Solar Influences Data analysis Center

Data Analysis Service supported by the FAGS

SUNSPOT BULLETIN

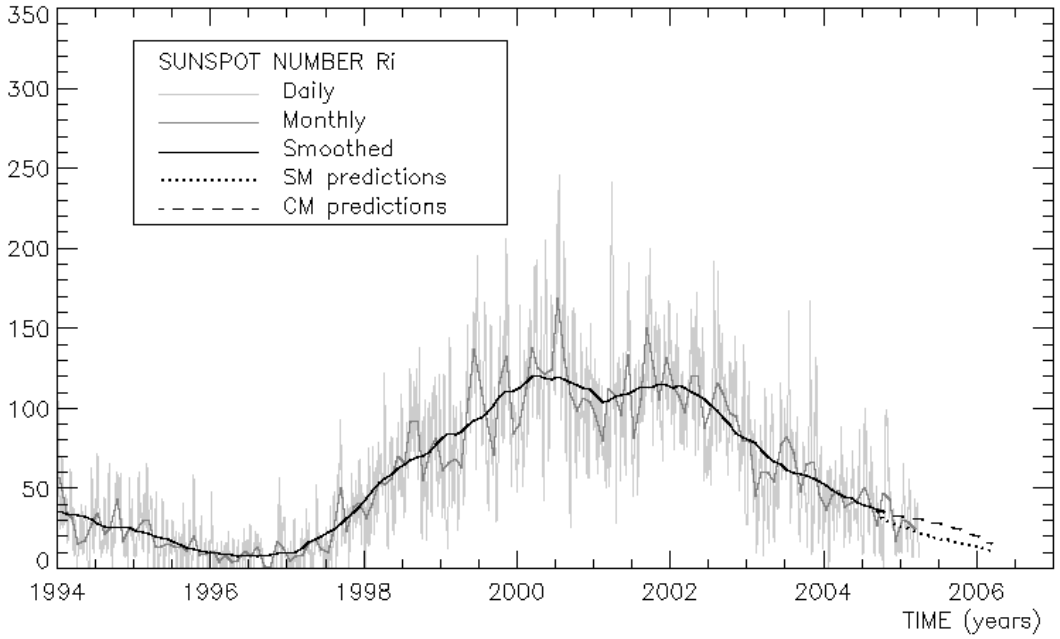
2005 n° 3

Provisional international and normalized hemispheric daily sunspot numbers for March 2005

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	4	3
2	8	0	8
3	9	0	9
4	8	8	0
5	9	9	0
6	10	10	0
7	18	10	8
8	33	11	22
9	38	14	24
10	41	12	29
11	43	17	26
12	42	10	32
13	42	10	32
14	40	9	31
15	37	8	29
16	28	0	28
17	25	0	25
18	25	0	25
19	26	0	26
20	25	0	25
21	30	8	22
22	28	13	15
23	32	17	15
24	41	19	22
25	34	15	19
26	26	12	14
27	22	10	12
28	10	10	0
29	9	9	0
30	7	4	3
31	15	15	0
Monthly mean	**24.8**	**8.5**	**16.3**
Cooperating stations	**44**	**38**	**38**

The definitive yearly sunspot number for 2004 is 40.4



Predictions of the monthly smoothed Sunspot Number

using the last provisional value, calculated for September 2004 : 37.5 (± 5%)

	SM	CM		SM	CM		SM	CM
2004 Oct	37	36	2005 Apr	27	31	2005 Oct	19	25
Nov	35	34	May	25	30	Nov	18	23
Dec	33	34	Jun	24	29	Dec	17	21
2005 Jan	31	33	Jul	22	28	2006 Jan	17	20
Feb	30	32	Aug	21	27	Feb	16	18
Mar	28	32	Sep	20	26	Mar	15	16

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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Ed. Ronald Van der Linden, avenue Circulaire, 3 B-1180 BRUXELLES - BELGIUM
Fax 32-(0)2-373 02 24 Tel 32-(0)2-373 04 91
e-mail : arille@oma.be, ronald@oma.be
ftp anonymous : omaftp.oma.be, directory dist/astro/sidcdata
http://sidc.oma.be

