



Sunspot Index and Long-term Solar Observations

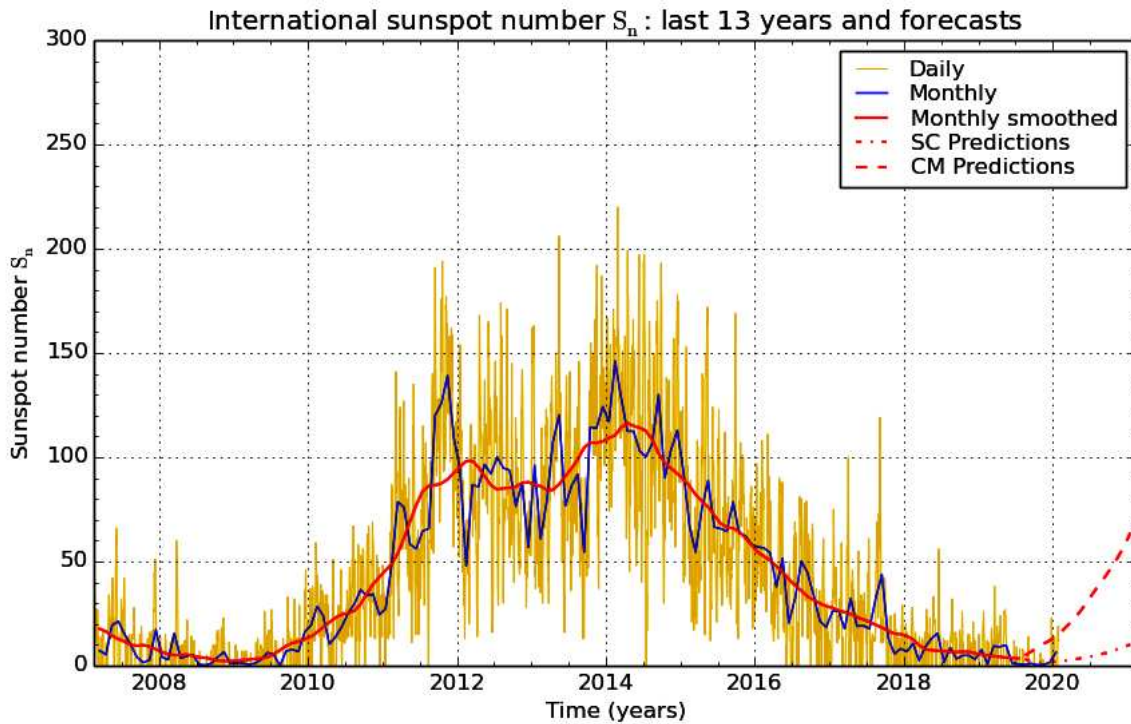
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SUNSPOT BULLETIN 2020 n° 1

Provisional international and normalized hemispheric daily sunspot numbers for January 2020

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	8	0	8
2	13	0	13
3	14	0	14
4	12	0	12
5	14	0	14
6	7	0	7
7	4	0	4
8	3	3	0
9	14	14	0
10	3	3	0
11	0	0	0
12	0	0	0
13	0	0	0
14	0	0	0
15	0	0	0
16	0	0	0
17	0	0	0
18	0	0	0
19	0	0	0
20	0	0	0
21	0	0	0
22	0	0	0
23	0	0	0
24	12	12	0
25	12	12	0
26	19	19	0
27	14	14	0
28	12	12	0
29	12	12	0
30	12	12	0
31	12	12	0
Monthly mean	6.4	4.0	2.4
Cooperating stations	69	54	54



SILSO graphics (<http://sidc.be/silso>) Royal Observatory of Belgium 2020 February 1

Predictions of the monthly smoothed Sunspot Number
 using the last provisional value, calculated for July 2019: 3.5 ($\pm 5\%$)

