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This report is a summary of information collected from three separate oceanographic experiments, each with three moorings, whose objectives were to study the influence of topography on low-frequency motions. Two arrays were set near Bermuda and one in the Charlie-Gibbs Fracture Zone (53°N, 34°W).

All the moorings were recovered after nine or thirteen months at sea. Temperature and current velocity data are displayed graphically as time series plots, histograms and spectra. Progressive vector plots and pressure time series are also presented. The data are summarized in statistical tables.

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WHOI-81-68

A COMPILATION OF MOORED CURRENT-METER DATA FROM THREE TOPOGRAPHIC EXPERIMENTS: THE BERMUDA MICROSTRUCTURE ARRAY, THE ISLAND TRAPPED WAVES ARRAY AND THE GIBBS FRACTURE ZONE ARRAY VOLUME XXVII

by

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and
Nelson G. Hogg

WOODS HOLE OCEANOGRAPHIC INSTITUTION
Woods Hole, Massachusetts 02543

August 1981

TECHNICAL REPORT

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Valentine Worthington, Chairman
Department of Physical Oceanography

ABSTRACT

This report is a summary of information collected from three separate oceanographic experiments, each with three moorings, whose objectives were to study the influence of topography on low-frequency motions. Two arrays were set near Bermuda and one in the Charlie-Gibbs Fracture Zone (53°N, 34°W).

All the moorings were recovered after nine or thirteen months at sea. Temperature and current velocity data are displayed graphically as time series plots, histograms and spectra. Progressive vector plots and pressure time series are also presented. The data are summarized in statistical tables.

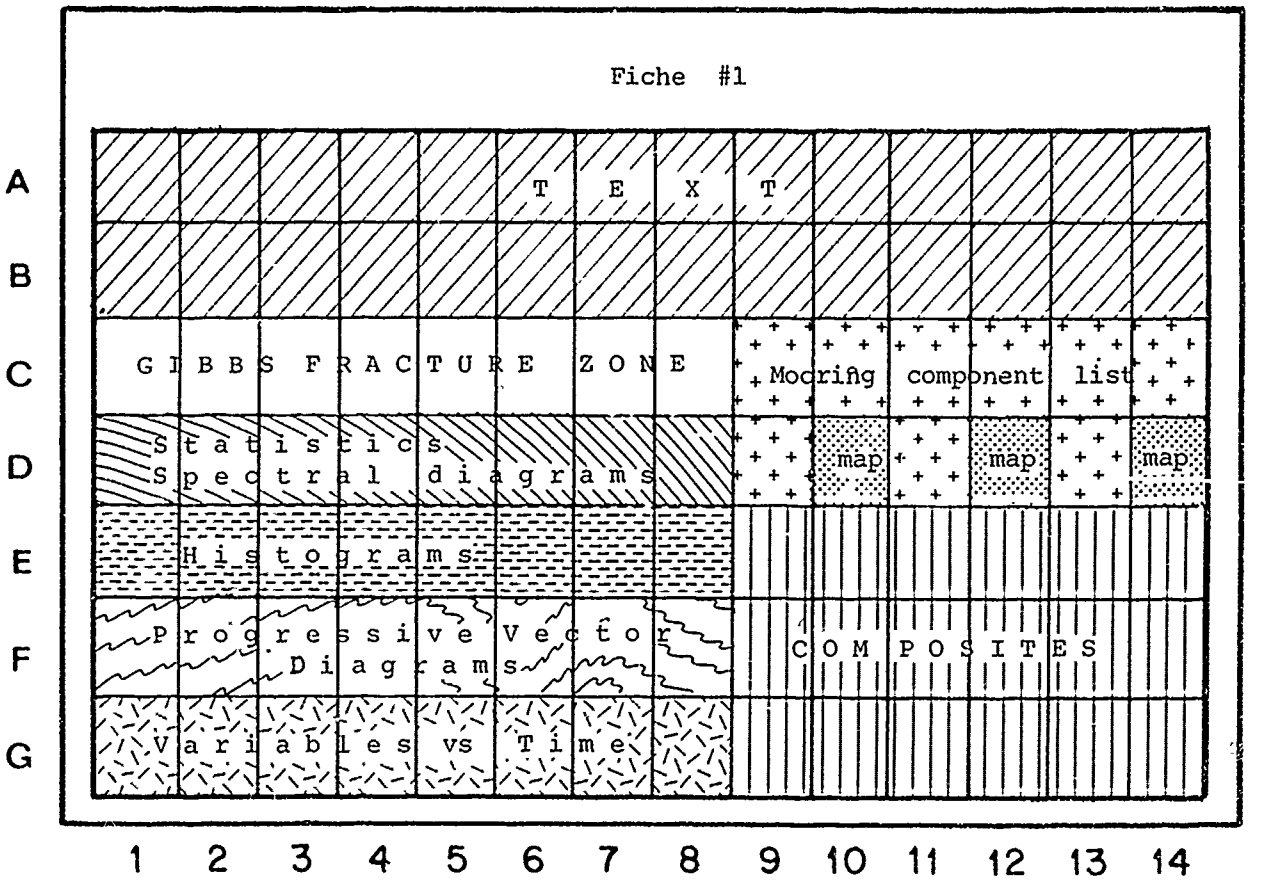
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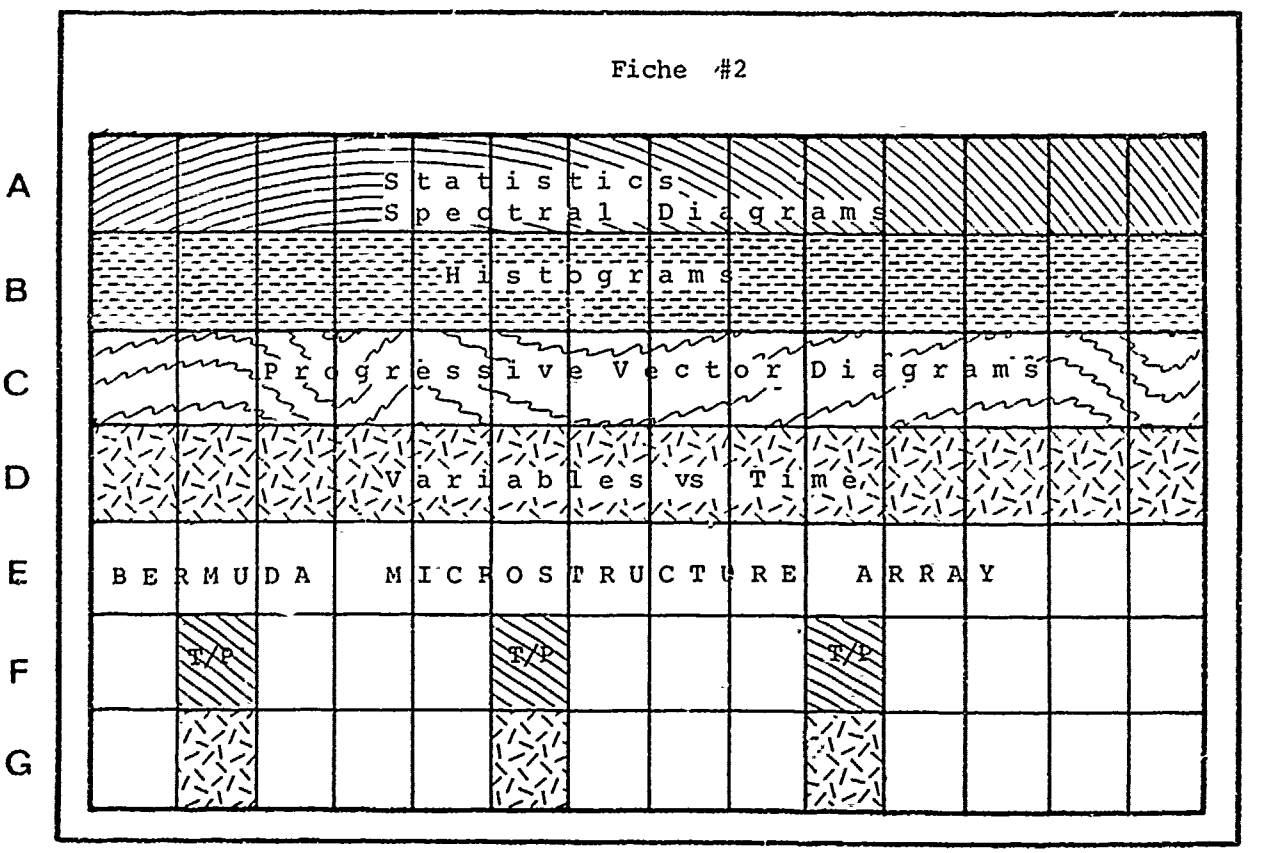
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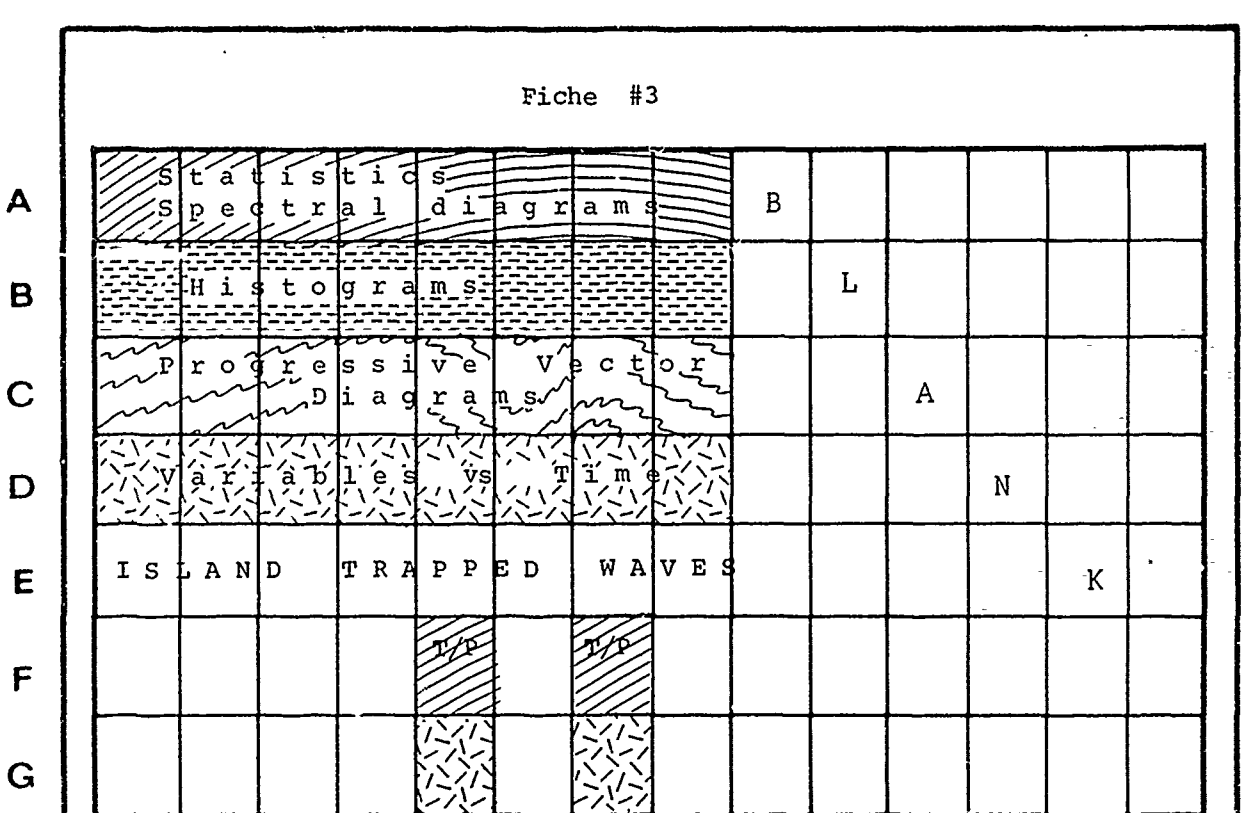
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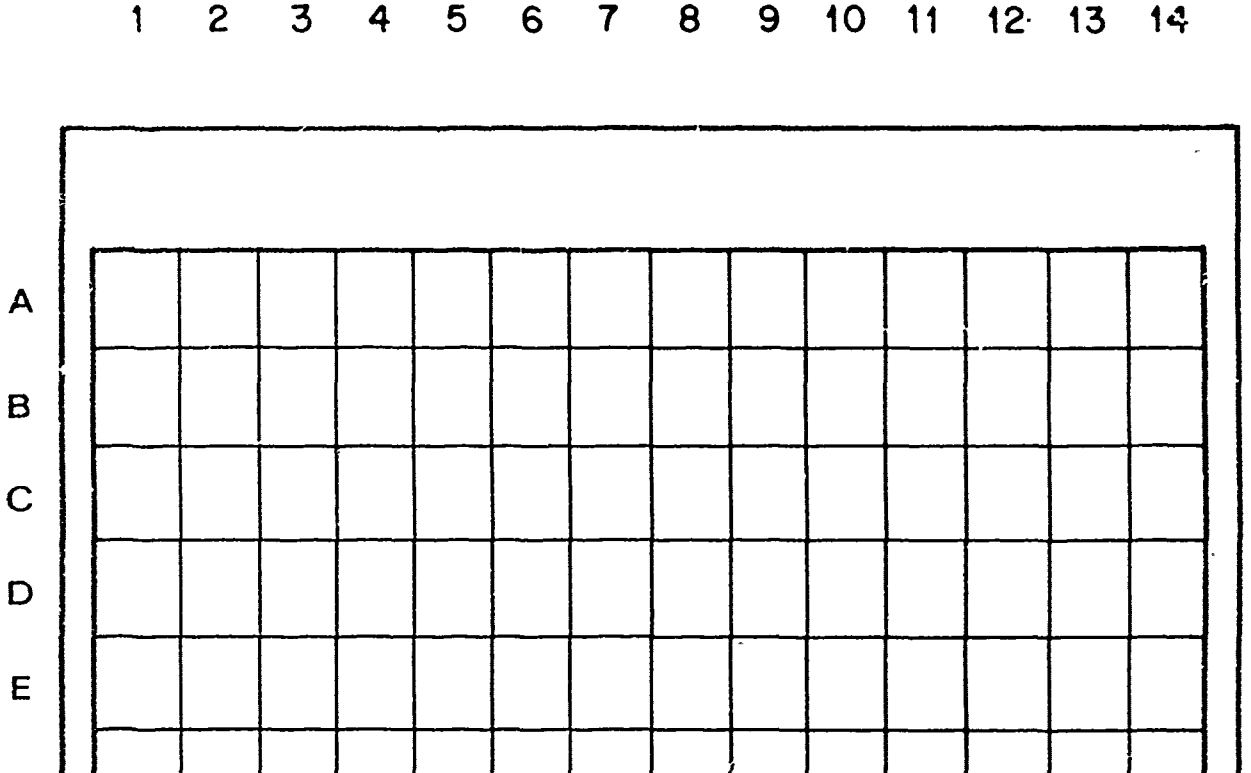


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The authors wish to acknowledge the moored array group's operations personnel for their work of organizing, deploying and recovering the instruments. They also would like to acknowledge the crews of the various ships involved in the work, with special mention of the effort of the people involved in the trip of the R/V Panulirus to pick up a mooring which had broken loose.

Data processors Ellen Levy, Ann Spencer and Susan Tarbell provided extensive help with the plots and layout of the report.

Acknowledgments are also due to the Office of Naval Research for its support. The work was performed under contract numbers N00014-74-C-0262, NR083-004 and N00014-76-C-0197, NR083-400.

PREFACE

This volume is the twenty-seventh in a series of Data Reports presenting moored current meter and associated data collected by the WHOI Buoy Group.

Volumes I through XXVI present data obtained during the years 1963-1978, arranged either by year or experiment (see notes).

A data directory and bibliography for the years 1963-1978 has been published, as WHOI Technical Report 79-88.

Volume XXVII presents data from the Bermuda Microstructure experiment, the Island Trapped Waves array and the Charlie-Gibbs Fracture Zone array.

Volume No.	WHOI Ref. No.		Notes Year	Experiment
I	65-44	Webster, F. and N. P. Fofonoff		
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VI	74-4	Tarbell, S.	1967	measurements
VII	74-52	Chausse, D. and S. Tarbell	1968	measurements
VIII	75-7	Pollard, R.T. and S. Tarbell	1970	Array Data
IX	75-68	Tarbell, S., M. G. Briscoe and D. Chausse	1973	IWEX Array
X	76-40	Tarbell, S.	1969a	measurements
XI	76-41	Tarbell, S.	1969b	measurements
XII	76-101	Chausse, D. and S. Tarbell	1973	MODE Array
XIII	77-18	Tarbell, S. and A. W. Whitlatch	1970	Measurements
XIV	77-41	Tarbell, S., R. Payne and R. Walden	1976	mooring 592 Saint Croix
XV	77-56	Tarbell, S. and A. W. Whitlatch	1971	measurements
XVI	78-5	Tarbell, S. and A. Spencer	1971-1975	MODE Site
XVII	78-49	Tarbell, S., A. Spencer and R. E. Payne	1975-1977	POLYMODE Array II
XVIII	79-65	Tarbell, S., M. G. Briscoe and R. A. Weller	1978	JASIN
XIX	79-34	Spencer, A., C. Mills and R. Payne	1974-1975	POLYMODE Array I
XX	79-56	Spencer, A.	1974	Rise Array
XXI	79-85	Mills, C. and P. Rhines.	1978	W.B.U.C.
XXII	79-87	Tarbell, S. and R. Payne.	1973	measurements
XXIII	80-40	Tarbell, S. and R. Payne.	1978	POLYMODE Array III
XXIV	80-41	Spencer, A., K. O'Neill and J. R. Luyten.	INDEX 1976	
XXV	81-12	Spencer, A., E. D'Asaro and L. Armi.	BBL 1977	
XXVI	81-45	Chausse, D. and R. E. Payne.	1972	measurements

PRESENTATION

The printed portion of this report contains introductory text and information about the instruments and data processing procedures. Tables and figures give summaries of the location of the instruments. Data are shown graphically in numerous composite displays.

The microfiche pages contain displays of the basic data. The data from the Gibbs Fracture Zone are shown on fiche 1, together with reproduction of the printed pages. Fiche 2 contains data from the Bermuda Microstructure experiment. Data from the Island Trapped Waves experiment are shown on fiche 3. The displays for the basic current meter data include spectral plots, tables of statistics, time series plots, progressive vector diagrams and frequency histograms. Time series plots, spectral plots and tables of statistics are shown for data from temperature/pressure recorders.

A detailed layout of the data on the microfiche sheets is shown on pages iii and iv.

INTRODUCTION

This report is a summary of information collected from three separate moored arrays, of nine or thirteen months duration. One array was deployed in the Charlie-Gibbs Fracture Zone to measure the mean flow and study the properties of the eddy field. The other two were deployed near Bermuda, one relatively far from the island and one close to the island. The objectives of the Bermuda experiment were to monitor low frequency motions during a shipboard investigation of microstructure near the island and to study low-frequency baroclinic waves trapped by the island.

Three moorings were set in September 1975 in the Charlie-Gibbs Fracture Zone, a deep east-west channel through the Mid-Atlantic ridge at 53° north (see Figure 1 and Table 1). Objectives were to measure the mean flow and investigate the properties of the mesoscale eddy field at this latitude and their interaction with the underlying topography. Results are reported in Schmitz and Hogg (1978) and Hogg and Schmitz (1980). The moorings were recovered in June 1976, giving 7 nine-month records. Data return is summarized in Table 2.

The first Bermuda array was set in April, 1975, in approximately an equilateral triangle configuration with 100 km sides and Bermuda at the center (see Figure 2 and Table 1). It was designed to monitor the background mesoscale eddy field during an intensive investigation of possible microstructure generation processes near the island (as a part of FAME, the north Atlantic Fine and Microstructure Experiment, Sanford and Hogg, 1977). The mooring and related hydrographic results are described in Hogg, Katz and Sanford (1978). The array was recovered in January, 1976, giving records of up to 9 months duration. Instrument performance is summarized in Table 3.

In these current meter records, there were suggestions of coherent motions (trapped waves) travelling clockwise around Bermuda. This prompted the setting of the second array (the "Island Trapped Waves" experiment) in November 1977 (see Figure 3 and Table 1) which was designed to be in the near field of the trapped wave motions. Results from this experiment have been reported by Hogg (1980). The array was recovered in December, 1978 after more than a years deployment, although one mooring released prematurely two weeks earlier and was found by a local fisherman. Data return is summarized in Table 4.

INSTRUMENTATION

Current Meters

The current meters described in this report were Vector Averaging Current Meters (VACMs), built by AMF SeaLink Systems (now EG&G SeaLink Systems), or Model 850 current meters built by Geodyne, now a part of EG&G.

Each time a pair of rotor magnets passes the sensing diode, the VACM samples compass and vane information and computes a measure of east and north water current components. These components are summed through the entire recording interval, usually 15 minutes, thus giving a true vector average. One complete rotor revolution initiates 8 compute cycles. Temperature is derived from a voltage-to-frequency converter (v/f), whose output frequency is related to the thermistor resistance at its input. The v/f output pulses are summed over the entire recording interval, thus averaging temperature. The thermistors are routinely calibrated before and after deployment and the temperatures are accurate to $\pm.01$°C (Payne et al., 1976). All variables are recorded on a cassette tape at the end of each recording interval.

The Model 850 current meter stores burst sampled data on magnetic tape cartridges. The instrument collects and stores 23 or 24 data cycles sampled at 5.27 second intervals. It then turns off for the remainder of the recording interval (usually 15 or 30 minutes). Model 850's, which have been modified to include temperature measurements, accumulate the count from the temperature circuit from one 5.19 second period and record it at the beginning of each data burst.

Time was measured using a quartz crystal oscillator with a manufacturer's specified accuracy of ± 1 second per day. All stated times are in UTC (Universal Coordinated Time). The instrument clock times were synchronized with UTC before mooring launch. After recovery, differences in the two times were noted.

Two of the instruments (5532 and 5552) were modified to record differential temperature (tdif). A thermistor was mounted externally at each end of the VACM pressure case (a distance of 1.74 meters apart), and a differential resistance was measured and recorded. The lithium batteries in the instruments failed shortly after deployment, giving short records of all variables. See McCullough (1975) and Dean (1979) for further information.

One of the VACMs (6331) contained a pressure transducer, manufactured by Paine. It is a strain gauge with a rated accuracy of .05 per cent of full scale. The instrument is routinely calibrated before deployment.

Temperature/Pressure Recorder

An instrument to record temperature, pressure and time (T/P) was developed in the Draper Laboratory at MIT for MODE-1 and has been used extensively since 1973. The instrument stores a sample every 15 seconds and records the sum of 128 successive data samples every 32 minutes on a magnetic tape cassette (128 x 15 = 1920 seconds = 32 minutes).

Temperatures have a resolution of .001°C (Wunsch and Dahlen, 1974). The absolute accuracy is not specified.

The pressure sensor is a strain gauge with a manufacturer-specified accuracy of .03 per cent of full scale (Wunsch and Dahlen, 1974). These sensors are recalibrated for each instrument deployment.

MOORINGS

Details of the mooring configuration are shown in Tables 5-13. The items on each mooring are listed. Depths in meters and data names are included for data recording instruments.

The anchor was usually a cylinder weighing from 2000-2700 pounds (wet weight). In the Gibbs Fracture Zone, the anchor on the short mooring weighed 1000 pounds.

Items with the words "glass spheres" refer to glass flotation spheres of 16" or 17" diameter with hard hats, each one bolted to 3/8" chain at 1 meter intervals.

Milliman samples are corrosion measuring devices, attached to the mooring wire.

Figures 1 through 3 show mooring locations and Tables 1 through 4 give summaries of the instruments, their depths and the quality of the data.

See Heinmiller (1976) for a more complete description of WHOI moorings.

DATA PROCESSING

Current Meters

The data from the instrument tapes were transcribed to 9-track magnetic tapes, converted to scientific units, edited to remove launch and retrieval transients and bad points, and linearly interpolated across missing or erroneous data cycles.

WHOI data are identified by a mooring number, a sequential instrument position number (e.g., 5713 is the third instrument down on mooring 571), a letter to indicate the data version (e.g., 5713B is the second editing of 5713), and a number to indicate the time sampling interval for that data record (e.g., 5713B1800 is the half-hour (1800 seconds) averaged version).

Low-passed versions of data series were formed by passing the data through a Gaussian filter with a 24 hour half-width, and then subsampling the filtered series once a day. The composite plots shown for each mooring and the time series plots and progressive vector plots on the microfiche use these low-passed data files.

Temperature/Pressure Recorders

Cassette reading and preliminary data processing were carried out at MIT. The basic time series received by WHOI had been truncated to remove launch and retrieval transients, but detailed editing was done at WHOI. Basic spectral plots, time series and statistics are shown for the T/Ps, and the low-passed temperature data are shown on the composite temperature plots for each mooring.

PROGRAMS

Time Series Plots

Current meter and T/P variables versus time are presented graphically. All the plots are based on low-passed time series.

Statistics

Statistics for each variable measured by the current meters and T/P's are presented on microfiche. Mean, standard error, variance, kurtosis and extrema are given for all the variables; east and north covariance, correlation and other statistics are given for the vectors. The data series used is based on the instrument sampling interval. For reference, note that a Gaussian random variable would have a kurtosis of three and a skewness of zero.

See Tarbell, Spencer and Payne, (1978) for a more detailed discussion of these parameters.

Progressive Vector Plots

Based on a low-passed time series, the current vectors are placed tail-to-head so as to show the path that a perfect particle in a perfectly homogeneous flow would have travelled. Flow regimes and low frequency behavior show up well on this type of plot. The plot begins with an asterisk and the first day of each month is marked with a plus sign and every 5th month is annotated.

Vector Stick Plots

The 24-hour averaged current components are plotted as individual vectors along a time scale. Unless otherwise indicated, the vector orientation is such that north is upwards on the page.

The vector roses show current vectors sampled every 7 days, plotted at the location of the mooring.

Histograms

The variables temperature, speed and direction are shown as frequency of occurence versus amplitude plots. The mean for each data series is marked.

Spectra

The horizontal kinetic energy (HKE) and temperature are displayed as spectra. The HKE spectrum is half of the sum of the spectra of the east and north components. It has the advantage of not being tied to a particular coordinate system.

The HKE and temperature have units of $(cm^2/sec^2)/cph$ and $(°C)^2/cph$ respectively. The spectra are all one-sided, i.e., the area under the spectrum is equal to the variance of the original record. The plots are log-log rather than 'variance preserving', i.e., the contributions of various frequency bands to the total variance are not in proportion to the displayed areas.

The spectra are calculated based on data sequences of 3240 or 4000 points ('pieces'). Frequency band averaging is across three frequencies and no data-windowing or prewhitening is done.

The WHOI spectral program TIMSAN (Hunt, 1977) averages the spectra in increasingly large groups at the high frequencies to prevent having to plot thousands of points. This procedure gives few degrees of freedom (d.o.f) at the low frequencies, and many at the high frequencies. For the spectra calculated from one piece with three frequencies averaged there are 6 d.o.f. in the lowest frequency group, and 600 d.o.f. in the highest frequency group.

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TABLE CAPTIONS

Table 1	Summary of Mooring Locations.
Table 2	Data return and quality from instruments in the Charlie-Gibbs Fracture Zone.
Table 3	Data return and quality from instruments in the Bermuda Microstructure array.
Table 4.	Data return and quality from instruments in the Island Trapped Waves experiment.

The following tables are printed on microfiche only:

Tables 5-7	List of mooring components: Gibbs Fracture Zone.
Tables 8-10	List of mooring components: Bermuda Microstructure Array.
Tables 11-13	List of mooring components: Island Trapped Waves experiment.

FIGURE CAPTIONS

Figure 1	Location of moorings in the Charlie-Gibbs Fracture Zone.
Figure 2	Location of moorings near Bermuda for the Bermuda Microstructure Array.
Figure 3	Location of moorings near Bermuda for the Island Trapped Waves experiment.
Figure 4	Current vectors at mooring locations in the Charlie-Gibbs Fracture Zone. Vector plotted for every 7th data point in a 271 day series.
Figure 5	Current vectors at mooring locations of the Bermuda Microstructure Array. Vector plotted for every 7th data point in a 271 day series.
Figure 6	Current vectors at 2 mooring locations during the Island Trapped Waves experiment. Vector plotted for every 7th data point in a 394 day series.
Figures 7-9	Composite time series plot of current vectors: Moorings 570-572
Figures 10-12	Composite time series plot of temperatures: Moorings 570-572
Figures 13-15	Composite time series plot of current vectors: Moorings 553-555
Figures 16-18	Composite time series plot of temperatures: Moorings 553-555
Figures 19-21	Composite time series plot of current vectors: Moorings 633-635
Figures 22-24	Composite time series plot of temperatures: Moorings 633-635

Figs. 7-21

Orientation of vectors is as noted on plots. Scales are in cm/sec (not mm/sec as noted in fiche).

TABLE 1

SUMMARY OF MOORINGS

Mooring No.	No. of instruments	Date Set	Date Retr.	Location	Bottom Depth (m)
		CHARLIE-GIBBS FRACTURE ZONE			
		...Cruise...			
		Knorr 51	Knorr 54 Leg 7		
570	1	Sep. 26 1975	June 24 1976	52° 42.7'N 33° 59.2'W	4288
571	3	Sep. 27 1975	June 26 1976	52° 53.7'N 35° 31.0'W	2895
572	4	Sep. 27 1975	June 25 1976	52° 46.1'N 35° 30.0'W	3398
		BERMUDA MICROSTRUCTURE ARRAY			
		...Cruise...			
		Knorr 49	USCGC Evergreen		
553	5	Apr. 28 1975	Jan. 26 1976	31° 46.9'N 64° 26.2'W	4353
554	5	Apr. 29 1975	Jan. 26 1976	32° 21.5'N 65° 27.0'W	4774
555	7	Apr. 9 1975	Jan. 25 1976	32° 59.3'N 64° 23.8'W	4527
		ISLAND TRAPPED WAVES EXPERIMENT			
		...Cruise...			
		RV Erline	Oceanus 52 Leg III		
633	4	Nov. 15 1977	Dec. 7 * 1978	32° 33.8'N 64° 44.7'W	1611
634	3	Nov. 16 1977	Dec. 16 1978	32° 32.2'N 64° 44.1'W	942
635	3	Nov. 17 1977	Dec. 17 1978	32° 22.4'N 65° 0.9'W	924

* Recovered by R/V Panulirus.

TABLE 2

DATA RETURN AND QUALITY

RECORDS FROM CHARLIE-GIBBS FRACTURE ZONE

Record No.	Inst. depth (m)	Data Dates 1975 - 1976	No. of days	Data presented	Comments
5701	4227	Sep.27 - June 24	271	V T *	
5711	1007	Sep.28 - June 26	272	V T	
5712	2537	Sep 28 - Nov. 4/75	39	V T	Electronic problems
5713	2835	Sep 28 - June 26	272	V T	
5721	998	Sep.28 - June 25	271	V T	
5722	2528	Sep.28 - June 25	271	V T	
5723	3060	Sep.28 - June 25	271	V T	
5724	3360	Sep.28 - June 25	271	V T	

V Velocity component data presented
T Temperature " "

* There were 2 thermistors on this current meter. The records were virtually identical, only one series is displayed

TABLE 3

DATA RETURN AND QUALITY

RECORDS FROM BERMUDA MICROSTRUCTURE ARRAY

Record No.	Inst. depth (m)	Data Dates 1975 - 1976	No. of Data pres-	Data pres- ented	Comments
5531	306	Apr.29 - Jan.26	272	V T	
5532	506	Apr.29 - Oct.15/75	170	V T TD	Errors on sea tape
5533(T/P)	734	Apr.29 - Jan.26	272	T P	
5534	1005	Apr.29 - Jan.26	272	V T	
5535	1505	Apr.29 - Jan.26	272	V T *	Vane stuck after Sept.15 Rotor stuck after Dec. 1
5541	314	Apr.29 - Jan.26	271	V T	
5542	514	Apr.29 - Jan.26	271	V T	
5543(T/P)	718	Apr.29 - Aug.29/75	122	T P	Battery depleted
5544	1013	Apr.29 - Jan.26	271	V T	
5545	1513	Apr.29 - May 25/75	26	V T #	Vane stuck after May 26. Rotor below threshold after Oct. 19
5551	316	Apr.30 - Jan.25	270	V T	
5552	516	Apr.30 - Aug.12/75	104	V T TD	Battery leaked
5553(T/P)	752	Apr.29 - May 20/75	20	V T	Electronic problem
5554	766	Apr.29 - Nov.21/75	206	V T	Battery leaked
5555	1016	Apr.30 - Jan.25	270	V T	
5556	1516	Apr.30 - June 12/75	44	V T #	Corrosion in vane vane stuck after June 13
5557	4016	Apr.30 - Jan.25	270	V T	

All instruments were current meters except where noted (T/P)

V	Velocity component data presented
P	Pressure " "
T	Temperature " "
TD	Instrument also had differential temperature sensors
*	No data is presented for the basic velocity series Time series are shown for all low-passed data.
#	All data is presented for the stated interval. A questionable full-length series is used to show provecs and time series plots.

TABLE 4

DATA RETURN AND QUALITY

RECORDS FROM ISLAND TRAPPED WAVES EXPERIMENT

Record No.	Inst. depth (m)	Data Dates 1977 - 1978	No. of days	Data pres-ented	Comments
6331	792	Nov.16 - Dec.3	382	T P	Rotor did not work
6332	1092	Nov.16 - Dec.3	382	V T	
6333	1392	Nov.16 - Aug.18/77	275	V T	Clock problems
6334	1692	Nov.16 - Dec.3	382	V T	
6341(T/P)	242	Nov.16 - Dec.16	395	T P	
6342	542	Nov.16 - Dec.16	395	V T	
6343	842	Nov.16 - Dec.16	395	V T	
6351(T/P)	224	Nov.17 - Dec.16	394	T P	
6352	524	Nov.17 - Dec.16	394	V T	
6353	824	Nov.17 - Dec.16	394	T	No rotor data on cassette

All instruments were current meters except where noted (T/P)

V	Velocity component	data	presented
P	Pressure	"	"
T	Temperature	"	"

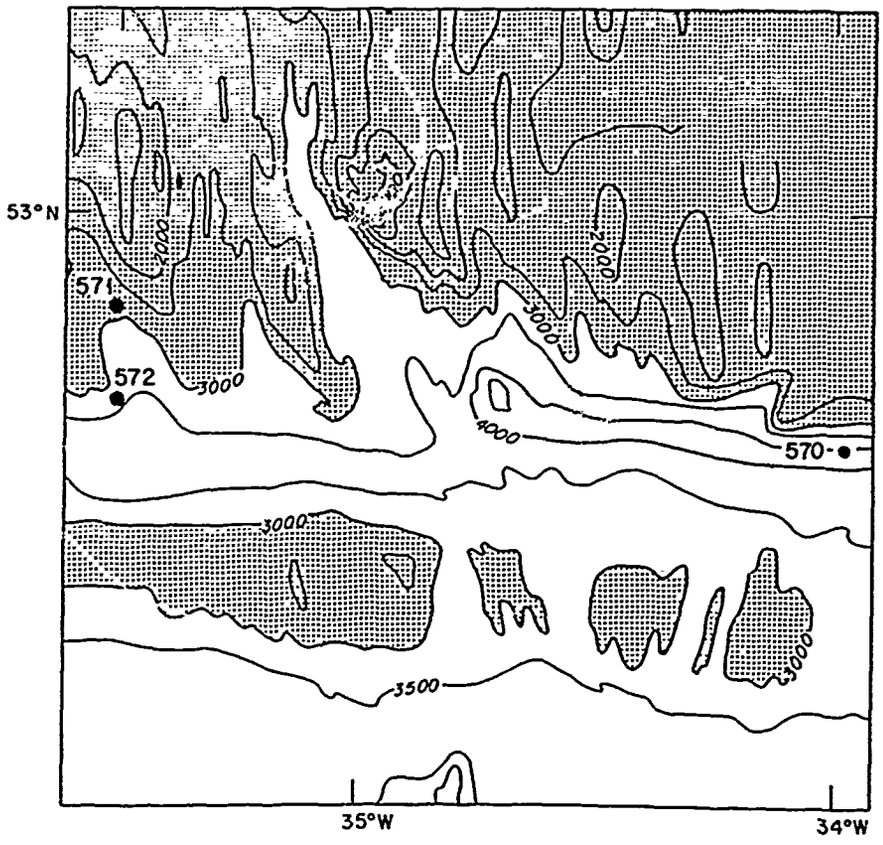


Figure 1

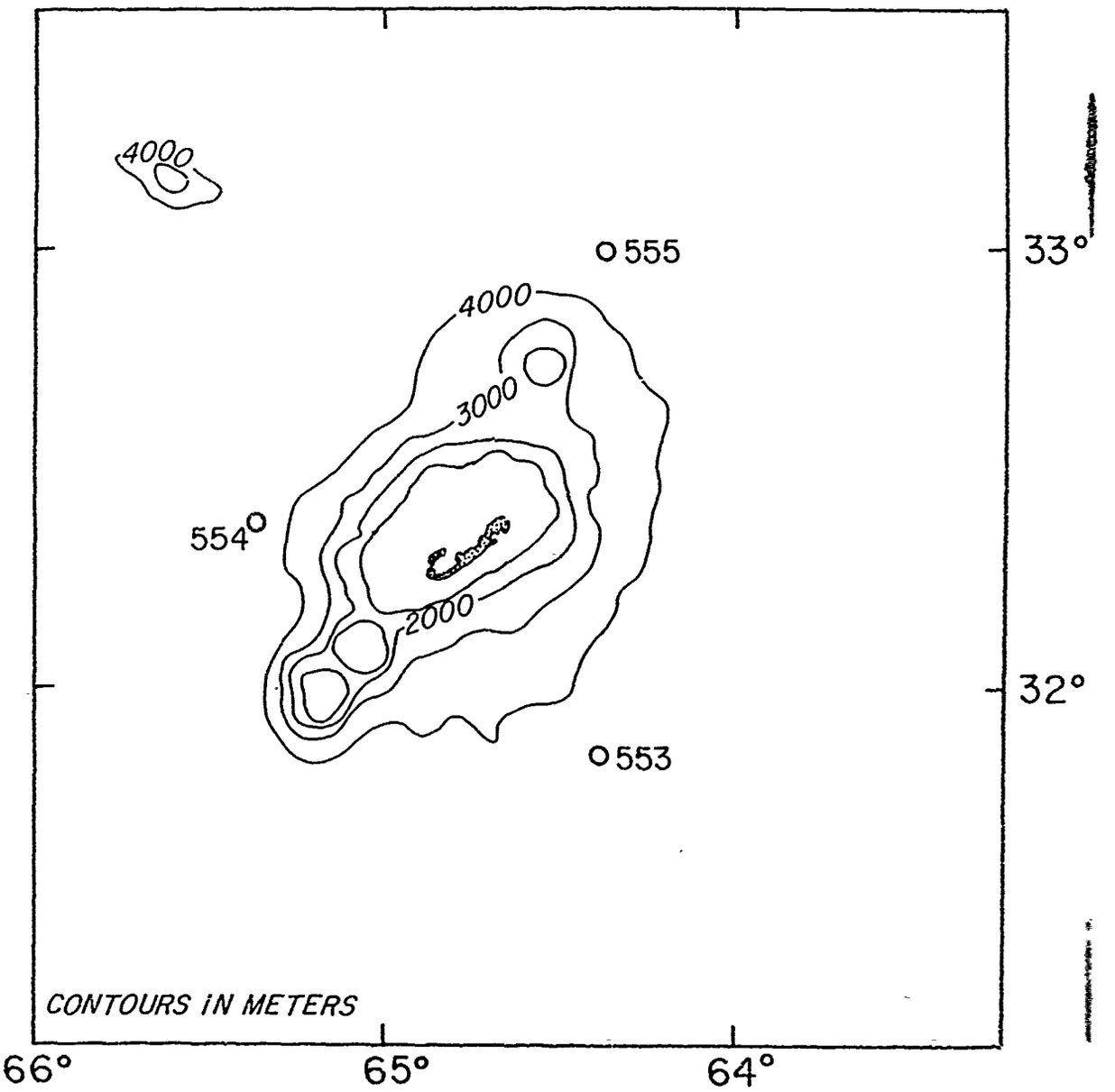

4000
555
33°
4000
3000
554°
2000
32°
553
CONTOURS IN METERS
66°
65°
64°

Figure 2

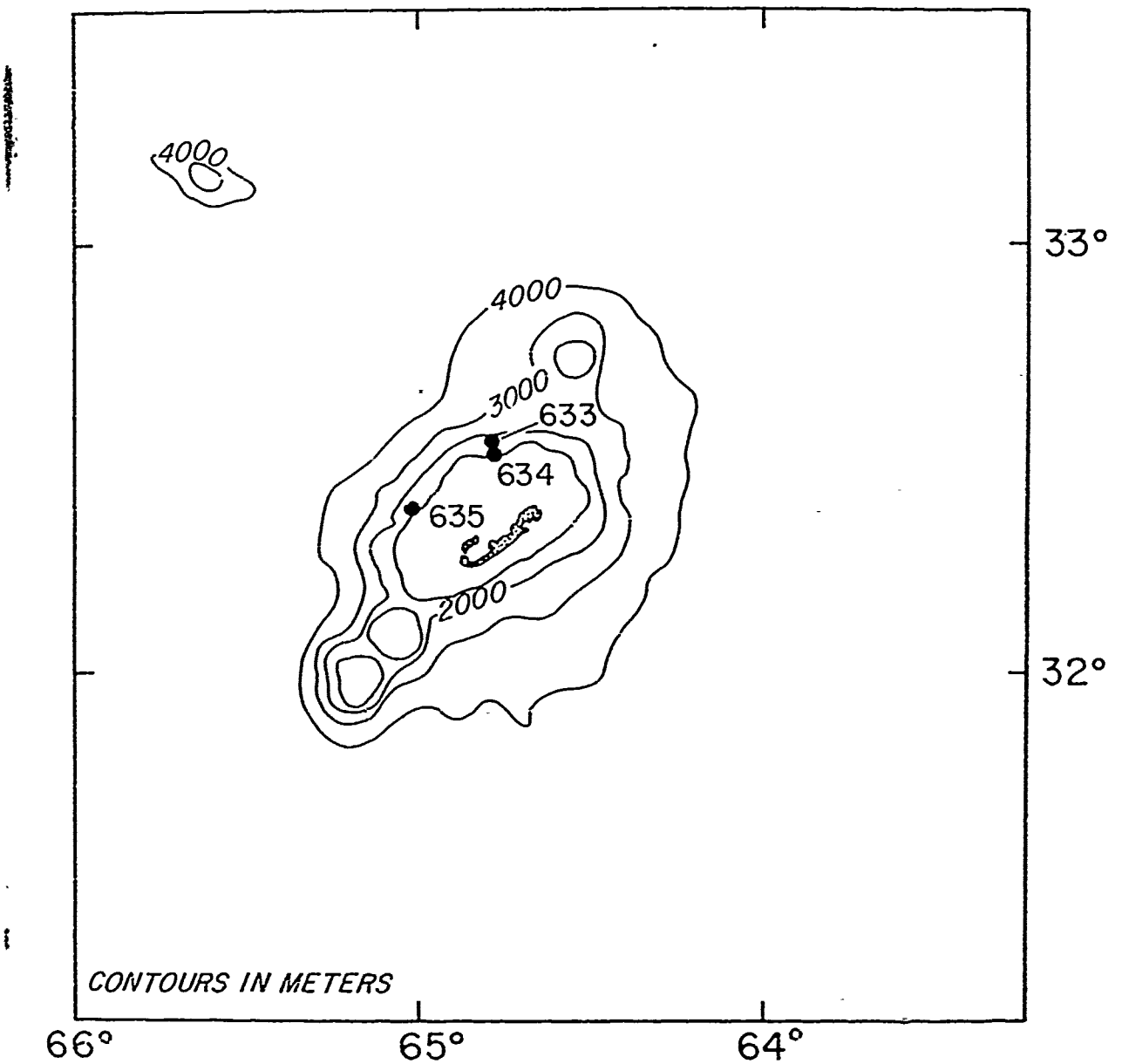

4000
4000
3000
633
634
635
2000
33°
32°
CONTOURS IN METERS
66°
65°
64°

Figure 3

CURRENT ROSES FOR NEAR BOTTOM INSTRUMENTS

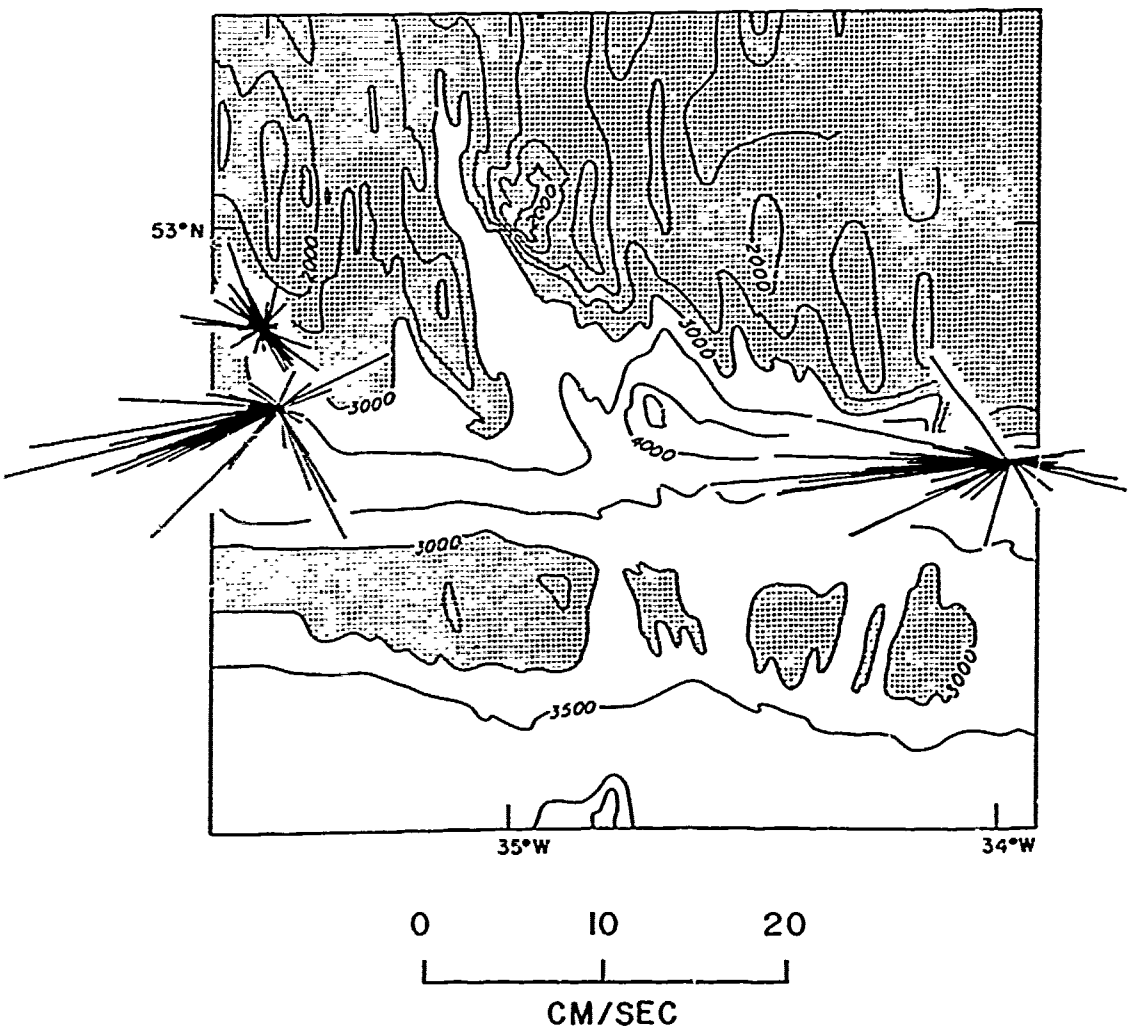


Figure 4

CURRENT ROSES AT A NOMINAL DEPTH OF 1500 M

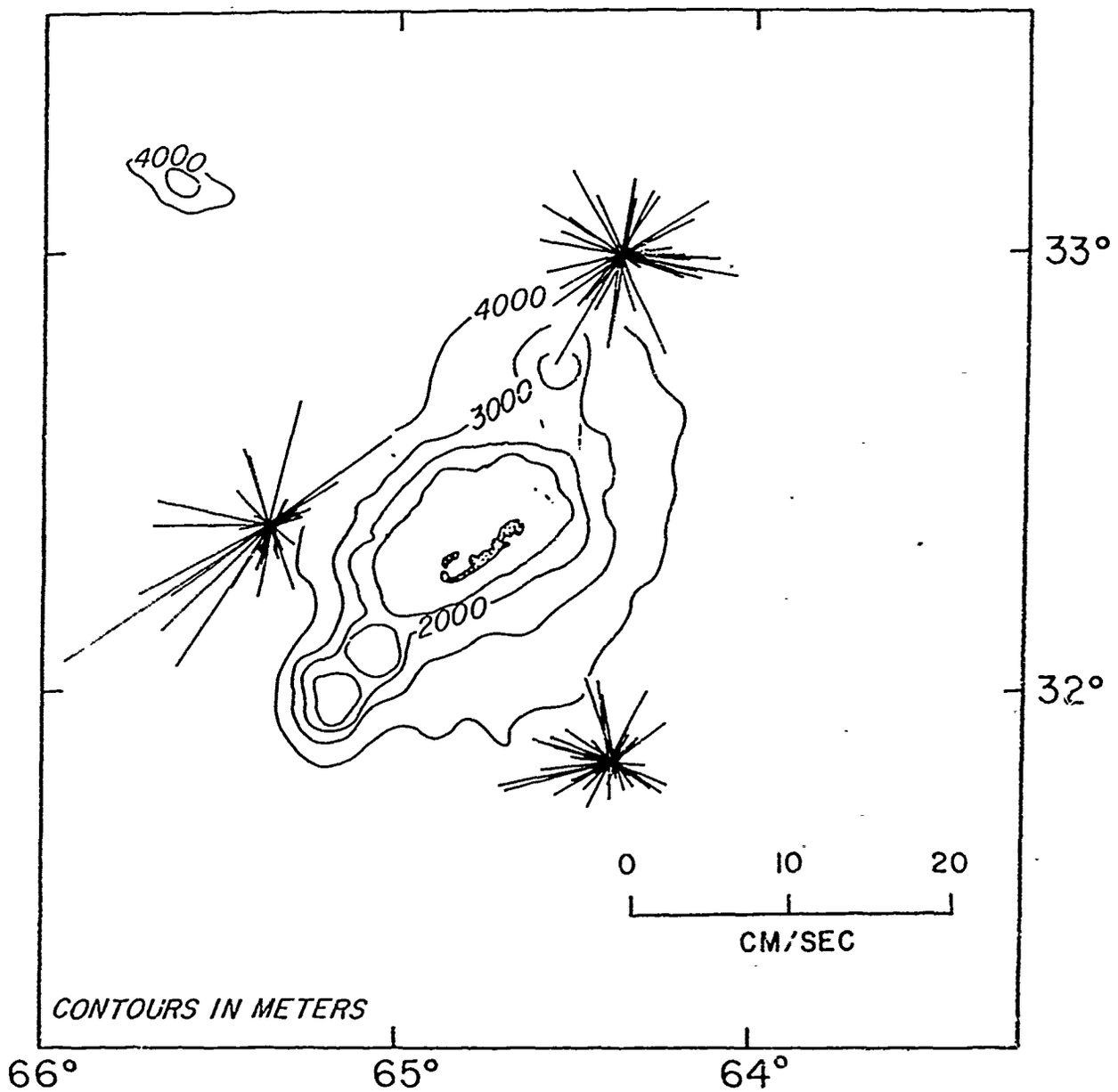


Figure 5

CURRENT ROSES AT A NOMINAL DEPTH OF 500 M

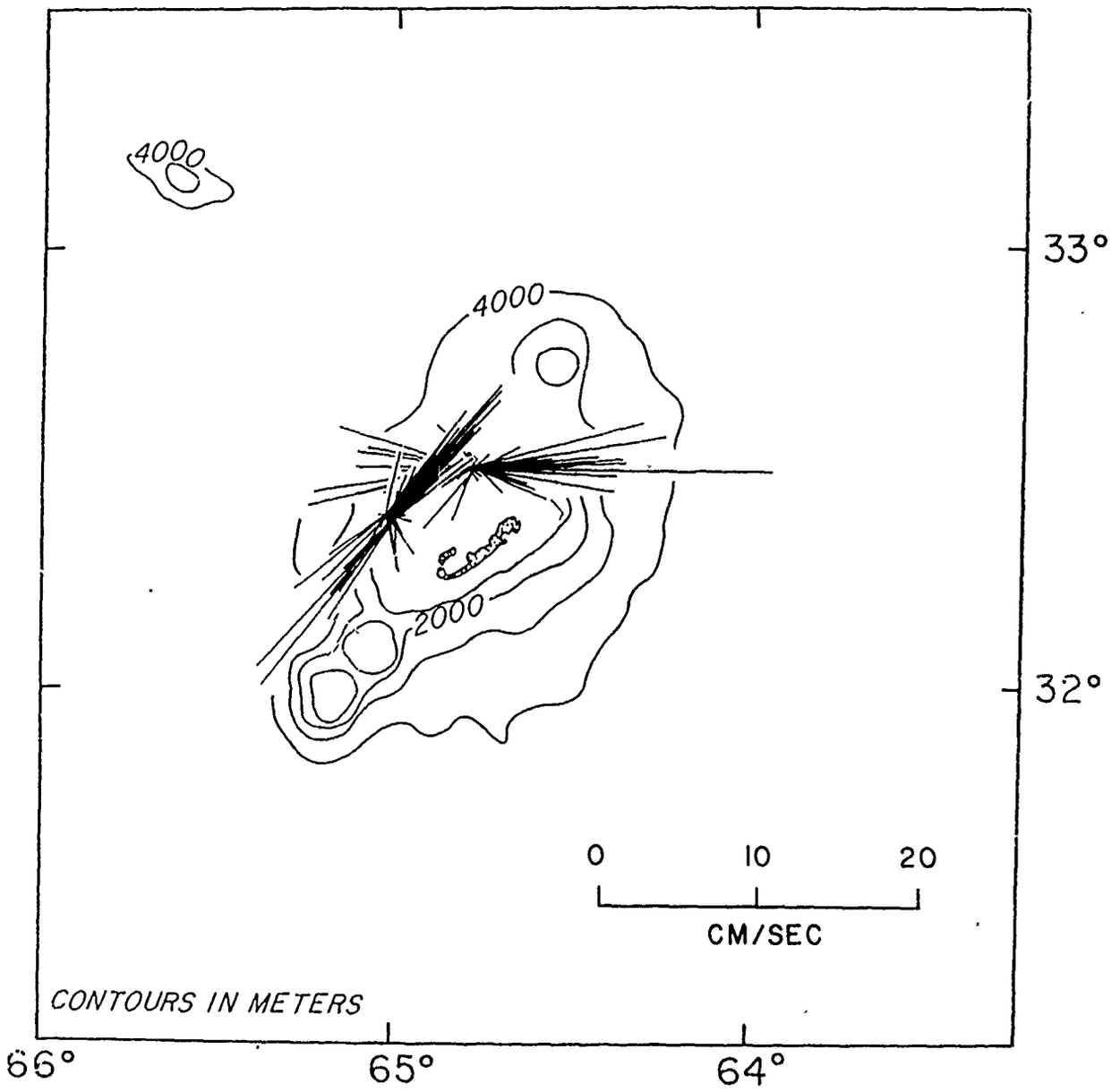


Figure 6

CURRENT VECTOR FOR MOORING 570

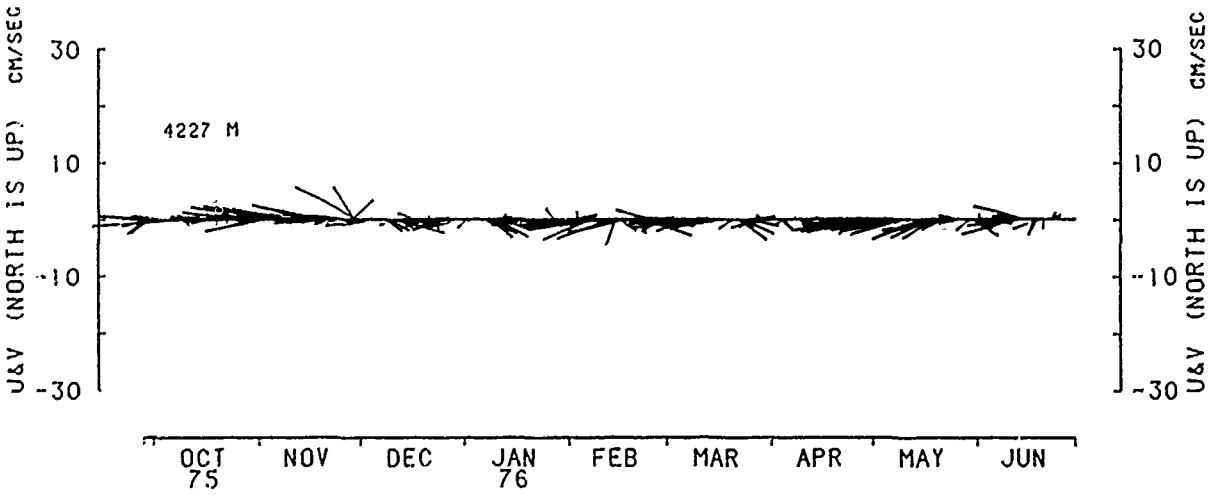


Figure 7

TEMPERATURE RECORD MOORING 570

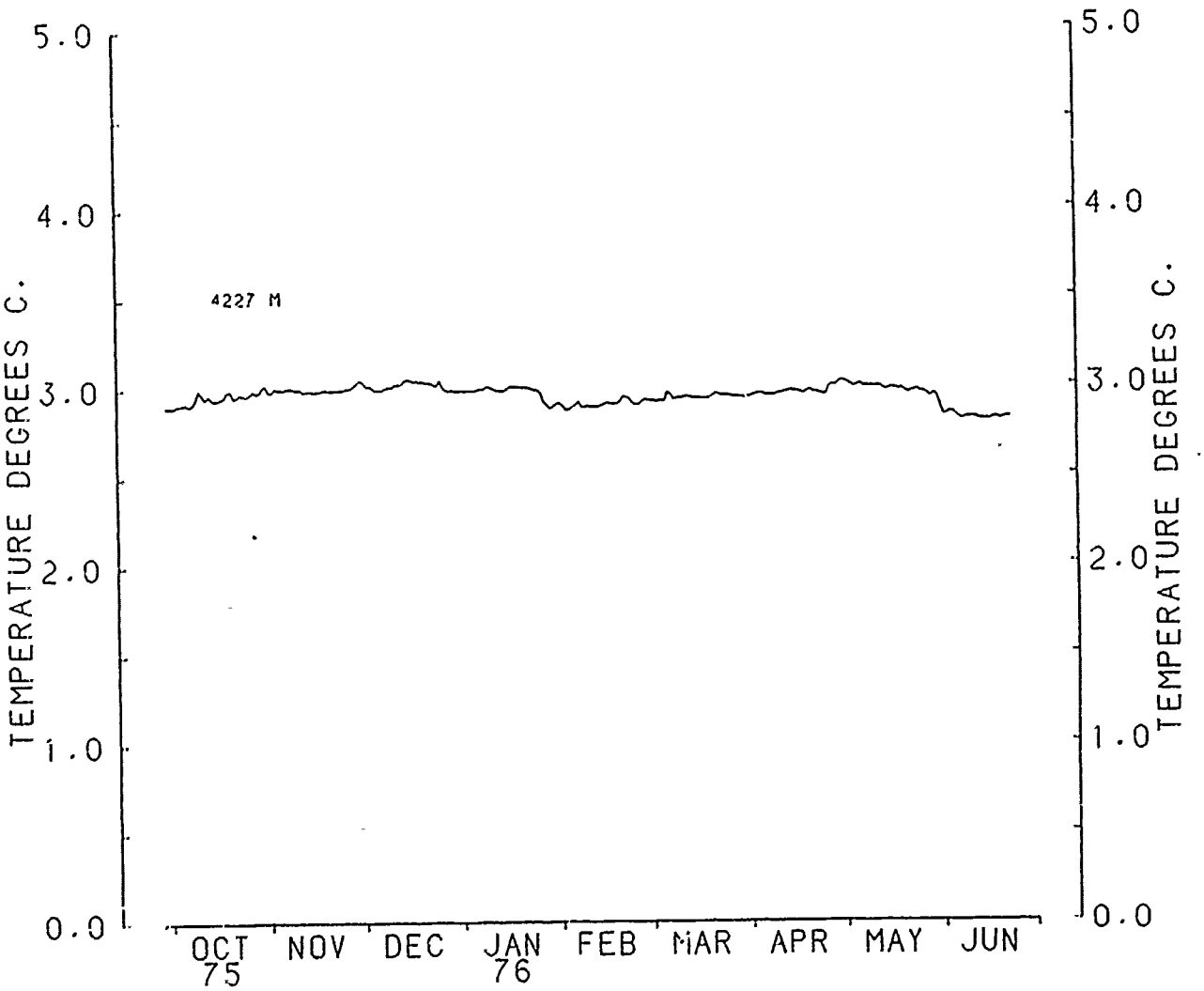


Figure 10

CURRENT VECTORS FOR MOORING 571

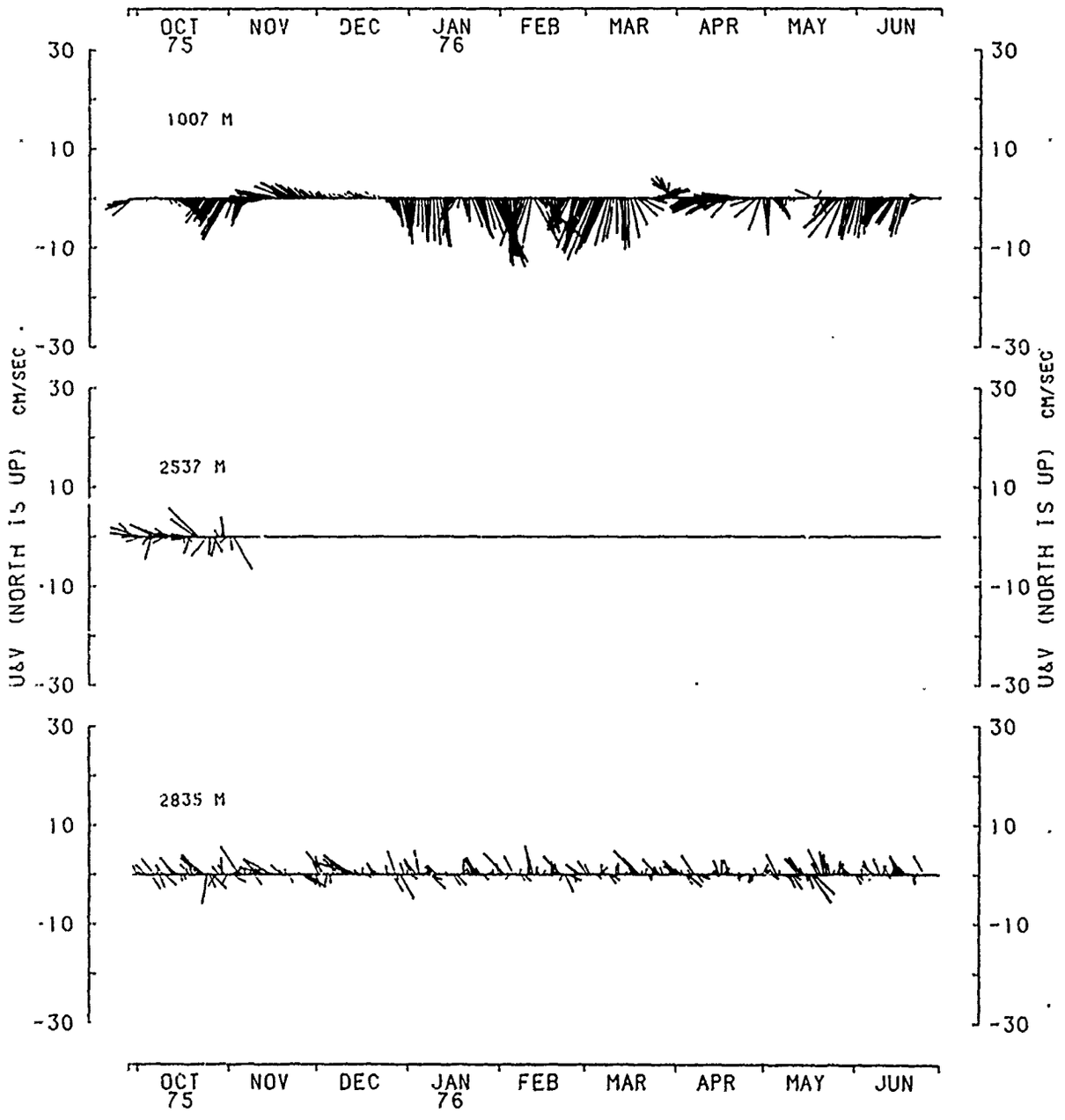


Figure 8

TEMPERATURE RECORDS MOORING 571

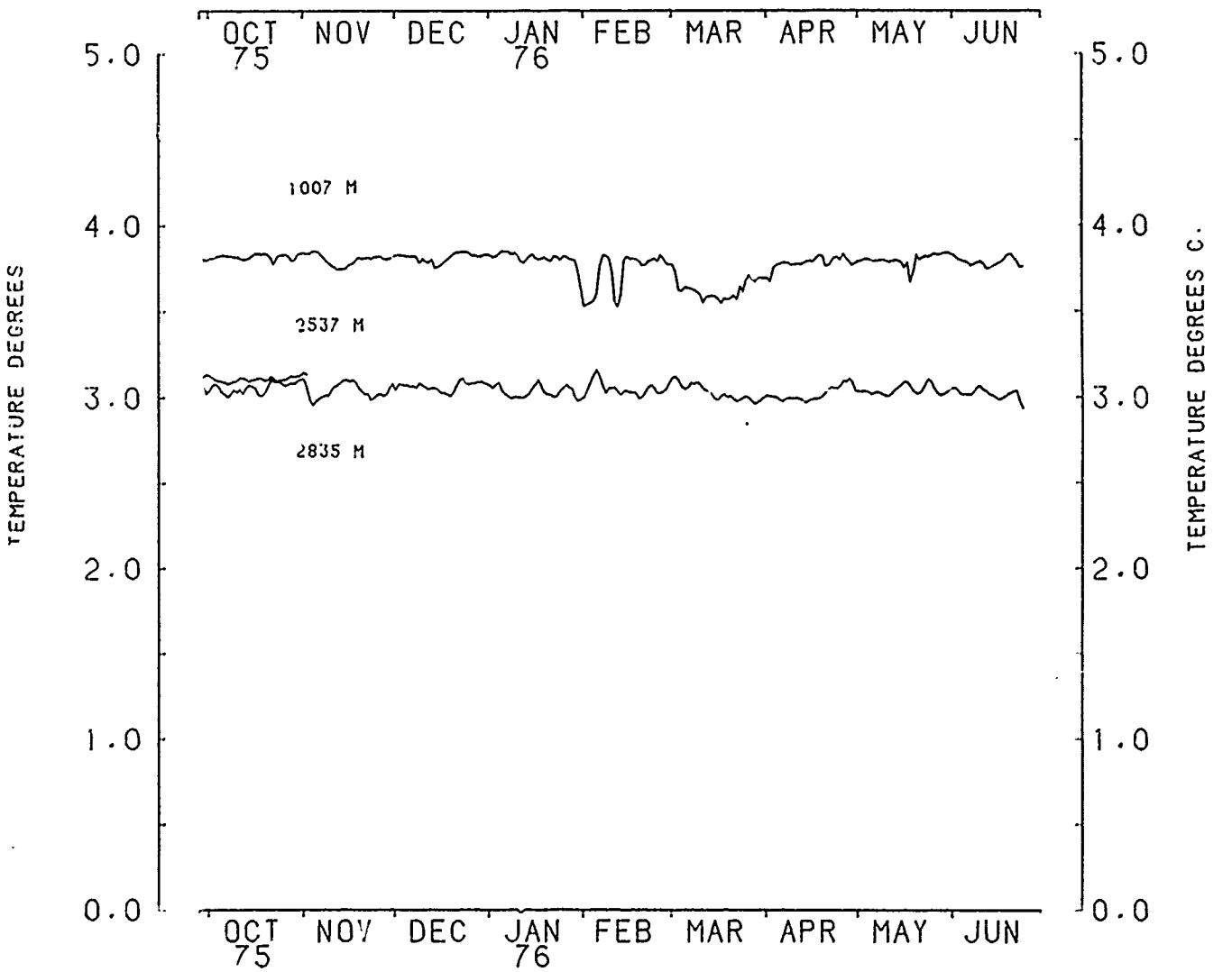


Figure 11

CURRENT VECTORS FOR MOORING 572

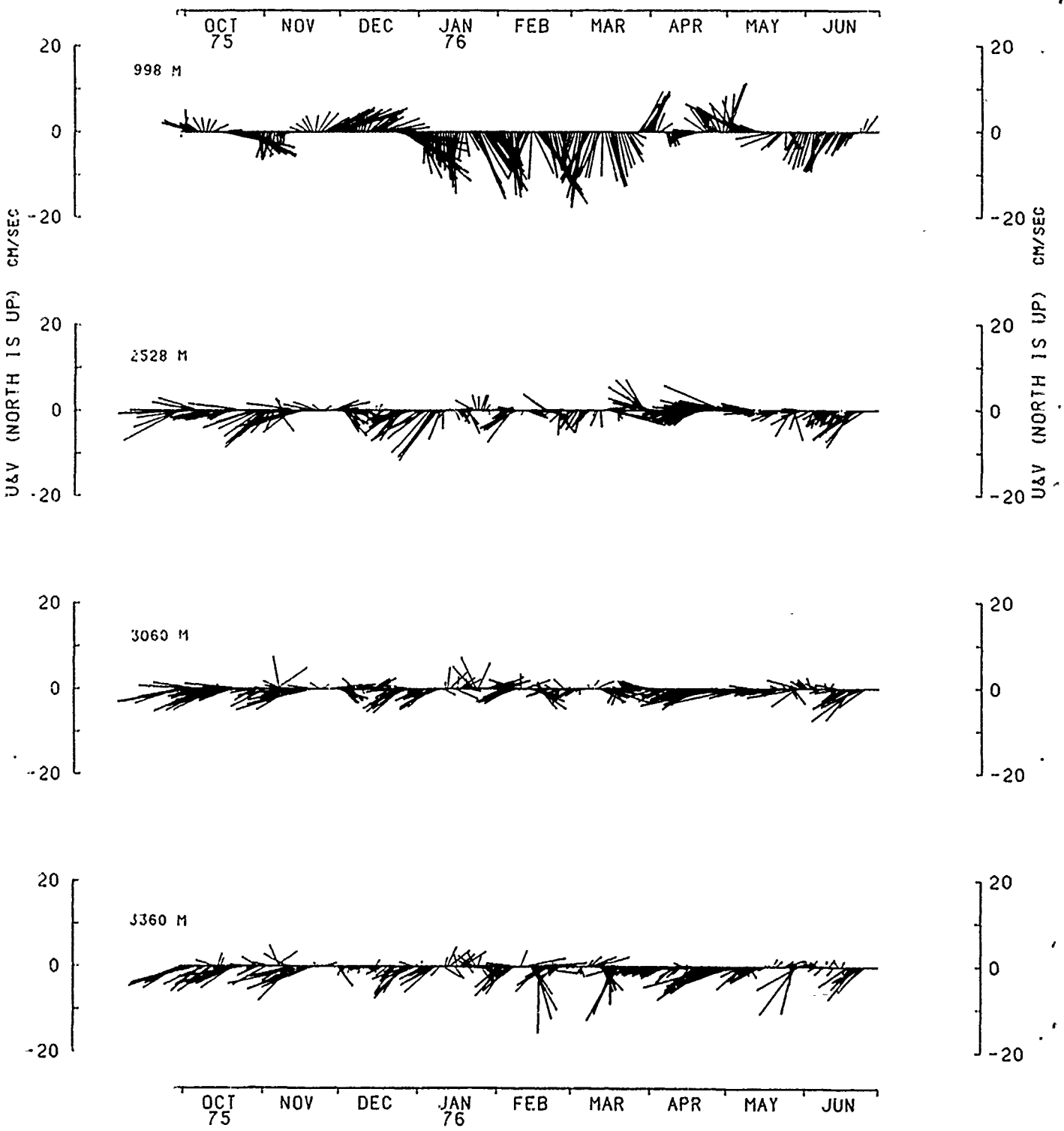


Figure 9

TEMPERATURE RECORDS MOORING 572

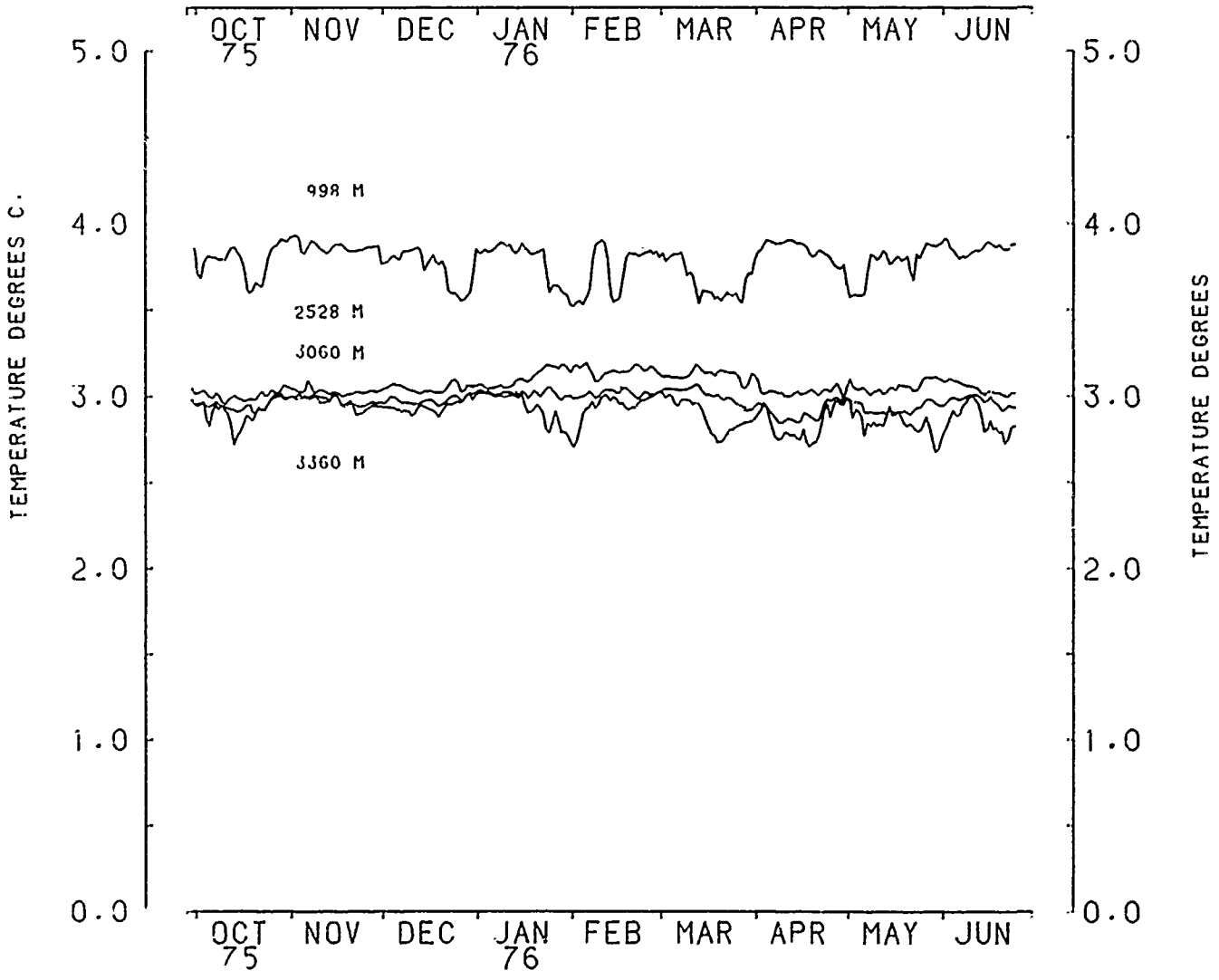


Figure 12

CURRENT VECTORS FOR MOORING 553

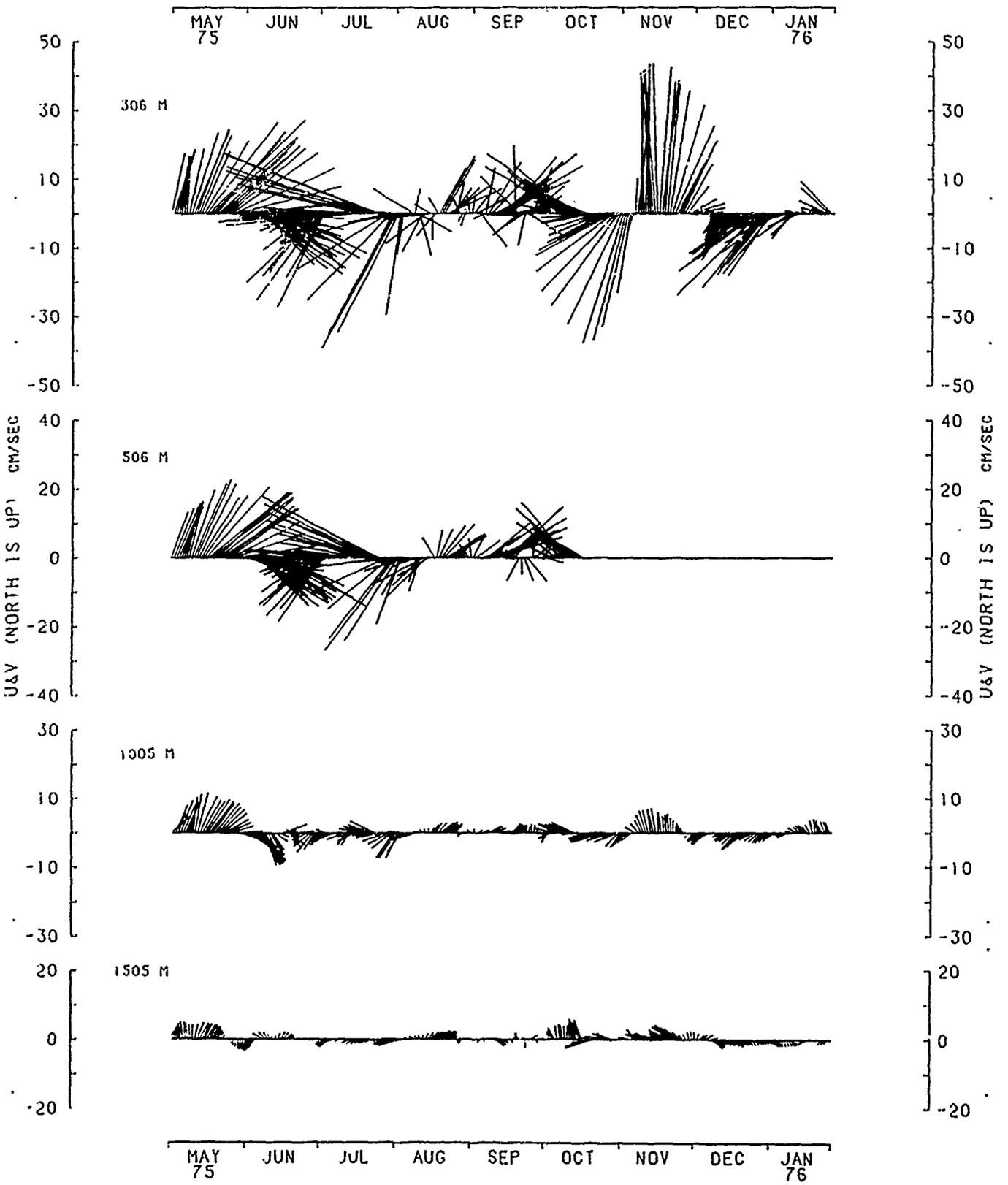


Figure 13

TEMPERATURE RECORDS MOORING 553

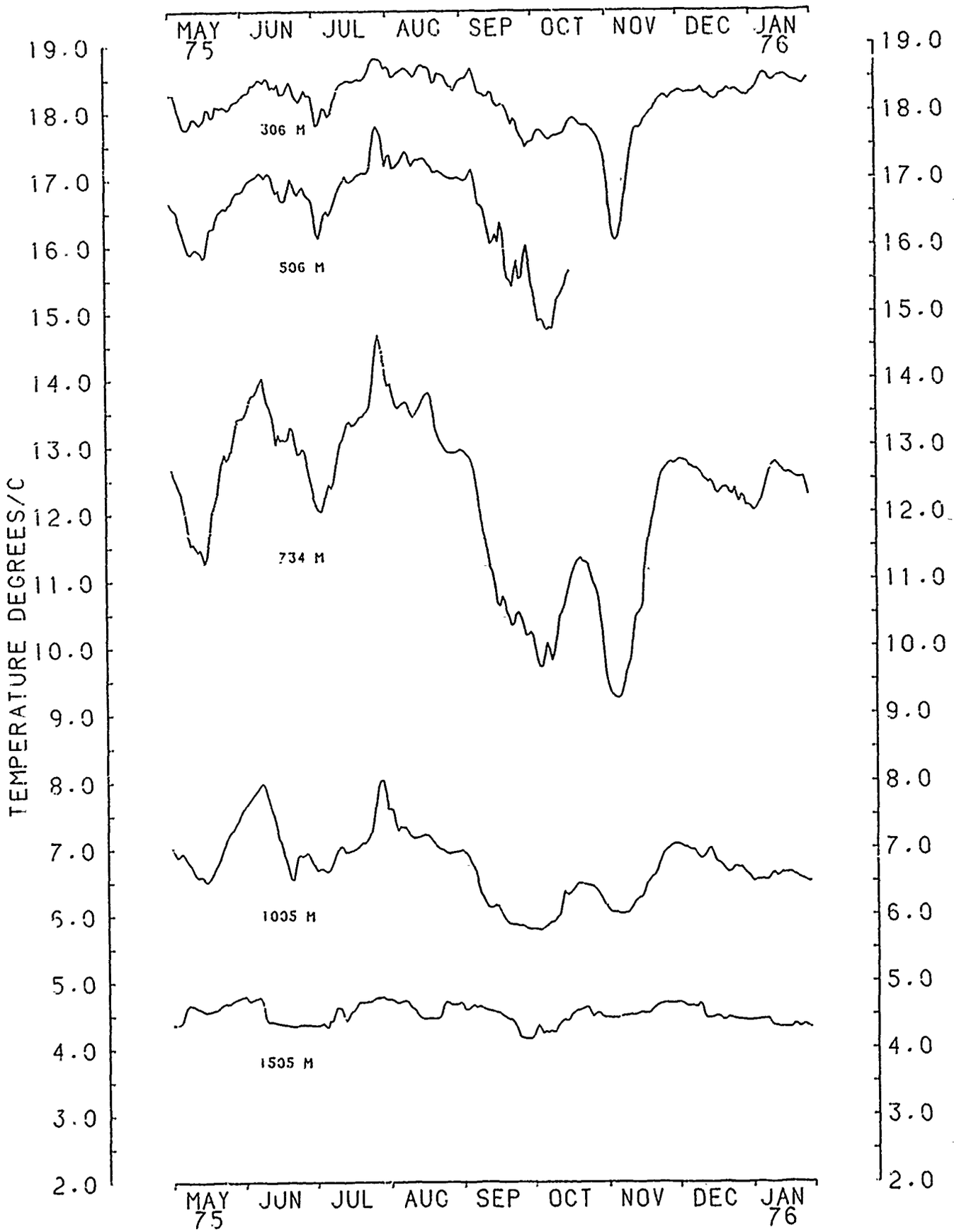


Figure 16

CURRENT VECTORS FOR MOORING 554

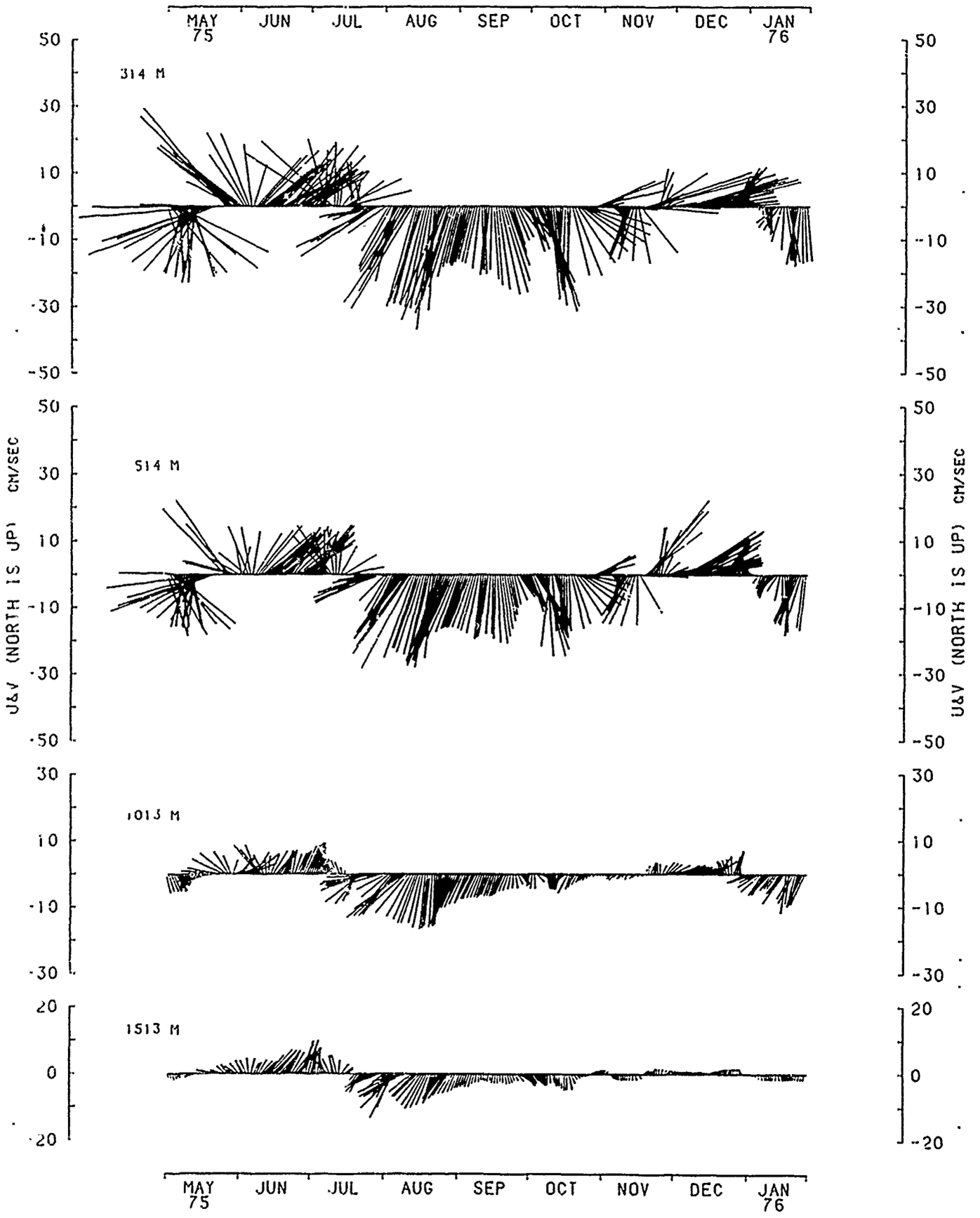


Figure 14

TEMPERATURE RECORDS MOORING 554

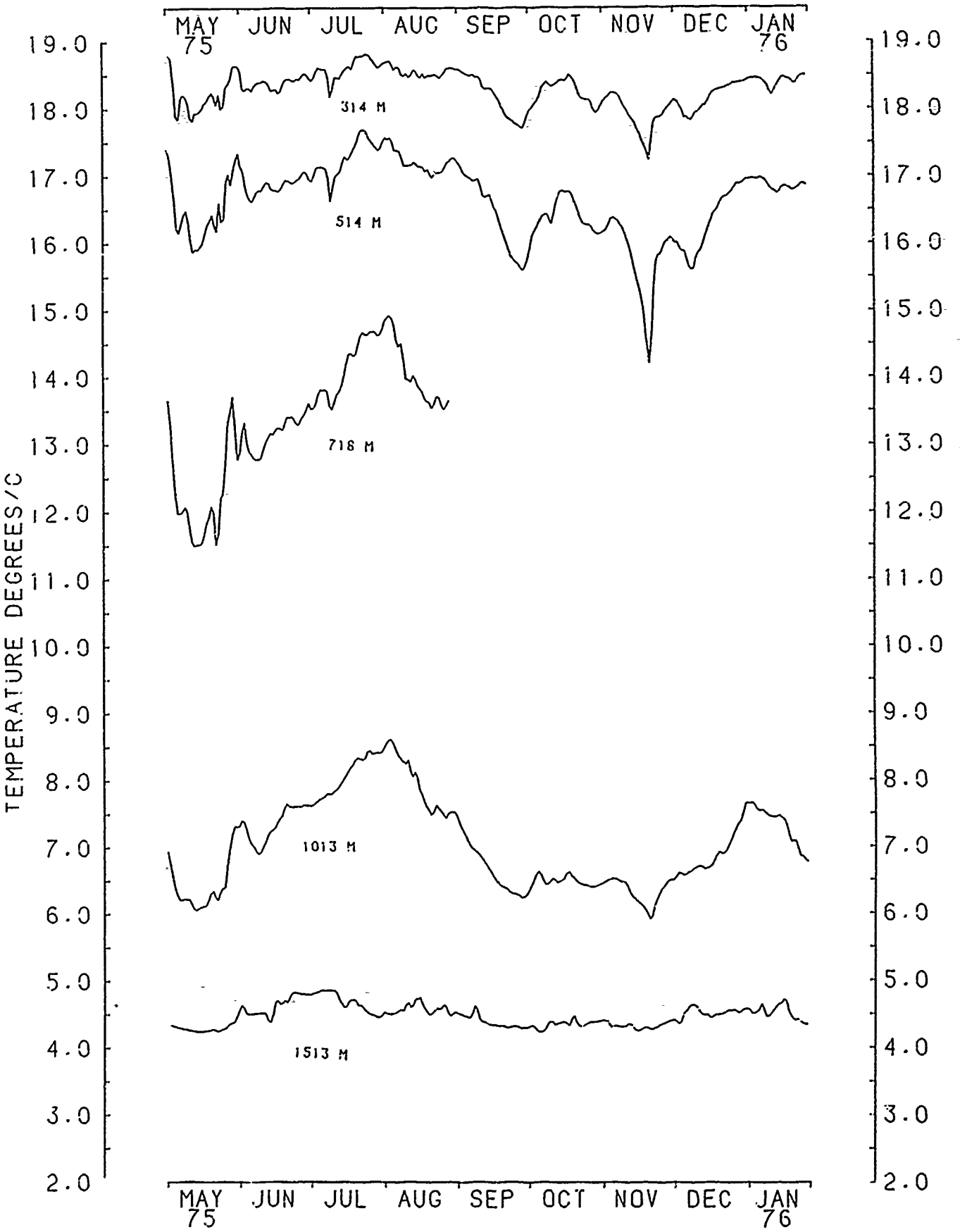


Figure 17

CURRENT VECTORS FOR MOORING 555

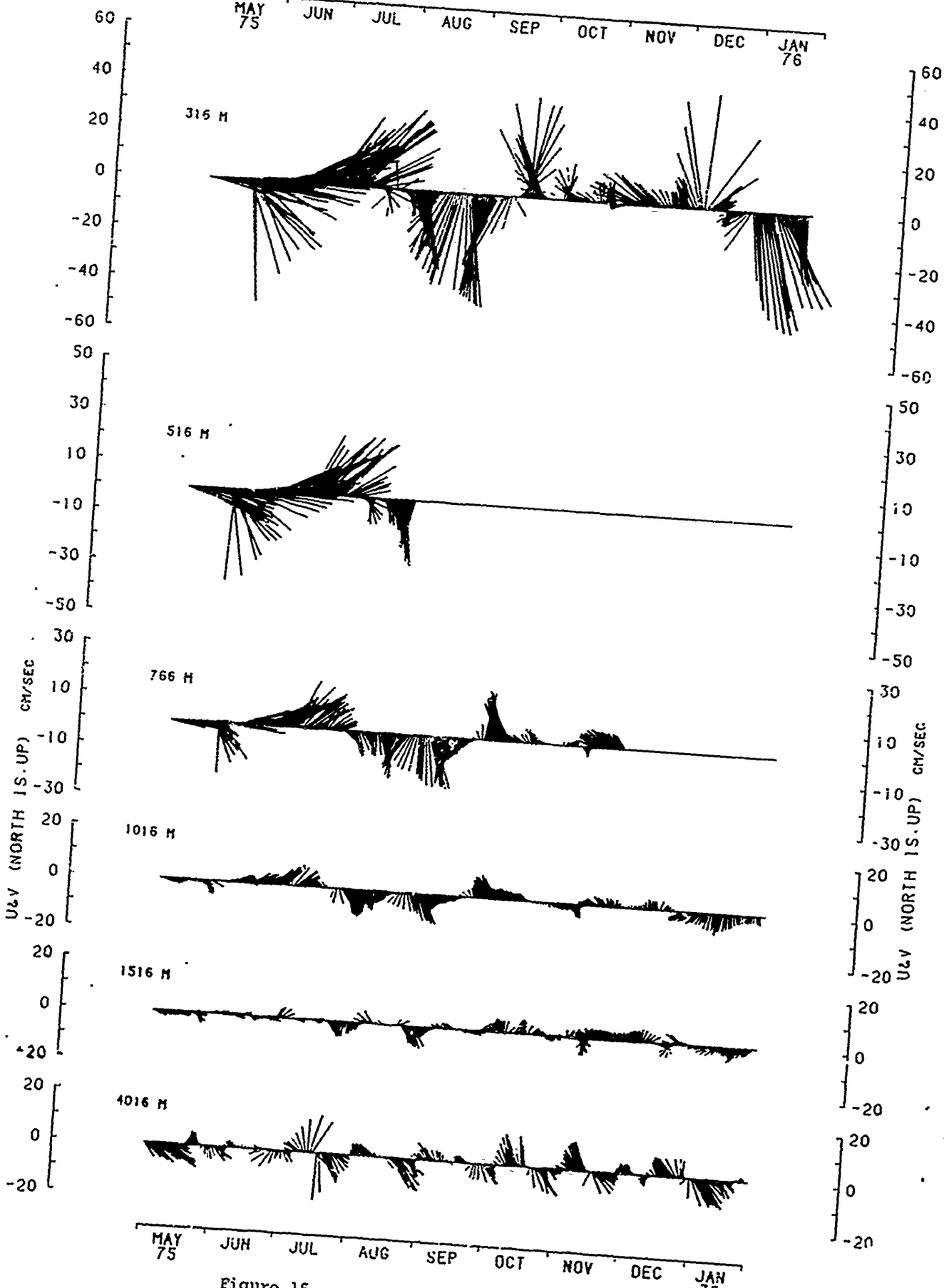


Figure 15

TEMPERATURE RECORDS MOORING 555

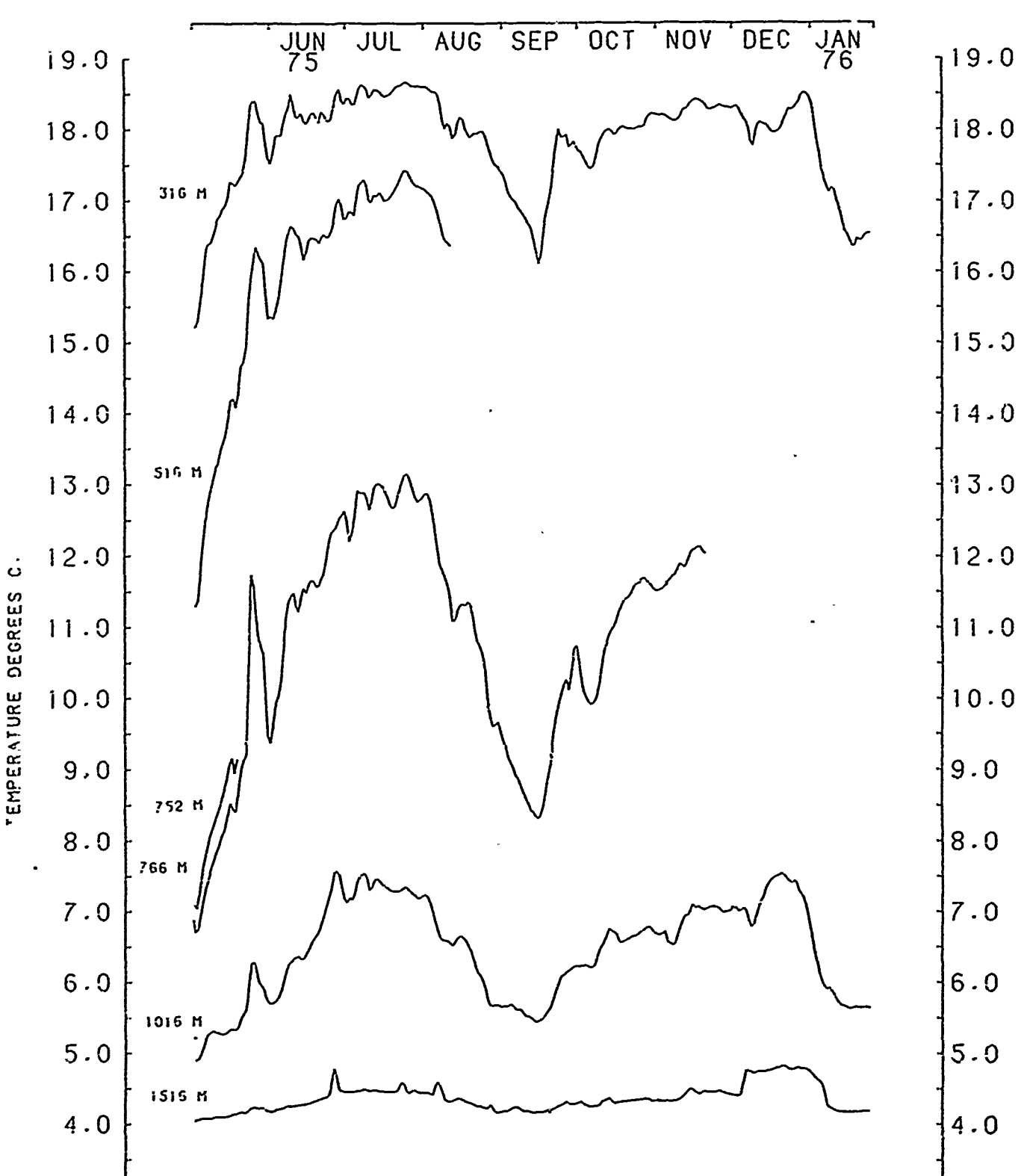
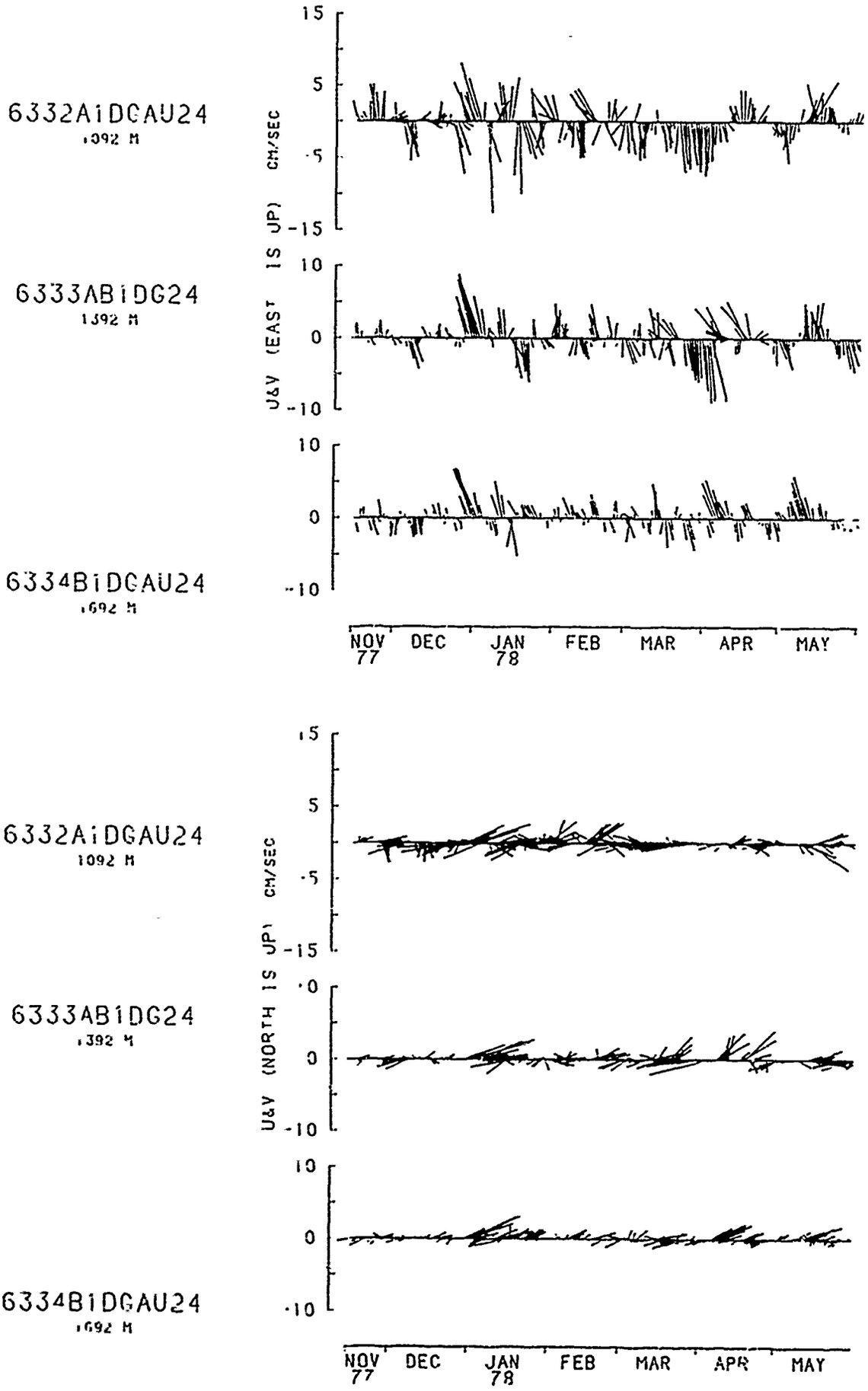
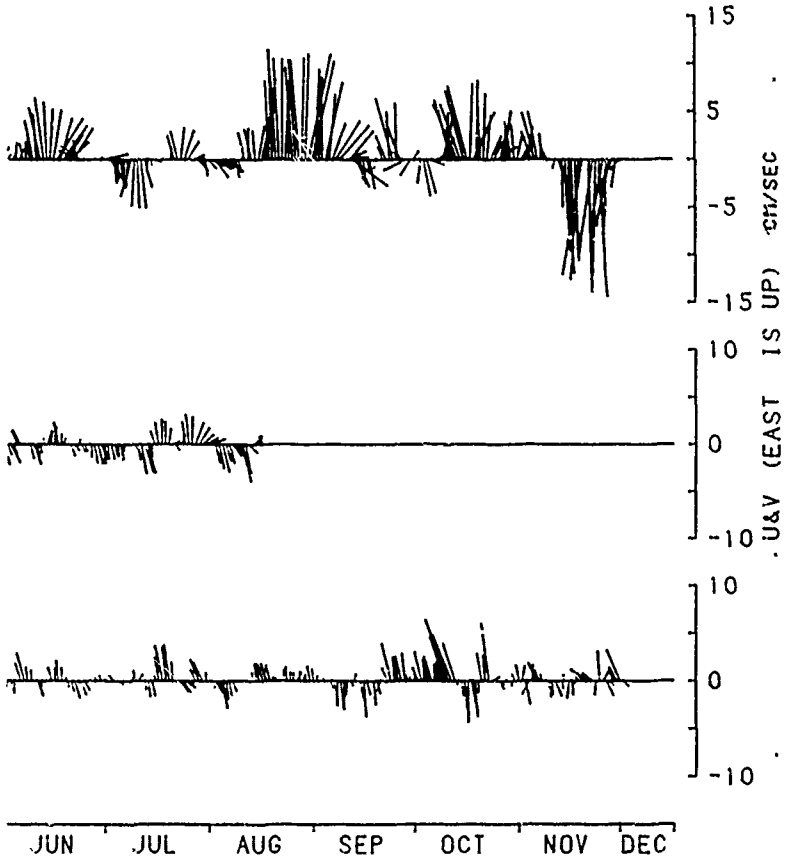
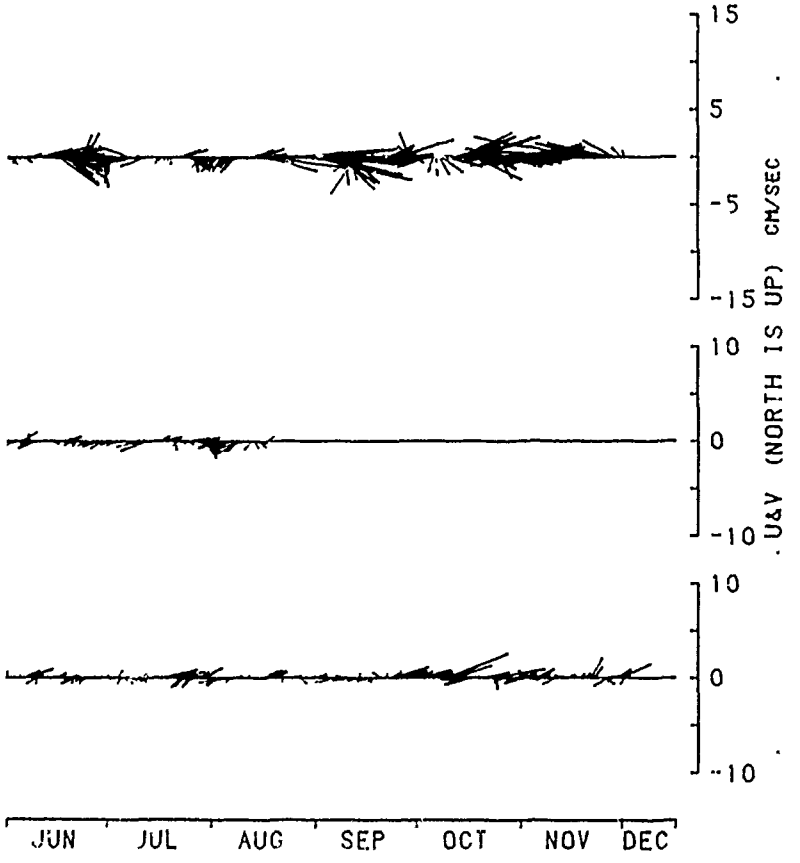


