



# Sunspot Index and Long-term Solar Observations

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## *SUNSPOT BULLETIN*

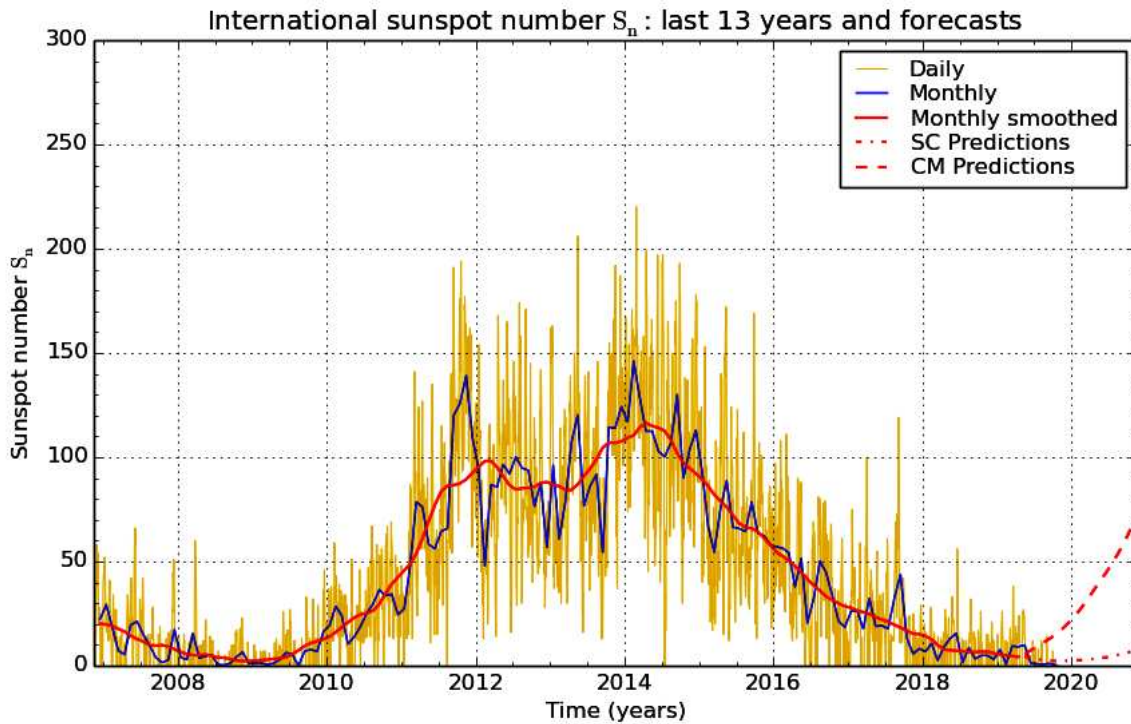
2019 n° 10

Provisional international and normalized hemispheric daily sunspot numbers for October 2019

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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	7	0	7
2	6	0	6
3	0	0	0
4	0	0	0
5	0	0	0
6	0	0	0
7	0	0	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	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	0	0	0
25	0	0	0
26	0	0	0
27	0	0	0
28	0	0	0
29	0	0	0
30	0	0	0
31	0	0	0
Monthly mean	0.4	0.0	0.4
Cooperating stations	64	51	51



SILSO graphics (<http://sidc.be/silso>) Royal Observatory of Belgium 2019 November 1

**Predictions of the monthly smoothed Sunspot Number**  
 using the last provisional value, calculated for April 2019: 4.3 ( $\pm 5\%$ )

	SM	CM		SM	CM		SM	CM
2019 May	4	6	2019 Nov	2	18	2020 May	4	40
Jun	4	8	Dec	2	21	Jun	4	44
Jul	3	9	2020 Jan	3	24	Jul	5	49
Aug	3	11	Feb	3	27	Aug	5	54
Sep	3	13	Mar	3	32	Sep	6	59
Oct	2	15	Apr	3	36	Oct	7	66

**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	13
1	7	0	-	69	////	0	0/0	12
2	6	0	-	68	////	0	0/0	7
3	0	0	-	68	////	0	0/0	5
4	0	0	-	68	////	0	0/0	10
5	0	0	-	68	////	0	0/0	8
6	0	0	-	67	////	0	0/0	5
7	0	0	-	68	////	0	0/0	10
8	0	0	-	67	////	0	0/0	6
9	0	0	-	68	////	0	0/0	8
10	0	0	-	68	////	0	0/0	14
11	0	0	-	69	////	0	0/0	10
12	0	0	-	68	////	0	0/0	6
13	0	0	-	67	////	0	0/0	1
14	0	0	-	66	////	0	0/0	6
15	0	0	-	67	////	0	0/0	4
16	0	0	-	66	////	0	0/0	8
17	0	0	-	66	////	0	0/0	7
18	0	0	-	66	////	0	0/0	6
19	0	0	-	66	////	0	0/0	6
20	0	0	-	65	////	0	0/0	5
21	0	0	-	64	////	0	0/0	6
22	0	0	-	66	////	0	0/0	3
23	0	0	-	65	////	0	0/0	1
24	0	0	-	65	////	0	0/0	24
25	0	0	-	69	////	0	0/0	21
26	0	0	-	69	////	0	0/0	28
27	0	0	-	69	////	0	0/0	20
28	0	0	-	69	////	0	0/0	16
29	0	0	-	69	////	0	0/0	7
30	0	0	-	70	////	0	0/0	8
31	0	0	-	71	////	0	0/0	9

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

**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 OCTOBER 2019

DATE	UT	NUMBER		RELATIVE SUNSPOT NUMBERS			PPSI	QUAL	OBS
		OF GROUPS	OF SPOTS	TOTAL	NORTH	SOUTH			
1	1350	0	0	0	0	0	0.0	1	OB
2	900	1	2	12	0	12	0.6	3	FC
3	750	0	0	0	0	0	0.0	2	OB
5	1300	0	0	0	0	0	0.0	3	OB
6	1230	0	0	0	0	0	0.0	2	OB
9	1135	0	0	0	0	0	0.0	1	OL
10	840	0	0	0	0	0	0.0	3	OL
12	935	0	0	0	0	0	0.0	3	OL
13	900	0	0	0	0	0	0.0	3	OL
14	1115	0	0	0	0	0	0.0	3	SB
17	830	0	0	0	0	0	0.0	3	OL
18	850	0	0	0	0	0	0.0	3	FC
19	1035	0	0	0	0	0	0.0	1	OL
22	910	0	0	0	0	0	0.0	2	SB
23	1000	0	0	0	0	0	0.0	3	SB
24	945	0	0	0	0	0	0.0	3	SB
25	840	0	0	0	0	0	0.0	2	SB
26	920	0	0	0	0	0	0.0	2	SB
27	1400	0	0	0	0	0	0.0	2	SB
28	900	0	0	0	0	0	0.0	3	OB
29	920	0	0	0	0	0	0.0	3	OB
30	1210	0	0	0	0	0	0.0	2	OB
31	845	0	0	0	0	0	0.0	3	OL

The relative mean sunspot number is 0.5.

NORMALISED UCCLE OBSERVATIONAL SUNSPOT NUMBERS  $U'=K'U$  FOR OCTOBER 2019

$$K' = 1.138 (*)$$

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

The normalised relative monthly mean sunspot number is 1.

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

The Sun has been observed 23 days on 31 possible.