

I. SUNSPOTS

Sunspot Relative-Numbers and Sunspot-Areas

Cooperating Observatories for Sunspot Relative-Numbers : Abastumani , Ankara , Athens (Nat.Obs.) , Athens (Eug.Plan.) , Attikis (Nat.Obs.Greece) , Beyazit , Bruxelles-Uccle , Bucarest , Buckten (Switzerland) , Campinas (Capric.Obs.Brazil) , Campinas , Catania , Chung-li (Telecom.Taiwan) , Cochabamba (Bolivia) , Crimmitchau (East-Germ.) , Dinant (Belgium) , Dover (U.K.) , Huancayo , Helwan , Inzernhagen (West-Germ.) , Jeddah , Kandilli , Kanzelhoehe , Kawagushi-Saitama , Kiev , Kislovodsk , Leval-Trahegnies (Belgium) , Locarno , Madrid , Manila , Mie-ken (O.A.A.Japan) , Nogales (Orion-Mexico) , Oostende (Belgium) , Potsdam , Rambouillet (France) , Roma , Ronse-Renaix (Belgium) , Roquetas-Tortosa , Rudolstadt (East-Germ.) , San Miguel , Santiago , Sao Francisco de Oliveira (Brazil) , Skalnaté-Pleso , Sonneberg (East-Germ.) , Suwa-City , Taipei (Observatory) , Taipei (Weather-Bureau) , Tokyo-Mitaka , Tokyo (Nat.Science Museum) , Urawa-Saitama , Valparaiso , Vivy (Belgium) .

The first column gives the definitive international Sunspot-Numbers for whole disk of the sun (R_T) established by the Sunspot Index Data Centre -Brussels on the basis of the observations of Locarno station as reference , the second that for the central zone (R_{IC}) on the basis of the observations of Bruxelles-Uccle station with a Cooperating network (Abastumani , Bruxelles-Uccle , Kawagushi-Saitama , Kiev , Kislovodsk , Mie-Ken , Roquetas-Tortosa , Skalnaté Pleso , Suwa-City , Taipei-Obs. , Taipei-Weather Bur. , Tokyo-Sc.Mus. , Urawa-Saitama). The diameter of the central zone is half that of the sun's disk .

The Sunspot-Areas A_C are determined at Catania , A_R at Roma and A_I are evaluated for the gap days by the Sunspot Index Data Center -Brussels on the observations of Athens-Eug.Plan. , Chung-li , Helwan , Jeddah and Rambouillet rattached to Catania values by a monthly scaling factor . The apparent total area of the umbra plus penumbra is uncorrected for foreshortening and expressed in millionths of the solar disk .

1981 Jan.	R _I	R _{IC}	A _C	A _R	A _I
1	159	50	2080	-	
2	141	46	1728	1970	
3	122	36	1346	-	
4	113	35	731	-	
5	94	23	877	-	
6	71	2	621	635	
7	95	35	489	709	
8	108	58	-	1533	
9	126	84	1618	-	
10	120	62	1396	-	
11	123	34	1591	-	
12	126	50	993	-	
13	123	67	383	-	
14	106	97	590	-	
15	106	73	578	-	
16	81	18	699	-	
17	72	16	651	-	
18	79	24	678	-	
19	78	37	609	973	
20	88	56	620	-	
21	99	46	-	-	725
22	99	43	-	-	459
23	115	55	761	917	
24	113	77	616	637	
25	115	87	679	-	
26	120	102	988	-	
27	135	81	694	-	
28	142	49	1696	-	
29	165	0	2063	2068	
30	158	29	2820	2900	
31	143	52	3050	2898	
Mean	114.0	49.2	1130	1524	-
1981 Feb.	R _I	R _{IC}	A _C	A _R	A _I
1	148	91	3156	-	
2	132	93	2511	2141	
3	150	97	2185	1734	
4	126	69	2117	-	
5	133	50	1539	-	
6	172	55	2380	2413	
7	158	38	2725	2580	
8	129	32	3107	-	
9	124	53	2426	-	
10	157	84	2105	-	
11	172	83	2674	-	
12	185	99	-	-	2957
13	143	47	2133	2164	
14	142	22	-	-	2889
15	124	57	2515	-	
16	129	76	2793	-	
17	120	89	-	2516	
18	131	90	-	2437	
19	138	47	1666	-	
20	133	60	1953	-	
21	131	40	1828	-	
22	128	55	-	-	2475
23	98	23	3077	2002	
24	124	24	4221	-	
25	137	13	4086	-	
26	148	35	4505	-	
27	175	75	5152	-	
28	170	95	-	-	5845
Mean	141.3	60.4	2766	2248	-