Figure 18

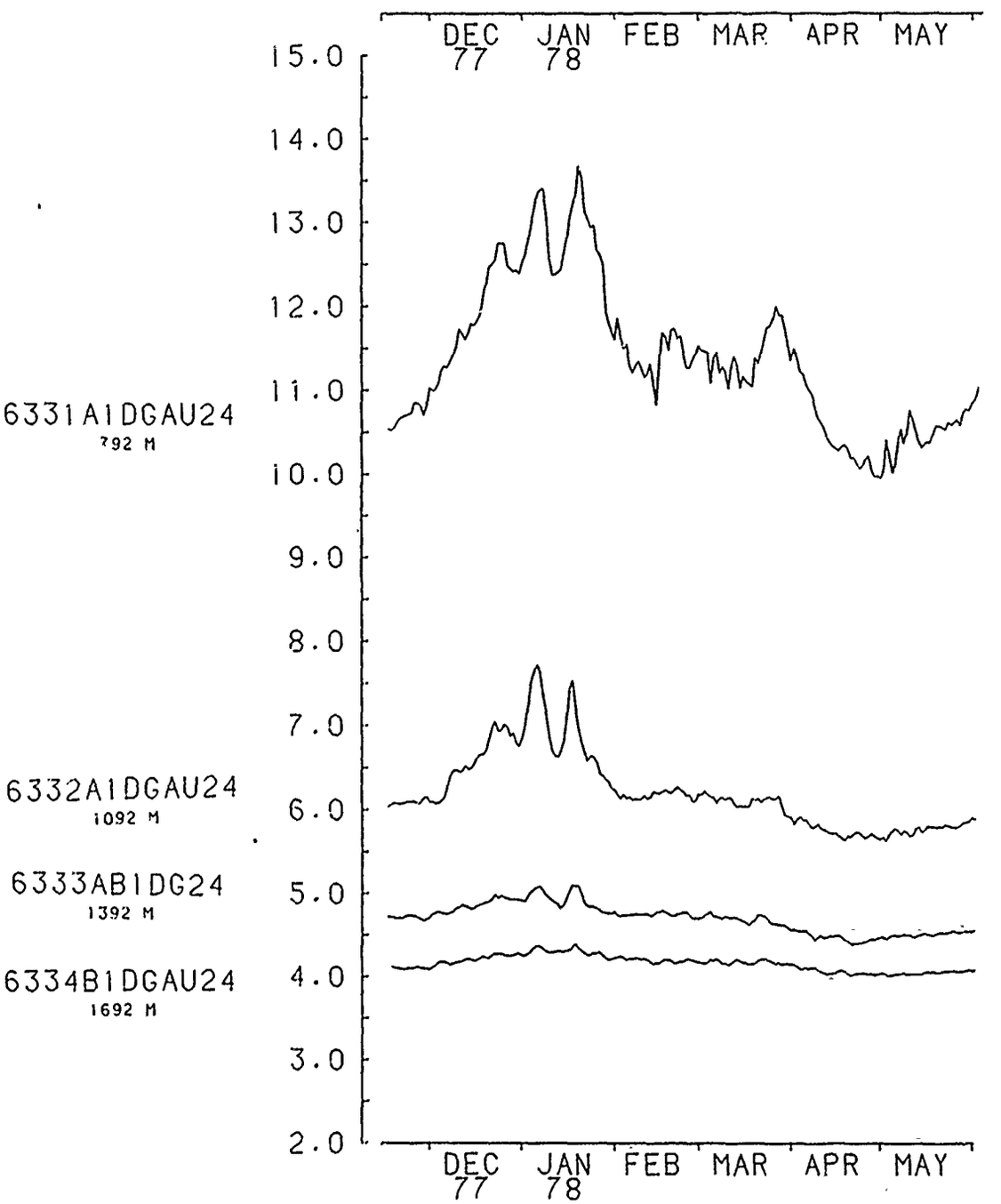
CURRENT VECTORS FOR MOORING 633

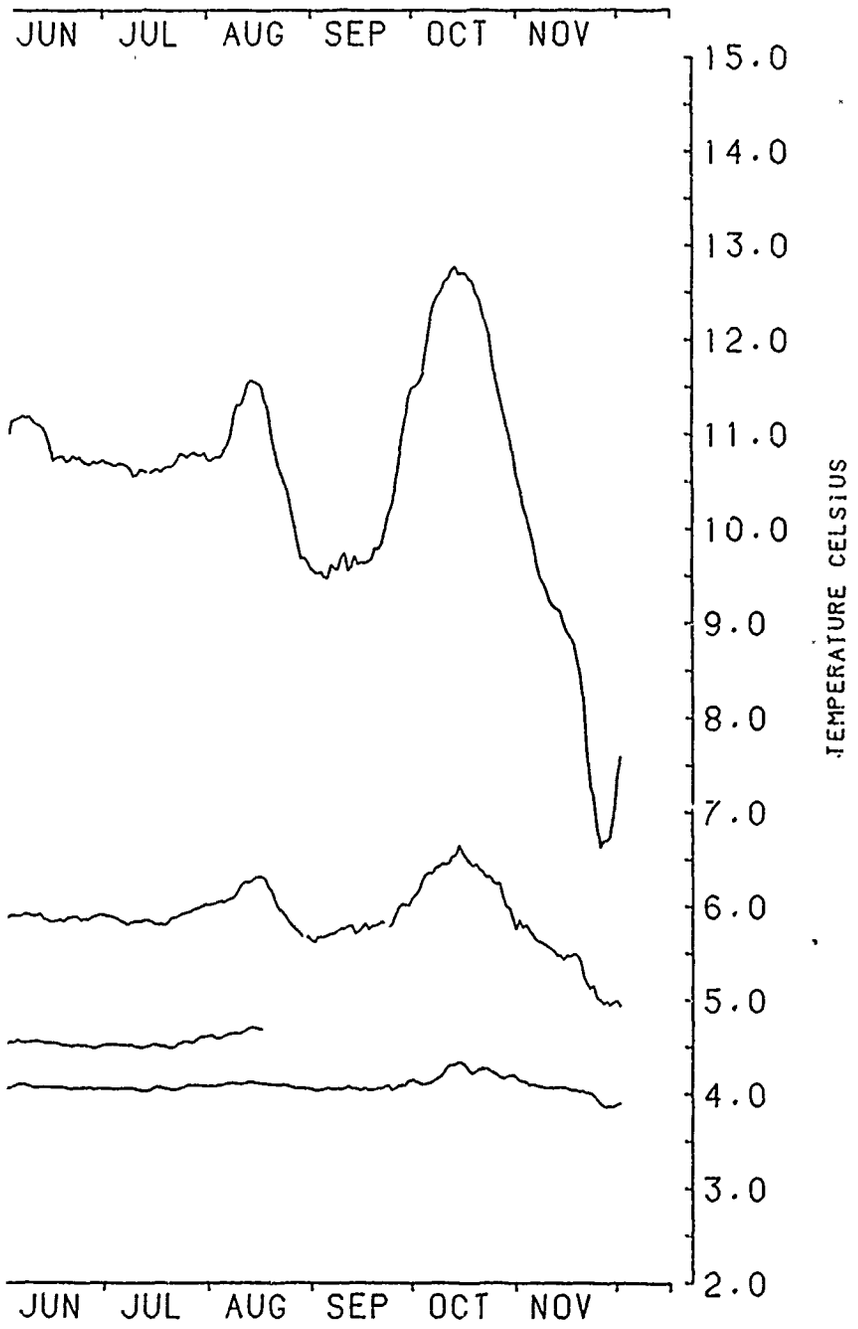



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U&V (EAST IS UP) CM/SEC
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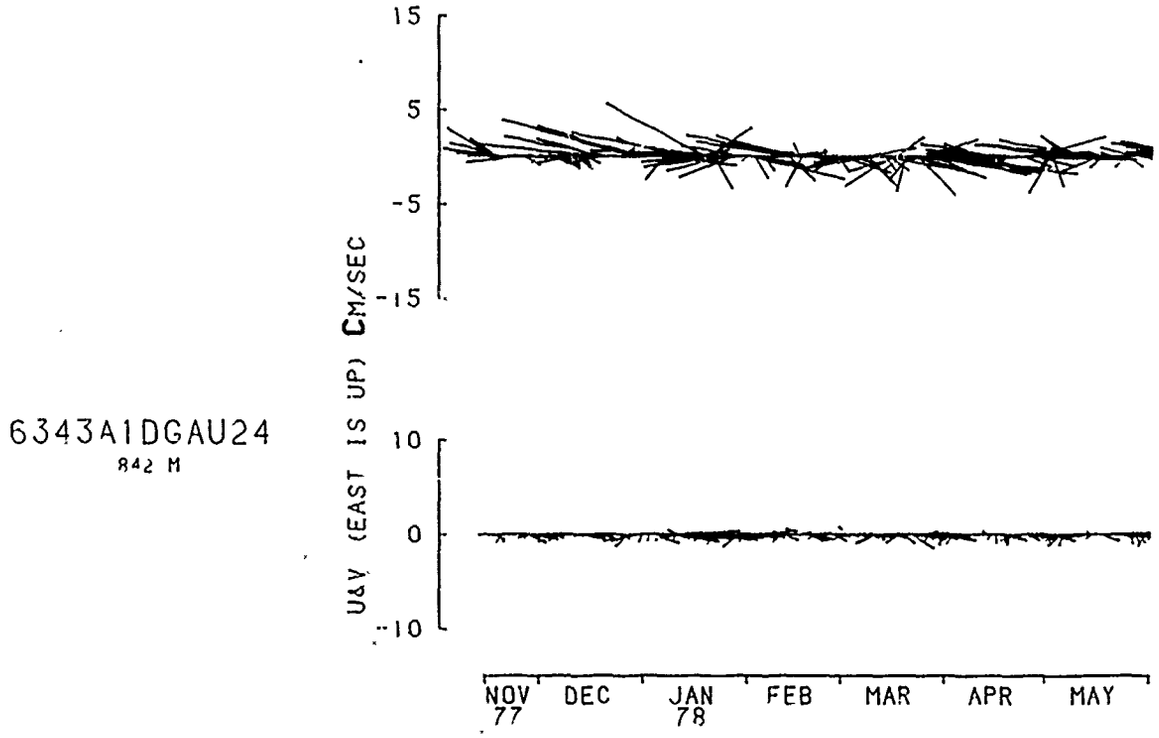

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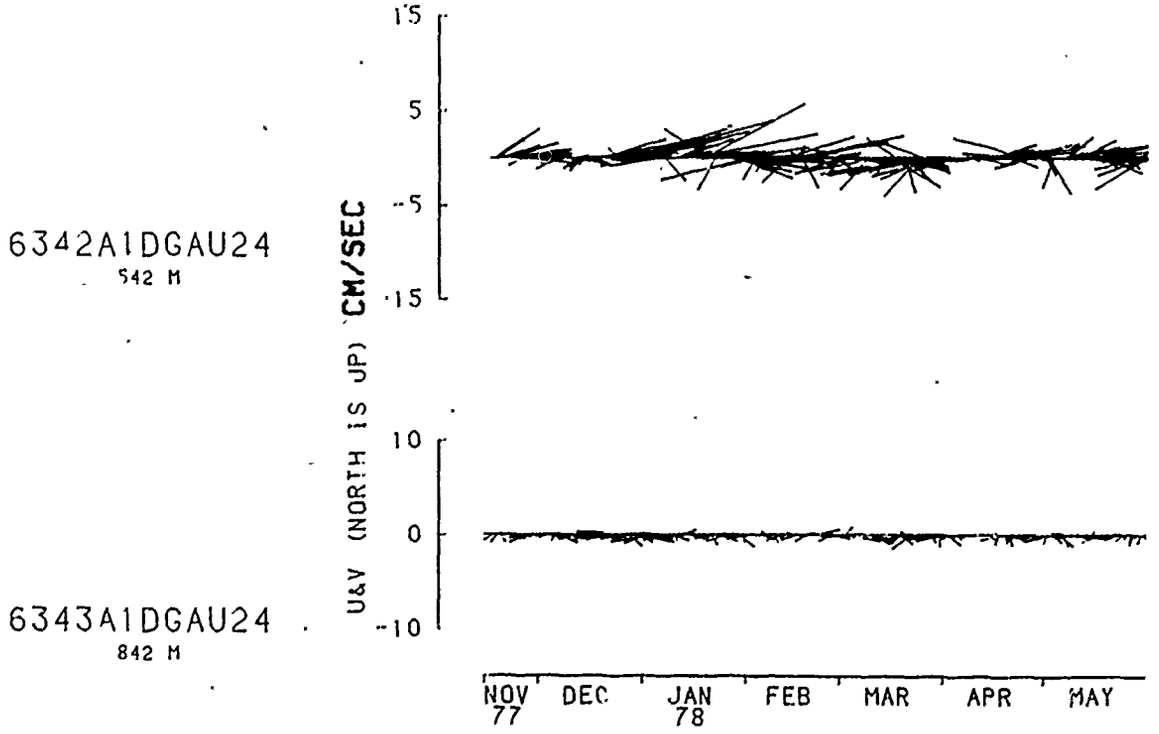
TEMPERATURE RECORDS MOORING 633

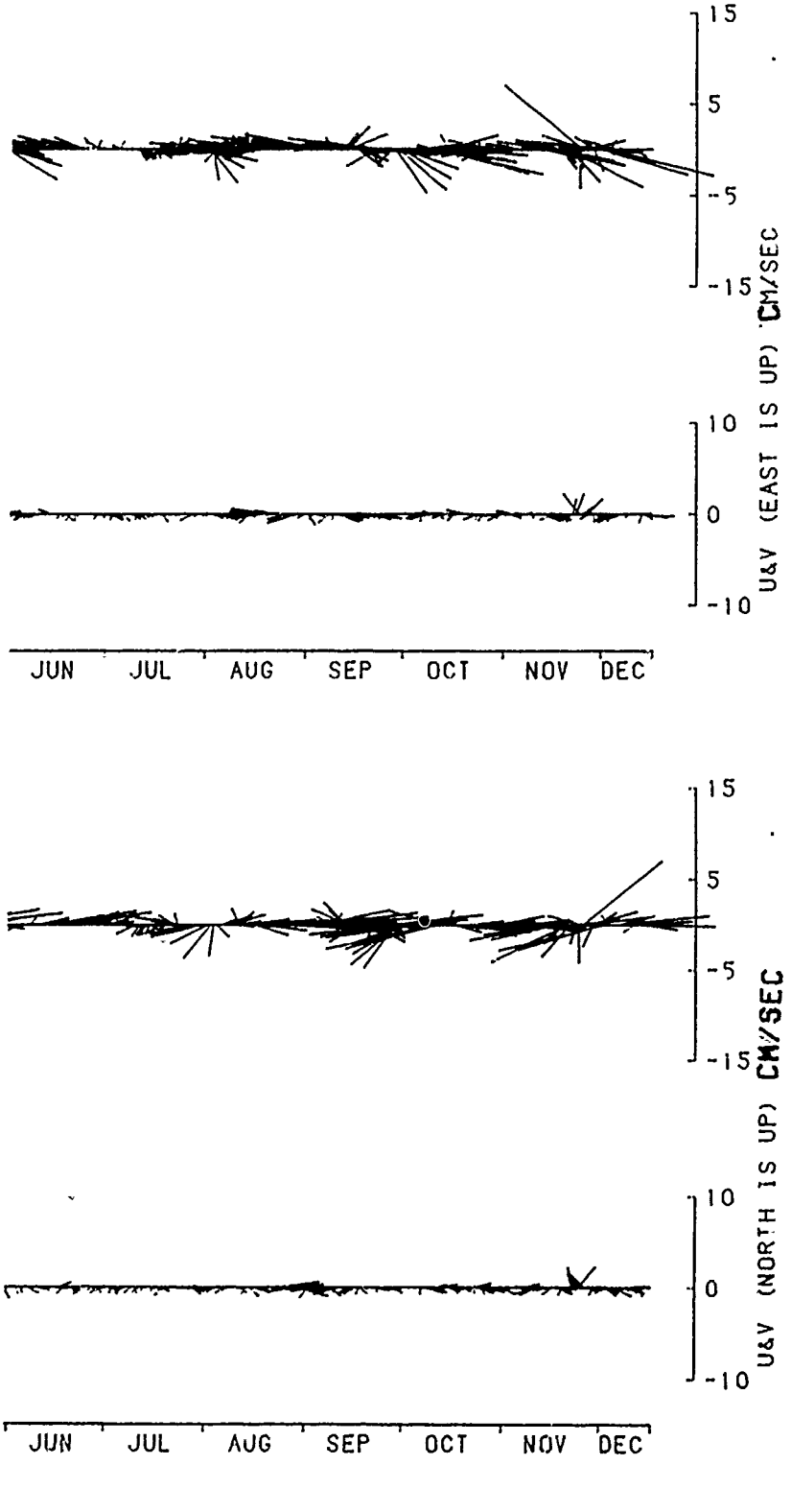



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TEMPERATURE CELSIUS

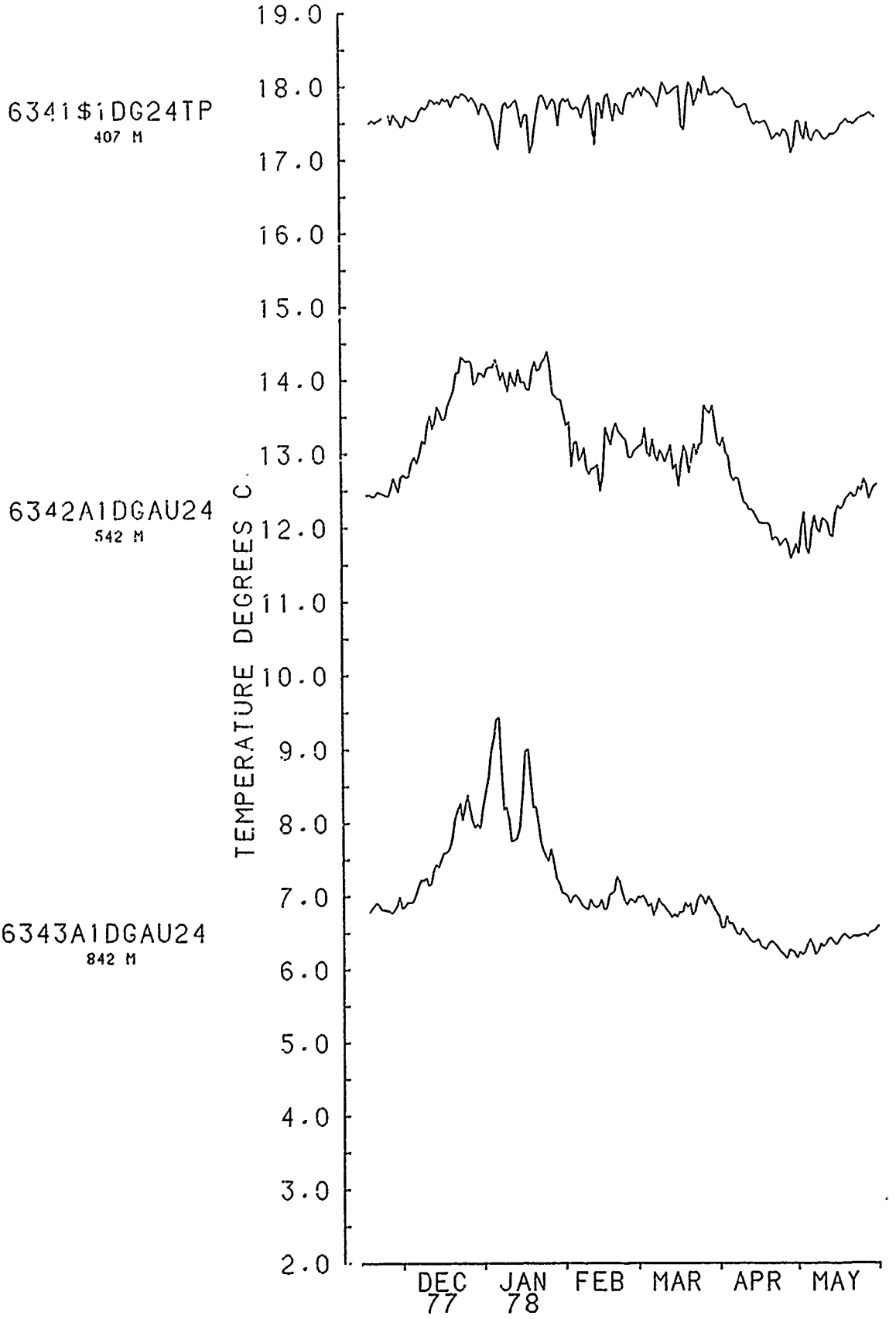
CURRENT VECTORS FOR MOORING 634

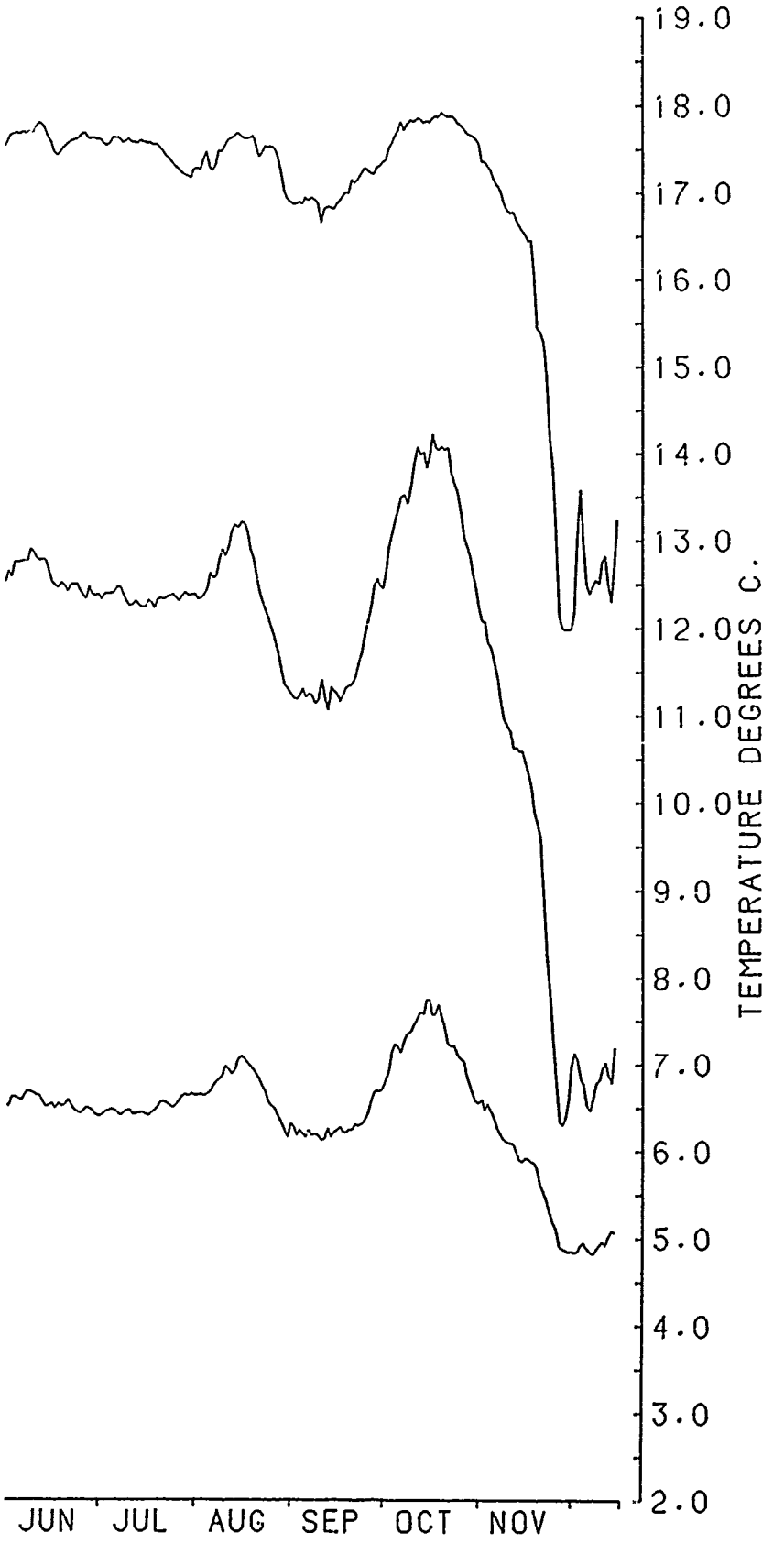




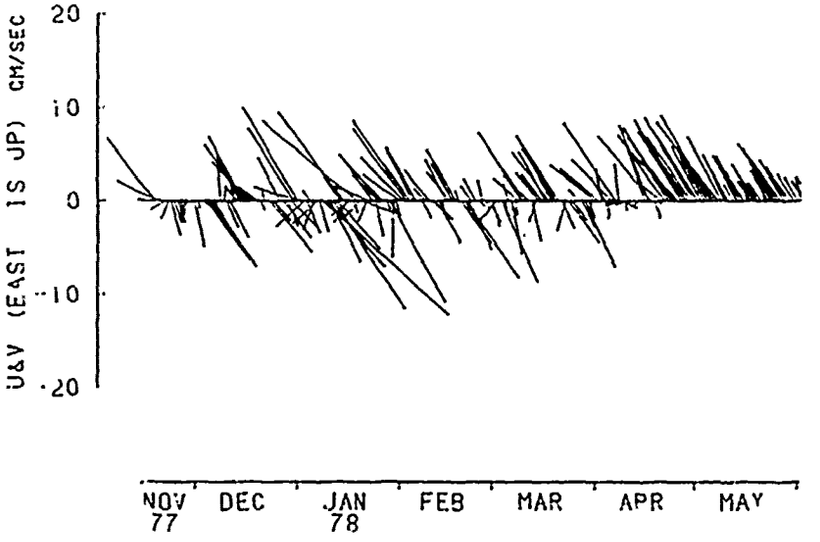

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U&V (EAST IS UP) CM/SEC
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-15
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U&V (NORTH IS UP) CM/SEC
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AUG
SEP
OCT
NOV
DEC

TEMPERATURE RECORDS MOORING 634

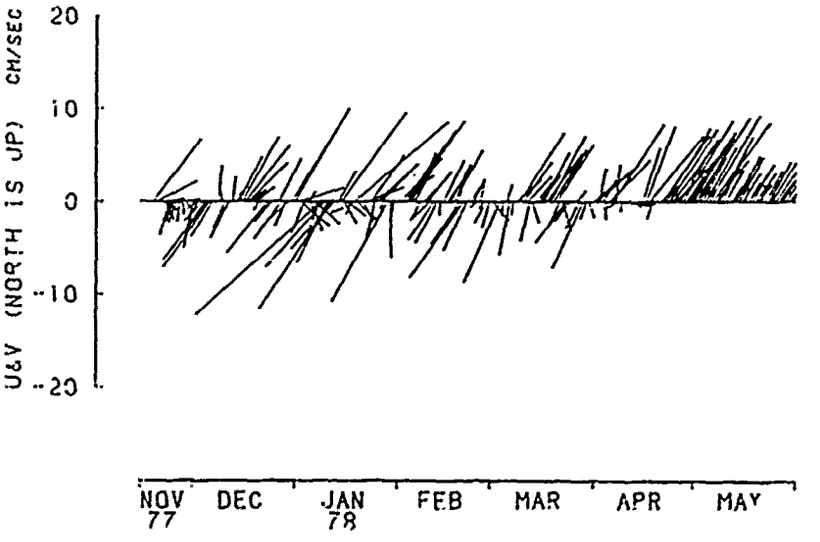



19.0
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4.0
3.0
2.0
TEMPERATURE DEGREES C.
JUN
JUL
AUG
SEP
OCT
NOV

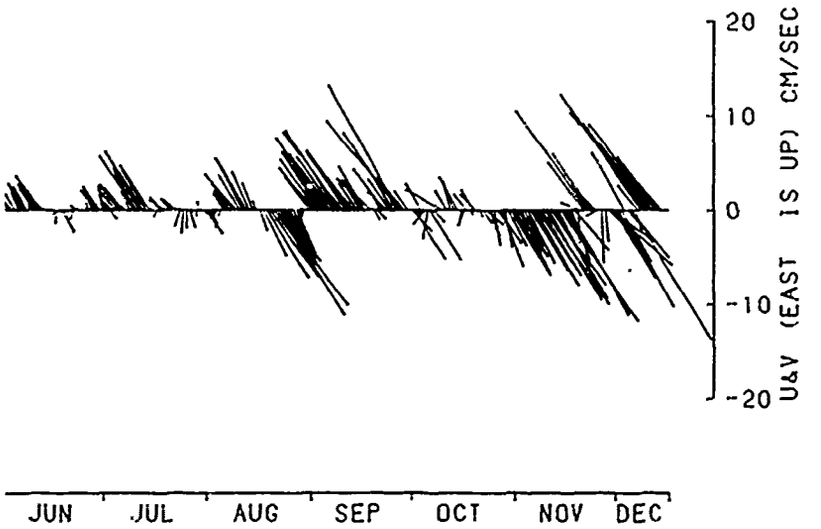
CURRENT VECTORS FOR MOORING 635

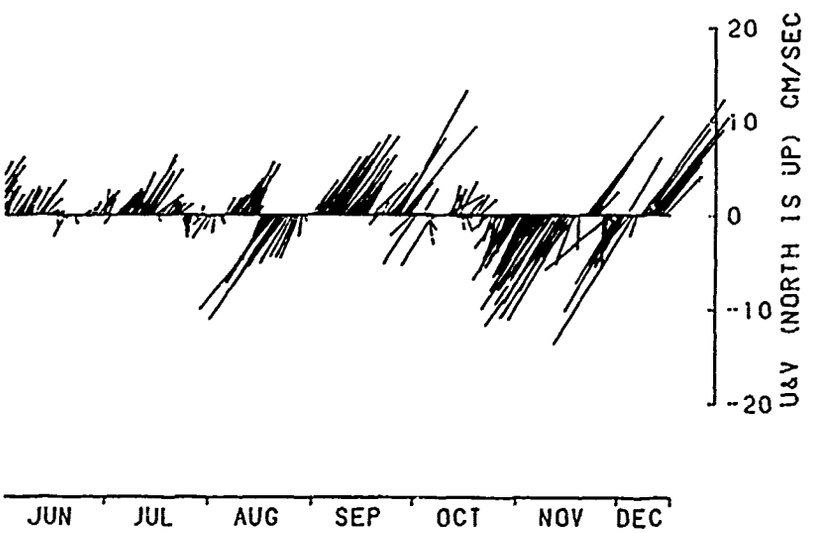


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524 M



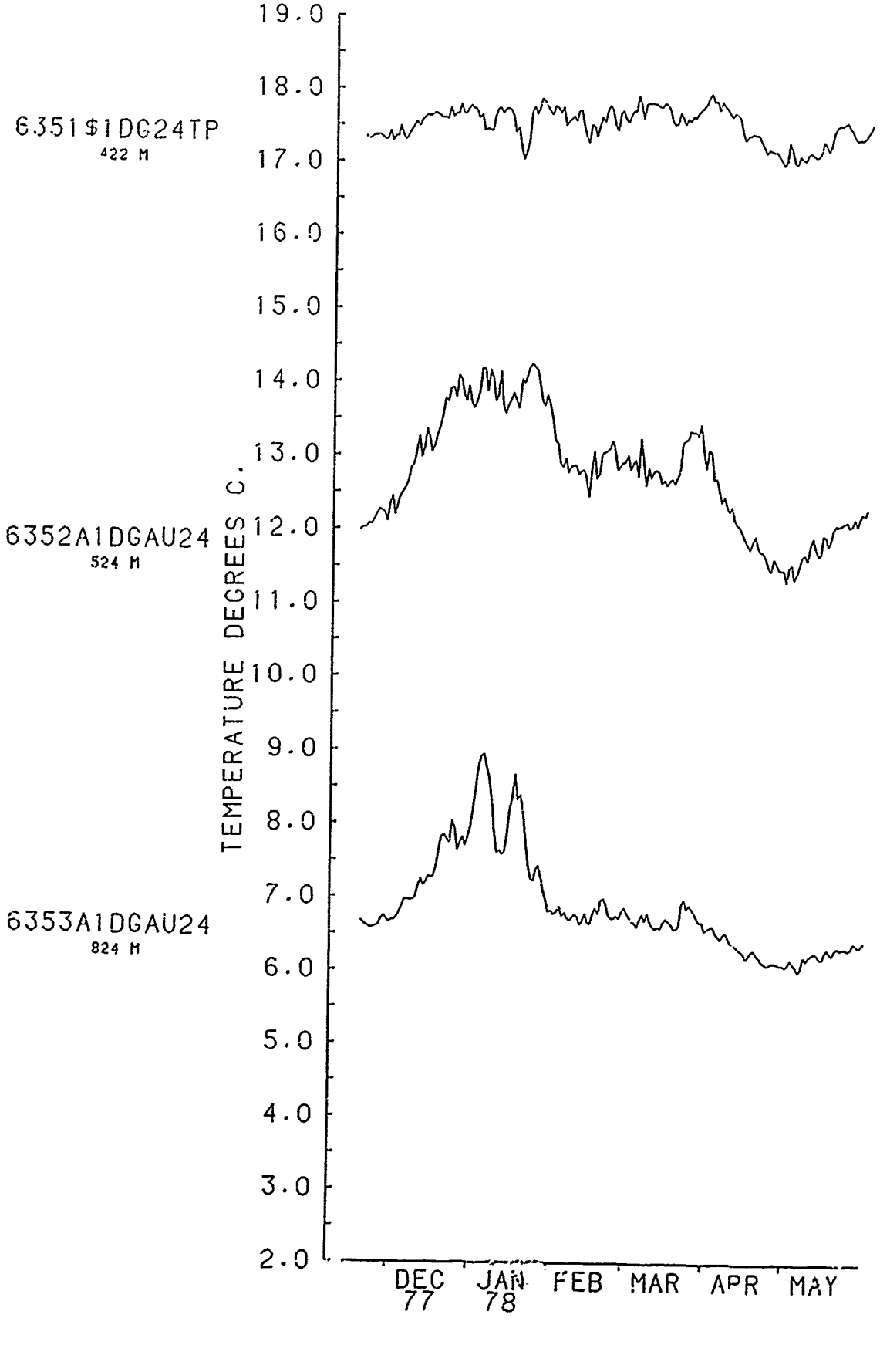
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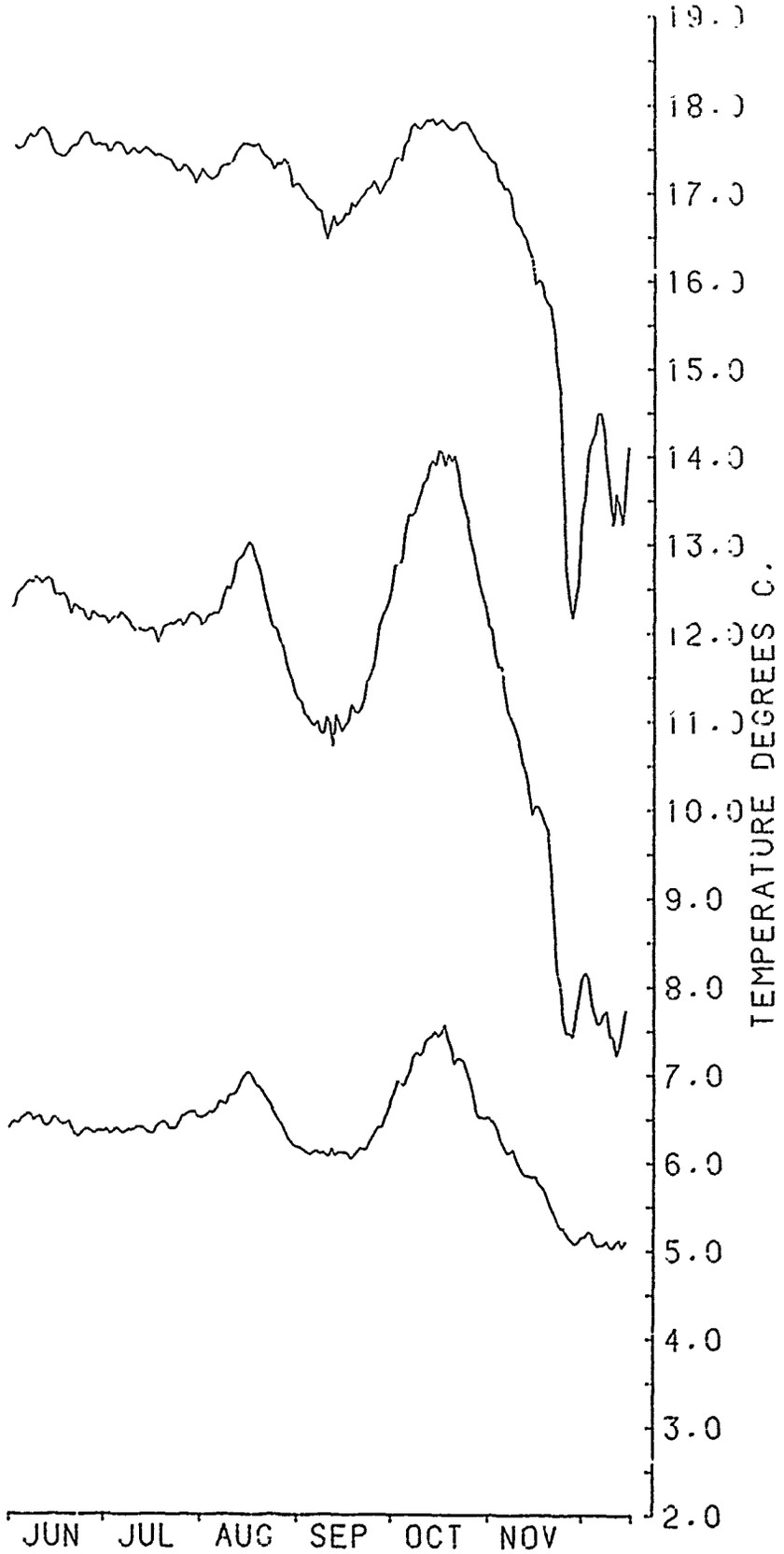

20
10
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-10
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U&V (EAST IS UP) CM/SEC
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AUG
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OCT
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DEC


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0
-10
-20
U&V (NORTH IS UP) CM/SEC
JUN
JUL
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SEP
OCT
NOV
DEC

TEMPERATURE RECORDS

MOORING 635




19.0
18.0
17.0
16.0
15.0
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13.0
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11.0
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9.0
8.0
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5.0
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TEMPERATURE DEGREES C.
JUN
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AUG
SEP
OCT
NOV

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WHOI-81-68

A COMPILATION OF MOORED CURRENT-METER DATA FROM THREE TOPOGRAPHIC EXPERIMENTS: THE BERMUDA MICROSTRUCTURE ARRAY, THE ISLAND TRAPPED WAVES ARRAY AND THE GIBBS FRACTURE ZONE ARRAY. VOLUME XXVII by Theresa K. McKee, Erika A. Francis and Nelson G. Hogg. 41 pages. August 1981. Prepared for the Office of Naval Research under Contracts N00014-74-C-0262; NR 083-400 and N00014-76-C-0197; NR 083-400.

This report is a summary of information collected from three separate oceanographic experiments, each with three moorings, whose objectives were to study the influence of topography on low-frequency motions. Two arrays were set near Bermuda and one in the Charlie-Gibbs Fracture Zone (53°N, 34°W).

All the moorings were recovered after nine or thirteen months at sea. Temperature and current velocity data are displayed graphically as time series plots, histograms and spectra. Progressive vector plots and pressure time series are also presented. The data are summarized in statistical tables.

1. Ocean currents
2. Ocean temperatures
3. Moored instruments
I. McKee, Theresa K.
II. Francis, Erika A.
III. Hogg, Nelson G.
IV. N00014-74-C-0262; NR 083-400
V. N00014-76-C-0197; NR 083-400

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A COMPILATION OF MOORED CURRENT-METER DATA FROM THREE TOPOGRAPHIC EXPERIMENTS: THE BERMUDA MICROSTRUCTURE ARRAY, THE ISLAND TRAPPED WAVES ARRAY AND THE GIBBS FRACTURE ZONE ARRAY VOLUME XXVII

by

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TECHNICAL REPORT

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Department of Physical Oceanography

ABSTRACT

This report is a summary of information collected from three separate oceanographic experiments, each with three moorings, whose objectives were to study the influence of topography on low-frequency motions. Two arrays were set near Bermuda and one in the Charlie-Gibbs Fracture Zone (53°N, 34°W).

All the moorings were recovered after nine or thirteen months at sea. Temperature and current velocity data are displayed graphically as time series plots, histograms and spectra. Progressive vector plots and pressure time series are also presented. The data are summarized in statistical tables.

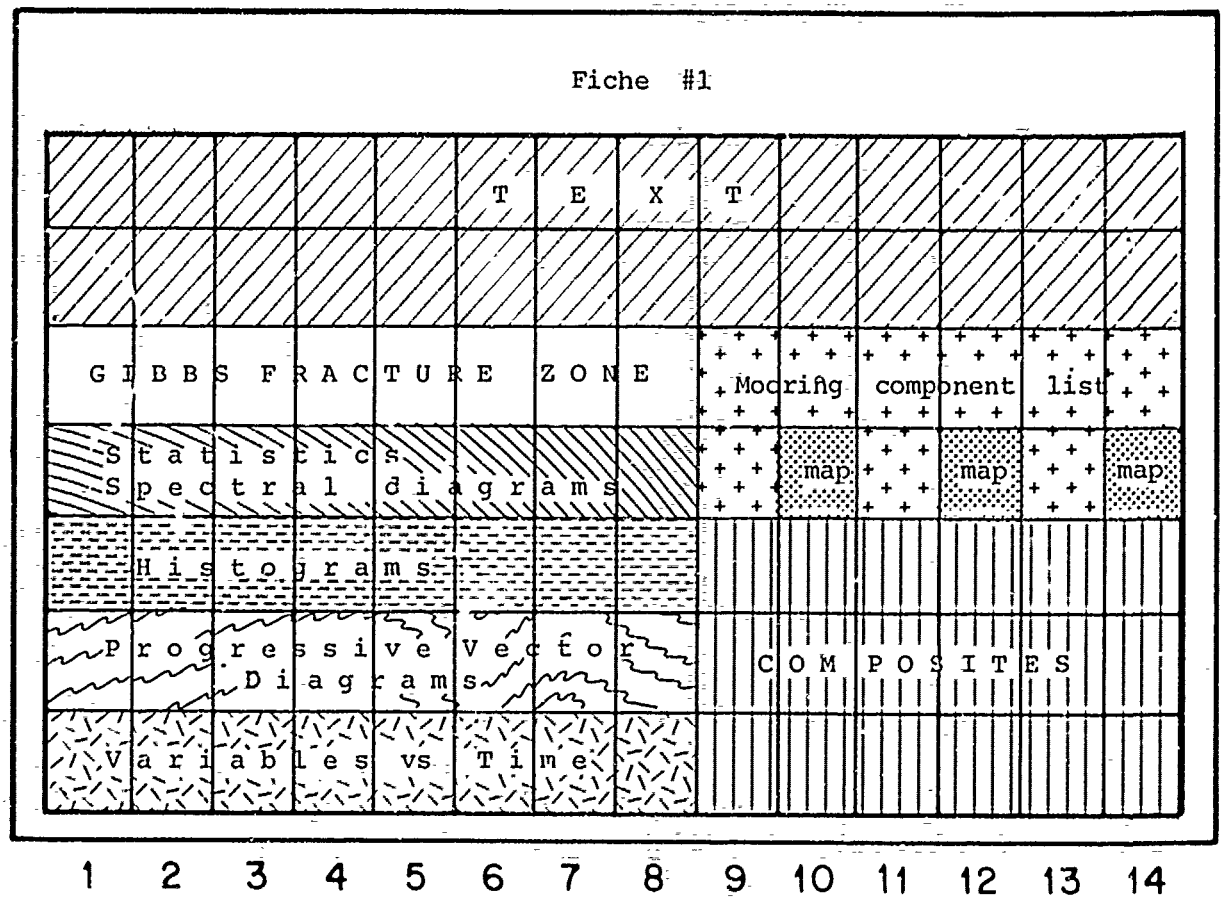
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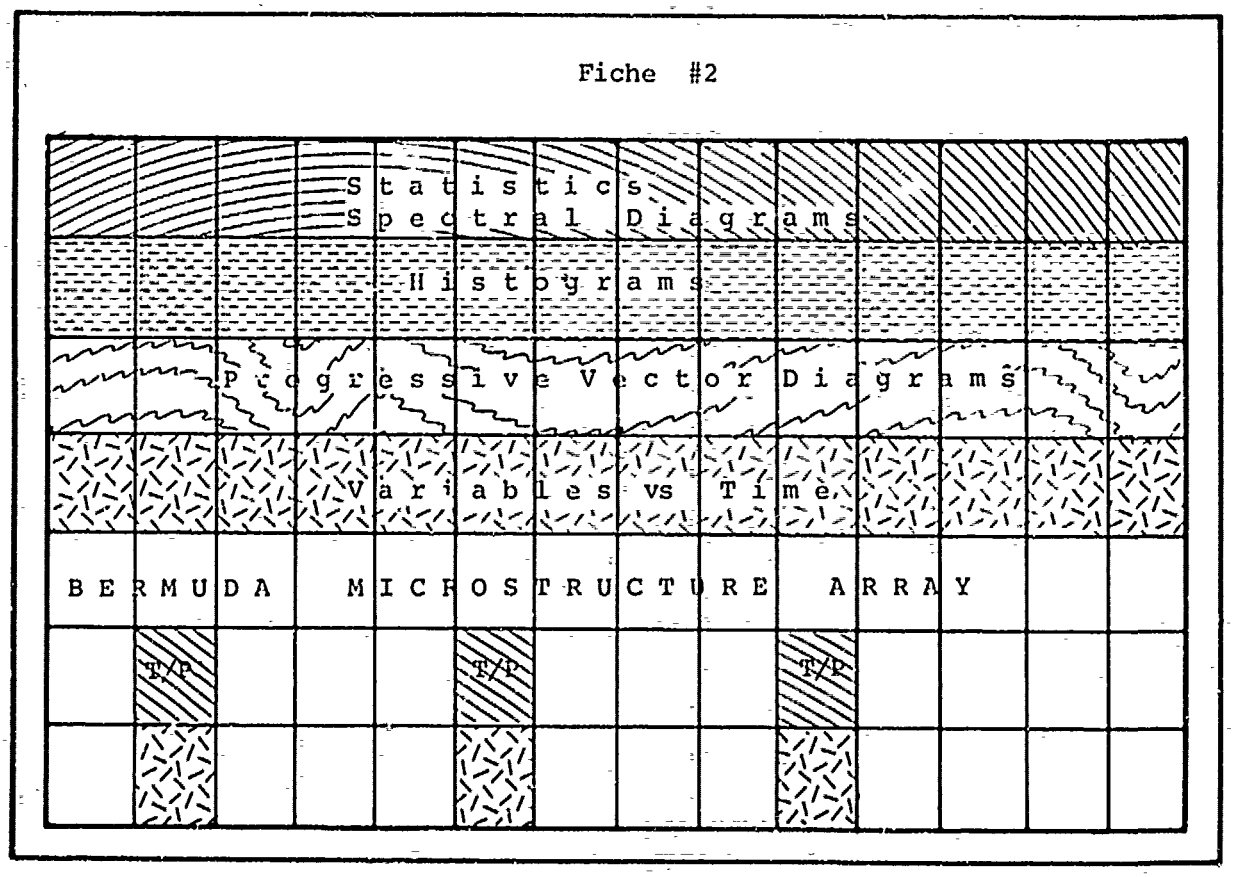
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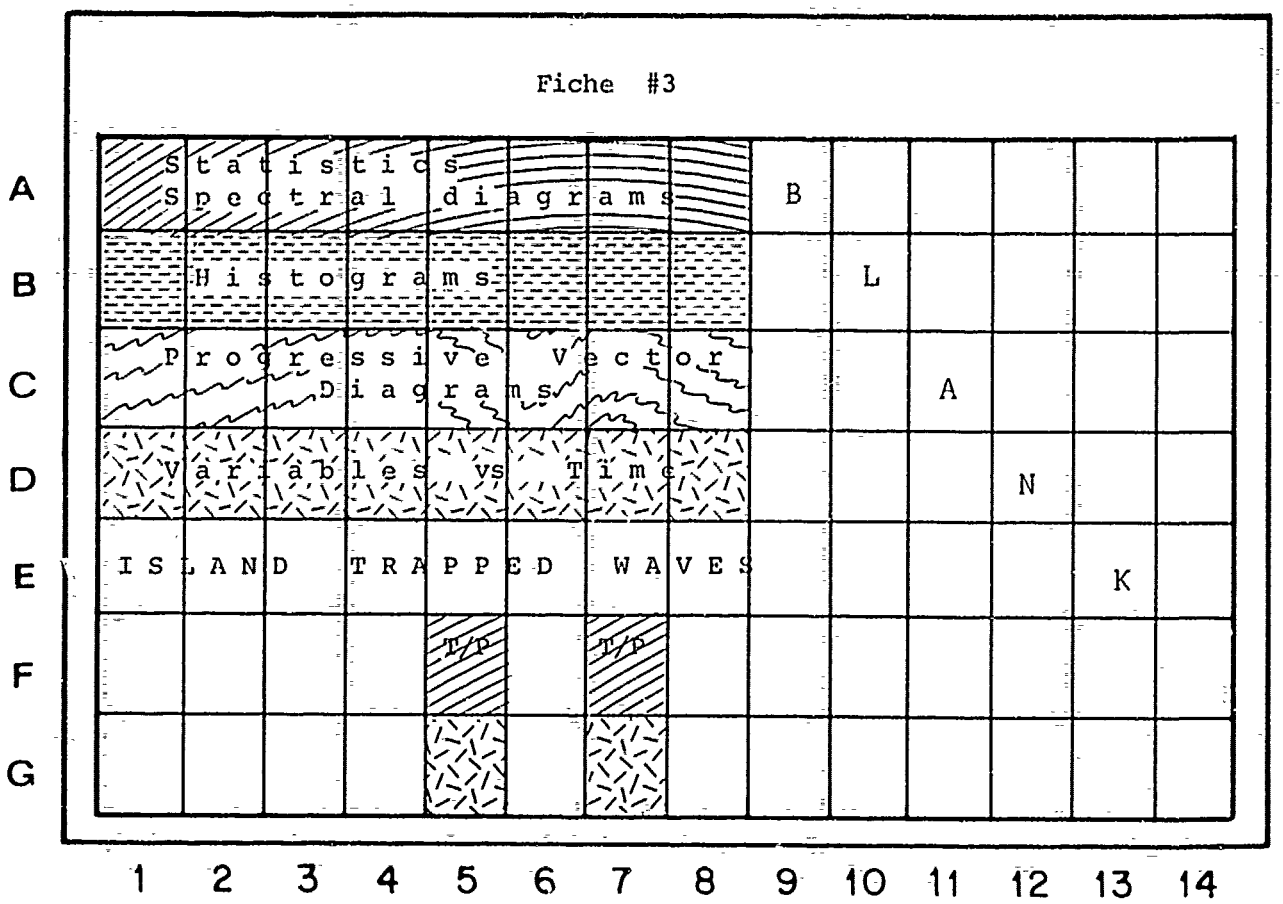
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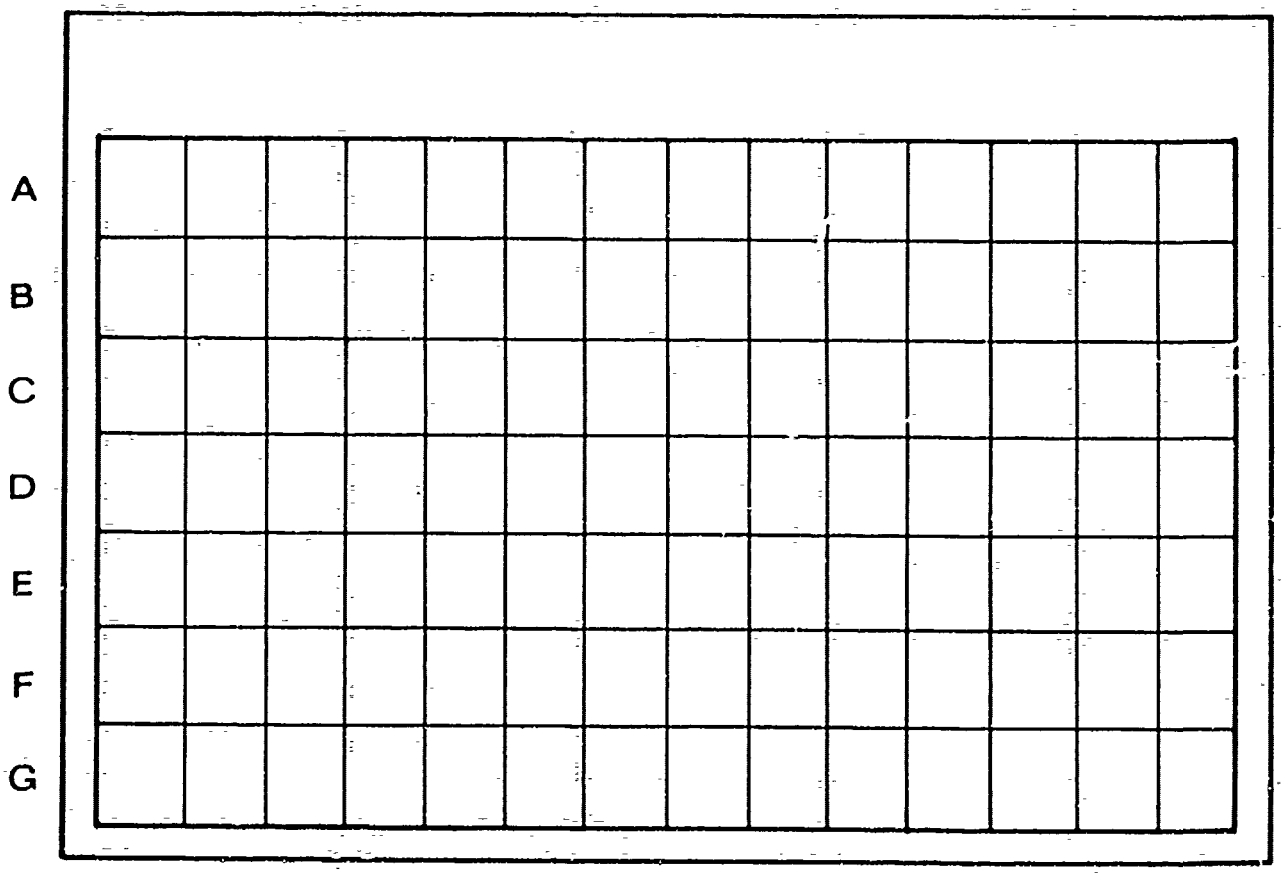
Fiche #1



Fiche #2




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ISLAND TRAPPED WAVES
T/P
T/P
B
L
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N
K
A
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C
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E
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1 2 3 4 5 6 7 8 9 10 11 12 13 14


A
B
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ACKNOWLEDGMENTS

The authors wish to acknowledge the moored array group's operations personnel for their work of organizing, deploying and recovering the instruments. They also would like to acknowledge the crews of the various ships involved in the work, with special mention of the effort of the people involved in the trip of the R/V Panulirus to pick up a mooring which had broken loose.

Data processors Ellen Levy, Ann Spencer and Susan Tarbell provided extensive help with the plots and layout of the report.

Acknowledgments are also due to the Office of Naval Research for its support. The work was performed under contract numbers N00014-74-C-0262, NR083-004 and N00014-76-C-0197, NR083-400.

PREFACE

This volume is the twenty-seventh in a series of Data Reports presenting moored current meter and associated data collected by the WHOI Buoy Group.

Volumes I through XXVI present data obtained during the years 1963-1978, arranged either by year or experiment (see notes).

A data directory and bibliography for the years 1963-1978 has been published, as WHOI Technical Report 79-88.

Volume XXVII presents data from the Bermuda Microstructure experiment, the Island Trapped Waves array and the Charlie-Gibbs Fracture Zone array.

Volume No.	WHOI Ref. No.		Notes Year	Experiment
I	65-44	Webster, F. and N. P. Fofonoff		
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X	76-40	Tarbell, S.	1969a	measurements
XI	76-41	Tarbell, S.	1969b	measurements
XII	76-101	Chausse, D. and S. Tarbell	1973	MODE Array
XIII	77-18	Tarbell, S. and A. W. Whitlatch	1970	Measurements
XIV	77-41	Tarbell, S., R. Payne and R. Walden	1976	mooring 592 Saint Croix
XV	77-56	Tarbell, S. and A. W. Whitlatch	1971	measurements
XVI	78-5	Tarbell, S. and A. Spencer	1971-1975	MODE Site
XVII	78-49	Tarbell, S., A. Spencer and R. E. Payne	1975-1977	POLYMODE Array II
XVIII	79-65	Tarbell, S., M. G. Briscoe and R. A. Weller	1978	JASIN
XIX	79-34	Spencer, A., C. Mills and R. Payne	1974-1975	POLYMODE Array I
XX	79-56	Spencer, A.	1974	Rise Array
XXI	79-85	Mills, C. and P. Rhines.	1978	W.B.U.C.
XXII	79-87	Tarbell, S. and R. Payne.	1973	measurements
XXIII	80-40	Tarbell, S. and R. Payne.	1978	POLYMODE Array III
XXIV	80-41	Spencer, A., K. O'Neill and J. R. Luyten.	INDEX 1976	
XXV	81-12	Spencer, A., E. D'Asaro and L. Armi.	BBL 1977	
XXVI	81-45	Chausse, D. and R. E. Payne.	1972	measurements

PRESENTATION

The printed portion of this report contains introductory text and information about the instruments and data processing procedures. Tables and figures give summaries of the location of the instruments. Data are shown graphically in numerous composite displays.

The microfiche pages contain displays of the basic data. The data from the Gibbs Fracture Zone are shown on fiche 1, together with reproduction of the printed pages. Fiche 2 contains data from the Bermuda Microstructure experiment. Data from the Island Trapped Waves experiment are shown on fiche 3. The displays for the basic current meter data include spectral plots, tables of statistics, time series plots, progressive vector diagrams and frequency histograms. Time series plots, spectral plots and tables of statistics are shown for data from temperature/pressure recorders.

A detailed layout of the data on the microfiche sheets is shown on pages iii and iv.

INTRODUCTION

This report is a summary of information collected from three separate moored arrays, of nine or thirteen months duration. One array was deployed in the Charlie-Gibbs Fracture Zone to measure the mean flow and study the properties of the eddy field. The other two were deployed near Bermuda, one relatively far from the island and one close to the island. The objectives of the Bermuda experiment were to monitor low frequency motions during a shipboard investigation of microstructure near the island and to study low-frequency baroclinic waves trapped by the island.

Three moorings were set in September 1975 in the Charlie-Gibbs Fracture Zone, a deep east-west channel through the Mid-Atlantic ridge at 53° north (see Figure 1 and Table 1). Objectives were to measure the mean flow and investigate the properties of the mesoscale eddy field at this latitude and their interaction with the underlying topography. Results are reported in Schmitz and Hogg (1978) and Hogg and Schmitz (1980). The moorings were recovered in June 1976, giving 7 nine-month records. Data return is summarized in Table 2.

The first Bermuda array was set in April, 1975, in approximately an equilateral triangle configuration with 100 km sides and Bermuda at the center (see Figure 2 and Table 1). It was designed to monitor the background mesoscale eddy field during an intensive investigation of possible microstructure generation processes near the island (as a part of FAME, the north Atlantic Fine and Microstructure Experiment, Sanford and Hogg, 1977). The mooring and related hydrographic results are described in Hogg, Katz and Sanford (1978). The array was recovered in January, 1976, giving records of up to 9 months duration. Instrument performance is summarized in Table 3.

In these current meter records, there were suggestions of coherent motions (trapped waves) travelling clockwise around Bermuda. This prompted the setting of the second array (the "Island Trapped Waves" experiment) in November 1977 (see Figure 3 and Table 1) which was designed to be in the near field of the trapped wave motions. Results from this experiment have been reported by Hogg (1980). The array was recovered in December, 1978 after more than a years deployment, although one mooring released prematurely two weeks earlier and was found by a local fisherman. Data return is summarized in Table 4.

INSTRUMENTATION

Current Meters

The current meters described in this report were Vector Averaging Current Meters (VACMs), built by AMF SeaLink Systems (now EG&G SeaLink Systems), or Model 850 current meters built by Geodyne, now a part of EG&G.

Each time a pair of rotor magnets passes the sensing diode, the VACM samples compass and vane information and computes a measure of east and north water current components. These components are summed through the entire recording interval, usually 15 minutes, thus giving a true vector average. One complete rotor revolution initiates 8 compute cycles. Temperature is derived from a voltage-to-frequency converter (v/f), whose output frequency is related to the thermistor resistance at its input. The v/f output pulses are summed over the entire recording interval, thus averaging temperature. The thermistors are routinely calibrated before and after deployment and the temperatures are accurate to ±.01°C (Payne et al., 1976). All variables are recorded on a cassette tape at the end of each recording interval.

The Model 850 current meter stores burst sampled data on magnetic tape cartridges. The instrument collects and stores 23 or 24 data cycles sampled at 5.27 second intervals. It then turns off for the remainder of the recording interval (usually 15 or 30 minutes). Model 850's, which have been modified to include temperature measurements, accumulate the count from the temperature circuit from one 5.19 second period and record it at the beginning of each data burst.

Time was measured using a quartz crystal oscillator with a manufacturer's specified accuracy of ±1 second per day. All stated times are in UTC (Universal Coordinated Time). The instrument clock times were synchronized with UTC before mooring launch. After recovery, differences in the two times were noted.

Two of the instruments (5532 and 5552) were modified to record differential temperature (tdif). A thermistor was mounted externally at each end of the VACM pressure case (a distance of 1.74 meters apart), and a differential resistance was measured and recorded. The lithium batteries in the instruments failed shortly after deployment, giving short records of all variables. See McCullough (1975) and Dean (1979) for further information.

One of the VACMs (6331) contained a pressure transducer, manufactured by Paine. It is a strain gauge with a rated accuracy of .05 per cent of full scale. The instrument is routinely calibrated before deployment.

Temperature/Pressure Recorder

An instrument to record temperature, pressure and time (T/P) was developed in the Draper Laboratory at MIT for MODE-1 and has been used extensively since 1973. The instrument stores a sample every 15 seconds and records the sum of 128 successive data samples every 32 minutes on a magnetic tape cassette (128 x 15 = 1920 seconds = 32 minutes).

Temperatures have a resolution of .001°C (Wunsch and Dahlen, 1974). The absolute accuracy is not specified.

The pressure sensor is a strain gauge with a manufacturer-specified accuracy of .03 per cent of full scale (Wunsch and Dahlen, 1974). These sensors are recalibrated for each instrument deployment.

MOORINGS

Details of the mooring configuration are shown in Tables 5-13. The items on each mooring are listed. Depths in meters and data names are included for data recording instruments.

The anchor was usually a cylinder weighing from 2000-2700 pounds (wet weight). In the Gibbs Fracture Zone, the anchor on the short mooring weighed 1000 pounds.

Items with the words "glass spheres" refer to glass flotation spheres of 16" or 17" diameter with hard hats, each one bolted to 3/8" chain at 1 meter intervals.

Milliman samples are corrosion measuring devices, attached to the mooring wire.

Figures 1 through 3 show mooring locations and Tables 1 through 4 give summaries of the instruments, their depths and the quality of the data.

See Heinmiller (1976) for a more complete description of WHOI moorings.

DATA PROCESSING

Current Meters

The data from the instrument tapes were transcribed to 9-track magnetic tapes, converted to scientific units, edited to remove launch and retrieval transients and bad points, and linearly interpolated across missing or erroneous data cycles.

WHOI data are identified by a mooring number, a sequential instrument position number (e.g., 5713 is the third instrument down on mooring 571), a letter to indicate the data version (e.g., 5713B is the second editing of 5713), and a number to indicate the time sampling interval for that data record (e.g., 5713B1800 is the half-hour (1800 seconds) averaged version).

Low-passed versions of data series were formed by passing the data through a Gaussian filter with a 24 hour half-width, and then subsampling the filtered series once a day. The composite plots shown for each mooring and the time series plots and progressive vector plots on the microfiche use these low-passed data files.

Temperature/Pressure Recorders

Cassette reading and preliminary data processing were carried out at MIT. The basic time series received by WHOI had been truncated to remove launch and retrieval transients, but detailed editing was done at WHOI. Basic spectral plots, time series and statistics are shown for the T/Ps, and the low-passed temperature data are shown on the composite temperature plots for each mooring.

PROGRAMS

Time Series Plots

Current meter and T/P variables versus time are presented graphically. All the plots are based on low-passed time series.

Statistics

Statistics for each variable measured by the current meters and T/P's are presented on microfiche. Mean, standard error, variance, kurtosis and extrema are given for all the variables; east and north covariance, correlation and other statistics are given for the vectors. The data series used is based on the instrument sampling interval. For reference, note that a Gaussian random variable would have a kurtosis of three and a skewness of zero.

See Tarbell, Spencer and Payne, (1978) for a more detailed discussion of these parameters.

Progressive Vector Plots

Based on a low-passed time series, the current vectors are placed tail-to-head so as to show the path that a perfect particle in a perfectly homogeneous flow would have travelled. Flow regimes and low frequency behavior show up well on this type of plot. The plot begins with an asterisk and the first day of each month is marked with a plus sign and every 5th month is annotated.

Vector Stick Plots

The 24-hour averaged current components are plotted as individual vectors along a time scale. Unless otherwise indicated, the vector orientation is such that north is upwards on the page.

The vector roses show current vectors sampled every 7 days, plotted at the location of the mooring.

Histograms

The variables temperature, speed and direction are shown as frequency of occurence versus amplitude plots. The mean for each data series is marked.

Spectra

The horizontal kinetic energy (HKE) and temperature are displayed as spectra. The HKE spectrum is half of the sum of the spectra of the east and north components. It has the advantage of not being tied to a particular coordinate system.

The HKE and temperature have units of $(cm^2/sec^2)/cph$ and $(°C)^2/cph$ respectively. The spectra are all one-sided, i.e., the area under the spectrum is equal to the variance of the original record. The plots are log-log rather than 'variance preserving', i.e., the contributions of various frequency bands to the total variance are not in proportion to the displayed areas.

The spectra are calculated based on data sequences of 3240 or 4000 points ('pieces'). Frequency band averaging is across three frequencies and no data-windowing or prewhitening is done.

The WHOI spectral program TIMSAN (Hunt, 1977) averages the spectra in increasingly large groups at the high frequencies to prevent having to plot thousands of points. This procedure gives few degrees of freedom (d.o.f) at the low frequencies, and many at the high frequencies. For the spectra calculated from one piece with three frequencies averaged there are 6 d.o.f. in the lowest frequency group, and 600 d.o.f. in the highest frequency group.

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Wunsch, C., and J. Dahlen, 1974, A moored temperature and pressure recorder. Deep-Sea Res., 21, 145-154.

TABLE CAPTIONS

Table 1	Summary of Mooring Locations.
Table 2	Data return and quality from instruments in the Charlie-Gibbs Fracture Zone.
Table 3	Data return and quality from instruments in the Bermuda Microstructure array.
Table 4.	Data return and quality from instruments in the Island Trapped Waves experiment.

The following tables are printed on microfiche only:

Tables 5-7	List of mooring components: Gibbs Fracture Zone.
Tables 8-10	List of mooring components: Bermuda Microstructure Array.
Tables 11-13	List of mooring components: Island Trapped Waves experiment.

FIGURE CAPTIONS

Figure 1	Location of moorings in the Charlie-Gibbs Fracture Zone.
Figure 2	Location of moorings near Bermuda for the Bermuda Microstructure Array.
Figure 3	Location of moorings near Bermuda for the Island Trapped Waves experiment.
Figure 4	Current vectors at mooring locations in the Charlie-Gibbs Fracture Zone. Vector plotted for every 7th data point in a 271 day series.
Figure 5	Current vectors at mooring locations of the Bermuda Microstructure Array. Vector plotted for every 7th data point in a 271 day series.
Figure 6	Current vectors at 2 mooring locations during the Island Trapped Waves experiment. Vector plotted for every 7th data point in a 394 day series.
Figures 7-9	Composite time series plot of current vectors: Moorings 570-572
Figures 10-12	Composite time series plot of temperatures: Moorings 570-572
Figures 13-15	Composite time series plot of current vectors: Moorings 553-555
Figures 16-18	Composite time series plot of temperatures: Moorings 553-555
Figures 19-21	Composite time series plot of current vectors: Moorings 633-635
Figures 22-24	Composite time series plot of temperatures: Moorings 633-635

TABLE 1

SUMMARY OF MOORINGS

Mooring No.	No. of instruments	Date Set	Date Retr.	Location	Bottom Depth (m)
		CHARLIE-GIBBS FRACTURE ZONE ...Cruise... Knorr 51	Knorr 54 Leg 7		
570	1	Sep. 26 1975	June 24 1976	52° 42.7'N 33° 59.2'W	4288
571	3	Sep. 27 1975	June 26 1976	52° 53.7'N 35° 31.0'W	2895
572	4	Sep. 27 1975	June 25 1976	52° 46.1'N 35° 30.0'W	3398
		BERMUDA MICROSTRUCTURE ARRAY ...Cruise... Knorr 49	USCGC Evergreen		
553	5	Apr. 28 1975	Jan. 26 1976	31° 46.9'N 64° 26.2'W	4353
554	5	Apr. 29 1975	Jan. 26 1976	32° 21.5'N 65° 27.0'W	4774
555	7	Apr. 9 1975	Jan. 25 1976	32° 59.0'N 64° 23.8'W	4527
		ISLAND TRAPPED WAVES EXPERIMENT ...Cruise... RV Erline	Oceanus 52 Leg III		
633	4	Nov. 15 1977	Dec. 7 * 1978	32° 33.8'N 64° 44.7'W	1611
634	3	Nov. 16 1977	Dec. 16 1978	32° 32.2'N 64° 44.1'W	942
635	3	Nov. 17 1977	Dec. 17 1978	32° 22.4'N 65° 0.9'W	924

* Recovered by R/V Panulirus.

TABLE 2

DATA RETURN AND QUALITY

RECORDS FROM CHARLIE-GIBBS FRACTURE ZONE

Record No.	Inst. depth (m)	Data Dates 1975 - 1976	No. of days	Data presented	Comments
5701	4227	Sep.27 - June 24	271	V T *	
5711	1007	Sep.28 - June 26	272	V T	
5712	2537	Sep 28 - Nov. 4/75	39	V T	Electronic problems
5713	2835	Sep 28 - June 26	272	V T	
5721	998	Sep.28 - June 25	271	V T	
5722	2528	Sep.28 - June 25	271	V T	
5723	3060	Sep.28 - June 25	271	V T	
5724	3360	Sep.28 - June 25	271	V T	

V Velocity component data presented
T Temperature " "

* There were 2 thermistors on this current meter. The records were virtually identical, only one series is displayed

TABLE 3

DATA RETURN AND QUALITY

RECORDS FROM BERMUDA MICROSTRUCTURE ARRAY

Record No.	Inst. depth (m)	Data Dates 1975 - 1976	No. of days	Data presented	Comments
5531	306	Apr.29 - Jan.26	272	V T	
5532	506	Apr.29 - Oct.15/75	170	V T TD	Errors on sea tape
5533(T/P)	734	Apr.29 - Jan.26	272	T P	
5534	1005	Apr.29 - Jan.26	272	V T	
5535	1505	Apr.29 - Jan.26	272	V T *	Vane stuck after Sept.15 Rotor stuck after Dec. 1
5541	314	Apr.29 - Jan.26	271	V T	
5542	514	Apr.29 - Jan.26	271	V T	
5543(T/P)	718	Apr.29 - Aug.29/75	122	T P	Battery depleted
5544	1013	Apr.29 - Jan.26	271	V T	
5545	1513	Apr.29 - May 25/75	26	V T #	Vane stuck after May 26. Rotor below threshold after Oct. 19
5551	316	Apr.30 - Jan.25	270	V T	
5552	516	Apr.30 - Aug.12/75	104	V T TD	Battery leaked
5553(T/P)	752	Apr.29 - May 20/75	20	V T	Electronic problem
5554	766	Apr.29 - Nov.21/75	206	V T	Battery leaked
5555	1016	Apr.30 - Jan.25	270	V T	
5556	1516	Apr.30 - June 12/75	44	V T #	Corrosion in vane vane stuck after June 13
5557	4016	Apr.30 - Jan.25	270	V T	

All instruments were current meters except where noted (T/P)

V	Velocity component data presented
P	Pressure " "
T	Temperature " "
TD	Instrument also had differential temperature sensors
*	No data is presented for the basic velocity series Time series are shown for all low-passed data.
#	All data is presented for the stated interval. A questionable full-length series is used to show provecs and time series plots.

TABLE 4

DATA RETURN AND QUALITY

RECORDS FROM ISLAND TRAPPED WAVES EXPERIMENT

Record No.	Inst. depth (m)	Data Dates 1977 - 1978	No. of days	Data presented	Comments
6331	792	Nov.16 - Dec.3	382	T P	Rotor did not work
6332	1092	Nov.16 - Dec.3	382	V T	
6333	1392	Nov.16 - Aug.18/77	275	V T	Clock problems
6334	1692	Nov.16 - Dec.3	382	V T	
6341(T/P)	242	Nov.16 - Dec.16	395	T P	
6342	542	Nov.16 - Dec.16	395	V T	
6343	842	Nov.16 - Dec.16	395	V T	
6351(T/P)	224	Nov.17 - Dec.16	394	T P	
6352	524	Nov.17 - Dec.16	394	V T	
6353	824	Nov.17 - Dec.16	394	T	No rotor data on cassette

All instruments were current meters except where noted (T/P)

V Velocity component data presented
P Pressure " "
T Temperature " "

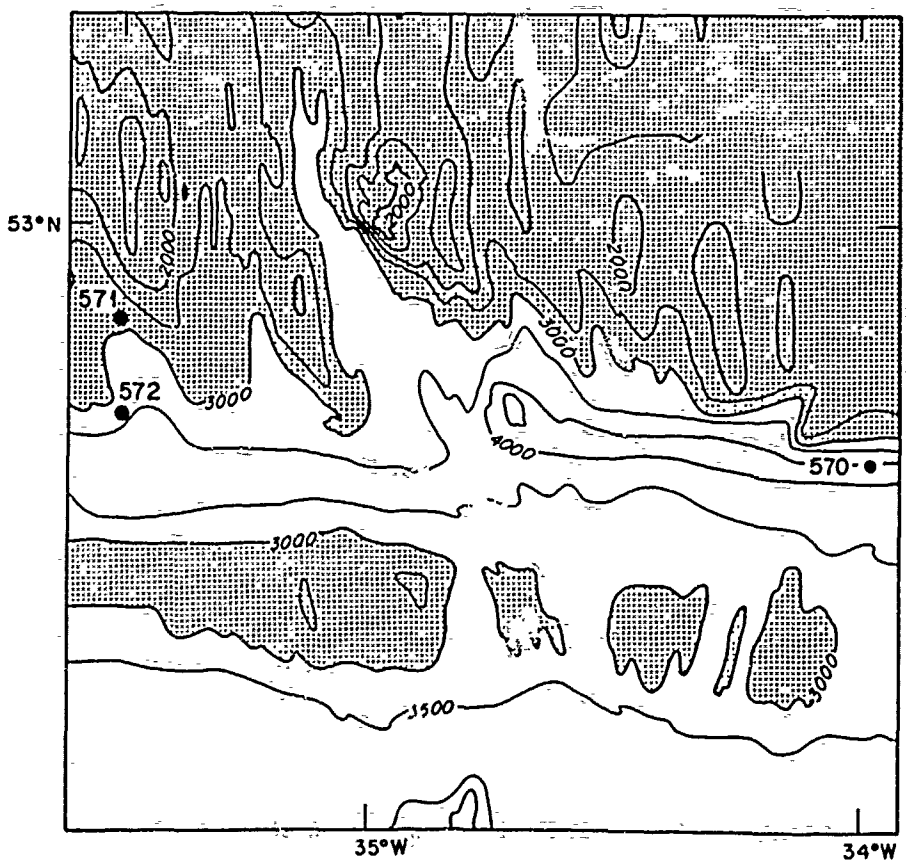


Figure 1

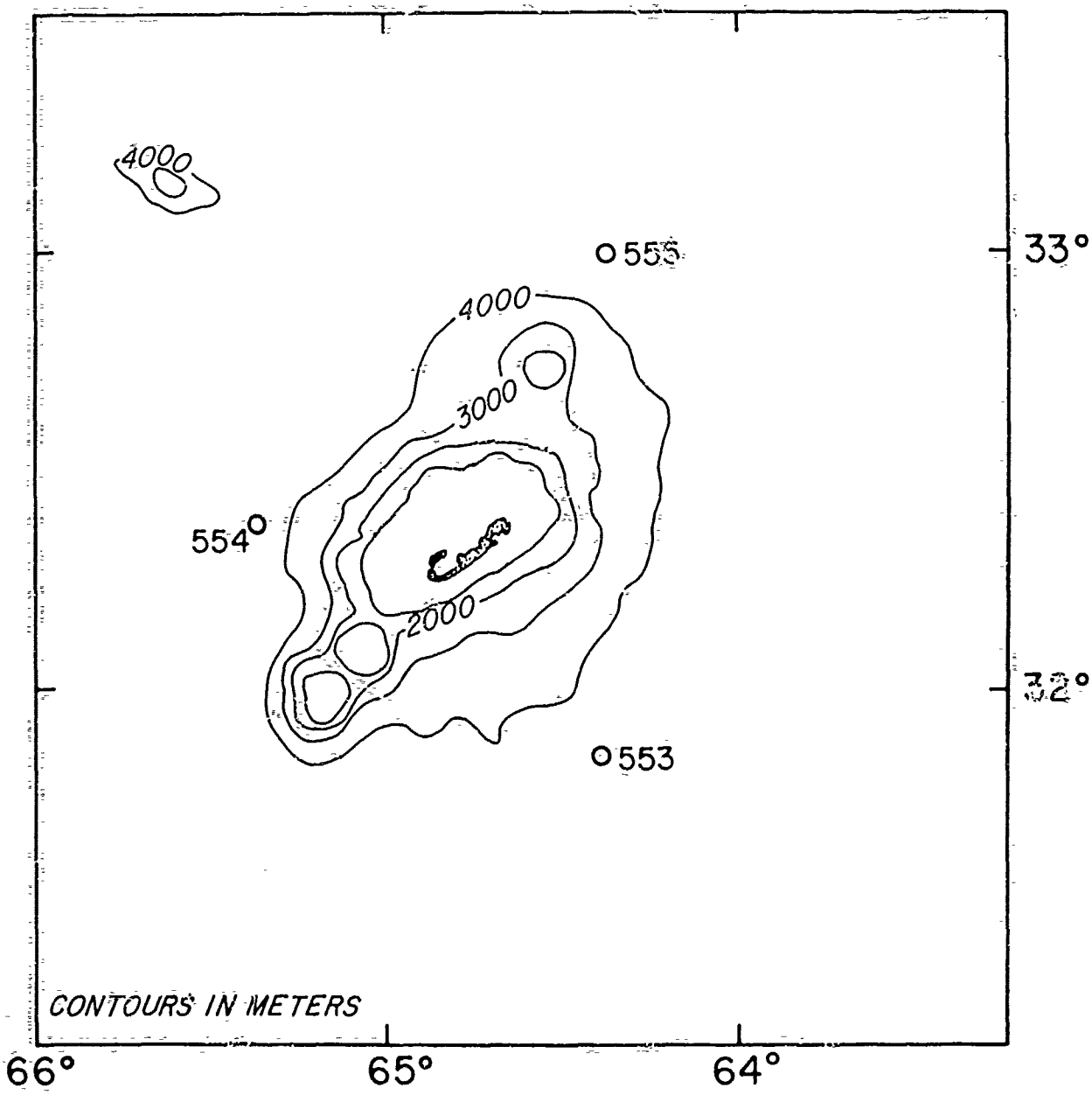

4000
555
33°
4000
3000
554°
2000
553
32°
CONTOURS IN METERS
66°
65°
64°

Figure 2

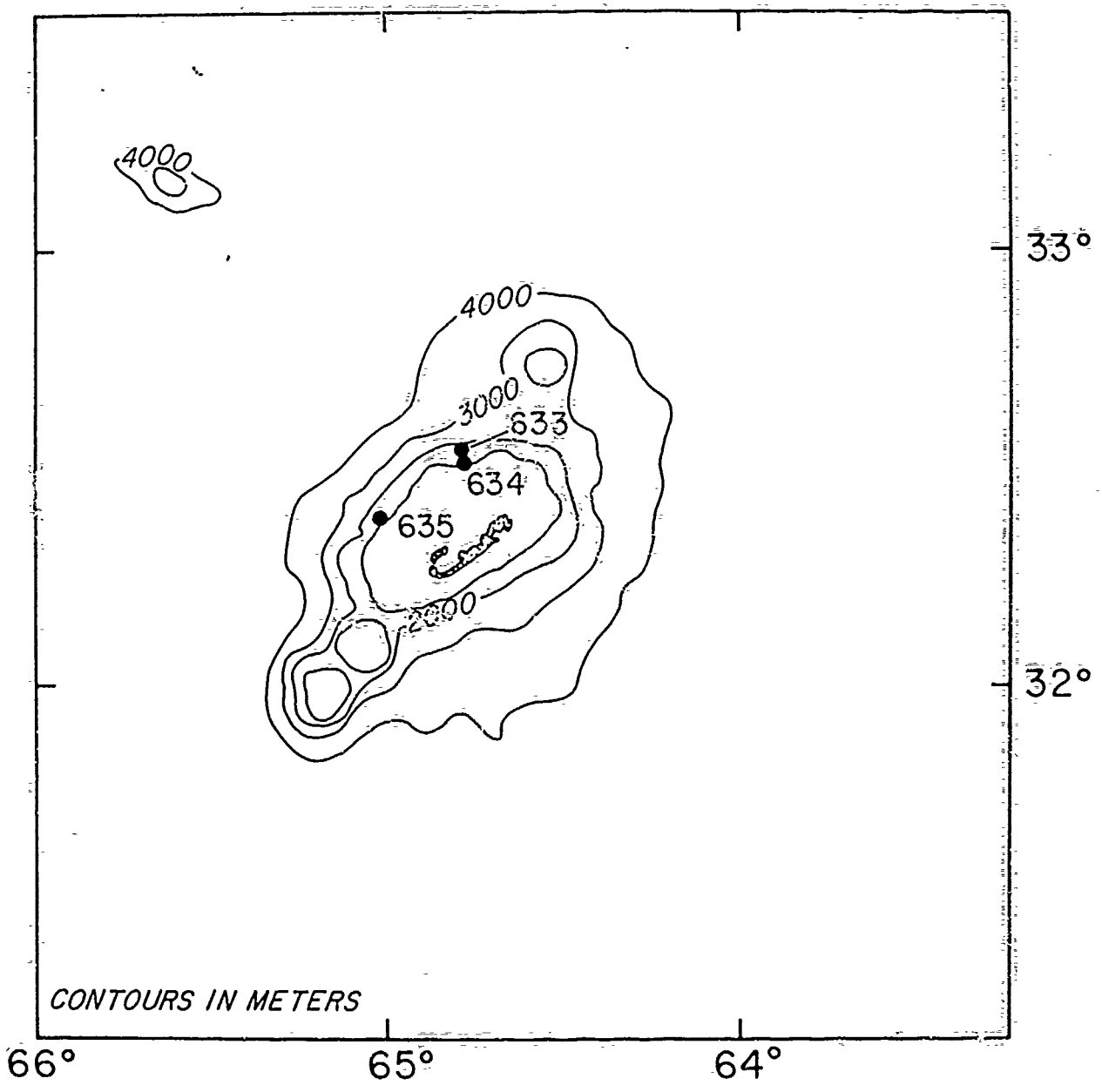
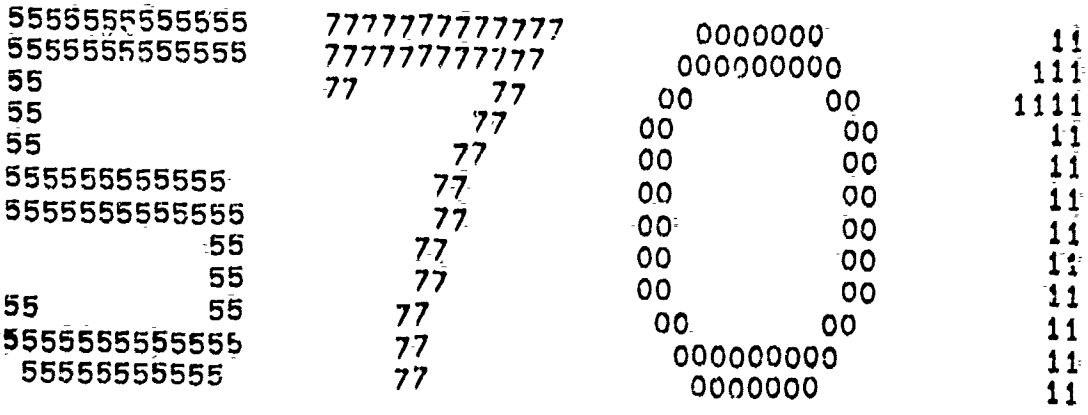
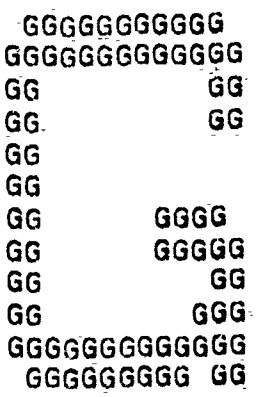
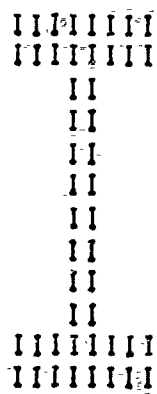
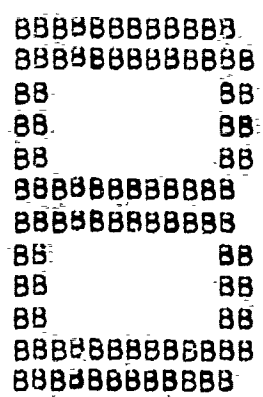

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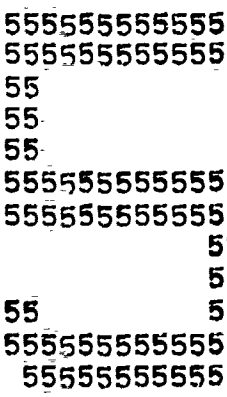
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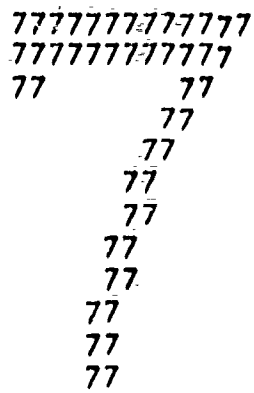

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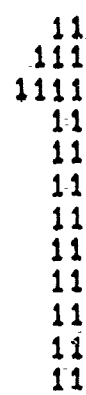


