



## Center

*Data Analysis Service supported by the FAGS*

**SUNSPOT BULLETIN**

2009

n° 9

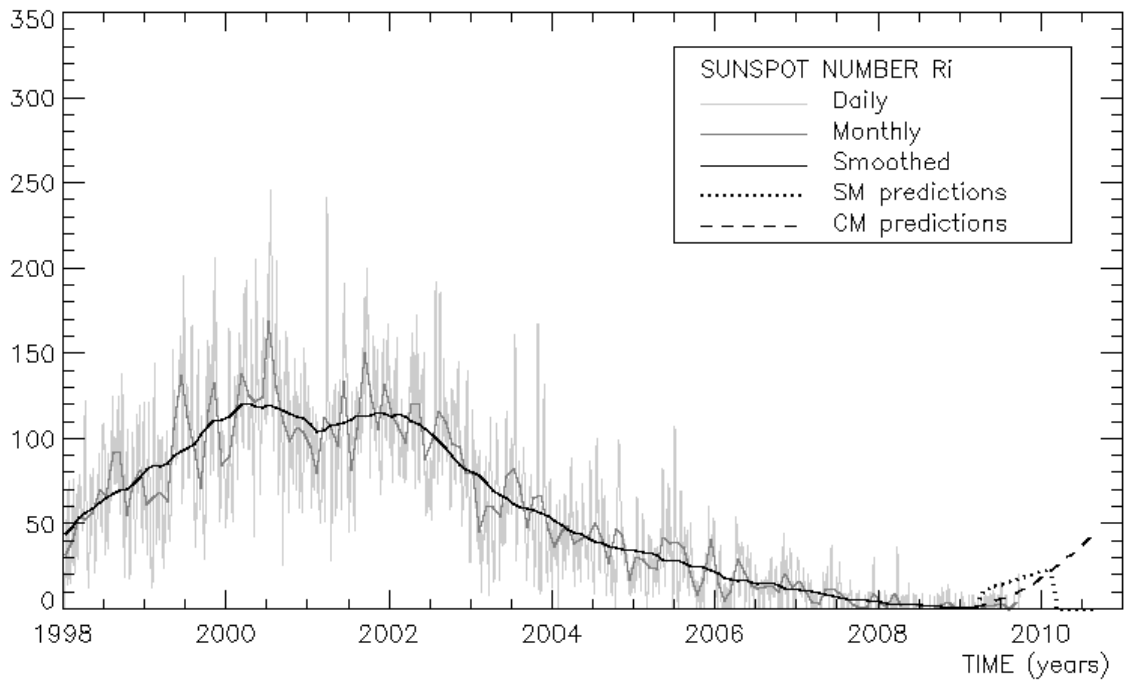
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**Provisional international and normalized hemispheric daily sunspot numbers for September 2009**


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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	8	8	0
2	0	0	0
3	0	0	0
4	0	0	0
5	0	0	0
6	0	0	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	8	0	8
22	12	4	8
23	20	12	8
24	20	12	8
25	17	9	8
26	9	9	0
27	7	7	0
28	10	10	0
29	9	9	0
30	7	7	0
<b>Monthly mean</b>	<b>4.2</b>	<b>2.9</b>	<b>1.3</b>
<b>Cooperating stations</b>	<b>64</b>	<b>57</b>	<b>57</b>



**Predictions of the monthly smoothed Sunspot Number**  
 using the last provisional value, calculated for March 2009 : 2. ( $\pm 5\%$ )

	SM	CM		SM	CM		SM	CM
2009 Apr	2	3	2009 Oct	15	12	2010 Apr	23	30
May	2	4	Nov	16	14	May	25	32
Jun	2	5	Dec	18	17	Jun	27	35
Jul	12	7	2010 Jan	19	20	Jul	28	39
Aug	13	8	Feb	20	23	Aug	30	43
Sep	14	10	Mar	22	26	Sep	32	47

