

Sunspot Relative Numbers and Sunspot Areas

1998

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); Bucharest (Rumania); Budapest (Hungary), 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); Gwyneed (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); 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_1) 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_{1C}) 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 (1998)

JANUARY 1998

1998 JAN.	Ri	Ric	Ac	Ar	Ai
1	39	12	-	0	219
2	31	8	-	0	427
3	23	0	-	343	150
4	20	0	-	0	58
5	10	0	-	0	47
6	1	0	-	0	2
7	0	0	-	0	0
8	0	0	-	0	0
9	0	0	-	0	0
10	10	0	-	13	16
11	27	12	-	0	30
12	38	26	-	0	249
13	36	22	-	0	365
14	30	18	-	0	498
15	32	11	-	1020	719
16	52	17	-	881	710
17	52	8	-	0	486
18	46	7	-	0	138
19	39	12	-	0	87
20	17	8	-	-	0
21	14	7	-	47	21
22	16	8	-	0	0
23	40	11	-	63	181
24	66	13	-	595	627
25	75	14	-	0	691
26	67	0	-	1426	837
27	61	11	-	0	637
28	53	16	-	878	888
29	47	16	-	521	250
30	28	8	-	-	103
31	18	8	-	0	200
MEAN	31.9	8.8	-	199.6	278.6

FEBRUARY 1998

1998 FEB.	Ri	Ric	Ac	Ar	Ai
1	17	0	-	0	0
2	15	7	-	3	54
3	28	0	-	0	80
4	28	0	-	0	0
5	22	0	-	178	39
6	30	0	-	223	49
7	27	0	-	249	84
8	28	7	-	0	39
9	33	8	-	322	99
10	42	18	-	226	113
11	40	8	-	217	119
12	47	0	-	-	264
13	47	0	-	1286	517
14	76	20	-	1591	572
15	65	33	-	0	334
16	62	31	-	1901	731
17	58	28	-	0	408
18	52	27	-	1311	568
19	35	10	-	1070	458
20	28	8	-	665	383
21	21	0	-	-	148
22	28	9	-	0	52
23	39	8	-	0	163
24	59	23	-	0	140
25	58	30	-	0	297
26	45	31	-	831	242
27	43	12	-	448	99
28	54	17	-	183	76
MEAN	40.3	12.0	-	411.7	218.9

I - 3 (1998)

MARCH 1998

1998 MAR.	Ri	Ric	Ac	Ar	Ai
1	59	16	-	0	78
2	67	23	-	951	256
3	35	9	-	519	271
4	36	0	-	0	453
5	32	8	-	0	302
6	29	7	-	99	453
7	36	0	-	0	13
8	33	12	-	0	26
9	35	11	-	351	124
10	50	10	-	674	178
11	56	9	-	675	276
12	72	8	-	0	0
13	74	14	-	0	182
14	79	28	-	1571	521
15	63	36	-	0	1056
16	60	38	-	3511	1133
17	59	38	-	3032	671
18	64	10	-	2796	1144
19	67	0	-	2753	1104
20	62	0	-	1854	889
21	69	0	-	331	727
22	72	13	-	0	138
23	55	22	-	0	490
24	59	28	-	0	346
25	59	10	-	0	642
26	52	31	-	2355	836
27	51	35	-	1792	685
28	56	23	-	0	500
29	58	19	-	0	346
30	46	9	-	1422	659
31	55	0	-	1533	756
MEAN	54.8	15.1	-	845.8	492.1

APRIL 1998

1998 APR.	Ri	Ric	Ac	Ar	Ai
1	56	9	-	-	837
2	59	29	-	0	238
3	57	36	-	528	393
4	51	31	-	541	269
5	59	23	-	0	0
6	63	23	-	1755	975
7	93	30	-	2048	858
8	106	34	-	0	794
9	122	42	-	0	603
10	108	47	-	2480	810
11	96	44	-	-	494
12	80	46	-	0	265
13	64	33	-	0	144
14	70	25	-	996	333
15	65	15	-	932	461
16	61	15	-	477	314
17	46	11	-	0	85
18	23	14	-	207	80
19	31	13	-	0	67
20	30	0	-	252	101
21	34	10	-	12	98
22	32	8	-	-	129
23	26	8	-	0	125
24	14	7	-	16	9
25	20	10	-	0	20
26	13	7	-	0	46
27	12	0	-	487	188
28	28	0	-	0	225
29	36	17	-	761	264
30	46	18	-	0	242
MEAN	53.4	20.2	-	425.6	315.6

I - 4 (1998)

