



# Sunspot Index and Long-term Solar Observations

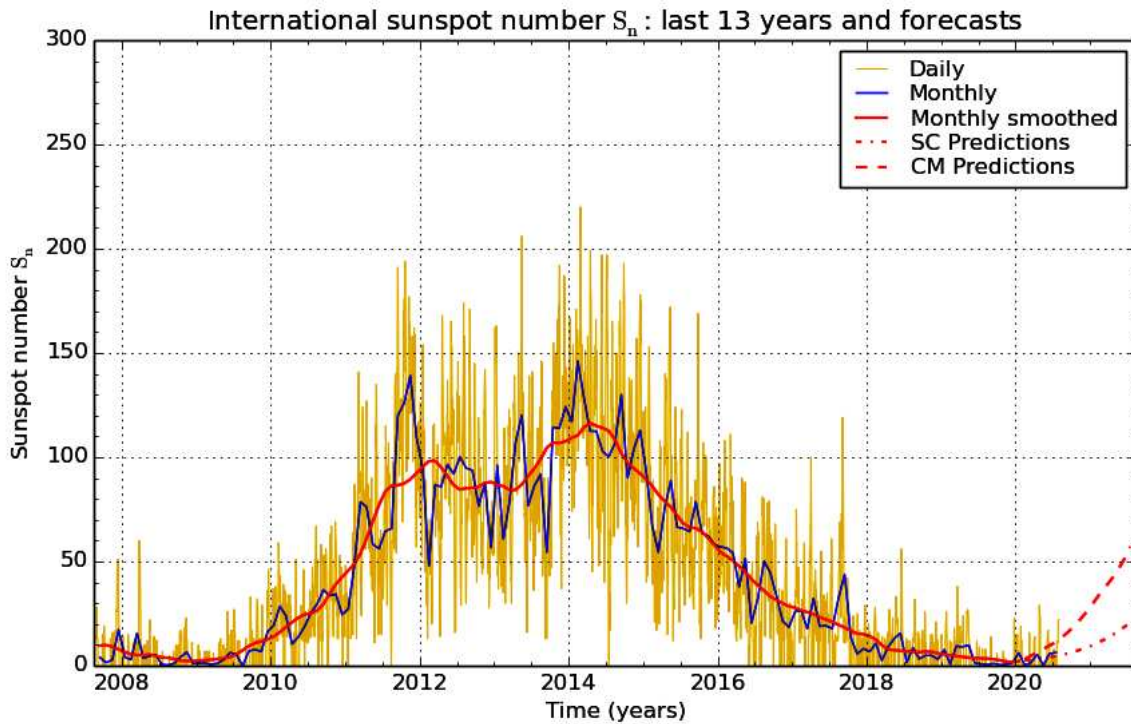
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## ***SUNSPOT BULLETIN*** 2020 n° 7

Provisional international and normalized hemispheric daily sunspot numbers for July 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	5	0	5
2	0	0	0
3	0	0	0
4	7	7	0
5	5	5	0
6	5	5	0
7	8	8	0
8	0	0	0
9	0	0	0
10	0	0	0
11	0	0	0
12	0	0	0
13	0	0	0
14	0	0	0
15	3	0	3
16	0	0	0
17	0	0	0
18	0	0	0
19	0	0	0
20	0	0	0
21	6	0	6
22	11	0	11
23	11	0	11
24	11	0	11
25	11	0	11
26	12	0	12
27	11	0	11
28	22	11	11
29	22	11	11
30	22	11	11
31	22	11	11
Monthly mean	6.3	2.2	4.1
Cooperating stations	72	61	61



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

**Predictions of the monthly smoothed Sunspot Number**  
using the last provisional value, calculated for January 2020:  $2.2 (\pm 5\%)$

	SM	CM		SM	CM		SM	CM
2020 Feb	3	3	2020 Aug	5	14	2021 Feb	11	34
Mar	3	5	Sep	6	16	Mar	13	38
Apr	3	7	Oct	7	19	Apr	15	42
May	4	8	Nov	8	23	May	17	46
Jun	4	10	Dec	9	26	Jun	19	51
Jul	5	11	2021 Jan	10	30	Jul	21	57

