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Laboratório de Física Espacial

São José dos Campos

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São José dos Campos
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TABLE OF CONTENTS

Abstract

1 INTRODUCTION 1

2 DATA RECQUISITION AND PROCESSING 2

3 TEMPERATURE - WINDS 4

3.1 Temperature Structure 4

3.2 Winds and Temperature 5

4 ZONAL WINDS STRUCTURE 5

4.1 Zonal Wind Comparison with CIRA-1965 10

5 MERIDIONAL COMPONENT 16

6 DENSITY PERCENTAGE VARIATION 16

7 CONCLUDING REMARKS 19

7.1 Temperature Winds 19

7.2 Zonal Structure 20

References 21

Appendix 23

Abstract

The structure and state of the stratosphere and the mesosphere have been measured in Natal-BRAZIL under a program of meteorological measurements within the EXAMETNET program. One of the purposes of EXAMETNET is to contribute to studies of structure and behavior of the atmosphere and to help explain differences and similarities between the Northern and Southern Hemispheres. Data of density, temperature, pressure and wind velocities have been obtained by radiosonde from the ground to about 20 km by Rocket from 18 km to 100 km at Natal since January 1966. They are believed to comprise the most comprehensive measurements of the Tropical Atmosphere. A brief description of the Atmospheric circulation, temperature and density structure at Natal is presented. Special emphasis is given to the period from January 1968 to March 1969. The appendix for this report includes a graph showing the launchings from Natal-Brazil, for the period from December 1967 to March 1969 and the Exametnet Meteorological Rocket Observations since the January 1966. Each plot presents the range of the available data in each launch.

1 - INTRODUCTION

Natal is located in the Brazilian Northeast ($05^{o}45'S$ and $35^{o}10'W$). The EXAMETNET's series of experiments at Natal is providing data over a region which is as yet barely understood. The launchings were spread out so that the equatorial upper atmosphere could be studied during different seasons. It is the purpose of this note to describe our findings concerning the variations of wind, temperature and density based on rocket and rawind observations at Natal since 1966.

According to Belmont [1965], the flow patterns in the stratosphere and low mesosphere at high and middle latitudes, which are characterized by a regular seasonal reversal with winter westerlies, are somewhat different from the low latitudes flow patterns. At these low latitudes the stratosphere's flow is characterized by the existence of another wind cycle and there is no definite variation either with season or with month specially at lower levels. It is one of the purposes of this paper to demonstrate the monthly and yearly variation of zonal wind in Natal.

A convenient way to report date from a particular site is to combine in a time-height cross section, observations from several launchings.

2 - DATA ACQUISITION AND PROCESSING

The data presented in this report comprise the period of December 1967 through March 1969.

The following table present some information about the rockets and payload used in the experiments and also the time of launch:

DATE OF LAUNCH	TIME OF LAUNCH (GMT)	MOTOR TYPE	PAYLOAD TYPE
1967			
DEC, 13	15:00	JUDI	CHAFF
1968			
Jan,17	15:00	JUDI	WOX 1A
Jan,31	15:12	JUDI	CHAFF
Abr,17	15:00	JUDI	WOX 1A
May, 1	15:00	JUDI	CHAFF
May,15	15:00	JUDI	WOX 1A
May,29	15:00	JUDI	CHAFF
Jun,12	15:02	JUDI	CHAFF
Jul,24	16:02	ARCAS	ARCASONDE
Sep,18	15:19	ARCAS	ARCASONDE
Oct,16	15:14	ARCAS	ARCASONDE
Nov,13	15:30	ARCAS	ARCASONDE
Dec,18	15:00	ARCAS	ARCASONDE
1969			
Jan,1	16:35	ARCAS	ARCASONDE
Feb,12	15:20	ARCAS	ARCASONDE
Mar,12	15:57	ARCAS	ARCASONDE

Problems such as failures in radar computer and some difficulties in rocket procurement caused interruptions in the period of observation being considered here, namely, from Jan,31 to April,17 1968 and in August, 1968.

The ground instrumentation for support of meteorological rocket launchings at Barreira do Inferno consists of:

a) MPS - 19 Radar System
b) Ground Meteorological Detector (GMS-1A) - 1680 MHz
c) Meteorological Data Receiving and Recording System-403 MHz.
d) Double Theodolite Warren - Model WK-84
e) Anemoter Tower 42 meters high
   Four Fuess Anemometer
f) A rail and a tubular launchers.

We have compared the wind and temperature profiles obtained through several payloads types used in the analysed period, with the measurements of radiosonde (see profiles attached).

Roughly, as regard to winds measurements we noticed a good overlap in the range 18 km to about 30 km.

With regard to the temperature measurements made either with radiosonde or with WOX-1A or ARCASONDE -we can assume also a good overlap in the range referred above, in spite or some failures with the payloads such as the excessive dynamic heating or absence of signal that happened in some launchs. For instance, we had a failure during the launch of May, 15, 1968, when occured on excessive heating on the payload. Despite this failures, we compare those values for temperature against the radiosonde data. There we can observe a coincidence since the behavior of the curves are very similar from 20 km to about 32 km.

The data were processed and reduced, in Natal and in this report, according to EXAMETNET DATA FORMAT [1968] and EXAMETNET DATA PREPARATION AND GUIDANCE PROCEDURES MANUAL [1968].

3 - TEMPERATURE - WINDS

3.1 - Temperature Structure

The complete temperature profiles concerning to rocketsonde and radiosonde measurements as functions of altitude are shown in Fig.1. Linear interpolation has been used to fill record gaps at higher levels from March to June 1968.

As shown this figure the troposphere is fairly well stratified and has a constant negative lapse rate. The stratosphere and low mesosphere was neither stratified nor uniform. The lapse rate shows height and times variations.

The tropopause is located apparently at an altitude of about 17 km during the Winter; in Spring it slopes downward to about 16 km and in the Summer it slopes upward to about 17 km to attend the level of 18 km in the fall.

Although no exact definition of the stratopause is possible, it appears to be located between 48 and 58 km. It has oscillated during the year reaching 58 km in Summer and 48 km in Spring.

The highest temperatures observed in stratosphere were 4.8°C, in September 1968, at a level of 44 km; 3.5°C, in October 1968-45km; 2.3°C in November 1968-51 km; 2.6°C in December 1968-56 km; -8°C in January 1969-43km; 5°C in February 1969-50km and 12°C in March 1969-47km.

The analysis illustrates the coldest stratosphere during the period from October 1968 to January 1969 when the stratopause slopes upward and it was a rather warm in February-March 1969 with a maximum temperature of 12°C at 47 km.

3.2 - Winds and Temperature

The analysis of Fig.1 and Fig.2 illustrates a strong easterly stratospheric jet stream with a maximum speed of 200 knots in the vicinity of 50 km in December 1968, January and Febrary 1969. At this time a stratospheric cooling occurred and its beginning (October 1968) was marked by changing of winds direction from west to east.

In March 1969 we note the beginning of a warming in the stratosphere in the vicinity of 50km; when another changing of winds direction from east to west was observed.

The stratospheric warming observed in October and November 1968 at 45 km seems to be the responsible for westerlies at a height of 30 km.

A particular feature of the zonal winds of the tropopause is the reversion, from tropospheric westerlies to stratospheric easterlies.

4 - ZONAL WINDS STRUCTURE

According to Reed [1965a] it is readily seen that the zonal circulation pattern in the equatorial stratosphere seems to be the result of a combination of the quasi biennial oscillation (QBW) that has a variable period of 20 to 30 months predominating at the lower levels, the semiannual component predominating ar heigher levels and a annual component present at all altitudes of the stratosphere and Mesosphere.

For a better understanding of these oscillations (semiannual and biennial), Quiroz [1967] suggests that more rocket information has to be obtained in order for one to be able to make a harmonic analysis of the phenomenon.

The time cross section of zonal wind component for Natal is shown in Fig.3. The analysis illustrates that in the stratosphere and low

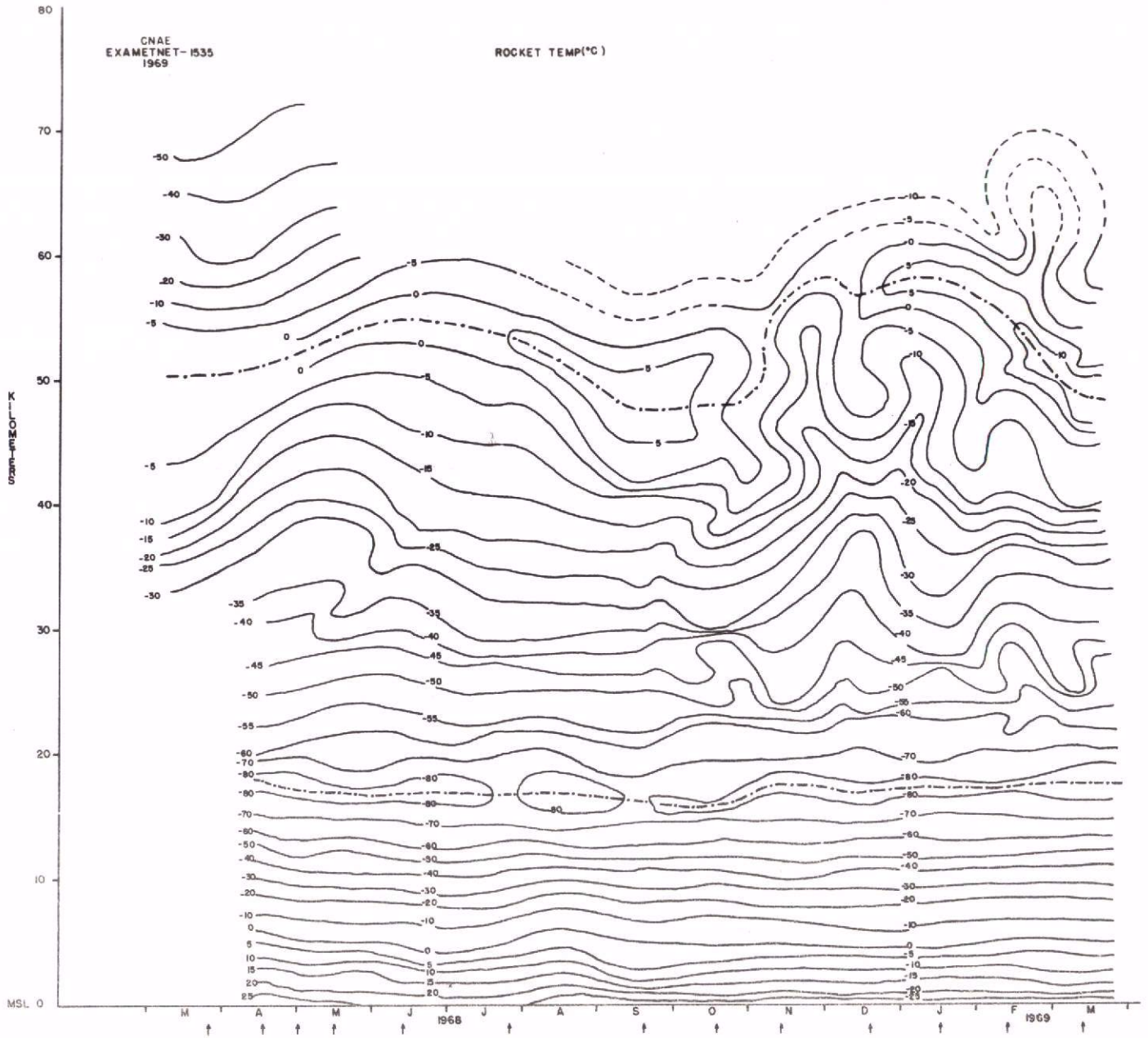
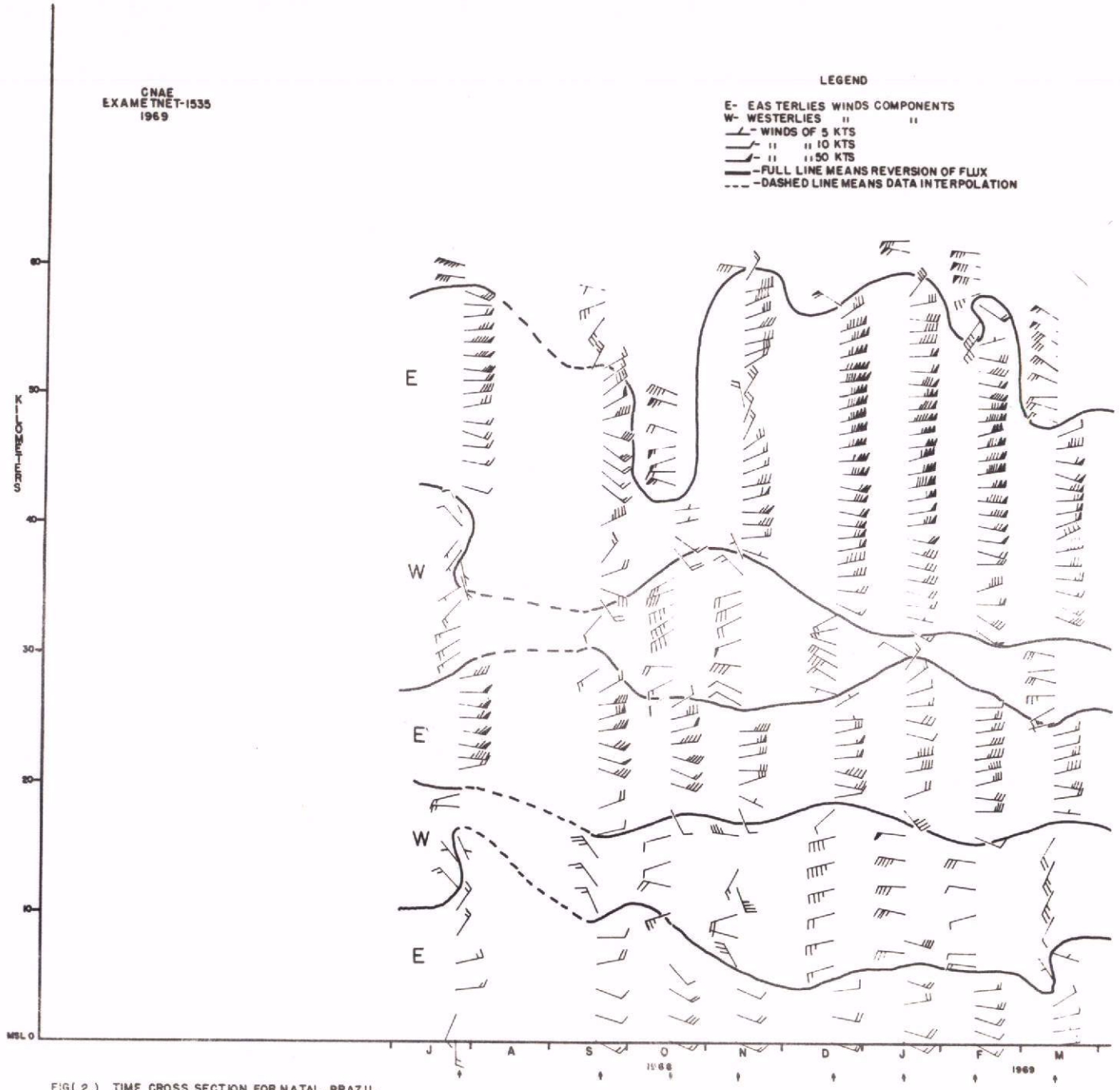


FIG.(1) Time cross section of temperature (°C) for NATAL, BRAZIL
The arrows bellow the time scale show the dates that data were obtained.
Dashed lines indicate extrapolated data.



FIG(2) TIME CROSS SECTION FOR NATAL, BRAZIL
1968/69 POLAR WINDS.

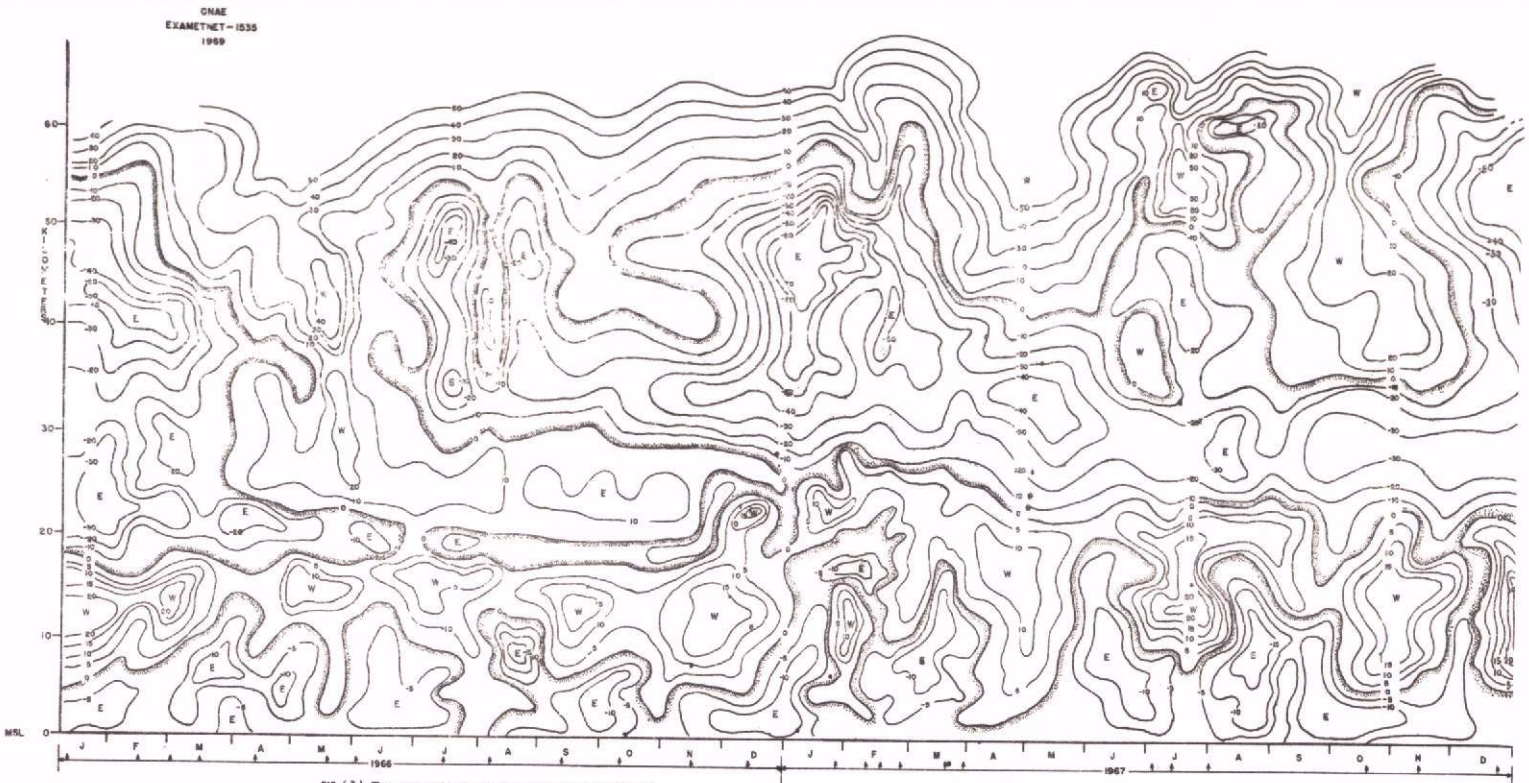
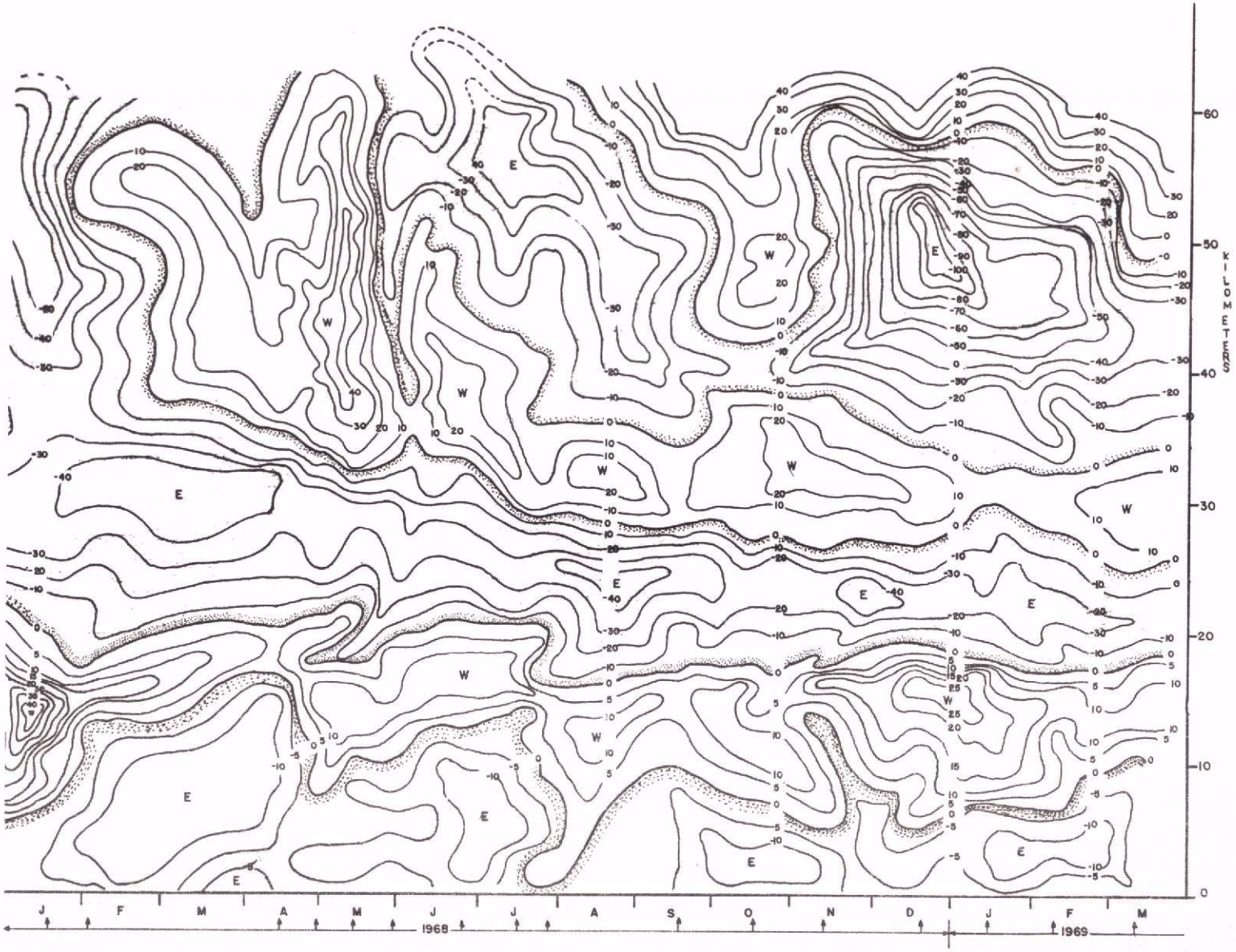


FIG. (3) Time cross section of zonal winds components (METERS / SEC) for NATAL (05° 45' S. 35° 10' W). The arrows below the time scale show the dates that data where obtained.



Continued from previous page

mesosphere the main pattern that emerges is a cycle characterized by easterly winds during the Winter and Summer and westerlies around the time of the equinoxes. The stratospheric easterlies attain a maximum at 45-50 km with speeds in the range from 100 km to 200 km. The Summer easterlies appear stronger than the Winter easterilies; this difference may be attributed to the influence of the annual circulation, according to Quiroz [1967]

The reversal of the stratospheric Winds takes place for Summer, in February and March;the reversal Fall-Winter occurred in June. The relative weakness of the westerlies compared to the easterilies is a feature noted by Reed [1965a]. It seems that the fall westerlies are stronger than the Spring westerlies.

In May-June of 1966 and April-May of 1968 the biennial westerlies appear as an integral parth of the fall equinoctial westerly regime of the semiannual oscillation. In October 1966, 1967 and April-May 1967 however, the equinoctial westerlies descend only to about 40 km, hence the presence of easterlies at 30 km. In October 1968 the equinoctial westerlies descend to 32 km and it was also observed the presence of westerlies at 30km.

It has been noted that the phase of the quasi-biennial oscillation becomes increasing earlier with height while the annual oscillation has a relative lag with height as mentioned by Belmont [1965]. There is some evidence of this behavior in the zonal circulation of Natal, shown by the oscillation features of the westerlies and easterlies at 30 km. It is shown at least two prominent waves each of which progress downward from one biennium to the next.

According to Reed [1965b] the behavior of the cycle at higher levels is of particular interest because of its apparent downward propagation from these levels and because of the suggestion of Staley [1963] and other, that the cycle has its origin in a possible 26 - month fluctuation in solar ultraviolet radiation. Since the ultraviolet radiation is absorbed primarily in the upper part of the ozone layer in the vicinity of 50 km, it seems reasonable

to presume that the oscillation should increase upward to this level if the ultraviolet hypotheses is correct.

The existence of the quasi-biennial oscillation at 28 km is apparent from visual inspection of Fig.4. Westerlies at the beginning of the two-year period (March-April, 1966) are replaced a year later by easterlies, and these in turn are replaced by light easterlies at the beginning of the new period (June-July, 1968) at the level 28 km) or weak westerlies (level 32km).

In the mesosphere, westerlies become more frequent and are noticeable even at times other then the equinoces.

Prevailing easterly winds below 5 km exhibit a high degree of day to day persistence in the Trosposphere.

Troposphere westerlies is located at an average altitude of 13 km. They are affected by the biennual wave and oscillate up and down from one biennium to another.

4.1 - Zonal Wind Comparison With CIRA-1965

The data of the zonal wind component of Natal from January 1966 to March 1969 at 30, 40, 50 and 60 km are presented in Fig.5., Fig.6, Fig.7 and Fig.8, and examined by overlay with the model of CIRA [1965].

The best agreement occurred at 40 and 50 km. In these levels are clearly noted the semi-annual and the annual variations of winter easterlies and the equinox westerlies. At these levels it is also evidenced by the relative weakness of the winter easterlies when compared with the summer easterlies.

At 60 km the agreement is not so good but it is still clearly shows the remarkable spread out of the mesospheric westerlies.

The analysis based on the figures appears to confirm the

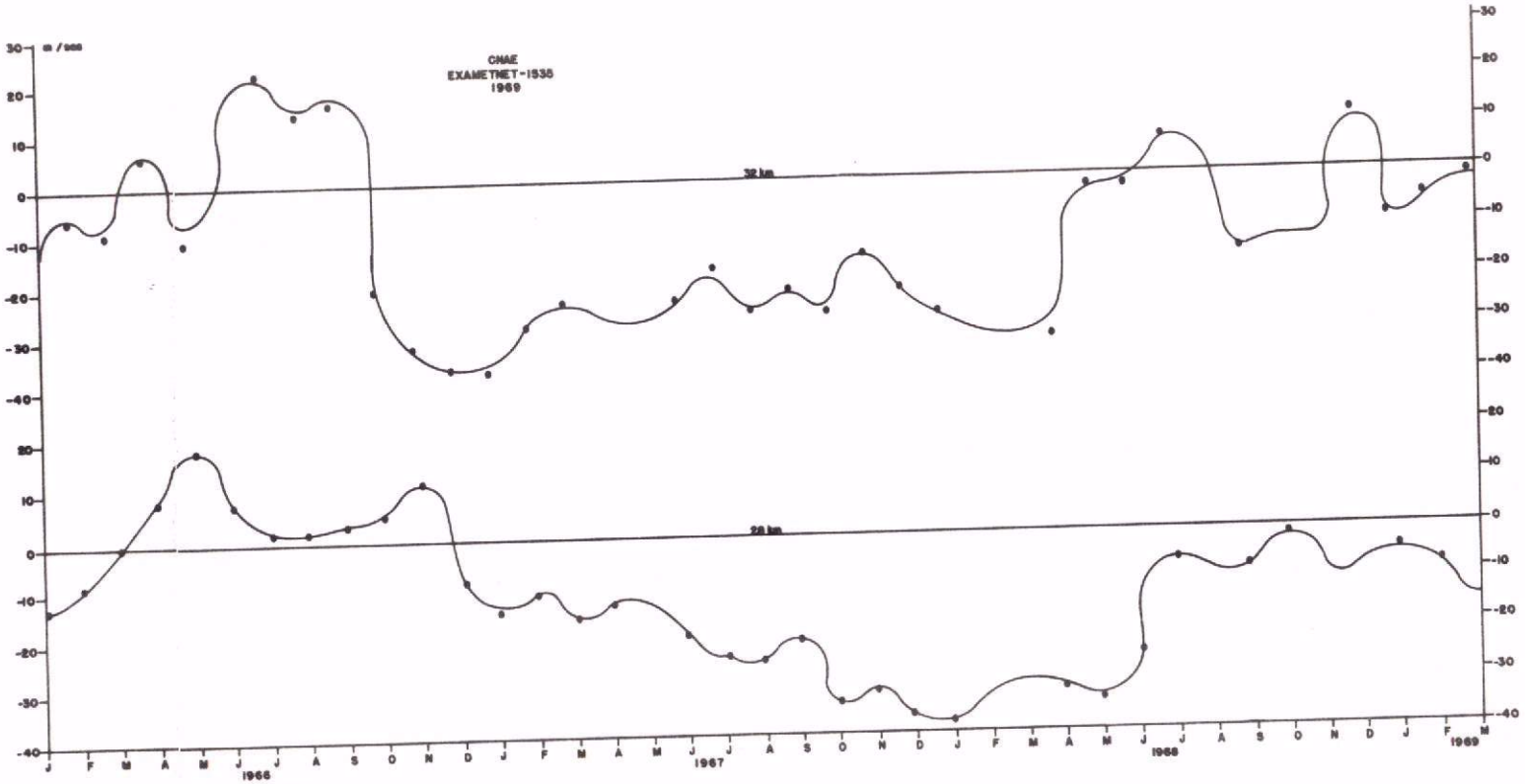
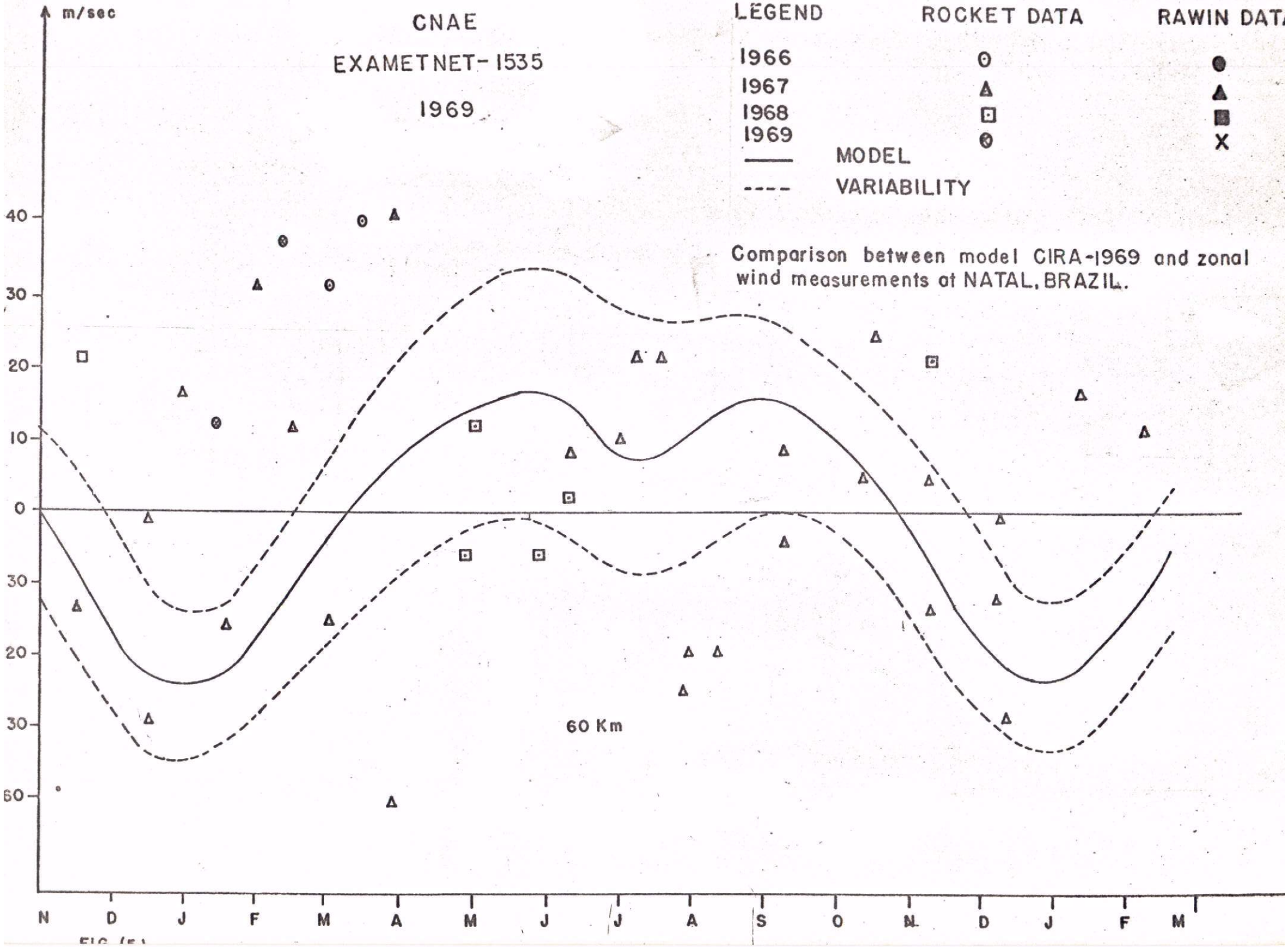


FIG.(4) Zonal wind velocity at NATAL,BRAZIL.
Those curves were drawn by using the
math values.
The circles means observed values.


m/sec
CNAE
EXAMETNET-1535
1969
LEGEND
ROCKET DATA
RAWIN DATA
1966
1967
1968
1969
MODEL
VARIABILITY
Comparison between model CIRA-1969 and zonal wind measurements at NATAL, BRAZIL.
40
30
20
10
0
30
20
30
60
60 Km
N
D
J
F
M
A
M
J
J
A
S
O
N
D
J
F
M

