Solar Bulletin

THE AMERICAN ASSOCIATION OF VARIABLE STAR OBSERVERS
SOLAR SECTION

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AMERICAN ASSOCIATION OF VARIABLE STAR OBSERVERS
SYDNEY CITY SKYWATCHERS, AUSTRALIA.
BRITISH ASTRONOMICAL ASSOCIATION
SOLAR OBSERVERS SOCIETY, POLAND
Lat. 33° 54'S – Long. 151° 15'E

E.A.S.T. DATE	11 December 2015.	TIME: 07+1hrs 35 Mins.
U.T. DATE	10 December 2015	TIME: 21hrs 35 Mins.

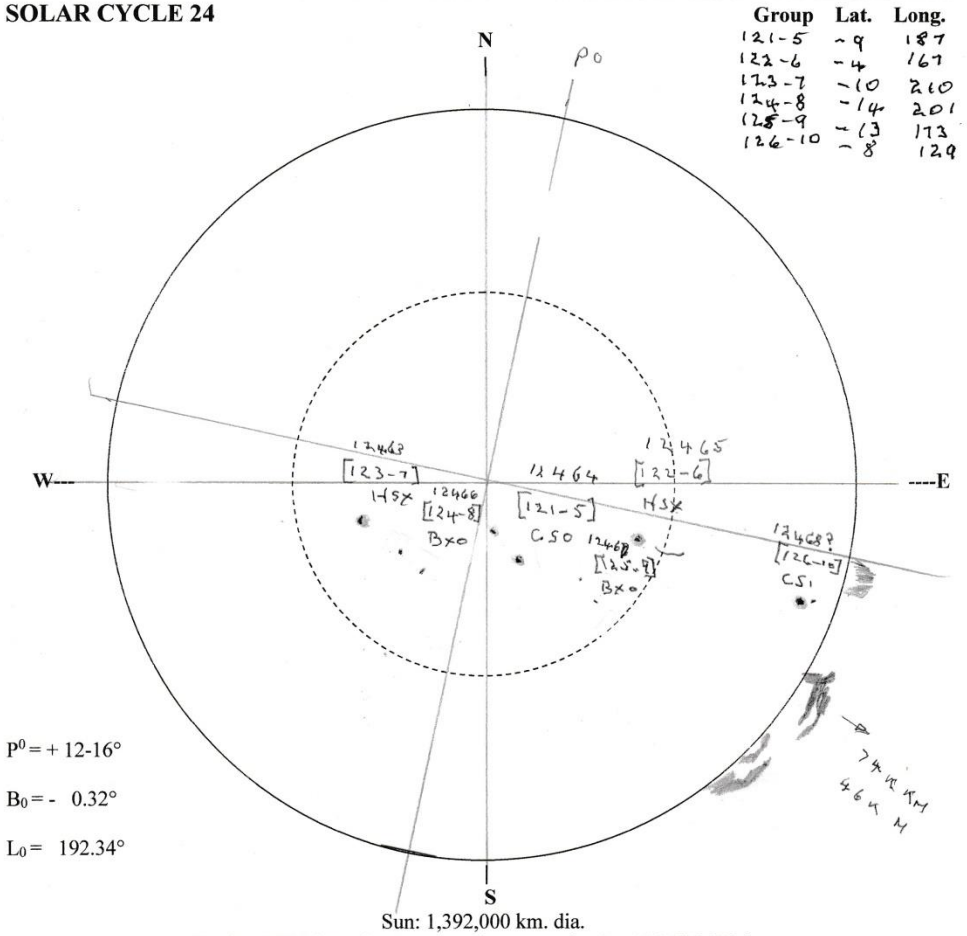
INSTRUMENT: S.C.T. 10". F=2,500 mm. f / 10. 40 mm Eyepiece. Full Aperture filter & 6Å H-alpha filter, f / 32. Mag: X62.5

ROTATION No. 2171 (at 00.00hrs). Synodic Rotation No.12 CONDITIONS (3) Fair. WIND: W 16 - 19km/h

TRANSPARENCY: (3) Fair. 80% Cirrostratus cloud. CURRENT TEMP.: 24C. 75°F.