	SM	CM		SM	CM		SM	CM
2019 Aug	3	5	2020 Feb	2	17	2020 Aug	5	39
Sep	2	7	Mar	3	20	Sep	6	43
Oct	1	9	Apr	3	23	Oct	7	48
Nov	2	11	May	4	26	Nov	8	52
Dec	2	12	Jun	4	31	Dec	9	57
2020 Jan	2	14	Jul	5	35	2021 Jan	10	64

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	0	0	-	71	////	0	0/0	3
1	8	0	-	72	////	0	0/0	3
2	13	0	-	72	////	0	0/0	2
3	14	1	-	71	////	0	0/0	5
4	12	1	-	72	////	0	0/0	8
5	14	1	-	72	////	0	0/0	11
6	7	1	-	71	////	0	0/0	9
7	4	1	-	72	////	0	0/0	6
8	3	0	-	74	////	0	0/0	8
9	14	1	-	74	////	0	0/0	12
10	3	0	-	73	////	0	0/0	6
11	0	0	-	74	////	0	0/0	6
12	0	0	-	72	////	0	0/0	3
13	0	0	-	72	////	0	0/0	3
14	0	0	-	72	////	0	0/0	2
15	0	0	-	71	////	0	0/0	4
16	0	0	-	72	////	0	0/0	4
17	0	0	-	70	////	0	0/0	2
18	0	0	-	71	////	0	0/0	3
19	0	1	-	72	////	0	0/0	1
20	0	0	-	71	////	0	0/0	1
21	0	0	-	71	////	0	0/0	7
22	0	0	-	72	////	0	0/0	8
23	0	0	-	71	////	0	0/0	6
24	12	0	-	71	////	0	0/0	2
25	12	1	-	73	////	1	0/0	2
26	19	8	-	75	////	1	0/0	4
27	14	8	-	73	////	0	0/0	2
28	12	6	-	74	////	0	0/0	6
29	12	2	-	74	////	0	0/0	10
30	12	1	-	74	////	0	0/0	18
31	12	1	-	74	////	0	0/0	7

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

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 JANUARY 2020

DATE	UT	NUMBER		RELATIVE SUNSPOT NUMBERS			PPSI	QUAL	OBS	
		OF GROUPS	OF SPOTS	TOTAL	NORTH	SOUTH				CENTRAL
1	1005	0	0	0	0	0	0	0.0	3	OB
4	1030	1	2	12	0	12	0	0.3	3	OB
6	1000	1	1	11	0	11	11	0.3	3	SB
10	1245	0	0	0	0	0	0	0.0	2	SB
13	1230	0	0	0	0	0	0	0.0	3	OL
15	1045	0	0	0	0	0	0	0.0	2	OL
16	1035	0	0	0	0	0	0	0.0	3	OL
17	1415	0	0	0	0	0	0	0.0	3	OL
18	1015	0	0	0	0	0	0	0.0	3	OL
19	1015	0	0	0	0	0	0	0.0	3	OL
21	1015	0	0	0	0	0	0	0.0	2	OB
26	1220	1	9	19	19	0	19	6.1	4	OB
28	1035	1	4	14	14	0	14	5.6	3	OL
29	1005	1	2	12	12	0	0	1.7	3	OL
30	1206	1	1	11	11	0	0	0.2	1	CB

The relative mean sunspot number is 5.3.

NORMALISED UCCLE OBSERVATIONAL SUNSPOT NUMBERS $U'=K'U$ FOR JANUARY 2020

$K' = 1.166 (*)$

1	0	7	***	13	0	19	0	25	***
2	***	8	***	14	***	20	***	26	22
3	***	9	***	15	0	21	0	27	***
4	14	10	0	16	0	22	***	28	16
5	***	11	***	17	0	23	***	29	14
6	13	12	***	18	0	24	***	30	13
								31	***

The normalised relative monthly mean sunspot number is 6.

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

The Sun has been observed 15 days on 31 possible.