

## Sunspot Relative Numbers and Sunspot Areas

2001

## Cooperating Observatories to the International Sunspot Number :

AMATEUR SOUTHERN CROSS OBSERVATORY (BOLIVIA); ASTR. CENTRE ARDENNE (BELGIUM); ASTRO. DE REUX CINEY (BELGIUM); BARNES AUCKLAND (NEW-ZEALAND); BORTOLOTTI MAURO (ITALIA); CAMAGUEY (CUBA); CAPRICORNO CAMPINAS (BRASIL); CATANIA ITALY - USSPS code (31405-); CENTRAL WEATHER BUREAU (CHINA); CLAEYS VEDRIN (BELGIUM); COURDURIE MARCQ EN BAROEUL (FRANCE); CULGOORA NARRABRI (AUSTRALIA); DE BACKER BOOM (BELGIUM); DUBOIS LANGEMARK (BELGIUM); EBRO ROQUETES (SPAIN); EVANS INVERCAGILL (NEW-ZEALAND); FEDERICO SAN HERMENEGILDO (SPAIN); FERNANDEZ RUIS SANTANDER (SPAIN); FERREIRA SAO FRANCISCO (BRASIL); FUJIMORI NAGANO (JAPAN); GERARD DINANT (BELGIUM); GERMAN MORALES COCHABAMBA (BOLIVIA); GUILLERY PULLIGNY (FRANCE); HAVANA SOLAR STATION (CUBA); HELWAN (EGYPT); HOLLOMAN U.S.A.- USSPS code (21305); HURBANOVO (SLOVAKIA); HVEZDAREN KYSUCKE (SLOVAKIA); HVEZDAREN PRESOV (SLOVAKIA); ISEO (ITALIA); JAMBOL (BULGARIA); JOHNSTON GWYNEDD (ENGLAND); JORGE LUIS GARCIA (SPAIN); JURI GAGARIN EILENBURG (GERMANY); KANDILLI (TURKEY); KANZELHOHE TREFFEN (AUSTRIA); KAWAGUCHI (JAPAN); KISLOVODSK (RUSSIA); KLDADNO (CZECH-REPUBLIC); LARISSA OBSERVATORY (GREECE); LEARMOUTH AUSTRALIA - USSPS code (81202); LOCARNO (SWITZERLAND); MAC KENZIE DOVER (UNITED-KINGDOM); MAURO OSCAR GALLO (ARGENTINA); MIKHAIL L. KUZMIN (RUSSIA); MILANO (ITALY); MIRA GRIMBERGEN (BELGIUM); MITAKA (JAPAN); MOCHIZUKI URAWA SAITAMA (JAPAN); MURMANSK (RUSSIA); NIJMEGEN (NETHERLANDS); OBS. COPERNICUS VARNA (BULGARIA); OBS.JORDANO DIMITROVGRAD (BULGARIA); OBSERV. PAUL AHNERT COTTBUS (GERMAN); OBSERVATORY FRANTISKA (CZECH-REP.); OBSERVATORY HASKOVO (BULGARIA); OBSERVATORY PROSTEJOV CZECH (REPUBL); OBSERVATORY ROKYCANY CZECH (REP.); ONDREJOV OBSERV. (CZECH-REPUBLIC); PASTERNAK BERLIN (GERMANY); PHILIPPE WITTELSHEIM (FRANCE); PYONG YANG (KOREA); QUEZON (PHILIPPINES); RAMEY (PUERTO-RICO); ROKYCANY - LUZICKA CZECH (REP.); SAN MIGUEL (ARGENTINA); SAN VITO ITALY - USSPS code (32404); SAUDI ARABIA (JEDDAH); SCHOTT LUTZ GERD (GERMANY); SKALNATE (SLOVAKIA); SLIVEN (BULGARIA); SMOLYAN (BULGARIA); SOBOTA (SLOVAKIA); SPANINKS TILBURG (NETHERLANDS); STEFANIKS OBS. PRAGUE (CZECH-REP.); SUZUKI (JAPAN); UCCLE (BELGIUM); VENTURA MOSTA (MALTA);

