Sunspot Index and Long-term Solar Observations

World Data Center supported by the ICSU - WDS

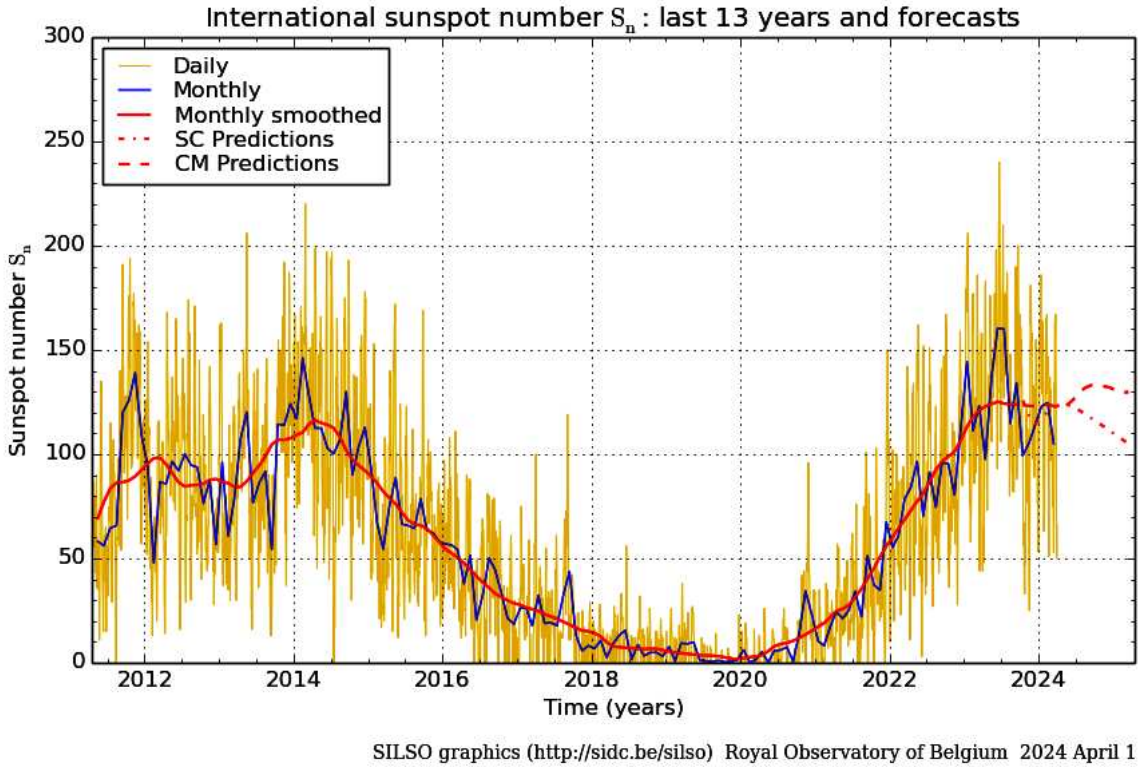
SUNSPOT BULLETIN

2024 n° 03

Provisional international and normalized hemispheric daily sunspot numbers for March 2024

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	119	72	47
2	97	38	59
3	101	36	65
4	109	50	59
5	111	61	50
6	101	53	48
7	97	40	57
8	102	40	62
9	95	37	58
10	77	24	53
11	75	24	51
12	84	35	49
13	81	34	47
14	70	36	34
15	53	23	30
16	63	28	35
17	74	43	31
18	119	63	56
19	134	66	68
20	124	38	86
21	162	59	103
22	164	59	105
23	157	50	107
24	166	56	110
25	167	58	109
26	141	54	87
27	114	36	78
28	98	27	71
29	81	24	57
30	50	19	31
31	66	44	22
Monthly mean	104.9	42.8	62.1
Cooperating stations	61	52	52



Predictions of the monthly smoothed Sunspot Number

using the last provisional value, calculated for September 2023: 123.8 (± 5%)

