

Solar Influences Data analysis

Center

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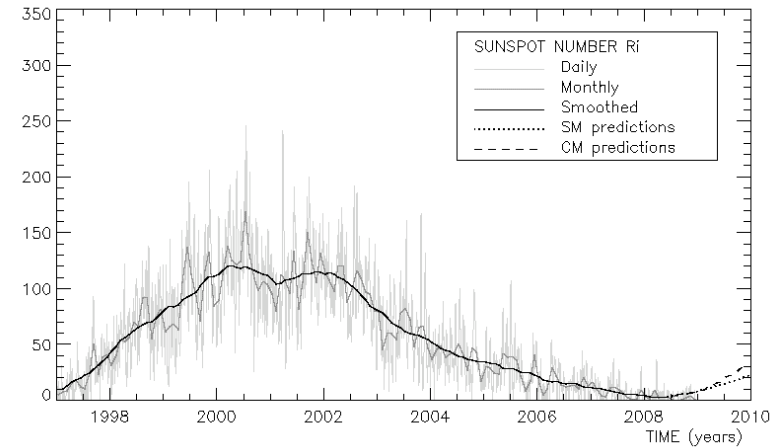
SUNSPOT BULLETIN

2008 n°12

Provisional international and normalized hemispheric daily sunspot numbers for December 2008

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	0	0	0
5	0	0	0
6	0	0	0
7	0	0	0
8	0	0	0
9	0	0	0
10	9	0	9
11	8	0	8
12	9	0	9
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	0	0	0
20	0	0	0
21	0	0	0
22	0	0	0
23	0	0	0
24	0	0	0
25	0	0	0
26	0	0	0
27	0	0	0
28	0	0	0
29	0	0	0
30	0	0	0
31	0	0	0
Monthly mean	0.8	0.0	0.8
Cooperating stations	68	61	61



Predictions of the monthly smoothed Sunspot Number using the last provisional value, calculated for June 2008 : 3.2 (± 5%)

	SM	CM		SM	CM		SM	CM
2008 Jul	3	4	2009 Jan	7	9	2009 Jul	13	21
Aug	2	5	Feb	7	10	Aug	14	23
Sep	2	6	Mar	8	12	Sep	15	25
Oct	4	6	Apr	9	14	Oct	16	28
Nov	5	7	May	10	16	Nov	17	31
Dec	6	8	Jun	12	18	Dec	19	34

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	0	///	-	68	////	0	0/0	2	
1	0	0	-	68	////	0	0/0	0	
2	0	///	-	69	////	0	0/0	0	
3	0	///	-	69	////	0	0/0	4	
4	0	0	-	70	////	0	0/0	10	
5	0	0	-	69	////	0	0/0	18	
6	0	///	-	69	////	0	0/0	22	
7	0	0	-	69	////	0	0/0	11	
8	0	///	-	69	////	0	0/0	5	
9	0	0	-	69	////	0	0/0	1	
10	9	7	-	71	////	0	0/0	3	
11	8	16	-	70	////	0	0/0	5	
12	9	24	-	71	////	0	0/0	4	
13	0	///	-	70	////	0	0/0	2	
14	0	///	-	69	////	0	0/0	1	
15	0	0	-	69	////	0	0/0	3	
16	0	0	-	69	////	0	0/0	7	
17	0	0	-	69	////	0	0/0	6	
18	0	0	-	68	////	0	0/0	3	
19	0	///	-	69	////	0	0/0	5	
20	0	0	-	69	////	0	0/0	2	
21	0	///	-	69	////	0	0/0	1	
22	0	0	-	68	////	0	0/0	5	
23	0	///	-	69	////	0	0/0	16	
24	0	0	-	69	////	0	0/0	9	
25	0	///	-	69	////	0	0/0	5	
26	0	0	-	69	////	0	0/0	3	
27	0	0	-	69	////	0	0/0	2	
28	0	0	-	70	////	0	0/0	2	
29	0	0	-	70	////	0	0/0	2	
30	0	0	-	69	////	0	0/0	1	
31	0	///	-	69	////	0	0/0	16	

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).
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 DECEMBER 2008

DATE	UT	NUMBER OF GROUPS	NUMBER OF SPOTS	RELATIVE SUNSPOT NUMBERS			PPSI 10-5 WM-2	QUAL	OBS
				TOTAL	NORTH	SOUTH			
2	1415	0	0	0	0	0	0.0	2	AE
3	1000	0	0	0	0	0	0.0	2	AE
6	1115	0	0	0	0	0	0.0	3	AE
7	930	0	0	0	0	0	0.0	3	AE
10	1030	1	2	12	0	12	0.7	1	SV
11	1005	1	3	13	0	13	0.4	2	SV
13	1245	0	0	0	0	0	0.0	2	SV
19	900	0	0	0	0	0	0.0	2	OB
23	905	0	0	0	0	0	0.0	3	OL
26	856	0	0	0	0	0	0.0	2	OL
27	855	0	0	0	0	0	0.0	2	OL
28	850	0	0	0	0	0	0.0	2	OL
29	945	0	0	0	0	0	0.0	2	SV
30	930	0	0	0	0	0	0.0	2	SV

The relative mean sunspot number is 1.8.

