

Monthly Report (00)

2025.02 Data Set

Friday 14th March, 2025

Prepared for

Statistics for Physical and Engineering Sciences

by

Jamie Riggs, Ph.D.

Principal Statistician
Statistics for Physical and Engineering Sciences Institute

1 Introduction

The process of reporting monthly Sunspot numbers consists of submitting individual observer's daily counts for a specific month to the AAVSO Solar Section. These data are maintained in a SQL database. The monthly data then are extracted for analysis using the R statistics package (<http://www.R-project.org/>). This report is the portion of the analysis concerned with both the raw daily average counts and the data Accuracy, Consistency, and Completeness measures for a particular month. The checks are used to scrub or filter the data to assure only error-free data are used to determine the monthly sunspot number.

This report consists of four sections: the raw daily average counts (Section 2), the known data errors (Section 3), the processed counts using a Generalized Linear Mixed Model to produce the relative sunspot numbers (Section 4), and supporting information on the model construction (Section 5).

The raw daily average of counts consist of submitted counts from all observers who provided data in the particular month. These averaged counts are reported by the day of the month, and are either from data not scrubbed or corrected data. The table captions indicate which. The errors, if any, are reported according to type.

The Error Tables section contains reported errors on missing data, inconsistencies in year and month, inconsistencies in the reported day number (1-31), seeing coding errors, number of annual observations by observer, and inconsistencies between the reported Wolf number and the calculated Wolf number from the group counts and sunspot counts, among other errors that are given in that section.

The relative sunspot numbers R_a section contains the sunspot numbers after the submitted data are scrubbed and modeled by a Generalized Linear Mixed Model (GLMM). The GLMM is a statistical model that accounts for variation due to random effects and fixed effects. For the R_a model random effects include the AAVSO observer as these observers are a selection from all possible observers, and the fixed effects include seeing conditions at one of four possible levels. More details on GLMM are available in a paper (GLMM05) on the sunspot counts research page. The paper title is *A Generalized Linear Mixed Model for Enumerated Sunspots*.

The supporting information for the model is provided for clarification.

2 Raw Daily Average Counts

The reported raw daily average counts have been checked for errors and inconsistencies, and no known errors are present. All observers whose submissions qualify through this month's scrubbing process are represented in Figure 1 and Table 1.

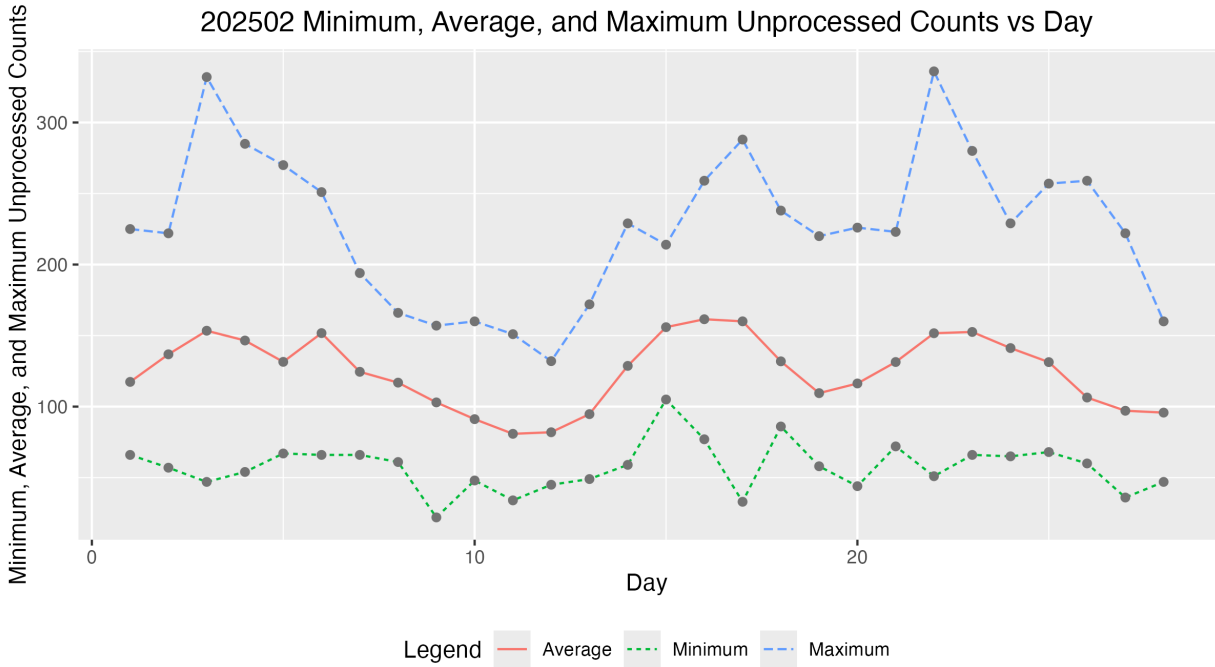


Figure 1: Raw average sunspot count by day of the month.

