Solar Bulletin

The American Association of Variable Star Observers
Solar Section

David Jackson, Kristine Larsen, Co-Chairs
c/o AAVSO, c/o 1770 Massachusetts Ave Ste 121
Cambridge, MA 02140-2808 USA

Web: https://www.aavso.org/solar-bulletin
Email: solar@aavso.org
ISSN 0271-8480

Volume 82 Number 05 May 2026

Preface

The Solar Bulletin of the American Association of Variable Star Observers (ISSN 0271-8480) is the publication of record for observational data relating to sunspot and sudden ionospheric disturbance (SID) observations by Solar Section observers of the AAVSO. The Solar Bulletin is published monthly in the calendar month following the cover date (i.e. the January issue is published in mid-February, and contains data for January). It has been published regularly with few interruptions since 1944.

The AAVSO Solar Bulletin is currently listed in the NASA ADS Abstract Service under journal code “AAVSB”. If you use AAVSO solar data or the bulletin in your publication, please cite the data accordingly; more importantly, please let us know that you use these data! We would appreciate receiving a copy of any and all publications that reference AAVSO data; please send offprints or links to abstract pages to aavso@aavso.org.

Active solar observers receive a copy of the Solar Bulletin each month. Institutions and other entities may subscribe to the Solar Bulletin for a fee. See our subscriptions page for details.

Note that data from the AAVSO Solar Section are only available either via the Bulletin or via NOAA’s National Geophysical Data Center. We are working toward making these data available electronically via the AAVSO website in the very near future.

News From The Solar Section

As you may have observed from the masthead of last month’s Solar Bulletin, there have been some changes afoot. Most importantly, our co-director, **Rodney Howe**, has stepped down after 16 years of service. Rodney has also been a dedicated solar observer for the AAVSO, since 2010, submitting over 5000 observations to the Solar archive. We thank him for his service, his leadership, and above all else, his friendship. But the good news is that Rodney will remain part of the Solar team, coordinating the SID observations.

We are pleased to welcome **David Jackson** to the team. David has already demonstrated his enthusiasm and creativity as a member of the solar group, and we look forward to the enhancements he will bring to our Bulletin. A dedicated Solar Observer since November 2014, David has contributed 1,041 observations to the record. He conducts his work using a 90mm f/11 Celestron AstroMaster telescope.

As you may have heard, the AAVSO is in the process of updating its in-house software, including SunEntry. The Solar Team has been busy testing and helping HQ debug the new software, and we hope to announce the roll-out in next month’s issue. It will be a staged process, giving everyone time to become comfortable with the new software.

Finally, this is a good time to remind everyone of the Solar Forum, a timely source for news concerning solar observing in general, and the Solar Section specifically. You can access the forum through the AAVSO website, at https://forums.aavso.org/.

Keeping an Eye on the Sun: Selected Current Solar Missions

Understanding the complex magnetic field of our sun and its connections with the sunspot cycle and various types of “space weather” activity is a primary goal of solar astrophysicists. Numerous satellite missions are currently gathering data on our star, some from the near-sun environment, others from the safe distance of the L1 Lagrangian point (about a million miles sunward from the Earth) or even Earth orbit. The international solar armada includes the following missions:

Parker Solar Probe: Launched in 2018, NASA’s Parker Solar Probe broke records on December 24, 2024, when it passed within 3.8 million miles of the photosphere, the Sun’s visible surface. Since then it has made several similar close approaches, adding to our understanding of the Sun’s outer layers through sampling of the outer corona and solar wind (https://parkersolarprobe.jhuapl.edu/).

Solar Orbiter: Launched in 2020, this ESA mission with strong NASA participation provided the first close-up images of the Sun’s polar regions. Multiple gravity assists from Venus allowed it to achieve its highly inclined orbit. It observes the Sun at multiple wavelengths as well as analyzing the solar wind and magnetic field strength (https://www.esa.int/Science_Exploration/Space_Science/Solar_Orbiter).

