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# I. SUNSPOTS Sunspot Relative-Numbers and Sunspot-Areas

Cooperating Observatories for Sunspot Relative-Numbers: Arcetri, Arosa, Athens (National Observatory), Athens (Eugenides Planetarium), Bucarest, Catania, Helwan, Herstmonceux, Hurbanovo, Istanbul, Kandilli, Kanzelhöhe, Kiev, Kislovodsk, Locarno, Madrid, Manila, Mitaka-Tokyo, Potsdam, Quezon-City, Roma-Monte Mario, Roquetas-Tortosa, Rosario, San Miguel, Santiago de Chile, Skalnaté Pleso, Taipei, Tashkent, Tokyo (Science Museum), Uccle, Zürich.

The first column gives the Relative-Numbers for the whole disk of the sun (R), the second that for the central zone ( $R_C$ ). The diameter of the central zone is half that of the sun's disk.

The Sunspot-Areas A are based upon measurements made at Catania  $A_{\mathbb{C}}$ , Roma-Monte Mario  $A_{\mathbb{R}}$ , and at Locarno and Zürich (combined values)  $A_{\mathbb{Z}}$ . The apparent total area of the umbra plus penumbra is uncorrected for foreshortening and expressed in millionths of the solar disk.

1976 Jan.	R	$^{\mathrm{R}}\mathrm{_{C}}$	<sup>A</sup> C	$^{\mathrm{A}}_{\mathrm{R}}$	$^{\rm A}_{ m Z}$
1	0	0	0		0
2	0	0	0		
2 3 4	0	0	0		
14	0	0	0		
5 6	0	0	0	0	0
	0	0			
7	0	0	0	0	0
8	0	0		0	0
9	0	0	0	0	0
10	0	0	0	0	0
11	0	0	0		
12	20	0	68	80	61
13	26	0	289		
14	34	0		679	519
15	20	0	672	670	
16	22	22	630	573	
17	22	22	546	604	
18	20	20			438
19	18	18	347	430	294
20	16	0	336		276
21	11	0	236		
22	10	ō	84		
23	10	0	95		41
24	0	0	Ó		0
25	0	0	0		0
26	0	0	0		0
27	7	7			3
28	0	0	0	0	3 0
29	8	8	0	0	14
30	8	0	0		10
31	0	0			
Mean	8.1	3.1	132	234	87

1976 Feb.	R	R <sub>C</sub>	A <sub>C</sub>	$^{\mathrm{A}}_{\mathrm{R}}$	A <sub>Z</sub>
1	0	0	0		0
2	0	0		0	
3 4	0	.0	0	0	0
	0	0	Ο.	0	
5 6	0	0	0		
6	0	0			
7 8	0	0	0	0	0
8	0	0	0		
9	0	0	0		0
10	0	0	0		0
11	0	0	0		0
12	0	0	0	0	0
13	13	13	74	86	74.74
14	16	16	105		84
15	18	18	79		53
16	11	0	74		27
17	8	0	32	38	8
18	15	0	16	35	10
19	10	0	26	48	8
20	12	0	26	35	11
21	8	8	21	26	5
22	7	7	0		2
23	Ö	0	0	0	5 2 0
24	0	0	0	0	1
25	0	0	0	0	0
26	0	0	0	0	0
27	7	0	0	0	2
28	0	0	0	0	0
29	0	0	0		0
Mean	4.3	2.1	17	16	11

1976 March	R	R <sub>C</sub>	A <sub>C</sub>	A <sub>R</sub>	AZ
1	0	0	0		0
2	0	Ω	0	0	0
3	0	0	0	0	0
14	0	0	0	0	0
5	0	0	0		
5 6	10	0			12 6
7 8	12	0	26		6
8	7	0	21		1
9	10	0	53		18
10	12	0	63		25
11	13	13	84		48
12	13	13	63	86	29
13	13	13	89		
14	22	0	79		57
15	16	0	10	~==	8
16	11	0	26	70	19
17	30	22			201
18	43	43	536	891	451
19	47	47	630		550
20	48	48	940		
21	74.74	1+1+	672		695
22	36	0		763	593
23	26	0	693		516
24	22	0	231		307
25	22	0	462	509	378
26	38	16	946	884	750
27	45	0	1150	1197	1010
28	43	0			1303
29	38	27	1365	1317	1278
30	32	23		1184	1208
31	26	26	1092	1082	1154
Mean	21.9	10.8	355	614	379

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The first column gives the Relative-Numbers for the whole disk of the sun (R), the second that for the central zone (R<sub>C</sub>). The diameter of the central zone is half that of the sun's disk.

