Solar Influences Data analysis Center

Data Analysis Service supported by the FAGS

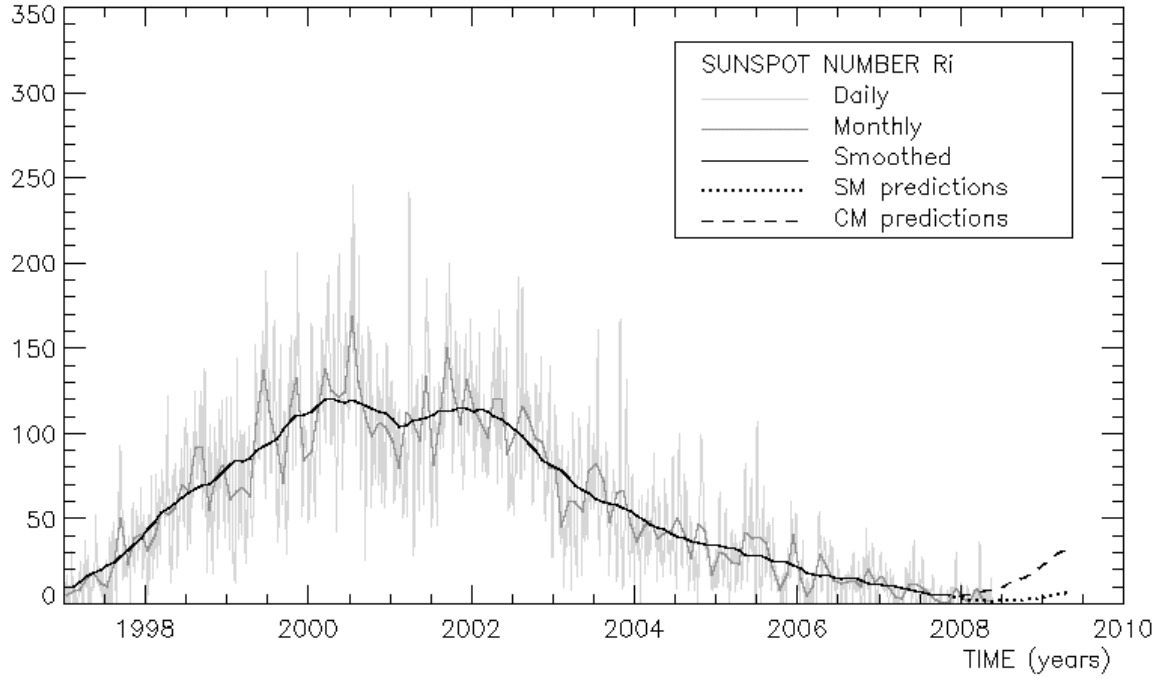
SUNSPOT BULLETIN

2008 n° 5

Provisional international and normalized hemispheric daily sunspot numbers for May 2008

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	7	4	3
5	8	4	4
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	8	4	4
14	0	0	0
15	9	5	4
16	14	0	14
17	12	12	0
18	15	0	15
19	11	0	11
20	7	0	7
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
31	0	0	0
Monthly mean	**2.9**	**0.9**	**2.0**
Cooperating stations	**63**	**58**	**58**



Predictions of the monthly smoothed Sunspot Number
using the last provisional value, calculated for November 2007 : 5.7 (± 5%)

	SM	CM		SM	CM		SM	CM
2007 Dec	5	4	2008 Jun	3	10	2008 Dec	3	21
2008 Jan	4	5	Jul	2	11	2009 Jan	4	24
Feb	5	6	Aug	2	13	Feb	4	27
Mar	4	7	Sep	2	14	Mar	5	30
Apr	4	8	Oct	2	16	Apr	5	33
May	3	9	Nov	3	19	May	6	36

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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Ed. Ronald Van der Linden, Ass. Ed. Petra Vanlommel
Editing contributions from various members of the SIDC team

Fax 32-(0)2-373 02 24 Tel 32-(0)2-373 04 91
e-mail : arille@oma.be, ronald@oma.be
ftp anonymous : omaftp.oma.be, directory dist/astro/sidcdata
http://sidc.oma.be

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

Date	R'_i	PPSI	600	2800	COS	SFI	XI	Ak	SEA
30	0	///	-	67	///	0	0/0	1	
1	0	0	-	69	////	0	0/0	10	
2	0	///	-	68	///	0	0/0	3	
3	0	///	-	67	///	0	0/0	7	
4	7	1	-	68	////	0	0/0	12	
5	8	4	-	68	////	0	0/0	15	
6	0	///	-	67	///	0	0/0	0	
7	0	///	-	67	///	0	0/0	6	
8	0	///	-	66	///	0	0/0	6	
9	0	///	-	67	///	0	0/0	4	
10	0	///	-	67	///	0	0/0	4	
11	0	0	-	68	////	0	0/0	6	
12	0	///	-	68	///	0	0/0	4	
13	8	0	-	68	////	0	0/0	5	
14	0	///	-	69	///	0	0/0	4	
15	9	0	-	71	///	0	0/0	3	
16	14	7	-	72	////	0	0/0	8	
17	12	2	-	71	////	0	0/0	2	
18	15	7	-	72	////	0	0/0	4	
19	11	4	-	69	////	0	0/0	10	
20	7	2	-	69	////	0	0/0	11	
21	0	0	-	69	////	0	0/0	15	
22	0	0	-	69	////	0	0/0	18	
23	0	///	-	68	///	0	0/0	1	
24	0	0	-	69	////	0	0/0	10	
25	0	1	-	68	////	0	0/0	8	
26	0	1	-	68	///	0	0/0	4	
27	0	0	-	68	///	0	0/0	6	
28	0	///	-	68	///	0	0/0	5	
29	0	///	-	68	////	0	0/0	13	
30	0	///	-	67	////	0	0/0	18	
31	0	0	-	67	////	0	0/0	14	

