

Sunspot Index Data Center

SUNSPOT BULLETIN

Data Analysis Service supported by the FAGS

1993 n° 11
 Provisional Sunspot numbers for November 1993

From observations at the *Locarno Specola Solare*,
 completed with data from an international network and
 computed at the *Observatoire Royal de Belgique*.
 37 cooperating stations on December 1, 10 UT

Day	R' ₁	Day	R' ₁
1	10	16	32
2	20	17	35
3	18	18	37
4	21	19	40
5	30	20	40
6	33	21	56
7	31	22	52
8	33	23	53
9	23	24	54
10	25	25	40
11	14	26	40
12	15	27	39
13	21	28	53
14	26	29	55
15	29	30	69

Mean = 34.8

Predictions of the smoothed monthly Sunspot Numbers :

Classical Method		SIDC Adjusted values			
1993 Dec.	46(± 10)	1994 Jun.	33(± 9)	1993 Dec.	27(± 5)
1994 Jan.	44	Jul.	31	1994 Jan.	25
Feb.	41	Aug.	29	Feb.	22
Mar.	39	Sep.	27	Mar.	20
Apr.	37	Oct.	25	Apr.	17
May	35	Nov.	23	May	14

forecasted on the basis of the most recent provisional monthly smoothed
 Sunspot Number calculated for 1993 May : 59.6 (± 5%)

Provisional smoothed values :

1993 Jun.	58(± 8)	1993 Aug.	54	1993 Oct.	50
Jul.	56	Sep.	52	Nov.	48

Brussels, 1993 December 01

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

1993 NOVEMBER $R'_{IM} = 34.8$

Date	R _i	PPSI	600	2800	COS	SFI	XI	Ak	SEA	MAG
31	25	41	26	091	974	2	0/0	12		
1	10	47	31	091	972	4	0/0	16	1341	SEA(1439)
2	20	70	30	093	977	2	0/0	6		
3	18	73	30	094	984	0	0/0	17		1755 ssc
4	21	103	29	096	970	2	0/0	57		
5	30	87	29	096	-	0	0/0	40		
6	33	97	28	097	963	0	0/0	28		
7	31	79	28	095	-	0	0/0	29		
8	33	61	28	092	967	1	0/0	23		
9	23	27	28	090	972	1	0/0	14		
10	25	15	28	090	974	0	0/0	14		
11	14	2	28	089	976	0	0/0	7		SID(1114)
12	15	4	27	091	986	8	1/0	3		MAG very quiet day on
13	21	16	28	094	986	14	2/0	10		12 and 13 small active events
14	26	35	27	094	988	6	0/0	19		
15	29	67	27	102	987	3	0/0	16		
16	32	78	27	100	982	1	0/0	15		
17	35	93	27	100	988	1	0/0	10		
18	37	147	27	103	993	4	0/0	34		1212 ssc MAG minor storm level
19	40	146	28	101	979	2	0/0	31		
20	40	103	28	100	983	1	0/0	8		
21	56	70	25	097	983	1	0/0	8		
22	52	56	26	099	-	1	0/0	6		
23	53	44	26	100	978	4	0/0	7		
24	54	59	26	100	973	8	0/0	5		FEW subflares(c)
25	40	50	27	097	975	18	0/0	8		
26	40	47	28	093	979	4	0/0	27		
27	39	26	26	090	984	0	0/0	8		
28	53	22	26	093	979	1	0/0	6		
29	55	22	26	094	985	2	0/0	16		
30	69	36	26	104	987	1	0/0	4		X(0600)

R'_i , R'_{IM} : 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 subtract from the mean solar constant.
 600 : 600 Mhz solar flux from Humain station (Belgium).
 2800 : 2800 Mhz solar flux from Ottawa (origin : Ursigrams - UGEO1 group 2).
 COS : thousands of the cosmic ray counts (origin : Ursigrams - UCOSE Kerguelen).
 SFI : From October 1992, Solar Flare Index from the S.I.D.C. (origin : Ursigrams - UGEOR group 3).
 XI : X-flares index from the Ursigrams (M-flares/X-flares) (origin : Ursigrams - UGEOR group 2; UGEO1 group 5).
 Ak : planetary geomagnetic index from Wingst, Germany (origin : Ursigrams).
 SEA : sudden enhancements of atmospherics from Uccle & Humain (Royal Observatory, Belgium).
 MAG : magnetic events from Dourbes station (Royal Meteorological Institute, Belgium).
 Remarks : sid (sudden ionospheric disturbance); ssc (sudden storm commencement); mgst (magnetic storm); sfe (solar flare effect);
 s-1-2-3-4 (class of flares); II-IV radio-burst; I (ten cm radio-burst); P (proton flare); p (proton event);
 gle (ground level event : neutron event); si (sudden impulse); F (Forbush); SFI Evaluation ($1 \times \text{Sn}+10 \times "1" + 100 \times ">1"$).

DEPARTEMENT 4 RADIOASTRONOMIE ET PHYSIQUE SOLAIRE

DAILY PROVISIONAL

RELATIVE SUNSPOT NUMBERS

STATION UCCLE BELGIUM

NOVEMBER 1993

DATE	UT	NUMBER		RELATIVE SUNSPOT NUMBERS				FPSI 10-3	QUAL	OBS
		OF GROUPS	OF SPOTS	TOTAL	NORTH	SOUTH	CENTRAL			
3	823	1	9	19	0	19	19	31.9	2	DC
4	839	1	20	30	0	30	30	36.0	3	VI
5	1457	4	10	50	11	39	17	37.5	4	DC
9	1237	2	9	29	14	15	14	16.2	2	VI
11	1031	0	0	0	0	0	0	0.0	4	PC
12	920	1	4	14	14	0	0	0.6	2	PC
16	834	1	30	40	40	0	40	57.9	2	DC
17	838	1	35	45	45	0	45	65.9	2	DC
18	834	1	32	42	42	0	42	101.5	3	DC
19	839	2	30	50	50	0	39	99.6	3	VI
20	920	2	28	48	48	0	37	89.9	2	PC
22	1002	3	35	65	65	0	20	56.2	1	VI
23	938	3	28	58	58	0	24	17.8	1	VI
24	906	3	30	60	60	0	31	32.5	4	PC
25	847	2	24	44	44	0	44	70.4	1	VI
26	1310	3	43	73	62	11	18	40.7	2	FC
29	1238	4	7	47	23	24	25	33.5	1	DC

The Sun has been observed 17 days on 30 possible.
The relative mean sunspot number is 42.0.

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

1993 NOVEMBER

$K' = 0.843$ (*)

1	***	7	***	13	***	19	42	25	37
2	***	8	***	14	***	20	40	26	61
3	16	9	24	15	***	21	***	27	***
4	25	10	***	16	33	22	54	28	***
5	42	11	0	17	37	23	48	29	39
6	***	12	11	18	35	24	50	30	***

The Sun has been observed 17 days on 30 possible.
The normalized relative monthly mean Wolf number is 34.

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

UCCLE OBSERVATIONAL MAJOR SUNSPOT GROUPS FOR 1993 NOVEMBER
E AND F BRUNNER'S TYPE GROUPS

Uccle N°	East Limb Date	Date and type			West Limb Date
		1st obs	CMP	Last Obs	
1-1876	11 11.6	12 C	11 18.4	24 G	11 25.1
2-1876	11 17.5	19 A	11 24.3	29 G	12 1.0

PROBABLE RETURN OF MAJOR GROUPS FOR 1993 DECEMBER

N°	New East Limb	New CMP	New West Limb
1	12 8.9	12 15.7	12 22.4
2	12 13.9	12 20.6	12 27.4