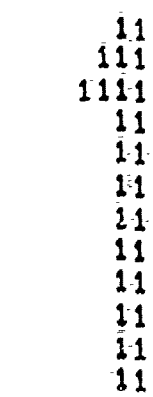


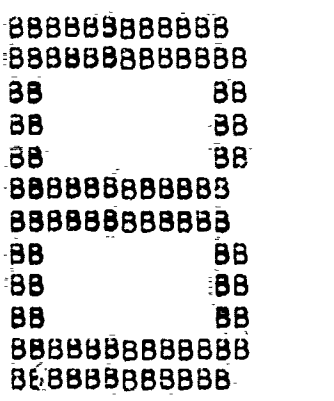


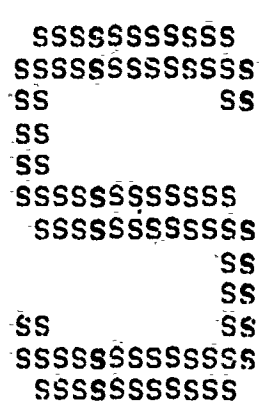


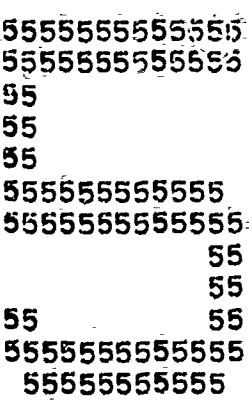


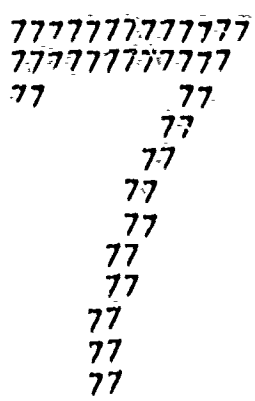




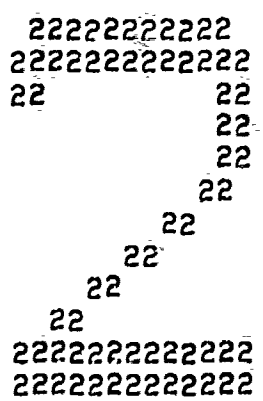


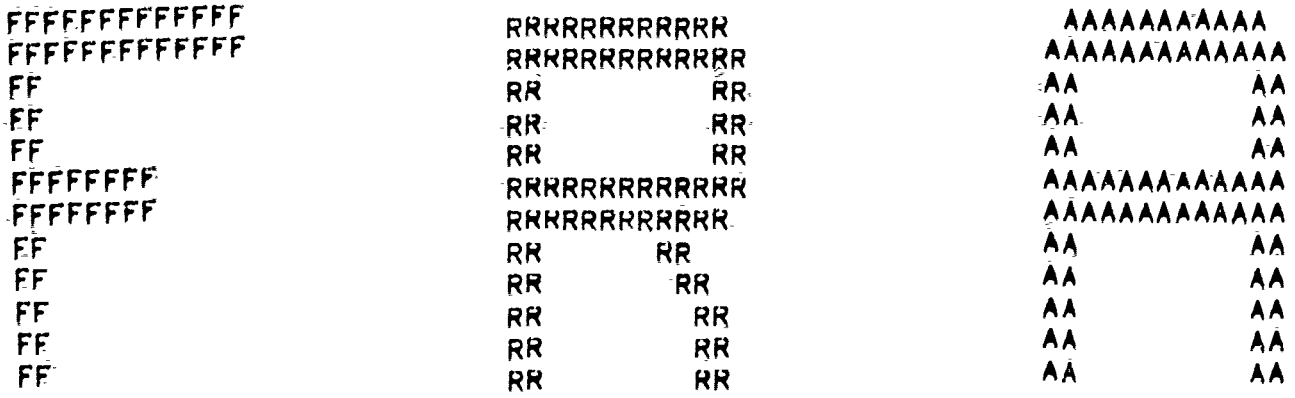


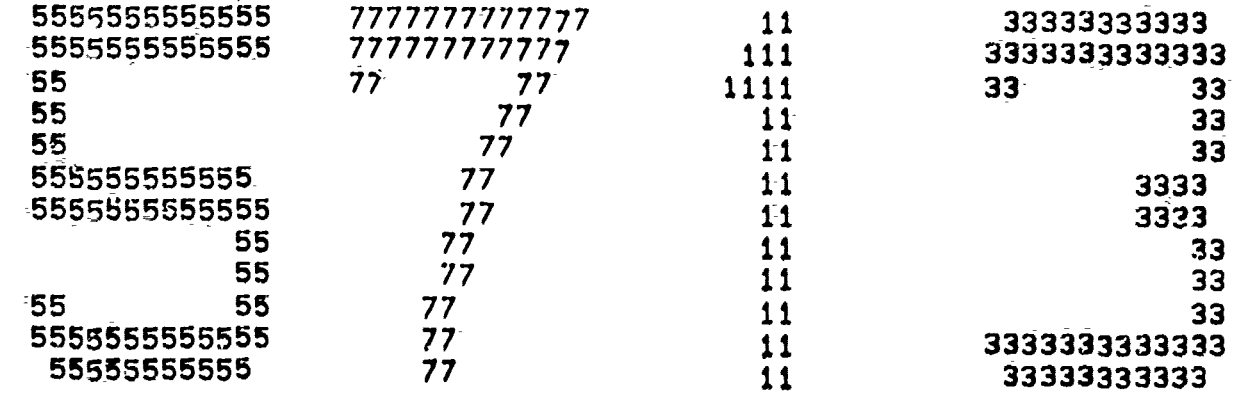


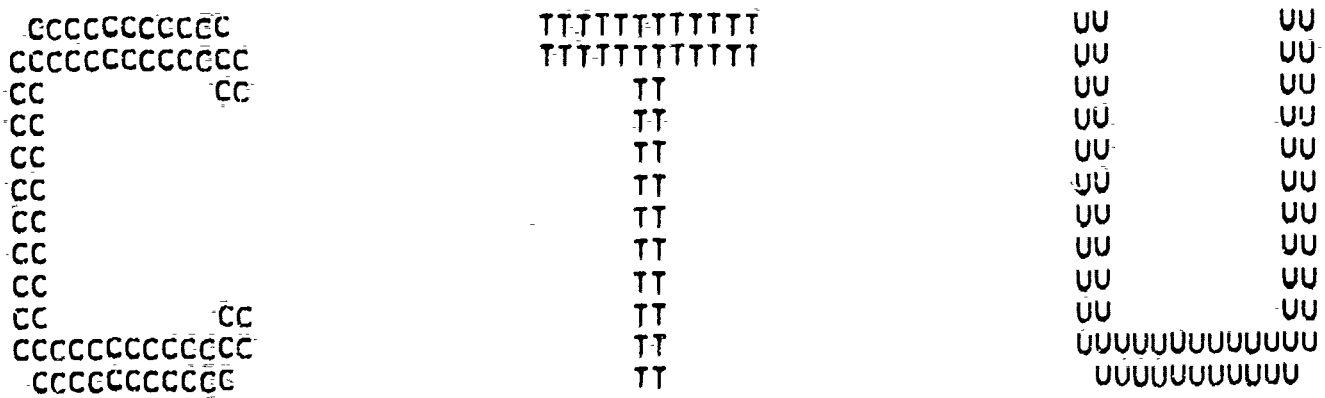


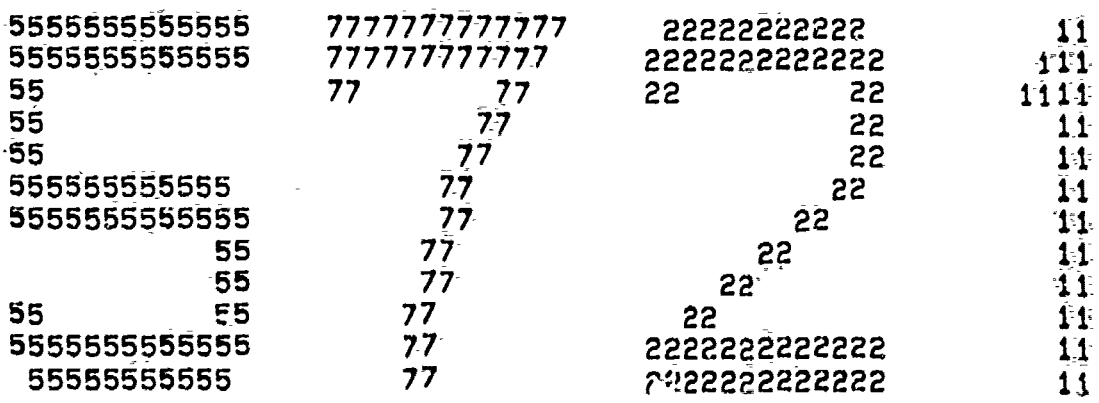


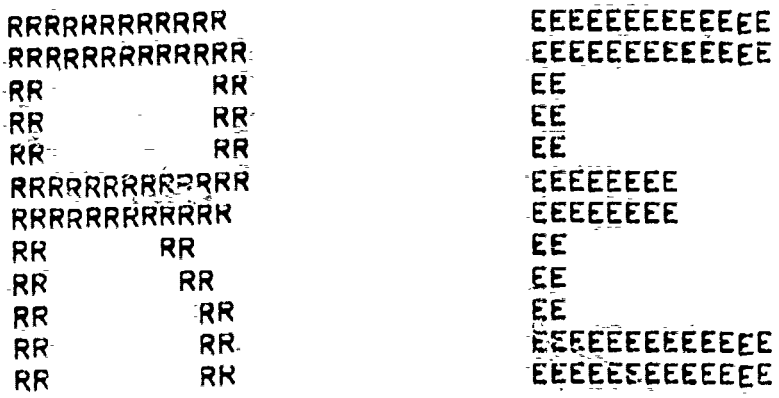


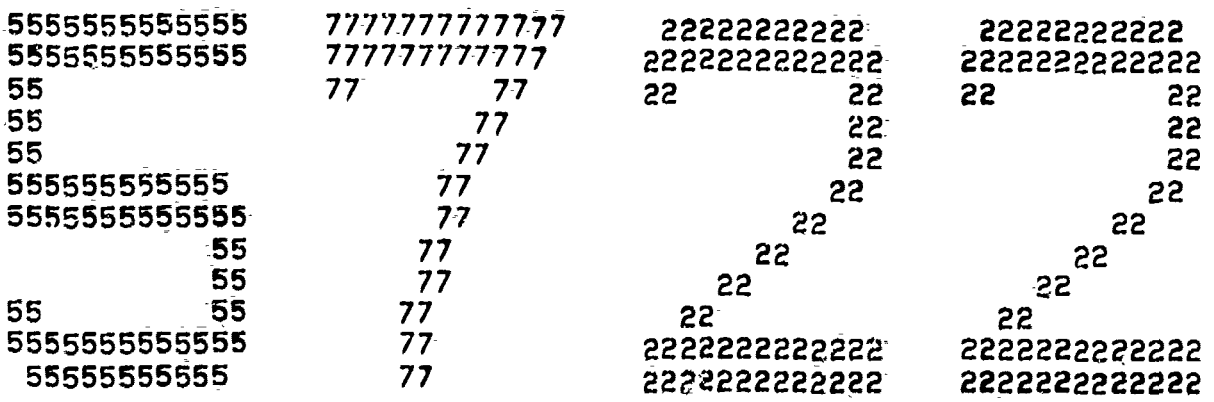

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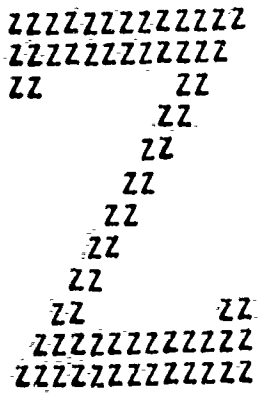

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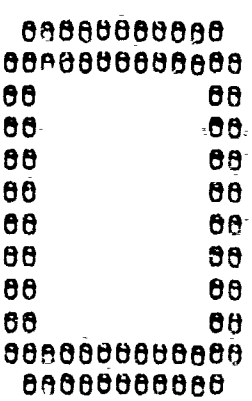

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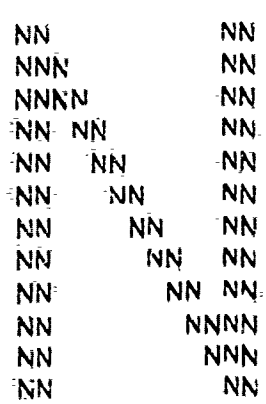

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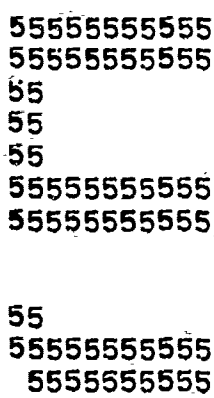

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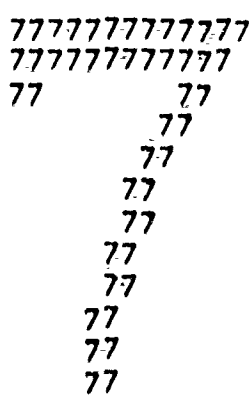

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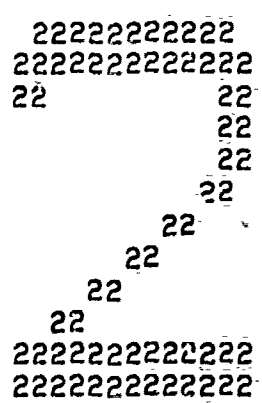


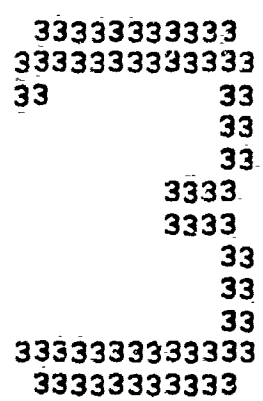












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Table 5

W.H.O.I. Mooring # 570

Charlie-Gibbs Fracture Zone

	Length of item in m.	Mooring Component	Depth in m.	Data Name
1	1	Radio Float	4190	
2	2	1/2" chain		
3	12	12 16" spheres		
4	20	3/16" wire		
5	1.5	VACM	4227	5701
6	13	5/8" Nylon		
7	3	3/8" chain		
8	2	Release	4247	
9	5	1/2" chain		
10	20	5/8" Nylon		
11	3	1/2" chain		
12		Anchor	4288	

Mooring set September 26, 1975

Retrieved June 24, 1976

Days at sea 272

Latitude 52° 42.7'N

Longitude 33° 59.7'W

Table 6

W.H.O.I. Mooring # 571

Charlie-Gibbs Fracture Zone

	Length of item in m.	Mooring Component	Depth in m.	Data Name
1		Radio Float	970	
2	2	1/2" chain		
3	13	13 17" spheres		
4	20	3/16" wire		
5	1.5	VACM	1007	5711
6	1000	3/16" wire		
7	400	3/16" wire		
8	66	3/16" wire		
9	28	5/8" Nylon		
10	8	8 17" spheres		
11	20	3/16" wire		
12	1.5	VACM	2538	5712
13	282	3/16" wire		
14	12	12 17" spheres		
15	1.5	VACM	2835	5713
16	15	5/8" Nylon		
17	3	3/8" chain		
18	2	Release	2857	
19	3	1/2" chain		
20	20	5/8" Nylon		
21	2.5	1/2" chain		
22		Anchors	2895	

Mooring set September 27, 1975

Retrieved June 26, 1976

Days at sea 273

Latitude 52° 53.7'N

Longitude 35° 31.0'W

Table 8

W.H.O.I. Mooring # 553

Bermuda Microstructure Array

	Length of item in m.	Mooring Component	Depth in m.	Data Name
1	1	Radio Float	286	
2	2	1/2" chain		
3	15	3/8" chain, 15 16" spheres		
4	1.5	VACM	306	5531
5	180	3/16" wire		
6	17	3/8" chain		
7	1.5	VACM	506	5532
8	218	3/16" wire		
9	.4	T/P	725	5533
10	258	3/16" wire		
11	18	3/8" chain, 18 16" spheres		
12	1.5	VACM	1005	5534
13	480	3/16" wire		
14	15	3/8" chain, 15 16" spheres		
15	1.5	850 CM	1505	5535
16	3	3/8" chain		
17	2	Release		
18	1193.5	1/4" wire		
19	1000	3/16" wire		
20	400	3/16" wire		
21	177	5/8" Nylon		
22	20	5/8" Nylon		
23	3	1/2" chain		
24		Anchor	4353	

Mooring set April 28, 1975 Latitude 31° 46.9'N

Retrieved January 26, 1976 Longitude 64° 26.2'W

Days at sea 273

Table 9

W.H.O.I. Mooring # 554

Bermuda Microstructure Array

	Length of item in m.	Mooring Component	Depth in m.	Data Name
1		Radio Float	294	
2		Light		
3		Radio		
4	2	1/2" chain		
5	15	3/8" chain, 15 16" spheres		
6	1.5	VACM	314	5541
7	180	3/16" wire		
8	17	3/8" chain, 17 16" spheres		
9	1.5	VACM	514	5542
10	218	3/16" wire		
11	14	T/P	733	5543
12	258	3/16" wire		
13	18	3/8" chain, 18 16" spheres		
14	1.5	VACM	1013	5544
15	480	3/16" wire		
16	15	3/8" chain, 15 16" spheres		
17	1.5	850 CM	1513	5545
18	3	3/8" chain		
19	2	Release		
20	1221	1/4" wire		
21	1000	3/16" wire		
22	780	3/16" wire		
23	180	5/8" Nylon		
24	20	5/8" Nylon		
25	3	1/2" chain		
26		Anchor	4774	

Mooring set April 29, 1975 Latitude 32° 21.5'N

Retrieved January 26, 1976 Longitude 65° 27.0'W

Days at sea 272

Table 11

W.H.O.I. Mooring # 633

Island Trapped Waves Experiment

	Length of item in m.	Mooring Component	Depth in m.	Data Name
1		Radio float Radio Light	565	
2	2	1/2" chain		
3	21	21 17" spheres		
4	20	3/16" wire		
5	1.5	VACM	511	6331
6	297	3/16" wire		
7	1.5	VACM	911	6332
8	297	3/16" wire		
9	1.5	VACM	1211	6333
10	259	3/16" wire		
11	17	17 17" spheres		
12	20	3/16" wire		
13	1.5	VACM	1511	6334
14	3	3/8" chain		
15	2	Release		
16	3	3/8" chain		
17	71	3/16" wire		
18	15	5/8" Nylon		
19	2	1/2" chain		
20		Anchor	1611	

Mooring set November 15, 1977

Retrieved December 7, 1978

Days at sea 388

Latitude 32° 33.8'N

Longitude 64° 44.7'W

Table 12

W.H.O.I. Mooring # 634

Island Trapped Waves Experiment

	Length of item in m.	Mooring Component	Depth in m.	Data Name
1		Radio Float Radio Light	217	
2	2	1/2" chain		
3	28	28 17" spheres		
4	.4	T/P	242	6341
5	295	3/16" wire		
6	1.5	VACM	542	6342
7	263	3/16" wire		
8	13	13 17" spheres		
9	20	3/16" wire		
10	1.5	VACM	842	6343
11	3	3/8" chain		
12	2	Release		
13	3	3/8" chain		
14	71	3/16" wire		
15	15	5/8" Nylon		
16	2	1/2" chain		
17		Anchor	942	

Mooring set November 16, 1977

Retrieved December 16, 1978

Days at sea 395

Latitude 32° 32.2'N

Longitude 64° 44.1'W

** 5701B1H ** 6502 POINTS FROM 75• IX •27 TO 76• VI •24

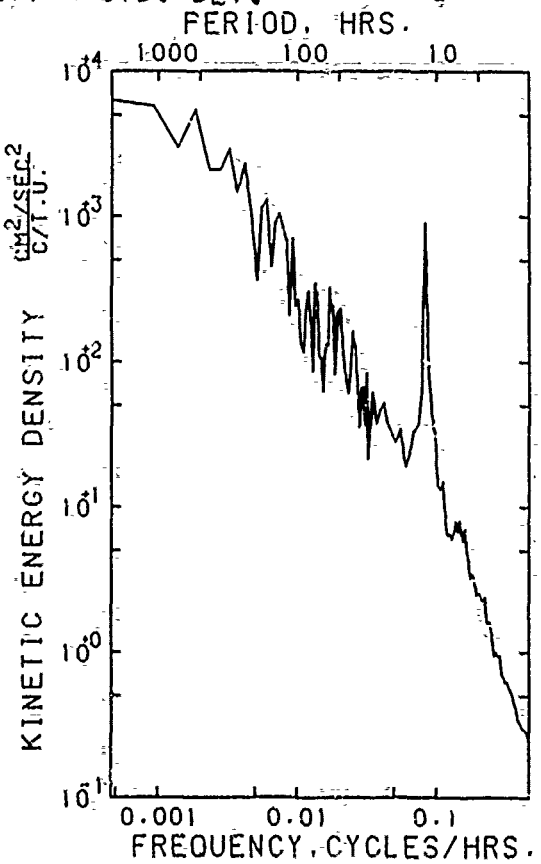
INST• V•0129 DEPTH 4227 M•

VARIABLE *	EAST	NORTH	SPEED	TEMPERATURE1	TEMP. 2
UNITS *	MM/S	MM/S	MM/S	DEGREES C•	DEG. C•
MEAN *	•40•584	•5•962	73•349	2•941	2•952
STD• ERR• *	•908	•302	•589	•714E•3	•711E•3
VARIANCE *	5357•006	594•362	2253•925	•331E•2	•329E•2
STD• DEV• *	73•192	24•380	47•476	•575E•1	•573E•1
KURTOSIS *	2•621	3•545	3•496	3•450	3•431
SKEWNESS *	•.145	•993E•1	1•011	•.896	•.892
MINIMUM *	•278•507	•94•496	2•316	2•782	2•793
MAXIMUM *	183•187	98•115	279•208	3•064	3•074

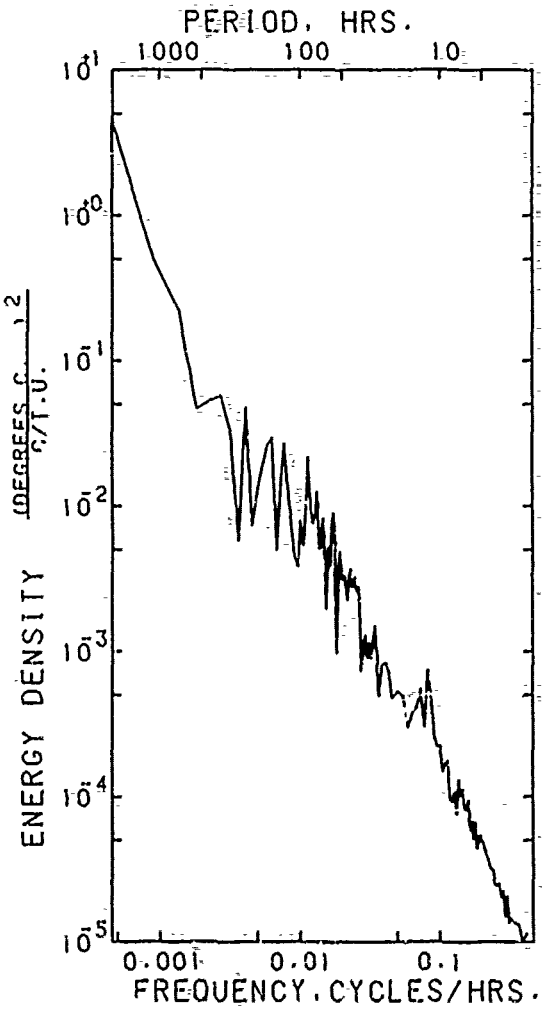
EAST & NORTH

* DURATION 270.88 DAYS

COVARIANCE	*	•75•696
STD• ERR• OF COVARIANCE	*	27•299
STD• DEV• OF COVARIANCE	*	2201•256
CORRELATION COEFFICIENT	*	•.424E•1
VECTOR MEAN	*	41•020
VECTOR VARIANCE	*	2975•684
VECTOR STD• DEV•	*	54•550



AUTO SPECTRUM
5701B1H EAST
5701B1H NORTH
4227 METERS
75-IX-27 TO 76-VI-23
PIECES WITH 3240 ESTIMATES
PER PIECE. AVERAGED OVER
3 ADJACENT FREQUENCY BANDS



AUTO SPECTRUM
5701B1H TEMPERATURE1
4227 METERS
75-IX-27 TO 76-VI-23
1 PIECES WITH 3240 ESTIMATES
PER PIECE. AVERAGED OVER
3 ADJACENT FREQUENCY BANDS

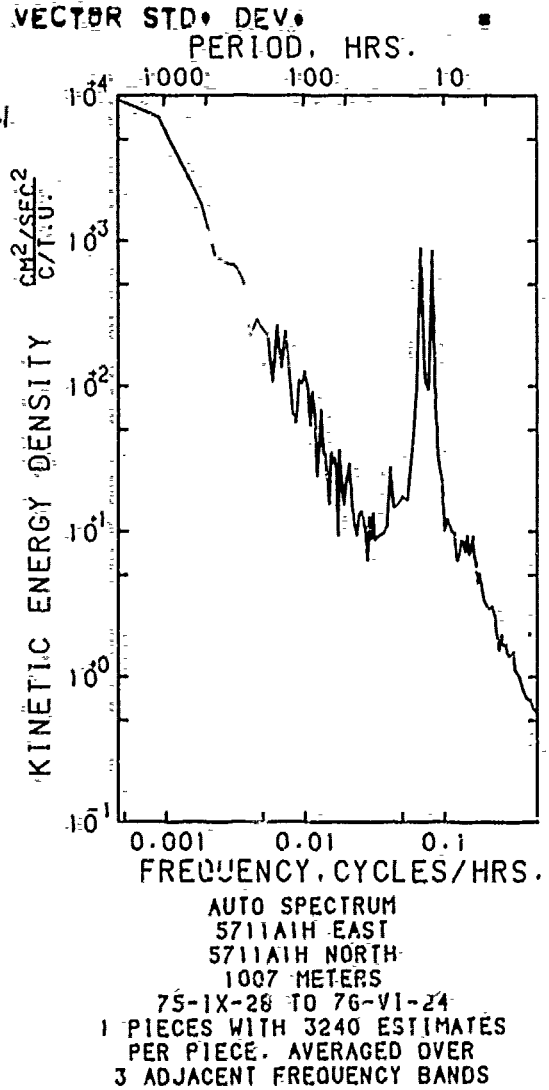
** 5711A1H ** 6524 POINTS FROM 75- IX -28 TO 76- VI -26
INST. V-0138 DEPTH 1007 M.

VARIABLE *	EAST	NORTH	SPEED	TEMPERATURE
UNITS *	MM/S	MM/S	MM/S	DEGREES C.
MEAN *	-16.375	-37.509	73.050	3.774
STD. ERR. *	.637	.625	.486	.989E-3
VARIANCE *	2651.218	2549.869	1539.818	.638E-2
STD. DEV. *	51.490	50.496	39.241	.799E-1
KURTOSIS *	3.166	2.942	3.328	5.260
SKEWNESS *	-.744E-1	-.307	.794	-1.745
MINIMUM *	-206.445	-237.379	.227	3.490
MAXIMUM *	179.167	100.551	245.435	3.916

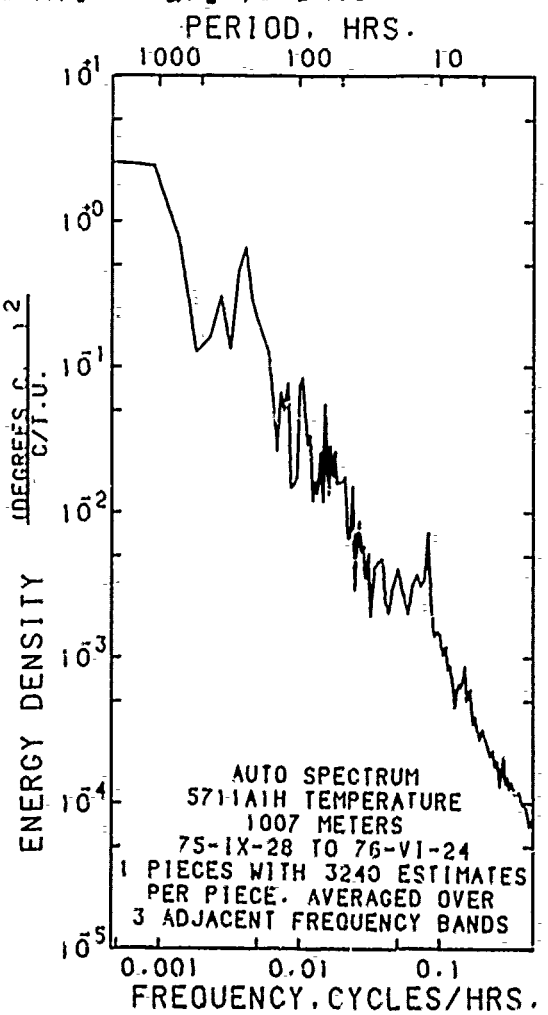
EAST & NORTH

COVARIANCE	*	-385.914
STD. ERR. OF COVARIANCE	*	42.683
STD. DEV. OF COVARIANCE	*	3447.531
CORRELATION COEFFICIENT	*	-.148
VECTOR MEAN	*	40.927
VECTOR VARIANCE	*	2600.543
VECTOR STD. DEV.	*	50.996

* SAMPLE SIZE = 6524 POINTS
*
* SPANNING RANGE
* FROM 75- IX -28 08.15.00
* TO 76- VI -26 03.15.00
*
* DURATION 271.79 DAYS



AUTO SPECTRUM
5711A1H EAST
5711A1H NORTH
1007 METERS
75-IX-28 TO 76-VI-24
1 PIECES WITH 3240 ESTIMATES
PER PIECE. AVERAGED OVER
3 ADJACENT FREQUENCY BANDS



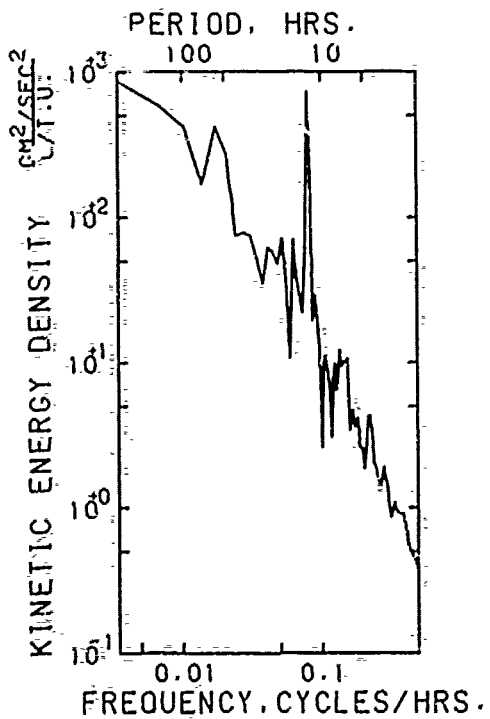
** 571281H ** 881 POINTS FROM 75- IX -28 TO 75- XI -04
INST. V-0119 DEPTH 2537 M.

VARIABLE	EAST	NORTH	SPEED	TEMPERATURE
UNITS	MM/S	MM/S	MM/S	DEGREES C.
MEAN	-23.041	-2.303	55.696	3.110
STD. ERR.	1.296	1.474	.969	.587E-3
VARIANCE	1479.226	1913.620	826.985	.304E-3
STD. DEV.	38.461	43.745	28.757	.174E-1
KURTOSIS	3.944	2.956	3.939	2.806
SKEWNESS	.151	-.641E-1	1.034	-.385E-1
MINIMUM	-149.923	-125.253	7.872	3.058
MAXIMUM	152.155	145.070	163.393	3.151

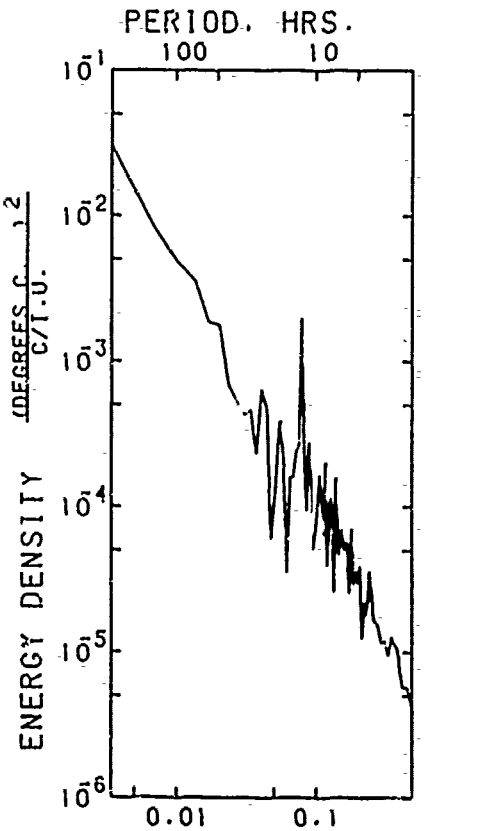
EAST & NORTH

COVARIANCE	-753.837
STD. ERR. OF COVARIANCE	69.214
STD. DEV. OF COVARIANCE	2054.375
CORRELATION COEFFICIENT	-.448
VECTOR MEAN	23.156
VECTOR VARIANCE	1696.423
VECTOR STD. DEV.	41.188

* SAMPLE SIZE = 881 POINTS
*
* SPANNING RANGE
* FROM 75- IX -28 08.15.00
* TO 75- XI -04 00.15.00
*
* DURATION 36.67 DAYS



AUTO SPECTRUM
571281H EAST
571281H NORTH
2537 METERS
75-IX-28 TO 75-XI-03
1 PIECES WITH 432 ESTIMATES
PER PIECE. AVERAGED OVER
3 ADJACENT FREQUENCY BANDS



AUTO SPECTRUM
571281H TEMPERATURE
2537 METERS
75-IX-28 TO 75-XI-03
1 PIECES WITH 432 ESTIMATES
PER PIECE. AVERAGED OVER
3 ADJACENT FREQUENCY BANDS

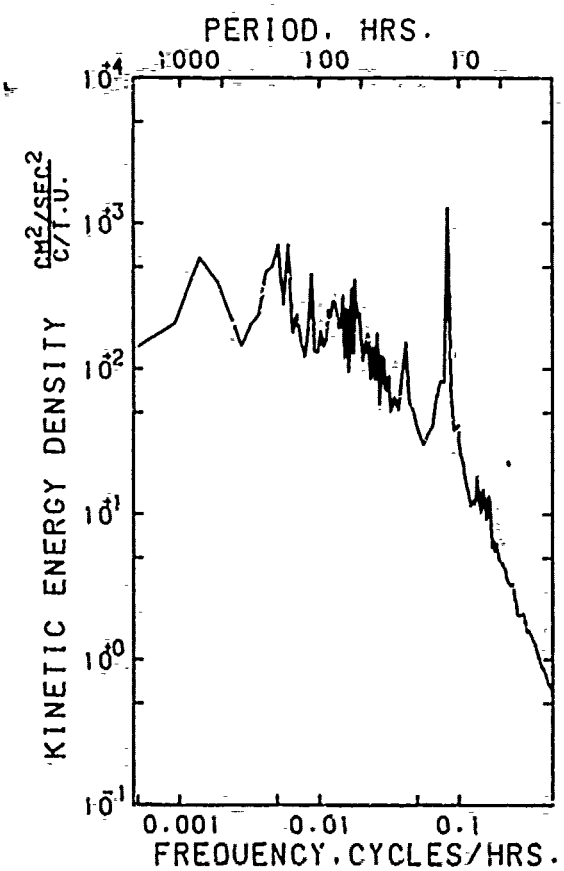
** 5713B1H 6524 POINTS FROM 75• IX •28 TO 76• VI •26
INST• V•0134 DEPTH 2835 M•

VARIABLE	EAST	NORTH	SPEED	TEMPERATURE
UNITS	MM/S	MM/S	MM/S	DEGREES C•
MEAN	•4.075	7.562	52.562	3.040
STD• ERR•	.468	.563	.353	.535E-3
VARIANCE	1430.352	2071.516	812.933	.187E-2
STD• DEV•	37.820	45.514	28.512	.432E-1
KURTOSIS	3.036	3.016	4.708	2.545
SKEWNESS	-.169	.105	1.105	.133
MINIMUM	•147.772	-145.281	.935	2.894
MAXIMUM	127.018	203.119	229.015	3.169

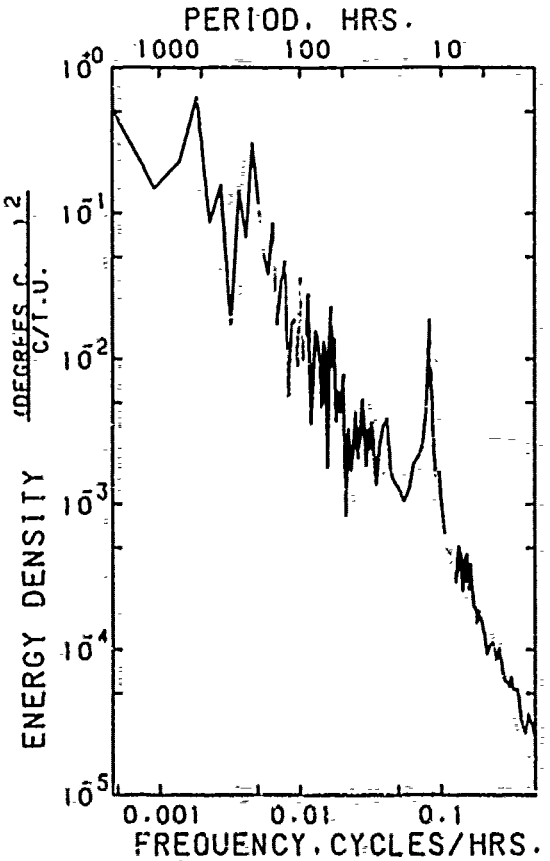
EAST & NORTH

COVARIANCE	•734.709
STD• ERR• OF COVARIANCE	24.724
STD• DEV• OF COVARIANCE	1996.975
CORRELATION COEFFICIENT	-.427
VECTOR MEAN	8.590
VECTOR VARIANCE	1750.934
VECTOR STD• DEV•	41.844

* SAMPLE SIZE = 6524 POINTS
*
* SPANNING RANGE
* FROM 75• IX •28 08.15.00
* TO 76• VI •26 03.15.00
*
* DURATION 271.79 DAYS



AUTO SPECTRUM
5713B1H EAST
5713B1H NORTH
2835 METERS
75-IX-28 TO 76-VI-24
1 PIECES WITH 3240 ESTIMATES
PER PIECE. AVERAGED OVER
3 ADJACENT FREQUENCY BANDS



AUTO SPECTRUM
5713B1H TEMPERATURE
2835 METERS
75-IX-28 TO 76-VI-24
1 PIECES WITH 3240 ESTIMATES
PER PIECE. AVERAGED OVER
3 ADJACENT FREQUENCY BANDS

** 5721A1H ** 6513 POINTS FROM 75- IX -28 TO 76- VI -25
INST. V-0121 DEPTH 998 M.

VARIABLE	EAST	NORTH	SPEED	TEMPERATURE
UNITS	MM/S	MM/S	MM/S	DEGREES C.
MEAN	13.691	-32.670	92.499	3.780
STD. ERR.	.856	.839	.563	.143E-2
VARIANCE	4775.810	4588.248	2062.712	.133E-1
STD. DEV.	69.107	67.737	45.417	.115
KURTOSIS	2.944	2.488	3.383	2.643
SKEWNESS	.303	-.812E-1	.722	-.954
MINIMUM	-179.519	-257.229	5.817	3.447
MAXIMUM	251.435	147.102	288.166	3.981

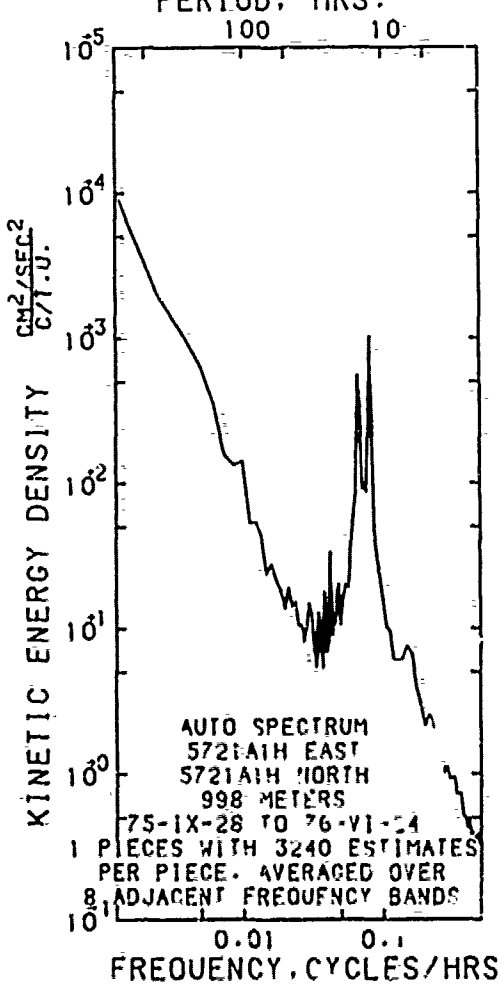
EAST & NORTH

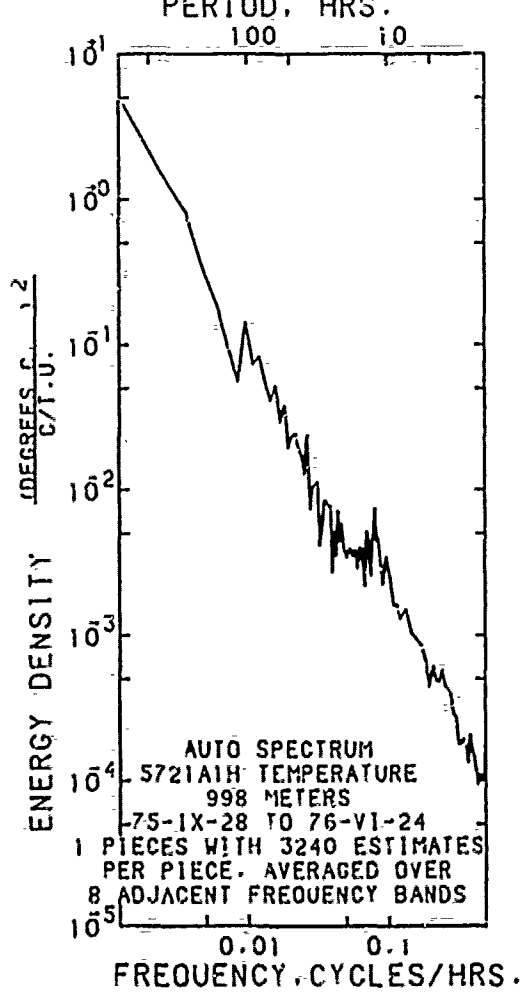
COVARIANCE	-436.177
STD. ERR. OF COVARIANCE	63.617
STD. DEV. OF COVARIANCE	5134.116
CORRELATION COEFFICIENT	-.932E-1
VECTOR MEAN	35.423
VECTOR VARIANCE	4682.029
VECTOR STD. DEV.	68.425

SAMPLE SIZE = 6513 POINTS

SPANNING RANGE
FROM 75- IX -28 12.15.00
TO 76- VI -25 20.15.00

DURATION 271.33 DAYS





** 5722A1H ** 6513 POINTS FROM 75- IX -28 TO 76- VI -25
INST. V=0118 DEPTH 2528 M.

VARIABLE	EAST	NORTH	SPEED	TEMPERATURE
UNITS	MM/S	MM/S	MM/S	DEGREES C.
MEAN	-44.411	-16.346	75.546	3.063
STD. ERR.	.780	.451	.528	.707E-3
VARIANCE	3963.663	1322.965	1818.945	.326E-2
STD. DEV.	62.958	36.373	42.649	.571E-1
KURTOSIS	3.208	3.634	3.151	2.368
SKEWNESS	.180	-.182	.786	.503
MINIMUM	-251.479	-163.498	2.252	2.931
MAXIMUM	209.870	114.455	256.312	3.210

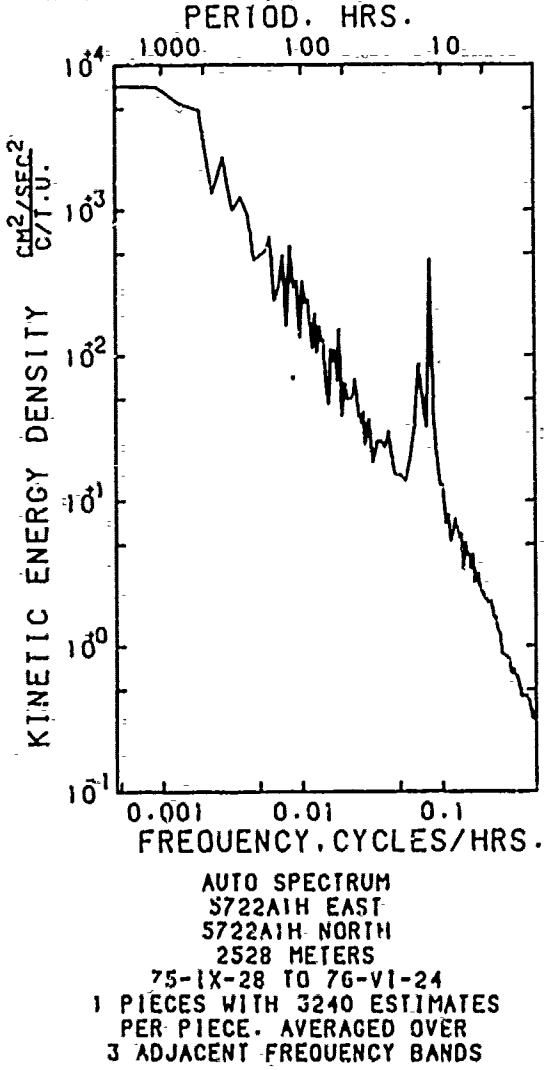
EAST & NORTH

COVARIANCE	14.769
STD. ERR. OF COVARIANCE	39.422
STD. DEV. OF COVARIANCE	3181.442
CORRELATION COEFFICIENT	.645E-2
VECTOR MEAN	47.323
VECTOR VARIANCE	2643.314
VECTOR STD. DEV.	51.413

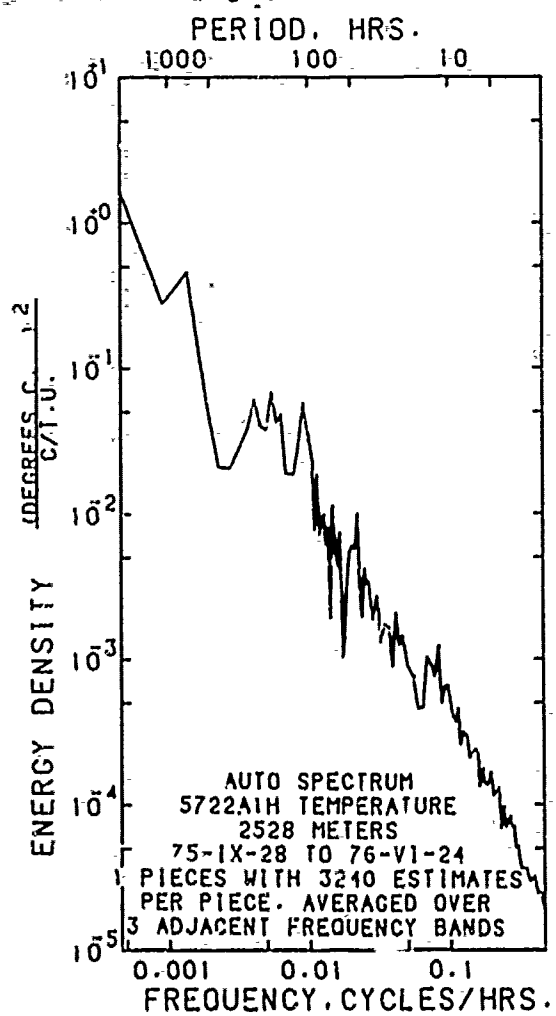
SAMPLE SIZE = 6513 POINTS

SPANNING RANGE
FROM 75- IX -28 12.15.00
TO 76- VI -25 20.15.00

DURATION 271.33 DAYS



AUTO SPECTRUM
5722A1H EAST
5722A1H NORTH
2528 METERS
75-IX-28 TO 76-VI-24
1 PIECES WITH 3240 ESTIMATES
PER PIECE. AVERAGED OVER
3 ADJACENT FREQUENCY BANDS



**** 5723A1H ** 6513 POINTS FROM 75- IX -28 TO 76- VI -25
INST. V-0165 DEPTH 3060 M.

VARIABLE	EAST	NORTH	SPEED	TEMPERATURE
UNITS	MM/S	MM/S	MM/S	DEGREES C.
MEAN	-38.224	-9.954	75.939	2.970
STD. ERR.	.875	.402	.530	.593E-3
VARIANCE	4986.988	1050.807	1831.284	.229E-2
STD. DEV.	70.619	32.416	42.793	.479E-1
KURTOSIS	2.887	3.310	3.937	2.984
SKEWNESS	.883E-1	-.436E-1	1.033	-.525
MINIMUM	-269.454	-122.792	1.992	2.814
MAXIMUM	192.233	123.886	274.712	3.086

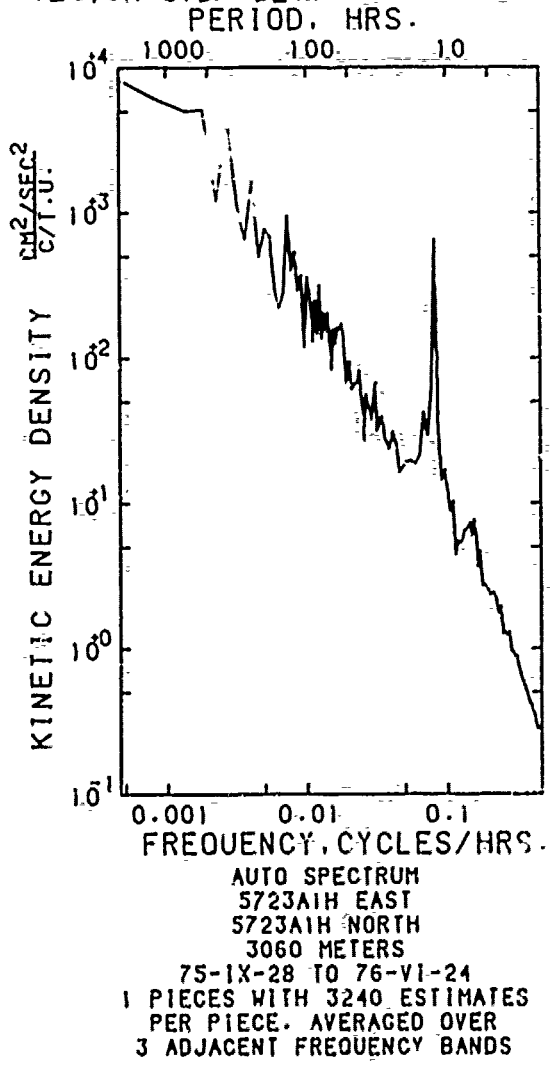
**** EAST & NORTH ****

COVARIANCE	476.658
STD. ERR. OF COVARIANCE	34.720
STD. DEV. OF COVARIANCE	2802.004
CORRELATION COEFFICIENT	.208
VECTOR MEAN	39.499
VECTOR VARIANCE	3018.897
VECTOR STD. DEV.	54.944

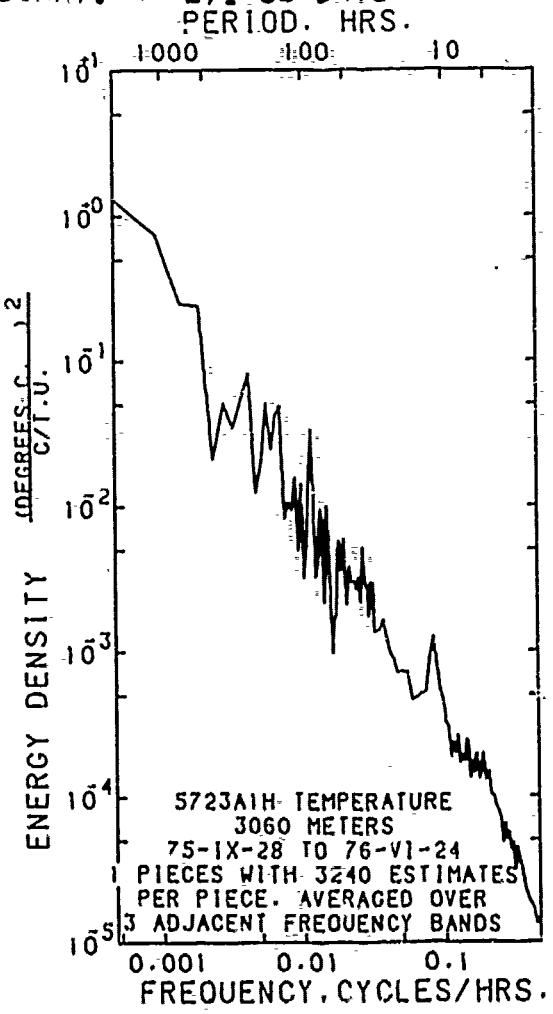
**** SAMPLE SIZE = 6513 POINTS

SPANNING RANGE
FROM 75- IX -28 12.15.00
TO 76- VI -25 20.15.00

DURATION 271.33 DAYS



AUTO SPECTRUM
5723A1H EAST
5723A1H NORTH
3060 METERS
75-IX-28 TO 76-VI-24
1 PIECES WITH 3240 ESTIMATES
PER PIECE. AVERAGED OVER
3 ADJACENT FREQUENCY BANDS



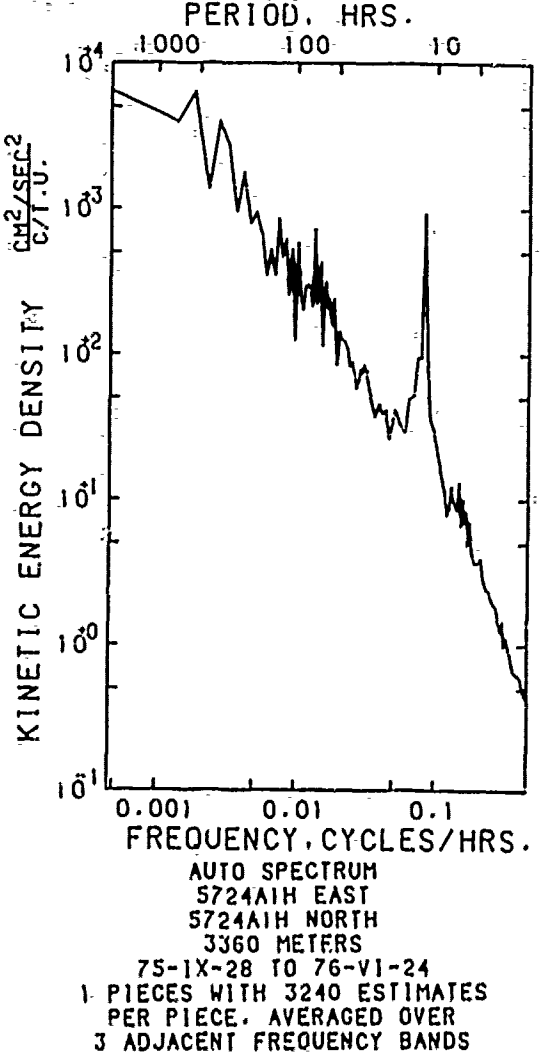
**** 5724A1H ** 6513 POINTS FROM 75- IX -28 TO 76- VI -25**
INST. V-0161 DEPTH 3360 M.

VARIABLE	EAST	NORTH	SPEED	TEMPERATURE
UNITS	MM/S	MM/S	MM/S	DEGREES C.
MEAN	-31.957	-20.992	76.187	2.904
STD. ERR.	.825	.548	.561	.111E-2
VARIANCE	4434.251	1955.429	2047.116	.807E-2
STD. DEV.	66.590	44.220	45.245	.899E-1
KURTOSIS	3.360	4.452	3.873	2.426
SKEWNESS	-.507E-2	-.764	1.030	-.631
MINIMUM	-266.978	-250.028	1.113	2.634
MAXIMUM	185.841	93.151	285.211	3.040

EAST & NORTH

COVARIANCE	600.467
STD. ERR. OF COVARIANCE	43.489
STD. DEV. OF COVARIANCE	3509.719
CORRELATION COEFFICIENT	.204
VECTOR MEAN	38.235
VECTOR VARIANCE	3194.840
VECTOR STD. DEV.	56.523

* SAMPLE SIZE = 6513 POINTS
*
* SPANNING RANGE
* FROM 75- IX -28 12.15.00
* TO 76- VI -25 20.15.00
*
* DURATION 271.33 DAYS



AUTO SPECTRUM
5724A1H EAST
5724A1H NORTH
3360 METERS
75-1X-28 TO 76-V1-24
1 PIECES WITH 3240 ESTIMATES
PER PIECE. AVERAGED OVER
3 ADJACENT FREQUENCY BANDS

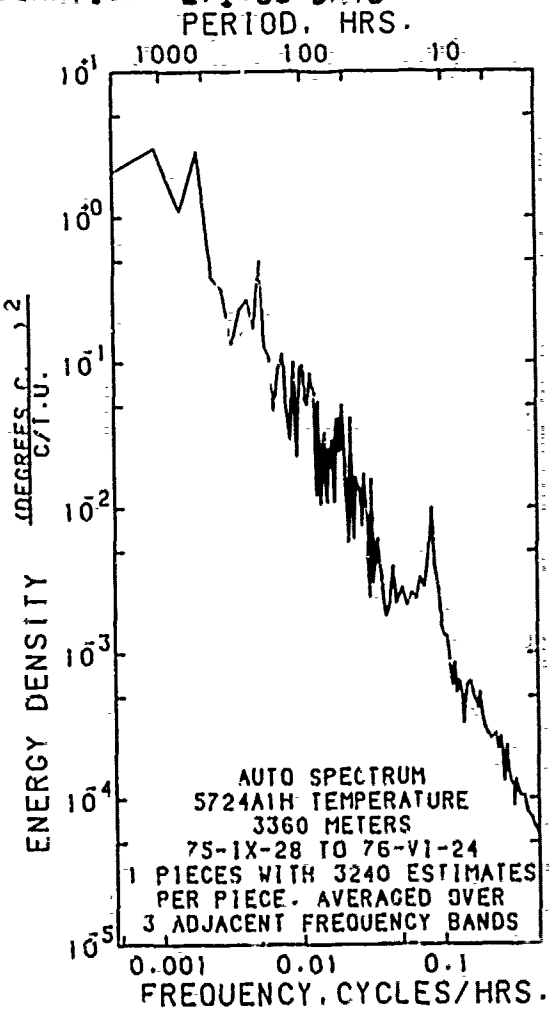


Table 7

W.H.O.I. Mooring # 572

Charlie-Gibbs Fracture Zone

	Length of item in m.	Mooring Component	Depth in m.	Data Name
1		Radio Float	956	
2	2	1/2" chain		
3	16	16 16" spheres		
4	20	3/16" wire		
5	1.5	VACM	997	5721
6	1000	3/16" wire		
7		Milliman sample		
8		Milliman sample		
9		Milliman sample		
10	400	3/16" wire		
11		Milliman sample		
12	79	3/16" wire		
13	13.5	5/8" Nylon		
14	11	11 16" spheres		
15	20	3/16" wire		
16	1.5	VACM	2528	5722
17	500	3/16" wire		
18		Milliman sample		
19	8	8 16" spheres		
20	20	3/16" wire		
21	1.5	VACM	3060	5723
22	269	3/16" wire		
23	17	17 16" spheres		
24	10	3/16" wire		
25	1.5	VACM	3359	5724
26	13	5/8" Nylon		
27		Milliman sample		
28	5	3/8" chain		
29	2	Release		
30	3	1/2" chain		
31	20	5/8" Nylon		
32	2.5	1/2" chain		
33		Anchors	3398	

Mooring Set September 27, 1975

Retrieved June 25, 1976

Days at sea 273

Latitude 52° 46.1'N

Longitude 35° 30.0'W

CURRENT ROSES FOR NEAR BOTTOM INSTRUMENTS

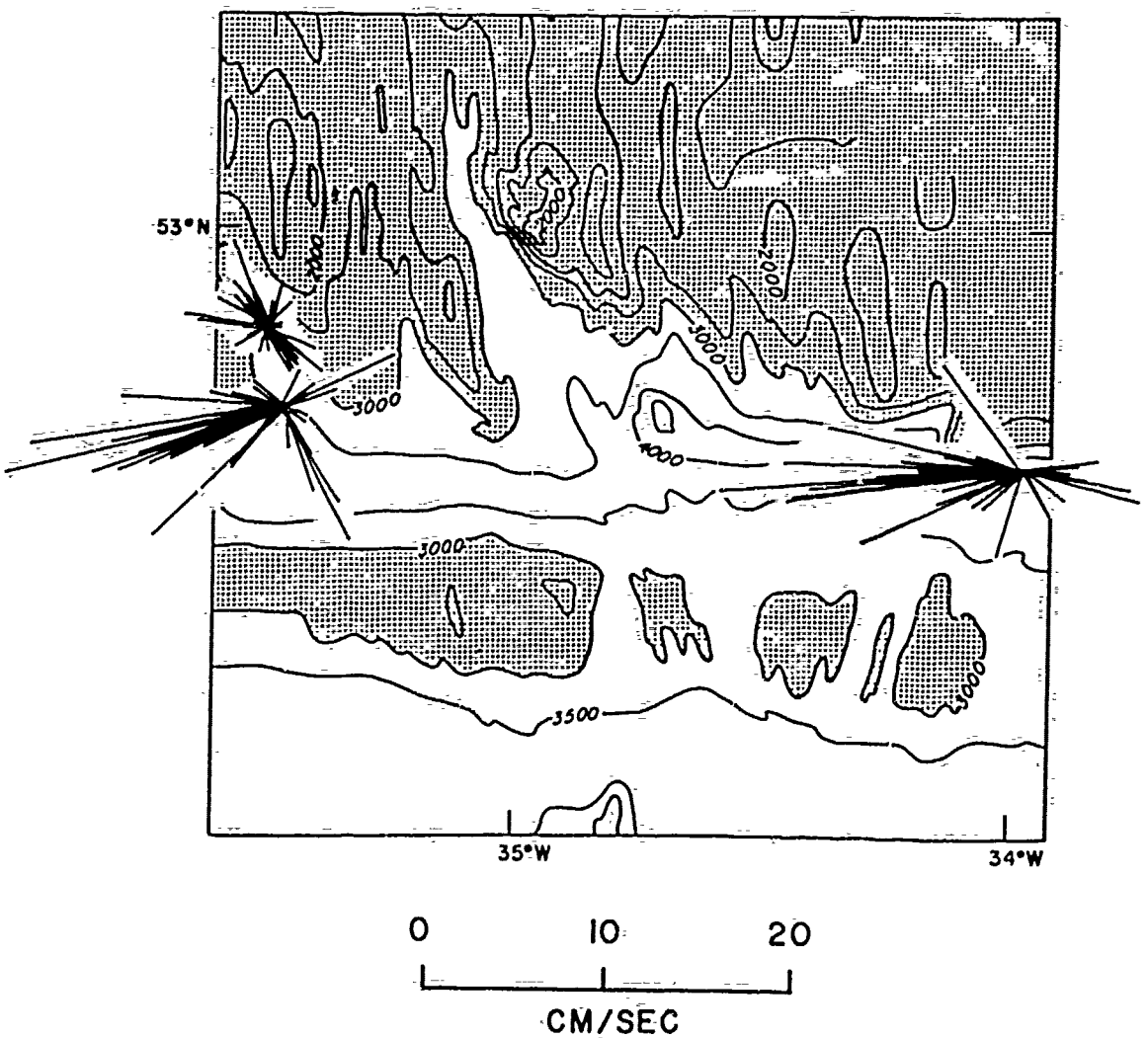


Figure 4

Table 10

W.H.O.I. Mooring # 555

Bermuda Microstructure Array

	Length of item in m.	Mooring Component	Depth in m.	Data Name
1		Teardrop Float	297	
2		Radio		
3		Light		
4	2	3/8" chain		
5	15	3/8" chain, 15 16" spheres		
6	1.5	VACM	316	5551
7	182	Wire		
8	15	3/8" chain, 15 16" spheres		
9	1.5	VACM	516	5552
10	218	3/16" wire		
11	.4	T/P	736	5553
12	28	3/16" wire		
13	1.5	VACM	766	5554
14	237	3/16" wire		
15	10	3/18" chain, 10 16" spheres		
16	1.5	VACM	1016	5555
17	480	3/16" wire		
18	15	3/8" chain, 15 16" spheres		
19	1.5	850 CM	1516	5556
20	1000	3/16" wire		
21	1000	3/16" wire		
22	478	3/16" wire		
23	5	3/8" chain, 5 16" spheres		
24	1.5	850 CM	4016	5557
25	200	3/16" wire		
26	20	3/16" wire		
27	50	3/16" wire		
28	100	3/16" wire		
29	76	5/8" Nylon		
30	15	3/8" chain, 15 16" spheres		
31	2	Release		
32	5	1/2" chain		
33	20	5/8" Nylon		
34	3	1/2" chain		
35		Anchor	4527	

Mooring Set April 29, 1975 Latitude 32° 59'N

Retrieved January 25, 1976 Longitude 64° 23.8'W

Days at sea 271

CURRENT ROSES AT A NOMINAL DEPTH OF 1500 M

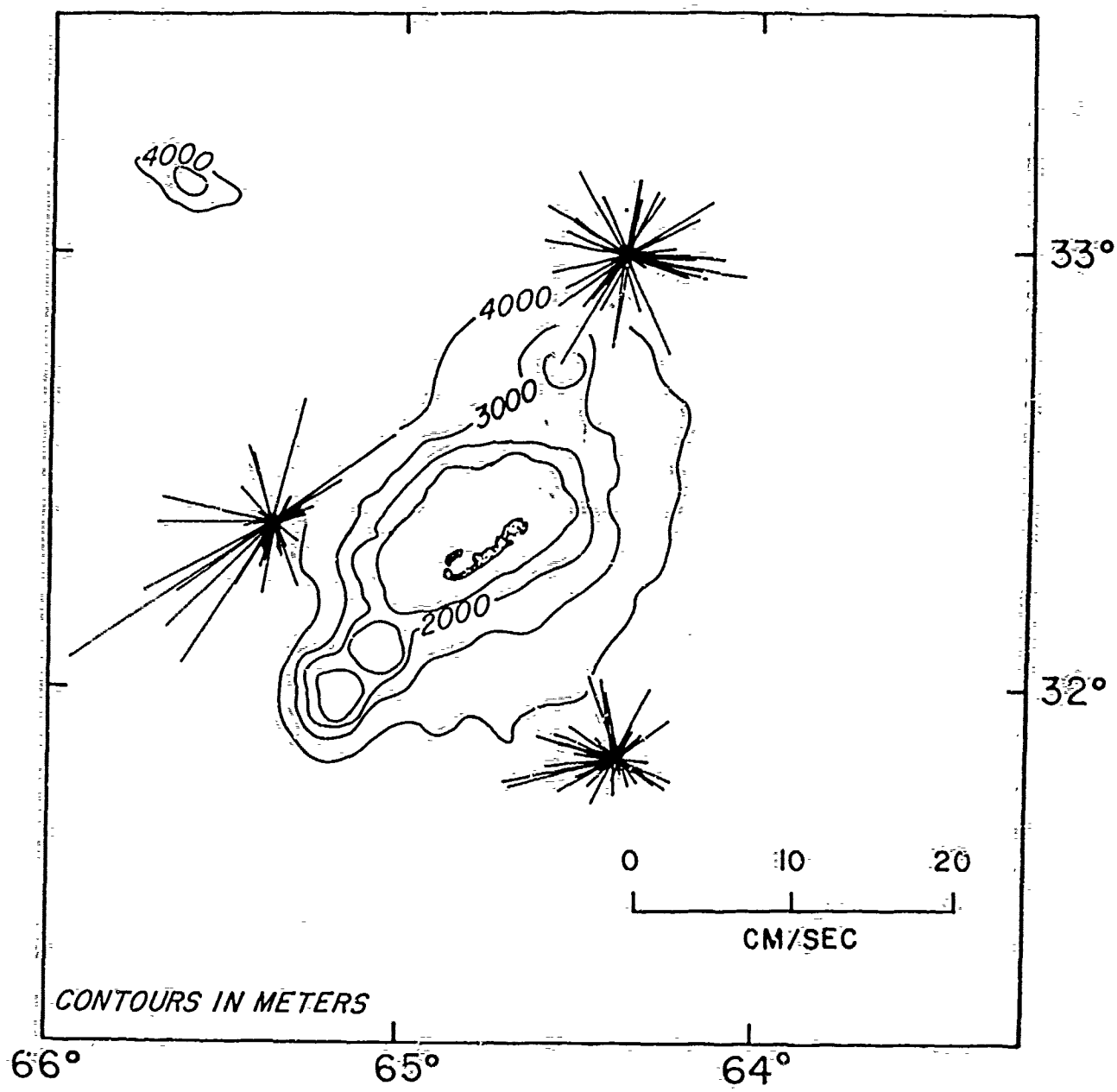


Figure 5

Table 13

W.H.O.I. Mooring # 635

Island Trapped Waves Experiment

	Length of Item in m.	Mooring Component	Depth in m.	Data Name
1		Radio Float Radio Light	199	
2	2	1/2" chain		
3	28	28 17" spheres		
4	.4	T/P	224	6351
5	295	3/16" wire		
6	1.5	VACM	524	6352
7	263	3/16" wire		
8	13	13 17" spheres		
9	20	3/16" wire		
10	1.5	VACM	824	6353
11	3	3/8" chain		
12	2	Release		
13	3	3/8" chain		
14	71	3/16" wire		
15	15	5/8" Nylon		
16	2	1/2" chain		
17		Anchors	924	

Mooring set November 17, 1977

Retrieved December 17, 1978

Days at sea 395

Latitude 32° 22.4'N

Longitude 65° 00.9'W

CURRENT ROSES AT A NOMINAL DEPTH OF 500 M

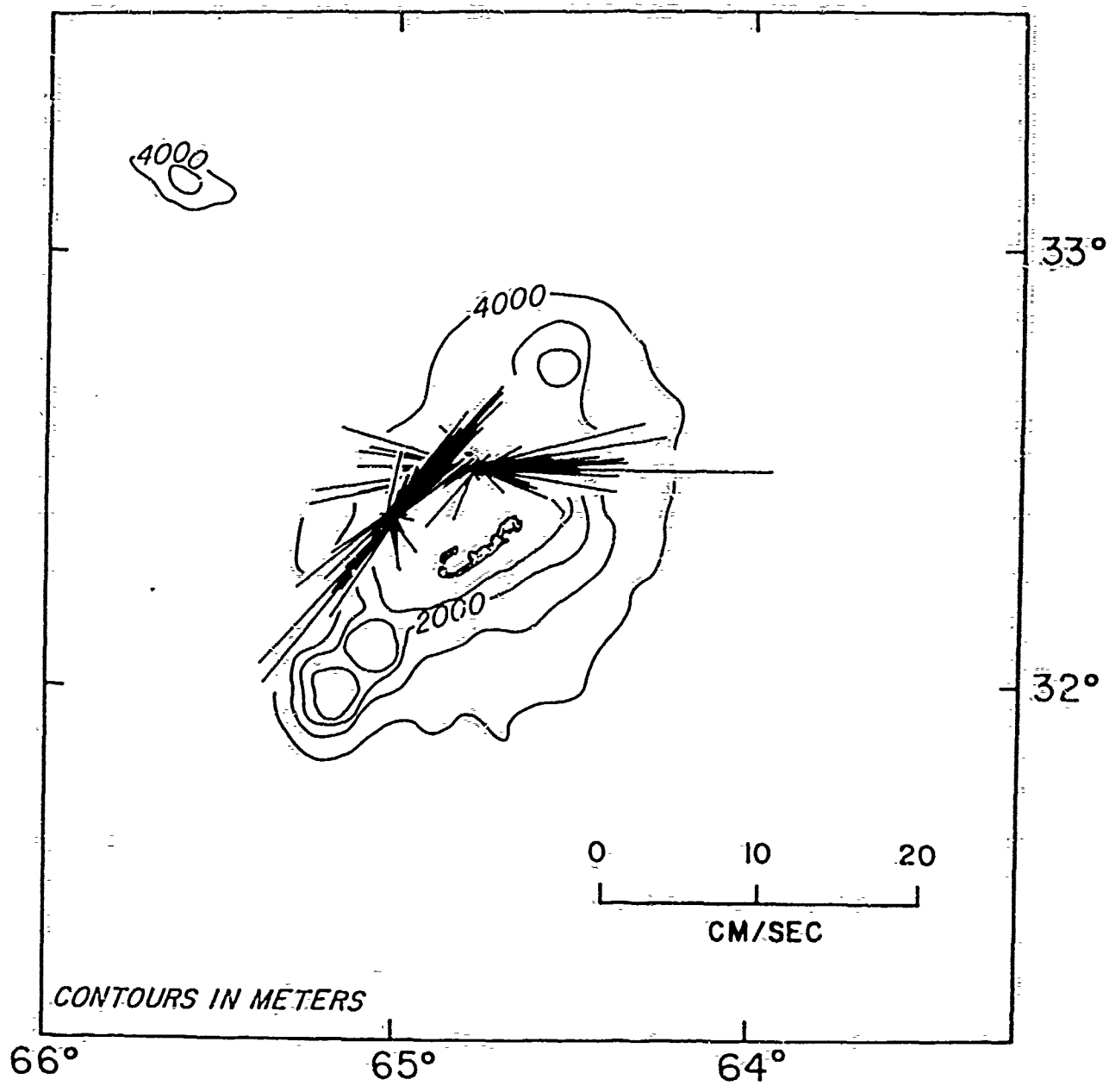
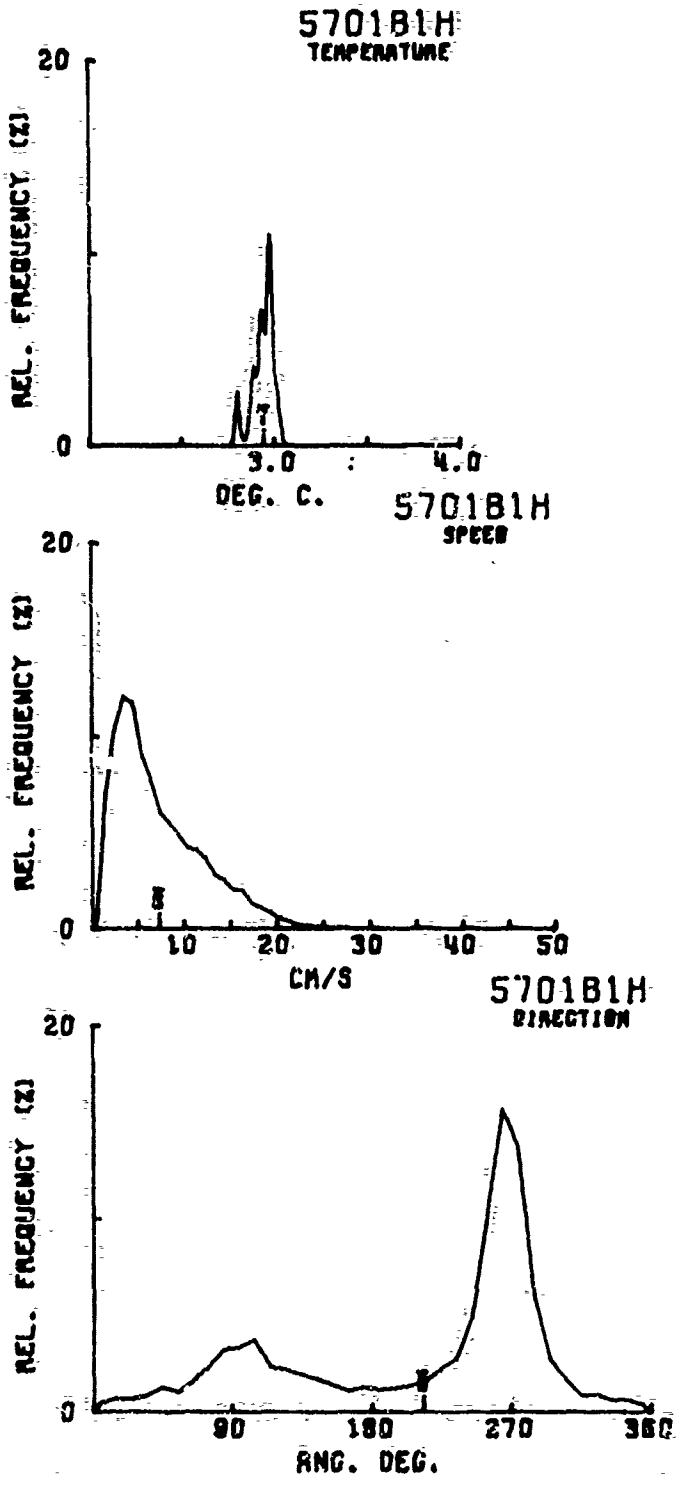
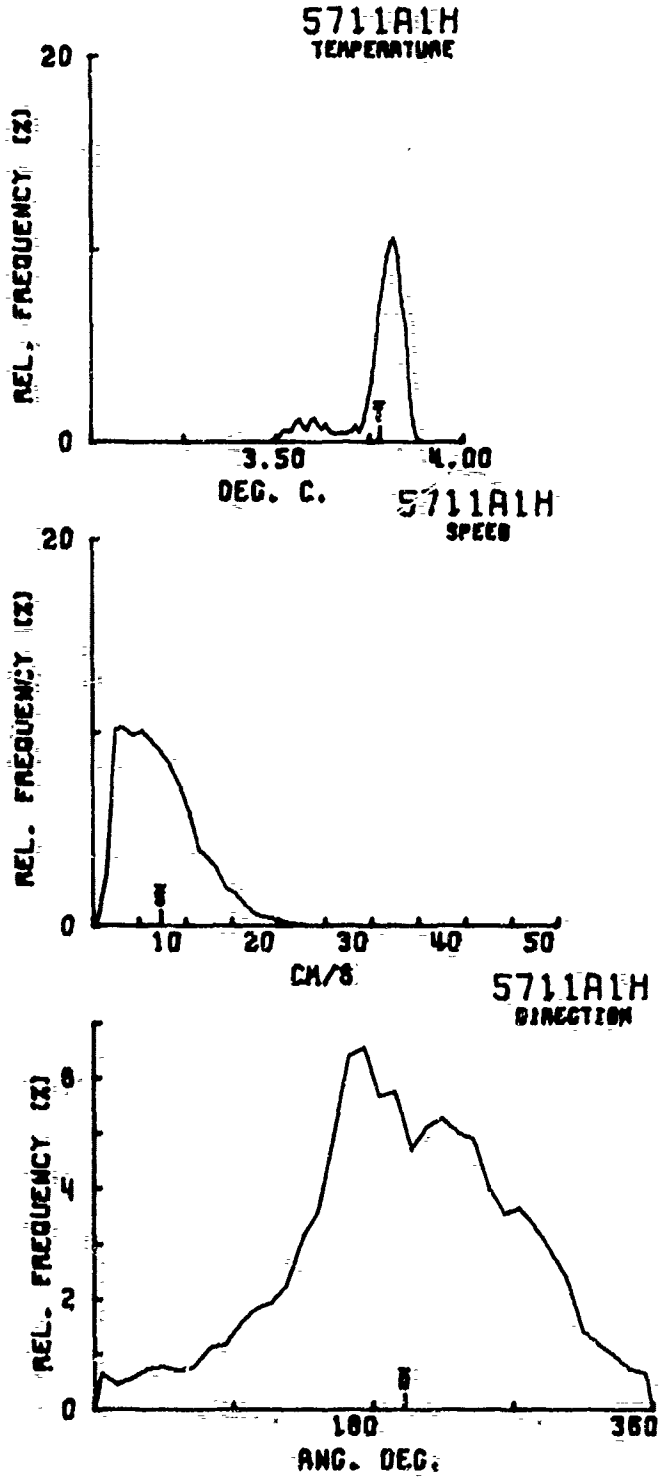
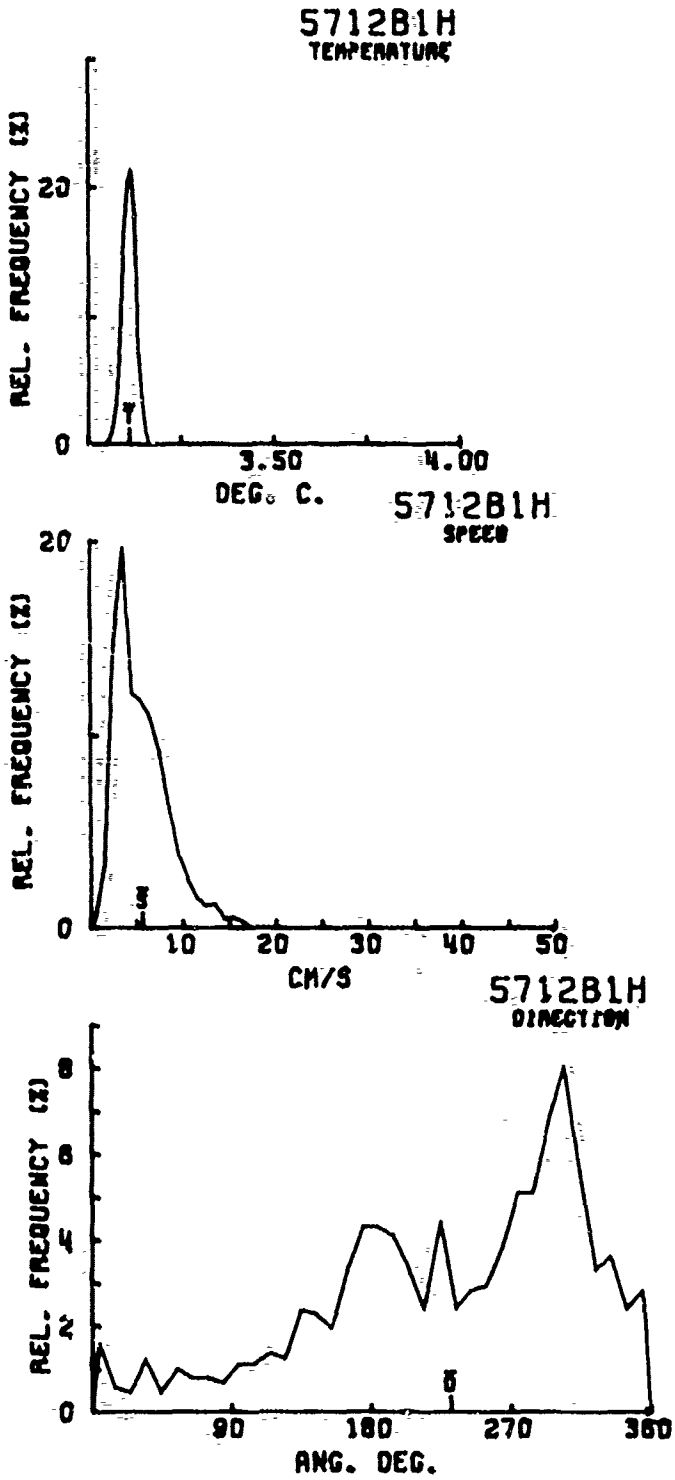
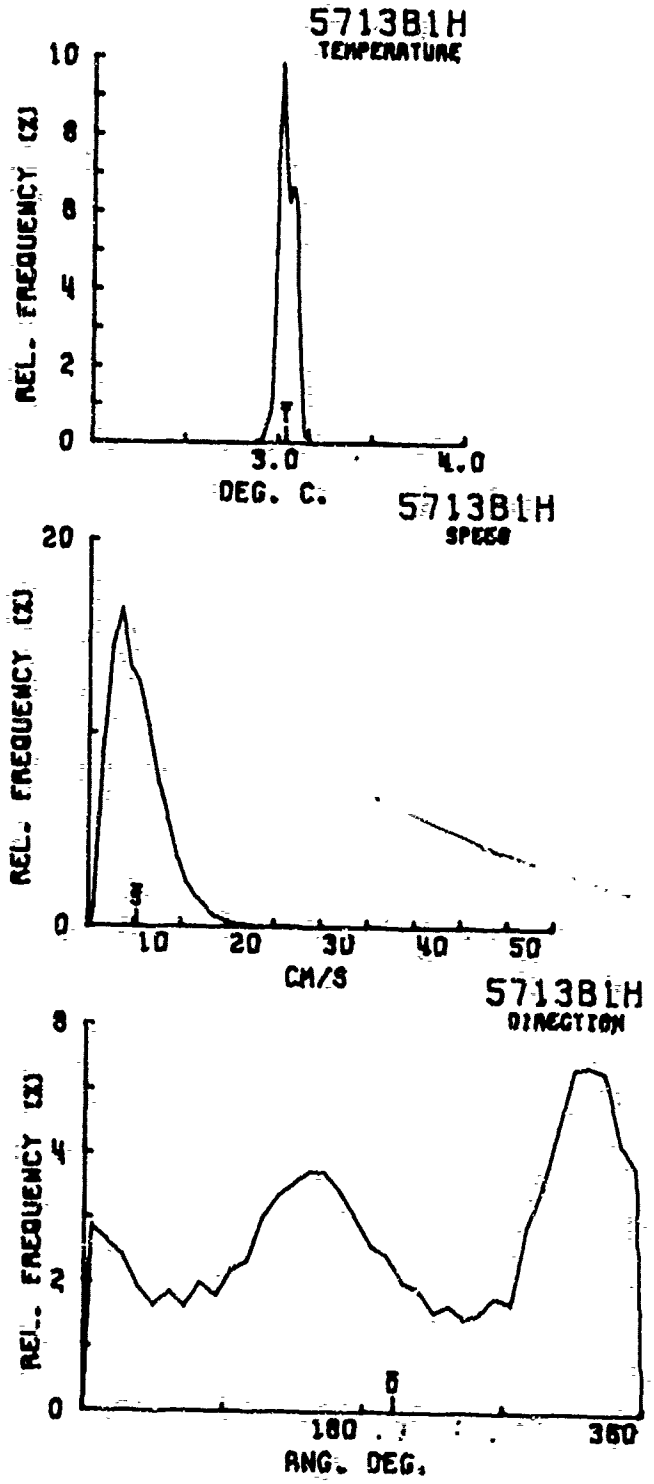


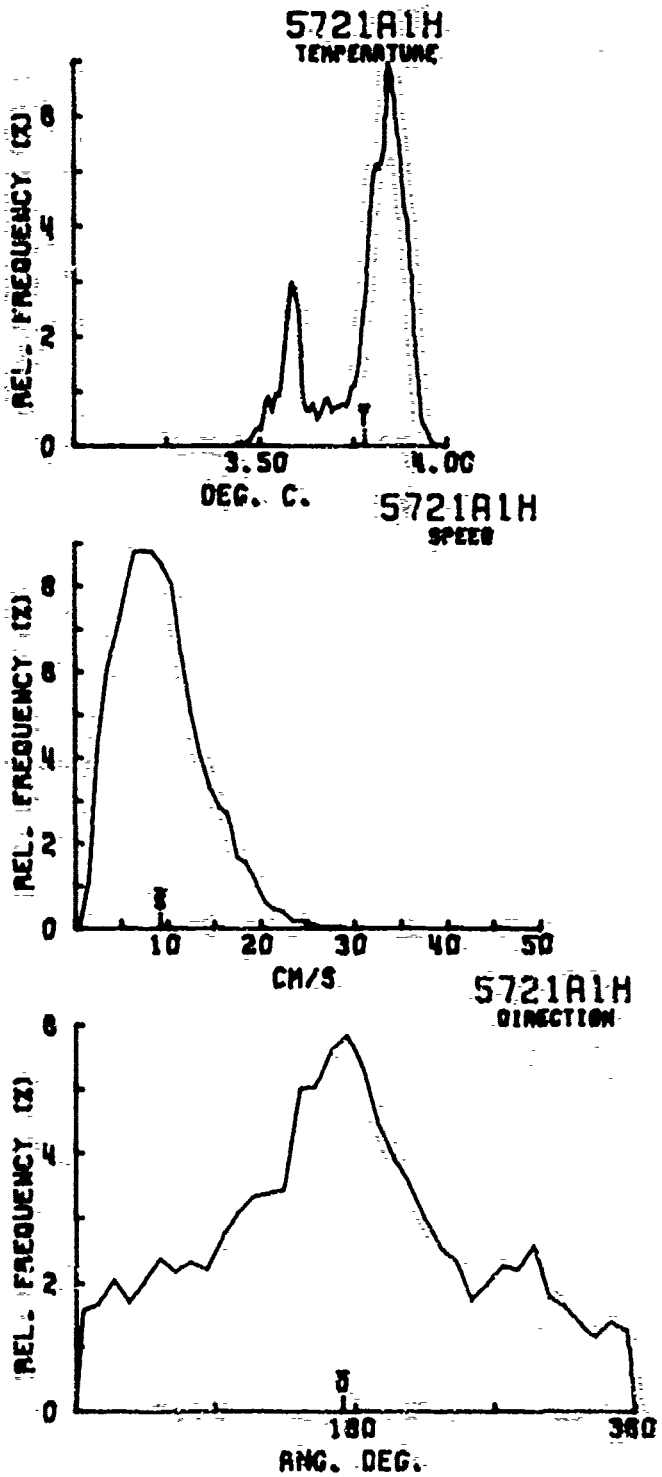
Figure 6

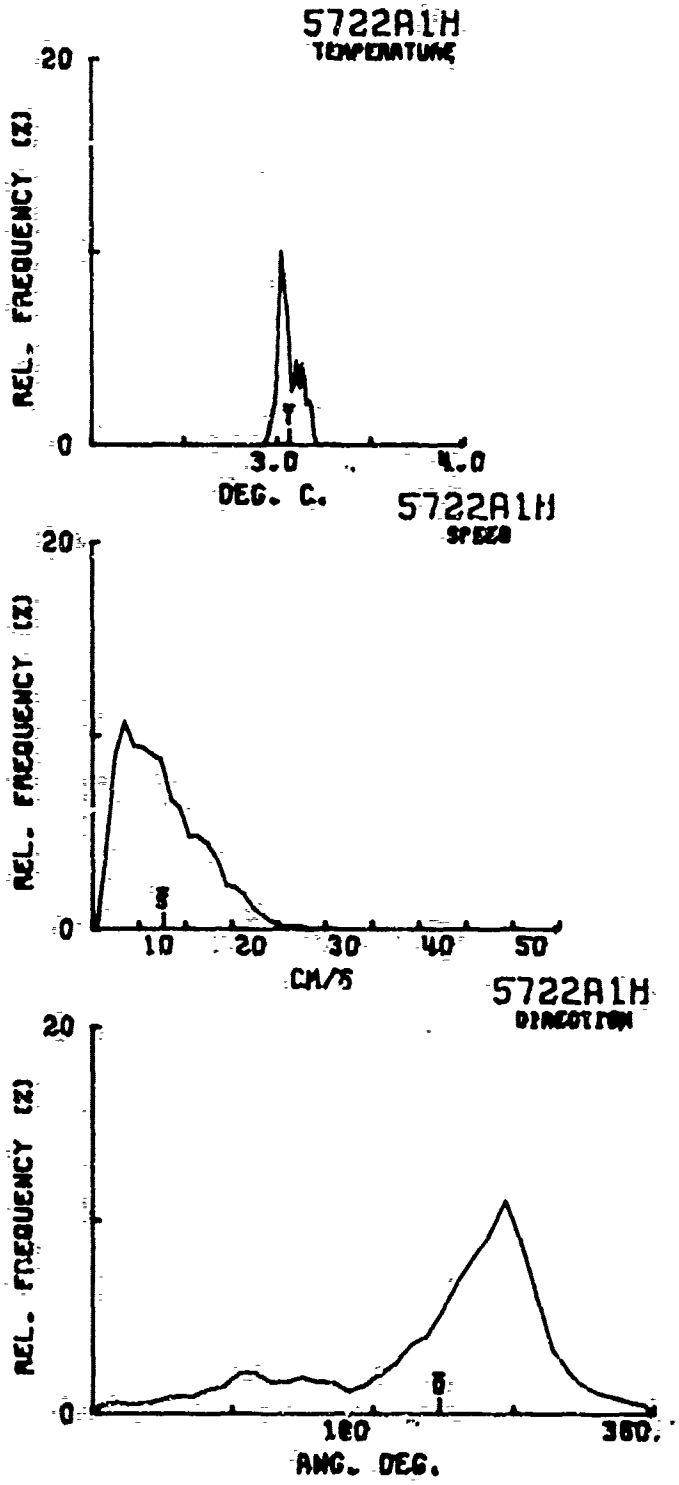

5701B1H
TEMPERATURE
20
0
REL. FREQUENCY (%)
3.0
4.0
DEG. C.
5701B1H
SPEED
20
0
REL. FREQUENCY (%)
10
20
30
40
50
CM/S
5701B1H
DIRECTION
20
0
REL. FREQUENCY (%)
90
180
270
360
RNG. DEG.

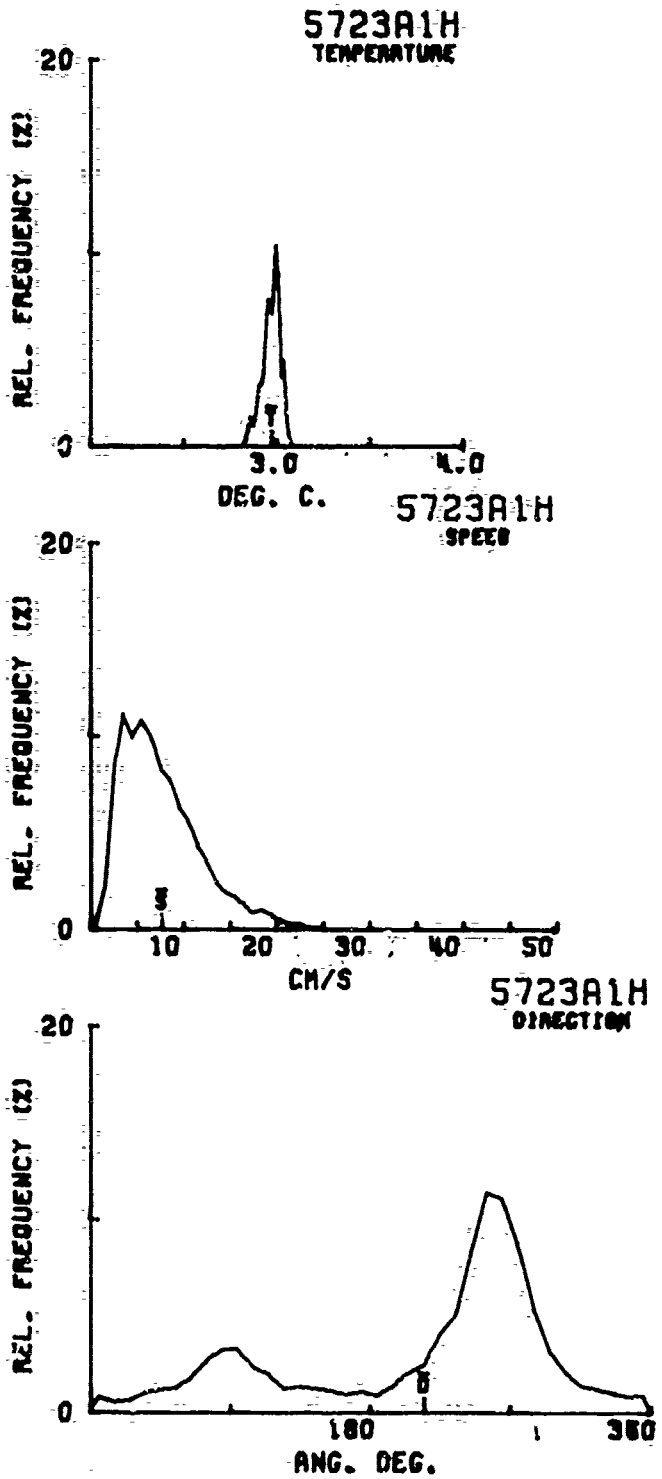

5711A1H
TEMPERATURE
REL. FREQUENCY (%)
20
0
3.50
4.00
DEG. C.
5711A1H
SPEED
REL. FREQUENCY (%)
20
0
10
20
30
40
50
CM/S
5711A1H
DIRECTION
REL. FREQUENCY (%)
6
4
2
0
180
360
ANG. DEG.

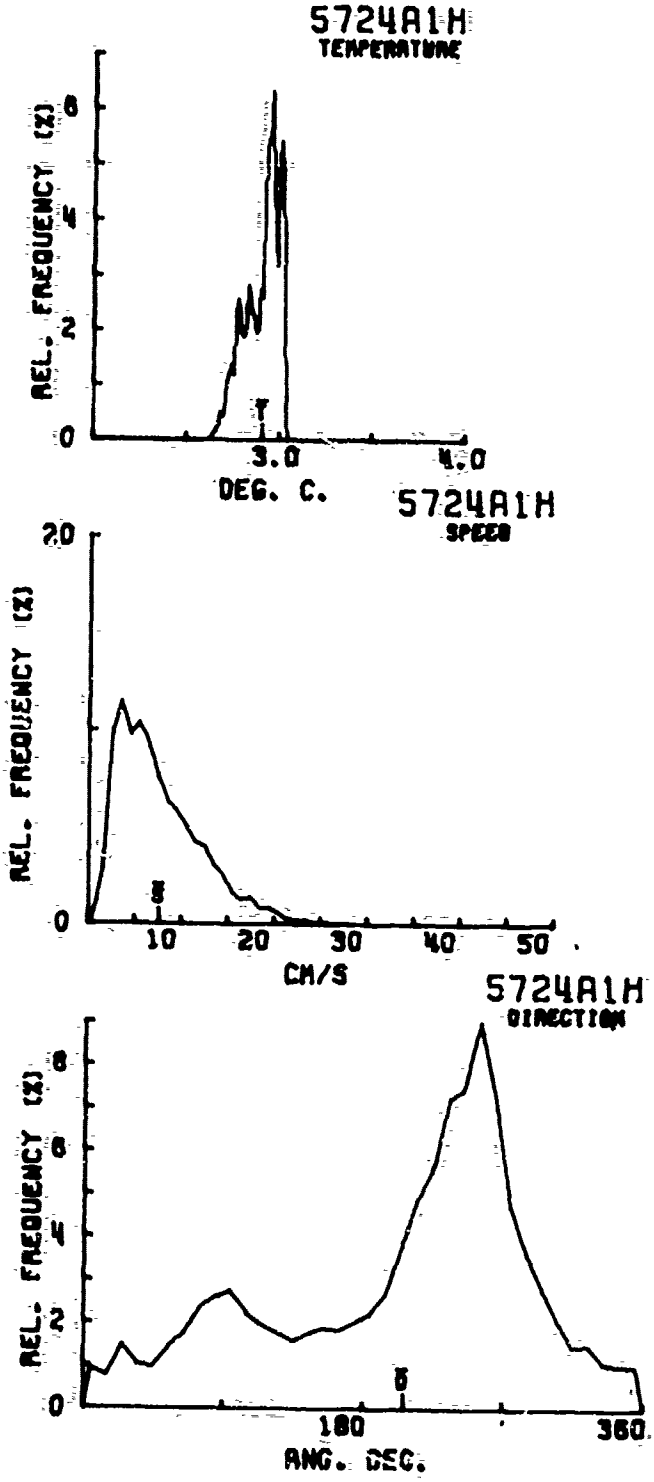

5712B1H
TEMPERATURE
REL. FREQUENCY (%)
20
0
3.50
4.00
DEG. C.
5712B1H
SPEED
REL. FREQUENCY (%)
20
0
10
20
30
40
50
CM/S
5712B1H
DIRECTION
REL. FREQUENCY (%)
8
6
4
2
0
90
180
270
360
ANG. DEG.


5713B1H
TEMPERATURE
REL. FREQUENCY (%)
10
8
6
4
2
0
3.0
4.0
DEG. C.
5713B1H
SPEED
REL. FREQUENCY (%)
20
0
10
20
30
40
50
CM/S
5713B1H
DIRECTION
REL. FREQUENCY (%)
8
4
2
0
180
360
RNG. DEG.


5721A1H
TEMPERATURE
REL. FREQUENCY (%)
0
2
4
6
3.50
4.00
DEG. C.
5721A1H
SPEED
REL. FREQUENCY (%)
0
2
4
6
8
10
20
30
40
50
CM/S
5721A1H
DIRECTION
REL. FREQUENCY (%)
0
2
4
6
180
360
ANG. DEG.


5722A1H
TEMPERATURE
20
0
REL. FREQUENCY (%)
T
3.0
4.0
DEG. C.
5722A1H
SPEED
20
0
REL. FREQUENCY (%)
S
10
20
30
40
50
CM/S
5722A1H
DIRECTION
20
0
REL. FREQUENCY (%)
D
180
360.
ANG. DEG.


5723A1H
TEMPERATURE
20
0
REL. FREQUENCY (%)
T
3.0
4.0
DEG. C.
5723A1H
SPEED
20
0
REL. FREQUENCY (%)
S
10
20
30
40
50
CM/S
5723A1H
DIRECTION
20
0
REL. FREQUENCY (%)
D
180
360
ANG. DEG.


5724A1H
TEMPERATURE
REL. FREQUENCY (%)
0
2
4
6
T
3.0
4.0
DEG. C.
5724A1H
SPEED
REL. FREQUENCY (%)
20
0
S
10
20
30
40
50
CM/S
5724A1H
DIRECTION
REL. FREQUENCY (%)
0
2
4
6
8
D
180
360
ANG. DEC.

