Solar Influences Data analysis Center

Data Analysis Service supported by the FAGS

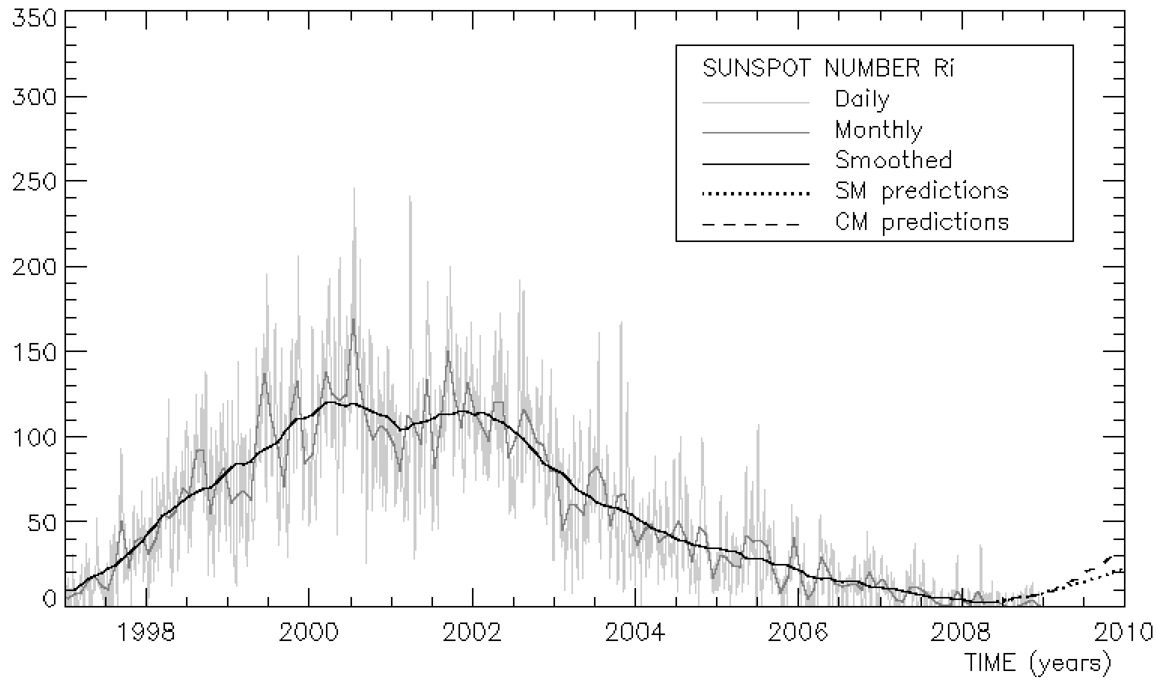
SUNSPOT BULLETIN

2009 n° 5

Provisional international and normalized hemispheric daily sunspot numbers for May 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	7	0	7
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	7	7	0
14	9	9	0
15	8	8	0
16	8	8	0
17	9	9	0
18	8	8	0
19	7	7	0
20	0	0	0
21	0	0	0
22	8	0	8
23	8	0	8
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	11	11	0
Monthly mean	**2.9**	**2.2**	**0.7**
Cooperating stations	**63**	**55**	**55**



Predictions of the monthly smoothed Sunspot Number
using the last provisional value, calculated for November 2008 : 1.8 (± 5%)

	SM	CM		SM	CM		SM	CM
2008 Dec	2	2	2009 Jun	11	8	2009 Dec	18	19
2009 Jan	2	3	Jul	12	9	2010 Jan	19	21
Feb	2	4	Aug	13	10	Feb	20	23
Mar	8	5	Sep	14	12	Mar	22	26
Apr	9	6	Oct	15	14	Apr	23	28
May	10	7	Nov	17	17	May	25	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
30	8	1	-	69	////	0	0/0	3	
1	0	0	-	69	////	0	0/0	4	
2	0	///	-	68	////	0	0/0	5	
3	0	0	-	69	////	0	0/0	4	
4	7	2	-	68	////	0	0/0	3	
5	0	0	-	68	////	0	0/0	4	
6	0	0	-	69	////	0	0/0	11	
7	0	///	-	70	////	0	0/0	9	
8	0	///	-	71	////	0	0/0	14	
9	0	///	-	72	////	0	0/0	6	
10	0	0	-	72	////	0	0/0	4	
11	0	///	-	72	////	0	0/0	5	
12	0	0	-	74	////	0	0/0	2	
13	7	2	-	74	////	0	0/0	4	
14	9	3	-	74	////	0	0/0	14	
15	8	2	-	74	////	0	0/0	3	
16	8	2	-	74	////	0	0/0	6	
17	9	2	-	74	////	0	0/0	2	
18	8	4	-	73	////	0	0/0	4	
19	7	1	-	72	////	0	0/0	4	
20	0	1	-	72	////	0	0/0	8	
21	0	///	-	72	////	0	0/0	6	
22	8	0	-	72	////	0	0/0	8	
23	8	3	-	70	////	0	0/0	6	
24	0	0	-	69	////	0	0/0	4	
25	0	///	-	69	////	0	0/0	3	
26	0	///	-	68	////	0	0/0	4	
27	0	///	-	67	////	0	0/0	2	
28	0	///	-	68	////	0	0/0	7	
29	0	///	-	68	////	0	0/0	7	
30	0	///	-	69	////	0	0/0	4	
31	11	3	-	69	////	0	0/0	4	

