

#### IV. IONOSPHERE

The following tables give the values of mean ionospheric absorption at oblique incidence (A3) for certain zenith distances of the Sun ( $\alpha$ ) expressed in decibels (dB). Values for ground sunset (SS) and ground sunrise (SR) are given for periods of 20 minutes centered on the times of  $\alpha = 90^\circ$ . Night values have been determined by taking the periods ranging from  $\alpha = 100^\circ$  to 23 00 GMT.

The sky wave of the transmitter Ceskoslovensko ( $f = 272$  kHz) has been recorded since January 1967. The geographical coordinates of the reflection point are  $48.4^\circ\text{N}$ ,  $17.1^\circ\text{E}$ . Because of reconstruction works on the transmitter Ceskoslovensko the absorption measurement at 272 kHz and the publication of data were suspended from April 1975 till September 1978.

The tables were compiled by F. MÄRCZ. The equipment and the method have been described in the papers by P. BENCZE and F. MÄRCZ: „Atmosphärisch-elektrische und ionosphärische Messungen im Observatorium bei Nagycenk”. *Observatoriumsberichte des Geophysikalischen Forschungslaboratoriums der Ungarischen Akademie der Wissenschaften vom Jahre 1966*, Sopron, 1967, as well as by P. BENCZE, J. HORVÁTH and F. MÄRCZ: „A new equipment for the measurement of ionospheric absorption” *Geophysical Observatory Report of the Geodetic and Geophysical Research Institute of the Hungarian Academy of Sciences, Year 1975. Observatory of Nagycenk, Sopron, 1976*. Further informations are given by P. BENCZE and F. MÄRCZ: „The Geophysical Observatory near Nagycenk. II. Atmospheric electric and ionospheric measurements”. *Acta Geod. Geoph. Mont. Hung.* 16 1981 353-357.

*Mean ionospheric Absorption L'(dB) at Oblique Incidence (A3)**f = 272*

January

Date of the night	SS	Night	SR
1/2	X	X	X
2,3	47,2	25.0	33.2
3/4	35.2	25.7	35.2
4 5	37.7	18.1	28.2
5/6	27.2	21.4	31.7
6,7	37.7	27.2	23.8
7,8	30.3	25.7	30.3
8,9	47.3	25.7	30.3
9 10	30.3	22.7	33.2
10,11	33.2	21.4	33.2
11/12	41.2	24.4	41.2
12,13	37.7	24.4	37.7
13,14	21.0	27.2	28.2
14,15	31.7	23.8	31.7
15,16	35.2	24.4	30.3
16,17	47.2	25.7	29.2
17,18	47.2	28.2	35.2
18,19	47.2	31.7	X
19,20	47.2	25.7	35.2
20/21	35.2	23.2	37.7
21,22	41.2	25.0	29.2
22 23	41.2	21.8	35.2
23 24	41.2	23.8	25.0
24 25	37.7	20.6	22.2
25/26	25.0	19.2	19.9
26 27	23.2	21.4	X
27/28	25.7	21.4	26.4
28/29	33.2	23.2	33.2
29 30	21.0	18.3	25.0
30/31	33.2	21.4	29.2
31/1	24.4	23.2	27.2
Median values	35.2	23.8	30.3

## February

Date of the night	SS	Night	SR
1/2	24.4	22.7	24.4
2/3	33.2	22.2	30.3
3/4	33.2	25.7	35.2
4/5	31.7	25.7	30.3
5/6	27.2	20.6	28.2
6/7	29.2	26.4	37.7
7/8	33.2	18.6	X
8/9	35.2	18.6	26.4
9/10	31.7	22.2	29.2
10/11	33.2	26.4	33.2
11/12	30.3	24.4	41.2
12/13	25.0	23.8	25.7
13/14	31.7	27.2	33.2
14/15	33.2	29.2	31.7
15/16	27.2	29.2	30.3
16/17	28.2	23.8	23.8
17/18	24.4	21.4	31.7
18/19	29.2	30.3	41.2
19/20	37.7	X	X
20/21	35.2	X	X
21/22	35.2	22.2	27.2
22/23	47.2	27.2	27.2
23/24	30.3	20.6	X
24/25	41.2	21.4	26.4
25/26	29.2	21.0	28.2
26/27	30.3	23.2	25.7
27/28	28.2	20.2	27.2
28/1	X	X	X
Median values	31.7	23.2	29.2

