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16. Summary/Notes

Data from EXAMETNET Meteorological Rocket Launchings at Barreira do Inferno, are presented for the period September 1973 - August 1975. Seventeen successful routine launchings are reported, one of them for chaff wind measurements and the rest for thermodynamic and wind measurements. One failure occurred in the period.

17. Remarks

The preparation of this report involved personnel from the EXAME project of INPE and from CTA-NUIAE of the Ministry of Aeronautics.

ABSTRACT

Data from the EXAMETNET Meteorological Rocket Launchings at Barreira do Inferno, are presented for the period September 1973 - August 1975. Seventeen successful rountine launchings are reported, one of them for chaff wind measurements and the rest for thermodynamic and wind measurements. One failure occurred in the period.

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1 - INTRODUCTION

This report, to be submitted to the Tenth Meeting of the EXAMETNET (Rio de Janeiro, Brazil, October 1975), describes the EXAMETNET activity in Brazil, in the period of September, 1973 to August 1975. The Experimental Inter-American Meteorological Rocket Network (EXAMETNET) promotes coordinated launchings of meteorological rockets to study the atmosphere up to 65 km. In Brazil, the rockets are launched from the Barreira do Inferno Range, Natal ($05^{o}55'S$, $30^{o}10'W$). The program has been active since January 1966. A review of the Network activities has been published in the report "EXAMETNET - The First Five Years" - available from the member organizations.

2 - DATA ACQUISITION AND PROCESSING

A total of 25 sounding rockets were launched for special and routine purposes in the period considered, 24 of them successfully. Table I summarizes the routine launching data.

Ground facilities at the Barreira do Inferno Range used for EXAMETNET purposes include:

a) MPS-19 Radar System.

b) Ground Meteorological Detector (GMD-1A) - 1680 MHz.

c) Meteorological Data Receiving and Recording System - 403 MHz.

d) Double Theodolite Warren - Model WK-84.

e) 42 m Anemometer Tower with four Fuess Anemometers.

f) Rail and Tubular Launchers.

g) Radar (BEARN) with MITRA-15 Computer System.

h) Control.

Data processing was done in accordance to the EXAMETNET Data Preparation Standards. Computer programs have been developed, at INPE - São José dos Campos (São Paulo), to reduce, compile on magnetic tape, as well as to plot and print the results in accordance to the EXAMETNET data preparation standards. These computer programs are also operational since August 1975 at INPE-Natal (Rio Grande do Norte), and now data processing can also be made there.

Table I and Figs. 1a, 1b, 1c, 1d, 1e summarize the rountine launchings schedule followed during the above period. The gaps in the actual schedule, compared with the proposed ones were due to difficulties in rocket procurement.

The Appendix I presents the routine data obtained during the period covered by this report, in both tabular and graphic form.

EXAMETNET SUMMARY of LAUNCH OPERATIONS

Form 1

STATION: -CLFBI- NATAL, BRAZIL

LAT: 05° 55'

LONG: 35° 10'

HEIGHT (above mean sea level): 43 (m)

