

## Center

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**SUNSPOT BULLETIN**

2008

n°11

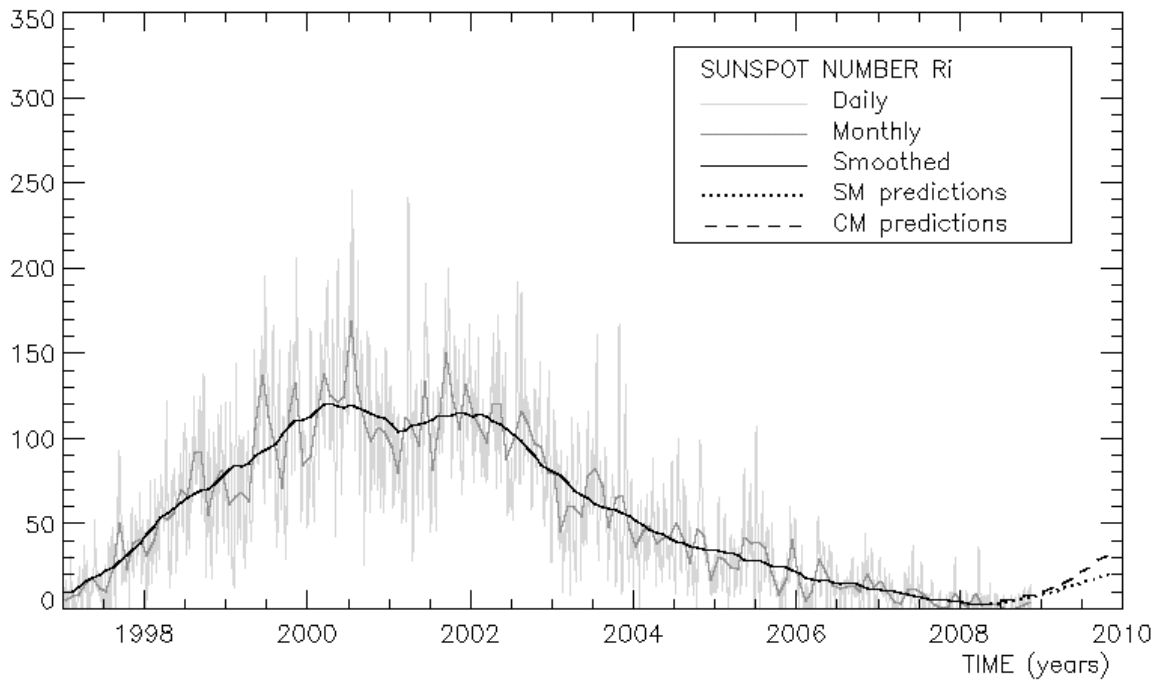
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**Provisional international and normalized hemispheric daily sunspot numbers for November 2008**


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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	9	9	0
2	11	11	0
3	11	11	0
4	10	10	0
5	8	8	0
6	7	7	0
7	0	0	0
8	0	0	0
9	0	0	0
10	0	0	0
11	12	12	0
12	14	14	0
13	9	9	0
14	8	8	0
15	8	8	0
16	8	8	0
17	7	7	0
18	0	0	0
19	0	0	0
20	0	0	0
21	0	0	0
22	0	0	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	0	0	0
30	0	0	0
<b>Monthly mean</b>	<b>4.1</b>	<b>4.1</b>	<b>0.0</b>
<b>Cooperating stations</b>	<b>67</b>	<b>59</b>	<b>59</b>



**Predictions of the monthly smoothed Sunspot Number**  
 using the last provisional value, calculated for May 2008 :  $3.5 (\pm 5\%)$

		SM	CM			SM	CM			SM	CM
2008	Jun	3	4	2008	Dec	6	10	2009	Jun	12	21
	Jul	3	5	2009	Jan	7	11		Jul	13	23
	Aug	2	6		Feb	8	12		Aug	14	26
	Sep	4	7		Mar	9	14		Sep	15	29
	Oct	4	8		Apr	10	16		Oct	17	31
	Nov	5	9		May	11	18		Nov	18	34

**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' <sub>i</sub>	PPSI	600	2800	COS	SFI	XI	Ak	SEA
31	9	16	-	68	////	0	0/0	(//)	
1	9	4	-	67	////	0	0/0	3	
2	11	8	-	69	////	2	0/0	3	
3	11	10	-	70	////	1	0/0	1	
4	10	4	-	68	////	1	0/0	1	
5	8	1	-	68	////	0	0/0	0	
6	7	0	-	69	////	0	0/0	1	
7	0	///	-	68	////	0	0/0	13	
8	0	///	-	68	////	0	0/0	15	
9	0	///	-	68	////	0	0/0	13	
10	0	3	-	69	////	0	0/0	4	
11	12	10	-	71	////	0	0/0	2	
12	14	12	-	71	////	0	0/0	3	
13	9	10	-	69	////	0	0/0	1	
14	8	5	-	68	////	0	0/0	1	
15	8	3	-	68	////	0	0/0	4	
16	8	1	-	68	////	0	0/0	10	
17	7	1	-	68	////	0	0/0	3	
18	0	0	-	70	////	0	0/0	1	
19	0	1	-	69	////	0	0/0	1	
20	0	0	-	70	////	0	0/0	2	
21	0	0	-	69	////	0	0/0	0	
22	0	///	-	69	////	0	0/0	0	
23	0	///	-	69	////	0	0/0	2	
24	0	///	-	68	////	0	0/0	2	
25	0	///	-	68	////	0	0/0	16	
26	0	///	-	68	////	0	0/0	11	
27	0	///	-	68	////	0	0/0	12	
28	0	///	-	67	////	0	0/0	7	
29	0	0	-	68	////	0	0/0	4	
30	0	///	-	68	////	0	0/0	2	

