



Sunspot Index and Long-term Solar Observations

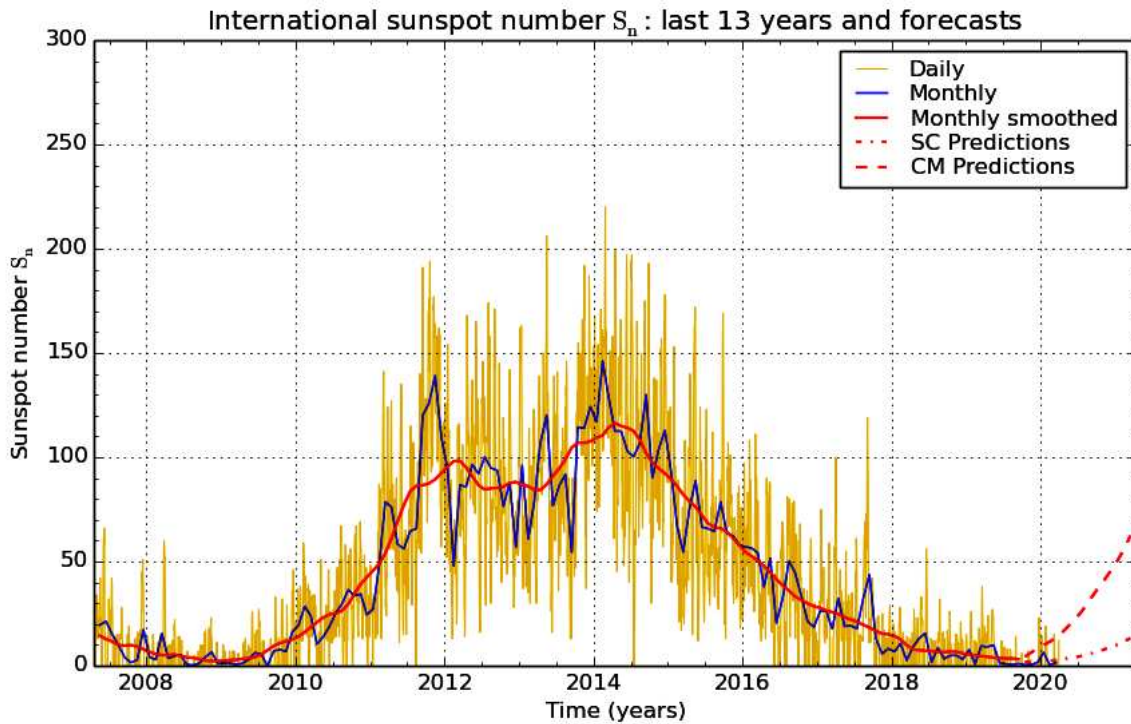
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SUNSPOT BULLETIN 2020 n° 3

Provisional international and normalized hemispheric daily sunspot numbers for March 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	0	0	0
2	0	0	0
3	0	0	0
4	0	0	0
5	0	0	0
6	0	0	0
7	0	0	0
8	15	0	15
9	12	0	12
10	0	0	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	3	3	0
19	0	0	0
20	0	0	0
21	0	0	0
22	0	0	0
23	0	0	0
24	0	0	0
25	0	0	0
26	0	0	0
27	0	0	0
28	0	0	0
29	0	0	0
30	4	4	0
31	12	12	0
Monthly mean	1.5	0.6	0.9
Cooperating stations	68	56	56



SILSO graphics (<http://sidc.be/silso>) Royal Observatory of Belgium 2020 April 2

Predictions of the monthly smoothed Sunspot Number
 using the last provisional value, calculated for September 2019: 3.1 ($\pm 5\%$)