PERIOD: from 08 30 73 to 07 02 75

NO.	MODEL CODE	DATE and LAUNCHTIME (GMT)	MOTOR TYPE	PAY-LOAD TYPE	PAYLOAD ACQ (meters)	WIND DATA (km) ROCKET TOP	WIND DATA (km) ROCKET BOT	WIND DATA (km) BALLOON TOP	WIND DATA (km) BALLOON BOT	THERMODYNAMIC DATA (km) ROCKET TOP	THERMODYNAMIC DATA (km) ROCKET BOT	THERMODYNAMIC DATA (km) BALLOON TOP	THERMODYNAMIC DATA (km) BALLOON BOT	RESULTS (POS or NEG)	NOTE #
108	BI-7322-C92	09/12 1346	LOKI	CHAFF	40274	40	18	32	.04	--	--	32	.04	+	
109	BI-7407-D108	03/20 1321	LOKI	DATAS	65410	66	24	27	.04	66	24	27	.04	+	
110	BI-7409-D110	03/27 1415	LOKI	DATAS	59253	59	22	28	.04	59	22	28	.04	+	
111	BI-7410-D111	04/18 1345	LOKI	DATAS	65776	65	20	30	.04	66	21	30	.04	+	
112	BI-7411-D112	05/02 1430	LOKI	DATAS	64000	64	20	28	.04	62	22	28	.04	+	
113	BI-7412-D113	05/15 1345	LOKI	DATAS	---	--	--	--	--	--	--	--	--	-	1
114	BI-7413-D114	05/15 1440	LOKI	DATAS	65745	65	20	30	.04	66	22	30	.04	+	
115	BI-7414-D115	05/29 1345	LOKI	DATAS	67208	66	20	29	.04	59	22	29	.04	+	
116	BI-7415-D116	06/12 1345	LOKI	DATAS	66690	66	20	32	.04	66	21	32	.04	+	
117	BI-7416-D117	06/26 1405	LOKI	DATAS	64465	64	19	34	.04	64	20	34	.04	+	
118	BI-7417-D118	07/17 1430	LOKI	DATAS	63307	63	20	30	.04	62	22	30	.04	+	
119	BI-7418-D119	07/31 1348	LOKI	DATAS	66000	66	20	30	.04	65	21	30	.04	+	
120	BI-7419-D120	08/14 1345	LOKI	DATAS	64861	64	21	31	.04	64	20	31	.04	+	
121	BI-7420-D121	08/29 1345	LOKI	DATAS	64953	62	20	32	.04	65	21	32	.04	+	
122	BI-7421-D121	09/18 1345	LOKI	DATAS	63090	61	19	27	.04	63	20	27	.04	+	
123	BI-7422-D123	10/16 1345	LOKI	DATAS	---	65	21	37	.04	49	22	37	.04	+	
124	BI-7423-D124	12/18 1345	LOKI	DATAS	52821	52	19	33	.04	-	-	33	.04	-	2
125	BI-7501-D125	07/02 1420	LOKI	DATAS	62380	46	19	37	.04	62	20	37	.04	+	

NOTES: 1 - no telemetry or radar acquisition. Probable parachute malfunction.
2 - no payload signal, probably explosion of the payload.

3 - SPECIAL LAUNCHINGS

On March 19-20, 1974, eight special launchings were made in collaboration with the experiment designed by NASA Wallops Meteorological Rocket Networks Project.

The results of special launchings are reported in the "March 19-20, 1974 Diurnal Experiment Data Report" (May, 1975), one of then is included in this report as routine launching.

EXAMETNET SUMMARY of METEOROLOGICAL DATA

Form 2b

APRIL 5 10 15 20 25 | MAY 5 10 15 20 25 | JUNE 5 10 15 20 25 | JULY 5 10 15 20 25 | AUGUST 5 10 15 20 25 | SEPTEMBER 5 10 15 20 25

19 73

2nd. QUARTER

19 73

3rd. QUARTER

ALTITUDE (KM)

70
60
50
40
30
20
10

5 10 15 20 25 | 5 10 15 20 25 | 5 10 15 20 25 | 5 10 15 20 25 | 5 10 15 20 25 | 5 10 15 20 25