CURRENT VECTORS FOR MOORING 553

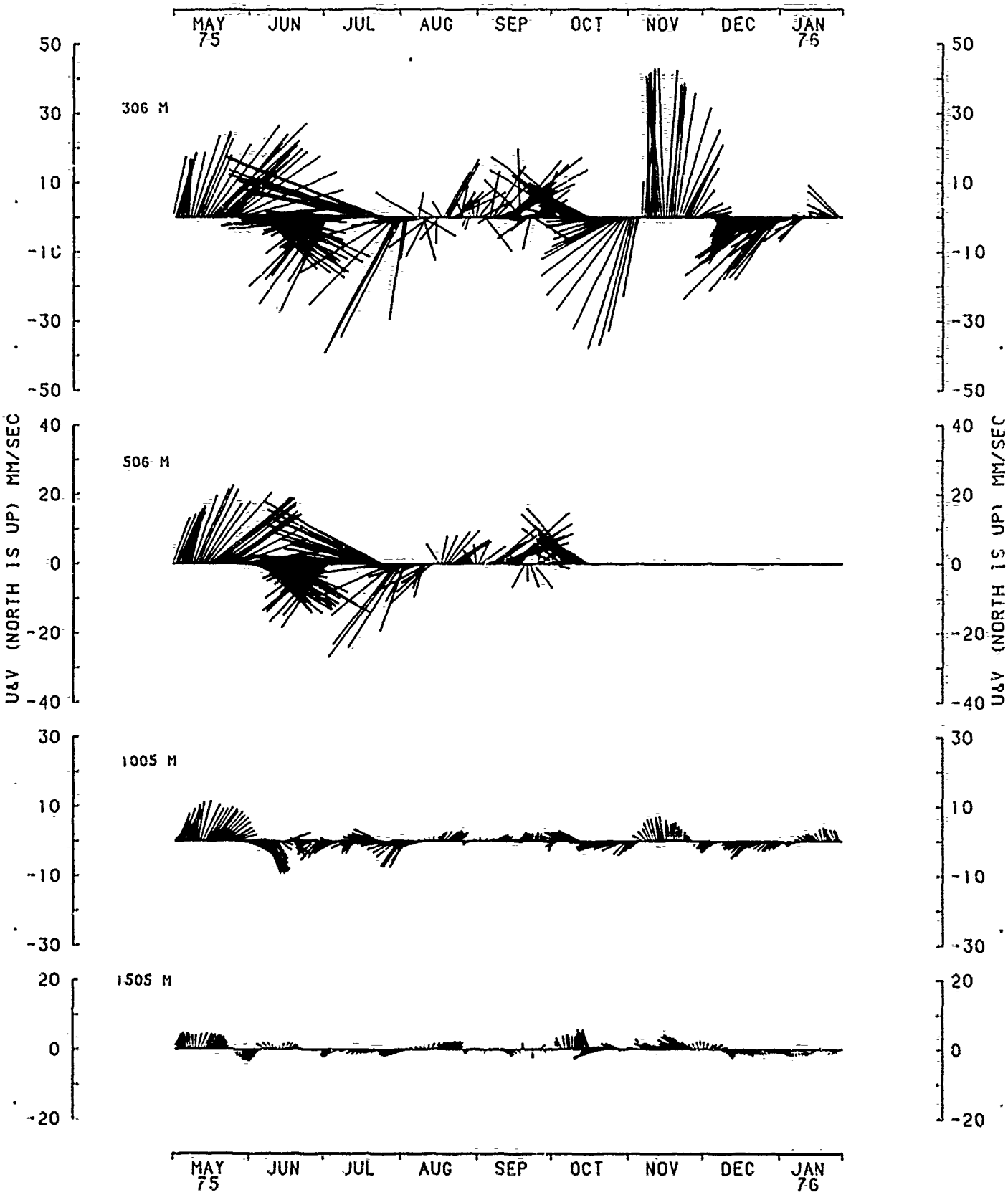


Figure 13

TEMPERATURE RECORDS MOORING 553

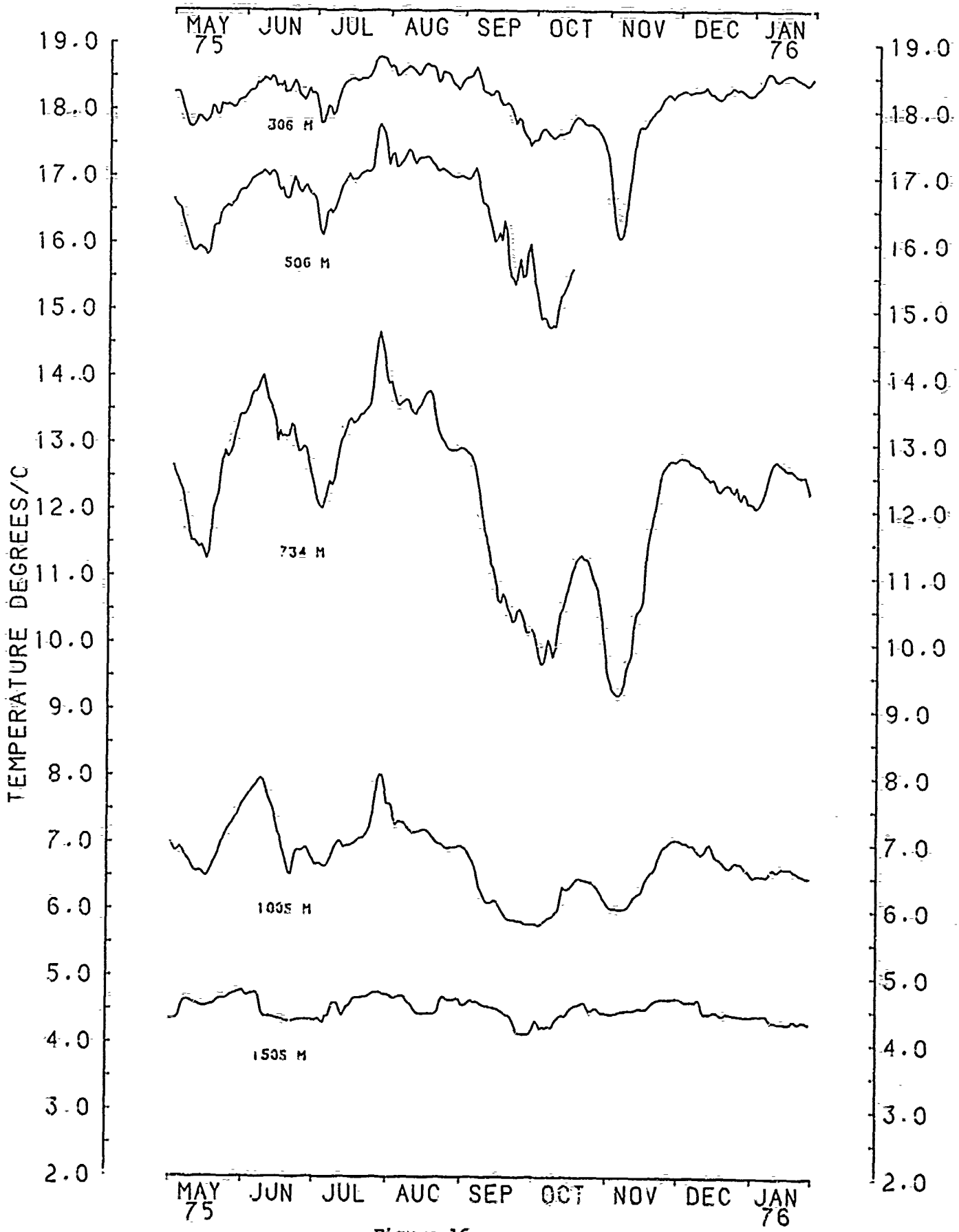


Figure 16

CURRENT VECTOR FOR MOORING 570

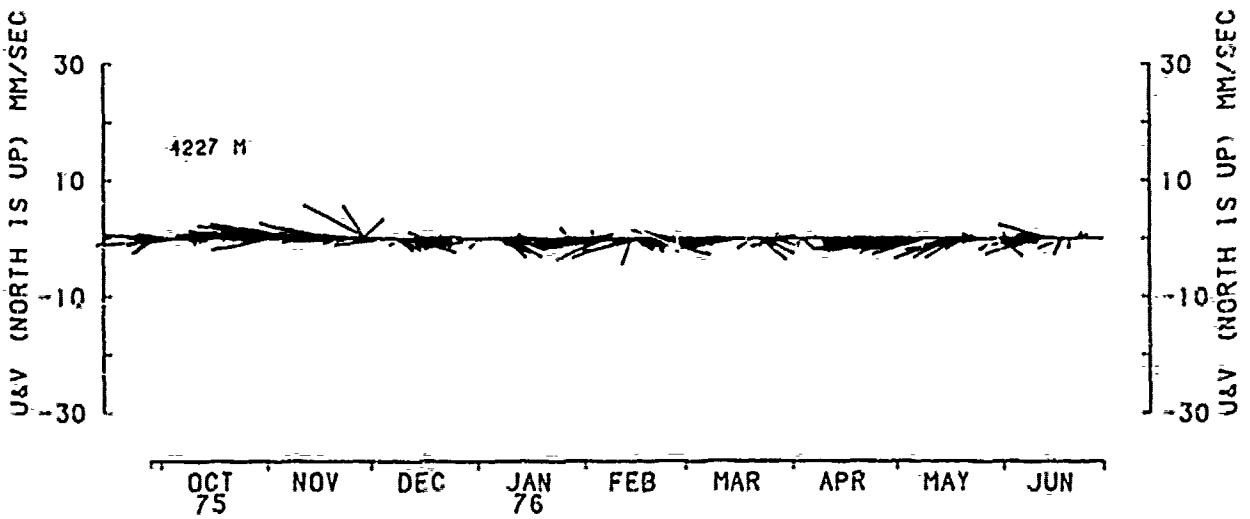


Figure 7

TEMPERATURE RECORD MOORING 570

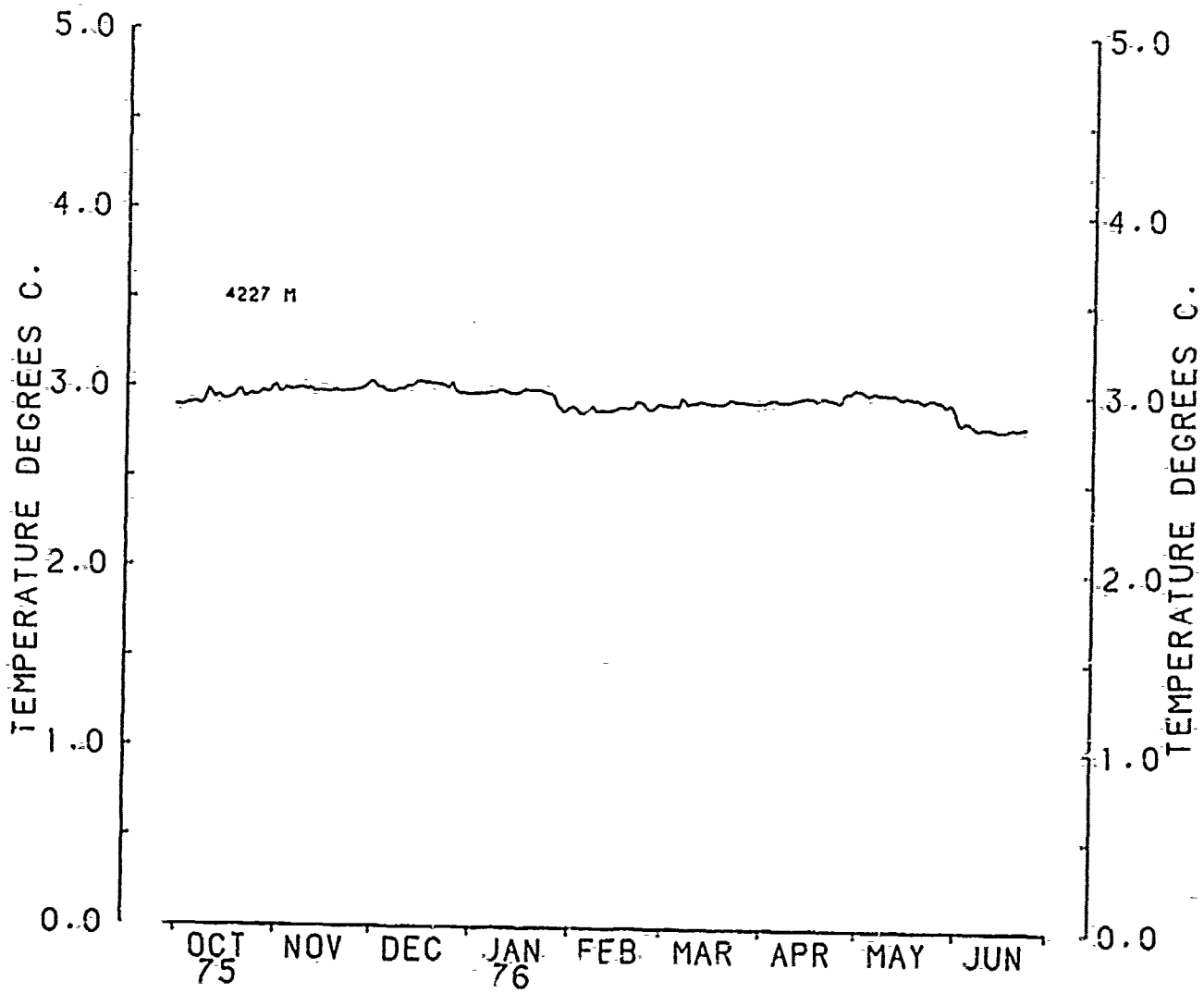


Figure 10

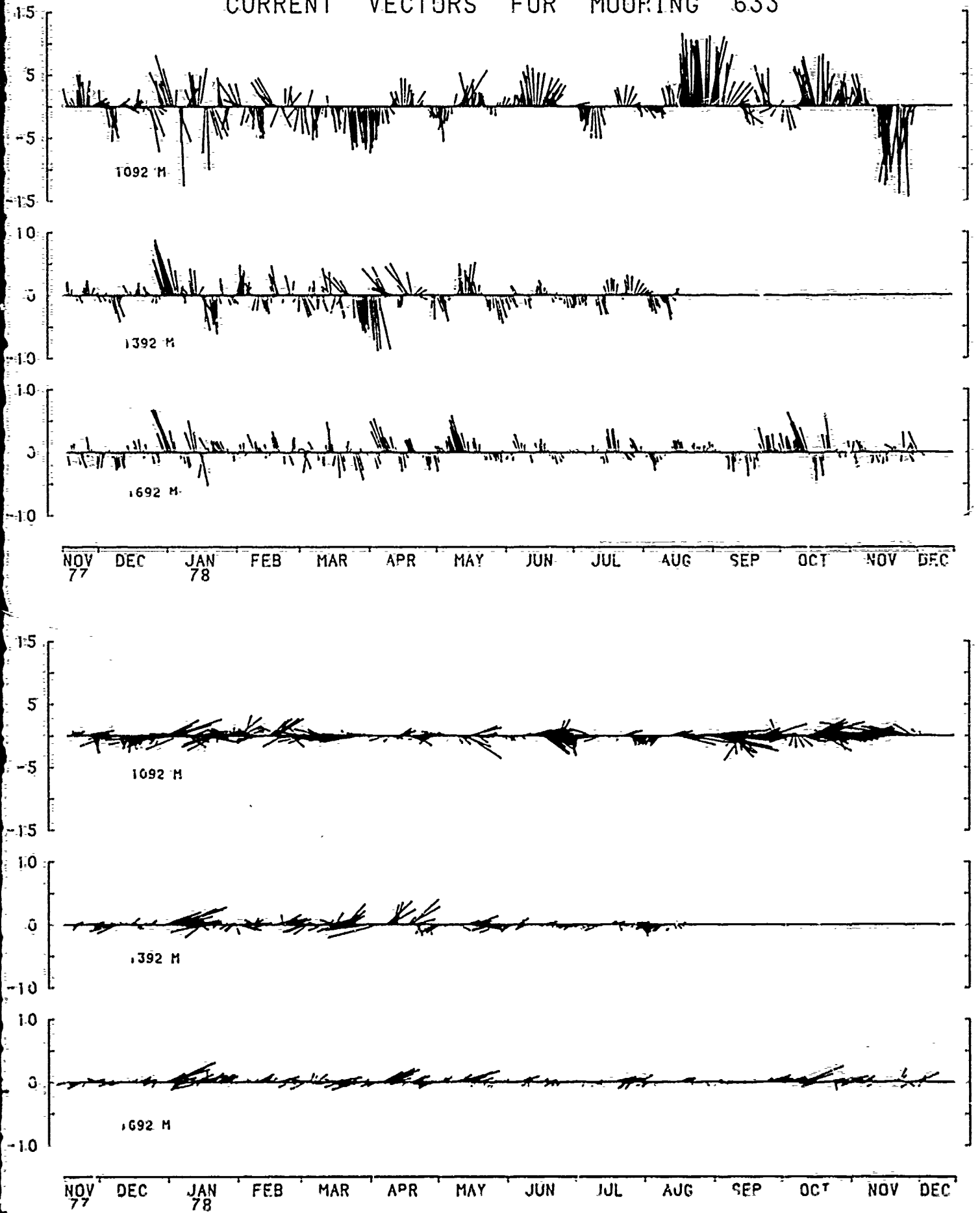

CURRENT VECTORS FOR MOORING 633
1092 M
1392 M
1692 M
NOV 77
DEC
JAN 78
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC

Figure 19

TEMPERATURE RECORDS MOORING 633

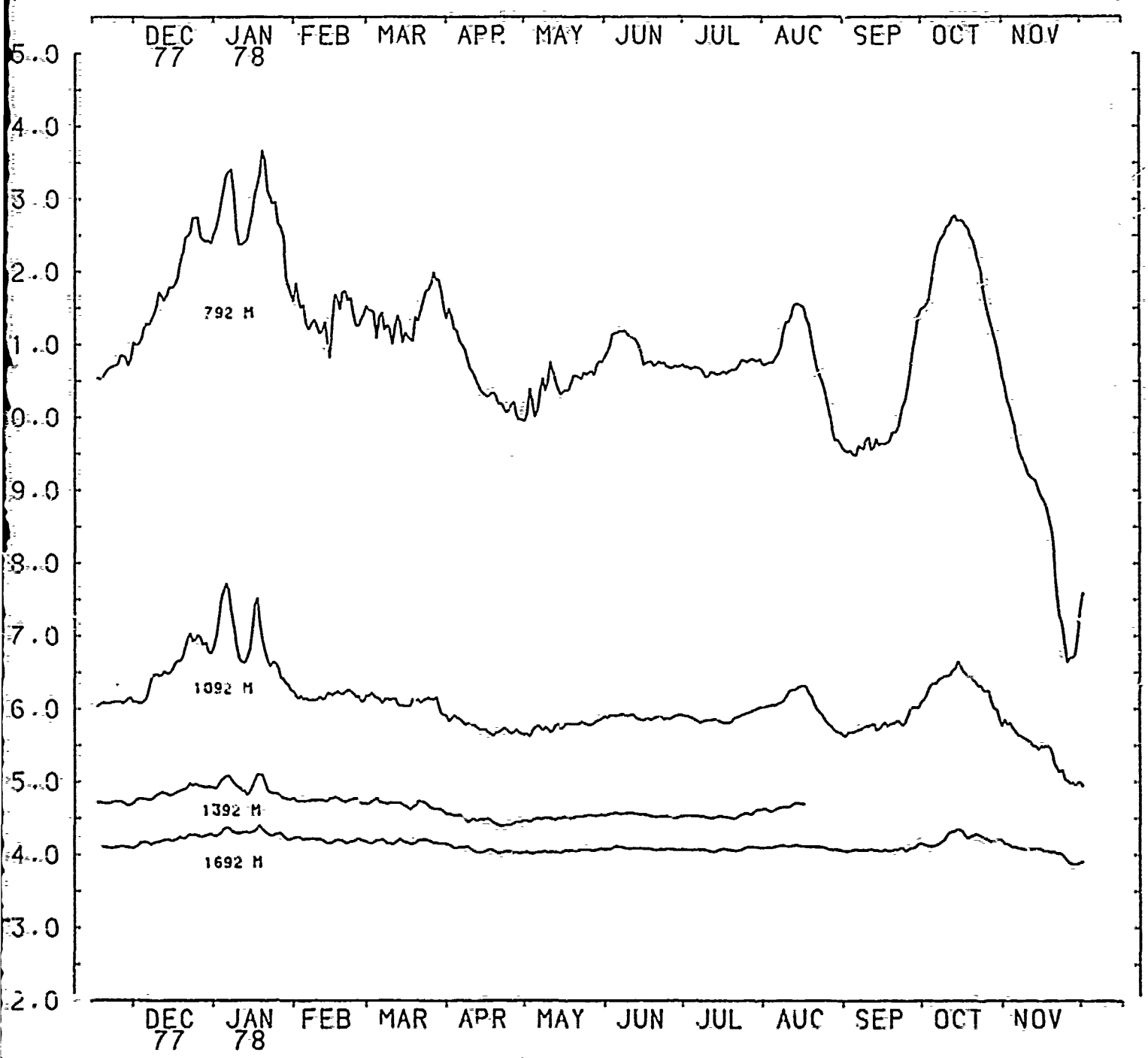
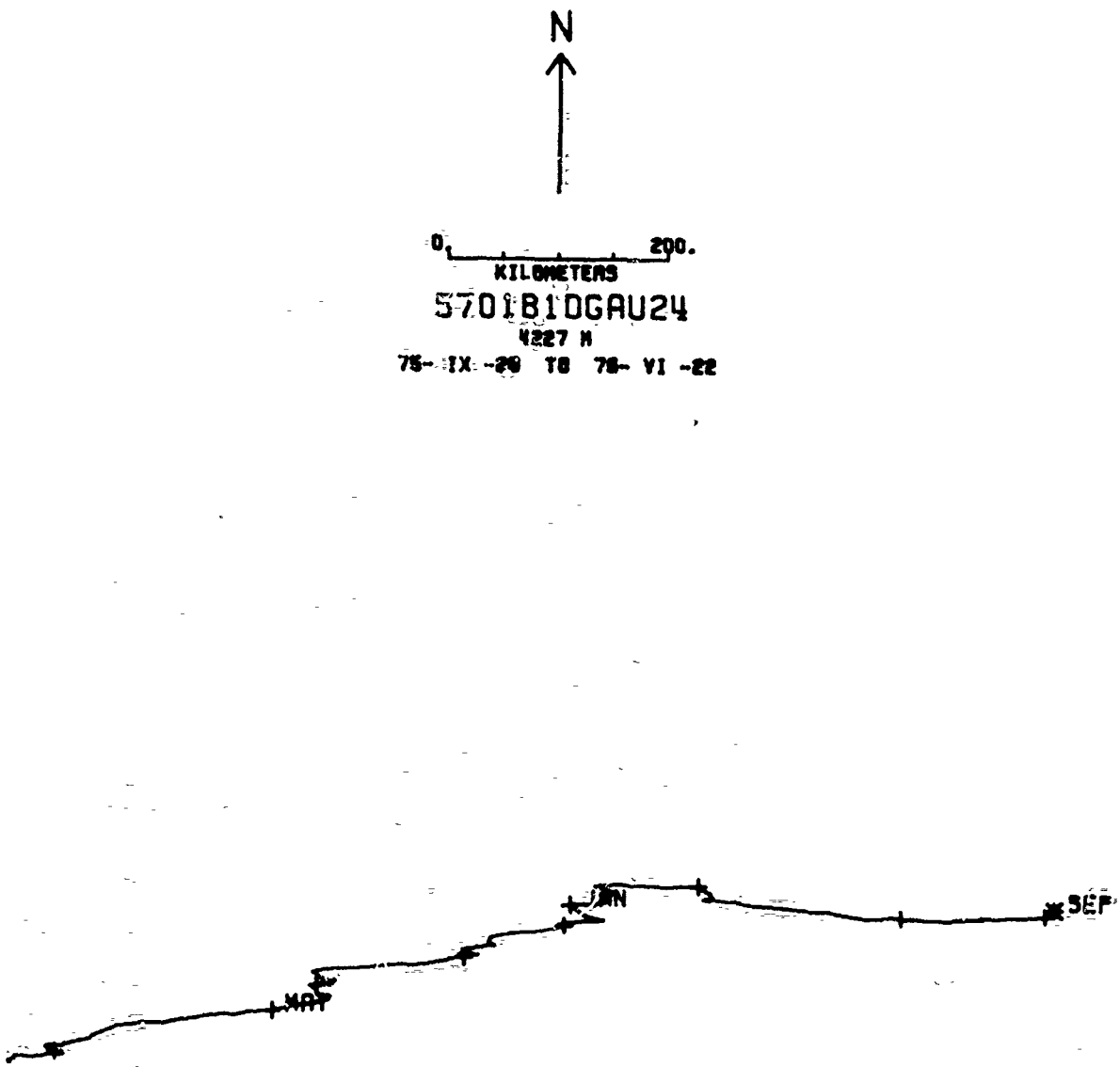
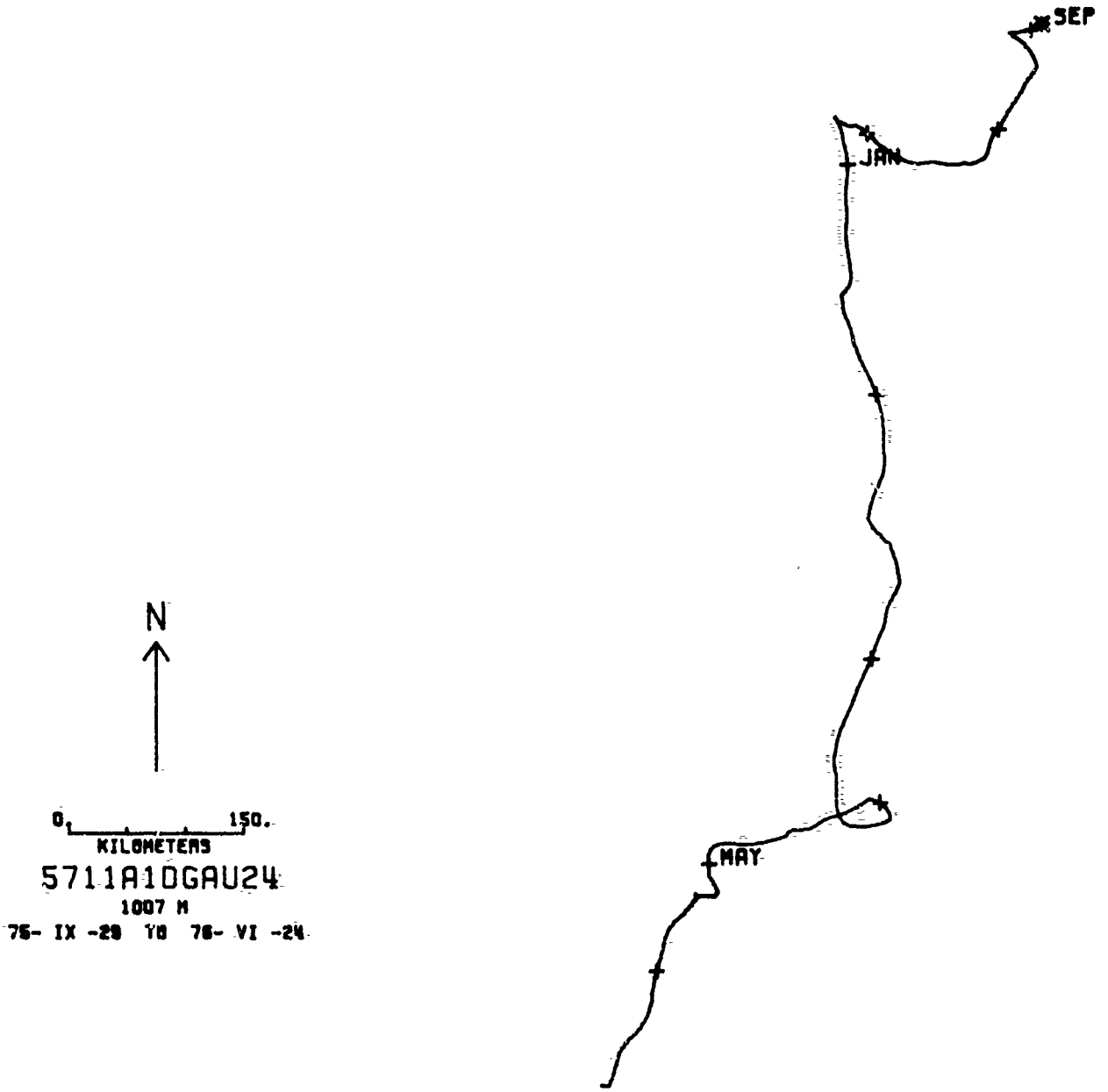
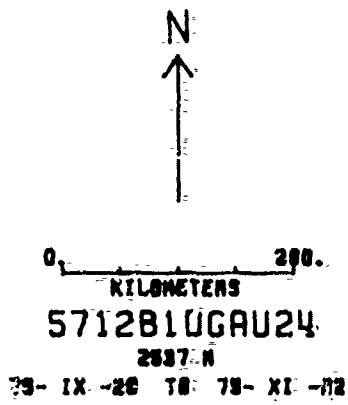


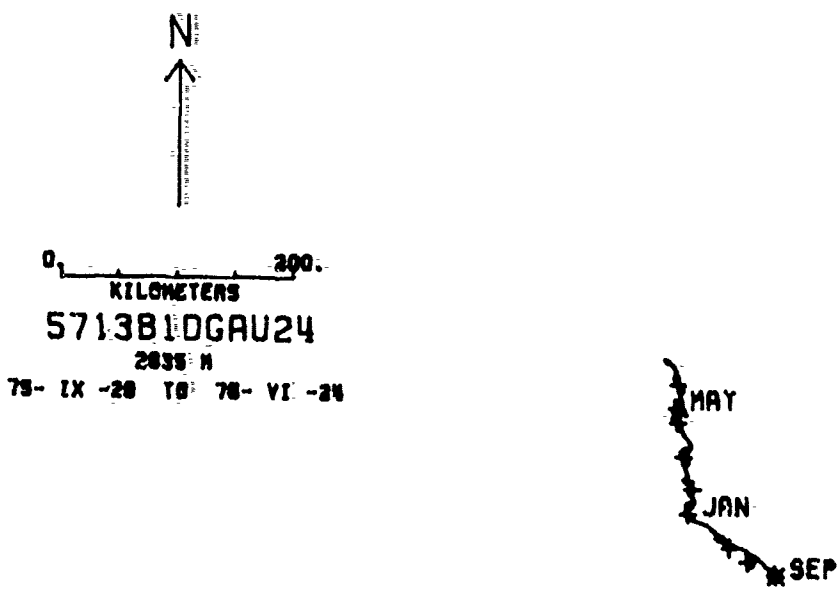
Figure 22

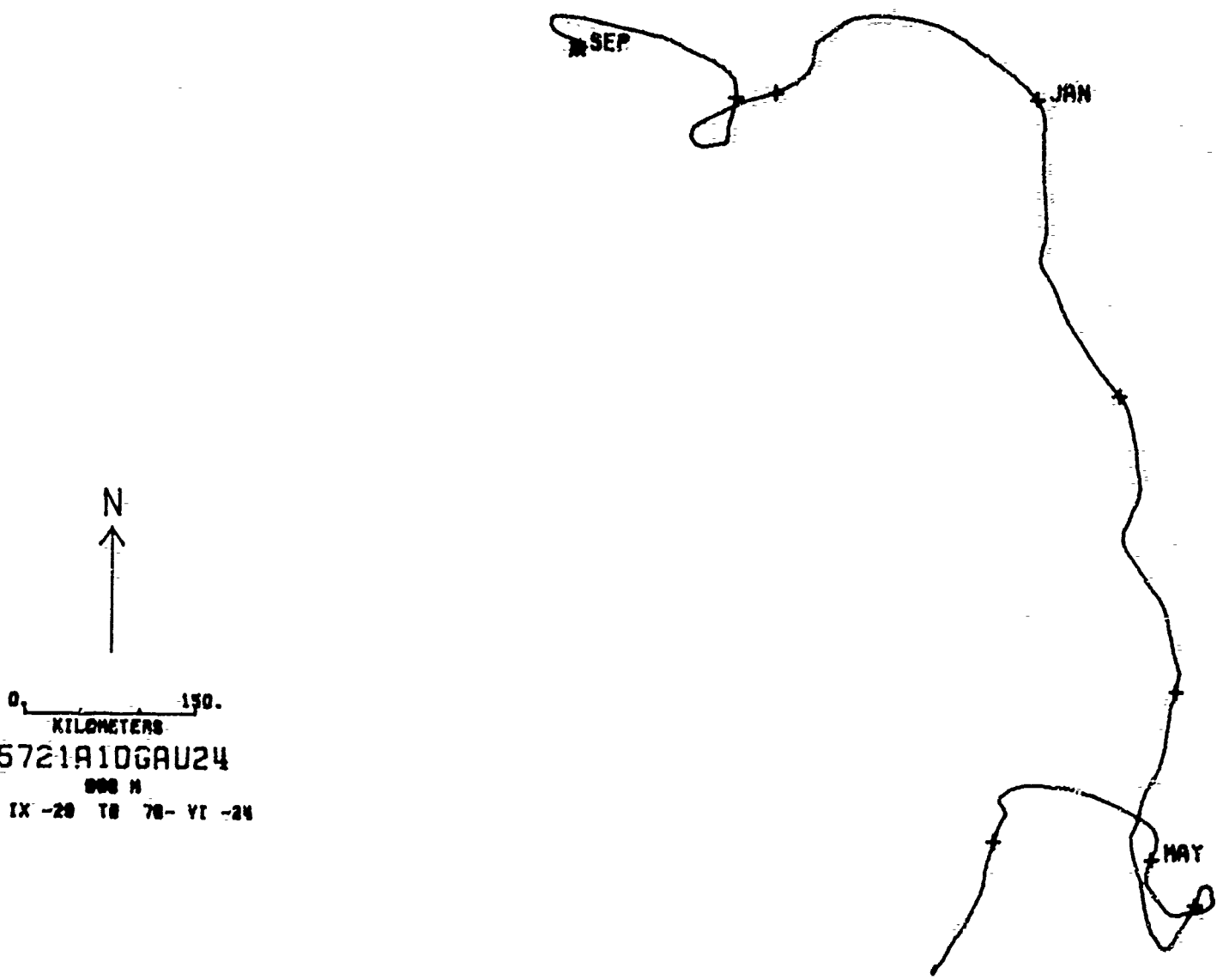

N
0
200.
KILOMETERS
5701B1DGAU24
4227 N
75- IX -29 TO 76- VI -22
MAY
JUN
SEP

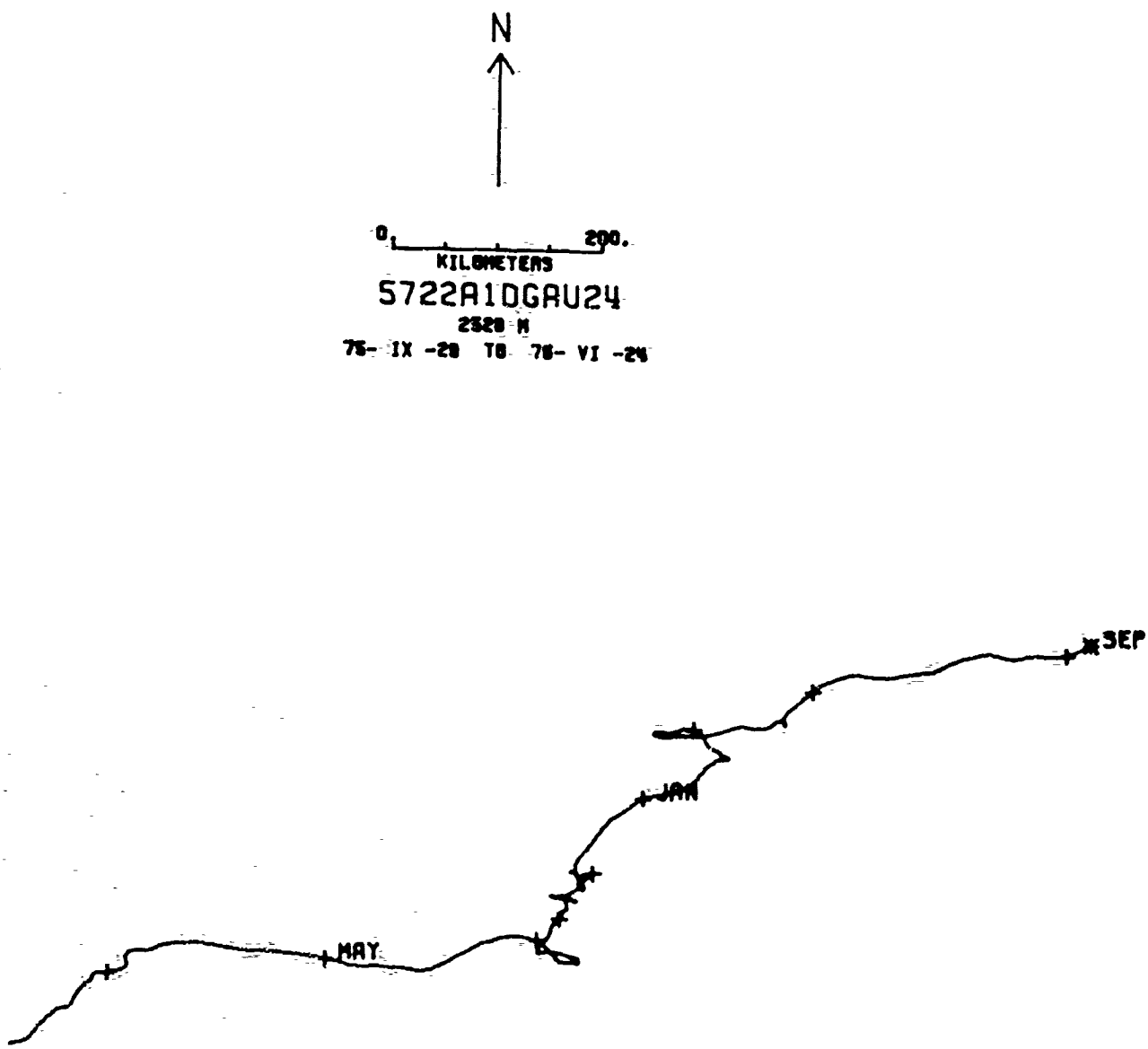

SEP
JAN
MAY
N
0
150.
KILOMETERS
5711A10GAU24
1007 M
76- IX -28 TO 76- VI -24

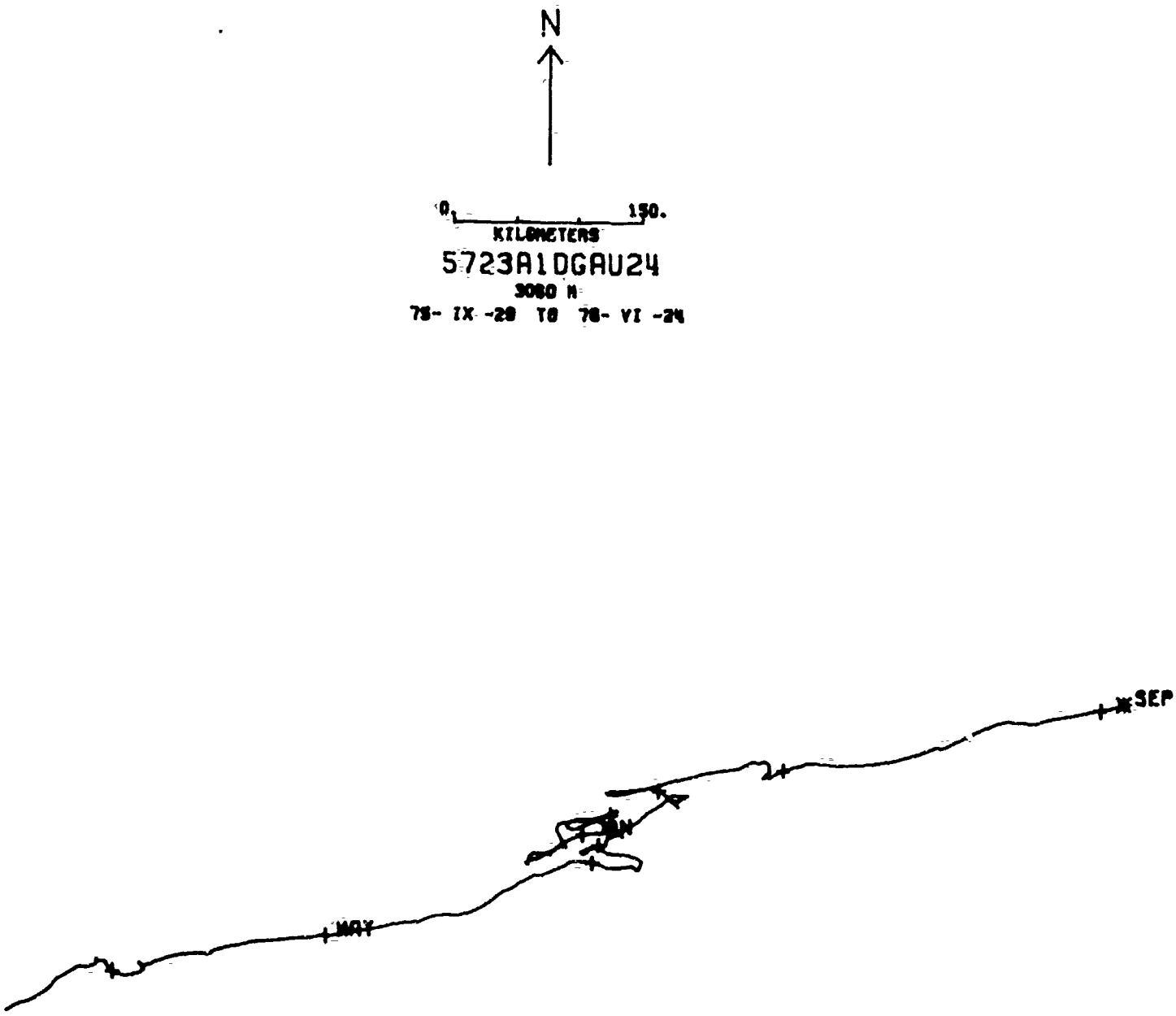

N
0
200.
KILOMETERS
5712B1UGAU24
2537 N
79- IX -26 TO 79- XI -02

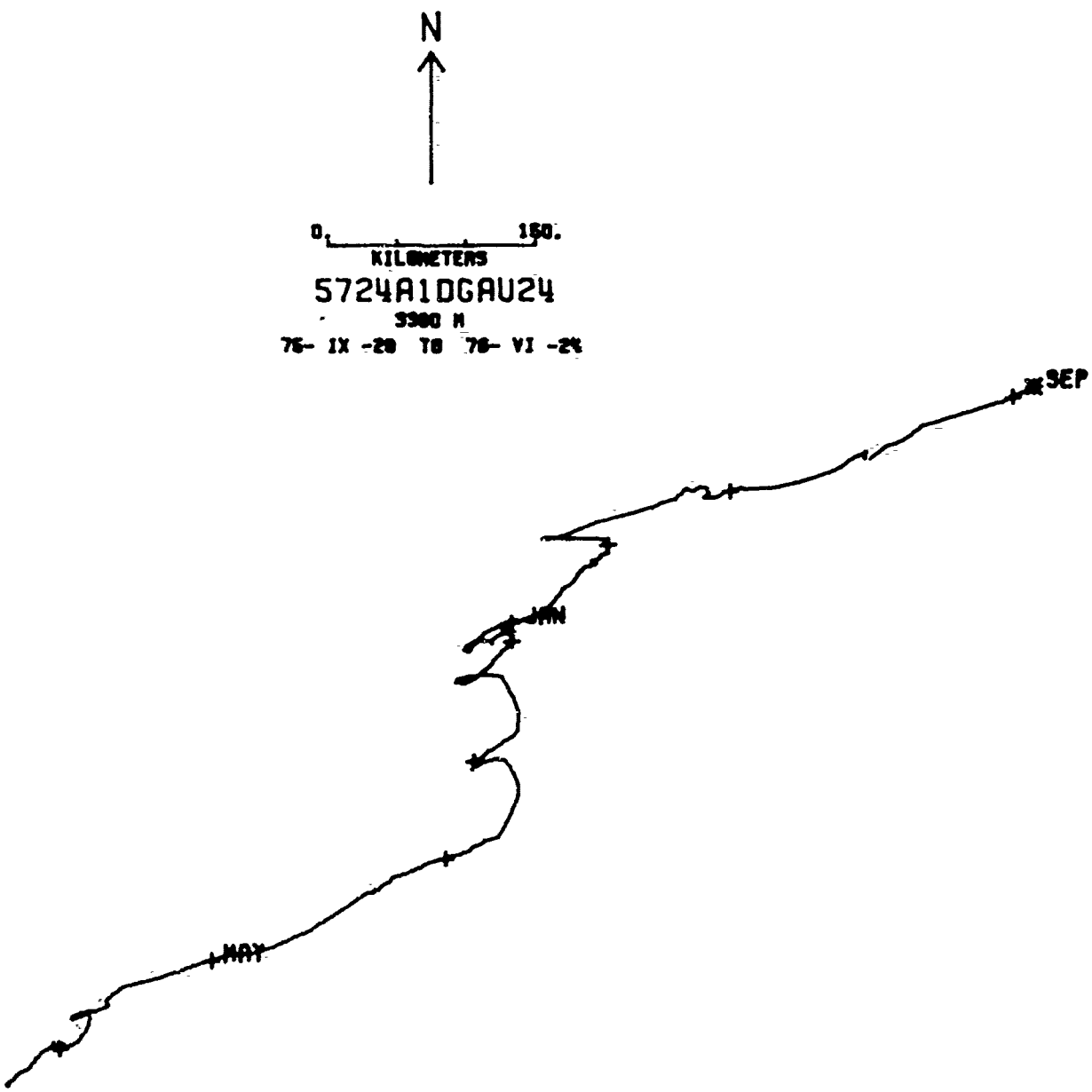

SEP


N
0
200.
KILOMETERS
5713B1DGAU24
2035 H
75- IX -20 TO 76- VI -24
MAY
JAN
SEP


SEP
JAN
MAY
N
0
150.
KILOMETERS
5721A10GAU24
- IX -20 T8 70- YI -24


N
0
200.
KILOMETERS
5722A1DGAU24
2328 N
75- IX -28 TO 76- VI -24
SEP
JAN
MAY


N
0
150.
KILOMETERS
5723A1DGAU24
3060 N
78- IX -28 TO 78- VI -24
SEP
MAY


N
0
150.
KILOMETERS
5724A1DGAU24
3300 M
76- IX -20 TO 76- VI -2
SEP
JAN
MAY

CURRENT VECTORS FOR MOORING 554

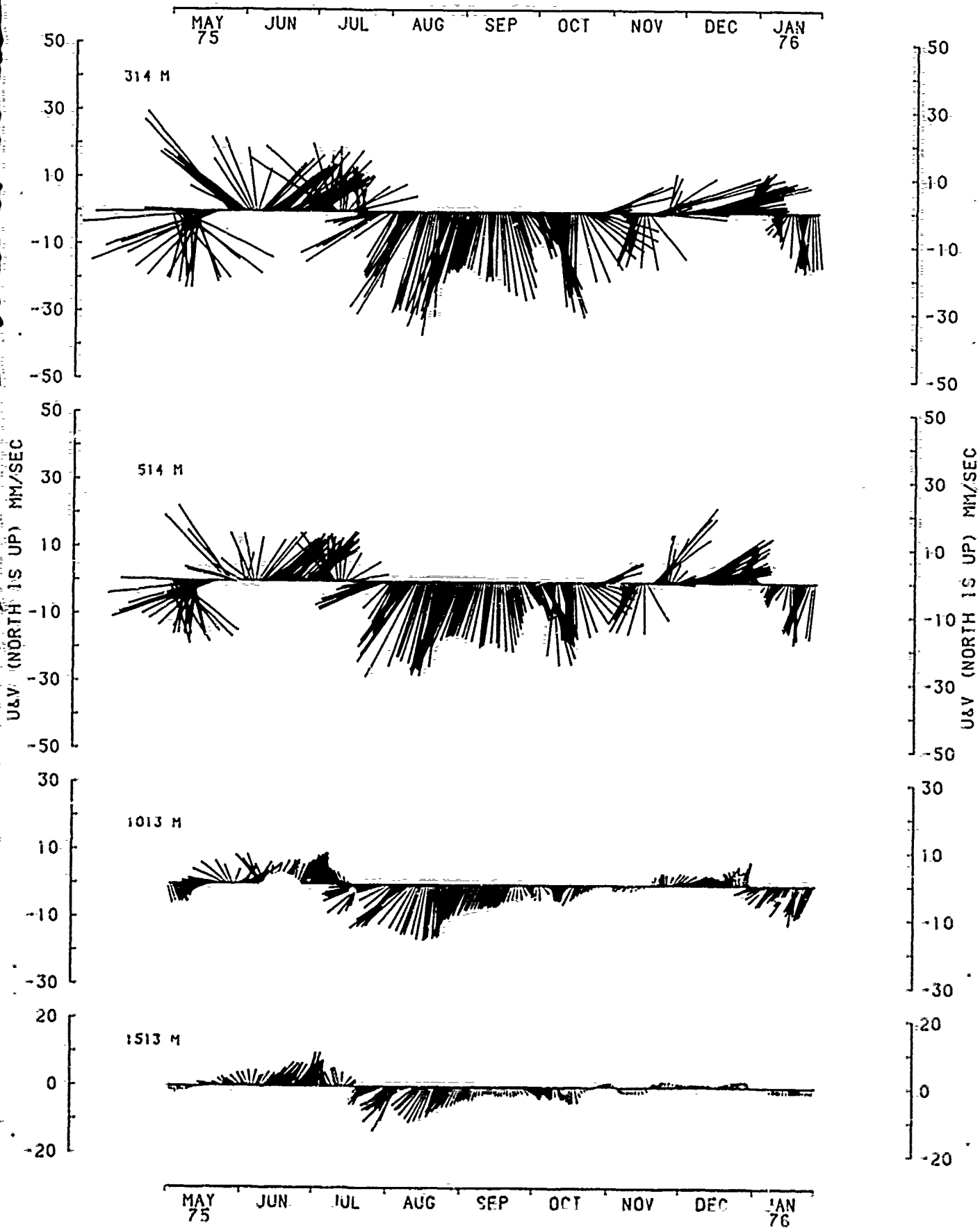


Figure 14

TEMPERATURE RECORDS MOORING 554

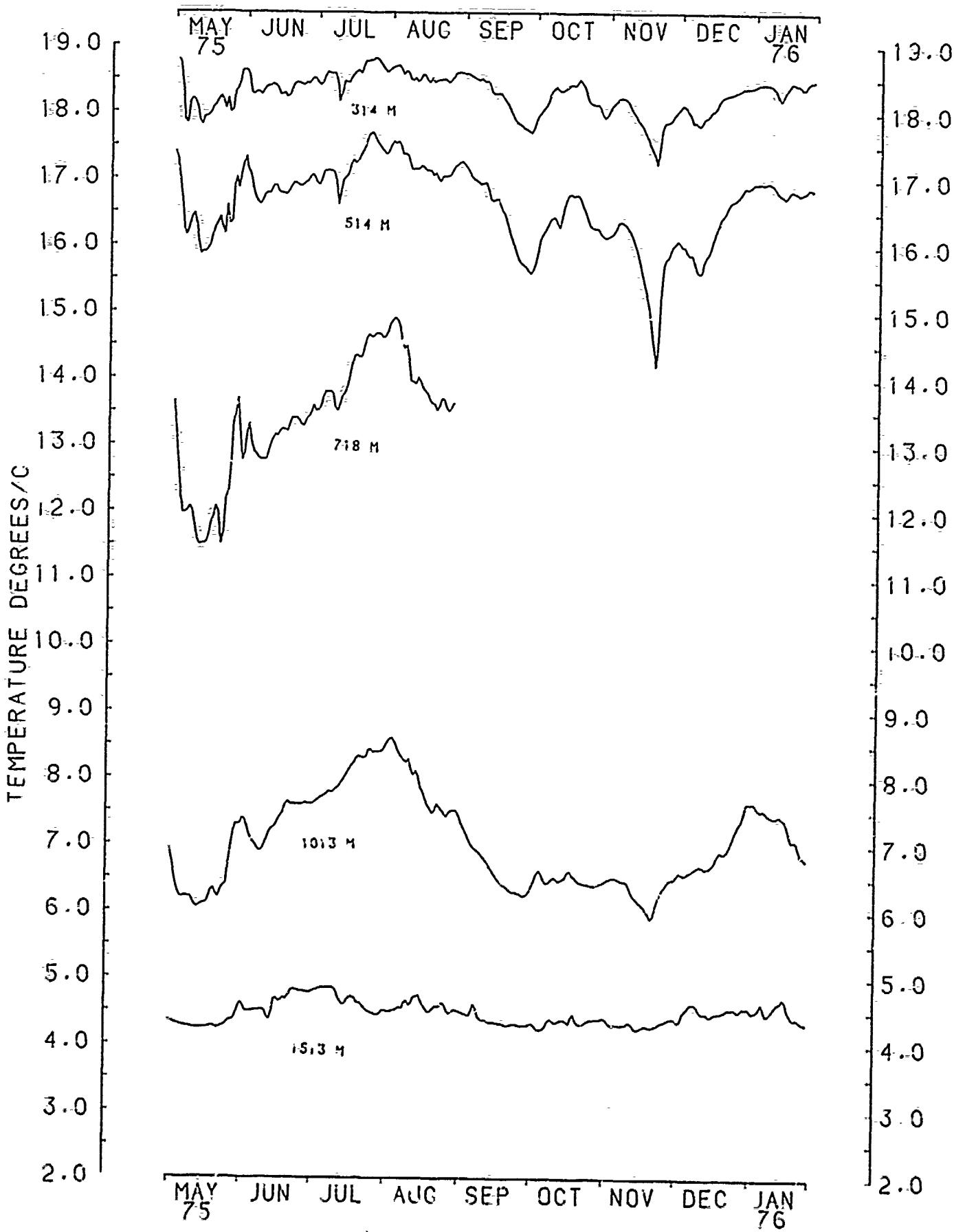


Figure 17

1-F-10

CURRENT VECTORS FOR MOORING 571

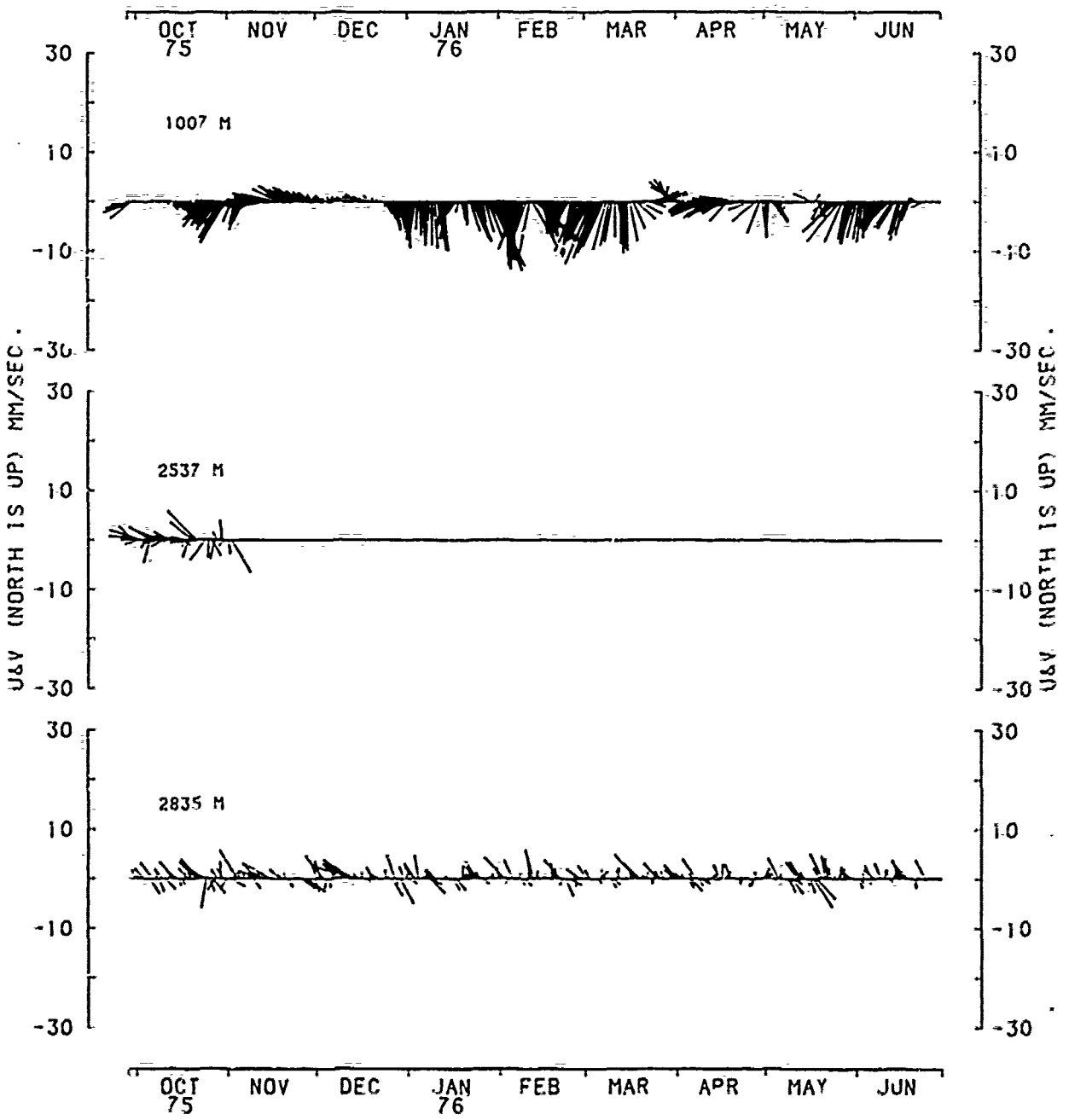


Figure 8

TEMPERATURE RECORDS MOORING 571

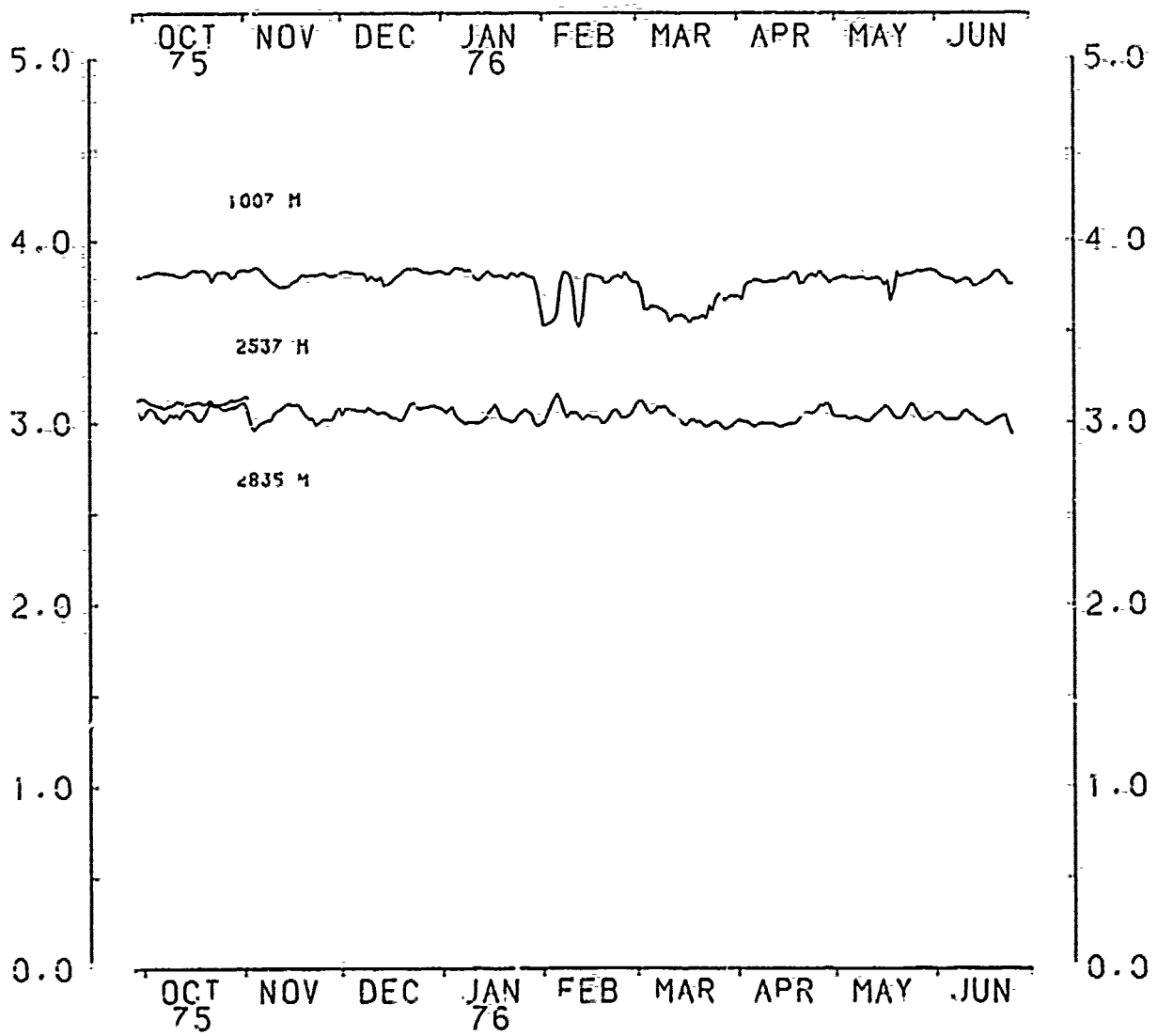


Figure 11

CURRENT VECTORS FOR MOORING 634

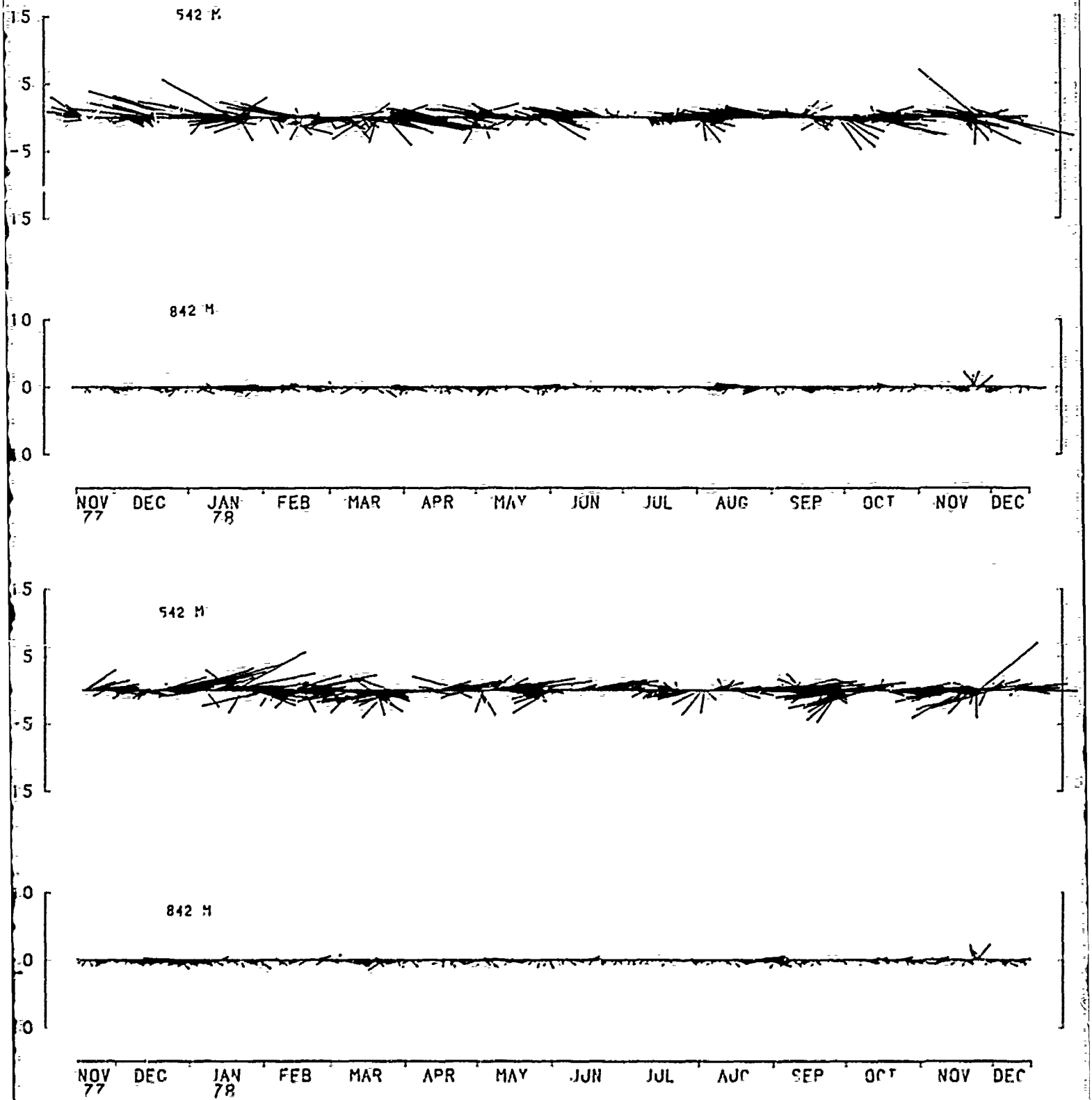


Figure 20

TEMPERATURE RECORDS MOORING 634

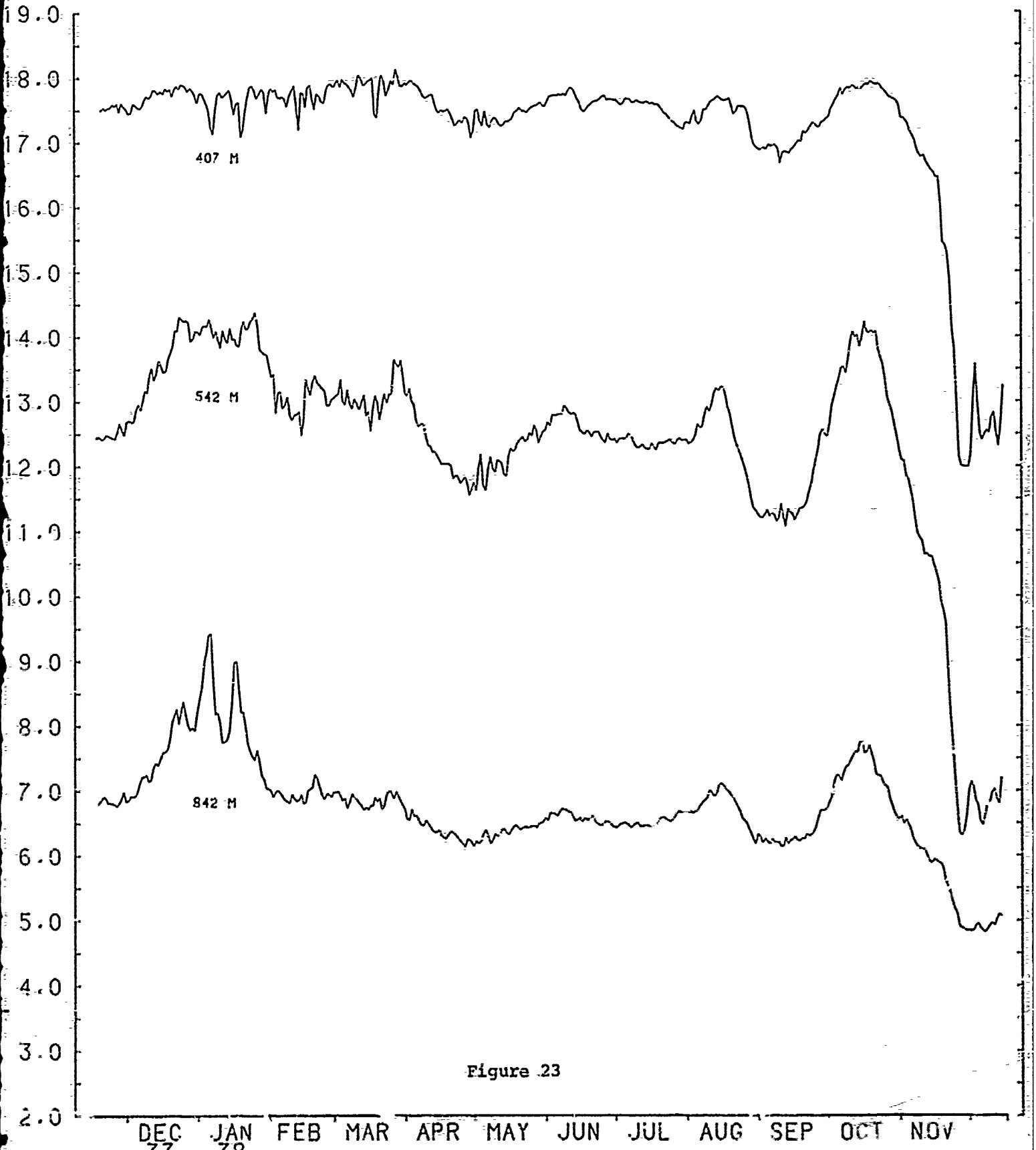
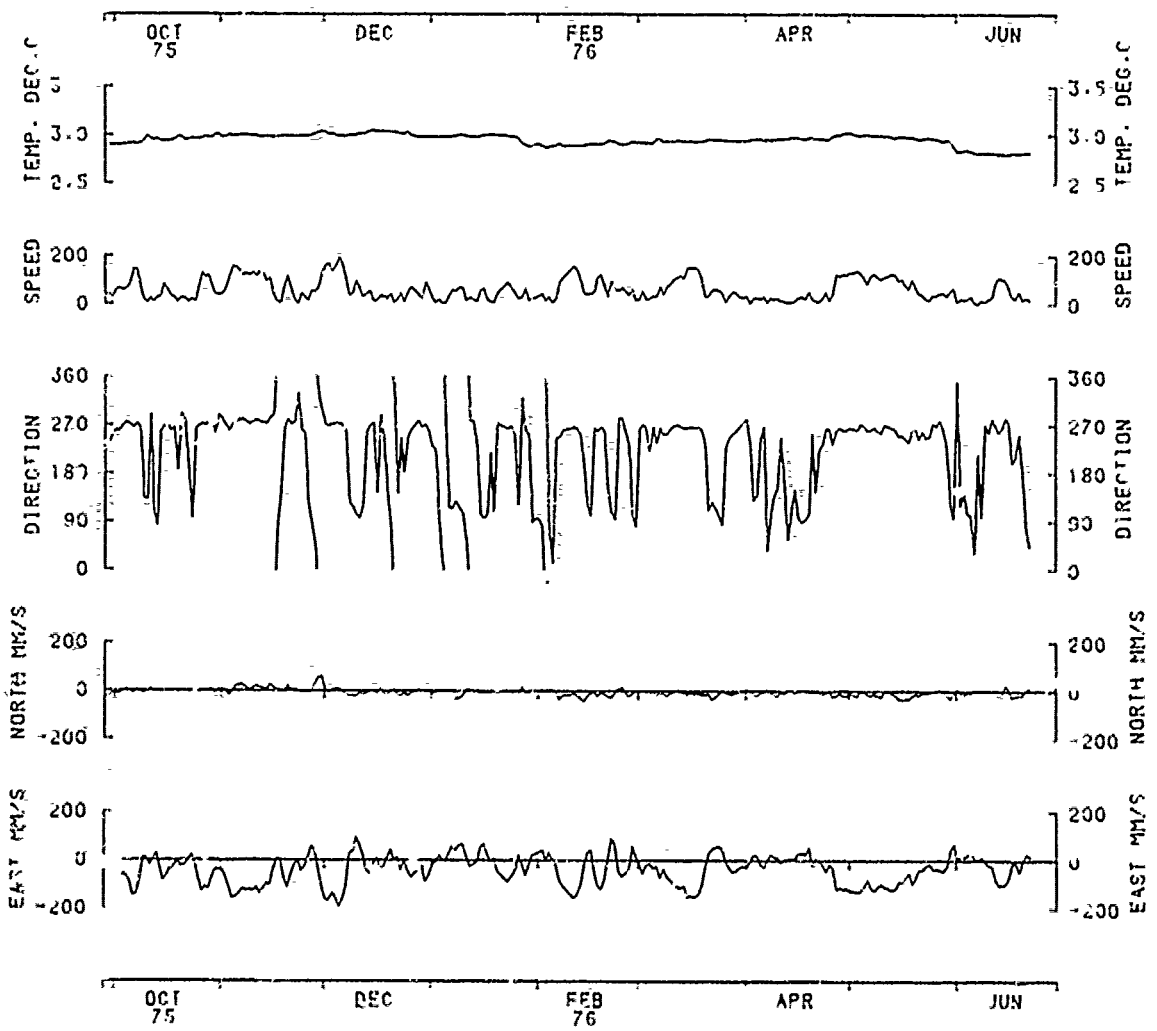
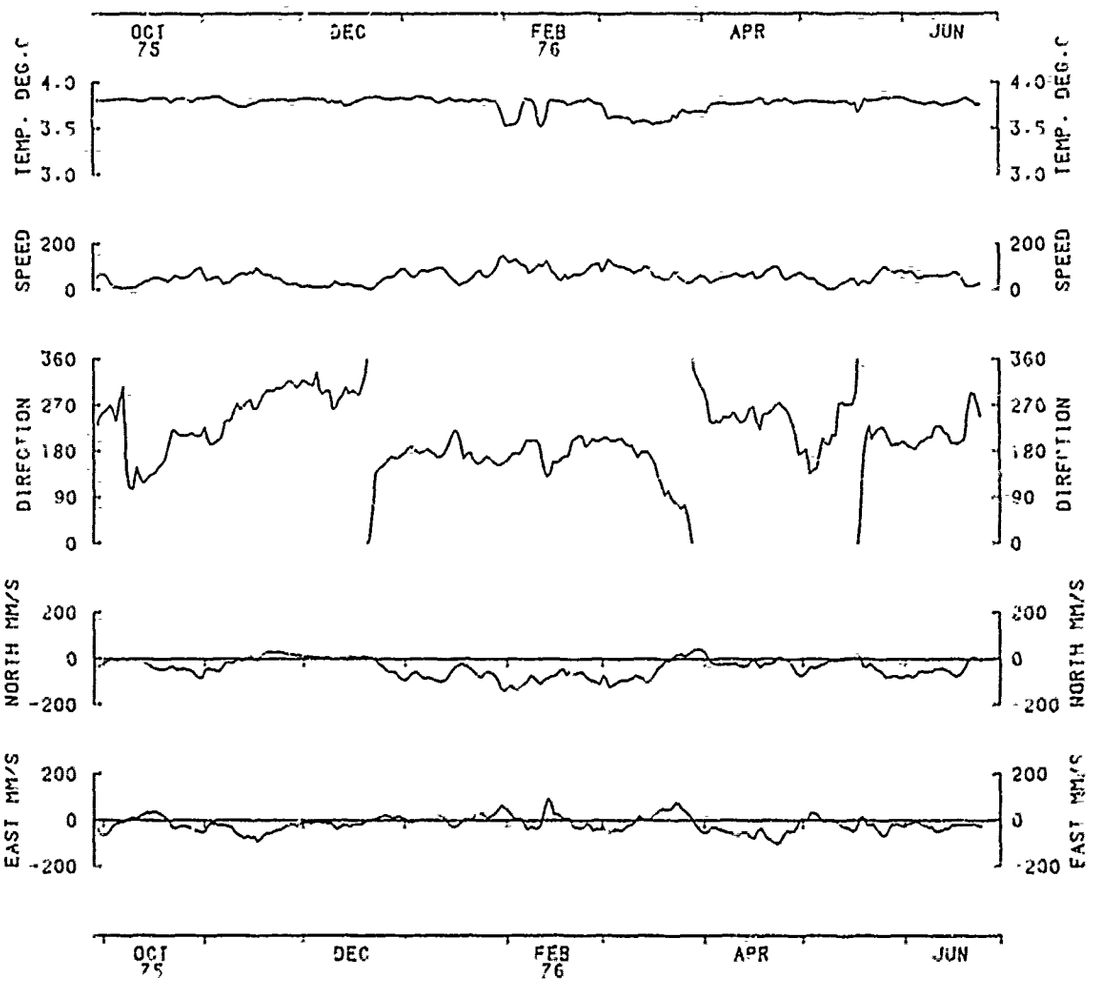


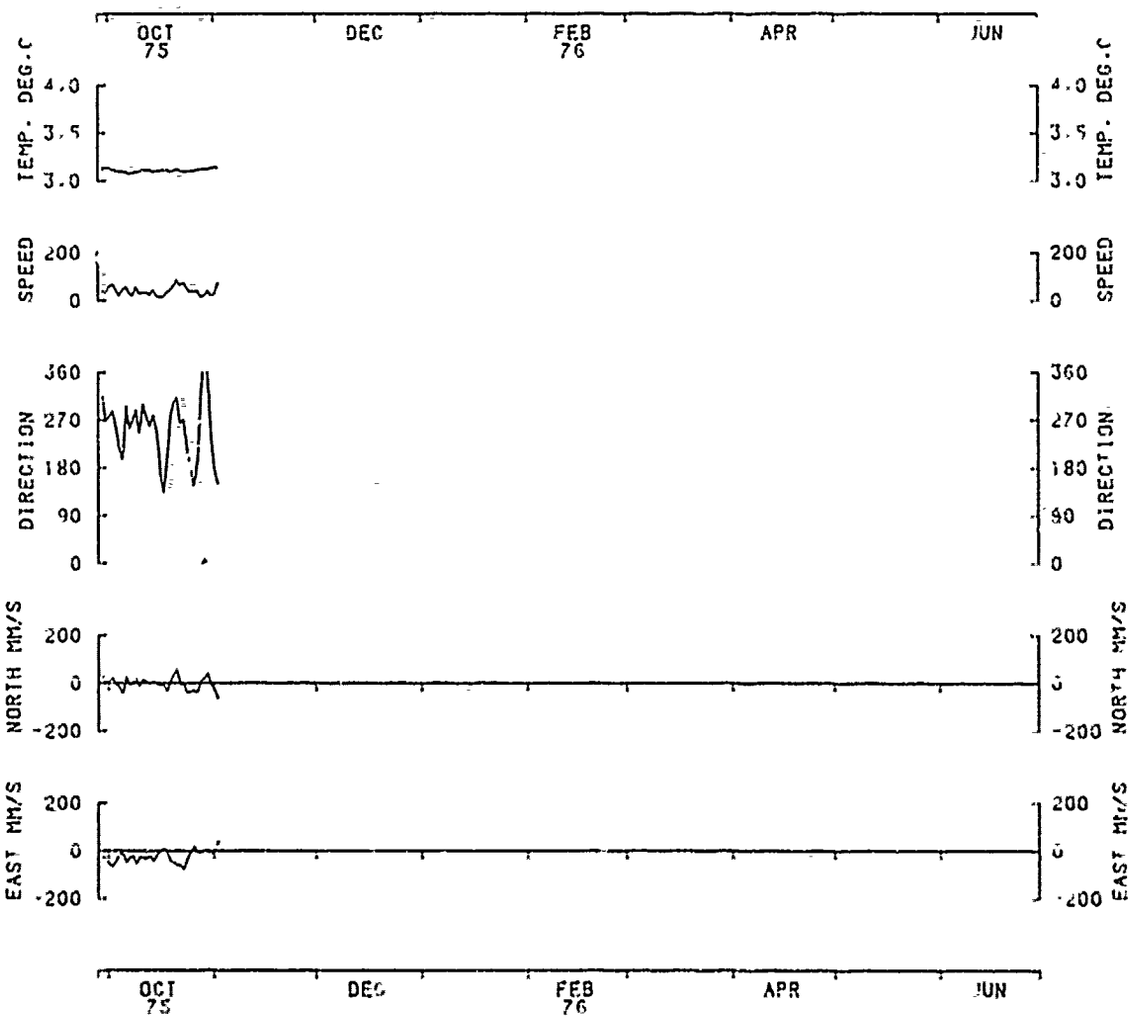
Figure 23



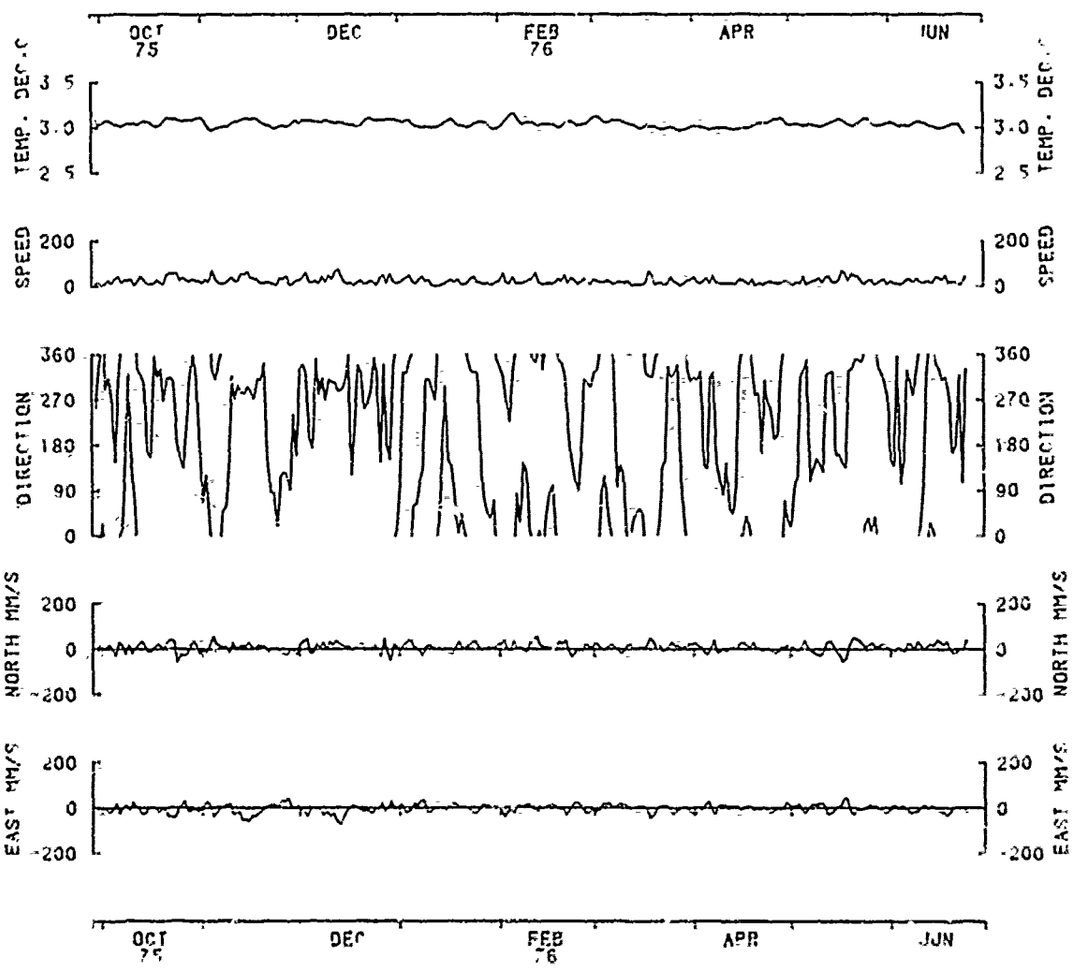
RECORD #5701B1DGAU24 DEPTH=4227 METERS



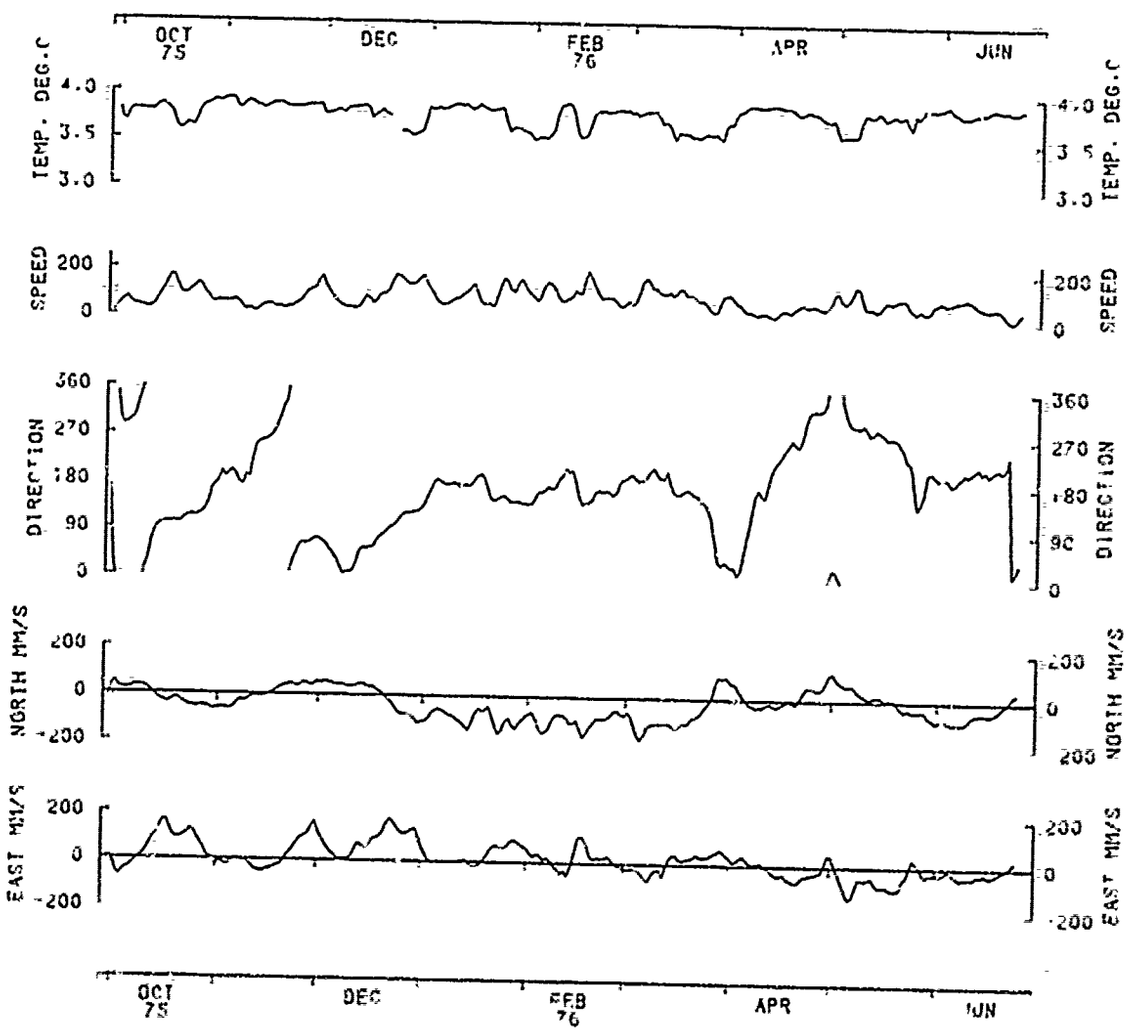
RECORD #5711A1DGAU24 DEPTH=1007 METERS



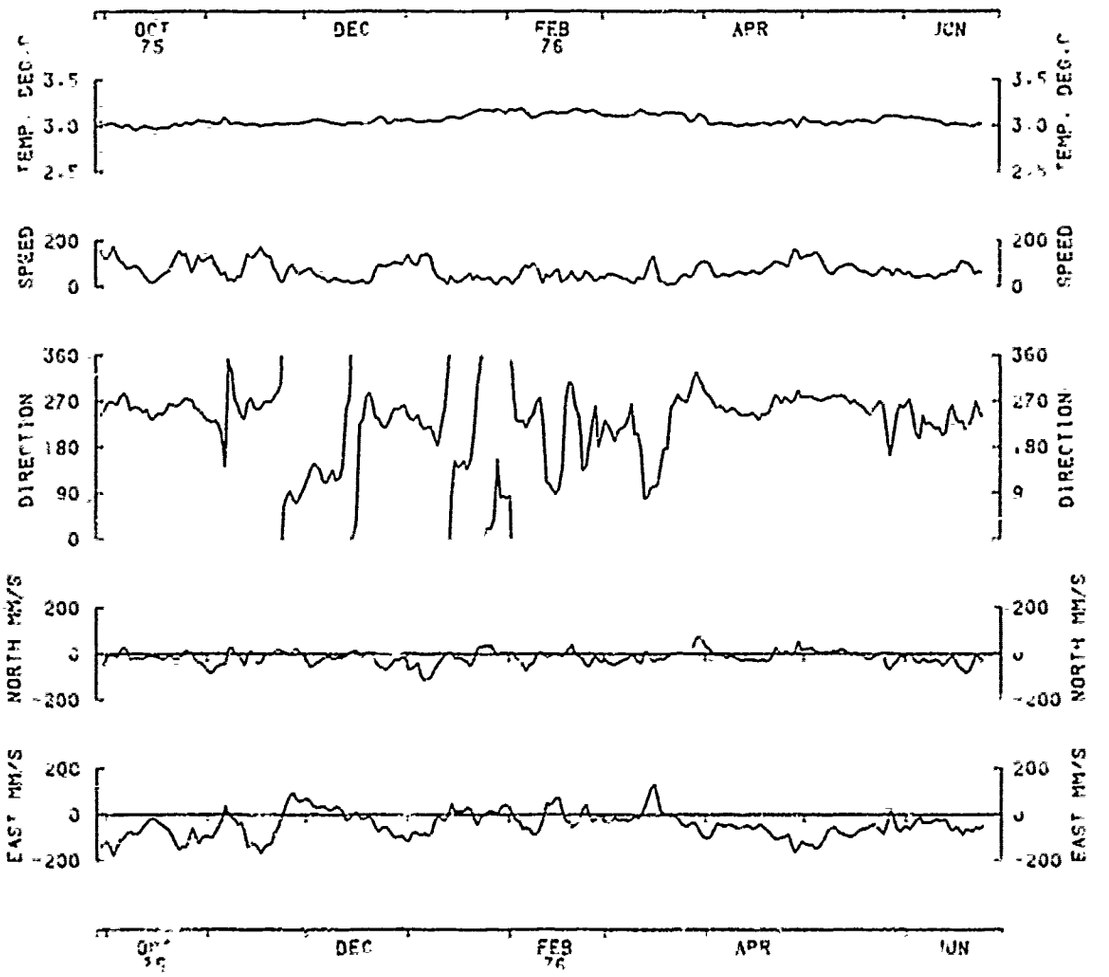
RECORD #5712B1DCAU24 DEPTH=2537 METERS



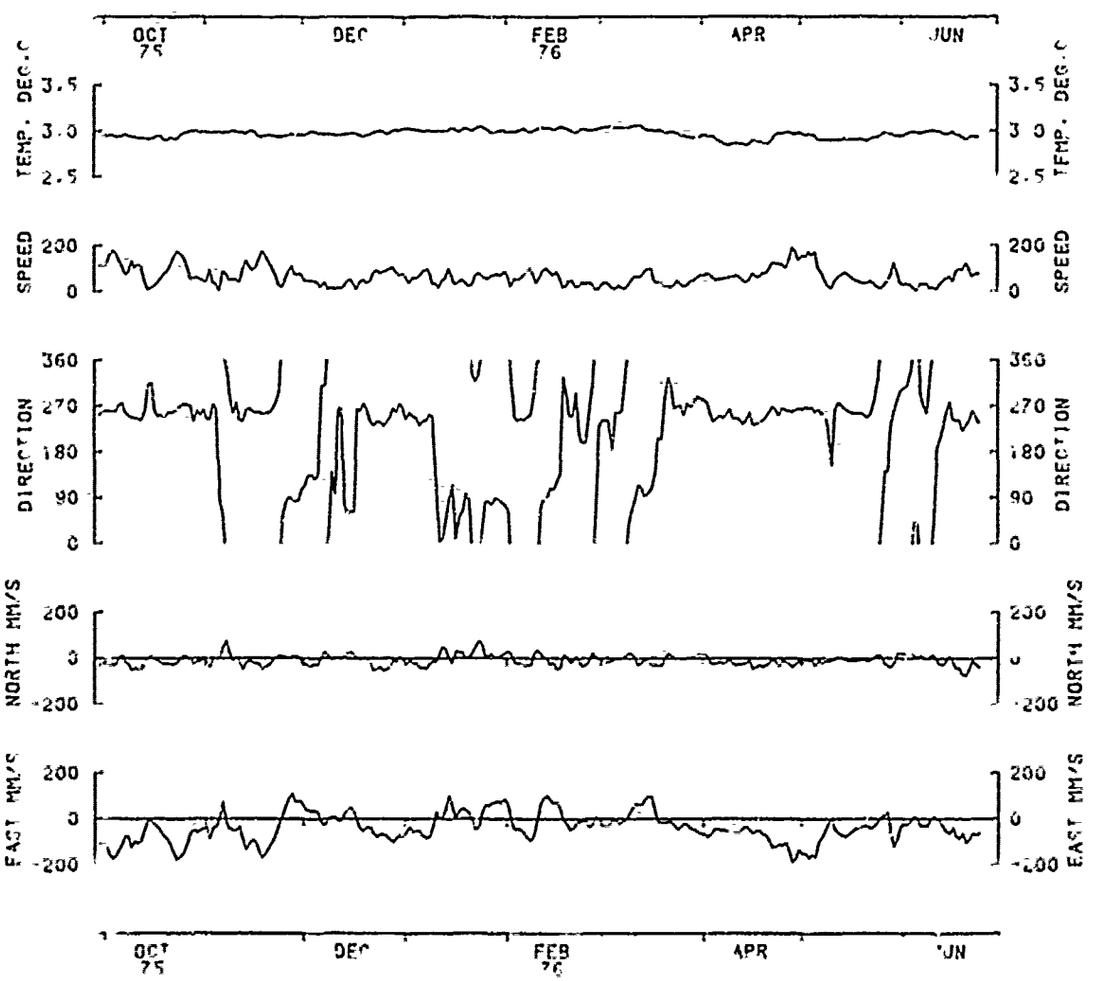
RECORD #5713B1DGAU24 DEPTH=2835 METERS



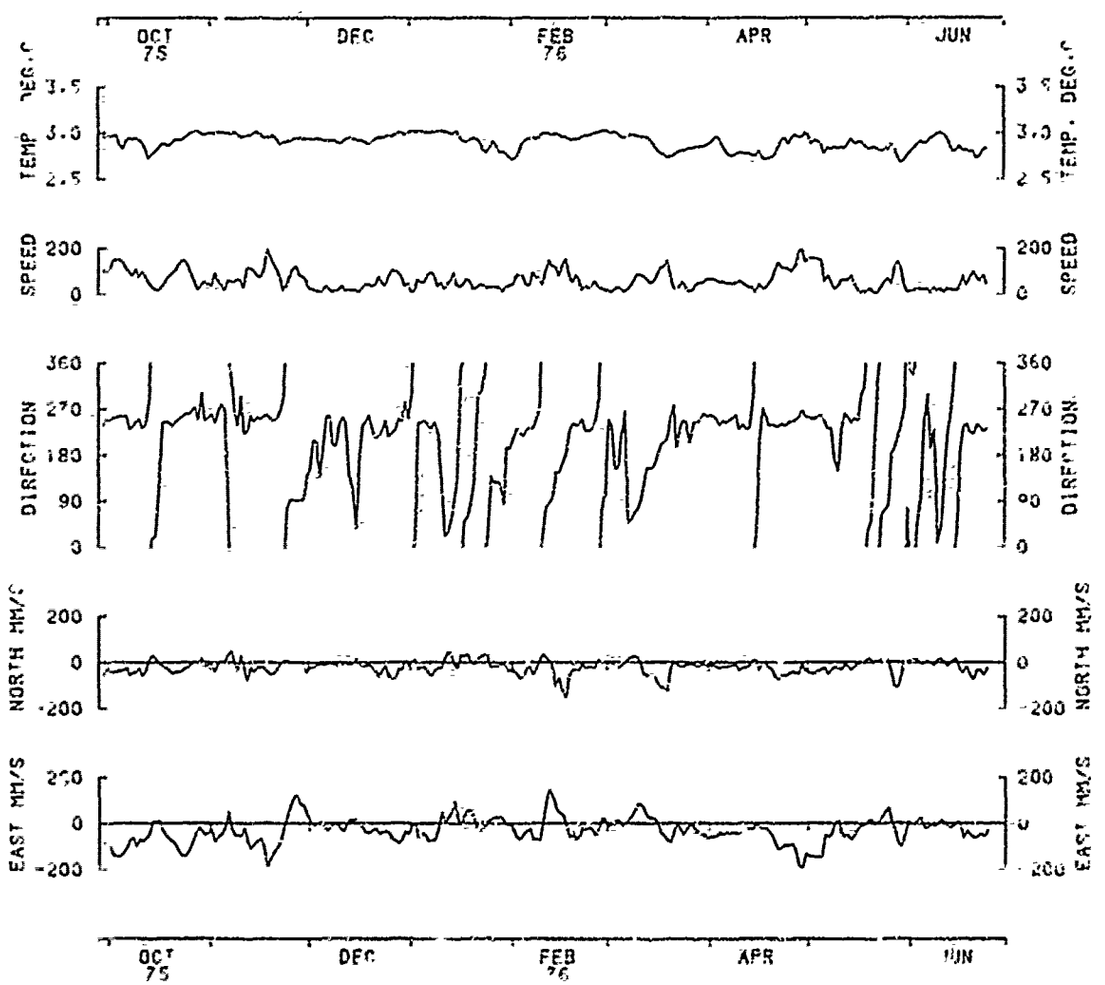
RECORD #5721A1DCAU24 DEPTH=998 METERS



RECORD #5722A1DCAU24 DEPTH=2528 METERS



RECORD #5723A1DCAU24 DEPTH=3060 METERS



RECORD #5724A1DGAU24 DEPTH=3360 METERS

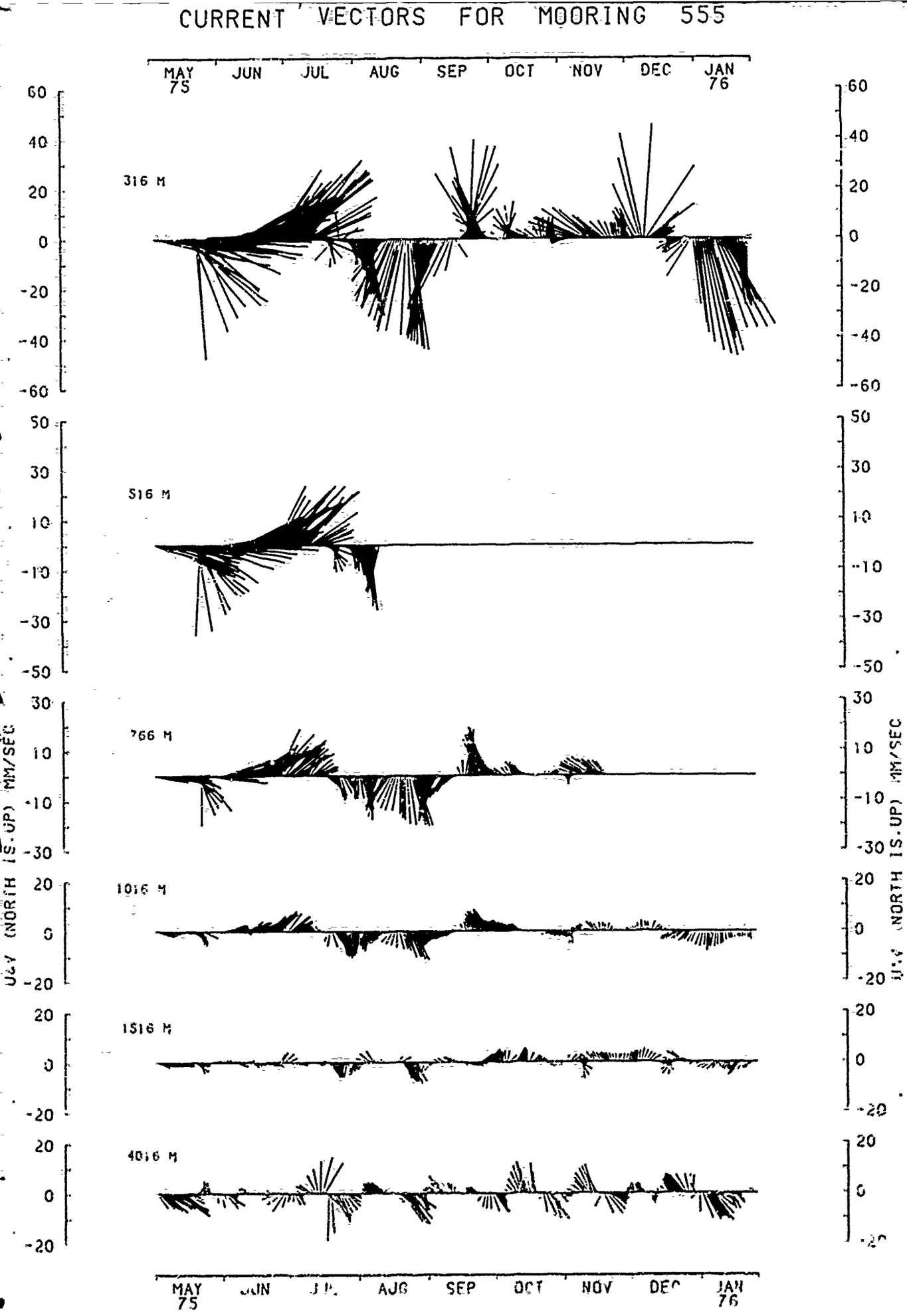

CURRENT VECTORS FOR MOORING 555
MAY 75
JUN
JUL
AUG
SEP
OCT
NOV
DEC
JAN 76
316 M
516 M
766 M
1016 M
1516 M
4016 M
U&V (NORTH IS.UP) MM/SEC