The Sunspot-Areas A are based upon measurements made at Catania  $A_{C}$ , Roma-Monte Mario  $A_{R}$ , and at Locarno and Zürich (combined values)  $A_{Z}$ . The apparent total area of the umbra plus penumbra is uncorrected for foreshortening and expressed in millionths of the solar disk.

1976 Apr.	R	R <sub>C</sub>	A <sub>C</sub>	A <sub>R</sub>	AZ
1	23	23	1323	1050	1131
2	23	23	903		978
3	21	0	840	636	867
$\lambda_{4}$	13	0	588		469
5	12	0	378	334	296
5 6	9	0	63		130
7	0	0	0		0
8	0	0	0		0.
9	8	0	84	102	117
10	10	0			224
11	15	0	305		308
12	17	7	420		393
13	17	17	462	382	421
14	19	11	546	573	493
15	19	11	567	557	544
16	19	10	609	573	562
17	22	0	525		542
18	27	8	420		509
19	27	20	305		476
20	30	22	389		354
21	37	20	273		338
22	50	0	95	446	350
23	17	0	357		
24	16	0	431		
25	17	11	462		369
26	26	8	415	350	400
27	23	11	399	397	371
28	21	11	378		325
29	24	24	357	323	
30	32	7	651	654	738
Mean	18.8	8.1	433	491	434

