



Sunspot Index and Long-term Solar Observations

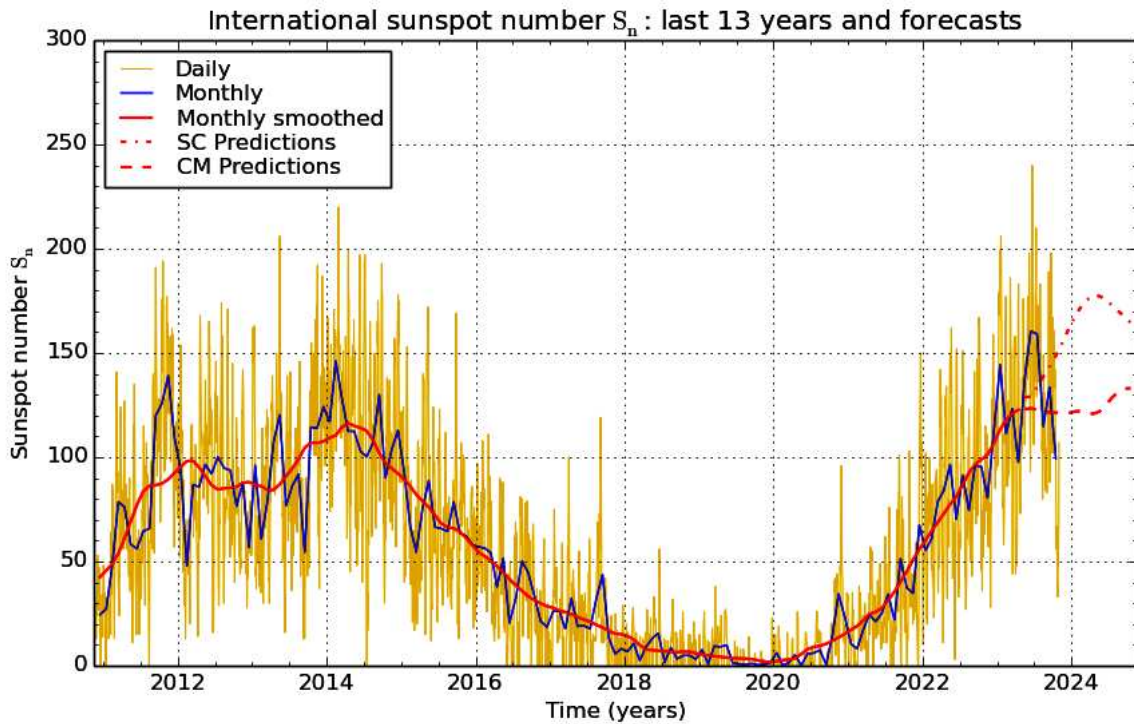
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SUNSPOT BULLETIN 2023 n° 10

Provisional international and normalized hemispheric daily sunspot numbers for October 2023

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	151	93	58
2	167	108	59
3	143	98	45
4	155	92	63
5	161	98	63
6	157	112	45
7	133	89	44
8	144	92	52
9	155	76	79
10	133	64	69
11	142	86	56
12	135	81	54
13	111	71	40
14	111	73	38
15	103	74	29
16	96	66	30
17	75	49	26
18	67	53	14
19	56	38	18
20	67	54	13
21	67	53	14
22	53	27	26
23	34	14	20
24	39	14	25
25	33	0	33
26	54	19	35
27	55	20	35
28	47	33	14
29	58	34	24
30	72	45	27
31	107	61	46
Monthly mean	99.4	60.9	38.5
Cooperating stations	65	55	55



SILSO graphics (<http://sidc.be/silso>) Royal Observatory of Belgium 2023 November 1

Predictions of the monthly smoothed Sunspot Number
 using the last provisional value, calculated for April 2023: 122.7 ($\pm 5\%$)

	SM	CM		SM	CM		SM	CM
2023 May	129	123	2023 Nov	155	121	2024 May	177	122
Jun	129	123	Dec	161	121	Jun	176	125
Jul	134	123	2024 Jan	167	122	Jul	173	129
Aug	139	122	Feb	172	122	Aug	170	131
Sep	144	121	Mar	176	121	Sep	167	133
Oct	149	121	Apr	178	121	Oct	165	133

