

Records of Radio Aurora at Syowa Station, Antarctica
in 1972

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1. Introduction

Observation of radio aurora by means of the rader with frequency of 112.2 MHz have been carried out at Syowa Station, Antarctica, since March 1966 by representatives from the Radio Research Laboratories.

This report has been prepared in order to make the data available to scientists who are interested in this field.

The records covering the period from March to December 1972, with the form of A-scope display on the 35mm film, are deposited in the Radio Research Laborbtories.

Inquiries about the details of the data should be addressed to:

Radio Research Laboratories
Ministry of Posts and Telecommunications
2-1, Nukui-Kitamachi 4-chome, Koganei-shi,
Takyo 184, Japan

2. Location

Syowa Station			
Geographic		Geomagnetic	
Latitude	Longitude	Latitude	Longitude
69°00' S	39°35' E	69.6° S	77.1° E

3. Observers

Susumu ISOZAKI (Radio Research Laboratories)

Shigeru MIYAZAKI (Radio Research Laboratories)

4. Method of measurement

The antenna was fixed with the direction of the magnetic south and an elevation

angle of 25 degrees. The declination in the geomagnetic field at Syowa Station was $45^{\circ}50'$ in 1970.

The observation was continuously made at interval of 18:00 to 09:00 L. T. (45° E. M. T. = U. T. + 3 hours) every day.

Characteristics of the equipments are as follows:

Antenna	Rotatable 2 stacks of 8-element Yagi Gain: 13.6 dB (in common with transmission and reception) Polarization: horizontal
Main equipments	Frequency: 112.2 MHz Transmission power: ~ 20 kW (peak) Pulse width : $50\sim 100\mu$ sec (variable) Repetition frequency: 50 Hz
Indicator and recorder	Maximum ranges: 1000 and 1500 km A-scope: 5-inch cathode ray oscilloscope 1 step/min with 35 mm camera

An A-scope is one of indication methods on the plate of a cathode ray oscilloscope: Range and the intensity of reflecting radio wave are put on the abscissa and the ordinate, respectively.

5. Explanation of tables

Time interval of operation of the equipments and the appearance of radio aurora expressed in local time (45° E. M. T.) are shown in Table 1 and Table 2, respectively.

The appearance of radio aurora is expressed by range and intensity of echo.

The intensity of echoes is expressed by the maximum and minimum signal level in dB during the observation.

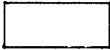
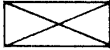


6. Explanation of figure

Aspect of hourly occurrence of radio aurora echoes observed at Syowa Station is shown in Figure 1.

The intensity of the radio aurora echoes is classified into four indices and the intensity is expressed by its maximum value in every hour.

The maximum intensity is valid even its observation is as short as a few minutes in an hour.

The criterion of the classification is as follows:

Index 0		:	no echoes
Index 1		:	1 dB ~ 10 dB
Index 2		:	11 dB ~ 20 dB
Index 3		:	more than 20 dB

N : no observation

Table 1. Time interval of operation of auroral rader at Syowa Station in 1972.

Date	Observing time interval (45°E. M. T.)				Total observing time interval (h. m.)	Date	Observing time interval (45°E. M. T.)				Total observing time interval (h. m.)
	Starting time	Ending time	Starting time	Ending time			Starting time	Ending time	Starting time	Ending time	
1972											
Feb.						Mar.					
2			18 00	23 59	6 00	24	00 00	08 59	18 00	23 59	15 00
3	00 00	08 26	18 18	23 59	14 09	25	00 00	08 59	18 00	23 59	15 00
4	00 00	08 59	22 55	23 59	10 05	26	00 00	08 59	18 00	23 59	15 00
5	00 00	02 39			2 40	27	00 00	08 59	18 00	23 59	15 00
6			18 02	23 59	5 58	28	00 00	08 59	18 00	23 59	15 00
7	00 00	08 59	18 00	23 59	15 00	29	00 00	08 59	18 00	23 59	15 00
8	00 00	08 45	18 00	23 59	14 46	30	00 00	08 59	18 00	23 59	15 00
9	00 00	08 59	18 00	18 06	14 57	31	00 00	08 59	18 56	23 59	14 04
			18 10	23 59		Apr.					
10	00 00	08 59	18 02	23 59	14 58	1	00 00	08 59	18 00	23 59	15 00
11	00 00	07 24	20 01	23 59	12 26	2	00 00	08 59	18 00	23 59	15 00
						3	00 00	08 59	18 00	23 59	15 00
						4	00 00	08 59	18 00	23 59	15 00
12	00 00	08 59	20 41	23 59	12 19	5	00 00	08 59	18 01	23 59	14 59
13	00 00	08 59	18 00	23 59	15 00	6	00 00	08 41			8 42
14	00 00	08 59	18 01	23 59	15 00	7	01 06	01 40	18 23	23 59	13 18
15	00 00	08 59	18 03	18 05	14 51						
			18 12	23 59		8	00 00	08 59	18 00	23 59	15 00
16	00 00	08 59	18 00	23 59	15 00	9	00 00	08 59	18 00	23 59	15 00
17	00 00	08 49	18 09	18 21	14 39	10	00 00	08 59	18 00	23 59	15 00
			18 24	23 59		11	00 00	08 59	18 04	23 59	14 56
18	00 00	08 59	18 00	23 59	15 00	12	00 00	08 59	18 00	23 59	15 00
19	00 00	08 53	18 52	19 30	9 39	13	00 00	08 59	18 01	23 59	14 59
			23 54	23 59		14	00 00	08 59	18 00	23 59	15 00
20	00 00	08 59			9 00	15	00 00	08 59	18 00	19 51	10 52
Mar.						16	03 03	07 47			4 45
14			18 06	18 11	5 50	17	03 50	05 48			10 55
			18 16	23 59					18 00	23 59	
15	00 00	08 59	18 00	23 59	15 00	18	00 00	08 59	18 00	23 59	15 00
16	00 00	08 59	18 03	23 59	14 57	19	00 00	08 59	18 00	23 59	15 00
17	00 00	08 59	18 00	23 59	15 00	20	00 00	08 59	18 00	23 59	15 00
18	00 00	08 59	18 06	23 59	15 00	21	00 00	08 59	18 01	23 59	14 59
19	00 00	08 59	18 00	23 59	15 00	22	00 00	08 59	18 00	23 59	15 00
20	00 00	08 59	18 00	23 59	15 00	23	00 00	07 50	18 00	23 59	13 50
21	00 00	08 59	18 00	23 59	15 00	24	00 00	08 56	18 00	23 59	14 57
22	00 00	08 59	18 12	23 59	14 48	25	00 00	08 59	18 00	23 59	15 00
23	00 00	08 59	18 00	23 59	15 00	26	00 00	08 59	18 00	23 59	15 00

Date	Observing time interval (45° E. M. T.)				Total observing time interval (h. m.)	Date	Observing time interval (45° E. M. T.)				Total observing time interval (h. m.)
	Starting time	Ending time	Starting time	Ending time			Starting time	Ending time	Starting time	Ending time	
Apr. 27	00 00	08 49	18 00	23 59	14 50	May 23	00 00	08 59	18 01	23 59	14 59
28	00 00	08 59	18 00	23 59	15 00	24	00 00	08 59	18 00	23 59	15 00
29	00 00	08 59			23 30	25	00 00	08 59	23 00	23 59	10 00
	09 29	09 31				26	00 00	08 59	18 00	23 59	15 00
	09 33	23 59				27	00 00	08 59	18 00	23 59	15 00
30	00 00	12 00	18 00	23 59	18 00	28	00 00	08 59	18 02	23 59	14 58
May 1	00 00	08 59	18 00	23 59	15 00	29	00 00	08 59	16 51	23 59	16 09
2	00 00	09 05	18 00	23 59	15 06	30	00 00	09 24	18 00	23 59	15 25
3	00 00	08 59	18 00	23 59	15 00	31	00 00	08 59	18 00	23 59	15 00
4	00 00	08 59	18 00	23 59	15 00	June 1	00 00	08 59	18 08	23 59	14 52
5	00 00	08 59	18 00	23 59	15 00	2	00 00	08 59	18 01	23 59	14 59
6	00 00	08 59	18 00	23 59	15 00	3	00 00	08 59	18 00	23 59	15 00
7	00 00	08 59	18 00	23 59	15 00	4	00 00	08 59	18 00	23 59	15 00
8	00 00	08 59	18 00	23 59	15 00	5	00 00	08 59	18 00	23 59	15 00
9	00 00	08 59	18 00	23 59	15 00	6	00 00	08 59	18 00	23 59	15 00
10	00 00	08 59	18 00	18 31	14 53	7	00 00	08 59	18 00	23 59	15 00
			18 33	18 35		8	00 00	08 59	18 00	23 59	15 00
			18 37	19 02		9	00 00	08 59	18 00	23 59	15 00
			19 04	19 19		10	00 00	08 59	18 00	23 59	15 00
			19 21	19 44		11	00 00	08 59	18 12	23 59	14 48
			19 48	23 59		12	00 00	08 59	18 00	23 59	15 00
11	00 00	08 59	18 00	23 59	15 00	13	00 00	08 59	18 00	23 59	15 00
12	00 00	08 59	18 04	18 14	14 50	14	00 00	08 59	18 00	23 59	15 00
			18 16	18 33		15	00 00	08 59	18 00	23 59	15 00
			18 35	18 40		16	00 00	00 09	23 03	23 59	1 19
			18 44	18 46			04 38	04 49			
			18 48	23 59		17	00 00	08 59	18 00	23 59	15 00
13	00 00	08 59	18 00	19 23	14 59	18	00 00	08 59	18 00	23 59	15 00
			19 25	23 59		19	00 00	08 59	18 01	18 07	9 57
14	00 00	08 36	18 00	18 08	14 36				18 09	18 48	
			18 11	23 59					18 50	23 59	
15	00 00	08 59	18 00	23 59	15 00	20	00 00	08 59	18 02	18 07	14 56
16	00 00	08 59	18 04	23 59	14 56				18 09	19 11	
17	00 00	08 59	18 00	23 59	15 00				19 13	23 59	
18	00 00	08 59	18 00	23 59	15 00	21	00 00	08 59	18 00	18 05	14 59
19	00 00	08 59	18 00	23 59	15 00				18 07	23 59	
20	00 00	08 59	18 00	23 59	15 00	22	00 00	08 59	18 00	23 59	15 00
21	00 00	08 59	18 00	23 59	15 00	23	00 00	08 50	18 00	23 59	14 50
22	00 00	08 59	18 00	23 59	15 00	24	00 00	08 59	18 00	23 59	15 00