1976 May	R	R <sub>C</sub>	<sup>A</sup> C	$^{\mathrm{A}}_{\mathrm{R}}$	$^{\mathrm{A}}\mathrm{_{Z}}$
1	30	7	462		460
2	23	0	210		194
3 4	25	0	68	127	81
4	8	8	5	0	6
5 6	21 10	7 0	11	52 95	21 66
7	10	0	84	97	131
7 8	9	0	147	223	159
9	8	0			212
10	10	10	147	289	221
11	16	8	252	255	237
12	17	10	189		233
13	23	9	215	254	198
14	30	7		207	176
15	17	. 0	147		114
16 17	12 18	0	63		110 40
18	8	0	5	19	4
19	20	7	16	26	14
20	20	7	16	12	8
21	13	7	10		5
22	7	0	21		11
23	15	15	32		
24	15 8	8	5 5		14
25	0	0	5	0	0
26	7	7	5 0		2
2 <b>7</b> 28	0	0			0
29	0	0	0	0	0
30	0	0	0		0
31	0	0	0	0	0
Mean	12.4	3.8	78	97	90
Mean 1976 June	12.4 R	3.8	78 <sup>A</sup> c	97 A <sub>R</sub>	90 <sup>A</sup> Z
1976 June	R	R <sub>C</sub>	<sup>A</sup> C	A <sub>R</sub>	<sup>A</sup> Z
1976 June	R O	R <sub>C</sub>	A <sub>C</sub>		<sup>A</sup> Z
1976 June	R 0 0	R <sub>C</sub>	A <sub>C</sub>	A <sub>R</sub>	A <sub>Z</sub>
1976 June	R 0 0 0	R <sub>C</sub>	A <sub>C</sub>	A <sub>R</sub>	A <sub>Z</sub>
1976 June  1 2 3 4	R 0 0 0 0 0	R <sub>C</sub>	A <sub>C</sub>	A <sub>R</sub>	A <sub>Z</sub>
1976 June  1 2 3 4	R 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	R <sub>C</sub> 0 0 0 0 0 0	A <sub>C</sub>	A <sub>R</sub>	A <sub>Z</sub>
1976 June  1 2 3 4	R 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	R <sub>C</sub>	A <sub>C</sub>	A <sub>R</sub>	A <sub>Z</sub>
1976 June  1 2 3 4 5 6 7 8	R 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	R <sub>C</sub>	Ac	A <sub>R</sub>	A <sub>Z</sub> 0 0 0 0 0 0 0 7
1976 June  1 2 3 4 5 6 7 8 9	R 0 0 0 0 0 0 0 10 10	R <sub>C</sub>	A <sub>C</sub>	A <sub>R</sub>	AZ 0 0 0 0 0 0 0 7 12
1976 June  1 2 3 4 5 6 7 8 9 10	0 0 0 0 0 0 0 0 0 10 10	R <sub>C</sub>	0 0 0 0 0 0	A <sub>R</sub>	AZ 0 0 0 0 0 0 7 12 4
1976 June  1 2 3 4 5 6 7 8 9 10 11	0 0 0 0 0 0 0 0 0 10 10	R <sub>C</sub>	Ac	A <sub>R</sub>	AZ 0 0 0 0 0 0 7 12 14
1976 June  1 2 3 4 5 6 7 8 9 10 11 12	R 0 0 0 0 0 0 10 10 7 7 8	R <sub>C</sub>	Ac	A <sub>R</sub>	AZ 0 0 0 0 0 0 0 7 12 4 1
1976 June  1 2 3 4 5 6 7 8 9 10 11 12 13	R 0 0 0 0 0 0 10 10 7 7 8 8	R <sub>C</sub>	A <sub>C</sub>	A <sub>R</sub>	AZ 0 0 0 0 0 0 0 7 12 4 1 10 2
1976 June  1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	R 0 0 0 0 0 0 10 10 7 7 8 8	R <sub>C</sub>	Acc 0 0 0 0 0 0 0 0 0 0 0 0 0 0 5 53	A <sub>R</sub>	A <sub>Z</sub> 0 0 0 0 0 0 7 12 4 1 10 2 13 63
1976 June  1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	R 0 0 0 0 0 0 10 10 7 7 8 8 15 18	R <sub>C</sub>	0 0 0 0 0 0 0 0 0 0 0 0 0 0 5 5 3 110	A <sub>R</sub>	AZ 0 0 0 0 0 0 7 12 4 1 10 2 13 63 67
1976 June  1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17	R 0 0 0 0 0 0 10 10 7 7 8 8 15 18	R <sub>C</sub>	0 0 0 0 0 0 0 0 0 0 0 0 0 5 5 3 110 0 0	A <sub>R</sub> 0 0 0 0 0 0 0 0 0 0 0 1 1 61	AZ 0 0 0 0 0 0 7 12 4 1 10 2 13 63 67 289
1976 June  1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18	R 0 0 0 0 0 0 10 10 7 7 8 8 15 18 15 18 24	R <sub>C</sub>	0 0 0 0 0 0 0 0 0 0 0 5 5 3 110 0 0 0	A <sub>R</sub> 0 0 0 0 0 0 0 0 0 0 1 1 430	A <sub>Z</sub> 0 0 0 0 0 0 7 12 4 1 10 2 13 63 67 289 317
1976 June  1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19	R 0 0 0 0 0 0 10 10 7 7 8 8 15 18 15 18 24 23	R <sub>C</sub> 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Ac	A <sub>R</sub> 0 0 0 0 0 0 0 0 0 0 1 1 430	AZ  0 0 0 0 0 0 7 12 4 1 10 2 13 63 67 289 317 295
