

Center

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SUNSPOT BULLETIN

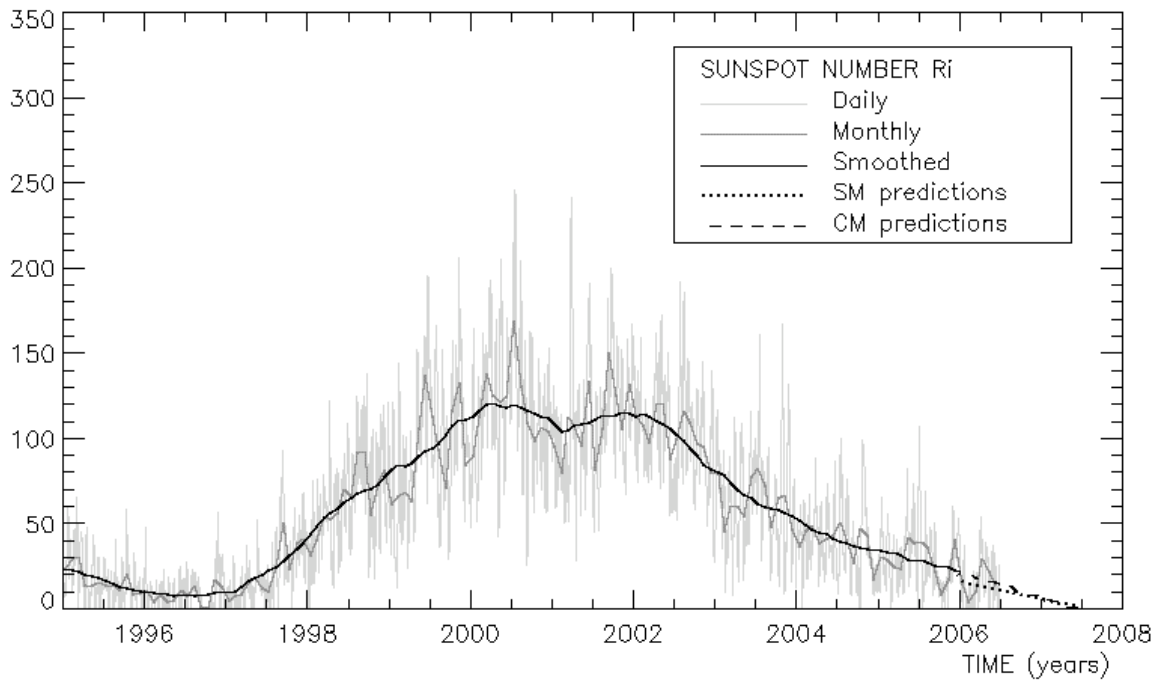
2006

n° 6

Provisional international and normalized hemispheric daily sunspot numbers for June 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	8	4	4
2	0	0	0
3	0	0	0
4	11	0	11
5	15	0	15
6	18	0	18
7	33	0	33
8	33	0	33
9	27	0	27
10	28	0	28
11	21	0	21
12	17	0	17
13	16	0	16
14	8	0	8
15	8	0	8
16	12	0	12
17	13	0	13
18	10	0	10
19	12	0	12
20	12	0	12
21	10	0	10
22	0	0	0
23	0	0	0
24	0	0	0
25	8	8	0
26	10	10	0
27	13	13	0
28	24	16	8
29	26	16	10
30	25	13	12
Monthly mean	13.9	2.7	11.2
Cooperating stations	48	40	40



Predictions of the monthly smoothed Sunspot Number
 using the last provisional value, calculated for December 2005 : 23.0 ($\pm 5\%$)

		SM	CM			SM	CM			SM	CM
2006	Jan	20	22	2006	Jul	14	15	2007	Jan	9	8
	Feb	19	21		Aug	13	14		Feb	8	5
	Mar	18	19		Sep	12	11		Mar	7	5
	Apr	17	18		Oct	11	10		Apr	7	2
	May	16	17		Nov	10	9		May	6	2
	Jun	15	16		Dec	10	9		Jun	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

