

Center

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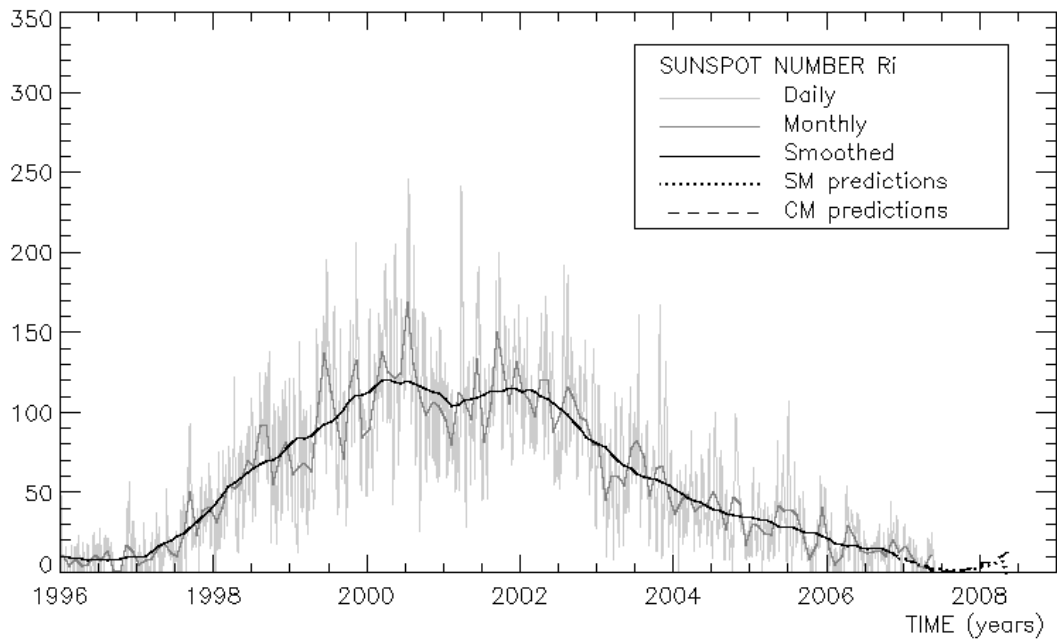
SUNSPOT BULLETIN

2007 n° 5

Provisional international and normalized hemispheric daily sunspot numbers for May 2007

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	20	0	20
2	20	0	20
3	12	0	12
4	11	0	11
5	10	0	10
6	9	0	9
7	8	0	8
8	9	5	4
9	11	0	11
10	12	0	12
11	14	0	14
12	13	0	13
13	11	0	11
14	18	8	10
15	18	10	8
16	17	17	0
17	24	24	0
18	25	25	0
19	22	22	0
20	14	14	0
21	11	11	0
22	9	9	0
23	14	7	7
24	9	5	4
25	0	0	0
26	0	0	0
27	0	0	0
28	0	0	0
29	7	0	7
30	7	0	7
31	7	4	3
Monthly mean	11.7	5.2	6.5
Cooperating stations	52	45	45



Predictions of the monthly smoothed Sunspot Number
 using the last provisional value, calculated for November 2006 : 12.7 (\pm 5%)

		SM	CM			SM	CM			SM	CM
2006	Dec	12	11	2007	Jun	6	2	2007	Dec	2	5
2007	Jan	12	8		Jul	5	2	2008	Jan	2	6
	Feb	11	7		Aug	4	2		Feb	3	7
	Mar	10	7		Sep	3	2		Mar	3	9
	Apr	9	5		Oct	2	2		Apr	4	11
	May	8	2		Nov	2	3		May	5	13

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

Brussels, June 1, 2007 09:17 UT

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

Date	R' _i	PPSI	600	2800	COS	SFI	XI	Ak	SEA
30	21	77	-	87	////	1	0/0	14	
1	20	80	-	86	////	0	0/0	7	
2	20	85	-	87	////	10	0/0	2	
3	12	67	-	83	////	1	0/0	6	
4	11	46	-	83	////	0	0/0	3	
5	10	27	-	81	////	10	0/0	2	
6	9	9	-	78	////	0	0/0	1	
7	8	7	-	76	////	0	0/0	21	
8	9	2	-	73	////	0	0/0	16	
9	11	12	-	72	////	0	0/0	6	
10	12	21	-	71	////	0	0/0	5	
11	14	26	-	72	////	0	0/0	5	
12	13	16	-	71	////	0	0/0	3	
13	11	11	-	74	////	0	0/0	2	
14	18	10	-	73	////	0	0/0	4	
15	18	15	-	77	////	1	0/0	6	
16	17	27	-	77	////	1	0/0	4	
17	24	52	-	77	////	0	0/0	8	
18	25	46	-	76	////	0	0/0	23	
19	22	45	-	75	////	0	0/0	18	
20	14	28	-	74	////	0	0/0	10	
21	11	19	-	73	////	0	0/0	7	
22	9	6	-	72	////	1	0/0	19	
23	14	2	-	70	////	0	0/0	32	
24	9	0	-	70	///	0	0/0	0	
25	0	///	-	68	///	0	0/0	9	
26	0	0	-	68	///	0	0/0	6	
27	0	///	-	67	////	0	0/0	14	
28	0	0	-	69	///	0	0/0	4	
29	7	1	-	70	////	0	0/0	6	
30	7	2	-	71	////	0	0/0	4	
31	7	0	-	75	///	0	0/0	5	