Figure 15

TEMPERATURE RECORDS MOORING 555

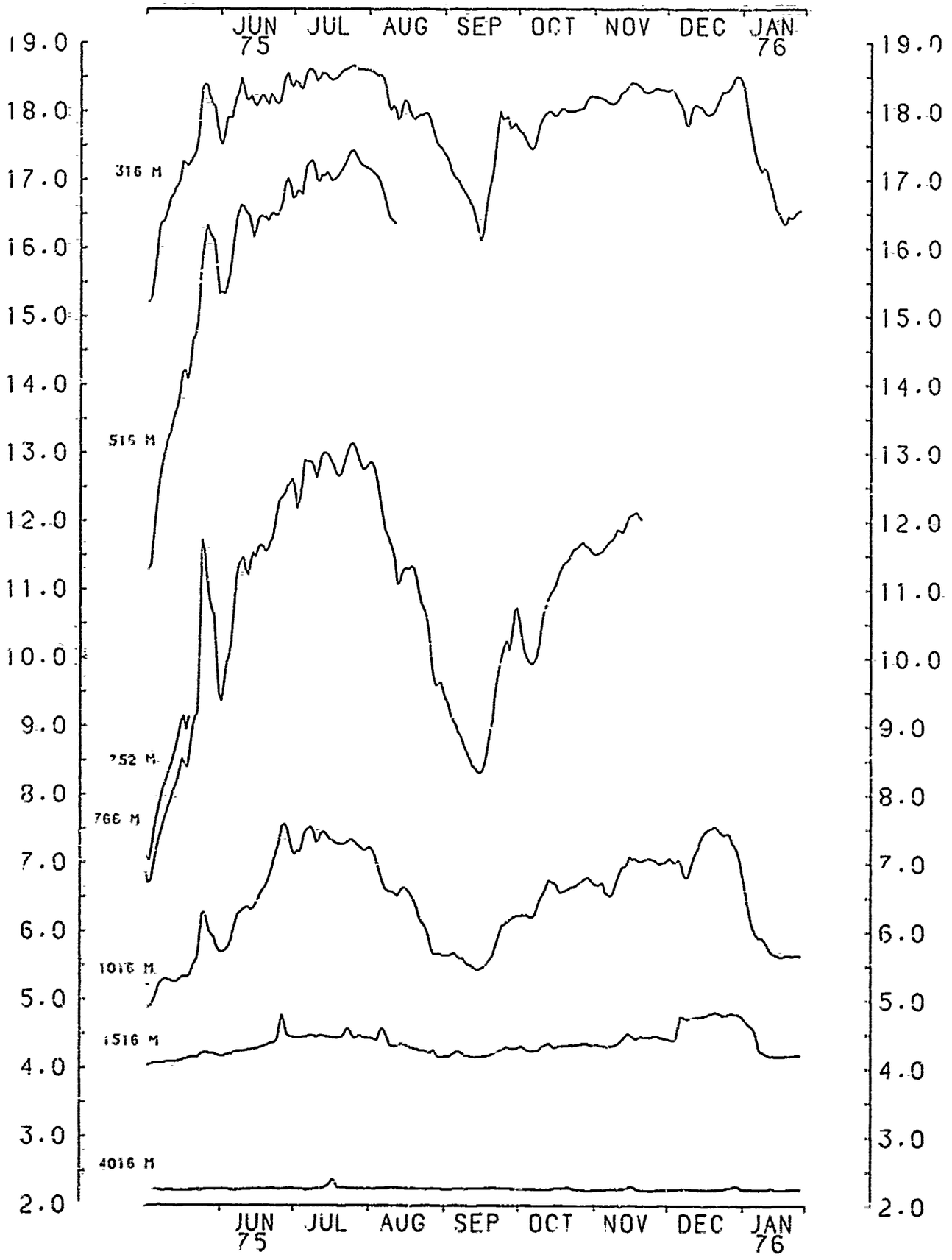


Figure 18

CURRENT VECTORS FOR MOORING 572

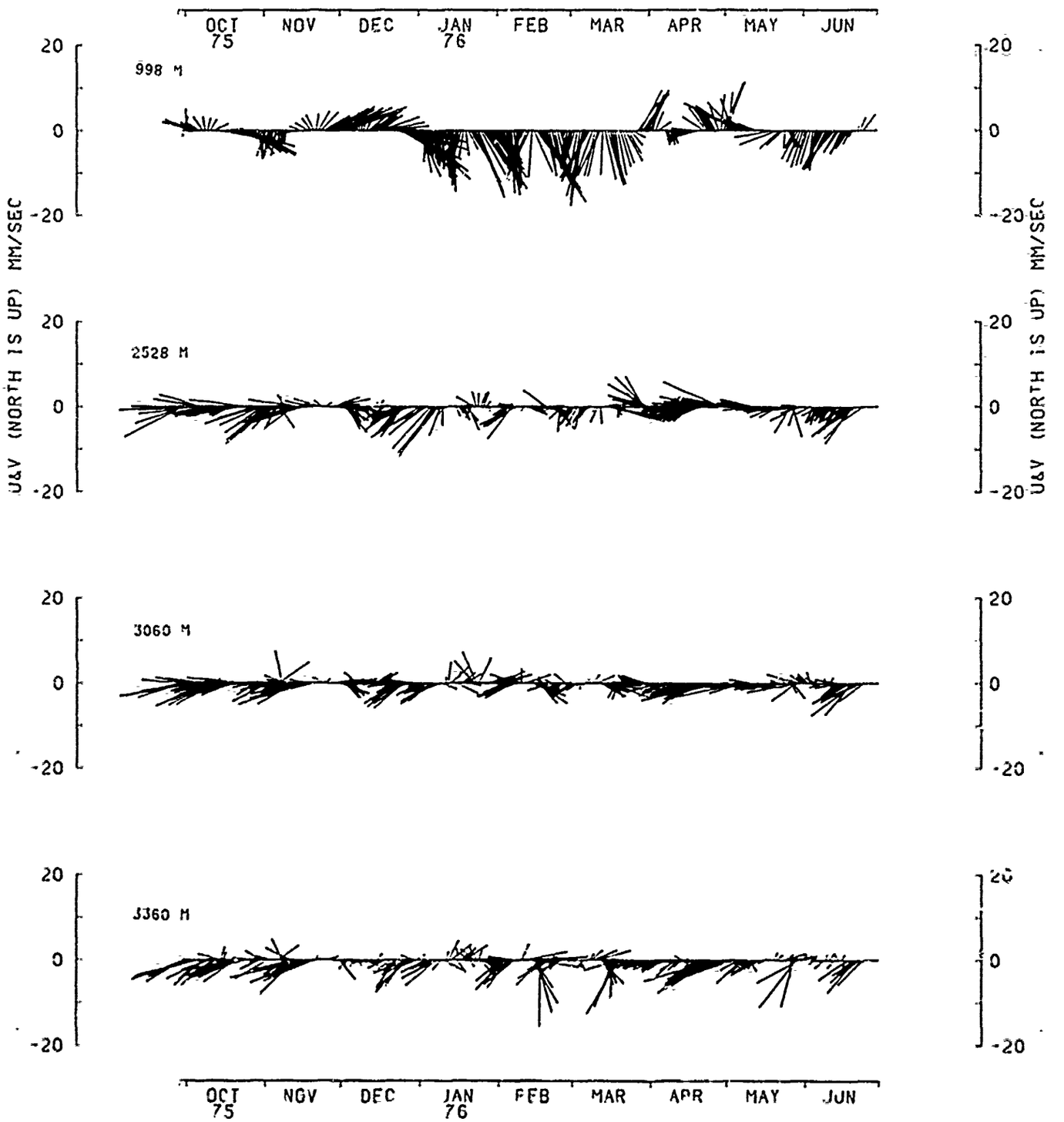


Figure 9

TEMPERATURE RECORDS MOORING 572

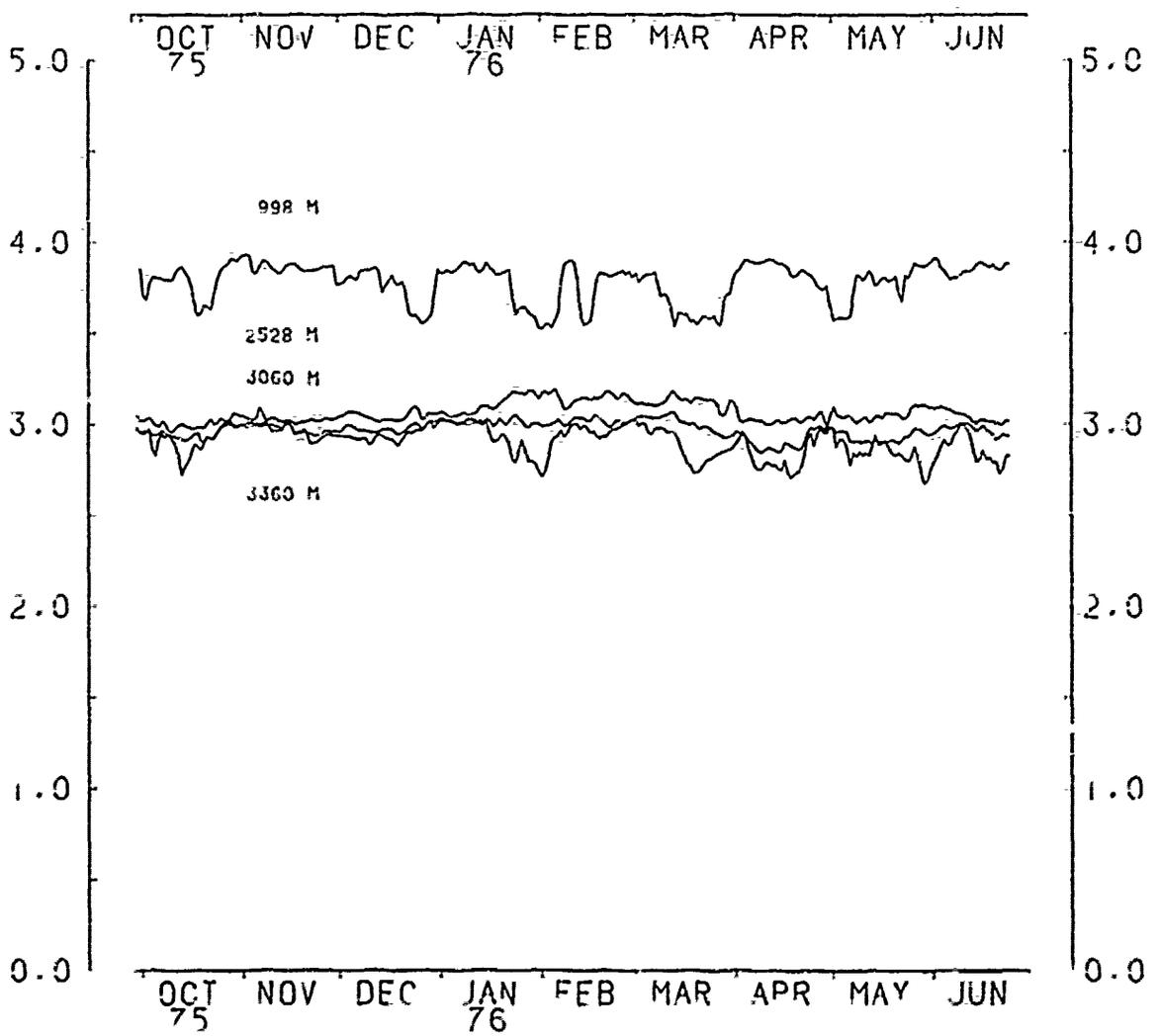


Figure 12

CURRENT VECTORS FOR MOORING 635

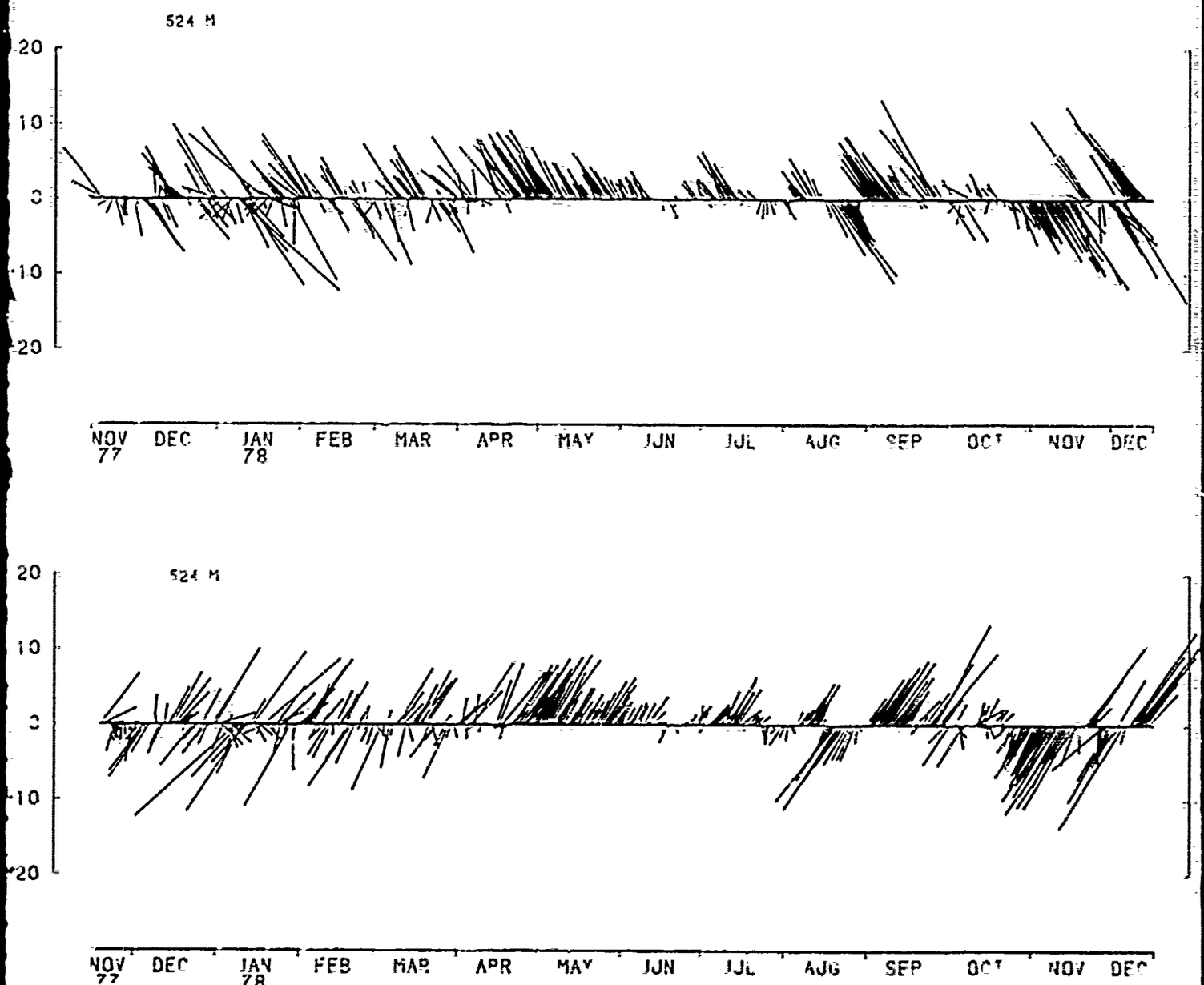


Figure 21

TEMPERATURE RECORDS MOORING 635

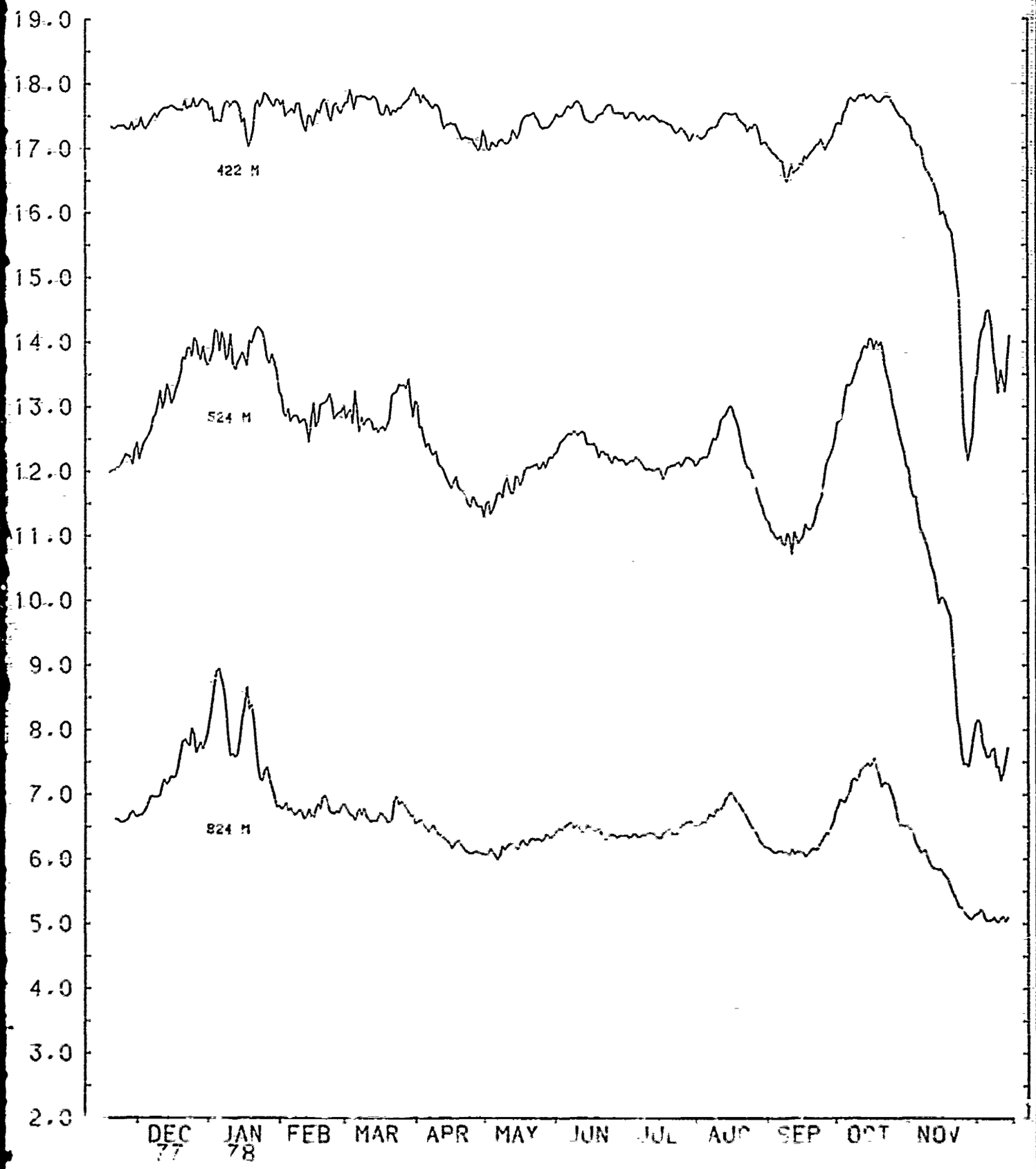


Figure 24

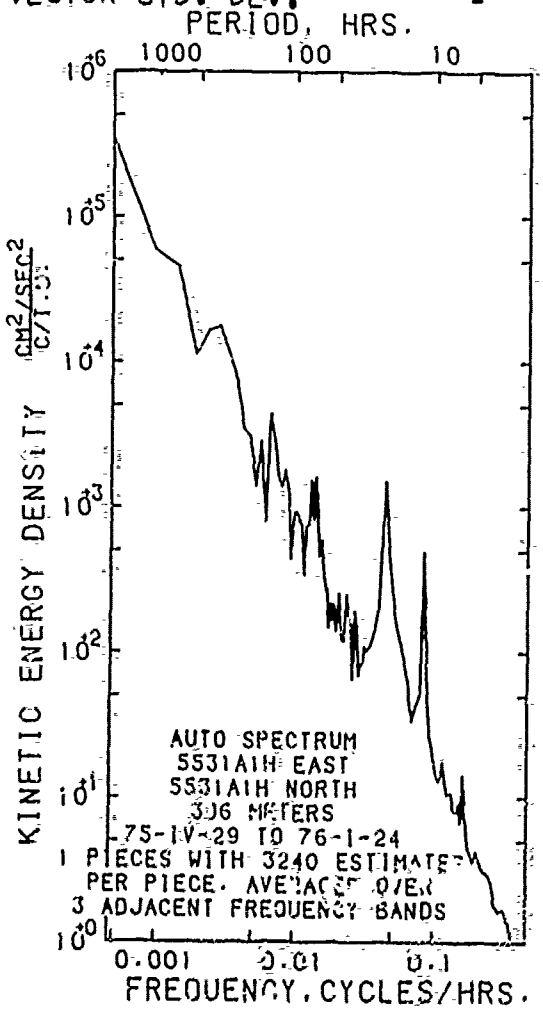
**** 5531A1H **** 6538 POINTS FROM 75- IV -29 TO 76- I -26
INST. V-0183 DEPTH 306 M.

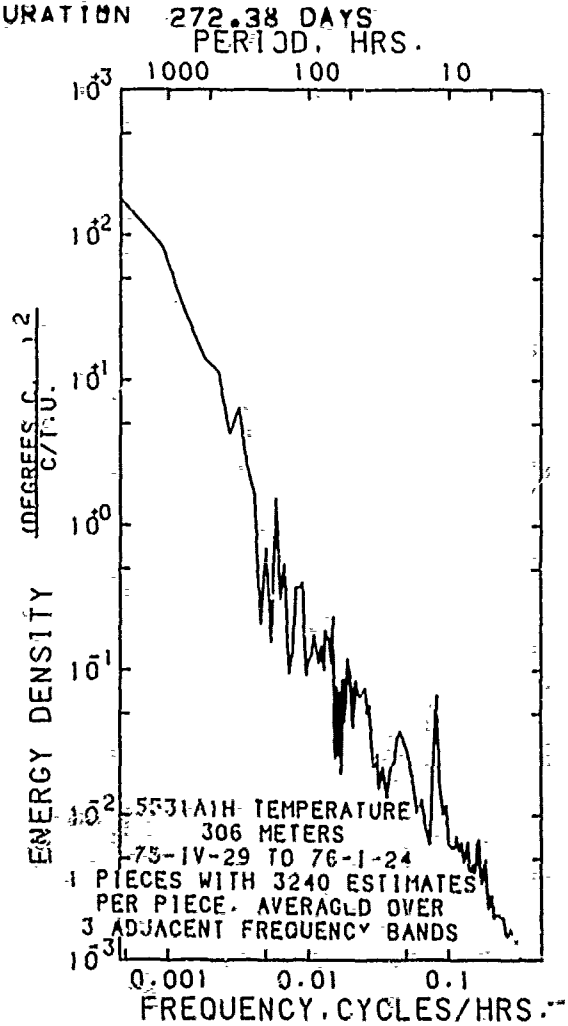
VARIABLE *	EAST	NORTH	SPEED	TEMPERATURE
UNITS *	MM/S	MM/S	MM/S	DEGREES C.
MEAN =	-31.931	18.532	213.396	18.145
STD. ERR. =	2.119	2.046	1.385	.567E-2
VARIANCE =	29351.972	27365.655	12542.642	.210
STD. DEV. =	171.324	165.426	111.994	.458
KURTOSIS =	2.744	3.268	2.501	8.490
SKEWNESS =	-.777E-1	.215	.462	-1.912
MINIMUM =	-522.516	-489.876	2.846	15.843
MAXIMUM =	402.526	495.907	561.533	18.846

****
EAST & NORTH
****

COVARIANCE =	7042.348
STD. ERR. OF COVARIANCE =	302.137
STD. DEV. OF COVARIANCE =	24430.164
CORRELATION COEFFICIENT =	.248
VECTOR MEAN =	26.920
VECTOR VARIANCE =	28358.813
VECTOR STD. DEV. =	168.401

****
* SAMPLE SIZE = 6538 POINTS
*
* SPANNING RANGE
* FROM 75- IV -29 04.00.00
* TO 76- I -26 13.00.00
*
* DURATION 272.38 DAYS





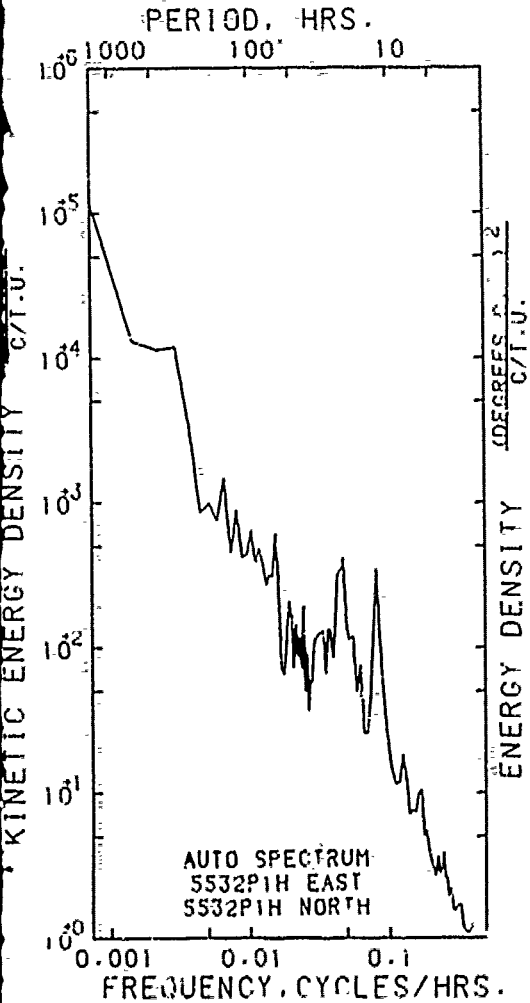
** 5532P1H ** 4079 P0INTS FR9M 75- IV -29 T0 75- X -15
INST. 0T-5106 DEPTH 506 M.

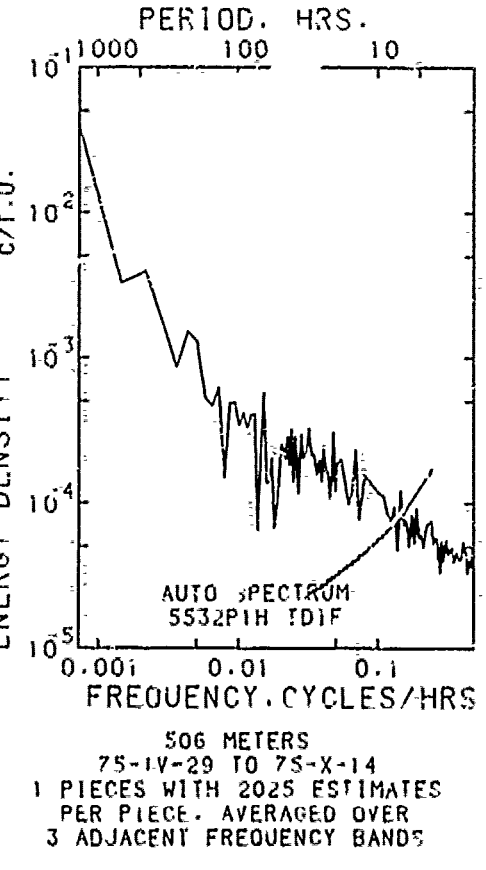
VARIABLE *	EAST	N0RTH	SPEED	TEMPERATURE	TDIF
UNITS *	MM/S	MM/S	MM/S	DEGREES C.	DEG. C.
MEAN =	.410	20.753	183.074	16.564	.131E-1
STD. ERR. =	2.590	1.779	1.328	.110E-1	.143E-3
VARIANCE =	27363.502	12912.912	7191.103	.490	.830E-4
STD. DEV. =	165.419	113.635	84.800	.700	.911E-2
KURT0SIS =	2.071	2.612	2.599	3.235	3.858
SKEWNESS =	-.208	-.247	.276	-.923	.534
MINIMUM =	-411.094	-395.810	1.844	14.376	-.155E-1
MAXIMUM =	336.132	278.320	439.973	17.872	.642E-1

EAST & NORTH

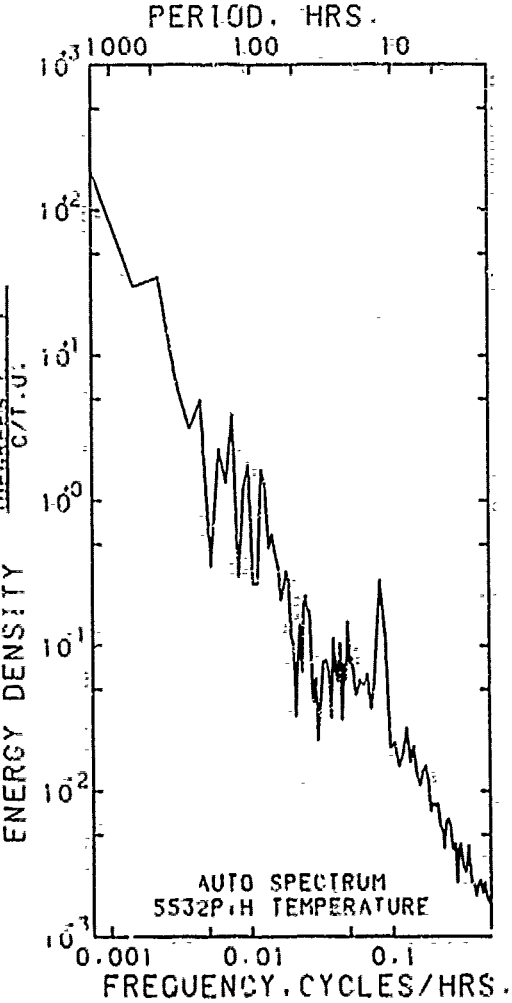
C0VARIANCE =	2175.815	
STD. ERR. 0F C0VARIANCE =	318.862	
STD. DEV. 0F C0VARIANCE =	20364.787	
C0RRELATI0N C0EFFICIENT =	.116	
VECT0R MEAN =	20.757	
VECT0R VARIANCE =	20138.207	
VECT0R STD. DEV. =	141.909	

* SAMPLE SIZE = 4079 P0INTS
*
* SPANNING RANGE
* FR0M 75- IV -29 01.37.30
* T0 75- X -15 23.37.30
*
* DURATI0 169.92 DAYS





506 METERS
75-IV-29 TO 75-X-14
1 PIECES WITH 2025 ESTIMATES
PER PIECE. AVERAGED OVER
3 ADJACENT FREQUENCY BANDS



**** 5534A1H ** 6538 POINTS FROM 75- IV -29 TO 76- I -26**

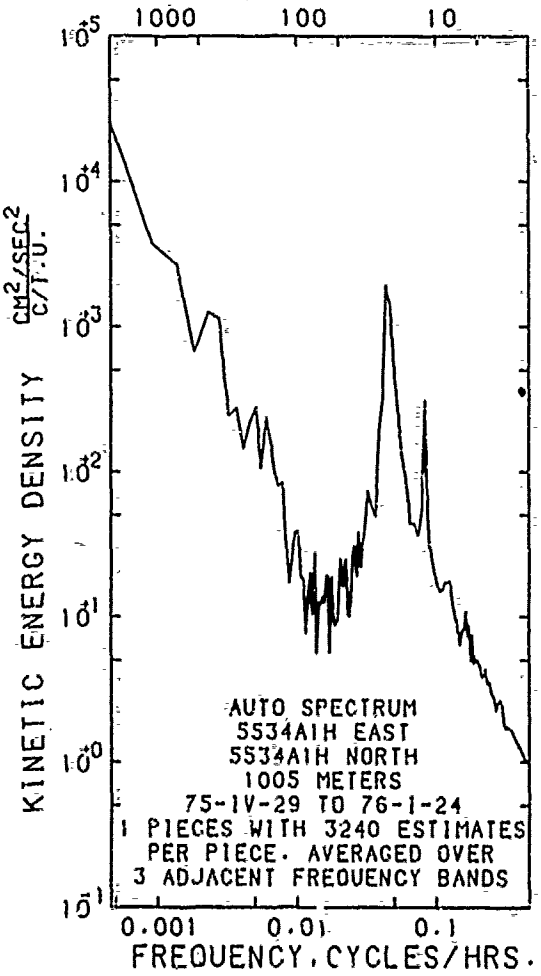
INST. V-0136 DEPTH 1005 M.

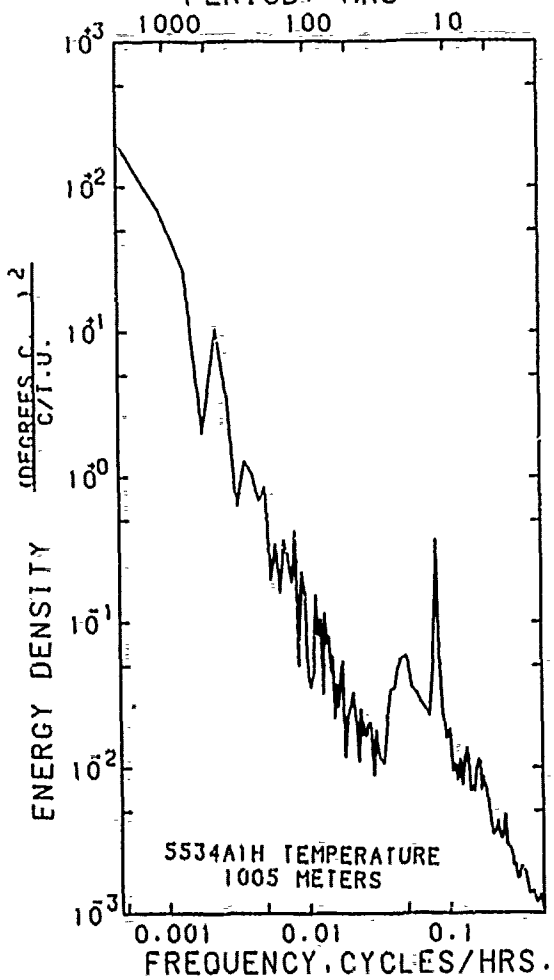
VARIABLE	EAST	NORTH	SPEED	TEMPERATURE
UNITS	MM/S	MM/S	MM/S	DEGREES C.
MEAN	-10.317	3.493	75.612	6.740
STD. ERR.	.782	.701	.496	.635E-2
VARIANCE	3999.645	3208.957	1610.044	.264
STD. DEV.	63.243	56.648	40.125	.514
KURTOSIS	2.728	3.342	3.041	2.902
SKEWNESS	.237E-1	.231	.699	.178
MINIMUM	-204.466	-190.015	1.175	5.683
MAXIMUM	194.928	228.960	245.272	8.167

EAST & NORTH

COVARIANCE	412.390
STD. ERR. OF COVARIANCE	46.252
STD. DEV. OF COVARIANCE	3739.860
CORRELATION COEFFICIENT	.115
VECTOR MEAN	10.892
VECTOR VARIANCE	3604.301
VECTOR STD. DEV.	60.036

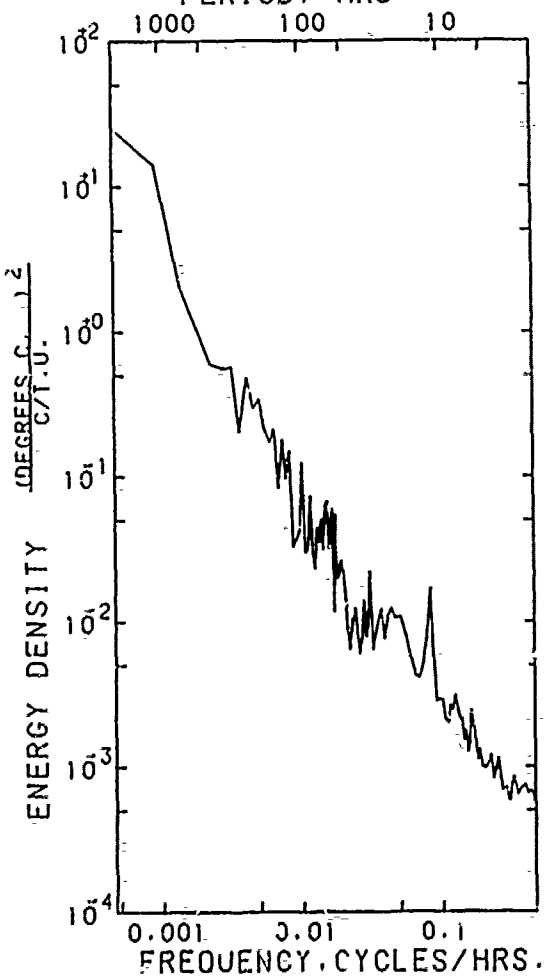
* SAMPLE SIZE = 6538 POINTS
*
* SPANNING RANGE
* FROM 75- IV -29 04.00.00
* TO 76- I -26 13.00.00
*
* DURATION 272.38 DAYS





```
**********************************************************************
**  5535A1HTEMP **  6538 PØINTS  FRØM 75- IV -29  TØ 76-  I -26
    INST. T-0052   DEPTH 1505 M.
************************
VARIABLE   *  TEMPERATURE
UNITS      *   DEGREES C.
************************
MEAN       =         4.504
STD. ERR.  =          .192E-2
VARIANCE   =          .241E-1
STD. DEV.  =          .155
KURTØSIS   =         2.335
SKEWNESS   =         -.145
MINIMUM    =         4.066
MAXIMUM    =         4.849


**********************
* SAMPLE SIZE =  6538 PØINTS
*
* SPANNING RANGE
* FRØM  75- IV -29  03.30.42
* TØ    76-  I -26  12.30.42
*
* DURATIØN  272.38 DAYS
```



AUTO SPECTRUM
5535A1HTEMP TEMPERATURE
1505 METERS
75-IV-29 TO 76-I-24
1 PIECES WITH 3240 ESTIMATES
PER PIECE. AVERAGED OVER
3 ADJACENT FREQUENCY BANDS

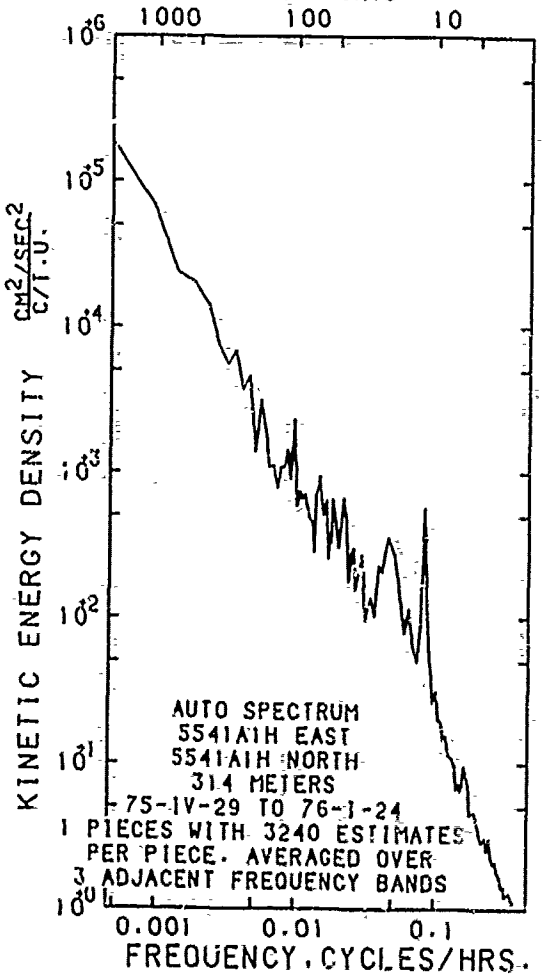
** 5541A1H ** 6510 POINTS FROM 75- IV -29 TO 76- I -26
INST. V-0131 DEPTH 314 M.

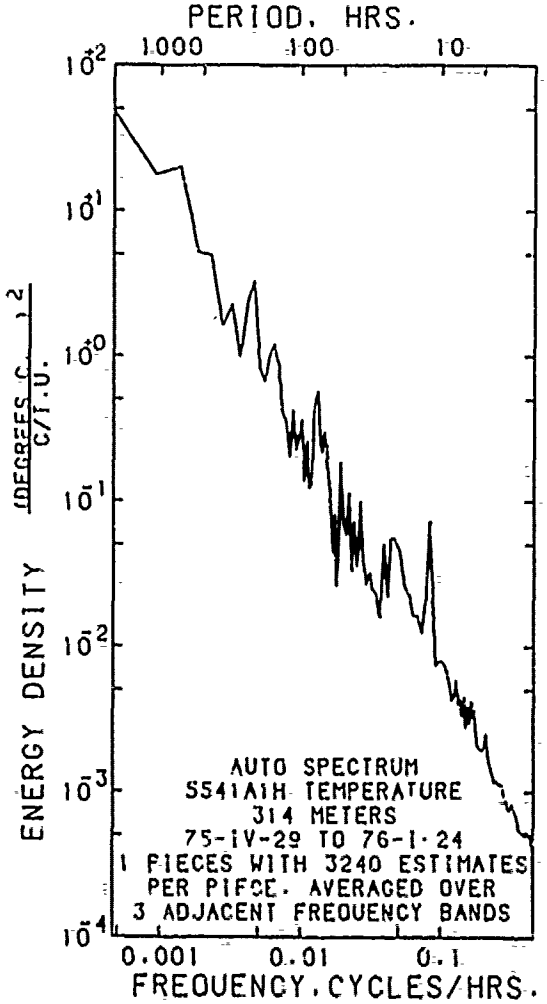
VARIABLE	EAST	NORTH	SPEED	TEMPERATURE
UNITS	MM/S	MM/S	MM/S	DEGREES C.
MEAN	22.117	-55.866	202.639	18.289
STD. ERR.	1.824	1.935	1.148	.368E-2
VARIANCE	21665.770	24365.303	8578.635	.883E-1
STD. DEV.	147.193	156.094	92.621	.297
KURTOSIS	3.766	2.190	3.391	3.425
SKEWNESS	-.405	.116	.504	-.693
MINIMUM	-522.638	-427.856	5.974	16.976
MAXIMUM	485.418	518.449	696.074	18.929

****
EAST & NORTH
****

COVARIANCE	=	5741.169
STD. ERR. OF COVARIANCE	=	269.821
STD. DEV. OF COVARIANCE	=	21770.377
CORRELATION COEFFICIENT	=	.250
VECTOR MEAN	=	60.084
VECTOR VARIANCE	=	23015.536
VECTOR STD. DEV.	=	151.709

****
* SAMPLE SIZE = 6510 POINTS
*
* SPANNING RANGE
* FROM 75- IV -29 22.00.00
* TO 76- I -26 03.00.00
*
* DURATION 271.21 DAYS
****





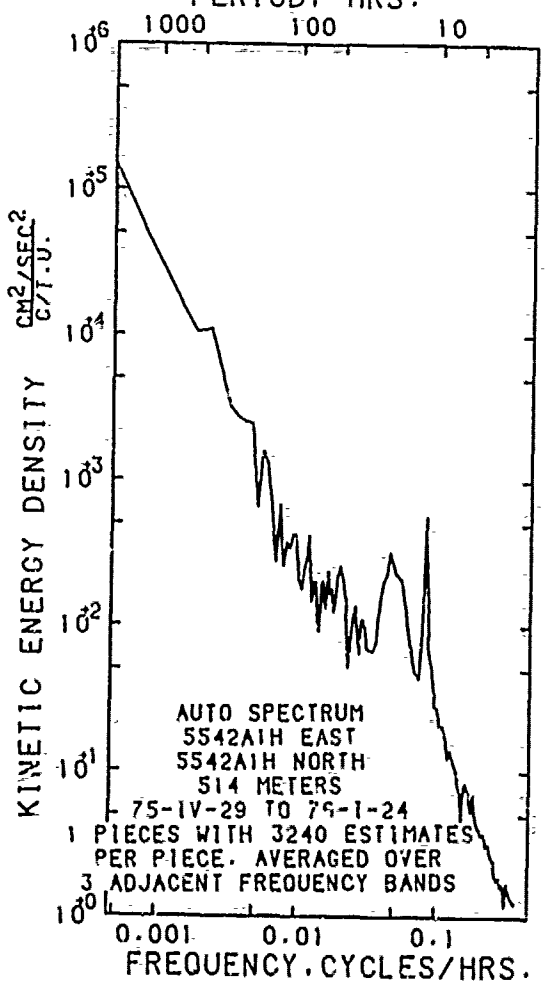
** 5542A1H ** 6510 POINTS FROM 75- IV -29 TO 76- I -26
INST. V-0106 DEPTH 514 M.

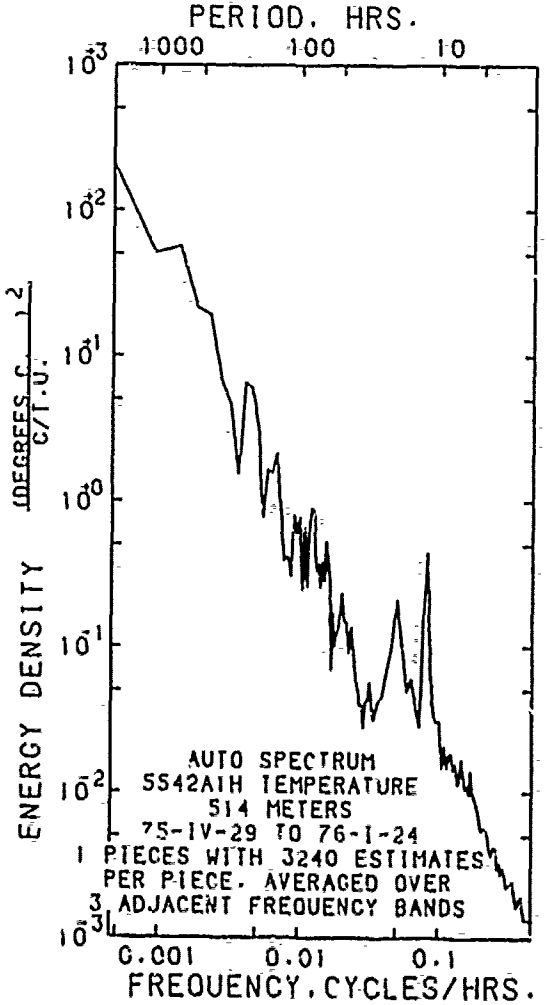
VARIABLE *	EAST	NORTH	SPEED	TEMPERATURE
UNITS *	MM/S	MM/S	MM/S	DEGREES C.
MEAN *	8.982	-44.652	166.785	16.621
STD. ERR. *	1.418	1.660	.902	.743E-2
VARIANCE *	13094.031	17949.513	5300.914	.359
STD. DEV. *	114.429	133.976	72.807	.600
KURTOSIS *	3.259	1.990	3.095	4.290
SKEWNESS *	-.440	.940E-1	.275	-.876
MINIMUM *	-406.235	-354.007	4.369	13.883
MAXIMUM *	285.636	364.985	461.469	17.808

****
EAST & NORTH
****

COVARIANCE	*	6077.522
STD. ERR. OF COVARIANCE	*	173.267
STD. DEV. OF COVARIANCE	*	13979.985
CORRELATION COEFFICIENT	*	.396
VECTOR MEAN	*	45.547
VECTOR VARIANCE	*	15521.772
VECTOR STD. DEV.	*	124.586

****
* SAMPLE SIZE = 6510 POINTS
*
* SPANNING RANGE
* FROM 75- IV -29 22.00.00
* TO 76- I -26 03.00.00
*
* DURATION 271.21 DAYS





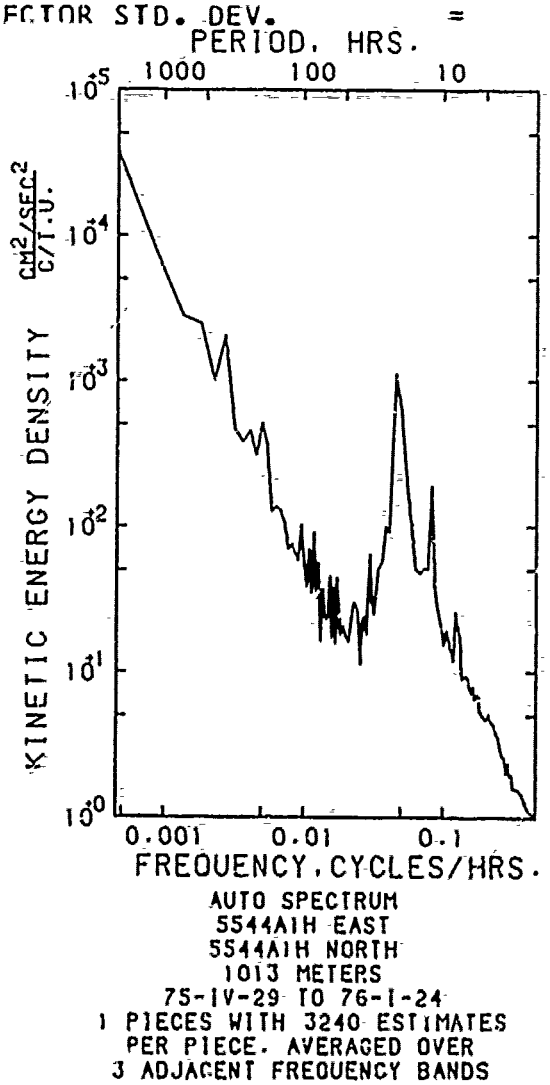
****
** 5544A1H ** 6510 POINTS FROM 75- IV -29 TO 76- I -26
INST. V-0180 DEPTH 1013 M.

VARIABLE *	EAST	NORTH	SPEED	TEMPERATURE
UNITS *	MM/S	MM/S	MM/S	DEGREES C.
MEAN =	-16.225	-20.294	87.306	7.046
STD. ERR. =	.779	.891	.577	.864E-2
VARIANCE =	3947.889	5164.897	2165.536	.486
STD. DEV. =	62.832	71.867	46.535	.697
KURTOSIS =	3.199	2.689	3.378	2.234
SKEWNESS =	-.317	-.202	.778	.484
MINIMUM =	-244.846	-269.253	3.220	5.819
MAXIMUM =	154.463	179.944	277.657	8.929

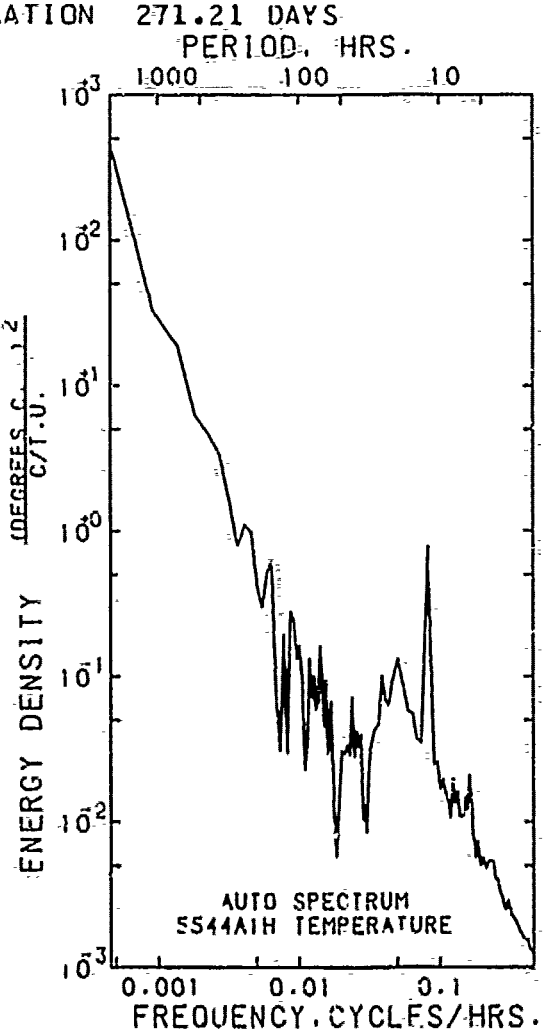
****
EAST & NORTH
****

COVARIANCE	=	1473.676
STD. ERR. OF COVARIANCE	=	56.699
STD. DEV. OF COVARIANCE	=	4574.746
CORRELATION COEFFICIENT	=	.326
VECTOR MEAN	=	25.983
VECTOR VARIANCE	=	4556.393
VECTOR STD. DEV.	=	67.501

****
* SAMPLE SIZE = 6510 POINTS
*
* SPANNING RANGE
* FROM 75- IV -29 22.00.00
* TO 76- I -26 03.00.00
*
* DURATION 271.21 DAYS



AUTO SPECTRUM
5544A1H EAST
5544A1H NORTH
1013 METERS
75-IV-29 TO 76-I-24
1 PIECES WITH 3240 ESTIMATES
PER PIECE. AVERAGED OVER
3 ADJACENT FREQUENCY BANDS



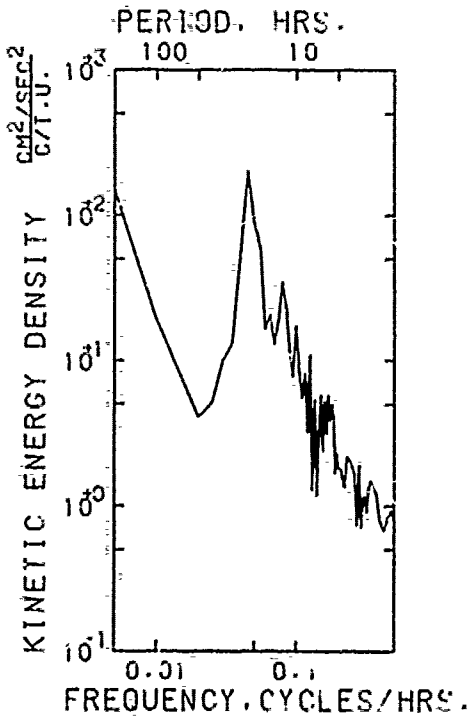
** 5545A1H ** 627 POINTS FROM 75- IV -29 TO 75- V -25
INST. M-260T DEPTH 1513 M.

VARIABLE *	EAST COMP	NORTH COMP	SPEED	TEMPERATURE
UNITS *	MM/SEC	MM/SEC	MM/SEC	DEGREES C.
MEAN =	-22.391	-6.521	39.220	4.275
STD. ERR. =	1.345	.799	.928	.175E-2
VARIANCE =	1134.416	399.788	539.902	.193E-2
STD. DEV. =	33.681	19.995	23.236	.439E-1
KURTOSIS =	2.748	3.702	3.126	3.882
SKEWNESS =	-.303	-.495	.975	1.050
MINIMUM =	-113.783	-81.405	17.276	4.188
MAXIMUM =	74.032	56.108	114.333	4.437

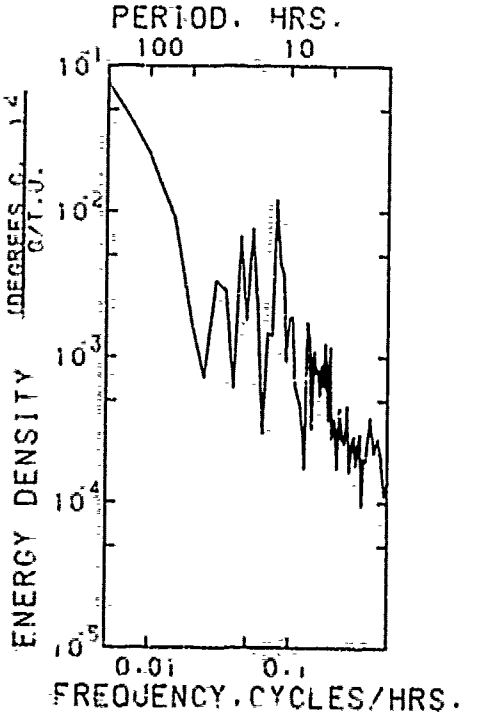
EAST COMP & NORTH COMP

COVARIANCE	=	-216.981
STD. ERR. OF COVARIANCE	=	30.071
STD. DEV. OF COVARIANCE	=	752.975
CORRELATION COEFFICIENT	=	-.322
VECTOR MEAN	=	23.321
VECTOR VARIANCE	=	767.102
VECTOR STD. DEV.	=	27.697

* SAMPLE SIZE = 627 POINTS
*
* SPANNING RANGE
* FROM 75- IV -29 21.30.42
* TO 75- V -25 23.30.42
*
* DURATION 26.08 DAYS



AUTO SPECTRUM
5545A1H EAST COMP
5545A1H NORTH COMP
1513 METERS
75-IV-29 TO 75-V-24
1 PIECES WITH 300 ESTIMATES
PER PIECE. AVERAGED OVER
3 ADJACENT FREQUENCY BANDS



AUTO SPECTRUM
5545A1H TEMPERATURE
1513 METERS
75-IV-29 TO 75-V-24
1 PIECES WITH 300 ESTIMATES
PER PIECE. AVERAGED OVER
3 ADJACENT FREQUENCY BANDS

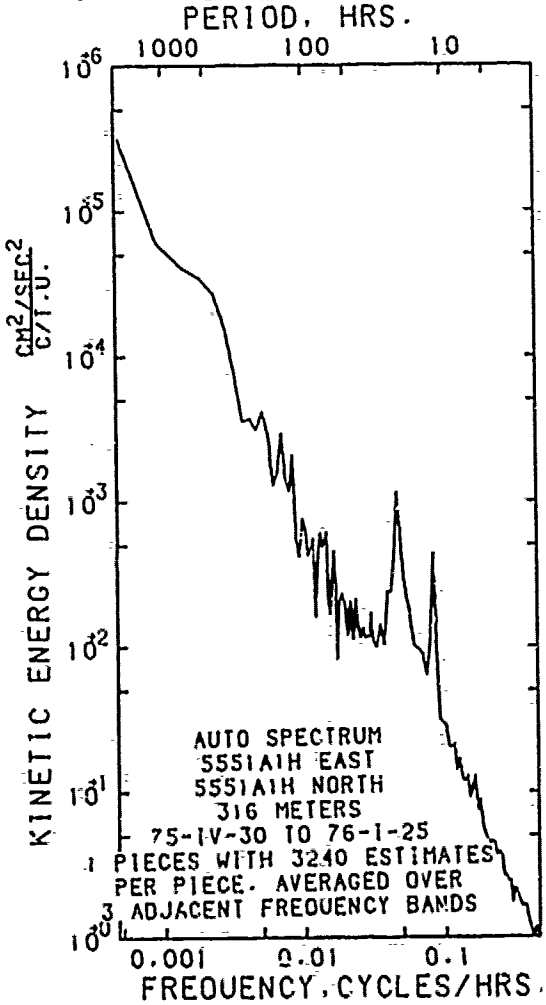
** 5551A1H ** 6488 POINTS FROM 75- IV -30 TO 76- I -25
INST. V-0111 DEPTH 316 M.

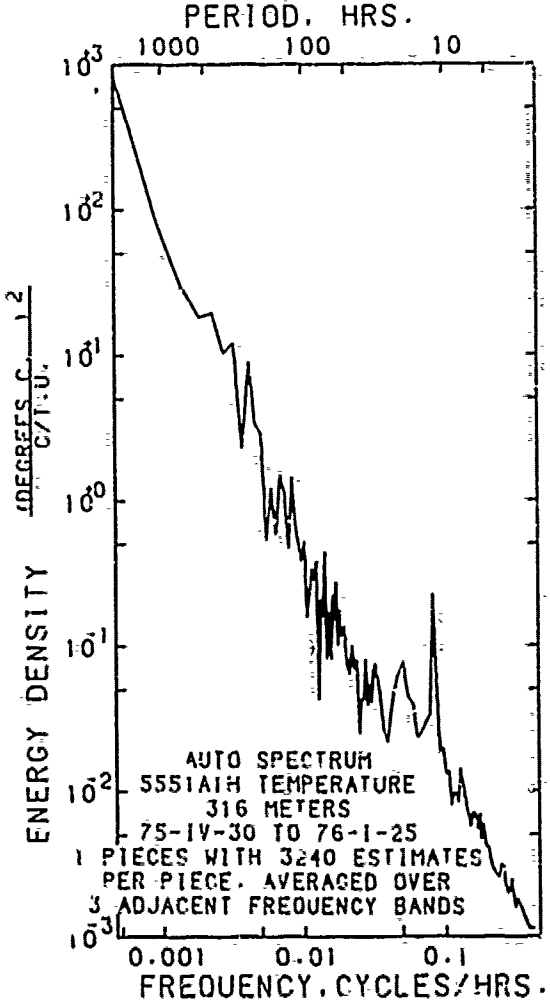
VARIABLE *	EAST	NORTH	SPEED	TEMPERATURE
UNITS *	MM/S	MM/S	MM/S	DEGREES C.
MEAN =	73.461	-32.533	256.881	17.817
STD. ERR. =	2.280	2.616	1.692	.892E-2
VARIANCE =	33733.439	44384.154	18584.638	.517
STD. DEV. =	183.667	210.675	136.325	.719
KURTOSIS =	2.445	2.470	1.944	4.210
SKEWNESS =	.633	-.244	.133	-1.289
MINIMUM =	-289.179	-594.268	4.758	14.783
MAXIMUM =	595.212	511.112	614.104	18.731

EAST & NORTH

COVARIANCE	=	5083.815
STD. ERR. OF COVARIANCE	=	413.015
STD. DEV. OF COVARIANCE	=	33267.586
CORRELATION COEFFICIENT	=	.131
VECTOR MEAN	=	80.343
VECTOR VARIANCE	=	39058.797
VECTOR STD. DEV.	=	197.633

* SAMPLE SIZE = 6488 POINTS
*
* SPANNING RANGE
* FROM 75- IV -30 11.00.00
* TO 76- I -25 18.00.00
*
* DURATION 270.29 DAYS





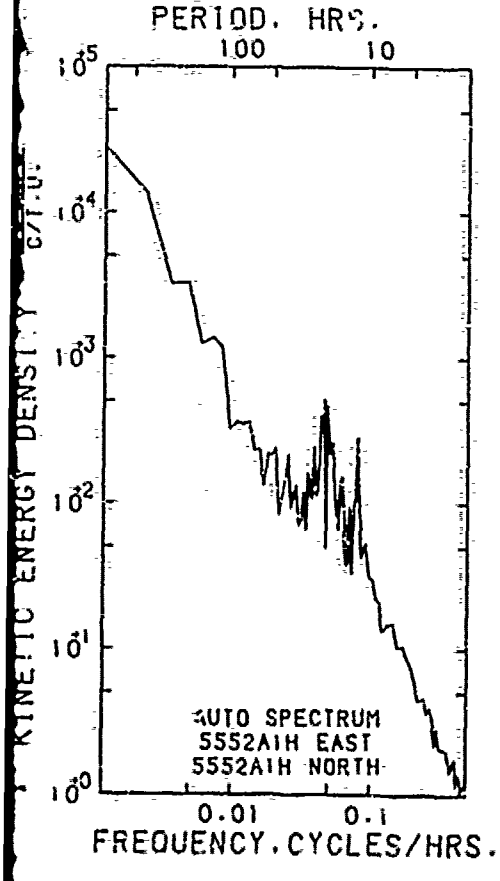
**** 5552A1H ** 2491 POINTS FROM 75- IV -30 TO 75-VIII-12
INST. DT-5107 DEPTH 516 M.

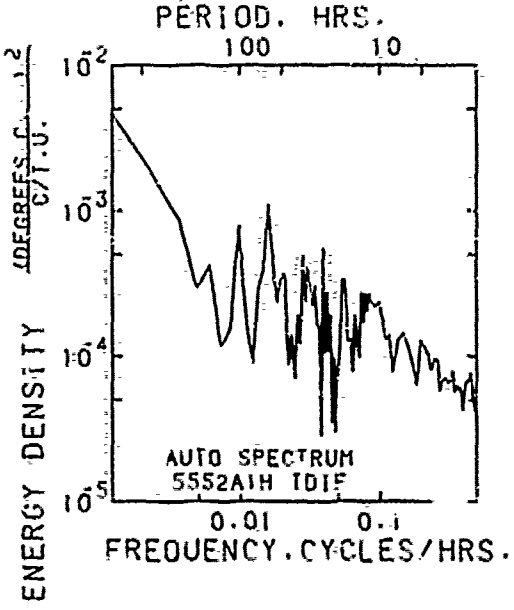
VARIABLE *	EAST	NORTH	SPEED	TEMPERATURE	TDIF
UNITS *	MM/S	MM/S	MM/S	DEGREES C.	DEG. C.
MEAN *	188.083	-6.134	253.461	15.915	.198E-1
STD. ERR. *	2.474	2.396	1.877	.319E-1	.194E-3
VARIANCE *	15243.364	22359.266	8772.938	2.527	.933E-4
STD. DEV. *	123.464	149.530	93.664	1.590	.966E-2
KURTOSIS *	2.332	2.393	2.691	4.102	4.479
SKEWNESS *	-.239	-.176	-.322	-1.454	1.002
MINIMUM *	-126.096	-414.125	7.816	10.656	-.226E-2
MAXIMUM *	557.268	335.092	559.182	17.625	.679E-1

****
EAST & NORTH
****

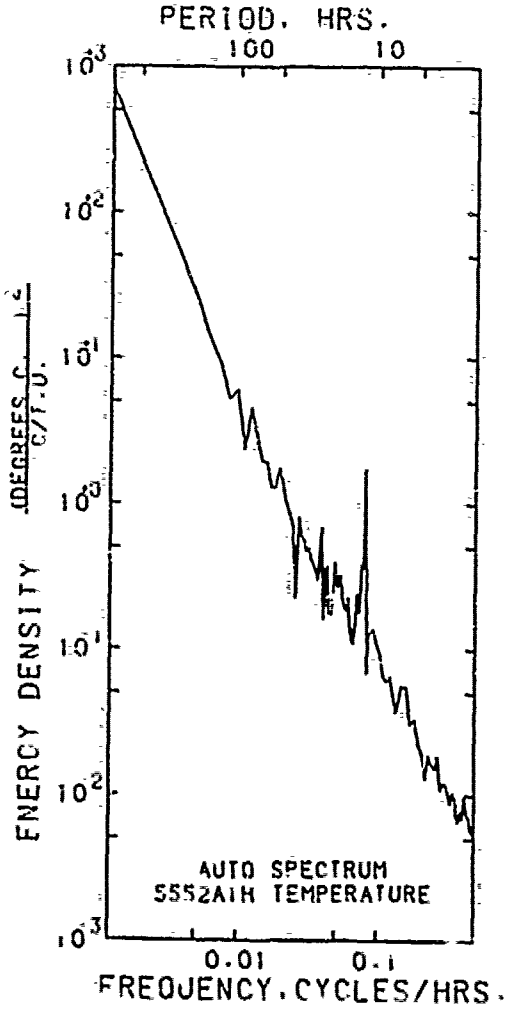
COVARIANCE	*	6645.988
STD. ERR. OF COVARIANCE	*	545.209
STD. DEV. OF COVARIANCE	*	27211.323
CORRELATION COEFFICIENT	*	.362
VECTOR MEAN	*	188.183
VECTOR VARIANCE	*	18801.315
VECTOR STD. DEV.	*	137.118

* DURATION 103.75 DAYS





516 METERS
75-IV-30 TO 75-VIII-09
1 PIECES WITH 1215 ESTIMATES
PER PIECE. AVERAGED OVER
3 ADJACENT FREQUENCY BANDS



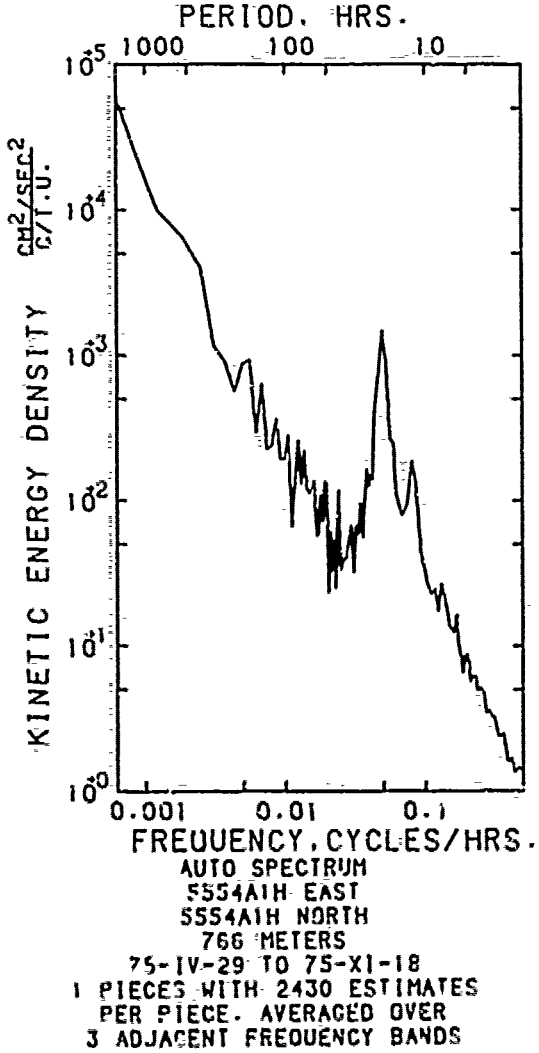
****
** 5554A1H ** 4946 POINTS FROM 75- IV -29 TO 75- XI -21
INST. D75115 DEPTH 766 M.
****

VARIABLE	EAST	NORTH	SPEED	TEMPERATURE
UNITS	MM/S	MM/S	MM/S	DEGREES C.
MEAN	41.254	-4.027	138.835	10.828
STD. ERR.	1.469	1.498	.923	.231E-1
VARIANCE	10669.758	11100.832	4213.462	2.629
STD. DEV.	103.295	105.360	64.911	1.621
KURTOSIS	2.346	2.443	2.562	2.513
SKEWNESS	.353	-.115	.323	-.620
MINIMUM	-222.006	-300.759	3.009	6.453
MAXIMUM	349.487	278.126	372.149	13.442

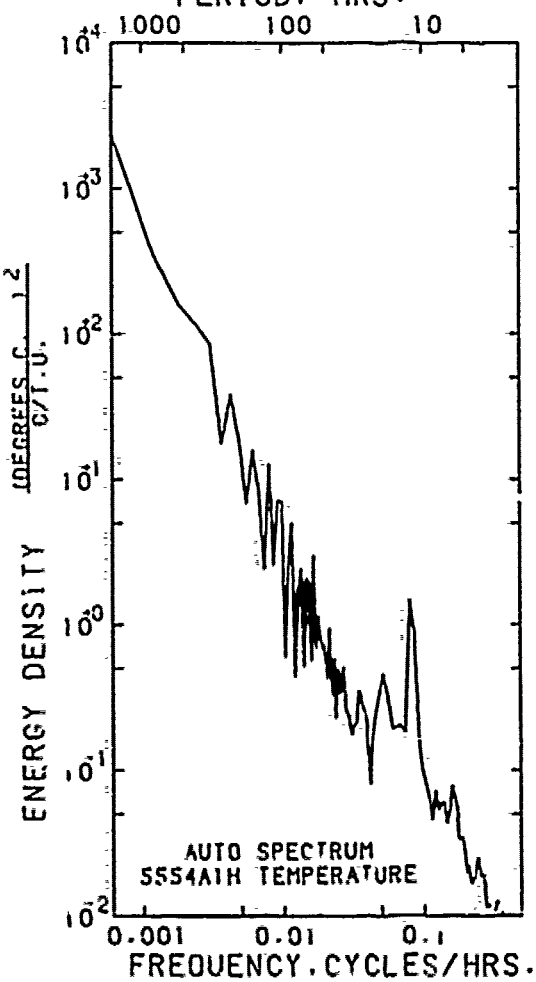
****
EAST & NORTH
****

COVARIANCE	=	1824.792
STD. ERR. OF COVARIANCE	=	142.401
STD. DEV. OF COVARIANCE	=	10014.749
CORRELATION COEFFICIENT	=	.168
VECTOR MEAN	=	41.450
VECTOR VARIANCE	=	10885.295
VECTOR STD. DEV.	=	104.333

****
* SAMPLE SIZE = 4946 POINTS
*
* SPANNING RANGE
* FROM 75- IV -29 22:00:00
* TO 75- XI -21 23:00:00
*
* DURATION 206.04 DAYS
****



AUTO SPECTRUM
5554A1H EAST
5554A1H NORTH
766 METERS
75-IV-29 TO 75-XI-18
1 PIECES WITH 2430 ESTIMATES
PER PIECE. AVERAGED OVER
3 ADJACENT FREQUENCY BANDS



AUTO SPECTRUM
5554A1H TEMPERATURE

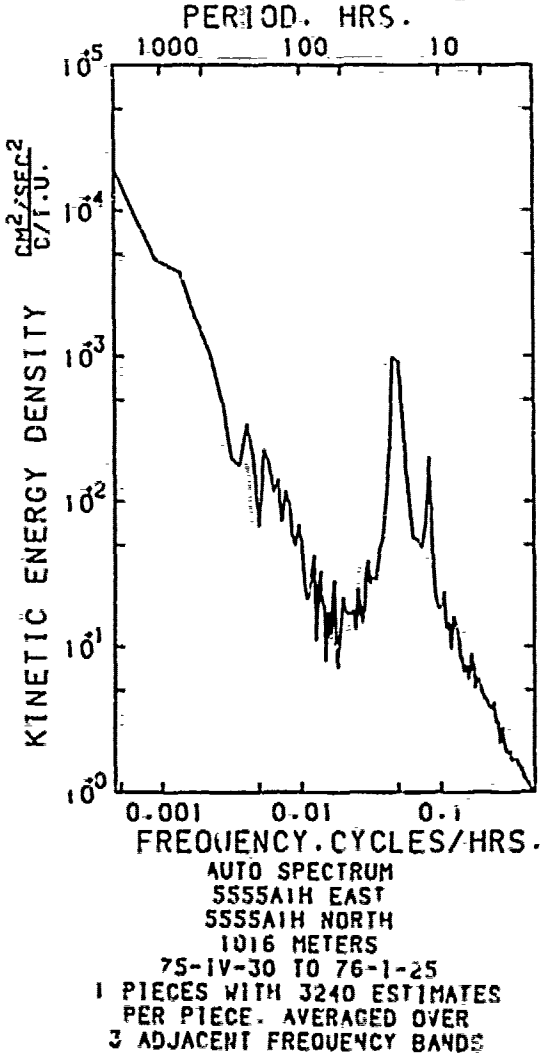
**** 5555A1H ** 6488 PBINTS FRBM 75- IV -30 TB 76- I -25**

INST. V-0193 DEPTH 1016 M.

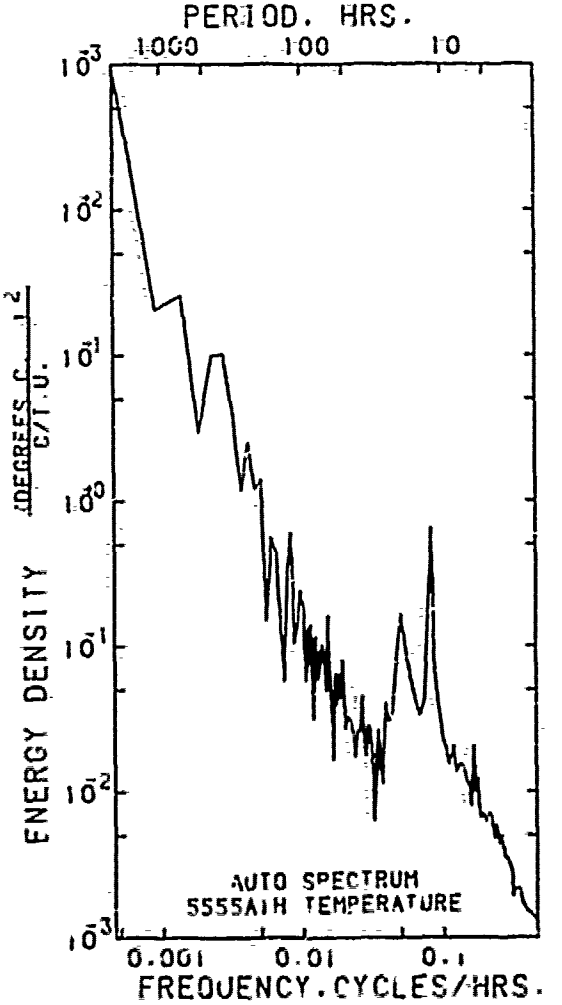
VARIABLE *	EAST	NBRTH	SPEED	TEMPERATURE
UNITS *	MM/S	MM/S	MM/S	DEGREES C.
MEAN =	7.258	-9.018	74.478	6.4[illegible]
STD. ERR. =	.711	.719	.433	.881E-2
VARIANCE =	3278.644	3353.136	1218.795	.504
STD. DEV. =	57.259	57.906	34.911	.710
KURTBSIS =	2.579	2.599	2.920	1.939
SKEWNESS =	.166	-.145	.496	-.222
MINIMUM =	-197.367	-185.570	1.611	4.816
MAXIMUM =	174.425	179.391	201.911	7.929

EAST & NBRTH

CBVARIANCE	=	104.270	* SAMPLE SIZE = 6488 PBINTS
STD. ERR. BF CBVARIANCE	=	39.657	*
STD. DEV. BF CBVARIANCE	=	3194.299	* SPANNING RANGE
CBRRELATIBN CBEFFICIENT	=	.314E-1	* FRBM 75- IV -30 11:00:00
VECTBR MEAN	=	11.576	* TB 76- I -25 18:00:00
VECTBR VARIANCE	=	3315.890	*
VECTBR STD. DEV.	=	57.584	* DURATIBN 270.29 DAYS



AUTO SPECTRUM
5555A1H EAST
5555A1H NORTH
1016 METERS
75-IV-30 TO 76-1-25
1 PIECES WITH 3240 ESTIMATES
PER PIECE. AVERAGED OVER
3 ADJACENT FREQUENCY BANDS



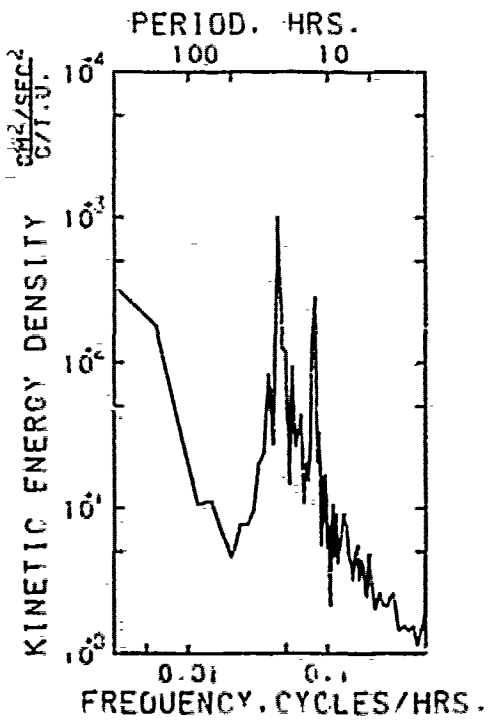
** 5556B1H ** 1046 POINTS FROM 75- IV -30 TO 75- VI -12
INST. M-271T DEPTH 1516 M.

VARIABLE *	EAST COMP	NORTH COMP	SPEED	TEMPERATURE
UNITS *	MM/SEC	MM/SEC	MM/SEC	DEGREES C.
MEAN =	45.695	-6.169	58.285	4.163
STD. ERR. =	.990	.982	.853	.224E-2
VARIANCE =	1024.345	1008.533	761.758	.523E-2
STD. DEV. =	32.005	31.757	27.600	.723E-1
KURTOSIS =	2.916	3.010	2.740	1.875
SKEWNESS =	-.357E-1	-.472	.495	-.482E-1
MINIMUM =	-58.741	-131.916	17.695	4.010
MAXIMUM =	134.834	89.692	153.333	4.311

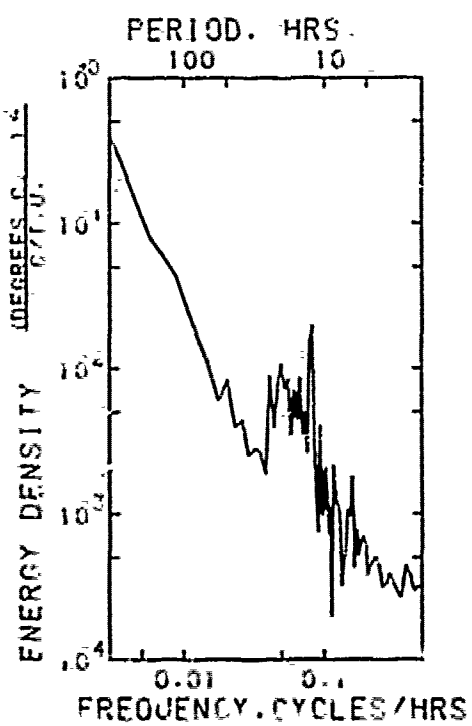
EAST COMP & NORTH COMP

COVARIANCE	=	-107.527
STD. ERR. OF COVARIANCE	=	58.153
STD. DEV. OF COVARIANCE	=	1880.782
CORRELATION COEFFICIENT	=	-.106
VECTOR MEAN	=	46.109
VECTOR VARIANCE	=	1016.439
VECTOR STD. DEV.	=	31.882

* SAMPLE SIZE = 1046 POINTS
*
* SPANNING RANGE
* FROM 75- IV -30 10.30.42
* TO 75- VI -12 23.30.42
*
* DURATION 43.54 DAYS



AUTO SPECTRUM
5556B1H EAST COMP
5556B1H NORTH COMP
1516 METERS
75-IV-30 TO 75-VI-12
1 PIECES WITH 512 ESTIMATES
PER PIECE. AVERAGED OVER
3 ADJACENT FREQUENCY BANDS



AUTO SPECTRUM
5556B1H TEMPERATURE
1516 METERS
75-IV-30 TO 75-VI-12
1 PIECES WITH 512 ESTIMATES
PER PIECE. AVERAGED OVER
3 ADJACENT FREQUENCY BANDS

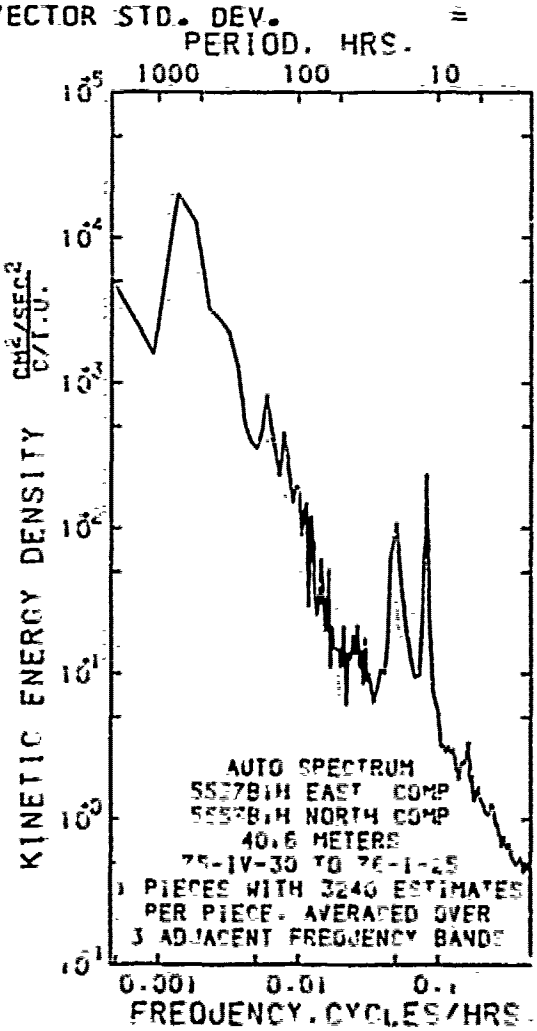
** 555781H ** 6488 POINTS FROM 75- IV -30 TO 76- I -25
INST. M-274T DEPTH 4016 M.

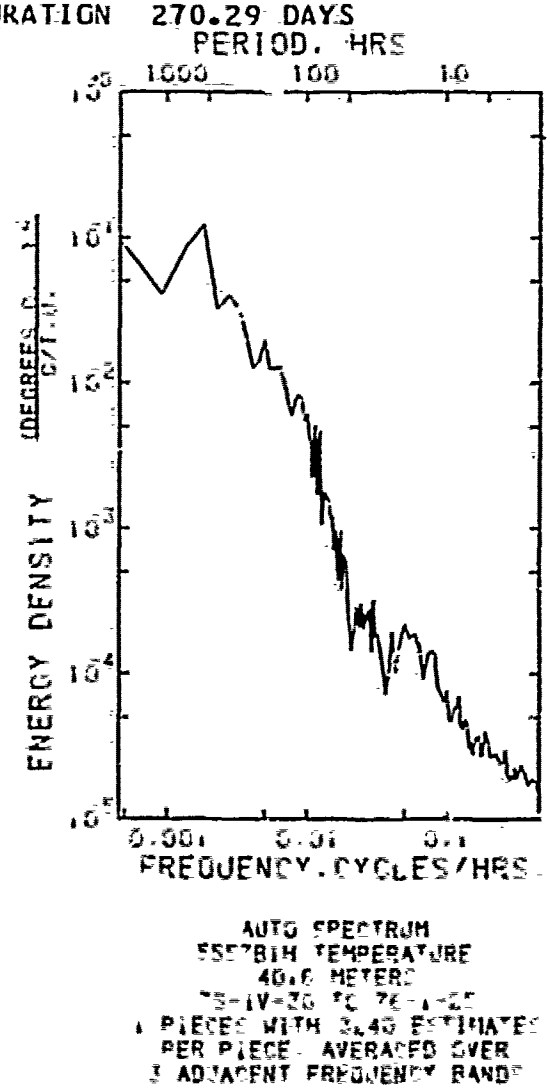
VARIABLE *	EAST COMP	NORTH COMP	SPEED	TEMPERATURE
UNITS *	MM/SEC	MM/SEC	MM/SEC	DEGREES C.
MEAN =	7.735	-7.238	65.971	2.243
STD. ERR. =	.587	.754	.510	.240E-3
VARIANCE =	2237.577	3687.979	1685.579	.375E-3
STD. DEV. =	47.303	60.729	41.056	.194E-1
KURTOSIS =	2.719	3.232	3.096	28.237
SKEWNESS =	.391	.426E-1	.772	3.521
MINIMUM =	-110.716	-245.405	16.844	2.201
MAXIMUM =	178.061	189.532	247.259	2.426

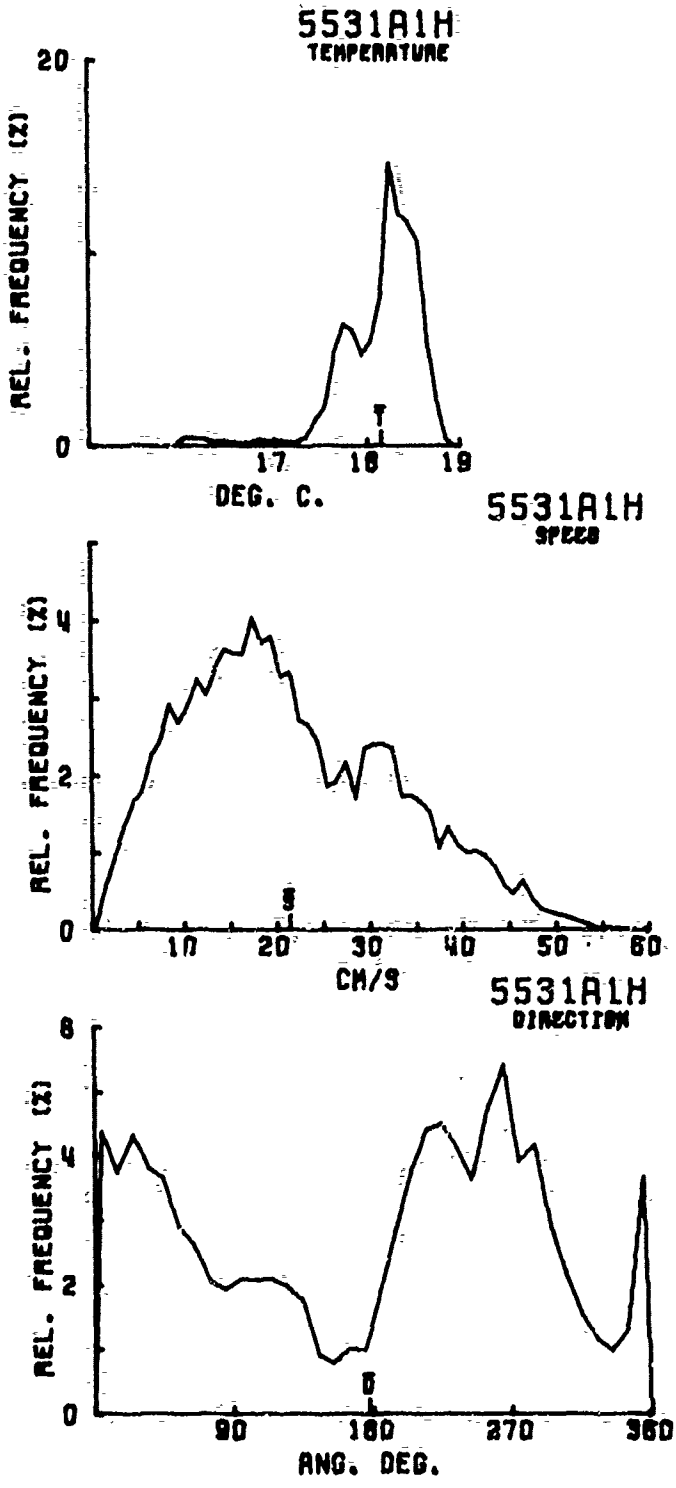
EAST COMP & NORTH COMP

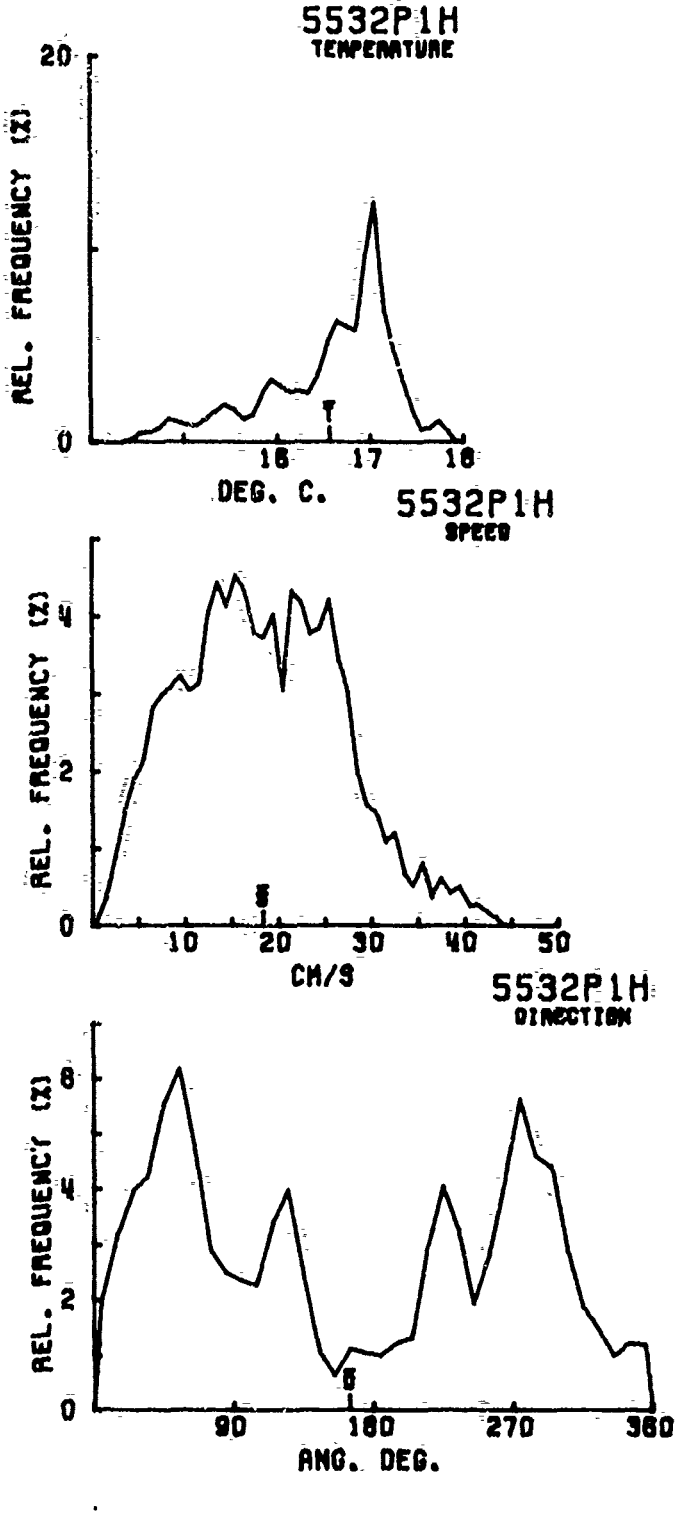
COVARIANCE	=	-1639.681
STD. ERR. OF COVARIANCE	=	38.826
STD. DEV. OF COVARIANCE	=	3127.367
CORRELATION COEFFICIENT	=	-.571
VECTOR MEAN	=	10.593
VECTOR VARIANCE	=	2962.778
VECTOR STD. DEV.	=	54.431

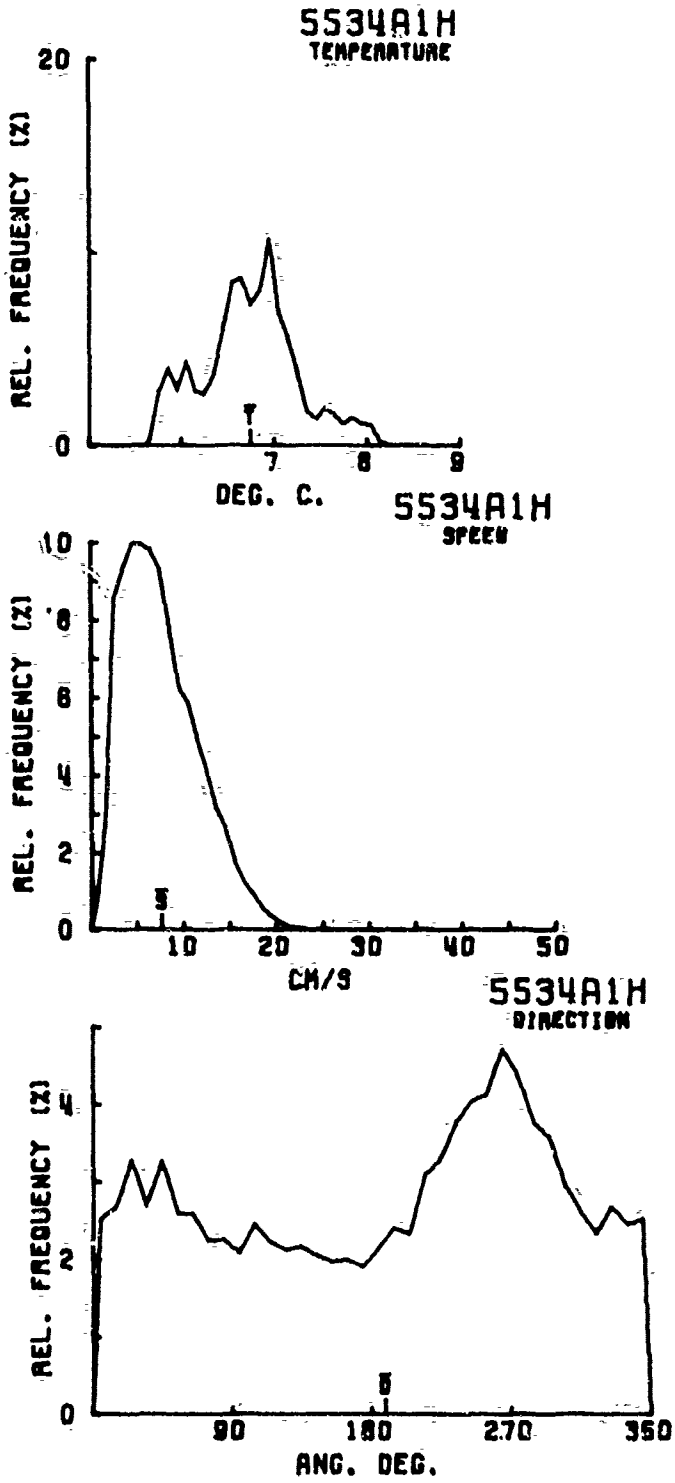
* SAMPLE SIZE = 6488 POINTS
*
* SPANNING RANGE
* FROM 75- IV -30 10.30.42
* TO 76- I -25 17.30.42
*
* DURATION 270.29 DAYS

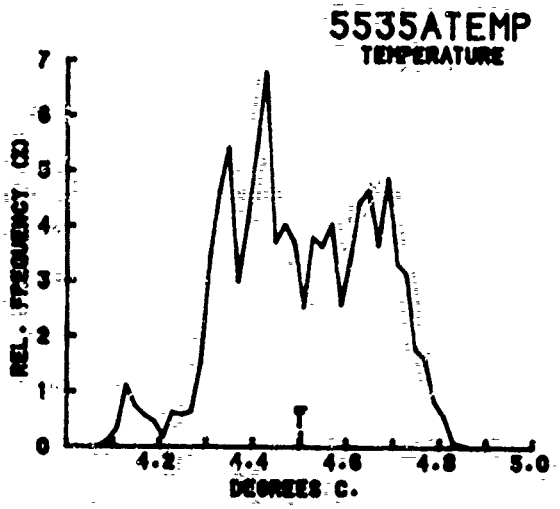


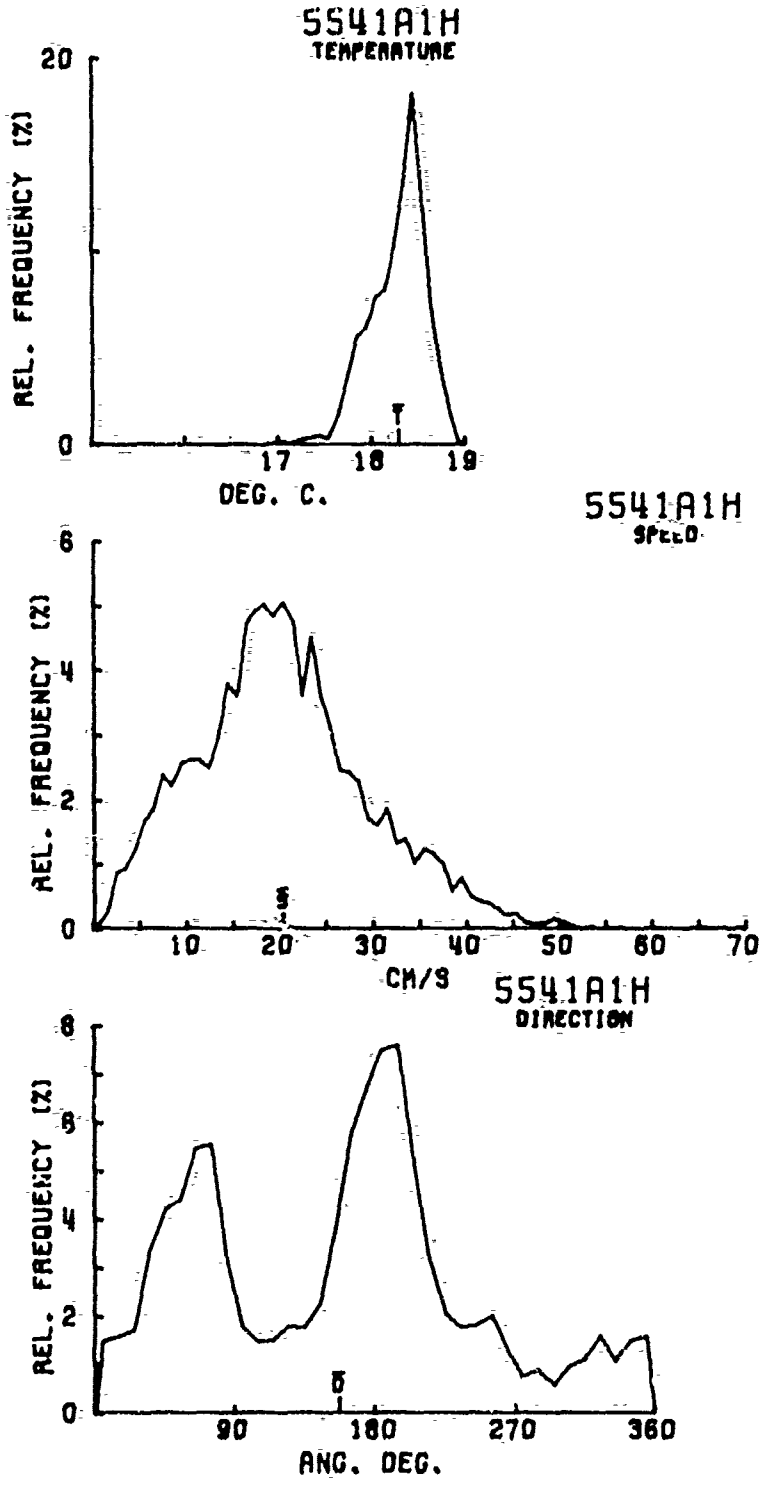


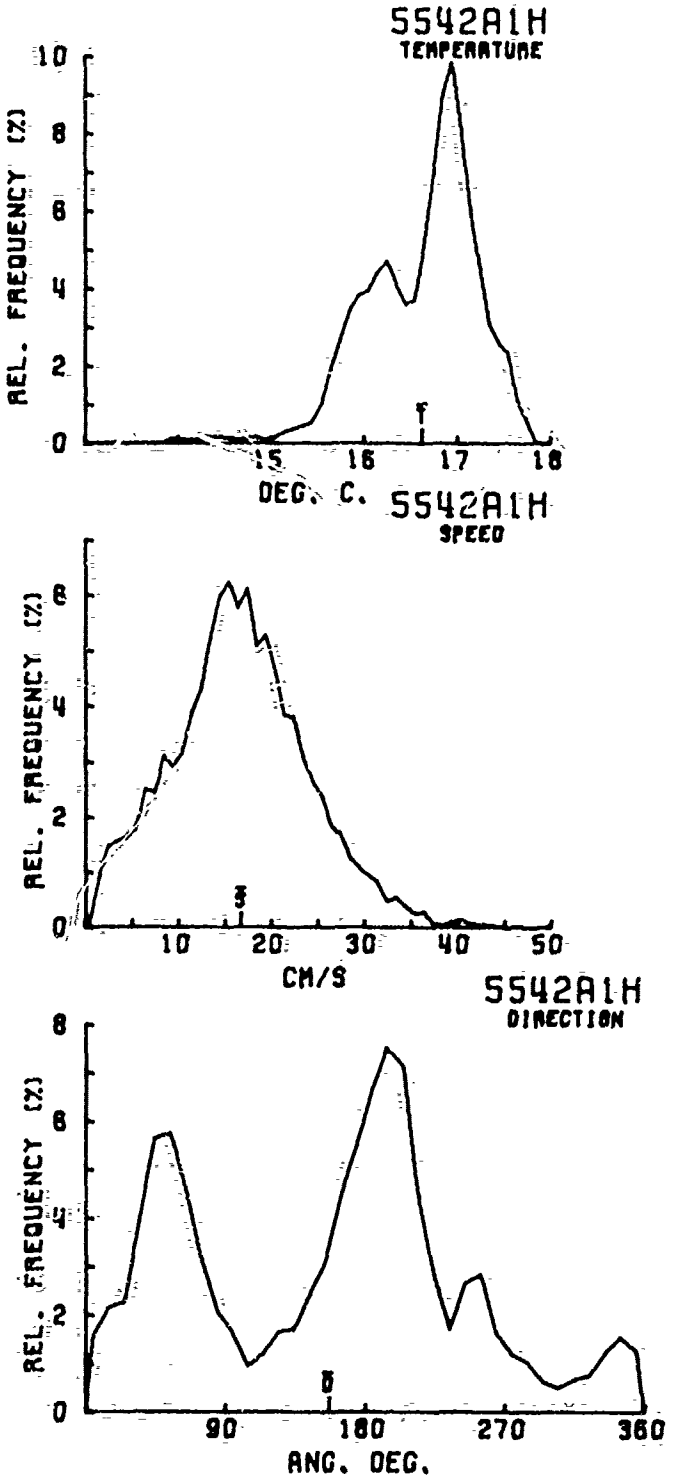

5531A1H
TEMPERATURE
REL. FREQUENCY (%)
20
0
T
17
18
19
DEG. C.
5531A1H
SPEED
REL. FREQUENCY (%)
4
2
0
S
10
20
30
40
50
60
CM/S
5531A1H
DIRECTION
REL. FREQUENCY (%)
6
4
2
0
D
90
180
270
360
ANG. DEG.

