

Center

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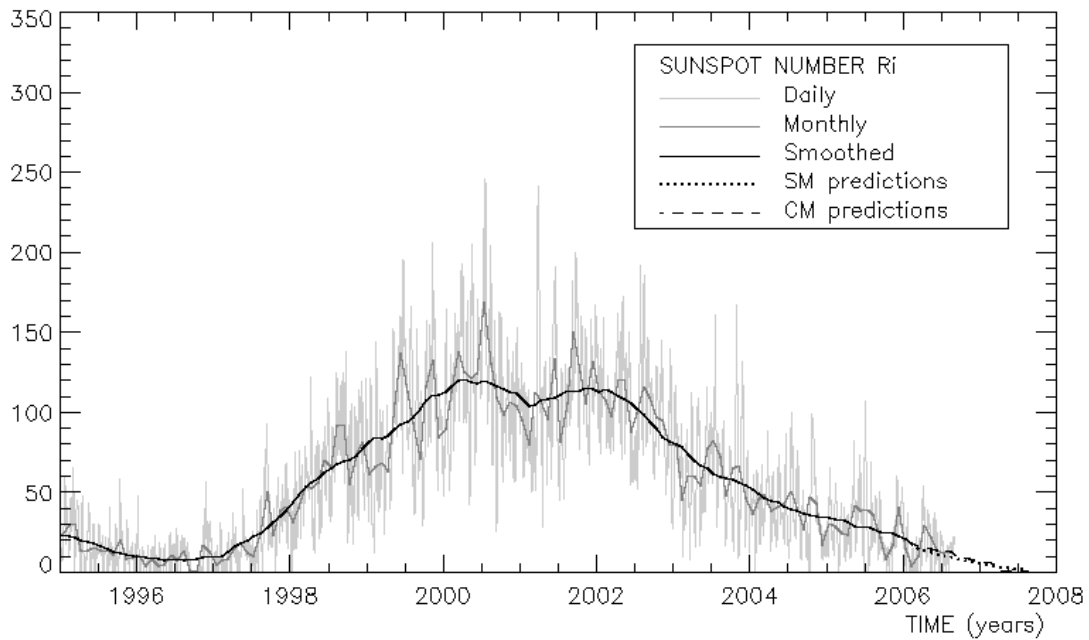
SUNSPOT BULLETIN

2006 n° 8

Provisional international and normalized hemispheric daily sunspot numbers for August 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	7	0	7
2	7	0	7
3	9	0	9
4	0	0	0
5	0	0	0
6	0	0	0
7	0	0	0
8	7	0	7
9	16	0	16
10	17	0	17
11	16	0	16
12	15	0	15
13	16	0	16
14	19	0	19
15	19	0	19
16	19	0	19
17	17	0	17
18	19	0	19
19	15	0	15
20	10	0	10
21	16	0	16
22	9	0	9
23	12	0	12
24	12	0	12
25	15	0	15
26	14	0	14
27	21	0	21
28	22	0	22
29	17	0	17
30	12	0	12
31	22	0	22
Monthly mean	12.9	0.0	12.9
Cooperating stations	53	46	46



Predictions of the monthly smoothed Sunspot Number
 using the last provisional value, calculated for February 2006 : 18.6 (\pm 5%)

	SM	CM		SM	CM		SM	CM
2006 Mar	18	17	2006 Sep	12	11	2007 Mar	7	5
Apr	17	16	Oct	11	10	Apr	7	2
May	16	15	Nov	10	9	May	6	2
Jun	15	14	Dec	10	8	Jun	5	2
Jul	14	14	2007 Jan	9	7	Jul	4	2
Aug	13	13	Feb	8	7	Aug	3	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, September 1, 2006 10:39 UT