1976 June  1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	R 0 0 0 0 0 0 10 10 7 7 8 8 15 18 15 18 24 23 20	R <sub>C</sub> C 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Acc 0 0 0 0 0 0 0 0 0 0 0 0 0 5 53 110 0 0 0 0	A <sub>R</sub> 0 0 0 0 0 0 0 0 0 0 0 1 1 430 204	AZ  0 0 0 0 0 0 7 12 4 1 10 2 13 63 67 289 317 295 108
1976 June  1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21	R 0 0 0 0 0 0 10 10 7 7 8 8 15 18 15 18 24 23 20 30	R <sub>C</sub> 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Ac 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	A <sub>R</sub> 0 0 0 0 0 0 0 0 0 0 1 1 430	AZ  0 0 0 0 0 0 7 12 4 1 10 2 13 63 67 289 317 295 108
1976 June  1 2 3 4 5 6 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	R 0 0 0 0 0 0 10 10 7 7 8 8 15 18 15 18 24 23 20 30 31	R <sub>C</sub> 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Acc 00000000000000000000000000000000000	A <sub>R</sub> 0 0 0 0 0 0 0 0 0 0 430 204	AZ  0 0 0 0 0 0 7 12 4 1 10 2 13 63 67 289 317 295 108 91 85
1976 June  1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	R 0 0 0 0 0 0 10 10 17 7 8 8 15 18 15 18 24 23 20 30 31 22	R <sub>C</sub> 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Acc 0 0 0 0 0 0 0 0 0 0 0 0 5 53 110 0 0 84 47 84	A <sub>R</sub> 0 0 0 0 0 0 0 0 0 0 0 1 1 430 204	A <sub>Z</sub> 0 0 0 0 0 0 7 12 4 1 10 2 13 63 67 289 317 295 108 91 85 115
1976 June  1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25	R 0 0 0 0 0 0 0 10 10 17 7 8 8 15 18 15 18 24 23 20 30 31 22 25	R <sub>C</sub> 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Acc 0 0 0 0 0 0 0 0 0 0 0 0 0 5 53 110 0 0 84 47 84 63	A <sub>R</sub> 0 0 0 0 0 0 0 0 0 0 430 204	A <sub>Z</sub> 0 0 0 0 0 0 7 12 4 1 10 2 13 63 67 289 317 295 108 91 85 115 110
1976 June  1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26	R 0 0 0 0 0 0 10 10 7 7 8 8 15 18 15 18 24 23 20 30 31 22 25 18 17	R <sub>C</sub> 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Ac 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	A <sub>R</sub> 0 0 0 0 0 0 0 0 0 0 0 61 430 204	AZ  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1976 June  1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27	R 0 0 0 0 0 0 10 10 7 7 8 8 15 18 15 18 24 23 20 30 31 22 25 18 17 9	R <sub>C</sub> 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Ac 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	A <sub>R</sub> 0 0 0 0 0 0 0 0 0 0 0 1 430 204 178 159	AZ  0 0 0 0 0 0 7 12 4 1 10 2 13 63 67 289 317 295 108 91 85 115 110 93 153 130
1976 June  1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28	R 0 0 0 0 0 0 0 10 10 17 7 8 8 15 18 15 18 24 23 20 30 31 22 25 18 17 9 11	R <sub>C</sub> 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Acc 00000000000000000000000000000000000	A <sub>R</sub> 0 0 0 0 0 0 0 0 0 0 0 430 178 159	A <sub>Z</sub> 0 0 0 0 0 0 7 12 4 1 10 2 13 63 67 289 317 295 108 91 85 115 110 93 153 153 153 130 137
1976 June  1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27	R 0 0 0 0 0 0 10 10 7 7 8 8 15 18 15 18 24 23 20 30 31 22 25 18 17 9	R <sub>C</sub> 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Ac 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	A <sub>R</sub> 0 0 0 0 0 0 0 0 0 0 0 1 430 204 178 159	AZ  0 0 0 0 0 0 7 12 4 1 10 2 13 63 67 289 317 295 108 91 85 115 110 93 153 130