Date	Observing time interval (45°E. M. T.)				Total observing time interval (h. m.)	Date	Observing time interval (45°E. M. T.)				Total observing time interval (h. m.)
	Starting time	Ending time	Starting time	Ending time			Starting time	Ending time	Starting time	Ending time	
June						July					
25	00 00	08 59	18 00	23 59	15 00	19			18 14	18 17	
26	00 00	08 59	18 00	23 59	15 00				18 19	18 31	
27	00 00	08 49	18 00	23 59	14 50				18 33	18 41	
28	00 00	08 59	18 00	23 59	15 00				18 43	23 59	
29	00 00	08 59	18 00	23 59	15 00	20	00 00	08 59	18 00	23 59	15 00
30	00 00	08 59	18 00	23 59	15 00	21	00 00	08 59	18 00	23 59	15 00
July						22	00 00	08 59	18 01	23 59	14 59
1	00 00	08 59	18 00	19 32	10 32	23	00 00	08 04	18 00	23 59	14 05
2	00 29	08 59	18 00	23 59	14 31	24	00 00	08 59	18 00	23 59	15 00
3	00 00	08 59	18 15	18 18	14 44	25	00 00	08 59	18 00	23 59	15 00
			18 20	23 59		26	00 00	08 59	18 00	23 59	15 00
4	00 00	08 59	18 00	23 59	15 00	27	00 00	08 59	18 00	23 59	15 00
5	00 00	07 30	18 01	23 59	14 29	28	00 00	08 59	18 00	23 59	15 00
6	00 00	08 59	18 00	23 59	15 00	29	00 00	08 59	18 00	23 59	15 00
7	00 00	08 59	18 00	23 33	14 36	30	00 00	08 59	18 00	23 59	15 00
			23 39	23 40		31	00 00	08 59	18 00	23 59	15 00
8	00 01	08 59	18 00	20 57	12 31	Aug.					
			22 44	23 16		1	00 00	08 59	18 00	23 59	15 00
9	00 13	08 59	18 00	23 59	14 47	2	00 00	08 59	18 01	23 59	14 59
10	00 00	08 59	18 00	23 59	15 00	3	00 00	08 59	18 00	23 59	15 00
11	00 00	08 59	23 06	23 59	9 54	4	00 00	08 59	18 00	23 59	15 00
12	00 00	08 59	18 00	18 09	14 55	5	00 00	08 59	18 00	23 59	15 00
			18 11	18 29		6	00 00	08 59	18 00	23 59	15 30
			18 31	18 33					11 45	12 14	
			18 35	18 57		7	00 00	03 13	18 02	23 59	14 57
			19 00	23 59					03 15	08 59	
13	00 00	01 43	18 00	18 07	7 42	8	00 00	08 59	18 10	23 59	14 50
			18 09	19 31		9	00 00	08 59	18 00	23 59	15 00
			19 33	23 59		10	00 00	08 59	18 00	23 59	15 00
14	00 00	08 59	18 00	18 09	14 56	11	00 00	08 59	18 01	23 59	14 59
			18 11	18 17		12	00 00	08 59	18 00	23 59	15 00
			18 19	18 28		13	00 00	08 59	18 04	23 59	14 56
			18 30	18 36		14	00 00	08 59	18 00	23 59	15 00
			18 38	23 59		15	00 00	08 59	18 00	23 59	15 00
15	00 00	08 33	23 57	23 59	8 37	16	00 00	08 59	18 00	18 01	14 59
16	00 00	08 59	18 02	23 59	14 58				18 03	23 59	
17	00 00	06 12	18 00	23 59	12 12	17	00 00	08 59	18 00	23 58	14 59
18	00 00	08 59	18 04	23 59	14 56	18	00 37	07 01	18 00	18 04	13 18
19	00 00	08 59	18 02	18 05	14 49				07 31	08 59	
			18 07	18 08					18 08	18 12	
									18 14	22 24	

Date	Observing time interval (45°E. M. T.)				Total observing time interval (h. m.)	Date	Observing time interval (45°E. M. T.)				Total observing time interval (h. m.)
	Starting time	Ending time	Starting time	Ending time			Starting time	Ending time	Starting time	Ending time	
Aug. 18			22 57	23 59		Sep. 9			18 31	18 36	
19	00 00	01 37	18 00	23 59	14 37				18 38	23 59	
		02 01				10	00 00	08 59	18 00	23 59	15 00
20	00 00	08 59	18 00	23 59	15 00	11	00 00	08 59	18 20	23 59	14 40
21	00 00	08 59	18 00	23 59	15 00	12	00 00	08 59	18 00	23 59	15 00
22	00 00	08 59	18 01	18 37	14 57	13	00 00	08 59	18 01	23 59	14 59
			18 39	18 54		14	00 00	08 59	18 00	23 59	15 00
			18 56	23 59		15	00 00	08 49	18 01	23 59	14 49
23	00 00	08 59	18 00	23 59	15 00	16	00 00	08 50	18 00	20 41	11 32
24	00 00	08 59	18 01	23 59	14 59	17			18 03	18 10	5 56
25	00 00	08 59	18 00	23 59	15 00				18 12	23 59	
26	00 00	08 59	18 00	19 10	10 10	18	00 00	08 59	18 00	23 59	15 00
27	00 10	08 59	18 00	18 15	14 46	19	00 00	08 59	18 00	23 59	15 00
			18 17	18 20		20	00 00	08 59	18 00	23 59	15 00
			18 22	18 26		21	00 00	08 59	18 00	23 59	15 00
			18 28	18 30		22	00 00	08 59			9 00
			18 32	23 59		23	01 32	01 41			00 21
28	00 00	08 59	18 00	19 12	10 12		01 43	01 44			
29	03 34	08 56			5 23		01 46	01 54			
30	00 43	04 19	18 00	23 59	13 55	24	00 04	08 59	18 01	23 59	14 55
		04 29				25	00 00	08 59	18 00	23 59	15 00
31	00 00	08 59	18 00	23 59	15 00	26	00 00	08 59	18 00	23 59	15 00
Sep. 1	00 00	08 59	18 00	23 59	15 00	27	00 00	08 59	18 01	23 59	14 59
2	00 00	08 59	18 00	23 59	15 00	28	00 00	08 59	18 00	23 59	15 00
3	00 00	08 59			9 00	29	00 00	08 59	18 00	23 59	15 00
4			17 59	18 09	5 50	30	00 00	08 59	18 04	23 59	14 56
			18 12	18 14		Oct. 1	00 00	08 59	18 00	23 59	15 00
			18 20	18 22		2	00 00	08 59	18 00	23 59	15 00
			18 25	18 27		3	00 00	08 59	18 02	23 59	14 58
			18 29	18 43		4	00 00	08 59	18 00	23 59	15 00
			18 45	23 59		5	00 00	08 59	18 00	23 59	15 00
5	00 00	00 18			00 18	6	00 00	08 59	18 00	23 59	15 00
6			23 57	23 59	00 03	7	00 00	08 59	18 00	23 59	15 00
7	00 00	03 49	16 43	16 57	11 24	8	00 00	08 59	19 21	23 59	13 39
		03 52	16 59	17 01		9	00 00	08 59	18 00	23 59	15 00
			17 05	23 59		10	00 00	08 59	18 00	20 56	11 56
8	00 00	00 06	18 00	23 59	14 14	11	00 07	11 59	18 02	23 59	17 51
		00 53				12	00 00	08 59	18 05	23 59	14 55
9	00 00	08 05	18 01	18 29	14 03	13	00 00	09 09	18 03	23 59	15 07

Date	Observing time interval (45°E. M. T.)				Total observing time interval (h. m.)	Date	Observing time interval (45°E. M. T.)				Total observing time interval (h. m.)
	Starting time	Ending time	Starting time	Ending time			Starting time	Ending time	Starting time	Ending time	
Oct.											
14	00 00	10 18	18 00	23 59	16 18						
15	00 00	08 58	18 00	23 59	14 59	8	18 03	23 59			05 57
16	00 00	08 58	18 00	23 59	14 59	9	00 00	08 59	18 00	23 59	15 00
17	00 00	08 59	18 00	23 59	15 00	10	00 00	08 59	18 01	23 59	14 59
18	00 00	08 59	18 02	23 59	14 58	11	00 00	08 59	18 00	18 02	14 59
19	00 00	08 59	18 00	23 59	15 00				18 04	23 59	
20	00 00	08 58	18 00	23 59	14 59	12	00 00	08 59	18 08	23 59	14 52
21	00 00	08 59	18 01	23 59	14 59	13	00 00	08 59	18 00	23 59	15 00
22	00 00	08 59	18 00	23 59	15 00	14	00 00	08 59	18 00	23 59	15 00
23	00 00	14 59	18 00	23 59	21 00	15	00 00	08 59	18 01	23 59	14 59
24	00 00	03 58	18 00	18 03	14 56	16	00 00	08 59	17 48	23 59	15 12
	04 02	08 58	18 05	23 59		17	00 00	09 27	18 09	23 59	15 19
25	00 00	03 09	18 15	23 59	08 55	18	00 00	08 59	18 00	23 59	15 00
26	00 00	08 59	18 01	23 59	14 59	19	00 00	08 59	18 05	23 59	14 55
27	00 00	08 59	18 00	23 59	15 00	20	00 00	08 59	18 00	23 59	15 00
28	00 00	08 59	18 01	23 59	14 59	21	00 00	08 59	18 00	23 59	15 00
29	00 00	08 59	18 01	23 59	14 59	22	00 00	08 59	18 01	23 59	14 59
30	00 00	08 59	18 00	23 59	15 00	23	00 00	08 59	18 00	23 59	15 00
31	00 00	08 59			09 00	24	00 00	08 59	18 00	23 59	15 00
Nov.						25	00 00	08 57	18 04	20 31	11 26
15			18 00	23 59	06 00	26	18 00	18 10	18 12	23 59	05 59
16	00 00	08 59	18 01	23 59	14 59	27	00 00	10 27	17 53	23 59	16 35
17	00 00	08 59	18 00	23 59	15 00	28	00 00	09 32	18 00	23 59	15 33
18	00 00	08 59	18 00	23 59	15 00	29	00 00	08 59	18 00	23 59	15 00
19	00 00	08 59	18 01	23 59	14 59	30	00 00	08 59	18 00	23 59	15 00
20	00 00	08 59	18 02	23 59	14 58	31	00 00	08 57	18 05	23 59	14 53
21	00 00	09 22			09 22						
22			18 00	23 59	06 00						
23	00 00	08 57	18 47	23 59	14 11						
24	00 00	08 59	18 02	23 59	14 58						
25	00 00	03 45			05 24						
	03 47	03 54									
	03 56	03 57									
	03 59	04 01									
	04 03	04 06									
	04 08	04 19									
	04 22	04 23									
	04 25	04 29									
	04 31	05 32									

Table 2 . Appearance of radio aurora at Syowa Station (Time interval in 45° East Meridian Time).