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

Date	R' _i	PPSI	600	2800	COS	SFI	XI	Ak
31	15	4	-	72	////	0	0/0	17
1	7	4	-	73	////	0	0/0	14
2	7	2	-	72	////	0	0/0	14
3	9	1	-	71	////	0	0/0	6
4	0	0	-	70	////	0	0/0	2
5	0	0	-	70	////	0	0/0	4
6	0	0	-	70	////	0	0/0	5
7	0	0	-	70	////	0	0/0	3
8	7	2	-	71	////	0	0/0	14
9	16	16	-	74	////	0	0/0	14
10	17	21	-	80	////	7	0/0	4
11	16	140	-	84	////	1	0/0	7
12	15	236	-	85	////	0	0/0	8
13	16	346	-	86	////	0	0/0	3
14	19	455	-	86	////	0	0/0	4
15	19	///	-	86	////	0	0/0	5
16	19	631	-	86	////	1	0/0	4
17	17	298	-	86	////	0	0/0	7
18	19	273	-	89	////	0	0/0	18
19	15	269	-	89	////	0	0/0	32
20	10	100	-	88	////	1	0/0	26
21	16	10	-	88	////	0	0/0	16
22	9	29	-	81	////	0	0/0	26
23	12	82	-	78	////	1	0/0	6
24	12	122	-	78	////	0	0/0	8
25	15	199	-	77	////	0	0/0	2
26	14	380	-	76	////	1	0/0	3
27	21	433	-	79	////	0	0/0	19
28	22	211	-	76	////	0	0/0	14
29	17	96	-	73	////	0	0/0	10
30	12	61	-	74	////	0	0/0	8
31	22	107	-	83	////	0	0/0	10

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).

SOLAR PHYSICS DEPARTMENT

UCCLE DAILY PROVISIONAL RELATIVE SUNSPOT NUMBERS FOR AUGUST 2006

DATE	UT	NUMBER		RELATIVE SUNSPOT NUMBERS			PPSI 10-5 WM-2	QUAL	OBS	
		OF GROUPS	OF SPOTS	TOTAL	NORTH	SOUTH				CENTRAL
1	1500	1	3	13	0	13	0	0.2	3	AE
2	1030	1	1	11	0	11	0	0.1	2	AE
3	845	2	2	22	0	22	0	0.2	3	AE
4	1445	0	0	0	0	0	0	0.0	3	AE
5	945	1	1	11	0	11	0	0.1	3	AE
6	1045	0	0	0	0	0	0	0.0	3	AE
7	845	0	0	0	0	0	0	0.0	3	AE
8	820	1	1	11	0	11	0	0.1	3	AE
10	1530	3	17	47	0	47	12	16.2	3	AE
16	900	1	21	31	0	31	31	92.0	3	AE
17	1130	1	25	35	0	35	0	81.7	3	AE
18	1215	2	23	43	0	43	0	68.0	3	AE
19	730	1	19	29	0	29	0	3.2	3	OB
21	750	2	4	24	0	24	0	1.7	3	FC
22	1030	1	5	15	0	15	0	5.9	4	OB
23	745	1	9	19	0	19	0	29.1	3	OB
24	1415	1	10	20	0	20	0	48.7	3	OB
25	1500	1	13	23	0	23	23	59.9	2	OB
26	910	1	10	20	0	20	20	63.8	3	LR
27	1045	1	19	29	0	29	29	97.5	3	LR
28	1300	1	36	46	0	46	46	91.1	3	OB
29	1500	1	15	25	0	25	0	4.7	4	OB
30	820	1	10	20	0	20	0	17.4	3	OB

The relative mean sunspot number is 21.5.

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

K' = 0.747 (*)

1	10	7	0	13	***	19	22	25	17
2	8	8	8	14	***	20	***	26	15
3	16	9	***	15	***	21	18	27	22
4	0	10	35	16	23	22	11	28	34
5	8	11	***	17	26	23	14	29	19
6	0	12	***	18	32	24	15	30	15
								31	***

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 AUGUST 2006
E AND F BRUNNER'S TYPE GROUPS

Uccle No	East Limb		Date and type			West Limb	
	Date		1st obs	CMP	Last obs	Date	
4-2046	8	8.9	10 E	8 15.7	18 F	8	22.4
1-2047	8	20.2	21 C	8 27.0	28 F	9	2.7

PROBABLE RETURN OF MAJOR GROUPS FOR SEPTEMBER 2006
NONE

MONTHLY SUMMARY OF SOLAR AND GEOMAGNETIC ACTIVITY

I. Solar Activity

There were only two sunspot groups that dominated the solar disk this month: Catania sunspot group 69 (NOAA AR 0904) and 72 (NOAA AR 0905). SOHO/EIT had a CCD-camera bake-out from Aug 19 onwards.