Table 1: 202502 Daily Raw Counts

Day	Submissions	Minimum	Average	Maximum
1.0000	28.0000	66.0000	117.3929	225.0000
2.0000	27.0000	57.0000	136.8148	222.0000
3.0000	29.0000	47.0000	153.4138	332.0000
4.0000	26.0000	54.0000	146.5385	285.0000
5.0000	30.0000	67.0000	131.5000	270.0000
6.0000	27.0000	66.0000	151.7407	251.0000
7.0000	22.0000	66.0000	124.5000	194.0000
8.0000	25.0000	61.0000	116.8800	166.0000
9.0000	25.0000	22.0000	102.9600	157.0000
10.0000	23.0000	48.0000	91.1739	160.0000
11.0000	19.0000	34.0000	80.8421	151.0000
12.0000	20.0000	45.0000	81.9500	132.0000
13.0000	27.0000	49.0000	94.7037	172.0000
14.0000	31.0000	59.0000	128.6774	229.0000
15.0000	24.0000	105.0000	155.9167	214.0000
16.0000	33.0000	77.0000	161.5152	259.0000
17.0000	32.0000	33.0000	160.0312	288.0000
18.0000	23.0000	86.0000	131.8696	238.0000
19.0000	23.0000	58.0000	109.4783	220.0000
20.0000	27.0000	44.0000	116.2963	226.0000
21.0000	26.0000	72.0000	131.3846	223.0000
22.0000	29.0000	51.0000	151.6552	336.0000
23.0000	31.0000	66.0000	152.5484	280.0000
24.0000	24.0000	65.0000	141.2083	229.0000
25.0000	28.0000	68.0000	131.3214	257.0000
26.0000	36.0000	60.0000	106.3889	259.0000
27.0000	25.0000	36.0000	97.0800	222.0000
28.0000	31.0000	47.0000	95.7742	160.0000

3 Error Tables

Data are for the month of February 2025. No errors were found, and hence no errors are reported.

4 Relative Sunspot Numbers

All data errors, if any, have been corrected prior to determining the following relative sunspot numbers. A Generalized Linear Mixed Model (GLMM) was constructed to provide monthly sunspot numbers (see Table 2). The GLMM treats observer as a random effect, with year, month, seeing conditions, observer rank, and dual submission to both AAVSO and SILSO as fixed effects.

Figure 2 shows the monthly R_a numbers for the years and months (ym) in Table 2. The solid cyan curve that connects the cyan X's are the GLMM model estimates given in 2. The dotted black curves on either side of the cyan curve depict a 99% confidence band about the GLMM estimates. The confidence band uses the large sample approximation based on the Gaussian distribution. The dashed red curve connecting the red O's are the SILSO values for the monthly sequence.

The tan box plots for each month are the actual observations submitted by the AAVSO observers. The heavy solid lines approximately midway in the boxes represent the count medians. The box of the box plot represents the InterQuartile Range (IQR), which depicts from the 25th through the 75th quartiles. The lower and upper whiskers extend 1.5 times the IQR below the 25th quartile, and 1.5 times the IQR above the 75th quartile. The black circles below and above the whiskers traditionally are considered outliers, but with GLMM modeling, they are observations that comprise overdispersion. Overdispersion skews the counts data from a true Poisson distribution. The GLMM adjusts for this overdispersion.

Table 2: Year Month (ym) Relative Sunspot Numbers with 99% CI

ym	Ra	lci99	uci99	aavso	sidc
2008.12	2.7705	2.4296	3.1114	0.5000	1.0000
2009.01	5.2239	4.6913	5.7565	1.3000	1.3000
2009.02	4.8283	4.3195	5.3371	0.7000	1.2000
2009.03	6.0043	5.7839	6.2247	0.3000	0.6000
2009.04	6.6558	6.4367	6.8749	0.4000	1.2000
2009.05	7.1383	6.8770	7.3997	1.6000	2.9000
2009.06	7.1957	6.8639	7.5276	3.2000	6.3000
2009.07	6.9763	6.7056	7.2469	3.6000	5.5000
2009.08	7.0821	6.8381	7.3260	0.0000	0.0000
2009.09	7.2772	7.0369	7.5176	4.5000	7.1000
2009.10	6.7380	6.3968	7.0792	4.5000	7.7000
2009.11	6.6813	6.4857	6.8769	3.3000	6.9000
2009.12	7.2361	7.0117	7.4605	10.4000	16.3000
2010.01	19.3054	17.2451	21.3657	13.3000	19.5000
2010.02	16.1246	14.0768	18.1724	19.4000	28.5000

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Table 2: Year Month (ym) Relative Sunspot Numbers with 99% CI

ym	Ra	lci99	uci99	aavso	sidc
2010.03	17.2056	15.2004	19.2107	15.4000	24.0000
2010.04	18.7125	16.6416	20.7834	7.0000	10.4000
2010.05	22.9607	22.5156	23.4058	8.4000	8.7000
2010.06	21.9277	21.5104	22.3451	11.0000	13.6000
2010.07	23.1366	22.7390	23.5343	15.2000	16.1000
2010.08	22.5827	22.1414	23.0241	18.3000	19.6000
2010.09	24.3132	23.8368	24.7896	22.8000	25.2000
2010.10	22.9046	22.4236	23.3857	21.0000	23.5000
2010.11	23.0138	22.5424	23.4853	20.9000	21.6000
2010.12	24.1210	23.5755	24.6665	13.9000	14.5000
2011.01	69.2989	67.7211	70.8766	17.7000	18.7000
2011.02	62.9758	61.4784	64.4732	29.1000	29.6000
2011.03	64.8130	63.4229	66.2031	48.0000	55.8000
2011.04	71.9702	70.4166	73.5238	47.3000	54.4000
2011.05	76.7964	75.2919	78.3010	37.3000	41.5000
2011.06	72.6919	71.2442	74.1395	35.2000	37.0000
2011.07	75.6527	74.2257	77.0797	41.5000	43.8000
2011.08	74.5697	73.2234	75.9160	42.4000	50.5000
2011.09	79.5174	77.9477	81.0870	73.8000	78.0000
2011.10	74.5487	73.1276	75.9699	78.9000	88.0000
2011.11	75.0580	73.3990	76.7170	84.6000	96.7000
2011.12	76.7889	75.1168	78.4610	65.8000	73.0000
2012.01	74.4578	72.8798	76.0359	55.8000	58.2000
2012.02	66.6727	65.1944	68.1510	29.2000	33.1000
2012.03	69.0579	67.7466	70.3692	53.1000	64.1000
2012.04	75.0607	73.5860	76.5354	51.4000	55.2000
2012.05	82.0609	80.5407	83.5812	61.8000	69.0000
2012.06	77.3995	75.9440	78.8549	59.7000	64.5000
2012.07	81.2613	79.7727	82.7499	64.2000	51.3000
2012.08	77.0440	75.6584	78.4297	57.7000	63.1000
2012.09	82.2702	80.7254	83.8150	57.7000	61.5000
2012.10	78.1853	76.6329	79.7376	48.3000	53.3000
2012.11	78.9931	77.3038	80.6824	56.7000	61.4000
2012.12	80.7265	78.8928	82.5602	37.4000	40.8000
2013.01	82.3265	80.6513	84.0018	63.8000	62.9000
2013.02	73.9027	72.2926	75.5128	37.8000	38.0000
2013.03	74.2791	72.6721	75.8862	50.6000	57.9000
2013.04	81.7276	80.1670	83.2882	70.6000	72.4000
2013.05	87.2534	85.5349	88.9719	77.4000	78.7000