Date	Time interval	Range (km)	Intensity (dB)	Total time (m)	Date	Time interval	Range (km)	Intensity (dB)	Total time (m)			
1972 Mar.	15	23 22 - 23 31	300 - 400	5	10	Mar.	21	02 46 - 02 56	280 - 380	5 - 20	11	
	15-16	23 54 - 00 05	280 - 350	5	12		03 12 - 04 10	270 - 350	5 - 10	59		
		16	03 11 - 04 35	260 - 410	5 - 35		85	22	00 36 - 00 41	300 - 340	5	6
	17		04 42 - 08 01	270 - 410	10 - 40		200	00 53 - 01 04	280 - 350	5	12	
		00 24 - 00 38	280 - 420	5 - 10	15		01 15 - 02 13	250 - 430	5 - 15	59		
		02 30 - 04 03	250 - 450	15 - 25	94		02 21 - 02 26	280 - 350	5	6		
		04 25 - 04 39	270 - 350	5 - 10	15		03 35 - 07 35	270 - 430	10 - 35	252		
		05 24 - 05 58	270 - 350	5	35		20 27 - 21 44	270 - 480	5 - 10	78		
		06 01 - 06 35	280 - 350	5 - 10	35		23	00 19 - 00 26	280 - 320	5 - 10	8	
		06 39 - 06 54	270 - 400	5 - 10	16		00 55 - 01 07	280 - 350	5 - 10	13		
		07 28 - 08 23	270 - 410	10 - 25	56		01 28 - 01 39	270 - 320	5 - 10	12		
		19 15 - 19 38	300 - 360	5	24		23 38 - 23 44	300 - 360	5 - 10	7		
		22 08 - 22 12	300 - 360	5	5		24	00 08 - 00 24	270 - 350	5 - 15	17	
	22 29 - 22 35	270 - 350	5	7	00 37 - 00 40		280 - 350	5	4			
	23 31 - 23 41	300 - 360	5 - 10	11	01 35 - 01 50		280 - 360	5 - 15	16			
	17-18	23 58 - 00 31	250 - 420	10 - 25	34		02 26 - 02 36	250 - 500	5	11		
		18	01 30 - 01 36	290 - 320	5 - 10		7	02 46 - 03 02	270 - 410	5 - 10	17	
	04 17 - 04 24		270 - 320	5	8		03 23 - 03 32	270 - 400	5	10		
	05 15 - 05 23		280 - 330	5	9		03 39 - 03 56	270 - 420	5 - 10	18		
	05 46 - 07 04		270 - 420	5 - 15	79		04 47 - 04 56	280 - 350	5	10		
	07 11 - 07 51		260 - 420	10 - 25	41		05 12 - 05 18	270 - 350	5	7		
	07 57 - 08 17		290 - 420	10 - 20	21		06 00 - 08 59	260 - 420	20 - 40	180		
	08 20 - 08 42		260 - 430	15 - 35	23		19 15 - 21 25	270 - 350	5	131		
	08 49 - 08 59		260 - 370	10 - 20	11		21 47 - 22 12	270 - 410	5	26		
	19		00 56 - 01 00	300 - 350	5		5	23 25 - 23 33	270 - 400	5 - 10	9	
			01 13 - 01 22	300 - 350	5 - 10		10	25	00 09 - 00 15	270 - 350	5	7
		03 16 - 05 51	280 - 420	5 - 15	156		03 08 - 04 01	270 - 360	5	54		
		20	00 13 - 00 18	300 - 410	5 - 10		6	07 46 - 08 07	260 - 410	5 - 30	22	
			00 27 - 00 31	290 - 360	5 - 10		5	23 45 - 23 55	270 - 350	5	11	
			02 24 - 02 35	280 - 350	5		12	26	00 17 - 00 22	280 - 400	5	6
			02 39 - 02 50	270 - 350	5		12	01 08 - 01 11	290 - 330	5	4	
			02 56 - 03 13	280 - 360	5 - 15		18	01 26 - 01 37	290 - 360	5 - 10	12	
			03 17 - 03 22	280 - 410	5 - 10		5	03 29 - 03 59	270 - 410	10 - 30	31	
03 47 - 04 31			250 - 460	10 - 30	45	05 28 - 05 57	250 - 400	5	30			
04 46 - 05 31	270 - 430		5 - 15	46	06 13 - 07 13	200 - 410	10 - 20	61				
05 40 - 05 48	280 - 350	5	9	22 14 - 22 17	300 - 330	5	4					
05 55 - 06 03	290 - 350	5	9	22 25 - 22 41	270 - 330	10 - 20	17					
					22 49 - 23 00	250 - 450	10 - 20	12				

Date	Time interval	Range (km)	Intensity (dB)	Total time (m)	Date	Time interval	Range (km)	Intensity (dB)	Total time (m)
Mar. 26	23 36 - 23 48	260 - 420	5	13	Mar. 31	03 48 - 03 57	270 - 320	5	10
26-27	23 51 - 00 09	250 - 410	5	19		04 40 - 04 54	260 - 420	10 - 15	15
	00 14 - 00 22	280 - 370	5 - 20	9		04 59 - 05 56	260 - 430	5	58
	00 30 - 01 20	270 - 410	15 - 40	52		06 30 - 08 19	270 - 420	10 - 35	110
	01 34 - 01 52	280 - 410	5 - 10	19		08 27 - 08 45	280 - 410	5	19
	02 02 - 02 22	280 - 450	25 - 40	21		08 50 - 08 59	280 - 370	5	10
	02 26 - 02 34	350 - 430	5	9		21 04 - 21 20	280 - 410	5	17
	03 24 - 07 46	200 - 550	15 - 40	263		22 12 - 22 22	280 - 420	10 - 15	11
	08 13 - 08 32	280 - 410	10 - 20	20	Apr. 1	01 03 - 01 26	270 - 420	5 - 15	24
	22 56 - 23 17	290 - 410	10 - 15	22		03 23 - 03 30	290 - 430	5 - 15	8
28	00 19 - 00 52	290 - 510	10 - 15	34		04 21 - 04 30	330 - 410	5	10
	01 11 - 01 24	300 - 410	5 - 10	14		04 35 - 04 47	300 - 410	5	13
	01 30 - 01 40	250 - 420	10 - 20	11		05 41 - 05 46	350 - 410	5	6
	01 43 - 01 48	300 - 420	5 - 10	6		06 25 - 06 29	300 - 410	10 - 15	5
	02 00 - 02 18	270 - 420	10 - 20	19		21 05 - 21 23	260 - 440	5	19
	02 21 - 02 47	260 - 450	20 - 40	27	2	00 55 - 02 31	250 - 600	20 - 40	97
	04 06 - 05 04	280 - 400	5 - 15	59		02 41 - 03 02	280 - 400	5	22
	05 27 - 05 39	250 - 420	5 - 10	13		05 03 - 05 10	280 - 410	5 - 10	8
	05 45 - 05 49	260 - 410	5	5		05 15 - 06 39	250 - 410	10 - 30	85
	05 52 - 05 57	350 - 430	10 - 15	6		07 57 - 08 24	270 - 420	20 - 40	28
	06 02 - 06 22	270 - 410	10 - 35	21	3	03 31 - 04 10	280 - 400	5	40
	06 37 - 07 04	270 - 410	5 - 25	28	4	01 04 - 01 12	290 - 320	5	9
	07 34 - 07 39	270 - 400	10 - 25	6		01 15 - 01 22	280 - 360	5	8
29	18 22 - 22 06	200 - 400	5 - 10	225		03 01 - 03 12	270 - 350	5	12
	22 57 - 23 01	270 - 320	5	5		03 21 - 03 25	280 - 330	5	5
	23 16 - 23 49	250 - 400	5 - 20	34		04 28 - 04 28	300 - 330	5	6
29-30	23 53 - 00 10	260 - 400	10 - 30	18		05 24 - 05 31	270 - 350	5	8
30	00 21 - 00 27	270 - 360	5	7		06 04 - 06 12	270 - 350	5	9
	00 47 - 00 53	290 - 320	5	7		06 37 - 07 09	270 - 370	5	33
	00 58 - 01 01	290 - 330	5	4		20 14 - 21 03	270 - 350	5	50
	01 23 - 01 29	290 - 330	5	7		21 12 - 22 57	270 - 410	5 - 10	106
	02 27 - 02 49	290 - 350	5 - 10	23	5	07 39 - 08 18	270 - 410	10 - 20	40
	02 57 - 03 00	290 - 350	5	4	8	01 22 - 01 25	280 - 350	5	4
	03 24 - 04 23	240 - 410	10 - 35	60		01 48 - 01 52	300 - 350	5	5
	04 30 - 08 59	200 - 410	10 - 40	270		20 38 - 21 02	250 - 370	5	25
	18 00 - 18 35	230 - 400	5	36	9	02 45 - 03 17	250 - 370	5 - 15	33
	18 44 - 21 17	250 - 400	5 - 10	154		03 37 - 03 53	260 - 350	5 - 10	17
	21 21 - 21 29	240 - 340	5	9	10	22 25 - 23 37	300 - 330	5	73
	21 41 - 21 49	250 - 320	5	9	11	04 52 - 05 04	300 - 340	5	13
	23 46 - 23 56	270 - 350	5 - 20	11		06 27 - 07 06	260 - 350	5 - 10	40
31	02 56 - 03 14	270 - 350	5	19	12	00 22 - 00 34	300 - 330	5	13
	03 19 - 03 34	250 - 350	5	16					

