



# Sunspot Index and Long-term Solar Observations

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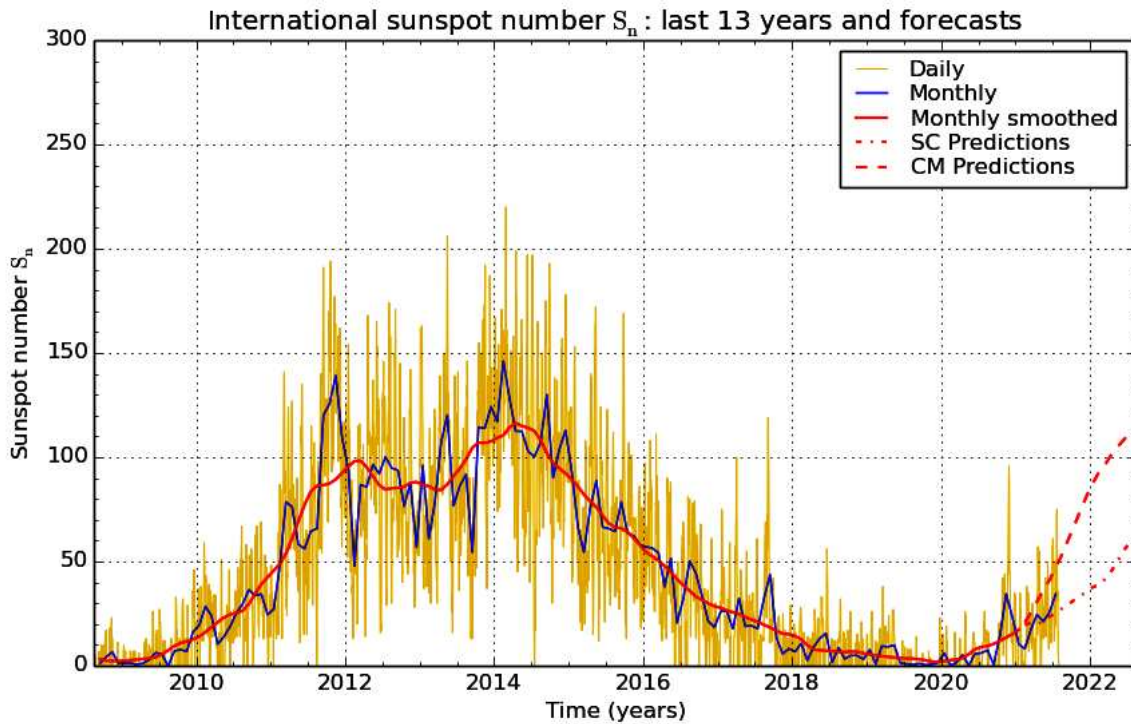
## *SUNSPOT BULLETIN*

2021 n° 07

Provisional international and normalized hemispheric daily sunspot numbers for July 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	57	16	41
2	61	19	42
3	61	23	38
4	51	28	23
5	44	26	18
6	50	31	19
7	20	20	0
8	17	17	0
9	12	4	8
10	16	4	12
11	22	11	11
12	23	11	12
13	19	13	6
14	29	16	13
15	22	13	9
16	35	13	22
17	50	20	30
18	48	18	30
19	49	34	15
20	46	36	10
21	72	48	24
22	75	41	34
23	55	31	24
24	31	18	13
25	36	18	18
26	31	14	17
27	21	11	10
28	7	0	7
29	4	0	4
30	0	0	0
31	2	2	0
Monthly mean	34.4	17.9	16.5
Cooperating stations	69	51	51



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

**Predictions of the monthly smoothed Sunspot Number**  
 using the last provisional value, calculated for January 2021: 17.3 ( $\pm 5\%$ )

	SM	CM		SM	CM		SM	CM
2021 Feb	20	21	2021 Aug	28	54	2022 Feb	39	93
Mar	21	26	Sep	29	61	Mar	42	97
Apr	20	31	Oct	32	68	Apr	46	102
May	22	36	Nov	34	75	May	51	105
Jun	24	41	Dec	36	82	Jun	56	109
Jul	25	47	2022 Jan	38	88	Jul	59	112