LEGEND

- APOGEE
- TOP OF TEMPERATURE
- WIND
- TOP OF BALLOON
- BOTTOM OF TEMPERATURE

- 6 -

Fig. 1a

EXPERIMENT SUMMARY OF METEOROLOGICAL DATA

Form 2a

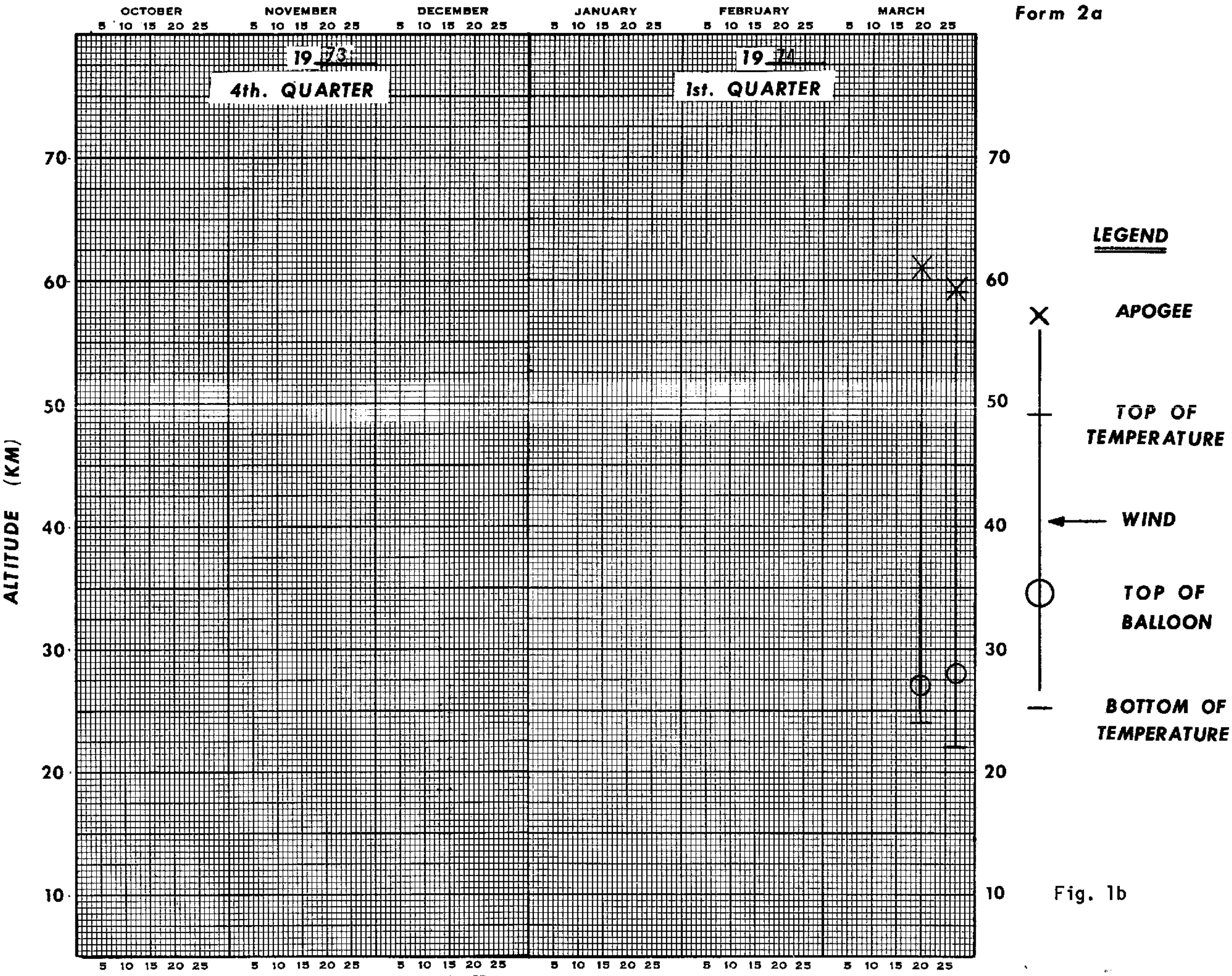


Fig. 1b

EXAMINER'S SUMMARY OF