Date	Time interval	Range (km)	Intensity (dB)	Total time (m)	Date	Time interval	Range (km)	Intensity (dB)	Total time (m)						
Apr. 12	00 58 - 01 08	240 - 350	5	11	Apr. 22	23 16 - 23 24	270 - 310	5	9						
	01 19 - 02 31	270 - 400	5 - 15	73		22-23	23 57 - 00 09	300 - 360	5 - 10	13					
	03 02 - 03 08	280 - 360	5	7		23	22 15 - 22 59	300 - 340	5	45					
	03 33 - 03 38	280 - 330	5	6		27	02 04 - 02 15	280 - 310	5	12					
	06 26 - 06 54	250 - 410	5 - 10	29		28	00 22 - 00 34	300 - 340	5 - 10	13					
	23 26 - 23 42	270 - 400	5 - 10	17		01 00 - 01 05	300 - 360	10	6						
	13	01 52 - 02 33	250 - 400	5		42	02 19 - 03 07	270 - 370	5 - 15	49					
		02 43 - 03 05	280 - 420	5		23	03 22 - 04 20	280 - 340	5 - 10	59					
		03 09 - 04 05	270 - 410	5 - 15		57	05 10 - 08 16	300 - 410	5 - 15	187					
		04 32 - 05 07	270 - 370	5 - 10		36	29	05 31 - 05 40	300 - 340	5	10				
05 33 - 05 38		300 - 330	5	6	07 36 - 08 59	270 - 400		10 - 35	84						
05 48 - 05 56		250 - 400	5	9	09 33 - 10 06	280 - 400		5 - 20	34						
06 12 - 06 50		260 - 410	5 - 25	39	10 43 - 10 49	270 - 330		5	7						
07 00 - 07 12		250 - 360	5 - 10	13	10 56 - 11 08	280 - 330		5	13						
07 22 - 07 48		270 - 360	5 - 10	27	11 13 - 12 25	280 - 390		5 - 10	73						
14		01 00 - 01 19	280 - 330	5	20	23 28 - 23 32		300 - 380	5	5					
	02 37 - 02 45	300 - 350	5 - 10	9	30	00 10 - 01 19		270 - 330	5	70					
	03 03 - 03 10	300 - 330	5	8		02 11 - 02 15		300 - 350	5	5					
	04 05 - 05 25	260 - 370	5 - 10	81		04 36 - 05 56		260 - 350	5 - 10	81					
	05 37 - 05 42	300 - 330	5	6		May	1	00 41 - 01 32	280 - 390	5 - 15	52				
	06 07 - 06 23	260 - 360	5 - 10	17				01 49 - 02 18	280 - 330	5 - 10	30				
	06 43 - 07 00	270 - 410	5 - 15	18				07 38 - 08 26	260 - 400	5 - 25	49				
	15	08 26 - 08 35	300 - 360	5				10	2	02 04 - 02 10	280 - 220	5	7		
		16	03 03 - 03 26	270 - 420				5		24	04 20 - 04 23	310	5	4	
			04 10 - 04 42	300 - 410				5		33	04 57 - 05 33	280 - 350	5	37	
05 07 - 05 49			260 - 410	5				43		07 11 - 07 22	300 - 340	5	12		
05 54 - 06 09			260 - 360	5 - 10	16			22 03 - 23 26		280 - 360	5 - 10	84			
17			04 35 - 04 51	280 - 410	5 - 10			17		5	05 13 - 05 36	300 - 340	5	24	
			05 09 - 05 34	280 - 360	5			26			06 43 - 07 04	300 - 340	5	22	
			18	04 45 - 08 59	260 - 410	5 - 30	255	9			20 18 - 20 54	300	5	37	
				19	03 10 - 03 18	260 - 370	5				9	21 43 - 22 09	260 - 390	5 - 35	27
					03 32 - 03 42	290 - 320	5				11	22 19 - 23 09	260 - 340	10 - 20	51
	21				00 16 - 00 23	300 - 350	5		8		10	04 53 - 05 11	280 - 330	5	19
		01 03 - 01 07			280 - 350	5 - 10	5		20 49 - 21 45			300 - 340	5	57	
		01 32 - 01 43			300 - 360	5	12		12			05 01 - 05 55	300 - 330	5	55
		01 55 - 01 59			280 - 350	5 - 15	5					06 01 - 07 51	270 - 400	5 - 20	111
		02 16 - 02 35			280 - 410	5 - 15	20					13	03 35 - 03 45	300 - 330	5
03 35 - 04 05		270 - 420			5 - 10	31	20 16 - 21 15			300 - 350			5	60	
04 17 - 05 01		280 - 350			5 - 10	45	14			01 03 - 01 22			280 - 330	5 - 10	20
05 36 - 06 20		260 - 410	5		45	03 43 - 03 49		300 - 400		5			7		
06 32 - 08 59		250 - 410	5 - 30	148	04 42 - 06 04	300 - 400		5 - 10		83					
20 27 - 21 10		270 - 340	5	44											

Date	Time interval	Range (km)	Intensity (dB)	Total time (m)	Date	Time interval	Range (km)	Intensity (dB)	Total time (m)
May 15	00 11 - 00 17	270 - 330	5 - 10	7	May 28	18 36 - 18 49	270 - 350	5	14
	22 18 - 23 04	250 - 410	5 - 15	47		19 45 - 20 04	290 - 340	5	20
	23 09 - 23 17	300 - 400	5	9		May 29	06 03 - 06 16	270 - 340	5
May 16	00 15 - 00 19	280 - 320	5	5	06 29 - 06 59		280 - 340	5	31
	02 11 - 02 45	270 - 400	5	35	May 30	03 39 - 03 44	300 - 330	5	6
	02 48 - 04 26	270 - 400	5 - 10	99		04 41 - 05 05	280 - 330	5	25
	05 16 - 05 50	270 - 350	5 - 10	35	05 20 - 05 29	280 - 340	5 - 10	10	
	06 46 - 07 20	300 - 340	5 - 15	35	05 39 - 06 04	280 - 350	5 - 10	26	
	07 57 - 08 05	300 - 340	5	9	22 08 - 22 45	300	5	38	
	May 18	04 49 - 05 30	300 - 400	5	42	May 31	00 22 - 00 28	310	5
05 49 - 06 25		290 - 330	5	37	03 59 - 04 02		280 - 310	5	4
06 45 - 07 01		270 - 340	5 - 10	17	04 50 - 05 50		280 - 340	5	61
08 17 - 08 34		270 - 340	5 - 10	18	06 32 - 06 43		300 - 330	5	12
May 20	02 35 - 02 40	300 - 340	5	6	07 09 - 07 22	300 - 340	5 - 10	14	
	03 07 - 03 14	300	5 - 10	8	08 01 - 08 07	310	5 - 10	7	
	03 23 - 03 32	300	5 - 10	10	May 08 12 - 08 59	270 - 350	10 - 25	48	
	06 13 - 07 21	290 - 380	5 - 10	69		June 1	02 13 - 02 32	280 - 350	5
May 22	02 13 - 02 20	300 - 340	5 - 10	8	2		02 41 - 02 45	300	5
	05 24 - 05 31	290 - 400	5 - 10	8	06 12 - 06 27	300 - 340	5 - 10	16	
May 23	02 51 - 03 11	260 - 350	5 - 10	21	June 3	02 42 - 02 49	270 - 330	5	8
	03 39 - 04 46	260 - 350	5 - 15	68		03 10 - 03 15	280 - 320	5	6
	20 11 - 22 56	300 - 350	5 - 10	166	04 36 - 04 42	280 - 330	5 - 10	7	
May 24	23 39 - 23 45	280 - 320	5 - 10	7	June 4	05 45 - 05 54	300	5	10
	00 07 - 00 25	300 - 330	5	19		June 5	05 03 - 05 39	250 - 370	10 - 15
	00 58 - 01 17	280 - 330	5	20	05 44 - 06 00		260 - 320	5 - 10	17
	01 50 - 02 14	270 - 340	5 - 10	25	06 03 - 06 27	260 - 350	5 - 15	25	
	02 19 - 02 31	270 - 330	5	13	06 33 - 06 46	280 - 310	5	14	
	03 36 - 04 02	280 - 350	5	27	07 20 - 07 48	270 - 330	5 - 10	29	
	04 06 - 04 11	310	5	6	June 7	01 20 - 01 26	270 - 350	5	7
	04 20 - 08 15	260 - 350	5 - 10	236		05 15 - 05 47	270 - 320	5	33
	08 40 - 08 49	300 - 330	5	10	7-8	23 53 - 00 12	280 - 390	10	20
	May 26	02 04 - 02 11	300	5	8	June 8	04 55 - 05 12	300	5
02 53 - 03 39		270 - 340	5 - 10	47	05 40 - 07 54		250 - 370	10 - 20	135
23 37 - 23 56		280 - 340	5 - 15	20	June 9	01 22 - 01 26	260 - 340	10	5
May 27		00 04 - 00 12	300 - 380	5		9	03 12 - 03 19	280 - 330	5
	01 58 - 02 08	270 - 330	5 - 10	11	04 19 - 04 31	280 - 330	5	13	
	22 05 - 22 09	270 - 340	10 - 15	5	June 11	05 16 - 05 28	300 - 340	5	13
	22 43 - 23 15	300	5	33		13	04 24 - 04 32	300	5
	May 28	00 15 - 00 28	300	5	14	14	23 49 - 23 58	300	5
02 17 - 02 23		280 - 320	5	7	15	01 10 - 01 16	300	5	7
02 28 - 02 32		260 - 300	10 - 20	5	June 17	19 53 - 20 11	300 - 330	5 - 10	19
03 52 - 04 01	280 - 320	5	10						

Date	Time interval	Range (km)	Intensity (dB)	Total time (m)	Date	Time interval	Range (km)	Intensity (dB)	Total time (m)
June					July				
17	23 50 - 23 59	260 - 340	10 - 15	10	18	06 39 - 07 13	270 - 330	5 - 10	35
18	01 45 - 02 01	280 - 320	5	17	19	06 17 - 06 48	270 - 340	5 - 10	32
	03 27 - 04 19	250 - 320	5 - 10	53	20	00 58 - 01 03	260 - 310	5 - 10	6
	04 33 - 05 01	260 - 330	5 - 10	29	20-21	23 55 - 00 16	260 - 340	5 - 10	22
	05 07 - 05 48	250 - 330	10 - 20	42	23	00 28 - 00 45	280 - 320	5 - 10	17
	06 57 - 07 17	280 - 320	5	21	25	00 17 - 00 21	260 - 360	30	4
	08 10 - 08 33	270 - 330	10 - 15	24		00 37 - 01 12	260 - 400	10 - 40	36
	08 37 - 08 59	260 - 320	5 - 10	23		03 36 - 04 17	260 - 360	5 - 15	42
	22 23 - 22 40	270 - 330	5 - 10	18		04 47 - 04 52	270 - 330	5 - 10	6
19	08 25 - 08 59	280 - 330	5 - 10	35		08 35 - 08 59	250 - 350	10 - 20	25
20	04 23 - 04 43	270 - 310	1	21	26	02 10 - 02 22	300	5	13
23	01 34 - 01 41	270 - 340	5 - 10	8		02 26 - 02 39	250 - 320	5 - 20	14
25	01 52 - 01 57	270 - 310	5	6	27	00 53 - 01 04	270 - 340	5 - 10	12
28	01 20 - 01 25	300 - 330	5	6		07 06 - 07 51	250 - 350	5	46
	02 20 - 02 27	270 - 320	5 - 10	8		08 01 - 08 16	260 - 340	5 - 10	16
July					31	04 46 - 05 04	300	5	19
4	06 08 - 06 17	300	5	10	Aug.				
7	02 56 - 03 03	310	5	8	1	01 39 - 01 49	270 - 340	5 - 10	11
	03 55 - 05 29	280 - 340	5 - 15	95		04 39 - 05 11	280 - 340	5 - 10	33
	05 32 - 06 32	280 - 350	5 - 10	61		05 34 - 06 26	260 - 340	5 - 10	53
	07 07 - 07 35	280 - 340	5 - 10	29		06 50 - 08 59	250 - 390	10 - 30	130
	19 21 - 19 45	300	5 - 10	25	4	07 40 - 08 04	260 - 350	5 - 15	25
	20 31 - 20 39	280 - 380	5 - 25	9	5	01 09 - 01 28	270 - 320	5 - 10	20
	21 22 - 22 39	250 - 350	5 - 10	78		01 42 - 01 50	260 - 310	5	9
8	00 01 - 00 03	270 - 390	10	3		02 48 - 02 55	300 - 400	5	8
	00 49 - 01 12	260 - 380	10 - 20	24		03 01 - 03 22	300 - 350	5	22
	01 49 - 01 53	270 - 350	5 - 15	5		04 15 - 04 19	280 - 400	5 - 15	5
	02 25 - 02 30	270 - 330	5	6		06 46 - 06 56	300 - 390	5	11
	02 41 - 02 49	260 - 390	5 - 10	9		18 01 - 18 09	280 - 330	5 - 10	9
	02 56 - 03 21	260 - 340	5 - 15	26		22 29 - 23 02	250 - 410	10 - 20	34
	03 40 - 03 47	280 - 340	5	8	6	01 07 - 01 18	260 - 420	5 - 10	12
	05 14 - 08 59	260 - 350	5 - 15	226		03 50 - 04 11	260 - 350	5 - 10	22
9	02 45 - 02 51	270 - 330	5 - 10	7		04 51 - 05 19	260 - 340	5 - 10	29
	03 26 - 03 31	280 - 330	5	6		06 38 - 07 06	290 - 410	5 - 10	29
10	03 31 - 03 38	270 - 320	5	8		07 26 - 08 14	240 - 330	5 - 10	49
	05 24 - 05 45	250 - 330	5	22		08 36 - 08 59	250 - 390	5 - 10	24
	21 28 - 21 32	280 - 320	5 - 10	5		11 55 - 12 08	290 - 340	5 - 10	14
13	00 47 - 00 51	300	5	5	7	04 38 - 05 06	250 - 360	5	29
16	03 53 - 04 03	280 - 330	5	11		05 21 - 05 56	250 - 360	5	36
	07 23 - 08 59	250 - 350	5 - 10	97		06 07 - 06 51	260 - 340	5 - 10	45
17	04 55 - 05 30	260 - 360	5 - 10	36		06 59 - 07 11	240 - 330	5 - 15	13
18	01 14 - 01 22	270 - 330	5	9		07 30 - 07 42	260 - 330	5 - 10	13

