

Center

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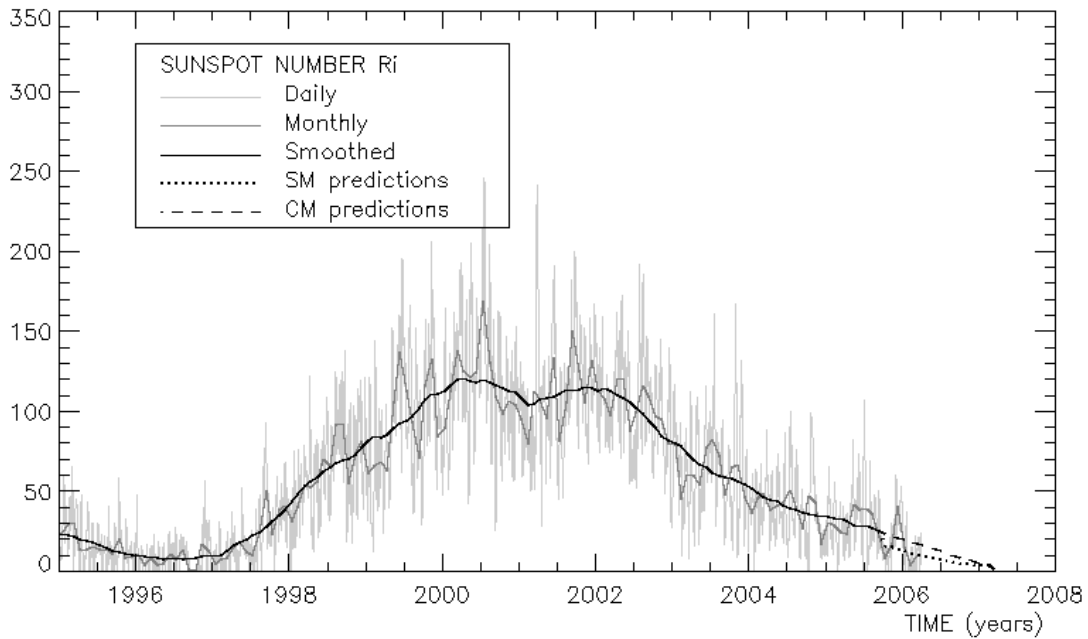
SUNSPOT BULLETIN

2006 n° 3

Provisional international and normalized hemispheric daily sunspot numbers for March 2006

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	9	5	4
5	22	10	12
6	14	7	7
7	0	0	0
8	0	0	0
9	0	0	0
10	0	0	0
11	0	0	0
12	9	9	0
13	8	8	0
14	14	0	14
15	14	0	14
16	13	0	13
17	21	0	21
18	16	0	16
19	16	0	16
20	19	0	19
21	19	0	19
22	19	0	19
23	18	0	18
24	21	7	14
25	11	6	5
26	0	0	0
27	0	0	0
28	9	0	9
29	19	0	19
30	20	0	20
31	24	0	24
Monthly mean	10.8	1.7	9.1
Cooperating stations	46	39	39



Predictions of the monthly smoothed Sunspot Number
 using the last provisional value, calculated for September 2005 : 25.8 ($\pm 5\%$)

	SM	CM		SM	CM		SM	CM
2005 Oct	25	24	2006 Apr	14	17	2006 Oct	8	9
Nov	21	23	May	13	16	Nov	7	8
Dec	17	21	Jun	12	14	Dec	6	6
2006 Jan	17	20	Jul	11	12	2007 Jan	6	6
Feb	16	19	Aug	9	11	Feb	5	5
Mar	15	18	Sep	8	10	Mar	5	2

