Solar Influences Data analysis Center

Data Analysis Service supported by the FAGS

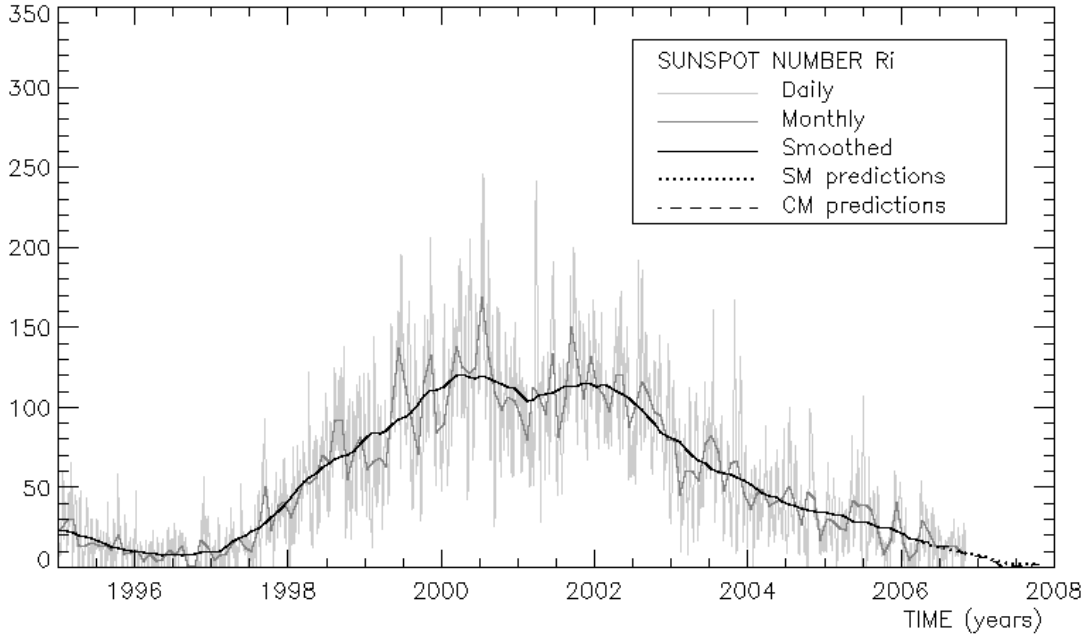
SUNSPOT BULLETIN

2006 n°10

Provisional international and normalized hemispheric daily sunspot numbers for October 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	25	0	25
2	23	0	23
3	16	0	16
4	16	0	16
5	17	0	17
6	16	0	16
7	16	0	16
8	15	0	15
9	15	0	15
10	10	0	10
11	0	0	0
12	0	0	0
13	0	0	0
14	0	0	0
15	0	0	0
16	0	0	0
17	0	0	0
18	0	0	0
19	10	0	10
20	10	0	10
21	11	0	11
22	15	0	15
23	27	0	27
24	21	0	21
25	10	0	10
26	0	0	0
27	8	4	4
28	10	5	5
29	0	0	0
30	9	0	9
31	23	0	23
Monthly mean	**10.4**	**0.3**	**10.1**
Cooperating stations	**52**	**47**	**47**



Predictions of the monthly smoothed Sunspot Number
using the last provisional value, calculated for April 2006 : 17.1 (± 5%)

	SM	CM		SM	CM		SM	CM
2006 May	16	16	2006 Nov	12	9	2007 May	7	2
Jun	16	15	Dec	12	8	Jun	6	2
Jul	16	14	2007 Jan	11	7	Jul	4	2
Aug	15	14	Feb	10	7	Aug	4	2
Sep	14	13	Mar	9	5	Sep	3	2
Oct	13	10	Apr	8	2	Oct	2	3