SOLAR CYCLE 24

Group	Lat.	Long.
121-5	-9	187
122-6	-4	167
123-7	-10	210
124-8	-14	201
125-9	-13	173
126-10	-8	129



P^0 = + 12-16°

B_0 = - 0.32°

L_0 = 192.34°

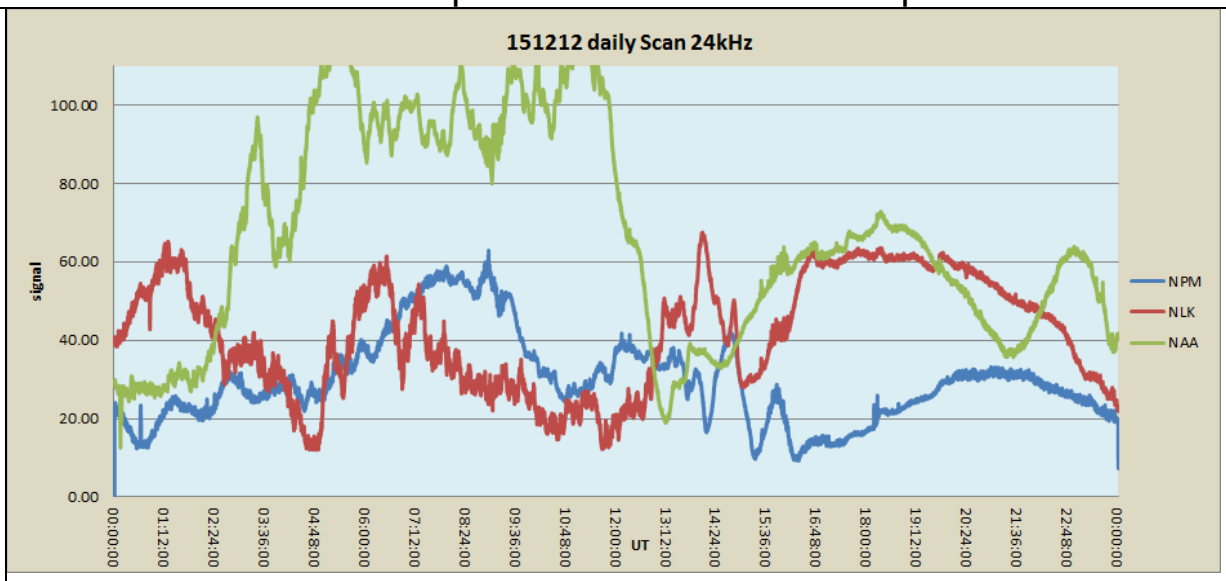
Sun: 1,392,000 km. dia.
Earth: 12,713 km. dia. Average distance to the Sun 150,000,000 km

NOTES: ***Region Nos. above Group Nos. for year – month in brackets above groups.***
Flares: 0 Filaments: 1 Faculæ: 0 Plage: 0 Prominences: 3 Surges: 0 Active areas incl.: 8
Total Sunspot groups: 4. Total single Sunspots: 2 Total Sunspots: 10. R = 70. C.M.E: 0. Total C.V: = 47
Sun limb in medium motion. Total Q. CV = 16
www.sydneycityskywatchers.asn.au/AForum
NAME: **Monty Leventhal OAM**
= Plage. = Faculæ = Flare
Supported by the Donovan Astronomical Trust.

Thanks for all our solar observers and their reports for 2015! We had over 81 observers submitting reports this past year.

Here is a drawing by Monty Leventhal LEVM for a very active day on 12 December, 2015