Date	Time interval	Range (km)	Intensity (dB)	Total time (m)	Date	Time interval	Range (km)	Intensity (dB)	Total time (m)
Aug. 7	07 54 -- 08 32	260 -- 340	5 -- 10	39	Sep. 25	01 12 -- 02 42	250 -- 410	10 -- 30	91
9	01 41 -- 01 53	270 -- 330	5	13		04 40 -- 04 55	260 -- 340	5	16
	03 10 -- 03 29	270 -- 290	5	20		06 35 -- 07 10	270 -- 340	5	36
	03 58 -- 04 14	270 -- 390	5	17	26	02 02 -- 02 06	270 -- 330	5 -- 10	5
	04 58 -- 05 10	280 -- 310	5	13		02 54 -- 02 59	300	5	6
	08 36 -- 08 59	260 -- 340	5 -- 10	24		03 23 -- 03 29	260 -- 380	5	7
11	00 22 -- 00 28	300	5	7		05 03 -- 06 35	250 -- 410	5 -- 15	93
	01 12 -- 01 48	270 -- 330	5	37	27	04 56 -- 07 32	250 -- 400	5 -- 15	157
	02 16 -- 02 20	280 -- 310	5	5		08 00 -- 08 13	290 -- 330	5	14
	04 13 -- 04 44	270 -- 330	5	32	28	03 06 -- 03 18	280 -- 360	5	13
	05 06 -- 05 39	270 -- 320	5	34		03 25 -- 03 39	300 -- 350	5	15
	05 55 -- 06 25	260 -- 330	5 -- 10	31		04 09 -- 04 39	260 -- 410	5 -- 10	31
12	02 35 -- 02 41	270 -- 340	5	7	29	00 18 -- 00 28	300 -- 350	5	11
	06 28 -- 06 48	300	5	21		01 21 -- 01 24	270 -- 380	5 -- 10	4
16	05 21 -- 05 56	280 -- 330	5	36		02 06 -- 02 15	270 -- 340	5 -- 15	10
18	02 57 -- 03 09	280 -- 360	5	13		02 19 -- 02 25	300 -- 390	5 -- 10	7
	22 57 -- 23 53	250 -- 350	10 -- 15	57		04 05 -- 04 22	270 -- 340	5	18
19	00 11 -- 00 27	270 -- 330	5	17		04 39 -- 04 57	270 -- 340	5 -- 10	19
	00 50 -- 01 04	270 -- 320	5	15		06 05 -- 07 59	250 -- 400	15 -- 25	115
	03 03 -- 03 13	260 -- 350	5 -- 10	11		08 16 -- 08 59	250 -- 400	15 -- 35	44
	06 04 -- 06 21	250 -- 350	5 -- 10	18		19 12 -- 19 40	270 -- 340	5	29
26	05 29 -- 06 05	260 -- 350	5 -- 10	37	30	04 24 -- 04 41	270 -- 340	5	18
	06 39 -- 08 25	250 -- 400	5 -- 25	106		04 49 -- 05 20	260 -- 410	5 -- 10	32
29	05 07 -- 05 13	300 -- 330	5	7		05 26 -- 08 59	250 -- 410	10 -- 30	214
30	01 59 -- 02 03	300	5	5	Oct.				
	03 13 -- 03 34	260 -- 340	5 -- 10	22	1	02 04 -- 02 17	300	5	14
Sep.						02 56 -- 03 16	300	5	21
1	02 10 -- 02 17	290 -- 330	5	8		03 35 -- 03 51	300	5	17
8-9	23 56 -- 00 45	290 -- 330	5 -- 10	50		04 27 -- 06 02	250 -- 390	10 -- 15	96
9	01 01 -- 01 29	260 -- 350	5 -- 15	29		06 08 -- 06 47	260 -- 340	10 -- 25	40
	04 51 -- 04 56	300	5	6	2	00 33 -- 00 38	300 -- 350	5	6
24	01 13 -- 01 47	270 -- 370	5 -- 10	35		03 07 -- 04 17	270 -- 340	5	71
	01 51 -- 02 28	280 -- 390	5 -- 10	38		06 02 -- 07 43	270 -- 350	5 -- 10	102
	02 34 -- 02 51	270 -- 340	5	18	3	01 29 -- 02 04	290 -- 370	5 -- 10	36
	02 56 -- 03 00	300 -- 350	5	5		05 32 -- 06 06	270 -- 340	5 -- 10	35
	03 12 -- 03 22	260 -- 340	5	11	4	02 00 -- 02 16	300	5	17
	04 10 -- 04 15	300 -- 390	5	6		02 23 -- 02 46	290 -- 350	5	24
	18 27 -- 19 50	250 -- 360	5 -- 10	84		03 18 -- 04 14	270 -- 330	5	57
	20 42 -- 21 48	270 -- 330	5	67		04 20 -- 04 31	300 -- 330	5	12
25	00 08 -- 00 18	270 -- 350	5	11		04 35 -- 04 48	290 -- 390	5 -- 10	14
	00 02 -- 00 35	300	5	4		05 16 -- 05 25	300 -- 320	5	10
						05 58 -- 06 36	280 -- 350	5 -- 10	32

Date	Time interval	Range (km)	Intensity (dB)	Total time (m)	Date	Time interval	Range (km)	Intensity (dB)	Total time (m)
Oct.					Oct.				
5	04 19 - 04 45	300 - 330	5	27	14	07 58 - 09 05	250 - 400	10 - 30	68
8	01 00 - 01 07	280 - 340	5	8		18 24 - 19 18	290 - 360	5 - 10	55
	01 58 - 02 38	260 - 360	5 - 10	41	16	00 48 - 00 58	300 - 350	5	11
	03 23 - 04 16	240 - 400	5 - 15	54		01 25 - 01 49	260 - 400	15 - 40	25
	04 23 - 04 52	250 - 350	5 - 10	30		01 59 - 02 22	260 - 400	25 - 40	24
	05 07 - 06 14	260 - 340	5 - 10	68		02 35 - 02 39	260 - 350	5	5
9	23 03 - 23 12	300 - 340	5	10		03 25 - 03 34	300 - 330	5	10
	23 50 - 23 58	300 - 350	10	9		06 02 - 08 00	230 - 410	15 - 35	119
10	00 23 - 00 37	300 - 350	10	15	17	02 47 - 03 11	260 - 350	5	25
	02 01 - 02 08	280 - 330	5	8	19	01 36 - 02 12	270 - 350	5 - 10	37
	02 54 - 03 09	300 - 330	5	16		02 26 - 03 24	260 - 410	10 - 20	59
	04 01 - 04 44	270 - 400	5 - 15	44		04 10 - 04 30	270 - 380	10 - 15	21
	20 01 - 20 56	260 - 350	5 - 10	56		06 13 - 06 30	260 - 400	5 - 10	18
11	01 03 - 01 21	280 - 330	5	19		06 46 - 07 56	250 - 410	5 - 15	71
	01 54 - 01 59	270 - 350	5 - 10	6		08 07 - 08 58	250 - 410	10 - 25	52
	02 21 - 02 26	300 - 340	5	6	20	03 41 - 04 13	270 - 360	5 - 10	33
	02 38 - 03 06	260 - 350	5	29		04 47 - 04 53	260 - 340	5	7
	03 31 - 03 35	300 - 320	5	5		07 23 - 07 57	260 - 350	5	35
	04 01 - 04 45	260 - 350	5 - 15	45		08 03 - 08 22	270 - 380	5	20
	04 51 - 05 47	270 - 340	5 - 15	57		21 15 - 21 24	250 - 380	5	10
	06 09 - 06 18	270 - 330	5	10	21	02 16 - 02 23	270 - 370	5	8
	06 50 - 09 01	250 - 410	15 40	132		06 03 - 08 52	250 - 360	5 - 10	170
	09 23 - 10 35	240 - 400	20 40	73		20 16 - 20 39	260 - 350	5	24
	18 30 - 19 03	290 - 350	5 10	34		21 34 - 22 31	250 - 350	5	58
12	05 24 - 05 45	270 - 350	5 10	22	22	01 08 - 01 12	280 - 340	5	5
	18 34 - 19 58	260 - 360	5 - 10	85		02 07 - 02 13	280 - 350	5	7
	20 22 - 21 01	260 - 350	5 - 10	40		03 19 - 03 37	270 - 360	5 - 10	19
	21 11 - 21 18	280 - 370	5 15	8		19 08 - 20 53	250 - 350	5	106
	21 46 - 21 53	270 - 350	5 15	8		22 26 - 22 30	270 - 350	10	5
	22 05 - 22 10	260 - 350	10 20	6		23 12 - 23 45	260 - 400	5 - 20	34
	22 34 - 22 40	300 - 360	5	7	22-23	23 50 - 00 07	270 - 400	5 - 15	18
	22 43 - 22 55	270 - 370	10 - 25	13	23	00 17 - 00 26	290 - 360	5	10
	23 57 - 00 01	250 - 350	10 30	5		00 47 - 00 58	260 - 370	10 - 15	12
13	01 45 - 02 15	270 - 350	5	31		01 44 - 02 06	260 - 360	5	23
	02 36 - 03 25	250 - 360	5 - 10	50		03 14 - 03 19	270 - 340	5	6
	03 31 - 04 29	270 - 350	5	59		03 45 - 03 57	270 - 330	5	13
	04 53 - 05 05	250 - 350	5 10	13		05 21 - 05 55	260 - 350	5	35
	05 45 - 05 57	260 - 350	5 15	13		06 10 - 07 40	260 - 380	5 20	91
	21 24 - 21 53	250 - 360	5 15	30		23 15 - 23 38	270 - 400	5 - 10	24
14	03 13 - 04 55	240 - 390	10 20	103		23 54 - 23 59	270 - 340	5	6
	06 30 - 07 07	250 - 400	10 20	38	24	02 05 - 02 11	270 - 350	5 - 10	7
	07 23 - 07 35	270 - 390	5	13		03 34 - 03 50	270 - 340	5	17