**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	0	///	-	///	////	///	///	6	
1	8	3	-	69	////	///	///	3	
2	0	///	-	68	////	///	///	4	
3	0	///	-	69	////	0	0/0	7	
4	0	///	-	68	////	0	0/0	8	
5	0	///	-	69	////	0	0/0	3	
6	0	///	-	69	////	0	0/0	4	
7	0	///	-	69	////	0	0/0	2	
8	0	///	-	69	////	0	0/0	3	
9	0	0	-	69	////	0	0/0	3	
10	0	///	-	69	////	0	0/0	3	
11	0	///	-	69	////	0	0/0	5	
12	0	///	-	69	////	0	0/0	2	
13	0	///	-	69	////	0	0/0	6	
14	0	0	-	69	////	0	0/0	8	
15	0	0	-	69	////	0	0/0	8	
16	0	///	-	69	////	0	0/0	4	
17	0	///	-	69	////	0	0/0	8	
18	0	1	-	69	////	0	0/0	3	
19	0	///	-	71	////	0	0/0	2	
20	0	0	-	71	////	0	0/0	7	
21	8	1	-	72	////	0	0/0	8	
22	12	4	-	///	////	0	0/0	3	
23	20	18	-	///	////	0	0/0	0	
24	20	20	-	///	////	0	0/0	2	
25	17	15	-	///	////	0	0/0	2	
26	9	10	-	///	////	0	0/0	5	
27	7	2	-	///	////	0	0/0	8	
28	10	8	-	///	////	0	0/0	9	
29	9	5	-	///	////	0	0/0	2	
30	7	1	-	///	////	0	0/0	7	

- 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, UGEOD), 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, UGEOD).
- 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 SEPTEMBER 2009

DATE	UT	NUMBER		RELATIVE SUNSPOT NUMBERS			PPSI 10-5 WM-2	QUAL	OBS	
		OF GROUPS	OF SPOTS	TOTAL	NORTH	SOUTH				CENTRAL
2	1045	0	0	0	0	0	0	0.0	2	SV
3	1125	0	0	0	0	0	0	0.0	3	SV
4	1105	0	0	0	0	0	0	0.0	3	SV
5	1155	0	0	0	0	0	0	0.0	3	SV
7	1150	0	0	0	0	0	0	0.0	3	OL
8	1150	0	0	0	0	0	0	0.0	3	OL
9	715	0	0	0	0	0	0	0.0	3	OL
10	945	0	0	0	0	0	0	0.0	1	OL
11	820	0	0	0	0	0	0	0.0	3	OL
12	930	0	0	0	0	0	0	0.0	3	OL
14	1418	0	0	0	0	0	0	0.0	3	OL
15	1100	1	1	11	0	11	11	0.4	3	AE
17	800	0	0	0	0	0	0	0.0	3	AE
18	800	0	0	0	0	0	0	0.0	3	AE
19	735	0	0	0	0	0	0	0.0	4	FC
20	755	0	0	0	0	0	0	0.0	4	FC
21	725	1	1	11	0	11	0	0.0	2	OB
22	935	2	4	24	13	11	0	0.4	3	OB
24	1200	2	9	29	18	11	18	21.9	3	OB
25	820	2	5	25	14	11	14	22.5	3	OB
26	830	1	2	12	12	0	12	1.4	2	OB
27	820	1	1	11	11	0	11	0.3	2	OB
28	845	1	8	18	18	0	0	1.0	2	AE
29	1115	1	4	14	14	0	0	0.7	3	SV
30	1120	1	1	11	11	0	0	0.1	1	SV

The relative mean sunspot number is 6.6.

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

$K'=0.844$  (\*)

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

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 25 days on 30 possible.

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

NONE

PROBABLE RETURN OF MAJOR GROUPS FOR OCTOBER 2009

NONE

# MONTHLY SUMMARY OF SOLAR AND GEOMAGNETIC ACTIVITY

## **I. Solar Activity**

*There was some minor solar activity, but it all remained very modest.*

On Aug 31, NOAA AR 1025 appeared. It was observed by Catania on Sep 01 and numbered Catania 17. It did not trigger any flare.

On Sep 21, another sunspot group in the southern hemisphere rotated onto the solar disk: Catania 18, NOAA AR 1026. It was this active region that was responsible for the increase of the X-ray background radiation above the measurement level from Sep 20 onwards. The bright loops peeked above the solar limb. With STEREO-Behind, we got an early avant-première of the active region before it rotated into the view of SOHO and Earth based-observers. AR 1026 degraded to a plage on Sep 27.

