



# Sunspot Index and Long-term Solar Observations

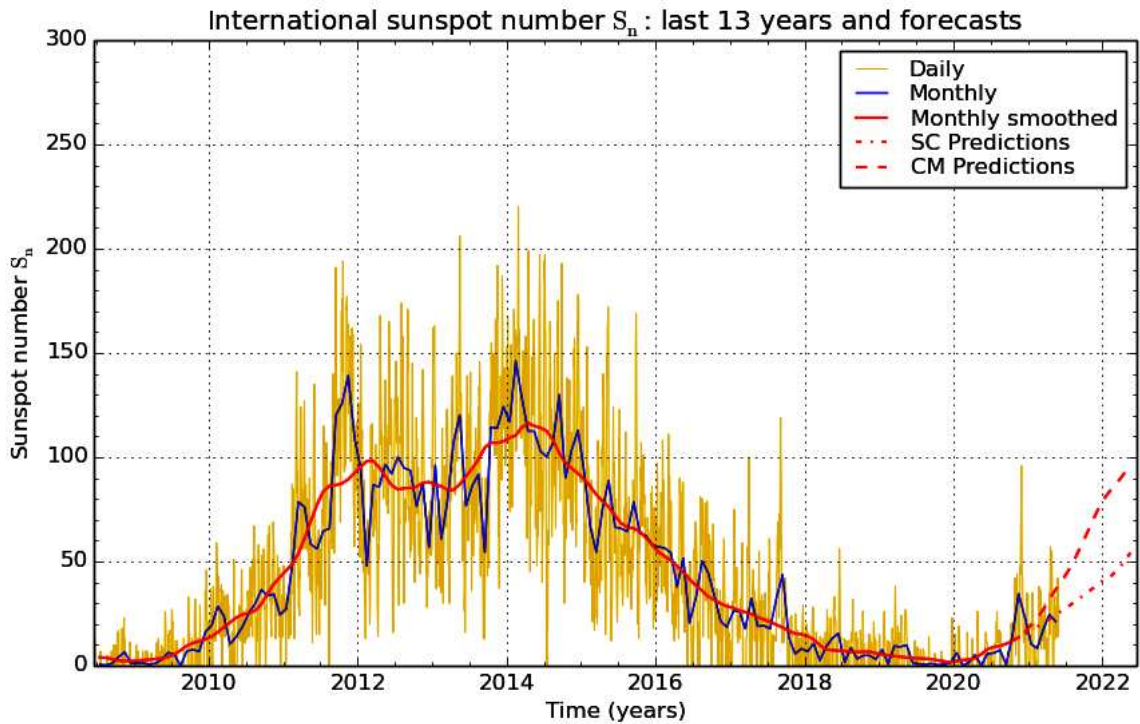
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## ***SUNSPOT BULLETIN*** 2021 n° 05

Provisional international and normalized hemispheric daily sunspot numbers for May 2021

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	10	0	10
2	0	0	0
3	0	0	0
4	0	0	0
5	0	0	0
6	0	0	0
7	10	10	0
8	16	16	0
9	20	20	0
10	33	20	13
11	32	19	13
12	33	20	13
13	30	17	13
14	26	15	11
15	28	18	10
16	13	13	0
17	14	14	0
18	28	28	0
19	27	27	0
20	20	13	7
21	14	14	0
22	19	19	0
23	27	27	0
24	31	31	0
25	41	41	0
26	41	41	0
27	42	42	0
28	30	30	0
29	14	14	0
30	28	20	8
31	29	19	10
Monthly mean	21.2	17.7	3.5
Cooperating stations	71	55	55



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

**Predictions of the monthly smoothed Sunspot Number**  
 using the last provisional value, calculated for November 2020: 13.6 ( $\pm 5\%$ )

	SM	CM		SM	CM		SM	CM
2020 Dec	15	16	2021 Jun	27	41	2021 Dec	40	76
2021 Jan	18	20	Jul	28	46	2022 Jan	42	81
Feb	19	23	Aug	31	51	Feb	43	85
Mar	21	27	Sep	33	57	Mar	46	88
Apr	23	32	Oct	35	64	Apr	50	92
May	25	37	Nov	37	70	May	54	96

