



Sunspot Index and Long-term Solar Observations

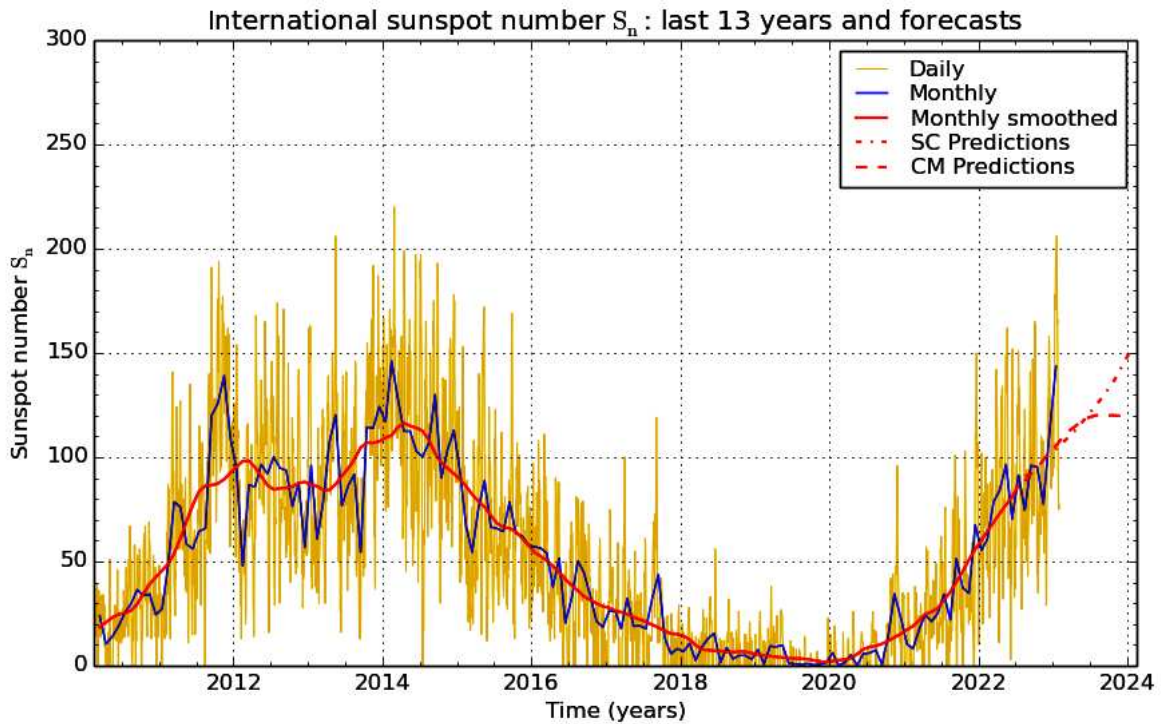
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SUNSPOT BULLETIN 2023 n° 01

Provisional international and normalized hemispheric daily sunspot numbers for January 2023

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

Date	S_n	$S_n(N)$	$S_n(S)$
1	107	77	30
2	103	71	32
3	107	67	40
4	95	54	41
5	112	39	73
6	132	28	104
7	130	22	108
8	136	19	117
9	147	34	113
10	178	53	125
11	173	57	116
12	171	59	112
13	179	74	105
14	187	89	98
15	199	80	119
16	188	83	105
17	187	99	88
18	198	117	81
19	206	137	69
20	205	142	63
21	194	133	61
22	164	118	46
23	166	122	44
24	151	120	31
25	133	118	15
26	108	108	0
27	84	84	0
28	84	72	12
29	77	54	23
30	75	29	46
31	77	31	46
Monthly mean	143.6	77.1	66.5
Cooperating stations	66	55	55



SILSO graphics (<http://sidc.be/silso>) Royal Observatory of Belgium 2023 February 2

Predictions of the monthly smoothed Sunspot Number
 using the last provisional value, calculated for July 2022: 86.5 ($\pm 5\%$)

	SM	CM		SM	CM		SM	CM
2022 Aug	91	89	2023 Feb	107	109	2023 Aug	127	121
Sep	92	92	Mar	110	112	Sep	131	120
Oct	96	95	Apr	113	115	Oct	135	120
Nov	99	99	May	116	117	Nov	140	120
Dec	101	102	Jun	120	119	Dec	146	120
2023 Jan	104	106	Jul	123	120	2024 Jan	151	121

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.