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); EBRO ROQUETES (SPAIN); EVANS INVERCAGILL (NEW-ZEALAND); FUJIMORI NAGANO (JAPAN); GERMAN MORALES COCHABAMBA (BOLIVIA); HOLLOMAN (U.S.A.); HVEZDAREN KYSUCKE (SLOVAKIA); HVEZDAREN PRESOV (SLOVAKIA); KANDILLI (TURKEY); KAWAGUCHI (JAPAN); KISLOVODSK (RUSSIA); LARISSA OBSERVATORY (GREECE); LEARMOUTH (AUSTRALIA); MIRA GRIMBERGEN (BELGIUM); MITAKA (JAPAN); MOCHIZUKI URAWA SAITAMA (JAPAN); NIJMEGEN (NETHERLANDS); OBS. COPERNICUS VARNA (BULGARIA); OBS. JORDANO DIMITROVGRAD (BULGARIA); OBSERVATORY FRANTISKA (CZECH-REP.); OBSERVATORY HASKOVO (BULGARIA); OBSERVATORY PROSTEJOV CZECH (REPUBL); ONDREJOV OBSERV. (CZECH-REPUBLIC); RAMEY (PUERTO-RICO); ROKYCANY - LUZICKA CZECH (REP.); SAN VITO (ITALY); SKALNATE (SLOVAKIA); SLIVEN (BULGARIA); SMOLYAN (BULGARIA); SOBOTA (SLOVAKIA); SPANINKS TILBURG (NETHERLANDS); STEFANIKS OBS. PRAGUE (CZECH-REP.); SUZUKI (JAPAN); UCCLE (BELGIUM);

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 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 2001						FEBRUARY 2001					
2001 JAN.	Ri	Ric	Ac	Ar	Ai	2001 FEB.	Ri	Ric	Ac	Ar	Ai
1	89	37	1524	-	513	1	78	38	596	780	228
2	94	39	1799	3016	867	2	78	19	559	901	237
3	88	40	1760	-	770	3	92	17	952	-	636
4	98	35	1601	-	927	4	91	17	711	-	177
5	110	15	1701	2727	942	5	105	24	1395	-	809
6	130	12	1951	-	487	6	110	28	2464	2092	1007
7	131	41	1546	-	677	7	111	52	1861	1975	648
8	105	44	1478	-	614	8	111	83	1495	1926	568
9	115	31	1102	1610	836	9	114	80	1290	-	322
10	101	41	1182	-	604	10	105	64	1436	1786	849
11	115	51	1448	2259	605	11	100	57	1204	-	741
12	117	61	-	3435	993	12	71	19	718	1203	312
13	111	55	-	-	1012	13	71	20	654	-	163
14	100	53	-	-	1403	14	68	10	671	1116	290
15	92	19	1577	-	1097	15	75	10	-	-	0
16	75	12	-	-	105	16	73	17	410	526	155
17	59	10	-	-	236	17	71	28	294	-	73
18	60	16	326	596	210	18	76	34	351	-	242
19	73	13	-	-	0	19	75	39	601	1202	288
20	61	22	-	-	180	20	76	50	957	-	239
21	81	39	674	-	168	21	94	44	1113	1449	425
22	93	30	-	1669	532	22	81	20	1226	1325	430
23	112	43	-	-	454	23	59	19	1093	-	273
24	118	61	-	-	497	24	56	10	1072	-	589
25	106	66	2094	-	523	25	56	28	-	-	0
26	84	43	1545	-	667	26	58	39	501	-	125
27	97	45	1321	-	839	27	50	43	375	699	172
28	102	33	1482	-	632	28	51	23	226	-	56
29	90	35	-	-	309						
30	70	24	613	-	432						
31	86	39	436	-	304						
MEAN	95.6	35.6	1358.0	2187.4	594.7	MEAN	80.6	33.3	931.7	1306.2	359.1