CNAE

EXAMETNET-1535

1969

The legend is the same as for Fig.5

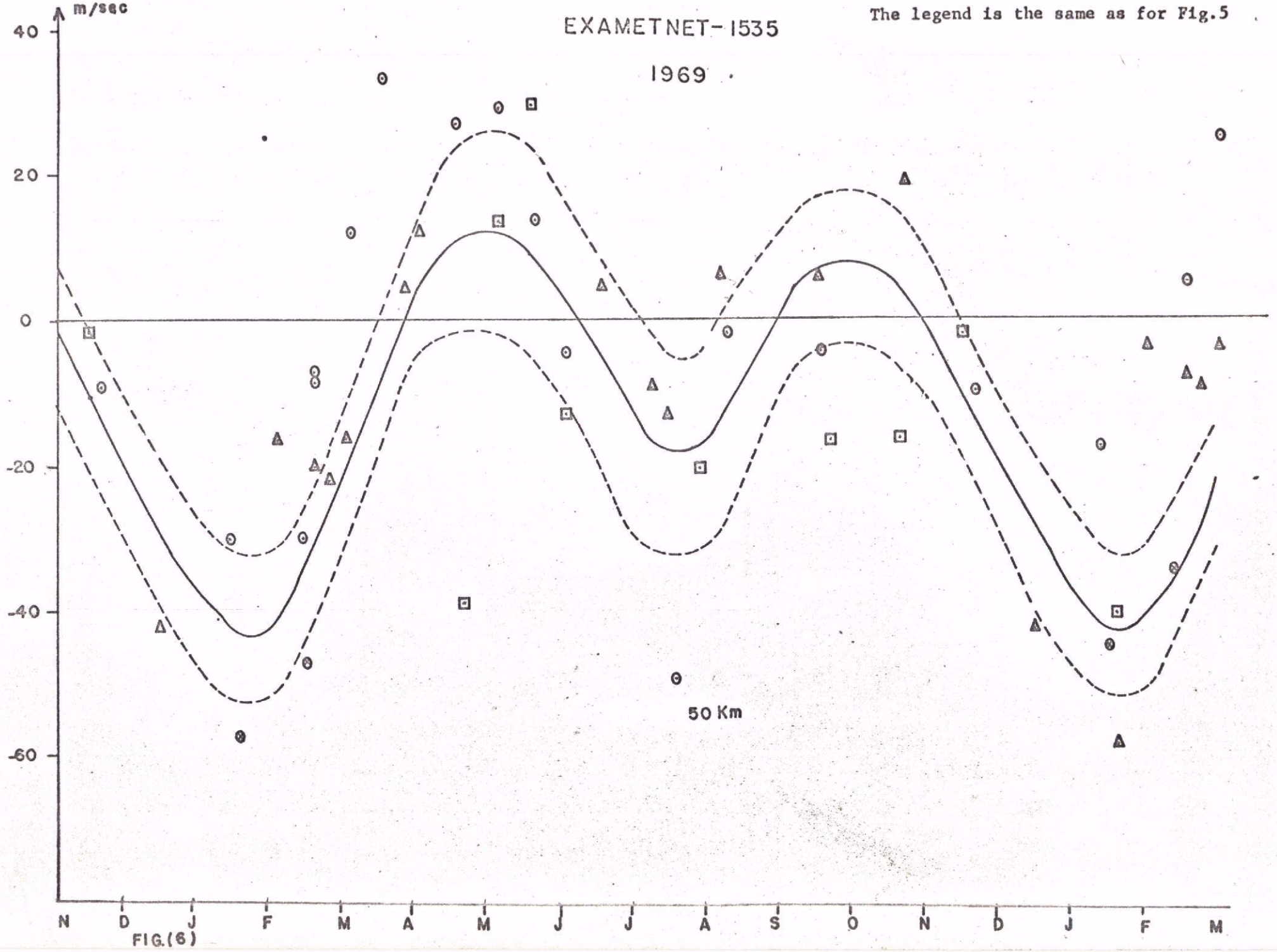


FIG.(6)

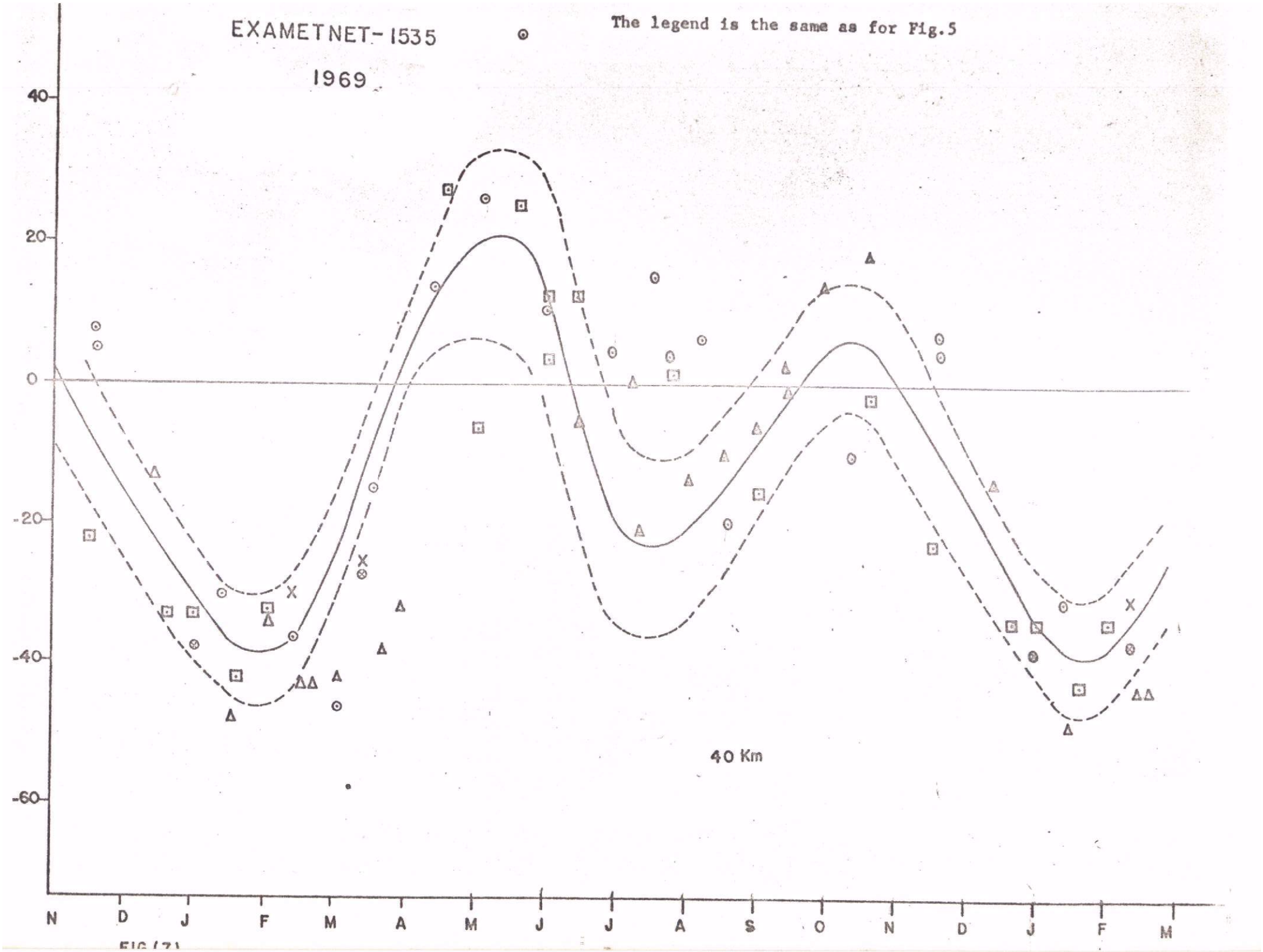
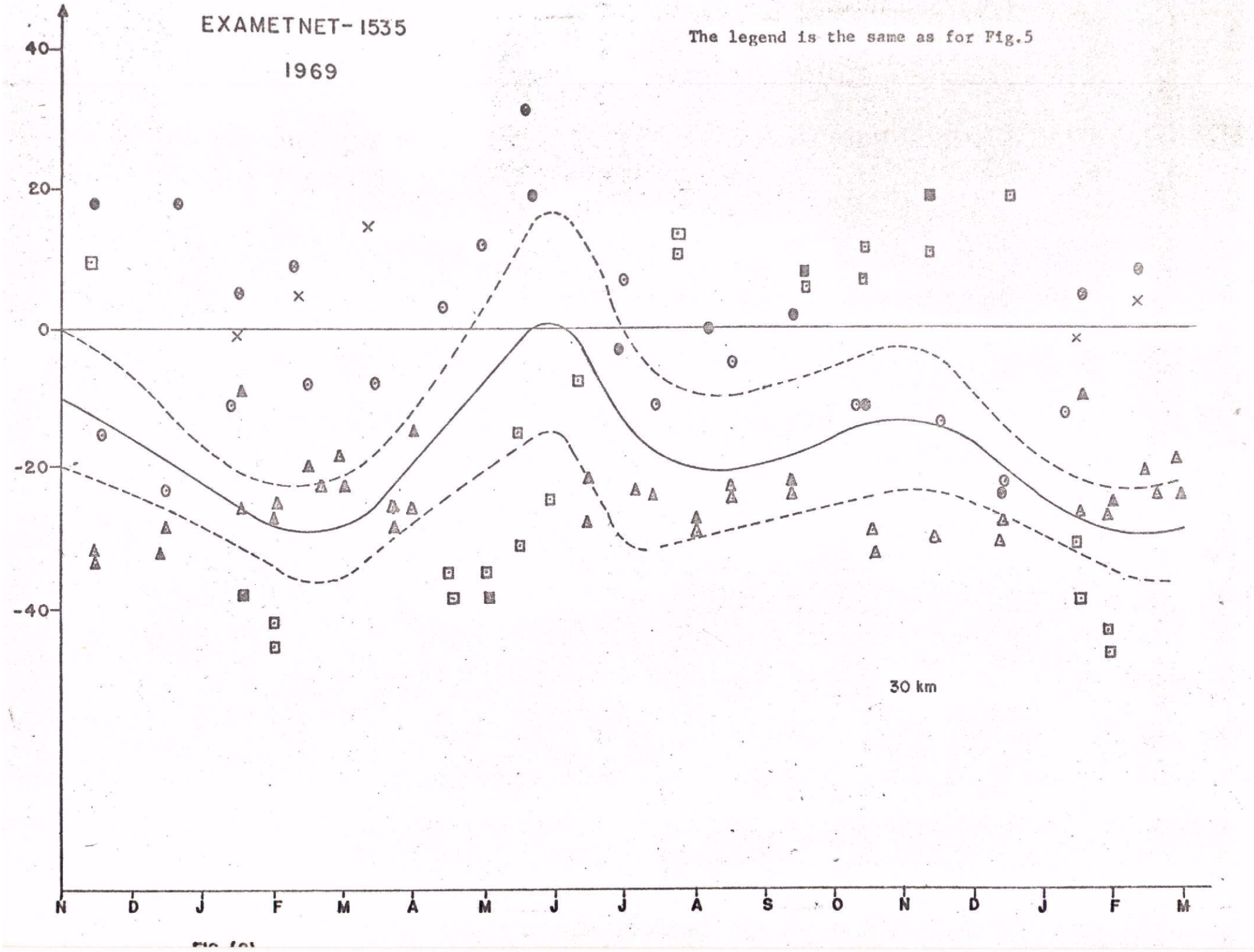

EXAMETNET-1535
1969
The legend is the same as for Fig.5
40
20
0
-20
-40
-60
40 Km
N
D
J
F
M
A
M
J
J
A
S
O
N
D
J
F
M

FIG (7)


EXAMETNET-1535
1969
The legend is the same as for Fig.5
40
20
0
-20
-40
30 km
N
D
J
F
M
A
M
J
J
A
S
O
N
D
J
F
M

presence of maxima amplitude of the 26 month oscillation in the lower stratosphere.

5 - MERIDIONAL COMPONENT

It would be risky to speculate about the meridional circulation with scanty data.

However, the observations from the available data Fig.9 (April 1968 through March 1969), are made for what they are worth. Below 60 km, there is a northerly component in most of the Fall and early Winter observations, indicating a cross-latitude flow towards the equator.

In that region, in July, August, September and October there is little evidence of definite northerly or southerly flow.

In late Spring and early Summer (November and December), between 25 km and 60 km levels, the flow assumes a well defined northerly component, with an 20 meters/sec value around 50 km level.

In the troposphere the prevailing component is northerly in Winter and southerly in Spring. It is not well-defined in Summer and Autumn.

There is a semi-annual variation in the stratosphere. This semi-annual variation of the meridional component in the equatorial upper stratosphere can probably be explained as a consequence of the double passage of the Sun over latitudes between 23^{o}N and S.

6 - DENSITY PERCENTAGE VARIATION

Fig.10 shows the seasonal percentage variation in density at Natal, based on U.S.Standard values [1962]

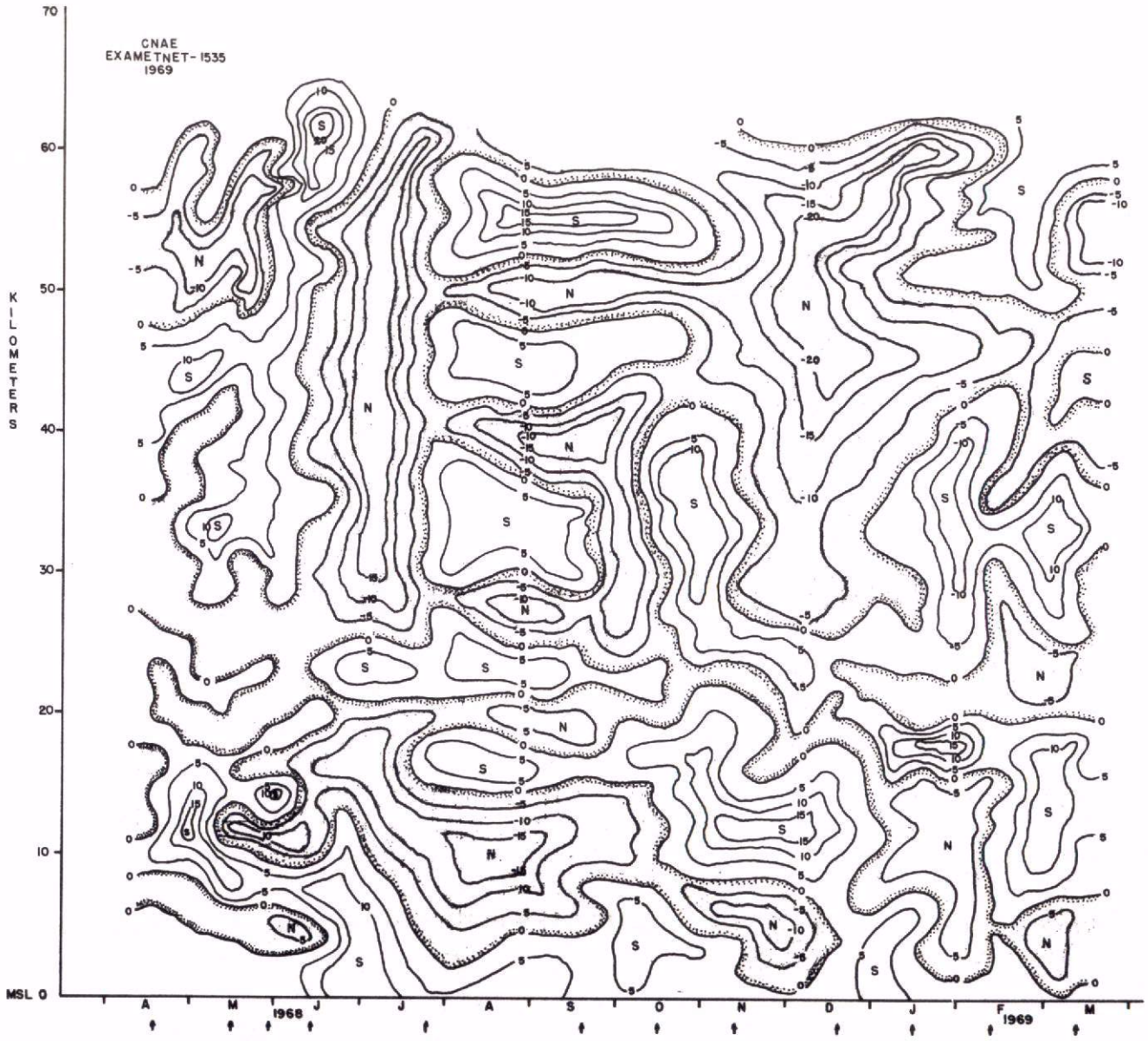


FIG.(9) Time cross section of meridional wind(kts)for NATAL_BRAZIL.
The arrows bellow the time scale show the dates that data were obtained.
Dashed lines indicate extrapolated data.

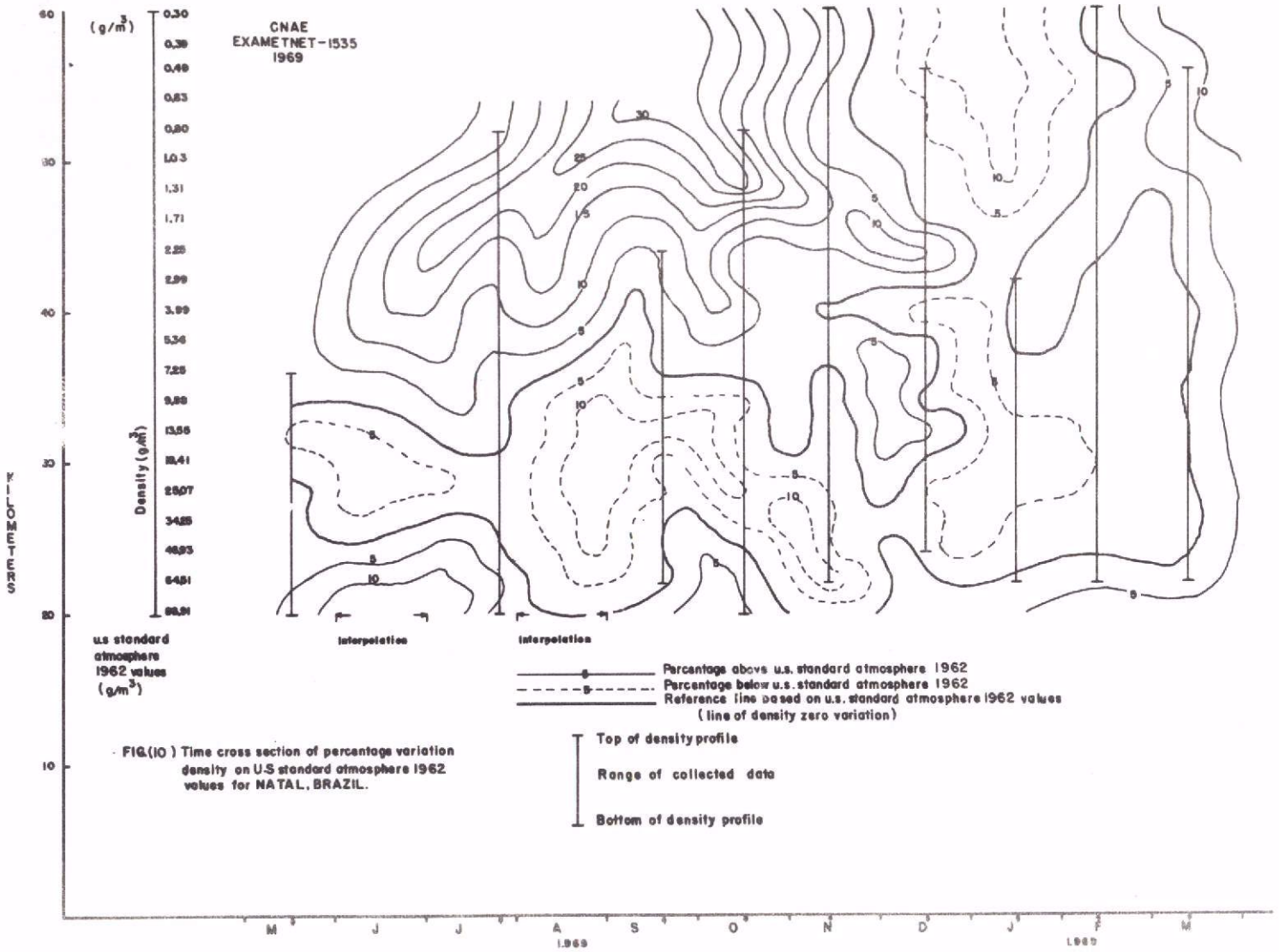


FIG.(10) Time cross section of percentage variation density on U.S standard atmosphere 1962 values for NATAL, BRAZIL.

Values for variations were obtained from $[\rho_i - \rho_{oi}/\rho_{oi}] \times 100$ where ρ_is are the density values in the i-th level, and ρ_{oi}s are the U.S. Standard Atmosphere values for i-th level.

This cell shows in dashed lines the percentage values bellow U.S.Standard Atmosphere values, and, solid lines the percentage above U.S. Standard Atmosphere values.

The heavy line represents the reference line based on U.S. Standard Atmosphere values (line of density zero variation).

Small variation was registred in Summer (February), around $\pm$ 5%, with values of the U.S.Standard Atmosphere for 24, 43, 52 and 57 km levels.

There is a well-defined decrease between 22 and 36 km levels, mainly for the September sounding values.

The greatest percentage value above U.S.Standard Atmosphere was recorded in June 1968 (20%), the first month of Winter, at 48 km level.

The percentage values above U.S.Standard Atmosphere were recorded still on Spring. After this time it attains values below U.S. Standard Atmosphere until February.

7 - CONCLUDING REMARKS

This program of meteorological measurements in Natal, while providing a partial picture of the structure and state of the tropical atmosphere has produced interesting and significant data. The most remarkable points are:

7.1 - Temperature Winds

a) The stratospheric warming of March 1969 is associated with

a change of winds direction from east to west, while the cooling of December 1968 January and February 1969 is associated with another change of winds direction from west to east.

b) The strong easterly stratospheric jet stream is associated with a stratospheric cooling.

7.2 - **Zonal Structure**

a) The cycle of Winter and Summer easterlies and equinoctial westerlies in the stratosphere appears to have maximum amplitude at 45-50 km.

b) The Summer easterlies appeas stronger than the Winter easterlies. This difference may be attributed to the influence of the annual circulation.

c) The relative weakness of the westerlies compared to the easterlies.

d)"When the semi-annual easterlies coincide with the Summer hemispheric easterlies of the mesosphere, a deep column of easterlies is expected. When they occur together with the Winter hemispheric westerlies of the mesosphere, a shrinking of the column of easterlies is expected", the same as observed by Quiroz [1967].

e) There is a good agreement between the zonal circulation of Natal and Ascension Island.

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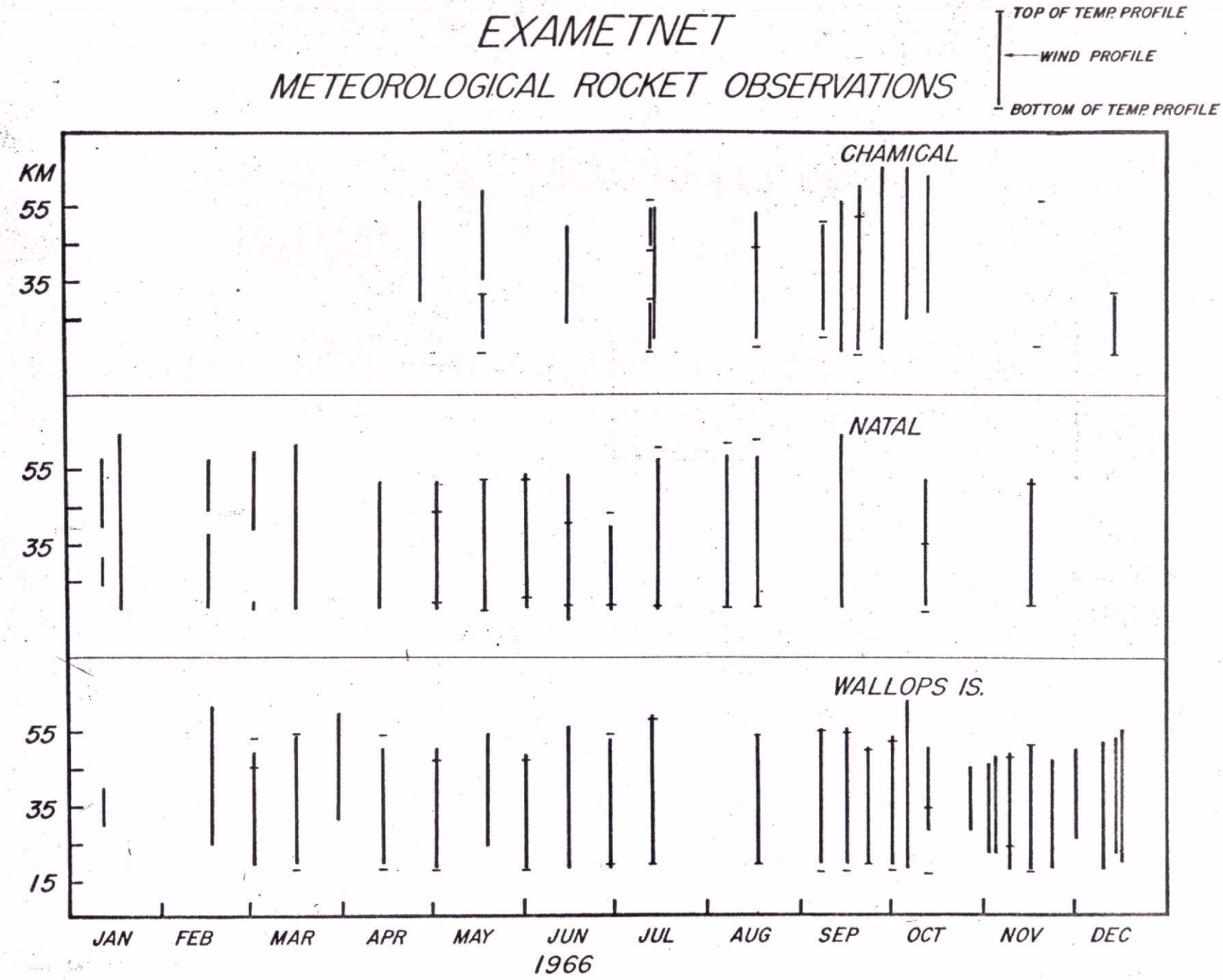
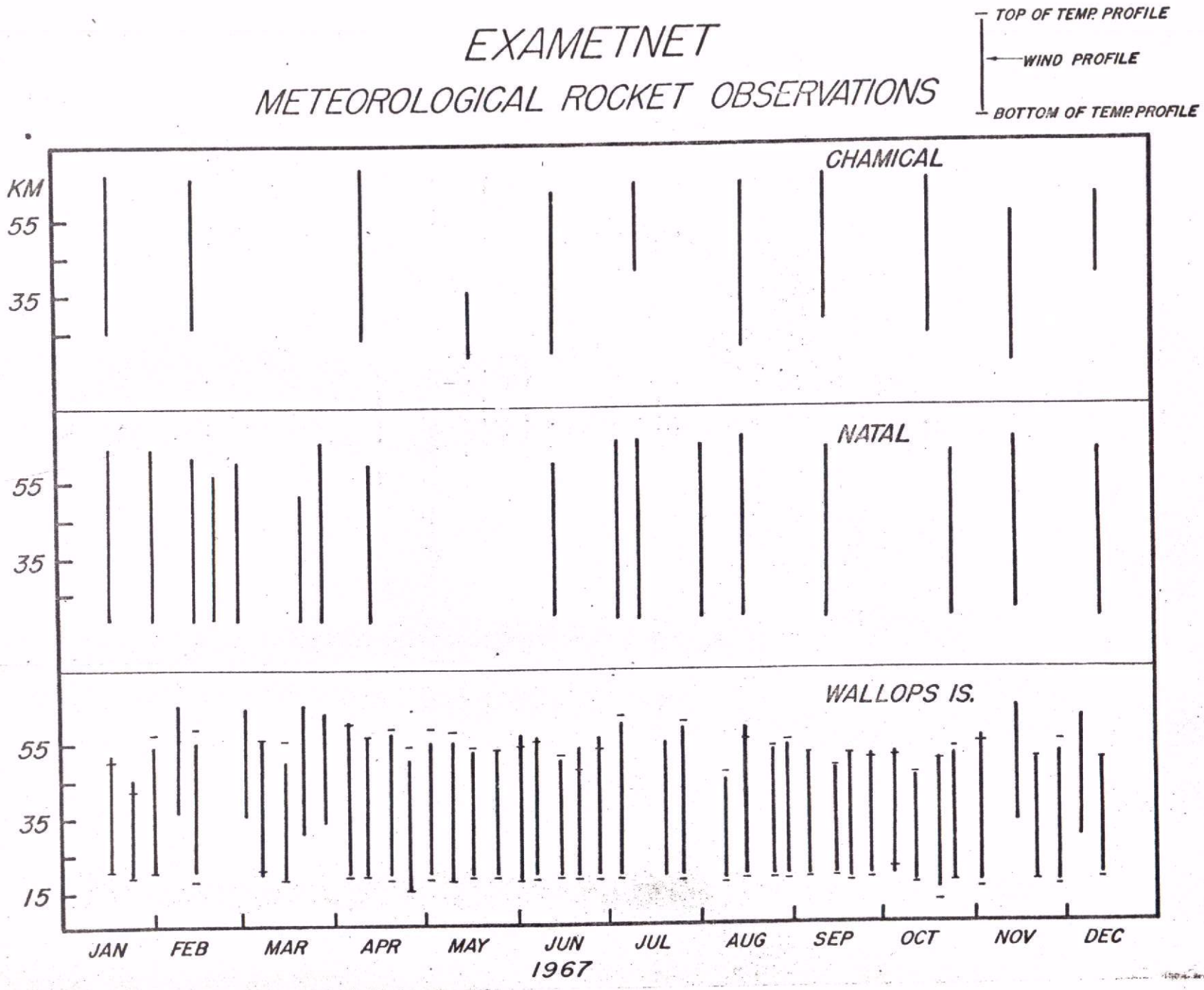
EXAMETNET

METEOROLOGICAL ROCKET OBSERVATIONS



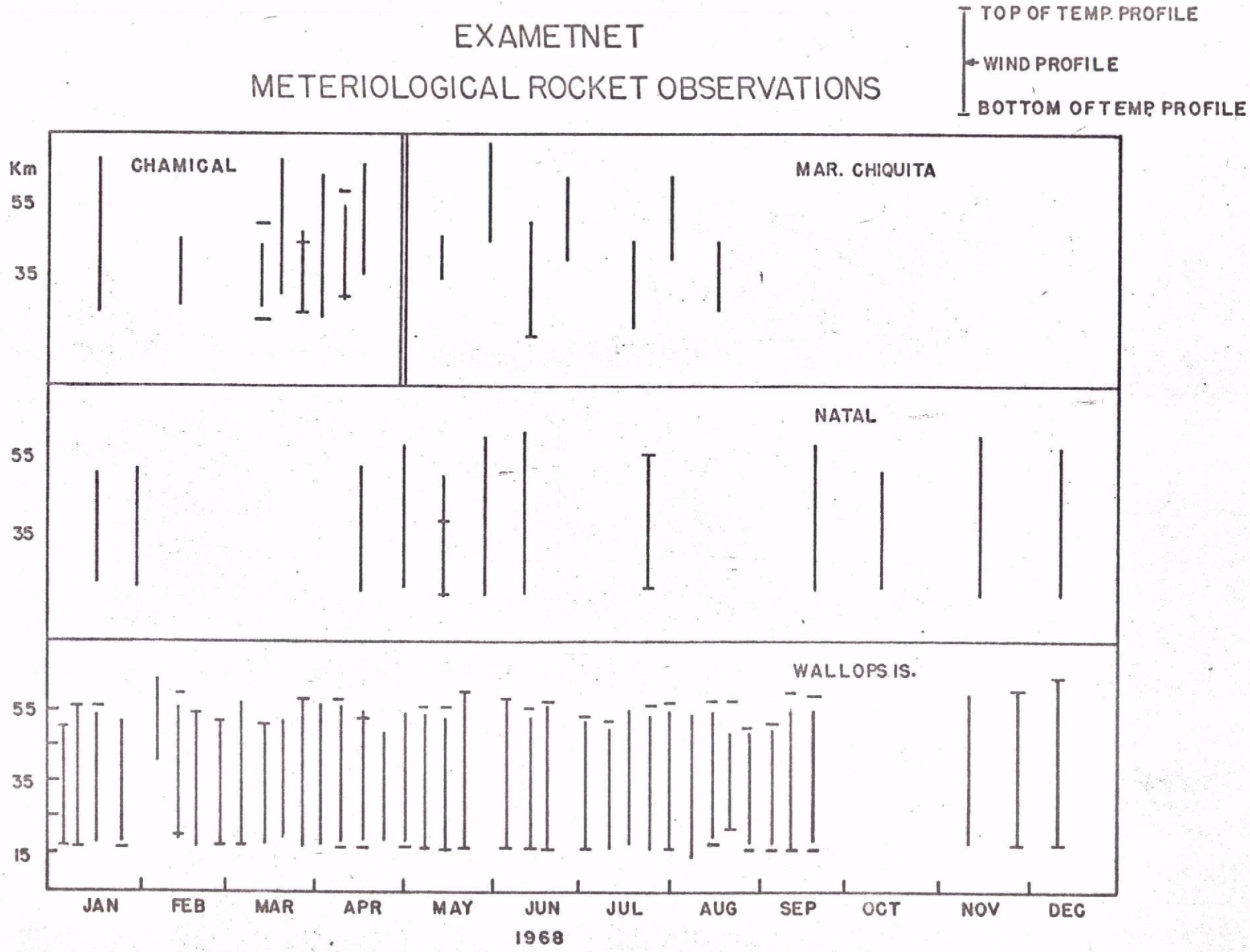
EXAMETNET

METEOROLOGICAL ROCKET OBSERVATIONS

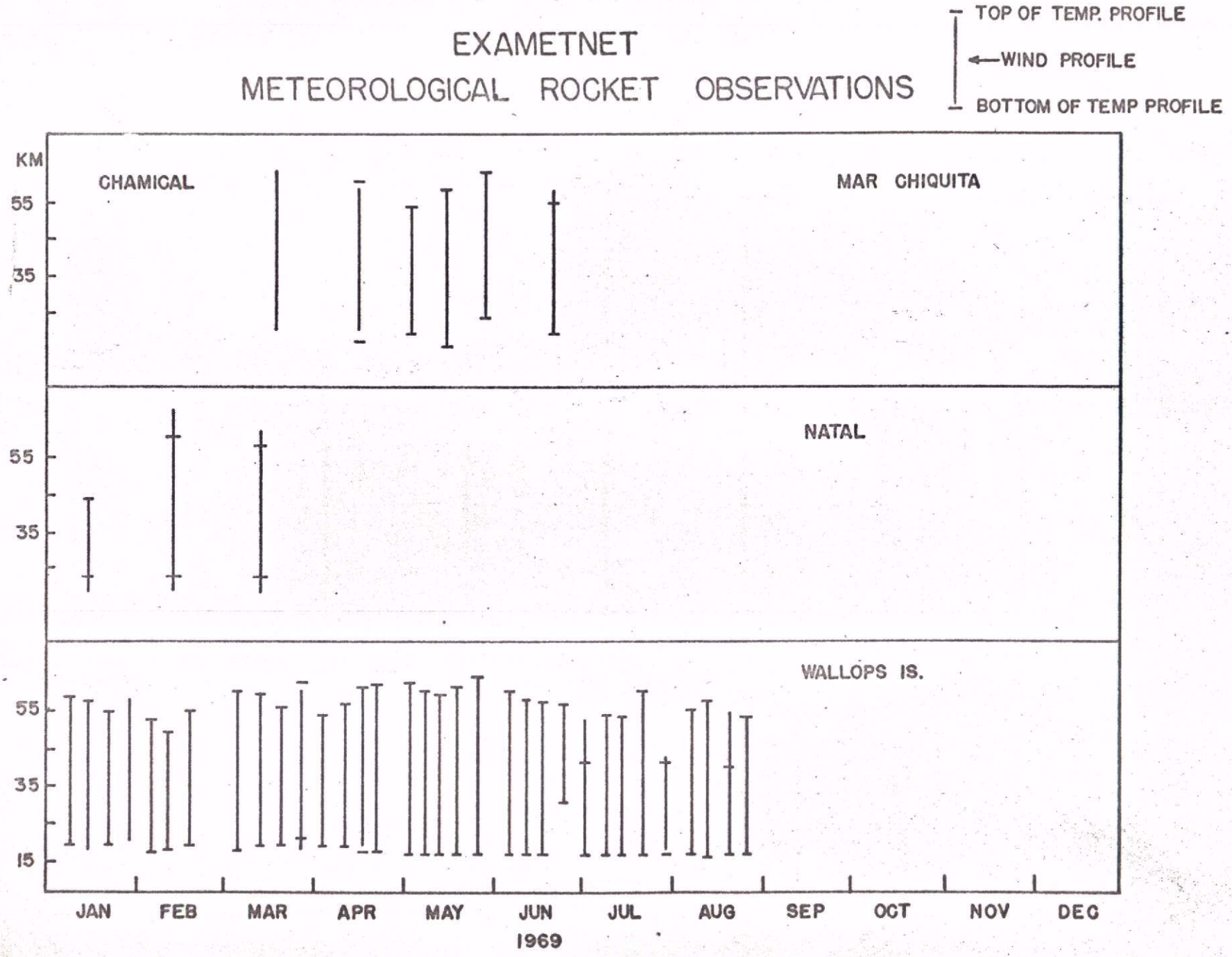


EXAMETNET

METERIOLOGICAL ROCKET OBSERVATIONS



EXAMETNET
METEOROLOGICAL ROCKET OBSERVATIONS



RR	STATION NAME	DATE	ROCKET RAWINSONDE LAUNCH TIME /	RELEASE TIME /
	(CNAE) NATAL, BRAZIL	/	/	/
82599	5°55' S 35°10' W ALT. 43 M	DECEMBER 13, 1967	1500	1101