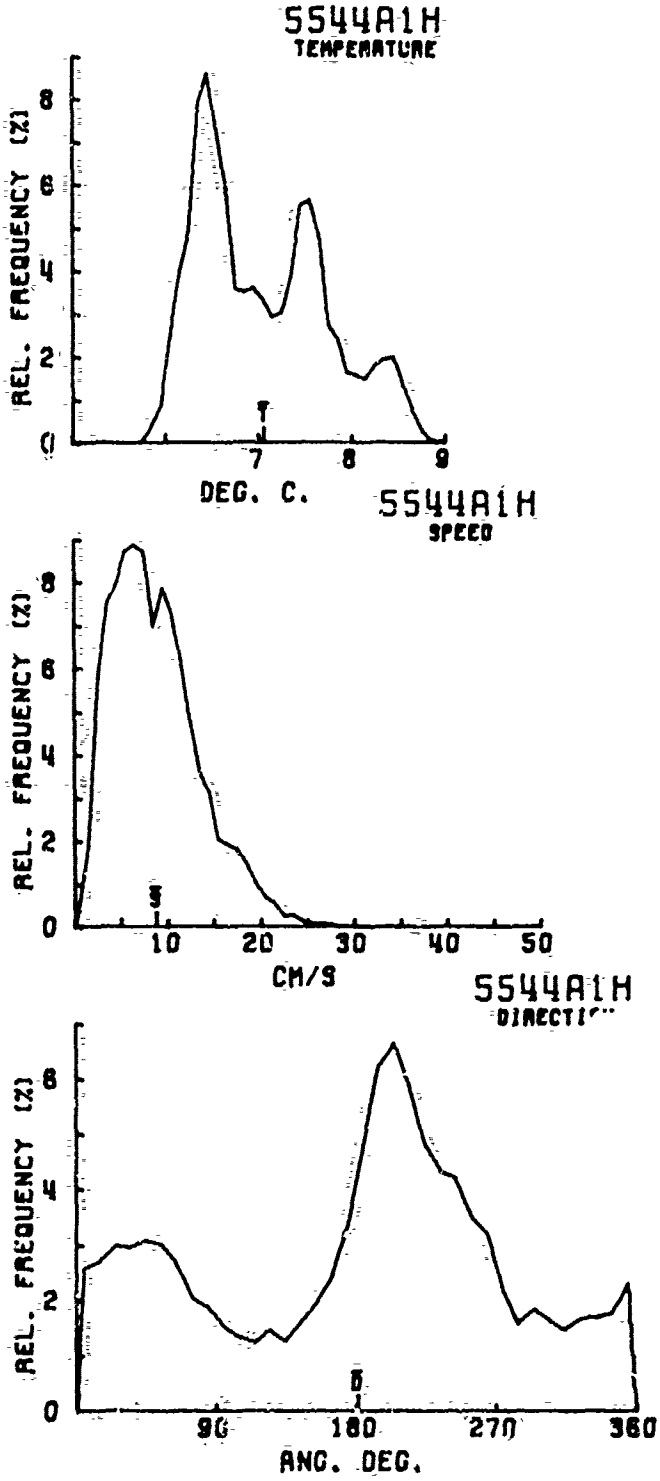

5532P1H
TEMPERATURE
REL. FREQUENCY (%)
20
0
16
17
18
DEG. C.
5532P1H
SPEED
REL. FREQUENCY (%)
4
2
0
10
20
30
40
50
CM/S
5532P1H
DIRECTION
REL. FREQUENCY (%)
6
4
2
0
90
180
270
360
ANG. DEG.

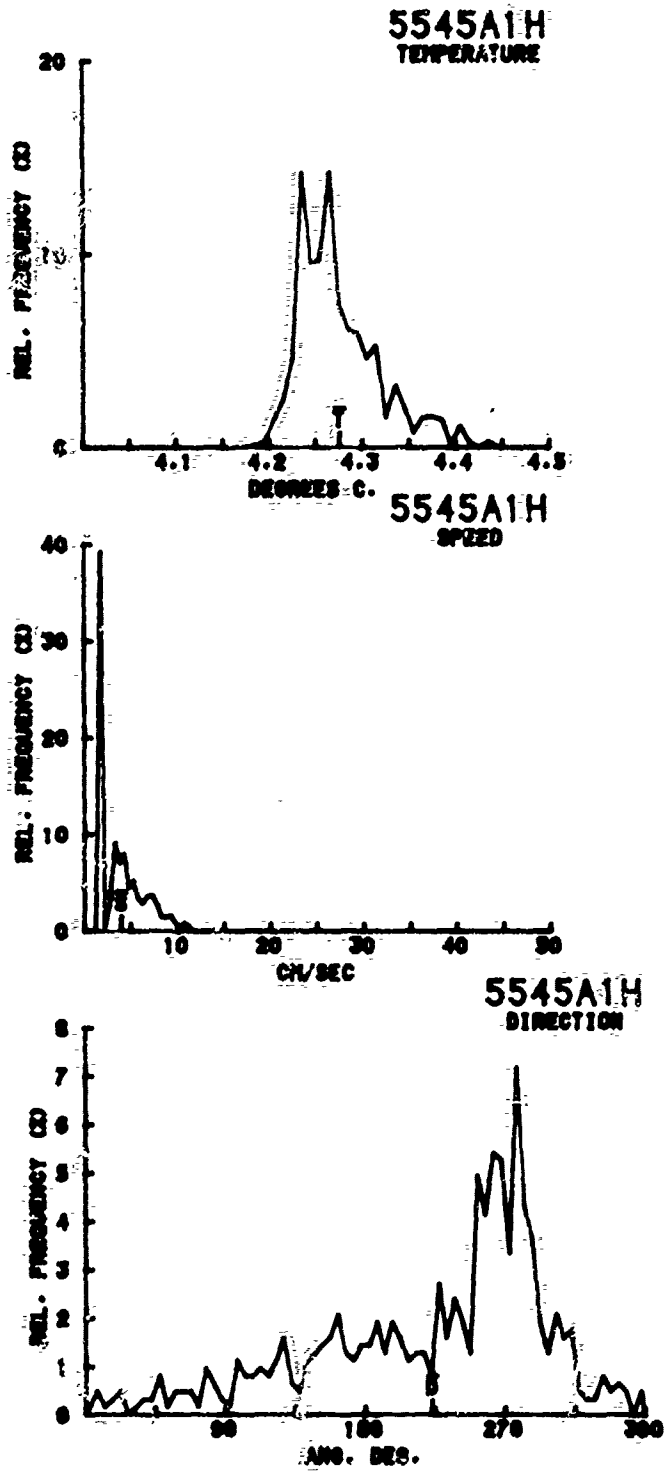

5534A1H
TEMPERATURE
REL. FREQUENCY (%)
20
0
7
8
9
DEG. C.
5534A1H
SPEED
REL. FREQUENCY (%)
10
8
6
4
2
0
10
20
30
40
50
CM/S
5534A1H
DIRECTION
REL. FREQUENCY (%)
4
2
0
90
180
270
360
ANG. DEG.

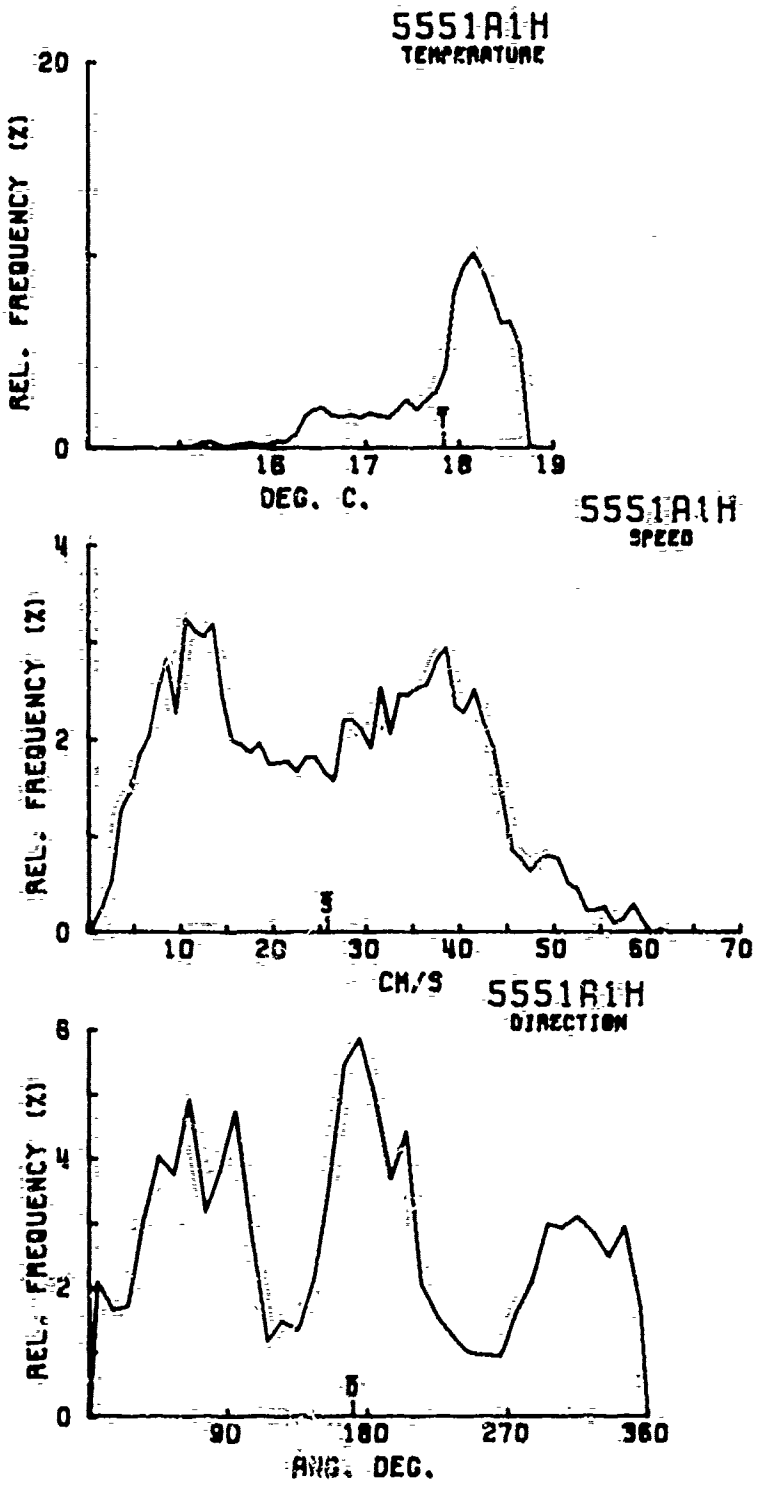

5535ATEMP
TEMPERATURE
REL. FREQUENCY (%)
0
1
2
3
4
5
6
7
4.2
4.4
4.6
4.8
5.0
DEGREES C.

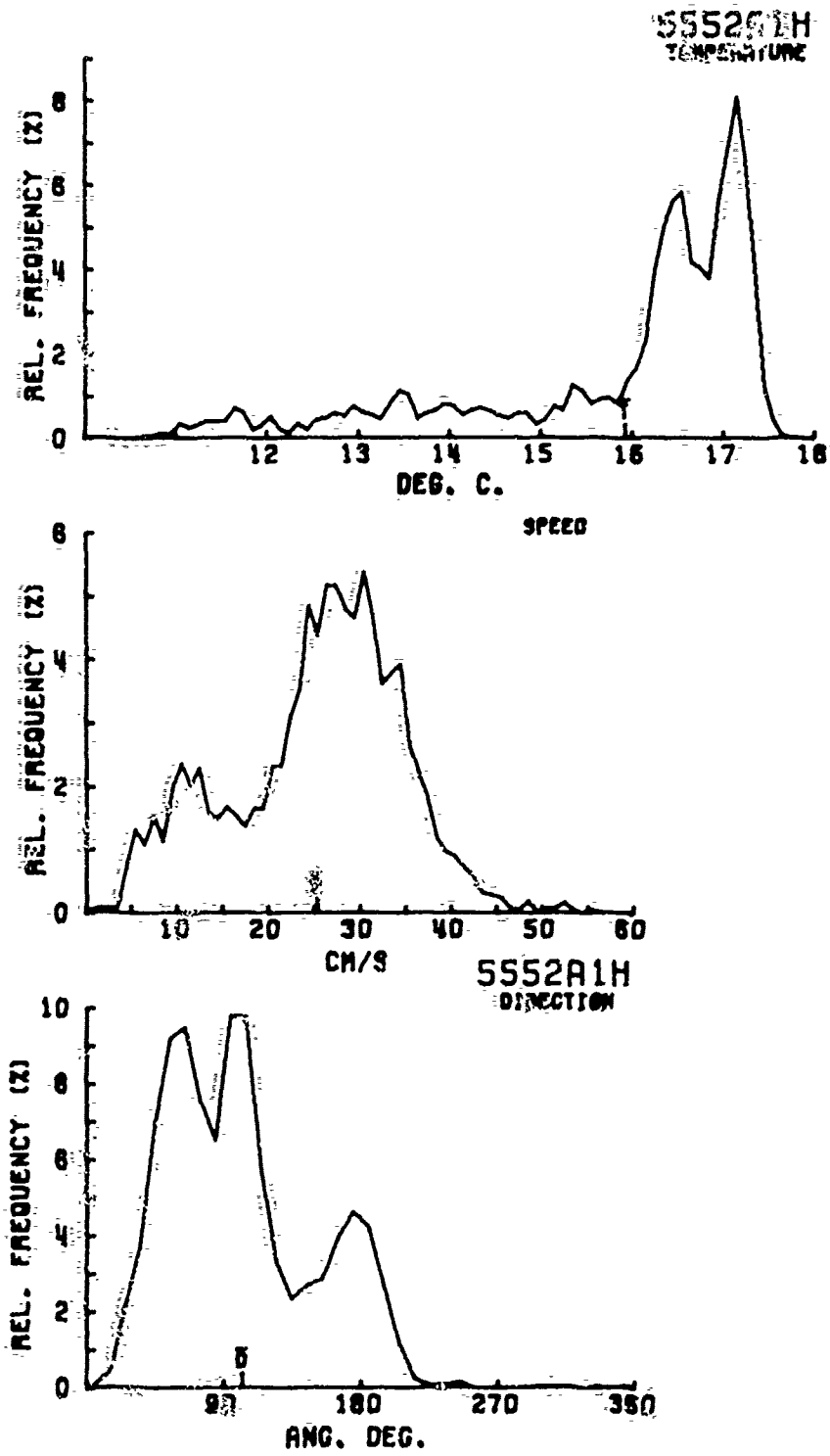

5541A1H
TEMPERATURE
REL. FREQUENCY (%)
20
0
17
18
19
T
DEG. C.
5541A1H
SPEED
REL. FREQUENCY (%)
6
4
2
0
10
20
30
40
50
60
70
S
CM/S
5541A1H
DIRECTION
REL. FREQUENCY (%)
8
6
4
2
0
90
180
270
360
D
ANG. DEG.

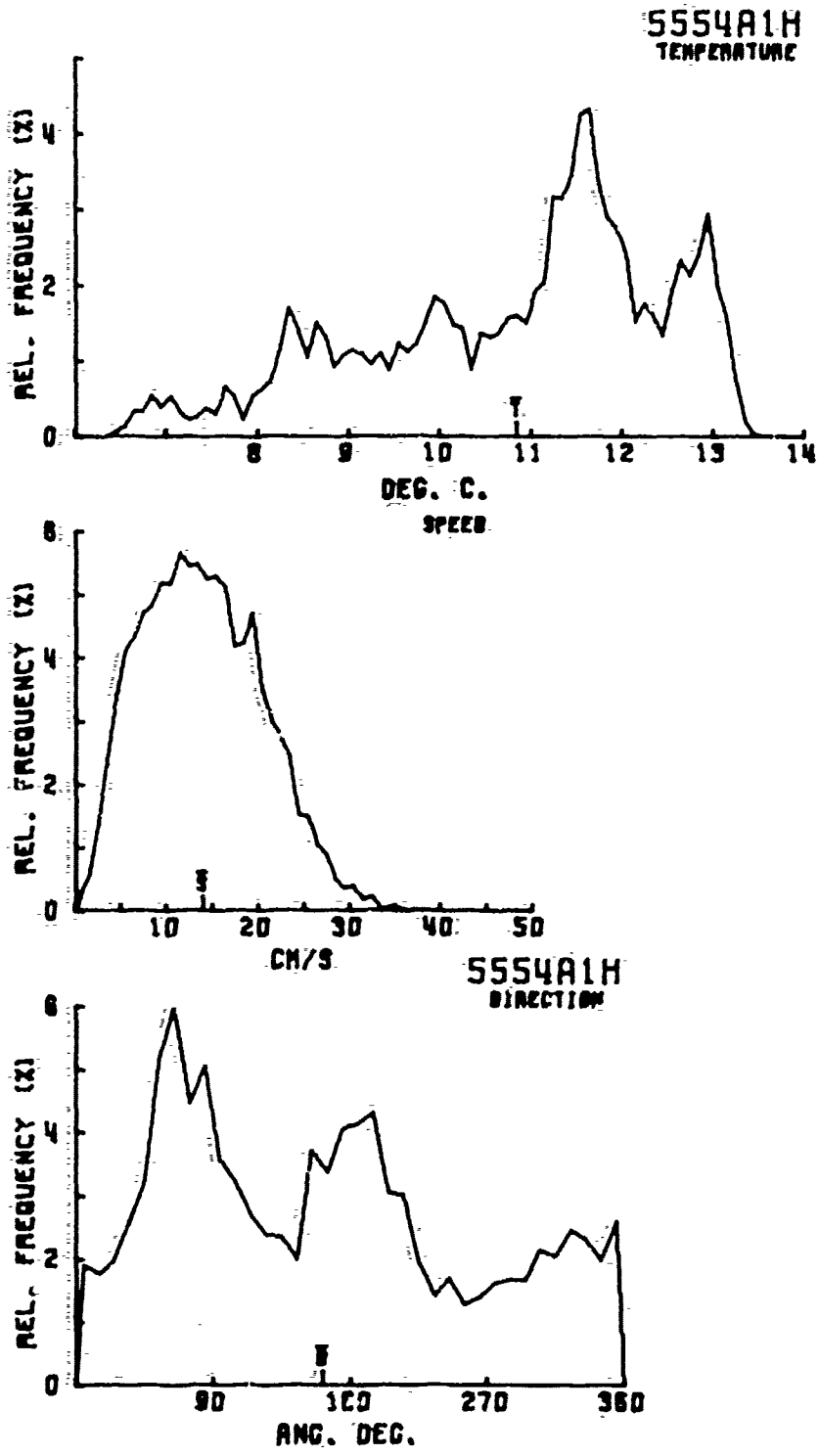

5542A1H
TEMPERATURE
REL. FREQUENCY (%)
0
2
4
6
8
10
15
16
17
18
DEG. C.
5542A1H
SPEED
REL. FREQUENCY (%)
0
2
4
6
8
10
20
30
40
50
CM/S
5542A1H
DIRECTION
REL. FREQUENCY (%)
0
2
4
6
8
90
180
270
360
ANG. DEG.

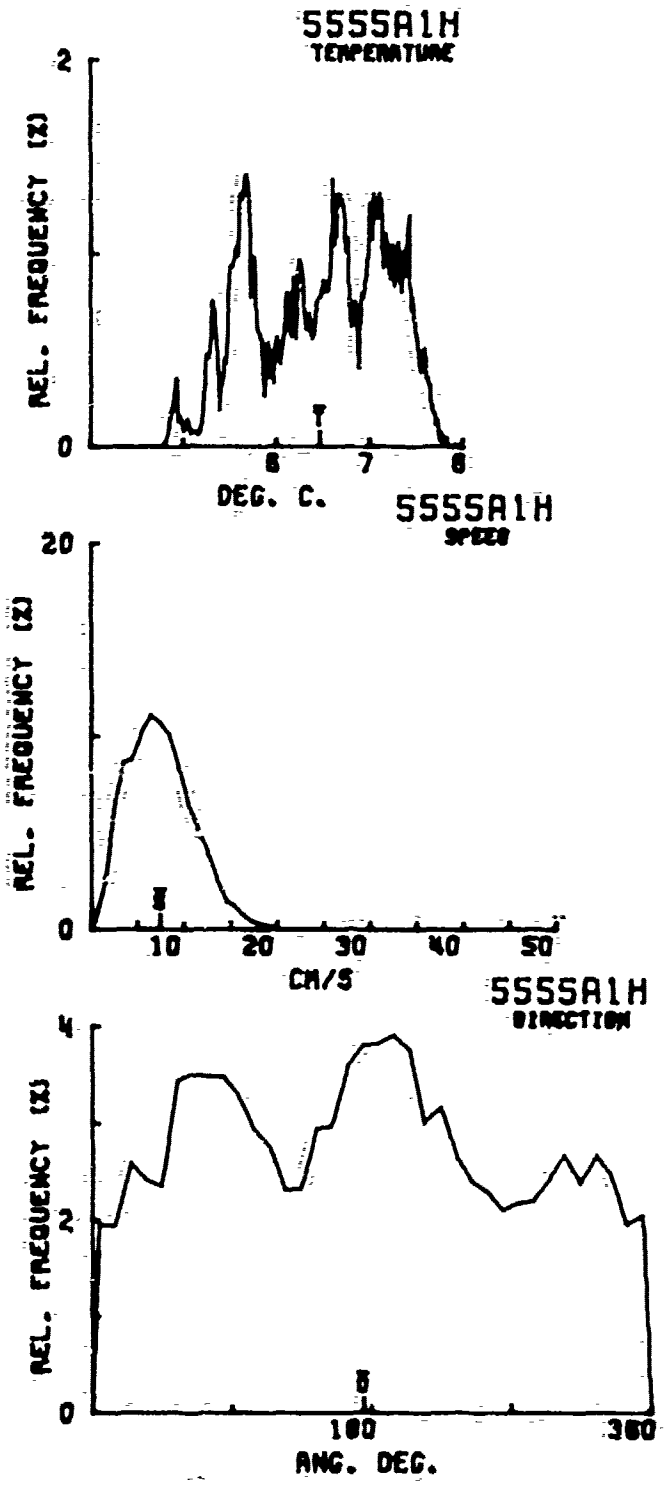

5544A1H
TEMPERATURE
REL. FREQUENCY (%)
0
2
4
6
8
T
7
8
9
DEG. C.
5544A1H
SPEED
REL. FREQUENCY (%)
0
2
4
6
8
S
10
20
30
40
50
CM/S
5544A1H
REL. FREQUENCY (%)
0
2
4
6
D
90
180
270
360
ANG. DEG.

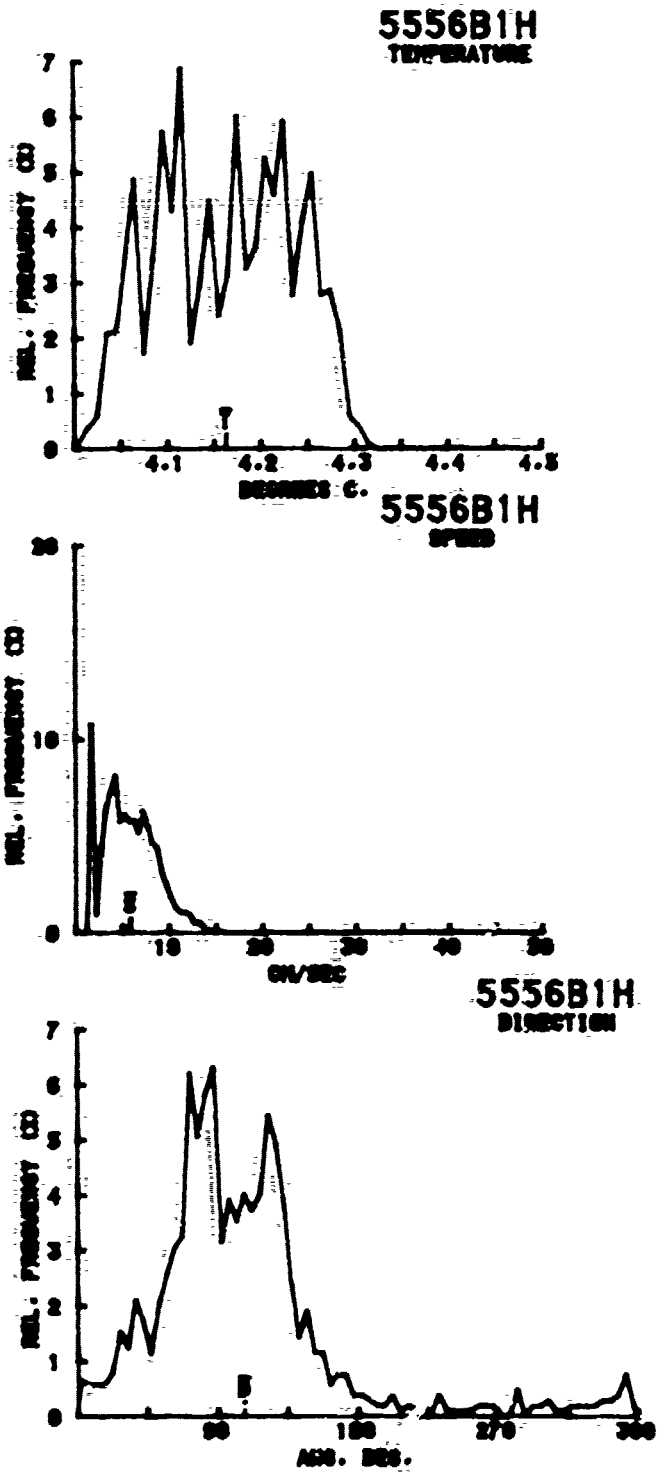

5545A1H
TEMPERATURE
REL. FREQUENCY (%)
20
10
0
4.1
4.2
4.3
4.4
4.5
DEGREES C.
5545A1H
SPEED
REL. FREQUENCY (%)
40
30
20
10
0
10
20
30
40
50
CM/SEC
5545A1H
DIRECTION
REL. FREQUENCY (%)
8
7
6
5
4
3
2
1
0
90
180
270
360
ANG. DEG.

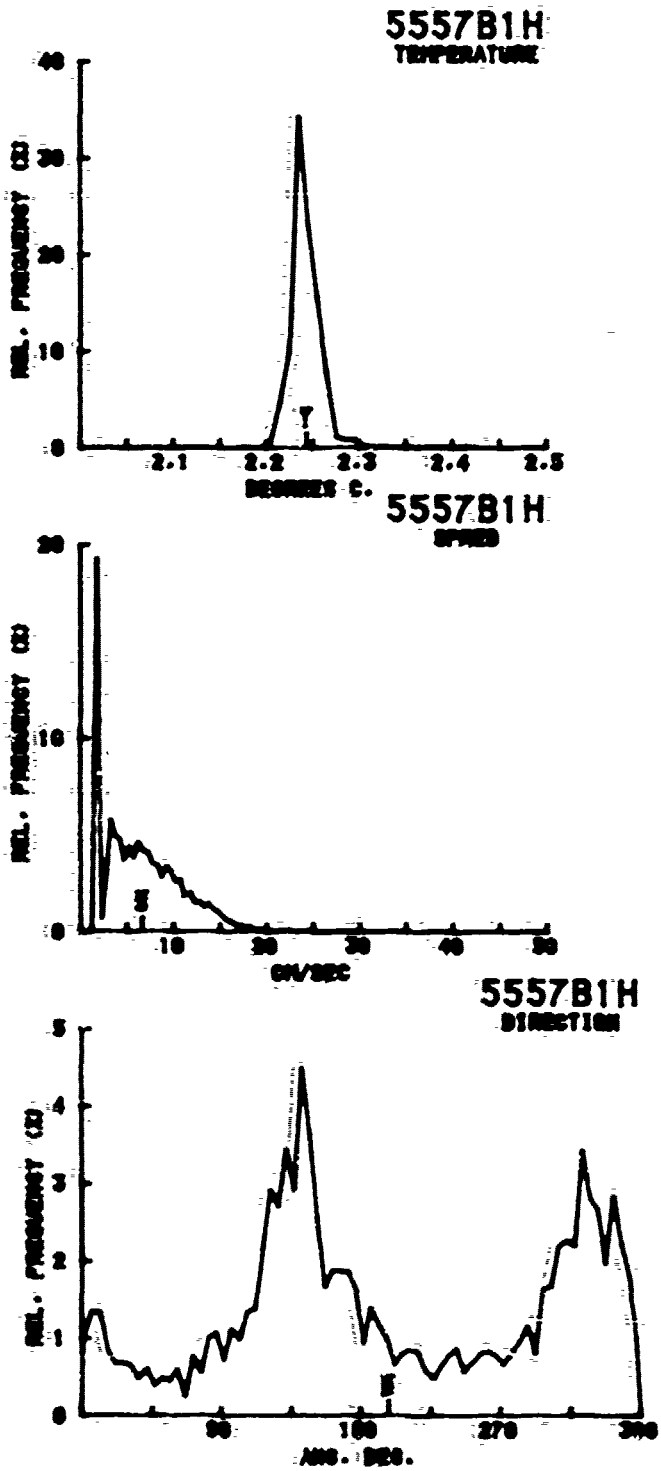

5551A1H
TEMPERATURE
REL. FREQUENCY (%)
20
0
16
17
18
19
DEG. C.
5551A1H
SPEED
REL. FREQUENCY (%)
4
2
0
10
20
30
40
50
60
70
CM/S
5551A1H
DIRECTION
REL. FREQUENCY (%)
6
4
2
0
90
180
270
360
ANG. DEG.

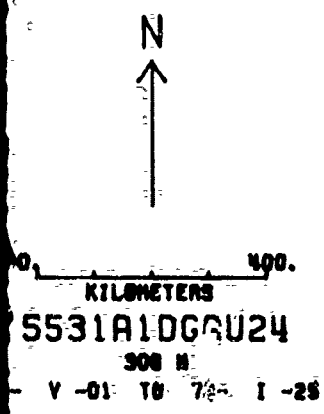

5552A1H
TEMPERATURE
REL. FREQUENCY (%)
0
2
4
6
8
12
13
14
15
16
17
18
DEG. C.
SPEED
REL. FREQUENCY (%)
0
2
4
6
10
20
30
40
50
60
CM/S
5552A1H
DIRECTION
REL. FREQUENCY (%)
0
2
4
6
8
10
90
180
270
360
ANG. DEG.

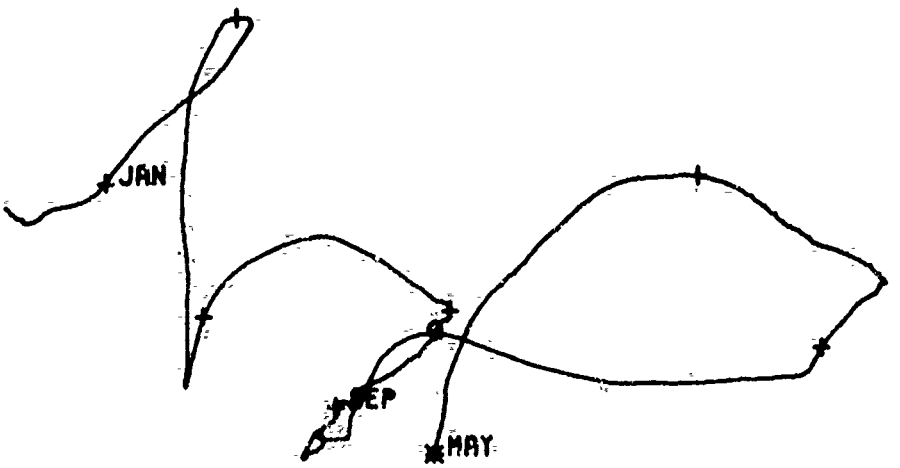

5554A1H
TEMPERATURE
REL. FREQUENCY (%)
0
2
4
8
9
10
11
12
13
14
DEG. C.
SPEED
REL. FREQUENCY (%)
0
2
4
6
10
20
30
40
50
CM/S
5554A1H
DIRECTION
REL. FREQUENCY (%)
0
2
4
6
90
180
270
360
ANG. DEG.

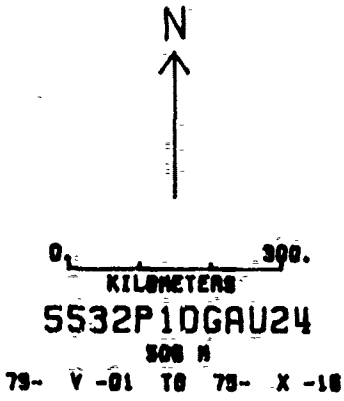

5555A1H
TEMPERATURE
REL. FREQUENCY (%)
2
0
T
6
7
8
DEG. C.
5555A1H
SPEED
20
0
10
20
30
40
50
CM/S
5555A1H
DIRECTION
4
2
0
180
360
ANG. DEG.

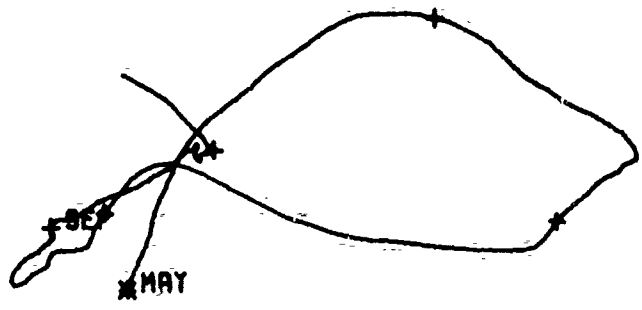

5556B1H
TEMPERATURE
REL. FREQUENCY (%)
0
1
2
3
4
5
6
7
T
4.1
4.2
4.3
4.4
4.5
DEGREES C.
5556B1H
REL. FREQUENCY (%)
0
10
20
10
20
30
40
50
KN/SEC
5556B1H
DIRECTION
REL. FREQUENCY (%)
0
1
2
3
4
5
6
7
90
180
270
360
AZIM. DEG.

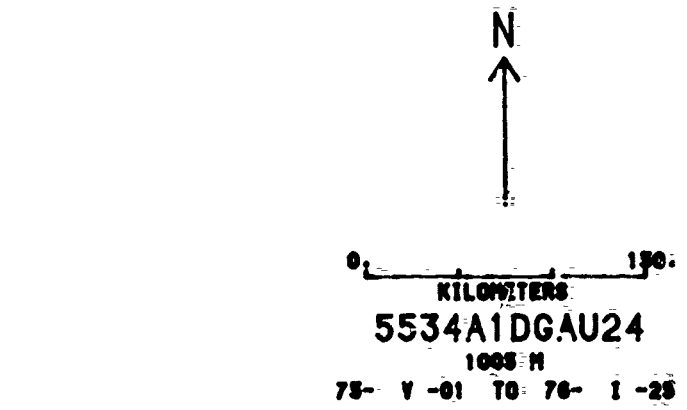

5557B1H
TEMPERATURE
REL. FREQUENCY (%)
0
10
20
30
40
2.1
2.2
2.3
2.4
2.5
DEGREES C.
5557B1H
REL. FREQUENCY (%)
0
10
20
10
20
30
40
50
CM/SEC
5557B1H
DIRECTION
REL. FREQUENCY (%)
0
1
2
3
4
5
90
180
270
360
AZIMUTH DEG.

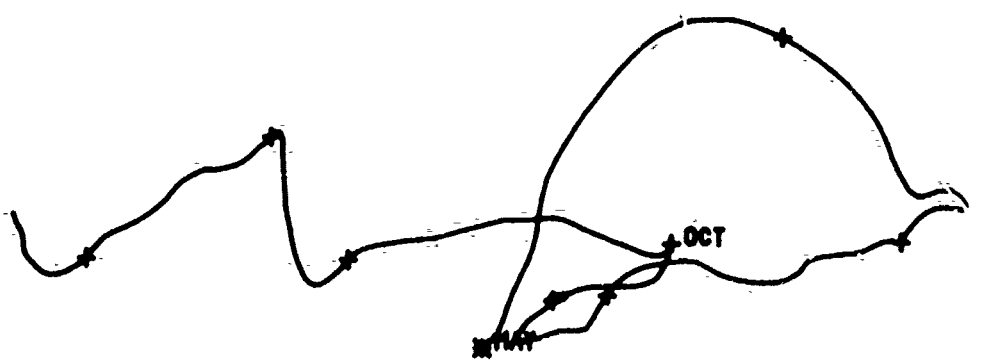

N
0
400.
KILOMETERS
5531A1DGGU24
308 M
V -01 TO 7 I -2S

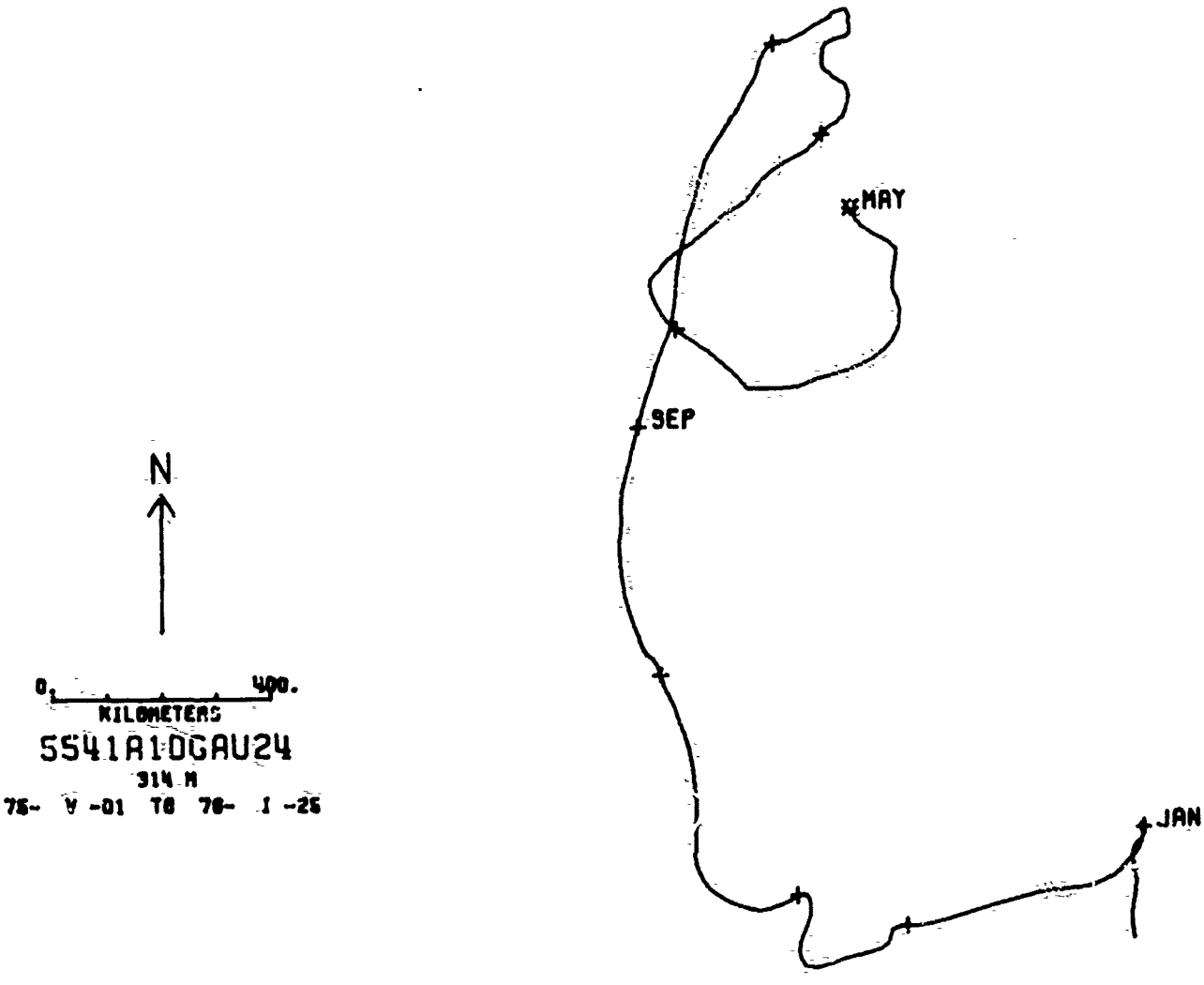

JAN
SEP
MAY

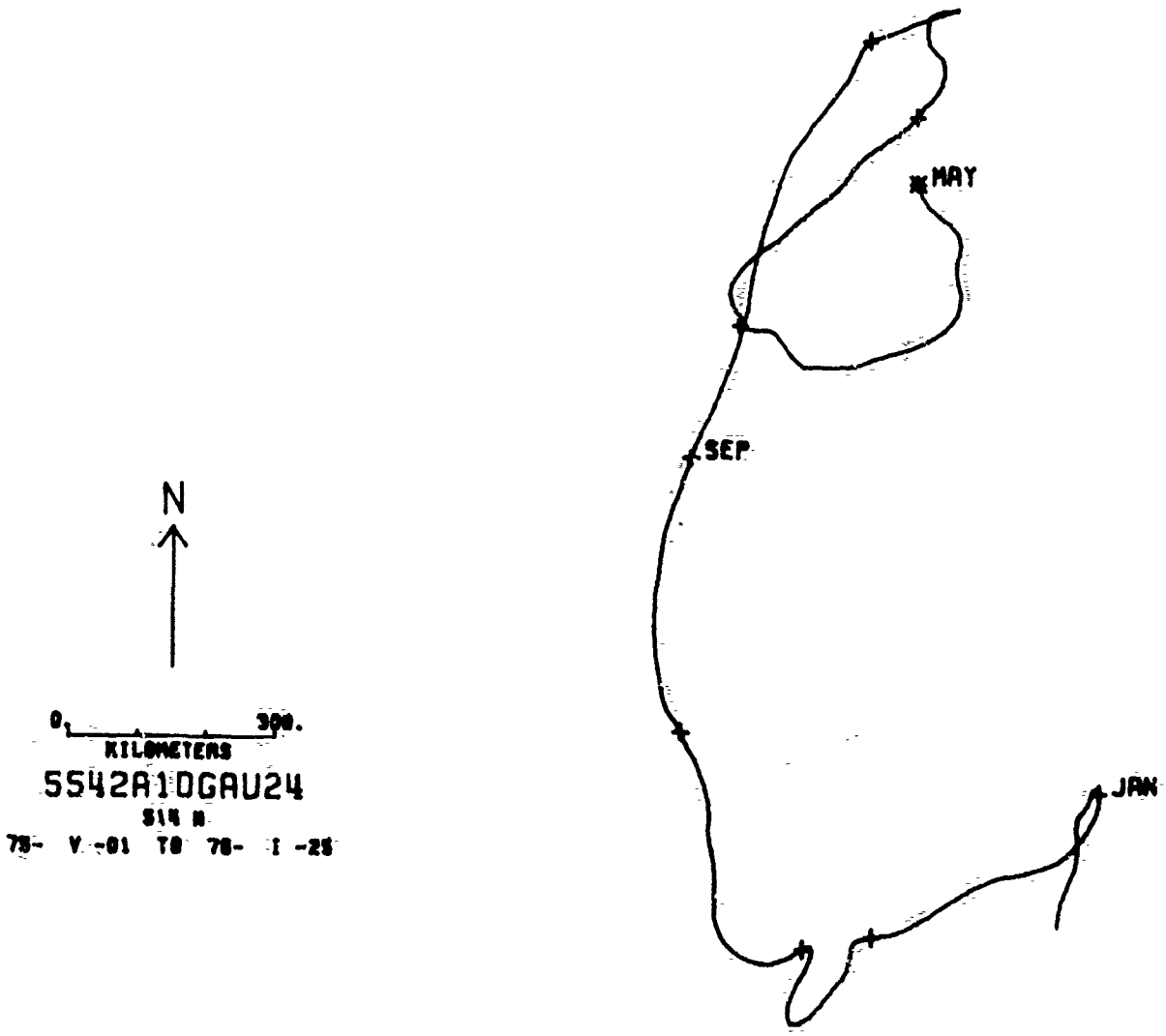

N
0
300.
KILOMETERS
5532P1DGAU24
SOS M
79- V -01 TO 79- X -16

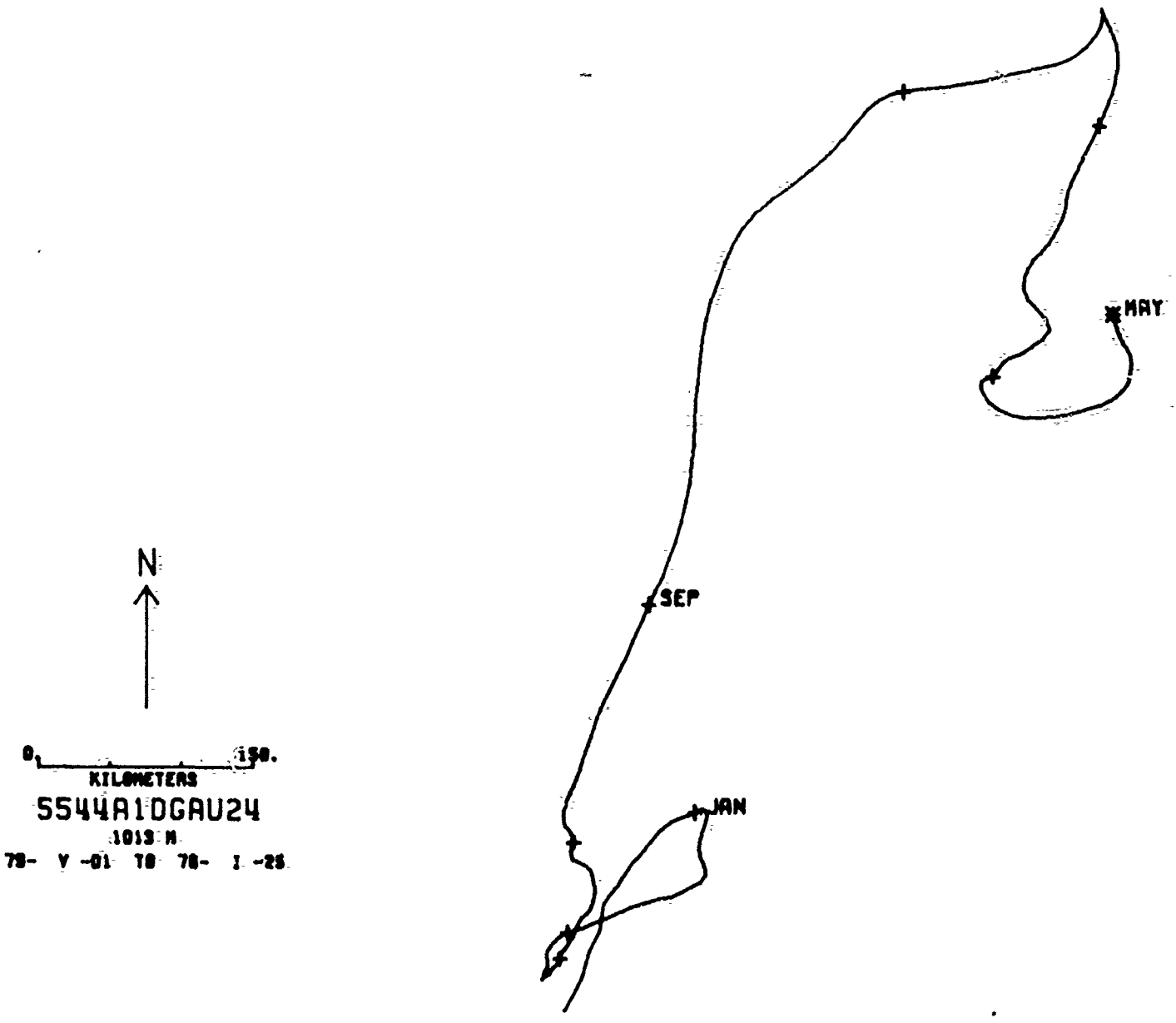

MAY

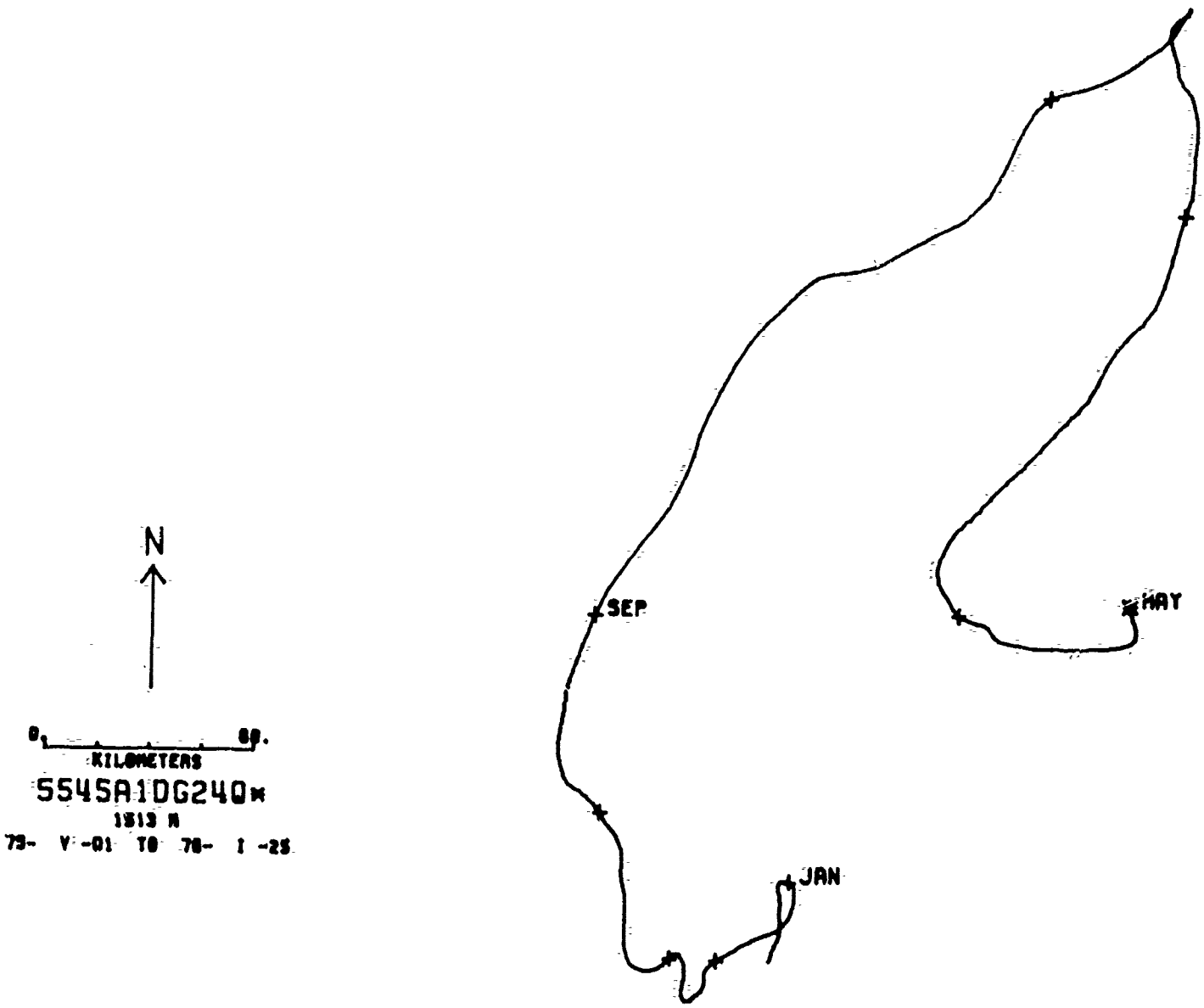

N
0
150
KILOMETERS
5534A1DGAU24
1005 M
75- V -01 TO 76- I -25

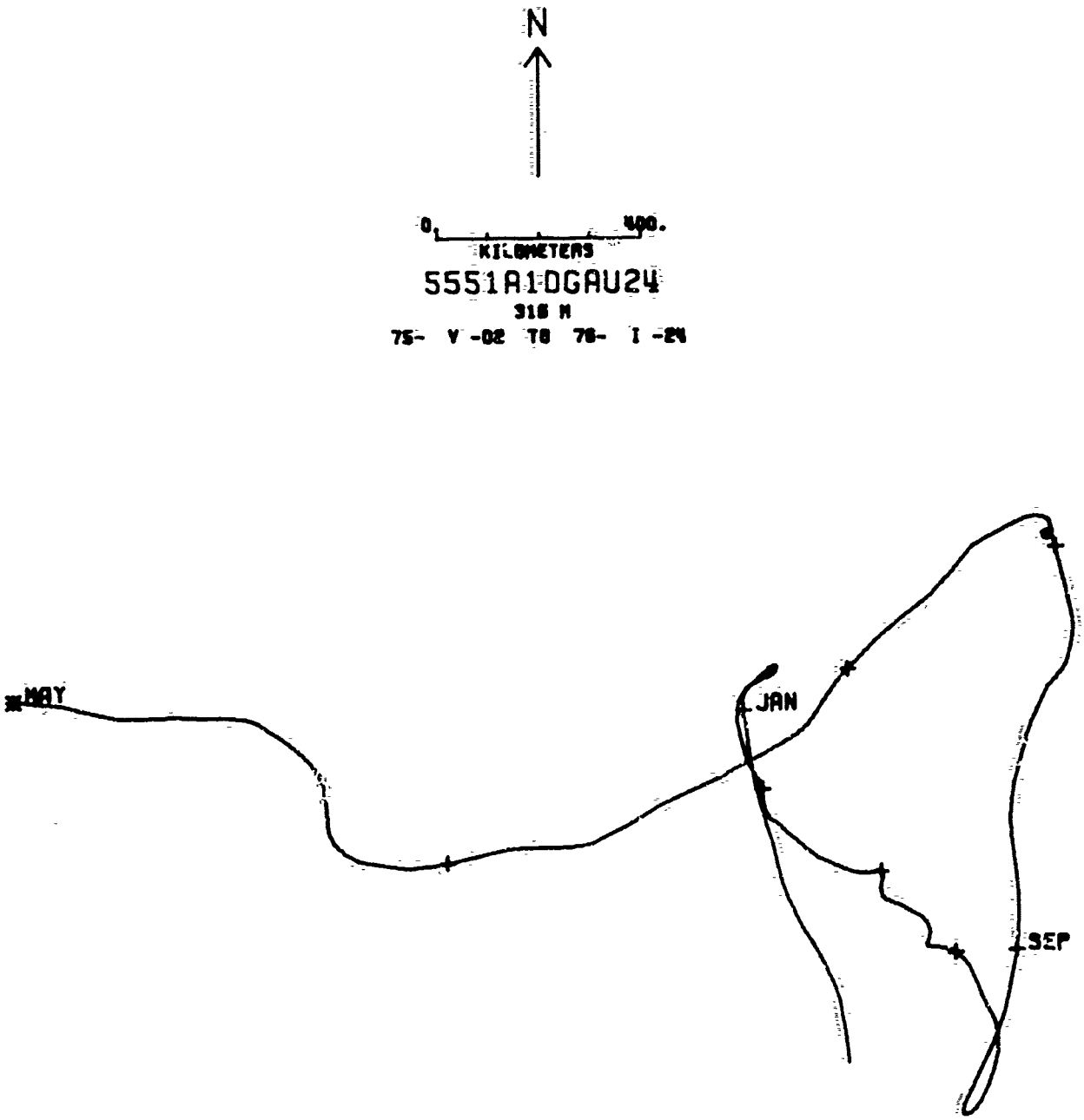

OCT
MAY

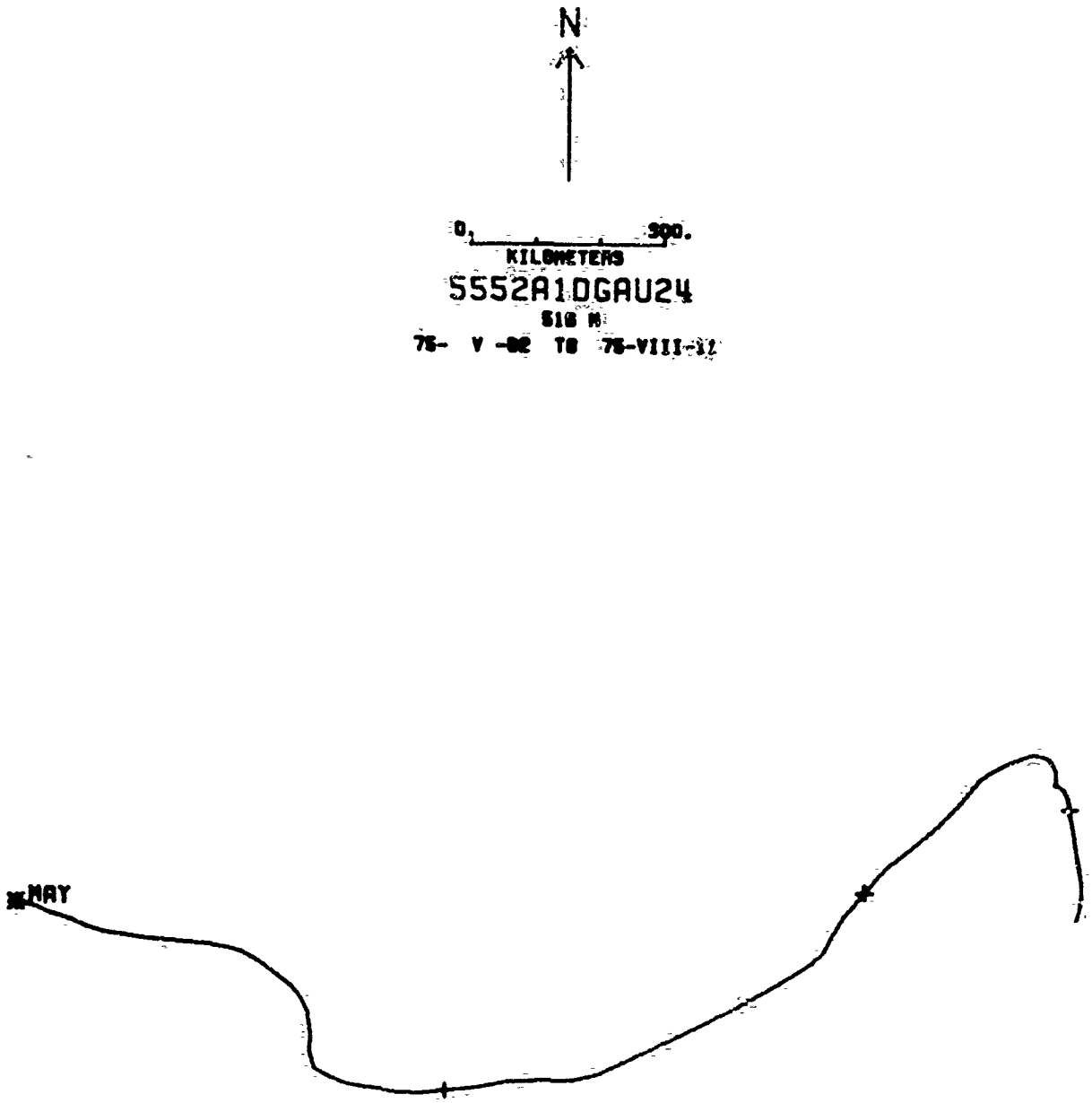

MAY
SEP
JAN
N
0
400.
KILOMETERS
5541A1DGAU24
314 M
75- V -01 T8 78- I -25

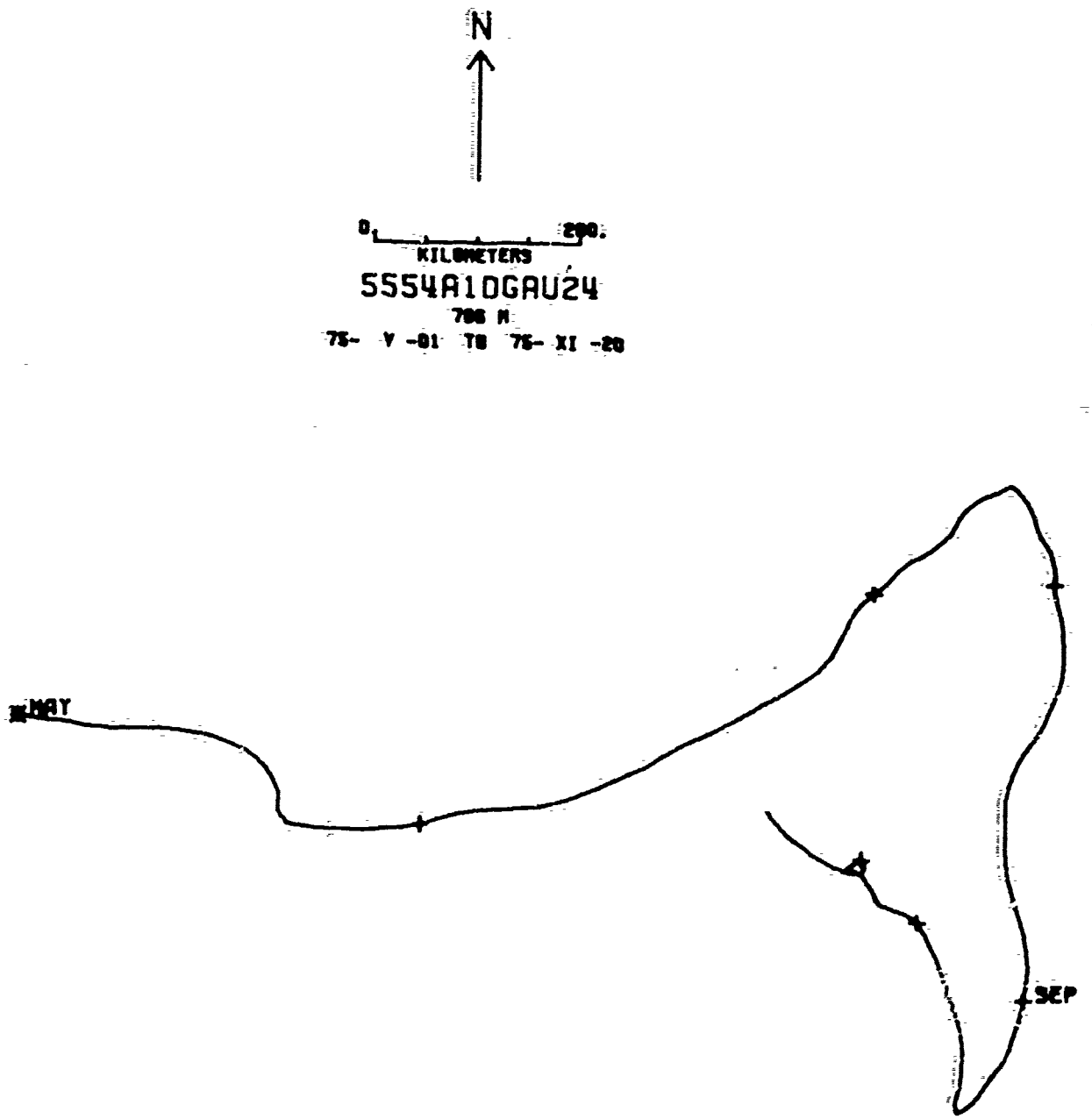

MAY
SEP
JAN
N
0
300.
KILOMETERS
5542A1DGAU24
SIN N
78- V -01 TO 78- I -25

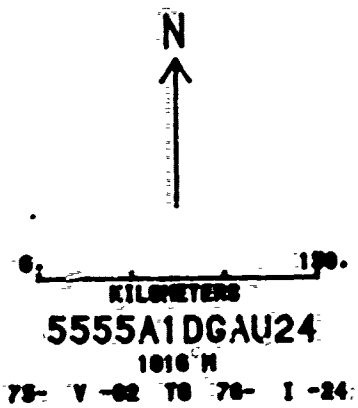

MAY
SEP
JAN
N
0
150.
KILOMETERS
5544A1DGAU24
1013 N
78- V -01 T8 78- I -25

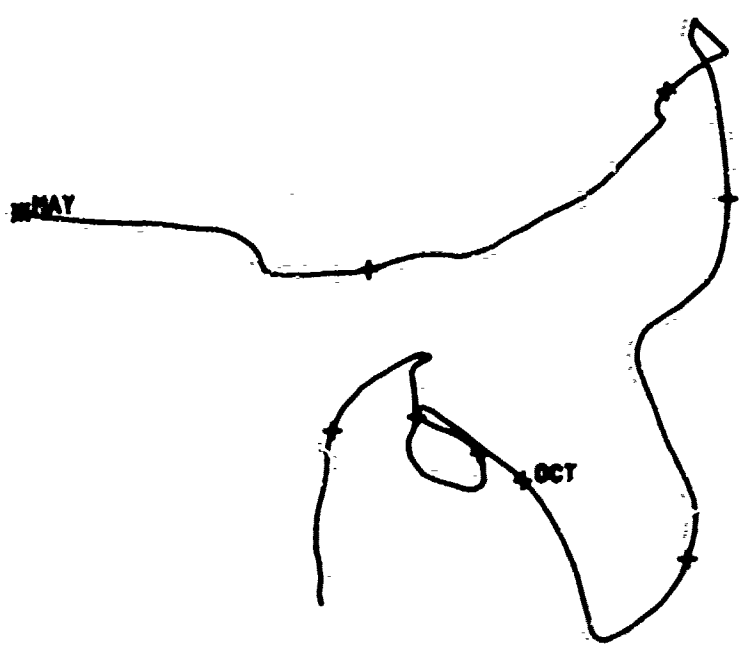

N
0
60.
KILOMETERS
5545A1DG240W
1513 N
79- V -01 TO 76- I -25
SEP
MAY
JAN

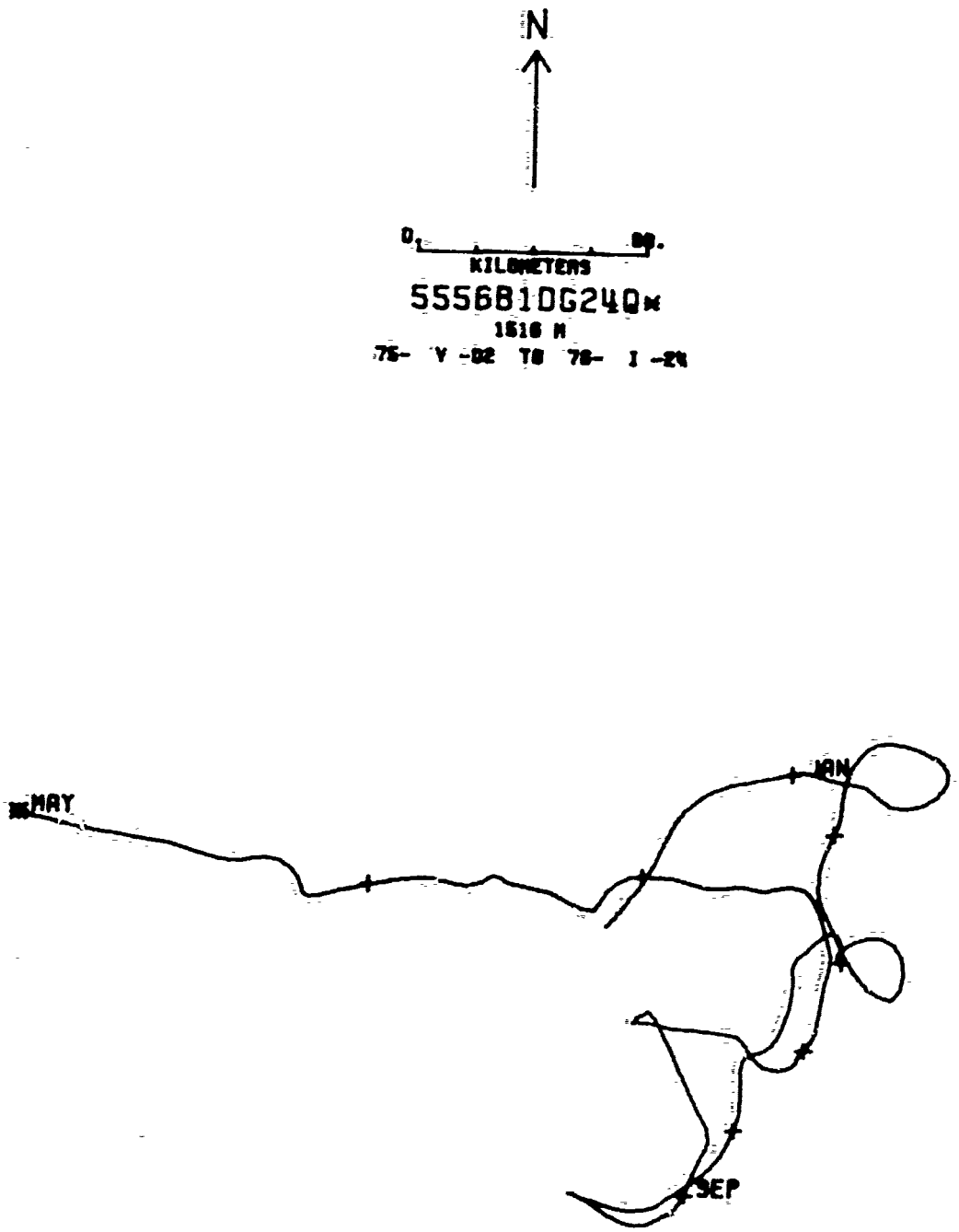

N
0
400.
KILOMETERS
5551A1DGAU24
318 M
75- V -02 TO 76- I -24
MAY
JAN
SEP

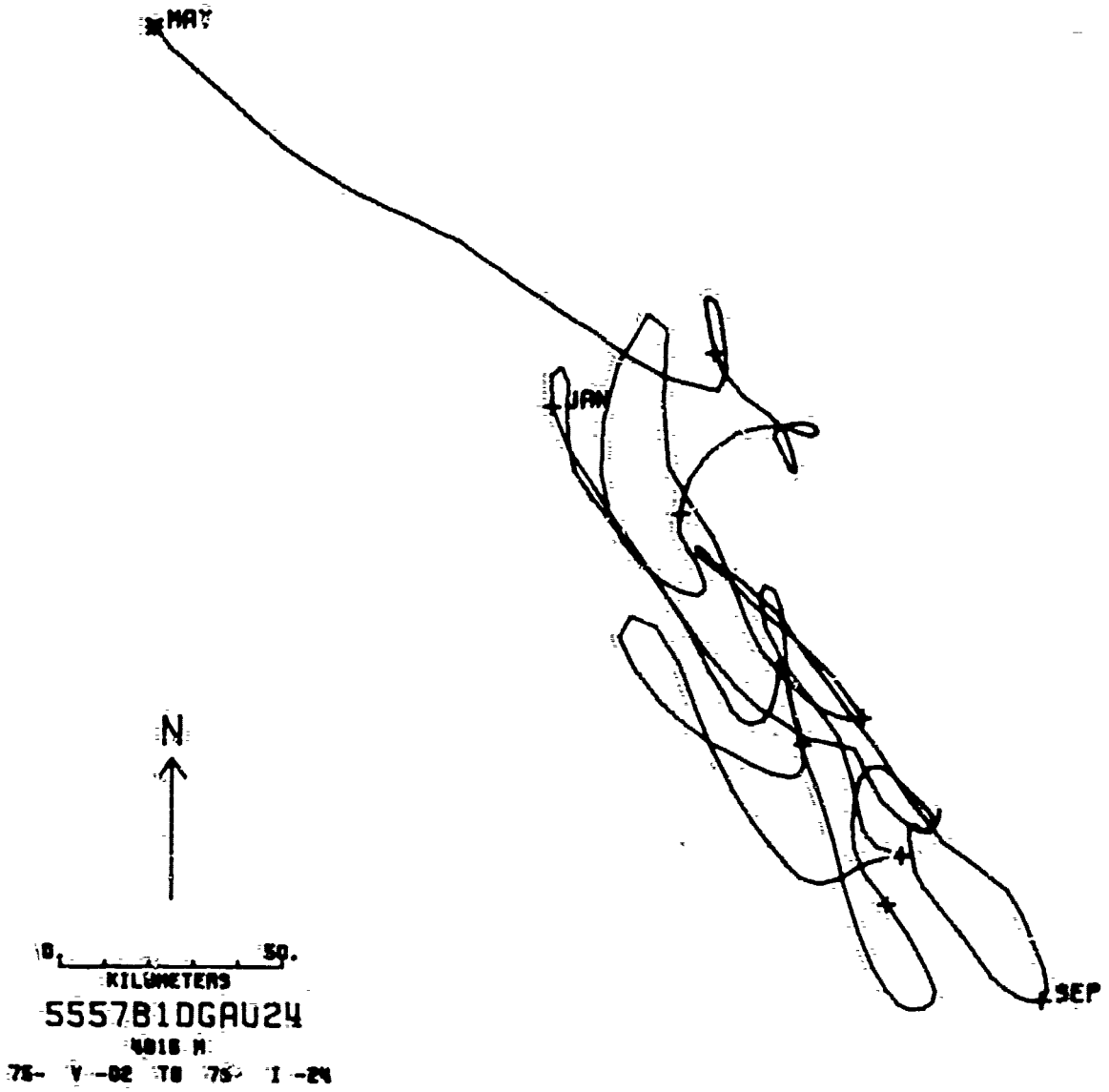

N
0
300.
KILOMETERS
S552A1DGAU24
SIB M
75- V -02 TO 75-VIII-11
MAY

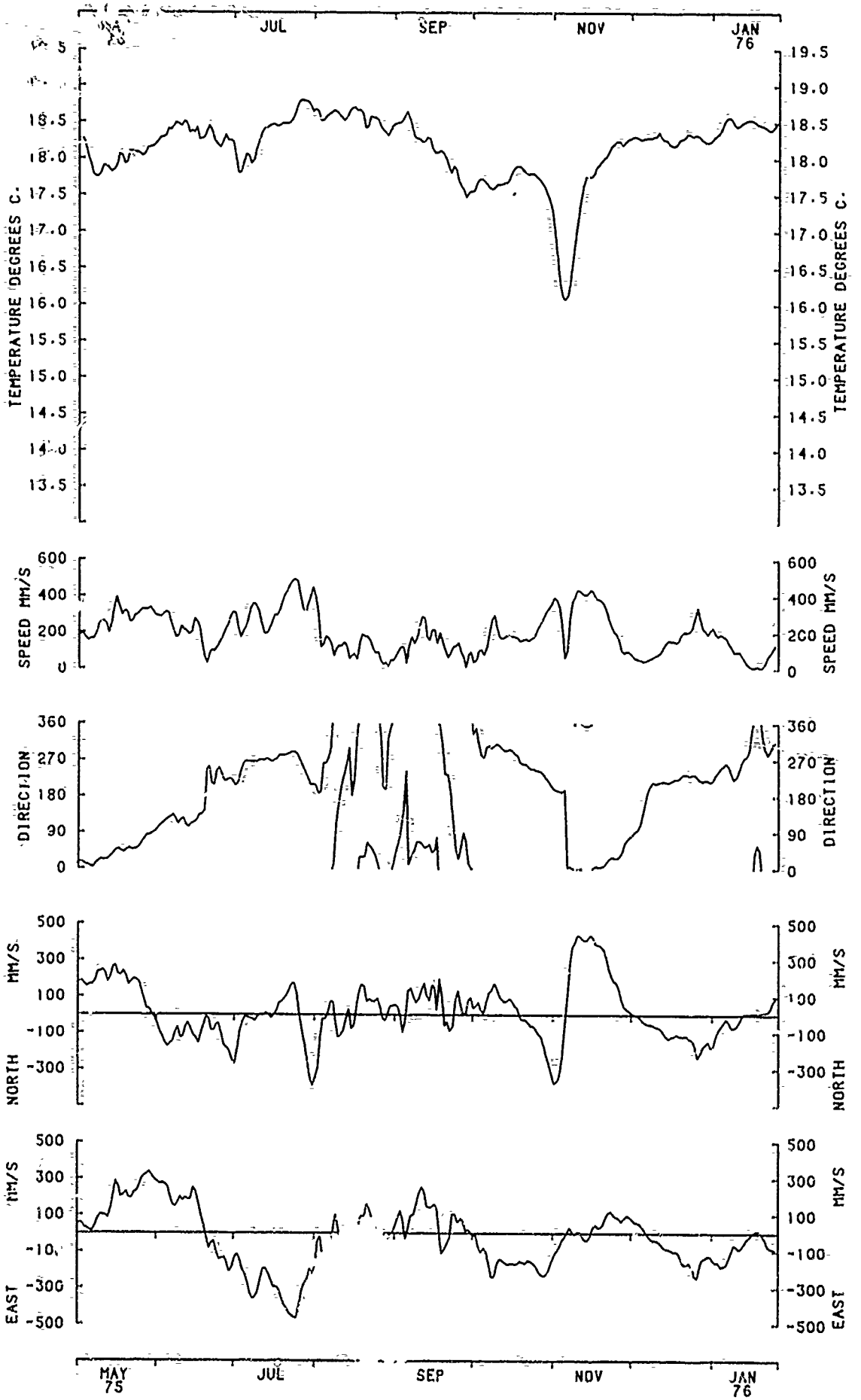

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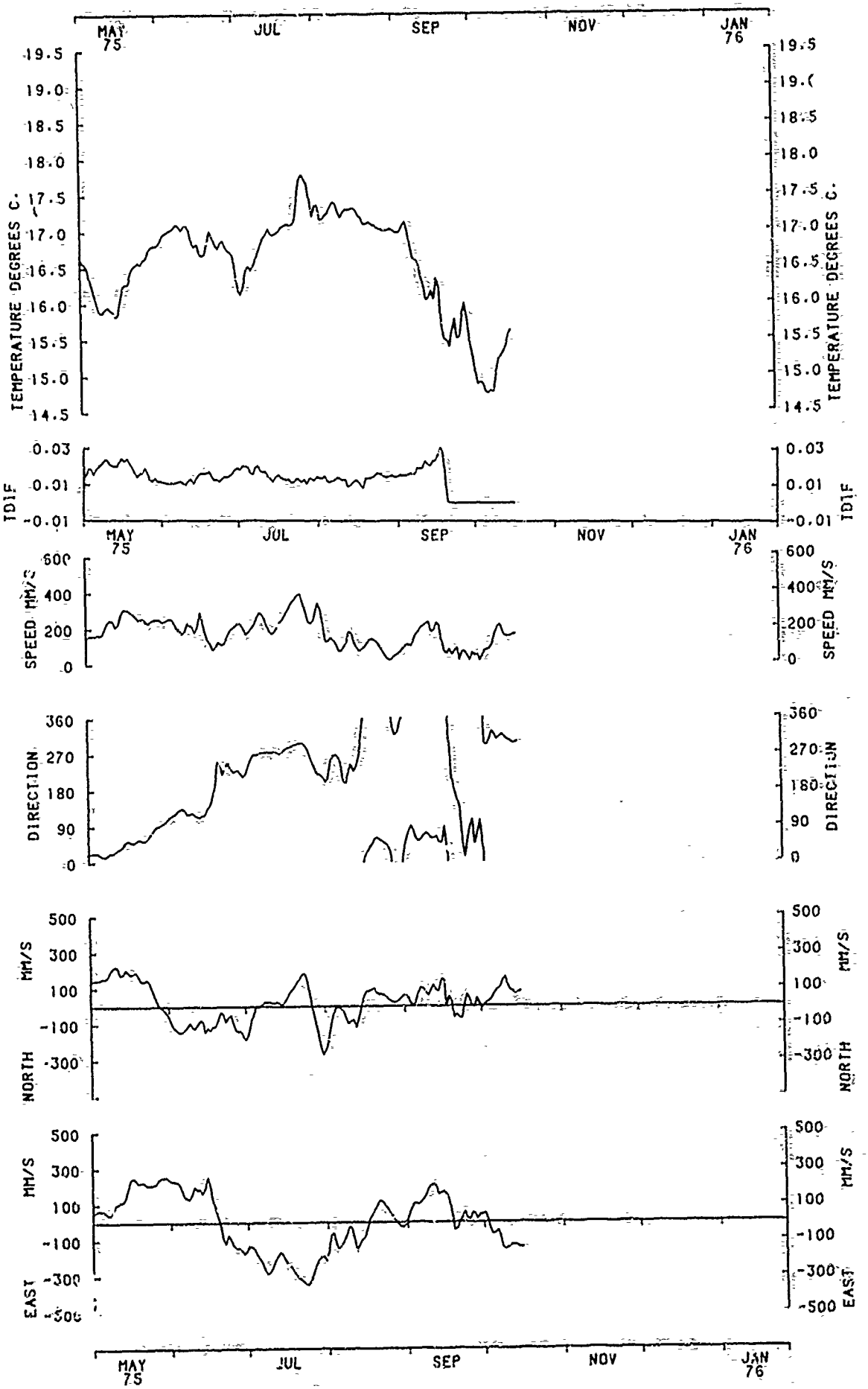

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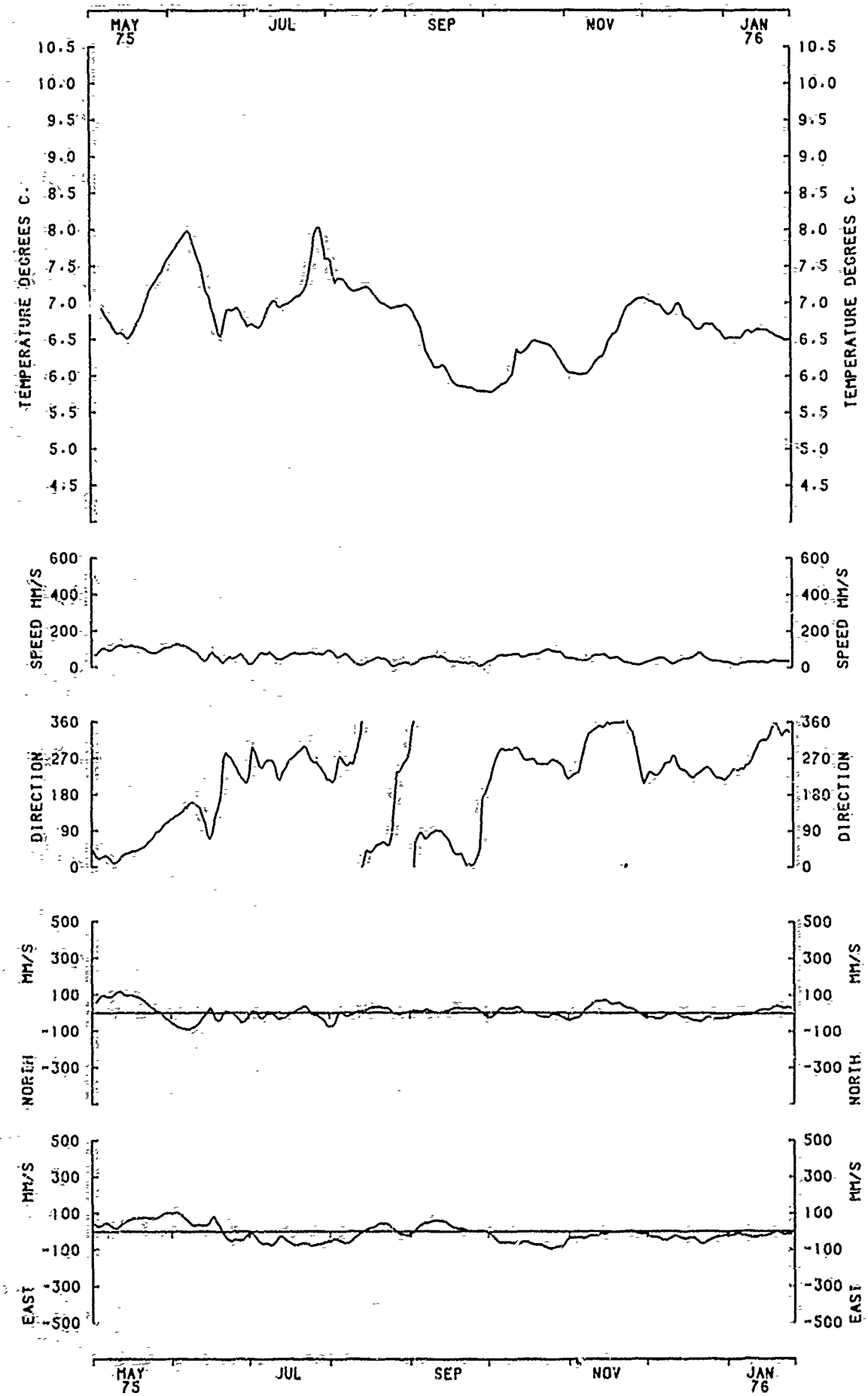