On Sep 22, another bright spot in EUV-images popped up: Catania 19, NOAA AR 1027. A small C-flare was measured on Sep 25. It rotated over the west limb on Oct 02 as a single A-class spot.

The northern polar coronal hole with several extensions was prominently present.

## **II. Geomagnetic Activity**

*At the level of the Earth's magnetic field, Sep 2009 was very calm.*

The geomagnetic conditions were quiet to unsettled except for Sep 28 when we had  $K_p = 4$  for one period. The solar wind speed measured by the ACE-satellite, situated just before Earth, was maximum 500 km/s.

On Sep 28, a small jump in the magnetic field parameters was seen. Although the solar wind speed stayed low, the geomagnetic  $K_p$  index reached once the value of 4 on Sep 28. At that moment, a southern coronal hole with was present at high latitude.

## **III. News item: Mark your calendars: Nov 2, 2009, launch of PROBA2**

The PROBA2 science centre at the Royal Observatory of Belgium/Solar-Terrestrial Centre of Excellence highlights the launch of the 'made in Belgium' satellite PROBA2.

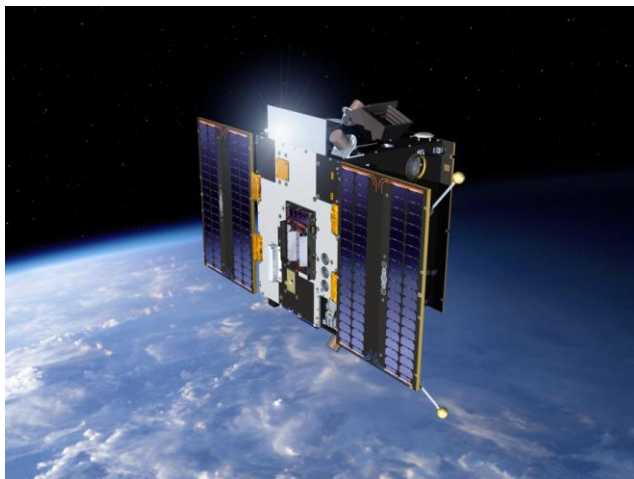


Figure 1: The picture (credits: ESA) shows an artist impression of PROBA2 looking at the Sun. LYRA are the three circles next to the right solar panel. The square hole located under LYRA is SWAP.

A Russian Rockot launcher carrying PROBA2 will take off at 02:50 (01:50 UTC) on November 2, 2009 from the launch base 'Plesetsk'. PROBA2 will separate from the rocket at 05:50 (04:50 UTC). Radio visibility from Redu, the Belgian ground station is expected around 06:00.

Onboard the satellite, are two 'state of the art' solar telescopes, SWAP and LYRA, demonstrating innovative technologies. The scientific responsibility for both instruments lies in Belgium. One of the successes of SWAP and LYRA is the international collaboration and support.

We cross our finger for a successful launch, a smooth commission phase and date input.

## News item: The Sixth European Space Weather Week

'Good evening!' The weatherman presents the daily weather talk on television. But, is a space weather talk science fiction? Not at all! 24/7, satellites and earth based observatories monitor the Sun. Space weather bulletins and forecasts are sent out.

A whole scientific community studies our star: long term events, short term events like light, mass and particle explosions and the everlasting solar wind attacking the Earth and other planets. For the sixth time, Belgium welcomes the European space weather scene. During one week in November, space weather, the science behind it, its impact on communication systems, services and applications and health issues will be discussed among scientists, industry and users.

Space weather is an important issue, especially with the new solar cycle knocking on the door, probably soon.

**ESWW**

# Sixth European Space Weather Week

16-20 November, 2009  
Brugge, Belgium

*Science-Models-Applications-Services-Users  
Space Situational Awareness  
Impacts on Communication Systems  
Health Issues*

<http://sidc.be/esww6>

Programme committee:

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Local organisation:  
SIDC@Solar-Terrestrial Centre of Excellence,  
Belgium

Logos: ESA, COST ES0803, RHEA, VRSI, and others.