

Sunspot Relative Numbers and Sunspot Areas

2004

Cooperating Observatories to the International Sunspot Number :

AMATEUR SOUTHERN CROSS OBSERVATORY (BOLIVIA); ANDRIES SON (BELGIUM); ASTRO. DE REUX CINEY (BELGIUM); BARNES AUCKLAND (NEW-ZEALAND); BORTOLOTTI MAURO (ITALIA); BULLON VALENCIA (SPAIN); CAMAGUEY (CUBA); CAPRICORNO CAMPINAS (BRASIL); CATANIA (ITALY); CENTRAL WEATHER BUREAU (CHINA); CLAEYS VEDRIN (BELGIUM); COURDURIE MARCQ EN BAROEUL (FRANCE); CULGOORA NARRABRI (AUSTRALIA); DE BACKER BOOM (BELGIUM); DRAGESCO JEAN (FRANCE); DUBOIS LANGEMARK (BELGIUM); EBRO ROQUETES (SPAIN); EUROPLANETARIUM (BELGIUM); EVANS INVERCAGILL (NEW-ZEALAND); FERNANDEZ RUIS SANTANDER (SPAIN); FERREIRA SAO FRANCISCO (BRASIL); FUJIMORI NAGANO (JAPAN); GEMA ARAUJO (SPAIN); GERARD DINANT (BELGIUM); GERMAN MORALES COCHABAMBA (BOLIVIA); GUILLERY PULLIGNY (FRANCE); GYSEL LUC (BELGIUM); HAVANA SOLAR STATION (CUBA); HAZEL COLLETT (UNITED-KINGDOM); HELWAN (EGYPT); HOLLOMAN (U.S.A); HURBANOVO (SLOVAKIA); HVEZDAREN KYSUCKE (SLOVAKIA); HVEZDAREN PRESOV (SLOVAKIA); ISEO (ITALIA); JOHNSTON GWYNEDD (ENGLAND); JURI GAGARIN EILENBURG (GERMANY); KANDILLI (TURKEY); KANZELHOHE TREFFEN (AUSTRIA); KAWAGUCHI (JAPAN); KISLOVODSK (RUSSIA); KLADNO (CZECH-REPUBLIC); LARISSA OBSERVATORY (GREECE); LEARMOUTH (AUSTRALIA); LOCARNO (SWITZERLAND); MAC KENZIE DOVER (UNITED-KINGDOM); MAHMOUD S MOSQUE SOCIETY (EGYPT); MILANO (ITALY); MIRA GRIMBERGEN (BELGIUM); MITAKA (JAPAN); MOCHIZUKI URAWA SAITAMA (JAPAN); MOJICA COCHABAMBA (BOLIVIA); MURMANSK (RUSSIA); NIJMEGEN (NETHERLANDS); OBSERV. PAUL AHNERT COTTBUS (GERMAN); OBSERVATORY FRANTISKA (CZECH-REP.); OBSERVATORY PROSTEJOV (CZECH REPUBL); ONDREJOV OBSERV. (CZECH-REPUBLIC); PASTERNAK BERLIN (GERMANY); PASTERNAK LEER (GERMANY); PHILIPPE WITTELSHEIM (FRANCE); QUEZON (PHILIPPINES); RAUL ROBERTO PODESTA (U.S.A.); ROBERTO de MANZANO (ITALIA); SAN MIGUEL (ARGENTINA); SAN VITO (ITALY); SAUDI ARABIA (JEDDAH); SCHOTT LUTZ GERD (GERMANY); SKALNATE (SLOVAKIA); SMOLYAN (BULGARIA); SOBOTA (SLOVAKIA); SPANINKS TILBURG (NETHERLANDS); STEFANIKS OBS. PRAGUE (CZECH-REP.); SUZUKI (JAPAN); UCCLE (BELGIUM); WATUKOSEK OBSERVATORY (INDONESIA); ZAGORA (BULGARIA).