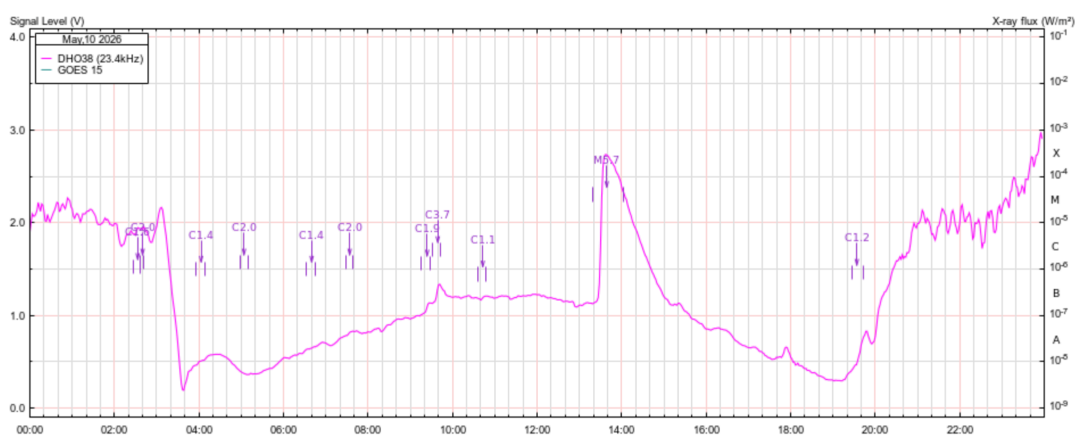
Solar Dynamics Observatory (SDO): Launched in 2010, SDO is an integral part of NASA’s Living With a Star program. It monitors solar activity such as flares and coronal mass ejections from a geosynchronous orbit 22,000 miles above the Earth (https://sdo.gsfc.nasa.gov/). Solar and Heliospheric Observatory (SOHO): This joint ESA/NASA mission launched in 1995 (https://soho.nascom.nasa.gov/) continues to provide valuable measurements of the solar wind and total solar irradiance (solar “constant), as well as discovering thousands of comets.

The newest member of the family is NOAA’s Space weather Observations at L1 to **Advance Readiness-1 (SOLAR-1)**, which launched on September 25, 2025, and is now parked at the L1 point. It became fully operational in early June 2026. This state-of-the-art satellite will download images of coronal mass ejections within 30 minutes, giving space weather scientists an even earlier warning of potential geomagnetic events (https://www.noaa.gov/news-release/noaas-solar-1-enters-new-era-of-space-weather-monitoring).

1 Sudden Ionospheric Disturbance (SID) Report

1.1 SID Records

In May 2026, there were 261 GOES-19 XRA flares: 9 M-class, 223 C-class, and 29 B-class flares. Far less flaring this month compared to last. (U.S. Dept. of Commerce–NOAA, 2024).



1.2 SID Observer

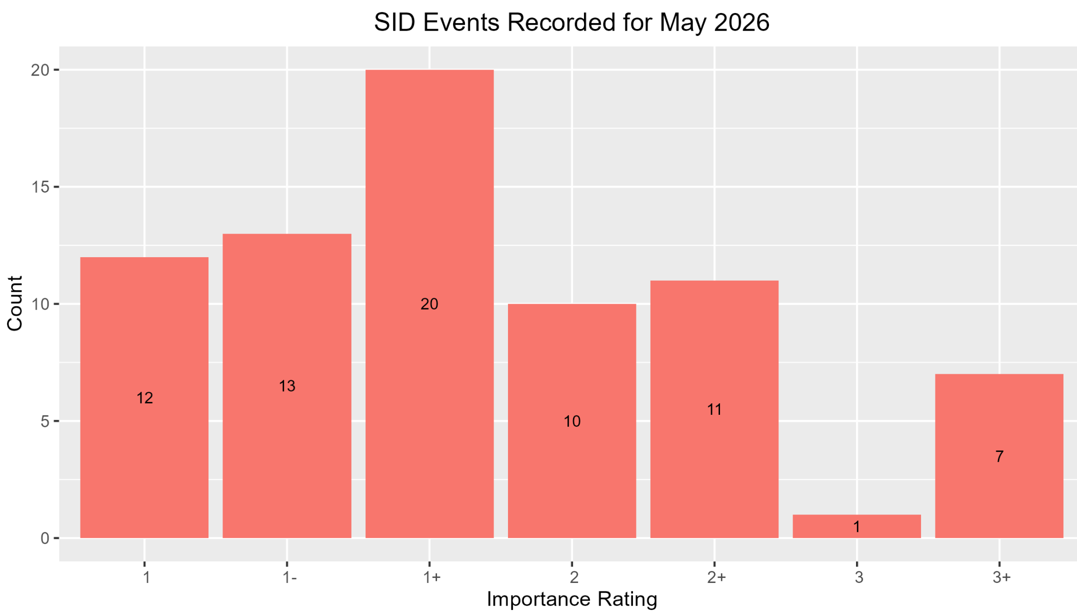
In May 2026, we had 9 AAVSO SID observers who submitted VLF data, as listed in Table.

