



Center

Data Analysis Service supported by the FAGS

SUNSPOT BULLETIN

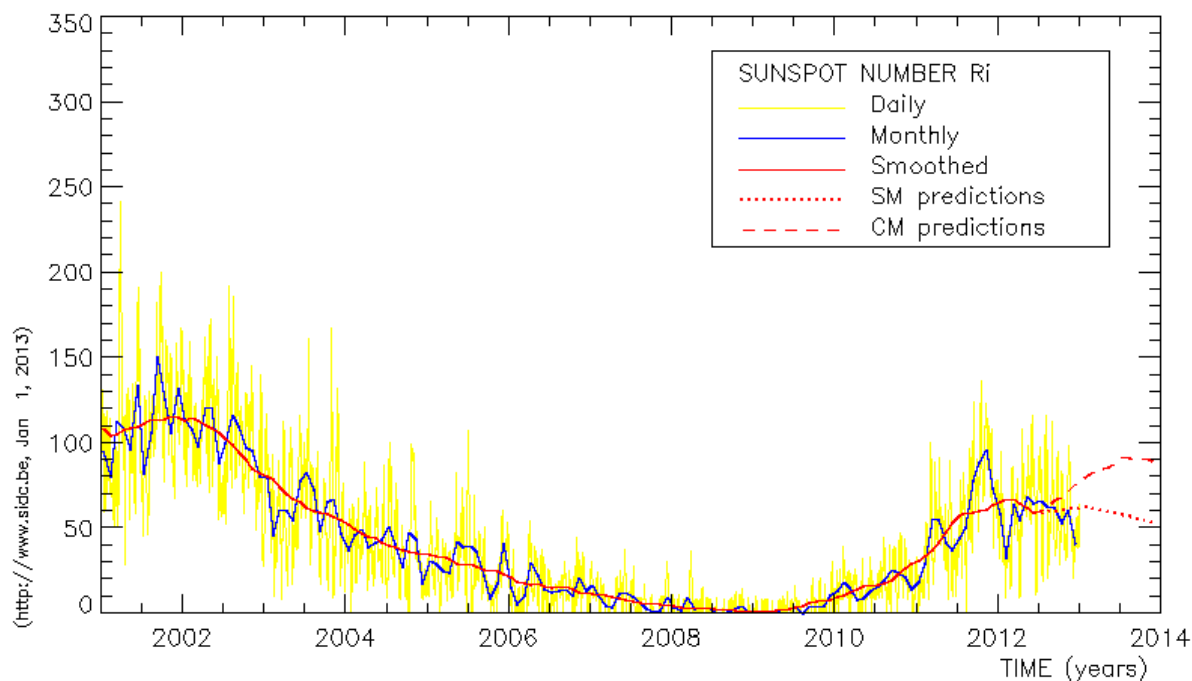
2012

n° 12

Provisional international and normalized hemispheric daily sunspot numbers for December 2012

computed at the *Royal Observatory of Belgium* using observations from an international network with the *Locarno Specola Solare* as reference station.

Date	R' ₁	R' _N	R' _S
1	38	38	0
2	34	34	0
3	32	32	0
4	39	39	0
5	43	35	8
6	20	20	0
7	22	22	0
8	36	36	0
9	30	30	0
10	31	31	0
11	34	34	0
12	48	48	0
13	49	49	0
14	43	43	0
15	45	25	20
16	47	26	21
17	53	29	24
18	43	17	26
19	39	15	24
20	40	14	26
21	43	15	28
22	56	21	35
23	57	22	35
24	41	19	22
25	41	32	9
26	41	32	9
27	39	30	9
28	38	28	10
29	40	30	10
30	40	30	10
31	64	47	17
Monthly mean	40.8	29.8	11.0
Cooperating stations	67	60	60



Predictions of the monthly smoothed Sunspot Number
using the last provisional value, calculated for June 2012: 58.9 ($\pm 5\%$)

		SM	CM			SM	CM			SM	CM
2012	Jul	60	60	2013	Jan	63	79	2013	Jul	59	92
	Aug	61	63		Feb	62	81		Aug	58	91
	Sep	60	66		Mar	62	83		Sep	57	91
	Oct	61	69		Apr	61	85		Oct	56	91
	Nov	62	72		May	60	86		Nov	55	90
	Dec	62	76		Jun	59	89		Dec	54	88

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, due to 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

Brussels, January 1, 2013 09:31 UT
Reproduction permitted if source mentioned.

Editor: Frédéric Clette
3, avenue Circulaire, B-1180 Bruxelles, Belgium
Fax: ..32/(0)2/374.98.22 Tel: ..32/(0)2/373.02.33 E-mail: arille@oma.be frederic.clette@oma.be

FTP anonymous : omaftp.oma.be, directory: dist/astro/sidcdata
Web: http://sidc.oma.be, "Sunspots" section in sidebar.