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1976 July	R	$^{\mathrm{R}}\mathrm{_{C}}$	$^{\mathrm{A}}_{\mathrm{C}}$	$A_{R}$	$^{\mathrm{A}}\mathrm{_{Z}}$
1	9	0	42	70	74
2	9 8	0	26		56
3 4	10	0	21		8
74	8	8	21		4 6
5 6	8	8	5	0	6
6	10	0	5 16		11
7	7	0	5		14
8	0	0	0	0	0
9	0	0	0	0	0
10	0	0	0	-0.00	0
11	0	0	0		0
12	0	0	0		0
13	0	0	0	0	0
14	0	0	0	0	0
15	0	0	0	0	0
16	0	0	0	0	0
17	0	0	0	0	0
18	0	0	0		0
19	0	0	0	0	0
20	0	0	0		0
21	0	0	0	0	0
22	0	0	0	0	
23	0	0	0		0
24	0	0	0	0	0
25	0	0	0		0
26	0	0	0	0	0
27	0	0	0		0
28	0	0	0	0	0
29	0	0	0	0	0
30	0	0	0	Q	0
31	0	0	0	0	0
Mean	1.9	0.5	4	<b>Ъ</b>	5

1976 Aug.	R	<sup>R</sup> c	<sup>A</sup> C	A <sub>R</sub>	AZ
1 2	10 16	0 8	105 252		132 338
3 4	17	8	693	636	597
4	13 16	0	924 1029	764 890	764 835
5 6	14	14	777	1018	988
7 8	24	12	945	1050	1043
8 9	27	16	903		939
10	31 24	13 10	924 819	994	908 841
11	23	10	746		652
12	28	18	462		466
13	26	18	210		290
14	15	0	58		39
15 16	8 15	8 15	21 42		32
17	19	19	84	270	140
18	22	0	168	334	192
19	25	0	106 84	243	158
20	20	0		185	138
21 22	17 8	0	63 74	114	116 
23	9	9		111	78
24	15	9	95	127	105
25	10	10	32	80	48
26 27	14 7	14 7	32 11	32 	21 2
28	8	0	0	0	
29	9	0	95		
30	10	0	273		240
31	9	0	231		316
Mean	16.4	7.0	342	428	386
1976 Sep.	Ř	R <sub>C</sub>	A <sub>C</sub>	A <sub>R</sub>	A <sub>Z</sub>
1976 Sep.				A <sub>R</sub>	
1 2	17 20	Ö 9	483 483	 569	A <sub>Z</sub> 422 412
1 2 3	17 20 12	0 9 12	483 483 441	 569 	422 412
1 2 3 4	17 20 12 11	0 9 12 11	483 483 441 504	 569	422 412 
1 2 3 4 5	17 20 12 11 17	0 9 12 11 17 0	483 483 441 504 336 284	 569  445  398	422 412   361 366
1 2 3 4 5 6	17 20 12 11 17 10	0 9 12 11 17 0	483 483 441 504 336 284 231	 569  445  398 318	422 412  361 366 303
1 2 3 4 5 6 7 8	17 20 12 11 17 10 9	0 9 12 11 17 0 0	483 483 441 504 336 284 231	 569  445  398 318 256	422 412  361 366 303 217
1 2 3 4 5 6	17 20 12 11 17 10	0 9 12 11 17 0	483 483 441 504 336 284 231	 569  445  398 318	422 412  361 366 303
1 2 3 4 5 6 7 8 9 10	17 20 12 11 17 10 9 9	0 9 12 11 17 0 0 0	483 483 441 504 336 284 231  84 294	569  445  398 318 256	422 412  361 366 303 217
1 2 3 4 5 6 7 8 9 10	17 20 12 11 17 10 9 9 18 22 24 20	0 9 12 11 17 0 0 0 0	483 483 441 504 336 284 231  84 294 294	 569  445  398 318 256  238 413	422 412  361 366 303 217 127  264
1 2 3 4 5 6 7 8 9 10 11 12 13	177 200 122 111 177 100 99 188 222 244 200	0 9 12 11 17 0 0 0 0 0	483 483 441 504 336 284 231  84 294 294 263 105	 569  445  398 318 256  238 413 	422 412  361 366 303 217 127  264
1 2 3 4 5 6 7 8 9 10 11 12 13 14	17 20 12 11 17 10 9 9 18 22 24 20 18	0 9 12 11 17 0 0 0 0 0 0	483 483 441 504 336 284 231  84 294 294 263 105 53	 569  445  398 318 256  238 413  112	422 412  361 366 303 217 127  264  42
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	17 20 12 11 17 10 9 18 22 24 20 18 10 16	0 9 12 11 17 0 0 0 0 0 24 14 0 0	483 483 441 504 336 284 231  84 294 294 263 105 53 21 21	 569  445  398 318 256  238 413  112 70 32	422 412  361 366 303 217 127  264  42 31
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17	17 20 12 11 17 10 9 18 22 24 20 18 10 16	0 9 12 11 17 0 0 0 0 0 0 24 14 0 0	483 483 441 504 336 284 231  84 294 294 263 105 53 21 21	 569  445  398 318 256  238 413  112 70 32  38	422 412  361 366 303 217 127  264  42 31 10 24
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18	17 20 12 11 17 10 9 18 22 24 20 18 10 16 14 8	0 9 12 11 17 0 0 0 0 0 0 24 14 0 0	483 483 441 504 336 284 231  84 294 294 263 105 53 21 21 21	 569  445  398 318 256  238 413  112 70 32  38 10	422 412  361 366 303 217 127  264  42 31 10 24
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17	17 20 12 11 17 10 9 18 22 24 20 18 10 16	0 9 12 11 17 0 0 0 0 0 0 24 14 0 0	483 483 441 504 336 284 231  84 294 294 263 105 53 21 21	 569  445  398 318 256  238 413  112 70 32  38	422 412  361 366 303 217 127  264  42 31
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	17 20 12 11 17 10 9 18 22 24 20 18 10 16 14 8 8 7	0 9 12 11 17 0 0 0 0 0 0 24 14 0 0 0	483 483 441 504 336 284 231  84 294 263 105 53 21 21 21 21	 569  445  398 318 256  238 413  112 70 32  38 10  0	422 412  361 366 303 217 127  264  42 31 10 24 9 4
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	17 20 12 11 17 10 9 18 22 24 20 18 10 16 14 8 8 7 0	0 9 12 11 17 0 0 0 0 0 0 24 14 0 0 0 0	483 483 441 504 336 284 231  84 294 294 263 105 53 21 21 21 0 0	 569  445  398 318 256  238 413  112 70 32  38 10  0	422 412  361 366 303 217 127  264  42 31 10 24 9 4 1
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	17 20 12 11 17 10 9 18 22 24 20 18 10 16 14 8 8 7	0 9 12 11 17 0 0 0 0 0 0 24 14 0 0 0 0	483 483 441 504 336 284 231  84 294 294 263 105 53 21 21 21 0 0	 569  445  398 318 256  238 413  112 70 32  38 10  0	422 412  361 366 303 217 127  264  42 31 10 24 9 4 1
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24	17 20 12 11 17 10 9 18 22 24 20 18 10 16 14 8 8 7 0	0 9 12 11 17 0 0 0 0 0 0 24 14 0 0 0 0	483 483 441 504 336 284 231  84 294 294 263 105 53 21 21 21 0 0	569 445 398 318 256 238 413 112 70 32 38 10 0 0	422 412  361 366 303 217 127  264  42 31 10 24 9 4 1
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# I. SUNSPOTS Sunspot Relative-Numbers and Sunspot-Areas

