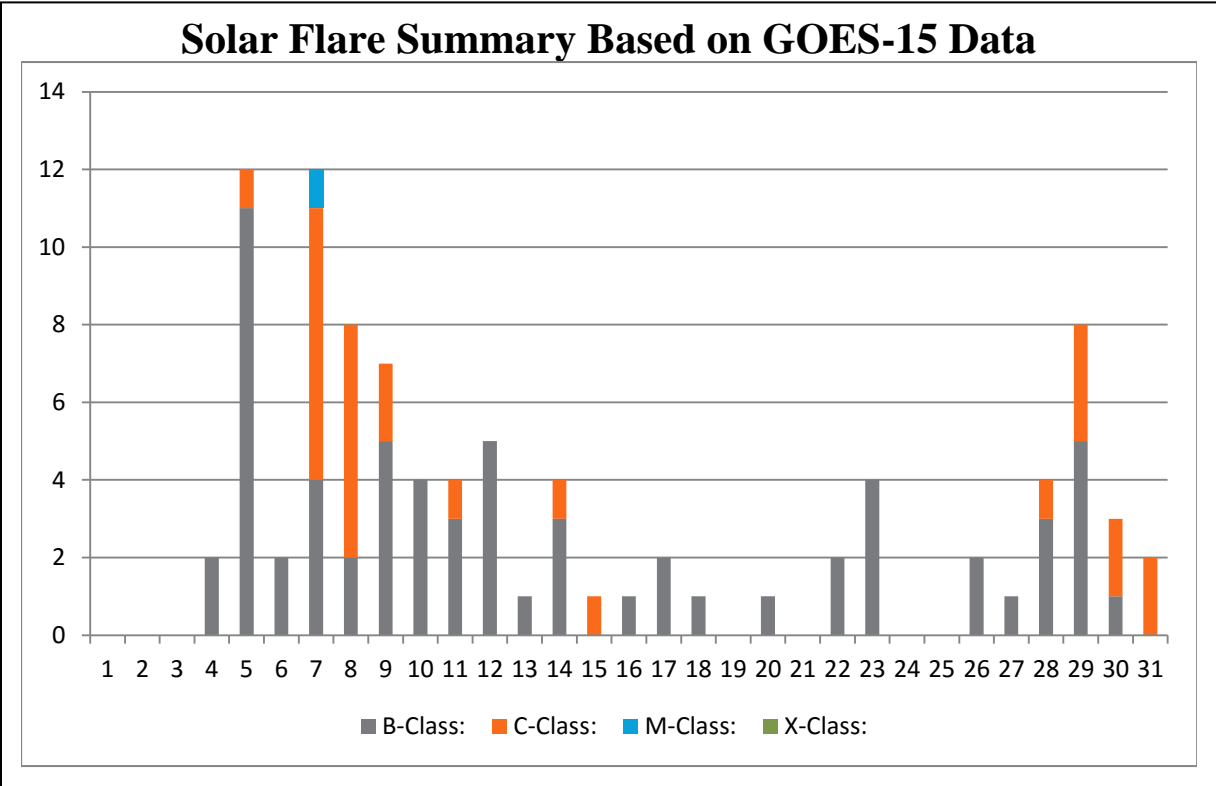


Importance rating: Duration (min)	1-: <19	1: 19-25	1+: 26-32	2: 33-45	2+: 46-85	3: 86-125	3+: 125
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Sudden Ionospheric Disturbances (SID) Observers During August, 2016

Observer	Code	Station(s) monitored	Observer	Code	Station(s) monitored
A McWilliams	A94	NML	R Mrlak	A136	GQD NSY
R Battaiola	A96	HWU	D Koawl	A137	NPM
J Wallace	A97	NAA	S Aguirre	A138	NPM
L Loudet	A118	DHO	G Silvis	A141	NLK NPM
J Godet	A119	GBZ GQD	I Ryumshin	A142	DHO GQD
B Terrill	A120	NWC	R Rogge	A143	DHO GQD
S Oatney	A125	NLK	K Menzies	A146	NAA
J Karlovsky	A131	DHO NSY	D Russel	A147	NML
R Green	A134	NWC			

There were 93 solar flares measured by GOES-15 for August, 2016: One M class, 27 C class and 65 B class flares. Almost half 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 August, 2016 [**boldface = maximum, minimum**]