March			
Date of the night	SS	Night	SR
1 2	33.2	21.8	X
2 3	35.2	21.4	28.2
3 4	31.7	16.3	27.2
4 5	30.3	17.8	23.2
5 6	27.2	22.7	29.2
6 7	19.2	23.2	23.2
7 8	31.7	21.4	28.2
8 9	31.7	21.4	21.8
9 10	27.2	15.9	18.1
10 11	17.8	14.5	25.7
11 12	22.7	17.6	18.6
12 13	27.2	19.5	25.0
13 14	22.7	16.9	22.7
14/15	26.4	18.1	23.2
15 16	23.2	18.6	20.6
16 17	31.7	18.9	24.4
17 18	X	X	X
18 19	25.7	19.9	33.2
19 20	23.8	19.5	19.2
20 21	X	14.6	X
21 22	25.0	21.0	25.0
22 23	27.2	16.9	X
23 24	31.7	18.3	X
24 25	25.7	16.9	19.5
25 26	30.3	18.1	19.2
26 27	27.2	X	X
27 28	23.8	17.8	18.1
28 29	22.7	16.7	19.2
29/30	18.1	17.8	23.2
30/31	31.7	16.9	15.2
31/1	31.7	19.9	23.8
Median values	27.2	18.1	23.2

## April

Date of the night	SS	Night	SR
1/2	19.2	17.8	23.2
2 3	24.4	23.8	26.4
3/4	25.7	23.8	28.2
4 5	21.4	16.9	24.4
5/6	19.2	16.7	22.7
6 7	21.4	20.2	19.5
7 8	21.4	21.8	23.8
8 9	19.5	18.6	30.3
9 10	35.2	16.5	23.2
10 11	28.2	22.2	22.7
11 12	23.8	17.3	22.7
12 13	21.4	18.6	22.2
13 14	25.7	19.2	23.2
14 15	X	X	X
15 16	20.6	17.3	19.9
16 17	27.2	20.2	21.8
17 18	47.2	21.8	23.2
18 19	18.9	18.1	20.2
19 20	19.9	16.7	26.4
20 21	27.2	16.1	19.5
21 22	17.3	24.4	21.4
22/23	27.2	22.2	17.6
23/24	X	21.4	29.2
24 25	27.2	22.2	25.0
25 26	35.2	21.4	25.0
26 27	25.7	21.0	19.9
27 28	25.7	22.2	X
28/29	29.2	21.4	24.4
29 30	29.2	16.9	21.8
30/1	18.6	19.9	23.8
Median values	25.0	20.2	23.2

May			
Date of the night	SS	Night	SR
1 2	37.7	22.7	30.3
2/3	28.2	22.7	28.2
3/4	22.7	20.9	26.4
4 5	29.2	17.6	25.7
5 6	27.2	15.2	21.0
6/7	25.7	15.5	25.7
7 8	29.2	19.2	28.2
8 9	25.0	17.3	22.2
9 10	26.4	19.9	27.2
10 11	25.7	16.7	20.6
11 12	17.8	18.9	27.2
12 13	19.9	20.2	24.4
13 14	25.0	17.6	27.2
14 15	26.4	15.9	24.4
15 16	24.4	21.0	X
16 17	16.3	15.7	23.8
17 18	23.8	21.0	25.0
18 19	23.8	17.8	25.0
19 20	31.7	20.2	23.8
20/21	27.2	18.1	21.8
21/22	21.0	16.9	26.4
22 23	X	X	X
23 24	35.2	17.8	20.2
24/25	30.3	20.2	22.2
25/26	35.2	22.2	X
26/27	29.2	21.0	25.7
27 28	29.2	24.4	29.2
28 29	31.7	21.4	24.4
29/30	27.2	22.2	26.4
30/31	29.2	19.2	22.2
31/1	33.2	18.9	27.2
Median values	27.2	19.2	25.4