On Aug 08 Catania sunspot group 69 (NOAA AR 0904) appeared on the east limb causing a significant increase of the background X-ray radiation. In the neighbourhood of the group, evidence of plasma eruptions was seen three times in SOHO/EIT195. The first such sign of a CME was a coronal dimming seen on Aug 14. The corresponding CME was too weak and vague to be captured by LASCO. A second eruption could be identified on Aug 16 around 07:00 UT. The accompanying partial halo CME was rather slow and not earth-directed. The main event in this sunspot group, a long duration C3.6-class flare, peaked at 16:17UT on Aug 16. The group was at that moment located at the central meridian in the southern hemisphere. A coronal dimming and post-flare loops were visible in SOHO/EIT195. The corresponding CME had an angular width of 210° and an apparent speed of 1078 km/s. From Aug 19 until Aug 21, the group still produced several confined C-flares.

At the time of the disappearance of Catania 69 at the west limb on Aug 22, a new group turned on the solar disk in the east: Catania 72 (NOAA AR 0905). The main achievement of this group was a C2.5 flare on Aug 26, which was accompanied by a partial halo CME observed by SOHO/LASCO. GOES-12/SXI showed a coronal dimming and a post-eruption arcade in the active region. At that time, the group was situated near the disk center. CACTUS reported the CME speed around 480 km/s.

We counted 4 coronal holes (CH) this month influencing the earth's magnetosphere. Three of them were visible in EIT pictures. The first CH passed the central meridian on Jul 29, the second slightly southern CH passed on Aug 03 and the third rather small southern CH passed on Aug 18. The last CH was not visible anymore because of the CCD bake-out.

II. Geomagnetic Activity

We counted 7 periods of geomagnetic activity this month. Different from previous months, several ICMEs caused most of the disturbances.

The first week of the month suffered only a small geomagnetic disturbance: the estimated K_p reached 4 twice on Aug 01. The cause of this disturbance was a CH, the first one mentioned in the section 'Solar Activity'. On Aug 07, the solar wind emanating from the second CH was measured by ACE to be 700 km/s. This pushed the estimated K_p up to 5 and 6, i.e. minor to major storm. Later on Aug 08, conditions settled again to quiet.

On Aug 18-19, two shocks were seen in ACE data. The shock of Aug 18 passed the L1 point around 15:30UT and was probably driven by the interplanetary coronal mass ejection (ICME) corresponding to the eruption observed by SOHO/EIT on Aug 14 emanating from Catania sunspot region 69 (NOAA AR 0904). The plasma cloud itself seems to have missed earth and only the shock heading in front of the cloud arrived. The second shock was detected by ACE around 10:50UT on Aug 19 by ACE and was followed by an ICME probably corresponding to the full halo CME of Aug 16. The ICME resulted in a geomagnetic storm with a NOAA estimated K_p of 6. The interplanetary magnetic field carried by the solar wind turned positive again on Aug 20, which hallmarked the end of the storm. One day later, Aug 21, another disturbance was on its way. This time, the source was the third CH with an imbedded Bz component fluctuating from positive to negative values resulting in active conditions for two days.

The last period of disturbed geomagnetic conditions was from Aug 27 until Aug 28 and was again induced by the solar wind stream emanating from the last coronal hole.

During Aug 31, the earth passed through a slow ICME produced by a halo CME observed on Aug 26. Although the IMF was directed southward for some time, only weak geomagnetic disturbances were reported (peak K index of 3 by Dourbes and NOAA, 4 by Izmiran).

III. Noticeable solar events

No M- or X-class flare occurred.

IV. Halo CME list

onset time	e-mail time CACTus	da	e-mail time LASCO	e-mail time FF	Ass. Events	consequences
08/05 01:54	08/05 15:33	214	-	-	-	-
08/07 01:54	-	-	08/08 15:05	-	backsided	-
08/16 07:54	-	-	08/16 18:40	-	B-flares @ 0904	-
08/16 16:30	08/16 21:31	210	08/17 12:20	08/17 02:40	LDE C3.6 @ 0904	08/19, minor storm
08/26 20:48	08/27 22:49	204	08/28 12:45	08/28 18:48	C2.5 @ 0904	08/31, active intervals, weak

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

FF: Fearless Forecast (a NOAA trial service)

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