TABULATED DATA

ROCKET WINDS

TIME TENTHS OF A MINUTE	FALL VEL M/S	ALT KM	WIND POLAR DEG	WIND POLAR KTS	WIND COMPONENTS MPS N-S	WIND COMPONENTS MPS E-W
020	078	63	232	044	+014	+018
023	067	62	063	004	-001	+002
025	056	61	090	052	+000	-027
029	048	60	088	056	-001	-029
032	043	59	087	039	-001	-020
036	042	58	078	064	-007	-032
040	042	57	075	092	-012	-046
044	042	56	073	106	-016	-052
049	037	55	072	114	-018	-056
053	033	54	071	112	-017	-055
059	030	53	070	113	-017	-057
064	030	52	085	111	-005	-057
070	028	51	094	093	+003	-048
076	026	50	096	081	+008	-041
083	024	49	104	058	+007	-029
090	024	48	106	049	+007	-024
097	022	47	102	038	+004	-019
105	021	46	100	022	+002	-011
113	021	45	086	018	-001	-009
121	020	44	072	025	-004	-012
130	019	43	067	025	-005	-012
139	019	42	061	024	-006	-011
148	019	41	081	024	-002	-012
157	017	40	090	027	+000	-014
168	016	39	107	026	+004	-013
178	017	38	120	017	+005	-007
188	015	37	117	013	+003	-006
200	014	36	084	020	-001	-010
212	014	35	085	021	-001	-011
224	014	34	104	024	+003	-012
236	013	33	110	039	+007	-019
250	012	32	095	043	+002	-022
263	012	31	083	049	-003	-025
277	012	30	086	055	-002	-028
291	011	29	083	067	-004	-034
307	010	28	081	073	-006	-037
323	010	27	085	062	-003	-032
340	009	26	088	055	-002	-028
359	009	25	081	051	-004	-026
377	009	24	078	038	-004	-019
397	008	23	079	020	-002	-010
417	008	22	090	004	+000	-002
438	008	21	270	008	+000	+004
461	007	20	304	007	-002	+003
485	007	19	045	005	-002	-002
510	007	18	108	006	+001	-003

ROCKET THERMODYNAMICS

ALT TENS OF METERS	TEMP DEG C	PRESSURE MB	DENSITY G M -3	SPEED OF SOUND M/S	WIND POLAR DEG	WIND POLAR KTS	WIND COMPONENTS MPS N-S	WIND COMPONENTS MPS E-W

RAWINSONDE

PRESSURE MB	ALT TENS OF METERS	WIND POLAR DEG	WIND POLAR KTS	WIND COMPONENTS MPS N-S	WIND COMPONENTS MPS E-W	RH %	TEMP DEG C
1007.7	0004	050	010	-003	-004	67	+27.7
0802.0	0200	067	011	-002	-005	42	+12.8
0629.0	0400	037	007	-003	-002	35	+02.4
0490.0	0600	122	005	+001	-002	39	-10.0
0376.0	0800	192	015	+004	+002	46	-22.8
0284.3	1000	165	027	+013	-004	34	-37.4
0210.4	1200	182	032	+016	+001		-49.7
0152.0	1400	153	051	+026	+001		-71.1
0124.0	1521	165	029	+015	-004		-80.0
0108.2	1600	156	024	+011	-005		-78.6
0076.5	1800	087	014	-000	-007		-80.1
0054.4	2000	315	015	-005	+005		-67.5
0039.0	2200	185	004	+002	+000		-67.3
0027.9	2400	091	036	+000	-019		-57.9
0020.8	2600	087	058	-002	-030		-50.0
0015.4	2800	078	071	-008	-036		-48.9
0011.5	3000	084	062	-003	-032		-43.3
0008.6	3200	082	051	-004	-024		-39.1
0006.4	3400	096	026	+001	-013		-33.2
0004.9	3600	059	028	-007	-012		-31.3
0003.7	1800	152	014	+006	-003		-30.0
0003.0	3949	154	013	+006	-003		-27.5

TECHNICAL DATA

VEHICLE DATA

MOTOR TYPE.. JUDI
MOTOR PERFORMANCE.. GOOD
PAYLOAD TYPE.. CHAFF
PAYLOAD PERFORMANCE.. GOOD
FUSE TYPE.. ELECTRICALLY ACTIVATED PYROTECHNIC
FUSE DELAY TIME.. PREDICTED.. 110 SEC. ACTUAL.. 90 SEC.
TYPE OF LAUNCHER.. 8.5 FT. TUBULAR
LAUNCHER SETTING.. 070 DEG. AZIMUTH 81.0 DEG. ELEVATION

RADAR DATA

RADAR TYPE.. MPS-19
MOTOR ACQUISITION.. 5 SECONDS 4,845 METERS ALTITUDE
MOTOR TRACK DROPPED.. 64 SECONDS 52,485 METERS ALTITUDE
PAYLOAD ACQUISITION.. 90 SECONDS 63,185 METERS ALTITUDE
PAYLOAD TRACK DROPPED.. 3,254 SECONDS 16,765 METERS ALTITUDE
APOGEE.. 102 SECONDS 68,455 METERS ALTITUDE

SENSOR AND TELEMETRY DATA

WIND SENSOR.. 0.005 INCH S BAND CHAFF
TEMPERATURE SENSOR.. N.A.
SENSOR FALL RATE.. BELOW NOMINAL
GROUND EQUIPMENT TYPE.. N.A.
TELEMETRY FREQUENCY.. N.A.
TELEMETRY QUALITY.. N.A.
TELEMETRY DATA RECEIVED FROM.. N.A.

REMARKS

NONE
THERMODYNAMICS BASE DATA.. PRESSURE N.A.
ALTITUDE N.A.
TEMPERATURE N.A.

RADIOSONDE AND BALLOON DATA

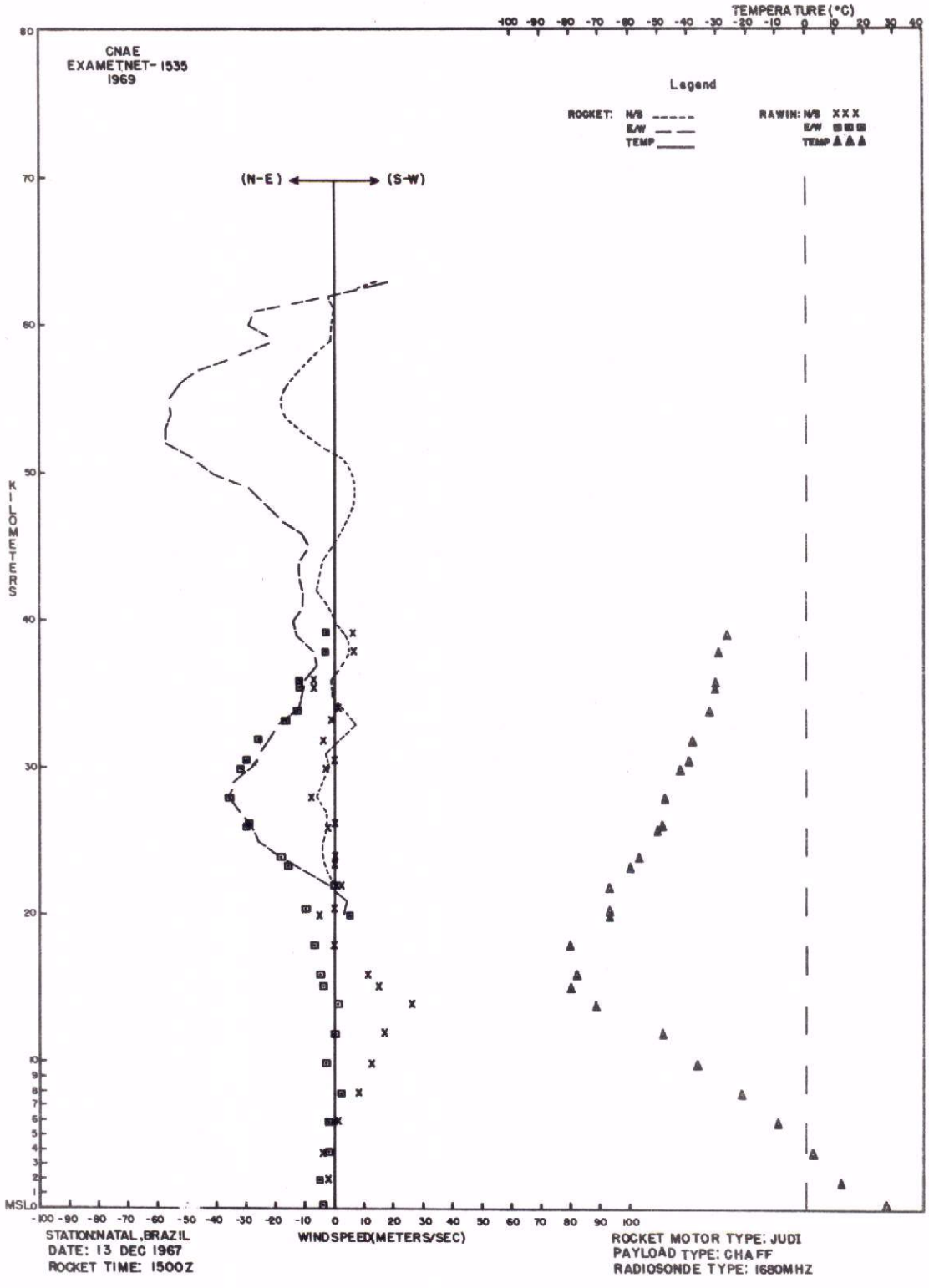
RADIOSONDE MANUFACTURER.. MOLDED INSULATION CO.
RADIOSONDE TYPE.. 1680 MHZ
TEMPERATURE ELEMENT TYPE.. ROD THERMISTOR
PRESSURE SENSOR TYPE.. ANEROID
GROUND EQUIPMENT TYPE.. GMD-1A
BALLOON TYPE.. NEOPHENE
BALLOON SIZE.. 1,200 GRAMS
FREE LIFT.. 1,300 GRAMS
ASCENSION RATES.. SFC-400 MB = 263 M/MINUTE
400 MB-TOP = 377 M/MINUTE

WEATHER OBSERVATION AT RAWINSONDE RELEASE

STATION PRESSURE.. 1007.7 MB
TEMPERATURE.. 27.7 DEG. C
RELATIVE HUMIDITY.. 67%
VISIBILITY.. 20 KM
SURFACE WIND.. 050 DEG. 10 KTS
CLOUD TYPE AND AMOUNT.. TOTAL.. 5 OCTAS
LOW.. 2 OCTAS/CU
MIDDLE.. 3 OCTAS/AC
HIGH.. NONE
TYPE OF PRECIPITATION.. NONE
OBSTRUCTIONS TO VISION.. NONE

WIND AT ROCKET LAUNCH

21 FT. 090 DEG/10 KTS, 29 FT. 060 DEG/10 KTS,
51 FT. 060 DEG/08 KTS, 82 FT. 050 DEG/10 KTS,
133 FT. 060 DEG/10 KTS


CNAE
EXAMETNET-1535
1969
TEMPERATURE (°C)
Legend
ROCKET: N/S
E/W
TEMP
RAWIN: N/S
E/W
TEMP
(N-E)
(S-W)
KILOMETERS
MSL
WINDSPEED(METERS/SEC)
STATION:NATAL, BRAZIL
DATE: 13 DEC 1967
ROCKET TIME: 1500Z
ROCKET MOTOR TYPE: JUDI
PAYLOAD TYPE: CHAFF
RADIOSONDE TYPE: 1680MHZ

ROCKET OBSERVATION DATA

RP STATION NAME

82599 (CNAE) NATAL, BRAZIL

LAT. 05°55'S LONG. 35°16'W

ROCKET LAUNCH

DATE JANUARY 17, 1968 TIME 1500 Z

RAWINSONDE RELEASE

DATE JANUARY 17, 1968 TIME 1946 Z

ROCKET WINDS

FALL VEL	ALT	WIND POLAR		WIND COMPONENTS MPS	
M/S	KM	DEG	MPS	N-S	E-W
067	50	084	053	-006	-055
057	49	085	052	-005	-053
059	48	082	055	-008	-056
061	47	079	052	-010	-053
059	46	082	059	-008	-060
057	45	086	054	-005	-055
056	44	088	052	-002	-053
051	43	089	052	-001	-053
048	42	095	046	+004	-046
043	41	099	036	+006	-039
041	40	097	033	+005	-034
038	39	088	028	-001	-029
035	38	081	022	-004	-022
033	37	079	021	-004	-020
033	36	087	022	-001	-023
028	35	095	026	+002	-026
028	34	092	030	+001	-030
025	33	085	032	-003	-032
024	32	084	037	-004	-037
021	31	085	038	-003	-038
019	30	087	038	-002	-039
018	29	085	038	-003	-038
017	28	083	038	-005	-038
015	27	085	037	-003	-037
013	26	090	033	+000	-034
013	25	096	027	+003	-028
012	24	084	019	-002	-019
010	23	069	011	-004	-011
010	22	058	004	-002	-003
009	21	061	007	-004	-007
008	20	097	006	+001	-006
007	19	191	008	+009	+002
007	18	208	010	+009	+005

ROCKET THERMODYNAMICS

ALT TENS OF METERS	TEMP DEG C	PRESSURE MB	DENSITY G M $^{-3}$	WIND POLAR DEG	MPS	WIND COMPONENTS MPS N-S	E-W
2816	-47.8			083	038	-004	-038
2764	-51.9	17.661	28.105	085	037	-003	-037
2670	-53.2	18.754	30.021	087	036	-002	-036
2661	-52.7	18.992	30.033	087	036	-002	-036
2627	-56.9	20.008	32.576	088	034	-001	-034
2588	-58.7	21.275	34.930	091	032	+000	-032
2536	-57.1	23.211	37.827	094	029	+005	+029
2493	-61.4	24.653	40.992	096	026	+003	-026
2414	-60.3	27.988	46.298	086	020	-001	-020
2384	-63.2	29.437	49.367	082	018	-002	-018
2295	-59.7	33.802	55.758	068	011	-004	-010
2280	-64.7	34.638	58.508	069	010	-003	-009
2246	-65.5	36.729	62.279	063	007	-003	-006
2179	-63.6	40.087	67.356	057	005	-003	-004
2115	-68.6	45.468	78.265	060	007	-003	-006
2051	-66.3	50.067	85.225	077	007	-002	-007
2024	-69.2	52.875	91.263	087	006	+000	-006
2000	-66.9	55.000	93.892	097	006	+001	-006
1957	-68.7			133	007	+005	-005
1942	-73.7			145	007	+006	-004
CONSTANT PRESSURE SURFACES (GEOPOTENTIAL HEIGHT)							
2045	-66.3	50.000	84.225	077	007	-002	-007
2361	-62.7	30.000	49.674	080	018	-002	-018
2616	-56.9	20.000	32.216	088	034	-001	-034

RAWINSONDE

PRESSURE MB	ALT TENS OF METERS	WIND POLAR DEG	MPS	WIND COMPONENTS MPS N-S	E-W	RH %	TEMP DEG C
1008.4	0004	140	004	+003	-003	60	+28.4
0804.0	0200	088	007	+000	-007	51	+15.0
0603.0	0400	086	006	+000	-006	32	+00.1
0480.0	0600	033	003	-003	-002	19	-09.9
0376.0	0800	268	013	+001	+013	21	-23.4
0283.5	1000	241	009	+004	+008	24	-38.0
0212.8	1200	272	030	-001	+030	24	-49.8
0153.6	1400	262	041	+006	+041		-66.4
0119.0	1547	240	038	+020	+033		-75.0
0109.6	1600	228	016	+011	+012		-75.2
0079.0	1785	213	005	+004	+003		-82.9
0077.6	1800	218	006	+005	+004		-82.1
0055.0	2000	112	006	+002	-006		-86.9
0039.5	2200	012	005	-005	-001		-65.0
0028.6	2400	076	024	-006	-023		-59.7
0020.9	2600	094	034	+003	-034		-57.2
0015.3	2800	094	038	+003	-038		-50.2
0011.4	3000	091	038	+001	-038		-43.6
0008.5	3200	083	036	-005	-035		-36.0
0006.4	3400	089	030	+000	-030		-31.1
0004.9	3600	090	027	+000	-027		-27.3
0003.7	3800	081	022	-004	-022		-24.9
0003.0	3932	090	030	+000	-030		-26.0

TECHNICAL DATA

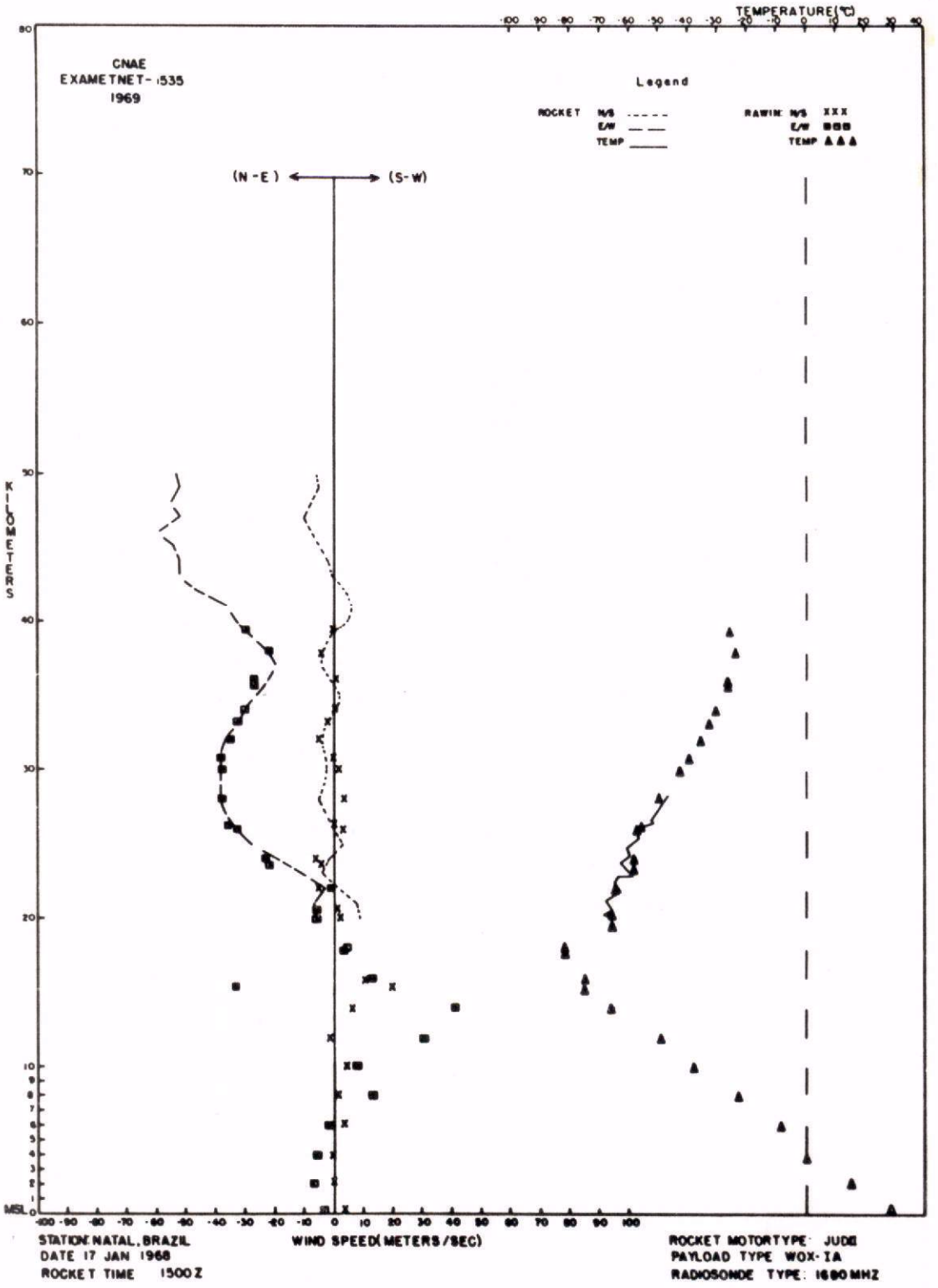
MOTOR TYPE..JUDI
PAYLOAD TYPE..WOX-1A
FUSE TYPE..ELECTRICALLY ACTIVATED PYROTECHNIC
LAUNCHER SETTING..060°AZIMUTH 78.0°ELEVATION
RADAR TYPE..MPS-19 APOGEE 55,839 METERS
WIND SENSOR TYPE..6 FT. SQUARE PARACHUTE
TEMPERATURE SENSOR TYPE..0.014 INCH BEAD THERMISTOR
GROUND EQUIPMENT TYPE..403 MHZ PORTABLE RECEIVER-RECORDER
REMARKS..NO SIGNAL RECEIVED FROM EJECTION TO 28 KM.

MOTOR PERFORMANCE..GOOD
PAYLOAD PERFORMANCE..POOR
ACTUAL FUSE DELAY TIME..UNKNOWN

SENSOR FALL-RATE..NOMINAL

RADIOSONDE MANUFACTURER..MOLDED INSULATION CO.
TEMPERATURE ELEMENT TYPE..R00 THERMISTOR
PRESSURE SENSOR TYPE..ANEROID
GROUND EQUIPMENT TYPE..GMD-1A
WIND AT ROCKET LAUNCH..UNKNOWN
BALLISTIC WIND..UNKNOWN AZIMUTH UNKNOWN MPS
THERMODYNAMIC BASE DATA..PRESSURE 55.0 MBS
TEMPERATURE -66.9°C
ALTITUDE 20,000 METERS

RADIOSONDE TYPE..1680 MHZ
BALLOON TYPE..NEOPRENE
BALLOON SIZE..1,200 GRAMS


CNAE
EXAMETNET-1535
1969
Legend
ROCKET N/S
E/W
TEMP
RAWIN N/S XXX
E/W
TEMP
TEMPERATURE(°C)
(N-E)
(S-W)
KILOMETERS
MSL
WIND SPEED(METERS/SEC)
STATION NATAL, BRAZIL
DATE 17 JAN 1968
ROCKET TIME 1500Z
ROCKET MOTOR TYPE: JUDE
PAYLOAD TYPE WOX-IA
RADIOSONDE TYPE: 1680 MHZ

ROCKET OBSERVATION DATA

RP STATION NAME

82599 (CNAE) NATAL, BRAZIL

LAT. 05°55'S LONG. 35°10'W

ROCKET LAUNCH

DATE JANUARY 31, 1968 TIME 1512 Z

RAWINSONDE RELEASE

DATE JANUARY 31, 1968 TIME 1147 Z

ROCKET WINDS

FALL VEL	ALT	WIND POLAR		COMPONENTS MPS	
M/S	KM	DEG	MSS	N-S	E-W
	53	308	025	-015	+020
027	52	312	012	-008	+009
026	51	327	006	-005	+003
025	50	091	008	+000	-008
024	49	100	019	+003	-019
024	48	095	028	+003	-029
022	47	090	039	+000	-039
022	46	087	040	-002	-041
021	45	083	037	-005	-037
019	44	079	028	-005	-028
020	43	071	023	-008	-022
019	42	078	024	-005	-023
018	40	086	027	-002	-027
017	40	095	033	+003	-033
016	39	108	030	+010	-029
016	38	106	027	+008	-027
016	37	097	027	+003	-027
014	36	098	027	+004	-027
013	35	100	030	+005	-030
013	34	098	034	+005	-034
014	33	094	037	+003	-037
013	32	092	039	+001	-040
013	31	091	041	+001	-042
012	30	090	044	+000	-045
011	29	086	043	-003	-044
010	28	086	040	-003	-041
010	27	085	037	-003	-037
010	26	086	036	-002	-037
009	25	094	029	-002	-029
009	24	090	020	+000	-020
009	23	073	013	-004	-012
008	22	085	007	-001	-007
008	21	106	003	+001	-003
007	20	066	002	-001	-002
007	19	098	004	+001	-004
007	18	156	006	+006	-003

RAWINSONDE

PRESSURE	ALT TENS OF	WIND POLAR		COMPONENTS MPS		RH	TEMP
MB	METERS	DEG	MPS	N-S	E-W	%	DEG C
1007.4	0004	100	005	+001	-005	66	+29.6
0882.1	0200	097	006	+001	-006	44	+14.2
0630.2	0400	077	011	-003	-011	18	+04.8
0491.0	0600	045	002	-002	-001	16	-05.4
0378.2	0800	121	004	+002	-004	14	-19.3
0287.0	1000	301	003	-002	+003	16	-35.8
0213.6	1200	350	007	-007	+001	17	-49.3
0155.7	1400	300	019	-009	+017		-65.0
0111.2	1600	322	011	-008	+007		-80.0
0095.0	1684	227	007	+004	+004		-84.3
0077.8	1800	128	012	-007	-009		-82.2
0054.7	2000	052	007	-004	-005		-78.5
0039.4	2200	088	010	-001	-010		-61.4
0028.6	2400	090	017	+000	-017		-58.1
0021.0	2600	088	035	-001	-034		-53.1
0015.6	2800	080	032	-006	-032		-46.8
0011.6	3000	085	042	-004	-042		-41.5
0008.6	3200	087	040	-002	-041		-37.3
0006.5	3400	100	035	+006	-036		-27.0

TECHNICAL DATA

MOTOR TYPE..JUDI

PAYLOAD TYPE..CHAFF

FUSE TYPE..ELECTRICALLY ACTIVATED PYROTECHNIC

LAUNCHER SETTING..055° AZIMUTH 78.0° ELEVATION

RADAR TYPE..MPS-19 AMOGEE AB.MAG METERS

WIND SENSOR TYPE..A.005 INCH S BAND COPPER CHAFF SENSOR FALL-RATE..NOMINAL

TEMPERATURE SENSOR TYPE..N.A.

GROUND EQUIPMENT TYPE..N.A.

REMARKS..NONE

MOTOR PERFORMANCE..GOOD

PAYLOAD PERFORMANCE..GOOD

ACTUAL FUSE DELAY TIME..104 SEC

RADIOSONDE MANUFACTURER..MOLDEU INSULATION CO. RADIOSONDE TYPE..16A8 MH7

TEMPERATURE ELEMENT TYPE..RAD THERMISTOR RALLOON TYPE..NEOPRENE

PRESSURE SENSOR TYPE..ANEROID. RALLOON SIZE..1.200 GRAMS

GROUND EQUIPMENT TYPE..GMD-1A

WIND AT ROCKET LAUNCH..6M 100DEG/03MPS 9M 100DEG/02MPS 14M 110DEG/04MPS

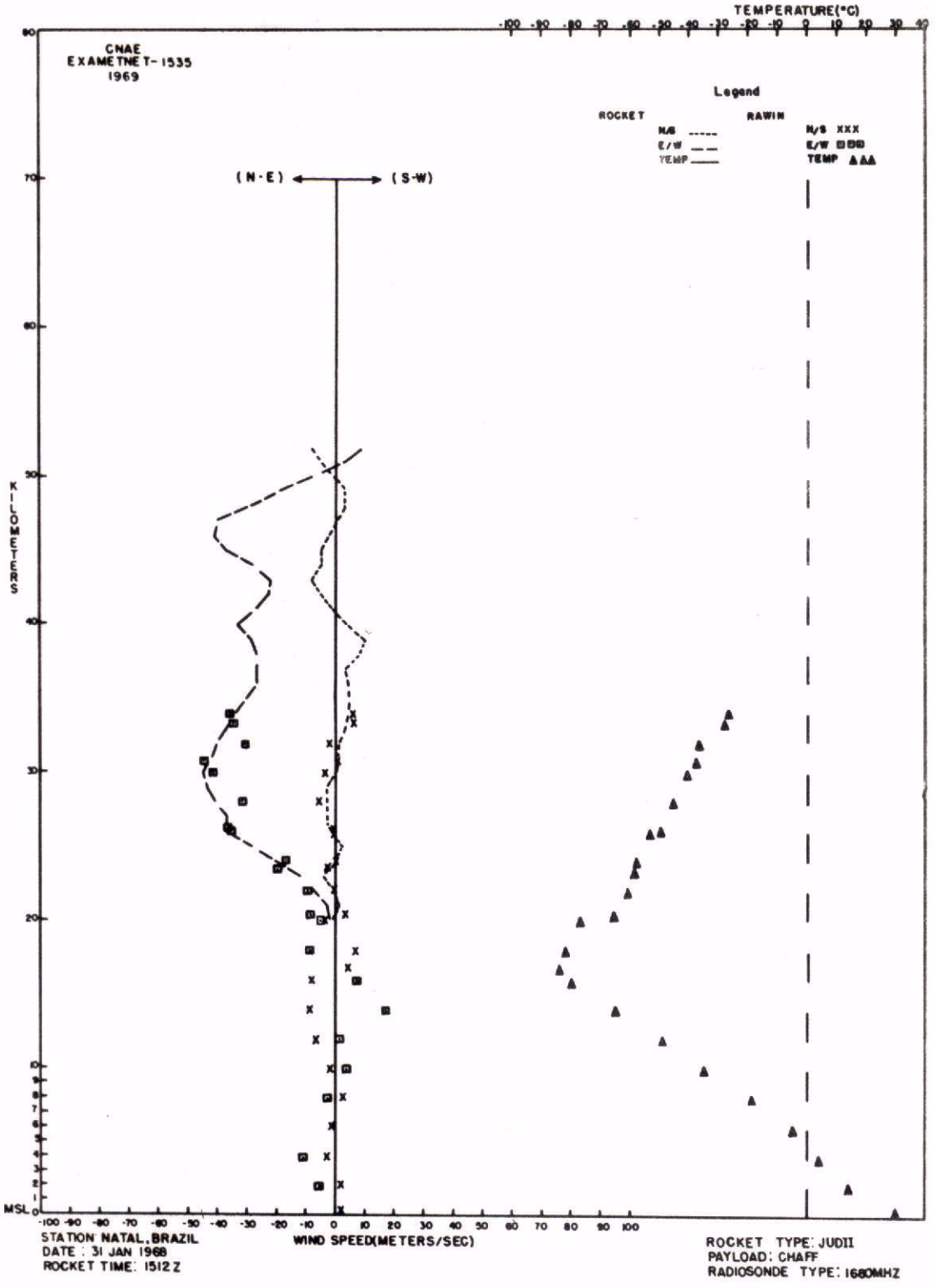
25M 040DEG/04MPS

BALLISTIC WIND.. UNKNOWN AZIMUTH UNKNOWN MPS

THERMODYNAMIC BASE DATA..PRESSURE N.A. MBS

TEMPERATURE N.A. C

ALTITUDE N.A. METERS


TEMPERATURE(°C)
CNAE
EXAMETNET-1535
1969
Legend
ROCKET
RAWIN
N/S -----
E/W — —
TEMP ——
N/S XXX
E/W □□□
TEMP ΔΔΔ
(N-E)
(S-W)
KILOMETERS
MSL
WIND SPEED(METERS/SEC)
STATION NATAL, BRAZIL
DATE : 31 JAN 1968
ROCKET TIME: 1512Z
ROCKET TYPE: JUDII
PAYLOAD: CHAFF
RADIOSONDE TYPE: 1680MHZ

ROCKET OBSERVATION DATA

RP STATION NAME

82599 (CNAE) NATAL, BRAZIL

LAT. 05°55'S LONG. 35°10'W

ROCKET LAUNCH

DATE APRIL 17, 1968 TIME 1500 Z

RAWINSONDE RELEASE

DATE APRIL 17, 1968 TIME 1058 Z

ROCKET WINDS

FALL VEL	ALT	POLAR		WIND COMPONENTS MPS	
M/S	KM	DEG	MPS	N-S	E-W
090	54	301	015	-008	+013
076	53	300	021	-010	+018
074	52	296	020	-009	+018
074	51	295	008	-003	+007
071	50	265	004	+000	+004
068	49	255	015	+002	+015
068	48	279	021	-003	+021
076	47	270	023	+000	+024
058	46	259	023	+005	+023
046	45	281	017	-003	+017
050	44	269	017	+001	+017
052	43	249	024	+009	+023
046	42	259	017	+004	+017
042	41	258	021	+005	+021
042	40	254	028	+008	+027
037	39	260	025	+005	+025
035	38	269	024	+000	+025
033	37	271	020	+000	+021
029	36	274	020	-001	+020
029	35	270	010	+000	+010
026	34	082	007	-001	-007
023	33	080	014	-002	-013
023	32	089	030	+000	-031
021	31	085	041	-004	-043
020	30	096	035	+004	-035
020	29	084	036	-004	-036
017	28	084	035	-004	-035
015	27	086	030	-002	-030
014	26	090	026	+000	-027
013	25	094	024	+002	-025
012	24	089	020	+000	-021
011	23	083	018	-002	-018
010	22	081	013	-002	-013
009	21	088	006	+000	-006
008	20	065	002	-002	-001
007	19	311	005	-003	+004
006	18	258	001	+000	+001