NORMALISED UCCLE OBSERVATIONAL SUNSPOT NUMBERS U'=K'U FOR DECEMBER 2008

K' = 0.868 (*)

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

The normalised relative monthly mean sunspot number is 2.

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

The Sun has been observed 14 days on 31 possible.

UCCLE OBSERVATIONAL MAJOR SUNSPOT GROUPS FOR DECEMBER 2008
E AND F BRUNNER'S TYPE GROUPS

NONE

PROBABLE RETURN OF MAJOR GROUPS FOR JANUARY 2009
NONE

MONTHLY SUMMARY OF SOLAR AND GEOMAGNETIC ACTIVITY

I. Solar Activity

The provisional international sunspot number differed from zero during only three days this month. The absence of significant sunspot groups led to a quiet flaring month. Several coronal holes were seen on the solar surface.

A tiny sunspot group, Catania 92 (NOAA AR 1009) produced a few A-, B- and one C-flare on Dec 11 and 12. This new solar cycle group emerged in the southwest of the solar disk on Dec 10 and rotated behind the west limb on Dec 13.

On Dec 12, a filament close to the pole in the northern solar hemisphere erupted. The associated CME was slow and not Earth-directed.

Five coronal holes (CH) were visible in EIT195. We list them and the date the CH crossed the central meridian (CM):

1. a CH with three branches passed the CM on Nov 30,
2. a small high-latitude, clear CH, Dec 08,
3. an equatorial CH, Dec 19,
4. another equatorial CH passed the CM on Dec 26,
5. a last CH situated in the southern hemisphere passed the CM on Dec 29.

II. Geomagnetic Activity

The geomagnetic activity was very limited this month. The highest value for the estimated Kp-index was only 4 (once).

The solar wind sped up on Dec 03 at the arrival of the co-rotating interaction region (CIR) between the slow and fast solar wind associated with the first CH mentioned in the previous section. After a first rise to around 500 km/s on Dec 04, the solar wind speed decreased to 350 km/s and then rose again to reach almost 600 km/s on Dec 07. The north-south component of the interplanetary magnetic field (IMF) was steadily negative (southward), but not sufficiently strong to produce a significant geomagnetic disturbance. Magnetic reconnection between the component of the IMF opposite to the Earth's magnetic field leads to magnetic disturbances. This is the case if the Bz-component of the IMF is strongly negative during a considerable time. The IMF magnitude returned to average values on Dec 06, and on Dec 07 the solar wind speed started to decrease. The geomagnetic response was limited: the conditions remained mainly quiet. The Kp-index reached on Dec 05 once the value of 4.

The second CH did not produce a significant geomagnetic disturbance, due to its northern location and its weakness. A small disturbance (Kp=2) during the night of Dec 10 to 11, was caused by a sector boundary crossing.

On Dec 22, another CIR arrived at Earth. It was associated with the equatorial CH that passed the CM on Dec 19. Despite of its clear signature in ACE-data, it did not produce a strong geomagnetic disturbance, Kp only reaching 3.

A dense CIR associated with the fourth CH arrived late on Dec 30. The plasma within this structure carried a strong magnetic field. However, the influence on Earth was limited since the magnetic component responsible for the strongest reconnection was negative only during a short time. The Earth's magnetic field was only slightly disturbed on Dec 31 and Jan 01: Kp's maximal value was 3.

III. News of the Month: A first radio burst observed at Humain

Scientists of the SIDC observed a first solar radio burst with the recently installed new radio receivers on the site of the Humain Radio Astronomy Station. Because of the low solar activity, there was not much to detect until Thursday Dec 11. The antennas of Humain witnessed on that day an increase of radio flux emitted by the Sun around 09:26UT. Christophe Marqué, the radio astronomer of the SIDC, double checked the event and confirmed that his Swiss colleagues, who use an identical receiver, observed also the event. The satellite GOES measured a simultaneous increase in X-ray flux between 09:22 and 09:27UT. The event is catalogued as a C1 flare.

The graph below is a color intensity diagram: the more intense the color, the higher the intensity of the radiation in a particular wavelength at a particular time.

