


Sunspot Index Data Center
SUNSPOT BULLETIN

Data Analysis Service supported by the FAGS

1990 n° 12
 Provisional Sunspot numbers for December 1990

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

Day	R _i	Day	R _i
1	127	16	99
2	160	17	112
3	171	18	121
4	186	19	134
5	167	20	124
6	169	21	125
7	182	22	99
8	177	23	91
9	176	24	95
10	157	25	98
11	157	26	91
12	138	27	104
13	117	28	111
14	98	29	109
15	88	30	103
		31	96

Mean = 128.5

Predictions of the smoothed monthly Sunspot Numbers

Classical Method		SIDC Adjusted values
1991 Jan. 129(± 31)	1991 Jul. 117 (± 39)	1991 Jan. 116(± 28)
Feb. 127	Aug. 114	Feb. 114
Mar. 125	Sep. 112	Mar. 112
Apr. 123	Oct. 109	Apr. 110
May 121	Nov. 107	May 108
Jun. 119	Dec. 105	Jun. 105

forecasted on the basis of the most recent provisional monthly smoothed Sunspot Number calculated for 1990 June : 143.4 (± 5%)

Provisional smoothed values :		
1990 Jul. 141(± 20)	1990 Sep. 137	1990 Nov. 133
Aug. 139	Oct. 135	Dec. 131

Brussels, 1991 January 01 A. KOECKELENBERGH and P. CUGNON

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

1990 DECEMBER R'_{IM} = 128.5

Date	R' _I	PPSI	600	2800	COS	XFI	XI	Ak	SEA
30	153	76	47	172	878	16	0/0	7	
1	127	75	44	176	886	9	1/0	4	
2	160	81	46	182	---	8	0/0	6	
3	171	113	47	193	880	23	1/0	7	
4	186	136	49	203	886	46	2/0	18	1435
5	167	130	52	218	883	44	1/0	19	
6	169	132	53	228	880	14	0/0	7	
7	182	146	53	226	882	28	1/0	5	
8	177	173	51	230	882	37	0/0	10	
9	176	166	52	235	863	49	2/0	5	0817 1n(0813)+ten
10	157	120	51	239	866	56	1/0	3	2b(0654)+ten(0735)+II
11	157	114	53	239	864	109	5/0	2	
12	138	145	52	236	876	89	7/0	7	1402
13	117	176	57	221	882	42	2/0	15	1f(0951)+ten(1021)
14	98	206	51	204	879	32	2/0	8	1332 sf(1332)+ten
15	88	235	49	198	875	30	1/0	8	
16	99	276	47	191	874	24	0/0	1	
17	112	295	52	200	879	41	2/0	8	
18	121	278	52	208	879	50	3/0	5	1304
19	134	267	47	198	869	59	3/0	2	1450 2b(1449)+sid
20	124	173	47	186	876	28	2/0	11	1n(0705)+ten
21	125	138	47	192	882	21	2/0	3	
22	99	107	47	184	882	54	4/0	2	2b(2212);1n(2313)+ten+II
23	91	88	48	191	869	116	1/1	7	0938 2b(0933)+ten+II
24	95	83	49	189	872	145	3/1	20	1322 1b(1531)+ten
25	98	94	48	190	868	25	0/0	10	
26	91	108	49	192	878	138	2/1	4	1400 2b(1356)+ten
27	104	118	49	197	884	17	0/0	6	
28	111	119	47	193	887	9	0/0	6	
29	109	120	50	200	890	6	0/0	4	
30	103	97	50	196	890	43	3/0	12	ssc(0411);sn(1144)+ten; sb(1318)+ten
31	96	75	50	184	886	11	0/0	9	

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).
 COS :thousands of the cosmic ray counts (origin:Ursigrams).
 XFI :X-flares index from the S.I.D.C. (origin:Ursigrams).
 XI :X-flares index from the Ursigrams (M-flares/X-flares).
 Ak :planetary geomagnetic index from Wingst (Germany from Ursigrams).
 SEA :sudden enhancements of atmospherics from Uccle & Humain (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;ten(ten cm radio-burst);P(proton flare);p(proton event);gle(ground level event;neutron event)

OBSERVATOIRE ROYAL DE BELGIQUE

DEPARTEMENT 4 RADIOASTRONOMIE ET PHYSIQUE SOLAIRE

NOMBRES RELATIFS DE WOLF JOURNALIERS

PROVISOIRES

PROVISIONAL

SUNSPOT RELATIVE NUMBERS

STATION UCCLE BELGIUM

DECEMBRE 1990

DATE	UT	NOMBRE DE GROUPE	NOMBRE DE TACHES	NOMBRE DE WOLF	NOMB REL ZONE CENTRALE	PPSI 10-6 WM-2	QUAL	OBS
4	1010	15	74	224	53	1704.	2	VI
5	1424	13	79	209	68	1654.	1	VI
6	1256	13	84	214	103	1476.	2	VI
7	1000	13	104	234	137	1384.	2	VI
12	1150	10	45	145	0	1151.	2	VI
17	1131	7	93	163	163	2231.	1	VI
20	1040	4	45	85	0	591.	1	AK
24	1113	8	50	130	33	975.	2	PC
25	942	7	54	124	80	926.	2	PC
27	1318	6	68	128	105	1833.	3	AK
28	1110	7	76	146	110	1370.	1	AK
30	1010	9	58	148	31	1171.	3	FC

LE SOLEIL A ETE OBSERVE 12 JOURS SUR 31 POSSIBLES
LE NOMBRE RELATIF DE WOLF MOYEN EST DE 162.5

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NORMALISED UCCLE OBSERVATIONAL SUNSPOT NUMBERS

U'=K'U FOR 1990 DECEMBER

K' = 0.815 (*)

1	***	7	190	13	***	19	***	25	101
2	***	8	***	14	***	20	69	26	***
3	***	9	***	15	***	21	***	27	104
4	182	10	***	16	***	22	***	28	118
5	170	11	***	17	132	23	***	29	***
6	174	12	118	18	***	24	105	30	120
								31	***

THE SUN WAS OBSERVED 12 DAYS ON 31 POSSIBLE
THE NORMALISED RELATIVE MONTHLY MEAN WOLF NUMBER IS 131

* K' IS THE MEAN OF THE MONTHLY K'S FOR THE LAST FIVE YEARS

UCCLE OBSERVATIONAL MAJOR SUNSPOTS FOR 1990 DECEMBER
E AND F BRUNNER'S TYPE GROUPS

UCCLE NO	EAST LIMB		DATE AND TYPE			WEST LIMB	
	DATE	1ST OBS	DATE	TYPE	LAST OBS	DATE	
22-1836	12 1.1	4 E	12 7.9		12 J	12 14.6	
32-1836	12 10.7	12 F	12 17.5		24 H	12 24.2	
35-1836	12 10.1	17 E	12 16.8		20 G	12 23.6	
7-1837	12 21.6	24 D	12 28.4		30 G	1 4.1	

PROBABLE RETURN OF MAJOR GROUPS FOR 1990 JANUARY
NO NEW EAST LIMB NEW CMP NEW WEST LIMB

NONE