Table 1: 202605 VLF Observers

Observer	Code	Stations
R Battaiola	A96	ICV
L Loudet	A118	DHO GBZ
J Godet	A119	DHO GBZ GQD
R Mrllak	A136	NSY GQD
S Aguirre	A138	NAA
L Pina	A148	NAA NML NLK
J Wendler	A150	NAA
J DeVries	A153	NLK
M Cervoni	A154	DHO

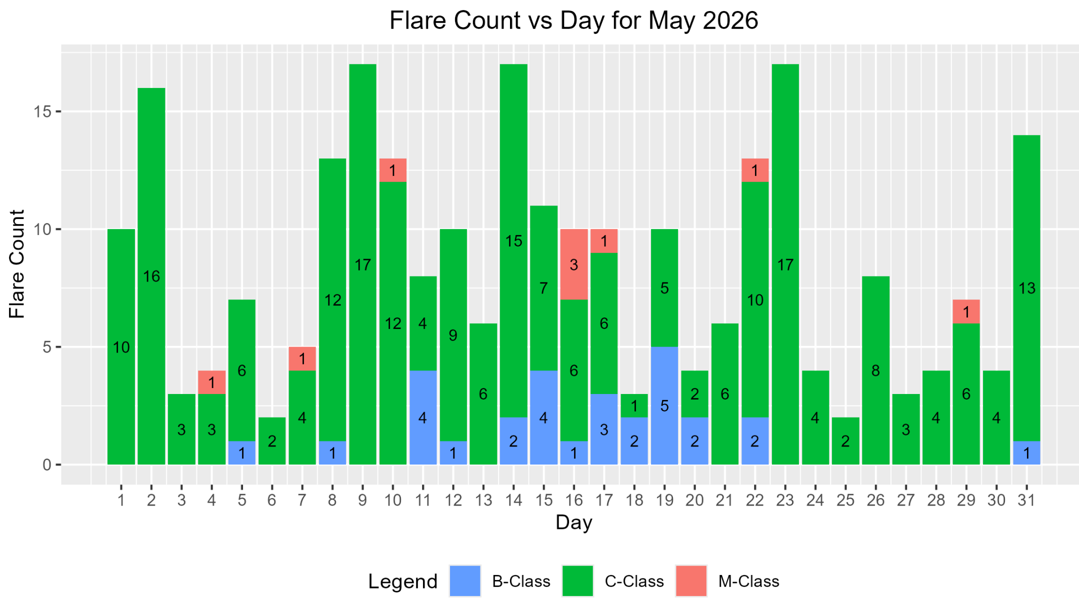
1.3 SID Events

Figure 2 depicts the importance rating of the solar events.
The duration in minutes are -1: LT 19, 1: 19-25, 1+: 26-32, 2: 33-45, 2+: 46-85, 3: 86-125, and 3+: GT 125.



1.4 Solar Flare Summary from GOES-16 Data (Figure 3)

In May 2026, there were 261 GOES-19 XRA flares: 9 M-class, 223 C-class, and 29 B-class flares. Far less flaring this month compared to last. (U.S. Dept. of Commerce–NOAA, 2024).