MARCH 2001						APRIL 2001					
2001 MAR.	Ri	Ric	Ac	Ar	Ai	2001 APR.	Ri	Ric	Ar	Ac	Ai
1	52	11	183	312	80	1	186	82	-	6968	1897
2	53	11	183	-	45	2	166	66	-	5610	1789
3	75	12	342	706	167	3	169	45	4119	4041	1787
4	92	29	637	-	159	4	134	30	2849	3182	1294
5	104	38	850	-	212	5	133	9	2487	3503	1200
6	91	38	1423	-	355	6	110	25	2519	4369	1145
7	85	33	1476	-	369	7	100	48	2286	-	676
8	63	19	-	-	0	8	115	47	-	-	508
9	79	26	-	1663	290	9	110	64	2430	4004	1062
10	97	41	1015	1557	420	10	114	62	1837	3308	999
11	90	8	1173	-	502	11	115	58	1815	3196	971
12	95	9	697	-	347	12	103	47	1772	2962	1056
13	74	34	702	1286	320	13	98	50	1148	2067	693
14	80	34	496	999	239	14	92	22	950	-	237
15	75	59	581	1208	285	15	75	20	547	-	428
16	70	61	751	1707	389	16	58	20	368	-	92
17	51	17	587	1094	270	17	28	10	216	381	496
18	61	19	-	-	297	18	38	20	310	-	347
19	66	16	656	-	164	19	62	35	692	1363	530
20	80	12	781	-	305	20	86	47	1285	-	321
21	88	0	929	-	232	21	116	56	2451	-	612
22	85	21	1269	1639	483	22	109	45	2812	-	1432
23	113	14	2333	3903	1012	23	106	41	2711	4884	2341
24	149	37	2848	3144	1531	24	109	59	2590	4968	2899
25	186	99	3253	-	1871	25	119	84	2668	-	2551
26	218	96	3985	-	1275	26	119	64	2100	3924	2613
27	241	111	-	8748	1530	27	128	44	2069	6020	1748
28	235	117	-	10061	1760	28	107	25	1735	3355	1344
29	233	128	-	10189	1782	29	113	51	1815	-	1728
30	231	110	-	9152	1601	30	112	44	2419	3140	1753
31	205	86	-	7351	1286						
MEAN	113.5	43.4	1180.4	3807.0	631.5	MEAN	107.7	44.0	1888.9	3749.7	1218.3

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MAY 2001						JUNE 2001					
2001 MAY	Ri	Ric	Ac	Ar	Ai	2001 JUN.	Ri	Ric	Ac	Ar	Ai
1	107	32	2695	-	673	1	58	34	318	783	210
2	118	51	2192	-	548	2	99	46	726	594	360
3	115	37	2494	3000	918	3	99	59	1179	-	544
4	132	42	2492	3296	959	4	96	28	1643	3083	1094
5	118	41	-	-	0	5	106	26	1815	3335	1006
6	92	22	1514	-	378	6	119	33	1636	2940	935
7	79	19	941	-	235	7	129	52	1697	2927	956
8	55	20	835	1181	332	8	142	81	2111	3800	1230
9	63	29	606	1165	721	9	168	105	2602	5158	1607
10	60	23	591	1135	277	10	159	91	2692	-	1150
11	80	39	-	-	0	11	173	97	3280	-	1318
12	84	46	1271	2642	1006	12	171	86	2732	2949	1160
13	85	40	1445	-	941	13	160	59	2314	2196	4086
14	102	59	2045	2454	1080	14	180	50	3257	3569	1270
15	96	35	1964	-	491	15	186	48	2853	3443	1308
16	99	23	1666	1868	594	16	191	46	4264	4591	1901
17	95	21	1412	-	353	17	178	84	3896	-	1406
18	93	19	894	-	357	18	153	96	2623	4904	1507
19	85	0	1199	-	299	19	141	103	2694	5143	1588
20	82	15	1083	-	270	20	136	113	2675	4980	1404
21	95	17	1157	-	754	21	144	97	2699	4853	1530
22	121	58	1516	2946	1028	22	151	40	2567	4028	1325
23	134	76	1810	3859	902	23	155	61	3478	3917	1538
24	118	72	1967	-	491	24	145	49	3971	-	1267
25	112	78	1756	3135	790	25	131	66	3228	2966	1182
26	118	66	1591	2698	980	26	114	53	2132	2393	804
27	124	50	1378	-	751	27	107	73	1628	1470	588
28	103	29	1325	1533	479	28	89	51	1166	1115	415
29	85	15	1024	1219	375	29	74	31	831	801	335
30	75	28	603	721	221	30	65	10	552	935	317
31	69	24	488	508	168						
MEAN	96.6	36.3	1446.7	2085.0	560.4	MEAN	134.0	62.3	2308.6	3074.9	1178.0