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 2009

DATE	UT	NUMBER OF GROUPS	NUMBER OF SPOTS	RELATIVE SUNSPOT NUMBERS TOTAL	NORTH	SOUTH	CENTRAL	PPSI 10-5 WM-2	QUAL	OBS
1	800	0	0	0	0	0	0	0.0	3	AE
2	1100	0	0	0	0	0	0	0.0	2	AE
3	1100	0	0	0	0	0	0	0.0	3	AE
4	640	0	0	0	0	0	0	0.0	2	SV
7	800	0	0	0	0	0	0	0.0	2	OB
8	730	0	0	0	0	0	0	0.0	2	OB
9	820	0	0	0	0	0	0	0.0	2	OB
10	740	0	0	0	0	0	0	0.0	3	OB
11	845	0	0	0	0	0	0	0.0	1	SV
14	830	1	7	17	17	0	0	1.2	3	SV
16	715	1	2	12	12	0	12	0.4	1	SV
18	745	1	5	15	15	0	0	0.3	3	AE
19	930	0	0	0	0	0	0	0.0	2	AE
20	1230	0	0	0	0	0	0	0.0	3	AE
21	830	0	0	0	0	0	0	0.0	3	AE
22	1530	1	3	13	0	13	0	0.2	4	AE
23	845	1	2	12	0	12	0	0.8	3	AE
24	800	0	0	0	0	0	0	0.0	2	SV
25	850	0	0	0	0	0	0	0.0	3	OL
26	720	0	0	0	0	0	0	0.0	3	OL
27	715	0	0	0	0	0	0	0.0	3	OL
28	815	0	0	0	0	0	0	0.0	2	OL
29	1150	0	0	0	0	0	0	0.0	3	OL
30	755	0	0	0	0	0	0	0.0	4	OL
31	700	2	3	23	23	0	12	1.6	3	OL

The relative mean sunspot number is 3.7.

NORMALISED UCCLE OBSERVATIONAL SUNSPOT NUMBERS U'=K'U FOR MAY 2009

K'= 0.779 (*)

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

The normalised relative monthly mean sunspot number is 3.

(*) 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 2009
E AND F BRUNNER'S TYPE GROUPS

NONE

PROBABLE RETURN OF MAJOR GROUPS FOR JUNE 2009
NONE

MONTHLY SUMMARY OF SOLAR AND GEOMAGNETIC ACTIVITY

I. Solar Activity

The global solar activity was a little more elevated compared with the previous months: the Provisional International monthly mean Sunspot Number for May 2009 was 2.9, the F10cm radio flux ranged between 68 and 74 sfu.

Some modest flaring activity was present from Apr 30 to May 02. The source was a coronal bright point that developed into a small active region (NOAA AR 1016) just before rotating over the west limb.

From May 08 to 14, more peaks at the A and B level were measured by GOES. The sources were two new solar cycle active regions with high latitude. The first of the two became visible in SOHO magnetograms on May 08. STEREO-B was able to see it before this date. It was probably this duo of active regions that was responsible for the type II burst on May 05 (see paragraph III). Only the second active region got a label from May 14: Catania 04 / NOAA AR 1017.

Another low latitude active region in the southern hemisphere developed sunspots on May 20: Catania 05 and 06. Both numbers refer in fact to the same sunspot group.

Another sunspot group was reported on May 23: Catania 07. It was located at high latitude in the southern hemisphere. The associated active region was NOAA AR 1018. It degraded to a plage on May 25. No activity corresponding to the last mentioned sunspot groups was measured.

A small equatorial coronal hole transited the solar disk the first week. The EUV telescopes onboard of STEREO-B and STEREO-A detected the hole. SOHO/EIT had a CCD bake-out from May 03 to 08.

II. Geomagnetic Activity

May 2009 was characterized by very low geomagnetic activity. Values above 3 were exceptional.

The co-rotating interaction region associated with the first CH mentioned in the previous section arrived late on May 05. The total interplanetary magnetic field carried with the solar wind was small. The solar wind speed was maximum 500 km/s. Bz had small negative values, however for a time period long enough to produce some geomagnetic disturbance. The Kp became a few times 4 on May 07 and 08.

May 14, the Kp-index reached the value 4, indicating unsettled space weather conditions. This was probably due to the earth crossing the heliospheric current sheet.

On May 28, a shock was detected by ACE and SOHO at 04:21 UT followed by a moderate fast speed stream that didn't create any disturbances above the unsettled level.

