



Sunspot Index and Long-term Solar Observations

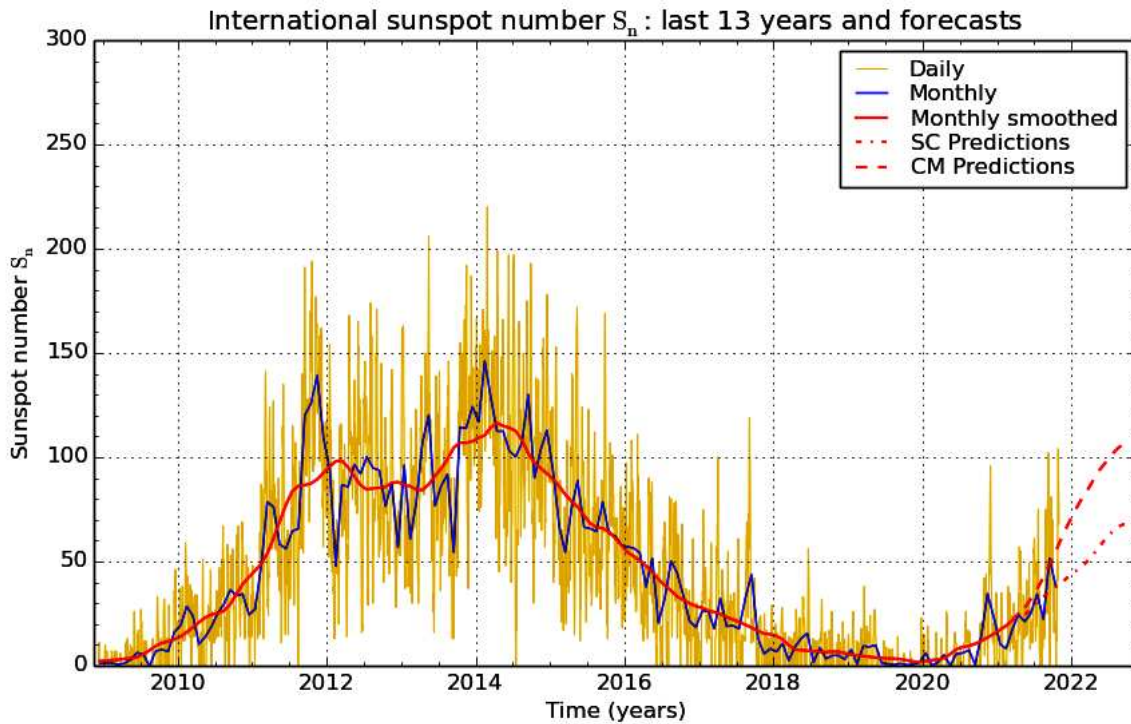
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SUNSPOT BULLETIN 2021 n° 10

Provisional international and normalized hemispheric daily sunspot numbers for October 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	36	20	16
2	34	19	15
3	26	26	0
4	35	35	0
5	31	31	0
6	26	26	0
7	16	16	0
8	19	19	0
9	24	21	3
10	39	27	12
11	30	19	11
12	18	18	0
13	20	20	0
14	21	21	0
15	12	12	0
16	11	11	0
17	0	0	0
18	18	8	10
19	13	0	13
20	12	0	12
21	18	6	12
22	37	8	29
23	50	7	43
24	41	0	41
25	68	0	68
26	92	0	92
27	104	14	90
28	100	19	81
29	85	23	62
30	78	39	39
31	68	48	20
Monthly mean	38.1	16.5	21.6
Cooperating stations	70	56	56



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

Predictions of the monthly smoothed Sunspot Number
 using the last provisional value, calculated for April 2021: 24.9 ($\pm 5\%$)

	SM	CM		SM	CM		SM	CM
2021 May	25	28	2021 Nov	40	62	2022 May	57	94
Jun	27	32	Dec	43	68	Jun	61	98
Jul	31	37	2022 Jan	45	74	Jul	64	101
Aug	33	43	Feb	47	79	Aug	67	104
Sep	36	49	Mar	50	84	Sep	68	107
Oct	38	55	Apr	53	89	Oct	68	108

