



# Sunspot Index and Long-term Solar Observations

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## ***SUNSPOT BULLETIN***

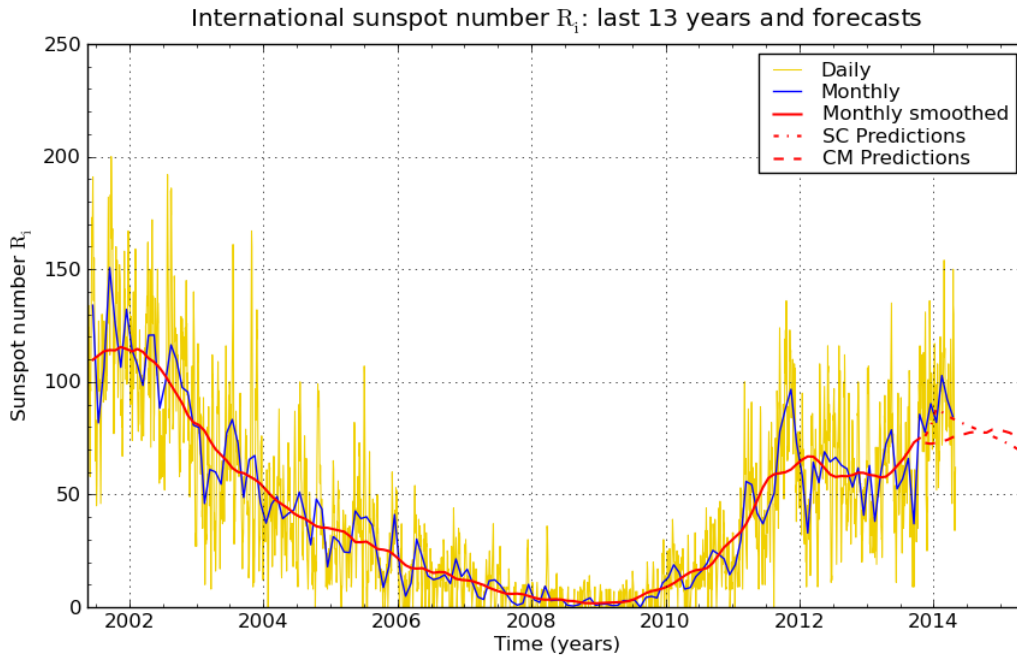
2014

n° 4

### Provisional international and normalized hemispheric daily sunspot numbers for April 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	72	25	47
2	86	37	49
3	100	50	50
4	119	63	56
5	102	49	53
6	91	45	46
7	86	53	33
8	88	55	33
9	71	52	19
10	49	39	10
11	46	38	8
12	55	38	17
13	60	31	29
14	79	32	47
15	109	43	66
16	141	55	86
17	150	63	87
18	134	57	77
19	134	53	81
20	130	39	91
21	113	29	84
22	93	19	74
23	64	10	54
24	54	8	46
25	43	9	34
26	34	9	25
27	58	28	30
28	60	26	34
29	58	18	40
30	62	18	44
<b>Monthly mean</b>	<b>84.7</b>	<b>36.4</b>	<b>48.3</b>
<b>Cooperating stations</b>	<b>69</b>	<b>60</b>	<b>60</b>



SILSO graphics (<http://sidc.be>) Royal Observatory of Belgium 01/05/2014

**Predictions of the monthly smoothed Sunspot Number**  
using the last provisional value, calculated for October 2013: 75.0 ( $\pm 5\%$ )

		SM	CM			SM	CM			SM	CM
2013	Nov	76	73	2014	May	82	76	2014	Nov	76	79
	Dec	80	73		Jun	81	77		Dec	75	79
2014	Jan	88	73		Jul	80	78	2015	Jan	74	78
	Feb	87	74		Aug	79	78		Feb	72	78
	Mar	85	74		Sep	78	78		Mar	71	76
	Apr	84	76		Oct	77	78		Apr	70	75