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Table 2: Year Month (ym) Relative Sunspot Numbers with 99% CI

ym	Ra	lci99	uci99	aavso	sidc
2013.06	84.0244	82.3669	85.6819	51.0000	52.5000
2013.07	87.2783	85.7061	88.8505	57.0000	57.0000
2013.08	84.5570	83.0490	86.0650	60.0000	66.0000
2013.09	88.7989	87.0814	90.5163	34.6000	36.9000
2013.10	83.2034	81.5343	84.8725	74.5000	85.6000
2013.11	82.8996	80.8811	84.9180	73.9000	77.6000
2013.12	87.0157	85.0733	88.9581	77.8000	90.3000
2014.01	96.3402	94.2036	98.4767	77.4000	82.0000
2014.02	88.2976	86.3859	90.2094	93.9000	102.8000
2014.03	90.7250	88.9465	92.5036	80.9000	92.2000
2014.04	99.9199	98.0012	101.8385	76.9000	84.7000
2014.05	107.3207	105.3385	109.3028	72.3000	75.2000
2014.06	103.1457	101.2074	105.0840	67.2000	71.0000
2014.07	106.6708	104.6967	108.6449	72.5000	72.5000
2014.08	103.3888	101.6163	105.1612	71.2000	74.7000
2014.09	109.8011	107.6722	111.9299	83.2000	87.6000
2014.10	102.3466	100.3288	104.3645	59.5000	60.6000
2014.11	102.9109	100.6004	105.2214	65.8000	71.1000
2014.12	105.4028	102.8938	107.9117	75.8000	78.0000
2015.01	59.6498	58.4063	60.8933	65.9000	67.0000
2015.02	53.5517	52.2575	54.8460	42.4000	44.8000
2015.03	55.8083	54.7091	56.9076	38.0000	38.4000
2015.04	61.1227	59.9180	62.3274	49.0000	54.4000
2015.05	65.5743	64.3964	66.7521	56.3000	58.8000
2015.06	62.4902	61.3252	63.6552	50.2000	68.3000
2015.07	63.9571	62.8534	65.0608	47.9000	65.8000
2015.08	63.2363	62.1579	64.3148	39.5000	57.2000
2015.09	66.5467	65.3180	67.7755	49.2000	72.1000
2015.10	62.4954	61.2706	63.7203	39.3000	48.3000
2015.11	63.2933	61.8820	64.7046	39.6000	55.9000
2015.12	65.6004	64.1139	67.0870	36.4000	44.8000
2016.01	32.6175	31.9197	33.3153	33.7000	43.3000
2016.02	29.2323	28.6075	29.8572	38.3000	46.8000
2016.03	30.0521	29.4371	30.6671	30.5000	38.9000
2016.04	32.6562	32.0191	33.2932	26.6000	30.9000
2016.05	35.2058	34.5531	35.8585	33.7000	48.4000
2016.06	33.3661	32.7873	33.9450	13.1000	19.5000
2016.07	34.9093	34.3386	35.4799	21.2000	27.5000
2016.08	34.0533	33.4426	34.6639	33.0000	47.9000

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Table 2: Year Month (ym) Relative Sunspot Numbers with 99% CI

