



# Sunspot Index and Long-term Solar Observations

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## ***SUNSPOT BULLETIN***

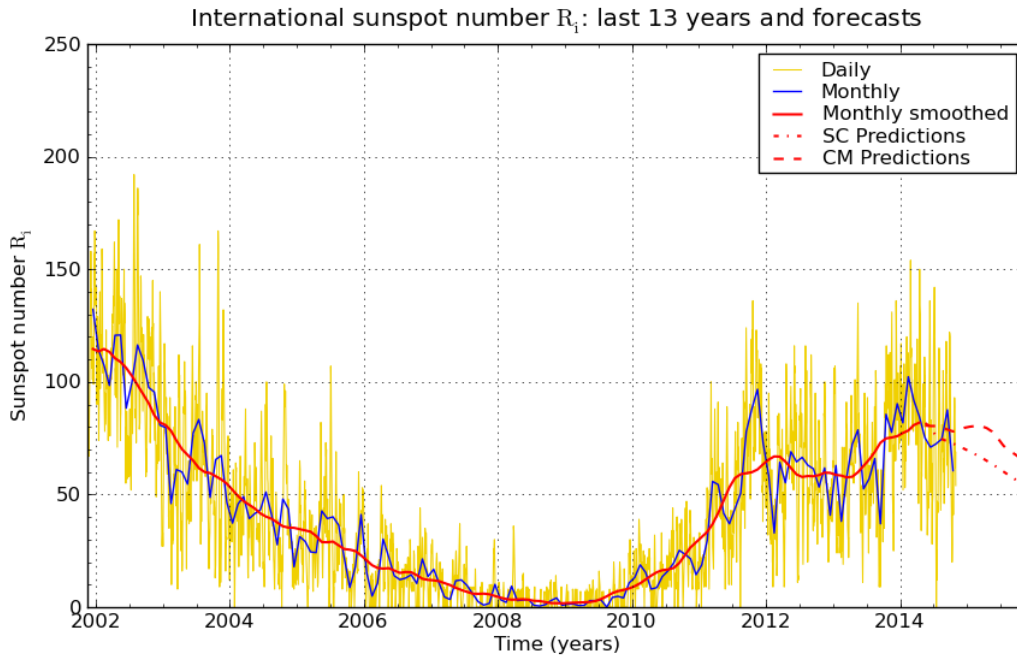
2014

n° 10

**Provisional international and normalized hemispheric daily sunspot numbers for October 2014**

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

Date	R' <sub>I</sub>	R' <sub>N</sub>	R' <sub>S</sub>
1	91	37	54
2	85	28	57
3	79	25	54
4	71	22	49
5	60	19	41
6	46	7	39
7	46	7	39
8	50	0	50
9	40	0	40
10	24	0	24
11	20	0	20
12	20	0	20
13	28	8	20
14	50	19	31
15	60	30	30
16	47	21	26
17	43	13	30
18	41	0	41
19	62	12	50
20	74	14	60
21	72	12	60
22	83	20	63
23	89	19	70
24	93	18	75
25	92	20	72
26	89	18	71
27	72	8	64
28	68	9	59
29	62	8	54
30	69	17	52
31	54	15	39
<b>Monthly mean</b>	<b>60.6</b>	<b>13.7</b>	<b>46.9</b>
<b>Cooperating stations</b>	<b>69</b>	<b>60</b>	<b>60</b>



SILSO graphics (<http://sidc.be>) Royal Observatory of Belgium 01/11/2014

**Predictions of the monthly smoothed Sunspot Number**  
using the last provisional value, calculated for April 2014: 81.9 ( $\pm 5\%$ )

	SM	CM		SM	CM		SM	CM
2014 May	82	81	2014 Nov	72	79	2015 May	64	78
Jun	80	80	Dec	70	80	Jun	62	75
Jul	76	80	2015 Jan	69	80	Jul	60	72
Aug	75	80	Feb	68	80	Aug	59	69
Sep	74	79	Mar	67	80	Sep	57	68
Oct	73	78	Apr	65	80	Oct	55	66