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

Date	R' _i	PPSI	600	2800	COS	SFI	XI	Ak	SEA
31	27	6	-	78	////	0	0/0	6	
1	8	1	-	77	////	0	0/0	14	
2	0	0	-	75	////	0	0/0	8	
3	0	0	-	76	///	0	/0	7	
4	11	8	-	76	////	0	0/0	4	
5	15	13	-	78	////	0	0/0	4	
6	18	24	-	78	////	0	0/0	23	
7	33	48	-	83	////	1	0/0	24	
8	33	68	-	80	////	0	0/0	28	
9	27	82	-	78	////	0	0/0	14	
10	28	51	-	76	////	0	0/0	13	
11	21	28	-	74	////	0	0/0	8	
12	17	16	-	74	////	0	0/0	4	
13	16	14	-	77	////	0	0/0	4	
14	8	6	-	75	////	0	0/0	10	
15	8	3	-	76	////	0	0/0	26	
16	12	6	-	75	////	0	0/0	12	
17	13	5	-	73	////	0	0/0	12	
18	10	3	-	73	////	0	0/0	7	
19	12	7	-	73	////	0	0/0	2	
20	12	8	-	73	////	0	0/0	6	
21	10	11	-	73	////	0	0/0	5	
22	0	0	-	72	////	0	0/0	8	
23	0	1	-	72	////	0	0/0	3	
24	0	0	-	74	////	0	0/0	4	
25	8	1	-	74	////	0	0/0	7	
26	10	3	-	76	////	0	0/0	3	
27	13	6	-	79	////	0	0/0	8	
28	24	19	-	84	////	0	0/0	18	
29	26	33	-	86	////	0	0/0	17	
30	25	46	-	86	////	0	0/0	9	

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 : $1 \times \text{Sn} + 10 \times "1" + 100 \times ">1"$).
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 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 JUNE 2006

DATE	UT	NUMBER		RELATIVE SUNSPOT NUMBERS			PPSI 10-5 WM-2	QUAL	OBS
		OF GROUPS	OF SPOTS	TOTAL	NORTH	SOUTH			
2	1015	0	0	0	0	0	0.0	3	OB
3	715	0	0	0	0	0	0.0	3	OB
5	1010	1	10	20	0	20	7.7	2	AE
6	1340	2	20	40	0	40	13.7	3	AE
7	1330	2	33	53	0	53	57.4	2	AE
8	710	2	35	55	0	55	76.1	3	AE
9	735	2	29	49	0	49	87.1	3	AE
10	745	2	24	44	0	44	12.0	4	FC
11	815	2	16	36	0	36	12.0	3	FC
12	740	2	4	24	0	24	4.0	4	OB
13	650	2	6	26	0	26	1.6	4	OB
14	1000	1	1	11	0	11	0.7	1	OB
16	750	1	3	13	0	13	0.2	3	OB
17	820	1	4	14	0	14	0.3	3	DB
18	810	1	5	15	0	15	1.3	2	DB
19	1050	1	17	27	0	27	1.5	1	AE
20	750	1	16	26	0	26	1.5	2	AE
21	1500	1	4	14	0	14	0.4	2	AE
22	740	1	3	13	0	13	0.4	2	AE
23	700	0	0	0	0	0	0.0	3	AE
24	745	0	0	0	0	0	0.0	3	LR
26	1300	1	7	17	17	0	2.0	3	OB
28	655	2	22	42	30	12	17.0	4	OB
29	720	2	24	44	26	18	31.2	4	OB
30	730	2	21	41	20	21	38.8	2	AE

The relative mean sunspot number is 25.0.

NORMALISED UCCLE OBSERVATIONAL SUNSPOT NUMBERS $U'=K'U$ FOR JUNE 2006

$K' = 0.741$ (*)

1	***	7	39	13	19	19	20	25	***
2	0	8	41	14	8	20	19	26	13
3	0	9	36	15	***	21	10	27	***
4	***	10	33	16	10	22	10	28	31
5	15	11	27	17	10	23	0	29	33
6	30	12	18	18	11	24	0	30	30

The normalised relative monthly mean sunspot number is 18.