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

Date	S _n	PPSI	600	2800	COS	SFI	XI	Ak
31	91	79	-	165	////	12	0/0	18
1	107	54	-	153	////	12	0/0	20
2	103	55	-	146	////	17	0/0	10
3	107	47	-	149	////	1	0/0	7
4	95	33	-	151	////	104	0/0	18
5	112	32	-	154	////	6	0/0	11
6	132	41	-	172	////	117	0/1	4
7	130	63	-	179	////	6	1/0	8
8	136	108	-	184	////	33	4/0	8
9	147	122	-	191	////	140	3/1	5
10	178	102	-	193	////	220	6/1	7
11	173	89	-	195	////	36	4/0	9
12	171	89	-	212	////	38	3/0	8
13	179	81	-	209	////	37	2/0	18
14	187	99	-	228	////	35	3/0	9
15	199	107	-	234	////	115	2/0	26
16	188	123	-	228	////	9	0/0	14
17	187	164	-	222	////	14	1/0	5
18	198	152	-	220	////	10	1/0	14
19	206	137	-	219	////	8	3/0	6
20	205	129	-	218	////	6	0/0	7
21	194	113	-	209	////	8	0/0	20
22	164	100	-	199	////	25	2/0	10
23	166	61	-	189	////	4	0/0	8
24	151	47	-	180	////	12	0/0	4
25	133	23	-	172	////	24	3/0	6
26	108	13	-	151	////	6	0/0	10
27	84	10	-	145	////	4	0/0	10
28	84	7	-	138	////	1	0/0	12
29	77	10	-	137	////	0	0/0	6
30	75	11	-	136	////	6	0/0	5
31	77	10	-	137	////	8	0/0	10

S_n : 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 : $1 \times S_n + 10 \times "1" + 100 \times ">1"$).

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 JANUARY 2023

DATE	UT	NUMBER		RELATIVE SUNSPOT NUMBERS			PPSI	QUAL	OBS	
		OF GROUPS	OF SPOTS	TOTAL	NORTH	SOUTH				CENTRAL
1	1055	8	50	130	97	33	58	110.4	2	FC
5	1000	7	47	117	42	75	68	68.8	2	FC
7	1025	7	115	185	39	146	57	128.6	3	OB
8	950	6	124	184	23	161	51	158.6	3	OB
9	1326	7	99	169	40	129	114	151.9	2	CB
11	925	9	116	206	65	141	103	178.3	2	CB
13	945	11	92	202	91	111	66	137.4	2	OL
15	915	11	71	181	83	98	50	230.3	1	CB
17	940	11	138	248	122	126	143	257.8	4	GV
18	950	11	115	225	121	104	140	228.3	3	GV
21	940	12	117	237	156	81	97	190.9	2	GV
28	1355	6	19	79	66	13	40	9.0	2	JV
30	1015	6	36	96	31	65	13	17.6	3	OB

The relative mean sunspot number is 173.8.

NORMALISED UCCLE OBSERVATIONAL SUNSPOT NUMBERS $U'=K'U$ FOR JANUARY 2023

$K' = 1.034 (*)$

1	134	7	191	13	209	19	***	25	***
2	***	8	190	14	***	20	***	26	***
3	***	9	175	15	187	21	245	27	***
4	***	10	***	16	***	22	***	28	82
5	121	11	213	17	256	23	***	29	***
6	***	12	***	18	233	24	***	30	99
								31	***

The normalised relative monthly mean sunspot number is 180.

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

The Sun has been observed 13 days on 31 possible.