- 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/m² : 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 2007

DATE	UT	NUMBER OF GROUPS	NUMBER OF SPOTS	RELATIVE TOTAL	SUNSPOT NUMBERS			PPSI 10-5 WM-2	QUAL	OBS
					NORTH	SOUTH	CENTRAL			
1	845	2	11	31	0	31	31	31.5	3	AE
2	800	2	12	32	0	32	32	31.0	3	AE
3	745	1	11	21	0	21	21	28.2	3	AE
4	745	1	8	18	0	18	0	22.9	2	AE
5	1140	1	11	21	0	21	0	15.9	3	DB
6	1005	1	4	14	0	14	0	9.6	2	DB
11	1400	1	14	24	0	24	24	1.6	3	OB
12	1420	1	10	20	0	20	20	1.5	2	LR
14	1210	2	8	28	12	16	0	1.4	2	LR
15	1245	1	16	26	26	0	0	11.2	4	OB
16	1300	1	16	26	26	0	0	16.1	2	OB
18	745	1	39	49	49	0	49	22.1	3	OB
19	1315	1	13	23	23	0	23	23.5	3	AE
20	945	1	9	19	19	0	19	6.1	2	AE
21	1300	1	6	16	16	0	16	5.3	2	AE
22	1400	1	2	12	12	0	0	1.5	2	AE
23	800	2	3	23	12	11	0	0.3	3	AE
24	1400	0	0	0	0	0	0	0.0	3	AE
25	1330	0	0	0	0	0	0	0.0	3	AE
29	1220	1	1	11	0	11	0	0.1	2	OB
30	800	1	1	11	0	11	0	0.2	3	AE
31	1115	1	2	12	0	12	0	0.3	3	AE

The relative mean sunspot number is 19.9.

NORMALISED UCCLE OBSERVATIONAL SUNSPOT NUMBERS $U'=K'U$ FOR MAY 2007

$K' = 0.779$ (*)

1	24	7	***	13	***	19	18	25	0
2	25	8	***	14	22	20	15	26	***
3	16	9	***	15	20	21	12	27	***
4	14	10	***	16	20	22	9	28	***
5	16	11	19	17	***	23	18	29	9
6	11	12	16	18	38	24	0	30	9
								31	9

The normalised relative monthly mean sunspot number is 15.

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

The Sun has been observed 22 days on 31 possible.

UCCLE OBSERVATIONAL MAJOR SUNSPOT GROUPS FOR MAY 2007
E AND F BRUNNER'S TYPE GROUPS

NONE

PROBABLE RETURN OF MAJOR GROUPS FOR JUNE 2007
NONE

MONTHLY SUMMARY OF SOLAR AND GEOMAGNETIC ACTIVITY

I. Solar Activity

More flaring activity was recorded than during previous months. The overall activity however stayed at minor level.

The first part of the month, from May 01 until May 09, flaring activity was a little more agitated than was the case lately. A C8.5, a C4.2 and a B9.8 flare occurred respectively on May 02, 05 and 06. The source of this activity was Catania sunspot group 32 (NOAA AR 0953), which rotated off the solar disk on May 09. The flare of May 02 was seen as a peak on top of a long duration B-flare and was accompanied by a slow west-ward CME. An associated EIT wave was visible. Almost immediately after the disappearance of this sunspot group, the newly emerging sunspot group Catania 35 (NOAA AR 0955) produced some A- and B-flares until it rotated from the solar disk on May 18. A new old-cycle sunspot group with a magnetic β - γ - δ structure appeared on the east limb on May 14: Catania 36 (NOAA AR 0956), which erupted twice, but with intensity only in the C-level.

On May 19, an H-alpha filament suddenly disappeared. The filament was located at the disk centre in the vicinity of sunspot group 36 (NOAA AR 0956). A type II eruption with inferred speed of 882 km/s and a B9.5 flare was recorded around noon on May 19. The eruption resulted in a CME with median and maximum speeds of 309 and 618 km/s estimated by CACTus. CACTus did not detect it as a halo since a large part of it was faint. Even before group 36 reached the solar centre, the group started already to decay. On May 22 and 23, two more type II radio bursts were measured, respectively at 14:36UT and 07:22UT with both an estimated speed around 580 km/s. Both events were linked with a long duration B-flare from sunspot group 36 (NOAA AR 0956), at that moment at the west side of the solar disk. The group disappeared in the west on May 26 with a last B1.8 flare. From May 30, flaring activity increased again. The returning sunspot group 35 (NOAA AR 0955) was at that moment located behind the east limb. GOES recorded two C-flares on May 30 and 31, heralding a period of intense flaring activity during the next month.