**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 <sub>n</sub>	PPSI	600	2800	COS	SFI	XI	Ak
30	0	0	-	68	////	0	0/0	5
1	5	1	-	68	////	0	0/0	6
2	0	0	-	68	////	0	0/0	4
3	0	0	-	69	////	0	0/0	6
4	7	0	-	70	////	0	0/0	10
5	5	0	-	69	////	0	0/0	12
6	5	0	-	69	////	0	0/0	8
7	8	1	-	68	////	0	0/0	4
8	0	0	-	67	////	0	0/0	3
9	0	0	-	69	////	0	0/0	4
10	0	0	-	69	////	0	0/0	2
11	0	0	-	69	////	0	0/0	3
12	0	0	-	68	////	0	0/0	3
13	0	0	-	68	////	0	0/0	8
14	0	0	-	69	////	0	0/0	12
15	3	0	-	68	////	0	0/0	6
16	0	0	-	69	////	0	0/0	5
17	0	0	-	68	////	0	0/0	7
18	0	0	-	68	////	0	0/0	6
19	0	0	-	69	////	0	0/0	5
20	0	0	-	69	////	0	0/0	4
21	6	0	-	70	////	0	0/0	6
22	11	2	-	70	////	0	0/0	4
23	11	3	-	70	////	0	0/0	4
24	11	4	-	70	////	0	0/0	14
25	11	7	-	70	////	0	0/0	15
26	12	10	-	71	////	0	0/0	4
27	11	6	-	71	////	0	0/0	4
28	22	6	-	72	////	0	0/0	6
29	22	6	-	73	////	0	0/0	6
30	22	5	-	73	////	0	0/0	4
31	22	3	-	72	////	0	0/0	6

**S<sub>n</sub>** : provisional international sunspot numbers from the S.I.D.C.

**PPSI** : prompt photometric sunspot index from the S.I.D.C. in  $10^{-5} \text{ w/m}^2$  : 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 JULY 2020

DATE	UT	NUMBER		RELATIVE SUNSPOT NUMBERS			PPSI	QUAL	OBS	
		OF GROUPS	OF SPOTS	TOTAL	NORTH	SOUTH				CENTRAL
1	1525	0	0	0	0	0	0.0	2	FC	
2	635	1	3	13	0	13	0.2	3	FC	
3	1320	1	1	11	0	11	0.3	3	FC	
5	1530	1	1	11	11	0	11	0.4	2	FC
6	745	0	0	0	0	0	0.0	3	OB	
7	800	0	0	0	0	0	0.0	3	OB	
9	1030	0	0	0	0	0	0.0	3	OB	
10	1025	0	0	0	0	0	0.0	3	OB	
11	840	0	0	0	0	0	0.0	2	OB	
12	815	0	0	0	0	0	0.0	3	OB	
13	718	0	0	0	0	0	0.0	3	CB	
15	811	0	0	0	0	0	0.0	1	CB	
18	646	0	0	0	0	0	0.0	1	CB	
19	706	0	0	0	0	0	0.0	1	CB	
20	710	0	0	0	0	0	0.0	3	SB	
21	945	1	1	11	0	11	0.2	3	SB	
22	720	1	1	11	0	11	0.5	3	SB	
23	700	1	1	11	0	11	0.8	3	SB	
24	1010	1	1	11	0	11	1.3	2	SB	
25	1315	1	1	11	0	11	1.7	2	SB	
26	825	1	2	12	0	12	5.0	3	SB	
27	925	1	1	11	0	11	11	2.0	3	OL
28	815	2	2	22	11	11	11	2.0	3	OL
29	730	2	2	22	11	11	0	1.9	3	OL
30	730	2	2	22	11	11	0	1.6	3	OL
31	712	2	2	22	11	11	0	1.3	2	OL

The relative mean sunspot number is 7.7.

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

$K' = 1.065 (*)$

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

The normalised relative monthly mean sunspot number is 8.

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

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The Sun has been observed 26 days on 31 possible.