RAWINSONDE

PRESSURE	ALT TENS OF	POLAR		WIND COMPONENTS MPS		RH	TEMP
MB	METERS	DEG	MPS	N-S	E-W	%	DEG C
1007.6	0004	170	002	+002	+000	84	+27.8
0805.0	0200	127	005	+003	-004	60	+19.5
0636.0	0400	102	005	+001	-005	29	+08.9
0497.0	0600	095	006	+001	-006	35	-02.9
0384.0	0800	082	010	-002	-010	22	-15.9
0293.0	1000	062	012	-006	-010	27	-30.8
0218.6	1200	061	009	-005	-008	29	-47.9
0160.0	1400	099	013	+002	-012		-64.4
0114.3	1600	018	005	-004	-001		-74.5
0084.0	1722	292	006	-002	+005		-82.8
0080.4	1800	144	007	+005	-004		-80.3
0057.6	2000	263	006	+001	+006		-66.7
0041.8	2200	085	012	-001	-012		-58.0
0030.5	2400	087	022	-001	-021		-52.9
0022.7	2600	095	025	+002	-025		-47.5
0016.9	2800	088	031	-001	-031		-44.7
0012.7	3000	085	038	-003	-039		-38.8
0009.4	3200	094	035	+002	-036		-33.3
0007.1	3400	090	015	+000	-015		-30.3
0005.4	3600						-27.7
0005.0	3637						-26.7

TECHNICAL DATA

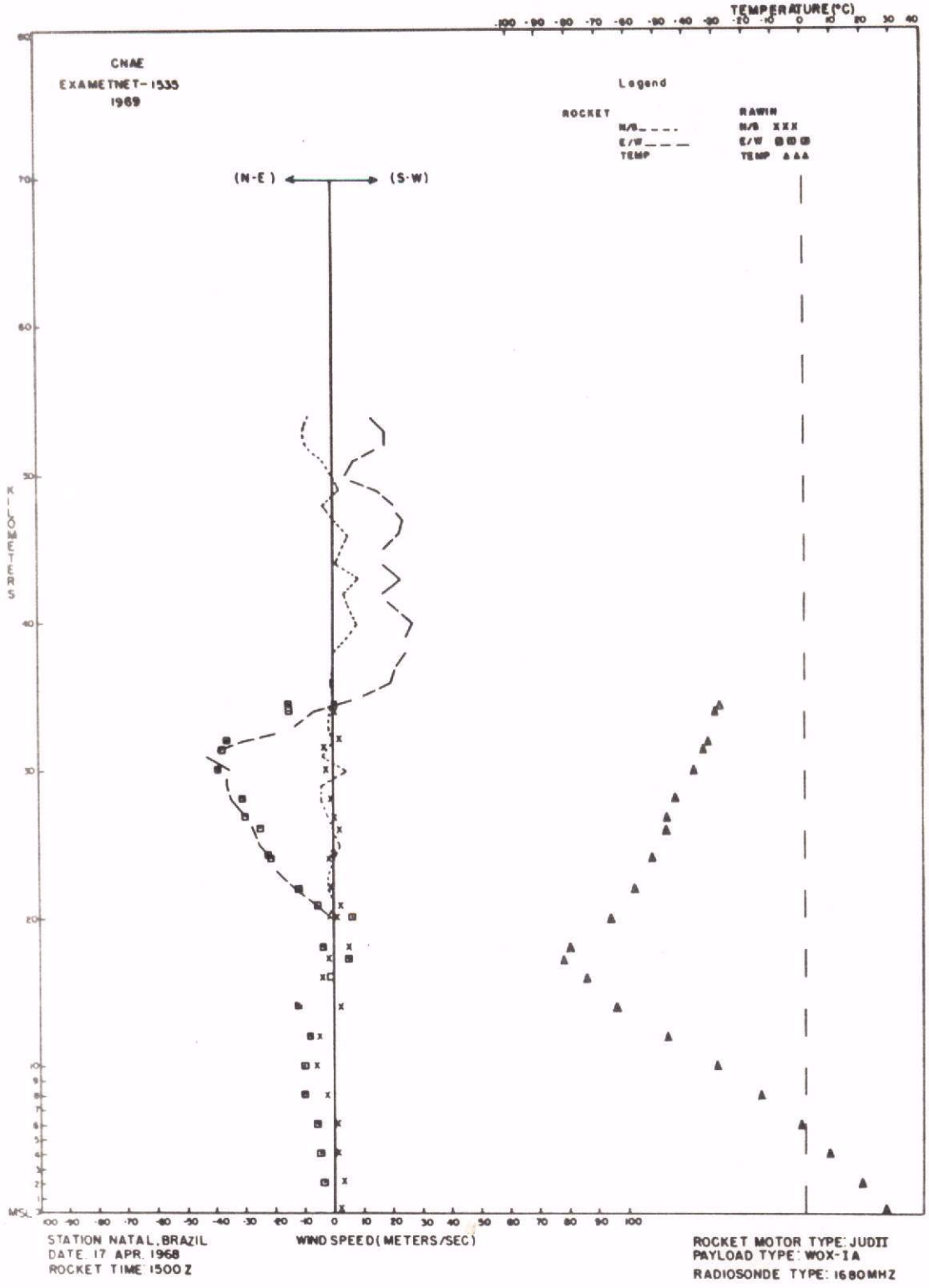
MOTOR TYPE..JUDI
PAYLOAD TYPE..WQX-1A
FUSE TYPE..ELECTRICALLY ACTIVATED PYROTECHNIC
LAUNCHER SETTING..058°AZIMUTH 80.0°ELEVATION
RADAR TYPE..MPS-19 APOGEE UNKNOWN METERS
WIND SENSOR TYPE..6 FT. SQUARE PARACHUTE
TEMPERATURE SENSOR TYPE..0.014 INCH BEAD THERMISTOR
GROUND EQUIPMENT TYPE..403 MHZ PORTABLE RECEIVER-RECORDER
REMARKS..NONE

MOTOR PERFORMANCE..GOOD
PAYLOAD PERFORMANCE..FAILURE
ACTUAL FUSE DELAY TIME..UNKNOWN

SENSOR FALL-RATE..NOMINAL

RADIOSONDE MANUFACTURER..MOLDED INSULATION CO.
TEMPERATURE ELEMENT TYPE..ROD THERMISTOR
PRESSURE SENSOR TYPE..ANEROID
GROUND EQUIPMENT TYPE..GMD-1A
WIND AT ROCKET LAUNCH..SFC. 090DEG/03MPS 6M 100DEG/04MPS 16M 090DEG/06MPS
25M 090DEG/04MPS 40M 110DEG/06MPS
BALLISTIC WIND..UNKNOWN AZIMUTH UNKNOWN MPS
THERMODYNAMIC BASE DATA..PRESSURE N.A. MBS
TEMPERATURE N.A. C
ALTITUDE N.A. METERS

RADIOSONDE TYPE..1680 MHZ
BALLOON TYPE..NEOPRENE
BALLOON SIZE..1,200 GRAMS


TEMPERATURE (°C)
CNAE
EXAMETNET-1535
1969
Legend
ROCKET
N/S
E/W
TEMP
RAWIN
N/S XXX
E/W
TEMP
(N-E)
(S-W)
KILOMETERS
MSL
WIND SPEED (METERS/SEC)
STATION NATAL, BRAZIL
DATE 17 APR. 1968
ROCKET TIME 1500 Z
ROCKET MOTOR TYPE: JUDII
PAYLOAD TYPE: WOX-1A
RADIOSONDE TYPE: 1680 MHZ

ROCKET OBSERVATION DATA

RP STATION NAME

82599 (CNAE) NATAL, BRAZIL

LAT. 05°55'S LONG. 35°10'W

ROCKET LAUNCH

DATE MAY 1, 1968 TIME 1500 Z

RAWINSONDE RELEASE

DATE MAY 1, 1968 TIME 1154 Z

ROCKET WINDS

FALL VEL	ALT	WIND POLAR		COMPONENTS MPS	
M/S	KM	DEG	MPS	N-S	E-W
052	61	287	013	-004	+013
049	60	308	015	-009	+012
043	59	290	018	-006	+017
039	58	288	026	-008	+025
040	57	274	028	-002	+028
040	56	268	029	+001	+029
034	55	269	021	+000	+021
031	54	276	017	-002	+017
030	53	304	016	-009	+013
028	52	338	018	-017	+007
026	51	330	020	-017	+010
025	50	303	017	-009	+014
024	49	291	014	-005	+013
024	48	288	017	-005	+016
023	47	265	020	+002	+020
021	46	255	026	+007	+025
021	45	253	033	+010	+032
021	44	254	039	+011	+038
020	43	256	042	+010	+041
018	42	263	038	+004	+038
017	41	275	033	+000	+033
016	40	279	027	-004	+027
016	39	279	033	-005	+033
017	38	269	019	+000	+019
016	37	266	026	+002	+026
015	36	283	025	-007	+025
015	35	276	019	-002	+019
013	34	244	014	+006	+013
013	33	179	008	+008	+000
012	32	104	015	+004	-015
012	31	088	026	-001	-026
012	30	044	035	-003	-035
011	29	089	036	+000	-036
011	28	091	034	+000	-034
010	27	087	036	-002	-036
010	26	087	037	-002	-037
009	25	089	034	+000	-034
009	24	089	029	+000	-029
009	23	088	022	-001	-022
008	22	091	014	+000	-014
008	21	102	002	+000	-002
007	20	293	004	+002	+004
007	19	032	002	-002	-001
006	18	054	004	-002	-003

RAWINSONDE

PRESSURE	ALT TENS OF METERS	WIND POLAR		COMPONENTS MPS		RH	TEMP
MB		DEG	MPS	N-S	E-W	%	DEG C
1007.5	0004	130	005	+003	-004	76	+28.7
0803.0	0200	110	009	+003	-009	41	+15.7
0630.8	0400	102	004	+001	-004	47	+04.6
0490.8	0600	016	003	+003	-001	58	-08.7
0377.0	0800	336	003	+002	-002	18	-19.3
0285.1	1000	176	007	+007	-001		-35.0
0212.0	1200	196	016	+015	+004		-51.8
0154.8	1400	232	018	+011	+014		-66.4
0110.4	1600	228	011	+007	+008		-76.9
0088.0	1722	290	004	-001	+004		-84.4
0092.4	1800	123	006	+003	-005		-82.5
0065.5	2000	283	007	-001	+007		-71.3
0040.2	2200	095	012	+001	-012		-61.2
0029.4	2400	095	027	+002	-027		-54.5
0021.6	2600	092	034	+001	-034		-48.4
0016.1	2800	086	035	+003	-035		-43.8
0011.9	3000	082	039	+036	-039		-42.9
0009.0	3200	079	024	+004	-024		-29.0
0006.8	3400	239	012	+006	+010		-30.4
0006.0	3472	230	018	+011	+014		-25.5

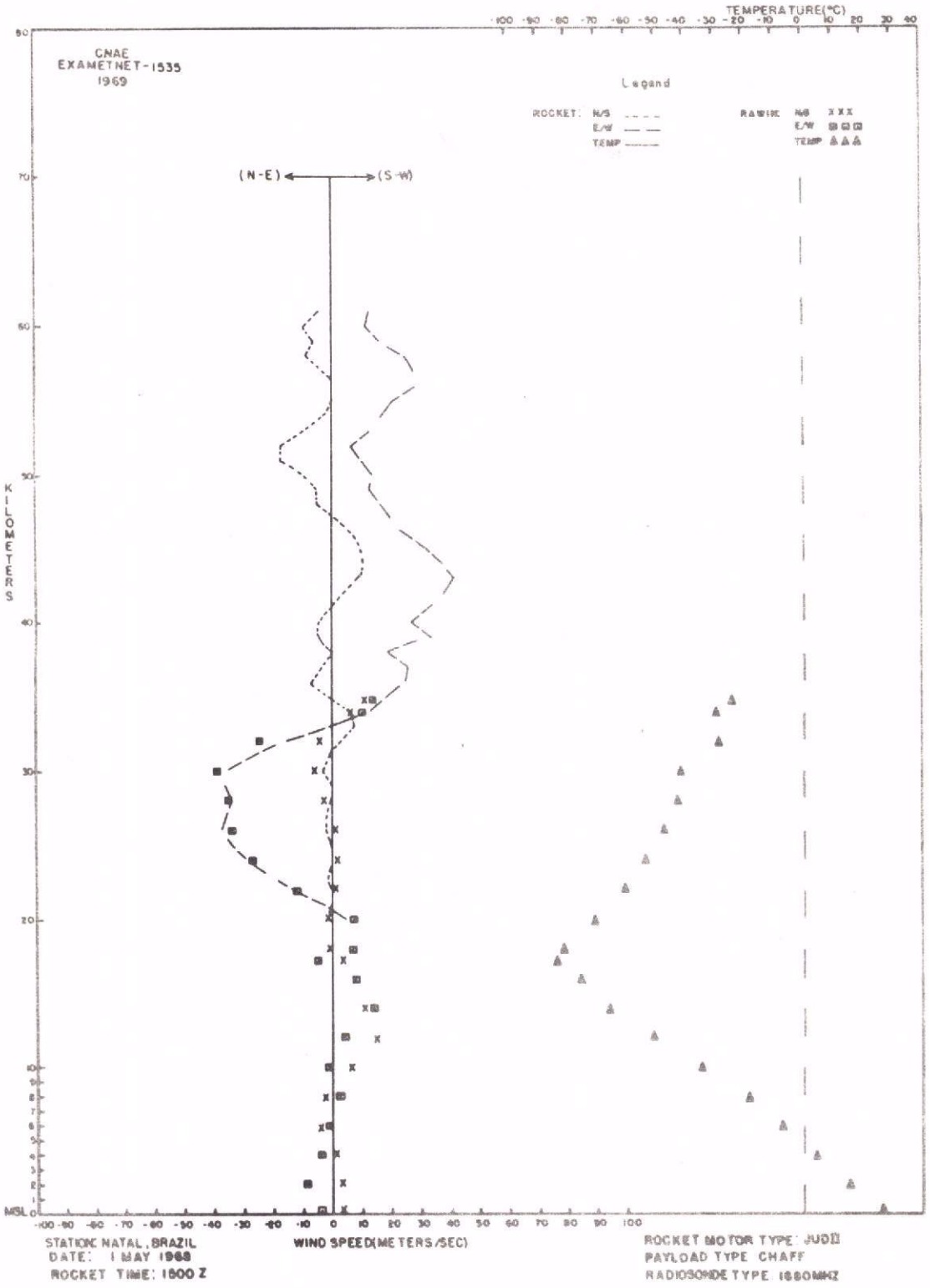
TECHNICAL DATA

MOTOR TYPE..JUDI
PAYLOAD TYPE..CHAFF
FUSE TYPE..ELECTRICALLY ACTIVATED PYROTECHNIC
LAUNCHER SETTING..060° AZIMUTH 79.0° ELEVATION
RADAR TYPE..MPS-19 APOGEE 61,950 METERS
WIND SENSOR TYPE..0.005 INCH S BAND COPPER CHAFF SENSOR FALL-RATE..NOMINAL
TEMPERATURE SENSOR TYPE..N.A.
GROUND EQUIPMENT TYPE..N.A.
REMARKS..NONE

MOTOR PERFORMANCE..GOOD
PAYLOAD PERFORMANCE..GOOD
ACTUAL FUSE DELAY TIME..100 SEC

RADIOSONDE MANUFACTURER..BENDIX
TEMPERATURE ELEMENT TYPE..ROD THERMISTOR
PRESSURE SENSOR TYPE..ANEROID
GROUND EQUIPMENT TYPE..GMD-1A
WIND AT ROCKET LAUNCH..6M 130DEG/04MPS 9M 150DEG/05MPS 16M 150DEG/05MPS
25M 150DEG/05MPS 40M 140DEG/06MPS
BALLISTIC WIND..UNKNOWN AZIMUTH UNKNOWN MPS
THERMODYNAMIC BASE DATA..PRESSURE N.A. MBS
TEMPERATURE N.A. C
ALTITUDE N.A. METERS

RADIOSONDE TYPE..1680 MHZ
BALLOON TYPE..NEOPRENE
BALLOON SIZE..1.200 GRAMS


CNAE
EXAMETNET-1535
1969
TEMPERATURE(°C)
Legend
ROCKET: N/S
E/W
TEMP
RAWIN: N/S
E/W
TEMP
(N-E)
(S-W)
KILOMETERS
MSL
WIND SPEED(METERS/SEC)
STATION: NATAL, BRAZIL
DATE: 1 MAY 1968
ROCKET TIME: 1600 Z
ROCKET MOTOR TYPE: JUDI
PAYLOAD TYPE: CHAFF
RADIOSONDE TYPE: 1680MHZ

ROCKET OBSERVATION DATA

RP STATION NAME

82599 (CNAE) NATAL, BRAZIL

LAT. 05°55'S LONG. 35°10'W

ROCKET LAUNCH

DATE MAY 15, 1968 TIME 1500 Z

RAWINSONDE RELEASE

DATE MAY 15, 1968 TIME 1203 Z

ROCKET WINDS.

FALL VEL	ALT	WIND POLAR		COMPONENTS MPS	
M/S	KM	DEG	MPS	N-S	E-W
052	51	277	035	-004	+035
065	50	295	032	-014	+029
062	49	269	033	+000	+032
061	48	270	033	+000	+033
061	47	260	032	+005	+032
059	46	258	030	+006	+029
057	45	256	030	+007	+029
054	44	264	030	+003	+030
048	43	269	033	+000	+033
045	42	270	029	+000	+029
045	41	276	022	-002	+022
040	40	263	025	+003	+025
037	39	262	029	+004	+029
036	38	264	033	+003	+033
033	37	261	033	+005	+033
030	36	264	032	+003	+032
027	35	259	030	+006	+030
025	34	251	027	+009	+026
024	33	250	021	+007	+020
023	32	263	015	+002	+015
021	31	032	005	-004	-003
020	30	064	025	-003	-025
018	29	089	032	+000	-032
016	28	084	031	-003	-031
016	27	084	029	-003	-029
013	26	084	027	-003	-027
013	25	087	024	-001	-024
012	24	065	019	-002	-019
011	23	085	015	-001	-015
010	22	097	007	+001	-007
008	21	324	007	-006	+004
007	20	320	007	-005	+005
006	19	198	004	+004	+001
005	18	238	010	+005	+009

RAWINSONDE

PRESSURE	ALT TENS OF	WIND POLAR		COMPONENTS MPS		RH	TEMP
MB	METERS	DEG	MPS	N-S	E-W	%	DEG C
1006.6	0004	140	006	+005	-004	73	+28.2
0801.0	0200	117	007	+003	-006	63	+15.7
0630.0	0400	083	003	+000	-003	36	+04.8
0493.0	0600	041	003	-002	-002	61	-07.2
0379.0	0800	169	014	+012	-007		-18.9
0288.0	1000	176	003	+003	+000		-35.0
0221.0	1200	028	014	+012	-007		-49.8
0155.3	1400	267	016	+001	+016		-67.2
0110.5	1600	277	013	-001	+013		-78.2
0093.0	1696	335	007	-006	+003		-81.3
0078.4	1800	263	007	+001	+007		-75.1
0055.0	2000	325	006	-005	+004		-67.6
0040.3	2200	080	011	-002	-011		-63.4
0029.4	2400	074	017	-005	-016		-56.7
0021.5	2600	090	027	+000	-027		-49.3
0015.9	2800	083	030	-003	-030		-44.5
0011.9	3000	082	031	-004	-031		-40.8
0008.5	3200	260	011	+002	-011		-34.8
0006.8	3400	263	028	+003	-028		-29.9
0005.0	3600	257	030	+007	-029		-23.2

TECHNICAL DATA

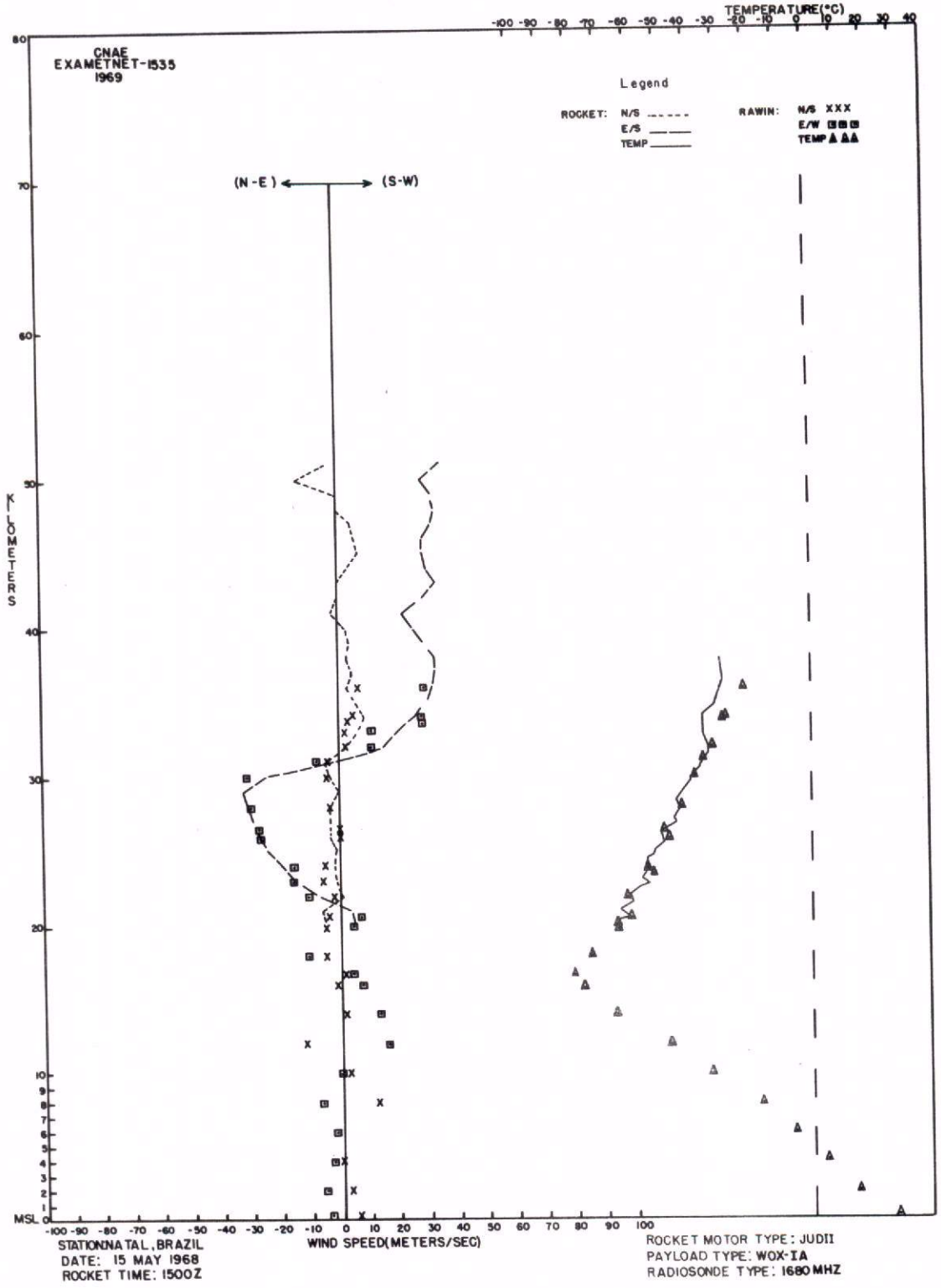
MOTOR TYPE..JUDI
PAYLOAD TYPE..NOX-1A
FUSE TYPE..ELECTRICALLY ACTIVATED PYROTECHNIC
LAUNCHER SETTING..050° AZIMUTH 78.0° ELEVATION
RADAR TYPE..MPS-19 APOGEE 51.816 METERS
WIND SENSOR TYPE..6 FT. SQUARE PARACHUTE
TEMPERATURE SENSOR TYPE..0.014 INCH BEAD THERMISTOR
GROUND EQUIPMENT TYPE..403 MHZ PORTABLE RECEIVER-RECORDER
REMARKS..TEMPERATURE DATA ASSUMED NOT APPLICABLE DUE TO EXCESSIVE DYNAMIC HEATING OF PAYLOAD.

MOTOR PERFORMANCE..GOOD
PAYLOAD PERFORMANCE..POOR
ACTUAL FUSE DELAY TIME..09 SEC

SENSOR FALL-RATE..NOMINAL

RADIOSONDE MANUFACTURER..SENDIX
TEMPERATURE ELEMENT TYPE..ROD THERMISTOR
PRESSURE SENSOR TYPE..ANEROID
GROUND EQUIPMENT TYPE..GMD-1A
WIND AT ROCKET LAUNCH..6M 140DEG/04MPS 9M 150DEG/04MPS 16M 130DEG/05MPS 25M 130DEG/06MPS 40M 130DEG/07MPS
BALLISTIC WIND..UNKNOWN AZIMUTH UNKNOWN MPS
THERMODYNAMIC BASE DATA..PRESSURE N.A. MBS
TEMPERATURE N.A. C
ALTITUDE N.A. METERS

RADIOSONDE TYPE..1680 MHZ
BALLOON TYPE..NEOPRENE
BALLOON SIZE..1,200 GRAMS


CNAE
EXAMETNET-1535
1969
Legend
ROCKET: N/S
E/S
TEMP
RAWIN: N/S XXX
E/W
TEMP
TEMPERATURE(°C)
(N-E)
(S-W)
KILOMETERS
MSL
WIND SPEED(METERS/SEC)
STATIONNATAL, BRAZIL
DATE: 15 MAY 1968
ROCKET TIME: 1500Z
ROCKET MOTOR TYPE: JUDII
PAYLOAD TYPE: WOX-IA
RADIOSONDE TYPE: 1680 MHZ

ROCKET OBSERVATION DATA

RP STATION NAME

82599 (CNAE) NATAL, BRAZIL

LAT. 05° 55' S LONG. 35° 10' W

ROCKET LAUNCH

DATE MAY 29, 1968 TIME 1500 Z

RAWINSONDE RELEASE

DATE MAY 29, 1968 TIME 1145 Z

ROCKET WINDS

FALL VEL	ALT	WIND POLAR		WIND COMPONENTS MPS	
M/S	KM	DEG	MPS	N-S	E-W
	62	271	022	+000	+022
057	61	157	002	+002	-001
051	60	054	007	-004	+006
045	59	089	006	+000	-006
039	58	122	013	+007	-011
038	57	122	022	+012	-019
036	56	108	027	+008	-026
034	55	105	024	+006	-023
032	54	103	023	+005	-022
029	53	093	025	+001	-025
029	52	092	023	+001	-023
027	51	099	017	+003	-017
025	50	095	013	+001	-013
024	49	096	011	+001	-011
023	48	114	011	+004	-010
022	47	129	012	+007	-009
022	46	128	012	+007	-010
020	45	111	011	+004	-010
019	44	114	008	+003	-007
019	43	152	005	+004	-002
018	42	174	007	+007	-001
017	41	187	007	+007	+001
017	40	218	005	+004	+003
016	39	246	008	+003	+007
016	38	254	011	+003	+011
015	37	251	012	+004	+011
014	36	248	015	+006	+014
014	35	254	018	+005	+017
013	34	253	016	+005	+015
013	33	244	008	+003	+007
012	32	130	004	+002	-003
012	31	106	017	+005	-016
012	30	099	027	+004	-027
011	29	093	033	+002	-033
011	28	091	035	+001	-035
011	27	089	033	+001	-033
010	26	086	033	+002	-033
010	25	088	029	+001	-029
009	24	090	026	+000	-026
009	23	091	028	+000	-028
008	22	088	024	+001	-024
007	21	081	012	+002	-012
007	20	060	015	+007	-013
007	19	259	002	+000	+002
006	18	270	006	+000	+006

RAWINSONDE

PRESSURE MB	ALT TENS OF METERS	WIND POLAR DEG	MPS	WIND COMPONENTS MPS N-S	E-W	RH %	TEMP DEG C
1010.5	0004	170	003	+003	-001	88	+24.3
0805.0	0200	113	005	+002	-005	90	+13.8
	0400	062	005	-002	-005		
	0600	047	006	-004	-005		
	0800	170	006	+006	-001		
	1000	330	004	-003	+002		
	1200	275	006	-001	+006		
	1400	225	014	+010	+010		
	1600	320	009	-007	+006		
	1800	248	006	+002	+006		
	2000	067	004	-002	+004		
	2200	090	024	+000	-024		
	2400	086	026	-002	-026		
	2590	079	030	-006	-030		

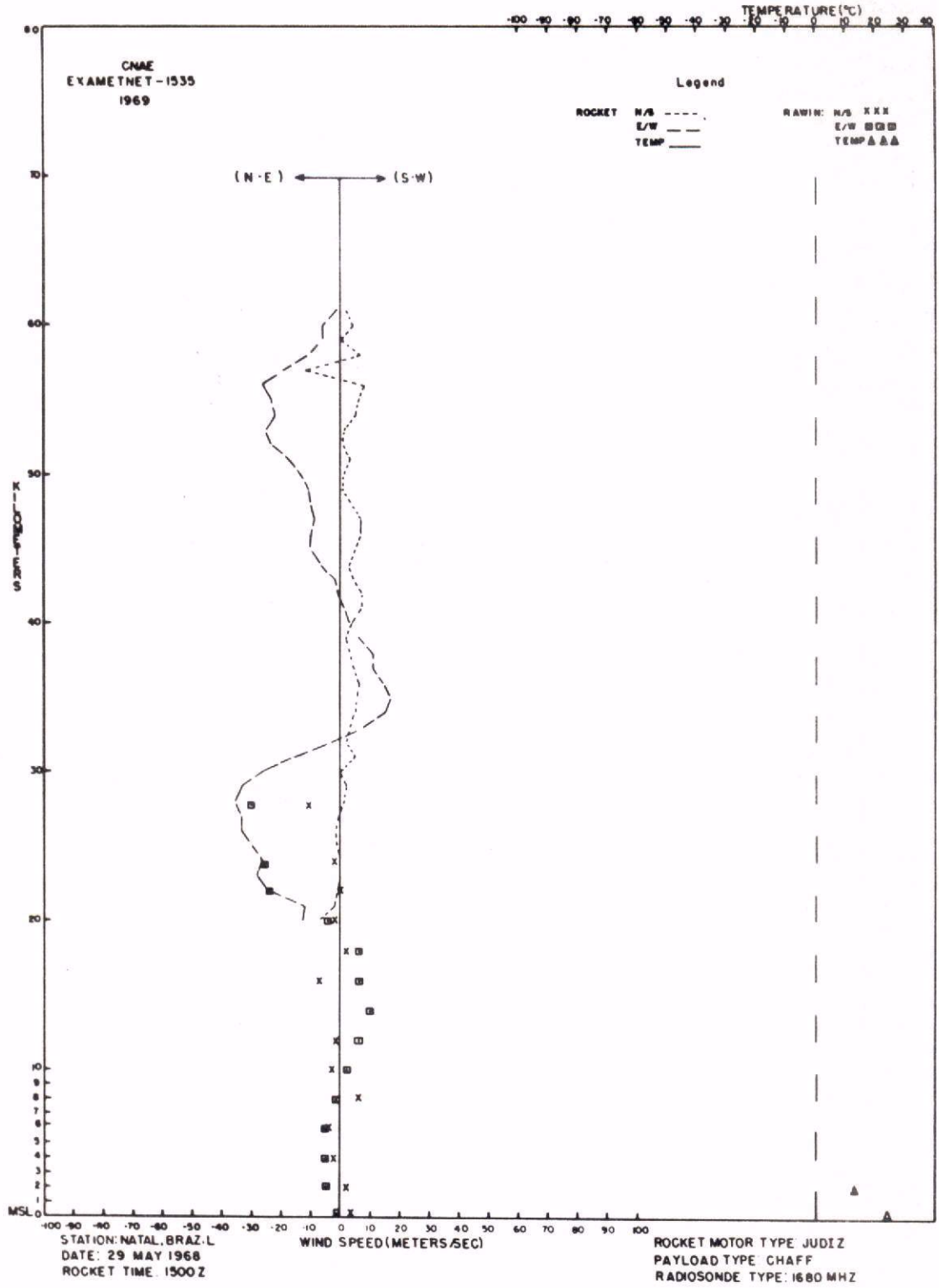
TECHNICAL DATA

MOTOR TYPE..JUDI
PAYLOAD TYPE..CHAFF
FUSE TYPE..ELECTRICALLY ACTIVATED PYROTECHNIC
LAUNCHER SETTING..048° AZIMUTH 80.0° ELEVATION
RADAR TYPE..MPS-19 APOGEE 62,606 METERS
WIND SENSOR TYPE..0.005 INCH S BAND COPPER CHAFF SENSOR FALL-RATE..NOMINAL
TEMPERATURE SENSOR TYPE..N.A.
GROUND EQUIPMENT TYPE..N.A.
REMARKS..GMD-1A POWER FAILURE.