Sudden Ionospheric Disturbance Report

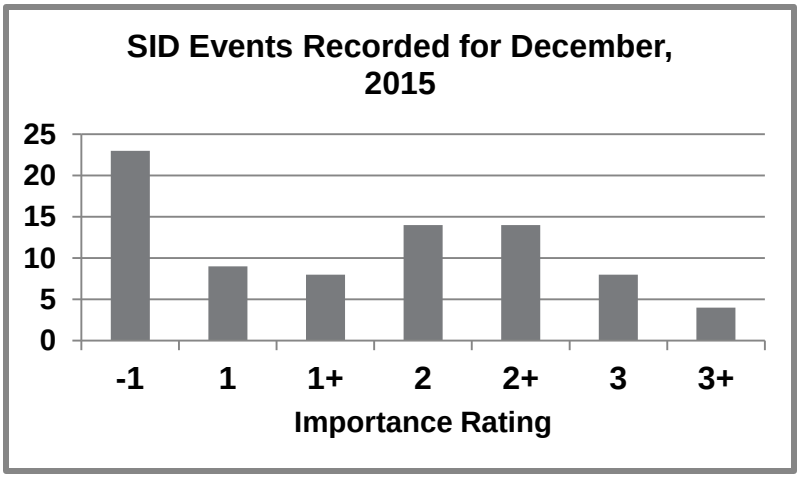


Two C class flares on December 12, 2015. This graph from Fort Collins, Colorado

Sudden Ionospheric Disturbances (SID) Records During December, 2015

Date	Max	Imp	Date	Max	Imp	Date	Max	Imp
151202	446	2+	151213	1030	2+	151223	416	2+
151204	536	1+	151213	2144	-1	151224	206	2+
151204	1710	2	151216	907	3	151224	616	3
151205	1649	-1	151217	1232	2	151224	2052	-1
151207	2251	-1	151218	509	2	151224	2246	-1
151208	1908	1	151218	529	2	151225	936	2
151208	1935	-1	151218	2353	3	151225	1716	1+
151210	749	1+	151219	204	1	151225	1729	1+
151211	1250	2+	151220	513	2+	151226	153	3
151211	1701	-1	151220	2245	1+	151226	516	2+
151211	1716	1	151221	828	-1	151226	1559	3+
151212	319	1	151221	1019	2	151227	1906	-1
151212	510	2+	151221	1512	2+	151228	31	2
151212	517	2+	151221	1828	2	151228	1206	3
151212	523	2+	151222	23	2+	151228	1223	3
151212	611	2	151222	320	1+	151229	1000	3+
151212	617	1+	151222	327	1	151229	1030	2
151212	1145	-1	151222	334	3+	151229	1520	-1
151212	1345	1+	151222	1336	2	151229	2046	2
			151223	31	1	151231	1101	3+