	SM	CM		SM	CM		SM	CM
2023 Oct	126	124	2024 Apr	124	122	2024 Oct	115	133
Nov	119	123	May	124	123	Nov	113	133
Dec	114	123	Jun	123	126	Dec	111	132
2024 Jan	118	124	Jul	121	129	2025 Jan	109	131
Feb	120	124	Aug	119	132	Feb	107	129
Mar	123	123	Sep	117	133	Mar	105	130

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
29	128	68	-	164	////	0	0/0	3
1	119	60	-	153	////	8	0/0	8
2	97	40	-	152	////	2	0/0	5
3	101	32	-	146	////	4	0/0	27
4	109	22	-	140	////	1	0/0	9
5	111	21	-	142	////	2	0/0	8
6	101	32	-	136	////	1	0/0	6
7	97	29	-	137	////	11	0/0	17
8	102	28	-	129	////	3	1/0	10
9	95	29	-	135	////	2	0/0	14
10	77	20	-	127	////	12	1/0	10
11	75	12	-	127	////	0	0/0	4
12	84	14	-	131	////	6	0/0	6
13	81	13	-	128	////	0	0/0	9
14	70	13	-	127	////	1	1/0	9
15	53	6	-	129	////	0	0/0	8
16	63	7	-	144	////	1	0/0	2
17	74	14	-	151	////	2	0/0	1
18	119	28	-	177	////	1	2/0	5
19	134	49	-	169	////	21	2/0	8
20	124	33	-	176	////	118	2/0	6
21	162	54	-	197	////	3	0/0	22
22	164	71	-	198	////	127	1/0	12
23	157	87	-	209	////	337	11/	3
24	166	114	-	195	////	262	8/0	62
25	167	115	-	190	////	30	1/0	22
26	141	117	-	178	////	9	5/0	12
27	114	67	-	175	////	47	2/0	6
28	98	62	-	173	////	235	3/1	8
29	81	32	-	167	////	25	2/0	6
30	50	13	-	140	////	7	0/0	5
31	66	2	-	134	////	0	0/0	10

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 x Sn+10 x "1"+100 x ">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 MARCH 2024

DATE	UT	NUMBER OF GROUPS	NUMBER OF SPOTS	RELATIVE SUNSPOT NUMBERS TOTAL	NORTH	SOUTH	CENTRAL	PPSI 10-5 WM-2	QUAL	OBS
1	850	8	50	130	84	46	83	98.0	2	OL
2	830	6	34	94	35	59	12	42.1	3	OL
4	925	9	27	117	54	63	0	43.1	3	JV
6	820	7	27	97	49	48	50	51.6	4	JV
7	1020	7	34	104	39	65	68	35.3	2	JV
8	825	6	36	96	37	59	84	39.9	3	JV
9	1045	6	46	106	39	67	95	55.7	2	JV
14	830	4	19	59	27	32	36	25.5	2	OB
18	1300	10	70	170	94	76	63	53.9	3	SB
19	1015	8	99	179	86	93	0	91.1	4	OB
20	1015	6	70	130	31	99	0	87.1	3	OB
23	1055	8	71	151	53	98	84	86.1	2	SB
25	840	8	116	196	70	126	134	115.0	3	OL
27	1440	5	82	132	33	99	46	68.5	3	OL
28	850	5	55	105	28	77	27	55.9	2	OL
29	1050	5	32	82	22	60	11	32.6	2	OL
31	740	7	12	82	49	33	13	2.6	2	OL

The relative mean sunspot number is 119.4.

NORMALISED UCCLE OBSERVATIONAL SUNSPOT NUMBERS U'=K'U FOR MARCH 2024

K'= 0.961 (*)

1	125	7	100	13	***	19	172	25	188
2	90	8	92	14	57	20	125	26	***
3	***	9	102	15	***	21	***	27	127
4	112	10	***	16	***	22	***	28	101
5	***	11	***	17	***	23	145	29	79
6	93	12	***	18	163	24	***	30	***
								31	79

The normalised relative monthly mean sunspot number is 115.

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

The Sun has been observed 17 days on 31 possible.