June			
Date of the night	SS	Night	SR
1 2	28.2	19.9	25.7
2 3	30.3	21.8	22.2
3,4	30.3	21.0	23.8
4/5	29.2	21.0	20.2
5,6	23.8	21.0	23.2
6/7	35.2	23.2	29.2
7/8	25.7	21.4	35.2
8 9	27.2	21.0	21.8
9/10	25.7	16.1	30.3
10 11	29.2	23.8	30.3
11/12	27.2	21.4	23.8
12/13	35.2	27.2	31.7
13/14	28.2	19.5	30.3
14/15	31.7	21.0	37.7
15/16	30.3	22.7	21.8
16/17	35.2	22.2	27.2
17,18	33.2	18.6	21.8
18/19	33.2	21.4	24.4
19 20	24.4	21.0	27.2
20 21	18.6	19.5	24.4
21/22	31.7	23.2	29.2
22 23	27.2	23.8	X
23/24	29.2	20.2	26.4
24/25	21.8	20.2	26.4
25/26	25.7	17.8	22.7
26 27	27.2	25.0	29.2
27 28	20.2	18.3	35.2
28/29	23.8	19.2	24.4
29 30	23.8	22.7	28.2
30/1	23.8	17.8	28.2
Median values	27.7	21.0	26.4

July			
Date of the night	SS	Night	SR
1/2	24.4	23.2	28.2
2/3	24.4	20.2	28.2
3/4	X	21.0	25.7
4/5	26.4	18.3	20.6
5/6	23.2	23.2	31.7
6/7	29.2	24.4	23.2
7/8	31.7	22.7	28.2
8/9	26.4	23.8	24.4
9/10	30.3	24.4	33.2
10/11	27.2	21.8	X
11/12	26.4	33.2	31.7
12/13	33.2	23.8	28.2
13/14	23.8	25.7	28.2
14/15	25.7	22.7	29.2
15/16	26.4	19.2	31.7
16/17	37.7	20.2	28.2
17/18	33.2	21.4	29.2
18/19	28.2	21.8	28.2
19/20	31.7	23.8	30.3
20/21	30.3	23.2	25.7
21/22	31.7	X	X
22/23	X	X	X
23/24	X	X	X
24/25	X	X	X
25/26	X	X	X
26/27	X	X	X
27/28	25.7	21.8	41.2
28/29	27.2	23.8	25.0
29/30	26.4	17.6	26.4
30/31	27.2	21.4	37.7
31/1	28.2	23.8	27.2
Median values	27.2	22.7	28.2

August			
Date of the night	SS	Night	SR
1/2	27.2	17.6	23.8
2/3	X	X	X
3/4	33.2	23.8	29.2
4/5	29.2	X	X
5/6	27.2	23.7	25.0
6/7	26.4	23.8	30.3
7/8	X	X	X
8/9	23.8	23.2	27.2
9/10	33.2	23.8	31.7
10/11	28.2	23.2	24.4
11/12	30.3	21.4	X
12/13	29.2	23.8	25.7
13/14	25.0	20.2	35.2
14/15	29.2	21.8	23.2
15/16	28.2	18.3	23.8
16/17	25.0	20.6	X
17/18	30.3	18.3	26.4
18/19	24.4	17.3	24.4
19/20	31.7	16.1	28.2
20/21	29.2	21.0	X
21/22	27.2	17.8	25.0
22/23	25.0	20.6	25.7
23/24	25.7	22.2	28.2
24/25	27.2	19.9	41.2
25/25	33.2	18.9	26.4
26/27	21.8	18.1	20.6
27/28	25.7	17.3	25.7
28/29	25.7	18.1	28.2
29/30	30.3	16.7	21.4
30/31	28.2	18.1	28.2
31/1	27.2	18.9	27.2
Median values	27.2	20.1	26.4

September			
Date of the night	SS	Night	SR
1/2	25.7	17.6	28.2
2 3	24.4	18.9	30.3
3/4	31.7	19.5	30.3
4 5	22.7	15.9	27.2
5/6	28.2	18.1	28.2
6/7	26.4	X	X
7 8	27.2	23.8	30.3
8 9	33.2	18.9	41.2
9 10	35.2	23.8	33.2
10/11	33.2	20.6	33.2
11/12	31.7	20.6	33.2
12/13	41.2	18.3	28.2
13/14	27.2	18.3	33.2
14/15	33.2	19.2	37.7
15/16	25.7	18.1	30.3
16/17	37.7	16.1	27.2
17/18	24.4	16.1	23.2
18 19	22.2	17.6	27.2
19/20	22.7	18.3	29.2
20/21	25.0	18.6	25.7
21 22	31.7	22.7	37.7
22/23	X	19.2	27.2
23 24	25.7	16.5	25.7
24/25	29.2	18.6	24.4
25/26	24.4	23.2	28.2
26 27	23.2	27.2	23.2
27/28	24.4	17.8	22.7
28 29	22.7	15.4	X
29/30	23.2	17.1	23.8
30 1	29.2	16.1	25.0
Median values	26.4	18.3	28.2