(*) 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 JUNE 2006
E AND F BRUNNER'S TYPE GROUPS

Uccle Nø	East Limb Date	Date and type 1st obs CMP Last obs	West Limb Date
1-2044	6 3.3	5 D 6 10.0 14 J	6 16.8

PROBABLE RETURN OF MAJOR GROUPS FOR JULY 2006
NONE

MONTHLY SUMMARY OF SOLAR AND GEOMAGNETIC ACTIVITY

I. Solar Activity

Solar activity was far from being spectacular this month. Two sunspot groups produced some small flares on their journey over the solar disk.

On June 04, Catania sunspot group 52 (NOAA AR 0892) came into sight at the East limb. Although this group was rather extended and had a $\beta\gamma$ magnetic configuration, it showed no significant activity. Only at the end of its passage over the solar disk (June 15-16), it fired 3 C-class flares.

The day after -June 17- three sunspot groups were still present. Nevertheless, the X-ray background radiation measured by GOES dropped even below the A-level and solar activity was completely absent. Late June 23, some coronal loops of a newly approaching active region became visible over the east limb. From June 24 onwards, several B-flares were recorded. The responsible sunspot group was Catania 59 (NOAA AR 0897) but the group stayed quiet during the rest of the month.

There were no (partial) halo CME's captured by CACTus this month. There was a nice prominence eruption in the southern hemisphere near the central meridian on June 25. The corresponding slow CME did not have an Earth-directed component.

In the first half of the month, no EIT images were available. Only from June 15, we had again a view on coronal holes in the 28.4nm band pass of EIT. After June 15, only two coronal holes were observed with EIT. A recurrent coronal hole passed the central meridian on June 25. Part of it was located at the equator, the rest in the northern hemisphere. The second CH was located 45° to the east of the central meridian on June 30.

II. Geomagnetic Activity

The absence of EIT hampered the forecast. Predictions were therefore largely based recurrence arguments. Once again, it were coronal holes causing all the geomagnetic disturbances this month.

On June 01, NOAA/Boulder announced an active period ($K_p=4$) due to the presence of a large recurrent coronal hole in the southern hemisphere.

On June 06, again a recurrent northern coronal hole put its imprint in the solar wind data of the ACE spacecraft at L1. The solar wind speed increased up till 700 km/s. On June 06, 07 and half of June 08, we had active geomagnetic conditions, with two periods of $K_p=5$. The solar wind slowed down from June 09 onwards down to 350 km/s on June 13. Soon thereafter, early June 14, a co-rotating interaction region was observed at L1. The interplanetary magnetic field (IMF) became 10nT. The solar wind emanating from the coronal hole reached a maximum value of 600 km/s from June 15 onwards. On June 15, K_p was 5 for two periods. June 17, K_p reached a value of 4 once. This short living geomagnetic disturbance was caused by the z-component of the IMF that fluctuated to more negative values for quarter of a day. The solar wind carrying this magnetic field orientation had still an enhanced speed. On June 21, the speed reached the value of 300 km/s. On June 28, active conditions were measured. These were caused by the coronal hole passing the central meridian on June 25.