ym	Ra	lci99	uci99	aavso	sidc
2016.09	36.6154	35.9337	37.2972	27.7000	37.1000
2016.10	34.1146	33.4440	34.7852	22.7000	31.7000
2016.11	34.1895	33.4614	34.9175	14.0000	22.2000
2016.12	35.8428	35.0584	36.6272	11.1000	20.0000
2017.01	17.6028	17.2239	17.9816	18.4000	26.2000
2017.02	15.8574	15.4994	16.2154	14.4000	20.6000
2017.03	16.3876	16.0671	16.7081	11.3000	15.5000
2017.04	17.9972	17.6726	18.3219	21.6000	33.2000
2017.05	19.1771	18.8385	19.5156	12.5000	18.1000
2017.06	18.1305	17.8257	18.4353	15.5000	19.3000
2017.07	19.0323	18.7229	19.3416	11.5000	16.3000
2017.08	18.5709	18.2425	18.8993	22.8000	35.7000
2017.09	20.2512	19.8204	20.6821	34.6000	42.9000
2017.10	18.3523	17.9717	18.7328	10.5000	11.0000
2017.11	18.3224	17.9295	18.7153	4.2000	5.6000
2017.12	19.1107	18.8160	19.4055	4.0000	4.6000
2018.01	4.8640	4.7581	4.9699	3.1000	6.3000
2018.02	4.3364	4.2306	4.4421	6.8000	11.8000
2018.03	4.4266	4.3363	4.5169	1.1000	1.2000
2018.04	4.8036	4.7060	4.9011	4.7000	7.5000
2018.05	5.1924	5.0951	5.2896	8.4000	14.0000
2018.06	4.9294	4.8416	5.0173	10.2000	13.6000
2018.07	5.1902	5.1321	5.2484	0.5000	1.7000
2018.08	4.9966	4.9110	5.0822	5.9000	9.5000
2018.09	5.2601	5.1617	5.3584	1.6000	2.9000
2018.10	5.0139	4.9160	5.1117	2.5000	5.6000
2018.11	5.0103	4.9048	5.1159	3.1000	4.2000
2018.12	5.3192	5.2148	5.4236	1.6000	2.3000
2019.01	3.2504	3.1877	3.3131	5.4000	2.3000
2019.02	2.9521	2.8932	3.0111	0.1000	1.2000
2019.03	2.9808	2.9297	3.0319	6.1000	12.1000
2019.04	3.2767	3.2149	3.3384	6.2000	9.3000
2019.05	3.4292	3.3694	3.4890	7.0000	11.9000
2019.06	3.2747	3.2194	3.3301	0.7000	1.5000
2019.07	3.4364	3.3851	3.4876	0.4000	2.2000
2019.08	3.3584	3.3086	3.4082	0.3000	0.8000
2019.09	3.6070	3.5504	3.6637	0.5000	1.0000
2019.10	3.3447	3.2881	3.4014	0.2000	0.5000
2019.11	3.4162	3.3502	3.4823	0.3000	0.6000

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Table 2: Year Month (ym) Relative Sunspot Numbers with 99% CI

ym	Ra	lci99	uci99	aavso	sidc
2019.12	3.5359	3.4641	3.6076	0.8000	1.0000
2020.01	7.1900	7.0484	7.3316	4.0000	5.3000
2020.02	6.4738	6.3436	6.6040	0.1000	0.0000
2020.03	6.5898	6.4661	6.7135	1.2000	1.5000
2020.04	7.2973	7.1784	7.4162	3.0000	5.1000
2020.05	7.6913	7.5717	7.8108	0.1000	0.4000
2020.06	7.3892	7.2753	7.5031	3.9000	6.4000
2020.07	7.6497	7.5362	7.7633	4.2000	7.7000
2020.08	7.3793	7.2768	7.4817	5.3000	7.8000
2020.09	7.8919	7.7644	8.0194	0.4000	0.9000
2020.10	7.4855	7.3611	7.6098	9.9000	13.6000
2020.11	7.5470	7.4217	7.6724	21.2000	33.1000
2020.12	7.8386	7.6955	7.9818	15.4000	19.8000
2021.01	25.0192	24.5658	25.4726	7.0000	15.8000
2021.02	22.9957	22.5849	23.4065	5.8000	10.7000
2021.03	23.5433	23.1688	23.9178	11.0000	17.2000
2021.04	26.2486	25.7739	26.7232	18.5000	28.8000
2021.05	27.9996	27.5366	28.4625	15.9000	22.9000
2021.06	26.7240	26.2727	27.1753	19.9000	24.1000
2021.07	27.5859	27.1050	28.0668	23.8000	35.6000
2021.08	27.4744	26.9998	27.9491	15.7000	19.5000
2021.09	29.0800	28.5556	29.6044	39.1000	52.5000
2021.10	27.8944	27.3825	28.4064	27.1000	37.0000
2021.11	27.7063	27.1731	28.2396	27.2000	35.1000
2021.12	29.6427	29.0130	30.2723	50.6000	69.0000
2022.01	71.5724	70.2059	72.9390	43.9000	62.0000
2022.02	65.2753	63.9871	66.5636	48.8000	60.5000
2022.03	67.6226	66.3020	68.9432	58.4000	80.6000
2022.04	71.7932	70.5428	73.0436	59.1000	83.9000
2022.05	79.1462	77.7835	80.5090	72.5000	0.4000
2022.06	73.3582	72.1276	74.5888	58.9000	0.4000
2022.07	77.7953	76.4361	79.1545	76.7000	102.5000
2022.08	76.0256	74.7367	77.3145	63.3000	86.0000
2022.09	80.4411	78.8539	82.0284	72.6000	94.5000
2022.10	75.7858	74.3604	77.2112	66.4000	112.1000
2022.11	75.8937	74.3368	77.4506	54.3000	82.1000
2022.12	79.5163	77.6649	81.3678	93.7000	165.0000
2023.01	117.7624	115.0327	120.4921	112.9000	173.8000
2023.02	104.9918	102.6470	107.3366	89.6000	152.3000

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Table 2: Year Month (ym) Relative Sunspot Numbers with 99% CI

ym	Ra	lci99	uci99	aavso	sidc
2023.03	105.2444	102.9459	107.5429	85.0000	126.8000
2023.04	115.9178	113.6031	118.2324	72.1000	114.3000
2023.05	124.4502	121.9500	126.9505	105.0000	140.0000
2023.06	120.4096	119.0417	121.7776	118.5000	173.0000
2023.07	121.6567	119.3855	123.9280	124.7000	161.2000
2023.08	119.5334	117.3063	121.7605	90.6000	132.5000
2023.09	128.5951	126.0854	131.1048	110.4000	156.8000
2023.10	120.6781	118.0496	123.3066	78.4000	119.6000
2023.11	118.0064	115.2949	120.7179	88.6000	105.1000
2023.12	126.7380	123.7166	129.7594	98.2000	115.0000
2024.01	135.5820	132.1004	139.0635	102.8000	120.0000
2024.02	118.7935	116.0606	121.5263	94.8000	124.6000
2024.03	123.3438	120.6455	126.0421	84.8000	119.4000
2024.04	133.8097	130.9077	136.7116	107.1000	136.5000
2024.05	143.0478	140.1532	145.9424	120.5000	171.7000
2024.06	134.5973	132.0207	137.1740	124.8000	164.2000
2024.07	140.1564	137.3633	142.9494	146.7000	196.5000
2024.08	139.5485	136.8077	142.2893	158.4000	215.5000
2024.09	148.2851	145.0526	151.5176	109.9000	141.4000
2024.10	139.2075	136.2140	142.2011	124.2000	166.3000
2024.11	142.5211	138.8648	146.1775	113.9000	152.5000
2024.12	142.6821	139.6920	145.6723	120.5000	154.5000
2025.01	124.5377	121.4566	127.6189	81.7000	137.0000
2025.02	114.5632	111.7077	117.4186	89.1000	154.7000