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

Date	R'_i	PPSI	600	2800	COS	SFI	XI	Ak	SEA
28	7	1	33	///	900	0	0/0	14	
1	7	2	-	74	902	0	0/0	12	
2	8	4	32	75	901	0	0/0	16	
3	9	3	33	77	903	0	0/0	//	
4	8	2	32	79	907	0	0/0	3	
5	9	5	31	81	907	0	0/0	16	
6	10	5	33	84	899	1	0/0	36	
7	18	10	34	87	902	0	0/0	40	
8	33	11	35	94	904	0	0/0	32	
9	38	34	37	100	905	3	0/0	30	
10	41	50	40	102	903	0	0/0	16	
11	43	76	40	105	904	0	0/0	6	
12	42	97	42	110	903	0	0/0	5	
13	42	116	43	114	905	0	0/0	8	
14	40	118	48	112	911	1	0/0	21	
15	37	116	44	108	908	1	0/0	6	
16	28	89	42	105	912	1	0/0	8	
17	25	64	41	101	944	2	0/0	17	
18	25	44	40	96	////	0	0/0	15	
19	26	50	37	93	895	1	0/0	11	
20	25	35	37	89	899	1	0/0	4	
21	30	27	36	90	894	2	0/0	9	
22	28	22	36	87	898	0	0/0	4	
23	32	30	36	88	900	0	0/0	5	
24	41	32	35	87	905	1	0/0	8	
25	34	50	34	82	901	1	0/0	23	
26	26	34	33	78	903	0	0/0	14	
27	22	22	33	78	899	0	0/0	18	
28	10	11	33	80	896	0	0/0	8	
29	9	3	33	79	894	0	0/0	5	
30	7	1	33	78	898	0	0/0	8	
31	15	2	32	77	903	0	0/0	11	

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 MARCH 2005

DATE	UT	NUMBER OF GROUPS	NUMBER OF SPOTS	RELATIVE SUNSPOT NUMBERS TOTAL	NORTH	SOUTH	CENTRAL	PPSI 10-5 WM-2	QUAL	OBS
4	840	1	1	11	11	0	0	0.8	2	OB
5	1515	1	1	11	11	0	0	2.2	1	AB
6	930	1	3	13	13	0	0	2.7	2	AB
10	1004	3	30	60	17	43	17	24.7	3	OB
12	945	3	33	63	17	46	35	77.2	3	FC
13	1105	3	44	74	16	58	58	78.6	3	FC
14	1400	3	8	38	13	25	25	72.1	2	OB
15	820	3	22	52	12	40	40	65.3	3	OB
16	815	2	19	39	23	16	16	48.2	3	ST
17	1210	2	13	33	0	33	16	7.5	3	OB
18	1307	2	13	33	0	33	0	5.3	3	ST
21	820	3	13	43	12	31	18	26.6	3	OB
23	720	2	26	46	24	22	22	19.5	3	OB
25	800	4	26	66	35	31	44	44.4	3	ST
26	1210	3	11	41	23	18	41	46.7	3	ER
29	1205	1	2	12	12	0	0	3.3	3	OB
30	700	0	0	0	0	0	0	0.0	2	FC
31	910	2	2	22	11	11	11	0.4	3	OB

The relative mean sunspot number is 36.5.

NORMALISED UCCLE OBSERVATIONAL SUNSPOT NUMBERS U'=K'U FOR MARCH 2005

K'= 0.811 (*)

1	***	7	***	13	60	19	***	25	54
2	***	8	***	14	31	20	***	26	33
3	***	9	***	15	42	21	35	27	***
4	9	10	49	16	32	22	***	28	***
5	9	11	***	17	27	23	37	29	10
6	11	12	51	18	27	24	***	30	0
								31	18

The normalised relative monthly mean sunspot number is 30.

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

The Sun has been observed 18 days on 31 possible.

UCCLE OBSERVATIONAL MAJOR SUNSPOT GROUPS FOR MARCH 2005
E AND F BRUNNER'S TYPE GROUPS

Uccle Nø	East Limb Date	Date and type 1st obs	CMP	Last obs	West Limb Date
4-2027	3 6.2	10 D	3 13.0	15 E	3 19.7
6-2027	3 6.3	76 E	3 13.1	16 E	3 19.8

PROBABLE RETURN OF MAJOR GROUPS FOR APRIL 2005
NONE

MONTHLY SUMMARY OF SOLAR AND GEOMAGNETIC ACTIVITY

I. Solar Activity

This month saw very little in the way of solar activity. Both sunspot counts and flaring activity were very low, in particular at the beginning and the end of the month. The largest flare of the month was a C7.3 flare on March 10.

