

Sunspot Relative Numbers and Sunspot Areas

2000

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); 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); EDNILSON OLIVEIRA (BRASIL); EVANS INVERCAGILL (NEW-ZEALAND); FEDERICO SAN HERMENEGILDO (SPAIN); FERNANDEZ RUIS SANTANDER (SPAIN); FUJIMORI NAGANO (JAPAN); GEMA ARAUJO (SPAIN); GERARD DINANT (BELGIUM); GERMAN MORALES COCHABAMBA (BOLIVIA); GUILLERY PULLIGNY (FRANCE); HELWAN (EGYPT); HOLLOMAN (U.S.A.); HURBANOVO (SLOVAKIA); HVEZDAREN KYSUCKE (SLOVAKIA); HVEZDAREN PRESOV (SLOVAKIA); ISEO (ITALIA); JOHNSTON GWYNEDD (ENGLAND); JORGE LUIS GARCIA (SPAIN); 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); MAURO OSCAR GALLO (ARGENTINA); MILANO (ITALY); MIRA GRIMBERGEN (BELGIUM); MITAKA (JAPAN); MOCHIZUKI URAWA SAITAMA (JAPAN); MOJICA COCHABAMBA (BOLIVIA); MURMANSK (RUSSIA); NIJMEGEN (NETHERLANDS); OBS. COPERNICUS VARNA (BULGARIA); OBS.JORDANO DIMITROVGRAD (BULGARIA); OBSERV. PAUL AHNERT COTTBUS (GERMAN); OBSERVAT. HECTOR OTTONELLO (ARGENTINI); 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.); ROMA (ITALY); SAN MIGUEL (ARGENTINA); SAN VITO (ITALY); SANTIAGO (CHILE); SAUDI ARABIA (JEDDAH); SKALNATE (SLOVAKIA); SLIVEN (BULGARIA); SOBOTA (SLOVAKIA); SPANINKS TILBURG (NETHERLANDS); STEFANIKS OBS. PRAGUE (CZECH-REP.); SUZUKI (JAPAN); UCCLE (BELGIUM); VASQUEZ CARLOS (ARGENTINA); VENTURA MOSTA (MALTA); WATUKOSEK OBSERVATORY (INDONESIA); ZAGORA (BULGARIA).

The first column gives the definitive international Sunspot Numbers for the whole solar disk (R_i established by the Sunspot 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-REPUBLIC); OBSERVATORY PROSTEJOV (CZECH REPUBLIC); 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 2000						FEBRUARY 2000					
2000 JAN.	Ri	Ric	Ac	Ar	Ai	2000 FEB.	Ri	Ric	Ac	Ar	Ai
1	48	14	963	-	512	1	71	21	767	-	269
2	51	16	1032	-	562	2	64	15	808	-	409
3	54	36	1329	-	443	3	81	23	808	-	269
4	64	56	1354	-	451	4	99	21	1129	-	366
5	73	61	1157	-	385	5	104	8	1466	1422	585
6	85	35	849	-	283	6	136	28	1429	-	421
7	85	28	1666	1195	674	7	130	20	1415	-	554
8	75	11	1183	-	394	8	128	38	1547	-	457
9	76	10	897	-	299	9	109	28	-	-	77
10	65	14	-	-	0	10	122	42	1253	1463	582
11	90	35	-	-	0	11	114	52	1054	1298	546
12	134	52	-	2413	897	12	113	41	985	-	328
13	153	65	-	2972	729	13	108	35	-	-	405
14	164	92	-	-	0	14	119	30	1373	1391	599
15	157	70	-	-	793	15	118	15	1052	-	593
16	163	96	-	-	0	16	131	25	1159	-	470
17	131	83	-	3608	885	17	109	44	1415	-	709
18	120	70	1604	2642	887	18	104	48	1299	1461	941
19	114	44	1844	2632	1242	19	89	19	1338	-	638
20	95	43	2000	2527	964	20	76	16	1837	-	873
21	88	44	2170	-	723	21	92	12	1698	-	929
22	84	39	1259	-	929	22	100	12	1498	-	886
23	82	39	883	-	294	23	95	10	1782	2470	899
24	80	39	728	1079	541	24	123	25	2168	2993	1417
25	85	50	1136	1366	740	25	131	48	2757	4656	1545
26	77	28	-	1504	738	26	144	73	3872	-	1290
27	70	29	958	1366	490	27	150	60	4417	-	2289
28	60	33	931	-	310	28	151	42	5429	7573	2750
29	61	27	681	-	399	29	162	56	5798	7518	2832
30	51	22	389	-	149						
31	58	28	750	-	415						
MEAN	90.1	42.2	1171.0	2118.5	520.3	MEAN	112.9	31.3	1909.4	3224.5	859.6

