

Sunspot Relative Numbers and Sunspot Areas

1999

Cooperating Observatories to the International Sunspot Number :

Athens Nat. Obs. (Greece); Athens by ussps 32404 (Greece); Auckland (New-Zealand); Australian Obs. (Australia); Bedizzole (Italy); Berlin (Germany); Boom (Belgium); Bruxelles-Uccle (Belgium); Budapest (Hungary); Buenos-Aires (Argentina); Camaguey (Cuba); Campinas (Brazil); Caracas (Venezuela); Catania (Italy); Ciney (Belgium); Cochabamba (3 stat. Bolivia); Cottbus (Germany); Culgoora (Australia); Dimitrograd (Bulgaria); Dinant (Belgium); Dover (U.K.); Eilenburg (Germany); Etalle (Belgium); Grimbergen (Belgium); Gwynedd (U.K.); Haskovo (Bulgaria); Helwan (Egypt); Holloman by ussps 21305 (U.S.A.); Hurbanovo (Slovakia); Hvezdaren (2stat. Slovakia); Invercargill (New-Zealand); Iseo (Italy); Jambol (Bulgaria); Jordanston (North Ireland); Jeddah (Saudi Arabia); Kandilli (Turkey); Kanzelohe (Austria); Karjali (Bulgaria); Kawaguchi-Saitama (Japan); Kislovodsk (Russia); Kladno (Czech Republic); Langemark (Belgium); Larissa Obs. (Greece); Learmonth by ussps 81202 (Australia); Locarno (Switzerland); Marcq en Baroeul (France); Milano (Italy); Mosta (Malta); Murmansk (Russia); Nijmegen (The Netherlands); Mie-Ken (Japan); Ondrejov (Czech Republic); Plodvid (Bulgaria); Potsdam (Germany); Prague (Czech Republic); Prostejov (Czech Republic); Pulligny (France); Pyong Yang (North Korea); Quezon-City (Philippines); Ramey by ussps 17201 (Puerto-Rico); Rokicany (2 stat. Czech Republic); Roma (Italy); Roquetes-Tortosa (Spain); San Hermenegildo (Spain); San Miguel (Argentina); Santander (Spain); Santiago (Chile); Sao Paulo (Brazil); Sezimovo (Czech Republic); Skalnaté (Slovakia); Sliven (Bulgaria); Sobota (Slovakia); Suwa City (Japan); Taipei Weather Bureau (Taiwan); Tilburg (The Netherlands); Tokyo-Mitaka (Japan); Urawa-Saitama (Japan); Valencia (2 stat. Spain); Varna (Bulgaria); Vedrin (Belgium); Wittelsheim (France); Zagora (Bulgaria); Zamora (Spain).

The first column gives the definitive International Sunspot Numbers for the whole disk of the sun (R_i) established by the Sunspot Index Data Center Brussels on the basis of Locarno as reference station, the second gives the same quantity for the central zone (R_{IC}) on the basis of the observations of Athens (Nat. Obs.); Athens 32404; Uccle; Catania by ussps 31405; Cochabamba; Dimitrograd; Grimbergen; Holloman; Hvezdaren; Kawaguchi-Saitama, Kislovodsk; Learmonth; Mie-Ken; Nijmegen; Ramey; Roquetes-Tortosa; Sobota; Suwa-city; Taipei Obs.; Tilburg; Urawa-Saitama; Varna

The diameter of the central zone is half that of the solar disk.

The Sunspot areas A_C are from Catania, A_R from Roma and A_I , are mean quantities calculated by the Sunspot Index Data Center on the basis of observations of Athens (Nat. Obs.), Roma, Helwan, Jeddah, Taipei Obs. and rattached to Catania by a monthly scaling factor. The apparent total area of the umbra plus penumbra is uncorrected for foreshortening and expressed in millonths of the solar disk.