At the start of the month, the sun was nearly spotless. There were two very small active regions near the equator, producing no flares. The northern hemisphere was dominated by a very large recurrent coronal hole, which became geo-effective on Mar 06. From late Mar 02 onwards, the increase in the background X-ray flux indicated the return of active region NOAA 0732 (which was very active two rotations before, then named NOAA 0720). Showing up on disk on Mar 04 as Catania sunspot group 38 (NOAA 0741), it became once again the dominant region on the disk, although on the current rotation it only produced (about 10) C-flares.

On Mar 07, Catania 40 (NOAA 0742) showed up in the east, growing steadily to average size over the next few days week, but without producing more than a few B-flares initially. It was followed a few days later by Catania 41 (NOAA 0743). On Mar 10, Catania 38 started to decay, but it generated also its largest flare (and the largest flare of the whole month) on this day. Though in decay, it took temporarily a beta-gamma magnetic configuration on Mar 12, producing several small C-flares before rotating out of view on Mar 16.

The solar flaring level continued at the C-class level due to the average-sized sunspot groups Catania 40 and 41. Both also achieved beta-gamma configurations (on Mar 17 and 19 respectively) as they approached the west limb. They rotated from view on Mar 20 and 23. After that, flaring activity became even lower, with just a bunch of B-flares and one more C-flare on Mar 24 from Catania sunspot group 44 (NOAA 0745). On the next day, the X-ray background decreased to the low A-level and the sun showed basically no more flaring activity for the rest of the month, with again a nearly spotless disk. A large low latitude northern coronal hole and the lack of significant active regions were responsible for very low 10cm flux measurements (below 80).

II. Geomagnetic Activity

As is typical for the current (descending) phase of the solar cycle, geomagnetic conditions were this month dominated by the influence of a chain of recurrent coronal holes. Most of the time, the effects were mild, leading only to active conditions with occasional minor storm periods. The exception to this was the period Mar 5-10, when a large recurrent coronal hole in the northern hemisphere led to prolonged minor storm conditions with a brief interval of major storming.

During the first days of the month the Earth was under the influence of a small southern coronal hole leading to short intervals of active geomagnetic conditions on Mar 01-02. It then became quiet until late on Mar 05
Then the Earth entered the high speed wind stream from a large recurrent coronal hole in the northern solar hemisphere. The solar wind speed rose to a maximum of about 750 km/s on Mar 08; after Mar 09 it decayed slowly to finally reach a minimum of 320 km/s on Mar 13. During three days, the Bz component of the interplanetary magnetic field was predominantly negative down to -5nT, but it turned towards 0 later on, reducing strongly the geo-effectiveness of the tail part of this high-speed stream (very similar to the chronology of its previous solar rotation).

Consequently, a minor geomagnetic storm started in the final hours (UT) of Mar 05, peaking at major geomagnetic storm level for a few hours on Mar 07. Active to minor storm periods

followed until early on Mar 10, when the geomagnetic field returned to quiet conditions. It remained quiet until Mar 13. Then, the geomagnetic field became increasingly unsettled, as the solar wind density, speed and IMF all started to increase announcing the start of the influence of a small equatorial coronal hole that was at central meridian on Mar 10. The effect of this hole was only small and short: the solar wind speed did not exceed the value of 450 km/s and conditions were only active for about 24 hours on Mar 13-14.

From March 17 onwards, another northern coronal hole (with meridian passage on Mar 14) pushed the solar wind speed up to values of a little less then 500 km/s. This led to intermittent active conditions from late on Mar 17 until early on Mar 19. Another small coronal hole made the solar wind speed increase to 400 km/s on Mar 21 and caused brief active conditions. Similarly, a big recurrent coronal hole became geoeffective from Mar 24, and pushed the solar wind speed up to 700 km/s. Bz went down to -10nT leading to active geomagnetic conditions on Mar 25, 26 and 27 (on Mar 25 several geomagnetic observatories, including Niemegk reported a K-index of 5).

For the rest of the month, the geomagnetic conditions remained quiet, with isolated intervals of active conditions.

III. Noticeable solar events

No M- or X-class flares occurred during March 2005. The most noteworthy event was:

DAY	BEGIN	MAX	END	LOC	XRAY	OP	10CM	RADIO TYPE	600 (Humain)	Cat	NOAA	NOTE
10	1136	1142	1144	N12W07	C7.3			III/3, V/3	1140	40	0741	SXI-derived loc.

loc: approximate heliographic location
Xray: X-ray flare class
op: optical flare class
10 cm: 10 cm radio flux
type: type of radio burst

600: peak time (UT) of 600 Mhz radio bursts in Humain
Cat: Catania sunspot group identification
NOAA: NOAA active region identification
p: proton event
CME: Coronal Mass Ejection