MOTOR PERFORMANCE..GOOD
PAYLOAD PERFORMANCE..GOOD
ACTUAL FUSE DELAY TIME..094 SEC

RADIOSONDE MANUFACTURER..BENDIX
TEMPERATURE ELEMENT TYPE..ROD THERMISTOR
PRESSURE SENSOR TYPE..ANEROID
GROUND EQUIPMENT TYPE..GMD-1A
WIND AT ROCKET LAUNCH..6M 150DEG/05MPS 9M 180DEG/05MPS 16M 150DEG/06MPS
25M 140DEG/07MPS 40M 140DEG/07MPS
BALLISTIC WIND..UNKNOWN AZIMUTH UNKNOWN MPS
THERMODYNAMIC BASE DATA..PRESSURE N.A. MBS
TEMPERATURE N.A. C
ALTITUDE N.A. METERS

RADIOSONDE TYPE..1680 MHZ
BALLOON TYPE..NEOPRENE
BALLOON SIZE..1,200 GRAMS


CNAE
EXAMETNET-1535
1969
Legend
ROCKET N/S
E/W
TEMP
RAWIN: N/S
E/W
TEMP
TEMPERATURE (°C)
(N-E)
(S-W)
MSL
WIND SPEED (METERS/SEC)
STATION: NATAL, BRAZIL
DATE: 29 MAY 1968
ROCKET TIME: 1500Z
ROCKET MOTOR TYPE: JUDIZ
PAYLOAD TYPE: CHAFF
RADIOSONDE TYPE: 1680 MHZ

ROCKET OBSERVATION DATA

RP STATION NAME

82599 (CNAE) NATAL, BRAZIL

LAT. 05°55' S LONG. 35°10' W

ROCKET LAUNCH

DATE JUNE 12, 1968 TIME 1502 Z

RAWINSONDE RELEASE

DATE JUNE 12, 1968 TIME 1201 Z

ROCKET WINDS

FALL VEL	ALT	WIND POLAR		COMPONENTS MPS	
M/S	KM	DEG	MPS	N-S	E-W
	64	251	033	+011	+032
087	63	242	029	+014	+026
069	62	206	027	+024	+012
061	61	205	023	+021	+010
050	60	187	017	+017	+002
045	59	152	016	+013	-009
042	58	140	016	+012	-010
038	57	147	018	+015	-010
038	56	122	015	+008	-013
034	55	083	024	-003	-024
033	54	077	027	-006	-026
031	53	070	012	-004	-011
029	52	160	007	+006	-003
026	51	179	008	+008	+000
025	50	303	003	-002	+003
024	49	014	004	-004	-001
024	48	305	007	-004	+006
023	47	286	013	-003	+013
021	46	285	012	-003	+012
020	45	290	010	-003	+009
019	44	290	011	-004	+010
019	43	282	018	-004	+018
018	42	281	020	-004	+020
017	41	280	017	-003	+017
017	40	288	013	-004	+012
017	39	309	011	-007	+009
017	38	309	010	-006	+008
016	37	279	011	-002	+011
015	36	263	009	+001	+009
014	35	253	009	+003	+009
013	34	266	007	+000	+007
013	33	332	002	-002	+001
013	32	076	003	-001	-003
012	31	031	005	-004	+003
012	30	057	009	-005	-008
011	29	088	021	-001	-021
011	28	088	030	-001	-030
010	27	087	033	-002	-033
010	26	087	033	-002	-033
009	25	086	030	-002	-030
009	24	090	024	+000	-024
008	23	092	022	+001	-022
008	22	088	021	-001	-021
008	21	090	014	+000	-014
007	20	184	005	+005	+000
007	19	245	014	+006	+013
006	18	282	010	-002	+010

RAWINSONDE

PRESSURE	ALT TENS OF	WIND POLAR		COMPONENTS MPS		RH	TEMP
MB	METERS	DEG	MPS	N-S	E-W	%	DEG C
1012.2	0002	170	005	+005	-001	88	+24.6
0805.0	0200	134	012	+008	-009	87	+12.3
0633.0	0400	013	005	-005	-001	57	+02.9
0492.0	0600	115	008	+003	-007	14	-06.9
0378.0	0800	152	013	+011	-006	17	-20.7
0286.8	1000	060	010	-005	-009	40	-38.7
0212.0	1200	359	006	-006	+000		-53.5
0154.0	1400	302	012	-006	+010		-68.7
0126.0	1523	310	014	-009	+011		-75.5
0109.7	1600	303	018	-010	+016		-76.3
0077.8	1800	298	010	-005	+009		-74.0
0055.3	2000	180	007	+007	+000		-69.4
0040.0	2200	086	021	-001	-021		-60.3
0029.3	2400	083	023	-003	-023		-53.7
0021.5	2600	086	031	-002	-031		-49.5
0015.9	2800	097	033	+004	-033		-41.5
0013.0	2928	097	016	+002	-016		-37.4

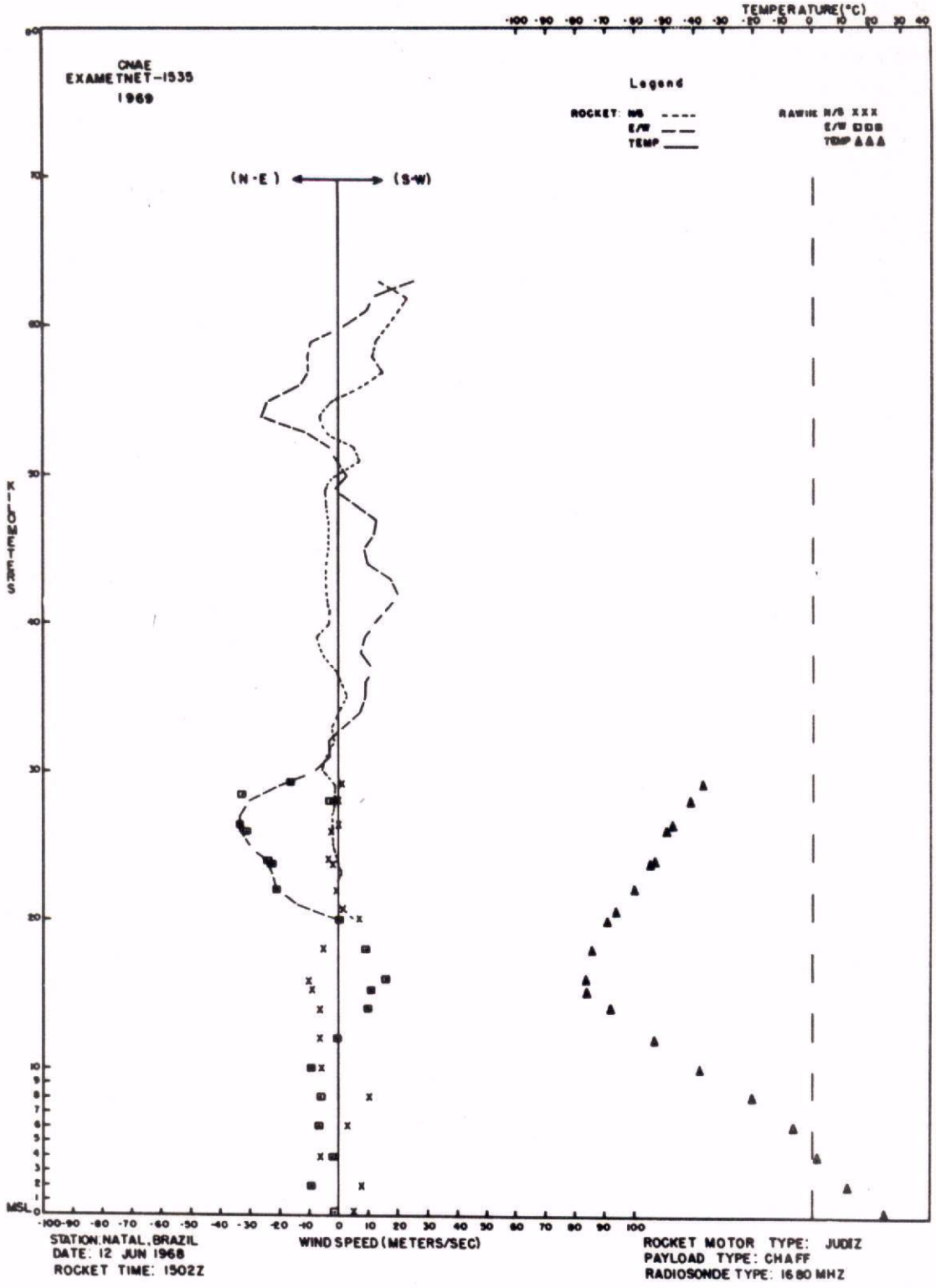
TECHNICAL DATA

MOTOR TYPE..JUDI
PAYLOAD TYPE..CHAFF
FUSE TYPE..ELECTRICALLY ACTIVATED PYROTECHNIC
LAUNCHER SETTING..055°AZIMUTH 74.0°ELEVATION
RADAR TYPE..MPS-19 APOGEE 64,618 METERS
WIND SENSOR TYPE..).005 INCH S BAND COPPER CHAFF SENSOR FALL-RATE..NOMINAL
TEMPERATURE SENSOR TYPE..N.A.
GROUND EQUIPMENT TYPE..N.A.
REMARKS..NONE

MOTOR PERFORMANCE..GOOD
PAYLOAD PERFORMANCE..GOOD
ACTUAL FUSE DELAY TIME..098 SEC

RADIOSONDE MANUFACTURER..BENDIX
TEMPERATURE ELEMENT TYPE..ROD THERMISTOR
PRESSURE SENSOR TYPE..ANEROID
GROUND EQUIPMENT TYPE..GMD-1A
WIND AT ROCKET LAUNCH..6M 150DEG/07MPS 9M 160DEG/08MPS 16M 150DEG/08MPS
40M 140DEG/09MPS
BALLISTIC WIND..UNKNOWN AZIMUTH UNKNOWN MPS
THERMODYNAMIC BASE DATA..PRESSURE N.A. MBS
TEMPERATURE N.A. C
ALTITUDE N.A. METERS

RADIOSONDE TYPE..1680 MHZ
BALLOON TYPE..NEOPRENE
BALLOON SIZE..1,000 GRAMS


CNAE
EXAMETNET-1535
1969
Legend
ROCKET: N/S
E/W
TEMP
RAWIN: N/S XXX
E/W □□□
TEMP △△△
TEMPERATURE(°C)
(N-E)
(S-W)
HEIGHT-KM
MSL
WIND SPEED (METERS/SEC)
STATION, NATAL, BRAZIL
DATE: 12 JUN 1968
ROCKET TIME: 1502Z
ROCKET MOTOR TYPE: JUDIZ
PAYLOAD TYPE: CHAFF
RADIOSONDE TYPE: 1680 MHZ

HIGH ALTITUDE METEOROLOGICAL DATA

WDC-A FORM NO. ____J
Page 1 of 7

STATION NUMBER	DATE DAY	MO	YR	OBS TIME (GMT)	RAOB TIME DIFF	SENSOR WIND	THERMO	SPEC A	SPEC B	CORRECTION METHOD WIND	TEMP	QUESTIONABLE DATA LAYERS WIND TOP	BOTTOM	THERMODYNAMIC TOP	BOTTOM	SPECIAL TYPE	TOP	BOTTOM	RAOB TYPE	RAOB REL. CONT	THERMODYNAMIC BASE DATA ALTITUDE	PRESS (MB)	TEMP
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	31 32 33	34 35	36 37 38	39 40 41 42 43	44 45 46 47	48 49 50 51	52	53 54 55 56 57	58 59 60 61	62	63 64	65 66 67 68 69	70 71 72 73 74	75 76 77 78 79 80
82599	24	Jul	68																		2000	056 10-68	1

MOBILE STATIONS ONLY	LAT	LONG
	5° 55'	35° 40'

SOUNDING DATA (HEIGHT IN GEOMETRIC DECAMETERS)

ALTITUDE	WIND POLAR DIR (DEG)	POLAR SPEED (MPS)	COMPONENT N-S (MPS)	COMPONENT E-W (MPS)	CORRECTED COMPONENT N-S (MPS)	CORRECTED COMPONENT E-W (MPS)	FALL VEL (MPS)	TEMPERATURE DEG C	TEMPERATURE CORR	PRESSURE (MB)	DENSITY GM/M³	SPEED OF SOUND	SPECIAL SENSOR DATA A	SPECIAL SENSOR DATA B
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	31 32 33 34	35 36 37	38 39 40 41 42 43	44 45 46 47 48 49 50 51	52 53 54	55 56 57	58 59 60 61
5691	088	28	-2	-28				- 2,5		3 . 680 -1	4 . 780 -1			
5371	092	46	2	-46				3,6		5 . 490 -1	6 . 980 -1			
5054	087	25	-1	-25				- 3,9		8 . 140 -1	1 . 064 +0			
4993	082	20	-3	-20				- 1,7		8 . 790 -1	1 . 140 +0			
4481	104	7	1	- 7				- 10,0		1 . 691 +0	2 . 262 +0			
4170	020	3	-3	- 1				- 11,8		2 . 533 +0	3 . 412 +0			
3892	223	1	1	1				- 17,3		3 . 612 +0	4 . 971 +0			
3737	183	2	2	0				- 18,9		4 . 425 +0	6 . 128 +0			
3658	161	3	3	- 1				- 23,7		4 . 915 +0	6 . 936 +0			
3572	195	3	3	1				- 23,7		5 . 526 +0	7 . 800 +0			
3408	225	8	2	8				- 29,9		6 . 898 +0	9 . 985 +0			
3298	265	8	1	8				- 29,3		8 . 027 +0	1 . 591+1			
3078	251	11	4	10				- 35,8		1 . 0986+1	1 . 6299+1			
2923	274	14	-1	14				- 35,0		1 . 3646+1	2 . 0177+1			
2877	310	15	-10	12				- 39,6		1 . 4620+1	2 . 2043+1			
2829	046	16	-11	-12				- 39,6		1 . 5700+1	2 . 3671+1			
2737	087	21	-1	-21				- 45,1		1 . 8000+1	2 . 7794+1			
2646	092	27	1	-27				- 47,5		2 . 0371+1	3 . 1790+1			
2588	091	29	0	-29				- 46,8		2 . 2285+1	3 . 4669+1			
2475	092	32	1	-32				- 50,2		2 . 6534+1	4 . 1909+1			
2347	096	32	3	-32				- 51,7		3 . 2220+1	5 . 1235+1			
2173	087	21	-1	-21				-61,8		4 . 2510+1	7 . 0829+1			
2042	030	7	-6	- 3				-64,0		5 . 2650+1	8 . 8647+1			
2000	360	4	-4	0				-62,1		5 . 6100+1	9 . 2989+1			
1993	341	4	-4	1				-60,4		5 . 6180+1	9 . 3605+1			
1966	317	5	-4	3				- -		- -	- -			
1765	-	-	-	-				- -		- -	- -			
1700	-	-	-	-				- -		- -	- -			
6000	282	88	-18	86			54							
5900	277	39	- 4	39			86							
5800	115	3	1	- 3			100							
5700	091	17	0	-17			100							
5600	087	29	- 1	-29			105							
5500	089	38	- 1	-38			95							
5400	090	47	0	-47			83							
5300	094	43	3	-43			76							
5200	092	38	1	-38			80							
5100	089	29	0	-29			74							
5000	082	20	- 3	-20			68							
4900	075	13	- 3	-12			66							
4800	097	8	1	- 8			62							
4700	120	9	4	- 8			57							
4600	092	9	0	- 9			52							
4500	099	7	1	- 7			46							
4400	128	6	4	- 5			44							
4300	136	4	3	- 3			43							
4200	035	2	- 2	- 1			38							
4100	329	4	- 3	2			37							
4000	318	4	- 3	4			34							
3900	223	1	1	1			30							
3800	221	1	1	1			28							
3700	161	3	3	- 1			26							
3600	162	3	3	- 1			24							
3500	256	3	1	3			22							
3400	255	8	2	8			21							
3300	265	8	1	8			19							
3200	263	6	1	6			16							
3100	251	11	4	11			15							
3000	254	12	4	12			14							
2900	278	6	- 1	6			12							
2800	081	17	- 3	-17			11							

HIGH ALTITUDE METEOROLOGICAL DATA

WDC-A FORM NO. 1
Page 2 of 7

STATION NUMBER	DATE DAY	DATE MO	DATE YR	OBS TIME (GMT)	RAOB TIME DIFF	SENSOR WIND	SENSOR THERMO	SENSOR SPEC A	SENSOR SPEC B	CORRECTION METHOD WIND	CORRECTION METHOD TEMP	QUESTIONABLE DATA LAYERS WIND TOP	QUESTIONABLE DATA LAYERS WIND BOTTOM	QUESTIONABLE DATA LAYERS THERMODYNAMIC TOP	QUESTIONABLE DATA LAYERS THERMODYNAMIC BOTTOM	QUESTIONABLE DATA LAYERS SPECIAL TYPE	QUESTIONABLE DATA LAYERS SPECIAL TOP	QUESTIONABLE DATA LAYERS SPECIAL BOTTOM	RAOB TYPE	RAOB REL PONT	THERMODYNAMIC BASE DATA ALTITUDE	THERMODYNAMIC BASE DATA PRESS (MB)	THERMODYNAMIC BASE DATA TEMP
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 31	32 33 34 35		36 37 38 39	40 41 42 43	44 45 46 47	48 49 50 51	52 53	54 55 56 57	58 59 60 61	62 63	64 65	66 67 68 69	70 71 72 73 74	75 76 77 78 79 80
82599	24	Jul	68																				

MOBILE STATIONS ONLY	LAT	LONG

SOUNDING DATA (HEIGHT IN GEOMETRIC DECAMETERS)

ALTITUDE	WIND POLAR DIR (DEG)	WIND POLAR SPEED (MPS)	WIND COMPONENT N-S (MPS)	WIND COMPONENT E-W (MPS)	WIND CORRECTED COMPONENT N-S (MPS)	WIND CORRECTED COMPONENT E-W (MPS)	FALL VEL (MPS)	TEMPERATURE DEG C	TEMPERATURE CORR	PRESSURE (MB)	DENSITY GM/M^3	SPEED OF SOUND	SPECIAL SENSOR DATA A	SPECIAL SENSOR DATA B
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	31 32 33 34 35		36 37 38 39 40 41 42 43	44 45 46 47 48 49 50 51	52 53 54	55 56 57	58 59 60 61
2700	090	24	0	-24			10							
2600	091	29	0	-29			9							
2500	090	31	0	-31			8							
2400	094	33	2	-33			6							
2300	096	31	3	-31			6							
2200	094	23	2	-23			6							
2100	070	10	-3	-9			6							
2000	360	4	-4	0			5							
1900	261	6	1	6			5							
1800	275	7	-1	7			5							

HIGH ALTITUDE METEOROLOGICAL DATA

STATION NUMBER	DATE DAY	MO	YR	OBSERVATION TIME (GMT)
1 2 3 4 5	6 7	8 9	10 11	12 13 14 15

SOUNDING DATA CONSTANT PRESSURE LEVELS (HEIGHT IN GEOPOTENTIAL DECAMETERS)

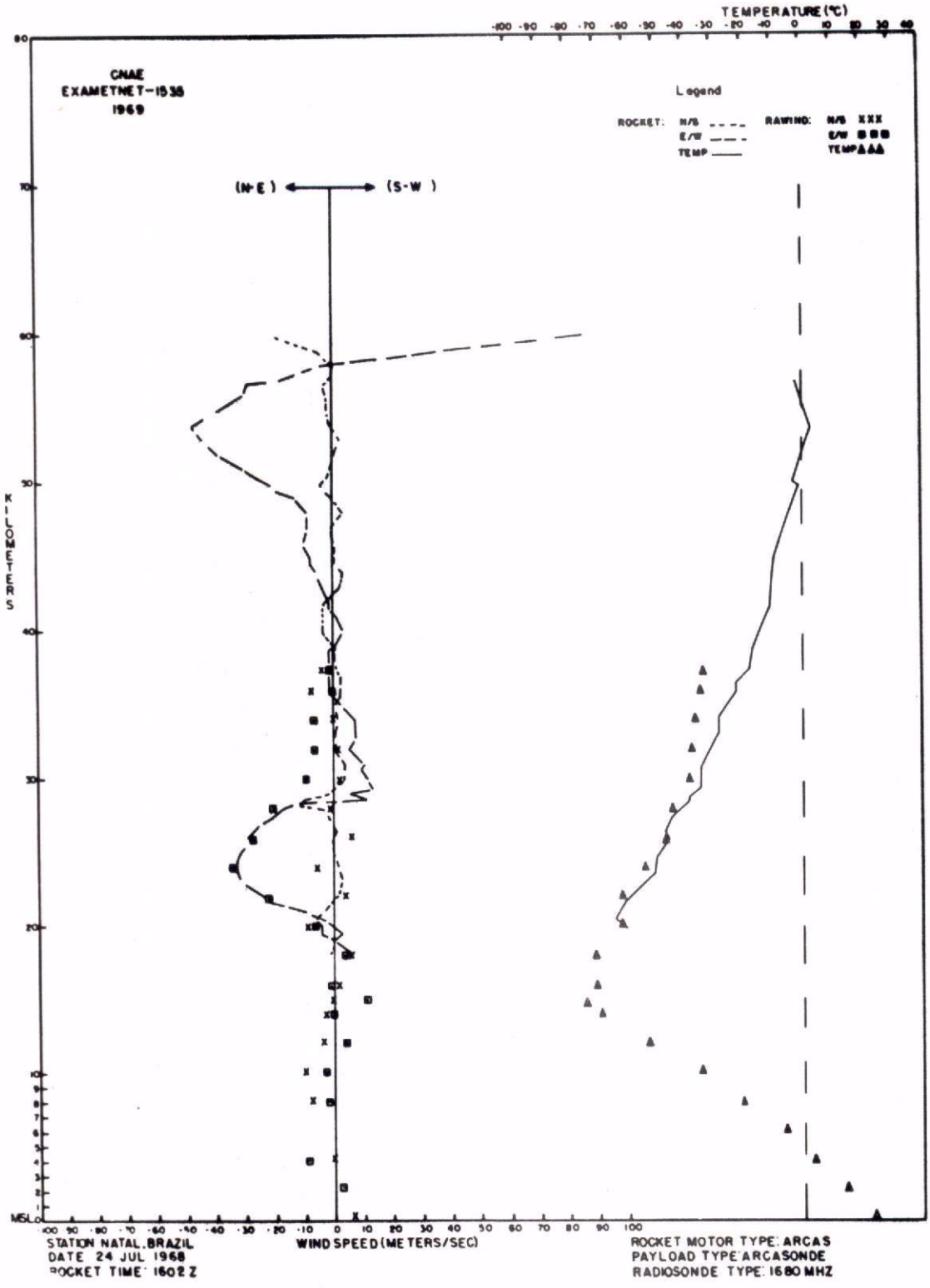
ALTITUDE	WIND POLAR DIR (DEG)	SPEED (MPS)	COMPONENT N-S (MPS)	E-W (MPS)	CORRECTED COMPONENT N-S (MPS)	E-W (MPS)		TEMPERATURE DEG C	CORR	PRESSURE (MB)	DENSITY GM/M³	SPEED OF SOUND	SPECIAL SENSOR DATA A	B
1 2 3 4 5 6	5 7 8	9 10 11	12 13 14 15	16 17 18 19	20 21 22 23	24 25 26 27	28 29 30	31 32 33 34	35 36 37	38 39 40 41 42 43 44	45 46 47 48 49 50 51	52 53 54	55 56 57	58 59 60 61
2065	072	13	-4	-12				-63.4		4. 0 0 0 − 1	8. 3944 +1			
2384	082	34	-5	-34				-54.1		7. 0 0 0 − 1	4. 8227 +1			
2649	091	27	1	-27				-46.8		1. 0 0 0 + 0	3. 1114 +1			
3115	247	14	6	13				-39.3		2. 0 0 0 + 0	1. 5058 +1			
3331	242	8	4	7				-36.7		3. 0 0 0 + 0	1. 0424 +1			
3594	025	3	-3	-1				-35.8		6. 0 0 0 + 0	7. 418 +0			
4029	322	7	-5	4				-15.6		7. 0 0 0 + 0	4. 102 +0			
4349	132	9	6	-7				-10.8		1. 0 0 0 + 1	2. 684 +0			
4893	077	24	-5	-23				-3.4		2. 0 0 0 + 1	1. 305 +0			
										3. 0 0 0 + 1	.			
										0. 0 0 0 + 1	.			

RAWINSONDE OBSERVATION (HEIGHT IN GEOPOTENTIAL DECAMETERS)

ALTITUDE	DIR (DEG)	SPEED (MPS)	N-S (MPS)	E-W (MPS)	TEMPERATURE DEG C	PRESSURE (MB)
SFC	180	6	6	0	24 8	1012 1
0200	215	4	3	2	13 2	805 7
0400	086	9	-1	-3	3 2	632 8
0600	066	7	-3	-7	-7 5	492 0
0800	018	8	-8	-2	-21 3	379 8
1000	021	11	-10	-3	-35 5	286 7
1200	320	6	-4	4	-53 0	212 6
1400	347	2	-2	0	-69 0	154 6
1600	140	2	1	-1	-71 4	110 0
1800	212	7	6	4	-71 8	78 2
2000	039	9	-8	-6	-62 1	56 1
2200	100	22	4	-22	-62 0	40 6
2400	082	34	-5	-34	-54 0	29 7
2600	102	28	6	-27	-47 4	21 6
2800	088	20	-1	-20	-45 6	16 3
3000	250	9	3	9	-39 3	12 2
3200	255	7	2	6	-38 6	9 0
3400	272	6	0	6	-37 2	6 8
3600	356	7	-7	0	-35 9	5 1
1498	275	11	-1	11	-75 1	130 0
1695	017	6	-6	-2	-77 5	93 0
3749	030	3	-3	-1	-34 8	4 0

SUPPLEMENTAL DATA

MOTOR Arcas PERFORM Good
PAYLOAD Arcasonde PERFORM Good
RADAR TYPE MPS-19
EF AZ ANG 046.0° EF EL ANG 84.0°
PAYLOAD ACQUIS ALT ___ TIME ___
WIND SENSOR 15 ft dia PAR
TEMP SENSOR BEAD THERM
SPEC SENSOR ___
GRND EQUIP GMD-1A
RADIOSONDE TYPE 1680 MHz
PRES SNSR TYPE ANEROID
TEMP ELMNT TYPE ML-419
BALLOON SIZE 1200 GRAMS
GROUND EQUIP GMD-1A
REMARKS:


TEMPERATURE (°C)
-100 -90 -80 -70 -60 -50 -40 -30 -20 -10 0 10 20 30 40
CNAE
EXAMETNET-1538
1969
Legend
ROCKET: N/S
E/W
TEMP
RAWIND: N/S XXX
E/W
TEMP
(N-E)
(S-W)
KILOMETERS
MSL
WIND SPEED (METERS/SEC)
STATION NATAL, BRAZIL
DATE 24 JUL 1968
ROCKET TIME 1602 Z
ROCKET MOTOR TYPE: ARCAS
PAYLOAD TYPE: ARCASONDE
RADIOSONDE TYPE: 1680 MHZ

HIGH ALTITUDE METEOROLOGICAL DATA

WDC-A FORM NO. ____
Page 1 of 9

STATION NUMBER	DATE DAY	MO	YR	OBS TIME (GMT)	RAOB TIME DIFF	SENSOR WIND	SENSOR THERMO	SENSOR SPEC A	SENSOR SPEC B	CORRECTION METHOD WIND	CORRECTION METHOD TEMP	QUESTIONABLE DATA LAYERS WIND TOP	WIND BOTTOM	THERMODYNAMIC TOP	THERMODYNAMIC BOTTOM	SPECIAL TYPE	SPECIAL TOP	SPECIAL BOTTOM	RAOB TYPE	RAOB REL POINT	THERMODYNAMIC BASE DATA ALTITUDE	PRESS (MB)	TEMP
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	31	32 33 34	35 36 37	38 39 40	41 42 43	44 45 46	47 48 49	50 51	52 53 54	55 56 57	58 59 60	61	62 63	64 65 66	67 68 69	70 71 72	73 74 75	76 77 78	79 80
82599	18	Set	68																				-2100	046	20+	583		
brasil																												

MOBILE STATIONS ONLY:

LAT	LONG
5° 55'	35° 10'

SOUNDING DATA (HEIGHT IN GEOMETRIC DECAMETERS)

ALTITUDE	WIND POLAR DIR (DEG)	WIND POLAR SPEED (MPS)	WIND COMPONENT N-S (MPS)	WIND COMPONENT E-W (MPS)	CORRECTED COMPONENT N-S (MPS)	CORRECTED COMPONENT E-W (MPS)	FALL VEL (MPS)	TEMPERATURE DEG C	TEMPERATURE CORR	PRESSURE (MB)	DENSITY GM/M³	SPEED OF SOUND	SPECIAL SENSOR DATA A	SPECIAL SENSOR DATA B
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	31 32 33	34 35 36 37	38 39 40 41 42	43 44 45 46	47 48 49 50 51	52 53 54	55 56 57	58 59 60 61
4494	110	8	3	- 8				4.6		1 | 789 +0	2 | 266 +0			
4240	073	9	-2	- 9				2.3		1 | 280 +0	1 | 916 +0			
4014	043	22	-16	-15				-11.5		3 | 056 +0	4 | 048 +0			
3889	029	20	-17	-10				-11.8		3 | 593 +0	4 | 823 +0			
3865	026	19	-17	- 8				-15.9		3 | 700 +0	5 | 047 +0			
3761	028	14	-12	- 6				-12.2		4 | 235 +0	5 | 715 +0			
3633	061	10	- 5	- 9				-21.1		5 | 000 +0	6 | 985 +0			
3560	085	9	- 1	- 9				-21.2		5 | 515 +0	7 | 798 +0			
3514	094	7	0	- 7				-24.1		5 | 813 +0	8 | 219 +0			
3377	179	5	0	5				-23.2		7 | 092 +0	1 | 0001+1			
3164	266	4	0	4				-30.2		6 | 584 +0	1 | 7462+1			
3103	260	3	1	3				-27.8		1 | 0078+1	1 | 4464+1			
2999	230	7	5	5				-35.4		1 | 195/+1	1 | 7710+1			
2865	280	9	- 1	9				-36.9		1 | 4454+1	2 | 1544+1			
2829	294	9	- 3	8				-42.3		1 | 1520+1	2 | 3206+1			
2731	035	8	- 7	- 5				-40.4		1 | 7562+1	2 | 6570+1			
2643	081	18	- 3	-18				-45.6		2 | 0018+1	3 | 0978+1			
2554	009	29	- 1	-29				-47.2		2 | 2788+1	3 | 5515+1			
2512	086	34	- 2	-34				-53.4		2 | 4193+1	3 | 8769+1			
2310	092	35	- 1	-35				-54.0		3 | 3095+1	5 | 3170+1			
2200	095	28	2	-28				-54.7		3 | 9487+1	6 | 3623+1			
2106	116	21	6	-20				-59.7		4 | 5967+1	7 | 5670+1			
2100	099	16	2	-16				-58.3		4 | 0200+1	7 | 5723+1			
										|	|			
										|	|			
										|	|			
										|	|			
3800	276	51	- 5	50			88			|	|			
3700	265	36	3	36			95			|	|			
3600	239	19	10	16			95			|	|			
3500	225	23	16	16			91			|	|			
3400	216	17	14	10			87			|	|			
3300	187	9	9	1			80			|	|			
3200	078	7	- 2	- 7			77			|	|			
3100	050	14	- 9	-11			71			|	|			
3000	056	19	-11	-16			67			|	|			
2900	065	24	-10	-23			63			|	|			
2800	080	23	- 4	-23			61			|	|			
2700	097	15	2	-15			59			|	|			
2600	108	11	3	-10			56			|	|			
2500	108	10	3	-10			49			|	|			
2400	111	7	2	- 7			44			|	|			
2300	102	8	2	- 8			43			|	|			
2200	063	9	- 4	- 8			41			|	|			
2100	051	15	-10	-12			38			|	|			
2000	042	23	+17	-15			35			|	|			
1900	032	21	-18	-11			31			|	|			
1800	020	17	-16	- 6			30			|	|			
1700	039	11	- 9	- 7			29			|	|			
1600	073	10	- 4	-10			25			|	|			
1500	096	7	1	- 7			24			|	|			
1400	164	5	5	- 2			22			|	|			
1300	230	5	3	4			19			|	|			
1200	269	5	0	5			19			|	|			
1100	259	3	1	3			17			|	|			
1000	228	7	5	5			16			|	|			
900	262	9	2	9			14			|	|			
800	304	9	- 5	8			12			|	|			
700	058	8	- 5	- 7			11			|	|			
600	089	23	0	-23			10			|	|			
500	085	34	- 3	-34			9			|	|			
400	089	38	- 1	-38			8			|	|			
300	092	35	1	-35			7			|	|			
200	095	28	2	-28			6			|	|			
100	099	16	2	-16			6			|	|			

HIGH ALTITUDE METEOROLOGICAL DATA

STATION NUMBER	DATE DAY	DATE MO	DATE YR	OBS TIME (GMT)	RAOB TIME DIFF	SENSOR WIND	SENSOR THERMO	SENSOR SPEC A	SENSOR SPEC B	CORRECTION METHOD WIND	CORRECTION METHOD TEMP	QUESTIONABLE DATA LAYERS WIND TOP	WIND BOTTOM	THERMODYNAMIC TOP	THERMODYNAMIC BOTTOM	SPECIAL TYPE	SPECIAL TOP	SPECIAL BOTTOM	RAOB TYPE	RAOB REL. POINT	THERMODYNAMIC BASE DATA ALTITUDE	PRESS (MB)	TEMP
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 31	32 33 34 35		36 37 38 39	40 41 42 43	44 45 46 47	48 49 50 51	52 53	54 55 56 57	58 59 60 61	62 63	64 65	66 67 68 69	70 71 72 73	74 75 76 77 78 79 80
82599	18	Sep	68																				

MOBILE STATIONS ONLY:	LAT	LONG
	50° 55'	350° 10'

SOUNDING DATA (HEIGHT IN GEOMETRIC DECAMETERS)

ALTITUDE	WIND POLAR DIR (DEG)	WIND POLAR SPEED (MPS)	WIND COMPONENT N-S (MPS)	WIND COMPONENT E-W (MPS)	CORRECTED COMPONENT N-S (MPS)	CORRECTED COMPONENT E-W (MPS)	FALL VEL (MPS)	TEMPERATURE DEG C	TEMPERATURE CORR	PRESSURE (MB)	DENSITY GM/M³	SPEED OF SOUND	SPECIAL SENSOR DATA A	SPECIAL SENSOR DATA B
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	31 32 33 34	35 36 37	38 39 40 41 42 43	44 45 46 47 48 49 50 51	52 53 54	55 56 57	58 59 60 61
2000	080	2	- 4	- 2			5							
1900	020	5	- 5	- 2			5							
1800	054	10	- 6	- 8			5							

HIGH ALTITUDE METEOROLOGICAL DATA

STATION NUMBER	DATE DAY	MO	YR	OBSERVATION TIME (GMT)
1 2 3 4 5	6 7	8 9	10 11	12 13 14 15

SOUNDING DATA CONSTANT PRESSURE LEVELS (HEIGHT IN GEOPOTENTIAL DECAMETERS)

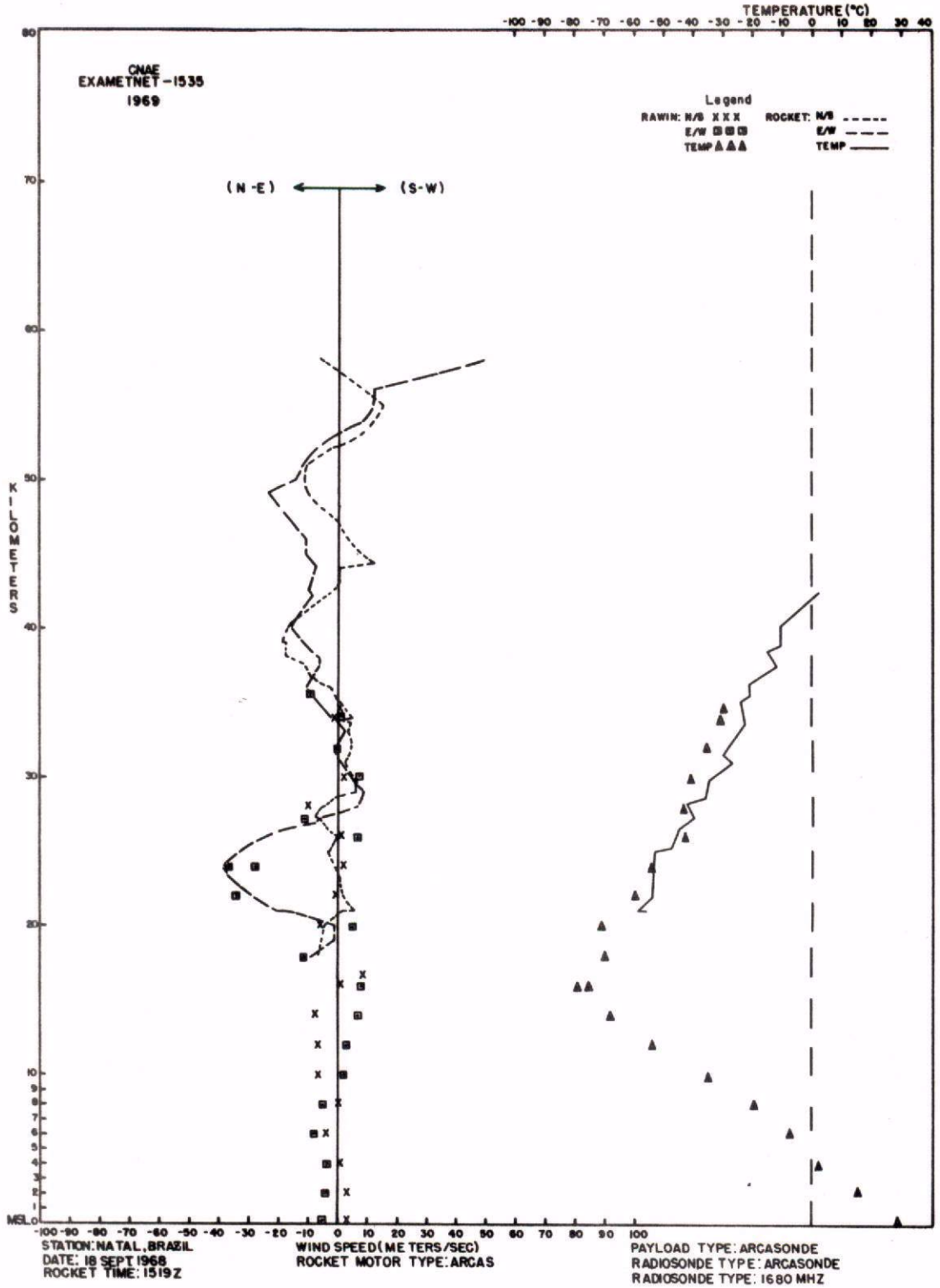
ALTITUDE	WIND POLAR DIR (DEG)	SPEED (MPS)	COMPONENT N-S (MPS)	E-W (MPS)	CORRECTED COMPONENT N-S (MPS)	E-W (MPS)		TEMPERATURE DEG C	CORR	PRESSURE (MB)	DENSITY GM/M³	SPEED OF SOUND	SPECIAL SENSOR DATA A	B
2059	105	11	3	-11				-61.4		[illegible]	[illegible]+1			
2381	095	36	3	-36				-5[illegible].5		[illegible]	8316+1			
2649	095	19	2	-19				-42.3		[illegible]	0500+1			
3118	205	2	2	1				-39.6		[illegible]	5078+1			
3368	290	1	0	1				-31.6		[illegible]	780 +0			
3633	065	10	-5	-10				-21.1		[illegible]	265 +0			
4029	045	20	-14	-14				-10.6		[illegible]	024 +0			
4346	107	8	2	-8				3.6		[illegible]	613 +0			

