



# Sunspot Index and Long-term Solar Observations

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## ***SUNSPOT BULLETIN***

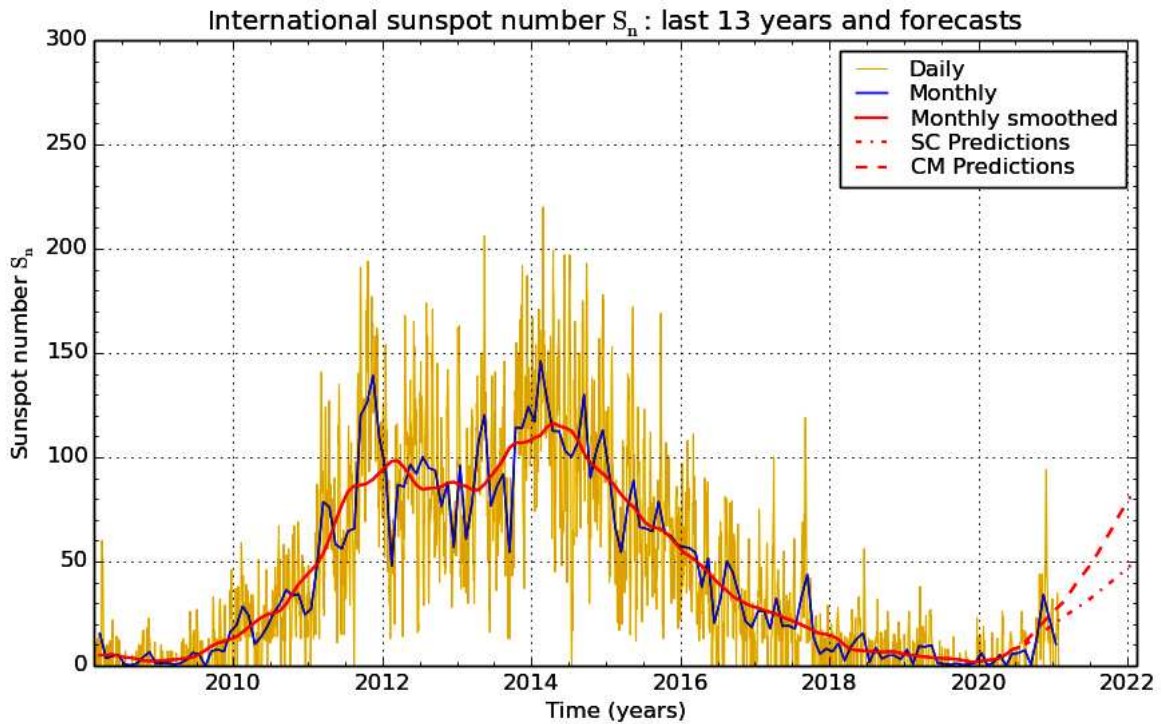
2021 n° 01

Provisional international and normalized hemispheric daily sunspot numbers for January 2021

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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	23	0	23
2	17	0	17
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	3	0	3
15	15	0	15
16	13	0	13
17	14	0	14
18	13	0	13
19	20	0	20
20	20	0	20
21	25	0	25
22	35	11	24
23	32	11	21
24	23	9	14
25	26	14	12
26	17	5	12
27	20	9	11
28	6	6	0
29	0	0	0
30	0	0	0
31	0	0	0
Monthly mean	10.4	2.1	8.3
Cooperating stations	67	56	56



SILSO graphics (<http://sidc.be/silso>) Royal Observatory of Belgium 2021 February 1

**Predictions of the monthly smoothed Sunspot Number**  
 using the last provisional value, calculated for July 2020: 8.8 ( $\pm 5\%$ )

	SM	CM		SM	CM		SM	CM
2020 Aug	10	11	2021 Feb	23	30	2021 Aug	36	55
Sep	12	15	Mar	25	34	Sep	38	61
Oct	14	18	Apr	27	38	Oct	41	66
Nov	17	21	May	29	43	Nov	43	71
Dec	19	24	Jun	31	46	Dec	46	76
2021 Jan	21	27	Jul	33	50	2022 Jan	48	81

**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
31	32	15	-	81	////	0	0/0	3
1	23	4	-	80	////	0	0/0	4
2	17	1	-	82	////	0	0/0	0
3	0	0	-	80	////	0	0/0	1
4	0	0	-	78	////	0	0/0	(//)
5	0	0	-	75	////	0	0/0	(//)
6	0	0	-	74	////	0	0/0	(//)
7	0	0	-	75	////	0	0/0	(//)
8	0	0	-	75	////	0	0/0	(//)
9	0	0	-	74	////	0	0/0	(//)
10	0	0	-	73	////	0	0/0	(//)
11	0	0	-	73	////	0	0/0	(//)
12	0	0	-	73	////	0	0/0	(//)
13	0	0	-	73	////	0	0/0	(//)
14	3	0	-	74	////	0	0/0	(//)
15	15	2	-	73	////	0	0/0	(//)
16	13	3	-	78	////	0	0/0	(//)
17	14	1	-	77	////	///	///	(//)
18	13	3	-	75	////	0	0/0	(//)
19	20	5	-	78	////	0	0/0	(//)
20	20	8	-	78	////	2	0/0	(//)
21	25	12	-	78	////	4	0/0	(//)
22	35	9	-	78	////	0	0/0	(//)
23	32	6	-	78	////	0	0/0	(//)
24	23	6	-	78	////	0	0/0	(//)
25	26	3	-	77	////	0	0/0	(//)
26	17	2	-	76	////	0	0/0	(//)
27	20	2	-	76	////	0	0/0	(//)
28	6	1	-	76	////	0	0/0	(//)
29	0	1	-	76	////	0	0/0	(//)
30	0	0	-	74	////	0	0/0	(//)
31	0	0	-	73	////	0	0/0	(//)

**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 JANUARY 2021

DATE	UT	NUMBER		RELATIVE SUNSPOT NUMBERS			PPSI 10-5	QUAL	OBS	
		OF GROUPS	OF SPOTS	TOTAL	NORTH	SOUTH				CENTRAL
1	1240	2	5	25	0	25	0	1.5	3	FC
9	1010	0	0	0	0	0	0	0.0	2	OB
10	915	0	0	0	0	0	0	0.0	2	OB
12	1505	0	0	0	0	0	0	0.0	1	CB
13	1000	0	0	0	0	0	0	0.0	2	CB
18	1110	1	1	11	0	11	0	0.6	1	SB
20	1040	2	5	25	0	25	0	4.5	2	SB
21	1115	2	7	27	0	27	0	6.0	1	SB
22	1009	3	8	38	12	26	26	4.6	2	GV
24	930	2	5	25	11	14	14	2.4	3	SB
25	1125	2	6	26	14	12	12	0.8	3	OL
26	1015	1	2	12	0	12	0	0.3	3	OL

The relative mean sunspot number is 15.8.

NORMALISED UCCLE OBSERVATIONAL SUNSPOT NUMBERS  $U'=K'U$  FOR JANUARY 2021

$K'= 1.144 (*)$

1	29	7	***	13	0	19	***	25	30
2	***	8	***	14	***	20	29	26	14
3	***	9	0	15	***	21	31	27	***
4	***	10	0	16	***	22	43	28	***
5	***	11	***	17	***	23	***	29	***
6	***	12	0	18	13	24	29	30	***
								31	***

The normalised relative monthly mean sunspot number is 18.

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

The Sun has been observed 12 days on 31 possible.