Cooperating Observatories for Sunspot Relative-Numbers: Arcetri, Arosa, Athens (National Observatory), Athens (Eugenides Planetarium), Bucarest, Catania, Helwan, Herstmonceux, Hurbanovo, Istanbul, Kandilli, Kanzelhöhe, Kiev, Kislovodsk, Locarno, Madrid, Manila, Mitaka-Tokyo, Potsdam, Quezon-City, Roma-Monte Mario, Roquetas-Tortosa, Rosario, San Miguel, Santiago de Chile, Skalnaté Pleso, Taipei, Tashkent, Tokyo (Science Museum), Uccle, Zürich.

The first column gives the Relative-Numbers for the whole disk of the sun (R), the second that for the central zone (R<sub>C</sub>). The diameter of the central zone is half that of the sun's disk.

The Sunspot-Areas A are based upon measurements made at Catania  $A_{\mathbb{C}}$ , Roma-Monte Mario  $A_{\mathbb{R}}$ , and at Locarno and Zürich (combined values)  $A_{\mathbb{Z}}$ . The apparent total area of the umbra plus penumbra is uncorrected for foreshortening and expressed in millionths of the solar disk.

1976 Oct.	R	R <sub>C</sub>	<sup>A</sup> C	$^{\mathrm{A}}_{\mathrm{R}}$	$^{\mathrm{A}}\mathrm{_{Z}}$
1	30	17	442	462	431
2	28	17	399	308	445
3	30	Ó	347		
14	30	0	326	370	285
5 6	25	0	137		
6	24	0	95	169	112
7	30	0	42		48
8	7	0		0	2
9	14	7	11	Ö	8
10	0	0	0		0
11	0	0	0	0	
12	13	0	32		
13	17	0	21		32
14	23	0	100		77
15	25	0	158		157
16	28	7			212
17	31	7	252		273
18	24	7	189	270	202
19	20	7	189		106
20	19	0	68		23
21	15	0	42		9
22	22	15	10		14
23	28	16	168		128
24	30	22	294		
25	30	0			~-
26	29	0	420		602
27	24	0	326		
28	19	0	179		
29	15	0	89	Andre man	47
30	8	0	26		
31	0	0	O		0
Mean	20.6	3.9	156	197	146