RAWINSONDE OBSERVATION (HEIGHT IN GEOPOTENTIAL DECAMETERS)

ALTITUDE	DIR (DEG)	SPEED (MPS)	N-S (MPS)	E-W (MPS)	TEMPERATURE DEG C		PRESSURE (MB)	
	120	6	3	-5	28	6	1010	6
0200	128	5	3	-4	15	3	[illegible]	0
0400	102	4	1	-4	2	4	[illegible]	6
0600	062	9	-4	-8	-8	5	4[illegible]	5
0800	089	5	0	-5	-20	7	[illegible]	[illegible]
1000	343	7	-7	2	-35	9	255	[illegible]
1200	338	5	7	3	-54	3	211	[illegible]
1400	322	11	-8	7	[illegible]	3	151	4
1600	261	8	1	8	[illegible]	[illegible]	101	[illegible]
1800	060	13	-7	-11	-7[illegible]	1	72	[illegible]
2000	314	8	-6	6	-71	0	[illegible]	[illegible]
2200	088	34	-1	-34	[illegible]	[illegible]	40	[illegible]
2400	093	37	2	-37	[illegible]	[illegible]	29	[illegible]
2600	093	28	1	-28	-45	0	21	[illegible]
2800	328	12	-10	7	[illegible]	[illegible]	16	3
3000	253	7	2	7	[illegible]	[illegible]	12	3
3200	206	1	1	0	[illegible]	[illegible]	9	1
3400	320	11	-1	1	-31	5	6	9
1664	140	9	7	-6	-2[illegible]	0	97	0
3476	100	8	1	-8	-30	5	6	0

SUPPLEMENTAL DATA

[…] ARCAS PERFORM Good
[…] PERFORM Bad
[…] 19
[…] EF EL ANG ____
[…] ALT ____ TIME ____
[…] 15 ft Dia PAR
TEMP SENSOR Bead Therm.
[…] SENSOR ____
[…] GMD-1A
[…]SONDE TYPE 1680 - MHz
[…] TYPE ANEROID
TEMP […] TYPE ML 419
BALLOON SIZE 1200 GRAMS
[…] GMD-1A
[…] THERMODYNAMIC DATA ARE NOT CORRECT ABOVE 30 Km


CNAE
EXAMETNET-1535
1969
Legend
RAWIN: N/S XXX
E/W
TEMP
ROCKET: N/S
E/W
TEMP
TEMPERATURE (°C)
-100 -90 -80 -70 -60 -50 -40 -30 -20 -10 0 10 20 30 40
(N-E)
(S-W)
KILOMETERS
MSL
-100 -90 -80 -70 -60 -50 -40 -30 -20 -10 0 10 20 30 40 50 60 70 80 90 100
STATION: NATAL, BRAZIL
DATE: 18 SEPT 1968
ROCKET TIME: 1519Z
WIND SPEED (METERS/SEC)
ROCKET MOTOR TYPE: ARCAS
PAYLOAD TYPE: ARCASONDE
RADIOSONDE TYPE: ARCASONDE
RADIOSONDE TYPE: 1680 MHZ

HIGH ALTITUDE METEOROLOGICAL DATA

STATION NUMBER	DATE DAY	DATE MO	DATE YR	OBS TIME (GMT)	RAOB TIME DIFF	SENSOR WIND	SENSOR THERMO	SENSOR SPEC A	SENSOR SPEC B	SENSOR RADOX	CORRECTION METHOD WIND	CORRECTION METHOD TEMP	QUESTIONABLE DATA LAYERS WIND TOP	WIND BOTTOM	THERMODYNAMIC TOP	THERMODYNAMIC BOTTOM	SPECIAL TYPE	SPECIAL TOP	SPECIAL BOTTOM	RAOB TYPE	RAOB SEQ POINT	THERMODYNAMIC BASE DATA ALTITUDE	PRESS (MB)	TEMP
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	31	32 33	34 35	36 37 38	39 40 41	42 43 44	45 46 47	48 49 50	51	52 53 54	55 56 57	58 59 60	61	62 63	64 65 66	67 68 69	70 71 72	73 74 75	76 77 78	79 80
82599	16	OCT	68																					2000	0561	20	-62	5

MOBILE STATIONS ONLY	LAT	LONG

SOUNDING DATA (HEIGHT IN GEOMETRIC DECAMETERS)

ALTITUDE	WIND POLAR DIR (DEG)	WIND POLAR SPEED (MPS)	WIND COMPONENT N-S (MPS)	WIND COMPONENT E-W (MPS)	WIND CORRECTED COMPONENT N-S (MPS)	WIND CORRECTED COMPONENT E-W (MPS)	FALL VEL (MPS)	TEMPERATURE DEG C	TEMPERATURE CORR	PRESSURE (MB)	DENSITY GM/M³	SPEED OF SOUND	SPECIAL SENSOR DATA A	SPECIAL SENSOR DATA B
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	31 32 33 34	35 36 37	38 39 40 41	42 43 44 45	46 47 48 49	50 51 52 53	54 55 56 57	58 59 60 61
5273								2.7		6 . 970 - 1	8 . 890 - 1			
5160								5.0		7 . 920 - 1	1 . 002 + 0			
4709	277	18	- 2	18				1.6		1 . 361 + 0	1 . 744 + 0			
4535	266	27	2	27				3.5		1 . 682 + 0	2 . 140 + 0			
4368	281	16	- 3	15				1.0		2 . 048 + 0	2 . 630 + 0			
4238	313	8	- 5	6				-4.6		2 . 405 + 0	3 . 153 + 0			
4106	090	2	0	- 2				-7.0		2 . 862 + 0	3 . 786 + 0			
3892	131	8	5	- 6				-11.4		3 . 749 + 0	5 . 049 + 0			
3822	165	9	9	- 2				- 9.0		4 . 098 + 0	5 . 462 + 0			
3761	196	12	11	3				-10.0		4 . 453 + 0	5 . 958 + 0			
3575	240	21	11	18				-12.5		5 . 723 + 0	7 . 731 + 0			
3463	254	18	5	17				-20.6		6 . 592 + 0	9 . 191 + 0			
3359	251	16	5	15				-19.5		7 . 571 + 0	1 . 0510 + 1			
3307	241	17	8	14				-21.0		8 . 037 + 0	1 . 1227 + 1			
3039	287	16	- 4	15				-26.6		1 . 1063 + 1	1 . 653 + 1			
3011	289	16	- 5	15				-41.7		1 . 2008 + 1	1 . 8269 + 1			
2947	278	12	- 2	12				-45.5		1 . 3347 + 1	2 . 0645 + 1			
2774	251	5	2	5				-47.1		1 . 7196 + 1	2 . 6787 + 1			
2682	208	4	4	2				-42.2		1 . 9746 + 1	3 . 0107 + 1			
2597	072	6	- 2	- 6				-45.5		2 . 2056 + 1	3 . 4117 + 1			
2539	078	12	- 3	-12				-52.1		2 . 4095 + 1	3 . 8396 + 1			
2490	084	17	- 2	-17				-49.5		2 . 5981 + 1	4 . 0907 + 1			
2356	092	24	1	-24				-57.6		3 . 1887 + 1	5 . 2093 + 1			
2301	100	23	4	-23				-57.2		3 . 4965 + 1	5 . 7016 + 1			
2240	094	22	2	-22				-60.6		3 . 8340 + 1	6 . 3520 + 1			
2203	095	21	2	-21				-60.2		4 . 0530 + 1	6 . 7022 + 1			
2079	099	16	2	-16				-65.2		4 . 9501 + 1	8 . 3826 + 1			
2000	096	11	1	-11				-62.5		5 . 6200 + 1	9 . 3950 + 1			
1945	085	9	- 1	- 9				-62.8						
5100	243	18	8	16			68							
5000	298	18	- 8	16			71							
4900	276	31	- 3	31			64							
4800	261	31	5	30			60							
4700	277	18	- 2	18			60							
4600	269	26	1	26			52							
4500	269	27	2	26			48							
4400	270	18	0	18			45							
4300	295	12	- 5	11			43							
4200	319	7	- 5	5			38							
4100	089	2	- 1	- 2			35							
4000	084	3	0	- 3			31							
3900	123	8	4	- 7			30							
3800	171	9	9	- 2			26							
3700	224	14	10	10			26							
3600	236	12	12	18			25							
3500	249	19	7	8			25							
3400	259	16	3	6			22							
3300	240	16	8	14			20							
3200	243	19	9	7			19							
3100	278	17	- 2	7			16							
3000	290	16	- 5	15			15							
2900	270	9	0	9			16							
2800	251	5	2	4			12							
2700	250	4	2	4			11							
2600	070	5	- 2	- 4			10							
2500	083	17	- 2	-12			9							
2400	085	24	- 2	-24			8							
2300	089	23	- 1	-23			7							
2200	095	21	2	-21			6							
2100	101	18	3	-18			6							
2000	095	11	1	-11			5							
1900	079	7	- 2	- 7			5							

HIGH ALTITUDE METEOROLOGICAL DATA

STATION NUMBER	DATE DAY	DATE MO	DATE YR	OBSERVATION TIME (GMT)

SOUNDING DATA CONSTANT PRESSURE LEVELS (HEIGHT IN GEOPOTENTIAL DECAMETERS)

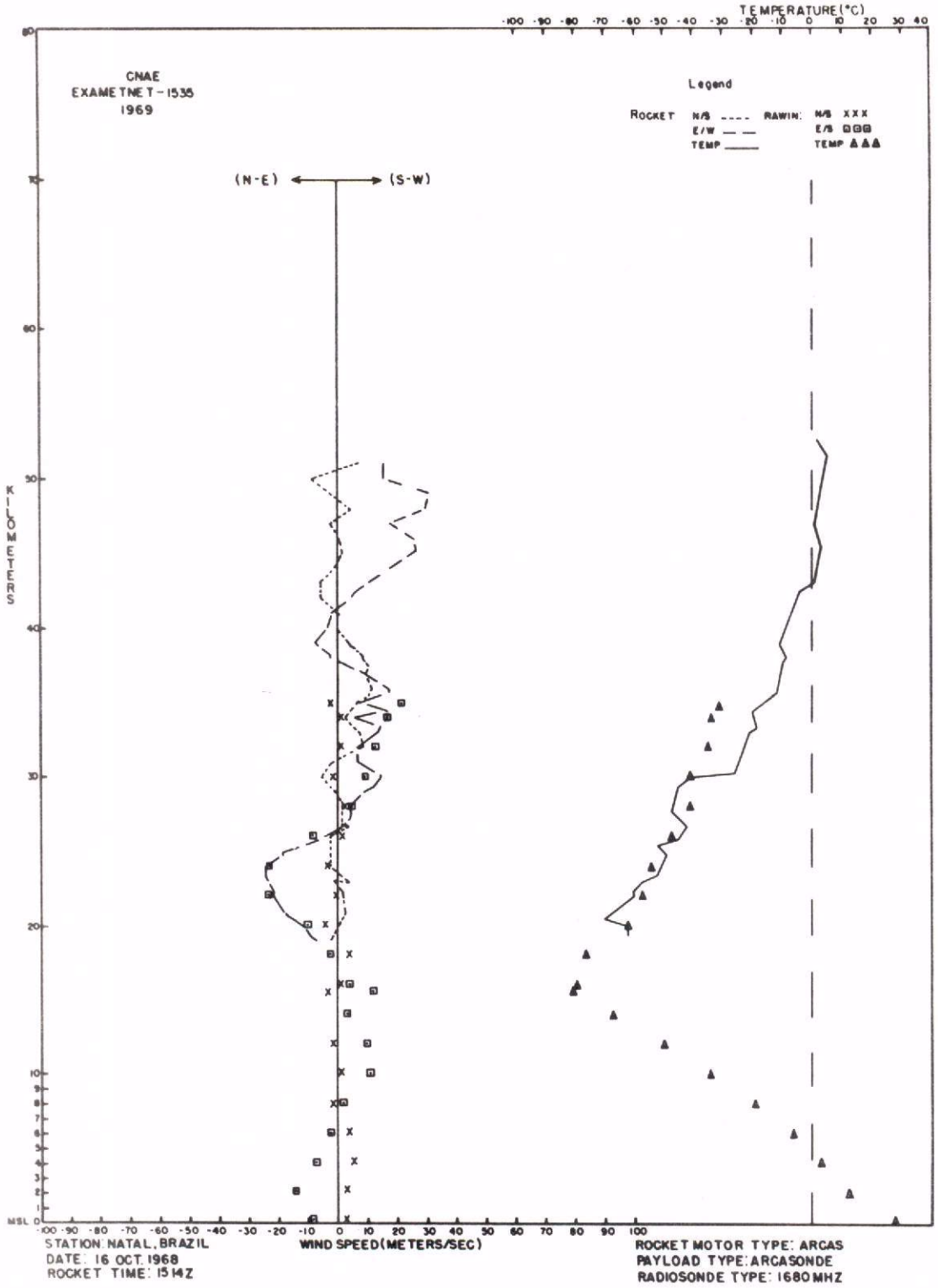
ALTITUDE	WIND POLAR DIR (DEG)	WIND POLAR SPEED (MPS)	WIND COMPONENT N-S (MPS)	WIND COMPONENT E-W (MPS)	CORRECTED COMPONENT N-S (MPS)	CORRECTED COMPONENT E-W (MPS)	TEMPERATURE DEG C	TEMPERATURE CORR	PRESSURE (MB)	DENSITY GM/M³	SPEED OF SOUND	SPECIAL SENSOR DATA A	SPECIAL SENSOR DATA B
2067	102	18	4	-18			-63.4		8.0 0 0 - 1	8.3944+ 1			
2388	083	21	- 3	-21			-54.7		7.0 0 0 - 1	4.8360+ 1			
2654	189	3	3	0			-42.4		5.0 0 0 + 0	3.0521+ 1			
3135	278	18	- 2	18			-36.9		4.0 0 0 + 0	1.4905+ 1			
3383	269	33	1	33			-34.1		3.0 0 0 + 0	1.0311+ 1			
3659	243	21	10	19			-11.4		6.0 0 0 + 0	6.726 + 0			
4039	085	3	0	- 3			- 8.3		7.0 0 0 + 0	3.988 + 0			
4352	285	15	- 4	14			0.4		1.0 0 0 + 1	2.574 + 0			
4917	279	31	- 5	30			3.3		8.0 0 0 + 1	1.273 + 0			
									3.0 0 0 + 1	1.1			
									8.0 0 0 + 1	1.1			

RAWINSONDE OBSERVATION (HEIGHT IN GEOPOTENTIAL DECAMETERS)

	110	8	3	- 8		285		1008.3
0200	102	14	3	-14		123		803.0
0400	131	9	6	- 7		31		633.4
0600	152	5	4	- 2		- 61		493.5
0800	313	2	- 1	2		- 193		381.0
1000	266	11	1	11		349		289.5
1200	278	10	- 1	10		508		214.9
1400	222	5	4	3		- 671		156.1
1600	260	4	1	4		- 791		111.0
1800	156	4	4	- 2		- 764		78.5
2000	070	11	- 4	-10		- 625		56.2
2200	090	23	0	-23		- 577		40.7
2400	083	22	- 3	-22		- 544		29.8
2600	105	8	2	- 8		- 477		22.1
2800	240	6	3	5		- 419		16.6
3000	275	10	- 1	10		- 415		12.1
3200	265	13	1	13		- 351		9.3
3400	268	17	1	17		- 341		7.0
1580	291	13	- 4	12		- 803		114.0
3492	265	12	- 2	22		- 315		6.0

SUPPLEMENTAL DATA

MOTOR Arcas PERFORM Good
PAYLOAD Arcasond PERFORM Bad
RADAR TYPE MPS-19
EF AZ ANG 045 EF EL ANG 840
PAYLOAD ACQUIS ALT TIME
WIND SENSOR 15cm DIA PAR
TEMP SENSOR Bead Thermister
SPEC SENSOR
GRND EQUIP GMD-1A
RADIOSONDE TYPE AN 80 MHz
PRES SNSR TYPE ANEROID
TEMP ELMNT TYPE ML-419
BALLOON SIZE 1200 GRAMS
GROUND EQUIP GMD-1A
REMARKS:


TEMPERATURE (°C)
-100 -90 -80 -70 -60 -50 -40 -30 -20 -10 0 10 20 30 40
CNAE
EXAMETNET-1535
1969
Legend
ROCKET N/S ---- RAWIN: N/S XXX
E/W — — E/S □□□
TEMP ____ TEMP △△△
(N-E)
(S-W)
KILOMETERS
MSL
-100 -90 -80 -70 -60 -50 -40 -30 -20 -10 0 10 20 30 40 50 60 70 80 90 100
WIND SPEED (METERS/SEC)
STATION: NATAL, BRAZIL
DATE: 16 OCT. 1968
ROCKET TIME: 1514Z
ROCKET MOTOR TYPE: ARCAS
PAYLOAD TYPE: ARCASONDE
RADIOSONDE TYPE: 1680 MHZ

HIGH ALTITUDE METEOROLOGICAL DATA

STATION NUMBER	DATE DAY	DATE MO	DATE YR	OBS TIME (GMT)	RAOB TIME DIFF	SENSOR WIND	SENSOR THERMO	SENSOR SPEC A	SENSOR SPEC B	SENSOR CODE	CORRECTION METHOD WIND	CORRECTION METHOD TEMP	QUESTIONABLE DATA LAYERS WIND TOP	WIND BOTTOM	THERMODYNAMIC TOP	THERMODYNAMIC BOTTOM	SPECIAL TYPE	SPECIAL TOP	SPECIAL BOTTOM	RAOB TYPE	RAOB NO. POINTS	THERMODYNAMIC BASE DATA ALTITUDE	PRESS (MB)	TEMP
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	31	32 33	34 35	36 37 38 39	40 41 42 43	44 45 46 47	48 49 50 51	52 53	54 55 56 57	58 59 60 61	62 63	64 65 66 67	68 69 70 71	72 73 74 75	76 77 78 79	80
82599	13	NOV	68																			9500	1032	90 -59

MOBILE STATIONS ONLY:	LAT	LONG
	50° 55'	350° 10'

SOUNDING DATA (HEIGHT IN GEOMETRIC DECAMETERS)

ALTITUDE	WIND POLAR DIR (DEG)	WIND POLAR SPEED (MPS)	WIND COMPONENT N-S (MPS)	WIND COMPONENT E-W (MPS)	CORRECTED COMPONENT N-S (MPS)	CORRECTED COMPONENT E-W (MPS)	FALL VEL (MPS)	TEMPERATURE DEG C	TEMPERATURE CORR	PRESSURE (MB)	DENSITY GM/M³	SPEED OF SOUND	SPECIAL SENSOR DATA A	SPECIAL SENSOR DATA B
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	31 32 33 34	35 36 37	38 39 40 41 42 43 44	45 46 47 48 49 50 51	52 53 54	55 56 57	58 59 60 61
5995	280	25	- 3	20				- 9,1		2[1]. 480 -1	3[1]. 330 -1			
5532	063	17	- 5	-16				- 4,7		4[1]. 420 -1	5[1]. 790 -1			
5540	071	12	- 4	-11				- 5,5		5[1]. 290 -1	6[1]. 950 -1			
5084	026	11	-10	- 6				2,3		7[1]. 360 -1	9[1]. 560 -1			
4990	009	13	-13	- 2				- 4,6		8[1]. 330 -1	1[1]. 092 +0			
4621	040	12	- 9	- 8				12,6		1[2]. 374 +0	1[1]. 788 +0			
4298	086	17	- 1	-17				- 2,9		2[2]. 037 +0	2[1]. 654 +0			
4197	087	30	- 2	-30				- 3,6		2[2]. 304 +0	3[1]. 009 +0			
4026	090	26	0	-26				- 3,1		2[1]. 863 +0	3[1]. 803 +0			
3935	092	16	0	-16				-13,2		3[1]. 208 +0	4[1]. 345 +0			
3898	093	13	0	-13				17,0		3[1]. 487 +0	4[1]. 793 +0			
3679	337	08	- 7	3				-25,2		4[1]. 596 +0	5[1]. 527 +0			
3344	252	18	6	17				-28,7		7[2]. 098 +0	1[1]. 0224+1			
3246	256	23	6	23				-34,6		8[2]. 123 +0	1[1]. 1990+1			
3054	275	21	- 2	21				-34,0		1[1]. 0911+1	1[1]. 6055+1			
3008	281	19	- 4	19				-39,1		1[1]. 1653+1	1[1]. 7532+1			
2871	292	13	- 3	12				-39,6		1[1]. 3791+1	2[1]. 1067+1			
2774	303	08	- 4	7				43,7		1[1]. 6015+1	2[1]. 9578+1			
2552	240	06	3	5				-42,4		2[1]. 2297+1	3[1]. 4026+1			
2521	190	07	7	1				-46,2		2[1]. 3314+1	3[1]. 6174+1			
2448	110	16	5	-15				-43,0		2[1]. 6087+1	3[1]. 9814+1			
2399	089	22	0	-22				-49,2		2[1]. 8122+1	4[1]. 4219+1			
2362	087	24	- 1	-24				-50,2		2[1]. 9923+1	4[1]. 7262+1			
2310	083	28	- 4	-28				-58,2		3[1]. 2077+1	5[1]. 2550+1			
6000	273	21	- 1	21			100							
5900	022	08	- 7	- 3			111							
5800	061	19	- 9	-17			111							
5700	058	23	-18	-19			95							
5600	061	17	- 8	-15			95							
5500	020	17	- 6	-16			100							
5400	078	14	- 4	-14			77							
5300	066	11	- 5	-10			74							
5200	049	09	- 6	- 7			80							
5100	029	11	-10	- 5			74							
5000	009	13	-13	- 2			69							
4900	256	10	-10	1			67							
4800	004	08	- 8	0			65							
4700	017	10	-10	- 3			59							
4600	051	12	- 8	- 9			51							
4500	059	06	- 3	- 5			48							
4400	051	07	- 5	- 5			48							
4300	086	18	- 2	-18			44							
4200	087	30	- 2	-30			40							
4100	090	33	0	-33			38							
4000	090	23	0	-23			36							
3900	092	13	0	-13			31							
3800	112	03	1	- 3			29							
3700	350	03	- 8	2			28							
3600	305	07	- 5	7			25							
3500	259	09	2	9			24							
3400	251	15	5	4			22							
3300	253	20	6	19			20							
3200	258	25	6	24			30							
3100	271	23	0	23			18							
3000	281	19	- 3	19			16							
2900	283	15	- 4	14			14							
2800	303	10	- 5	9			12							
2700	299	05	- 2	4			12							
2600	301	05	- 3	4			11							
2500	136	08	6	- 5			10							
2400	089	22	0	-22			8							

HIGH ALTITUDE METEOROLOGICAL DATA

WBAN-A FORM NO. ...
PAGE ... OF ...

STATION NUMBER	DATE DAY	DATE MO	DATE YR	OBS TIME (GMT)	RAOB TIME DIFF	SENSOR WIND	SENSOR THERMO	SENSOR SPEC A	SENSOR SPEC B	SENSOR RADIO	CORRECTION METHOD WIND	CORRECTION METHOD TEMP	QUESTIONABLE DATA LAYERS WIND TOP	QUESTIONABLE DATA LAYERS WIND BOTTOM	QUESTIONABLE DATA LAYERS THERMODYNAMIC TOP	QUESTIONABLE DATA LAYERS THERMODYNAMIC BOTTOM	SPECIAL TYPE	SPECIAL TOP	SPECIAL BOTTOM	WIND DATA TYPE CODE	THERMODYNAMIC BASE DATA ALTITUDE	THERMODYNAMIC BASE DATA PRESS (MB)	THERMODYNAMIC BASE DATA TEMP
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	31	32 33	34 35	36 37 38 39	40 41 42 43	44 45 46 47	48 49 50 51	52 53	54 55 56 57	58 59 60 61	62 63	64 65 66 67	68 69 70 71	72 73 74 75	76 77
Barreira	13	Nov	68																				
do																							
Inferno																							
Brasil																							

MOBILE STATIONS ONLY	LAT	LONG
	5°55'	35°10'

SOUNDING DATA (HEIGHT IN GEOMETRIC DECAMETERS)

ALTITUDE	WIND POLAR DIR (DEG)	WIND POLAR SPEED (MPS)	WIND COMPONENT N-S (MPS)	WIND COMPONENT E-W (MPS)	WIND CORRECTED COMPONENT N-S (MPS)	WIND CORRECTED COMPONENT E-W (MPS)	FALL VEL (MPS)	TEMPERATURE DEG C	TEMPERATURE CORR	PRESSURE (MB)	DENSITY GM/M³	SPEED OF SOUND	SPECIAL SENSOR DATA A	SPECIAL SENSOR DATA B
1 2 3 4	5 7 8	9 10 11	12 13 14	15 16 17 18 19	20 21 22 23	24 25 26 27	28 29 30 31	32 33 34 35	36 37	38 39 40 41 42 43 44	45 46 47 48 49 50 51	52 53 54 55	56 57 58 59	60 61 62 63
2300	083	28	- 4	-27			7							
2400	085	26	- 2	-26			6							
2100	089	19	0	-19			6							
2000	072	11	- 4	-10			5							
1900	105	03	1	- 3			5							
1800	178	05	5	0			5							

HIGH ALTITUDE METEOROLOGICAL DATA

STATION NUMBER	DATE DAY	MO	YR	OBSERVATION TIME (GMT)
1 2 3 4 5	6 7	8 9	10 11	12 13 14 15

SOUNDING DATA CONSTANT PRESSURE LEVELS (HEIGHT IN GEOPOTENTIAL DECAMETERS)

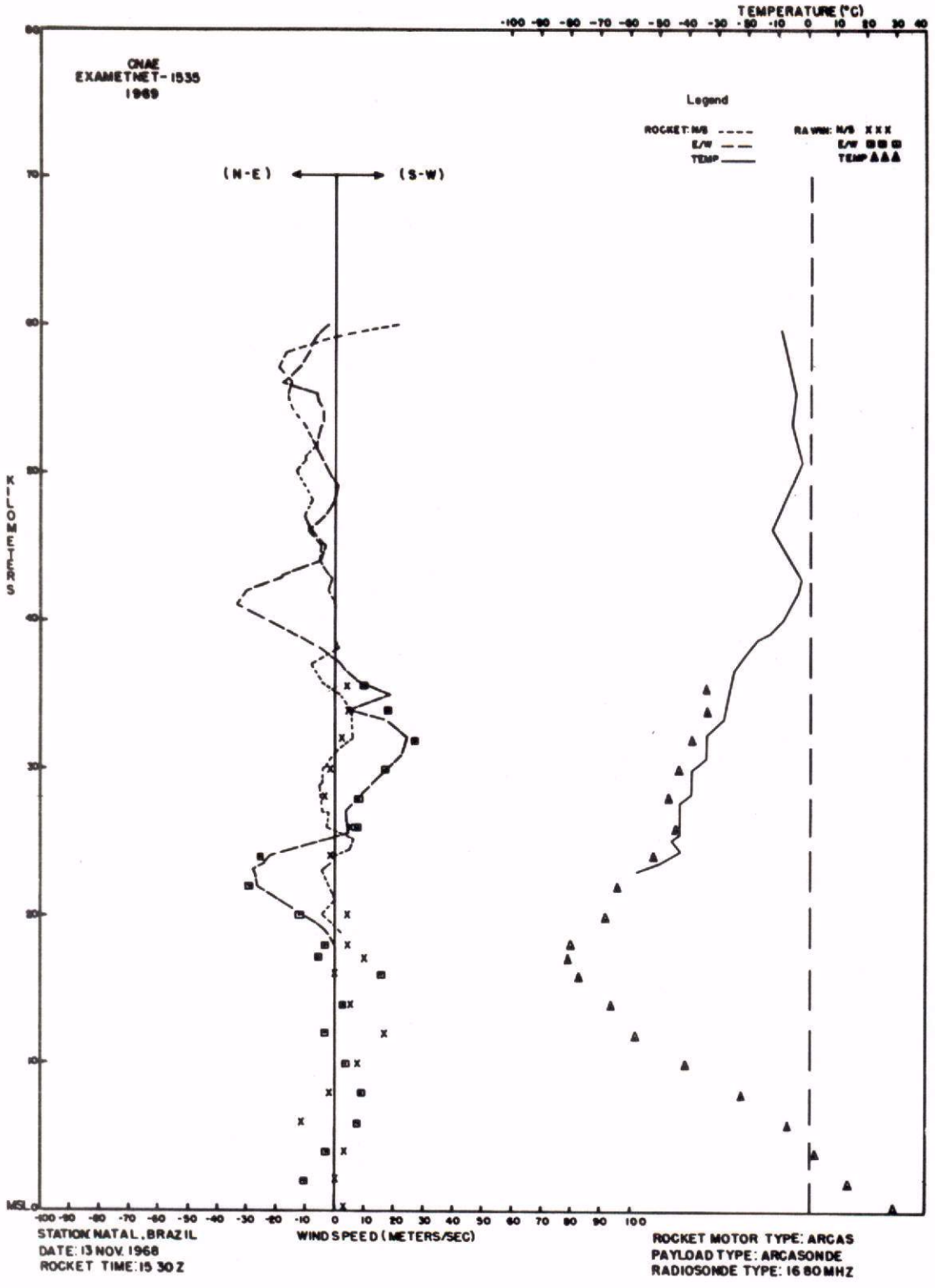
ALTITUDE	WIND POLAR DIR (DEG)	SPEED (MPS)	COMPONENT N-S (MPS)	E-W (MPS)	CORRECTED COMPONENT N-S (MPS)	E-W (MPS)		TEMPERATURE DEG C	CORR	PRESSURE (MB)	DENSITY GM/M³	SPEED OF SOUND	SPECIAL SENSOR DATA A	B
1 2 3 4 5	6 7 8	9 10 11	12 13 14 15	16 17 18 19	20 21 22 23	24 25 26 27	28 29 30	31 32 33 34	35 36 37	38 39 40 41 42 43 44	45 46 47 48 49 50 51	52 53 54	55 56 57	58 59 60 61
2041	078	14	-3	-14				-67.9		4. 000 -1	8. 5785 +1			
2372	087	24	-1	-24				-54.5		7. 000 -1	4. 7661 +1			
2643	300	65	-2	4				-42.7		1. 000 +0	3. 0561 +1			
3132	267	23	1	23				-34.1		2. 000 +0	1. 4730 +1			
3386	251	15	5	4				-29.8		3. 000 +0	1. 0129 +1			
3633	317	09	-7	6				-25.1		5. 000 +0	7. 098 +0			
3774	080	04	-1	- 4				-21.6		7. 000 +0	4. 199 +0			
4313	089	16	-2	-16				- 2.5		1. 000 +1	2. 602 +0			
4872	358	09	-2	-16				- 2.3		2. 000 +1	1. 300 +0			
										3. 000 +1	.			
										5. 000 +1	.			

