



# Sunspot Index and Long-term Solar Observations

World Data Center supported by the ICSU - WDS

## *SUNSPOT BULLETIN*

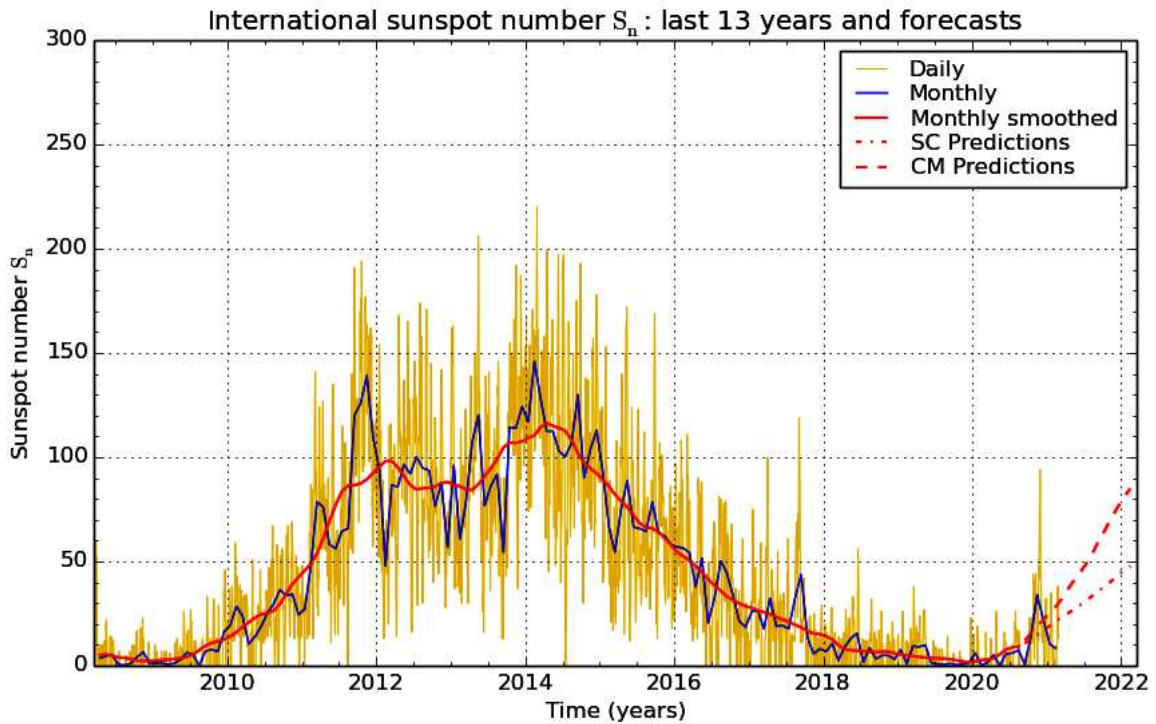
2021 n° 02

Provisional international and normalized hemispheric daily sunspot numbers for February 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	0	0	0
2	9	9	0
3	7	7	0
4	0	0	0
5	0	0	0
6	0	0	0
7	0	0	0
8	3	0	3
9	2	0	2
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	10	10	0
19	9	9	0
20	9	9	0
21	10	10	0
22	16	13	3
23	35	17	18
24	38	22	16
25	34	23	11
26	19	19	0
27	17	17	0
28	13	13	0
Monthly mean	8.3	6.4	1.9
Cooperating stations	68	53	53



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

**Predictions of the monthly smoothed Sunspot Number**  
 using the last provisional value, calculated for August 2020: 9.3 ( $\pm 5\%$ )

	SM	CM		SM	CM		SM	CM
2020 Sep	11	12	2021 Mar	24	32	2021 Sep	36	61
Oct	13	16	Apr	25	37	Oct	39	66
Nov	15	19	May	27	41	Nov	41	71
Dec	17	22	Jun	29	45	Dec	43	76
2021 Jan	19	25	Jul	32	50	2022 Jan	46	81
Feb	21	28	Aug	34	55	Feb	48	85

**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	0	0	-	73	////	0	0/0	(//)
1	0	0	-	74	////	0	0/0	7
2	9	1	-	73	////	0	0/0	16
3	7	0	-	74	////	0	0/0	17
4	0	0	-	74	////	0	0/0	8
5	0	0	-	73	////	0	0/0	8
6	0	0	-	73	////	0	0/0	9
7	0	0	-	73	////	0	0/0	18
8	3	0	-	74	////	0	0/0	8
9	2	0	-	70	////	0	0/0	3
10	0	0	-	74	////	0	0/0	2
11	0	0	-	76	////	0	0/0	2
12	0	0	-	72	////	0	0/0	7
13	0	0	-	71	////	0	0/0	13
14	0	0	-	71	////	0	0/0	3
15	0	0	-	70	////	0	0/0	6
16	0	0	-	71	////	0	0/0	(//)
17	0	0	-	72	////	0	0/0	8
18	10	2	-	71	////	0	0/0	5
19	9	1	-	73	////	0	0/0	17
20	9	0	-	76	////	0	0/0	26
21	10	1	-	75	////	0	0/0	22
22	16	4	-	76	////	3	0/0	21
23	35	17	-	78	////	1	0/0	15
24	38	16	-	81	////	2	0/0	25
25	34	16	-	80	////	1	0/0	17
26	19	10	-	80	////	1	0/0	11
27	17	4	-	79	////	1	0/0	5
28	13	1	-	78	////	1	0/0	7

**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 FEBRUARY 2021

DATE	UT	NUMBER		RELATIVE SUNSPOT NUMBERS			PPSI	QUAL	OBS
		OF GROUPS	OF SPOTS	TOTAL	NORTH	SOUTH			
4	950	0	0	0	0	0	0.0	2	JV
5	1024	0	0	0	0	0	0.0	2	JV
9	1020	0	0	0	0	0	0.0	2	GV
10	1045	0	0	0	0	0	0.0	2	GV
11	908	0	0	0	0	0	0.0	2	GV
12	916	0	0	0	0	0	0.0	2	GV
13	920	0	0	0	0	0	0.0	2	SB
14	920	0	0	0	0	0	0.0	2	SB
16	905	0	0	0	0	0	0.0	2	GV
17	1035	0	0	0	0	0	0.0	3	GV
18	1003	1	2	12	12	0	1.0	2	GV
19	843	1	1	11	11	0	0.1	2	GV
20	857	1	2	12	12	0	0.1	2	GV
21	924	1	2	12	12	0	0.2	3	GV
22	1012	1	3	13	13	0	1.3	2	OL
23	1015	2	18	38	18	20	27.5	3	OL
24	1105	2	20	40	26	14	22.7	3	OL
25	905	2	16	36	25	11	14.4	3	OL
26	900	1	10	20	20	0	10.1	3	OL
27	1315	1	7	17	17	0	1.4	2	OL
28	915	1	3	13	13	0	0.8	3	OL

The relative mean sunspot number is 10.7.

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

$$K' = 1.180 (*)$$

1	***	7	***	13	0	19	13	25	42
2	***	8	***	14	0	20	14	26	24
3	***	9	0	15	***	21	14	27	20
4	0	10	0	16	0	22	15	28	15
5	0	11	0	17	0	23	45		
6	***	12	0	18	14	24	47		

The normalised relative monthly mean sunspot number is 13.

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

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The Sun has been observed 21 days on 28 possible.