

#### IV. IONOSPHERE

The following tables give the values of mean ionospheric absorption at oblique incidence (A3) for certain zenith distances of the Sun ( $\chi$ ) 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  $\chi = 90^\circ$ . Night values have been determined by taking the periods ranging from  $\chi = 100^\circ$  to 23 00 GMT.

The sky wave of the transmitter Československo ( $f = 272$  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 Československo, 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 information is 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 kHz*

January

Date of the night	SS	Night	SR
1 2	28.2	26.4	28.2
2 3	30.3	22.7	33.2
3 4	25.7	30.3	33.2
4 5	41.2	X	X
5 6	31.7	21.4	21.8
6 7	25.7	20.6	20.2
7 8	29.2	X	X
8 9	33.2	23.8	X
9 10	28.2	22.2	29.2
10 11	31.7	23.8	25.7
11 12	21.4	21.8	28.2
12 13	47.2	23.8	26.4
13 14	33.2	22.2	28.2
14 15	33.2	22.2	28.2
15 16	33.2	22.2	29.2
16 17	47.2	18.9	X
17 18	47.2	28.2	26.4
18 19	37.7	22.2	22.2
19 20	37.7	18.9	26.4
20 21	22.2	20.2	23.2
21 22	33.2	21.8	20.6
22 23	21.8	19.9	25.7
23 24	28.2	25.0	25.0
24 25	30.3	20.6	26.4
25 26	24.4	19.2	25.0
26 27	33.2	18.3	27.2
27 28	30.3	16.7	35.2
28 29	37.7	22.7	29.2
29 30	33.2	20.2	X
30 31	33.2	18.3	29.2
31 1	19.9	17.6	25.0
Median values:	31.7	21.8	26.4

## February

Date of the night	SS	Night	SR
1/2	17.6	19.5	23.8
2/3	21.8	18.1	19.5
3/4	16.5	17.6	23.8
4/5	18.9	18.1	26.4
5/6	25.0	18.9	25.7
6/7	15.5	17.6	22.2
7/8	18.6	17.1	X
8/9	19.2	16.7	26.4
9/10	20.2	17.8	24.4
10/11	25.0	19.9	28.2
11/12	30.3	16.5	23.2
12/13	31.7	17.1	27.2
13/14	28.2	19.5	33.2
14/15	30.3	25.7	33.2
15/16	35.2	22.2	22.7
16/17	21.0	21.4	24.4
17/18	28.2	18.6	30.3
18/19	31.7	19.2	X
19/20	23.8	16.9	X
20/21	25.7	20.6	28.2
21/22	31.7	18.3	30.3
22/23	33.2	19.5	28.2
23/24	25.0	21.4	28.2
24/25	X	X	X
25/26	X	X	X
26/27	X	X	X
27/28	37.7	19.9	X
28/1	22.2	20.2	24.4
Median values:	25.0	18.9	26.4

March			
Date of the night	SS	Night	SR
1/2	28.2	20.6	22.7
2/3	30.3	18.9	18.3
3/4	35.2	20.2	29.2
4/5	33.2	19.2	21.0
5/6	33.2	19.5	21.8
6/7	26.4	19.5	29.2
7/8	21.8	16.5	21.8
8/9	25.0	20.6	24.4
9/10	23.8	18.9	24.4
10/11	21.0	X	30.3
11/12	27.2	18.9	22.2
12/13	18.6	17.6	24.4
13/14	26.4	21.0	25.0
14/15	23.8	X	23.2
15/16	27.2	16.7	25.7
16/17	30.3	19.2	21.8
17/18	26.4	17.1	25.7
18/19	18.6	16.9	16.3
19/20	17.3	17.6	15.9
20/21	22.2	17.1	18.3
21/22	25.0	16.5	25.7
22/23	25.7	16.1	23.2
23/24	22.7	18.3	23.8
24/25	27.2	15.9	23.2
25/26	21.4	15.1	16.9
26/27	19.2	16.5	30.3
27/28	25.0	17.8	23.8
28/29	19.9	18.6	19.5
29/30	X	X	X
30/31	24.4	13.3	28.2
31/1	X	17.3	30.3
Median values:	25.0	17.7	23.5