I - 2 (1999)

JANUARY 1999

1999 JAN.	Ri	Ric	Ac	Ar	Ai
1	64	12	-	-	191
2	68	10	-	-	95
3	58	13	1106	-	221
4	65	17	656	1931	414
5	64	18	597	1147	262
6	48	16	322	-	142
7	64	19	369	-	149
8	51	17	369	-	91
9	47	23	279	-	56
10	46	12	263	-	77
11	32	11	147	-	45
12	35	22	105	-	43
13	41	13	540	-	215
14	65	19	703	1588	336
15	83	27	-	2499	446
16	83	26	865	2410	564
17	93	44	1477	-	295
18	102	80	1520	-	304
19	121	79	2018	3591	760
20	120	78	-	3323	743
21	114	13	2065	2684	875
22	108	26	1810	2451	689
23	87	21	1450	1734	612
24	68	10	830	-	166
25	31	14	285	306	138
26	30	9	126	-	79
27	28	10	105	-	29
28	28	17	-	115	26
29	24	0	63	426	59
30	24	0	180	363	172
31	30	0	222	-	102
MEAN	62.0	21.8	710.5	1754.9	270.8

FEBRUARY 1999

1999 FEB.	Ri	Ric	Ac	Ar	Ai
1	29	0	169	-	80
2	25	9	31	-	5
3	19	0	121	352	80
4	15	11	159	316	64
5	12	10	95	-	28
6	19	9	84	-	45
7	28	13	89	-	30
8	36	7	337	-	103
9	41	0	927	-	403
10	60	0	1370	-	852
11	78	0	1825	-	689
12	115	18	2365	4494	1201
13	134	56	2410	4556	1683
14	138	68	3161	-	1585
15	144	68	3559	4689	1929
16	133	65	3531	4636	1997
17	122	34	2598	-	1178
18	105	29	2560	3282	1052
19	85	12	2049	-	410
20	86	9	1280	-	549
21	74	20	941	-	333
22	47	8	236	-	107
23	42	8	252	-	108
24	38	7	285	547	151
25	44	0	289	-	94
26	51	10	-	-	70
27	59	8	353	1119	232
28	77	8	395	-	175
MEAN	66.3	17.4	1165.6	2665.7	544.0

I - 3 (1999)

MARCH 1999

1999 MAR.	Ri	Ric	Ac	Ar	Ai
1	77	14	496	-	198
2	88	29	988	-	592
3	102	41	1899	-	745
4	96	13	-	-	211
5	99	15	1115	-	378
6	79	27	1072	-	417
7	43	27	857	-	265
8	41	28	348	631	199
9	63	12	607	-	292
10	61	0	1070	1400	445
11	76	0	1085	1484	470
12	87	11	1301	2184	539
13	76	38	1647	2207	824
14	94	45	2410	-	897
15	91	33	1657	-	799
16	97	55	1817	-	992
17	99	42	-	-	663
18	96	46	-	1898	412
19	101	35	918	1349	332
20	78	25	-	1236	297
21	71	29	368	-	133
22	61	16	367	-	111
23	30	13	178	430	90
24	41	0	274	930	187
25	37	0	352	-	70
26	31	0	332	-	66
27	24	8	306	-	61
28	37	8	316	-	63
29	51	16	416	-	83
30	55	16	363	-	73
31	51	9	391	734	205
MEAN	68.8	21.0	850.0	1316.6	358.4

APRIL 1999

1999 APR.	Ri	Ric	Ac	Ar	Ai
1	44	9	359	-	72
2	39	13	269	-	54
3	48	30	289	-	122
4	71	38	646	-	259
5	81	47	979	-	566
6	92	24	1037	-	540
7	82	23	893	-	485
8	89	26	-	-	110
9	104	68	983	-	197
10	90	53	1026	-	547
11	75	42	708	-	371
12	76	59	717	-	211
13	81	76	495	-	217
14	74	51	262	-	154
15	63	29	-	-	75
16	67	30	413	-	83
17	75	11	512	-	151
18	55	13	396	-	127
19	50	19	528	-	227
20	50	24	798	-	239
21	42	35	592	-	222
22	40	25	540	-	220
23	42	22	540	-	108
24	51	17	428	-	167
25	45	12	512	-	162
26	47	0	576	-	273
27	55	21	826	-	426
28	55	39	835	-	428
29	61	44	857	-	310
30	66	29	850	-	170
MEAN	63.7	31.0	638.1	-	243.1

I - 4 (1999)