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, April 1, 2006 09:46 UT

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

Date	R' _i	PPSI	600	2800	COS	SFI	XI	Ak	SEA
28	7	1	-	77	////	0	0/0	6	
1	0	0	-	77	///	0	0/0	10	
2	0	0	-	76	///	0	0/0	3	
3	0	0	-	76	///	0	0/0	4	
4	9	4	-	75	////	0	0/0	3	
5	22	5	-	74	////	0	0/0	2	
6	14	///	-	74	///	0	0/0	2	
7	0	2	-	74	///	0	0/0	2	
8	0	4	-	72	///	0	0/0	7	
9	0	1	-	73	///	0	0/0	5	
10	0	1	-	72	///	0	0/0	1	
11	0	0	-	74	///	0	0/0	1	
12	9	4	-	73	////	0	0/0	5	
13	8	3	-	73	////	0	0/0	3	
14	14	2	-	74	////	0	0/0	3	
15	14	3	-	74	////	0	0/0	10	
16	13	4	-	72	////	0	0/0	8	
17	21	7	-	72	////	0	0/0	2	
18	16	8	-	72	////	0	0/0	30	
19	16	22	-	75	////	0	0/0	36	
20	19	28	-	77	////	2	0/0	20	
21	19	19	-	77	////	4	0/0	16	
22	19	8	-	76	////	0	0/0	12	
23	18	5	-	77	////	1	0/0	4	
24	21	4	-	76	////	0	0/0	6	
25	11	1	-	76	////	0	0/0	8	
26	0	0	-	74	////	0	0/0	10	
27	0	0	-	74	////	0	0/0	13	
28	9	1	-	79	////	0	0/0	8	
29	19	16	-	82	////	0	0/0	8	
30	20	28	-	84	////	2	0/0	6	
31	24	47	-	86	////	0	0/0	6	

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 : $1 \times S_n + 10 \times "1" + 100 \times ">1"$).
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 atmospheric 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 MARCH 2006

DATE	UT	NUMBER		RELATIVE SUNSPOT NUMBERS			PPSI 10-5 WM-2	QUAL	OBS	
		OF GROUPS	OF SPOTS	TOTAL	NORTH	SOUTH				CENTRAL
1	850	0	0	0	0	0	0	0.0	3	AE
2	925	0	0	0	0	0	0	0.0	3	AE
3	1400	0	0	0	0	0	0	0.0	2	AE
4	1525	2	10	30	12	18	18	1.7	3	AE
5	1145	5	16	66	35	31	38	4.3	2	AE
6	1315	0	0	0	0	0	0	0.0	3	OB
7	1245	0	0	0	0	0	0	0.0	3	OB
9	1445	0	0	0	0	0	0	0.0	2	OB
12	920	1	5	15	15	0	0	1.2	3	LR
13	1410	2	4	24	13	11	13	1.5	2	AE
14	1320	1	1	11	0	11	0	0.2	3	AE
15	1225	2	2	22	0	22	0	0.5	3	AE
18	905	2	7	27	0	27	27	6.5	3	FC
19	1405	1	18	28	0	28	28	23.4	3	FC
20	1150	1	14	24	0	24	24	21.8	3	OB
21	1510	1	20	30	0	30	0	1.2	2	OB
22	900	2	18	38	12	26	0	1.2	3	OB
23	1200	2	7	27	12	15	0	0.7	2	OB
24	1415	2	5	25	11	14	0	0.2	3	OB
27	915	0	0	0	0	0	0	0.0	2	AE
28	745	1	5	15	0	15	0	0.4	3	FC
29	1300	2	11	31	0	31	0	12.5	2	AE
31	1145	3	14	44	0	44	22	6.9	2	AE

The relative mean sunspot number is 19.9.

NORMALISED UCCLE OBSERVATIONAL SUNSPOT NUMBERS U'=K'U FOR MARCH 2006

K' = 0.811 (*)

1	0	7	0	13	19	19	23	25	***
2	0	8	***	14	9	20	19	26	***
3	0	9	0	15	18	21	24	27	0
4	24	10	***	16	***	22	31	28	12
5	54	11	***	17	***	23	22	29	25
6	0	12	12	18	22	24	20	30	***
								31	36

The normalised relative monthly mean sunspot number is 16.

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

The Sun has been observed 23 days on 31 possible.

