

Center

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SUNSPOT BULLETIN

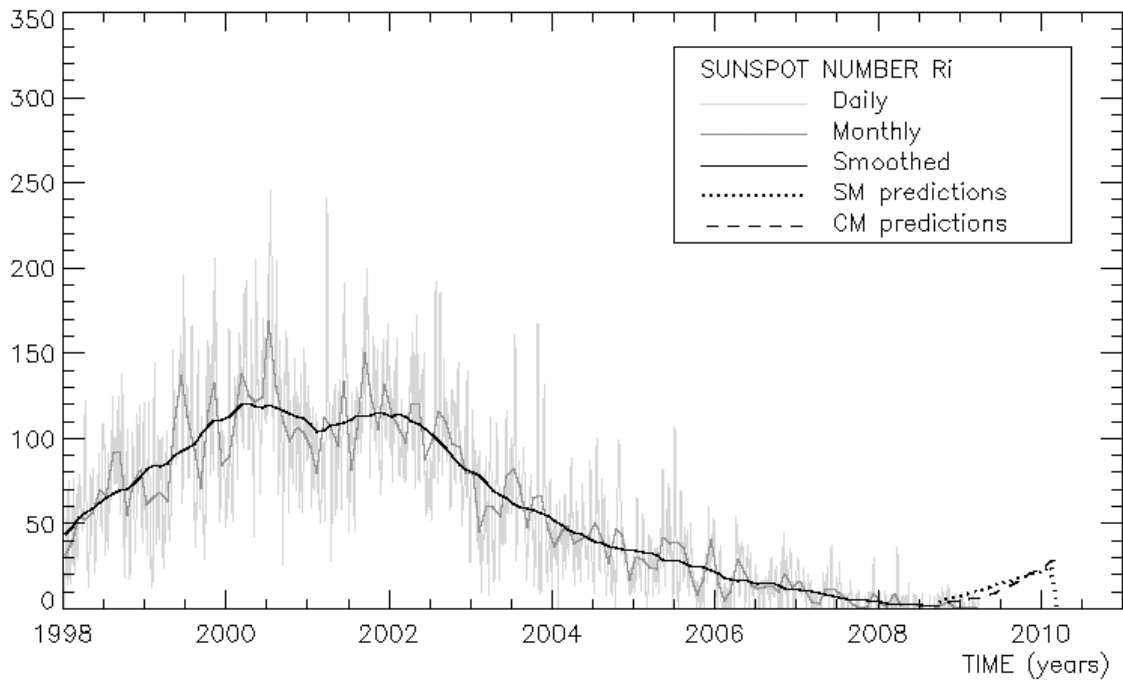
2009

n° 4

Provisional international and normalized hemispheric daily sunspot numbers for April 2009

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

Date	R' _I	R' _N	R' _S
1	0	0	0
2	0	0	0
3	0	0	0
4	0	0	0
5	0	0	0
6	7	7	0
7	0	0	0
8	0	0	0
9	0	0	0
10	0	0	0
11	0	0	0
12	0	0	0
13	0	0	0
14	0	0	0
15	0	0	0
16	0	0	0
17	0	0	0
18	0	0	0
19	0	0	0
20	0	0	0
21	7	7	0
22	7	7	0
23	0	0	0
24	0	0	0
25	0	0	0
26	0	0	0
27	0	0	0
28	0	0	0
29	8	0	8
30	8	0	8
Monthly mean	1.2	0.7	0.5
Cooperating stations	62	55	55



Predictions of the monthly smoothed Sunspot Number
using the last provisional value, calculated for October 2008 : $1.9 (\pm 5\%)$

		SM	CM			SM	CM			SM	CM
2008	Nov	2	2	2009	May	10	8	2009	Nov	17	19
	Dec	2	3		Jun	11	9		Dec	18	21
2009	Jan	2	4		Jul	12	10	2010	Jan	19	24
	Feb	7	5		Aug	13	12		Feb	21	26
	Mar	8	6		Sep	14	14		Mar	22	29
	Apr	9	7		Oct	16	17		Apr	24	32

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 idea 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' _i	PPSI	600	2800	COS	SFI	XI	Ak	SEA
31	0	0	-	71	////	0	0/0	4	
1	0	0	-	71	////	0	0/0	4	
2	0	0	-	71	////	0	0/0	3	
3	0	0	-	70	////	0	0/0	3	
4	0	///	-	70	////	0	0/0	2	
5	0	0	-	70	////	0	0/0	5	
6	7	0	-	69	////	0	0/0	4	
7	0	///	-	70	////	0	0/0	3	
8	0	///	-	70	////	0	0/0	10	
9	0	0	-	70	////	0	0/0	12	
10	0	0	-	69	////	0	0/0	12	
11	0	0	-	69	////	0	0/0	11	
12	0	///	-	69	////	0	0/0	8	
13	0	0	-	68	////	0	0/0	4	
14	0	0	-	69	////	0	0/0	3	
15	0	0	-	69	////	0	0/0	6	
16	0	///	-	70	////	0	0/0	8	
17	0	///	-	70	////	0	0/0	8	
18	0	///	-	70	////	0	0/0	8	
19	0	0	-	70	////	0	0/0	6	
20	0	0	-	70	////	0	0/0	5	
21	7	1	-	71	////	0	0/0	6	
22	7	0	-	71	////	0	0/0	5	
23	0	0	-	71	////	0	0/0	3	
24	0	0	-	70	////	0	0/0	8	
25	0	0	-	69	////	0	0/0	6	
26	0	0	-	69	////	0	0/0	3	
27	0	0	-	68	////	0	0/0	4	
28	0	0	-	69	////	0	0/0	3	
29	8	2	-	70	////	0	0/0	4	
30	8	1	-	69	////	0	0/0	3	

