Sunspot Index and Long-term Solar Observations

World Data Center supported by the ICSU - WDS

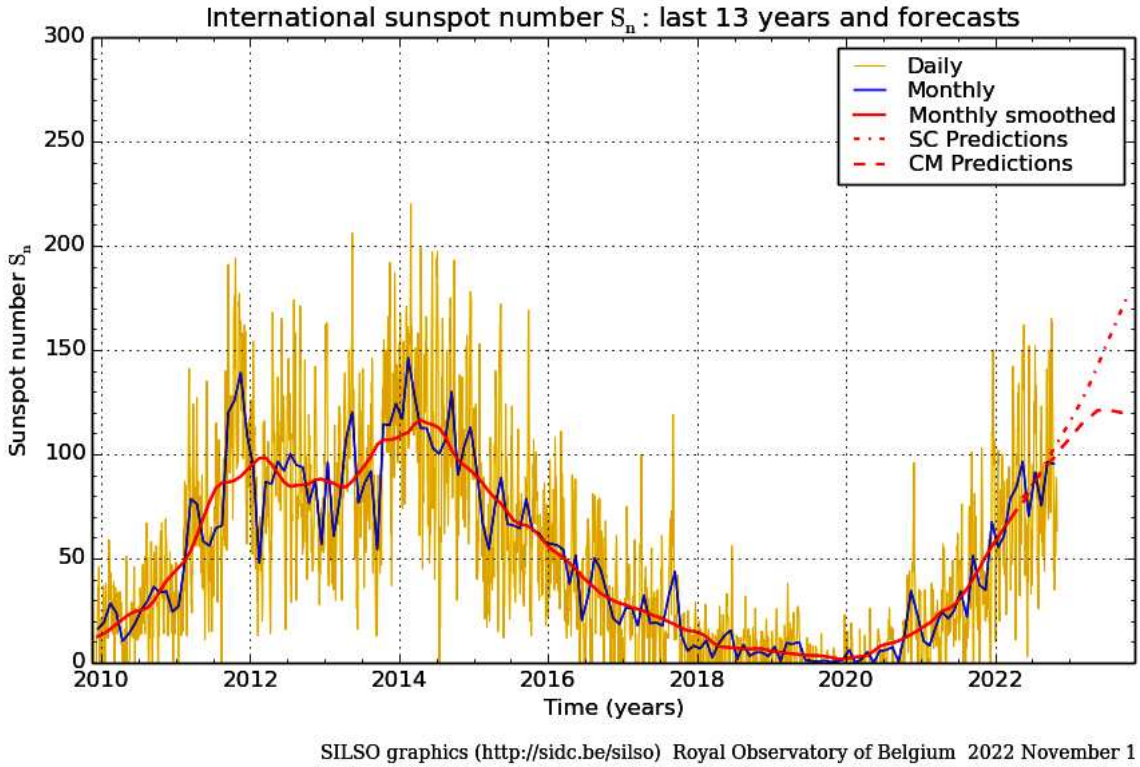
SUNSPOT BULLETIN

2022 n° 10

Provisional international and normalized hemispheric daily sunspot numbers for October 2022

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	111	75	36
2	131	107	24
3	165	128	37
4	165	127	38
5	161	125	36
6	162	124	38
7	163	135	28
8	154	139	15
9	128	125	3
10	121	121	0
11	105	101	4
12	103	87	16
13	86	73	13
14	83	60	23
15	44	41	3
16	75	47	28
17	72	33	39
18	51	12	39
19	49	0	49
20	35	0	35
21	59	0	59
22	69	0	69
23	51	0	51
24	53	13	40
25	77	29	48
26	82	31	51
27	86	40	46
28	89	48	41
29	87	65	22
30	77	67	10
31	63	53	10
Monthly mean	95.4	64.7	30.7
Cooperating stations	63	53	53



Predictions of the monthly smoothed Sunspot Number

using the last provisional value, calculated for April 2022: 73.1 (± 5%)

	SM	CM		SM	CM		SM	CM
2022 May	79	77	2022 Nov	108	102	2023 May	142	121
Jun	84	82	Dec	113	106	Jun	149	121
Jul	87	87	2023 Jan	118	109	Jul	156	121
Aug	92	92	Feb	123	113	Aug	163	121
Sep	98	95	Mar	129	116	Sep	170	120
Oct	103	98	Apr	135	118	Oct	177	120