MAY 1998

1998 MAY	Ri	Ric	Ac	Ar	Ai
1	57	26	-	0	219
2	73	37	-	0	484
3	74	30	-	0	530
4	73	43	-	0	589
5	79	35	-	0	1290
6	76	21	-	2816	1539
7	71	9	-	753	1031
8	63	8	-	687	793
9	54	8	-	1447	741
10	43	8	-	0	417
11	58	22	-	1081	513
12	73	25	-	896	549
13	80	30	-	1290	662
14	82	33	-	0	411
15	80	19	-	0	340
16	79	38	-	1343	426
17	71	44	-	0	223
18	67	46	-	584	221
19	56	22	-	573	367
20	43	0	-	343	196
21	26	0	-	238	160
22	21	0	-	127	97
23	28	13	-	76	26
24	32	19	-	0	131
25	41	0	-	0	333
26	43	0	-	888	463
27	51	8	-	744	526
28	33	10	-	618	295
29	28	17	-	573	191
30	40	14	-	611	260
31	49	14	-	0	246
MEAN	56.3	19.3	-	506.1	460.3

JUNE 1998

1998 JUN.	Ri	Ric	Ac	Ar	Ai
1	49	13	-	809	396
2	57	11	-	1088	644
3	55	17	-	1194	608
4	74	18	-	0	278
5	79	16	-	1773	702
6	72	30	-	1725	382
7	66	25	-	0	360
8	66	28	-	-	630
9	81	16	-	-	722
10	77	23	-	-	489
11	76	12	-	0	330
12	83	16	-	0	431
13	91	13	-	-	262
14	69	12	-	0	177
15	53	9	-	0	198
16	49	10	-	0	304
17	67	25	-	734	470
18	55	23	-	-	527
19	52	17	-	850	413
20	60	18	-	849	344
21	64	8	-	0	255
22	51	8	-	805	370
23	53	8	-	312	371
24	45	0	-	423	393
25	75	8	-	696	278
26	83	9	-	894	595
27	100	20	-	930	374
28	108	28	-	0	438
29	109	30	-	0	640
30	101	35	-	1228	743
MEAN	70.7	16.9	-	572.4	437.5

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JULY 1998

1998 JULY	Ri	Ric	Ac	Ar	Ai
1	94	8	-	1752	1619
2	95	18	-	0	1418
3	95	31	-	0	1418
4	100	27	-	0	1533
5	94	38	-	2289	1097
6	74	19	-	1386	1122
7	51	19	-	0	750
8	38	10	-	0	627
9	32	0	-	688	759
10	49	0	-	581	280
11	57	8	-	0	163
12	55	8	-	0	181
13	44	7	-	559	347
14	41	21	-	494	183
15	55	31	-	0	224
16	67	27	-	742	382
17	59	21	-	834	649
18	42	12	-	0	311
19	35	0	-	0	312
20	69	11	-	595	449
21	78	0	-	723	589
22	91	0	-	1401	927
23	90	11	-	1246	994
24	79	12	-	1589	1424
25	68	12	-	2069	1971
26	63	9	-	0	2006
27	65	32	-	2227	1370
28	85	33	-	2180	1945
29	74	23	-	2027	2099
30	57	0	-	1675	1334
31	68	8	-	1363	1209
MEAN	66.6	14.7	-	852.3	957.8

AUGUST 1998

1998 AUG.	Ri	Ric	Ac	Ar	Ai
1	64	17	1100	1191	875
2	76	24	420	1139	861
3	68	26	500	1064	634
4	66	28	760	939	556
5	70	10	1090	0	902
6	98	9	1860	0	1297
7	104	17	2329	-	2108
8	97	38	2617	2888	2246
9	125	44	3422	0	2155
10	119	17	2705	4118	2835
11	118	22	3056	3503	3026
12	121	32	2909	3512	2809
13	92	31	2600	3299	2280
14	94	28	2642	2784	2450
15	73	30	2436	0	2176
16	94	19	2317	0	1366
17	87	0	1455	2161	1888
18	83	10	1119	2001	1501
19	101	17	1103	-	1591
20	91	15	819	1976	1205
21	89	25	978	1811	770
22	81	13	1195	1994	1698
23	84	24	1301	1775	1767
24	79	27	1466	-	1789
25	73	23	1313	1603	1390
26	87	31	1279	1583	1183
27	100	41	1100	1342	1136
28	96	45	1407	0	1261
29	102	40	2138	-	1590
30	117	24	2675	3109	1185
31	109	15	3163	3649	2908
MEAN	92.2	23.9	1783.0	1757.1	1659.3