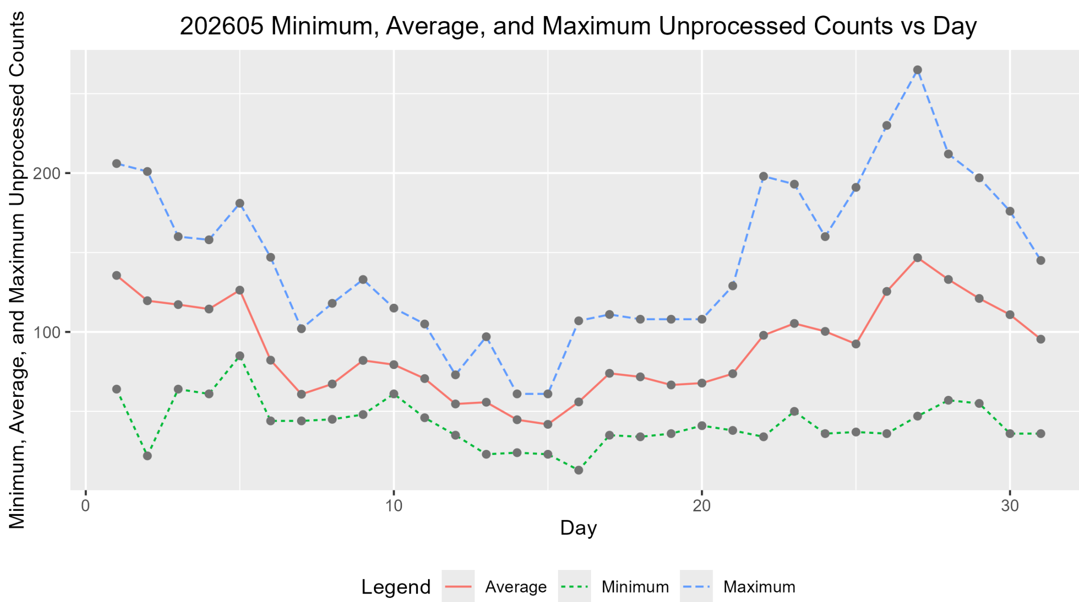


2 Relative Sunspot Numbers (Ra)

Reporting monthly sunspot numbers consists of submitting an individual observer's daily counts for a specific month to the AAVSO Solar Section. These data are maintained in a Structured Query Language (SQL) database. The monthly data then are extracted for analysis. This section is the portion of the analysis concerned with both the raw and daily average counts for a particular month. Scrubbing and filtering the data assure error-free data are used to determine the monthly sunspot numbers

2.1 Raw Sunspot Counts(Figure 4)

The raw daily sunspot counts consist of submitted counts from all observers who provided data in May 2026. These counts are reported by the day of the month. The reported raw daily average counts have been checked for errors and inconsistencies, and no known errors are present.



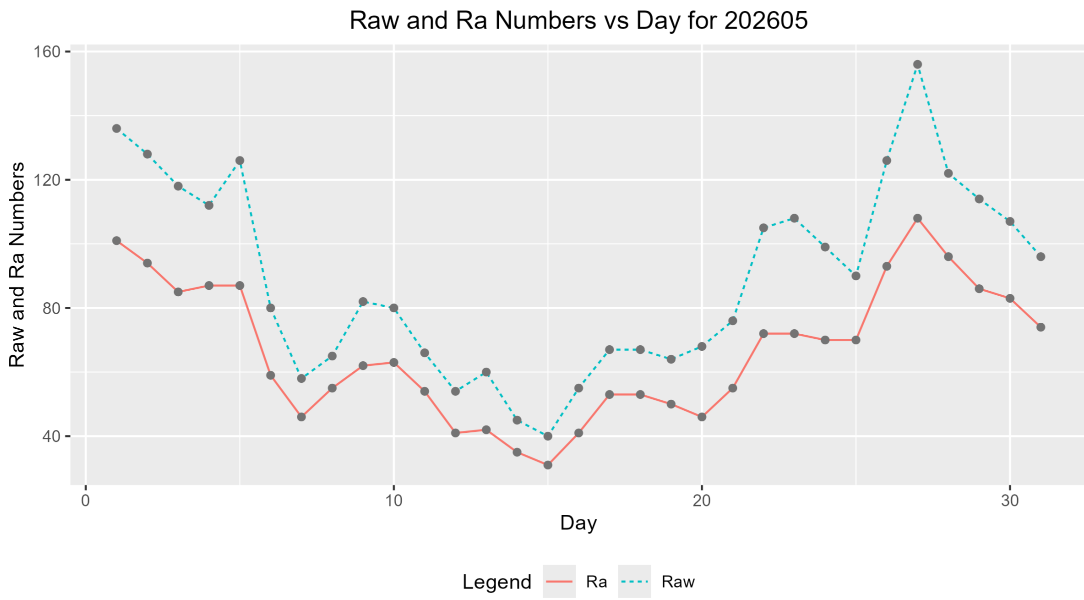


Figure 5: Raw Wolf average and Ra numbers by day of the month for all observers.