**The WDC-Sunspot team wishes you a happy and sunny year 2013,
with the prospect of reaching the cycle 24 maximum.**

S.I.D.C. SUMMARY OF THE URSIGRAMS

Date	R' _i	PPSI	600	2800	COS	SFI	XI	Ak	SEA
30	49	68	-	111	////	7	0/0	1	
1	38	58	-	102	////	2	0/0	8	
2	34	42	-	98	////	0	0/0	7	
3	32	50	-	97	////	0	0/0	3	
4	39	34	-	96	////	0	0/0	3	
5	43	29	-	96	////	0	0/0	2	
6	20	17	-	97	////	0	0/0	1	
7	22	11	-	97	////	0	0/0	0	
8	36	5	-	101	////	1	0/0	0	
9	30	14	-	104	////	0	0/0	7	
10	31	17	-	104	////	2	0/0	4	
11	34	28	-	104	////	1	0/0	2	
12	48	28	-	112	////	3	0/0	2	
13	49	33	-	117	////	1	0/0	2	
14	43	32	-	119	////	0	0/0	5	
15	45	22	-	122	////	0	0/0	11	
16	47	29	-	120	////	3	0/0	7	
17	53	40	-	115	////	3	0/0	14	
18	43	36	-	116	////	1	0/0	8	
19	39	41	-	113	////	1	0/0	5	
20	40	62	-	114	////	0	0/0	9	
21	43	55	-	115	////	5	0/0	5	
22	56	52	-	115	////	2	0/0	1	
23	57	48	-	114	////	4	0/0	2	
24	41	43	-	113	////	0	0/0	3	
25	41	39	-	113	////	3	0/0	4	
26	41	21	-	110	////	2	0/0	3	
27	39	12	-	107	////	3	0/0	0	
28	38	17	-	106	////	0	0/0	2	
29	40	13	-	104	////	1	0/0	2	
30	40	15	-	107	////	0	0/0	6	
31	64	31	-	114	////	0	0/0	1	

- R'_i** : 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** : From October 1992, Solar Flare Index from the S.I.D.C. (origin : Ursigrams – UGEOR, evaluation : $1 \times \text{Sn} + 10 \times "1" + 100 \times ">1"$).
- XI** : X-flares index from the Ursigrams (M-flares/X-flares) (origin : Ursigrams – UGEOR, UGEOI).
- Ak** : geomagnetic index from Wingst, Germany (origin : Ursigrams).
- SEA** : sudden enhancements of atmospherics from Uccle & Humain (Royal Observatory, Belgium).

Note that due to problems of interferences saturating our receivers, no SEA could be detected this month.

SOLAR PHYSICS DEPARTMENT

UCCLE DAILY PROVISIONAL RELATIVE SUNSPOT NUMBERS FOR DECEMBER 2012

DATE	UT	NUMBER		RELATIVE SUNSPOT NUMBERS			PPSI 10-5	QUAL	OBS	
		OF GROUPS	OF SPOTS	TOTAL	NORTH	SOUTH				CENTRAL
4	915	5	12	62	49	13	37	13.1	2	AE
8	1045	4	10	50	50	0	13	2.2	3	OB
11	900	2	16	36	36	0	36	42.9	3	SV
12	915	3	20	50	50	0	32	45.5	2	SV
13	1050	3	13	43	43	0	31	40.9	2	SV
15	1110	4	16	56	31	25	0	12.1	2	SV
19	1145	3	14	44	12	32	32	38.4	2	OB
24	1200	2	12	32	19	13	19	34.7	1	FC
26	1020	2	12	32	32	0	21	20.6	2	SV
29	1100	5	7	57	44	13	22	2.7	2	OB
30	1030	5	8	58	46	12	11	5.1	2	AE

The relative mean sunspot number is 47.3.

NORMALISED UCCLE OBSERVATIONAL SUNSPOT NUMBERS $U'=K'U$ FOR DECEMBER 2012

$$K' = 0.868 (*)$$

1	***	7	***	13	37	19	38	25	***
2	***	8	43	14	***	20	***	26	28
3	***	9	***	15	49	21	***	27	***
4	54	10	***	16	***	22	***	28	***
5	***	11	31	17	***	23	***	29	49
6	***	12	43	18	***	24	28	30	50
								31	***

The normalised relative monthly mean sunspot number is 41.

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

The Sun has been observed 11 days on 31 possible.

UCCLE OBSERVATIONAL MAJOR SUNSPOT GROUPS FOR DECEMBER 2012
E AND F BRUNNER'S TYPE GROUPS

NONE

PROBABLE RETURN OF MAJOR GROUPS FOR JANUARY 2013

NONE