JULY 2001						AUGUST 2001					
2001 JULY	Ri	Ric	Ac	Ar	Ai	2001 AUG.	Ri	Ric	Ac	Ar	Ai
1	74	11	516	-	212	1	62	25	691	712	293
2	83	9	451	758	279	2	81	23	745	868	291
3	80	9	489	802	353	3	93	60	1030	1164	394
4	71	13	499	798	283	4	115	78	1879	2837	996
5	62	32	500	713	290	5	130	86	2922	-	927
6	45	27	262	708	246	6	120	66	3099	4158	1275
7	47	36	416	-	207	7	118	63	2752	4508	1882
8	54	39	458	-	280	8	117	33	3176	3113	1303
9	71	42	739	1378	483	9	104	12	2842	3294	1206
10	70	43	878	-	299	10	99	26	2822	2450	996
11	69	38	707	1087	331	11	112	42	3323	3274	1475
12	90	33	918	1205	438	12	112	61	2809	-	960
13	111	55	1036	1391	525	13	91	60	1470	2635	979
14	99	50	1325	1782	669	14	93	36	1020	2073	735
15	102	54	1559	-	720	15	106	33	953	1702	527
16	113	67	1690	-	621	16	127	13	832	1437	463
17	123	54	1554	2865	987	17	117	11	661	1089	378
18	127	49	1510	2389	820	18	106	12	1003	-	494
19	122	47	1335	2250	630	19	100	19	1251	-	489
20	118	65	1675	2349	768	20	101	64	2036	2205	957
21	96	74	1387	2559	703	21	110	80	1905	2461	886
22	100	63	1110	-	490	22	112	64	2058	2429	4029
23	101	24	976	2039	516	23	119	37	1975	2559	922
24	90	25	1005	1795	770	24	116	32	1709	2675	970
25	79	24	728	1349	432	25	92	16	2233	2773	1069
26	61	22	677	1360	574	26	101	19	2524	-	1012
27	60	22	369	814	230	27	112	31	2154	3266	1163
28	63	33	310	598	269	28	121	44	2127	3183	1256
29	46	17	226	-	99	29	96	28	2250	3532	1260
30	57	13	622	372	225	30	99	18	2319	4193	1759
31	52	9	655	622	310	31	115	16	2525	4373	1366
MEAN	81.8	35.5	857.5	1390.6	453.5	MEAN	106.4	39.0	1970.8	2652.4	1055.2