Solar Events

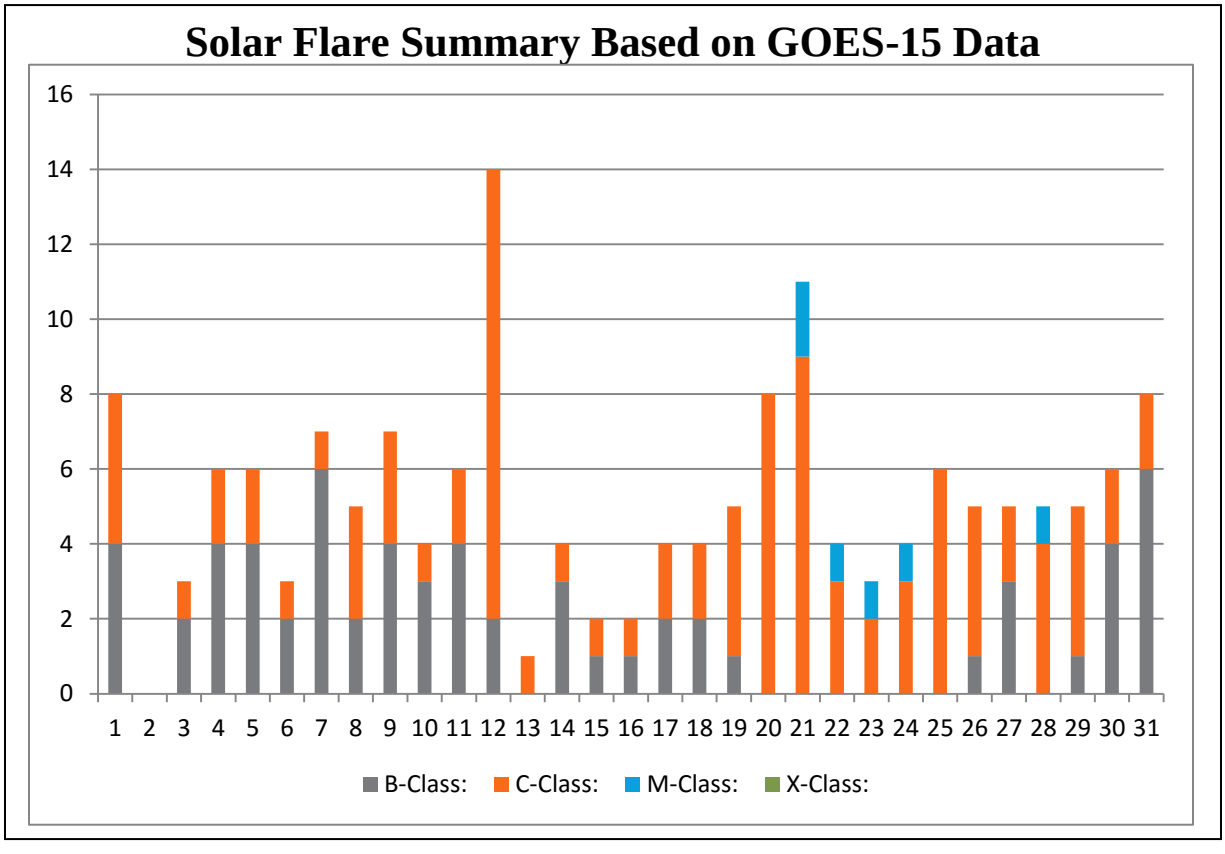


Importance rating: Duration (min)	1-: <19	1: 19-25	1+: 26-32	2: 33-45	2+: 46-85	3: 86-125	3+: 125

Sudden Ionospheric Disturbances (SID) Observers During December, 2015

Observer	Code	Station(s) monitored	Observer	Code	Station(s) monitored
A McWilliams	A94	NML	R Green	A134	NWC
R Battaiola	A96	HWU	R Mrllak	A136	GQD NSY
J Wallace	A97	NAA	S Aguirre	A138	NPM
L Loudet	A118	GQD	G Silvis	A141	NAA 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 NML	D Russel	A147	NML
J Karlovsky	A131	DHO NSY			

There were 161 solar flares measured by GOES-15 for December, 2015: 6 M class, 93 C class and 62 B class flares. A little less flaring this month compared to last. There were 17 AAVSO SID observers who submitted reports this month.



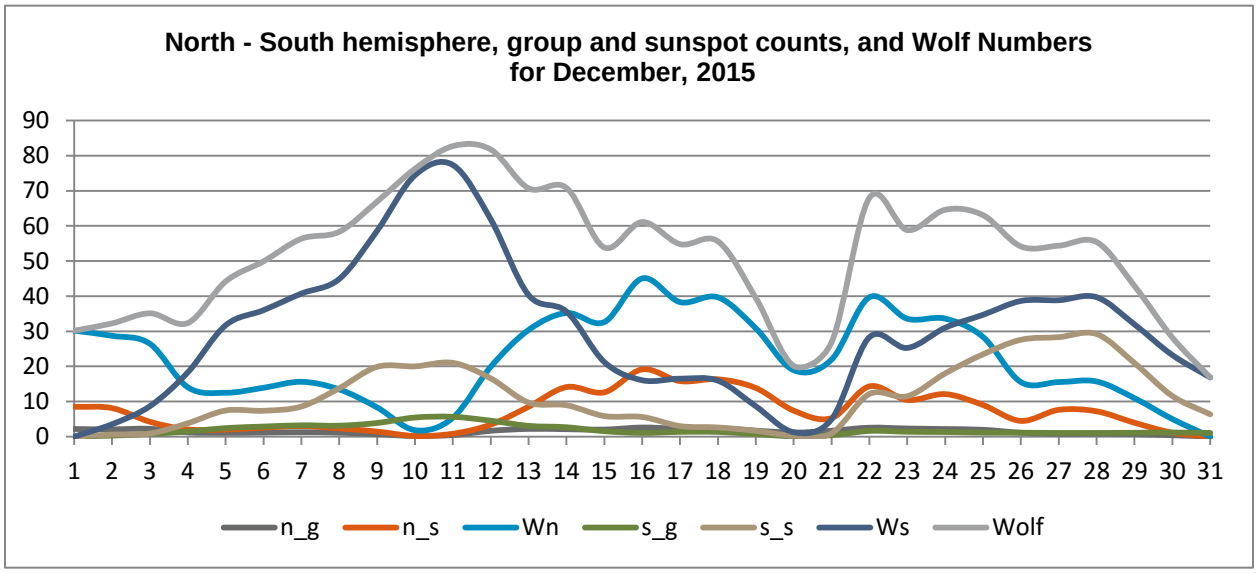
American Relative Sunspot Numbers (Ra) for December, 2015 [**boldface = maximum, minimum**]