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	116	28	-	159	////	45	1/0	12
1	151	39	-	161	////	20	1/0	10
2	167	50	-	158	////	19	1/0	9
3	143	55	-	154	////	13	0/0	9
4	155	62	-	155	////	4	0/0	12
5	161	54	-	156	////	9	0/0	19
6	157	38	-	155	////	4	0/0	8
7	133	50	-	157	////	10	1/0	4
8	144	40	-	157	////	13	0/0	7
9	155	34	-	166	////	32	0/0	11
10	133	28	-	164	////	19	2/0	2
11	142	50	-	158	////	6	0/0	3
12	135	31	-	157	////	8	0/0	2
13	111	29	-	149	////	11	0/0	15
14	111	33	-	148	////	2	0/0	8
15	103	31	-	145	////	4	0/0	4
16	96	34	-	144	////	3	0/0	2
17	75	28	-	137	////	1	0/0	2
18	67	22	-	135	////	0	0/0	11
19	56	13	-	129	////	1	0/0	8
20	67	12	-	126	////	1	0/0	10
21	67	10	-	123	////	0	0/0	23
22	53	9	-	119	////	0	0/0	9
23	34	6	-	122	////	4	0/0	2
24	39	4	-	121	////	0	0/0	4
25	33	5	-	126	////	0	0/0	4
26	54	6	-	126	////	1	0/0	24
27	55	2	-	128	////	0	0/0	11
28	47	7	-	128	////	4	0/0	16
29	58	11	-	135	////	4	0/0	28
30	72	26	-	140	////	4	0/0	14
31	107	61	-	147	////	1	0/0	6

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 2023

DATE	UT	NUMBER		RELATIVE SUNSPOT NUMBERS			PPSI	QUAL	OBS	
		OF GROUPS	OF SPOTS	TOTAL	NORTH	SOUTH				CENTRAL
1	910	9	65	155	95	60	56	77.6	3	OL
2	755	11	97	207	129	78	109	120.4	3	GV
3	1130	8	102	182	132	50	146	174.3	2	GV
4	750	8	100	180	103	77	123	163.9	3	GV
5	1125	10	84	184	110	74	100	103.4	1	GV
6	832	12	79	199	133	66	109	96.0	2	GV
7	845	11	83	193	117	76	114	130.3	2	GV
8	755	10	94	194	131	63	54	112.3	3	GV
10	830	10	50	150	69	81	43	35.6	3	OB
11	800	9	65	155	95	60	49	67.6	3	OB
14	1000	7	44	114	77	37	66	47.0	3	OB
15	825	6	49	109	81	28	61	44.8	3	OB
16	840	8	34	114	76	38	39	48.7	1	JV
17	910	3	22	52	41	11	41	27.9	3	JV
18	900	4	17	57	46	11	22	11.6	3	JV
19	1255	5	16	66	44	22	33	5.0	3	JV
21	915	7	18	88	66	22	50	20.5	2	JV
22	1216	5	14	64	27	37	39	19.0	2	JV
24	1110	3	5	35	11	24	23	3.5	3	OL
26	1430	4	15	55	25	30	0	2.9	2	OL
27	1255	5	12	62	24	38	0	2.5	3	OL
28	920	5	19	69	42	27	14	6.9	2	OL
29	850	4	26	66	34	32	35	7.7	2	OL

The relative mean sunspot number is 119.6.

NORMALISED UCCLE OBSERVATIONAL SUNSPOT NUMBERS $U'=K'U$ FOR OCTOBER 2023

$$K' = 0.996 (*)$$

1	154	7	192	13	***	19	66	25	***
2	206	8	193	14	114	20	***	26	55
3	181	9	***	15	109	21	88	27	62
4	179	10	149	16	114	22	64	28	69
5	183	11	154	17	52	23	***	29	66
6	198	12	***	18	57	24	35	30	***
								31	***

The normalised relative monthly mean sunspot number is 119.

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

The Sun has been observed 23 days on 31 possible.