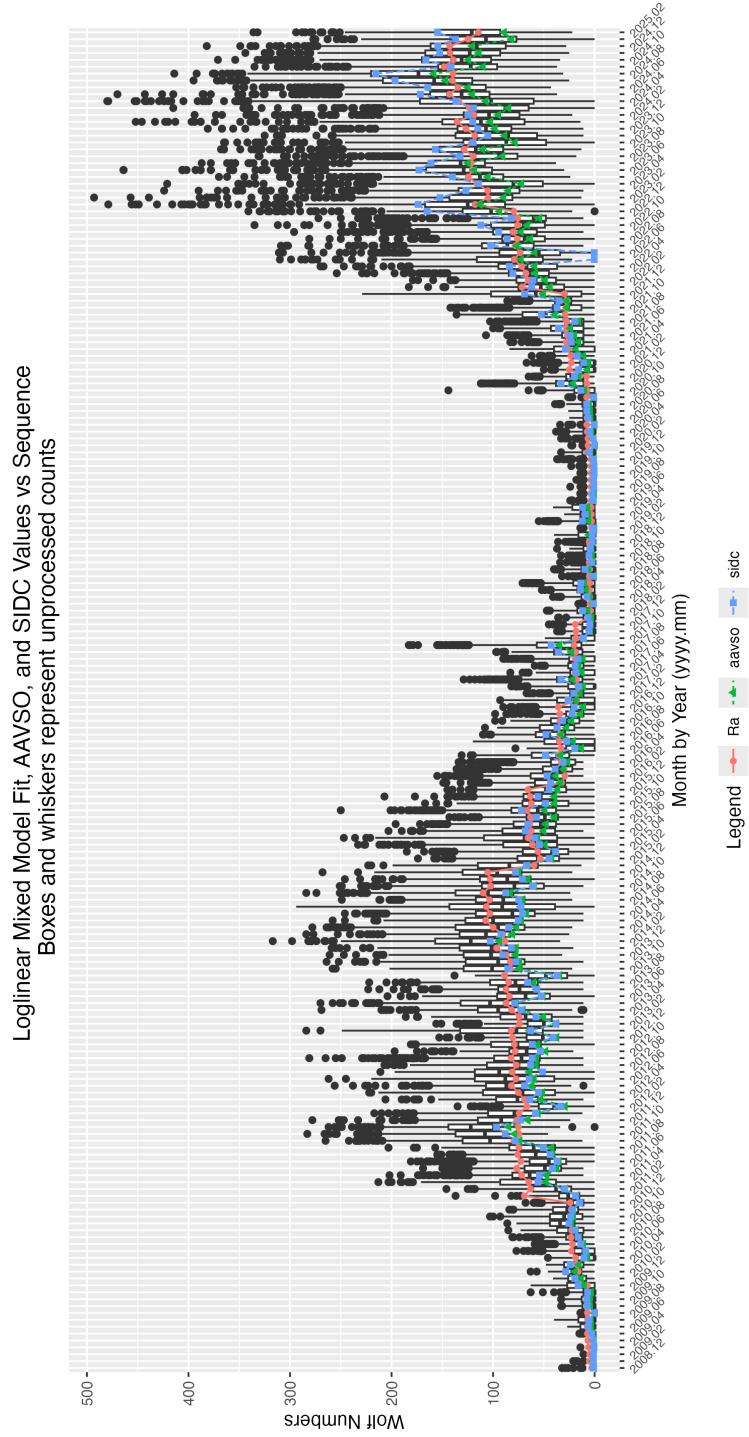


Figure 2: GLMM fitted data for R_a . AAVSO data: <https://www.aavso.org/category/tags/solar-bulletin>. SILSO data: WDC-SILSO, Royal Observatory of Belgium, Brussels

The GLMM parameter estimates and measures of importance in the determining the monthly R_a values are given in Table 3. The parameter estimates and levels of statistical significance are determined for the residual error size combined with the observer random effect error size. Thus, the parameter estimates are adjusted for the random effect of observer. The significance level is set at 0.05. Any $\Pr(>|z|)$ values equal to or less than 0.05 are considered statistically significant.

The year effect levels are given as year2011, year2012, and year2013. The yearly effect is significant as $\Pr(>|z|) < 0.05$. So the year in which the observations are made is commensurate with the expected rise toward and anticipated sunspot number maximum. Similarly, the monthly effect, denoted as mon2 through mon12, is significant at the 0.05 level.

The seeing conditions account for a significant amount of deviation in sunspot numbers. The seeing conditions are denoted as seeF (Fair), seeG (Good), and seeP (Poor), and are significant at the 0.05 level. Therefore, seeing conditions influence the reported sunspot numbers, as intuition anticipates.

The level of observer experience (denoted r1000B through r5000H, which is least to most experience) is not significant at the 0.05 significance level. It therefore does not contribute to changes in the monthly sunspot numbers.