As last item of this section, we list the coronal holes transiting across the solar disk. A recurrent southern coronal hole crossed the central meridian on May 03. On May 16, a fairly compact southern coronal hole transited the central meridian. During the previous rotation, an elongated, skewed coronal hole was visible on the solar disk. There is not much of similarity between those two coronal holes. It is therefore not entirely clear if the hole of this month is new or the remnant of the elongated hole of past month. There was a SOHO/EIT CCD bake-out from May 19. On the TRACE 171 mosaic, a southern coronal hole was visible at the solar disk center on May 22. A last coronal hole, which was hardly recognized, passed the central meridian on May 26.

II. Geomagnetic Activity

ACE-data of the interplanetary magnetic field (IMF) reveal 4 clear periods of magnetic disturbances.

The first hole mentioned above, became geo-effective on May 07. The estimated planetary K-index (NOAA, Boulder) indicated unsettled to minor storm conditions until May 08.

The co-rotating interaction region preceding the fast solar wind stream emanating from the second coronal hole arrived on May 17. The total IMF increased prior to the rise of the solar wind speed. The global geomagnetic conditions estimated by NOAA became unsettled to active on May 18 and 19.

During the first part of May 22, a small shock was seen in the magnetic field/density data measured by ACE and speed/temperature data measured by CELIAS. An interplanetary coronal mass ejection (ICME) could be recognized. This ICME was possibly linked with the filament disappearance and type II outburst on May 19. Geomagnetic disturbances caused by this shock arrival were overruled by the arrival of the co-rotating interaction region of the third coronal hole. The fast wind stream itself arrived on May 24. Those two events, the ICME-arrival and coronal hole wind stream, built up to a

geomagnetic storm with Kp peaking at the value of 6 on May 23-24. Unsettled conditions lasted until May 27.

The last coronal hole became geo-effective beginning of next month.

III. Noticeable solar events

No M- or X-class flares occurred.

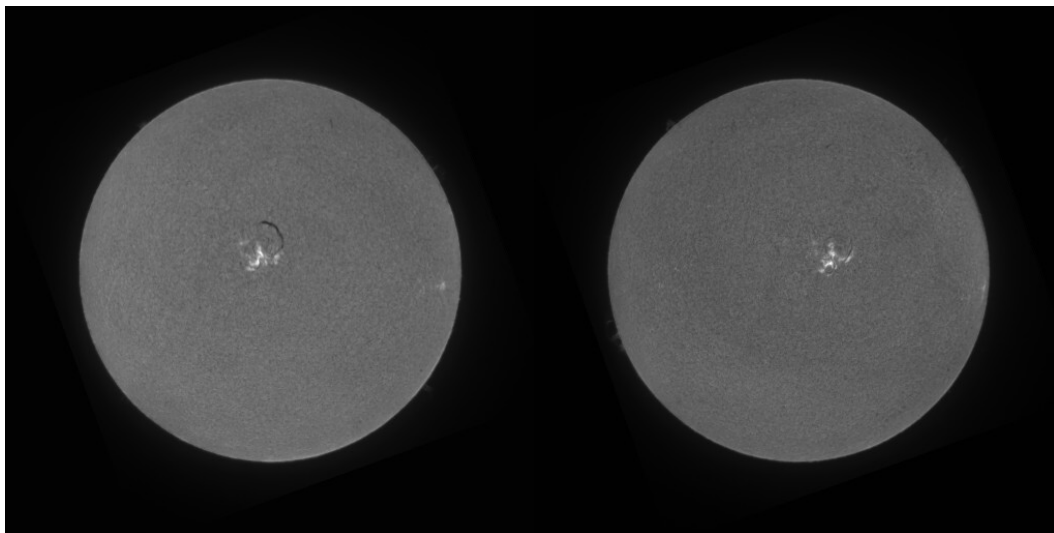
IV. Halo CME list

onset time	e-mail time CACTus	da	e-mail time LASCO	Ass. Events	onset time NEMO	consequences
05/13 13:54	05/14 18:37	238	-	False alert	-	-

Onset time: Utime first visible in C2 field of view
CACTus: Computer Aided CME Tracking (software developed by the SIDC)
LASCO: SOHO-LASCO Operations, G. Stenborg
NEMO: Novel EIT wave Machine Observing (software developed by the SIDC)

e-mail time CACTus/LASCO/FF: Utime alert e-mail sent by group
da: angular width of CME, measured by CACTus
Ass. Events: Associated Events, Long Duration Event (LDE), flare class

V. Picture of the Month



The pictures above are taken by the Kanzelhoehe observatory in H-alpha. The left picture shows a significant filament on May 19 which has disappeared in the right picture dating from May 20. The filament eruption resulted in a faint halo CME.