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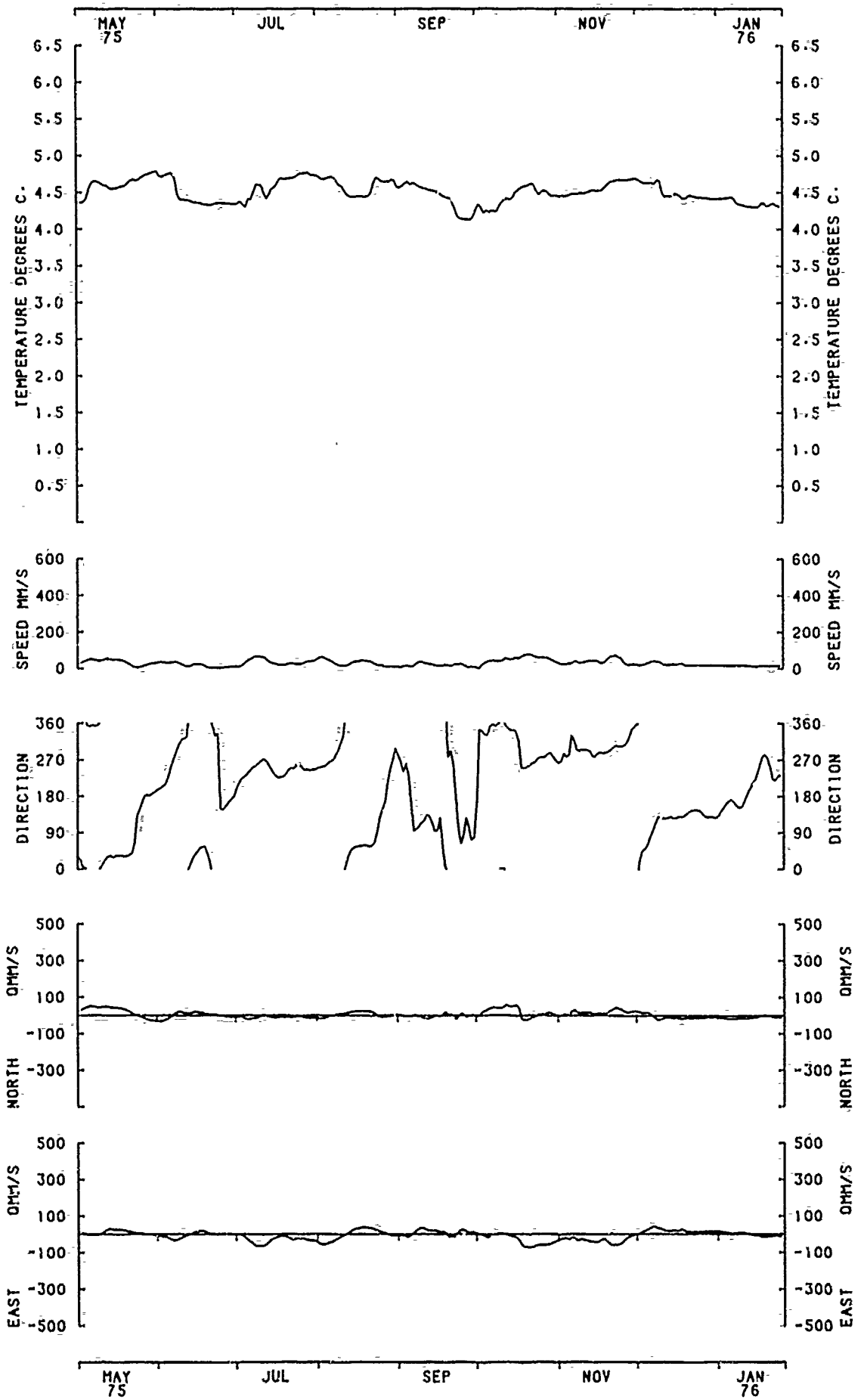
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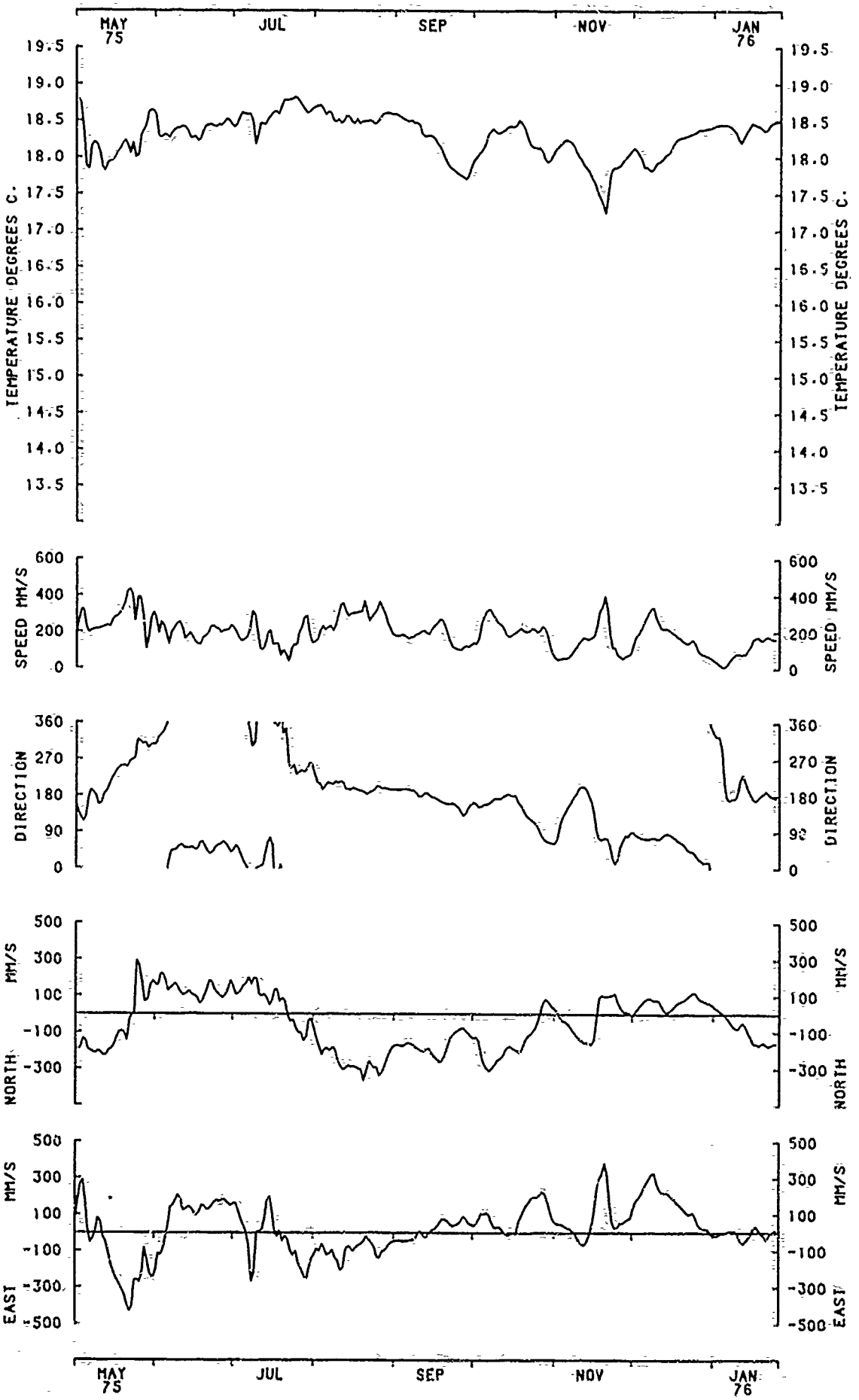
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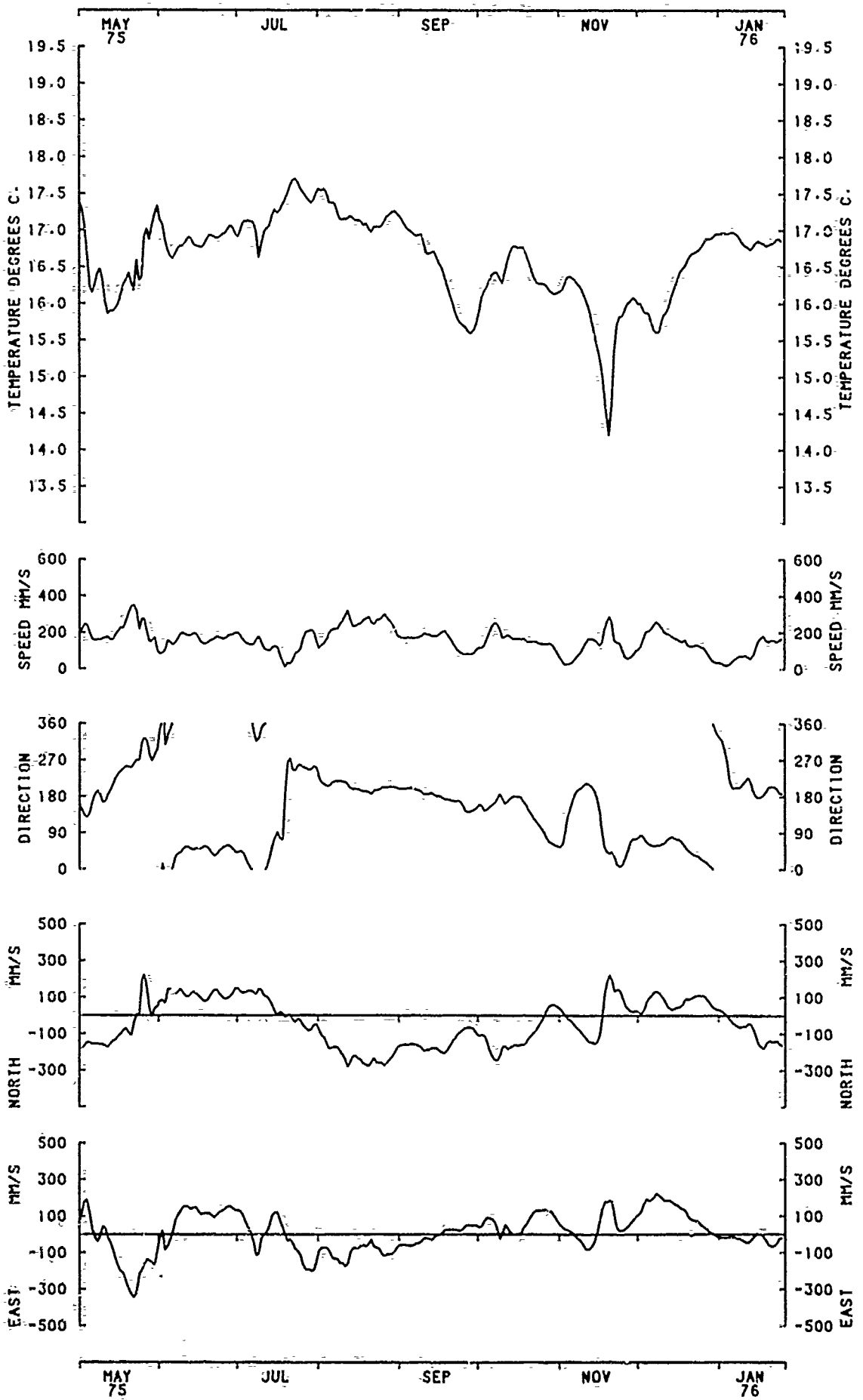
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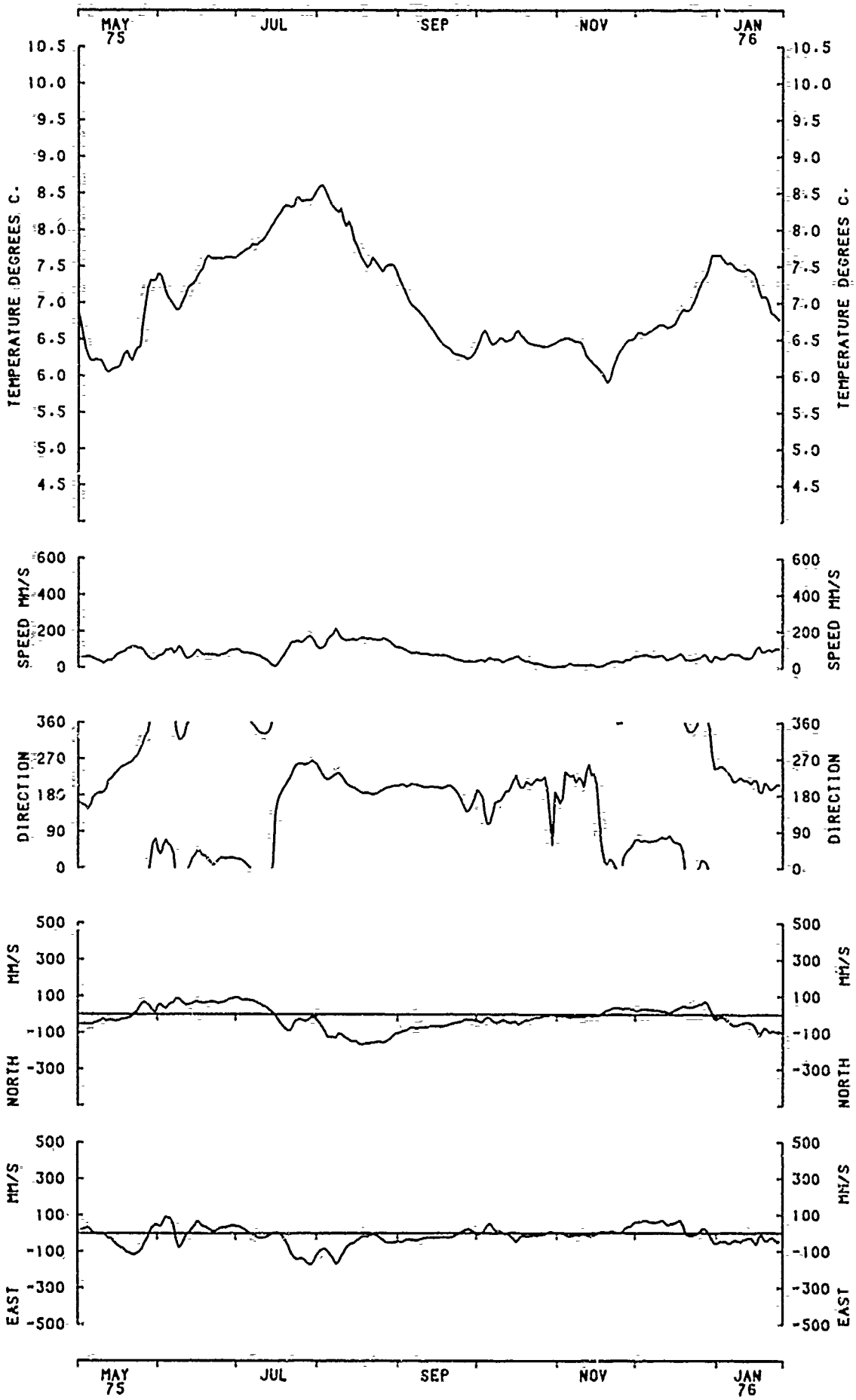
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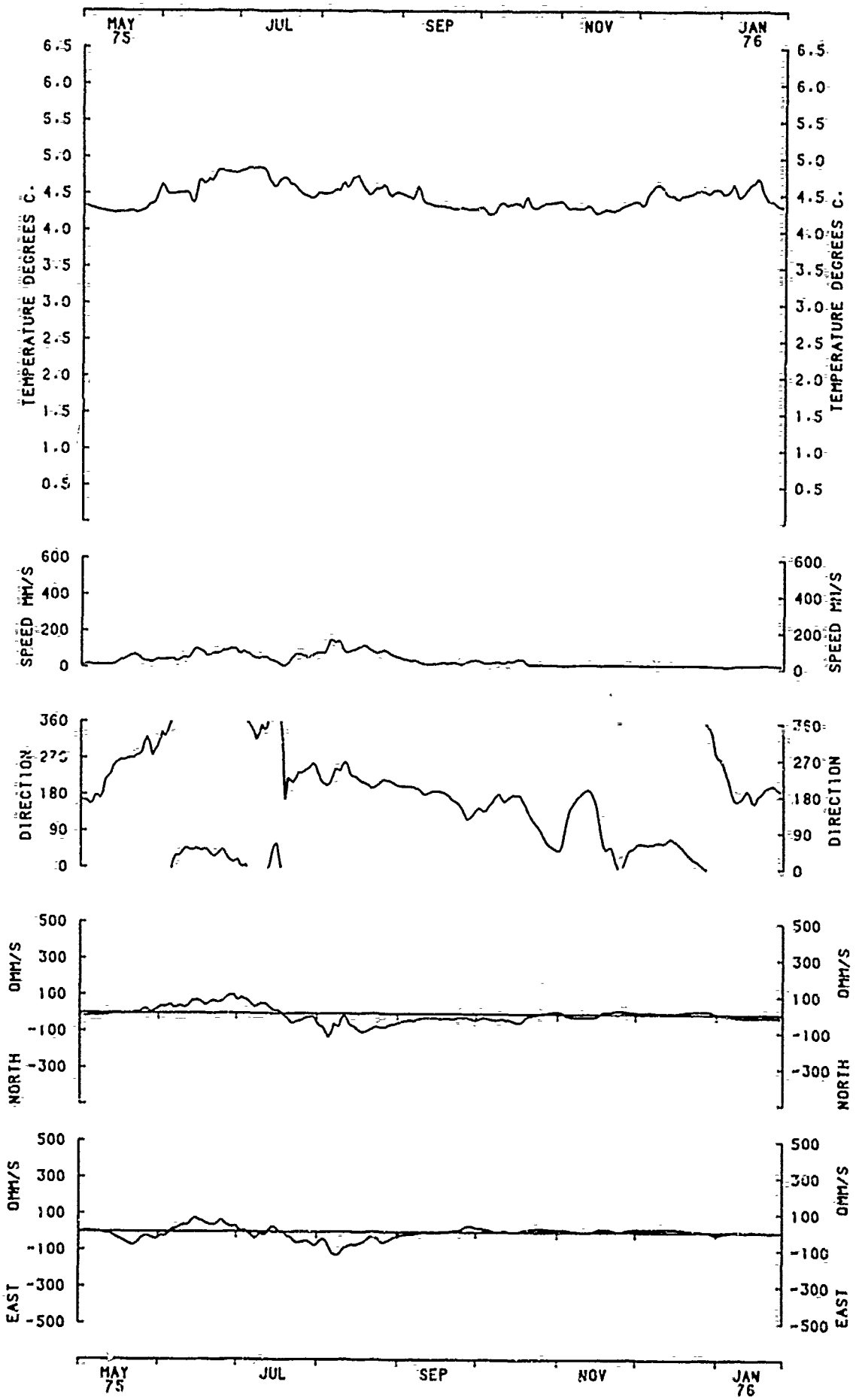
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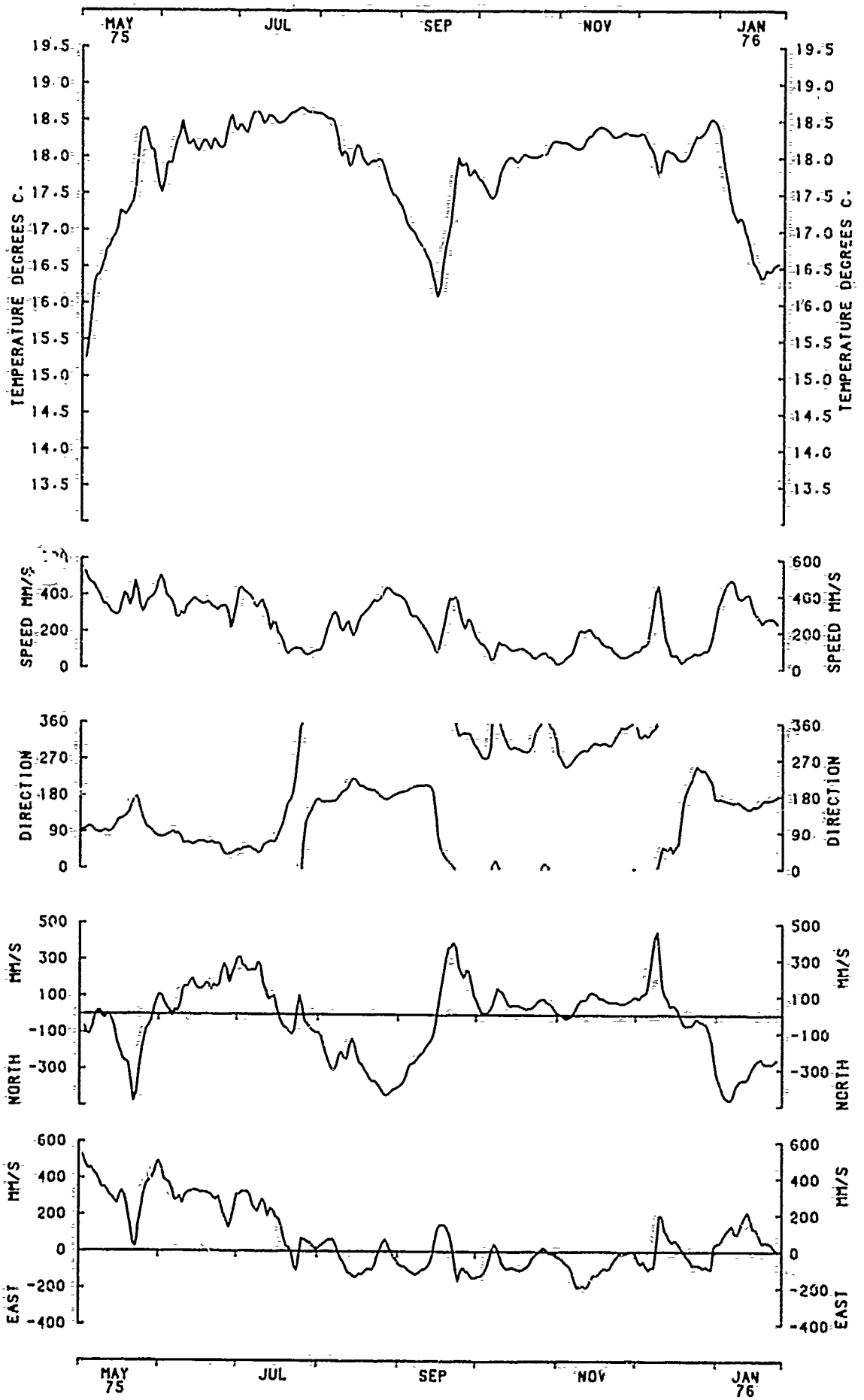
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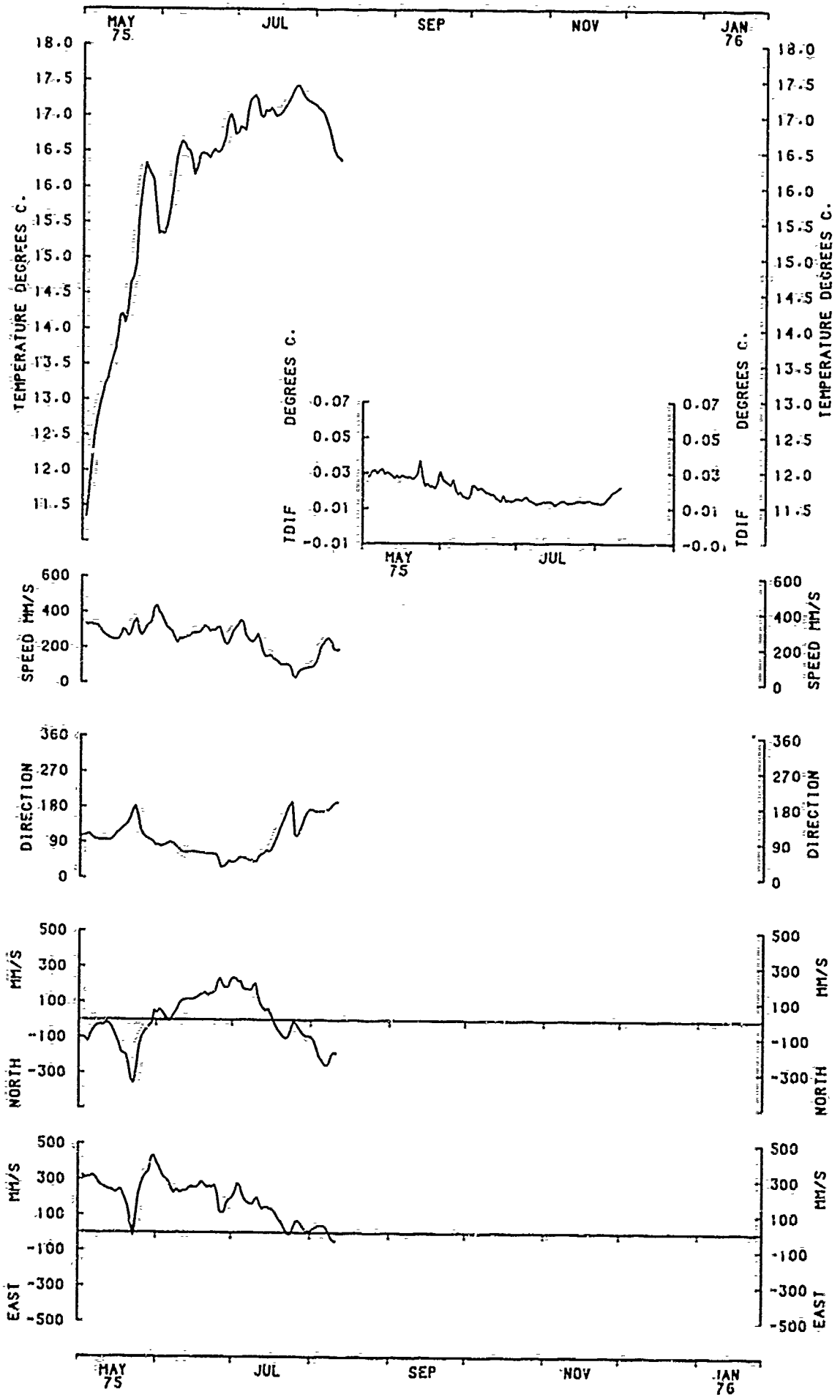
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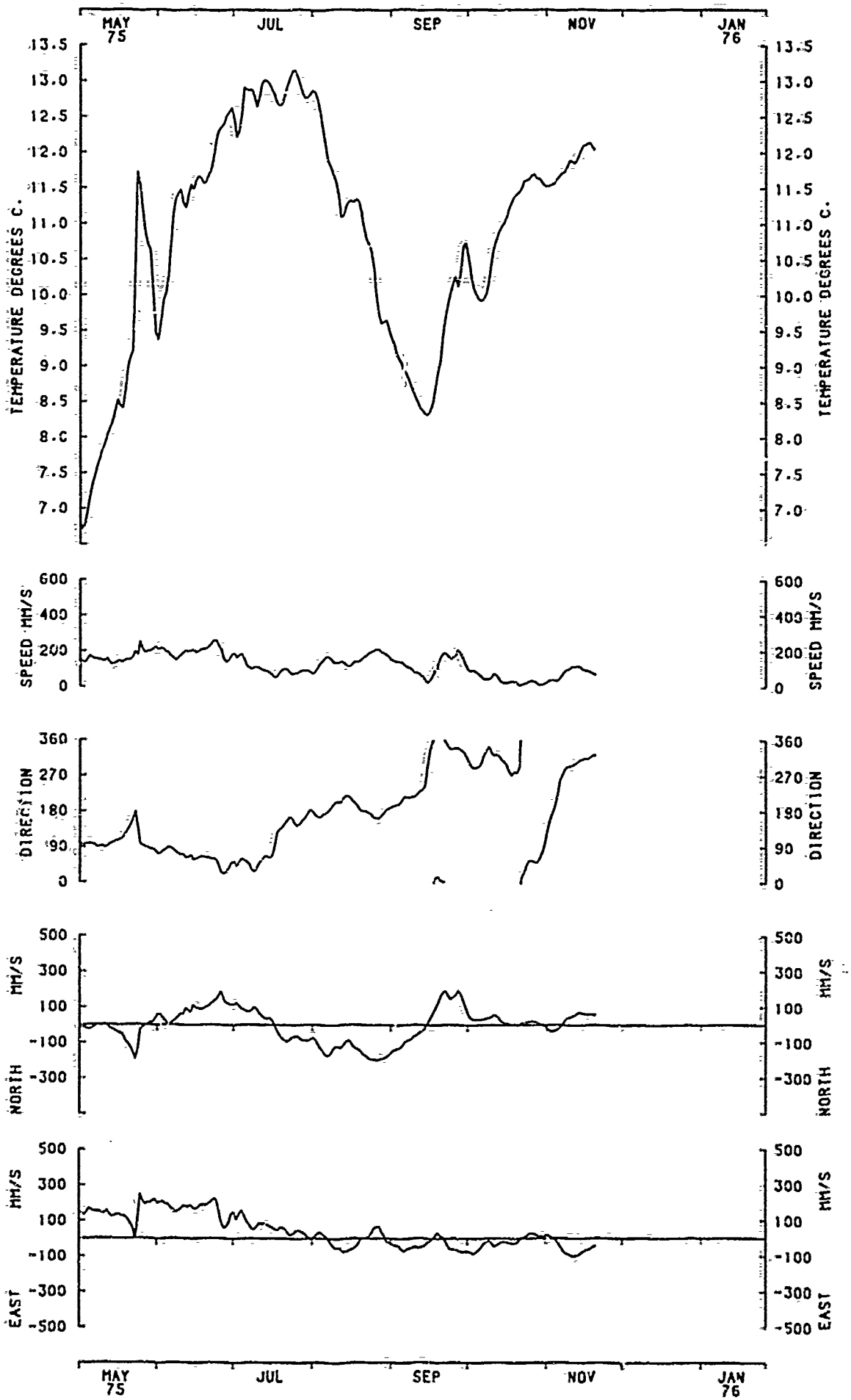
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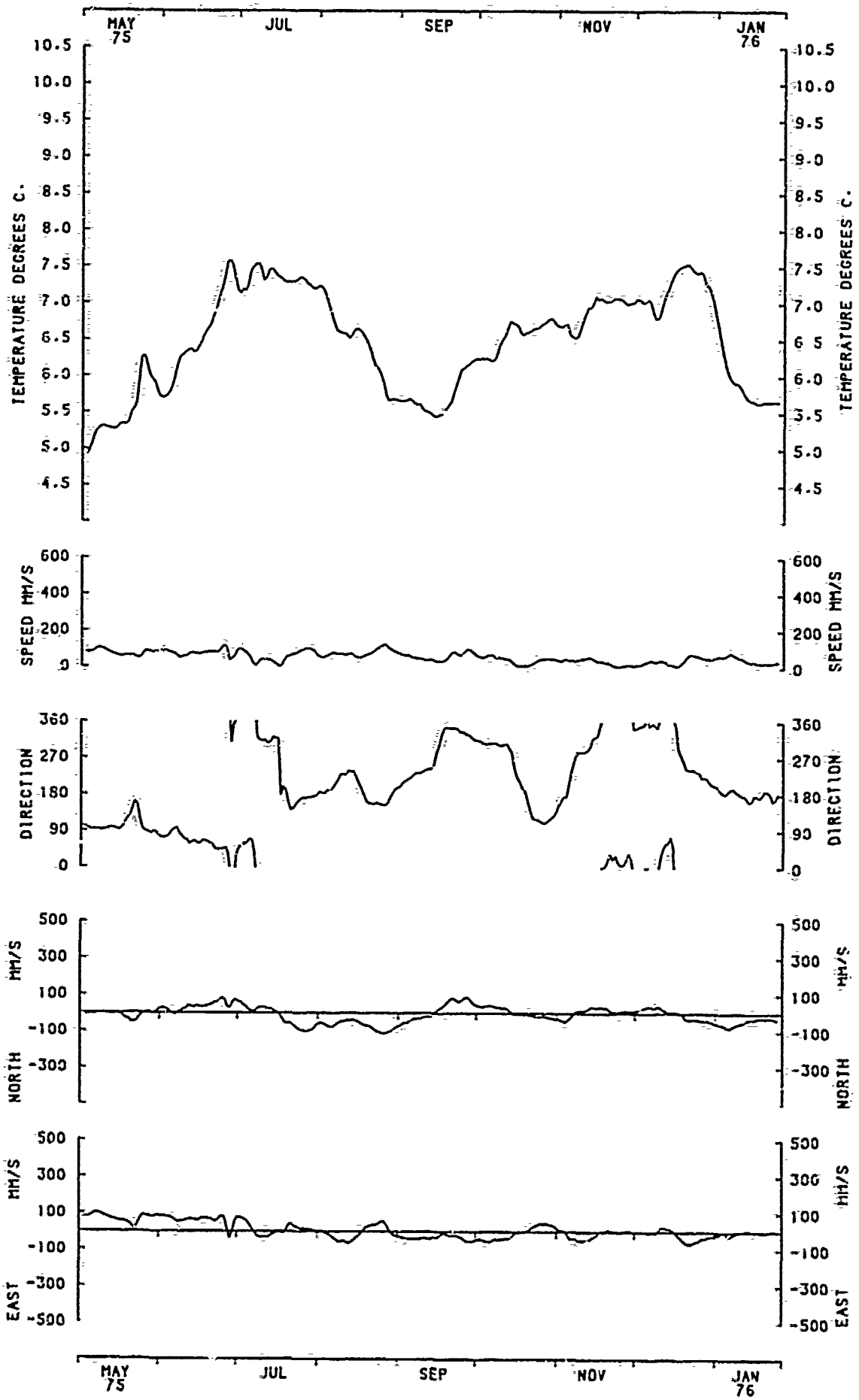
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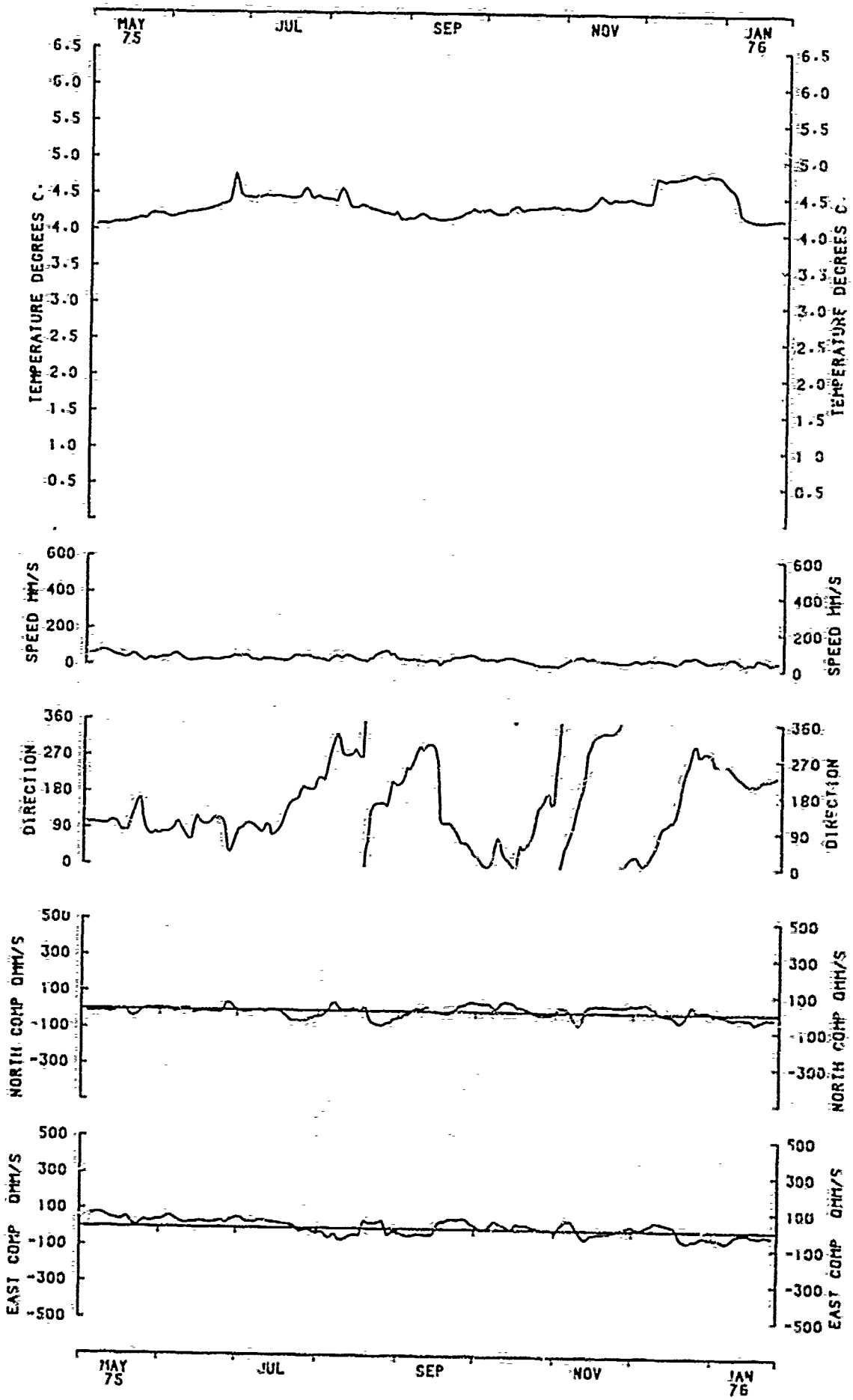
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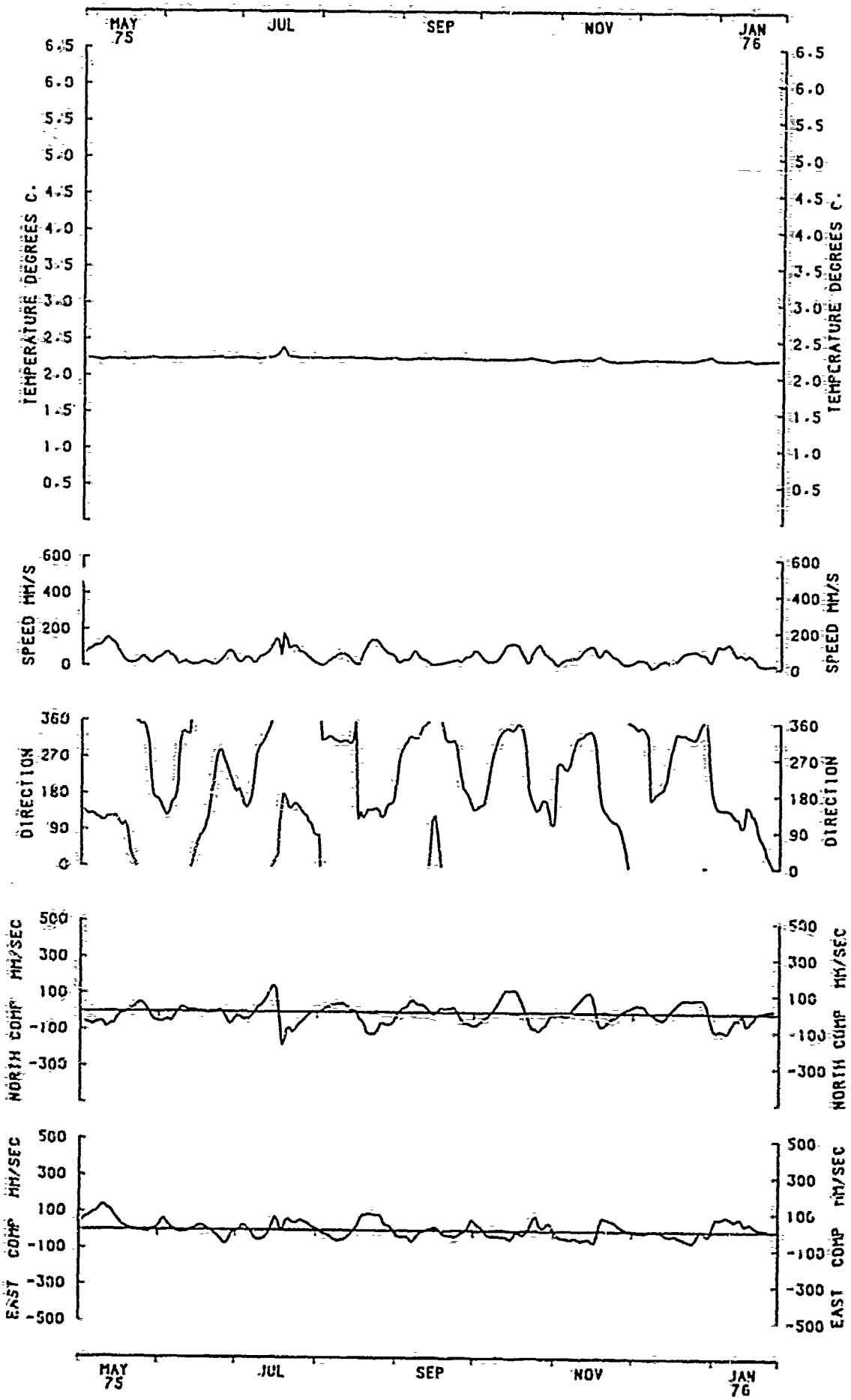
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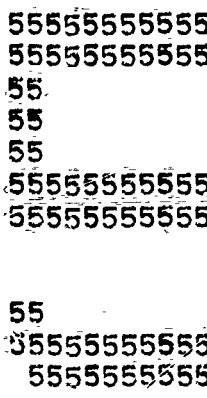


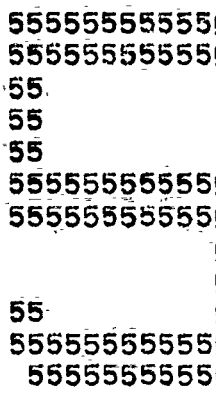
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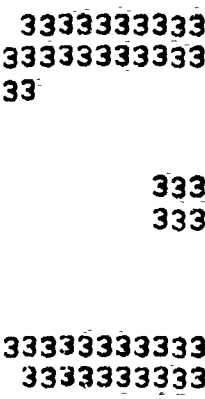


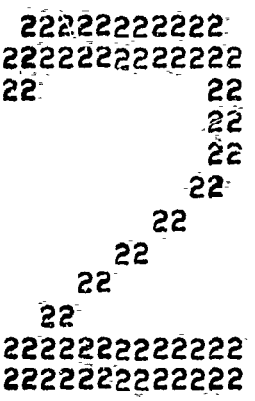
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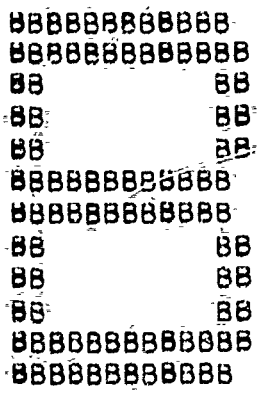
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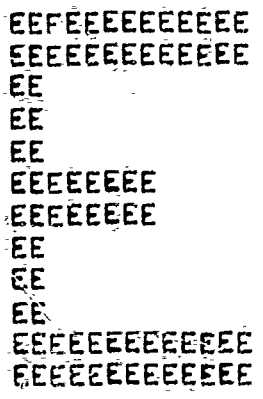


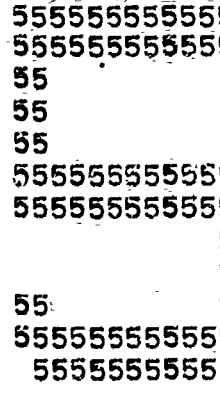


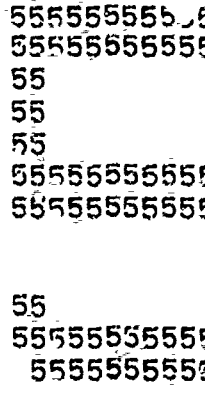




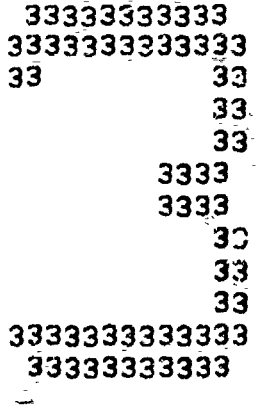


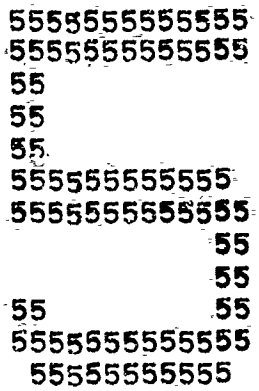


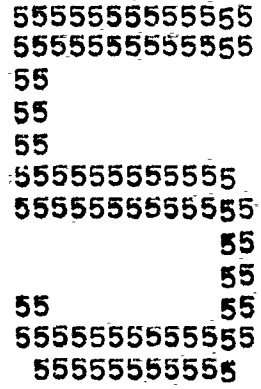


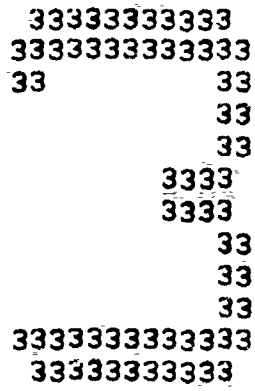


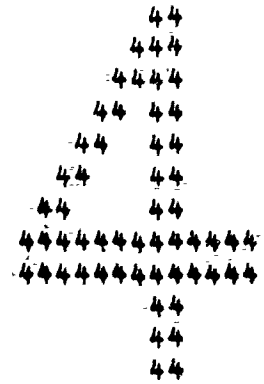


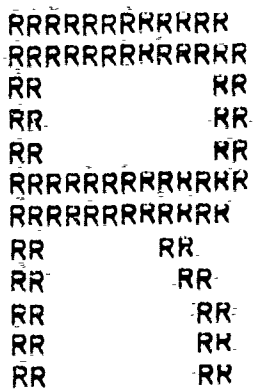


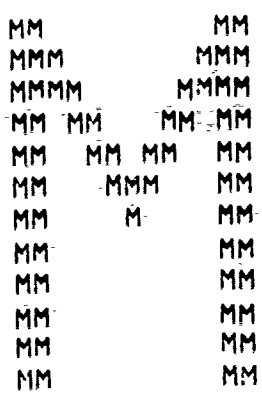

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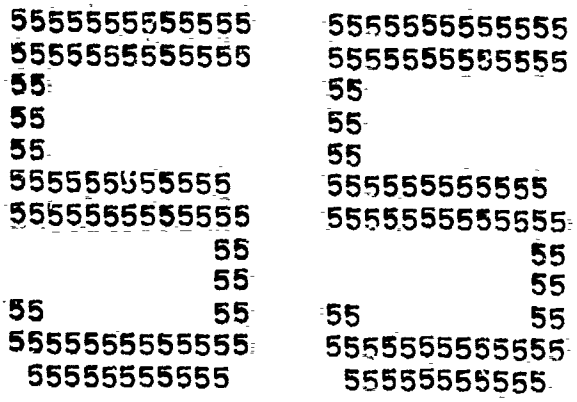

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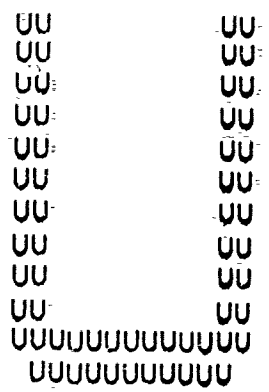

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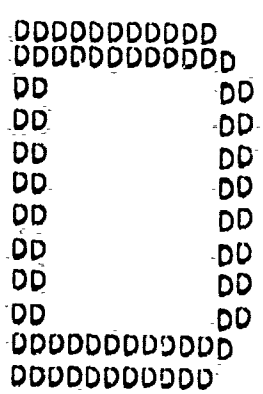

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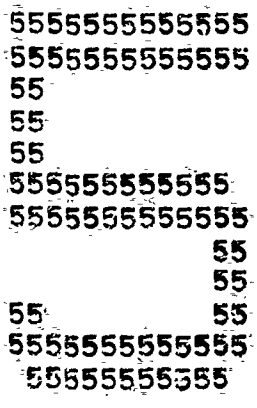

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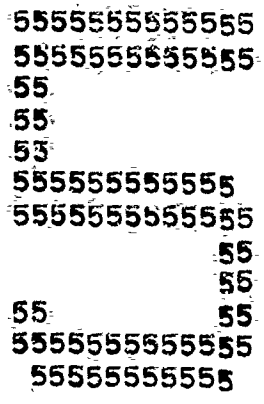

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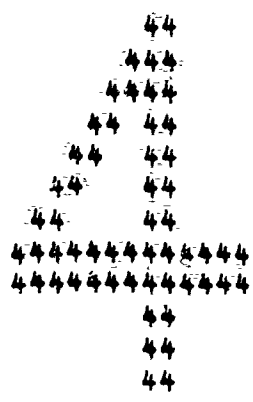

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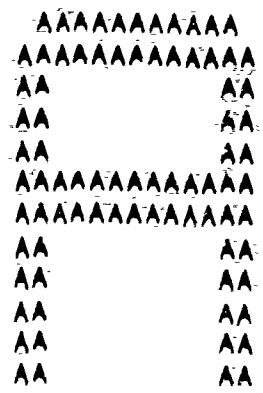

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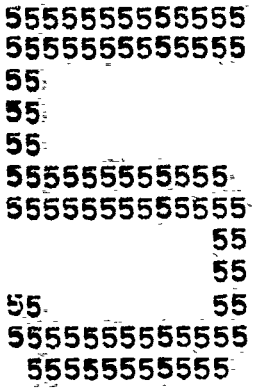

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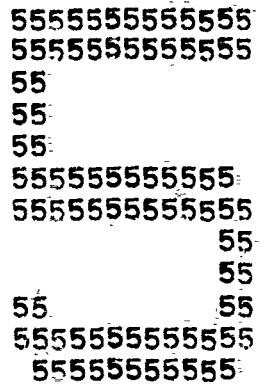


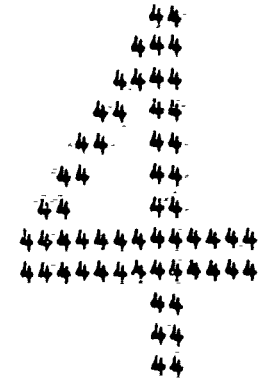


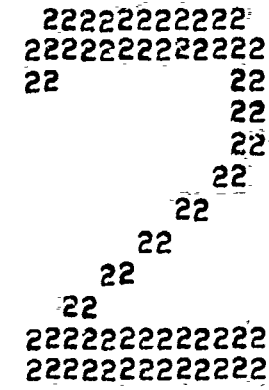


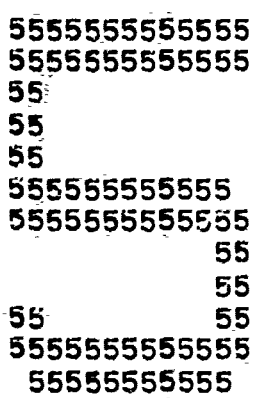


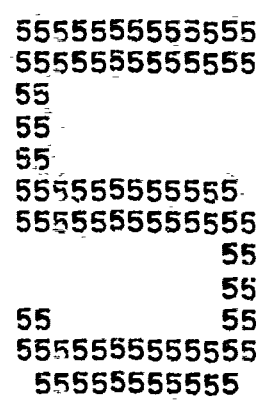

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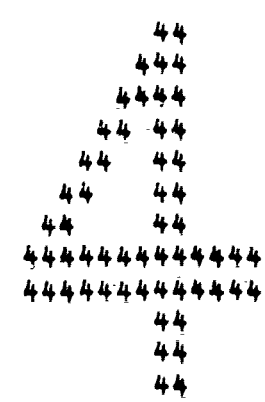

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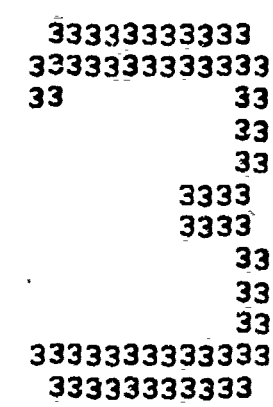

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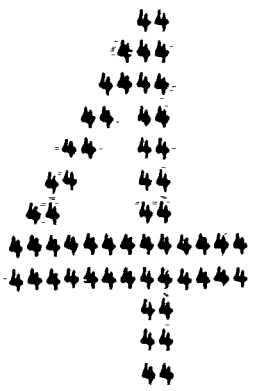

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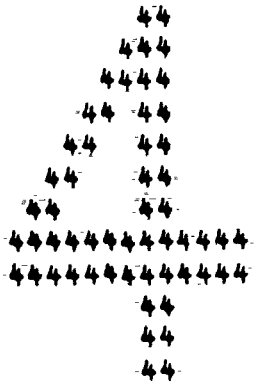

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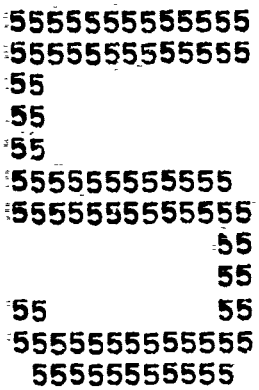
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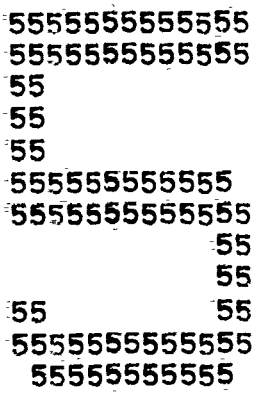


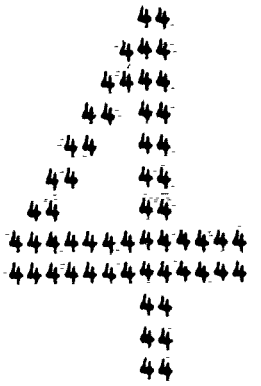


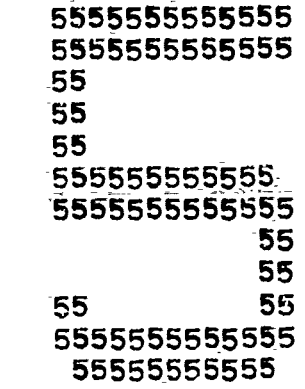
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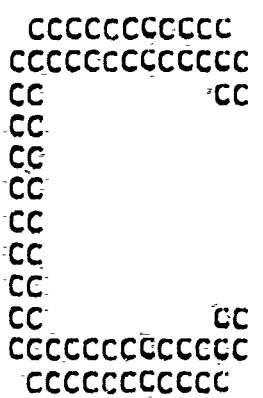
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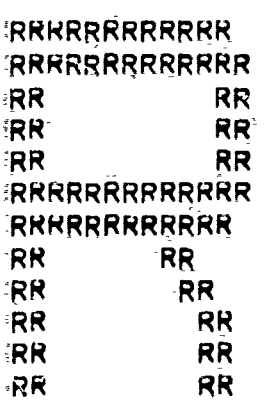


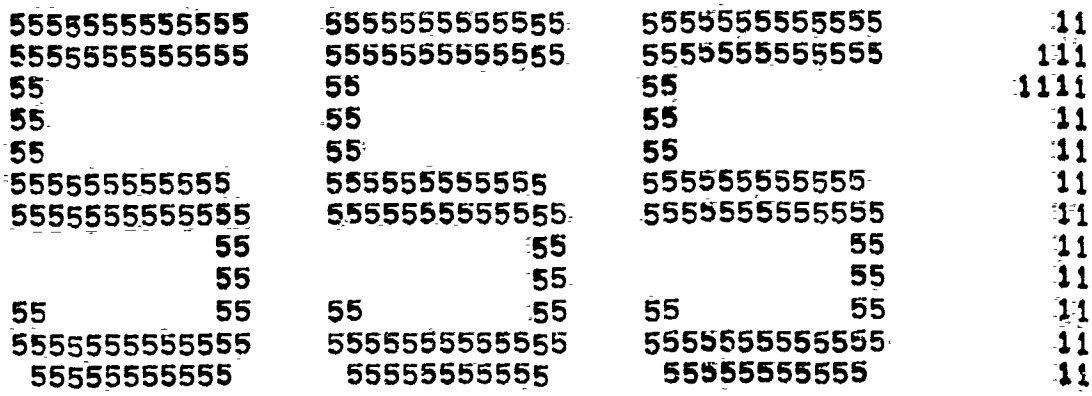


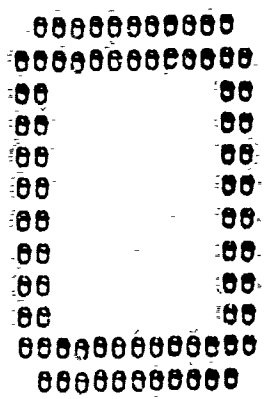


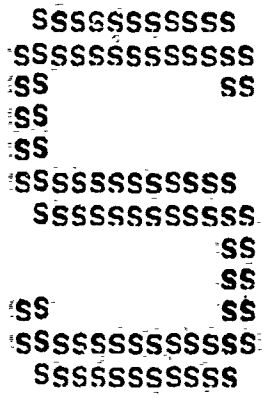


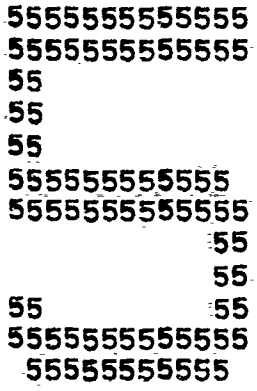


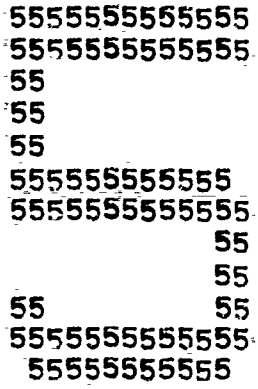


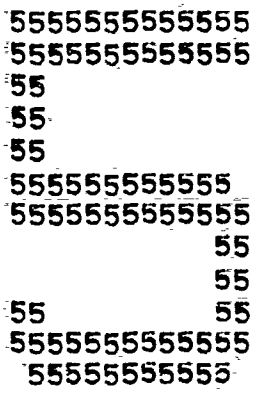

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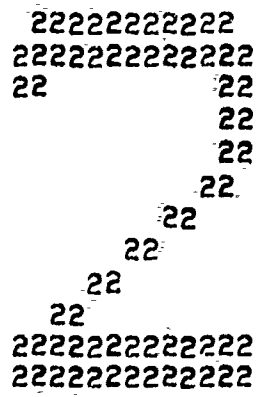

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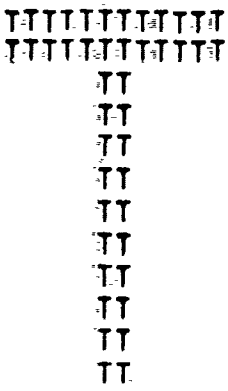

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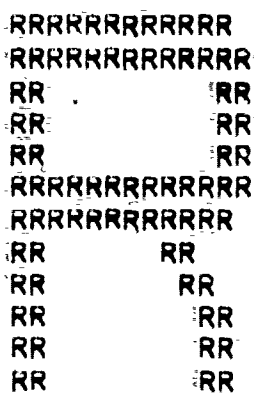


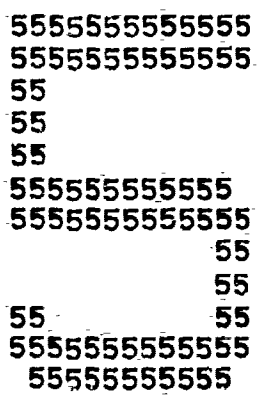


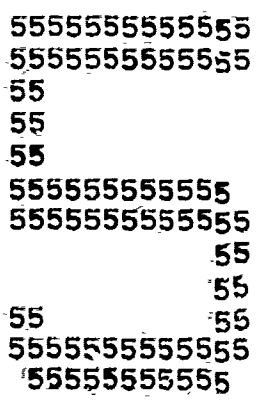


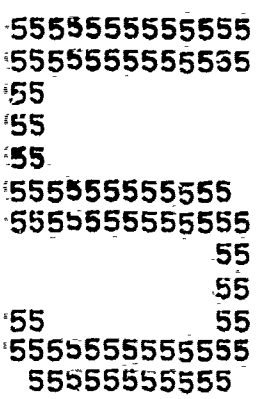


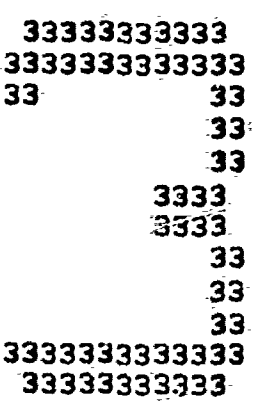


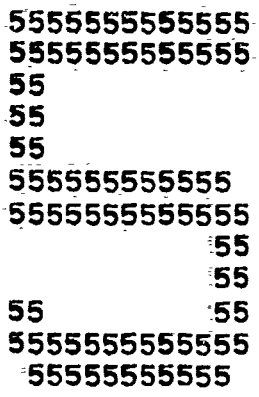


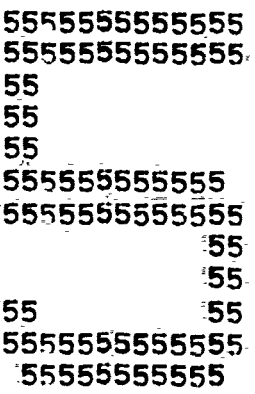


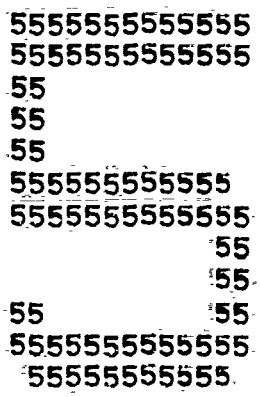


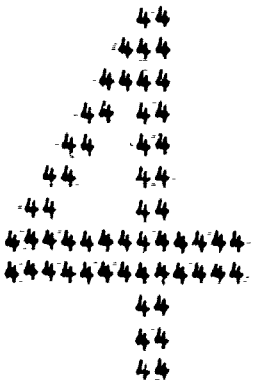


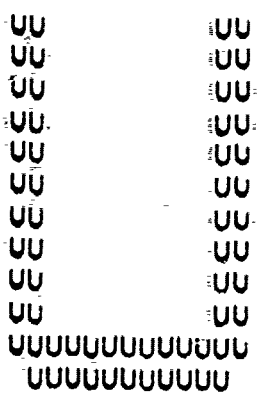


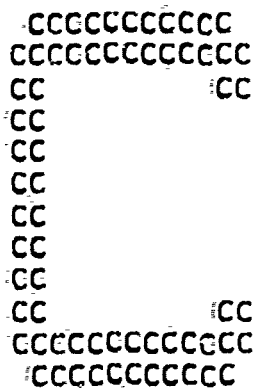


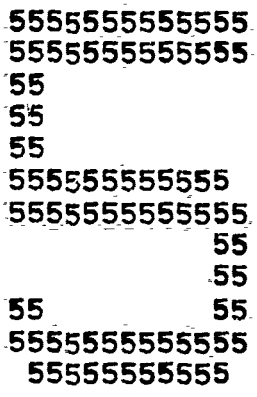


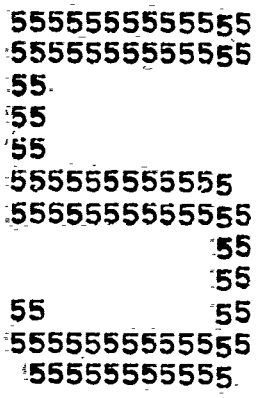


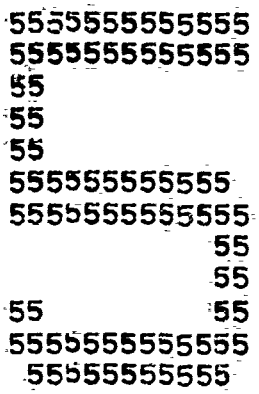


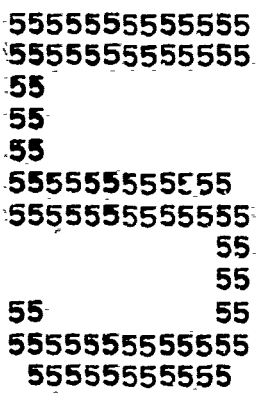


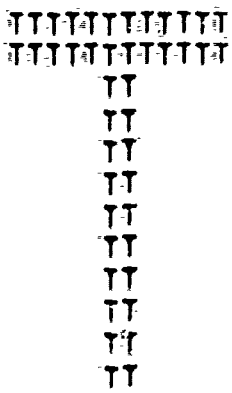


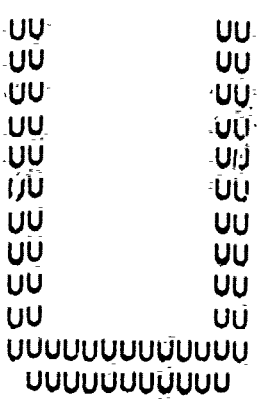


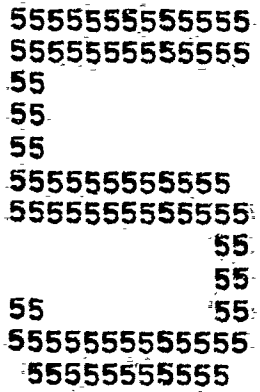


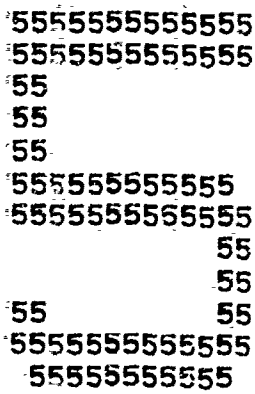


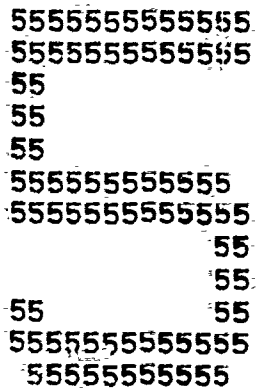


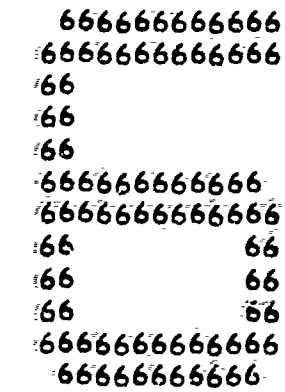


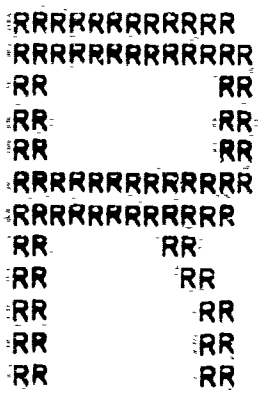


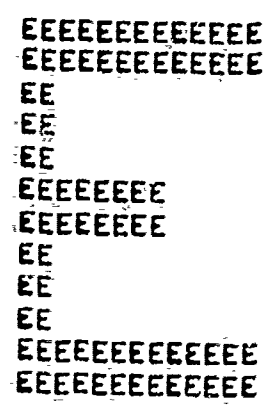

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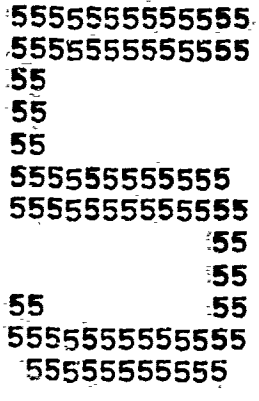

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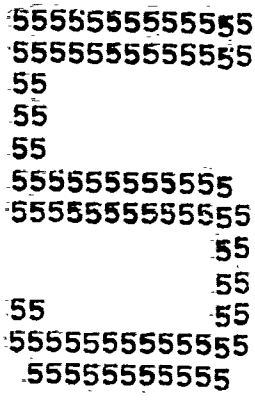

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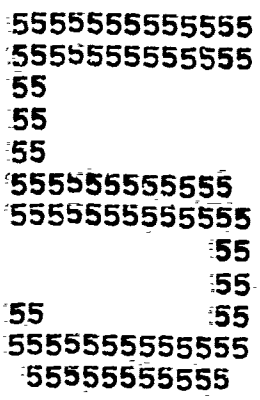

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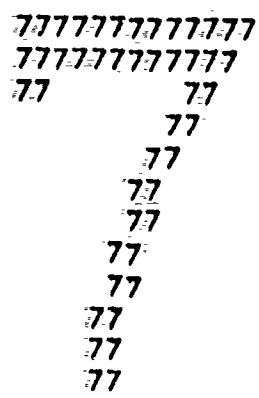

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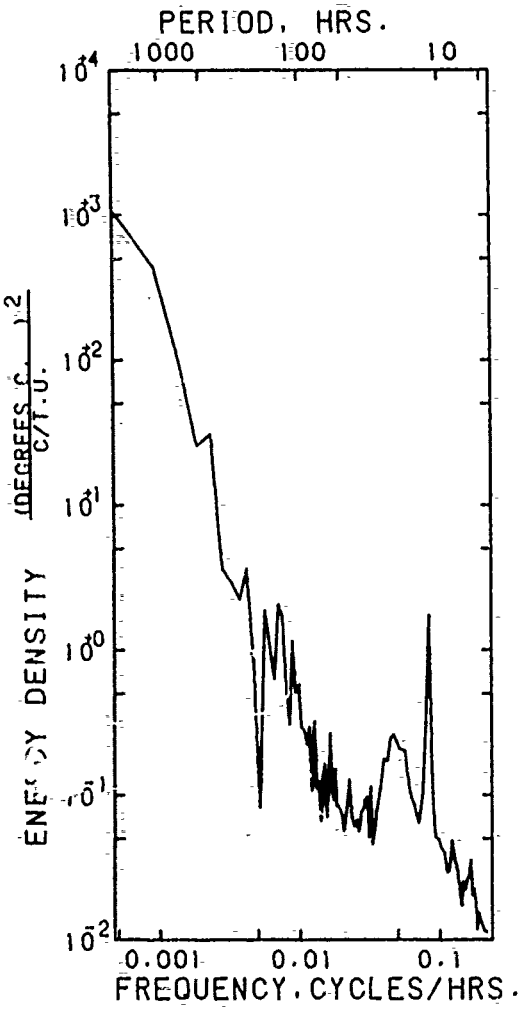

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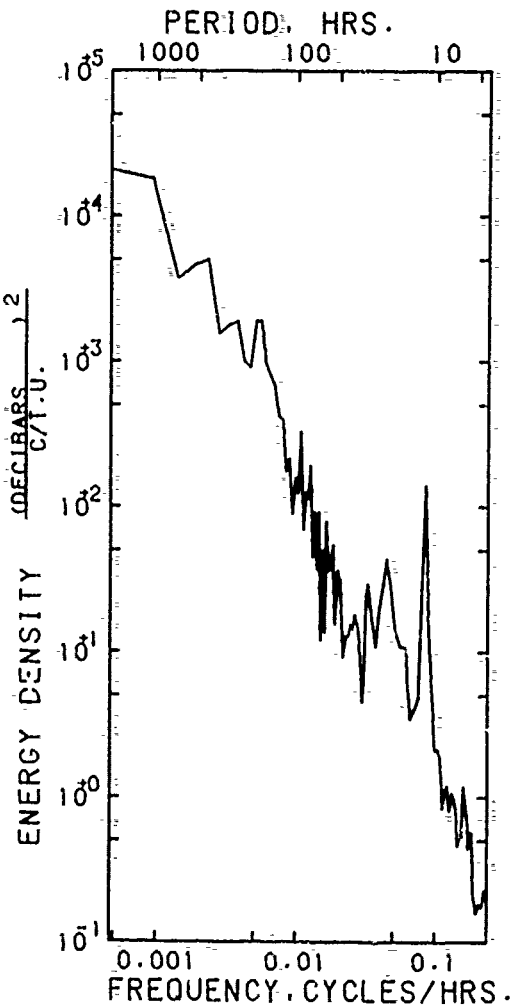

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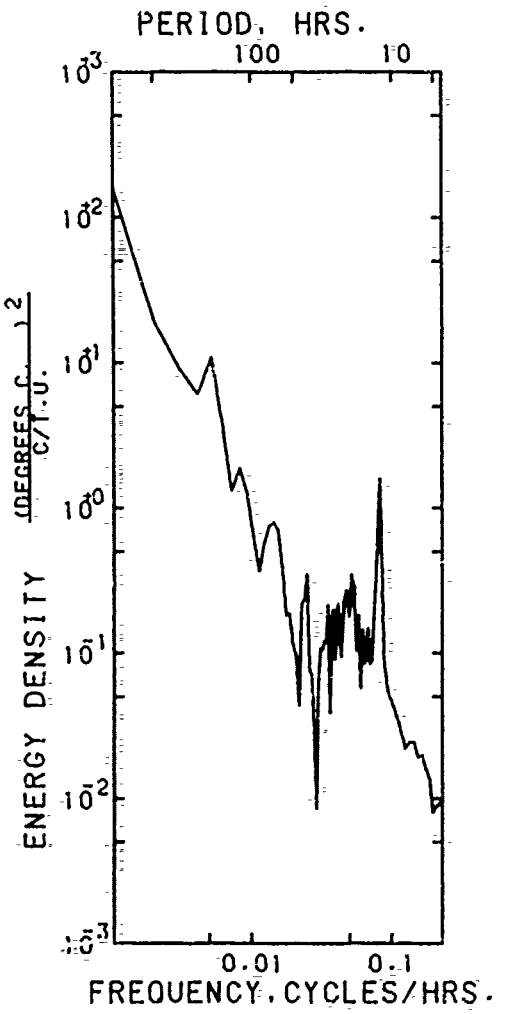


AUTO SPECTRUM
5533$1920 TEMPERATURE
735 METERS
75-IV-29 TO 76-1-21
1 PIECES WITH 1500 ESTIMATES
PER PIECE. AVERAGED OVER
3 ADJACENT FREQUENCY BANDS

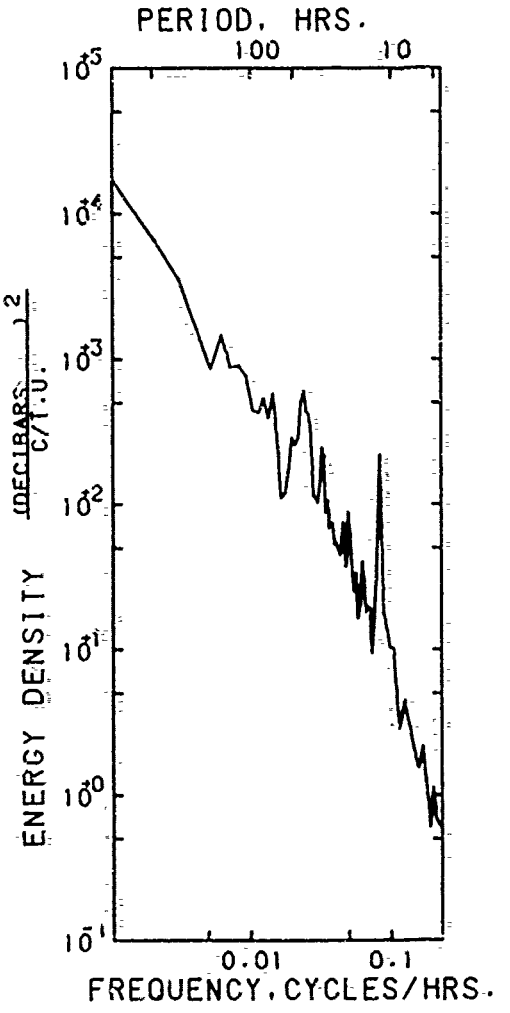


AUTO SPECTRUM
5533$1920 PRESSURE
735 METERS
75-IV-29 TO 76-1-21
1 PIECES WITH 1500 ESTIMATES
PER PIECE. AVERAGED OVER
3 ADJACENT FREQUENCY BANDS

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**********************************************************************
** 5533$1920     ** 12220 POINTS FROM 75- IV -29  TO 76-  I -26
INST. TD#15     DEPTH  734 M.   UNITS = DEGREES , DECIBARS
VARIABLE --- TEMPERATURE --- PRESSURE ---------------------------
MEAN        =     12.210       741.962
STD.ERR.    =      .113E-1       .529E-1
VARIANCE    =     1.547         34.163
KURTOSIS    =     2.632         12.252
SKEWNESS    =      .632          2.687
MINIMUM     =     8.824        737.401
MAXIMUM     =    14.912        782.572
**********************************************************************
```



AUTO SPECTRUM
5543$1920 TEMPERATURE
719 METERS
75-IV-29 TO 75-VIII-27
1 PIECES WITH 675 ESTIMATES
PER PIECE, AVERAGED OVER
3 ADJACENT FREQUENCY BANDS

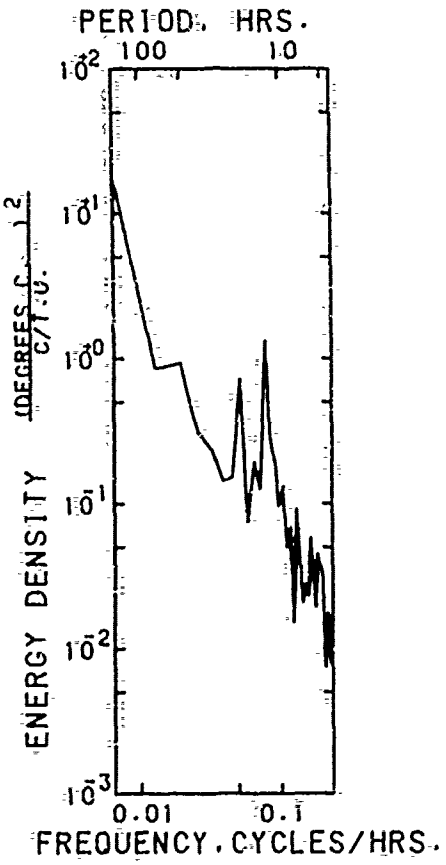


AUTO SPECTRUM
5543$1920 PRESSURE
719 METERS
75-IV-29 TO 75-VIII-27
1 PIECES WITH 675 ESTIMATES
PER PIECE, AVERAGED OVER
3 ADJACENT FREQUENCY BANDS

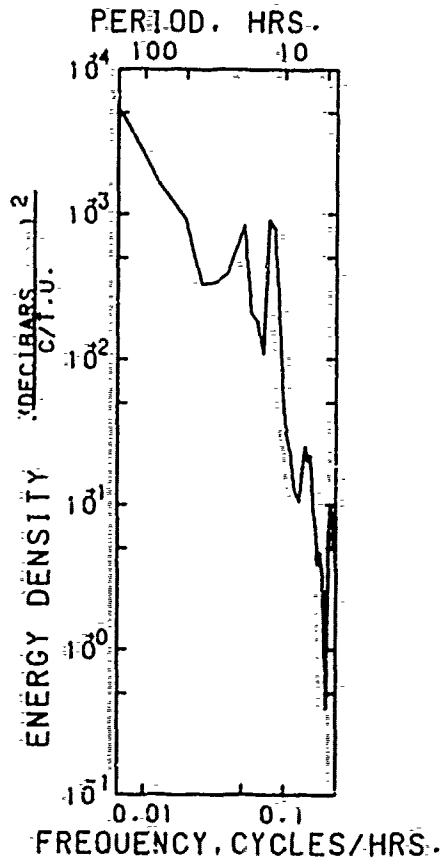
****
** 5543$1920 ** 5490 POINTS FROM 75- IV -29 TO 75-VIII-29
INST. DEPTH 718 M. UNITS = DEGREES , DECIBARS

VARIABLE		TEMPERATURE	PRESSURE
MEAN	=	13.404	725.388
STD.ERR.	=	.124E-1	.992E-1
VARIANCE	=	.841	54.056
KURTOSIS	=	2.625	10.481
SKEWNESS	=	-.476	2.199
MINIMUM	=	11.122	718.109
MAXIMUM	=	15.177	785.999

****

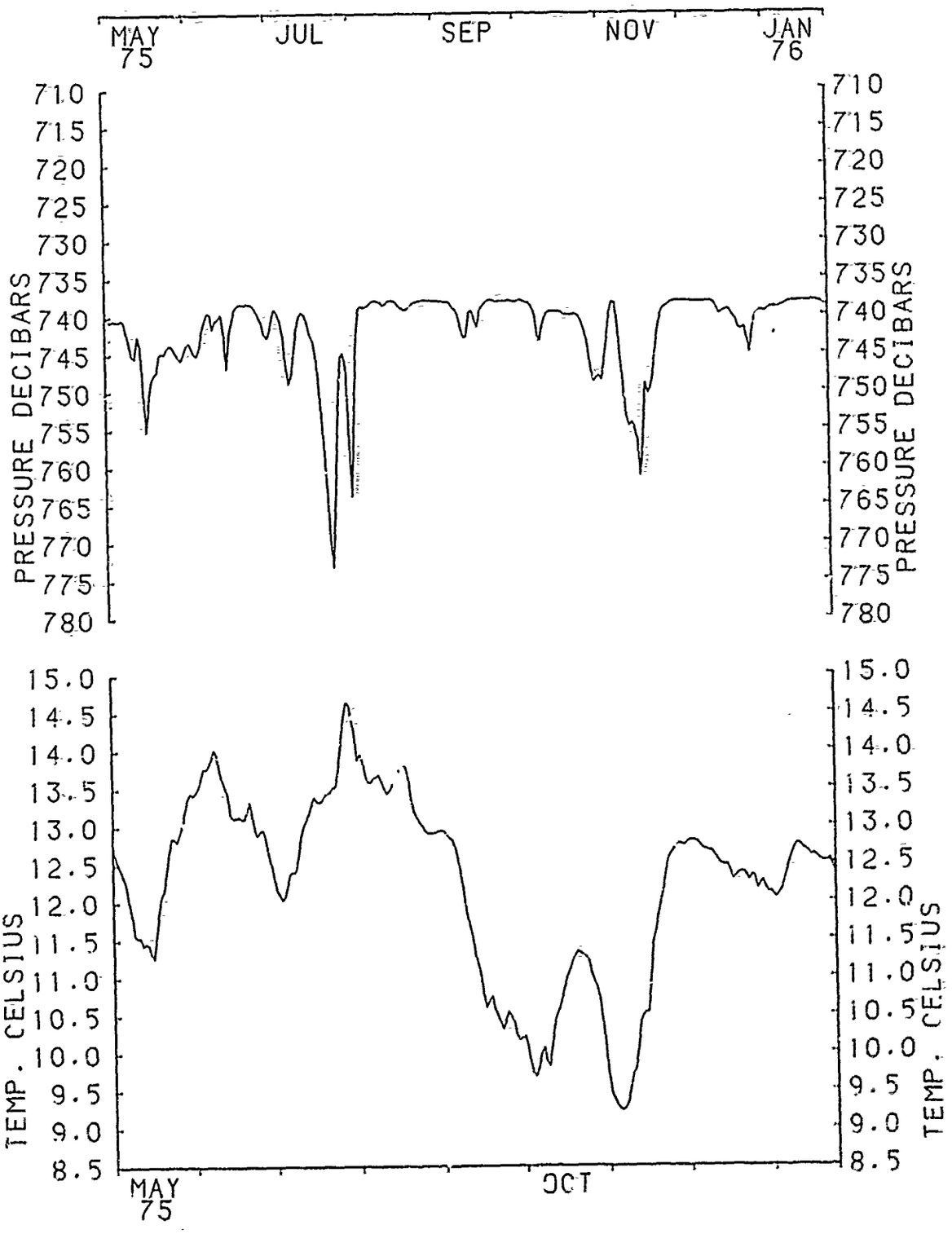


AUTO SPECTRUM
5553$1920 TEMPERATURE
753 METERS
75-IV-29 TO 75-V-19
1 PIECES WITH 108 ESTIMATES
PER PIECE. AVERAGED OVER
3 ADJACENT FREQUENCY BANDS

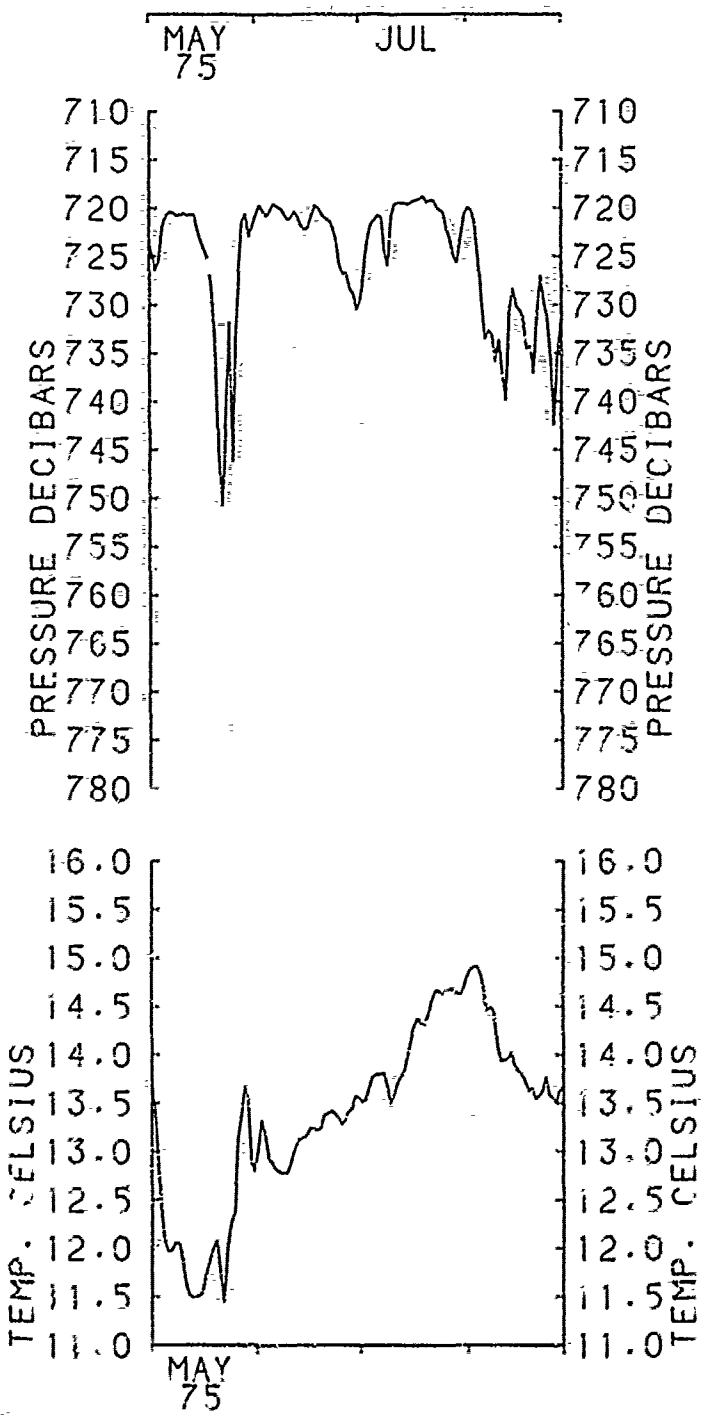


AUTO SPECTRUM
5553$1920 PRESSURE
753 METERS
75-IV-29 TO 75-V-19
1 PIECES WITH 108 ESTIMATES
PER PIECE. AVERAGED OVER
3 ADJACENT FREQUENCY BANDS

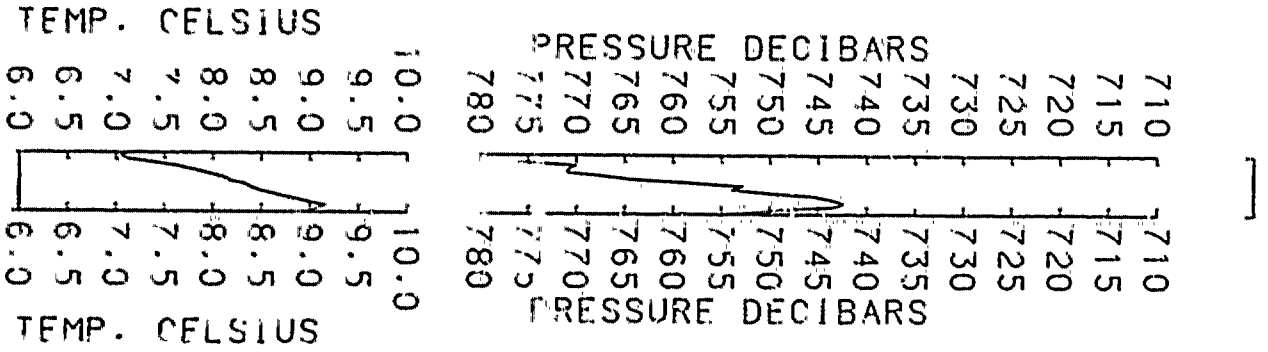
** 5553$1920	**	924 POINTS FROM 75- IV -29 TO 75- V -20	
INST.		DEPTH 752 M. UNITS = DEGREES , DECIBARS	
VARIABLE ---		TEMPERATURE	-- PRESSURE ---
MEAN	=	8.253	759.786
STD.ERR.	=	.245E-1	.501
VARIANCE	=	.554	232.321
KURTOSIS	=	1.978	2.514
SKEWNESS	=	-.127	.441
MINIMUM	=	6.702	719.252
MAXIMUM	=	9.767	802.928



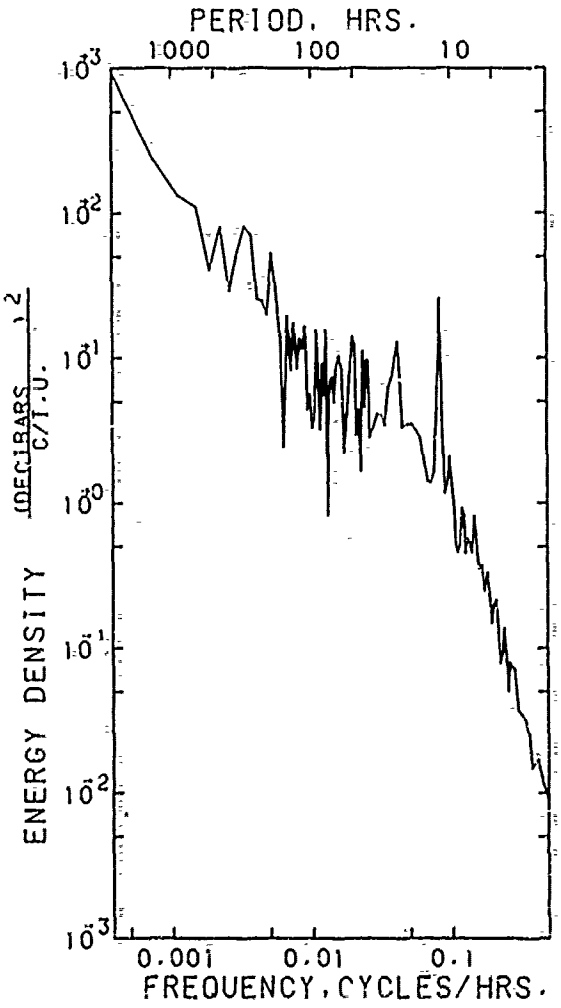
DATA 5533$1DCAU24



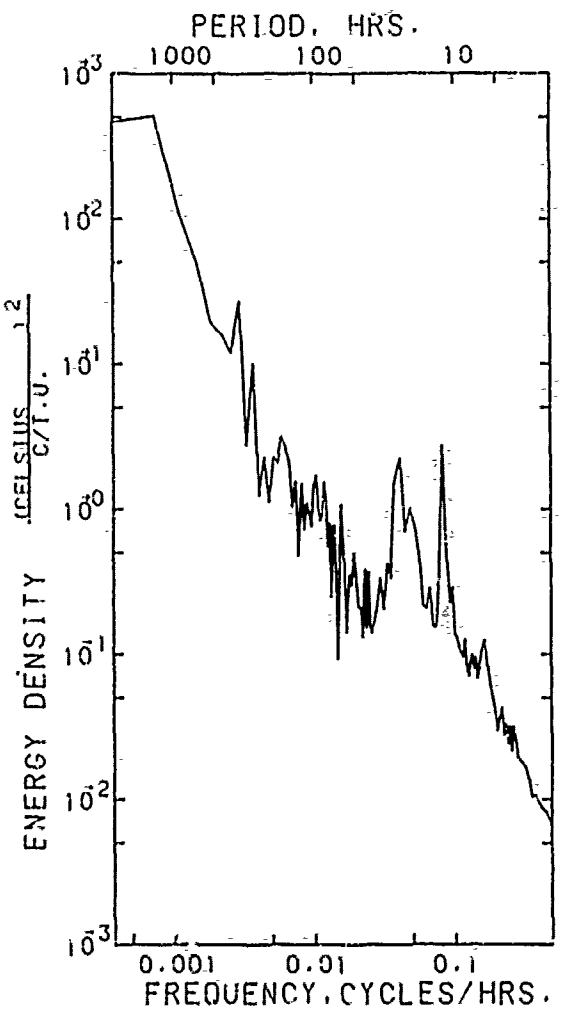
DATA 5543$100411124


TEMP. CELSIUS
6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 10.0
PRESSURE DECIBARS
780 775 770 765 760 755 750 745 740 735 730 725 720 715 710
6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 10.0
TEMP. CELSIUS
780 775 770 765 760 755 750 745 740 735 730 725 720 715 710
PRESSURE DECIBARS

```
**********************************************************
** 6331A900      ** 36720 POINTS  FROM 77- XI -16  TO 78- XII-03
INST.  V-0325P DEPTH  792 M.   UNITS = DBARS , DEGREES CELSIUS
VARIABLE -- PRESSURE --- TEMPERATURE ----------------------
MEAN       =    798.335        10.928
STD.ERR.   =      .857E-2        .632E-2
VARIANCE   =     2.697          1.466
KURTOSIS   =    38.235          4.866
SKEWNESS   =     4.446          -.709
MINIMUM    =   794.203          6.243
MAXIMUM    =   819.586         14.296
**********************************************************
```

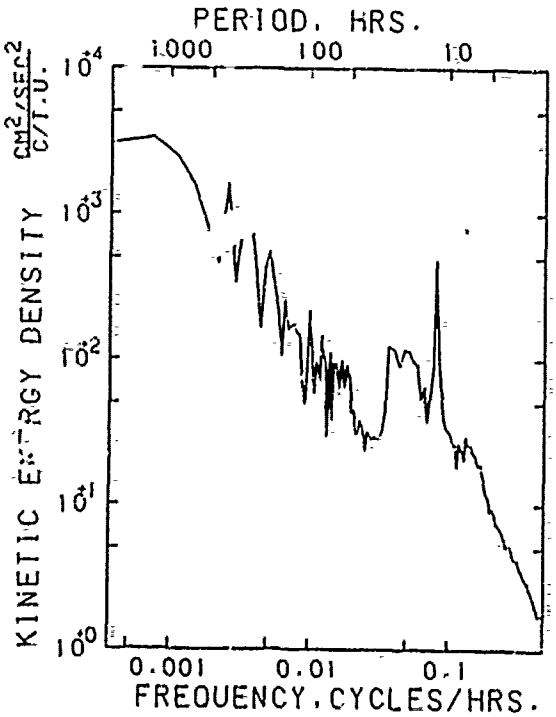


AUTO SPECTRUM
6331A1H PRESSURE
792 METERS
77-XI-16 TO 78-X-15
1 PIECES WITH 4000 ESTIMATES
PER PIECE. AVERAGED OVER
3 ADJACENT FREQUENCY BANDS

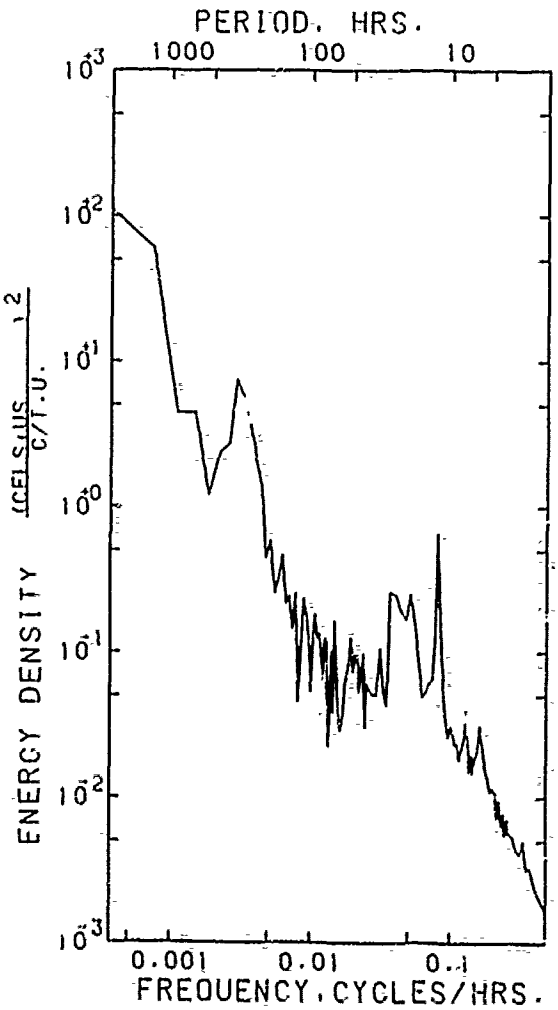


AUTO SPECTRUM
6331A1H TEMPERATURE
792 METERS
77-XI-16 TO 78-X-15
1 PIECES WITH 4000 ESTIMATES
PER PIECE. AVERAGED OVER
3 ADJACENT FREQUENCY BANDS

```
**********************************************************************
** 6332B900      ** 36720 POINTS  FROM 77- XI -16  TO 78- XII-03
INST.  V-0139  DEPTH 1092 M.   UNITS = MM/SEC , DEGREES CELSIUS
VARIABLE -------- EAST ------ NORTH ----- SPEED ---- TEMPERATURE
MEAN        =      3.840        -1.995        59.345         6.048
STD.ERR.    =       .308          .174          .173          .237E-2
VARIANCE    =   3483.713      1112.673      1093.306          .206
KURTOSIS    =      3.514         2.937         5.324         5.375
SKEWNESS    =      -.441          .219E-1      1.345          .893
MINIMUM     =   -255.262      -129.108         1.944         4.758
MAXIMUM     =    202.680       137.924       257.547         8.242
-----EAST & NORTH-------- * * * * * * * * * * * * * * * * * * * * *
COVARIANCE  =    135.735    *
CORR. COEF. =       .689E-1 *
ORIENTATION =     86.734    *
MAJAX       =     59.089    *
MINAX       =     33.240    *
ELLIP       =       .437    *
**********************************************************************
```

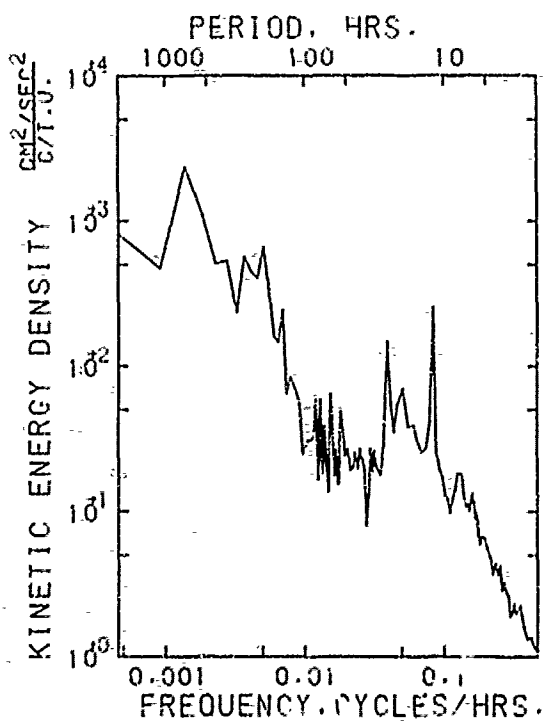


AUTO SPECTRUM
6332B1H EAST
6332B1H NORTH
1092 METERS
77-X1-16 TO 78-X-15
1 PIECES WITH 4000 ESTIMATES
PER PIECE. AVERAGED OVER
3 ADJACENT FREQUENCY BANDS

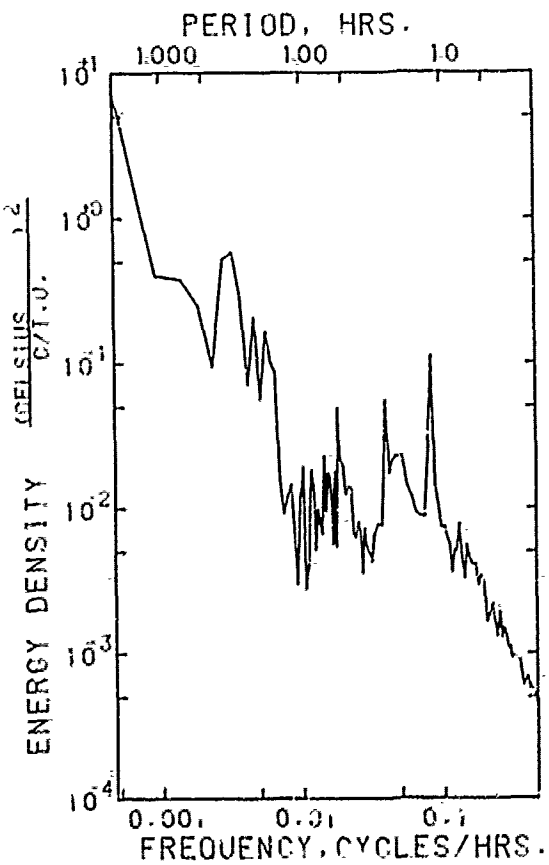


AUTO SPECTRUM
6332B1H TEMPERATURE
1092 METERS
77-X1-16 TO 78-X-15
1 PIECES WITH 4000 ESTIMATES
PER PIECE. AVERAGED OVER
3 ADJACENT FREQUENCY BANDS

```
**********************************************************
** 6333AC900     ** 26478 POINTS  FROM 77- XI -16  TO 78-VIII-18
INST.  V-0183  DEPTH 1392 M.   UNITS = MM/SEC , DEGREES CELSIUS
VARIABLE ------- EAST ------ NORTH ----- SPEED ---- TEMPERATURE
MEAN       =     -1.097          -.222        41.588         4.661
STD.ERR.   =       .243           .149          .127          .104E-2
VARIANCE   =   1560.879        591.427       423.965          .284E-1
KURTOSIS   =      3.048          2.922         5.723         3.055
SKEWNESS   =      -.876E-1        .234         1.465          .677
MINIMUM    =   -160.865        -89.635         1.393         4.293
MAXIMUM    =    148.623        103.375       164.941         5.349
-----EAST & NORTH--------  * * * * * * * * * * * * * * * * * * * *
COVARIANCE =    210.115    *
CORR. COEF. =       .219   *
ORIENTATION =     78.282   *
MAJAX      =     40.056    *
MINAX      =     23.406    *
ELLIP      =       .416    *
**********************************************************
```

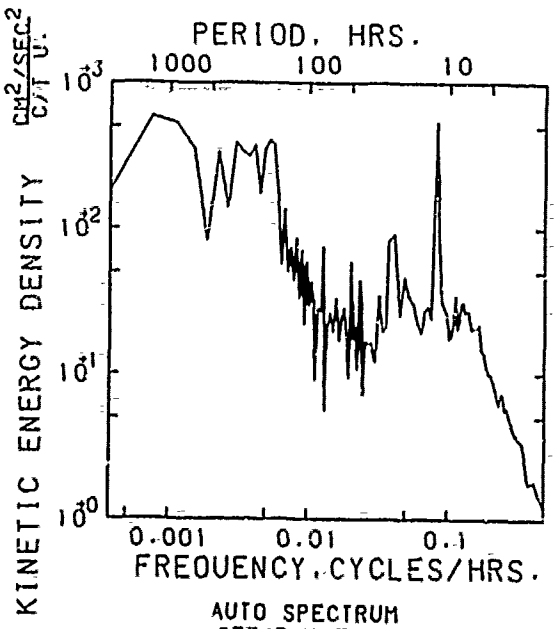


AUTO SPECTRUM
6333AC1H EAST
6333AC1H NORTH
1392 METERS
77-XI-16 TO 78-VIII-13
1 PIECES WITH 3240 ESTIMATES
PER PIECE, AVERAGED OVER
3 ADJACENT FREQUENCY BANDS

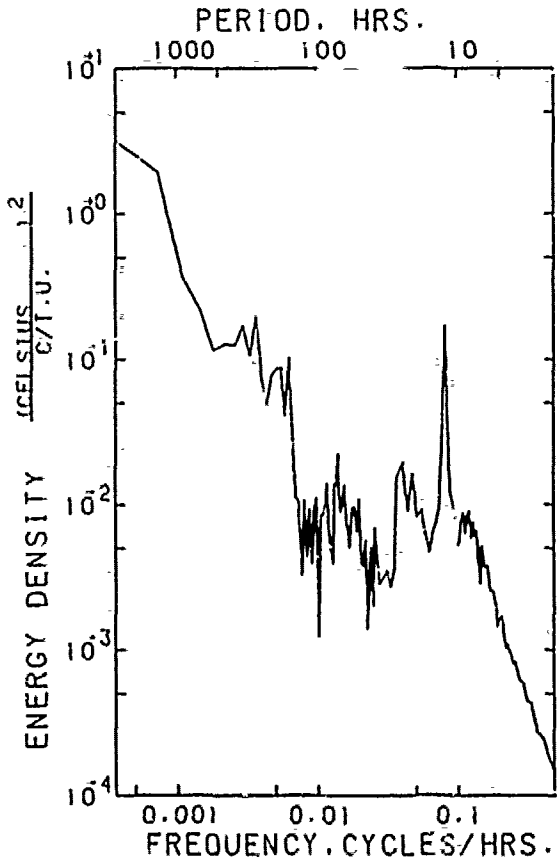


AUTO SPECTRUM
6333AC1H TEMPERATURE
1392 METERS
77-XI-16 TO 78-VIII-13
1 PIECES WITH 3240 ESTIMATES
PER PIECE, AVERAGED OVER
3 ADJACENT FREQUENCY BANDS

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**********************************************************************
** 63348900     ** 36720 POINTS  FROM 77- XI -16  TO 78- XII-03
INST.  V-0122  DEPTH 1692 M.   UNITS = MM/SEC , DEGREES CELSIUS
VARIABLE ------- EAST ------ NORTH ----- SPEED ---- TEMPERATURE
MEAN       =      3.110         1.515        42.854         4.128
STD.ERR.   =       .203          .140          .105          .542E-3
VARIANCE   =   1505.893       720.920       402.288          .108E-1
KURTOSIS   =      2.969         2.813         5.036         3.549
SKEWNESS   =       .522E-1      -.806E-2       1.317          .432
MINIMUM    =   -148.917       -105.595         2.715         3.775
MAXIMUM    =    147.724        108.069       151.797         4.583
-----EAST & NORTH-------- * * * * * * * * * * * * * * * * * * * * *
COVARIANCE =     66.773    *
CORR. COEF. =      .641E-1*
ORIENTATION =    85.172    *
MAJAX      =     38.878    *
MINAX      =     26.745    *
ELLIP      =      .312     *
**********************************************************************
```

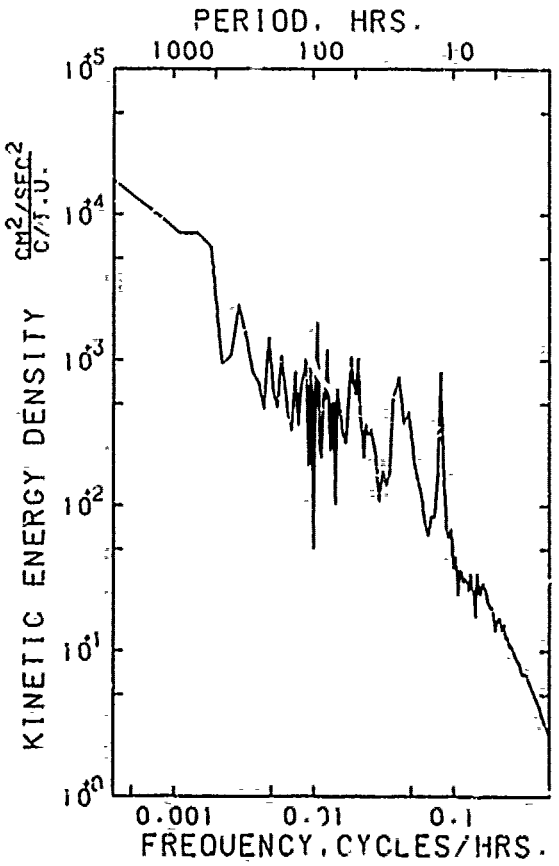


AUTO SPECTRUM
6334B1H EAST
6334B1H NORTH
1692 METERS
77-XI-16 TO 78-X-15
1 PIECES WITH 4000 ESTIMATES
PER PIECE. AVERAGED OVER
3 ADJACENT FREQUENCY BANDS

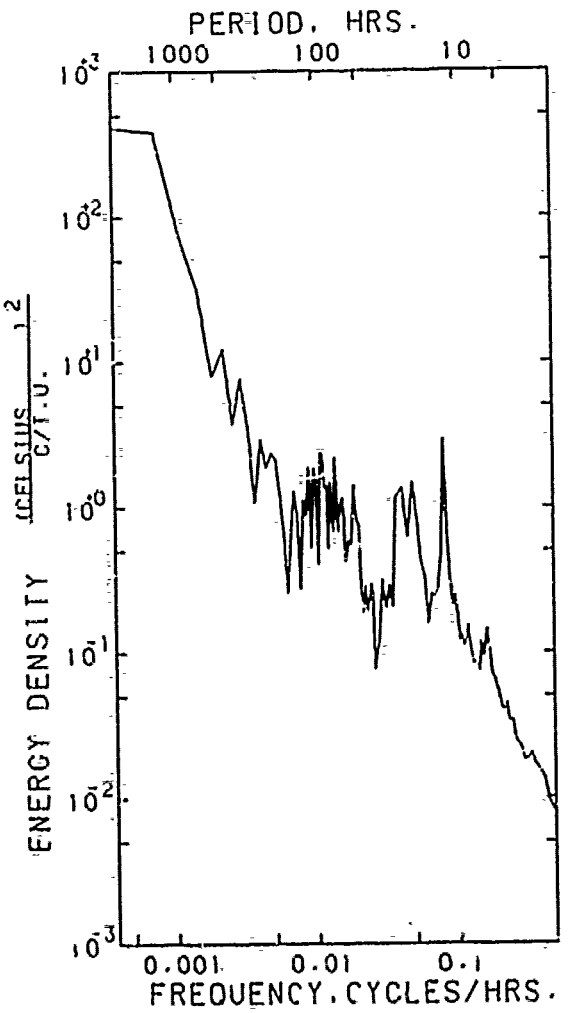


AUTO SPECTRUM
6334B1H TEMPERATURE
1692 METERS
77-XI-16 TO 78-X-15
1 PIECES WITH 4000 ESTIMATES
PER PIECE. AVERAGED OVER
3 ADJACENT FREQUENCY BANDS