UCCLE OBSERVATIONAL MAJOR SUNSPOT GROUPS FOR MARCH 2006
E AND F BRUNNER'S TYPE GROUPS

NONE

PROBABLE RETURN OF MAJOR GROUPS FOR APRIL 2006
NONE

MONTHLY SUMMARY OF SOLAR AND GEOMAGNETIC ACTIVITY

I. Solar Activity

Once again, the Sun was quiet. An all-quiet-alert was issued by the SIDC for the periods from Feb 23 to Mar 08, from Mar 16 to Mar 18 and from Mar 26. The last all-quiet-alert has not ended yet. There were 10 days on which the Estimated and Provisional International Sunspot Numbers (EISN & PISN) were 0.

During the first half of the month, the only events worth mentioning were two long duration B-flares: a B2.1 flare on Mar 07 (peak at 16:14 UT) and a B3.4 flare on Mar 11 (peak at 14:00 UT). Both flares were caused by the same sunspot group Catania 010 / NOAA active region 0856. At the moment of the first long duration event (LDE), NOAA AR 0856 was located at 39° in the west. A coronal dimming and post-eruption arcade observed by GOES-12/SXI evidenced the eruption of a CME. There was no SOHO/LASCO data for this period due to spacecraft manoeuvres. Given the position of the active region at W39, the CME was not expected to arrive at earth. Indeed, ACE data didn't show any clear CME signature in the days after the eruption. At the moment of the second LDE, the active region was located at the far west. A CME was spotted in LASCO-pictures by the CACTus software. The CME had a speed of 480 km/s and was directed westward. Geomagnetic influences were not seen.

During the time intervals Mar 14-16 and Mar 18-22, the closely spaced Catania sunspot groups 13/15/16 produced some activity. NOAA identified them as AR 0860/0862/0861 respectively. Finally, 0862/015 pushed the X-ray radiation background up when it evolved to a magnetic β - γ configuration. On Mar 21, the group produced several C-flares, the strongest one being a C2.5 flare peaking at 09:44UT. One day later, the group started to decay.

From Mar 28, the background soft X-ray got a new boost from a source at the east limb. From Mar 23, several eastward CMEs were detected. On Mar 28, the magnetic imprint of an active region was visible in MDI magnetograms: Catania 19/NOAA AR 0865. Another sunspot group trailed behind and was visible on Mar 29: Catania 020/NOAA AR 0966. Up till now, both groups were only capable of producing A and B-flares with 19/0865 as the most active group.

II. Geomagnetic Activity

Once again, a similar story like previous months. If there is a geomagnetic disturbance, it originates from a coronal hole wind stream. Earth crossed 4 times a fast stream. From Mar 1 until Mar 18, SOHO/EIT was not available. We had no direct information about the coronal holes. We give a list of the periods with enhanced geomagnetic activity.

- Late Mar 06, early Mar 07, a coronal hole led to active conditions. The hole was not recurrent with only a small geo-effective part since the solar wind speed rose slightly above 400 km/s.
- Mar 09, ACE-data showed that the interaction region of a recurrent coronal had arrived at L1. Active conditions were recorded on Mar 10. The solar wind speed peaked at 550 km/s on Mar 11.
- A new fast stream was crossed by the Earth during a few hours on Mar 15, but the interplanetary magnetic field was oriented predominantly to the north, just causing the geomagnetic field to become temporarily unsettled.
- The major event of the month started late on Mar 18. After a first sharp rise to 550km/s, the solar wind accelerated further to 650 km/s, while the interplanetary magnetic field gained strength (10 nT) and turned southward. This triggered a moderate to major geomagnetic storm. This strong event was the response to a strong recurrent fast stream originating in a low-latitude coronal hole. The earth's magnetic field was subjected to the coronal hole output until Mar 22. Although the disturbance was announced, its magnitude largely exceeded the predictions based on the activity level recorded on the previous solar rotations.