MARCH 2000						APRIL 2000					
2000 MAR.	Ri	Ric	Ac	Ar	Ai	2000 APR.	Ri	Ric	Ac	Ar	Ai
1	138	66	5573	-	3380	1	187	79	3514	-	2088
2	130	54	5540	-	2420	2	193	85	2584	-	1984
3	114	35	4444	5301	2086	3	177	87	2317	-	1657
4	113	52	4080	-	2169	4	164	57	2057	-	1213
5	113	43	3603	-	2038	5	129	54	1685	2360	1155
6	129	67	-	-	1198	6	108	43	1262	1845	793
7	155	67	3000	4182	1940	7	94	25	865	1582	633
8	145	68	3093	4080	2127	8	100	43	1046	1802	847
9	146	74	3249	4518	1993	9	108	46	-	-	593
10	137	65	3394	-	1131	10	102	45	1374	-	885
11	127	34	3601	-	1903	11	96	39	1533	-	899
12	122	48	3389	-	1708	12	113	43	1516	-	1066
13	121	57	3612	-	1751	13	118	59	1779	-	852
14	115	39	-	-	984	14	114	50	1965	-	655
15	103	45	3268	-	1224	15	105	46	1934	-	897
16	100	44	3055	3576	1572	16	98	42	1432	-	477
17	95	43	2553	4038	1638	17	110	41	-	-	803
18	101	61	3672	4379	2318	18	94	35	-	-	527
19	126	84	-	-	1217	19	103	40	1109	-	668
20	150	55	3654	-	1218	20	121	37	1369	-	456
21	148	48	3812	6120	2078	21	128	25	2046	2931	1050
22	156	41	-	6934	2525	22	145	46	3064	6536	2537
23	182	46	3932	5482	1991	23	170	55	4410	-	3106
24	188	65	3511	-	1170	24	160	58	4946	-	4070
25	185	73	2906	-	1939	25	151	104	4356	-	3607
26	170	27	-	-	1703	26	136	98	3267	5965	3692
27	155	56	4178	4473	2366	27	118	60	3056	-	1858
28	169	110	-	-	1256	28	124	82	-	-	1381
29	148	96	2792	-	1670	29	100	71	-	-	2316
30	148	96	2708	3132	1489	30	100	34	2409	-	2135
31	164	79	2941	3559	1390						
MEAN	138.5	59.3	3582.4	4598.0	1793.3	MEAN	125.5	54.3	2275.8	3288.7	1496.7

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MAY 2000						JUNE 2000					
2000 MAY	Ri	Ric	Ac	Ar	Ai	2000 JUN.	Ri	Ric	Ac	Ar	Ai
1	91	14	2118	-	1778	1	85	35	1448	1915	892
2	80	14	1136	-	1028	2	79	40	1704	2519	889
3	76	21	575	610	228	3	75	12	1954	3021	1572
4	71	31	236	-	104	4	101	26	1815	-	1368
5	71	26	150	-	63	5	95	15	2278	3392	1742
6	42	28	129	89	59	6	99	31	2434	3588	1832
7	52	27	160	-	80	7	105	35	2832	-	1589
8	64	10	368	456	296	8	120	44	2469	-	1089
9	99	37	781	-	590	9	122	42	2827	3472	1345
10	120	66	-	-	656	10	119	45	2356	-	1585
11	133	74	2418	-	1174	11	151	73	2672	-	1763
12	133	63	3193	4480	1622	12	147	68	2736	-	1892
13	161	51	3914	4832	2390	13	156	88	4425	4585	2487
14	193	41	4023	-	2968	14	171	41	-	4083	2183
15	205	40	3847	5958	3047	15	158	36	-	3619	1513
16	189	40	4379	6714	3636	16	142	36	2640	3693	1339
17	170	62	4573	7750	4226	17	139	61	2544	3947	2039
18	161	81	5277	7988	3675	18	147	61	2350	-	1998
19	167	89	5553	8756	3647	19	145	58	2619	3740	1895
20	180	98	6788	8173	3695	20	159	61	2477	3080	1821
21	163	79	5908	-	4300	21	147	44	2778	3037	1715
22	143	47	5287	-	2827	22	127	25	2143	2445	1435
23	132	41	3480	4642	2480	23	124	25	2162	2510	1511
24	134	41	2394	2776	1493	24	119	26	2178	2437	1499
25	115	49	2079	2461	972	25	111	41	2181	-	1598
26	117	34	-	2112	751	26	129	48	2540	4221	1957
27	106	23	-	2368	1172	27	138	48	2761	4220	2140
28	124	28	1809	-	1396	28	115	39	2127	4020	2090
29	117	46	1830	-	1384	29	109	39	2046	-	1333
30	93	46	1609	2558	1490	30	114	47	1893	-	1172
31	67	28	1481	-	1216						
MEAN	121.6	44.4	2696.2	4277.8	1756.2	MEAN	124.9	43.0	2406.8	3377.2	1642.8