	SM	CM		SM	CM		SM	CM
2019 Oct	2	4	2020 Apr	3	16	2020 Oct	7	38
Nov	2	6	May	4	19	Nov	8	42
Dec	2	8	Jun	4	22	Dec	9	46
2020 Jan	2	10	Jul	5	26	2021 Jan	10	51
Feb	2	12	Aug	5	30	Feb	12	56
Mar	3	14	Sep	6	34	Mar	13	62

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
29	0	0	-	70	////	0	0/0	14
1	0	0	-	69	////	0	0/0	8
2	0	0	-	69	////	0	0/0	5
3	0	0	-	70	////	0	0/0	7
4	0	0	-	70	////	0	0/0	6
5	0	0	-	70	////	0	0/0	3
6	0	0	-	70	////	0	0/0	4
7	0	0	-	70	////	0	0/0	4
8	15	0	-	70	////	0	0/0	6
9	12	1	-	71	////	0	0/0	6
10	0	0	-	71	////	0	0/0	6
11	0	0	-	71	////	0	0/0	4
12	0	0	-	70	////	0	0/0	6
13	0	0	-	69	////	0	0/0	8
14	0	0	-	68	////	0	0/0	3
15	0	0	-	70	////	0	0/0	5
16	0	0	-	70	////	0	0/0	7
17	0	0	-	72	////	0	0/0	7
18	3	0	-	72	////	0	0/0	8
19	0	0	-	72	////	0	0/0	13
20	0	0	-	72	////	0	0/0	11
21	0	0	-	71	////	0	0/0	10
22	0	0	-	70	////	0	0/0	8
23	0	0	-	70	////	0	0/0	14
24	0	0	-	71	////	0	0/0	4
25	0	0	-	71	////	0	0/0	4
26	0	0	-	70	////	0	0/0	8
27	0	0	-	69	////	0	0/0	8
28	0	0	-	69	////	0	0/0	7
29	0	0	-	68	////	0	0/0	9
30	4	0	-	69	////	0	0/0	16
31	12	1	-	70	////	0	0/0	18

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 MARCH 2020

DATE	UT	NUMBER		RELATIVE SUNSPOT NUMBERS			PPSI	QUAL	OBS	
		OF GROUPS	OF SPOTS	TOTAL	NORTH	SOUTH				CENTRAL
1	910	0	0	0	0	0	0.0	3	OL	
3	820	0	0	0	0	0	0.0	3	SB	
4	825	0	0	0	0	0	0.0	2	SB	
6	1530	0	0	0	0	0	0.0	3	SB	
7	1130	1	1	11	0	11	0	0.2	3	SB
9	815	1	5	15	0	15	15	4.9	3	FC
11	1225	0	0	0	0	0	0	0.0	2	FC
12	855	0	0	0	0	0	0	0.0	3	FC
13	930	0	0	0	0	0	0	0.0	3	FC
14	815	0	0	0	0	0	0	0.0	3	FC
15	1430	0	0	0	0	0	0	0.0	3	FC
16	930	0	0	0	0	0	0	0.0	2	OB
17	915	0	0	0	0	0	0	0.0	3	OL
18	907	0	0	0	0	0	0	0.0	3	OB
21	840	0	0	0	0	0	0	0.0	3	OB
22	815	0	0	0	0	0	0	0.0	3	OB
23	747	0	0	0	0	0	0	0.0	3	CB
24	753	0	0	0	0	0	0	0.0	3	CB
25	755	0	0	0	0	0	0	0.0	3	CB
26	810	0	0	0	0	0	0	0.0	3	CB
27	815	0	0	0	0	0	0	0.0	3	CB
28	812	0	0	0	0	0	0	0.0	4	CB
29	830	0	0	0	0	0	0	0.0	3	CB
30	815	0	0	0	0	0	0	0.0	3	OL
31	800	1	2	12	12	0	0	0.1	3	OL

The relative mean sunspot number is 1.5.

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

$K'= 1.168 (*)$

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

The normalised relative monthly mean sunspot number is 2.

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

The Sun has been observed 25 days on 31 possible.