**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 NOVEMBER 2008

DATE	UT	NUMBER		RELATIVE SUNSPOT NUMBERS			PPSI 10-5	QUAL	OBS	
		OF GROUPS	OF SPOTS	TOTAL	NORTH	SOUTH				CENTRAL
4	1000	1	5	15	15	0	0	0.8	3	AE
6	845	1	1	11	11	0	0	0.0	3	AE
7	845	0	0	0	0	0	0	0.0	2	AE
8	1000	0	0	0	0	0	0	0.0	3	AE
11	918	1	5	15	15	0	15	1.3	2	SV
12	1300	1	12	22	22	0	0	4.8	2	SV
13	1030	1	4	14	14	0	0	4.2	2	SV
19	950	0	0	0	0	0	0	0.0	2	OL
22	1122	0	0	0	0	0	0	0.0	2	OL
24	950	0	0	0	0	0	0	0.0	2	OB
25	840	0	0	0	0	0	0	0.0	2	OB
26	950	0	0	0	0	0	0	0.0	2	OB

The relative mean sunspot number is 6.4.

NORMALISED UCCLE OBSERVATIONAL SUNSPOT NUMBERS  $U'=K'U$  FOR NOVEMBER 2008

$K' = 0.876$  (\*)

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

The normalised relative monthly mean sunspot number is 6.

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

The Sun has been observed 12 days on 30 possible.

UCCLE OBSERVATIONAL MAJOR SUNSPOT GROUPS FOR NOVEMBER 2008  
E AND F BRUNNER'S TYPE GROUPS

NONE

PROBABLE RETURN OF MAJOR GROUPS FOR DECEMBER 2008  
NONE

## MONTHLY SUMMARY OF SOLAR AND GEOMAGNETIC ACTIVITY

### **I. Solar Activity**

*Some flaring activity caused by new cycle sunspot groups was measured during the first part of November, but for the rest of the month solar activity remained low.*

At the end of the previous month (Oct 30), a new cycle group appeared. It was labeled Catania 90 (NOAA AR 1007). This group made a promising start. From Nov 01 to Nov 04, it caused several small flares, two of which reaching the C-level. A long-duration B-flare on Nov 02 spanned several hours. The flare was accompanied by coronal dimmings, a post-eruption arcade and a partial halo CME with angular width around 130 degrees. This CME was weak and slow with a speed around 150 km/s. The CMEs associated with the other flares were weak and/or narrow. The group rotated over the west limb on Nov 07.

On Nov 10, a new high latitude sunspot group with magnetic configuration typical for cycle 24 popped up near the central meridian. NOAA AR 1008 produced some B and A flares from Nov 10 until Nov 13.

Three coronal holes (CH) transited the solar disk. We mention the date when the hole reached the solar central meridian (CM).

1. A weak and fragmented low-latitude coronal hole reached the CM on Nov 04.
2. Around Nov 10-11, a faint CH was present, but almost not visible in EIT.
3. A recurrent CH reached the CM on Nov 21. There was an EIT CCD bake-out at that moment. A hole is present at this position since June 2007!

### **II. Geomagnetic Activity**

*Three periods with geomagnetic disturbances caused by the coronal holes were noticed. The overall geomagnetic activity stayed low.*

On Nov 07 the Earth passed through a co-rotating interaction region (CIR) between slow and fast solar wind flows. The fast stream, originating from the weak low-latitude CH arrived on Nov 08. K index values up to 3 (Dourbes) and 4 (NOAA, IZMIRAN) were reported on Nov 07-09.

On Nov 14, the signature of a CIR was visible in ACE data. The influence was limited since the Bz component of the interplanetary magnetic field was small. On Nov 15, the Earth was under the influence of another CIR announcing the fast solar wind emanating from a coronal hole. This CIR was dense and caused more disturbances compared with the previous one. But the geomagnetic influence stayed beneath storm levels. The local K-index of Niemegeh reached a few times the value of 3 on Nov 15 and 16, while the planetary index reached two times 4 on Nov 16.

Finally, on Nov 25, an abrupt change in the solar wind data was visible in ACE data. The source of these changes was the third CH in the above list. The imbedded magnetic field was at some moment more than 20 nT. The Bz component was negative during a limited time period resulting in only unsettled geomagnetic conditions from Nov 25 to Nov 27.

### **III. Picture of the Month**



This is the logo of the European Space Weather Week symbolising the grip of the Sun on the Earth. Scientist, companies and users found each other during scientific oriented sessions and workshops from Nov 17-21 in Brussels. Space Situational Awareness, GNSS, offshore drilling, modelling, data-tools-services and solar weather were all on the menu of this year.

See the press release at [www.sidc.be/esww5](http://www.sidc.be/esww5).