1976 Nov.	R	R <sub>C</sub>	A <sub>C</sub>	$\mathbf{A}_{\mathbf{R}}$	$^{\mathrm{A}}\mathrm{_{Z}}$
1	0	0			2
2	0	0	0		0
3 4	0	0	0		
5	0	0	0	0	0
5 6	0	0		0	
7	0	0	0		
8	0	0	0	0	0
9	0	0	0	0	0
10	0	0	0	0	0
11	0	0			
12 13	0	0	0		0
. 14	0	0	0		0
15	7	Ö	ő	0	2
16	7	0	0	0	3
17	14	0			55
18	20	0			144
19 20	13 12	0	284		234 285
21 22	8	8 .	273		265
23	13 11	13 11	399	289	407
24	10	10		289	
25	9	9	252	255	
26	9 8	0	242	208	
27	8	0	189	159	183
28 29	8	0	84 74		122 49
30	0	0	0		49
Mean	5.2	1.7	86	100	92
1976 Dec.	R	R <sub>C</sub>	A <sub>C</sub>	A <sub>R</sub>	A <sub>Z</sub>
1976 Dec.	R 0	R <sub>C</sub>	A <sub>C</sub>	A <sub>R</sub>	
1 2	0	0	0		A <sub>Z</sub>
1 2 3	0 0 0	0 0 0	0 0 0	A <sub>R</sub> o	0
1 2 3 4	0 0 0	0 0 0	0 0 0		0 0
1 2 3 4	0 0 0 0	0 0 0 0	0 0 0 0		0 0 0 0
1 2 3 4 5 6	0 0 0 0 0	0 0 0 0	0 0 0 0 0		0 0
1 2 3 4 5 6 7 8	0 0 0 0 0 0 7	0 0 0 0 0 0	0 0 0 0 0 0 0		0 0  0 0 0
1 2 3 4 5 6 7 8	0 0 0 0 0 0 7 19 22	0 0 0 0 0 0 0	0 0 0 0 0 0 0 63	 0   	0 0 0 0 0 0 0  71 119
1 2 3 4 5 6 7 8 9	0 0 0 0 0 0 7 19 22	0 0 0 0 0 0 0 0 9 7	0 0 0 0 0 0 0 0 63 121 336	 0    	0 0  0 0 0
1 2 3 4 5 6 7 8 9 10	0 0 0 0 0 0 7 19 22 19	0 0 0 0 0 0 0 0 9 7 19	0 0 0 0 0 0 0 63 121 336	 0      493	0 0  0 0 0 0  71 119 
1 2 3 4 5 6 7 8 9 10	0 0 0 0 0 7 19 22 19	0 0 0 0 0 0 0 0 9 7 19 22 16	0 0 0 0 0 0 63 121 336 462 378	 0      493	0 0 0 0 0 0 0  71 119 
1 2 3 4 5 6 7 8 9 10 11 12 13	0 0 0 0 0 7 19 22 19 22 16	0 0 0 0 0 0 0 0 7 19 22 16	0 0 0 0 0 0 63 121 336 462 378 368	 0     493	0 0 0 0 0 0  71 119 
1 2 3 4 5 6 7 8 9 10 11 12 13 14	0 0 0 0 0 7 19 22 19 22 16 12 32 34	0 0 0 0 0 0 0 0 7 19 22 16 12	0 0 0 0 0 0 63 121 336 462 378 368 405	 0      493	0 0 0 0 0 0 0 71 119 
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	0 0 0 0 0 7 19 22 19 22 16 12 32 34 36	0 0 0 0 0 0 0 0 9 7 19 22 16 12 13 0	0 0 0 0 0 0 63 121 336 462 378 368 405 394 352	 0     493  431	0 0 0 0 0 0 0 71 119   376 352
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17	0 0 0 0 0 7 19 22 19 22 16 12 32 34 36 34	0 0 0 0 0 0 0 0 9 7 19 22 16 12 13 0	0 0 0 0 0 0 0 63 121 336 462 378 368 405 394 352	 0     493  431	0 0 0 0 0 0 0 71 119   376 352
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18	0 0 0 0 0 7 19 22 19 22 16 12 32 34 36 34 24	0 0 0 0 0 0 0 0 9 7 19 22 16 12 13 0 0	0 0 0 0 0 0 0 63 121 336 462 378 368 405 394 352 	 0     493  431	0 0 0 0 0 0 0 71 119   376 352
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19	0 0 0 0 0 7 19 22 19 22 16 12 32 34 36 34 24	0 0 0 0 0 0 0 0 9 7 19 22 16 12 13 0 0	0 0 0 0 0 0 63 121 336 462 378 368 405 394 352 	 0     493  431	0 0 0 0 0 0 71 119   376 352
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	0 0 0 0 0 7 19 22 19 22 16 12 32 34 36 34 24	0 0 0 0 0 0 0 0 9 7 19 22 16 12 13 0 0 0	0 0 0 0 0 0 0 63 121 336 462 378 368 405 394 352  294 257 273	 0     493  431  	0 0 0 0 0 0 71 119   376 352   271