RAWINSONDE OBSERVATION (HEIGHT IN GEOPOTENTIAL DECAMETERS)

ALTITUDE	DIR	SPEED	N-S	E-W	TEMPERATURE	PRESSURE
	110	08	3	- 8	29 8	1006 2
0200	103	10	0	-10	14 6	800 0
0400	137	04	3	- 3	3 6	629 4
0600	325	14	-11	8	- 6 1	489 8
0800	288	03	- 2	9	-22 6	376 8
1000	205	09	8	4	-41 4	274 0
1200	170	17	17	- 3	-58 7	208 0
1400	210	06	5	3	-66 3	150 5
1600	271	16	0	-16	-77 4	107 5
1800	155	06	5	- 2	-80 7	75 7
2000	110	13	4	-12	-68 8	53 8
2200	81	29	- 2	-29	-64 3	38 4
2400	085	25	- 2	-25	-52 0	27 9
2600	239	08	5	-25	-74 3	20 6
2800	306	09	- 4	8	-47 3	15 3
3000	277	17	- 2	17	43 7	11 3
3200	267	27	2	27	39 0	8 4
3400	259	18	4	18	34 3	6 3
1720	155	11	10	- 5	-81 2	86 0
3563	250	11	4	15	-34 2	5 0

SUPPLEMENTAL DATA

MOTOR Arcas PERFORM Good
PAYLOAD Arcasonde PERFORM Good
RADAR TYPE MPS-19
EF AZ ANG 035° EF EL ANG 85°
PAYLOAD ACQUIS ALT ____ TIME ____
WIND SENSOR 15 ft. DIA PAR
TEMP SENSOR Bead Therm.
SPEC SENSOR ____
GRND EQUIP GMD-1A
RADIOSONDE TYPE 1680 MHz
PRES SNSR TYPE ANEROID
TEMP ELMNT TYPE ML-419
BALLOON SIZE 1200 GRAMS
GROUND EQUIP GMD-1A
REMARKS:


CNAE
EXAMETNET-1535
1969
TEMPERATURE (°C)
-100 -90 -80 -70 -60 -50 -40 -30 -20 -10 0 10 20 30 40
Legend
ROCKET: N/S
E/W
TEMP
RAWIN: N/S
E/W
TEMP
(N-E)
(S-W)
KILOMETERS
MSL
-100 -90 -80 -70 -60 -50 -40 -30 -20 -10 0 10 20 30 40 50 60 70 80 90 100
WIND SPEED (METERS/SEC)
STATION: NATAL, BRAZIL
DATE: 13 NOV. 1968
ROCKET TIME: 15 30 Z
ROCKET MOTOR TYPE: ARCAS
PAYLOAD TYPE: ARCASONDE
RADIOSONDE TYPE: 1680 MHZ

HIGH ALTITUDE METEOROLOGICAL DATA

WDC-A FORM NO. ____
Page 1 of 12

STATION NUMBER	DATE DAY	DATE MO	DATE YR	OBS TIME (GMT)	RAOB TIME DIFF	SENSOR WIND	SENSOR THERMO	SENSOR SPEC A	SENSOR SPEC B	CORRECTION METHOD WIND	CORRECTION METHOD TEMP	QUESTIONABLE DATA LAYERS WIND TOP	QUESTIONABLE DATA LAYERS WIND BOTTOM	QUESTIONABLE DATA LAYERS THERMODYNAMIC TOP	QUESTIONABLE DATA LAYERS THERMODYNAMIC BOTTOM	QUESTIONABLE DATA LAYERS SPECIAL TYPE	QUESTIONABLE DATA LAYERS SPECIAL TOP	QUESTIONABLE DATA LAYERS SPECIAL BOTTOM	RADIO TYPE	RADIO SET NO.	THERMODYNAMIC BASE DATA ALTITUDE	THERMODYNAMIC BASE DATA PRESS (MB)	THERMODYNAMIC BASE DATA TEMP
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 31	32 33	34 35	36 37 38	39 40 41	42 43 44	45 46 47	48 49 50 51	52 53 54	55 56 57	58 59 60 61	62 63	64 65 66 67	68 69 70 71	72 73 74	75 76 77 78
82599	18	DEC	68																		2300	033	110	34.1

MOBILE STATIONS ONLY	LAT	LONG

SOUNDING DATA (HEIGHT IN GEOMETRIC DECAMETERS)

ALTITUDE	WIND POLAR DIR (DEG)	WIND POLAR SPEED (MPS)	WIND COMPONENT N-S (MPS)	WIND COMPONENT E-W (MPS)	CORRECTED COMPONENT N-S (MPS)	CORRECTED COMPONENT E-W (MPS)	FALL VEL (MPS)	TEMPERATURE DEG C	TEMPERATURE CORR	PRESSURE (MB)	DENSITY GM/M³	SPEED OF SOUND	SPECIAL SENSOR DATA A	SPECIAL SENSOR DATA B
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	31 32 33 34	35 36 37	38 39 40 41 42 43	44 45 46 47 48 49 50 51	52 53 54 55	56 57 58 59	60 61 62 63
5700	303	30	-16	25				1.1		3. 170 - 1	6. 070 - 1			
5596	047	17	-12	-12				2.6		3. 600 - 1	7. 460 - 1			
5118	085	97	-10	-96				- 5.9		6. 520 - 1	8. 390 - 1			
4993	078	84	-18	-83				- 1.6		7. 610 - 1	9. 460 - 1			
4813	080	86	-17	-86				- 1.3		9. 480 - 1	1. 227 + 0			
3828	079	30	- 6	-29				-35.3		3. 498 + 0	5. 179 + 0			
3423	121	7	- 1	- 6				-35.7		6. 207 + 0	9. 275 + 0			
3112	283	15	- 3	14				-46.2		9. 800 + 0	1. 5206 + 1			
3002	287	18	18	- 5				-41.0		1. 1520 + 1	1. 7474 + 1			
2853	288	13	- 6	12				-42.2		1. 4314 + 1	2. 1525 + 1			
2740	280	5	- 1	5				-49.5		1. 6775 + 1	2. 6633 + 1			
2630	022	1	- 1	0				-49.5		1. 9991 + 1	3. 2476 + 1			
2576	063	1	0	- 1				-52.5		2. 1677 + 1	3. 4611 + 1			
2524	083	2	0	- 2				-49.3		2. 3463 + 1	3. 6911 + 1			
2390	079	16	- 5	-15				-50.3		2. 8886 + 1	4. 5645 + 1			
2371	075	19	- 5	-18				-56.1		2. 9891 + 1	4. 8414 + 1			
2300	079	27	- 5	-26				-54.1		3. 3100 + 1	5. 8211 + 1			
2277	082	27	- 4	-26				-63.7		3. 4400 + 1	5. 7837 + 1			
2137	092	24	1	-24										
2012	092	12	0	- 2										
1960	077	8	- 2	- 8										
1899	056	4	- 2	- 3										
1829	291	5	- 2	5										
1737														
1700														
5700	303	30	-16	25			76							
5600	047	17	-12	-12			86							
5500	078	46	-10	-45			100							
5400	071	62	-20	-59			100							
5300	083	83	-12	-82			84							
5200	088	105	- 5	-105			77							
5100	085	96	-10	- 95			74							
5000	079	83	-18	-82			69							
4900	078	88	-20	-86			69							
4800	081	86	-15	-86			69							
4700	080	85	-16	-84			69							
4600	085	84	- 9	-89			59							
4500	089	79	- 3	-79			53							
4400	093	65	4	-65			50							
4300	095	51	4	-50			47							
4200	091	45	1	-45			43							
4100	093	40	2	-40			40							
4000	091	33	1	-33			36							
3900	083	31	- 4	-30			36							
3800	078	29	- 6	-29			32							
3700	082	23	- 3	-23			27							
3600	087	18	- 1	-18			27							
3500	092	11	0	-11			26							
3400	133	6	4	- 4			23							
3300	223	7	5	5			22							
3200	266	11	1	11			19							
3100	283	16	-3	16			19							
3000	287	18	- 5	17			17							
2900	290	16	- 5	15			16							
2800	286	8	- 2	8			13							
2700	277	2	0	2			11							
2600	052	1	- 1	- 1			10							
2500	089	2	0	- 2			9							
2400	072	15	- 5	-14			9							
2300	079	27	- 5	-26			8							
2200	087	28	- 1	-28			8							

HIGH ALTITUDE METEOROLOGICAL DATA

STATION NUMBER	DATE DAY	DATE MO	DATE YR	OBS TIME (GMT)	RAOB TIME DIFF	SENSOR WIND	SENSOR THERMO	SENSOR SPEC A	SENSOR SPEC B	CORRECTION METHOD WIND	CORRECTION METHOD TEMP	QUESTIONABLE DATA LAYERS WIND TOP	QUESTIONABLE DATA LAYERS WIND BOTTOM	QUESTIONABLE DATA LAYERS THERMODYNAMIC TOP	QUESTIONABLE DATA LAYERS THERMODYNAMIC BOTTOM	QUESTIONABLE DATA LAYERS SPECIAL TYPE	QUESTIONABLE DATA LAYERS SPECIAL TOP	QUESTIONABLE DATA LAYERS SPECIAL BOTTOM	RAOB TYPE	RAOB REL POINT	THERMODYNAMIC BASE DATA ALTITUDE	THERMODYNAMIC BASE DATA PRESS (MB)	THERMODYNAMIC BASE DATA TEMP
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 31	32 33 34 35	36 37 38 39 40 41 42 43	44 45 46 47 48 49 50 51		52 53	54 55 56 57 58 59 60 61		62 63	64 65	66 67 68 69	70 71 72 73 74 75 76 77 78 79 80
82599																							

MOBILE STATIONS ONLY	LAT	LONG

SOUNDING DATA (HEIGHT IN GEOMETRIC DECAMETERS)

ALTITUDE	WIND POLAR DIR (DEG)	WIND POLAR SPEED (MPS)	WIND COMPONENT N-S (MPS)	WIND COMPONENT E-W (MPS)	WIND CORRECTED COMPONENT N-S (MPS)	WIND CORRECTED COMPONENT E-W (MPS)	FALL VEL (MPS)	TEMPERATURE DEG C	TEMPERATURE CORR	PRESSURE (MB)	DENSITY GM/M^3	SPEED OF SOUND	SPECIAL SENSOR DATA A	SPECIAL SENSOR DATA B
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	31 32 33 34	35 36 37	38 39 40 41 42 43 44	45 46 47 48 49 50 51	52 53 54	55 56 57	58 59 60 61
2100	094	22	2	-24			7							
2000	091	11	0	-11			6							
1900	056	4	-2	-3			5							
1800	236	5	3	-4			5							

HIGH ALTITUDE METEOROLOGICAL DATA

STATION NUMBER	DATE DAY	DATE MO	DATE YR	OBSERVATION TIME (GMT)

SOUNDING DATA CONSTANT PRESSURE LEVELS (HEIGHT IN GEOPOTENTIAL DECAMETERS)

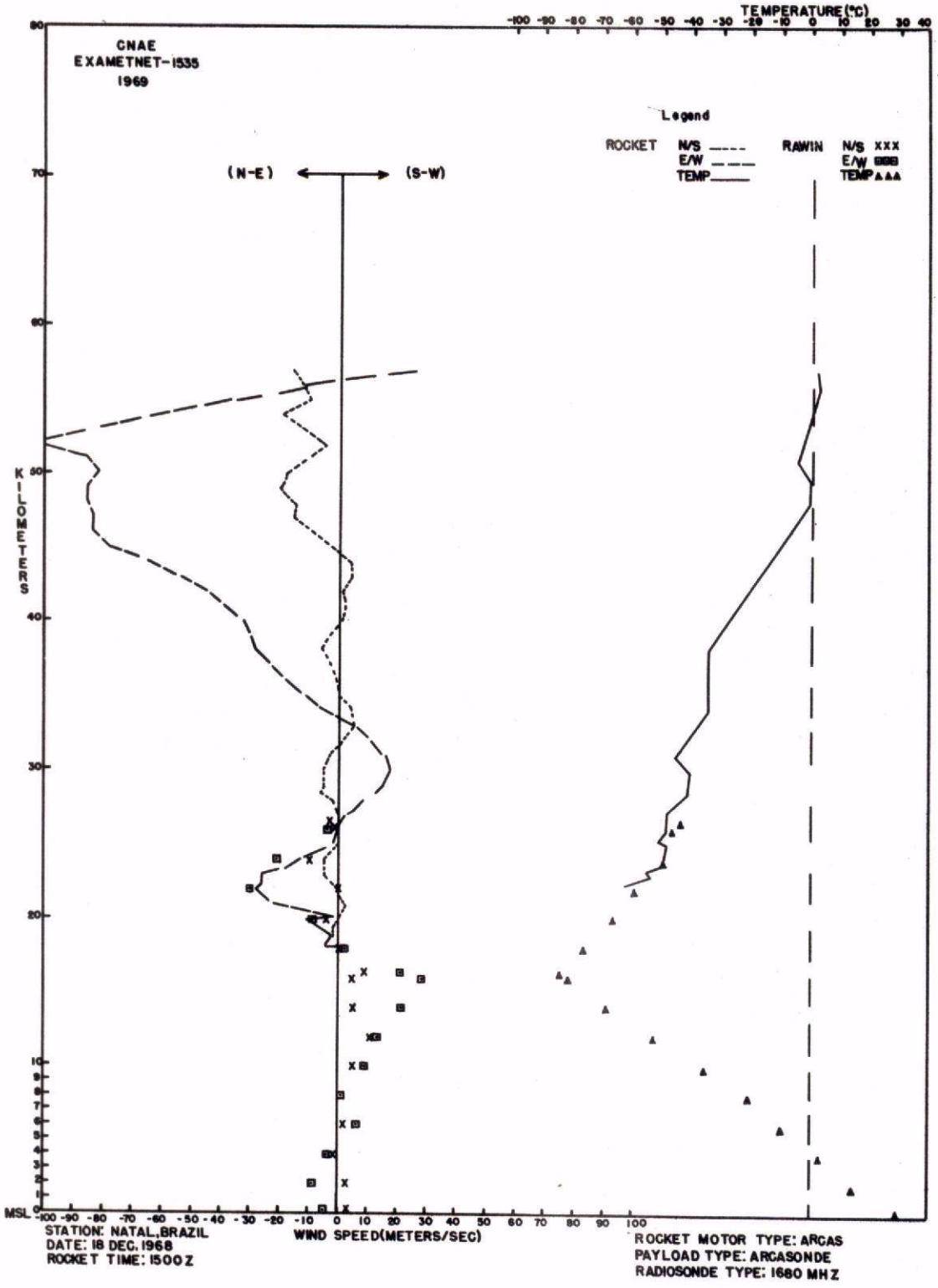
ALTITUDE	WIND POLAR DIR (DEG)	WIND POLAR SPEED (MPS)	WIND COMPONENT N-S (MPS)	WIND COMPONENT E-W (MPS)	CORRECTED COMPONENT N-S (MPS)	CORRECTED COMPONENT E-W (MPS)	TEMPERATURE DEG C	TEMPERATURE CORR	PRESSURE (MB)	DENSITY GM/M³	SPEED OF SOUND	SPECIAL SENSOR DATA A	SPECIAL SENSOR DATA B
2043	090	17	0	-17			- 66.1		4|.|000-1	8|.5039+1			
2362	070	26	- 9	-24			- 49.9		7|.|000-1	7|.7320+1			
2629	050	3	- 2	+ 2			- 45.7		1|.|000+0	3|.0964+1			
3084	284	16	- 4	15			- 44.9		8|.|000+0	1|.5428+1			
3327	198	7	7	2			- 39.1		3|.|000+0	1|.0132+1			
3555	090	15	0	-15			- 35.7		8|.|000+0	7|.|415+0			
3964	088	32	- 1	-32			- 30.6		7|.|000+0	4|.|355+0			
4204	091	45	1	-45			- 27.3		1|.|000+1	2|.|807+0			
4732	080	85	-16	-84			- 4.1		8|.|000+1	1|.|309+0			
									3|.|000+1	1|.|			
									8|.|000+1	1|.|			

RAWINSONDE OBSERVATION (HEIGHT IN GEOPOTENTIAL DECAMETERS)

	120	6	3	- 5	292		1007|3
0200	111	10	3	- 9	145		802|0
0400	081	4	-1	- 4	038		629|7
0600	254	6	2	6	- 107		429|7
0800	240	11	1	1	- 214		376|0
1000	243	10	5	9	- 368		285|1
1200	230	17	11	13	- 533		211|7
1400	258	22	5	21	- 698		152|9
1600	260	19	5	28	822		108|3
1800	265	2	0	2	774		76|8
2000	068	10	- 9	- 9	672		54|6
2200	038	30	0	-30	606		39|3
2400	064	23	-10	-21	- 500		28|7
2600	062	5	- 2	- 4	- 478		21|8
1641	249	23	9	21	- 851		100|0
2663	336	03	- 3	1	- 440		19|0

SUPPLEMENTAL DATA

MOTOR ARCAS PERFORM GOOD
PAYLOAD ARC.BAL PERFORM GOOD
RADAR TYPE M-PS-19
EF AZ ANG 030° EF EL ANG 95°
PAYLOAD ACQUIRD ALT. TIME
WIND SENSOR 10 DIA PRT
TEMP SENSOR BEAD THERM
SPEC SENSOR
GRND EQUIP GMD 1A
RADIOSONDE TYPE 1680 MHz
PRES SENSR TYPE ANEROID
TEMP ELMNT TYPE ML-419
BALLOON SIZE 1200 GRAMS
GROUND EQUIP GMD-1A
REMARKS:


CNAE
EXAMETNET-1535
1969
TEMPERATURE (°C)
-100 -90 -80 -70 -60 -50 -40 -30 -20 -10 0 10 20 30 40
Legend
ROCKET N/S ----- RAWIN N/S XXX
E/W - - - E/W
TEMP____ TEMP
(N-E)
(S-W)
KILOMETERS
MSL
-100 -90 -80 -70 -60 -50 -40 -30 -20 -10 0 10 20 30 40 50 60 70 80 90 100
WIND SPEED(METERS/SEC)
STATION: NATAL, BRAZIL
DATE: 18 DEC. 1968
ROCKET TIME: 1500Z
ROCKET MOTOR TYPE: ARCAS
PAYLOAD TYPE: ARCASONDE
RADIOSONDE TYPE: 1680 MHZ

HIGH ALTITUDE METEOROLOGICAL DATA

STATION NUMBER	DATE DAY	DATE MO	DATE YR	OBS TIME (GMT)	RAOB TIME DIFF	SENSOR WIND	SENSOR THERMO	SENSOR SPEC A	SENSOR CODE	SENSOR SPEC B	SENSOR CODE	CORRECTION METHOD WIND	CORRECTION METHOD TEMP	QUESTIONABLE DATA LAYERS WIND TOP	WIND BOTTOM	THERMODYNAMIC TOP	THERMODYNAMIC BOTTOM	SPECIAL TYPE	SPECIAL TOP	SPECIAL BOTTOM	RAOB TYPE	RAOB REL. POINT	THERMODYNAMIC BASE DATA ALTITUDE	PRESS (MB)	TEMP
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 31				32 33 34 35	36	37 38 39 40 41 42 43		44 45 46 47	48 49 50 51	52 53	54 55 56 57	58 59 60 61	62 63	64 65	66 67 68 69	70 71 72 73 74	75 76 77 78 79 80
82599	15	01	69	1635	-292	102	010														01	00	2200	039	20 -60 8

MOBILE STATIONS ONLY	LAT	LONG

SOUNDING DATA (HEIGHT IN GEOMETRIC DECAMETERS)

ALTITUDE	WIND POLAR DIR (DEG)	WIND POLAR SPEED (MPS)	WIND COMPONENT N-S (MPS)	WIND COMPONENT E-W (MPS)	CORRECTED COMPONENT N-S (MPS)	CORRECTED COMPONENT E-W (MPS)	FALL VEL (MPS)	TEMPERATURE DEG C	TEMPERATURE CORR	PRESSURE (MB)	DENSITY GM/M³	SPEED OF SOUND	SPECIAL SENSOR DATA A	SPECIAL SENSOR DATA B
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 31	32 33 34 35	36 37	38 39 40 41 42 43 44	45 46 47 48 49 50 51	52 53 54 55 56 57	58 59 60 61	
04349	084	074	-008	-073			050	-008		1 .862 + 0	2 .469 + 0	327		
03987	091	038	001	-038			035	-022		3 .007 + 0	4 .214 + 0	318		
03657	112	016	006	-015			027	-025		4 .697 + 0	6 .651 + 0	316		
03529	113	012	005	-011			024	-028		5 .595 + 0	8 .025 + 0	314		
03397	104	005	001	-005			021	-026		6 .879 + 0	9 .797 + 0	315		
03240	140	007	005	-004			020	-032		8 .307 + 0	1 .213 + 1	311		
03033	275	004	000	004			016	-035		1 .099 + 1	1 .626 + 1	309		
02947	347	006	-006	001			015	-039		1 .263 + 1	1 .898 + 1	307		
02786	055	006	-003	-005			014	-040		1 .590 + 1	2 .403 + 1	306		
02652	066	006	-001	-006			011	-052		1 .949 + 1	3 .099 + 1	298		
02432	098	008	001	-008			008	-051		2 .724 + 1	4 .318 + 1	299		
02387	096	007	001	-007			008	-059		2 .921 + 1	4 .798 + 1	293		
02292	089	017	000	-017			007	-057		3 .396 + 1	5 .587 + 1	295		
02268	088	019	-001	-017			007	-063		3 .525 + 1	5 .902 + 1	290		
02200	081	021	-002	-021			007	-061		3 .920 + 1	6 .501 + 1	292		
02176	087	021	-001	-021			007							
02140	086	020	-002	038			006							
02112	086	020	-002	-668			006							
02057	086	017	-001	-012			006							
02006	085	015	-002	-015			001							
01917	082	010	-002	-010			005							
06200	265	038	005	068			143							
06100	289	029	-009	027			125							
06000	328	025	021	013			125							
05900	346	023	022	006			118							
05800	012	019	-019	-004			105							
05700	068	014	-006	-013			105							
05600	092	019	001	-019			111							
05500	088	019	-001	-019			111							
05400	079	023	-005	-022			091							
05300	081	029	-005	-029			080							
05200	092	030	001	-030			080							
05100	091	046	001	-046			080							
05000	089	058	-001	-058			074							
04900	086	076	-005	-076			069							
04800	084	071	-008	-070			065							
04700	081	080	-013	-078			061							
04600	081	075	-014	-074			054							
04500	079	079	-015	-077			050							
04400	081	076	-012	-075			049							
04300	084	069	-007	-069			050	-009		1 .988 + 0	2 .572 + 0	326		
04200	081	055	-003	-055			040	-013		2 .261 + 0	3 .014 + 0	323		
04100	086	047	-003	-047			035	-017		2 .577 + 0	3 .488 + 0	320		
04000	088	038	-001	-038			035	-021		2 .944 + 0	4 .047 + 0	318		
03900	094	028	002	-028			035	-023		3 .368 + 0	4 .703 + 0	317		
03800	105	016	004	-015			032	-023		3 .855 + 0	5 .426 + 0	317		
03700	111	014	005	-013			027	-024		4 .414 + 0	6 .213 + 0	317		
03600	112	018	007	-017			029	-026		5 .058 + 0	7 .148 + 0	315		
03500	112	010	004	-010			024	-028		5 .803 + 0	8 .267 + 0	314		
03400	098	006	001	-006			029	-026		6 .656 + 0	9 .560 + 0	315		
03300	111	003	001	-003			020	-029		7 .638 + 0	1 .088 + 1	313		
03200	159	002	002	-001			020	-033		8 .784 + 0	1 .266 + 1	311		
03100	236	004	002	003			018	-034		1 .012 + 1	1 .484 + 1	310		
03000	300	004	-002	004			016	-037		1 .166 + 1	1 .717 + 1	308		
02900	018	006	-006	-002			015	-039		1 .347 + 1	2 .009 + 1	307		
02800	050	006	-004	-006			014	-040		1 .557 + 1	2 .342 + 1	306		
02700	076	005	-001	-005			011	-048		1 .804 + 1	2 .725 + 1	301		
02600	089	007	000	-007			010	-052		2 .010 + 1	3 .286 + 1	298		
02500	100	014	002	-014			009	-057		2 .448 + 1	3 .898 + 1	299		
02400	097	004	001	-004			008	-056		2 .854 + 1	4 .524 + 1	296		
02300	035	016	000	-016			009	-057		3 .341 + 1	5 .418 + 1	295		

HIGH ALTITUDE METEOROLOGICAL DATA

WDC-A FORM NO. ____
Page 2 of 3

STATION NUMBER	DATE DAY	DATE MO	DATE YR	OBS TIME (GMT)	RAOB TIME DIFF	SENSOR WIND	SENSOR THERMO	SENSOR SPEC A	SENSOR SPEC B	CORRECTION METHOD WIND	CORRECTION METHOD TEMP	QUESTIONABLE DATA LAYERS WIND TOP	WIND BOTTOM	THERMODYNAMIC TOP	THERMODYNAMIC BOTTOM	SPECIAL TYPE	SPECIAL TOP	SPECIAL BOTTOM	RAOB TYPE	RAOB REL POINT	THERMODYNAMIC BASE DATA ALTITUDE	PRESS (MB)	TEMP
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	31	32 33 34 35	36 37 38 39 40 41 42 43	44 45 46 47	48 49 50 51	52 53	54 55 56 57	58 59 60 61	62 63	64 65	66 67 68 69	70 71 72 73 74	75 76 77 78 79 80		
12599	15	01	69	1635	-292	102	010												01	00	2200	039	-60 8

MOBILE STATIONS ONLY	LAT	LONG

SOUNDING DATA (HEIGHT IN GEOMETRIC DECAMETERS)

ALTITUDE	WIND POLAR DIR (DEG)	WIND POLAR SPEED (MPS)	WIND COMPONENT N-S (MPS)	WIND COMPONENT E-W (MPS)	CORRECTED COMPONENT N-S (MPS)	CORRECTED COMPONENT E-W (MPS)	FALL VEL (MPS)	TEMPERATURE DEG C	TEMPERATURE CORR	PRESSURE (MB)	DENSITY GM/M^3	SPEED OF SOUND	SPECIAL SENSOR DATA A	SPECIAL SENSOR DATA B
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	31 32 33 34	35 36 37	38 39 40 41 42 43 44	45 46 47 48 49 50 51	52 53 54	55 56 57	58 59 60 61
02200	086	021	-002	-021			007	-061		3 920 + 1	51 506 + 1	292		
02100	086	019	-001	-019			006							
02000	015	014	-001	-014			005							
01900	081	010	-002	-010			005							
01800	149	018	016	-009			005							

HIGH ALTITUDE METEOROLOGICAL DATA

STATION NUMBER	DATE DAY	DATE MO	DATE YR	OBSERVATION TIME (GMT)
82599	15	01	69	1635

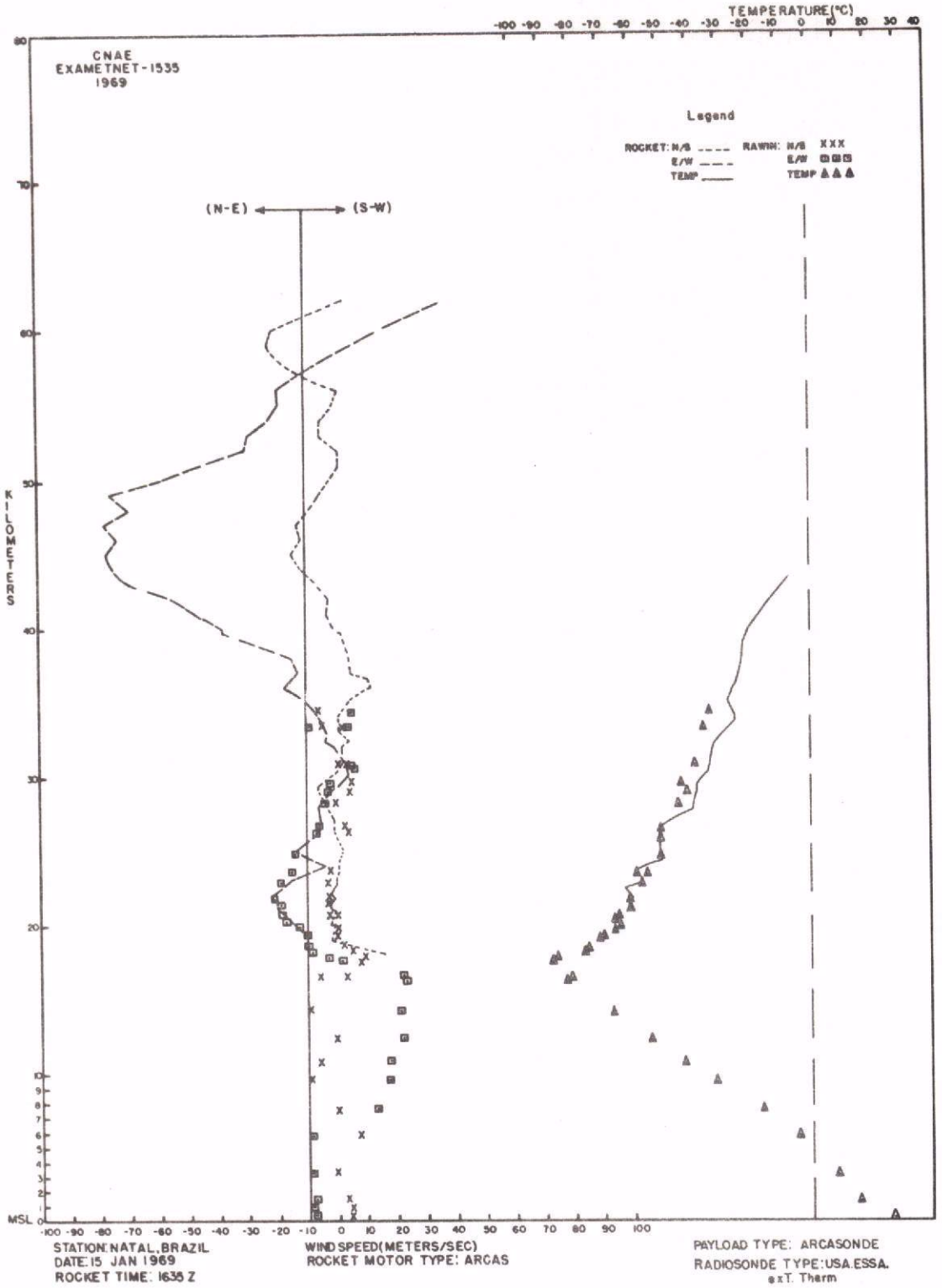
SOUNDING DATA CONSTANT PRESSURE LEVELS (HEIGHT IN GEOPOTENTIAL DECAMETERS)

ALTITUDE	WIND POLAR DIR (DEG)	WIND POLAR SPEED (MPS)	WIND COMPONENT N-S (MPS)	WIND COMPONENT E-W (MPS)	CORRECTED COMPONENT N-S (MPS)	CORRECTED COMPONENT E-W (MPS)	TEMPERATURE DEG C	TEMPERATURE CORR	PRESSURE (MB)	DENSITY GM/M³	SPEED OF SOUND	SPECIAL SENSOR DATA A	SPECIAL SENSOR DATA B
									.000 - 1				
									.000 - 1				
									.000+00				
04264	087	065	-005	-065			-044		.000+03	1.072 + 0	304		
03960	092	034	001	-034			-055		.000+04	8.44 + 0	296		
03588	113	017	007	-016			-027		.000+06	7.138 + 0	315		
03339	106	009	002	-009			-036		.000+06	1.040 + 1	309		
03092	242	006	003	005			-039		.000+11	1.505 + 1	307		
02629	120	008	004	-007			-051		.000+13	1.173 + 1	299		
02368	084	015	-002	-015			-059		.000+15	1.933 + 1	293		
02050	089	017	000	-017			-066		.000+18	1.496 + 1	289		

RAWINSONDE OBSERVATION (HEIGHT IN GEOPOTENTIAL DECAMETERS)

03445	321	008	-006	005	-34 .9	0006 .0
03339	323	006	-005	003	-36 .2	0007 .0
03092	249	006	002	006	-39 .1	0010 .0
02969	157	005	005	-002	-44 .2	0012 .0
02914	141	005	004	-003	-42 .0	0013 .0
02818	093	004	000	-004	-45 .5	0015 .0
02662	117	007	003	-006	-51 .2	0019 .0
02629	121	008	004	-007	-51 .2	0020 .0
02484	097	014	002	-014	-51 .3	0025 .0
02368	084	015	-002	-015	-57 .0	0030 .0
02290	081	018	-003	-018	-57 .0	0034 .0
02188	082	021	-003	-021	-61 .0	0040 .0
02144	081	020	-003	-020	-61 .5	0043 .0
02076	083	018	-002	-018	-65 .5	0048 .0
02050	089	017	000	-017	-65 .9	0050 .0
01985	089	013	000	-013	-66 .7	0056 .0
01941	088	010	000	-010	-70 .6	0060 .0
01932	085	010	-001	-010	-71 .6	0061 .0
01853	099	010	002	-010	-75 .2	0070 .0
01829	122	010	005	-002	-76 .2	0073 .0
01720	163	009	009	-003	-86 .7	0078 .0
01775	183	008	008	001	-86 .1	0080 .0
01669	252	022	003	022	-81 .5	0097 .0
01651	284	024	-006	023	-82 .0	0100 .0
01417	292	023	-009	021	-67 .6	0150 .0
01238	273	022	-001	022	-54 .9	0200 .0
01022	291	018	-006	017	-43 .9	0250 .0
00866	098	019	-009	017	-32 .9	0300 .0
00757	271	013	000	013	-17 .5	0400 .0
00585	129	011	007	-009	-05 .3	0500 .0
00313	081	009	-001	-009	08 .5	0700 .0
00149	111	008	003	-008	16 .6	0850 .0
00008	136	006	004	-004	27 .7	1000 .0
00004	137	006	004	-004	28 .2	1004 .0

SUPPLEMENTAL DATA
MOTOR ARCAS PERFORM GOOD
PAYLOAD Crmson. PERFORM Bad
RADAR TYPE MPS - 19
EF AZ ANG 030° EF EL ANG 85°
PAYLOAD ACQUIRE ALT TIME
WIND SENSOR 15 ft DIA PAR
TEMP SENSOR Bead Therm
SPEC SENSOR
GRND EQUIP GMD - 1A
RADIOSONDE TYPE USA-RSSA ext.therm.
PRES SENSR TYPE Aneroid
TEMP ELMNT TYPE USW B 230
BALLOON SIZE 1200 GRAMS
GROUND EQUIP GMD -1A
REMARKS: NONE


CNAE
EXAMETNET-1535
1969
TEMPERATURE(°C)
-100 -90 -80 -70 -60 -50 -40 -30 -20 -10 0 10 20 30 40
Legend
ROCKET: N/S
E/W
TEMP
RAWIN: N/S
E/W
TEMP
(N-E)
(S-W)
KILOMETERS
MSL
-100 -90 -80 -70 -60 -50 -40 -30 -20 -10 0 10 20 30 40 50 60 70 80 90 100
STATION: NATAL, BRAZIL
DATE: 15 JAN 1969
ROCKET TIME: 1635 Z
WIND SPEED (METERS/SEC)
ROCKET MOTOR TYPE: ARCAS
PAYLOAD TYPE: ARCASONDE
RADIOSONDE TYPE: USA ESSA.
ϵ T. Therm

HIGH ALTITUDE METEOROLOGICAL DATA

WDC-A FORM NO. ____J
Page 1 of 3

STATION NUMBER	DATE DAY	MO	YR	OBS TIME (GMT)	RAOB TIME DIFF	SENSOR WIND	THERMO	SPEC A	SPEC B	CORRECTION METHOD WIND	TEMP	QUESTIONABLE DATA LAYERS WIND TOP	WIND BOTTOM	THERMODYNAMIC TOP	THERMODYNAMIC BOTTOM	SPECIAL TYPE	SPECIAL TOP	SPECIAL BOTTOM	RAOB TYPE	RAOB RE. POINT	THERMODYNAMIC BASE DATA ALTITUDE	PRESS (MB)	TEMP
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 31	32 33 34 35	36 37 38 39	40 41 42 43	44 45 46 47	48 49 50 51	52 53	54 55 56 57	58 59 60 61	62 63	64 65 66 67	68 69 70 71	72 73 74 75	76 77 78 79 80
82599	12	02	69	1520	-298	102	010												01	00	2200	039 : 30	-62 : 0

MOBILE STATIONS ONLY	LAT	LONG
	:	:

SOUNDING DATA (HEIGHT IN GEOMETRIC DECAMETERS)