III. Noticeable solar events

No M- or X-class flare occurred

IV. Halo CME list

No CME alert was sent

V. Picture of the month

On Mar 28, the SIDC launched a new website. The main page offers at a glance an overview of the relevant space weather information and the hot news. More detailed information is still available, as well as the archive of the daily usrsigrams, weekly and monthly bulletins.

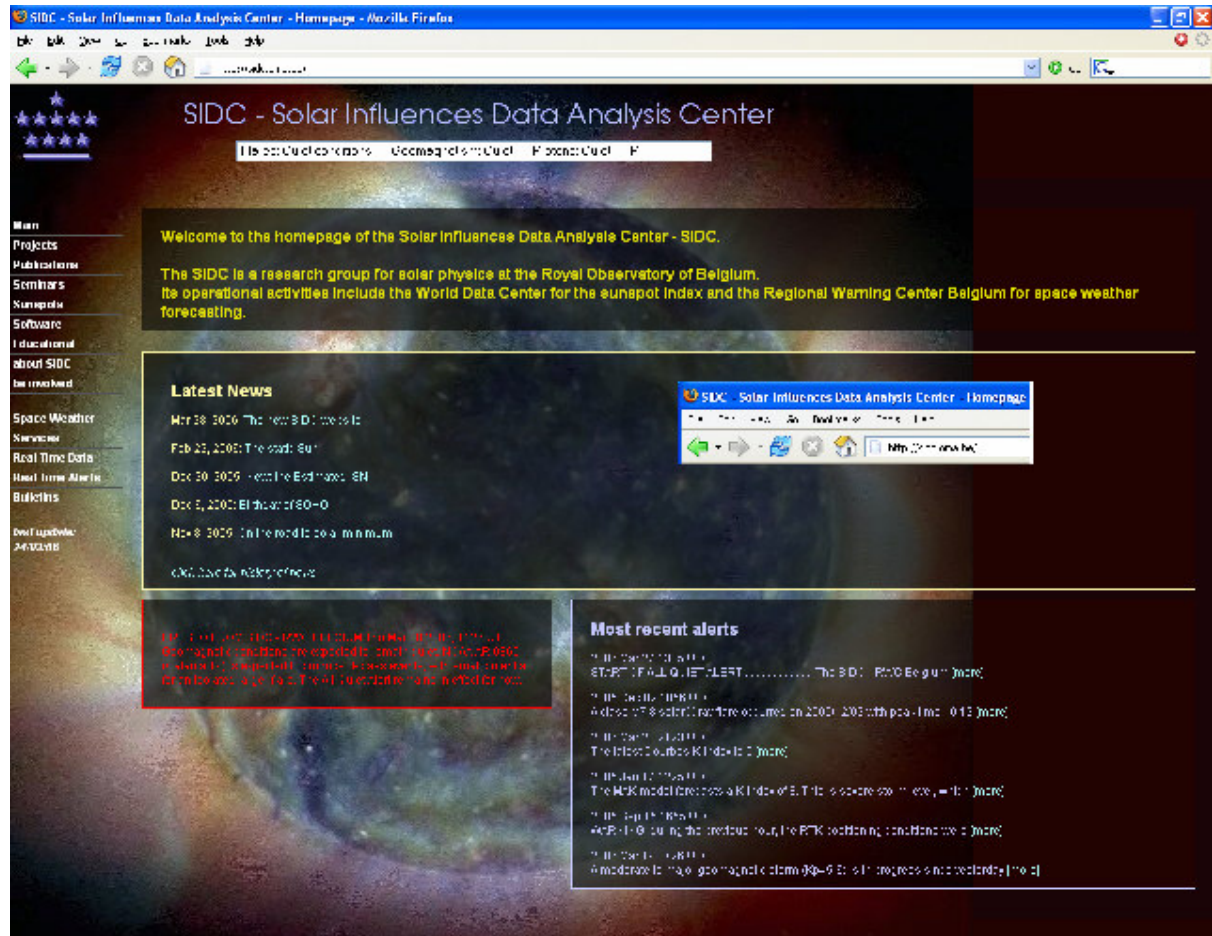


Figure 1 A snapshot of the new SIDC-website