October			
Date of the night	SS	Night	SR
1/2	25.7	17.8	26.4
2/3	23.8	17.8	24.4
3/4	25.0	X	25.7
4/5	31.7	18.1	25.7
5/6	27.2	18.3	23.2
6/7	19.2	15.7	25.0
7/8	X	X	X
8/9	25.7	15.9	21.4
9/10	19.9	17.3	21.4
10/11	23.2	16.9	19.2
11/12	22.2	16.9	22.7
12/13	18.1	15.1	23.2
13/14	18.9	15.9	22.7
14/15	26.4	17.1	25.0
15/16	28.2	X	28.2
16/17	25.7	18.3	24.4
17/18	23.8	18.9	27.2
18/19	25.7	19.5	31.7
19/20	21.4	17.3	27.2
20/21	23.8	19.5	24.4
21/22	21.4	15.9	29.2
22/23	22.7	15.7	17.6
23/24	20.6	15.7	19.9
24/25	25.0	16.1	25.0
25/26	21.8	18.3	28.2
26/27	29.2	19.5	41.2
27/28	31.7	17.3	25.0
28/29	22.2	19.9	27.2
29/30	23.8	19.2	25.0
30/31	21.8	17.3	23.8
31/1	23.8	16.9	27.2
Median values	23.8	17.3	25.0

November			
Date of the night	SS	Night	SR
1 2	25.0	19.5	30.3
2/3	24.4	22.2	23.8
3 4	30.3	18.1	22.2
4 5	16.1	17.6	19.9
5 6	22.2	18.6	23.8
6/7	31.7	19.9	29.2
7 8	22.2	23.2	28.2
8 9	28.2	23.8	29.2
9 10	37.7	17.8	25.0
10 11	27.2	18.1	22.2
11 12	23.8	23.2	29.2
12 13	17.3	18.1	33.2
13 14	41.2	23.8	30.3
14 15	35.2	21.0	22.2
15 16	30.3	18.3	18.1
16 17	X	19.5	23.8
17 18	25.7	19.5	23.2
18 19	23.8	18.1	24.4
19,20	X	21.0	28.2
20 21	26.4	16.1	28.2
21 22	33.2	16.7	33.2
22 23	33.2	16.1	25.0
23/24	31.7	25.7	37.7
24/25	41.2	23.8	28.2
25 26	35.2	18.6	23.8
26 27	26.4	18.1	27.2
27 28	29.2	19.5	33.2
28/29	35.2	23.8	25.0
29 30	X	X	X
30 1	41.2	21.8	47.2
Median values	29.2	19.5	27.2

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December			
Date of the night	SS	Night	SR
1/2	35.2	25.0	35.2
2/3	27.2	19.5	25.7
3/4	29.2	18.1	26.4
4/5	27.2	21.4	19.9
5/6	25.0	18.6	23.2
6/7	29.2	21.0	33.2
7/8	31.7	24.4	27.2
8/9	41.2	24.4	30.3
9/10	28.2	19.2	26.4
10/11	47.2	23.8	41.2
11/12	27.2	23.8	30.3
12/13	33.2	X	28.2
13/14	25.7	X	37.7
14/15	X	X	X
15/16	X	X	X
16/17	41.2	24.4	33.2
17/18	25.7	23.8	27.2
18/19	41.2	22.7	37.7
19/20	28.2	18.1	33.2
20/21	29.2	27.2	47.2
21/22	37.7	26.4	37.7
22/23	37.7	21.0	30.3
23/24	23.8	22.2	37.7
24/25	27.2	23.2	35.2
25/26	33.2	27.2	35.2
26/27	31.7	25.0	29.2
27/28	31.7	25.7	30.3
28/29	37.7	23.2	X
29/30	37.7	25.7	30.3
30/31	37.7	23.8	29.2
31/1	31.7	21.4	31.7
Median values	31.7	23.8	30.3