1981 Mar.	R _I	R _{IC}	A _C	A _R	A _I
1	161	107	4809	-	
2	182	107	-	-	(4384)
3	169	75	3959	-	
4	173	69	3749	3824	
5	141	58	3703	2733	
6	147	57	3432	-	
7	130	69	2757	-	
8	142	69	2696	-	
9	124	42	2553	-	
10	127	69	2468	-	
11	130	60	2531	-	
12	128	65	1953	-	
13	127	66	1235	2124	
14	128	50	1959	2218	
15	110	58	2179	-	
16	128	61	1943	-	
17	109	33	1319	-	
18	95	22	-	-	1058
19	95	19	1360	-	
20	120	41	1691	-	
21	135	72	2404	-	
22	134	44	2595	-	
23	130	51	3067	3077	
24	125	56	2889	-	
25	142	78	2715	-	
26	133	58	2458	-	
27	126	43	2353	-	
28	165	30	2086	-	
29	160	39	1791	-	
30	152	52	1859	-	
31	132	18	1876	-	
Mean	135.5	56.1	2496	2795	-

1981 Apr.	R _I	R _{IC}	A _C	A _R	A _I
1	153	27	1561	-	
2	170	76	1772	-	
3	148	42	1666	-	
4	151	44	1609	1973	
5	146	44	2059	-	
6	132	46	2929	2963	
7	152	84	2727	-	
8	195	84	3456	-	
9	199	96	3781	-	
10	199	78	3759	4318	
11	200	49	4653	4400	
12	193	20	-	-	4036
13	197	72	3483	3410	
14	180	74	3975	3523	
15	212	97	4611	3575	
16	197	83	4112	-	
17	213	85	3781	-	
18	214	74	3145	-	
19	203	87	2566	-	
20	199	80	2674	-	
21	154	67	2091	-	
22	122	60	-	-	(2191)
23	103	20	2290	-	
24	92	9	2137	-	
25	119	27	2617	-	
26	90	9	1323	-	
27	81	0	735	590	
28	72	29	762	-	
29	100	46	1088	-	
30	106	43	1092	-	
Mean	156.4	55.1	2588	3094	-

1981 May.	R _I	R _{IC}	A _C	A _R	A _I
1	112	49	1083	-	
2	133	45	1586	-	
3	156	55	1696	-	
4	152	96	2191	-	
5	162	94	1975	-	
6	192	128	2783	-	
7	171	125	2807	3043	
8	177	68	2321	-	
9	168	54	2673	3174	
10	148	77	1970	-	
11	169	95	2636	2554	
12	183	147	2757	-	
13	149	98	3281	-	
14	140	45	3687	3801	
15	141	63	-	-	2876
16	127	86	-	4423	
17	124	103	2910	-	
18	119	102	2903	3213	
19	100	75	2604	2786	
20	77	36	2058	1941	
21	99	49	1759	-	
22	106	19	1360	-	
23	93	7	1050	-	
24	96	25	1612	-	
25	93	51	1366	-	
26	105	92	1554	-	
27	99	83	1801	2308	
28	93	65	1895	2142	
29	92	61	1885	1559	
30	83	13	1486	-	
31	92	43	1024	-	
Mean	127.5	69.3	2094	2813	-

1981 Jun.	R _I	R _{IC}	A _C	A _R	A _I
1	62	43	784	797	
2	59	24	820	-	
3	44	18	604	574	
4	58	0	494	-	
5	55	7	279	-	
6	57	23	241	-	
7	58	24	325	-	
8	46	23	336	430	
9	58	17	467	-	
10	59	20	594	-	
11	72	29	1034	1034	
12	79	19	1344	1066	
13	86	25	1019	1134	
14	99	40	1513	-	
15	111	33	1508	-	
16	109	47	2101	-	
17	119	65	2478	-	
18	104	50	2122	-	
19	90	40	1779	1333	
20	71	6	1044	931	
21	87	8	1098	-	
22	106	23	1602	-	
23	119	23	2316	-	
24	109	48	2253	-	
25	127	67	2080	-	
26	127	72	2494	-	
27	133	57	3661	-	
28	123	26	2783	-	
29	138	34	2932	2971	
30	161	69	2972	3288	
Mean	90.9	32.7	1503	1356	-

1981 Jul.	R _I	R _{IC}	A _C	A _R	A _I
1	149	112	2605	2929	
2	140	120	2200	-	
3	140	59	2284	-	
4	112	39	1503	-	
5	112	21	952	-	
6	85	21	694	-	
7	66	19	274	-	
8	62	9	357	-	
9	65	0	478	-	
10	99	9	-	1398	
11	130	27	1864	-	
12	139	29	2227	-	
13	153	62	1072	2110	
14	145	74	2803	2610	
15	150	64	2594	2400	
16	161	79	2659	-	
17	171	53	2693	2400	
18	161	50	2789	-	
19	151	50	3514	-	
20	145	66	4525	3515	
21	122	46	4008	3983	
22	129	65	5939	5028	
23	162	98	7346	-	
24	196	84	7594	8191	
25	213	93	6778	7765	
26	206	106	7179	-	
27	218	116	6172	-	
28	208	112	5621	5835	
29	159	116	4363	4519	
30	156	78	3838	-	
31	152	66	3481	2668	
Mean	143.8	62.7	3347	3954	-

