



Sunspot Index Data Center
SUNSPOT BULLETIN

Data Analysis Service supported by the FAGS

1993 n° 2
 Provisional Sunspot numbers for February 1993

From observations at the Locarno Specola Solare
 completed with data from an international network,
 computed at the Observatoire Royal de Belgique
 29 cooperating stations on March 1st, 10 UT

Day	Rt	Day	Rt
1	22	16	84
2	34	17	68
3	69	18	78
4	85	19	88
5	119	20	97
6	129	21	92
7	128	22	100
8	134	23	101
9	126	24	90
10	114	25	88
11	95	26	86
12	97	27	86
13	92	28	82
14	78		
15	73		

Mean = 90.5

Predictions of the smoothed monthly Sunspot Numbers

Classical Method		SIDC Adjusted values	
1993 Mar.	70(± 16)	1993 Sep.	58(± 18)
Apr.	68	1993 Mar.	75(± 17)
May	66	Apr.	72
Jun.	64	May	69
Jul.	62	Jun.	66
Aug.	60	Jul.	61
		Aug.	57
		1994 Jan.	50
		Feb.	48

forecasted on the basis of the most recent provisional monthly smoothed
 Sunspot Number calculated for 1992 August : 84.0 (± 5%)

Provisional smoothed values :

1992 Sep.	82(± 12)	1992 Nov.	78	1993 Jan.	74
Oct.	80	Dec.	76	Feb.	72

Brussels, 1993 March 01

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

1993 FEBRUARY R'_{IM} = 90.5

Date	R' _I	PPSI	600	2800	COS	SFI	XI	Ak	SEA	MAG
31	32	21	31	119	952	0	1/0	51		
1	22	13	33	125	1047	6	2/0	33	1344	
2	34	11	36	128	951	14	0/0	21		
3	69	49	34	137	1048	12	0/0	10		
4	85	73	35	147	1046	14	0/0	10		
5	119	153	38	160	1044	15	1/0	6	1438	
6	129	180	38	184	1037	222	2/0	6	1636	2b(1813)+T
7	128	201	39	176	961	17	0/0	33	1400	0345 mgst
8	134	229	41	188	961	17	0/0	49		
9	126	238	46	185	951	19	1/0	31		
10	114	219	48	180	946	222	3/0	20	2004	0852?2b(0734);2b(2001)
11	95	197	40	173	1043	68	2/0	23		1M2.7(1829)
12	97	157	37	149	956	32	0/0	12	1259	
13	92	94	37	135	1038	15	0/0	19	1446	
14	78	67	37	141	1035	109	1/0	8	1251	2b(1241)+T
15	73	45	34	135	962	8	0/0	5		
16	84	38	35	134	?	40	1/0	4	1415	
17	68	39	34	124	956	25	1/0	32		0301
18	78	45	34	126	1037	145	3/0	16	1401	2b(0258)+T;1(n)0927 IV(0940);1(b)1054
19	88	48	32	116	1032	11	0/0	7		
20	97	57	32	123	965	3	0/0	27		0030 ssc
21	92	68	33	123	946	22	1/0	32	1350	
22	100	104	34	133	934	2	0/0	27		
23	101	113	33	132	-	5	0/0	-		
24	90	114	34	135	-	3	0/0	6		
25	88	87	34	128	937	5	0/0	5		
26	86	71	33	126	1051	1	0/0	7		
27	86	79	34	124	1044	1	0/0	6		2220 ssc
28	82	69	35	124	951	2	0/0	19		

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 v.w.-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:UGE01 group2).
 COS: thousands of the cosmic ray counts (origin: Ursigrams:UCOSE Kerguelen).
 SFI: Now (October 1992) Solar Flare Index from the S.I.D.C. (origin: Ursigrams:UGBOR group3).
 XI: X-flares index from the Ursigrams (M-flares/X-flares) (origin: Ursigrams:UGBOR group2;UGE01 group5).
 Ak: planetary geomagnetic index from Wingst (Germany from Ursigrams).
 SEA: sudden enhancements of atmospherics from Uccle & Humain (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 10¹⁰ x "1" + 100 x "1").

OBSERVATOIRE ROYAL DE BELGIQUE

DEPARTEMENT 4 RADIOASTRONOMIE ET PHYSIQUE SOLAIRE

DAILY PROVISIONAL

RELATIVE SUNSPOT NUMBERS

STATION UCCLE BELGIUM

FEBRUARY 1993

DATE	UT	NUMBER		RELATIVE SUNSPOT NUMBERS			PPSI 10-5 WM-2	QUAL	OBS	
		OF GROUPS	OF SPOTS	TOTAL	NORTH	SOUTH				CENTRAL
1	1238	2	14	34	0	34	23	29.5	4	ST
3	1328	4	32	72	41	31	17	54.3	3	ST
10	1254	8	85	165	88	77	104	141.9	4	ST
11	1416	5	83	133	61	72	72	127.5	1	ST
12	841	5	74	124	62	62	62	118.4	2	VI
13	1153	4	42	82	40	42	0	51.7	1	PC
16	1112	6	35	95	38	57	38	59.4	3	ST
19	1221	8	56	136	60	76	62	65.7	2	VI
20	940	10	53	153	34	119	68	86.9	3	AK
22	828	8	62	142	60	82	52	130.7	3	ST
23	814	8	80	160	80	80	82	139.1	5	ST
24	908	6	58	118	45	73	60	152.2	2	VI
28	1128	8	43	123	64	59	13	80.6	4	ST

The Sun has been observed 13 days on 28 possible.
The relative mean sunspot number is 118.2.

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

1993 FEBRUARY

$K' = 0.839$ (*)

1	28	7	***	13	68	19	114	25	***
2	***	8	***	14	***	20	128	26	***
3	60	9	***	15	***	21	***	27	***
4	***	10	138	16	79	22	119	28	103
5	***	11	111	17	***	23	134		
6	***	12	104	18	***	24	99		

The Sun has been observed 13 days on 28 possible.

The normalized relative monthly mean Wolf number is 98.

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

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

Uccle N°	East Limb Date	Date and type			West Limb Date
		1st obs	CMP	Last Obs	
14-1865	2 4.1	10 F	2 10.9	16 G	2 17.6

PROBABLE RETURN OF MAJOR GROUPS FOR 1993 MARCH

N°	New East Limb	New CMP	New West Limb
14	3 3.0	3 9.7	3 16.5