Whether an observer contributes counts to the SILSO as well as the AAVSO (silsoy) is not significant at the 0.05 level, and hence we conclude that those observers who contribute to both institutions tend to differ from those observers contributing only to the AAVSO.

5 Supporting Information

Table 3: 202502 Parameter Estimates

	Estimate	Std. Error	t-value	Pr(> t)
(Intercept)	1.1765	0.3163	3.7197	0.0002
seeG	-0.1059	0.0039	-27.4253	0.0000
seeF	-0.2152	0.0044	-48.4465	0.0000
seeP	-0.3132	0.0064	-48.8031	0.0000
seeM	-0.1725	0.0243	-7.0878	0.0000
sidc1	0.0432	0.0089	4.8753	0.0000
year2009	0.7571	0.3179	2.3816	0.0172
year2010	1.9682	0.3157	6.2346	0.0000
year2011	3.1245	0.3156	9.9007	0.0000
year2012	3.1707	0.3156	10.0472	0.0000
year2013	3.2645	0.3156	10.3448	0.0000
year2014	3.4642	0.3156	10.9776	0.0000
year2015	2.9862	0.3156	9.4627	0.0000
year2016	2.3705	0.3156	7.5107	0.0000
year2017	1.7596	0.3157	5.5746	0.0000
year2018	0.4668	0.3159	1.4775	0.1396
year2019	0.0614	0.3162	0.1941	0.8461
year2020	0.8672	0.3158	2.7461	0.0060
year2021	2.1469	0.3156	6.8022	0.0000
year2022	3.1397	0.3156	9.9489	0.0000
year2023	3.6117	0.3156	11.4449	0.0000
year2024	3.7664	0.3156	11.9350	0.0000
year2025	3.7143	0.3157	11.7638	0.0000
mon2	-0.1010	0.0067	-15.0349	0.0000
mon3	-0.0783	0.0068	-11.5904	0.0000
mon4	0.0046	0.0065	0.7076	0.4792
mon5	0.0696	0.0063	11.0120	0.0000
mon6	0.0206	0.0062	3.3543	0.0008
mon7	0.0551	0.0063	8.7712	0.0000
mon8	0.0319	0.0063	5.0872	0.0000
mon9	0.1015	0.0063	15.9920	0.0000
mon10	0.0394	0.0065	6.0755	0.0000
mon11	0.0574	0.0068	8.4938	0.0000
mon12	0.1002	0.0068	14.8342	0.0000

Table 4: 202502 Summary of Sunspot Numbers

year	mon	day	obs	sidc
Min. :2008	Min. : 1.000	Min. : 0.0	Length:191098	Min. :0.0000
1st Qu.:2014	1st Qu.: 4.000	1st Qu.: 8.0	Class :character	1st Qu.:0.0000
Median :2018	Median : 7.000	Median :16.0	Mode :character	Median :0.0000
Mean :2017	Mean : 6.578	Mean :15.7		Mean :0.2333
3rd Qu.:2021	3rd Qu.: 9.000	3rd Qu.:23.0		3rd Qu.:0.0000
Max. :2025	Max. :12.000	Max. :31.0		Max. :1.0000

Table 5: 202502 Summary of Sunspot Numbers

g	s	w	see	method
Min. : 0.000	Min. : 0.00	Min. : 0.00	E:40471	Length:191098
1st Qu.: 1.000	1st Qu.: 1.00	1st Qu.: 11.00	G:78765	Class :character
Median : 3.000	Median : 12.00	Median : 42.00	F:55276	Mode :character
Mean : 3.542	Mean : 20.84	Mean : 56.26	P:15801	
3rd Qu.: 6.000	3rd Qu.: 31.00	3rd Qu.: 89.00	M: 785	
Max. :31.000	Max. :295.00	Max. :493.00		

Table 6: 202502 Summary of Sunspot Numbers

inst	filter	unit
Length:191098	Length:191098	Length:191098
Class :character	Class :character	Class :character
Mode :character	Mode :character	Mode :character

Table 7: 202502 Summary of Sunspot Numbers

aperture	eyep	foclen	mag
Min. : 0.00	Min. : 0.00	Min. : 0.0	Min. : 0.0
1st Qu.: 60.00	1st Qu.: 4.00	1st Qu.: 400.0	1st Qu.: 40.0
Median : 80.00	Median : 14.00	Median : 900.0	Median : 55.0
Mean : 94.37	Mean : 42.11	Mean : 888.9	Mean : 181.5
3rd Qu.: 104.00	3rd Qu.: 23.00	3rd Qu.:1200.0	3rd Qu.: 72.0
Max. :1524.00	Max. :2010.00	Max. :9990.0	Max. :4591.0

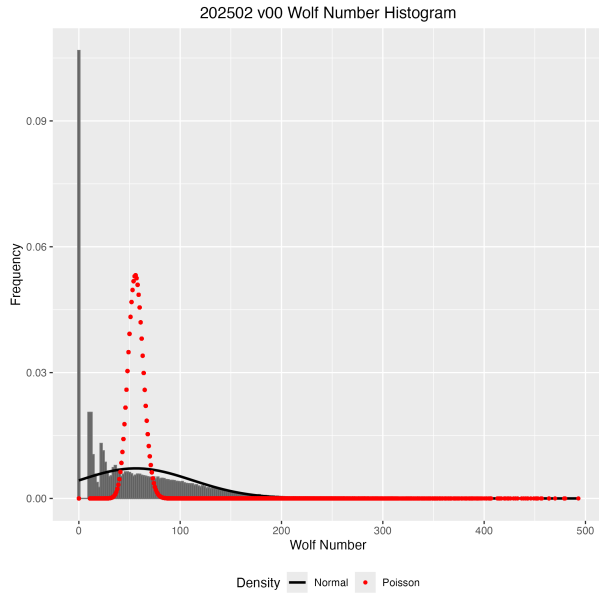


Figure 3: Box plots of raw Wolf number (w) by observer rank.