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 : $1 \times \text{Sn} + 10 \times \text{"1"} + 100 \times \text{">1"}$).
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 2009

DATE	UT	NUMBER		RELATIVE SUNSPOT NUMBERS			PPSI 10-5 WM-2	QUAL	OBS
		OF GROUPS	OF SPOTS	TOTAL	NORTH	SOUTH			
1	715	0	0	0	0	0	0.0	3	AE
2	740	0	0	0	0	0	0.0	3	AE
3	730	0	0	0	0	0	0.0	3	AE
5	815	0	0	0	0	0	0.0	4	AE
6	1100	0	0	0	0	0	0.0	3	SV
9	1440	0	0	0	0	0	0.0	3	SV
10	805	0	0	0	0	0	0.0	2	SV
11	820	0	0	0	0	0	0.0	2	SV
13	950	0	0	0	0	0	0.0	2	OB
14	820	0	0	0	0	0	0.0	1	OB
15	900	0	0	0	0	0	0.0	2	OB
19	800	0	0	0	0	0	0.0	2	OB
20	750	0	0	0	0	0	0.0	4	OL
21	805	1	2	12	12	0	0.5	3	OL
22	750	1	1	11	11	0	0.1	2	OL
23	715	0	0	0	0	0	0.0	3	OL
24	715	0	0	0	0	0	0.0	3	OL
25	705	0	0	0	0	0	0.0	4	OL
26	1150	0	0	0	0	0	0.0	2	OL
27	730	0	0	0	0	0	0.0	2	AE
28	1315	0	0	0	0	0	0.0	2	AE
29	730	0	0	0	0	0	0.0	2	AE
30	730	1	1	11	0	11	0.1	3	AE

The relative mean sunspot number is 1.5.

NORMALISED UCCLE OBSERVATIONAL SUNSPOT NUMBERS $U'=K'U$ FOR APRIL 2009

$K' = 0.784$ (*)

1	0	7	***	13	0	19	0	25	0
2	0	8	***	14	0	20	0	26	0
3	0	9	0	15	0	21	9	27	0
4	***	10	0	16	***	22	9	28	0
5	0	11	0	17	***	23	0	29	0
6	0	12	***	18	***	24	0	30	9

The normalised relative monthly mean sunspot number is 1.

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

The Sun has been observed 23 days on 30 possible.

UCCLE OBSERVATIONAL MAJOR SUNSPOT GROUPS FOR APRIL 2009
E AND F BRUNNER'S TYPE GROUPS

NONE

PROBABLE RETURN OF MAJOR GROUPS FOR MAY 2009
NONE

MONTHLY SUMMARY OF SOLAR AND GEOMAGNETIC ACTIVITY

I. Solar Activity

Solar activity was again low this month.

Small sunspots were observed during three periods: Apr 6, 21-22, 29-30. Only on Apr 30 and May 01, GOES10 measured several, but small and confined A-flares and one B-flare. The source was probably the low latitude sunspot at that moment present on the west side of the solar disk.

Only two coronal holes (CH) of some importance for the geomagnetic conditions on Earth transited the solar disk. A first equatorial CH reached the central meridian on Apr 05. The second CH was small and located in the southern hemisphere. It reached the central meridian on Apr 12.

II. Geomagnetic Activity

The overall geomagnetic conditions were quiet this month. Only during one period of 3 hours, the Kp index reached the value of 4.

Solar wind data from ACE had a pronounced CH profile on Apr 08-13 and Apr 16-20. The solar wind speed increases and decreases relatively smoothly over a period of several days. The strength of the interplanetary magnetic field (IMF) increases with the arrival of the co-rotating interaction region which is the compressed plasma between the slow and fast solar wind. The increase of the IMF strength and solar wind density is seen typically half a day before the arrival of the actual fast stream emanating from the coronal hole. As soon as we are in the fast solar wind regime, the density and IMF decrease.

During both periods, the solar wind speed increased to 550 km/s, which is not particularly high. The difference between the two CHs is that the solar wind associated with the first CH carried a slightly more negative Bz component of the IMF inducing once a Kp of 4 on Apr 9. The total IMF associated with the second CH was stronger, but the Bz was predominantly positive. This resulted in a short and weak disturbed period with Kp maximum 3 on Apr 16 and 18.