**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
31	84	45	-	152	////	17	1/0	6	
1	72	65	-	153	////	3	0/0	5	
2	86	98	-	155	////	112	1/0	5	
3	100	100	-	153	////	5	0/0	6	
4	119	145	-	157	////	112	0/0	6	
5	102	105	-	142	////	0	0/0	12	
6	91	58	-	141	////	1	0/0	3	
7	86	68	-	140	////	12	0/0	11	
8	88	55	-	132	////	0	0/0	4	
9	71	38	-	131	////	1	0/0	5	
10	49	30	-	137	////	1	0/0	2	
11	46	37	-	138	////	0	0/0	11	
12	55	52	-	136	////	0	0/0	18	
13	60	63	-	137	////	2	0/0	18	
14	79	80	-	150	////	15	0/0	7	
15	109	168	-	162	////	21	0/0	4	
16	141	180	-	184	////	39	1/0	4	
17	150	215	-	179	////	5	0/0	12	
18	134	180	-	172	////	4	1/0	8	
19	134	69	-	169	////	4	0/0	14	
20	130	84	-	163	////	15	0/0	23	
21	113	79	-	159	////	9	0/0	14	
22	93	60	-	145	////	16	0/0	4	
23	64	52	-	136	////	1	0/0	8	
24	54	37	-	130	////	0	0/0	17	
25	43	30	-	125	////	1	0/0	10	
26	34	12	-	121	////	0	0/0	6	
27	58	20	-	118	////	0	0/0	4	
28	60	38	-	121	////	10	0/0	6	
29	58	47	-	120	////	2	0/0	6	
30	62	61	-	124	////	10	0/0	16	

**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 :  $1 \times \text{Sn} + 10 \times \text{"1"} + 100 \times \text{">1"}$ ).  
**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 APRIL 2014

DATE	UT	NUMBER		RELATIVE SUNSPOT NUMBERS			PPSI 10-5	QUAL	OBS	
		OF GROUPS	OF SPOTS	TOTAL	NORTH	SOUTH				CENTRAL
1	810	6	39	99	33	66	43	42.9	2	OL
2	750	7	45	115	48	67	38	56.5	2	OL
3	745	7	41	111	54	57	32	70.0	2	OL
5	1040	6	69	129	48	81	100	72.7	3	OL
6	725	7	55	125	53	72	105	44.8	3	OL
7	1115	7	22	92	65	27	40	75.9	2	AE
8	945	7	26	96	64	32	28	70.5	2	AE
9	745	7	12	82	59	23	22	47.3	1	AE
10	800	4	10	50	37	13	0	32.3	2	AE
11	900	4	10	50	39	11	0	36.5	2	AE
12	925	4	19	59	45	14	17	48.3	2	LL
13	1200	4	13	53	27	26	13	62.2	1	AE
14	900	5	39	89	32	57	67	46.9	2	OB
15	900	6	53	113	33	80	75	70.0	2	OB
16	800	8	63	143	44	99	119	89.0	2	OB
17	800	9	62	152	62	90	101	172.0	2	OB
18	815	8	62	142	63	79	22	92.6	2	OB
19	800	7	37	107	40	67	35	58.2	1	OB
20	1015	11	50	160	51	109	21	38.8	2	OB
21	705	9	78	168	37	131	43	62.0	2	OL
22	830	9	39	129	26	103	53	31.7	2	AE
23	800	5	23	73	13	60	13	18.7	3	OL
24	1200	5	23	73	11	62	32	19.0	2	OL
25	810	4	10	50	11	39	27	4.5	2	OL
26	705	4	9	49	11	38	16	3.2	3	OL
27	710	6	19	79	37	42	19	8.1	3	OL
28	845	5	21	71	28	43	0	38.0	2	AE
29	1345	5	20	70	23	47	18	43.5	2	AE
30	755	5	26	76	23	53	26	41.5	3	OL

The relative mean sunspot number is 96.7.

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

$$K' = 0.784 (*)$$

1	78	7	72	13	42	19	84	25	39
2	90	8	75	14	70	20	125	26	38
3	87	9	64	15	89	21	132	27	62
4	***	10	39	16	112	22	101	28	56
5	101	11	39	17	119	23	57	29	55
6	98	12	46	18	111	24	57	30	60

The normalised relative monthly mean sunspot number is 76.

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

The Sun has been observed 29 days on 30 possible.