**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

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

Date	R' <sub>i</sub>	PPSI	600	2800	COS	SFI	XI	Ak	SEA
30	120	97	-	162	////	11	0/0	14	
1	91	69	-	155	////	14	0/0	12	
2	85	41	-	149	////	13	2/0	12	
3	79	44	-	137	////	3	0/0	5	
4	71	49	-	128	////	4	0/0	4	
5	60	43	-	128	////	1	0/0	6	
6	46	38	-	130	////	3	0/0	8	
7	46	17	-	125	////	2	0/0	6	
8	50	22	-	126	////	6	0/0	10	
9	40	31	-	119	////	41	3/0	16	
10	24	24	-	121	////	0	0/0	8	
11	20	25	-	112	////	0	0/0	8	
12	20	36	-	111	////	0	0/0	2	
13	28	42	-	113	////	0	0/0	10	
14	50	55	-	120	////	0	0/0	22	
15	60	58	-	126	////	///	///	12	
16	47	61	-	139	////	0	0/0	8	
17	43	55	-	146	////	///	///	8	
18	41	85	-	160	////	///	///	22	
19	62	138	-	173	////	110	0/1	10	
20	74	268	-	185	////	154	5/0	28	
21	72	445	-	199	////	39	0/0	17	
22	83	529	-	216	////	109	2/1	20	
23	89	482	-	227	////	29	1/0	10	
24	93	488	-	218	////	110	1/1	11	
25	92	445	-	219	////	117	0/1	11	
26	89	323	-	217	////	109	4/1	12	
27	72	206	-	188	////	311	5/1	15	
28	68	141	-	167	////	45	3/0	12	
29	62	60	-	150	////	18	5/0	8	
30	69	25	-	140	////	24	3/0	6	
31	54	14	-	121	////	11	0/0	6	

- R'<sub>i</sub>** : provisional international sunspot numbers from the S.I.D.C.
- PPSI** : prompt photometric sunspot index from the S.I.D.C. in  $10^{-5} \text{ w/m}^2$  : 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 OCTOBER 2014

DATE	UT	NUMBER		RELATIVE SUNSPOT NUMBERS			PPSI 10-5 WM-2	QUAL	OBS	
		OF GROUPS	OF SPOTS	TOTAL	NORTH	SOUTH				CENTRAL
1	842	8	61	141	88	53	73	41.9	2	AM
2	1150	9	61	151	86	65	85	25.0	2	AM
3	1040	8	45	125	42	83	72	21.7	2	AM
4	740	7	28	98	37	61	65	31.8	1	AM
6	1320	4	25	65	0	65	24	33.3	2	OL
7	805	5	14	64	12	52	28	8.5	3	OL
9	1230	3	18	48	0	48	13	25.4	3	OL
10	800	2	9	29	0	29	0	24.7	3	OL
11	810	2	7	27	0	27	0	23.4	1	OL
12	755	2	6	26	0	26	14	33.1	3	OL
15	800	8	17	97	51	46	25	50.3	2	AE
17	1045	5	11	61	22	39	22	49.3	2	AE
18	845	4	15	55	0	55	23	37.5	1	AE
19	830	4	24	64	14	50	25	59.8	2	AE
20	1230	4	66	106	18	88	18	53.0	2	OB
26	1100	6	65	125	23	102	23	71.7	2	OB
27	855	5	51	101	11	90	22	57.1	3	OL
28	915	5	53	103	14	89	42	44.9	3	OL
30	1440	8	20	100	27	73	51	16.5	2	OL
31	910	5	5	55	22	33	22	5.2	2	OL

The relative mean sunspot number is 82.1.

NORMALISED UCCLE OBSERVATIONAL SUNSPOT NUMBERS  $U'=K'U$  FOR OCTOBER 2014

$$K' = 0.831 (*)$$

1	117	7	53	13	***	19	53	25	***
2	125	8	***	14	***	20	88	26	104
3	104	9	40	15	81	21	***	27	84
4	81	10	24	16	***	22	***	28	86
5	***	11	22	17	51	23	***	29	***
6	54	12	22	18	46	24	***	30	83
								31	46

The normalised relative monthly mean sunspot number is 68.

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

The Sun has been observed 20 days on 31 possible.