The first column gives the definitive international Sunspot Numbers for the whole solar disk (R_i established by the Solar Influences Data analysis Center (Brussels, Belgium), the second gives the same quantity for the central zone (R_{ic}) on the basis of the observations of AMATEUR SOUTHERN CROSS OBSERVATORY (BOLIVIA); ASTRO. DE REUX CINEY (BELGIUM); CAPRICORNO CAMPINAS (BRASIL); CATANIA (ITALY); CENTRAL WEATHER BUREAU (CHINA); EUROPLANETARIUM (BELGIUM); GERMAN MORALES COCHABAMBA (BOLIVIA); HOLLOMAN (U.S.A); HVEZDAREN KYSUCKE (SLOVAKIA); HVEZDAREN PRESOV (SLOVAKIA); KANDILLI (TURKEY); KISLOVODSK (RUSSIA); KLADNO (CZECH-REPUBLIC); LARISSA OBSERVATORY (GREECE); LEARMOUTH (AUSTRALIA); MIRA GRIMBERGEN (BELGIUM); MITAKA (JAPAN); NIJMEGEN (NETHERLANDS); OBSERVATORY FRANTISKA (CZECH-REP.); OBSERVATORY PROSTEJOV CZECH (REPUBL); ONDREJOV OBSERV. (CZECH-REPUBLIC); SAN VITO (ITALY); SKALNATE (SLOVAKIA); SMOLYAN (BULGARIA); STEFANIKS OBS. PRAGUE (CZECH-REP.); SUZUKI (JAPAN); UCCLE (BELGIUM).

The diameter of the central zone is half the size 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 SIDC on the basis of observations of Roma, Helwan, Jeddah and rattached to Catania by a monthly scale factor. The apparent total area of the umbra plus penumbra is uncorrected for foreshortening and expressed in millionths of the solar disk.

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JANUARY 2004						FEBRUARY 2004					
2004 JAN.	Ri	Ric	Ac	Ar	Ai	2004 FEB.	Ri	Ric	Ac	Ar	Ai
1	32	22	508	-	323	1	43	19	422	-	161
2	40	19	1155	-	508	2	64	41	905	856	442
3	45	19	1404	2147	796	3	63	25	585	853	323
4	46	15	1992	-	664	4	60	23	564	962	321
5	44	16	1467	2723	932	5	62	47	655	1287	404
6	39	35	1515	-	505	6	51	50	1259	1449	529
7	50	33	1901	-	624	7	40	49	794	-	343
8	53	37	1850	-	616	8	45	27	1027	-	308
9	38	29	-	-	0	9	48	24	1133	1799	559
10	36	23	1177	-	392	10	48	18	1005	1368	535
11	32	13	805	-	268	11	44	17	894	-	354
12	29	13	795	-	525	12	48	36	778	957	393
13	35	14	873	-	291	13	48	34	734	-	403
14	34	14	1191	-	397	14	38	25	523	-	174
15	43	11	989	1262	751	15	50	23	453	-	351
16	50	9	847	-	282	16	41	13	-	361	205
17	49	31	1111	-	370	17	18	13	137	221	269
18	43	28	1064	-	354	18	22	13	136	183	394
19	54	50	999	-	689	19	18	8	99	-	244
20	61	75	1716	-	572	20	26	8	78	-	318
21	61	67	1609	1726	760	21	30	8	-	-	486
22	49	44	-	1306	715	22	30	0	-	-	492
23	42	13	449	-	149	23	55	33	937	-	312
24	34	0	231	305	324	24	47	47	1170	-	783
25	16	0	58	-	388	25	53	57	1753	-	584
26	13	0	36	-	450	26	53	56	1737	-	579
27	0	7	-	-	0	27	67	40	2305	-	1431
28	8	8	-	1658	459	28	66	25	2167	-	722
29	16	9	41	91	201	29	50	23	1307	-	435
30	27	15	110	196	84						
31	38	13	184	-	257						
MEAN	37.3	22.0	965.8	1268.2	440.2	MEAN	45.8	27.7	906.0	936.0	443.2