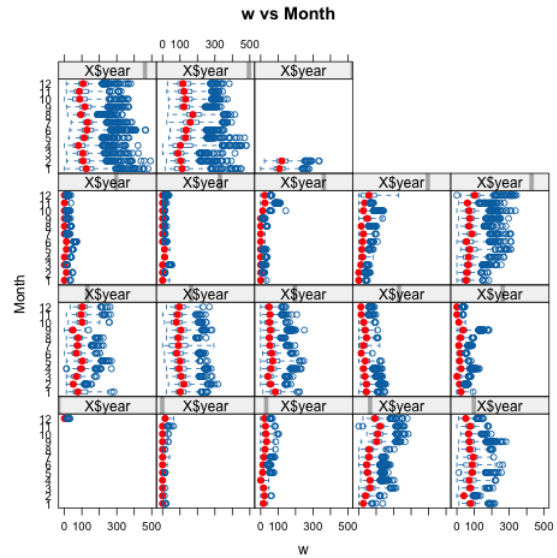


Figure 4: Box plots of raw Wolf number (w) by month and year.

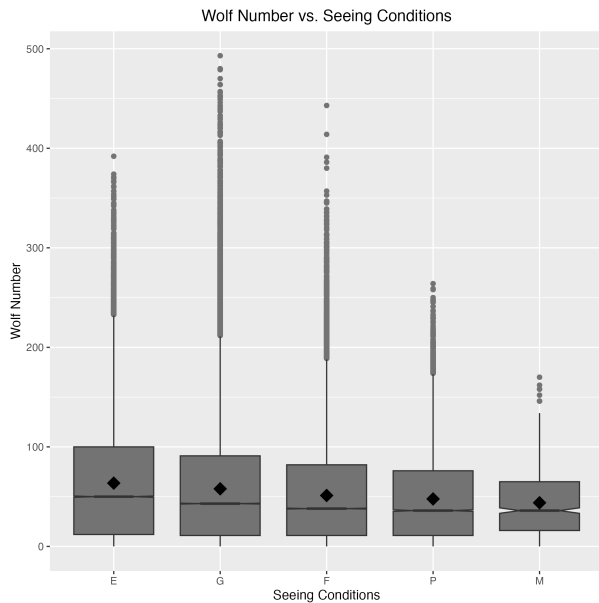


Figure 5: Box plots of raw Wolf number (w) by seeing condition.

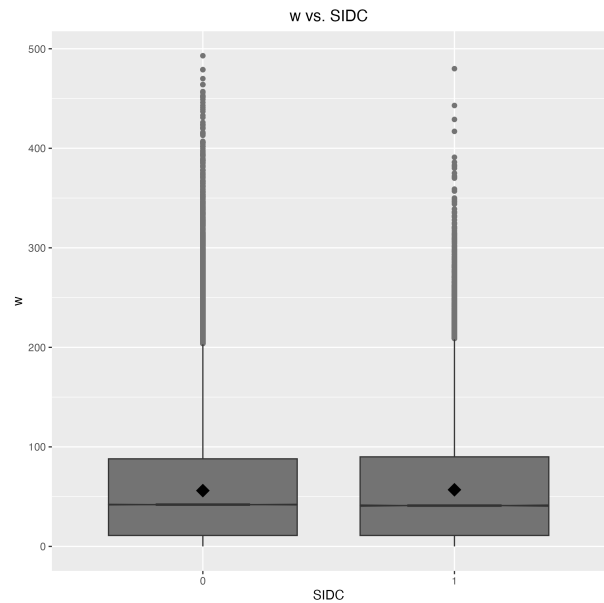


Figure 6: Box plots of raw Wolf number (w) by organization.

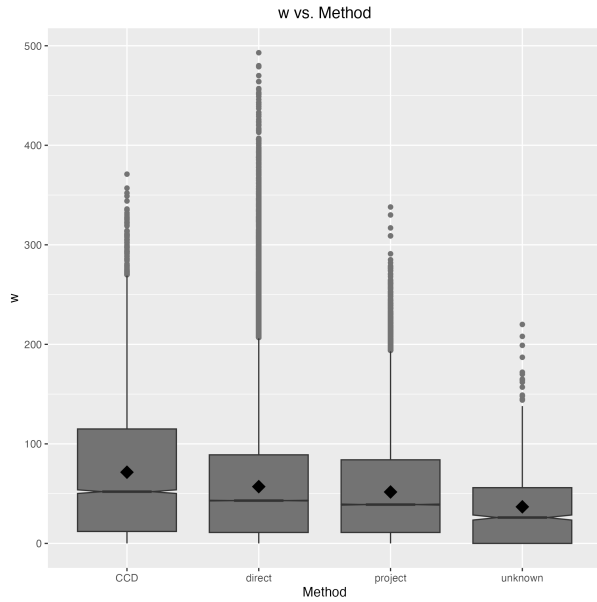


Figure 7: Box plots of raw Wolf number (w) by observer rank.

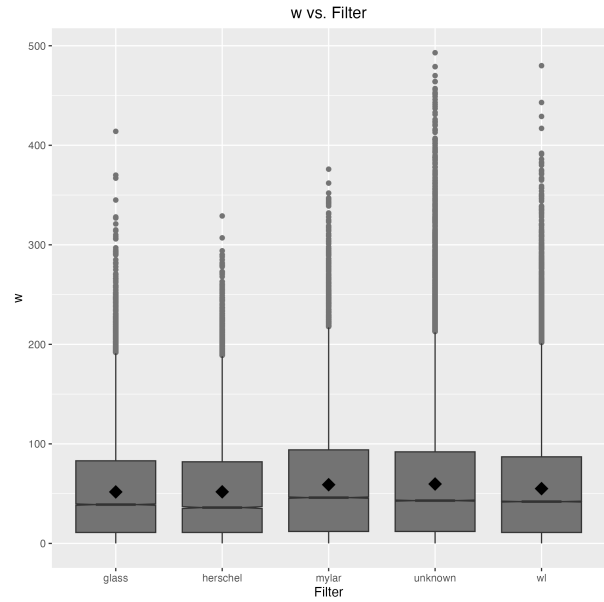


Figure 8: Box plots of raw Wolf number (w) by month and year.