## April

Date of the night	SS	Night	SR
1/2	28.2	17.1	23.2
2/3	19.9	18.1	18.3
3/4	26.4	16.5	25.7
4/5	21.0	18.3	21.4
5/6	18.3	15.4	19.5
6/7	17.8	19.9	19.2
7/8	20.2	18.1	20.6
8/9	19.5	17.3	21.4
9/10	X	X	X
10/11	18.6	14.9	16.5
11/12	21.8	16.9	19.2
12/13	23.8	19.2	15.7
13/14	19.9	15.7	21.0
14/15	24.4	14.4	19.2
15/16	19.5	15.9	16.1
16/17	25.0	15.9	16.7
17/18	23.8	15.4	17.8
18/19	23.2	21.8	19.5
19/20	25.0	20.6	20.2
20/21	21.0	21.0	19.2
21/22	18.9	20.2	17.6
22/23	20.6	18.3	16.3
23/24	18.9	18.9	33.2
24/25	28.2	19.2	20.2
25/26	21.0	17.1	24.4
26/27	26.4	19.9	19.9
27/28	21.0	19.5	25.0
28/29	17.1	18.1	20.2
29/30	22.2	20.6	21.0
30/1	23.8	20.6	21.8
Median values:	21.0	18.1	19.9

May			
Date of the night	SS	Night	SR
1/2	X	X	X
2/3	21.0	17.8	25.0
3/4	27.2	18.3	26.4
4/5	25.7	19.9	37.7
5/6	28.2	27.2	26.4
6/7	22.7	18.9	24.4
7/8	24.4	17.6	29.2
8/9	26.4	21.0	28.2
9/10	25.7	18.1	28.2
10/11	23.8	22.2	16.7
11/12	19.2	19.2	20.2
12/13	X	X	X
13/14	X	X	X
14/15	41.2	25.0	19.9
15/16	37.7	17.3	20.2
16/17	23.2	X	X
17/18	28.2	20.2	24.4
18/19	X	X	X
19/20	25.7	15.7	23.8
20/21	24.4	17.6	22.7
21/22	X	X	X
22/23	18.3	19.5	26.4
23/24	29.2	17.6	23.2
24/25	24.4	20.6	26.4
25/26	25.0	21.0	25.0
26/27	41.2	23.2	23.8
27/28	35.2	21.8	25.8
28/29	22.2	19.9	25.8
29/30	24.4	17.8	18.3
30/31	28.2	21.0	23.2
31/1	20.6	16.7	21.8
Median values:	25.4	19.5	24.4

June			
Date of the night	SS	Night	SR
1/2	21.8	19.2	26.4
2/3	22.2	16.3	21.4
3/4	X	X	X
4/5	X	X	X
6/6	X	X	X
6/7	X	X	X
7/8	X	X	X
8/9	20.6	19.9	26.4
9/10	25.0	21.4	25.7
10/11	26.4	21.8	21.8
11/12	21.4	21.0	21.4
12/13	24.4	16.3	24.4
13/14	22.7	20.6	X
14/15	25.7	21.8	24.4
15/16	28.2	20.2	29.2
16/17	X	X	X
17/18	20.6	18.9	24.4
18/19	22.7	20.2	19.9
19/20	19.5	18.6	19.5
20/21	X	X	X
21/22	22.7	19.5	28.2
22/23	24.4	X	X
23/24	X	X	X
24/25	25.0	X	23.2
25/26	19.9	19.5	47.2
26/27	21.4	23.2	19.9
27/28	28.2	21.4	19.9
28/29	21.0	18.9	23.2
29/30	18.6	19.2	25.7
30/1	X	X	X
Median values:	22.7	19.9	24.4