Date	Time interval	Range (km)	Intensity (dB)	Total time (m)	Date	Time interval	Range (km)	Intensity (dB)	Total time (m)	
Oct.	24 22 24 - 23 30	280 - 340	5	67	Nov.	20 07 26 - 07 51	250 - 400	5 - 20	26	
	25 01 05 - 01 21	270 - 350	5 - 15	17		18 00 - 18 53	230 - 330	5	54	
	26 02 07 - 02 11	300 - 390	5	5		21 04 - 21 16	280 - 350	5	13	
	05 28 - 07 04	250 - 400	5 - 20	97		23 43 - 23 48	300 - 350	10 - 15	6	
	27 02 59 - 03 03	260 - 340	5	5		21 05 41 - 06 25	260 - 330	5	45	
	28 00 47 - 01 00	270 - 330	5	14		06 43 - 07 00	250 - 340	5	18	
	01 24 - 01 31	200 - 300	5 - 15	8		07 05 - 07 11	280 - 400	5	7	
	05 14 - 05 33	200 - 320	5	20		22 18 00 - 18 56	240 - 380	5	57	
	07 29 - 07 47	280 - 400	5 - 15	19		19 05 - 19 44	250 - 360	5	40	
	08 13 - 08 59	240 - 410	5 - 35	47		21 04 - 21 39	250 - 400	10 - 15	36	
	29 01 48 - 02 10	280 - 360	5	23		23 04 00 - 04 05	300 - 340	5	6	
	18 01 - 19 03	260 - 360	5 - 10	63		04 27 - 04 31	260 - 320	5	5	
	30 02 57 - 03 04	260 - 340	5 - 10	8		18 47 - 19 23	300 - 330	5	37	
	03 17 - 03 30	270 - 320	5	14		24 01 49 - 02 05	280 - 320	5	17	
	05 27 - 05 54	270 - 330	5	28		02 10 - 02 36	270 - 320	5	27	
	06 10 - 06 31	260 - 390	5 - 20	22		03 11 - 03 20	280 - 320	5	10	
	06 38 - 06 56	260 - 400	5 - 10	19		Dec.			5	
	07 35 - 08 32	220 - 410	10 - 35	58		9 01 10 - 01 13	270 - 310	5	4	
	31 03 58 - 04 13	290 - 320	5	16		13 07 28 - 07 32	280 - 350	5	5	
	Nov.	15 18 00 - 20 08	250 - 370	10 - 20		129	07 53 - 08 59	250 - 400	10 - 20	67
23 23 - 23 31		300 - 340	5	9	18 00 - 19 36	250 - 350	5	97		
23 40 - 23 47		300 - 350	5	8	20 37 - 20 47	260 - 350	5	11		
16 02 14 - 03 01		250 - 350	10 - 25	48	13-14 23 54 - 00 24	250 - 350	5 - 15	31		
04 57 - 05 02		300 - 330	5	6	00 28 - 00 34	250 - 350	10 - 15	7		
07 43 - 08 25		250 - 400	10 - 30	43	03 22 - 03 37	290 - 360	5	16		
18 54 - 21 22		250 - 390	5 - 10	149	07 59 - 08 22	270 - 360	5 - 15	24		
17 00 33 - 00 39		260 - 340	5 - 10	7	15 07 31 - 07 44	260 - 340	5 - 10	14		
00 46 - 01 01		270 - 320	5	16	16 00 33 - 01 26	240 - 390	5 - 20	54		
02 00 - 02 18		260 - 300	5	19	05 08 - 05 20	280 - 320	5	13		
06 45 - 06 52		270 - 330	5	8	07 23 - 07 36	280 - 340	5	14		
18 01 - 19 05		250 - 330	5	65	17 06 55 - 07 04	260 - 350	5	10		
20 55 - 21 10		280 - 320	5	16	07 06 - 07 12	290 - 350	5	7		
18 02 06 - 02 13		300 - 320	5	8	19 23 23 - 23 17	290 - 350	5 - 10	5		
02 55 - 03 07		260 - 340	5 - 10	13	22 19 49 - 20 24	270 - 330	5	36		
18 00 - 18 36		260 - 340	5 - 10	37	21 35 - 21 43	270 - 330	5	9		
19 06 50 - 07 34		250 - 390	5 - 10	45	23 05 - 23 13	260 - 350	5	9		
07 47 - 08 05		250 - 400	5 - 10	19	23 04 29 - 04 39	270 - 360	5 - 10	11		
20 04 10 - 04 20		300 - 350	5	11	05 28 - 06 19	240 - 410	5 - 10	52		
04 58 - 06 31		250 - 400	5 - 25	94	06 36 - 06 44	260 - 340	5	9		
06 39 - 06 50	250 - 330	5	12	06 56 - 07 16	270 - 340	5 - 10	21			
07 07 - 07 15	280 - 330	5	9	20 04 - 20 28	280 - 360	5 - 10	25			
					22 17 - 22 20	250 - 340	10 - 15	4		

Date	Time interval	Range (km)	Intensity (dB)	Total time (m)
Dec. 24	03 21 - 03 26	270 - 330	5	6
	04 31 - 05 09	260 - 350	5 - 10	39
27	06 35 - 07 05	250 - 400	5 - 15	31
29	18 24 - 20 15	250 - 360	5 - 10	112
30	08 18 - 08 22	300 - 350	5	5
	23 19 - 23 27	250 - 360	10 - 30	9
	23 31 - 23 40	260 - 360	5 - 10	10
31	00 21 - 00 26	270 - 330	5	6
	00 51 - 01 00	260 - 310	5	10
	06 58 - 07 17	250 - 350	5 - 10	20

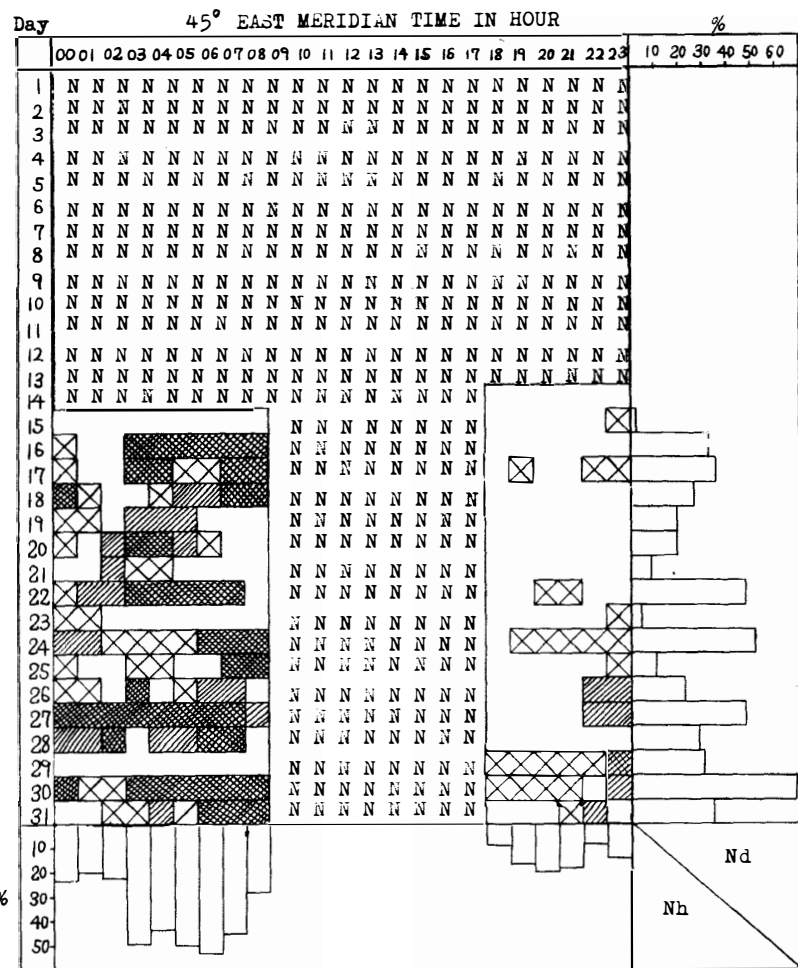


Fig. 1(a) March 1972

Note: Nd and Nh denote daily and hourly occurrence frequencies, together with the auroral echo intensity indices 1, 2, and 3, in the relevant month, respectively.

