



Sunspot Index and Long-term Solar Observations

World Data Center supported by the ICSU - WDS

SUNSPOT BULLETIN

2015 n° 5

WARNING OF MAJOR DATA CHANGE

Over the past 4 years a community effort has been carried out to **revise entirely the historical sunspot number series**. A good overview of the analyses and identified corrections is provided in the recent review paper: *Clette, F., Svalgaard, L., Vaquero, J.M., Cliver, E. W., "Revisiting the Sunspot Number. A 400-Year Perspective on the Solar Cycle", Space Science Reviews, Volume 186, Issue 1-4, pp. 35-103.*

Now that the new data series has been finalized, we are about to replace the original version of our sunspot data by an entirely new data set on July 1st. On this occasion, we decided to simultaneously introduce changes in several conventions in the data themselves and also in the distributed data files.

The most prominent change in the sunspot number will be the choice of a new reference observer, A. Wolfer (pilot observer from 1876 to 1928) instead of R. Wolf himself. This means **dropping the conventional 0.6 Zürich scale factor**, thus raising the scale of the entire sunspot number time series to the level of modern sunspot counts. This major scale change may thus strongly affect some user applications. Be prepared!

Regarding data files, various files will be replaced by new ones, with new more homogeneous names and new internal column formats. The included information will sometimes change: combining data (e.g. hemispheric numbers together with total numbers), separating data (monthly smoothed numbers in a separate file) or adding new values that were not provided previously (standard errors on values).

All those changes will be explained in the information accompanying our data. Probably, while the core files will all be replaced in early July, some other changes will still occur in the next two or three months. During this transitory phase, we thus invite you to visit the main SILSO Web site to follow the changes, as we are preparing this major transition now scheduled for July 1st, 2015. So, please visit our SILSO Web site: <http://www.sidc.be/silso>.

For specific technical questions, in particular, if you need to adapt automated data import software used for operational purposes, please contact us by e-mail at silso.info@oma.be



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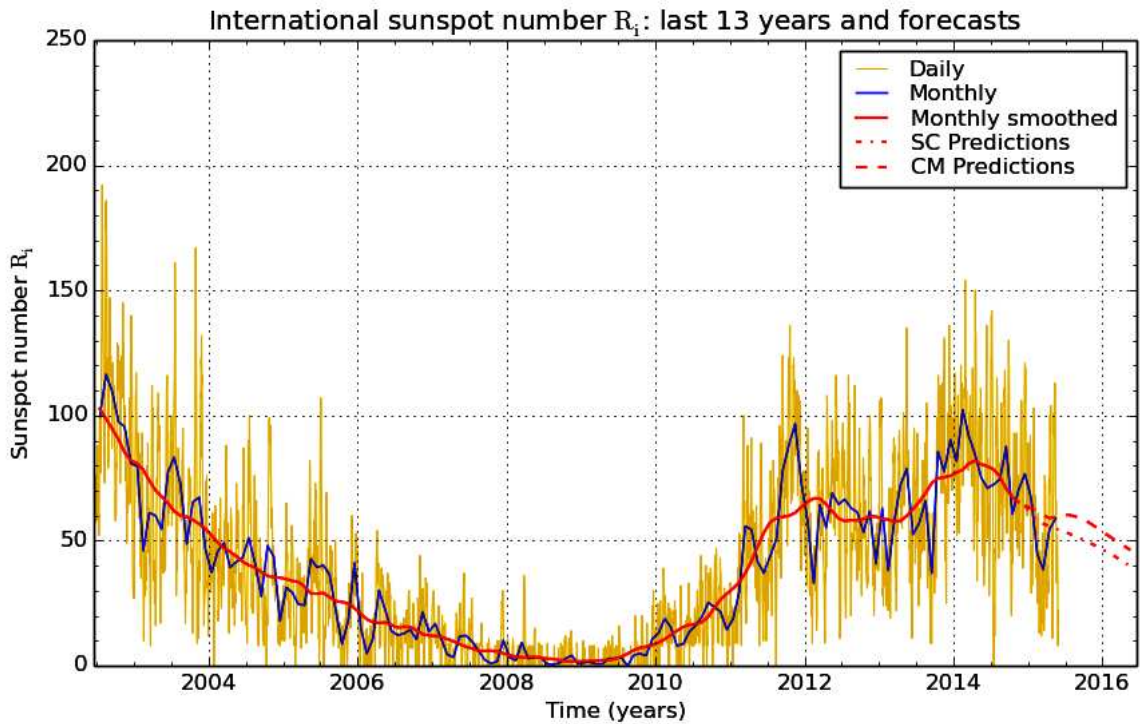
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Provisional international and normalized hemispheric daily sunspot numbers for May 2015

