



Sunspot Index Data Center  
**SUNSPOT BULLETIN**

Data Analysis Service supported by the FAGS

1993 n° 1  
 Provisional Sunspot numbers for January 1993

From observations at the Locarno Specola Solare  
 completed with data from an international network,  
 computed at the Observatoire Royal de Belgique  
 38 cooperating stations on February 1st, 11 UT

Day	Ri	Day	Ri
1	46	16	59
2	37	17	62
3	36	18	66
4	52	19	68
5	66	20	52
6	84	21	47
7	81	22	34
8	89	23	30
9	94	24	45
10	100	25	51
11	91	26	37
12	94	27	38
13	107	28	37
14	69	29	35
15	58	30	36
		31	32

Mean = 59.1

Predictions of the smoothed monthly Sunspot Numbers

Classical Method		SIDC Adjusted values			
1993 Feb.	76(± 18)	1993 Aug.	64(± 20)	1993 Feb.	84(± 19)
Mar.	74	Sep.	62	Mar.	81
Apr.	72	Oct.	60	Apr.	78
May	70	Nov.	58	May	75
Jun.	68	Dec.	56	Jun.	72
Jul.	66	1994 Jan.	54	Jul.	68

forecasted on the basis of the most recent provisional monthly smoothed  
 Sunspot Number calculated for 1992 July : 90.7 (± 5%)

Provisional smoothed values :

1992 Aug.	89(± 13)	1992 Oct.	85	1992 Dec.	80
Sep.	87	Nov.	82	1993 Jan.	78

Brussels, 1993 February 01 A. KOECKELENERGH and P. CUGNON

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

1993 JANUARY R'<sub>IM</sub> = 59.1

Date	R' <sub>I</sub>	PPSI	600	2800	COS	SFI	XI	Ak	SEA	MAG
31	59	30	35	130	952	4	1/0	10		
1	46	22	33	122	949	1	0/0	10	1337	
2	37	27	31	121	946	1	1/0	32		
3	36	47	31	125	941	0	0/0	34		
4	52	78	31	121	844	0	0/0	38		
5	66	93	32	125	1052	5	0/0	17		
6	84	105	32	131	1051	2	0/0	18		
7	81	103	47	131	948	13	0/0	36	1108	ssc
8	89	87	35	133	1051	2	0/0	23		
9	94	104	34	129	944	1	0/0	19		
10	100	65	34	132	942	2	0/0	21	1327	
11	91	97	33	132	1055	6	0/0	23		
12	94	52	35	140	1051	8	0/0	14	1432	
13	107	56	36	141	1046	16	0/0	15		
14	69	47	35	133	1040	1	0/0	24		
15	58	114	35	126	1038	2	0/0	18		
16	59	57	34	133	1033	22	0/0	14	1430	
17	62	54	35	126	1030	8	0/0	15		
18	66	58	36	122	1028	3	0/0	16		
19	68	65	35	116	1027	1	0/0	33	1022	ssc(+1145)
20	52	59	35	110	964	1	0/0	16		
21	47	56	34	107	956	1	0/0	8		
22	34	44	33	104	1000	0	0/0	10		
23	30	43	33	106	1035	1	0/0	5		
24	45	43	34	105	1032	4	0/0	14		
25	51	36	33	106	964	3	0/0	28	1115	ssc(+1125)
26	37	24	33	107	963	0	0/0	25		
27	38	23	32	111	958	0	0/0	17		
28	37	27	30	112	955	1	0/0	5		
29	35	31	30	114	1040	1	0/0	6		
30	36	27	32	113	957	3	0/0	15		
31	32	21	31	119	952	0	1/0	51		

R'<sub>I</sub>, R'<sub>IM</sub> : 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.n-2: the quantity to subtract from the mean solar constant.  
 600 : 600 Mhz solar flux from Huain station (Belgium).  
 2800: 2800 Mhz solar flux from Ottawa (origin: Ursigrams:UGB01 group2).  
 COS : thousands of the cosmic ray counts (origin: Ursigrams:UCOSE Kerguelen).  
 SFI : Nov (October 1992) Solar Flare Index from the S.I.D.C. (origin: Ursigrams:UGB03 group3).  
 XI : I-flares index from the Ursigrams (M-flares/X-flares)(origin: Ursigrams:UGB02 group2;UGB01 group5).  
 Ak : planetary geomagnetic index from Wingst (Germany from Ursigrams).  
 SEA : sudden enhancements of atmospherics from Uccle & Huain (Belgium).  
 MAG : magnetic events from Dourbes station(Royal Météo. 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; T(ten cm radio-burst); P(proton flare); p(proton event); gle(ground level event;  
 neutron event); si(sudden impulse); F(Forbush); SFI Evaluation(1 x S<sub>n</sub>+10 x '1'+100 x '>1').

## OBSERVATOIRE ROYAL DE BELGIQUE

## DEPARTEMENT 4 RADIOASTRONOMIE ET PHYSIQUE SOLAIRE

## DAILY PROVISIONAL

## RELATIVE SUNSPOT NUMBERS

STATION UCCLE BELGIUM

JANUARY 1993

DATE	UT	NUMBER		RELATIVE SUNSPOT NUMBERS			PPSI 10-5 WM-2	QUAL	OBS	
		OF GROUPS	OF SPOTS	TOTAL	NORTH	SOUTH				CENTRAL
1	1215	4	12	52	12	40	0	21.6	1	AK
2	1127	5	13	63	11	52	11	27.6	4	ST
3	1000	3	18	48	0	48	0	38.5	4	PC
4	1031	3	12	42	0	42	0	60.4	1	ST
7	1103	7	32	102	24	78	54	101.0	1	ST
8	935	8	42	122	37	85	74	74.8	2	VI
12	1031	6	51	111	41	70	81	23.0	4	ST
14	928	6	30	90	28	62	23	39.3	4	ST
15	1106	4	14	54	11	43	0	25.0	2	VI
17	1132	5	24	74	26	48	28	49.3	1	ST
18	1046	6	32	92	29	63	47	59.2	5	ST
19	1235	5	29	79	14	65	62	71.9	5	ST
21	938	4	24	64	15	49	37	56.6	4	ST
23	1220	3	4	34	11	23	12	57.4	2	AK
25	1009	5	21	71	40	31	46	49.5	4	ST
26	913	5	13	63	25	38	38	41.8	5	ST
27	914	4	9	49	0	49	27	31.1	2	VI
30	1100	3	8	38	0	38	0	34.8	2	AK
31	958	2	13	33	0	33	0	30.3	3	PC

The Sun has been observed 19 days on 31 possible.  
The relative mean sunspot number is 67.4.

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

1993 JANUARY

K' = 0.837 (\*)

1	43	7	85	13	***	19	66	25	59
2	52	8	102	14	75	20	***	26	52
3	40	9	***	15	45	21	53	27	41
4	35	10	***	16	***	22	***	28	***
5	***	11	***	17	61	23	28	29	***
6	***	12	92	18	77	24	***	30	31
								31	27

The Sun has been observed 19 days on 31 possible.  
The normalized relative monthly mean Wolf number is 56.

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

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

Uccle N°	East Limb Date	Date and type 1st obs	CMP	Last Obs	West Limb Date
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NONE

PROBABLE RETURN OF MAJOR GROUPS FOR 1993 FEBRUARY

N°	New East Limb	New CMP	New West Limb
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