JULY 2000						AUGUST 2000					
2000 JULY	Ri	Ric	Ac	Ar	Ai	2000 AUG.	Ri	Ric	Ac	Ar	Ai
1	145	34	1664	-	940	1	106	31	1279	1595	832
2	141	22	1701	-	880	2	110	45	1142	1372	658
3	124	12	1880	-	1007	3	107	43	1013	1187	471
4	114	21	1793	-	836	4	110	36	1161	1361	649
5	127	44	1881	-	884	5	144	49	1346	-	802
6	154	70	2003	3376	1342	6	143	34	1718	-	850
7	177	75	1961	-	653	7	164	41	1458	-	914
8	177	76	3610	4878	2149	8	140	46	1393	2412	1151
9	179	61	3824	-	1888	9	128	53	1491	-	994
10	215	43	3705	-	2001	10	154	47	1452	2545	1068
11	202	19	4091	-	2466	11	165	32	1535	2531	849
12	186	40	4296	6923	2784	12	170	25	1185	2224	1015
13	194	50	3266	5731	2465	13	176	33	1107	-	626
14	164	58	2798	-	932	14	204	43	1373	-	809
15	148	74	2079	-	1231	15	183	73	1737	-	958
16	197	80	3001	-	1449	16	178	90	1674	2811	1261
17	224	72	3393	4766	2027	17	152	90	1748	2403	1060
18	228	72	4279	5664	2813	18	140	72	1304	2441	775
19	246	81	4678	6253	2959	19	133	44	1216	1579	781
20	241	102	4786	7597	3064	20	106	24	765	-	534
21	231	80	5250	7580	2707	21	77	20	1104	1497	720
22	216	59	5158	6778	2878	22	67	13	903	1336	573
23	199	72	3400	-	1782	23	67	18	782	1331	538
24	171	60	3257	-	1688	24	77	10	849	995	492
25	177	43	3133	-	1631	25	81	13	908	1066	423
26	133	43	2773	3234	1429	26	79	27	1041	1491	534
27	126	33	1378	2179	922	27	113	30	1528	-	509
28	120	26	1070	1636	568	28	132	41	1740	2759	942
29	113	20	1094	1831	762	29	138	44	1909	3449	1111
30	112	19	1024	-	586	30	144	38	1867	3077	1032
31	93	0	1453	1763	777	31	157	35	1612	-	537
MEAN	170.1	50.4	2892.9	4679.3	1629.0	MEAN	130.5	40.0	1333.5	1974.4	789.3