MARCH 2004						APRIL 2004					
2004 MAR.	Ri	Ric	Ac	Ar	Ai	2004 APR.	Ri	Ric	Ac	Ar	Ai
1	44	16	666	-	2068	1	55	38	1468	-	1417
2	31	18	439	783	816	2	51	19	1356	1315	1454
3	26	20	-	520	143	3	47	13	968	-	1195
4	23	21	360	614	1097	4	55	18	803	-	705
5	35	12	549	719	1113	5	57	15	1451	-	788
6	39	11	-	-	1147	6	40	15	417	-	347
7	40	11	-	-	1157	7	39	16	469	-	322
8	35	8	1165	-	1336	8	27	13	444	551	523
9	38	10	1355	1694	1042	9	15	10	285	-	460
10	38	20	1223	-	407	10	13	10	152	-	544
11	38	29	-	-	966	11	13	0	115	-	533
12	48	32	1569	1991	1142	12	25	9	163	-	676
13	40	26	1261	1726	1028	13	35	13	152	-	332
14	38	14	1409	-	885	14	42	15	332	-	110
15	32	0	1017	999	604	15	34	11	243	441	361
16	37	9	893	714	611	16	31	8	-	-	0
17	48	13	364	480	537	17	50	7	384	-	615
18	54	9	1094	877	888	18	58	23	528	-	510
19	58	23	1407	-	1011	19	63	27	745	-	534
20	50	21	771	-	257	20	59	22	841	1334	487
21	48	20	704	-	234	21	59	36	942	1315	508
22	57	29	1472	-	1270	22	57	30	962	1116	1299
23	61	45	1493	-	497	23	43	33	783	-	2112
24	57	42	1594	-	531	24	38	23	-	-	3360
25	83	37	-	1533	1384	25	31	13	-	-	2981
26	84	21	1602	1512	1438	26	34	20	-	1058	2665
27	88	11	1948	-	1519	27	26	11	492	690	845
28	76	16	-	-	1035	28	23	13	434	513	770
29	66	29	-	1407	1165	29	24	8	253	-	1671
30	54	31	-	-	585	30	34	15	158	-	1460
31	56	35	-	-	0						
MEAN	49.1	20.6	1107.0	1112.1	900.4	MEAN	39.3	16.8	590.0	925.9	986.1

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MAY 2004						JUNE 2004					
2004 MAY	Ri	Ric	Ac	Ar	Ai	2004 JUN.	Ri	Ric	Ac	Ar	Ai
1	44	20	273	-	1206	1	35	17	210	423	344
2	28	11	454	-	780	2	36	20	274	-	91
3	32	0	507	551	205	3	37	24	268	334	817
4	33	19	270	380	143	4	36	18	226	-	903
5	29	16	364	-	109	5	36	24	109	151	814
6	20	22	142	-	53	6	29	23	-	-	1296
7	16	8	110	193	75	7	37	23	120	205	746
8	17	12	428	-	250	8	33	28	156	150	329
9	24	8	364	-	431	9	34	25	98	126	50
10	29	15	523	558	529	10	31	9	215	125	833
11	25	11	507	-	538	11	24	11	147	240	898
12	40	28	592	821	318	12	18	11	180	288	1038
13	37	31	1053	1371	1085	13	28	8	210	-	1231
14	54	51	1057	1888	1980	14	35	8	549	544	1278
15	58	53	1323	2570	1976	15	44	8	1038	1552	955
16	73	43	1470	-	2482	16	64	16	1340	2358	824
17	69	30	2071	2638	2834	17	62	23	-	-	1438
18	60	21	1868	1860	1556	18	67	28	1779	3193	1843
19	58	23	1518	1416	1440	19	69	55	2395	-	1504
20	59	33	777	1136	1163	20	86	59	2697	-	1592
21	52	18	672	887	2453	21	87	67	2109	-	1274
22	47	8	534	-	1633	22	76	45	1773	2532	1242
23	59	11	-	-	1657	23	61	17	1456	1895	1118
24	62	37	-	1714	1060	24	52	12	1164	-	1060
25	55	40	1201	1638	640	25	37	14	767	656	1009
26	43	34	1175	1303	660	26	34	12	480	235	733
27	32	35	1038	-	894	27	31	13	178	-	1204
28	30	16	943	929	1006	28	30	12	232	188	1127
29	31	0	1202	882	1042	29	26	0	221	294	568
30	35	0	1313	-	1193	30	22	0	147	289	481
31	34	0	736	526	856						
MEAN	41.5	21.1	844.3	1224.3	1040.2	MEAN	43.2	21.0	733.5	788.9	954.7