2.2 American Relative Sunspot Numbers

The relative sunspot numbers, Ra, represent the sunspot counts after the submitted data have been cleaned and processed using Shapley's method with k-factors (http://iopscience.iop.org/article/10.1086/126109/pdf). The Shapley method is a statistical model that combines random effects, such as observer group selection, and fixed effects, like seeing conditions. The raw Wolf averages and the calculated Ra are shown in Figure 7, while Table 2 presents the day of observation (column 1), the number of observers recording that day (column 2), the raw Wolf number (column 3), and the Shapley Correction (Ra) (column 4).

Table 2: 202605 American Relative Sunspot Numbers (R_a).

Day	Number of Observers	Raw	R_a
1	33	136	101
2	37	128	94
3	28	118	85
4	28	112	87
5	23	126	87
6	22	80	59
7	32	58	46
8	29	65	55
9	39	82	62
10	32	80	63
11	31	66	54
12	38	54	41
13	33	60	42
14	30	45	35
15	29	40	31
16	34	55	41
17	38	67	53
18	29	67	53

Continued

Table 2: 202605 American Relative Sunspot Numbers (R_a).

Day	Number of Observers	Raw	R_a
19	30	64	50
20	30	68	46
21	31	76	55
22	29	105	72
23	23	108	72
24	32	99	70
25	41	90	70
26	40	126	93
27	32	156	108
28	41	122	96
29	38	114	86
30	38	107	83
31	34	96	74
Averages	32.4	89.4	66.6

2.3 Sunspot Observers

Table3 lists the Observer Code(column1), the Number of Observations (column2) submitted for May 2026, and the Observer Name(column3). The final row gives the total number of observers who submitted sunspot counts(60),and total number of observations submitted(1019)

Table 3: 202605 Number of observations by observer.

Observer Code	Number of Observations	Observer Name
AAX	23	Alexandre Amorim
AJV	29	J. Alonso
ARAG	31	Gema Araujo
ASA	2	Salvador Aguirre
BATR	3	Roberto Battaiola
BKL	3	John A. Blackwell
BMIG	28	Michel Besson
BVZ	15	Jesus E. Blanco
BXZ	27	Jose Alberto Berdejo
BZX	19	A. Gonzalo Vargas
CIOA	5	Ioannis Chouinavas
CKB	26	Brian Cudnik
CMAB	6	Maurizio Cervoni
CNT	20	Dean Chantiles
CWD	4	David Cowall
DARB	16	Aritra Das
DELS	3	Susan Delaney
DFR	17	Frank Dempsey
DGIA	7	Giuseppe di Tommasco
DIL	20	Bill Dillon
DJOB	6	Jorge del Rosario
DJSA	2	Jeff DeVries
DJVA	27	Jacques van Delft

Continued

Table 3: 202605 Number of observations by observer.

Observer Code	Number of Observations	Observer Name
DMIB	24	Michel Deconinck
DPAL	20	Pacal Dabrowski
DUBF	28	Franky Dubois
EHOA	9	Howard Eskildsen
FALB	18	Allen Frohardt
FERA	26	Eric Fabrigat
HKY	22	Kim Hay
HOWR	20	Rodney Howe
HRUT	24	Timothy Hrutkay
ILUB	6	Luigi Iapichino
JDAC	9	David Jackson
JSI	3	Simon Jenner
KAMB	31	Amoli Kakkar
KAND	23	Kandilli Observatory
KAPJ	23	John Kaplan
KNJS	25	James & Shirley Knight
KTOC	16	Tom Karnuta
LKR	4	Kristine Larsen
LLEC	25	Leroy Leonard
LRRA	17	Robert Little
MARE	11	Enrico Mariani
MJHA	26	John McCammon
MMI	31	Michael Moeller
MUDG	12	George Mudry
MWMB	8	William McShan
MWU	17	Walter Maluf
PLUD	21	Ludovic Perbet
RJV	18	Javier Ruiz Fernandez
SDAW	22	David Scott
SDOH	31	Solar Dynamics Obs - HMI
SNE	10	Neil Simmons
SRIE	7	Rick St. Hilaire
TDE	21	David Teske
TPJB	7	Patrick Thibault
TST	19	Steven Toothman
URBP	27	Piotr Urbanski
WGI	4	Guido Wollenhaupt
Totals	1004	60

3 Observing Method Comparison: May 2026 Raw Data Distributions

For May 2026, CCD observers reported the highest raw counts across all three metrics — groups, Wolf number, and sunspots — with the widest interquartile ranges, while projection observers tended toward moderate, tightly clustered values. Direct observers showed the most right-skewed distributions, with numerous high-end outliers pulling well beyond the upper whiskers in all three plots.