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21	0 0 0 0 0 7 19 22 19 22 16 12 32 34 36 34 24	0 0 0 0 0 0 0 0 9 7 19 22 16 12 13 0 0	0 0 0 0 0 0 63 121 336 462 378 368 405 394 352  294 257 273	 0     493  431	0 0 0 0 0 0 0 71 119   376 352   271
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	0 0 0 0 0 7 19 22 19 22 16 12 34 34 34 24 15 8	0 0 0 0 0 0 0 0 9 7 19 22 16 12 13 0 0	0 0 0 0 0 0 63 121 336 462 378 368 405 394 352  294 257 273	 0     493  431  	0 0 0 0 0 0 71 119   376 352  271 238 224
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24	0 0 0 0 0 0 7 19 22 19 22 16 12 34 36 34 21 5 8 9 9 9	0 0 0 0 0 0 0 0 7 19 22 16 12 13 0 0 0 0	0 0 0 0 0 0 0 63 121 336 462 378 368 405 394 352  294 257 273 	493  493  431	0 0 0 0 0 0 0 71 119   376 352   271
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25	0 0 0 0 0 0 7 19 22 19 22 16 12 32 34 36 34 24 15 8 9 9	0 0 0 0 0 0 0 0 0 9 7 19 22 16 12 13 0 0 0 0 8 8 8 9 9	0 0 0 0 0 0 0 63 121 336 462 378 368 405 394 352  294 257 273  210 200 263	493  493   	0 0 0 0 0 0 0 0 71 119   376 352  271 238 224 217
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26	0 0 0 0 0 0 7 19 22 19 22 16 12 32 34 36 34 24 15 8 9 9 9	0 0 0 0 0 0 0 0 0 9 7 19 22 16 12 13 0 0 0 0 8 8 8 9 9	0 0 0 0 0 0 0 63 121 336 462 378 368 405 394 352  294 257 273  210 200 263	493   493   	0 0 0 0 0 0 0 0 1119   376 352   271 238 224 217
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27	0 0 0 0 0 7 19 22 19 22 16 12 32 34 36 34 24 15 8 9 9 9	0 0 0 0 0 0 0 0 0 9 7 19 22 16 12 13 0 0 0 0 8 8 8 9 9 0 0 0	0 0 0 0 0 0 0 63 121 336 462 378 368 405 394 352  294 257 273  210 200 263	493  493    	0 0 0 0 0 0 0 0 1119   376 352   271 238 224 217 178 
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28	0 0 0 0 0 0 7 19 22 19 22 16 12 34 36 34 24 15 8 9 9 9 17 22 21 19	0 0 0 0 0 0 0 0 0 9 7 19 22 16 12 13 0 0 0 0 8 8 8 9 9 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 63 121 336 462 378 368 405 394 352  294 257 273  210 200 263	493  493    	0 0 0 0 0 0 0 0 1119   376 352   271 238 224 217 178 
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1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28	0 0 0 0 0 0 7 19 22 19 22 16 12 34 36 34 24 15 8 9 9 9 17 22 21 19	0 0 0 0 0 0 0 0 0 9 7 19 22 16 12 13 0 0 0 0 8 8 8 9 9 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 63 121 336 462 378 368 405 394 352  294 257 273  210 200 263	493  493    	0 0 0 0 0 0 0 0 1119   376 352   271 238 224 217 178 
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30	0 0 0 0 0 0 7 19 22 19 22 16 12 33 4 15 8 9 9 9 17 22 25 16 17 19	0 0 0 0 0 0 0 0 0 9 7 19 22 16 12 13 0 0 0 0 8 8 8 9 9 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 63 121 336 462 378 368 405 394 352  294 257 273  210 200 263 	1	0 0 0 0 0 0 0 0 71 119   376 352  271 238 224 217 178   204 175 216