Index 1 Index 2 Index 3

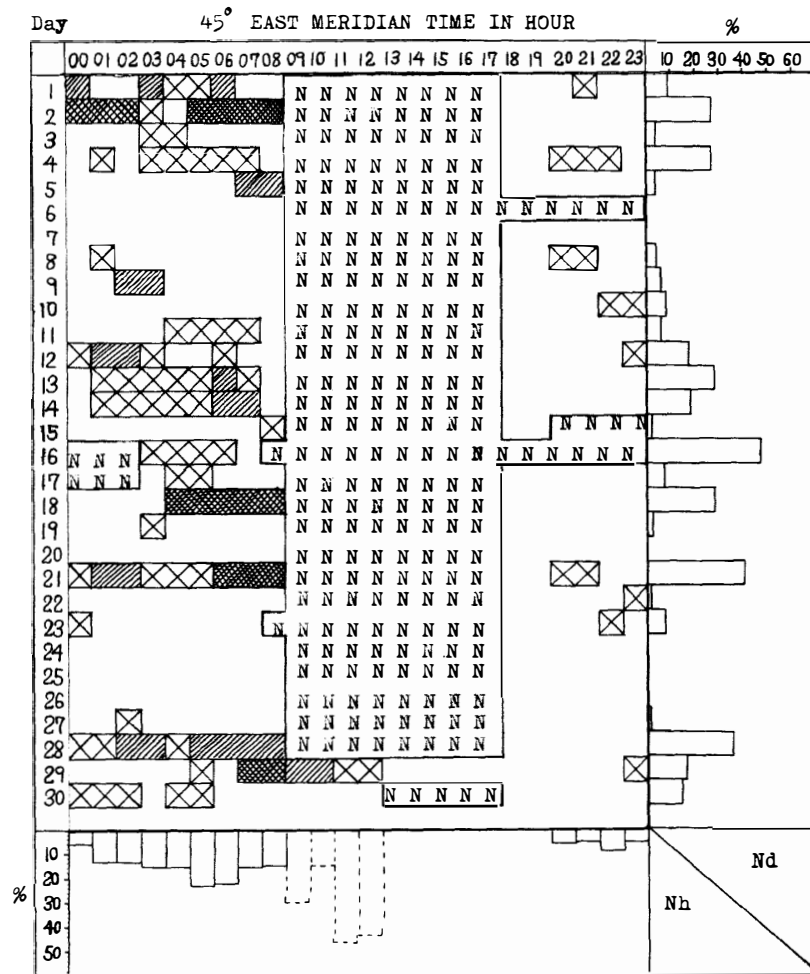


Fig. 1(b) April 1972

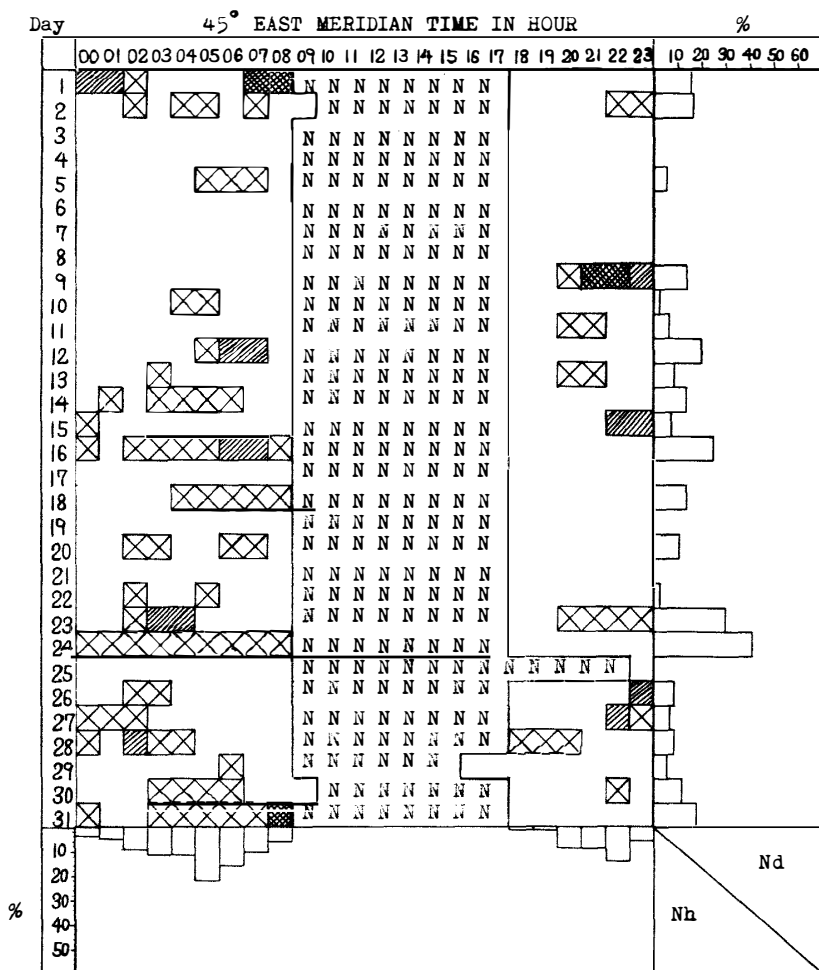


Fig. 1(c) May 1972

Note: Nd and Nh denote daily and hourly occurrence frequencies, together with the auroral echo intensity indices 1, 2, and 3, in the relevant month, respectively.

Index 1 Index 2 Index 3

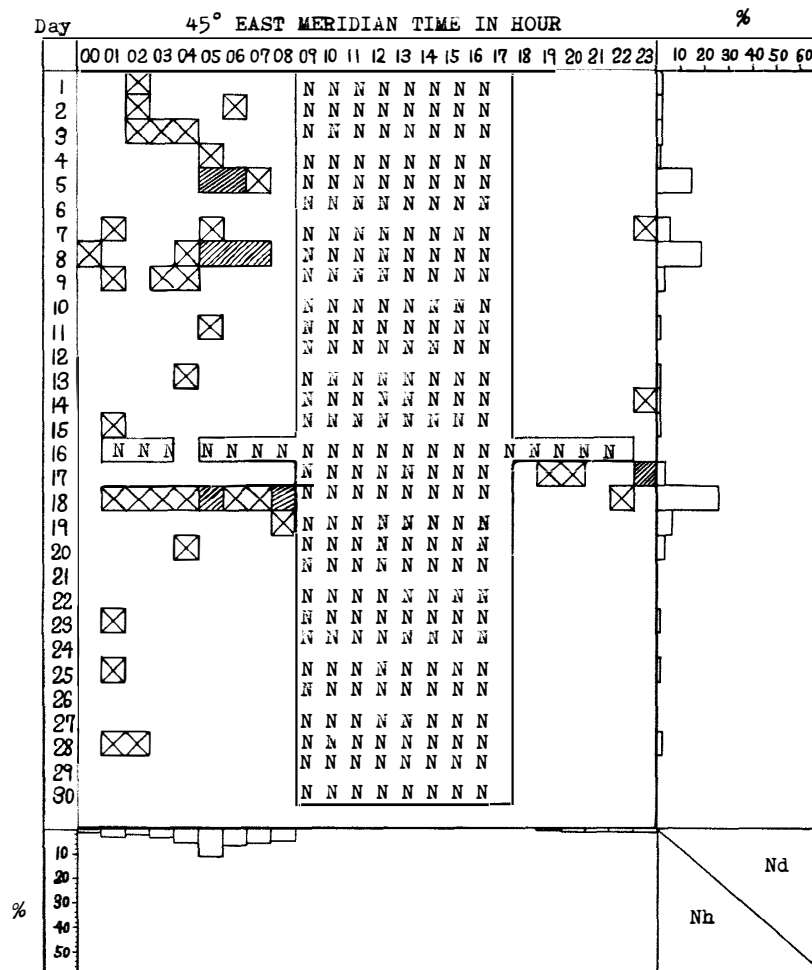


Fig. 1(d) June 1972

Note: Nd and Nh denote daily and hourly occurrence frequencies, together with the auroral echo intensity indices 1, 2, and 3, in the relevant month, respectively.

Index 1 Index 2 Index 3

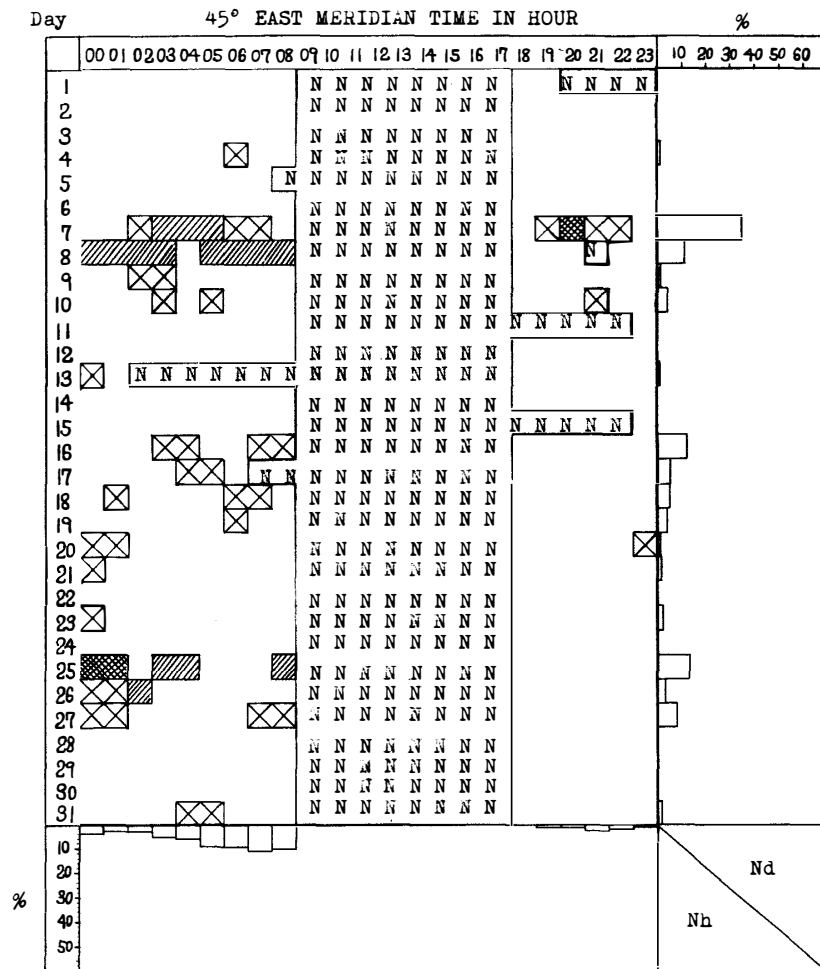


Fig. 1(e) July 1972

Note: Nd and Nh denote daily and hourly occurrence frequencies, together with the auroral echo intensity indices 1, 2, and 3, in the relevant month, respectively.

Index 1 Index 2 Index 3

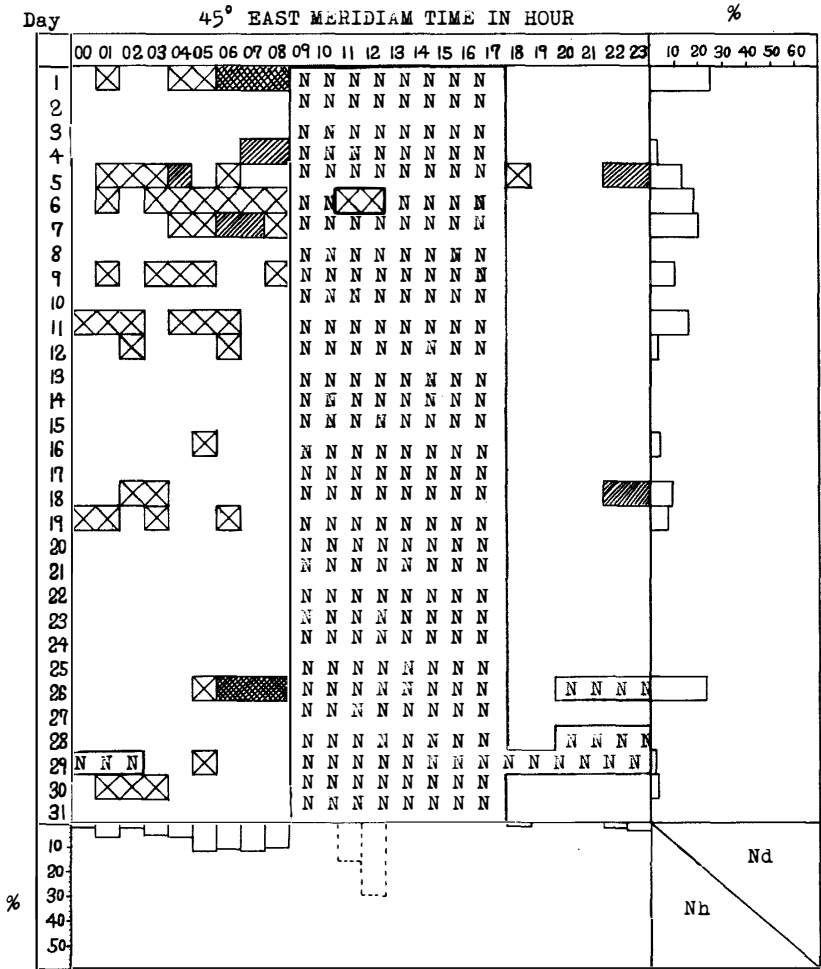


Fig. 1(f) August 1972

Note: Nd and Nh denote daily and hourly occurrence frequencies, together with the auroral echo intensity indices 1, 2, and 3, in the relevant month, respectively.