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 _n	PPSI	600	2800	COS	SFI	XI	Ak
30	45	108	-	95	////	9	0/0	11
1	36	41	-	91	////	1	0/0	13
2	34	34	-	87	////	0	0/0	7
3	26	27	-	86	////	1	0/0	6
4	35	28	-	84	////	1	0/0	6
5	31	25	-	82	////	0	0/0	4
6	26	18	-	85	////	0	0/0	8
7	16	23	-	86	////	1	0/0	4
8	19	41	-	92	////	0	0/0	4
9	24	31	-	81	////	101	1/0	4
10	39	31	-	85	////	0	0/0	19
11	30	41	-	89	////	1	0/0	16
12	18	59	-	84	////	4	0/0	35
13	20	18	-	84	////	6	0/0	6
14	21	12	-	83	////	1	0/0	8
15	12	7	-	84	////	0	0/0	4
16	11	2	-	78	////	0	0/0	6
17	0	0	-	77	////	0	0/0	14
18	18	3	-	76	////	0	0/0	12
19	13	4	-	76	////	0	0/0	17
20	12	9	-	76	////	0	0/0	6
21	18	11	-	82	////	0	0/0	6
22	37	12	-	87	////	0	0/0	4
23	50	25	-	87	////	2	0/0	3
24	41	27	-	93	////	0	0/0	4
25	68	33	-	101	////	1	0/0	6
26	92	48	-	109	////	0	1/0	5
27	104	43	-	111	////	35	0/0	3
28	100	52	-	112	////	143	2/1	0
29	85	44	-	108	////	24	1/0	2
30	78	38	-	107	////	14	0/0	10
31	68	29	-	103	////	5	0/0	17

S_n : provisional international sunspot numbers from the S.I.D.C.

PPSI : prompt photometric sunspot index from the S.I.D.C. in 10^{-5} 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 OCTOBER 2021

DATE	UT	NUMBER		RELATIVE SUNSPOT NUMBERS			PPSI	QUAL	OBS	
		OF GROUPS	OF SPOTS	TOTAL	NORTH	SOUTH				CENTRAL
1	735	2	10	30	18	12	0	25.0	2	CB
2	841	2	5	25	13	12	13	23.0	1	CB
3	1544	2	6	26	15	11	15	20.5	1	CB
4	815	2	7	27	27	0	16	20.1	3	JV
5	905	2	7	27	27	0	0	18.8	2	JV
7	1335	1	2	12	12	0	0	4.8	2	JV
8	750	1	7	17	17	0	17	5.4	3	JV
9	1405	1	8	18	18	0	18	6.1	3	JV
10	1309	3	9	39	27	12	14	6.5	2	JV
11	1030	1	3	13	13	0	13	5.6	1	OB
12	1030	1	7	17	17	0	0	4.7	3	OB
13	845	1	3	13	13	0	0	3.7	3	OB
16	1000	1	1	11	11	0	0	2.2	3	OB
17	920	0	0	0	0	0	0	0.0	3	OB
18	1010	2	3	23	12	11	0	0.7	2	SB
19	1410	2	2	22	11	11	0	0.9	3	SB
21	1510	2	3	23	12	11	0	1.9	2	SB
22	840	4	7	47	12	35	11	3.4	2	SB
23	1010	5	14	64	11	53	22	10.5	3	SB
24	935	3	11	41	0	41	11	12.2	2	SB
26	900	5	47	97	0	97	18	23.8	2	OL
27	955	5	62	112	16	96	0	25.6	3	OL
28	900	5	39	89	17	72	0	23.3	2	OL
29	905	3	28	58	19	39	0	17.3	2	OL
31	940	4	29	69	53	16	42	10.1	3	OL

The relative mean sunspot number is 36.8.

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

$K'= 1.019 (*)$

1	31	7	12	13	13	19	22	25	***
2	25	8	17	14	***	20	***	26	99
3	26	9	18	15	***	21	23	27	114
4	28	10	40	16	11	22	48	28	91
5	28	11	13	17	0	23	65	29	59
6	***	12	17	18	23	24	42	30	***
								31	70

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 25 days on 31 possible.