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SEPTEMBER 2001						OCTOBER 2001					
2001 SEP.	Ri	Ric	Ac	Ar	Ai	2001 OCT.	Ri	Ric	Ac	Ar	Ai
1	103	54	2452	4059	5738	1	168	95	3117	-	779
2	106	62	2462	-	5819	2	144	67	2617	-	654
3	120	58	2868	3836	1365	3	135	62	2245	2523	802
4	108	37	3102	3902	1863	4	132	62	1923	1990	663
5	120	8	3750	4401	1992	5	114	19	1976	1752	640
6	141	8	4148	4534	1742	6	104	23	1948	-	729
7	166	49	4630	5353	1675	7	103	48	1935	-	589
8	182	60	4412	6108	2203	8	77	33	726	-	294
9	166	52	4704	-	2378	9	79	26	729	1265	393
10	150	36	3799	6548	2981	10	98	52	706	-	176
11	126	53	3635	6296	2174	11	113	46	1062	1672	446
12	149	57	3645	6203	2297	12	127	42	1304	2425	600
13	150	47	3007	5079	1575	13	108	43	1470	2684	850
14	148	11	2700	-	1092	14	115	58	1603	-	653
15	130	9	2217	3610	2027	15	123	85	2328	3305	1096
16	121	32	1644	-	942	16	121	80	2425	3709	1004
17	112	45	2366	1622	1031	17	126	54	-	4194	733
18	136	50	1940	-	641	18	131	51	3087	4637	1266
19	143	55	3013	-	1479	19	143	70	3994	5110	1514
20	183	64	3492	-	1405	20	160	69	4399	5121	1538
21	173	81	4447	5765	1696	21	154	89	3796	-	949
22	164	77	5405	6836	2602	22	135	81	2439	4424	1107
23	186	72	5674	-	2210	23	143	73	2278	3915	1263
24	200	101	4937	-	2386	24	135	67	2280	4176	1268
25	193	87	4579	-	2160	25	151	83	2752	5006	1251
26	175	71	4321	-	1815	26	154	90	3283	6151	1517
27	176	49	4084	-	1987	27	143	68	3298	5652	1272
28	170	51	3967	-	2192	28	139	67	3340	-	1215
29	159	68	3548	-	1765	29	120	71	4466	6438	1887
30	165	80	3009	-	752	30	103	56	3861	6062	1620
						31	93	43	3714	5769	1550
MEAN	150.7	52.8	3598.6	4943.5	2066.1	MEAN	125.5	60.4	2503.4	3999.1	978.0

NOVEMBER 2001						DECEMBER 2001					
2001 NOV.	Ri	Ric	Ac	Ar	Ai	2001 DEC.	Ri	Ric	Ac	Ar	Ai
1	96	51	3810	-	1693	1	133	61	3050	6081	2001
2	100	42	3794	-	1450	2	149	77	2768	-	692
3	100	24	3016	4967	1695	3	150	84	2902	5278	2066
4	111	41	2823	-	1047	4	145	68	2777	5280	1294
5	130	23	2409	3580	1383	5	158	84	-	5514	964
6	140	57	2540	-	1277	6	142	69	2395	5126	1196
7	123	41	2267	-	566	7	138	47	-	4445	1135
8	152	69	4105	7825	2240	8	140	51	-	-	827
9	149	83	3022	-	1590	9	141	56	-	-	628
10	149	65	3690	-	1953	10	115	41	-	3195	865
11	145	61	-	-	0	11	106	9	-	3383	1100
12	121	56	4098	-	1900	12	117	29	2853	3305	1446
13	118	28	3910	-	1618	13	119	48	2833	3196	1222
14	118	42	3885	-	971	14	101	73	2916	-	931
15	117	53	3217	-	1096	15	108	66	3457	-	1149
16	90	40	2461	3325	1167	16	120	35	3680	-	1094
17	85	34	2301	3262	1253	17	119	46	-	3204	851
18	92	58	1979	-	494	18	115	42	-	2300	402
19	81	44	1927	3615	891	19	99	32	2608	1763	876
20	87	36	2032	3627	1259	20	101	57	-	-	0
21	80	42	1906	3035	1269	21	120	73	1693	-	881
22	87	32	1551	-	663	22	135	86	2513	-	1124
23	80	31	1381	-	624	23	133	98	2916	-	1255
24	67	19	1296	1771	609	24	157	66	6798	-	2684
25	73	33	1151	-	442	25	143	47	6045	-	2108
26	84	26	1334	-	627	26	167	94	5154	-	1288
27	76	29	-	-	0	27	164	96	4670	-	1167
28	107	62	3226	3508	1382	28	156	113	3264	3888	1197
29	115	59	3346	4747	1364	29	137	80	2571	-	919
30	121	51	3584	5239	1450	30	134	51	2179	-	544
						31	135	58	1951	-	487
MEAN	106.5	44.4	2716.5	4041.8	1132.4	MEAN	132.2	62.5	3272.4	3997.0	1109.5