MAY 1999

1999 MAY	Ri	Ric	Ac	Ar	Ai
1	76	0	873	-	258
2	92	22	849	-	330
3	80	25	622	1012	312
4	84	26	597	1610	375
5	88	43	605	-	223
6	104	29	987	-	197
7	142	30	1345	-	269
8	152	14	2101	-	723
9	149	58	1706	-	570
10	136	64	1701	3174	844
11	134	70	1770	-	570
12	122	87	1678	2649	717
13	101	86	1449	-	290
14	94	39	1352	-	270
15	105	35	1486	-	508
16	105	17	1571	-	680
17	99	24	1492	-	652
18	93	33	1460	-	652
19	94	36	1206	-	528
20	96	48	-	-	0
21	109	34	1715	-	343
22	98	21	1693	-	726
23	86	17	1455	-	635
24	85	25	2160	1995	790
25	92	34	1640	2119	733
26	114	34	1370	-	540
27	119	36	1522	1956	484
28	119	48	1624	2077	516
29	115	45	-	2088	542
30	107	40	-	-	502
31	109	38	2511	3086	1244
MEAN	106.4	37.4	1447.9	2176.6	516.9

JUNE 1999

1999 JUN.	Ri	Ric	Ac	Ar	Ai
1	137	72	3128	-	1623
2	135	91	2943	-	1516
3	131	87	3319	-	1256
4	140	87	2932	-	586
5	144	59	1785	-	941
6	146	20	1352	-	603
7	123	11	1483	-	482
8	131	73	1488	-	759
9	160	127	1579	2676	829
10	146	119	1787	724	383
11	159	115	1960	-	392
12	153	64	2085	3344	1171
13	152	29	2313	3183	1120
14	147	39	3613	-	1199
15	139	77	3028	2567	1169
16	120	57	1947	-	743
17	97	59	1353	1924	452
18	80	39	1041	-	454
19	79	18	776	-	372
20	62	0	-	-	202
21	79	0	955	1187	507
22	106	12	1452	-	461
23	144	32	1551	2281	732
24	195	21	2594	3245	815
25	194	97	2890	4876	1057
26	182	126	3058	5611	1171
27	172	135	2429	4353	1220
28	169	168	2465	-	890
29	160	105	2434	610	972
30	148	74	1941	2805	1194
MEAN	137.7	67.1	2126.9	2813.3	842.4

I - 5 (1999)

JULY 1999

1999 JULY	Ri	Ric	Ac	Ar	Ai
1	141	66	-	3230	457
2	146	52	-	2756	390
3	142	36	-	3914	554
4	134	11	-	-	0
5	130	35	-	3476	492
6	122	35	-	3764	533
7	117	63	-	-	0
8	113	43	-	-	0
9	115	21	-	-	0
10	112	13	-	1921	272
11	115	28	-	2193	310
12	130	46	-	1478	209
13	103	58	-	2076	294
14	84	53	-	-	0
15	80	37	-	1872	265
16	77	26	-	1570	222
17	79	13	-	1448	205
18	90	26	-	-	0
19	79	13	-	1196	169
20	77	11	-	1419	201
21	79	13	-	1740	246
22	94	40	-	2756	390
23	97	43	-	-	0
24	113	62	-	-	0
25	119	64	-	-	0
26	100	8	-	-	0
27	115	28	-	3285	465
28	144	39	-	-	0
29	161	56	-	-	0
30	165	69	-	3845	544
31	146	55	-	4203	595
MEAN	113.5	37.5	-	2533.8	219.8

AUGUST 1999

1999 AUG.	Ri	Ric	Ac	Ar	Ai
1	166	86	3192	-	1197
2	165	88	4106	-	1295
3	151	84	4476	5467	1391
4	127	74	3814	3837	1327
5	127	41	2892	4969	1443
6	110	34	1942	2650	636
7	100	21	1332	-	266
8	98	12	1093	-	354
9	76	13	618	-	228
10	54	39	687	-	248
11	52	45	736	1096	252
12	60	39	597	772	249
13	67	20	353	931	169
14	57	0	495	-	162
15	49	17	655	-	131
16	44	12	640	-	228
17	36	15	512	918	270
18	38	32	534	-	235
19	42	40	630	1543	389
20	48	32	958	-	192
21	58	25	1491	1495	518
22	68	23	1752	-	350
23	76	0	1769	-	354
24	86	22	1647	2359	553
25	129	15	2748	2781	1187
26	136	37	2094	2830	1033
27	128	51	2760	-	552
28	147	47	3373	3886	1266
29	152	78	3586	-	717
30	150	75	-	3689	786
31	109	60	2265	-	855
MEAN	93.7	38.0	1791.6	2614.9	607.5

I - 6 (1999)