Computed at the *Royal Observatory of Belgium* using observations from an international network with the *Specola Solare Ticinese Locarno* as reference station.

Date	R' _I	R' _N	R' _S
1	13	0	13
2	24	0	24
3	28	10	18
4	68	27	41
5	68	37	31
6	82	44	38
7	95	44	51
8	101	52	49
9	92	57	35
10	107	62	45
11	109	68	41
12	112	73	39
13	113	76	37
14	109	70	39
15	83	47	36
16	69	35	34
17	59	22	37
18	66	24	42
19	51	19	32
20	39	15	24
21	33	12	21
22	48	21	27
23	48	19	29
24	52	15	37
25	45	12	33
26	35	10	25
27	9	9	0
28	8	0	8
29	22	8	14
30	19	8	11
31	17	6	11
Monthly mean	58.8	29.1	29.7
Cooperating stations	78	66	66



SILSO graphics (<http://sidc.be/silso>) Royal Observatory of Belgium 2015 June 1

Predictions of the monthly smoothed Sunspot Number
 using the last provisional value, calculated for November 2014: 65.4 ($\pm 5\%$)

	SM	CM		SM	CM		SM	CM
2014 Dec	64	64	2015 Jun	54	60	2015 Dec	47	55
2015 Jan	61	63	Jul	53	60	2016 Jan	46	53
Feb	58	62	Aug	52	60	Feb	45	51
Mar	57	60	Sep	51	59	Mar	43	49
Apr	56	59	Oct	50	58	Apr	41	48
May	55	60	Nov	48	56	May	40	46

SM : SIDC classical method : based on an interpolation of Waldmeier's standard curves. The estimated error ranges from 7% (first month) to 35% (last month)

CM : Combined method : the combined method is a regression technique coupling a dynamo-based estimator with Waldmeier's method of standard curves, designed by K. Denkmayr.

Ref.: K. Denkmayr, P. Cugnon, 1997 : "About Sunspot Number Medium-Term Predictions", in "Solar-Terrestrial Prediction Workshop V", eds. G.Heckman et al., Hiraiso Solar Terrestrial Research Center, Japan, 103.

Brussels, June 1, 2015 08:26 UT

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Summary of the URSIGRAMs from S.I.D.C.

Date	R _i	PPSI	600	2800	COS	SFI	XI	Ak
30	11	3	-	102	////	0	0/0	5
1	13	4	-	100	////	1	0/0	5
2	24	16	-	106	////	6	0/0	8
3	28	27	-	111	////	12	0/0	10
4	68	56	-	125	////	21	0/0	8
5	68	72	-	128	////	124	4/1	6
6	82	108	-	136	////	28	1/0	28
7	95	130	-	147	////	27	0/0	8
8	101	146	-	150	////	16	0/0	6
9	92	145	-	155	////	12	0/0	11
10	107	186	-	160	////	11	0/0	12
11	109	194	-	163	////	17	0/0	16
12	112	160	-	163	////	20	0/0	16
13	113	127	-	157	////	36	0/0	40
14	109	120	-	145	////	17	0/0	10
15	83	82	-	137	////	13	0/0	8
16	69	73	-	131	////	2	0/0	6
17	59	44	-	120	////	1	0/0	6
18	66	34	-	115	////	2	0/0	18
19	51	24	-	110	////	3	0/0	16
20	39	17	-	106	////	2	0/0	9
21	33	17	-	102	////	5	0/0	3
22	48	24	-	99	////	2	0/0	3
23	48	28	-	98	////	5	0/0	4
24	52	27	-	99	////	0	0/0	5
25	45	20	-	97	////	0	0/0	4
26	35	10	-	95	////	0	0/0	10
27	9	3	-	95	////	0	0/0	6
28	8	3	-	93	////	0	0/0	11
29	22	6	-	92	////	0	0/0	12
30	19	32	-	95	////	0	0/0	6
31	17	39	-	94	////	0	0/0	8

R_i : provisional international sunspot numbers from the S.I.D.C.