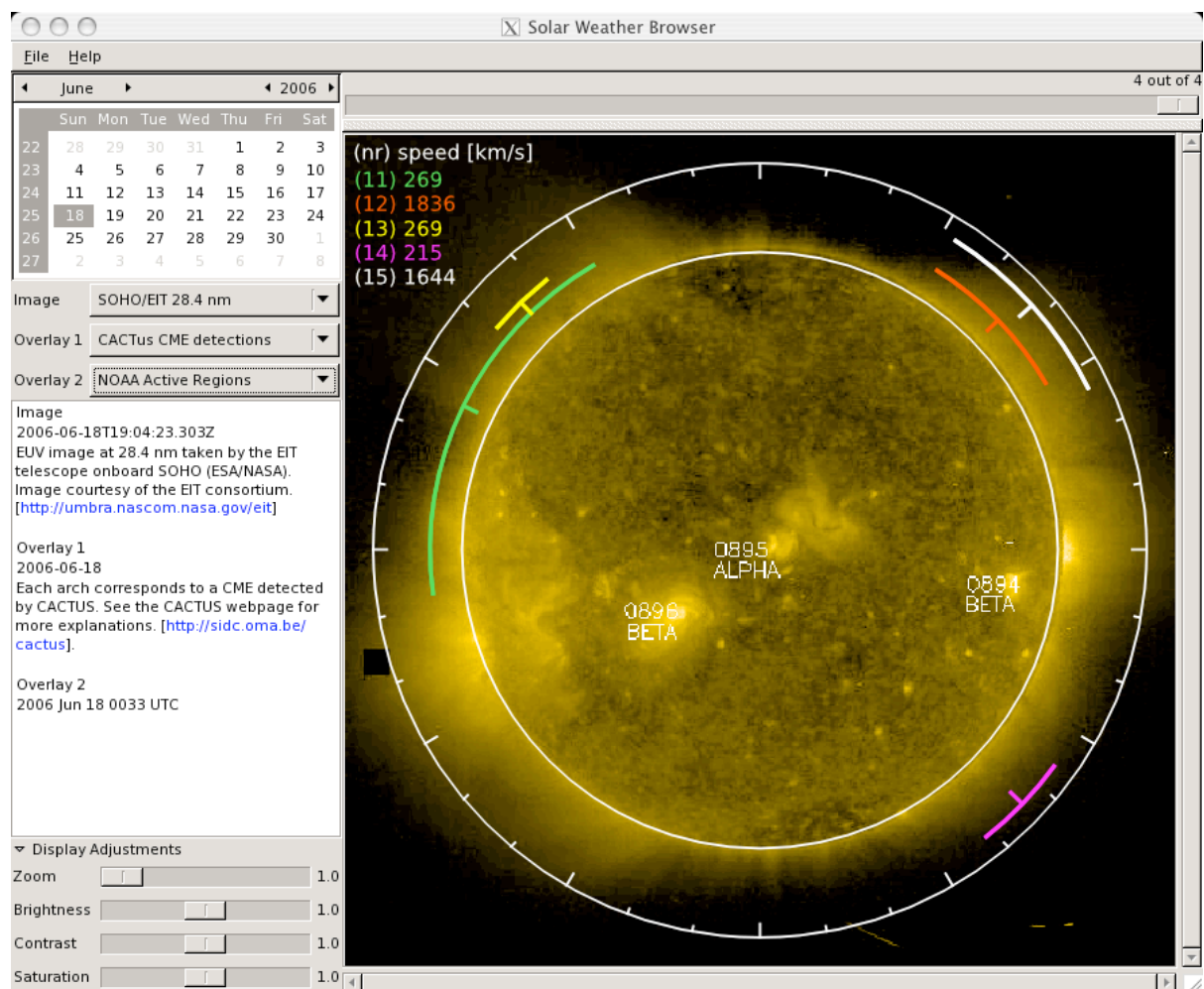
III. Noticeable solar events

No M- or X-class flare occurred

IV. Halo CME list

No CME alert was sent

IV. Picture of the Month



The Solar Weather Browser (SWB) is an open-source software package developed at the SIDC for easy visualisation of solar images. It allows the user to select from a variety of images and interactively overlay context information. The example above shows an EIT 28.4nm image, overlaid with CME occurrences (speed and direction) and NOAA active region locations. Other selectable combinations include –among others– ground-based data (white light, H-alpha), magnetograms, coronagraph images, sunspot groups and classification and flare occurrences. The SWB package is available for all major operating systems (MS Windows, Mac OS X and Linux) and can be downloaded free of any charge at: <http://sidc.be/SWB>