DAY	NumObs	RAW	Ra
1	19	28	20
2	26	28	19
3	26	32	24
4	33	30	23
5	37	42	34
6	34	48	38
7	36	52	41
8	35	53	41
9	27	65	48
10	28	73	**60**
11	18	75	55
12	24	71	51
13	23	70	47
14	27	65	47
15	20	52	39
16	28	55	42
17	29	52	39
18	24	52	36
19	33	33	26
20	29	20	15
21	21	23	18
22	23	62	45
23	23	53	44
24	29	61	46
25	23	60	46
26	29	52	41
27	28	51	39
28	28	54	39
29	26	39	29
30	31	26	19
31	28	18	**14**
Average	**27.3**	**48.2**	**36.3**

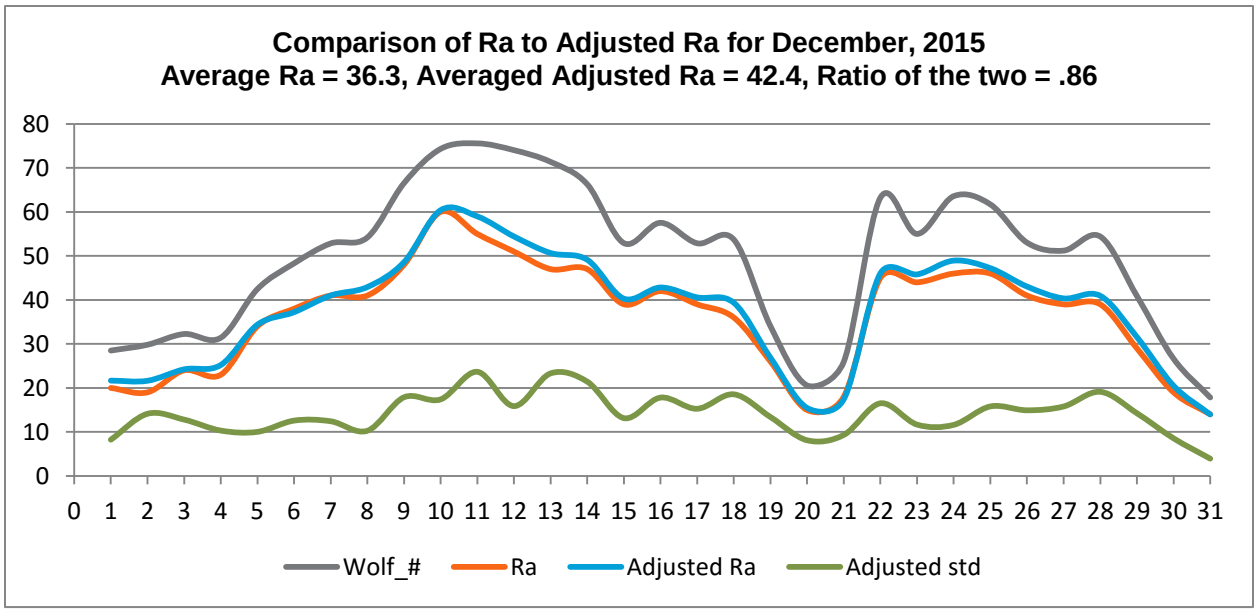
Obs	#Obs	Name
AAX	12	Alexandre Amorim
AJV	13	J. Alonso
ARAG	30	Gema Araujo
ASA	22	Salvador Aguirre
BARH	7	Howard Barnes
BATR	2	Roberto Battaiola
BDDA	6	Diego Bastiani
BERJ	14	Jose Alberto Berdejo
BMF	3	Michael Boschat
BRAB	29	Brenda Branchett
BRAF	11	Raffaello Braga
BROB	19	Robert Brown
BSAB	21	Santanu Basu
BURS	2	Scott Burgess
CHAG	24	German Morales Chavez
CIOA	10	Ioannis Chouinavas
CKB	19	Brian Cudnik
CNT	6	Dean Chantiles
DEMF	1	Frank Dempsey
DJOB	12	Jorge del Rosario
DUBF	22	Franky Dubois
FERJ	16	Javier Ruiz Fernandez
FLET	23	Tom Fleming
FLF	2	Fredirico Luiz Funari
FTAA	5	Tadeusz Figiel
FUJK	23	K. Fujimori
HAYK	11	Kim Hay
HOWR	25	Rodney Howe
JDAC	10	David Jackson
JGE	4	Gerardo Jimenez Lopez
JJMA	8	Jessica M.Johnson
KAND	21	Kandilli Observatory
KAPJ	8	John Kaplan
KNJS	29	James & Shirley Knight
KROL	14	Larry Krozel
LEVM	20	Monty Leventhal
LKR	9	Kristine Larsen
LRRA	16	Robert LIttle
MARE	10	Enrico Mariani
MENM	21	Miguel Menegotto
MILJ	10	Jay Miller
MJAF	30	Juan Antonio Moreno Quesada
MJHA	26	John McCammon
MWU	8	Walter Maluf
OATS	6	Susan Oatney
OBSO	12	IPS Observatory
ONJ	8	John O'Neill
RLM	18	Mat Raymonde
SCGL	21	Gerd-Lutz Schott
SDOH	31	Jan Alvestad(SDO)
SIDM	6	Monika Sidor
SIMC	1	Clyde Simpson
SONA	6	Andries Son
SPIA	7	Piotr Skorupski
STAB	20	Brian Gordon-States
SUZM	23	Miyoshi Suzuki