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 x Sn+10 x "1"+100 x ">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 MAY 2008

DATE	UT	NUMBER OF GROUPS	NUMBER OF SPOTS	RELATIVE SUNSPOT NUMBERS TOTAL	NORTH	SOUTH	CENTRAL	PPSI 10-5 WM-2	QUAL	OBS
1	940	0	0	0	0	0	0	0.0	2	SV
2	810	0	0	0	0	0	0	0.0	3	SV
3	755	0	0	0	0	0	0	0.0	3	FC
4	750	1	2	12	0	12	0	0.3	3	FC
5	710	1	4	14	0	14	0	1.2	3	OL
6	1210	0	0	0	0	0	0	0.0	4	OL
7	720	0	0	0	0	0	0	0.0	4	OL
8	710	0	0	0	0	0	0	0.0	3	OL
9	720	0	0	0	0	0	0	0.0	3	OL
10	635	0	0	0	0	0	0	0.0	3	OL
11	655	0	0	0	0	0	0	0.0	4	OL
12	730	0	0	0	0	0	0	0.0	3	OB
13	730	1	2	12	12	0	0	0.3	3	OB
14	700	0	0	0	0	0	0	0.0	2	OB
16	910	1	3	13	0	13	13	1.5	2	OB
19	650	1	3	13	0	13	0	1.3	2	SV
20	710	1	1	11	0	11	0	0.3	2	SV
21	620	0	0	0	0	0	0	0.0	3	SV
22	725	0	0	0	0	0	0	0.0	3	SV
23	745	0	0	0	0	0	0	0.0	1	SV
24	835	0	0	0	0	0	0	0.0	2	SV
25	1100	0	0	0	0	0	0	0.0	1	SV
26	800	0	0	0	0	0	0	0.0	2	AE
28	720	0	0	0	0	0	0	0.0	2	OL
31	830	0	0	0	0	0	0	0.0	3	AE

The relative mean sunspot number is 3.0.

NORMALISED UCCLE OBSERVATIONAL SUNSPOT NUMBERS U'=K'U FOR MAY 2008

K'= 0.779 (*)

1	0	7	0	13	9	19	10	25	0
2	0	8	0	14	0	20	9	26	0
3	0	9	0	15	***	21	0	27	***
4	9	10	0	16	10	22	0	28	0
5	11	11	0	17	***	23	0	29	***
6	0	12	0	18	***	24	0	30	***
								31	0

The normalised relative monthly mean sunspot number is 2.

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

The Sun has been observed 25 days on 31 possible.

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

NONE

PROBABLE RETURN OF MAJOR GROUPS FOR JUNE 2008
NONE

MONTHLY SUMMARY OF SOLAR AND GEOMAGNETIC ACTIVITY

I. Solar Activity

No flaring events with significance took place this month. Most space weather relevance came from several coronal holes that transited the solar disk.

MDI magnetograms showed on May 03 a new signature of solar cycle 24. It was not the first region with a typical solar cycle 24 magnetic configuration, but it was the first region spotted in the southern hemisphere. On May 05, the region got a number: Catania 80, (NOAA AR 0993). As quickly as it appeared, it disappeared. On May 07, the active region degraded to a plage.

On May 12, coronal loops were seen peeking around the east limb. The bright feature was the sign of an active region coming into view. Indeed, small peaks in the X-ray flux output were measured by GOES shortly after. The densest concentration and the highest level of peaks were seen on May 12: 11 spikes of which a few reached the B-level. Two regions with a visible magnetic footprint in MDI magnetograms, rotated onto the solar disk. On May 16, two additional bipolar regions in front of the two existing regions popped up. Only on May 17, three of the four regions got a label: AR 0994 (Catania 81), 0995, 0996. The group of active regions was responsible for a few small flares from May 12 up to May 20. By May 22, all three had degraded to a plage area.

For the remaining days of the month, the X-ray output was under the measurement level of GOES.

Several coronal holes (CH) were visible. We indicate the date when the CH passes the central meridian.

- Apr 26: a fragmented southern CH,
- Apr 30: a recurrent southern CH with a polar extension,
- May 16: a leading small equatorial CH with a trailing Y-shaped part,
- May 23: a small equatorial CH,
- May 27: the same CH as the first one mentioned in this list. The CH became less broad in latitude and more confined.