METEOROLOGICAL DATA

Form 2b

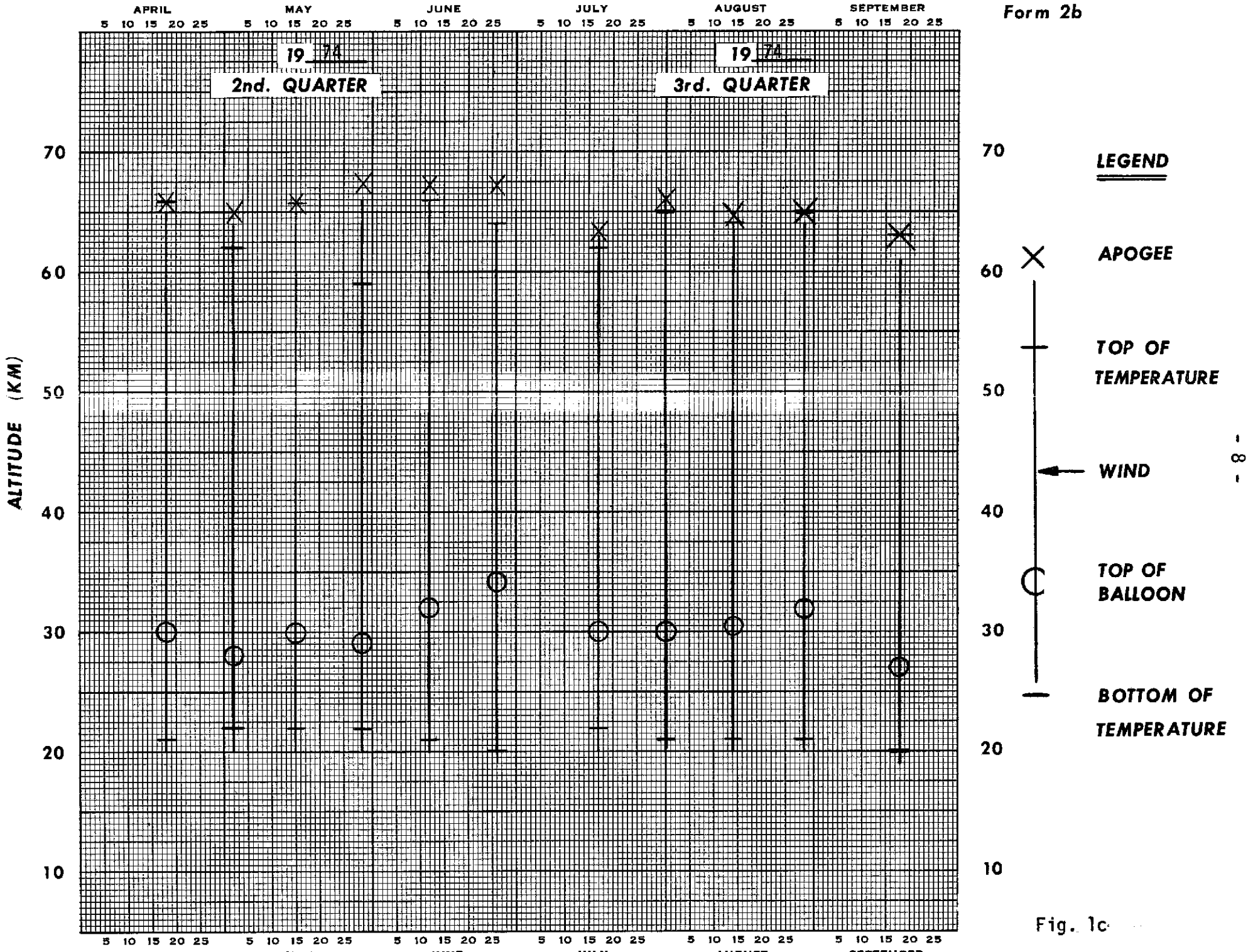
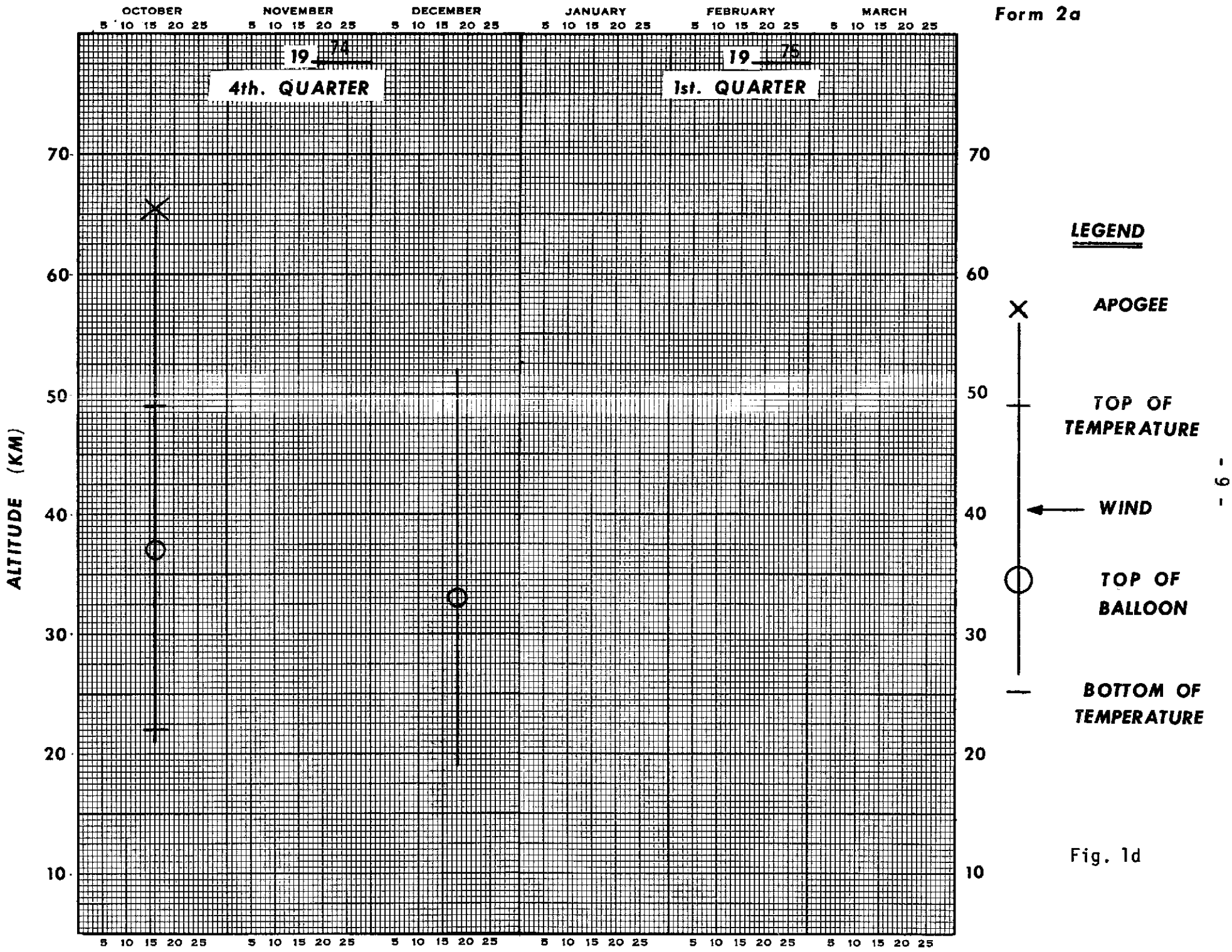