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	76	37	-	137	////	4	3/0	14
1	111	33	-	148	////	11	1/0	3
2	131	43	-	154	////	25	3/1	16
3	165	42	-	155	////	225	4/0	27
4	165	54	-	152	////	9	0/0	23
5	161	76	-	161	////	7	0/0	19
6	162	71	-	156	////	3	0/0	20
7	163	75	-	160	////	15	1/0	15
8	154	65	-	157	////	10	0/0	13
9	128	55	-	161	////	10	0/0	25
10	121	58	-	163	////	13	2/0	10
11	105	41	-	150	////	4	2/0	7
12	103	28	-	141	////	3	0/0	7
13	86	21	-	130	////	2	0/0	6
14	83	7	-	121	////	0	1/0	14
15	44	9	-	115	////	1	0/0	21
16	75	8	-	119	////	7	0/0	16
17	72	9	-	126	////	1	0/0	4
18	51	6	-	114	////	15	0/0	8
19	49	4	-	113	////	2	0/0	4
20	35	9	-	116	////	0	0/0	8
21	59	10	-	109	////	0	0/0	4
22	69	13	-	105	////	0	0/0	26
23	51	4	-	108	////	0	0/0	21
24	53	10	-	115	////	3	0/0	8
25	77	16	-	116	////	1	0/0	3
26	82	17	-	122	////	2	0/0	5
27	86	21	-	130	////	0	0/0	11
28	89	30	-	129	////	0	0/0	19
29	87	27	-	134	////	0	0/0	26
30	77	25	-	131	////	0	0/0	14
31	63	28	-	128	////	0	0/0	14

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 OCTOBER 2022

DATE	UT	NUMBER OF GROUPS	NUMBER OF SPOTS	RELATIVE SUNSPOT NUMBERS TOTAL	NORTH	SOUTH	CENTRAL	PPSI 10-5 WM-2	QUAL	OBS
1	1020	7	35	105	78	27	23	43.2	2	OL
3	1030	8	101	181	142	39	35	44.3	3	OB
4	800	9	102	192	140	52	63	54.6	3	OB
5	1000	8	94	174	135	39	91	50.2	3	OB
6	755	9	125	215	178	37	122	91.6	3	FC
7	800	10	116	216	180	36	138	61.9	3	OB
8	810	9	117	207	195	12	141	110.8	3	OB
9	830	6	73	133	133	0	120	85.6	3	OB
10	755	6	69	129	129	0	44	67.1	2	FC
11	850	6	58	118	118	0	51	57.8	3	OL
12	850	8	44	124	112	12	14	53.6	3	OB
15	1545	3	10	40	40	0	13	24.0	2	SB
16	820	4	16	56	39	17	0	31.3	3	SB
18	808	5	14	64	11	53	17	7.9	3	GV
19	816	4	12	52	0	52	17	4.8	1	GV
20	1127	3	19	49	11	38	38	23.9	3	GV
21	1135	5	40	90	11	79	43	27.6	2	GV
22	1023	7	36	106	0	106	65	34.1	2	GV
24	940	3	19	49	13	36	16	33.9	2	JV
25	1115	6	25	85	36	49	32	35.4	2	JV
26	840	5	35	85	34	51	12	34.6	2	JV
27	920	6	41	101	46	55	0	25.3	3	FC
28	925	7	39	109	59	50	29	52.6	2	GV
29	846	6	37	97	69	28	26	38.4	2	GV
30	957	5	41	91	78	13	47	20.0	2	OL
31	1240	3	17	47	35	12	16	21.8	3	OL

The relative mean sunspot number is 112.1.

NORMALISED UCCLE OBSERVATIONAL SUNSPOT NUMBERS U'=K'U FOR OCTOBER 2022

K'= 1.032 (*)

1	108	7	223	13	***	19	54	25	88
2	***	8	214	14	***	20	51	26	88
3	187	9	137	15	41	21	93	27	104
4	198	10	133	16	58	22	109	28	112
5	180	11	122	17	***	23	***	29	100
6	222	12	128	18	66	24	51	30	94
								31	49

The normalised relative monthly mean sunspot number is 116.

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

The Sun has been observed 26 days on 31 possible.