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	25	14	-	78	////	1	0/0	16	
1	25	11	-	78	////	0	0/0	23	
2	23	12	-	78	////	0	0/0	8	
3	16	11	-	77	////	0	0/0	10	
4	16	12	-	77	////	0	0/0	6	
5	17	11	-	77	////	1	0/0	6	
6	16	8	-	76	////	0	0/0	2	
7	16	6	-	77	////	0	0/0	14	
8	15	3	-	75	////	0	0/0	8	
9	15	3	-	75	////	0	0/0	7	
10	10	3	-	75	////	0	0/0	3	
11	0	0	-	74	////	0	0/0	3	
12	0	0	-	74	////	0	0/0	7	
13	0	0	-	73	////	0	0/0	3	
14	0	0	-	72	////	0	0/0	28	
15	0	0	-	71	////	0	0/0	15	
16	0	1	-	70	////	0	0/0	8	
17	0	0	-	70	////	0	0/0	4	
18	0	0	-	70	////	0	0/0	5	
19	10	6	-	70	////	0	0/0	2	
20	10	6	-	71	////	1	0/0	13	
21	11	13	-	75	////	0	0/0	26	
22	15	22	-	76	////	0	0/0	19	
23	27	19	-	76	////	0	0/0	6	
24	21	7	-	75	////	0	0/0	6	
25	10	1	-	75	////	0	0/0	4	
26	0	0	-	72	////	0	0/0	3	
27	8	2	-	72	////	0	0/0	5	
28	10	4	-	75	////	0	0/0	15	
29	0	0	-	73	////	0	0/0	27	
30	9	3	-	76	////	1	0/0	12	
31	23	17	-	80	////	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/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 OCTOBER 2006

DATE	UT	NUMBER OF GROUPS	NUMBER OF SPOTS	RELATIVE SUNSPOT NUMBERS TOTAL	NORTH	SOUTH	CENTRAL	PPSI 10-5 WM-2	QUAL	OBS
1	1440	4	6	46	11	35	0	2.5	3	DB
2	1415	2	5	25	0	25	0	2.2	2	AE
3	1045	2	5	25	0	25	25	2.4	2	AE
4	1130	2	8	28	0	28	28	2.4	2	AE
5	800	2	10	30	0	30	12	2.2	3	AE
7	945	2	3	23	0	23	0	1.5	2	AE
8	1000	2	2	22	0	22	0	0.9	3	AE
9	1015	2	4	24	0	24	12	0.4	3	OB
10	1230	1	4	14	0	14	14	1.4	3	OB
11	1100	0	0	0	0	0	0	0.0	3	OB
12	750	0	0	0	0	0	0	0.0	3	OB
13	1100	0	0	0	0	0	0	0.0	4	OB
15	1030	0	0	0	0	0	0	0.0	4	OB
16	1245	2	4	24	11	13	0	0.5	2	AE
17	1315	0	0	0	0	0	0	0.0	2	AE
18	1200	0	0	0	0	0	0	0.0	2	AE
19	1345	0	0	0	0	0	0	0.0	2	AE
20	1445	1	8	18	0	18	18	5.8	3	AE
22	1140	1	10	20	0	20	0	15.5	2	LR
24	1540	1	4	14	0	14	0	0.3	2	OB
25	930	0	0	0	0	0	0	0.0	1	OB
26	1055	0	0	0	0	0	0	0.0	3	OB
27	830	1	2	12	0	12	12	0.4	3	AE
29	940	0	0	0	0	0	0	0.0	3	DB
30	1345	1	5	15	0	15	0	0.5	3	AE
31	1300	2	10	30	0	30	0	12.9	2	AE

The relative mean sunspot number is 14.2.

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

K'= 0.831 (*)

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

The normalised relative monthly mean sunspot number is 12.

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

The Sun has been observed 26 days on 31 possible.

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

NONE

PROBABLE RETURN OF MAJOR GROUPS FOR NOVEMBER 2006
NONE

MONTHLY SUMMARY OF SOLAR AND GEOMAGNETIC ACTIVITY

I. Solar Activity

The activity level in October did not deviate from that in other recent months. The Sun is still heading for solar minimum and showed almost no flaring activity. No C, M or X-flares occurred this month.

In the first part of the month, the solar disk was occupied by 2 to 3 sunspot groups. NOAA registered two active regions, 0913 and 0914. The transit over the solar disk of those groups involved only some A and B-flares. This pair of active regions rotated off the solar disk on Oct 09. The GOES X-ray curve became monotonously flat in the period between Oct 08 and 21 except on Oct 13-14 when 5 isolated A/B flares occurred, originating from plage area 0916 in the west. From Oct 21, the X-ray background radiation rose to A2-A3. Sunspot group 88 (NOAA AR 0917) emerged at the disk center on Oct 19 and grew rapidly, pushing up the X-ray radiation. Its size remained limited, resulting in only a few B-flares on Oct 22, despites its magnetic beta-gamma configuration. On the last day of the month, sunspot groups 93 and 94 (NOAA AR 0921, 0922) appeared on the eastern side and were responsible for new A and B flaring activity from that side of the disk.