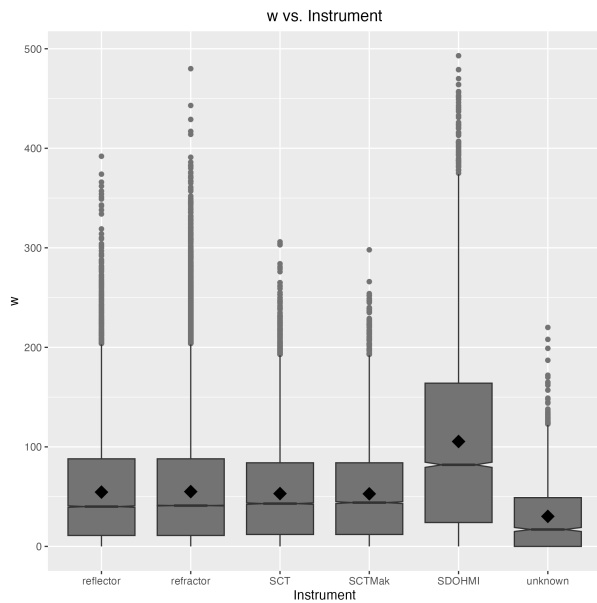


Figure 9: Box plots of raw Wolf number (w) by seeing condition.

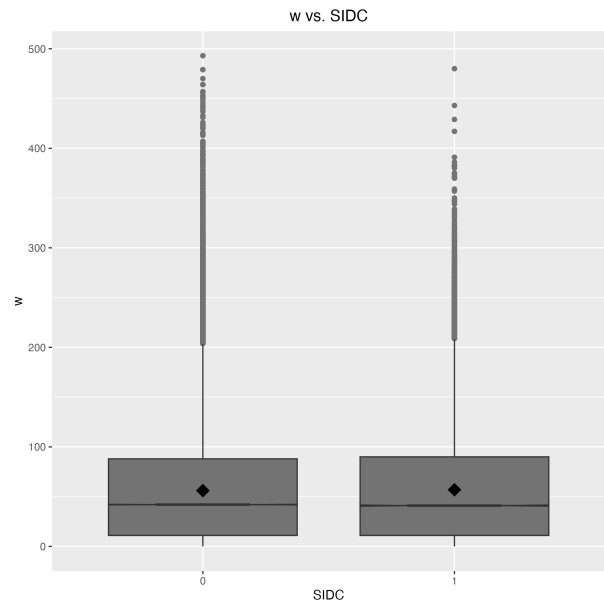


Figure 10: Box plots of raw Wolf number (w) by organization.

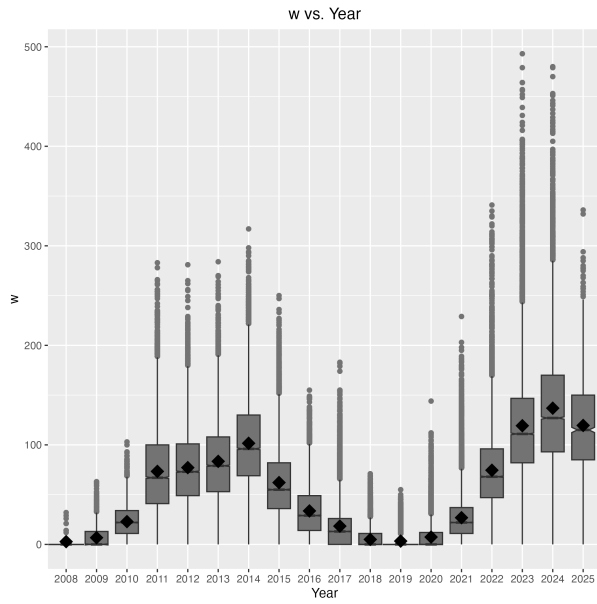


Figure 11: Box plots of raw Wolf number (w) by year.

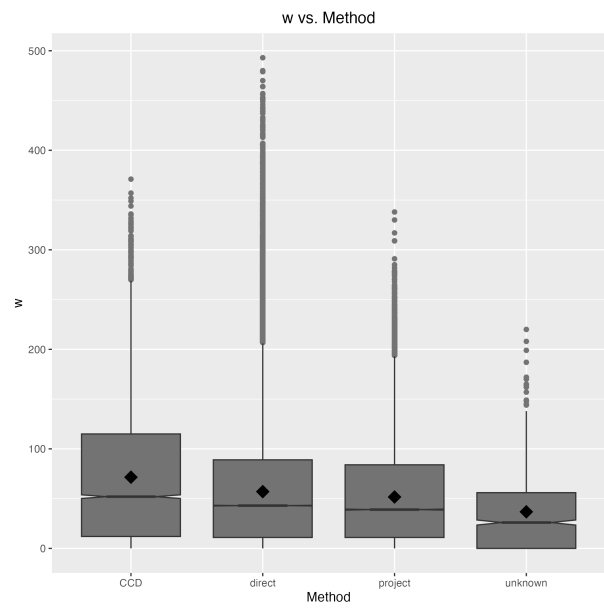


Figure 12: Box plots of raw Wolf number (w) by observing method.