SEPTEMBER 1999

1999 SEP.	Ri	Ric	Ac	Ar	Ai
1	94	37	1487	1392	493
2	82	29	846	-	275
3	77	20	538	-	108
4	69	27	533	-	156
5	71	29	257	-	78
6	58	20	205	849	168
7	69	11	268	-	104
8	76	10	441	1852	331
9	73	10	-	1307	246
10	74	17	734	1130	256
11	76	29	926	1284	474
12	85	46	1063	-	577
13	102	57	1891	2776	898
14	112	59	2145	3346	1064
15	113	42	2230	-	959
16	111	9	2228	-	760
17	99	38	2232	2815	704
18	99	38	1280	-	335
19	86	32	1013	-	342
20	65	21	574	-	280
21	44	14	513	887	368
22	60	22	560	999	366
23	57	20	696	1023	314
24	41	16	513	-	103
25	29	17	434	710	302
26	31	17	348	-	119
27	35	11	396	-	155
28	46	16	331	-	149
29	52	10	300	623	168
30	58	9	266	592	152
MEAN	71.5	24.4	870.6	1439.0	360.1

OCTOBER 1999

1999 OCT.	Ri	Ric	Ac	Ar	Ai
1	50	8	183	-	37
2	64	7	463	692	175
3	68	22	530	-	165
4	77	16	912	1149	378
5	124	35	1171	2363	603
6	136	49	1543	-	599
7	138	72	1451	2549	542
8	113	62	1151	-	230
9	131	54	1225	1661	544
10	130	41	1322	-	583
11	126	23	1918	-	708
12	145	16	2443	3114	1104
13	157	67	2967	-	1036
14	151	74	3017	-	603
15	115	97	3407	-	681
16	122	89	3719	-	1253
17	125	76	3598	-	1340
18	114	64	2950	-	1242
19	109	30	2198	3496	1214
20	113	24	1721	-	736
21	97	34	813	-	163
22	86	25	1408	-	282
23	79	11	1754	-	696
24	90	29	1975	-	911
25	120	40	3279	-	1169
26	143	55	4381	-	1332
27	140	69	3735	-	1358
28	135	79	3003	3732	940
29	137	56	3257	-	651
30	155	57	3505	-	1095
31	129	66	2898	-	912
MEAN	116.7	46.7	2190.2	2344.5	751.0

I - 7 (1999)

NOVEMBER 1999

1999 NOV.	Ri	Ric	Ac	Ar	Ai
1	115	60	1512	-	619
2	99	47	1635	2206	771
3	81	45	1460	1737	590
4	95	31	1263	-	253
5	102	30	-	-	0
6	103	18	880	-	346
7	123	21	1368	-	391
8	146	29	3065	-	929
9	169	60	4222	-	1418
10	206	89	-	7361	1761
11	205	105	-	-	0
12	188	87	5095	-	1019
13	164	52	-	-	1096
14	146	45	4614	-	1509
15	153	67	4270	-	1641
16	171	78	3795	-	1434
17	166	82	4815	-	2206
18	159	79	4440	-	888
19	164	59	4463	-	893
20	152	47	3132	-	1298
21	142	43	2622	-	1080
22	137	63	3266	-	1075
23	110	41	2856	3543	963
24	103	25	2599	-	749
25	102	25	2344	2808	722
26	95	29	-	2651	375
27	124	42	-	1939	371
28	105	35	-	-	251
29	78	45	-	-	429
30	93	37	-	2486	752
MEAN	133.2	50.5	3034.1	3091.4	861.0

DECEMBER 1999

1999 DEC.	Ri	Ric	Ac	Ar	Ai
1	103	31	1927	2486	1140
2	99	27	1258	-	440
3	70	18	1777	-	355
4	57	9	1334	-	737
5	51	20	-	-	778
6	63	21	1175	2120	799
7	59	37	1715	2081	948
8	78	41	1831	-	941
9	87	48	1956	-	736
10	110	62	2108	-	833
11	101	50	1761	-	952
12	89	41	1587	-	723
13	102	40	823	1659	472
14	104	34	850	-	286
15	92	21	1078	-	483
16	94	25	1062	-	440
17	102	47	1863	-	591
18	99	56	-	3033	1061
19	100	44	3246	-	1113
20	102	36	3315	-	1349
21	93	41	4153	6062	2314
22	94	43	3990	5842	1354
23	89	48	-	5485	1316
24	97	54	3279	-	1304
25	93	14	3194	-	1152
26	84	16	3067	-	1076
27	69	10	2273	-	835
28	62	11	1923	-	781
29	75	17	1417	1346	557
30	48	0	-	1168	305
31	57	0	941	1791	470
MEAN	84.6	31.0	2033.4	3006.6	859.4