PPSI : prompt photometric sunspot index from the S.I.D.C. in 10^{-5} w/m^2 : the quantity to be subtracted from the mean solar constant to account for the sunspot contribution.

600 : 600 Mhz solar flux from the station at Humain (Belgium).

2800 : 2800 Mhz solar flux from Ottawa (origin : Ursigrams - UGEOI). The 10.7cm Flux data are a service of the National Research Council of Canada.

COS : thousands of the cosmic ray counts (origin : Ursigrams - UCOSE Terre Adélie).

SFI : Solar Flare Index from the S.I.D.C. (origin: Ursigrams - UGEOR, evaluation : $1 \times \text{Sn} + 10 \times \text{"1"} + 100 \times \text{">1"}$).

XI : X-flares index from the Ursigrams (M-flares/X-flares) (origin: Ursigrams - UGEOR, UGEOI).

Ak : geomagnetic index from Wingst, Germany (origin: Ursigrams).

SOLAR PHYSICS DEPARTMENT

UCCLE DAILY PROVISIONAL RELATIVE SUNSPOT NUMBERS FOR MAY 2015

DATE	UT	NUMBER		RELATIVE SUNSPOT NUMBERS			PPSI	QUAL	OBS	
		OF GROUPS	OF SPOTS	TOTAL	NORTH	SOUTH				CENTRAL
1	815	1	4	14	0	14	0	1.4	3	AM
2	600	1	13	23	0	23	0	8.7	3	AM
4	715	5	48	98	38	60	32	20.6	2	AE
5	745	5	42	92	49	43	52	39.0	2	AE
6	715	5	58	108	55	53	87	104.5	2	AE
7	930	7	54	124	54	70	62	122.8	2	AE
8	745	7	53	123	61	62	53	108.1	2	AE
9	830	7	60	130	90	40	13	82.3	2	AE
10	1015	9	43	133	70	63	34	103.6	2	AE
11	720	8	69	149	88	61	74	102.3	2	OL
12	850	8	73	153	102	51	100	102.0	2	OL
13	730	8	82	162	109	53	97	101.5	4	OL
14	715	10	77	177	117	60	74	95.6	3	OL
15	735	8	34	114	64	50	62	36.4	2	OL
17	1510	7	19	89	26	63	39	8.0	2	FC
18	815	6	11	71	11	60	14	7.2	2	OB
19	1130	6	22	82	24	58	19	4.8	2	OB
20	830	4	11	51	13	38	15	3.5	2	OB
21	830	3	6	36	13	23	11	3.4	2	OB
22	830	5	12	62	28	34	51	11.0	2	OB
23	920	4	21	61	16	45	29	48.1	1	LL
24	730	4	32	72	24	48	24	22.8	2	AM
25	840	5	15	65	15	50	0	11.0	3	AM
26	645	4	12	52	13	39	14	5.9	2	AM
27	1450	4	5	45	11	34	0	0.8	2	AM
28	1220	1	1	11	0	11	0	0.6	2	OB
29	925	3	4	34	12	22	0	1.9	4	AM
30	810	3	9	39	16	23	0	5.7	3	AM

The relative mean sunspot number is 84.6.

NORMALISED UCCLE OBSERVATIONAL SUNSPOT NUMBERS $U'=K'U$ FOR MAY 2015

$K' = 0.779 (*)$

1	11	7	97	13	126	19	64	25	51
2	18	8	96	14	138	20	40	26	41
3	***	9	101	15	89	21	28	27	35
4	76	10	104	16	***	22	48	28	9
5	72	11	116	17	69	23	48	29	26
6	84	12	119	18	55	24	56	30	30
								31	***

The normalised relative monthly mean sunspot number is 66.

(*) K' is the mean of the monthly K' for the last five years.

The Sun has been observed 28 days on 31 possible.