ALTITUDE	WIND POLAR DIR (DEG)	WIND POLAR SPEED (MPS)	WIND COMPONENT N-S (MPS)	WIND COMPONENT E-W (MPS)	CORRECTED COMPONENT N-S (MPS)	CORRECTED COMPONENT E-W (MPS)	FALL VEL (MPS)	TEMPERATURE DEG C	TEMPERATURE CORR	PRESSURE (MB)	DENSITY GM/M³	SPEED OF SOUND	SPECIAL SENSOR DATA A	SPECIAL SENSOR DATA B
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	31 32 33 34	35 36 37	38 39 40 41 42 43 44	45 46 47 48 49 50 51	52 53 54	55 56 57	58 59 60 61
06760								-008				227		
06075	273	042	-002	042			133	-009		2 : 190 - 1	2 : 920 - 1	326		
05584	259	015	005	014			105	006		3 : 990 - 1	9 : 020 - 1	335		
05365	090	013	000	-013			091	007		5 : 790 - 1	6 : 510 - 1	336		
05176	094	024	002	-024			080	004		6 : 420 - 1	8 : 230 - 1	333		
05051	093	038	002	-038			074	005		7 : 580 - 1	9 : 510 - 1	334		
04879	087	071	-004	-071			065	-004		1 : 006 + 0	1 : 316 + 0	329		
04721	086	074	-005	-074			061	-002		1 : 142 + 0	1 : 482 + 0	330		
04630	082	068	-009	-067			053	-008		1 : 283 + 0	1 : 701 + 0	327		
04197	092	046	002	-046			042	-008		2 : 235 + 0	2 : 962 + 0	327		
03770	095	010	001	-010			031	-021		3 : 882 + 0	5 : 421 + 0	318		
03597	052	013	-008	-010			027	-032		4 : 890 + 0	7 : 134 + 0	317		
03435	082	023	-003	-023			022	-035		6 : 187 + 0	9 : 152 + 0	309		
03749	218	006	004	004			019	-044		9 : 180 + 0	1 : 409 + 1	304		
02987	286	007	-002	007			016	-039		1 : 172 + 1	1 : 765 + 1	307		
02694	186	001	001	000			012	-052		1 : 830 + 1	2 : 908 + 1	298		
02529	283	011	-001	-011			010	-048		2 : 362 + 1	3 : 699 + 1	301		
02478	082	014	002	-014			010	-054		2 : 537 + 1	4 : 084 + 1	297		
02225	086	022	-002	-026			006	-064		3 : 826 + 1	6 : 448 + 1	290		
02200	092	021	001	-021			006	-062		3 : 930 + 1	6 : 559 + 1	291		
01886	091	007	000	-007			005							
01700	098	007	001	-007										
06100	271	043	000	043			133	-009		2 : 100 - 1	2 : 799 - 1	326		
06000	277	039	-005	038			111	-007		2 : 380 - 1	3 : 148 - 1	327		
05900	276	034	-005	034			133	-004		2 : 700 - 1	3 : 532 - 1	324		
05800	263	036	005	036			125	-001		3 : 060 - 1	3 : 959 - 1	331		
05700	156	030	006	029			118	003		3 : 460 - 1	4 : 411 - 1	333		
05600	248	016	006	015			105	006		3 : 900 - 1	4 : 919 - 1	335		
05500	251	006	001	006			095	007		4 : 400 - 1	5 : 530 - 1	336		
05400	085	008	-001	-008			091	007		4 : 970 - 1	6 : 246 - 1	336		
05300	096	020	002	-020			087	006		5 : 600 - 1	7 : 062 - 1	335		
05200	094	022	002	-022			080	003		6 : 320 - 1	8 : 058 - 1	333		
05100	093	029	001	-029			074	003		7 : 140 - 1	9 : 104 - 1	333		
05000	093	047	004	-047			074	003		8 : 060 - 1	1 : 228 + 0	333		
04900	089	065	-001	-065			067	-001		9 : 110 - 1	1 : 179 + 0	331		
04800	087	073	-007	-073			065	-004		1 : 032 + 0	1 : 350 + 0	329		
04700	086	074	-005	-074			061	-003		1 : 067 + 0	1 : 529 + 0	330		
04600	082	066	-009	-065			053	-008		1 : 326 + 0	1 : 760 + 0	327		
04500	084	066	-009	-065			050	-008		1 : 505 + 0	1 : 998 + 1	327		
04400	086	071	-005	-071			048	-008		1 : 709 + 0	2 : 269 + 0	327		
04300	090	059	000	-059			043	-008		1 : 940 + 0	2 : 576 + 0	327		
04200	092	046	002	-046			042	-008		2 : 203 + 0	2 : 985 + 0	327		
04100	093	043	002	-045			041	-010		2 : 503 + 0	3 : 349 + 0	325		
04000	096	036	004	-036			037	-014		2 : 849 + 0	3 : 871 + 0	323		
03900	097	024	003	-024			032	-017		3 : 247 + 0	4 : 463 + 0	321		
03800	099	013	002	-013			031	-020		3 : 707 + 0	5 : 156 + 0	317		
03700	088	002	000	-002			030	-025		4 : 740 + 0	8 : 098 + 0	316		
03600	049	011	-007	-008			027	-032		4 : 869 + 0	7 : 109 + 0	311		
03500	063	023	-015	-021			024	-034		3 : 604 + 0	8 : 201 + 0	310		
03400	092	028	001	-023			022	-036		6 : 458 + 0	9 : 589 + 0	309		
03300	112	016	006	-015			020	-039		7 : 455 + 0	8 : 129 + 1	308		
03200	131	028	005	-006			019	-042		8 : 623 + 0	7 : 314 + 1	305		
03100	278	005	-001	005			017	-042		9 : 987 + 0	7 : 580 + 1	305		
03000	287	008	-002	008			016	-039		1 : 755 + 0	7 : 737 + 1	307		
02900	784	006	-002	006			014	-043		1 : 337 + 0	2 : 045 + 1	304		
02800	311	002	-001	002			013	-047		1 : 551 + 1	2 : 415 + 1	308		
02700	202	001	001	000			012	-052		1 : 804 + 1	2 : 472 + 1	298		
02600	089	004	000	-008			011	-050		1 : 806 + 1	3 : 315 + 1	300		
02500	080	013	-002	-013			010	-052		2 : 944 + 1	3 : 391 + 1	298		

HIGH ALTITUDE METEOROLOGICAL DATA

STATION NUMBER	DATE DAY	DATE MO	DATE YR	OBS TIME (GMT)	RAOB Time Diff	SENSOR WIND	SENSOR THERMO	SENSOR SPEC A	SENSOR SPEC B	CORRECTION METHOD WIND	CORRECTION METHOD TEMP	QUESTIONABLE DATA LAYERS WIND TOP	WIND BOTTOM	THERMODYNAMIC TOP	THERMODYNAMIC BOTTOM	SPECIAL TYPE	SPECIAL TOP	SPECIAL BOTTOM	RAOB TYPE	RAOB RELEASE POINT	THERMODYNAMIC BASE DATA ALTITUDE	PRESS (MB)	TEMP
82599	12	02	69	1520	-298	102	010												01	00	2200	039	30 -62 10

MOBILE STATIONS ONLY	LAT	LONG

SOUNDING DATA (HEIGHT IN GEOMETRIC DECAMETERS)

ALTITUDE	WIND POLAR DIR (DEG)	WIND POLAR SPEED (MPS)	WIND COMPONENT N-S (MPS)	WIND COMPONENT E-W (MPS)	WIND CORRECTED COMPONENT N-S (MPS)	WIND CORRECTED COMPONENT E-W (MPS)	FALL VEL (MPS)	TEMPERATURE DEG C	TEMPERATURE CORR	PRESSURE (MB)	DENSITY GM/M^3	SPEED OF SOUND	SPECIAL SENSOR DATA A	SPECIAL SENSOR DATA B
02400	086	017	-001	-017			008	-057		2. .855 + 1	4. .651 + 1	295		
02300	087	020	-001	-020			007	-061		3. .345 + 1	5. .552 + 1	292		
02200	087	023	-001	-023			006	-062		3. .930 + 1	6. .554 + 1	291		
02100	081	022	-003	-022			006			.	.			
02000	083	018	-002	-018			005			.	.			
01900	095	012	001	-012			005			.	.			
01800	090	016	000	-016			005			.	.			

HIGH ALTITUDE METEOROLOGICAL DATA

STATION NUMBER	DATE DAY	DATE MO	DATE YR	OBSERVATION TIME (GMT)
82599	12	02	69	1520

SOUNDING DATA CONSTANT PRESSURE LEVELS (HEIGHT IN GEOPOTENTIAL DECAMETERS)

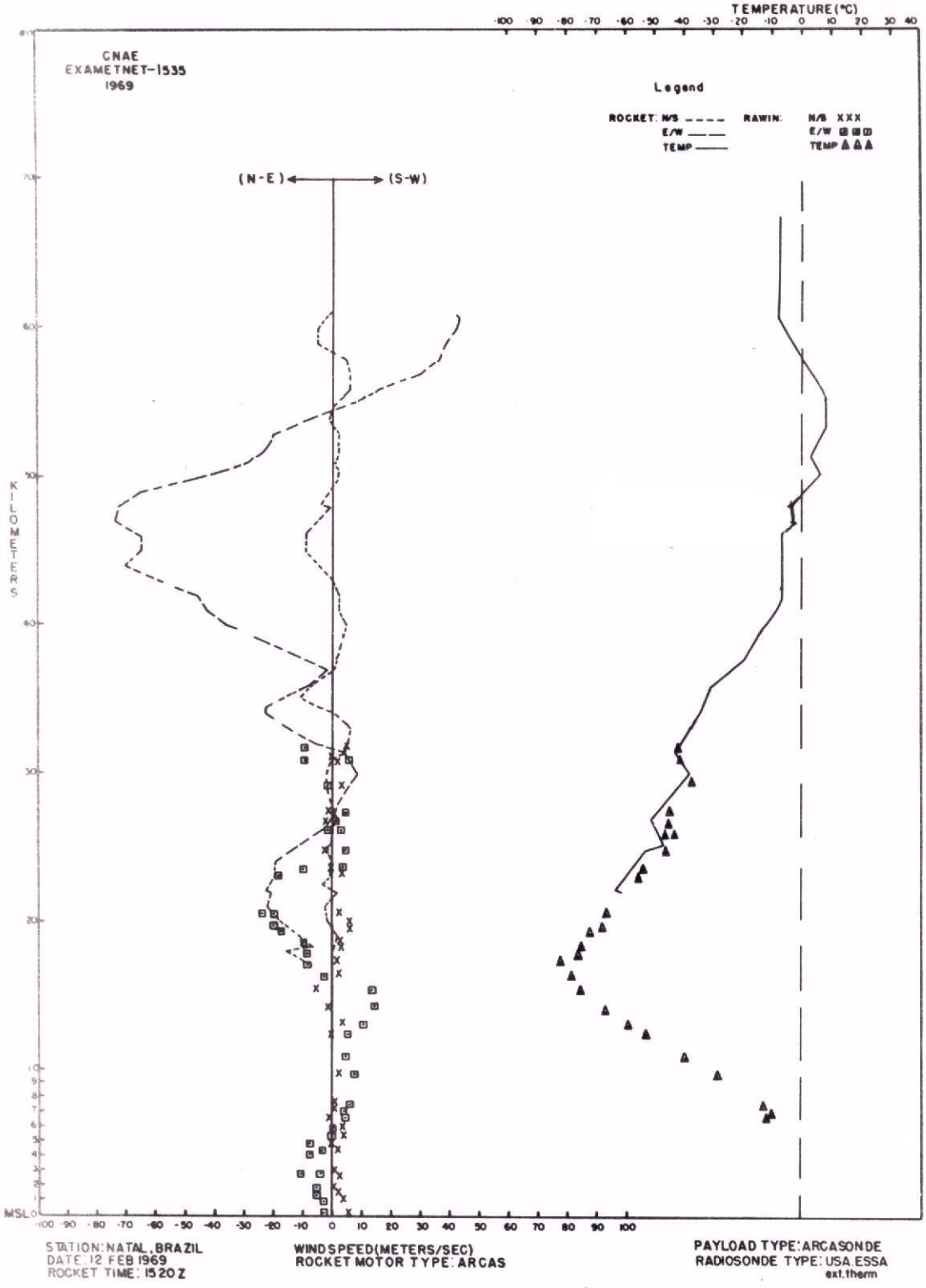
ALTITUDE	WIND POLAR DIR (DEG)	WIND POLAR SPEED (MPS)	WIND COMPONENT N-S (MPS)	WIND COMPONENT E-W (MPS)	CORRECTED COMPONENT N-S (MPS)	CORRECTED COMPONENT E-W (MPS)	TEMPERATURE DEG C	TEMPERATURE CORR	PRESSURE (MB)	DENSITY GM/M³	SPEED OF SOUND	SPECIAL SENSOR DATA A	SPECIAL SENSOR DATA B
05570	252	011	004	010			006		4[illegible]	5[illegible] 045 - 1	335		
05108	093	029	001	-029			003		7[illegible]	8[illegible] 925 - 1	333		
04819	081	071	-004	-021			-004		1[illegible]	1[illegible] 306 + 0	329		
04277	092	056	002	-056			-008		2[illegible]	2[illegible] 652 + 0	327		
03759	096	030	003	-030			-015		3[illegible]	4[illegible] 092 + 0	322		
03579	054	015	-009	-012			-032		8[illegible]	7[illegible] 304 + 0	311		
03346	102	019	004	-019			-040		7[illegible]	1[illegible] 056 + 1	306		
03104	270	005	000	005			-042		1[illegible]	1[illegible] 525 + 1	305		
02639	134	003	002	-002			-046		2[illegible]	3[illegible] 096 + 1	302		
02371	086	018	-001	-018			-055		3[illegible]	4[illegible] 847 + 1	296		
02054	082	020	-003	-020			-067		5[illegible]	8[illegible] 554 + 1	288		

RAWINSONDE OBSERVATION (HEIGHT IN GEOPOTENTIAL DECAMETERS)

03346	140	015	001	-010		-39	8	0007 |0
03175	113	011	004	-010		-43	8	0009 |0
03104	095	010	007	-010		-42	2	0010 |0
02924	238	005	003	004		-39	9	0013 |0
02745	327	002	-002	001		-46	5	0017 |0
02610	321	003	-002	002		-43	9	0019 |0
02636	295	004	-002	004		-45	7	0020 |0
02604	320	004	-003	003		-47	7	0021 |0
02489	071	010	-003	-010		-47	4	0025 |0
02371	100	018	003	018		-55	8	0030 |0
02349	100	019	003	-019		-56	7	0031 |0
02054	095	024	002	-024		-61	3	0050 |0
01987	105	020	005	-020		-67	8	0056 |0
01975	105	019	005	-018		-73	3	0057 |0
01857	100	010	002	-010		-76	5	0070 |0
01810	102	009	002	-009		-77	7	0076 |0
01747	097	009	001	-009		-81	4	0085 |0
01636	120	004	002	-003		-79	0	0100 |0
01556	297	014	-006	013		-76	9	0119 |0
01420	280	014	-002	014		-67	7	0150 |0
01300	256	010	003	010		-60	0	0182 |0
01242	280	005	-001	005		-54	7	0200 |0
01094	240	005	003	004		-41	6	0250 |0
00968	250	007	002	007		-30	9	0300 |0
00757	270	005	000	005		-14	2	0400 |0
00759	279	003	000	003		-11	6	0425 |0
00696	284	003	-001	003		-13	8	0433 |0
00585	180	003	003	000		-04	2	0500 |0
00574	172	004	004	-001		-03	3	0506 |0
00497	087	008	-001	-008		00	0	0556 |0
00447	100	004	001	-004		02	7	0594 |0
00316	092	011	000	-011		11	8	0697 |0
00311	290	011	000	-011		11	4	0700 |0
00273	100	010	002	-010		08	5	0733 |0
00198	090	006	000	-006		11	0	0802 |0
00159	096	006	001	-006		16	7	0839 |0
00149	100	006	001	-006		17	0	0850 |0
00136	105	005	001	-005		17	5	0863 |0
00109	123	005	003	-004		19	8	0890 |0
00013	143	006	005	-004		26	8	0994 |0
00007	145	006	005	-003		28	8	1000 |0
00004	150	005	004	-003		30	2	1003 |1

SUPPLEMENTAL DATA

MOTOR Arcas PERFORM Good
PAYLOAD Arcas PERFORM Good
RADAR TYPE MPS-19
EF AZ ANG 035 EF EL ANG 86°
PAYLOAD ACQUIS ALT TYPE
WIND SENSOR 15 ft DIA PAR
TEMP SENSOR Read Therm
SPEC SENSOR GMD-1A
GRND EQUIP USA-ESA ext. therm
RADIOSONDE TYPE Aerovid
PRES SENSR TYPE USSR 230
TEMP ELMNT TYPE 1200
BALLOON SIZE GMD-1A GRAMS
GROUND EQUIP
REMARKS:


TEMPERATURE (°C)
-100 -90 -80 -70 -60 -50 -40 -30 -20 -10 0 10 20 30 40
CNAE
EXAMETNET-1535
1969
Legend
ROCKET: N/S
E/W
TEMP
RAWIN:
N/S XXX
E/W
TEMP
(N-E)
(S-W)
KILOMETERS
MSL
-100 -90 -80 -70 -60 -50 -40 -30 -20 -10 0 10 20 30 40 50 60 70 80 90 100
STATION: NATAL, BRAZIL
DATE: 12 FEB 1969
ROCKET TIME: 1520Z
WINDSPEED (METERS/SEC)
ROCKET MOTOR TYPE: ARCAS
PAYLOAD TYPE: ARCASONDE
RADIOSONDE TYPE: USA. ESSA
ext. therm

HIGH ALTITUDE METEOROLOGICAL DATA

WDC-A FORM NO. ____
Page 1 of 3

STATION NUMBER	DATE DAY	DATE MO	DATE YR	OBS TIME (GMT)	RAOB TIME DIFF	SENSOR WIND	SENSOR THERMO	SENSOR SPEC A	SENSOR SPEC B	SENSOR CODE	CORRECTION METHOD WIND	CORRECTION METHOD TEMP	QUESTIONABLE DATA LAYERS WIND TOP	WIND BOTTOM	THERMODYNAMIC TOP	THERMODYNAMIC BOTTOM	SPECIAL TYPE	SPECIAL TOP	SPECIAL BOTTOM	RAOB TYPE	RAOB REL PONT	THERMODYNAMIC BASE DATA ALTITUDE	PRESS (MB)	TEMP
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	31	32	33 34 35	36 37 38 39	40 41 42 43	44 45 46 47	48 49 50 51	52 53	54 55 56 57	58 59 60 61	62 63	64 65	66 67 68 69	70 71 72 73 74	75 76 77 78 79 80	
82599	12	03	69	1557	-195	102	010													04	00	2200	039	00 -63 11

MOBILE STATIONS ONLY	LAT	LONG

SOUNDING DATA (HEIGHT IN GEOMETRIC DECAMETERS)

ALTITUDE	WIND POLAR DIR (DEG)	WIND POLAR SPEED (MPS)	WIND COMPONENT N-S (MPS)	WIND COMPONENT E-W (MPS)	CORRECTED COMPONENT N-S (MPS)	CORRECTED COMPONENT E-W (MPS)	FALL VEL (MPS)	TEMPERATURE DEG C	TEMPERATURE CORR	PRESSURE (MB)	DENSITY GM/M³	SPEED OF SOUND	SPECIAL SENSOR DATA A	SPECIAL SENSOR DATA B
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	31 32 33 34	35 36 37	38 39 40 41	42 43 44 45	46 47 48 49	50 51 52 53	54 55 56 57	58 59 60 61
06096								006		2 262 - 1	2 850 - 1	335		
05837								-008		3 110 - 1	4 130 - 1	327		
05534	295	028	003	-028			097	-004		4 540 - 1	5 930 - 1	329		
05194	308	017	-010	013			091	005		6 920 - 1	8 750 - 1	334		
05038	287	013	-004	013			069	001		8 360 - 1	1 076 + 0	332		
04889	303	007	-004	006			067	011		9 910 - 1	1 230 + 0	338		
04673	076	011	-003	-011			059	012		1 267 + 0	1 567 + 0	339		
04493	095	031	003	-031			049	000		1 596 + 0	2 055 + 0	331		
04404	099	034	005	-034			048	001		1 783 + 0	2 286 + 0	332		
04298	094	036	003	-036			043	-004		2 035 + 0	2 666 + 0	329		
04060	085	032	-003	-032			038	000		2 734 + 0	3 521 + 0	331		
03743	088	019	-001	019			030	-023		4 200 + 0	5 719 + 0	317		
03716	090	017	000	-017			029	-020		4 518 + 0	6 294 + 0	319		
03560	104	011	003	-011			025	-034		5 289 + 0	7 778 + 0	310		
03472	124	008	004	-007			025	-029		5 963 + 0	8 587 + 0	313		
03295	185	012	012	001			020	-039		7 671 + 0	1 152 + 1	307		
03106	255	012	003	012			018	-036		1 003 + 1	1 491 + 1	309		
03008	275	014	-001	014			016	-043		1 166 + 1	1 786 + 1	304		
02859	274	015	-001	015			014	-047		1 460 + 1	2 870 + 1	302		
02478	290	004	-001	004			010	-043		2 543 + 1	3 896 + 1	304		
02429	350	006	-006	001			008	-051		2 131 + 1	4 336 + 1	299		
02402	034	007	-006	-004			008	-053		2 841 + 1	4 538 + 1	298		
02387	075	007	-002	-007			008	-056		2 908 + 1	4 719 + 1	296		
02234	082	010	-002	-010			007	057		3 700 + 1	6 636 + 1	295		
02200	079	013	-003	-013			006	-063		3 900 + 1	6 538 + 1	291		
02185	078	014	-003	-014			006	-062		3 979 + 1	6 632 + 1	241		
01957	090	014	000	-014			005							
05600	291	030	-011	028			095	-005		4 140 - 1	5 436 - 1	328		
05500	297	027	-012	024			100	-003		1 172 - 1	5 438 - 1	330		
05400	300	015	-008	014			080	000		5 811 - 1	6 846 - 1	331		
05300	305	015	-008	073			080	002		6 010 - 1	7 691 - 1	333		
05200	307	017	-010	014			091	006		6 985 - 1	8 811 - 1	335		
05100	294	013	-005	012			071	002		7 621 - 1	9 753 - 1	333		
05000	270	013	000	013			069	010		8 734 - 1	1 086 + 0	337		
04900	300	007	-004	006			067	011		9 781 - 1	1 212 + 0	338		
04800	337	007	-006	003			065	011		1 101 + 0	1 364 + 0	338		
04700	068	005	-002	-006			061	011		1 238 + 0	1 534 + 0	338		
04600	088	023	-001	-023			050	007		1 411 + 0	1 773 + 0	336		
04500	094	031	002	-031			049	000		1 587 + 0	2 046 + 0	331		
04400	099	031	005	-034			048	001		1 803 + 0	2 315 + 0	332		
04300	094	036	003	-036			043	-004		2 047 + 0	2 678 + 0	324		
04200	089	037	-001	-037			042	-003		2 312 + 0	3 013 + 0	330		
04100	087	035	-001	-035			039	-001		2 611 + 0	3 780 + 0	331		
04000	083	027	-003	-027			035	-004		2 935 + 0	3 839 + 0	329		
03900	074	023	-006	-022			032	-012		3 342 + 0	4 506 + 0	324		
03800	087	022	-001	-022			031	-019		3 812 + 0	5 282 + 0	320		
03700	090	016	000	-016			029	-022		4 351 + 0	5 100 + 0	318		
03600	092	012	002	-012			026	-031		4 982 + 0	7 244 + 0	312		
03500	112	008	003	-008			024	-030		5 712 + 0	8 272 + 0	313		
03400	161	006	008	-003			022	-033		6 795 + 0	9 964 + 0	311		
03300	125	012	012	001			020	-039		7 624 + 0	1 197 + 1	307		
03200	222	011	008	007			019	-038		8 812 + 0	1 320 + 1	308		
03100	260	012	002	012			017	-037		1 033 + 1	1 540 + 1	308		
03000	277	014	-001	014			016	-044		1 194 + 1	1 854 + 1	304		
02900	269	015	001	015			014	-045		1 374 + 1	2 120 + 1	303		
02800	283	015	-003	015			013	-046		1 583 + 1	2 454 + 1	302		
02700	270	012	000	012			011	-045		1 847 + 1	3 854 + 1	303		
02600	258	010	002	010			011	-044		2 144 + 1	3 294 + 1	304		
02500	265	002	000	002			010	-044		2 485 + 1	3 819 + 1	304		
02400	083	007	-001	-007			008	-054		2 867 + 1	4 607 + 1	297		

HIGH ALTITUDE METEOROLOGICAL DATA

WDC-A FORM 60 ...
Page ... of ...

STATION NUMBER	DATE DAY	DATE MO	DATE YR	OBS TIME (GMT)	RAOB TIME DIFF	SENSOR WIND	SENSOR THERMO	SPEC A	SPEC A SENSOR	SPEC B	SPEC B SENSOR	CORRECTION METHOD WIND	CORRECTION METHOD TEMP	QUESTIONABLE DATA LAYERS WIND TOP	WIND BOTTOM	THERMODYNAMIC TOP	THERMODYNAMIC BOTTOM	SPECIAL TYPE	SPECIAL TOP	SPECIAL BOTTOM	RADIO TYPE	RADIO FREQUENT	THERMOD ALTITUDE	THERMOD PRESS	THERMOD TEMP
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	31	32	33	34	35	36 37 38	39 40 41 42	43	44 45 46 47	48 49 50 51	52	53 54 55 56	57 58 59 60	61	62	63 64 65 66	67 68 69	70
82599	12	03	69	1557	-195	102	010																		04	00	2200	039	XX

MOBILE STATIONS ONLY:	LAT	LONG

SOUNDING DATA (HEIGHT IN GEOMETRIC DECAMETERS)

ALTITUDE	WIND POLAR DIR (DEG)	WIND POLAR SPEED (MPS)	WIND COMPONENT N-S (MPS)	WIND COMPONENT E-W (MPS)	CORRECTED COMPONENT N-S (MPS)	CORRECTED COMPONENT E-W (MPS)	FALL VEL (MPS)	TEMPERATURE DEG C	TEMPERATURE CORR	PRESSURE (MB)	DENSITY GM/M³	SPEED OF SOUND	SPECIAL SENSOR DATA A	SPECIAL SENSOR DATA B
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	31 32 33 34	35 36	37 38 39 40 41 42 43	44 45 46 47 48 49 50 51	52 53 54	55 56 57 58	59 60 61
02300	085	005	000	-005			008	-057		[illegible]	[illegible]	205		
02200	079	013	-003	-013			006	-063		[illegible]	[illegible]	202		
02100	088	020	-001	-020			006			[illegible]	[illegible]			
02000	093	017	001	-017			005			[illegible]	[illegible]			
01900	085	010	-001	-010			005			[illegible]	[illegible]			
01800	096	003	000	-003			005			[illegible]	[illegible]			

HIGH ALTITUDE METEOROLOGICAL DATA

STATION NUMBER	DATE DAY	MO	YR	OBSERVATION TIME (GMT)
1 2 3 4 5	6 7	8 9	10 11	12 13 14 15
82599	12	03	69	1557

SOUNDING DATA CONSTANT PRESSURE LEVELS (HEIGHT IN GEOPOTENTIAL DECAMETERS)

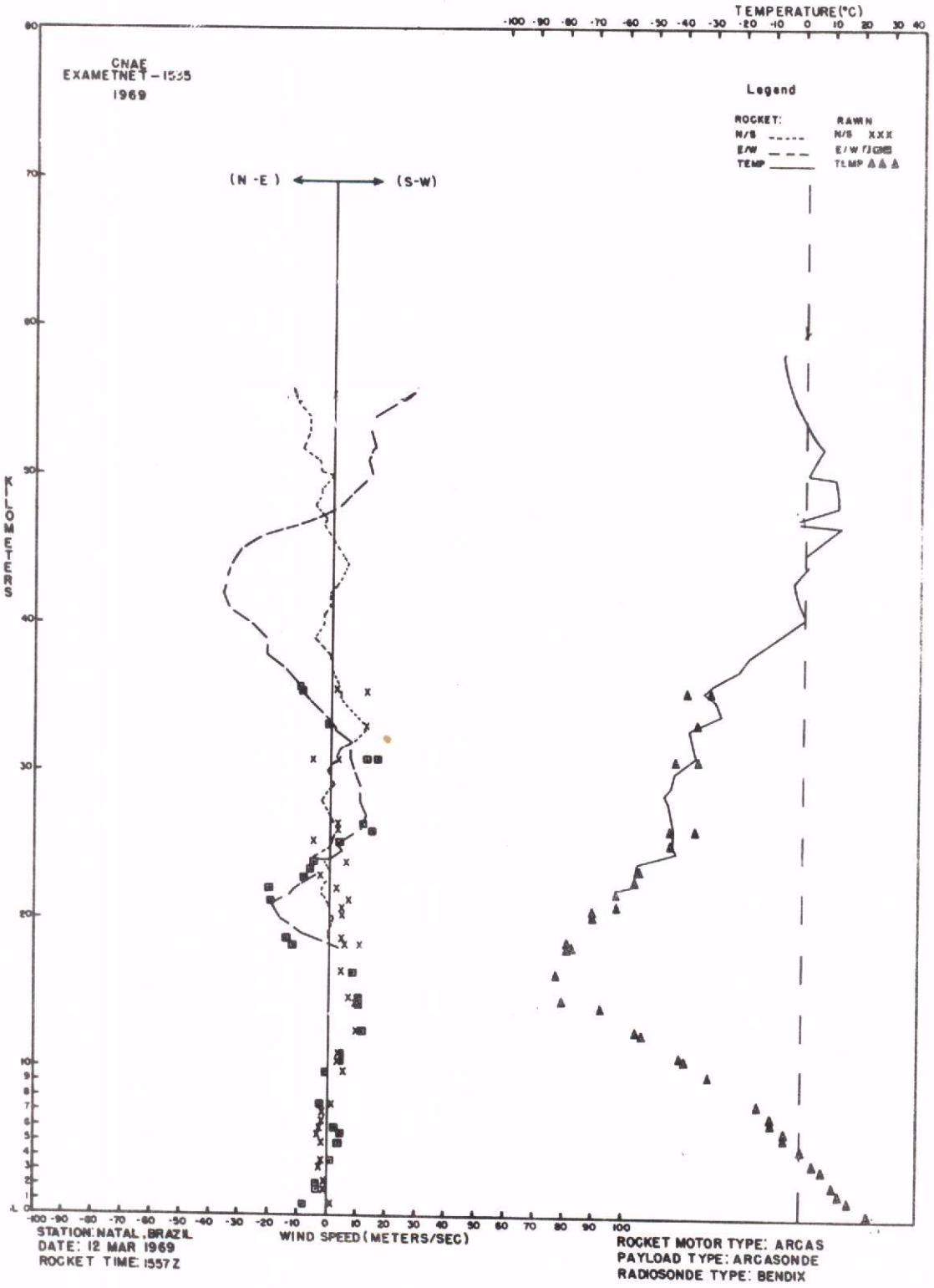
ALTITUDE	WIND POLAR DIR (DEG)	SPEED (MPS)	WIND COMPONENT N-S (MPS)	E-W (MPS)	CORRECTED COMPONENT N-S (MPS)	E-W (MPS)		TEMPERATURE DEG C	CORR	PRESSURE (MB)	DENSITY GM/M³	SPEED OF SOUND	SPECIAL SENSOR DATA A	B
05582	293	030	-012	028				-004		4. 000 - 1	5. 239 - 1	329		
05144	301	015	-008	013				004		7. 000 - 1	8. 906 - 1	334		
04842	320	007	-005	007				-011		1. 000 + 0	1. 240 + 0	308		
04248	093	036	002	-035				-004		2. 000 + 0	4. 617 + 0	329		
03959	279	025	-005	-025				-007		3. 000 + 0	3. 972 + 0	327		
03577	103	011	002	-011				-032		5. 000 + 0	7. 313 + 0	311		
03338	175	011	011	-001				-036		7. 000 + 0	1. 041 + 1	309		
03099	260	012	002	012				-036		1. 000 + 1	1. 482 + 1	309		
02635	263	011	002	011				-037		2. 000 + 1	2. 978 + 1	308		
02367	083	007	-001	-007				-056		3. 000 + 1	4. 871 + 1	296		
02050	089	018	000	-018				-072		5. 000 + 1	8. 744 + 1	284		

RAWINSONDE OBSERVATION (HEIGHT IN GEOPOTENTIAL DECAMETERS)

03564	142	015	012	-010	-40	1	0005	0
03094	292	016	-006	015	-43	8	0010	0
02630	268	014	001	018	-45	2	0020	0
02539	337	007	-006	003	-45	5	0023	0
02387	127	008	005	-006	-58	4	0029	0
02365	146	005	004	-003	-58	2	0030	0
02287	061	010	-004	-009	-57	7	0034	0
02200	474	021	002	-021	-63	1	0039	0
02113	106	021	006	-020	-63	1	0045	0
02062	103	015	004	-015	-71	1	0049	0
02050	100	015	003	-015	-71	8	0050	0
01854	108	013	004	-012	-80	5	0069	0
01857	111	014	005	-013	-80	0	0070	0
01874	141	013	010	-013	-78	4	0074	0
01655	243	009	004	008	-83	3	0100	0
01462	235	012	007	010	-71	6	0140	0
01421	222	013	009	010	-68	2	0150	0
01259	229	013	009	011	-56	2	0195	0
01243	228	013	009	010	-54	8	0200	0
01095	230	005	003	004	-41	5	0250	0
01076	228	005	003	004	-40	0	0257	0
00969	172	005	005	-001	-31	4	0300	0
00758	115	003	001	-003	-15	4	0400	0
00681	040	003	-002	-002	-10	8	0441	0
00646	014	002	-002	-001	-10	3	0463	0
00590	339	003	-003	001	-05	4	0497	0
00587	337	004	-004	002	-05	3	0500	0
00558	317	005	-004	004	-05	1	0518	0
00484	308	004	-002	003	00	0	0569	0
00447	345	002	-002	001	01	4	0597	0
00379	047	003	-002	-002	04	8	0648	0
00315	047	004	-003	-003	07	6	0700	0
00229	073	004	-001	-004	11	5	0776	0
00183	077	004	-001	-004	13	8	0819	0
00160	076	003	-001	-003	16	7	0842	0
00152	076	003	-001	-003	17	1	0850	0
00058	100	008	001	-008	22	4	0949	0
00027	084	010	-001	-008	24	3	0984	0
00011	075	009	-003	-009	27	1	1000	0
00004	100	008	001	-008	28	4	1008	0

SUPPLEMENTAL DATA

MOTOR ARCAS PERFORM Good
PAYLOAD ARCASONDE PERFORM Good
RADAR TYPE MPS-19
EF AZ ANG 045° EF EL ANG 86°
PAYLOAD ACQUIS ALT ___ TIME ___
WIND SENSOR 15 Ft DIA PAR
TEMP SENSOR BEAD THERM
SPEC SENSOR ___
GMD EQUIP GMD-1A
RADIOSONDE TYPE BENDIX
PRES SNSR TYPE ANEROID
TEMP ELMNT TYPE ML-419
BALLOON SIZE 1200 GRAMS
GROUND EQUIP GMD 1-A
REMARKS:


CNAE
EXAMETNET – 1535
1969
TEMPERATURE(°C)
-100 -90 -80 -70 -60 -50 -40 -30 -20 -10 0 10 20 30 40
Legend
ROCKET:
N/S
E/W
TEMP
RAWIN
N/S XXX
E/W
TEMP
(N-E)
(S-W)
KILOMETERS
WIND SPEED (METERS/SEC)
STATION: NATAL, BRAZIL
DATE: 12 MAR 1969
ROCKET TIME: 1557Z
ROCKET MOTOR TYPE: ARCAS
PAYLOAD TYPE: ARCASONDE
RADIOSONDE TYPE: BENDIX