1981 Aug.	R _I	R _{IC}	A _C	A _R	A _I
1	121	44	2877	2414	
2	105	40	1953	-	
3	112	28	1716	-	
4	109	28	2021	1218	
5	113	0	2988	2315	
6	102	0	3665	3113	
7	107	7	4037	3420	
8	115	73	5287	3517	
9	121	69	3477	-	
10	138	69	3619	-	
11	136	68	3119	-	
12	140	34	3045	2513	
13	134	21	2415	2517	
14	140	15	2814	-	
15	153	8	2815	-	
16	134	31	3162	-	
17	125	43	3214	3520	
18	148	53	2984	3867	
19	175	73	3829	3951	
20	188	88	4108	4011	
21	222	99	4024	-	
22	220	88	3712	3448	
23	200	93	2670	-	
24	178	81	2774	2144	
25	189	98	-	2118	
26	215	96	2679	2936	
27	222	110	4228	3559	
28	214	80	5078	3972	
29	194	108	3617	2607	
30	233	78	3878	-	
31	216	82	3017	2077	
Mean	158.7	58.2	3294	2962	-

1981 Sep.	R _I	R _{IC}	A _C	A _R	A _I
1	205	68	3939	3359	
2	183	39	3177	3645	
3	160	76	3173	3701	
4	170	79	3445	-	
5	195	87	3326	-	
6	220	80	4420	-	
7	205	61	5434	5378	
8	208	51	5171	4913	
9	190	92	4243	4146	
10	196	151	3987	-	
11	164	81	3709	-	
12	138	56	2852	5379	
13	132	140	3177	-	
14	148	38	3565	-	
15	129	48	3051	3061	
16	138	46	2170	2388	
17	129	48	2567	2486	
18	145	63	2610	-	
19	156	74	3182	-	
20	137	44	2370	-	
21	175	54	2661	2288	
22	172	79	1749	1181	
23	137	67	1439	1088	
24	135	53	1003	-	
25	142	51	1045	974	
26	153	55	1265	1320	
27	181	65	1918	-	
28	195	68	2433	-	
29	191	90	1929	2147	
30	190	75	2223	-	
Mean	167.3	69.3	2908	2966	-

1981 Oct.	R _I	R _{IC}	A _C	A _R	A _I
1	216	99	2386	1828	
2	206	148	1845	-	
3	219	132	1542	1574	
4	189	125	1173	-	
5	195	178	2206	2019	
6	169	125	1959	2185	
7	171	106	2249	1925	
8	185	107	2746	2449	
9	177	68	2297	2475	
10	144	48	2852	-	
11	131	33	3461	-	
12	123	46	4709	-	
13	171	102	5282	5951	
14	187	127	6258	7880	
15	212	91	7340	-	
16	223	66	7241	8875	
17	219	89	7897	8369	
18	210	89	7819	-	
19	189	121	6611	7064	
20	183	193	4654	4765	
21	145	71	3491	3844	
22	145	49	3119	-	
23	118	26	1890	-	
24	109	11	1906	906	
25	101	39	1095	-	
26	92	18	-	-	889
27	75	18	1056	-	
28	92	36	1140	1228	
29	131	63	1561	1574	
30	152	65	2354	-	
31	156	66	3125	2716	
Mean	162.4	82.4	3442	3757	-

1981 Nov.	R _I	R _{IC}	A _C	A _R	A _I
1	165	61	3677	-	
2	222	107	4117	4166	
3	218	154	4821	-	
4	221	112	5101	-	
5	233	151	4963	-	
6	199	134	3638	-	
7	192	66	3556	3653	
8	184	50	3199	-	
9	134	69	2447	-	
10	147	109	2993	-	
11	146	105	2905	3822	
12	160	113	3324	-	
13	158	115	-	3810	
14	178	66	3435	-	
15	139	56	2058	-	
16	126	26	1486	1474	
17	103	34	1125	1074	
18	108	54	-	1257	
19	90	56	1009	1428	
20	82	52	1328	-	
21	82	29	1223	-	
22	73	15	793	-	
23	65	0	373	-	
24	59	0	326	203	
25	60	4	509	-	
26	60	14	894	159	
27	77	40	1056	1893	
28	130	54	1603	2944	
29	148	112	2496	-	
30	165	112	-	4074	
Mean	137.5	69.0	2387	2304	-

1981 Dec.	R _I	R _{IC}	A _C	A _R	A _I
1	193	112	3161	-	
2	197	103	2656	2352	
3	212	77	-	2444	
4	212	52	-	2830	
5	219	65	3145	3270	
6	234	58	3742	-	
7	244	85	5098	-	
8	249	153	6711	-	
9	258	134	7374	-	
10	253	168	6574	-	
11	263	133	6190	-	
12	240	117	4032	6053	
13	185	76	3363	-	
14	159	44	-	-	3514
15	113	16	2578	1497	
16	66	14	1281	1647	
17	80	27	799	-	
18	79	27	642	-	
19	74	30	467	-	
20	57	20	431	-	
21	65	14	546	-	
22	75	7	726	-	
23	86	19	939	1065	
24	68	19	1165	-	
25	62	23	1097	-	
26	100	72	1097	-	
27	104	65	974	-	
28	136	60	1520	-	
29	132	51	1513	-	
30	112	37	1299	-	
31	126	44	1131	-	
Mean	150.1	62.0	2509	2645	-