JULY 2004						AUGUST 2004					
2004 JULY	Ri	Ric	Ac	Ar	Ai	2004 AUG.	Ri	Ric	Ac	Ar	Ai
1	17	19	185	325	393	1	23	10	571	-	451
2	20	23	206	345	361	2	28	0	476	-	324
3	20	20	153	255	383	3	30	20	466	789	280
4	19	17	142	-	315	4	33	26	555	720	387
5	16	10	79	92	270	5	21	28	428	-	443
6	17	0	63	38	340	6	33	22	757	-	493
7	9	0	78	15	22	7	44	21	724	-	578
8	11	0	36	19	522	8	39	0	799	-	667
9	27	14	195	345	634	9	50	0	1149	1955	913
10	38	13	354	439	764	10	58	28	3900	-	1339
11	47	45	707	-	1219	11	63	58	1764	4104	1293
12	54	29	661	1026	957	12	68	55	2681	-	1077
13	88	31	2504	1836	1505	13	76	68	2708	-	929
14	90	40	1641	2098	845	14	68	18	3064	-	1102
15	82	19	1397	2100	1039	15	61	8	1011	-	631
16	65	34	1492	2174	1063	16	54	9	3138	-	1247
17	79	57	2249	2726	1370	17	44	20	2804	2534	1239
18	93	54	2792	-	1712	18	41	20	1361	1916	738
19	100	47	3798	4701	2337	19	36	32	1117	-	555
20	91	41	5195	5843	2724	20	50	33	1546	-	1322
21	88	52	4272	6654	2449	21	57	33	1774	-	695
22	84	64	4543	7062	2695	22	66	45	3410	-	1030
23	74	70	4002	-	1673	23	56	38	1292	2065	736
24	69	81	2931	5480	2001	24	38	33	1361	-	499
25	57	52	465	-	728	25	31	24	1016	-	338
26	64	37	2146	3351	1273	26	24	15	636	-	212
27	55	20	1776	-	738	27	21	14	418	508	210
28	39	15	1223	-	407	28	20	10	221	-	73
29	24	13	540	-	382	29	16	0	116	-	38
30	24	17	402	-	338	30	10	0	127	82	48
31	23	16	667	-	372	31	9	0	89	-	29
MEAN	51.1	30.6	1512.7	2234.5	1026.8	MEAN	40.9	22.2	1338.0	1630.3	642.5

