

# Sunspot Index Data Center

## SUNSPOT BULLETIN

Data Analysis Service supported by the FAGS

1993 n° 12  
 Provisional Sunspot numbers for December 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 January 1, 11 UT

Day	R' <sub>1</sub>	Day	R' <sub>1</sub>
1	62	16	20
2	56	17	21
3	60	18	28
4	66	19	18
5	63	20	27
6	55	21	37
7	65	22	44
8	57	23	54
9	53	24	63
10	46	25	82
11	35	26	62
12	21	27	69
13	17	28	65
14	23	29	81
15	8	30	75
		31	99

Mean = 49.4

Predictions of the smoothed monthly Sunspot Numbers :

Classical Method		SIDC Adjusted values	
1994 Jan. 41(± 9)	1994 Jul. 28(± 8)	1994 Jan. 25(± 5)	
Feb. 39	Aug. 27	Feb. 22	
Mar. 37	Sep. 25	Mar. 20	
Apr. 35	Oct. 23	Apr. 17	
May 33	Nov. 21	May 14	
Jun. 31	Dec. 19	Jun. 11	

forecasted on the basis of the most recent provisional monthly smoothed  
 Sunspot Number calculated for 1993 June : 55.9 (± 5%)

Provisional smoothed values :		
1993 Jul. 54(± 7)	1993 Sep. 49	1993 Nov. 45
Aug. 52	Oct. 47	Dec. 43

Brussels, 1994 January 01

A. KOECKELENBERGH and P. CUGNON

Reproduction permitted if source mentioned.

Ed. Resp. Dr. André Koeckelenbergh, avenue Circulaire, 3 B-1180 BRUXELLES - BELGIUM  
 Telex 21565obsbel Fax 32-2-373 02 24 Tel 02-373 02 23 /373 02 76  
 e-mail : arille@astro.oma.be

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

1993 DECEMBER  $R'_{IM} = 49.4$

Date	R <sub>f</sub>	PPSI	600	2800	COS	SFI	XI	Ak	SEA	MAG
30	69	36	26	104	987	1	0/0	4		
1	62	70	28	109	989	22	0/0	44		1156 mgst
2	56	62	29	104	978	3	0/0	53		
3	60	55	29	106	968	4	0/0	33		
4	66	43	29	105	971	11	0/0	12		
5	63	46	29	101	970	1	0/0	14		
6	55	58	28	103	977	20	0/0	8		
7	65	53	28	107	978	6	0/0	26		1201 ssc
8	57	53	28	105	-	7	0/0	38		
9	53	26	28	098	964	1	0/0	3		
10	46	20	27	096	972	0	0/0	10		
11	35	12	27	093	972	0	0/0	9		
12	21	2	27	091	979	3	0/0	6		
13	17	1	27	088	985	0	0/0	5		
14	23	3	26	088	990	0	0/0	5		
15	8	3	26	085	991	0	0/0	12		
16	20	10	26	085	981	0	0/0	29		
17	21	15	26	084	975	1	0/0	25		
18	28	12	25	085	977	1	0/0	27		
19	18	12	25	087	970	1	0/0	17		
20	27	13	25	091	974	5	0/0	16		
21	37	24	26	093	969	0	0/0	29		
22	44	44	26	100	970	20	1/0	12		1B(1721)+T
23	54	64	28	105	970	13	0/0	18		
24	63	90	28	111	976	32	2/0	13		
25	82	112	30	119	975	18	1/0	15		
26	62	155	29	125	976	64	1/0	16		
27	69	145	29	140	978	8	1/0	8		
28	65	111	30	134	981	23	1/0	4		X(1205)+T
29	81	131	30	129	981	13	0/0	3		
30	75	131	30	143	982	37	1/0	4		
31	99	135	30	141	985	28	0/0	20		

R<sub>f</sub>, 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<sup>-5</sup> w/m<sup>2</sup> : 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 - UGEOI group 2). "The 10.7cm Flux data are provided as a service of the National Research Council of Canada."

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 - UGEOI group 3).

XI : X-flares index from the Ursigrams (M-flares/X-flares) (origin : Ursigrams - UGEOI group 2; UGEOI 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; 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 Sn+10 x "1"+100 x ">1").

DEPARTEMENT 4 RADIOASTRONOMIE ET PHYSIQUE SOLAIRE

DAILY PROVISIONAL

RELATIVE SUNSPOT NUMBERS

STATION UCCLE BELGIUM

DECEMBER 1993

DATE	UT	NUMBER		RELATIVE SUNSPOT NUMBERS				PPSI 10-3	QUAL	OBS
		OF GROUPS	OF SPOTS	TOTAL	NORTH	SOUTH	CENTRAL			
5	1220	6	27	87	11	76	28	39.2	4	DC
9	912	3	24	54	0	54	54	12.3	1	DC
11	1225	2	9	29	0	29	0	3.4	2	AK
12	1028	2	4	24	0	24	0	0.2	1	VI
13	1337	2	6	26	0	26	0	0.1	4	DC
14	1435	2	4	24	12	12	0	2.2	2	FC
23	915	3	25	55	55	0	0	62.1	2	DC
28	1140	2	24	44	44	0	13	113.6	1	DC
31	1100	5	57	107	69	38	0	54.7	4	DC

The Sun has been observed 9 days on 31 possible.  
The relative mean sunspot number is 50.0.

Ed. resp. Dr. ANDRE KOECKELENBERGH  
3, Avenue Circulaire, B-1180 BRUXELLES, BELGIUM.  
Telex : 21565 OBSBEL - Tel. : (322) 373 02 23  
Fax : (322) 373 02 24 - E\_mail : arille@astro.oma.be

DECEMBER 1993

PROVISIONAL INTERNATIONAL NORMALIZED HEMISPHERIC SUNSPOT NUMBERS

Date	Ri	Rn	Rs
1	62	22	40
2	56	21	35
3	60	13	47
4	66	11	55
5	63	8	55
6	55	0	55
7	65	7	58
8	57	0	57
9	53	10	43
10	46	8	38
11	35	0	35
12	21	0	21
13	17	0	17
14	23	0	23
15	8	8	0
16	20	20	0
17	21	21	0
18	28	28	0
19	18	18	0
20	27	27	0
21	37	37	0
22	44	44	0
23	54	54	0
24	63	63	0
25	82	82	0
26	62	62	0
27	69	69	0
28	65	65	0
29	81	68	13
30	75	59	16
31	99	63	36

MONTHLY MEAN :           49.4                   28.6                   20.8

COOPERATING STATIONS :   37                   23                   23

PILOT STATION : Specola Solare Ticinese, Locarno

Reproduction permitted if source mentioned  
P. CUGNON and A. KOECKELNBERGH  
avenue Circulaire, 3 B-1180 BRUXELLES - BELGIUM  
Telex 21565obsbel   Fax 32-2-3749822   Tel 32-2-3730276/3730211  
e-mail pierrec@astro.oma.be