**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	29	3	-	73	////	0	0/0	8
1	10	0	-	72	////	0	0/0	7
2	0	0	-	72	////	0	0/0	12
3	0	0	-	72	////	0	0/0	6
4	0	0	-	70	////	0	0/0	5
5	0	0	-	70	////	0	0/0	2
6	0	0	-	71	////	0	0/0	4
7	10	1	-	75	////	10	1/0	4
8	16	4	-	76	////	4	0/0	4
9	20	7	-	76	////	4	0/0	4
10	33	12	-	77	////	1	0/0	10
11	32	17	-	76	////	0	0/0	4
12	33	17	-	75	////	2	0/0	33
13	30	9	-	75	////	2	0/0	9
14	26	11	-	71	////	1	0/0	5
15	28	8	-	73	////	0	0/0	9
16	13	3	-	73	////	0	0/0	4
17	14	2	-	75	////	0	0/0	8
18	28	3	-	76	////	2	0/0	12
19	27	5	-	76	////	0	0/0	7
20	20	9	-	72	////	1	0/0	28
21	14	11	-	74	////	5	0/0	8
22	19	16	-	76	////	53	2/0	6
23	27	17	-	79	////	129	1/0	4
24	31	18	-	73	////	2	0/0	3
25	41	15	-	84	////	3	0/0	4
26	41	29	-	88	////	26	0/0	15
27	42	19	-	83	////	4	0/0	18
28	30	11	-	77	////	10	0/0	3
29	14	3	-	76	////	1	0/0	9
30	28	3	-	74	////	1	0/0	6
31	29	8	-	82	////	2	0/0	2

**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 MAY 2021

DATE	UT	NUMBER		RELATIVE SUNSPOT NUMBERS			PPSI 10-5	QUAL	OBS	
		OF GROUPS	OF SPOTS	TOTAL	NORTH	SOUTH				CENTRAL
1	715	1	1	11	0	11	0	0.1	3	OL
2	813	0	0	0	0	0	0	0.0	3	OL
3	735	0	0	0	0	0	0	0.0	3	CB
5	737	0	0	0	0	0	0	0.0	2	CB
7	815	1	2	12	12	0	0	0.7	2	CB
9	843	1	4	14	14	0	0	9.7	1	CB
10	1103	2	13	33	20	13	0	18.2	2	GV
11	735	2	10	30	18	12	0	22.1	3	GV
12	630	2	12	32	19	13	32	28.9	2	GV
13	1050	2	6	26	15	11	26	4.3	1	GV
14	617	2	6	26	15	11	26	27.9	2	GV
15	1422	2	4	24	24	0	0	23.1	3	SB
16	730	1	1	11	11	0	0	1.5	2	SB
17	1150	1	1	11	11	0	0	1.0	2	SB
18	835	3	3	33	33	0	0	5.1	3	SB
19	1120	2	4	24	24	0	0	10.1	2	SB
20	615	2	4	24	13	11	11	14.8	3	SB
21	635	1	1	11	11	0	0	19.8	3	SB
23	609	2	8	28	28	0	17	27.8	3	CB
24	1315	4	15	55	55	0	32	30.0	4	OB
26	1010	2	25	45	45	0	0	26.5	3	OB
27	1230	2	20	40	40	0	0	17.7	2	OB
28	855	2	10	30	30	0	0	11.6	3	OB
29	850	1	4	14	14	0	0	4.8	3	OB
30	900	2	8	28	16	12	0	1.3	3	OB
31	730	2	13	33	22	11	22	5.5	3	OL

The relative mean sunspot number is 22.9.

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

$K' = 1.055 (*)$

1	12	7	13	13	27	19	25	25	***
2	0	8	***	14	27	20	25	26	47
3	0	9	15	15	25	21	12	27	42
4	***	10	35	16	12	22	***	28	32
5	0	11	32	17	12	23	30	29	15
6	***	12	34	18	35	24	58	30	30
								31	35

The normalised relative monthly mean sunspot number is 24.

(\*)  $K'$  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.