II. Geomagnetic Activity

The disturbances were all caused by an associated CH. All disturbances were weak: the highest value for the estimated Kp index was only 4.

The first disturbance was initiated by the CH passing the CM on Apr 26. This disturbance came right behind the arrival of a partial halo CME associated with a prominence eruption that took place previous month. The disturbance was limited: 3 times a Kp of 4 on May 01 and 02.

A co-rotating interaction region (CIR) with the typical increased magnetic field strength arrived on May 03. The solar wind speed increased and reached the value of 650 km/s on May 06. There were almost no geomagnetic consequences: once a Kp index of 4 on May 06. After May 06 the solar wind speed reduced to 300 km/s and geomagnetic conditions were quiet until May 19.

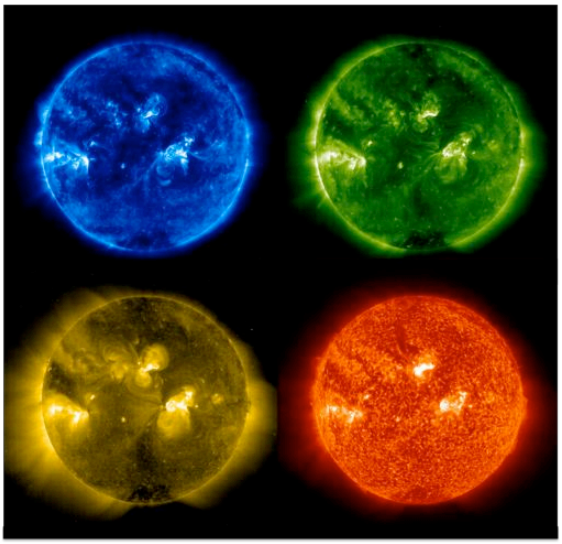
The next CIR arrived on May 21, with solar wind speed peaking at 5800 km/s. It caused sporadic active geomagnetic conditions on May 21-23.

The fourth CH mentioned in the previous section induced unsettled conditions from May 28 to May 30, with solar wind speed rising to 600 km/s towards the end of the month.

III. News of the month

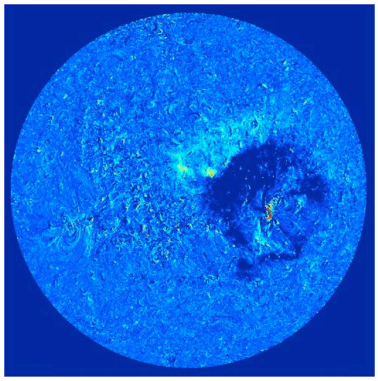
Belgian solar physicists win prizes
Scientific results thanks to a 12 years old space-based telescope

A young scientist, Elena Podladchikova, gets the internationally recognized Zeldovich medal pinned up during the COSPAR conference in Canada. The medal is conferred 'for excellence and achievements'. Dr. Podladchikova works at the 'Solar-Terrestrial Center of Excellence' (STCE), a Sun-Earth research group in Ukkel. Members of this team are also nominated for the prestigious Descartes prizes for their unique and excellent contributions to solar physics and space research.



4 solar images taken by EIT, each in a different wavelength of the extreme ultraviolet spectrum. We see loops, black zones, bright spots. This could never be seen in the visible light. The sun doesn't seem to be a simple yellow ball, the solar disk is full of complex structures.

Like in the world of the movies, there exist similar festivals and awards for different scientific categories. One is the European Descartes Prize awarded for achieved outstanding scientific or technological results through collaborative research in any field of science. A number of STCE-scientists belong to a team nominated for this money prize. These solar physicists worked on a telescope onboard of an ESA-NASA solar mission, SOHO. This satellite was launched in 1995. The Extreme Ultraviolet Imaging Telescope, short EIT, was constructed by the Centre Spatial de Liège and was a strong example of high technology. EIT was the first of a generation of innovating space-based observatories. Before EIT, scientists could observe only sporadically the physical phenomena on the sun that can now be continuously monitored in EUV light. It were Belgian scientists that thought of the concept that made it possible to display a full disk movie of the sun over a long time period. Thanks to EIT, Belgium got the scope of observing for the first time sound waves in the solar atmosphere.



A processed EIT image of the sun with an example of a solar tsunami.

Elena Podladchikova did pioneering research on solar tsunamis, waves on the solar surface. Solar tsunamis give an indication of gas clouds that are catapulted violently away from the sun into space. These clouds are important for space weather. Space weather is the equivalent of the usual weather, but in space. Disturbed space weather lies at the origin of disturbed radio communication, interruptions in the electricity network, corrosion of pipelines, inaccurate GPS-measurements, mal functioning or defect satellites. It can lead to dangerous situations during space missions, but has also consequences for airplane flights with routes over the North Pole.

Nice to know is that EIT itself could be a candidate for a real movie nomination in the category visual effects. EIT images were used in Hollywood productions like *The Da Vinci Code*, *Spiderman 2* and *Sunshine.*

For more information, see http://sidc.be/news/104/welcome.html