Index 1 Index 2 Index 3

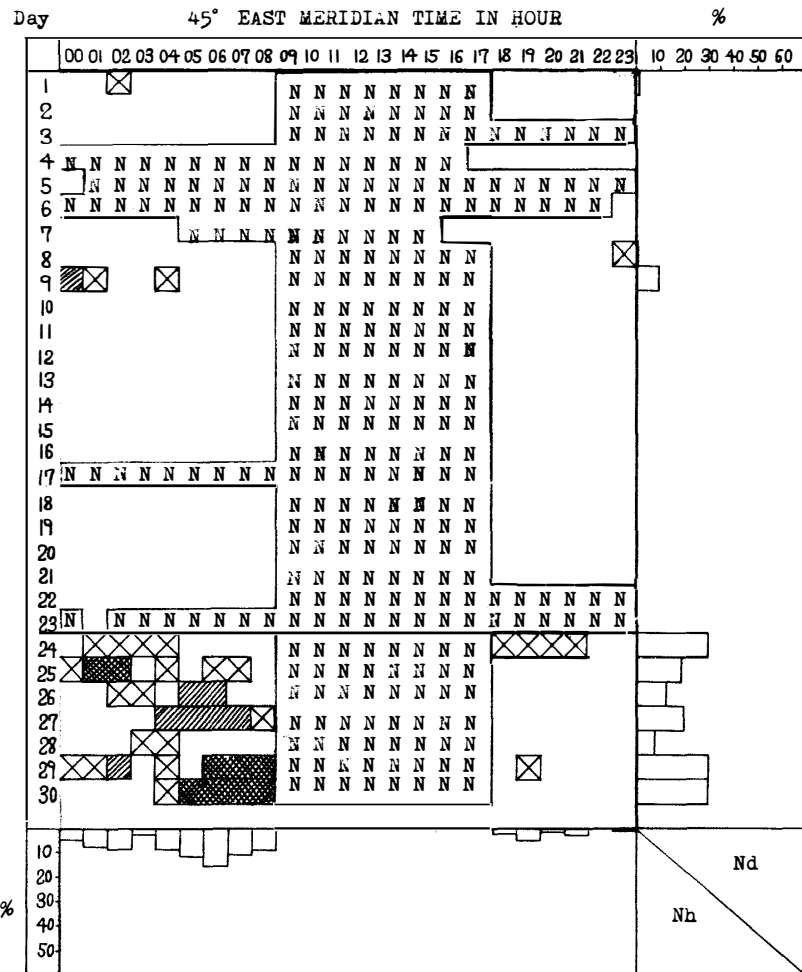



Fig. 1(g) September 1972

Note: Nd and Nh denote daily and hourly occurrence frequencies, together with the auroral echo intensity indices 1, 2, and 3, in the relevant month, respectively.

Index 1  Index 2  Index 3 

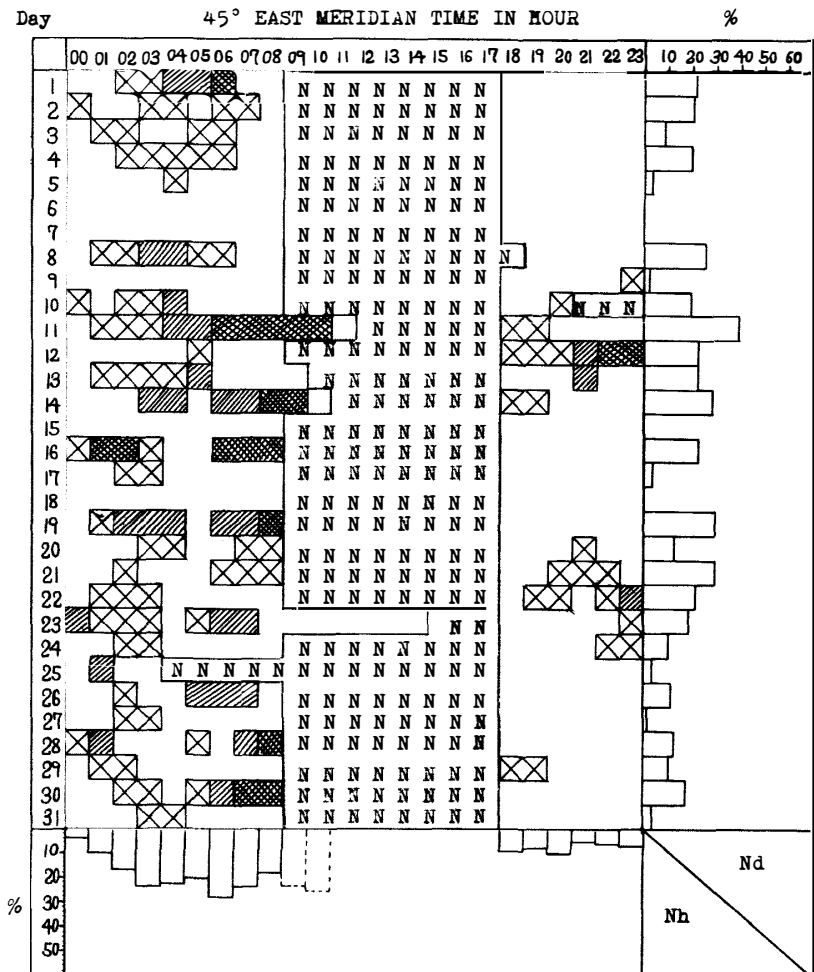

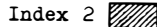
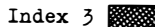


Fig. 1(h) October 1972

Note: Nd and Nh denote daily and hourly occurrence frequencies, together with the auroral echo intensity indices 1, 2, and 3, in the relevant month, respectively.

Index 1  Index 2  Index 3 

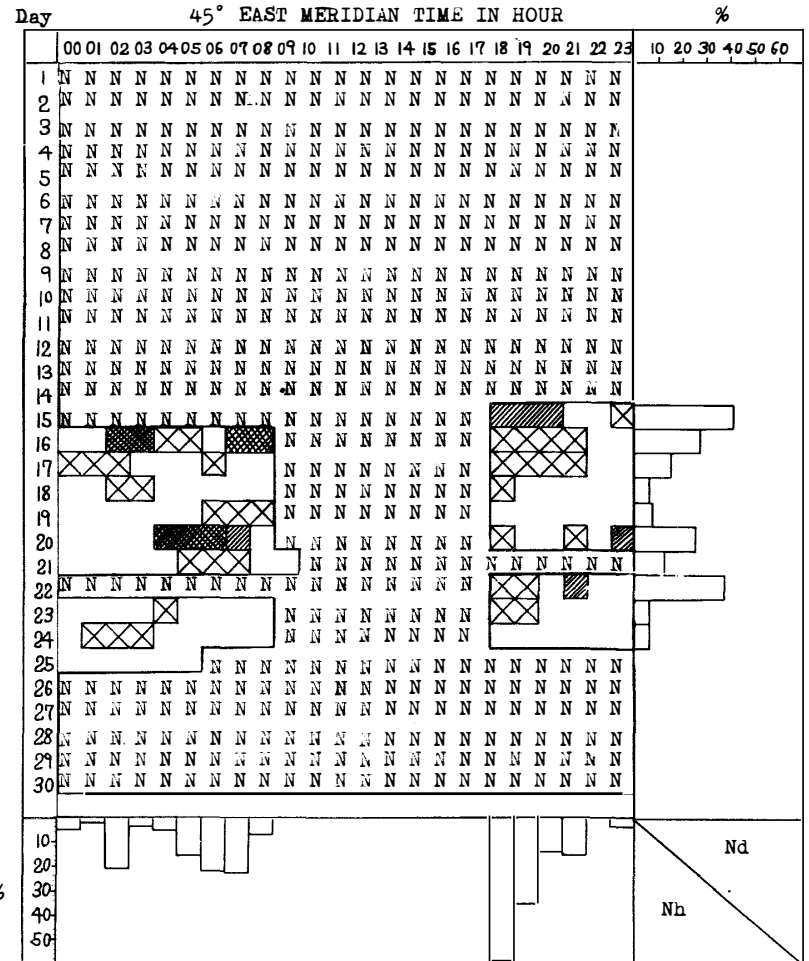


Fig. 1(i) November 1972

Note: Nd and Nh denote daily and hourly occurrence frequencies, together with the auroral echo intensity indices 1, 2, and 3, in the relevant month, respectively.

Index 1 Index 2 Index 3

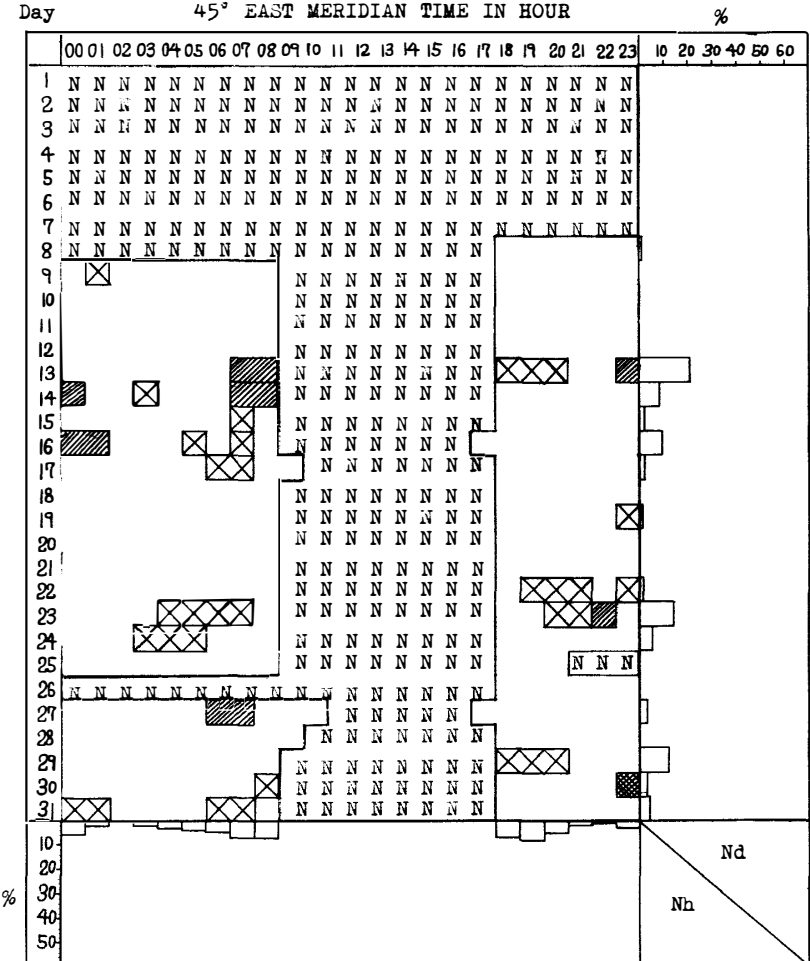


Fig. 1(j) December 1972

Note: Nd and Nh denote daily and hourly occurrence frequencies, together with the auroral echo intensity indices 1, 2, and 3, in the relevant month, respectively.

Index 1 Index 2 Index 3