**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	56	60	-	94	////	3	0/0	17
1	57	67	-	94	////	1	0/0	8
2	61	55	-	95	////	0	0/0	7
3	61	56	-	94	////	9	2/1	4
4	51	26	-	91	////	4	0/0	4
5	44	25	-	89	////	1	0/0	10
6	50	13	-	83	////	0	0/0	8
7	20	12	-	76	////	0	0/0	8
8	17	1	-	73	////	0	0/0	6
9	12	1	-	74	////	0	0/0	5
10	16	1	-	74	////	0	0/0	8
11	22	4	-	74	////	1	0/0	4
12	23	2	-	72	////	0	0/0	10
13	19	4	-	72	////	0	0/0	8
14	29	5	-	72	////	0	0/0	19
15	22	4	-	74	////	0	0/0	14
16	35	4	-	75	////	2	0/0	6
17	50	6	-	77	////	1	0/0	6
18	48	10	-	80	////	1	0/0	5
19	49	8	-	83	////	1	0/0	12
20	46	9	-	87	////	0	0/0	16
21	72	14	-	94	////	2	0/0	10
22	75	12	-	89	////	0	0/0	9
23	55	10	-	87	////	2	0/0	6
24	31	7	-	84	////	0	0/0	4
25	36	6	-	82	////	0	0/0	3
26	31	3	-	81	////	0	0/0	4
27	21	2	-	80	////	1	0/0	6
28	7	1	-	79	////	0	0/0	18
29	4	1	-	76	////	0	0/0	12
30	0	0	-	76	////	0	0/0	10
31	2	0	-	76	////	0	0/0	8

**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 2021

DATE	UT	NUMBER		RELATIVE SUNSPOT NUMBERS			PPSI	QUAL	OBS	
		OF GROUPS	OF SPOTS	TOTAL	NORTH	SOUTH				CENTRAL
1	1544	3	22	52	14	38	27	22.4	2	SB
2	845	3	37	67	19	48	55	25.1	3	LL
4	700	3	31	61	30	31	17	5.0	3	OL
5	818	2	7	27	15	12	0	26.9	1	CB
6	706	4	15	55	32	23	31	25.8	2	CB
7	715	2	8	28	17	11	28	22.4	1	CB
8	720	2	2	22	22	0	11	2.3	1	CB
9	828	2	2	22	11	11	11	2.1	1	CB
10	804	0	0	0	0	0	0	0.0	1	CB
11	749	2	2	22	11	11	0	6.3	2	OL
17	930	3	10	40	17	23	29	7.1	3	JV
18	700	3	13	43	15	28	31	11.1	3	JV
19	810	3	16	46	32	14	0	5.7	2	SB
20	715	3	15	45	34	11	0	5.3	2	GV
21	755	5	15	65	42	23	12	14.3	3	GV
22	645	6	18	78	43	35	14	11.5	3	GV
23	640	5	12	62	38	24	12	9.4	3	GV
24	1305	2	11	31	20	11	20	7.0	2	GV
25	615	3	11	41	18	23	18	3.3	2	GV
26	935	2	4	24	13	11	13	0.7	3	OL
28	750	1	2	12	0	12	0	0.3	3	OL
29	745	1	1	11	0	11	11	0.3	2	OL
30	815	0	0	0	0	0	0	0.0	2	OL
31	735	0	0	0	0	0	0	0.0	3	OL

The relative mean sunspot number is 35.6.

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

$K' = 1.030 (*)$

1	54	7	29	13	***	19	47	25	42
2	69	8	23	14	***	20	46	26	25
3	***	9	23	15	***	21	67	27	***
4	63	10	0	16	***	22	80	28	12
5	28	11	23	17	41	23	64	29	11
6	57	12	***	18	44	24	32	30	0
								31	0

The normalised relative monthly mean sunspot number is 37.

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

The Sun has been observed 24 days on 31 possible.