November			
Date of the night	SS	Night	SR
1/2	21.8	19.5	21.0
2/3	17.6	19.2	29.2
3/4	22.2	15.7	23.8
4/5	25.0	19.2	29.2
5/6	25.7	17.1	21.8
6/7	21.4	X	X
7/8	X	X	X
8/9	X	X	X
9/10	X	X	X
10/11	30.3	X	X
11/12	X	X	X
12/13	28.2	X	X
13/14	21.8	X	X
14/15	19.9	18.1	26.4
15/16	18.6	18.9	27.2
16/17	33.2	17.8	25.0
17/18	24.4	19.2	24.4
18/19	28.2	X	X
19/20	23.2	18.1	22.2
20/21	26.4	18.9	20.6
21/22	33.2	21.8	24.4
22/23	25.7	16.1	19.9
23/24	22.7	17.8	23.8
24/25	23.2	22.2	25.7
25/26	22.7	17.3	22.7
26/27	21.4	21.0	X
27/28	25.7	22.2	23.8
28/29	19.9	22.7	X
29/30	21.0	20.2	30.3
30/1	21.4	23.8	33.2
Median values:	23.0	19.2	24.4



## December

Date of the night	SS	Night	SR
1/2	26.4	25.7	30.3
2/3	31.7	27.2	33.2
3/4	18.6	22.2	25.7
4/5	25.0	18.6	25.7
5/6	31.7	19.9	21.0
6/7	35.2	19.9	20.6
7/8	30.3	19.9	21.8
8/9	30.3	18.9	19.9
9/10	29.2	18.9	X
10/11	41.2	X	X
11/12	37.7	X	X
12/13	33.2	22.7	21.0
13/14	41.2	22.7	21.8
14/15	27.2	20.2	25.7
15/16	41.2	23.2	X
16/17	33.2	24.4	27.2
17/18	31.7	X	X
18/19	35.2	22.2	20.6
19/20	25.0	18.9	19.9
20/21	23.2	18.6	20.2
21/22	23.2	17.1	19.5
22/23	20.6	16.5	25.0
23/24	15.4	16.7	21.8
24/25	29.2	19.9	17.6
25/26	22.2	23.2	26.4
26/27	30.3	22.7	22.7
27/28	30.3	22.2	25.0
28/29	31.7	22.7	22.2
29/30	33.2	20.2	25.0
30/31	33.2	25.0	23.8
31/1	33.2	23.8	26.4
Median values:	30.3	21.2	22.5

September			
Date of the night	SS	Night	SR
1 2	24.4	18.3	27.2
2 3	21.0	19.9	27.2
3 4	29.2	19.5	22.7
4 5	29.2	19.9	29.2
5 6	19.5	17.3	27.2
6 7	19.9	19.5	27.2
7 8	20.6	17.6	21.8
8 9	21.0	16.7	20.2
9 10	19.9	17.1	23.2
10 11	22.2	18.3	24.4
11 12	22.7	17.8	27.2
12 13	27.2	17.6	29.2
13 14	23.2	17.8	37.7
14 15	31.7	17.8	21.4
15 16	29.2	17.8	30.3
16 17	27.2	18.1	29.2
17 18	21.0	17.3	24.4
18 19	20.6	15.1	28.2
19 20	24.4	16.7	23.8
20 21	29.2	17.8	29.2
21 22	24.4	19.2	25.0
22 23	29.2	18.1	30.3
23 24	33.2	18.6	23.8
24 25	31.7	17.1	33.2
25 26	30.3	16.7	30.3
26 27	26.4	17.3	23.8
27 28	21.8	15.5	23.8
28 29	28.2	16.9	24.4
29 30	22.7	15.9	28.2
30 1	18.3	14.2	23.8
Median values:	24.4	17.7	27.2