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SEPTEMBER 2004						OCTOBER 2004					
2004 SEP.	Ri	Ric	Ac	Ar	Ai	2004 OCT.	Ri	Ric	Ac	Ar	Ai
1	8	9	111	-	37	1	18	9	252	501	823
2	8	9	264	510	361	2	16	8	418	479	902
3	18	10	508	906	517	3	28	27	470	483	1004
4	20	0	540	951	509	4	27	12	205	396	802
5	37	17	575	1142	822	5	21	11	147	226	83
6	32	27	677	1314	913	6	17	0	106	170	61
7	38	28	942	1654	661	7	22	0	120	76	323
8	47	32	1270	2124	748	8	23	8	179	75	167
9	51	30	1429	2070	718	9	10	0	42	56	222
10	44	14	1356	1457	474	10	0	0	5	48	283
11	42	0	1557	-	403	11	0	0	10	55	411
12	43	14	1132	-	277	12	12	10	-	89	439
13	39	21	1080	-	253	13	20	10	-	294	479
14	32	32	1287	-	391	14	20	9	286	454	378
15	39	32	852	-	554	15	16	11	359	494	330
16	38	30	1076	-	1755	16	18	12	371	741	399
17	36	19	779	-	739	17	44	20	575	818	413
18	33	14	-	-	1362	18	54	33	633	-	279
19	34	14	-	-	2245	19	60	39	497	853	282
20	27	17	906	-	2758	20	66	28	1221	1284	569
21	24	17	741	-	1812	21	76	34	1427	-	672
22	17	14	773	-	1979	22	80	25	1112	1591	644
23	10	10	593	-	3846	23	93	20	2080	2280	984
24	10	0	424	-	1573	24	99	44	2648	3474	1321
25	10	0	444	-	2396	25	90	50	2044	-	716
26	15	0	359	-	2160	26	91	61	1842	-	624
27	15	10	275	324	1303	27	94	73	4234	2459	1442
28	8	7	200	-	540	28	96	66	1453	2361	881
29	25	12	290	523	488	29	89	44	2622	2858	1306
30	31	18	289	523	586	30	96	36	2206	3325	1630
						31	91	25	-	-	1061
MEAN	27.7	15.2	740.3	1124.8	1106.0	MEAN	48.0	23.4	984.4	997.7	642.9

NOVEMBER 2004						DECEMBER 2004					
2004 NOV.	Ri	Ric	Ac	Ar	Ai	2004 DEC.	Ri	Ric	Ac	Ar	Ai
1	76	32	-	3771	1786	1	32	25	927	-	442
2	74	34	-	3733	1191	2	29	16	773	1351	473
3	67	36	-	3794	1180	3	30	10	831	-	516
4	58	43	-	-	1444	4	26	9	-	-	0
5	55	37	3366	-	1886	5	29	8	517	-	222
6	62	31	2426	-	1330	6	24	7	379	255	147
7	63	31	2045	-	2058	7	9	0	-	202	55
8	57	27	1456	2181	1307	8	15	7	-	-	0
9	52	0	1270	1378	688	9	13	0	-	-	0
10	32	0	683	700	365	10	15	11	41	-	192
11	38	12	-	288	321	11	13	9	-	-	199
12	38	12	390	-	565	12	22	12	-	-	261
13	42	28	-	-	414	13	16	0	328	278	242
14	48	27	995	-	538	14	14	0	285	-	95
15	44	19	672	-	887	15	8	0	63	448	386
16	41	25	603	-	491	16	10	0	-	-	561
17	41	27	607	706	526	17	24	0	295	-	98
18	38	8	395	525	1006	18	21	0	168	-	341
19	35	14	320	-	1368	19	12	7	137	-	277
20	33	0	-	-	604	20	11	0	302	-	454
21	26	0	279	-	457	21	15	12	440	714	505
22	29	12	427	-	1041	22	26	21	630	-	508
23	28	13	459	-	512	23	18	16	402	716	249
24	34	10	592	531	539	24	22	14	344	-	534
25	34	11	-	-	1174	25	12	9	249	-	464
26	34	10	751	-	641	26	10	0	216	-	72
27	37	10	576	-	705	27	10	10	199	-	66
28	29	17	652	-	217	28	17	0	290	-	96
29	28	20	784	-	1791	29	12	0	-	-	0
30	32	24	946	-	315	30	18	0	-	576	638
						31	22	0	-	576	647
MEAN	43.5	19.0	940.6	1760.7	911.6	MEAN	17.9	6.5	372.2	568.4	281.9