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SEPTEMBER 2000						OCTOBER 2000					
2000 SEP.	Ri	Ric	Ac	Ar	Ai	2000 OCT.	Ri	Ric	Ac	Ar	Ai
1	142	50	1405	2650	838	1	115	46	1853	-	1389
2	118	56	1258	2267	895	2	153	61	-	-	1350
3	128	47	1045	-	643	3	159	32	2843	-	1794
4	134	74	1387	-	664	4	150	36	3034	-	1605
5	114	88	1593	3031	1306	5	128	15	2292	-	764
6	114	51	1740	2894	1344	6	97	13	1699	1661	730
7	110	17	1548	-	730	7	66	11	1371	1497	765
8	85	10	-	1385	500	8	72	18	1082	-	477
9	63	13	-	666	366	9	71	17	571	-	416
10	42	14	290	-	135	10	57	16	639	-	523
11	26	10	21	40	25	11	82	31	1014	-	792
12	35	14	89	89	82	12	122	43	1040	2030	972
13	55	13	154	176	85	13	121	54	1268	-	896
14	60	27	332	766	256	14	104	23	-	-	498
15	77	38	1026	2249	914	15	83	11	684	-	401
16	85	43	1377	-	1004	16	92	19	1152	-	551
17	108	56	1545	-	955	17	97	21	1030	-	503
18	112	38	3385	4108	2123	18	95	21	802	778	377
19	121	41	4964	-	3164	19	90	30	966	1022	400
20	124	41	9269	-	4829	20	94	52	1075	1420	579
21	137	65	4314	8695	3945	21	97	59	1206	1872	780
22	142	126	4602	-	3624	22	89	53	-	-	274
23	160	99	4734	-	5314	23	85	34	1736	1663	883
24	163	96	4557	-	2672	24	82	23	1401	1296	695
25	153	88	4068	-	3541	25	88	9	1327	-	545
26	161	69	3984	-	3279	26	73	9	-	-	302
27	162	17	2403	-	2164	27	80	26	1158	1015	640
28	142	18	2339	-	1264	28	106	29	1618	1301	814
29	119	43	1973	-	1088	29	113	30	2103	-	1149
30	100	35	-	-	1018	30	108	30	2176	-	1592
						31	111	26	2085	-	1420
MEAN	109.7	46.6	2422.3	2232.0	1625.6	MEAN	99.4	29.0	1452.8	1414.1	802.5

NOVEMBER 2000						DECEMBER 2000					
2000 NOV.	Ri	Ric	Ac	Ar	Ai	2000 DEC.	Ri	Ric	Ac	Ar	Ai
1	140	57	1882	3291	1798	1	116	62	1582	2382	900
2	147	64	2260	-	1141	2	109	53	1448	1923	715
3	141	75	2191	-	1091	3	118	36	-	-	569
4	130	63	1940	3348	1825	4	72	17	-	655	160
5	133	65	1807	-	1774	5	65	8	-	848	285
6	108	32	2037	-	1372	6	57	8	618	959	330
7	122	28	2025	-	2227	7	68	28	669	-	223
8	127	34	1537	1882	1364	8	57	24	532	-	177
9	95	30	1395	-	704	9	58	23	474	565	222
10	101	31	-	1923	547	10	62	15	621	-	407
11	90	43	1407	1776	832	11	72	9	717	854	434
12	72	38	1175	-	796	12	89	22	839	1262	570
13	70	24	851	-	570	13	114	45	1299	-	551
14	84	26	1151	-	689	14	135	74	1299	-	433
15	98	25	1547	-	1176	15	153	69	2194	-	1066
16	95	10	1274	1724	886	16	145	70	1209	2348	1053
17	94	25	-	-	664	17	151	39	1197	-	399
18	116	56	1560	-	1537	18	138	28	1198	1556	800
19	125	95	1899	-	1852	19	118	21	1328	1734	790
20	110	74	2159	-	1167	20	127	45	2263	-	1090
21	120	38	2007	-	1039	21	116	32	-	-	690
22	113	39	1831	3085	1585	22	107	45	2471	2910	1310
23	91	35	1931	2843	1244	23	102	50	-	2873	704
24	98	34	2043	-	1086	24	115	44	1768	-	1063
25	74	27	1768	3317	1633	25	108	40	-	-	742
26	59	17	1526	-	1009	26	121	40	1657	-	552
27	84	42	1428	3141	1369	27	118	75	2233	-	744
28	106	58	1672	2927	956	28	118	45	2600	3425	1280
29	123	61	2095	3123	1564	29	110	26	-	-	0
30	138	79	1703	-	567	30	111	38	2090	-	1241
						31	87	38	-	-	975
MEAN	106.8	44.2	1717.9	2698.3	1202.1	MEAN	104.4	37.7	1404.6	1735.3	660.5