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SEPTEMBER 1998

1998 SEP.	Ri	Ric	Ac	Ar	Ai
1	100	16	3019	3703	2918
2	85	10	2665	3524	3155
3	79	26	1923	2356	2932
4	68	36	1960	3390	1053
5	80	21	2193	0	2695
6	112	30	2271	3005	2483
7	116	24	2091	-	3006
8	125	54	-	0	2005
9	119	74	1625	2791	1771
10	112	67	1538	2338	1629
11	96	53	1449	2127	1480
12	92	30	1672	0	528
13	95	33	1380	0	1345
14	78	26	957	1610	736
15	60	21	772	2375	1137
16	56	0	486	793	535
17	74	12	643	1026	679
18	70	14	871	1255	734
19	93	17	1432	0	713
20	114	14	1481	0	584
21	125	29	2214	2180	1565
22	138	67	1952	2908	1932
23	135	80	2091	2780	1353
24	117	70	-	0	1378
25	105	50	-	0	570
26	82	18	1557	-	802
27	76	17	1147	0	1050
28	85	13	691	991	928
29	60	10	410	1584	656
30	41	0	184	-	196
MEAN	92.9	31.1	1506.4	1508.7	1418.3

OCTOBER 1998

1998 OCT.	Ri	Ric	Ac	Ar	Ai
1	30	0	163	0	60
2	32	8	-	-	423
3	25	0	291	0	137
4	19	11	371	0	450
5	30	0	789	0	651
6	54	25	830	0	608
7	66	29	1207	0	939
8	92	47	1201	0	672
9	84	42	1083	0	915
10	60	21	566	-	857
11	51	14	-	0	575
12	42	21	375	0	381
13	48	32	333	-	208
14	66	31	656	1085	525
15	84	48	937	1161	1098
16	93	19	1566	0	1288
17	98	22	1472	-	1609
18	105	32	1010	0	1122
19	96	36	871	0	789
20	81	42	-	1461	470
21	63	35	-	1182	601
22	49	19	667	1074	815
23	50	25	406	-	647
24	39	11	274	-	560
25	31	8	153	0	103
26	32	0	189	210	165
27	18	11	137	218	137
28	23	12	137	-	165
29	54	17	395	-	413
30	54	24	521	-	294
31	52	20	480	-	432
MEAN	55.5	21.4	632.6	304.3	584.2

I - 7 (1998)

NOVEMBER 1998

1998 NOV.	Ri	Ric	Ac	Ar	Ai
1	37	15	-	0	627
2	41	22	-	-	892
3	56	29	-	0	904
4	88	54	-	0	1293
5	95	40	-	-	1067
6	98	38	-	0	673
7	103	34	-	2381	1636
8	92	30	-	2373	1591
9	71	21	-	2428	1430
10	68	20	-	-	354
11	66	17	-	0	1036
12	73	0	-	1875	1224
13	88	14	-	2078	1200
14	94	15	-	0	1589
15	95	23	-	2870	1499
16	76	32	-	1620	974
17	53	10	-	1424	1149
18	51	18	-	0	505
19	35	10	-	0	728
20	46	0	-	961	687
21	33	13	-	1022	768
22	41	19	-	0	296
23	47	10	-	-	314
24	59	11	-	0	550
25	85	10	-	0	1015
26	106	13	-	0	928
27	114	11	-	0	0
28	106	31	-	0	1877
29	105	36	-	0	1535
30	99	64	-	0	1577
MEAN	74.0	22.0	-	732.0	997.3

DECEMBER 1998

1998 DEC.	Ri	Ric	Ac	Ar	Ai
1	108	52	1956	-	1857
2	99	53	1708	0	764
3	101	33	1677	2956	817
4	86	20	2196	0	535
5	68	23	1746	0	684
6	89	41	1204	3099	931
7	95	35	1566	3454	1045
8	119	44	2674	4620	1280
9	109	19	2409	-	1087
10	108	21	2439	0	610
11	105	28	2042	0	466
12	102	26	1630	2887	914
13	84	48	1781	0	607
14	83	45	-	0	290
15	72	21	983	0	417
16	60	8	1158	1462	646
17	49	8	947	1185	514
18	60	10	747	0	202
19	50	9	539	1073	347
20	50	0	417	0	192
21	43	0	-	0	153
22	39	13	243	944	210
23	47	13	221	834	184
24	58	9	328	-	156
25	66	21	593	0	175
26	81	22	927	1909	561
27	100	18	1624	0	538
28	121	25	2165	3187	1207
29	96	40	2441	-	1095
30	99	57	2808	3449	1275
31	92	11	-	-	0
MEAN	81.9	24.9	1470.3	1194.6	637.4