TESD	22	David Teske
URBP	13	Piotr Urbanski
VARG	21	A. Gonzalo Vargas
VIDD	21	Dan Vidican
VRUA	3	Ruben Verboven
WILW	13	William M. Wilson
WRP	2	Russell Wheeler

Total Observers: 63
Total Observations: 888



There were 40 out of 63 observers who counted northern and southern hemisphere groups and sunspots this month. Neither northern nor southern hemisphere was predominant with days of crossover on the 4th, 14th, and 24th.



Here's a graph comparing the American Ra, created with AAVSO k – factors, to the Raw AAVSO data with no k- factors (Adjusted_Ra). The calculations for the Adjusted_Ra match closely to those of the reconstructed SILSO ISN (see table below).

JDay	#Obs	Wolf_#	Wolf_Std	Adjusted_Ra	Adjusted_Std
57357	20	28.50	9.34	21.67	8.24
57358	28	29.82	17.34	21.63	14.13
57359	27	32.26	13.77	24.23	12.81
57360	34	31.41	12.50	25.21	10.31
57361	38	42.47	11.98	34.38	10.02
57362	35	48.31	14.20	37.22	12.58
57363	37	52.84	13.41	41.01	12.43
57364	36	54.19	13.52	42.93	10.27
57365	28	66.54	19.27	48.58	17.88
57366	30	74.33	17.83	60.40	17.40
57367	19	75.58	23.00	58.99	23.67
57368	26	74.04	24.37	54.42	15.87
57369	24	71.38	22.38	50.66	23.31
57370	28	66.29	24.00	49.13	21.43
57371	22	52.91	16.76	40.29	13.14
57372	30	57.53	20.98	42.83	17.81
57373	31	52.87	13.76	40.58	15.27
57374	25	53.72	23.08	39.36	18.55
57375	34	34.03	19.74	26.87	13.39
57376	30	20.57	11.04	15.46	8.11
57377	22	25.95	17.88	17.44	9.32
57378	25	63.24	16.92	46.04	16.51
57379	25	55.00	15.04	45.80	11.67
57380	31	63.58	18.04	48.94	11.61
57381	25	61.72	22.74	47.22	15.80
57382	30	53.03	17.46	43.05	14.92
57383	29	51.21	22.15	40.35	15.79
57384	29	54.41	24.39	40.94	19.12
57385	28	40.89	19.71	31.55	14.25
57386	32	26.63	12.14	20.49	8.55
57387	30	17.83	5.53	13.97	3.93

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888 observations, Adjusted_Ra = 42.43

Above would be an AAVSO report, similar to the SILSO calculations (Adjusted Ra) for their ISN report using no k – factors – The SILSO relative mean sunspot number is 44.8. (See last page of their December Solar Bulletin): http://www.sidc.be/sunspots/bulletins/monthly/monthlybull201512.pdf

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