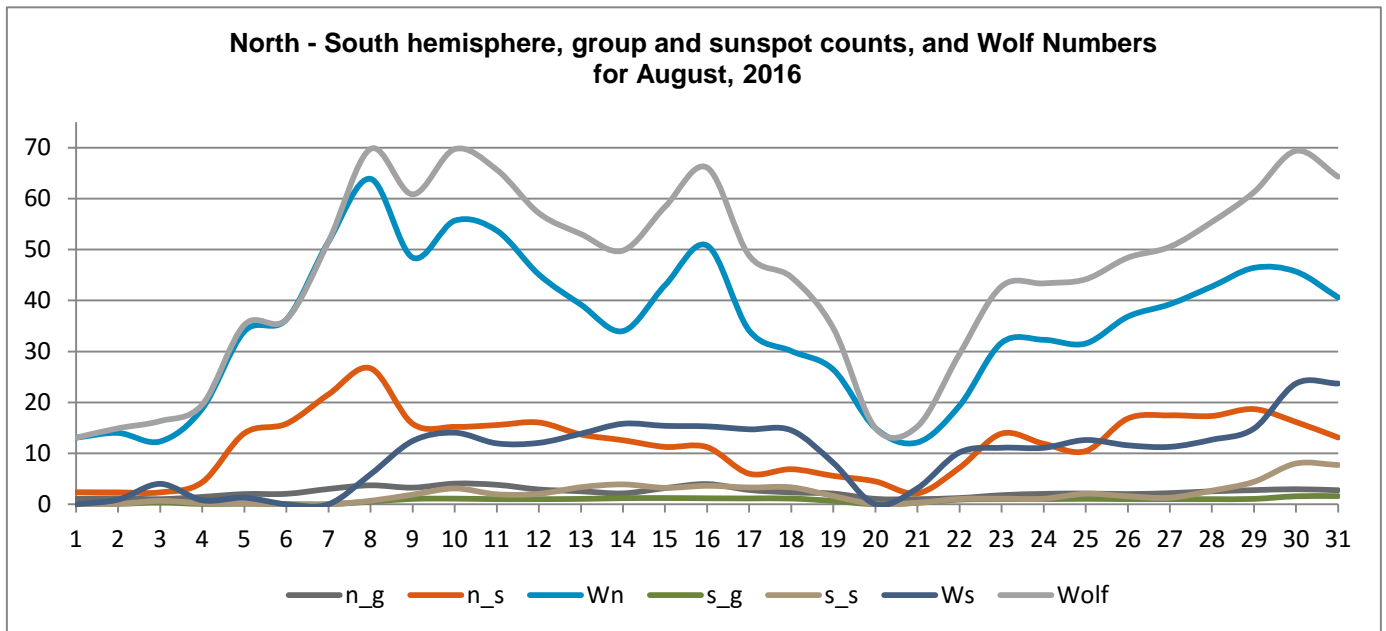
DAY	NumObs	RAW	Ra
1	33	6	4
2	30	6	4
3	33	1	1
4	32	15	12
5	29	35	27
6	37	35	28
7	38	50	39
8	39	65	50
9	31	63	49
10	35	68	51
11	35	66	52
12	32	58	45
13	32	51	41
14	33	49	40
15	33	54	44
16	32	62	48
17	35	46	36
18	36	42	34
19	33	32	24
20	32	12	9
21	31	5	4
22	41	29	23
23	41	42	33
24	38	43	34
25	32	43	34
26	39	45	35
27	35	47	38
28	39	54	43
29	32	59	45
30	38	64	49
31	34	62	46
Average	34.5	42.3	33

Obs	#Obs	Name
AAX	18	Alexandre Amorim
AJV	24	J. Alonso
ARAG	31	Gema Araujo
ASA	27	Salvador Aguirre
BARH	9	Howard Barnes
BERJ	21	Jose Alberto Berdejo
BRAB	29	Brenda Branchett
BRAF	27	Raffaello Braga
BROB	31	Robert Brown
BSAB	16	Santanu Basu

BXD	4	Alexandru Burda
CHAG	31	German Morales Chavez
CIOA	12	Ioannis Chouinavas
CKB	21	Brian Cudnik
CNT	11	Dean Chantiles
DEMF	8	Frank Dempsey
DJOB	26	Jorge del Rosario
DUBF	28	Franky Dubois
FERJ	25	Javier Ruiz Fernandez
FLET	20	Tom Fleming
FLF	15	Fredirico Luiz Funari
FUJK	16	K. Fujimori
HALB	8	Brian Halls
HAYK	19	Kim Hay
HOWR	27	Rodney Howe
JDAC	16	David Jackson
JENS	3	Simon Jenner
JGE	7	Gerardo Jimenez Lopez
KAND	27	Kandilli Observatory
KAPJ	21	John Kaplan
KNJS	30	James & Shirley Knight
KROL	28	Larry Krozel
LEVM	21	Monty Leventhal
LKR	5	Kristine Larsen
LRRA	31	Robert Little
MARE	22	Enrico Mariani
MCE	24	Etsuiku Mochizuki
MILJ	20	Jay Miller
MJAF	30	Juan Antonio Moreno
MJHA	31	John McCammon
OATS	1	Susan Oatney
ONJ	18	John O'Neill
RLM	20	Mat Raymonde
SDOH	30	Solar Dynamics Obs - HMI
SIMC	11	Clyde Simpson
SMNA	4	Michael Stephanou
SNE	11	Neil Simmons
SONA	6	Andries Son
STAB	31	Brian Gordon-States
SUZM	29	Miyoshi Suzuki
TESD	31	David Teske
URBP	28	Piotr Urbanski
VARG	24	A. Gonzalo Vargas
VIDD	24	Dan Vidican
VRUA	5	Ruben Verboven
WAU	1	Artur Wargin
WGI	7	Guido Wollenhaupt

WILW 23 William M. Wilson
WRP 2 Russell Wheeler

Total Observers: 59
Total Observations: 1126



There were 38 out of 59 observers who counted northern and southern hemisphere groups and sunspots this month. The northern hemisphere was predominant with no days of crossover. (These data include the SDO north/south hemisphere group and sunspot counts.)

Reporting Addresses:
Sunspot Reports – Kim Hay solar@aavso.org
SID Solar Flare Reports – Rodney Howe ahowe@frii.com