Fig. 1c



Form 2a

Fig. 1d

EXAMETNET SUMMARY of METEOROLOGICAL DATA

Form 2b

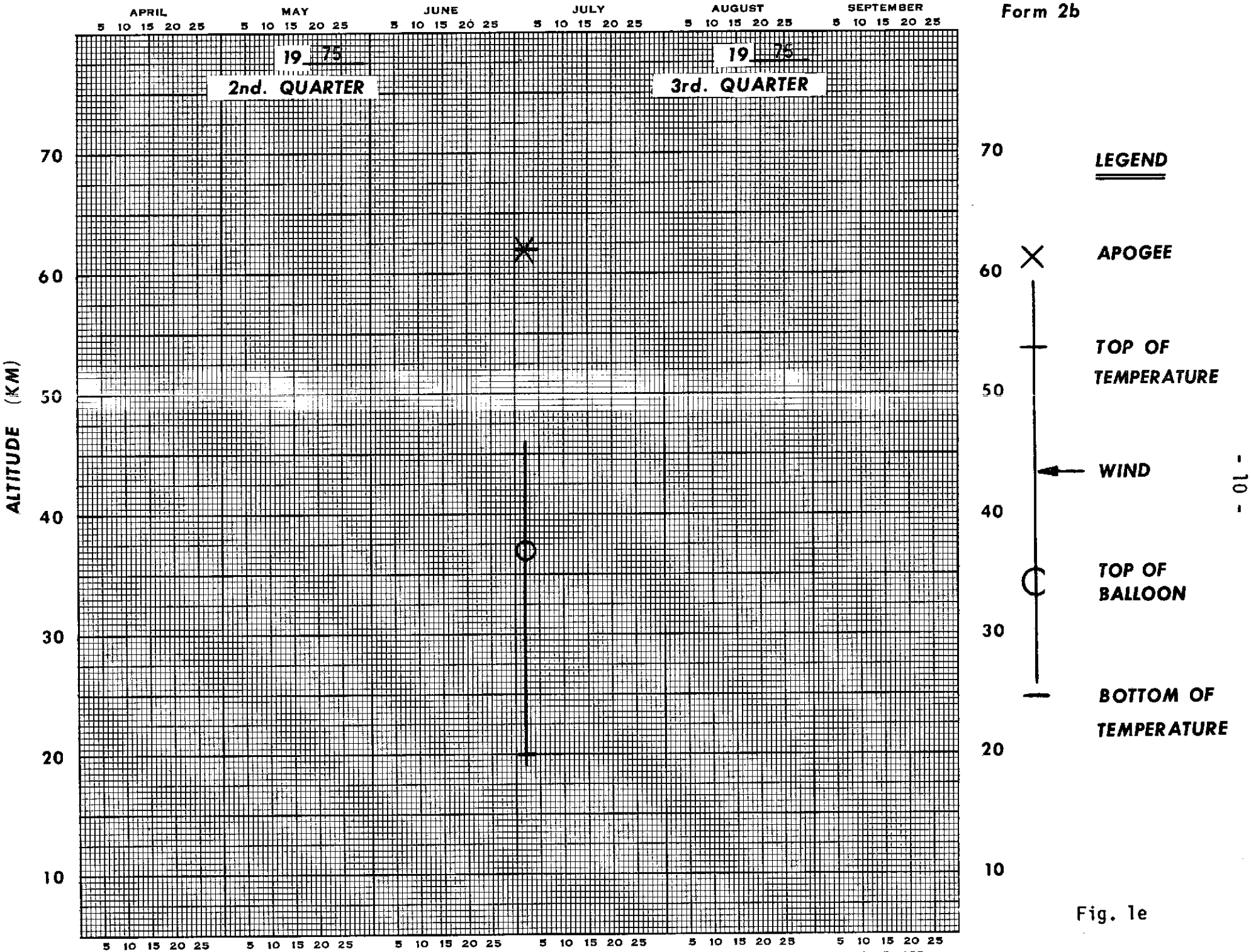


Fig. 1e

4 - NATIONAL TEST AND DEVELOPMENT ACTIVITIES

The SONDA-I is a meteorological sounding rocket capable of carrying a 5 kg payload up to 70 km to 120 km in altitude. The development has been made to meet the needs of EXAMETNET programme.

Flight testing of SONDA-I with payload has been made with more than 200 launchings. Since the capacity of SONDA-I is 5 kg it will allow in addition to the payload in test which is of 1.810 g, other kinds of payloads.

Table II shows the SONDA-I, vehicle data.

TABLE II

SONDA-I DATA

VEHICLE DATA		
Total weight	(kg)	54
Maximum velocity	(m/s)	1200
Propellant	Solid,	composite
FIRST-STAGE		
Weight	(kg)	26
Burning time	(s)	1.2
Average thrust	(kg)	2400
SECOND-STAGE		
Weight	(kg)	24
Burning time	(s)	24
Average thrust	(kg)	170

5 - DISCUSSION OF RESULTS

The analysis of Time-height sections of temperature, and wind components has been prepared using the data given in this report

The group of MESA/EXAME project at INPE is involved in research concerning tidal oscillations, annual and semi-annual variations in wind and temperature, and stratospheric sudden warmings. The reports "On the Annual Temperature variation in the Stratosphere" by V.B. Rao and Yoshihiro Yamazaki, "Sensible Heat Transport in the Stratosphere of Southern Hemisphere" by Kioshi Hada, "Diurnal Tidal Oscillations in the Meridional wind between 30 and 60 km" by V.B. Rao and Yoshihiro Yamazaki, will be presented.

APPENDIX A

In the following pages, the data for the 17 successful routine launchings between September 1973 and August 1975 are presented in tabular form, according to the World Data Center recommendation and in graphic form. Correction is applied to temperature data as given in Krumins and Lyons (1972).