3.1 Raw Sunspots

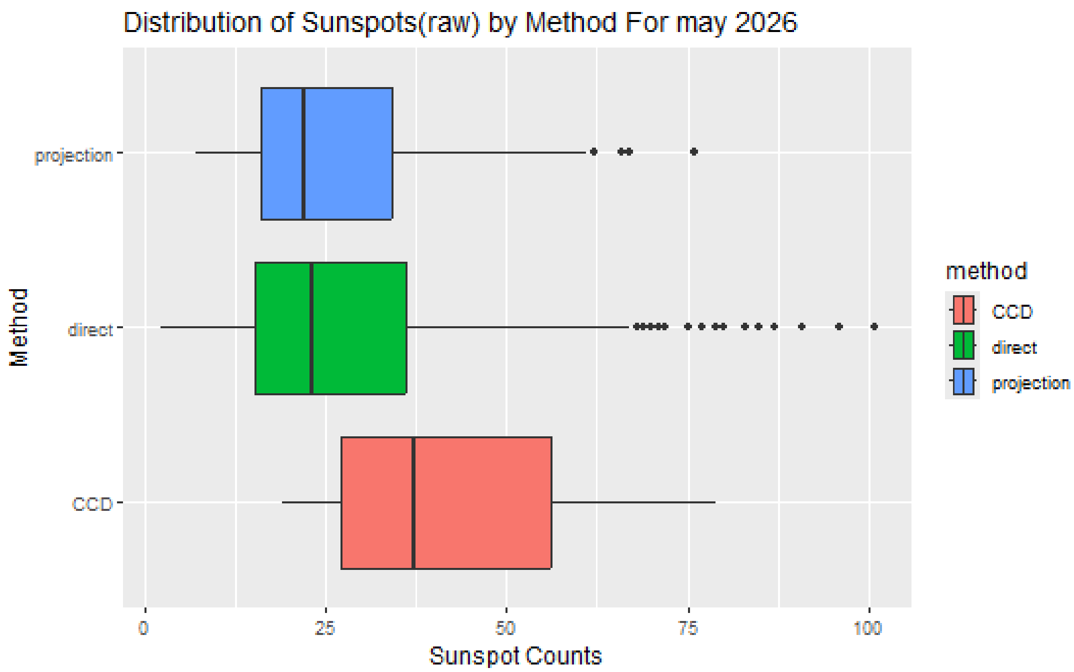


Figure 6: Distribution of Sunspots by Method

3.2 Raw Groups

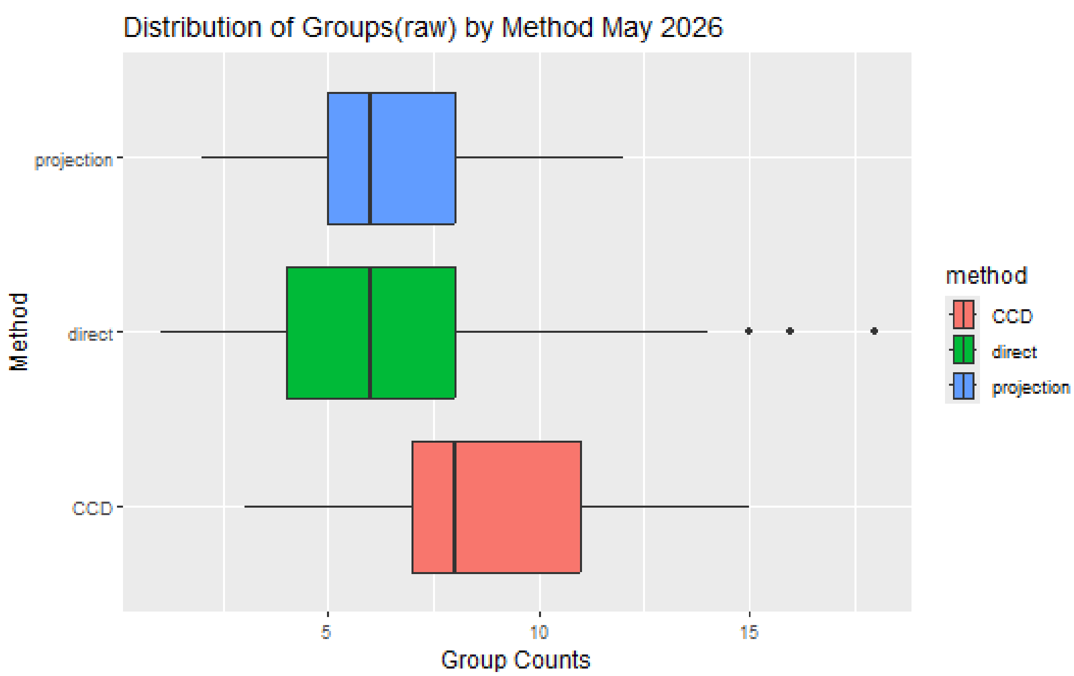


Figure 7: Distribution of Sunspot Groups by Method

3.3 Raw Wolf Numbers

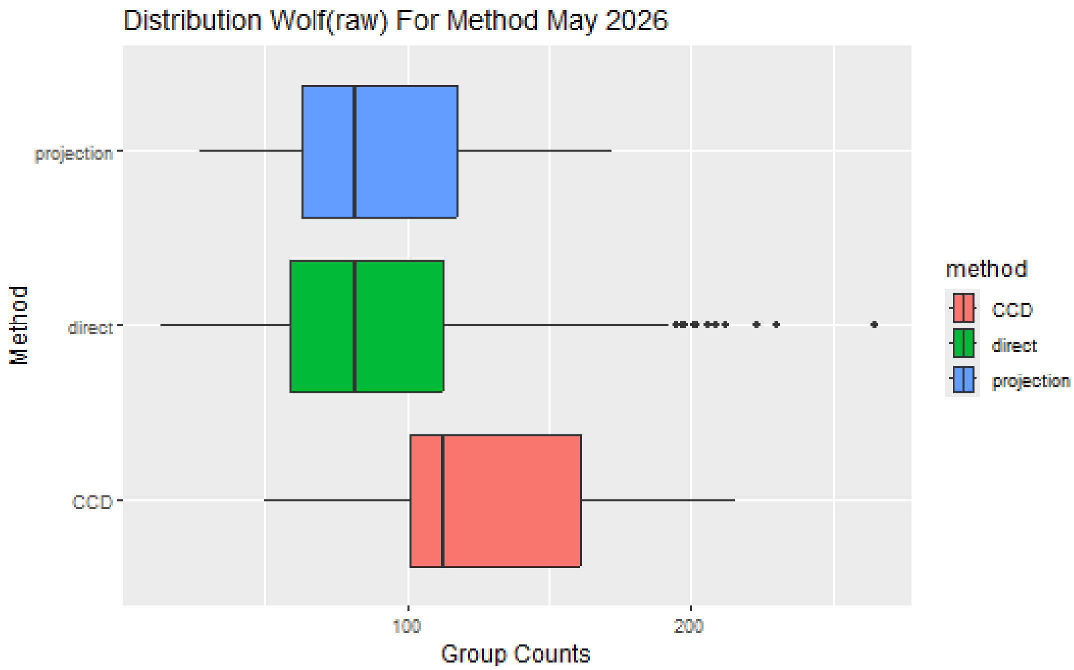


Figure 8: Distribution of Wolf Numbers by Method

4 Endnotes

- Sunspot Reports: Kim Hay solar@aavso.org
- SID Solar Flare Reports: Rodney Howe rhowe137@icloud.com
- Sunspot data as of June 18, 2026

5 References

- Dr. Jamie Riggs (2017), Solar System Science Section Head, International Astrostatistics (using R Statistical Software (2023), TSA Libraries: (https://cran.r-project.org)
- Shapley, (1949), method with k-factors (http://iopscience.iop.org/article/10.1086/126109/pdf).
- U.S. Dept. of Commerce–NOAA, Space Weather Prediction Center, 2022. GOES-16 XRA data. ftp://ftp.swpc.noaa.gov/pub/indices/events/