III. News: solar radio silence ended

At the radio station in Humain, operated by the SIDC, a solar burst was detected. On May 05, 2009, scientists from the SIDC noticed an enhanced solar radio signal. The burst lasted nearly 3 minutes and is seen as a bright line in the diagram. The colour in the diagram is related to the intensity of the signal, see Figure 1. This is a so called type II radio burst. It is a shock in this particular case produced by a coronal mass ejection, a CME. The shock in front of the CME triggers the radio emission. The frequency of this emission is a measure for the distance from the Sun: the higher the frequency, the closer to the Sun. When the frequency decreases with time, the shock propagates away from the Sun. How fast the frequency decreases is a measure of the speed of the shock.

STEREO-B did see the eruption as an event just behind the east limb of the Sun from its point of view as shown in the series of pictures. LASCO/SOHO had not enough observations during this time period. The beacon data from STEREO-A are not available. Beacon data are first, quick data. They are not used for scientific research but are useful for forecasting space weather. STEREO-A should have seen the event as a backward halo CME.

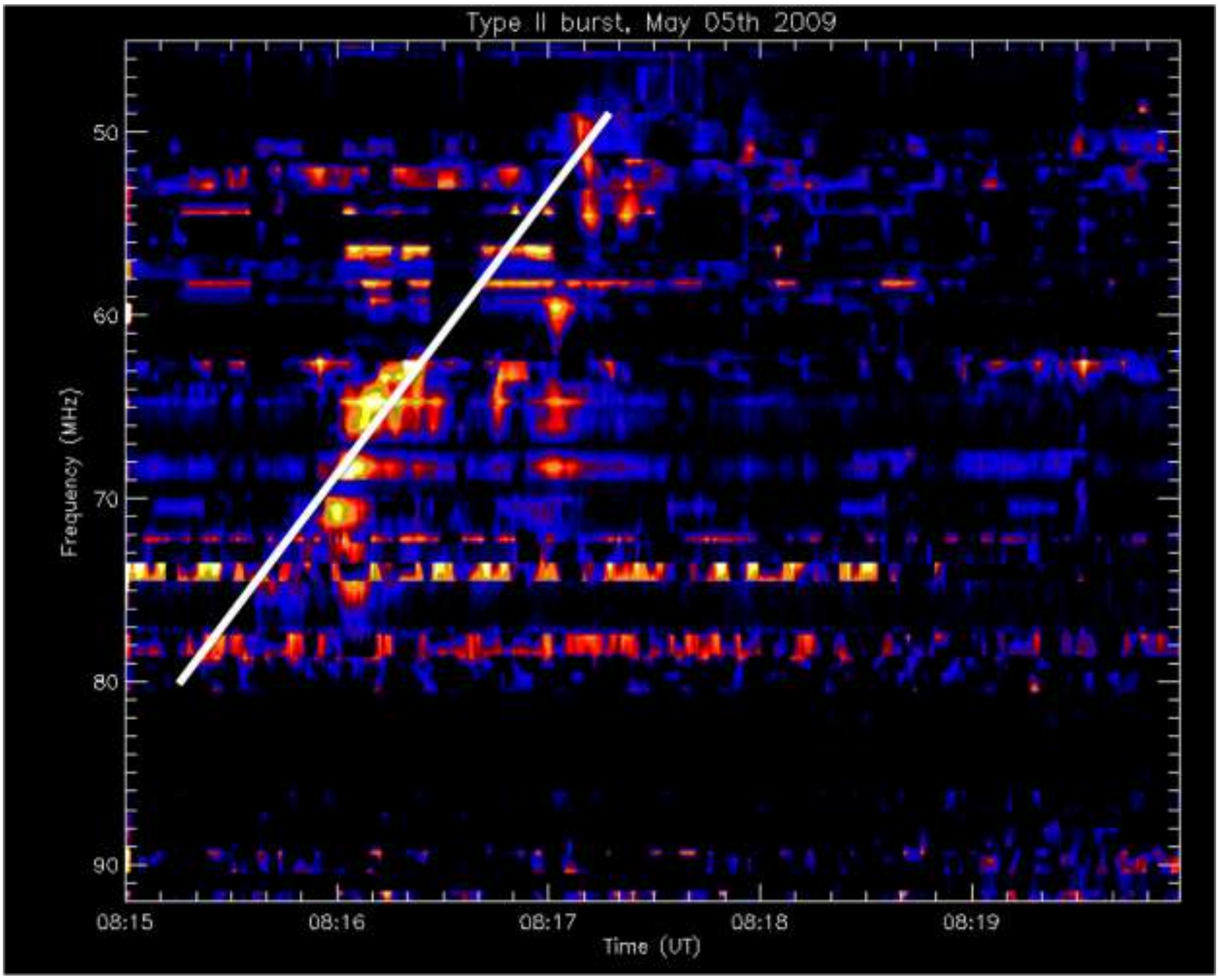

Figure 1: A colour diagram: Time versus frequency. The more intense the colour, the higher the intensity of that particular wavelength.