October			
Date of the night	SS	Night	SR
1'2	28.2	17.3	22.2
2'3	22.2	17.6	29.2
3'4	17.8	19.9	23.2
4'5	20.6	13.4	21.0
5'6	28.2	18.6	28.2
6'7	22.2	15.7	23.2
7'8	15.9	17.3	23.2
8'9	16.5	16.3	18.1
9'10	28.2	16.1	21.4
10'11	21.4	14.6	21.4
11'12	22.7	21.8	21.4
12'13	24.4	17.8	19.5
13'14	18.1	18.3	16.1
14'15	19.9	19.2	24.4
15'16	18.1	17.3	23.8
16'17	17.3	16.9	20.6
17'18	21.0	16.7	19.2
18'19	18.1	15.7	18.9
19'20	23.2	15.7	18.9
20'21	21.8	14.5	21.8
21/22	24.4	16.9	20.2
22'23	19.2	16.5	21.4
23'24	20.2	18.6	21.8
24'25	30.3	18.1	19.2
25'26	21.0	17.8	21.4
26'27	18.9	14.5	21.4
27'28	21.8	17.6	17.6
28'29	19.9	17.8	22.7
29'30	25.0	18.6	X
30'31	21.8	17.6	21.4
31'1	22.7	18.6	21.8
Median values:	21.4	17.3	21.4

July			
Date of the night	SS	Night	SR
1/2	23.8	18.9	22.7
2/3	X	X	X
3/4	25.7	21.4	19.9
4/5	29.2	20.6	27.2
5/6	28.2	21.8	30.3
6/7	27.2	22.7	33.2
7/8	29.2	19.9	25.7
8/9	30.3	X	X
9/10	26.4	19.2	22.7
10/11	22.2	20.6	22.2
11/12	26.4	21.4	18.1
12/13	30.3	23.8	22.2
13/14	19.5	22.7	28.2
14/15	22.2	19.9	19.9
15/16	27.2	19.9	21.4
16/17	29.2	20.2	X
17/18	17.3	18.1	24.4
18/19	30.3	23.8	27.2
19/20	33.2	15.9	21.8
20/21	29.2	20.6	25.7
21/22	33.2	20.2	25.0
22/23	25.7	X	X
23/24	X	X	X
24/25	20.2	17.8	21.8
25/26	19.5	22.2	23.2
26/27	21.8	18.1	25.0
27/28	26.4	17.6	25.7
28/29	21.4	16.9	26.4
29/30	23.8	17.1	25.7
30/31	23.2	17.6	33.2
31/1	26.4	20.6	23.8
Median values:	26.4	20.2	24.7

August			
Date of the night	SS	Night	SR
1/2	22.2	20.2	20.2
2/3	26.4	20.6	26.4
3/4	29.2	21.4	31.7
4/5	29.2	19.2	29.2
5/6	23.8	20.6	18.3
6/7	23.2	18.3	19.2
7/8	26.4	16.5	26.4
8/9	20.2	15.2	21.8
9/10	31.7	19.9	21.0
10/11	23.8	16.9	25.0
11/12	22.7	19.2	21.0
12/13	22.7	21.0	23.8
13/14	20.6	20.2	25.7
14/15	15.7	15.5	19.5
15/16	19.9	16.1	21.4
16/17	24.4	16.7	25.7
17/18	24.4	21.4	X
18/19	27.2	19.2	22.2
19/20	22.2	18.9	20.6
20/21	19.2	18.1	23.2
21/22	21.4	16.1	26.4
22/23	21.4	19.9	29.2
23/24	28.2	19.9	25.7
24/25	24.4	17.3	24.4
25/26	22.2	15.1	23.8
26/27	30.3	17.8	26.4
27/28	21.4	18.9	X
28/29	20.6	19.9	30.3
29/30	28.2	18.9	25.7
30/31	24.4	21.8	24.4
31/1	23.2	22.7	26.4
Median values:	23.2	19.2	24.4