Four geo-effective coronal holes transited across the solar disk. A first small, northern coronal hole passed the central meridian on Oct 04. The second equatorial coronal hole passed this line on Oct 10. The third coronal hole was clearly visible in EIT images as a rather big hole, mainly situated in the northern hemisphere. This recurrent feature passed the central meridian on Oct 17. The last hole, also recurrent, had the shape of an upside down 'y', noticeable from EIT pictures of Oct 23. A first part passed the central meridian on that day.

On Oct 11 a filament erupted in the SE. EIT304 captured this coronal activity (see picture of the month). Another filament located around NOAA AR 0917 erupted. The evidence was given by two subsequent Hα pictures on Oct 21 and Oct 22 from Kanzelhöhe Observatory in Austria in which the filament disappeared. The associated slow and faint CME was directed to the SW. Another remarkable event took place on late 22/early 23 Oct. A faint halo CME was captured by LASCO but is was established to be a back sided event. The CME was not noticed by CACTus, nor by real-time SOHO-LASCO operations.

II. Geomagnetic Activity

October 2006 was a typical month in solar minimum: geomagnetic disturbances were all caused by enhanced solar wind speed emanating from coronal holes.

In the beginning of the month, the Earth was situated in a fast flow of a coronal hole passing the central meridian on Sep 26. The influence was masked by the arrival of a CME on Sep 30. From 08:00 UT on Oct 01, a coronal hole signature was visible in the solar wind measurements of ACE with e.g. decreased density and a high temperature level.

The second disturbance was associated with the second coronal hole mentioned above.
The interaction region between the fast and slow wind flow with enhanced density arrived on Oct 07. It was followed by the fast flow itself on Oct 07-08. Geomagnetic consequences were limited: on Oct 07 one interval of K=4 was reported by Dourbes, NOAA estimated also only one interval of Kp=4, Izmiran reported two K=4 periods.

Late Oct 19, Earth entered a recurrent fast stream originating from the third coronal hole mentioned above. The strong southward fluctuation of the Bz component of the interplanetary magnetic field resulted in unsettled geomagnetic conditions. Only on Oct 21 and early Oct 22, one active and one minor storm period occurred.

The last period of geomagnetic disturbances was caused by the fourth coronal hole. The fast stream from this coronal hole encountered Earth from Oct 27. Initially, the Bz peaked only briefly around -10nT. Except from this period, Bz was weak and only intermittent southwards.
The Kp index reached only 4 on Oct 28 and 29 for 6 periods.

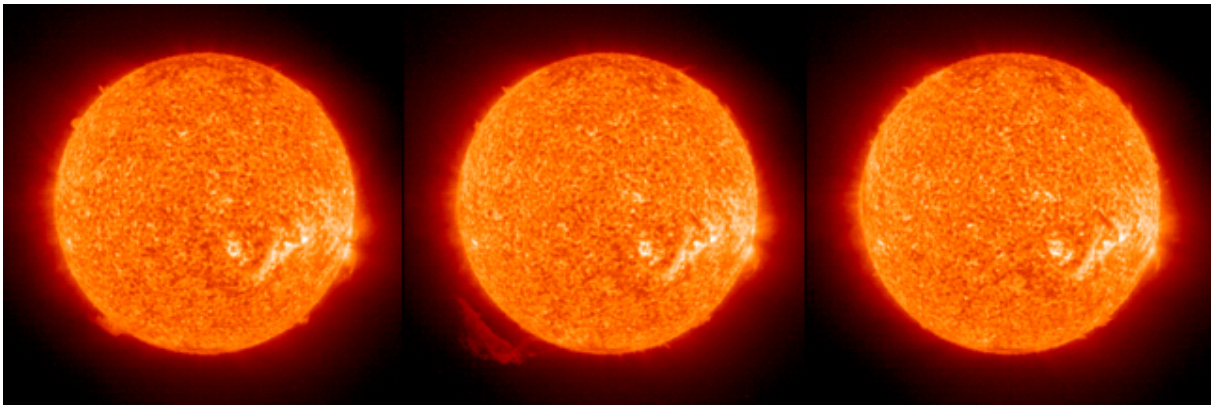
III. Noticeable solar events

No M- or X-class flare occurred.

IV. Halo CME list

No CME alert was sent.

V. Picture of the Month



A sequence of three SOHO/EIT304 pictures dating from Oct 11, 2006, at 07:18UT, 13:20 UT and 19:18 UT respectively. The sequence shows a filament eruption at the SE limb of the solar disk. .