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**********************************************************************
** 6342A900      ** 37908 PCINTS  FROM 77- XI -16  TO 78- XII-16
INST. V0113    DEPTH  542 M.   UNITS = MM/SEC , DEGREES CELSIUS
VARIABLE -------- EAST ------ NORTH ----- SPEED ---- TEMPERATURE
MEAN        =     18.697         -.800        89.850        12.309
STD.ERR.    =       .501          .212          .303          .855E-2
VARIANCE    =   9498.162      1699.979      3475.318         2.774
KURTOSIS    =      3.605         4.827         5.835         7.519
SKEWNESS    =       .133         -.101         1.483        -2.021
MINIMUM     =   -481.855      -243.064          .926         5.817
MAXIMUM     =    460.616       261.425       482.015        15.022
-----EAST & NORTH-------- * * * * * * * * * * * * * * * * * * * * *
COVARIANCE  =    900.648    *
CORR. COEF. =       .224    *
ORIENTATION =     83.497    *
MAJAX       =     97.984    *
MINAX       =     39.966    *
ELLIP       =       .592    *
**********************************************************************
```

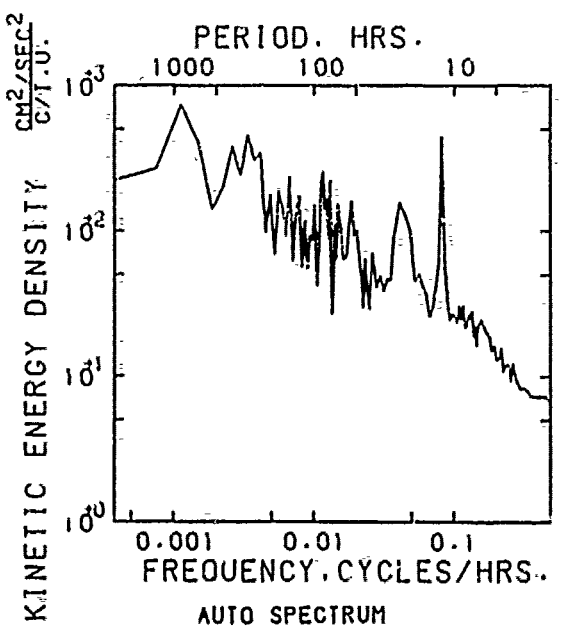


AUTO SPECTRUM
6342A1H EAST
6342A1H NORTH
542 METERS
77-XI-16 TO 78-X-16
1 PIECES WITH 4000 ESTIMATES
PER PIECE. AVERAGED OVER
3 ADJACENT FREQUENCY BANDS

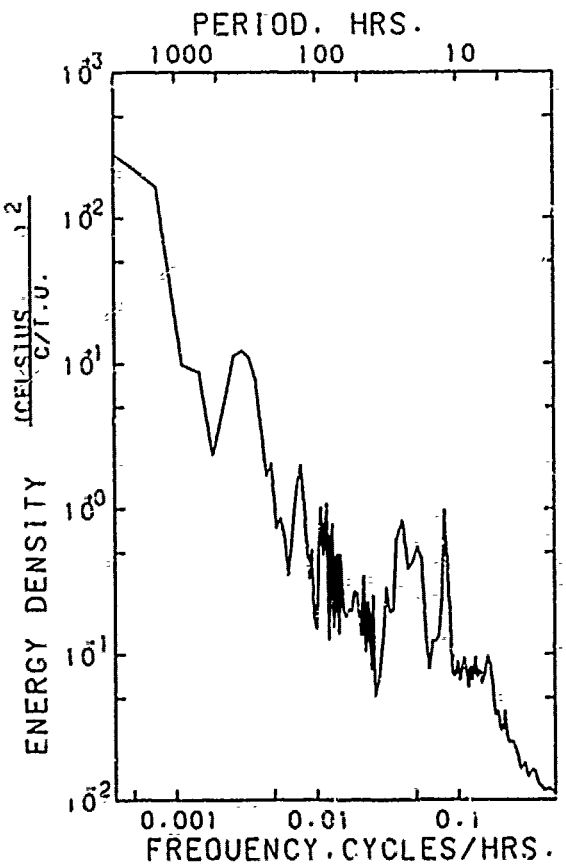


AUTO SPECTRUM
6342A1H TEMPERATURE
542 METERS
77-XI-16 TO 78-X-16
1 PIECES WITH 4000 ESTIMATES
PER PIECE. AVERAGED OVER
3 ADJACENT FREQUENCY BANDS

```
**********************************************************************
** 6343A900      ** 37908 POINTS  FROM 77- XI -16  TO 78- XII-16
INST. V-0163   DEPTH  842 M.   UNITS = MM/SEC , DEGREES CELSIUS
VARIABLE ------- EAST ------ NORTH ----- SPEED ---- TEMPERATURE
MEAN       =     -1.023        -3.296        51.536         6.721
STD.ERR.   =       .246          .168          .138          .400E-2
VARIANCE   =   2292.087      1069.007       717.022          .606
KURTOSIS   =      3.544         3.194         5.889         4.930
SKEWNESS   =      -.914E-1       .127         1.401          .372
MINIMUM    =  -247.625       -167.056         .535         4.596
MAXIMUM    =   205.776        156.775       247.647        10.049
-----EAST & NORTH-------- * * * * * * * * * * * * * * * * * * * * *
COVARIANCE   =  -178.164    *
CORR. COEF.  =      -.114   *
ORIENTATION  =     98.121   *
MAJAX        =     48.141   *
MINAX        =     32.305   *
ELLIP        =       .329   *
**********************************************************************
```

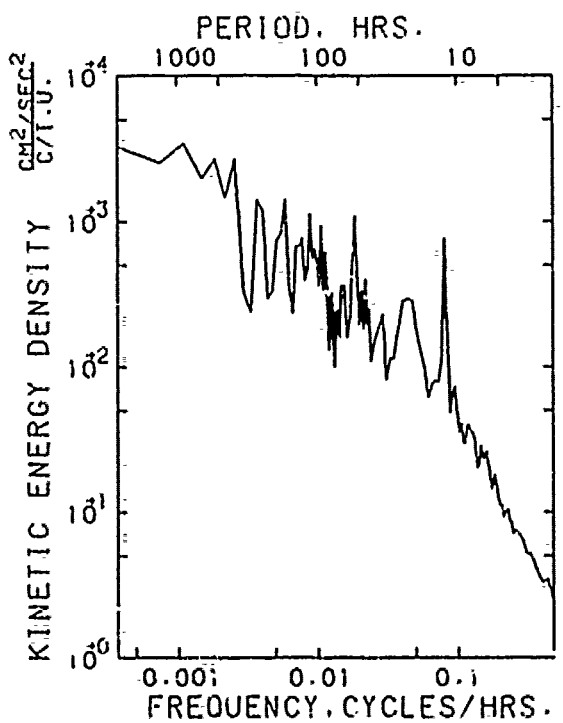


AUTO SPECTRUM
6343A1H EAST
6343A1H NORTH
842 METERS
77-XI-16 TO 78-X-16
1 PIECES WITH 4000 ESTIMATES
PER PIECE. AVERAGED OVER
3 ADJACENT FREQUENCY BANDS

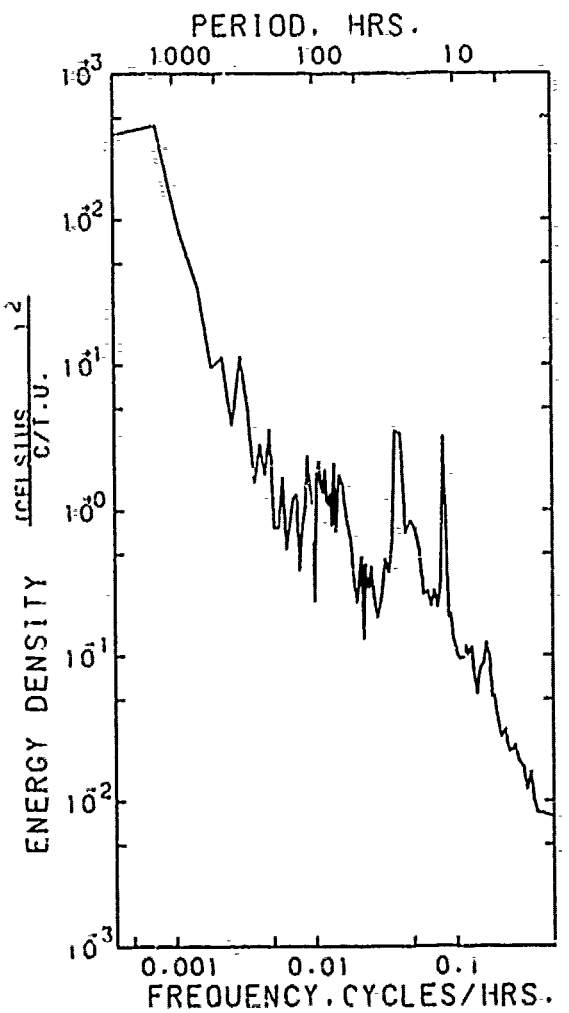


AUTO SPECTRUM
6343A1H TEMPERATURE
842 METERS
77-XI-16 TO 78-X-16
1 PIECES WITH 4000 ESTIMATES
PER PIECE. AVERAGED OVER
3 ADJACENT FREQUENCY BANDS

```
**********************************************************************
** 6352A900      ** 37824 POINTS  FROM 77- XI -17  TO 78- XII-16
INST. V-0181    DEPTH  524 M.    UNITS = MM/SEC , DEGREES CELSIUS
VARIABLE ------- EAST ------ NORTH ----- SPEED ---- TEMPERATURE
MEAN        =      8.515         6.310        75.780        12.149
STD.ERR.    =       .288          .357          .248          .765E-2
VARIANCE    =   3144.290      4815.346      2329.388         2.214
KURTOSIS    =      5.197         3.429         6.948         5.822
SKEWNESS    =      -.261         -.218         1.631        -1.533
MINIMUM     =   -346.078      -301.932          .939         6.776
MAXIMUM     =    398.535       330.080       440.822        14.838
-----EAST & NORTH--------  * * * * * * * * * * * * * * * * * * * * *
COVARIANCE  =   2743.674    *
CORR. COEF. =       .705    *
ORIENTATION =     36.531    *
MAJAX       =     82.752    *
MINAX       =     33.343    *
ELLIP       =       .597    *
**********************************************************************
```

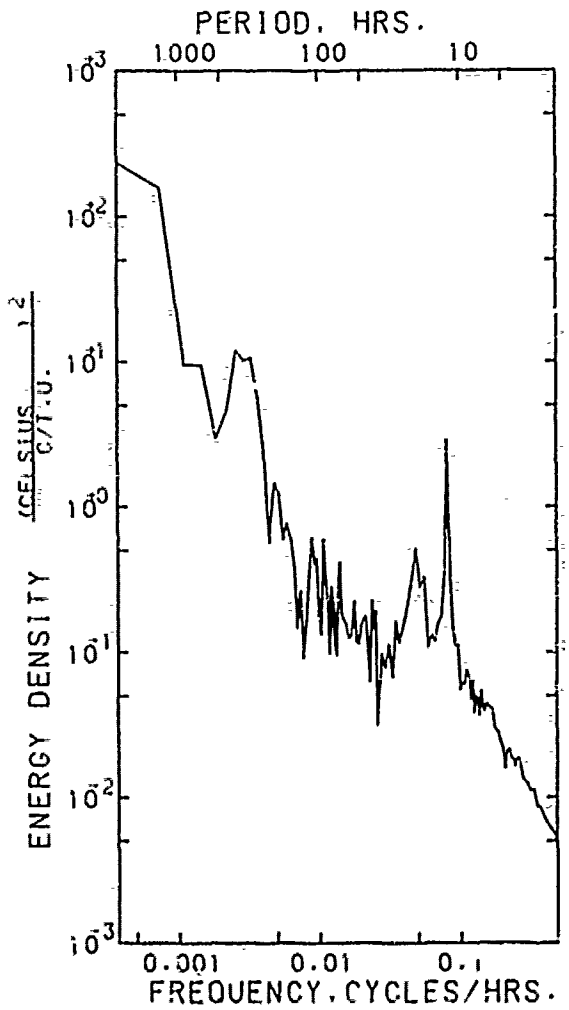


AUTO SPECTRUM
6352A1H EAST
6352A1H NORTH
524 METERS
77-XI-17 TO 78-X-17
1 PIECES WITH 4000 ESTIMATES
PER PIECE. AVERAGED OVER
3 ADJACENT FREQUENCY BANDS

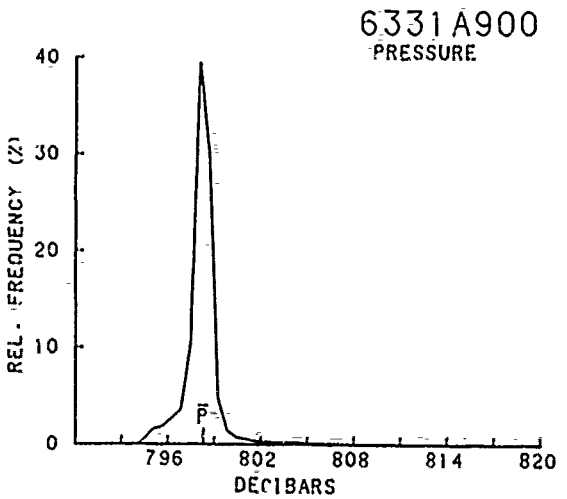


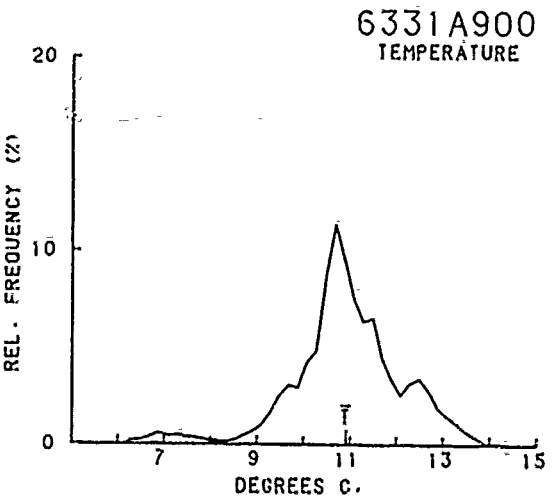
AUTO SPECTRUM
6352A1H TEMPERATURE
524 METERS
77-XI-17 TO 78-X-17
1 PIECES WITH 4000 ESTIMATES
PER PIECE. AVERAGED OVER
3 ADJACENT FREQUENCY BANDS

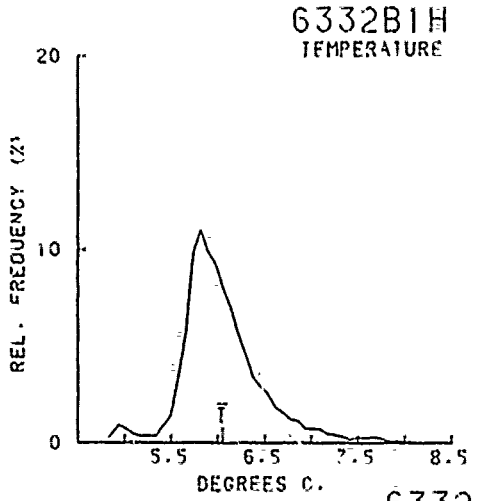
```
**********************************************************************
** 6353A900     ** 37824 POINTS  FROM 77-XI-17  TO 78-XII-16
INST. V-0371   DEPTH  824 M.   UNITS =  DEGREES CELSIUS
VARIABLE ---------------- TEMPERATURE ------------------------
MEAN       =                  6.590
STD.ERR.   =                  .361E-2
VARIANCE   =                  .494
KURTOSIS   =                 4.700
SKEWNESS   =                  .545
MINIMUM    =                 4.790
MAXIMUM    =                 9.874
**********************************************************************
```

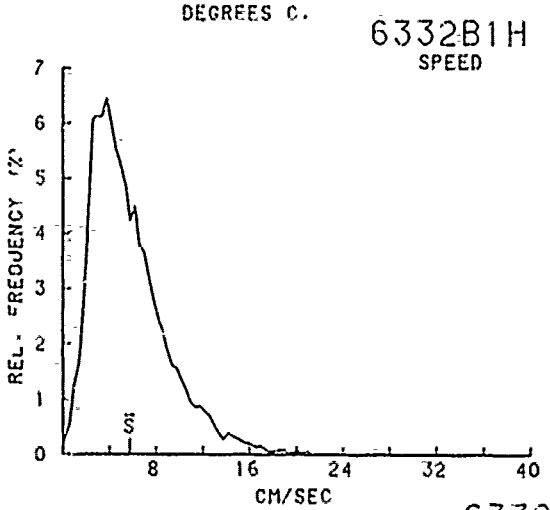


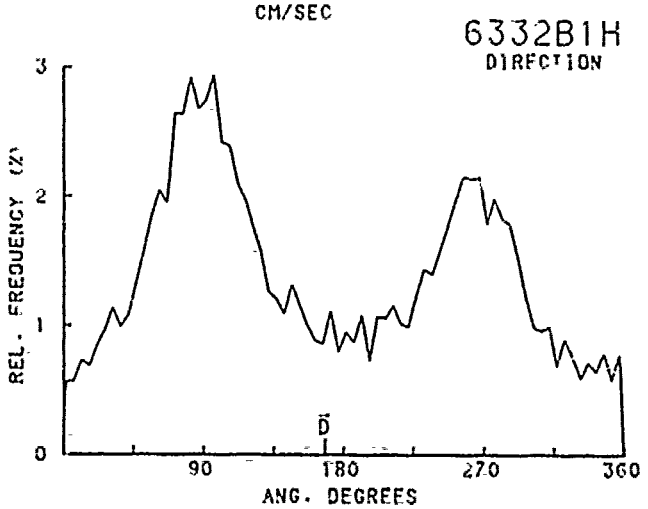
AUTO SPECTRUM
6353A1H TEMPERATURE
824 METERS
77-XI-17 TO 78-X-17
1 PIECES WITH 4000 ESTIMATES
PER PIECE. AVERAGED OVER
3 ADJACENT FREQUENCY BANDS

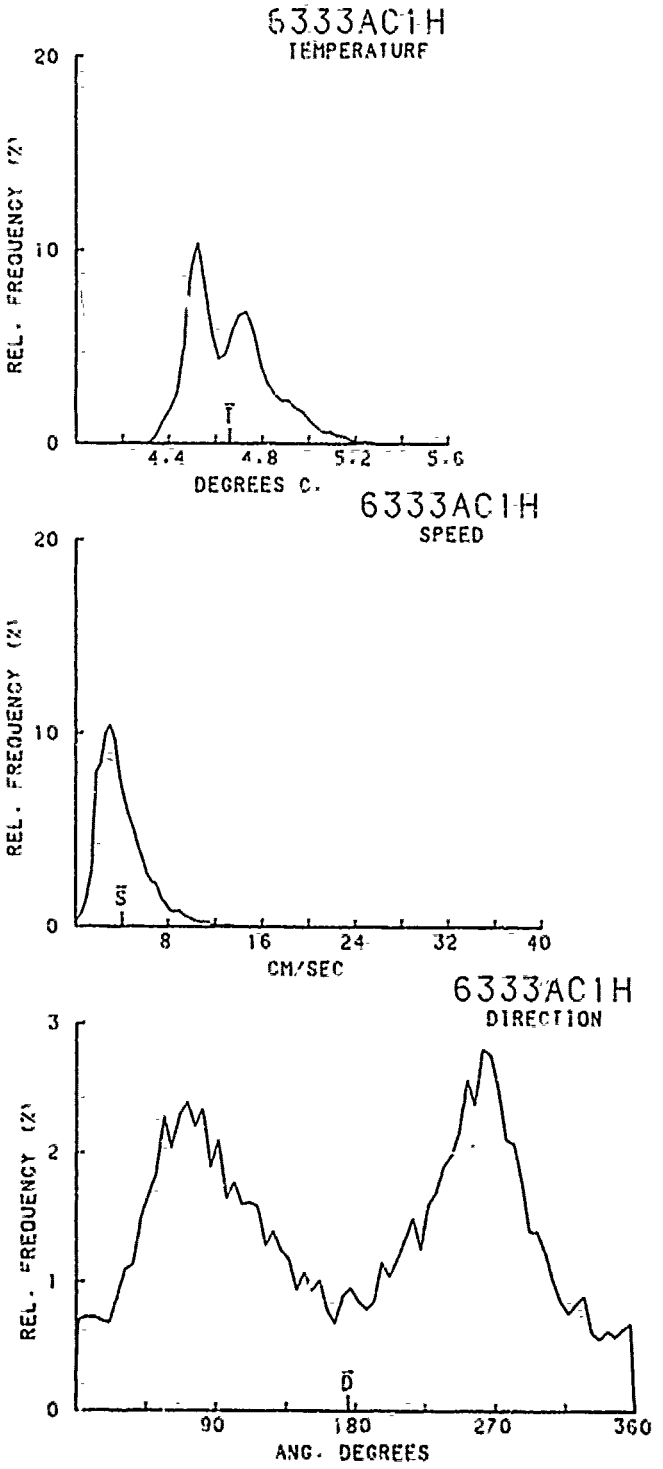

6331A900
PRESSURE
REL. FREQUENCY (%)
40
30
20
10
0
P̄
796
802
808
814
820
DECIBARS

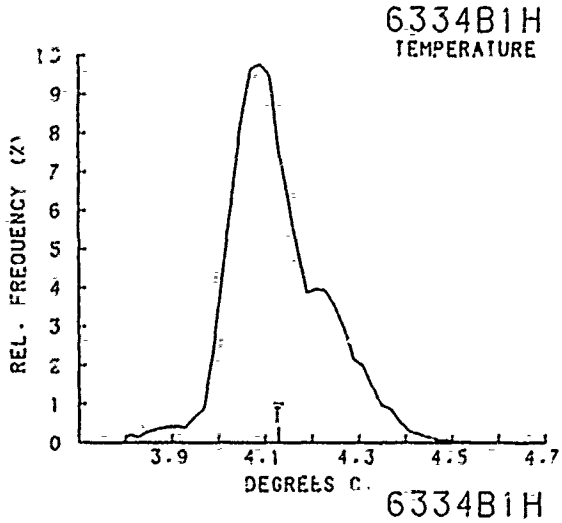

6331A900
TEMPERATURE
REL. FREQUENCY (%)
20
10
0
T̄
7
9
11
13
15
DEGREES C.

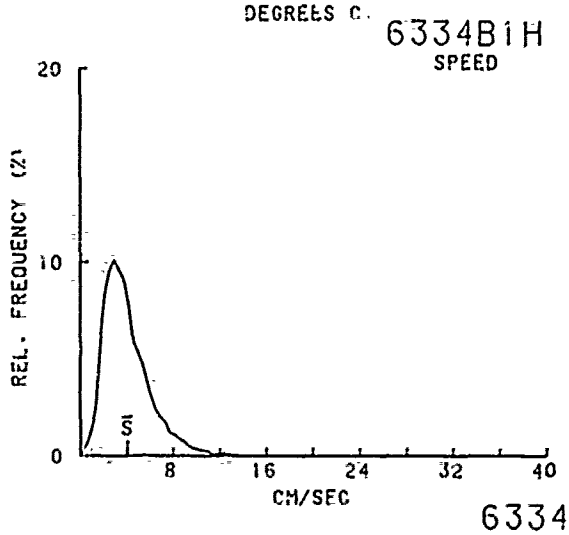

6332B1H
TEMPERATURE
REL. FREQUENCY (%)
20
10
0
5.5
6.5
7.5
8.5
DEGREES C.

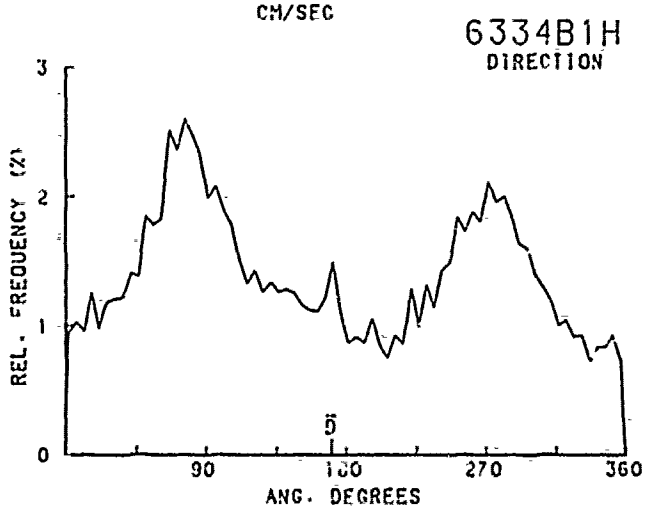

6332B1H
SPEED
REL. FREQUENCY (%)
7
6
5
4
3
2
1
0
8
16
24
32
40
CM/SEC

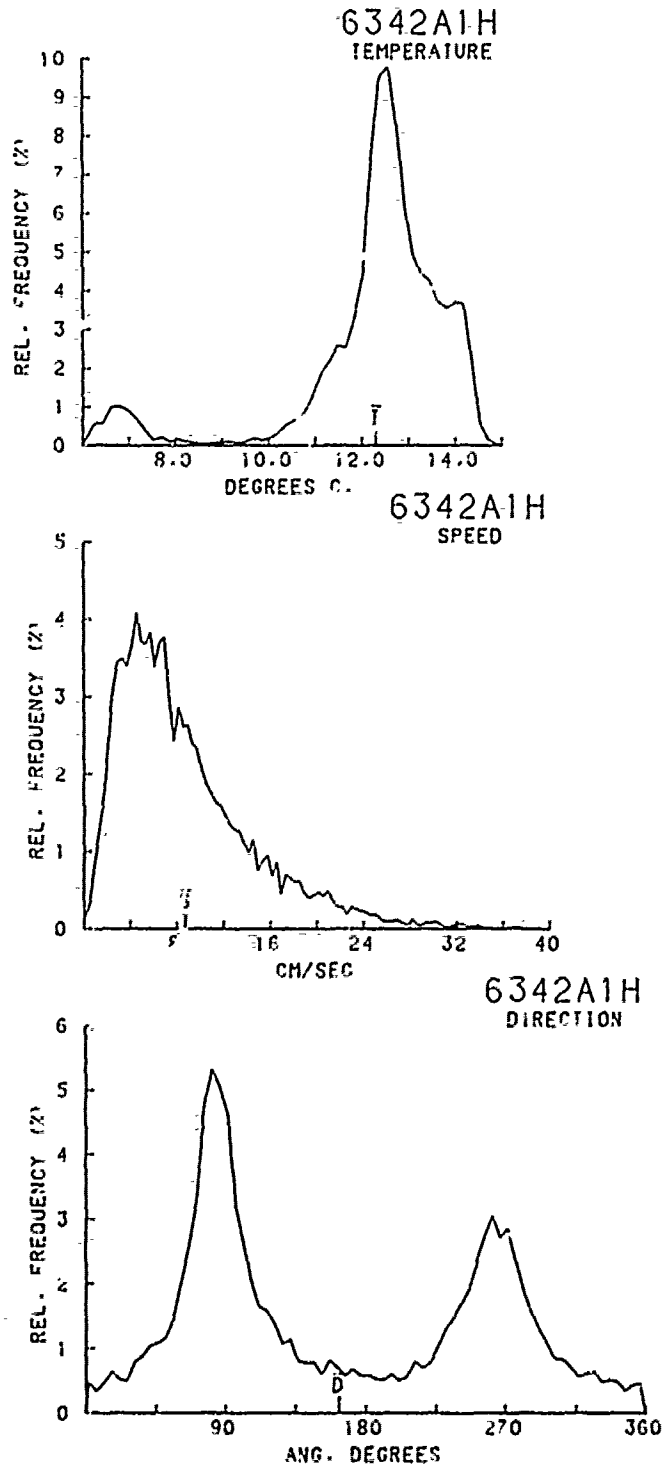

6332B1H
DIRECTION
REL. FREQUENCY (%)
3
2
1
0
90
180
270
360
ANG. DEGREES

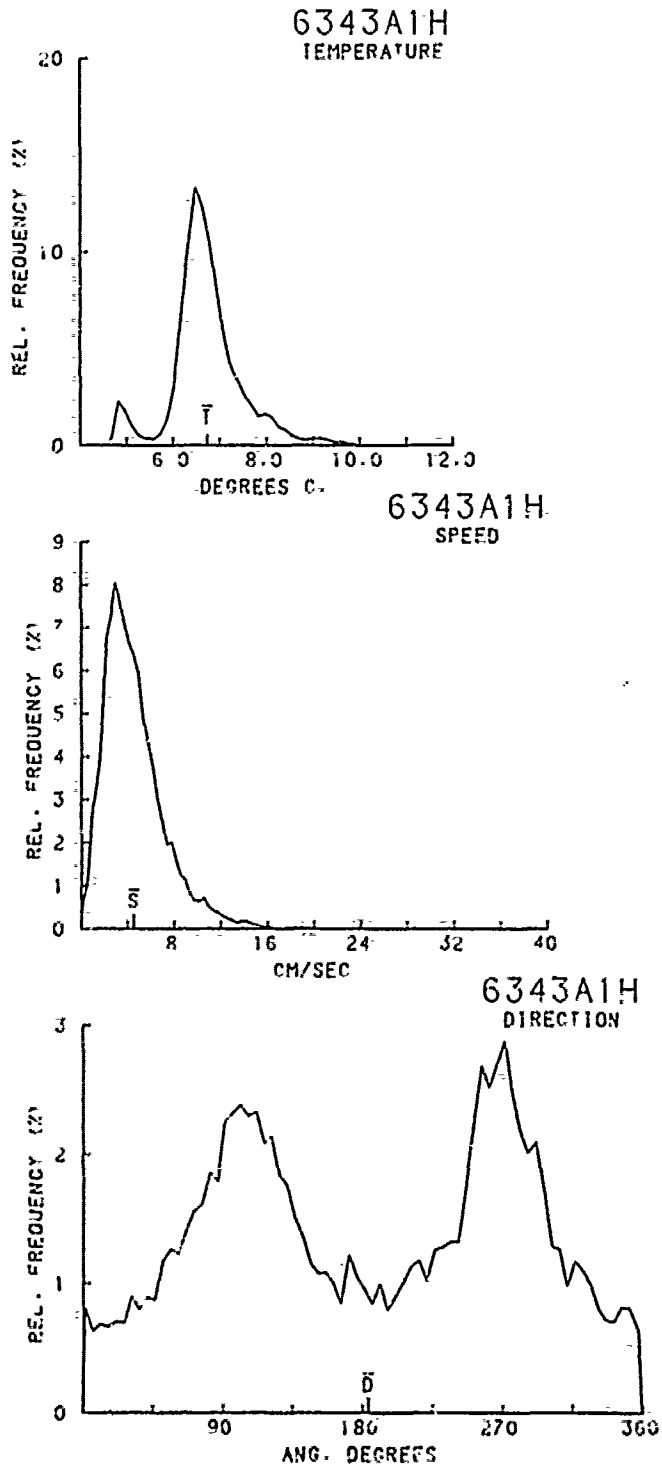

6333AC1H
TEMPERATURE
20
10
0
REL. FREQUENCY (%)
T̄
4.4
4.8
5.2
5.6
DEGREES C.
6333AC1H
SPEED
20
10
0
REL. FREQUENCY (%)
S̄
8
16
24
32
40
CM/SEC
6333AC1H
DIRECTION
3
2
1
0
REL. FREQUENCY (%)
D̄
90
180
270
360
ANG. DEGREES

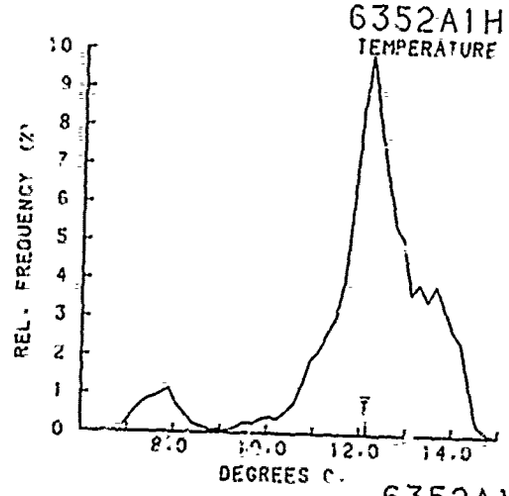

6334B1H
TEMPERATURE
REL. FREQUENCY (%)
0
1
2
3
4
5
6
7
8
9
3.9
4.1
4.3
4.5
4.7
DEGREES C.

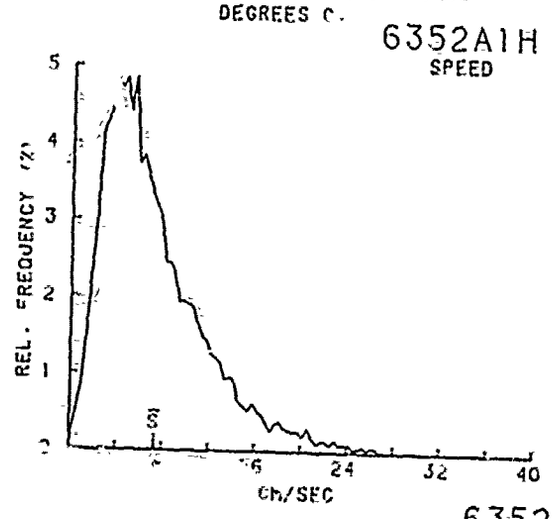

6334B1H
SPEED
REL. FREQUENCY (%)
0
10
20
8
16
24
32
40
CM/SEC

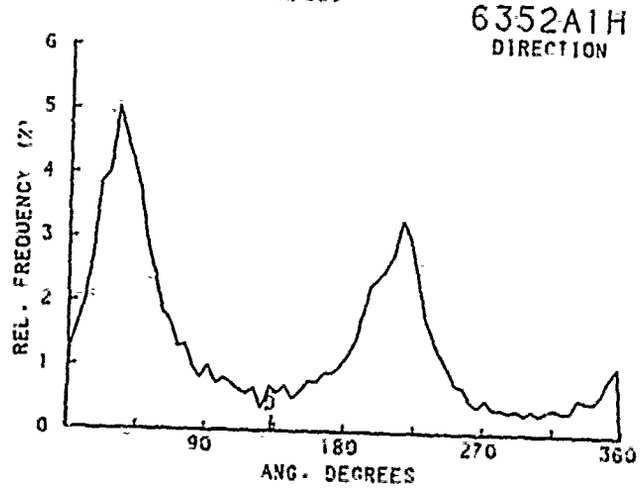

6334B1H
DIRECTION
REL. FREQUENCY (%)
0
1
2
3
90
180
270
360
ANG. DEGREES

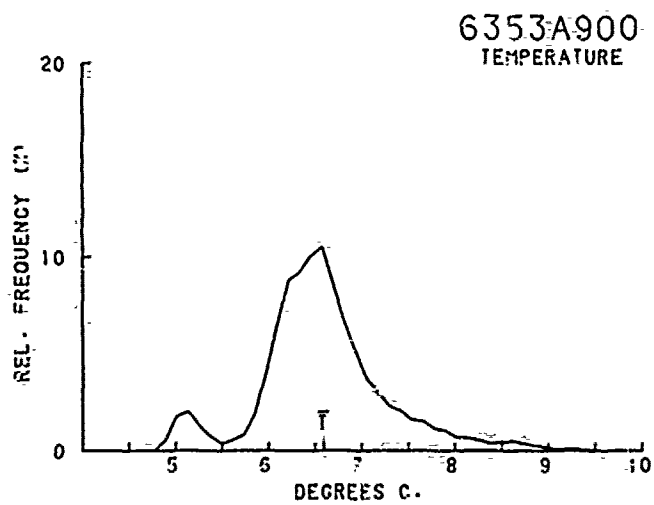

6342A1H
TEMPERATURE
REL. FREQUENCY (%)
10
9
8
7
6
5
4
3
2
1
0
8.0
10.0
12.0
14.0
DEGREES C.
6342A1H
SPEED
REL. FREQUENCY (%)
5
4
3
2
1
0
8
16
24
32
40
CM/SEC
6342A1H
DIRECTION
REL. FREQUENCY (%)
6
5
4
3
2
1
0
90
180
270
360
ANG. DEGREES

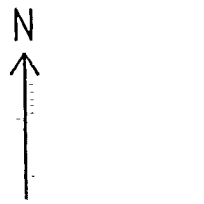

6343A1H
TEMPERATURE
REL. FREQUENCY (%)
20
10
0
T̄
6.0
8.0
10.0
12.0
DEGREES C.
6343A1H
SPEED
REL. FREQUENCY (%)
9
8
7
6
5
4
3
2
1
0
S̄
8
16
24
32
40
CM/SEC
6343A1H
DIRECTION
REL. FREQUENCY (%)
3
2
1
0
D̄
90
180
270
360
ANG. DEGREES


6352A1H
TEMPERATURE
REL. FREQUENCY (%)
10
9
8
7
6
5
4
3
2
1
0
8.0
10.0
12.0
14.0
DEGREES C.


6352A1H
SPEED
REL. FREQUENCY (%)
5
4
3
2
1
0
16
24
32
40
CM/SEC

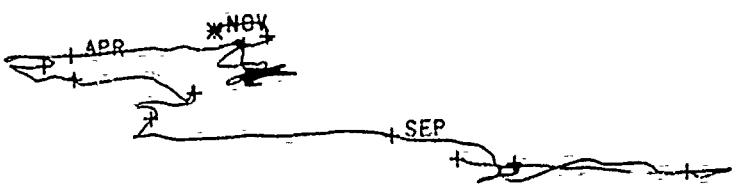

6352A1H
DIRECTION
REL. FREQUENCY (%)
6
5
4
3
2
1
0
90
180
270
360
ANG. DEGREES

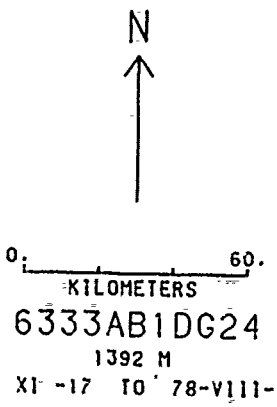

6353A900
TEMPERATURE
20
10
0
REL. FREQUENCY (%)
T
5
6
7
8
9
10
DEGREES C.

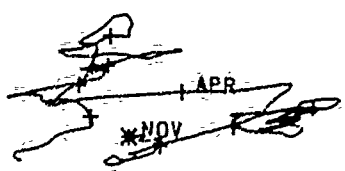


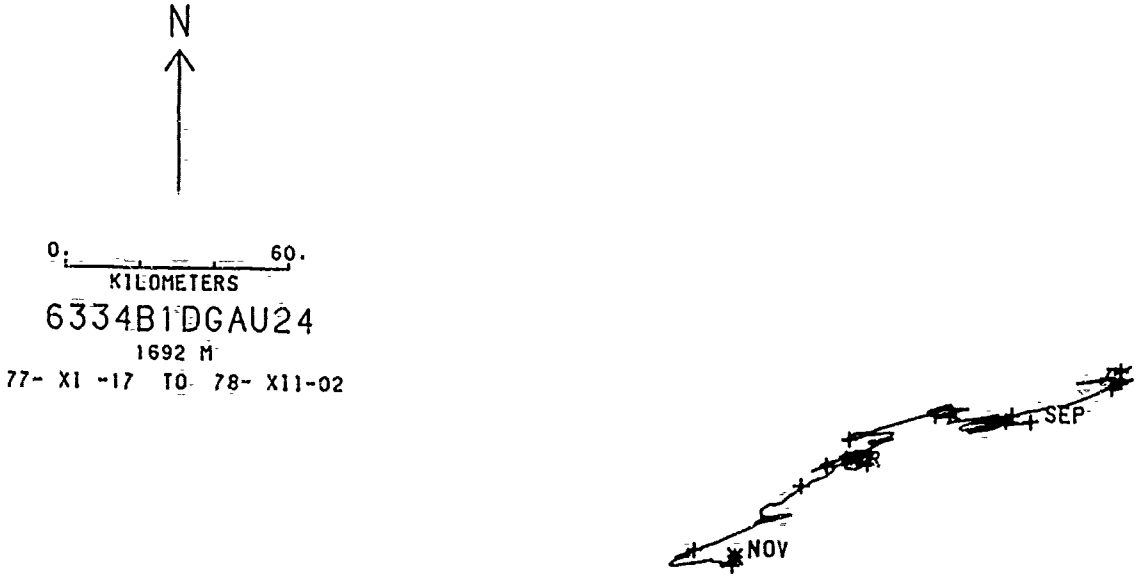
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KILOMETERS

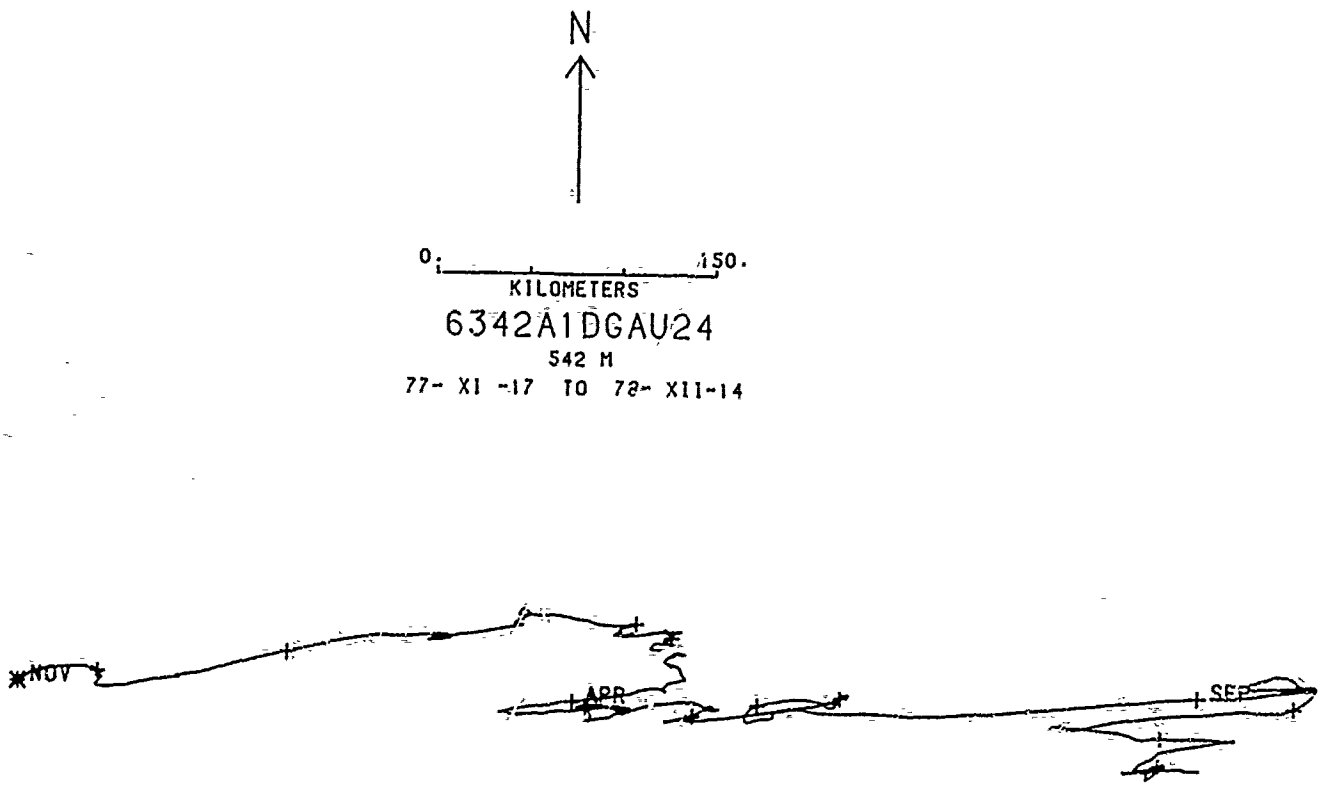
6332A1DGAU24
1092 M
77- X1 -17 TO 78- X11-02

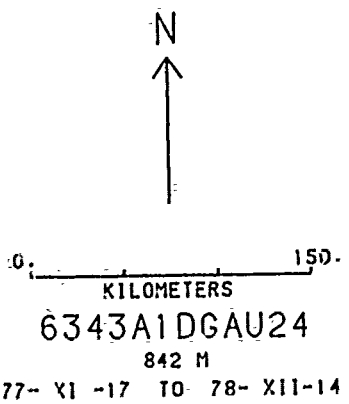


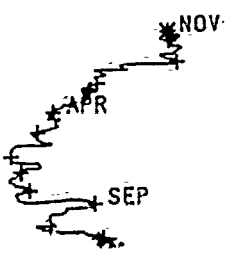

N
0
60.
KILOMETERS
6333AB1DG24
1392 M
77- XI -17 TO 78-VIII-17

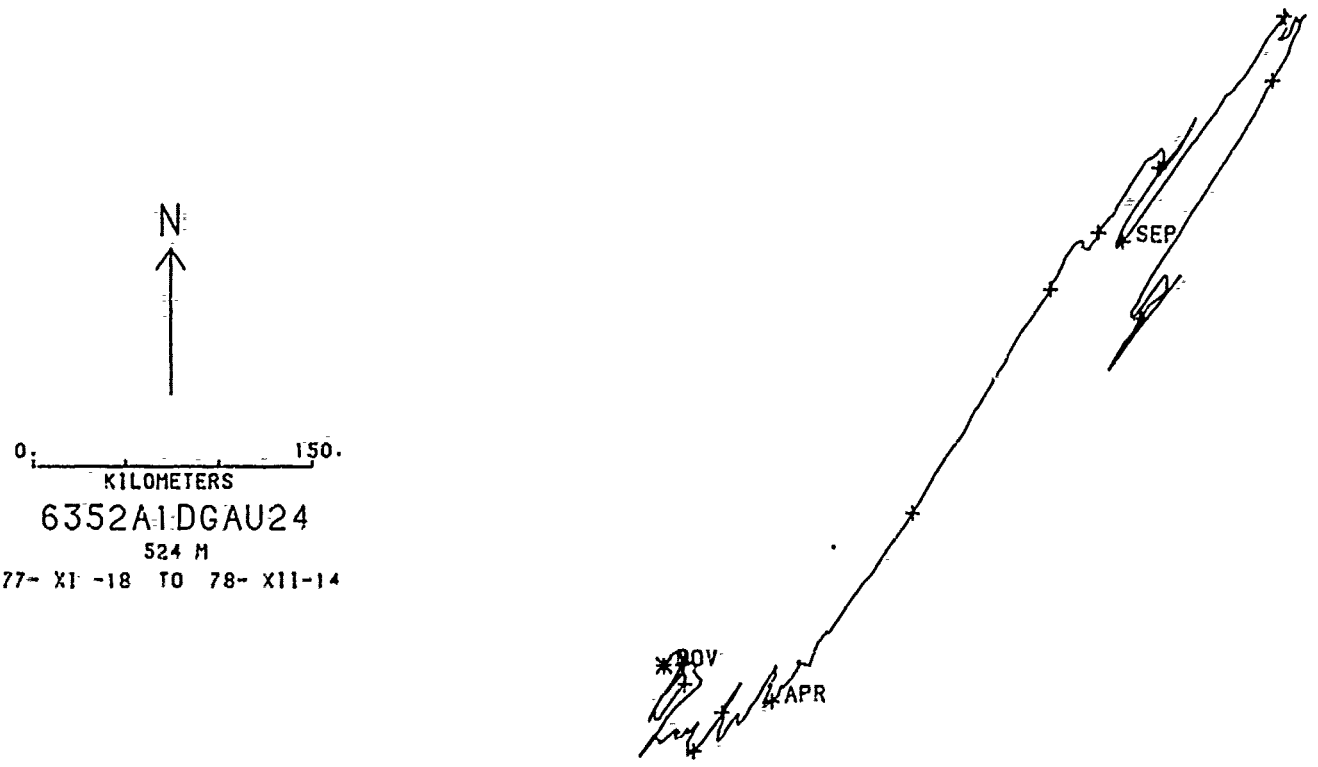

APR
NOV

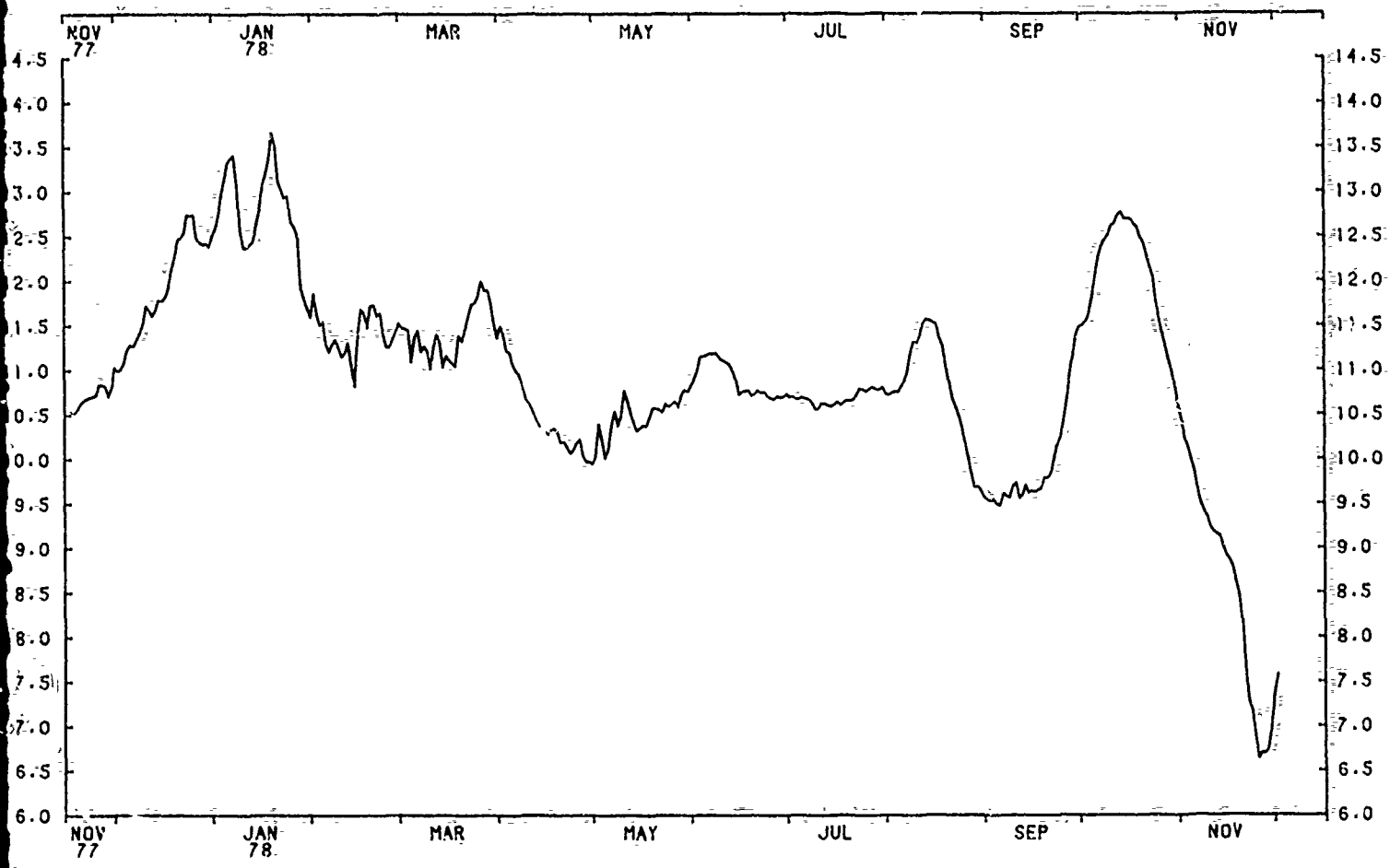

N
0.
60.
KILOMETERS
6334B1DGAU24
1692 M
77- XI -17 TO 78- XII-02
SEP
NOV


N
0.
150.
KILOMETERS
6342A1DGAU24
542 M
77- XI -17 TO 78- XII-14
NOV
APR
SEP

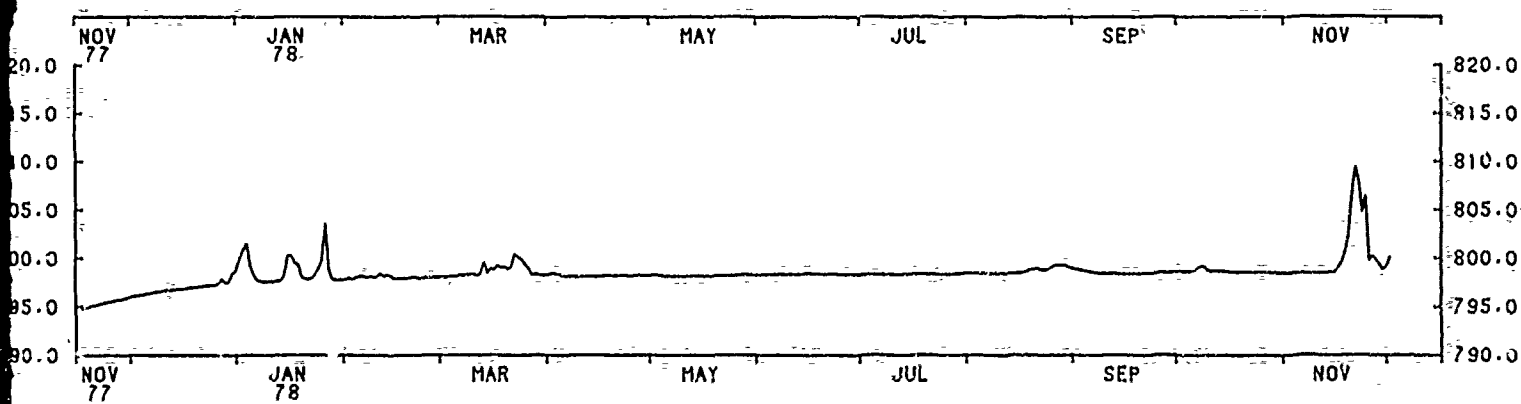

N
0.
150.
KILOMETERS
6343A1DGAU24
842 M
77- XI -17 TO 78- XII-14


NOV
APR
SEP

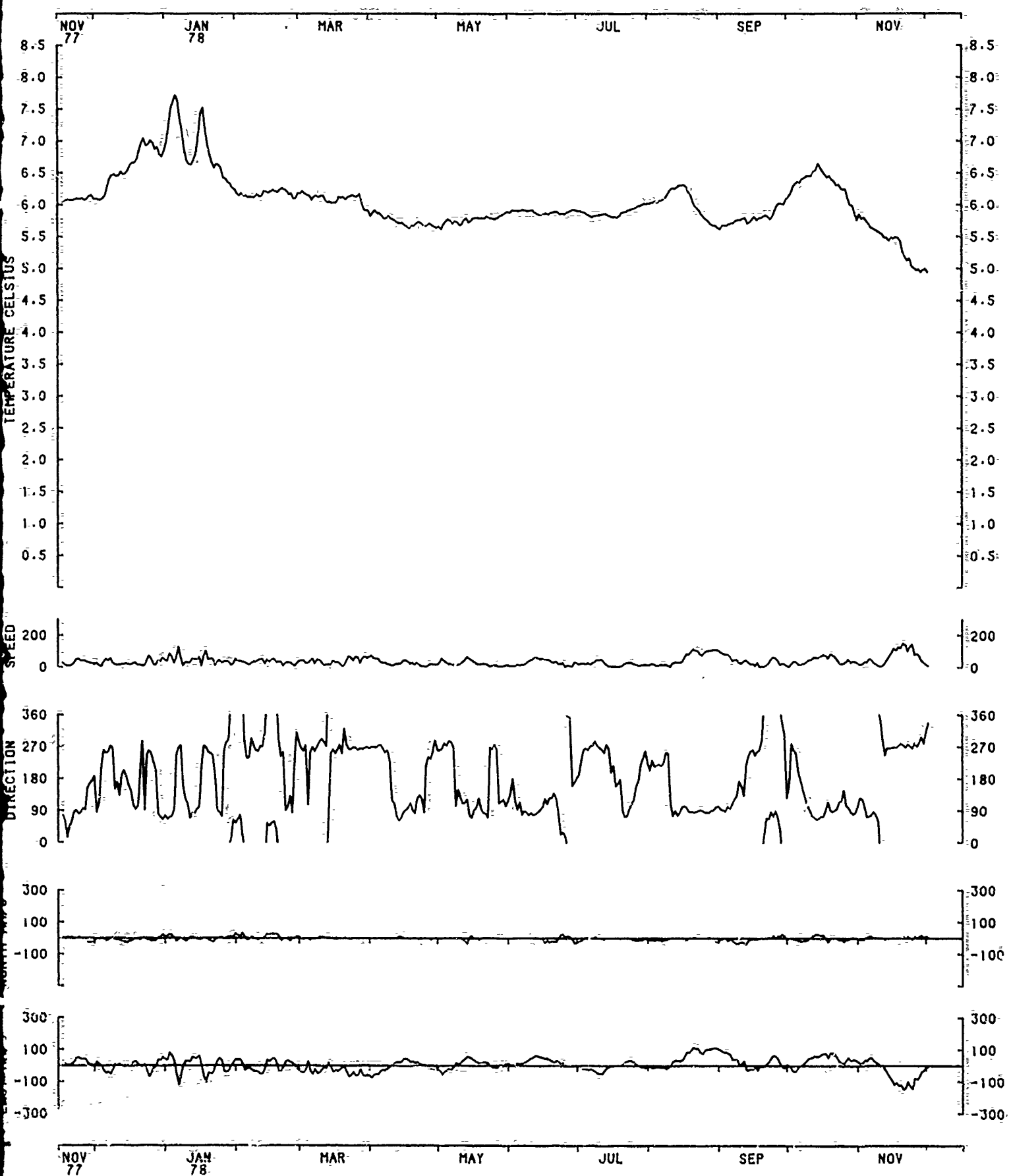

N
0.
150.
KILOMETERS
6352A1DGAU24
524 M
77- XI -18 TO 78- XII-14
SEP
NOV
APR



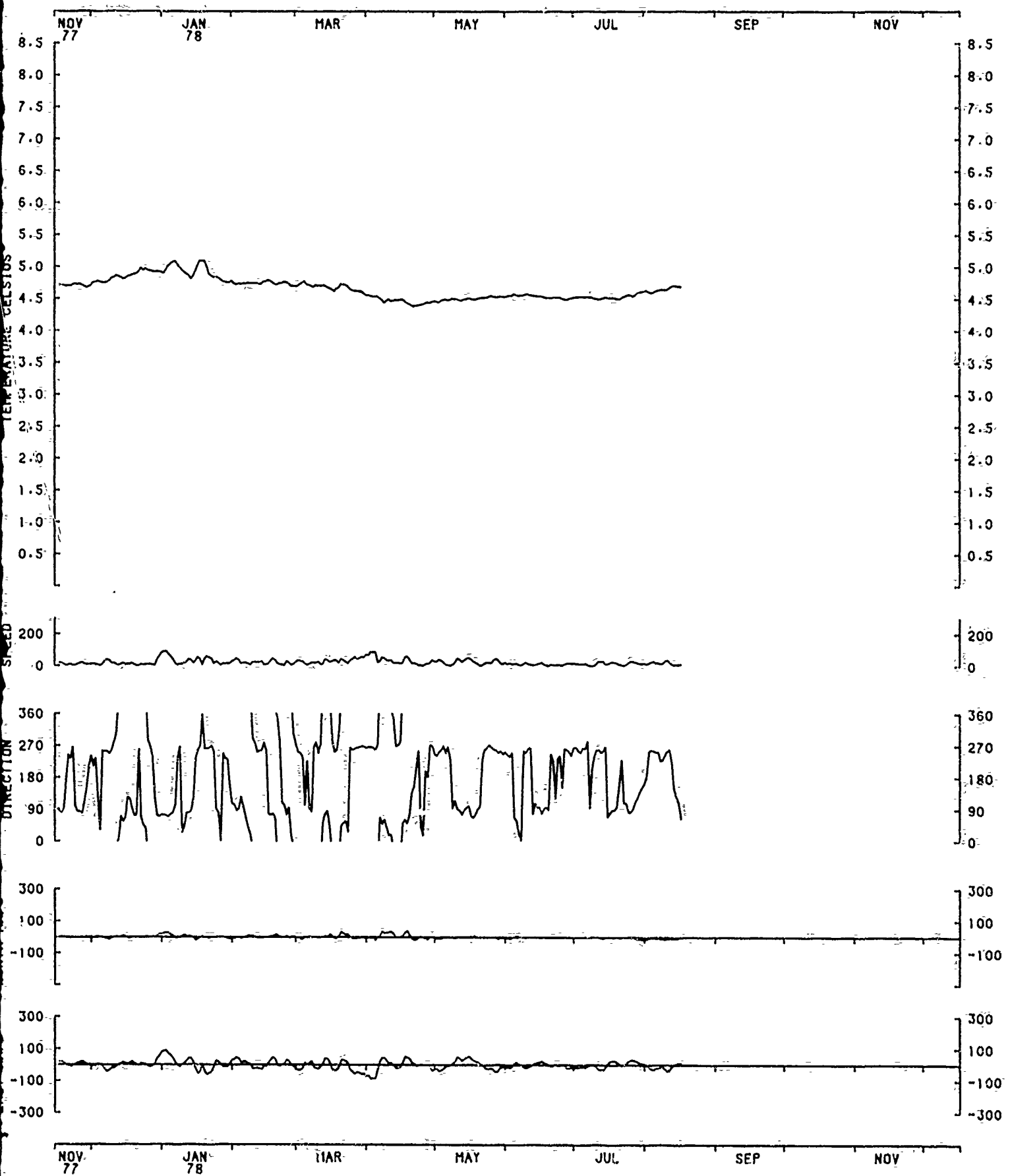
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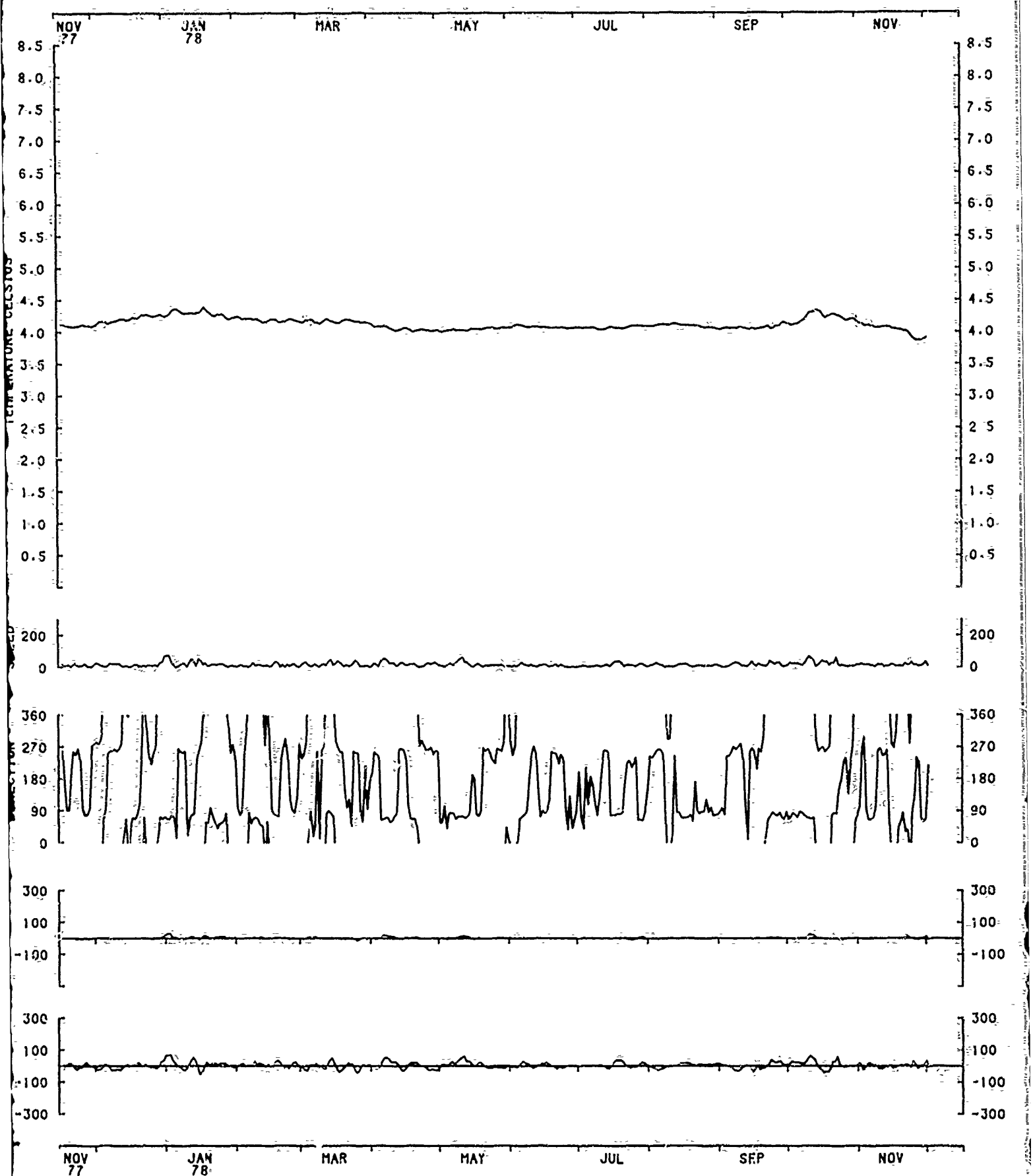
RECORD #6331A1DGAU24 DEPTH=792 METERS



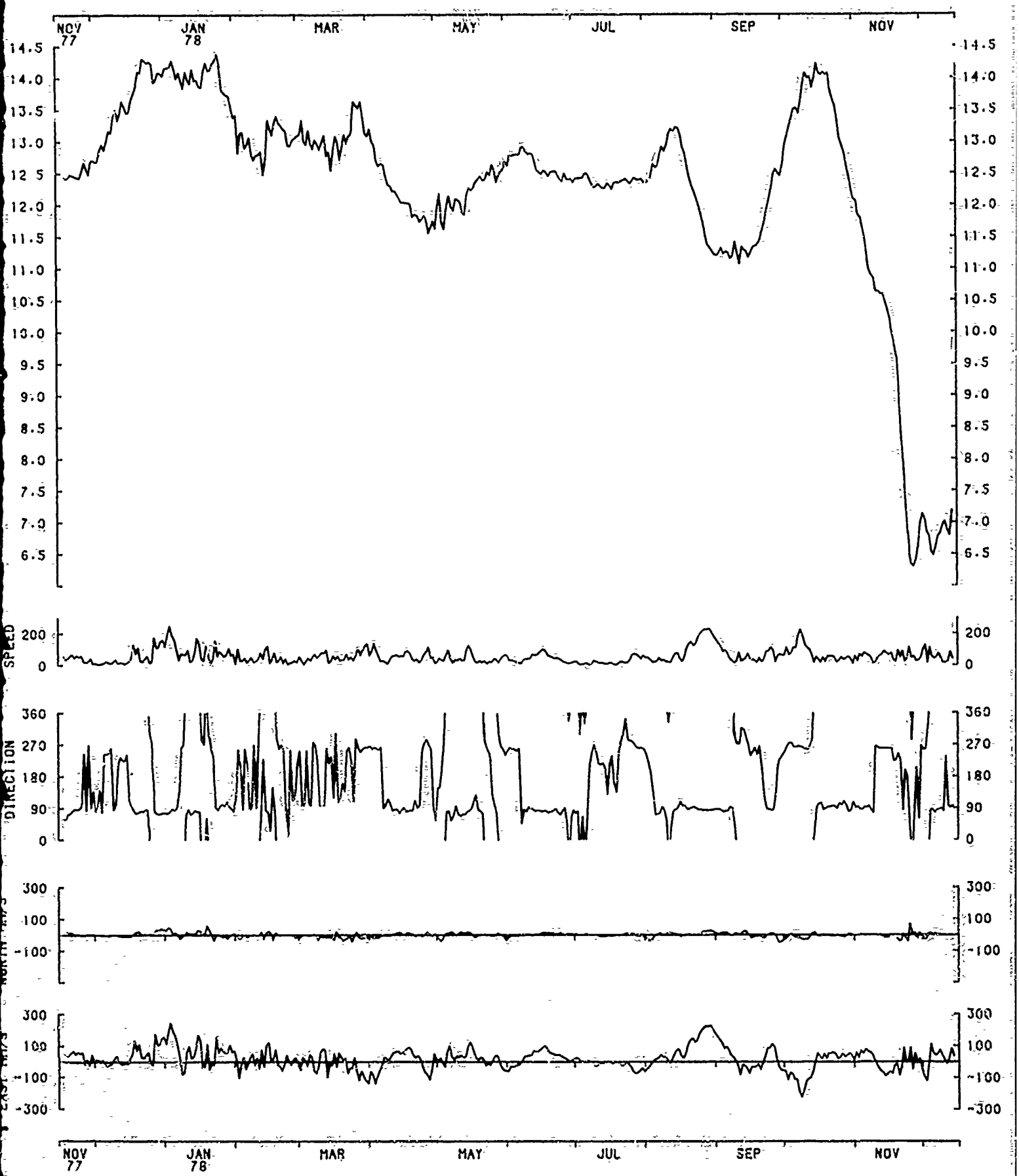
RECORD #6332A1DGAU24 DEPTH=1092 METERS



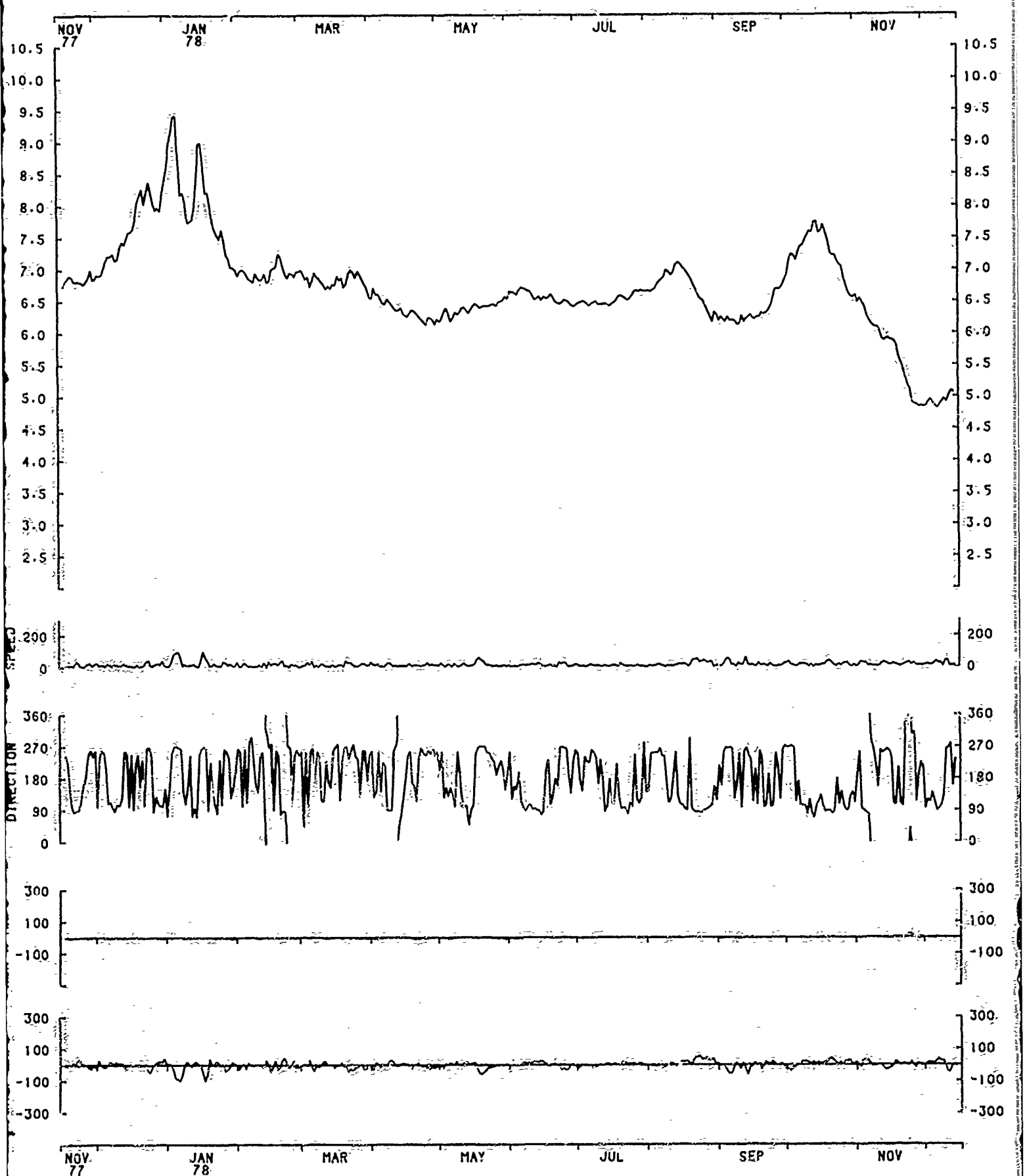
RECORD #6333AB1DG24 DEPTH=1392 METERS



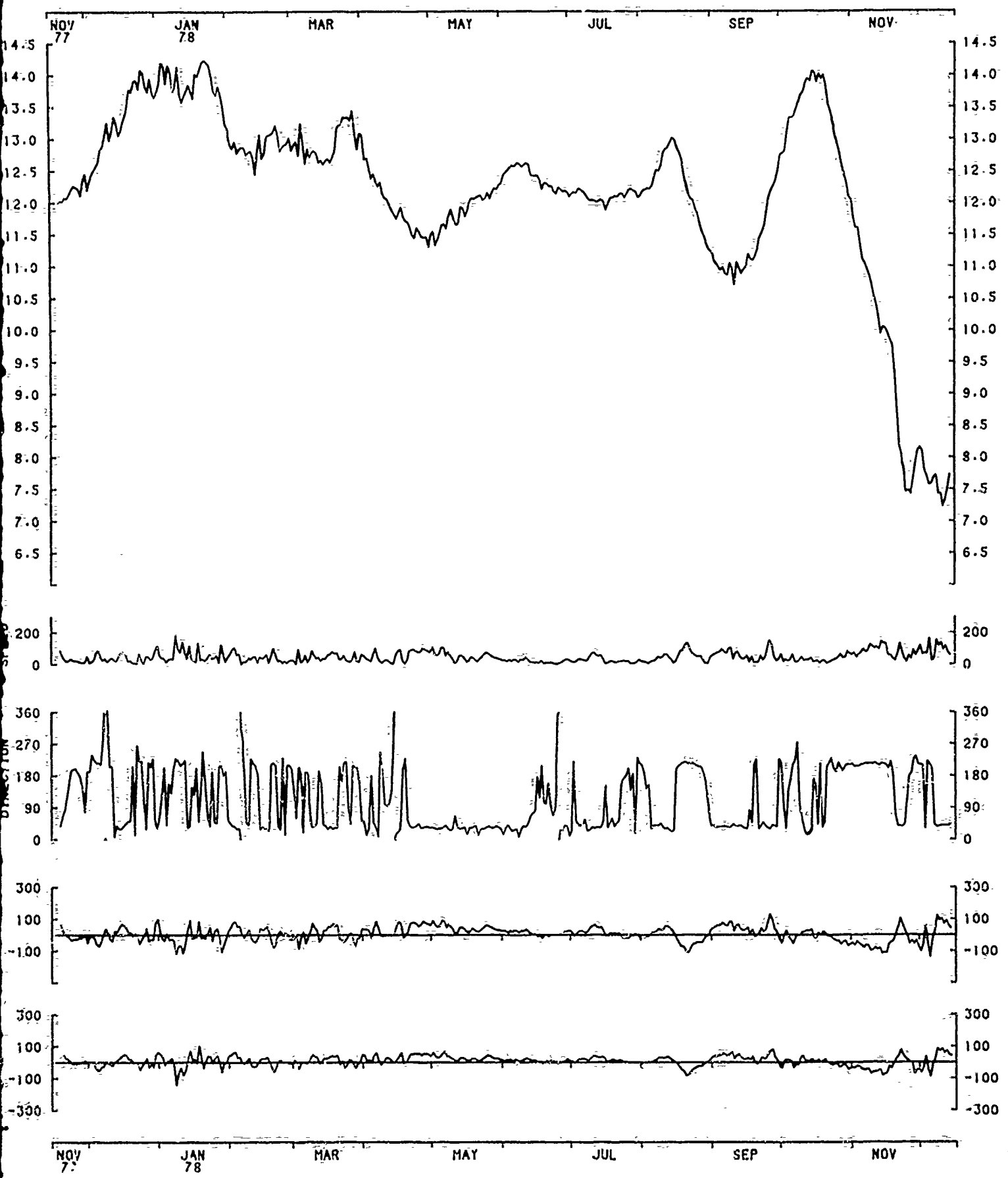
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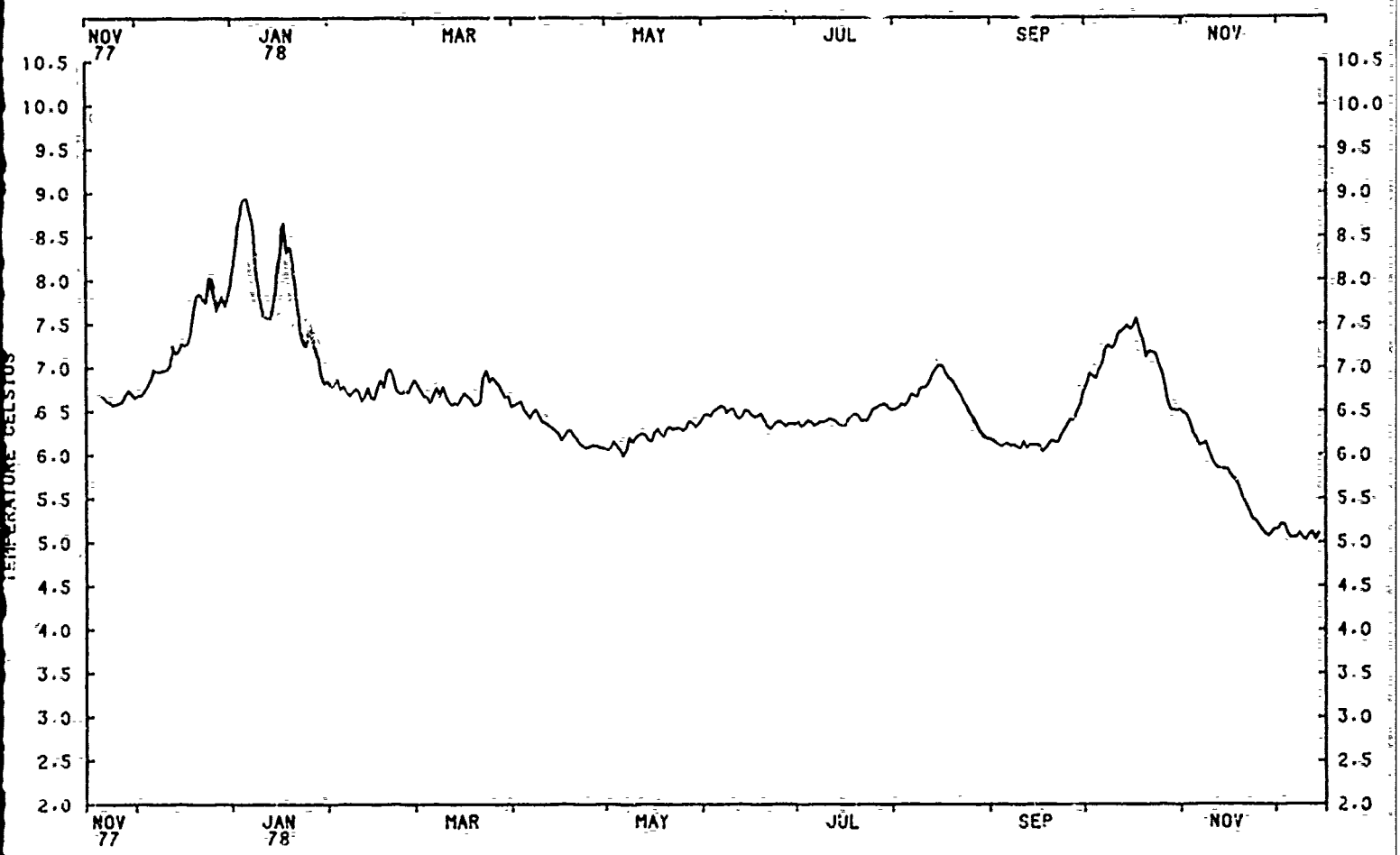
RECORD #6342A1DGAU24 DEPTH=542 METERS



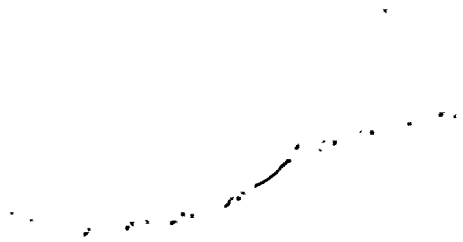
RECORD #6343A1DGAU24 DEPTH=842 METERS

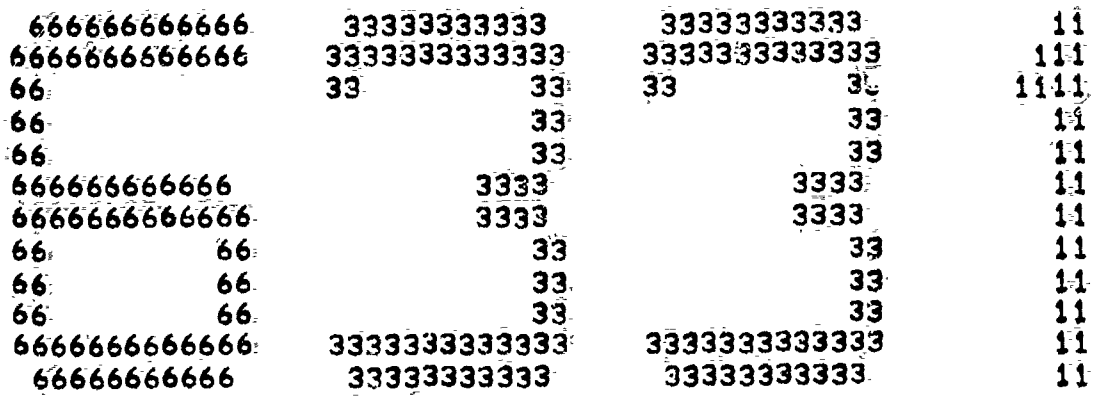


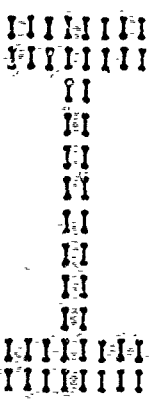
RECORD #6352A1DGAU24 DEPTH=524 METERS

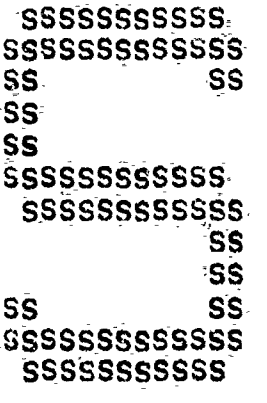


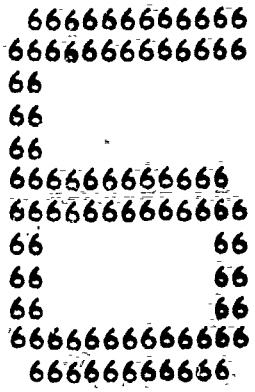
RECORD #6353A1DGAU24 DEPTH=824 METERS

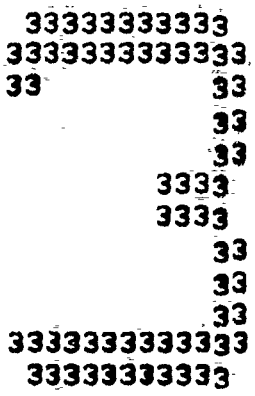


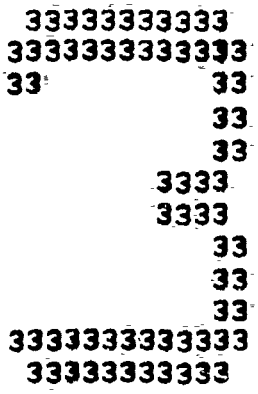

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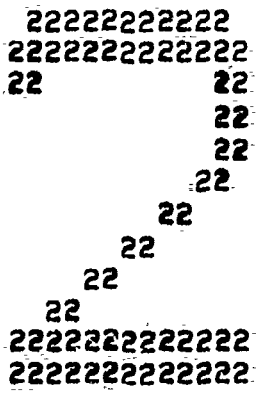

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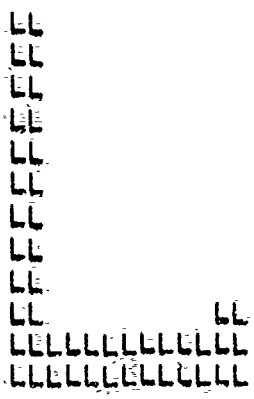

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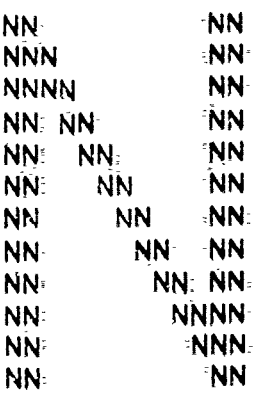


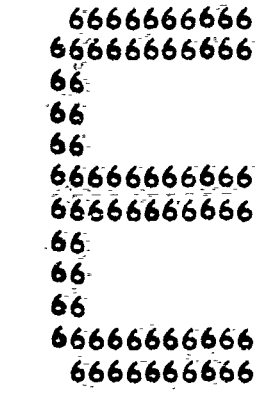


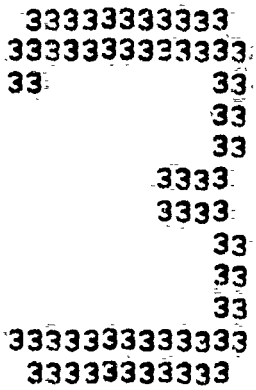


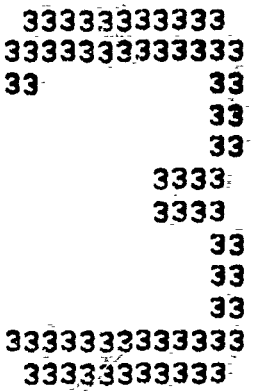


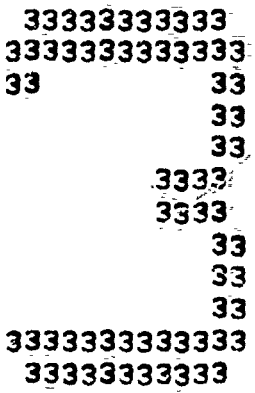


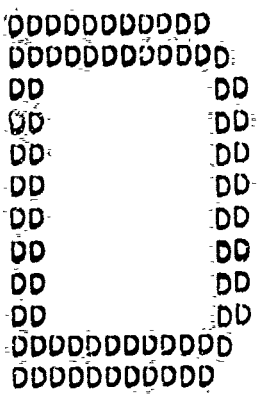


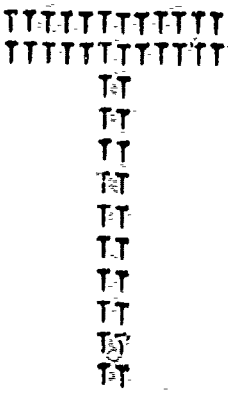


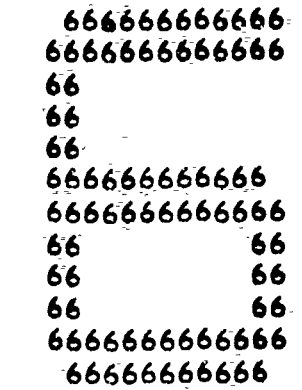


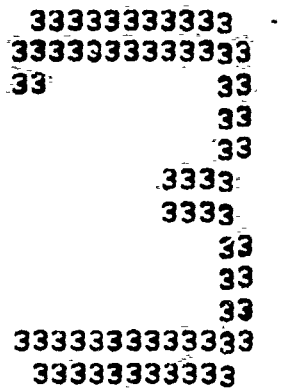


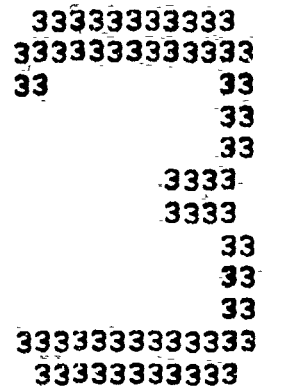


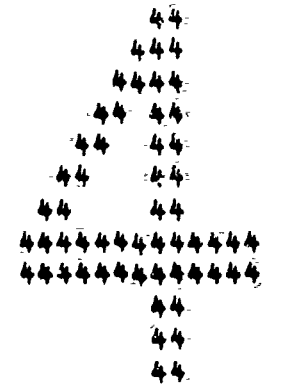


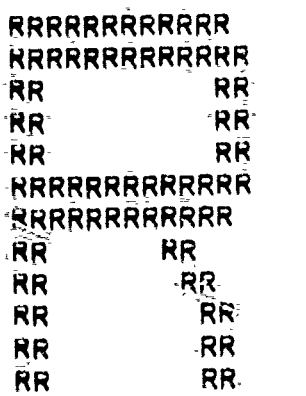


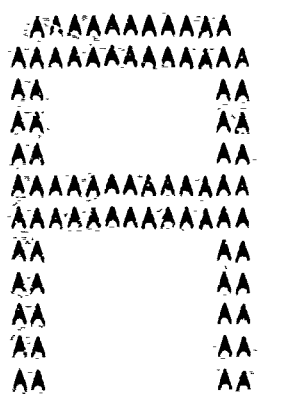

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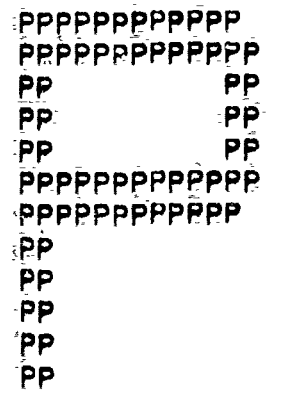

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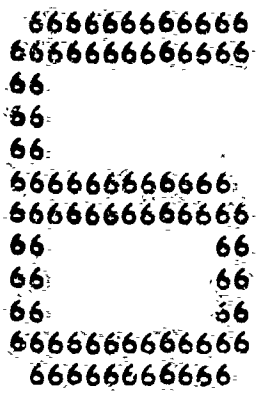

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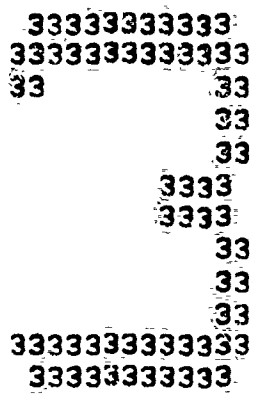

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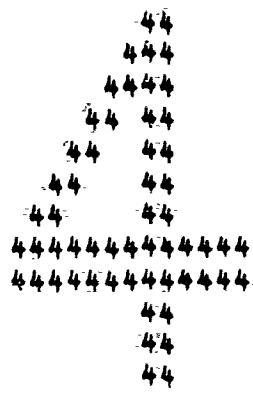

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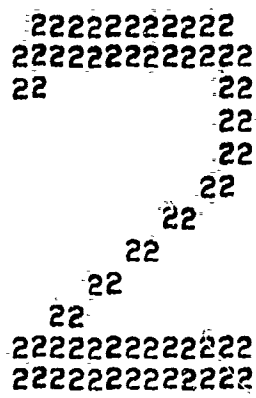

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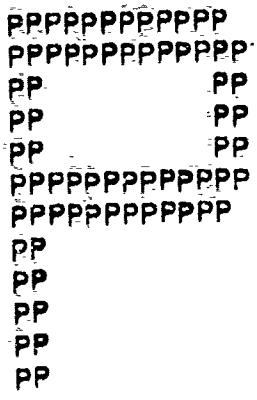

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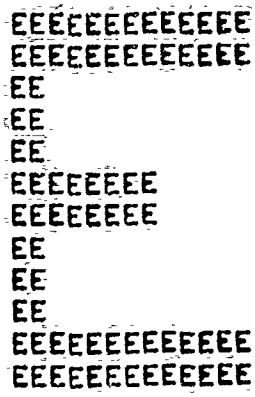

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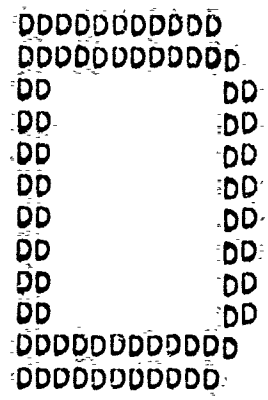

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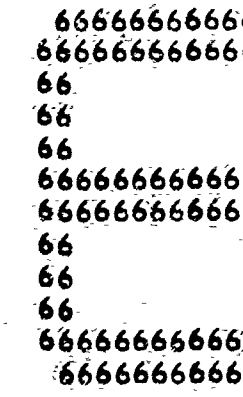

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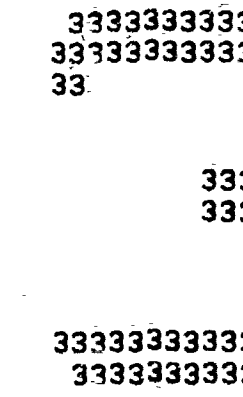

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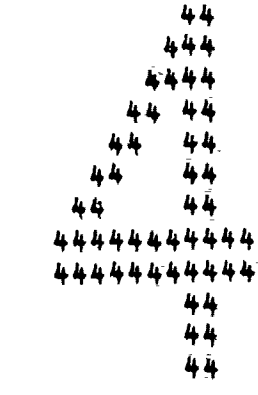

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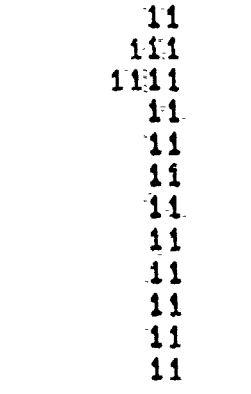

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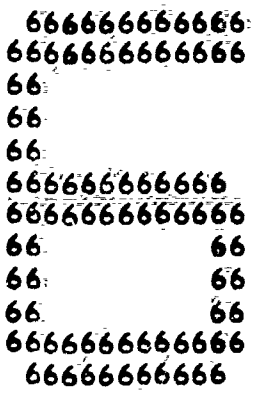

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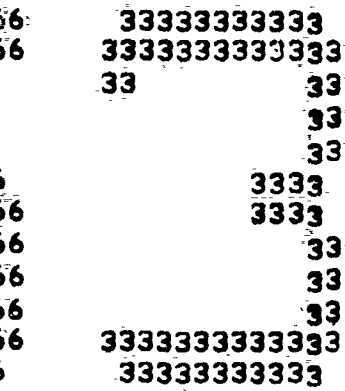

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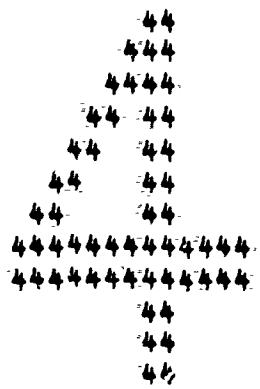

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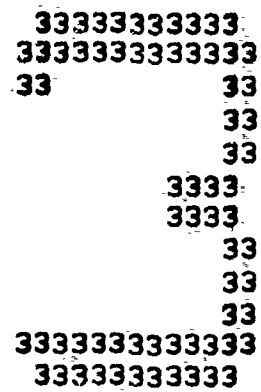

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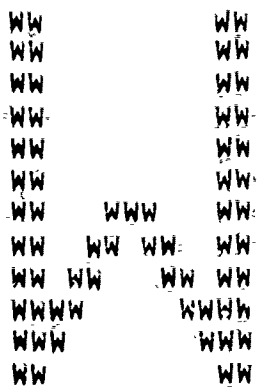

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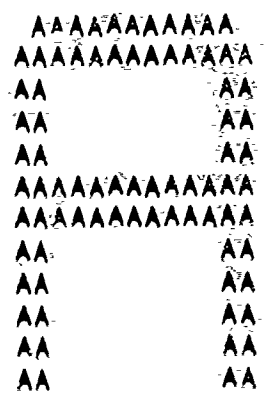


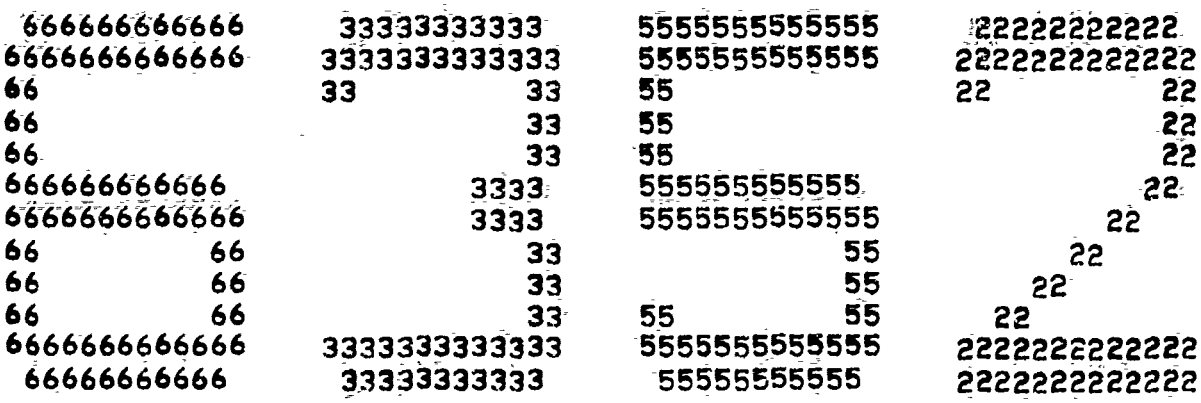


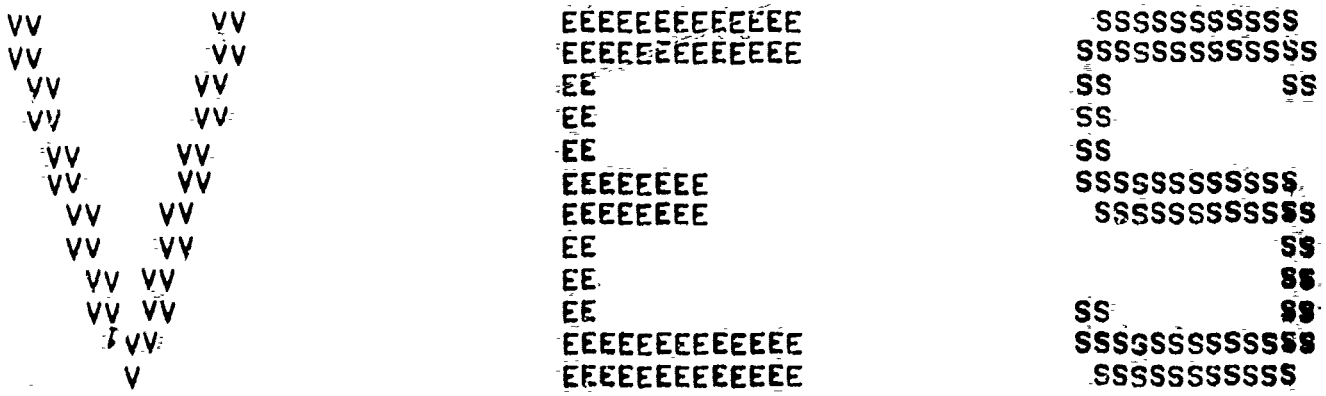


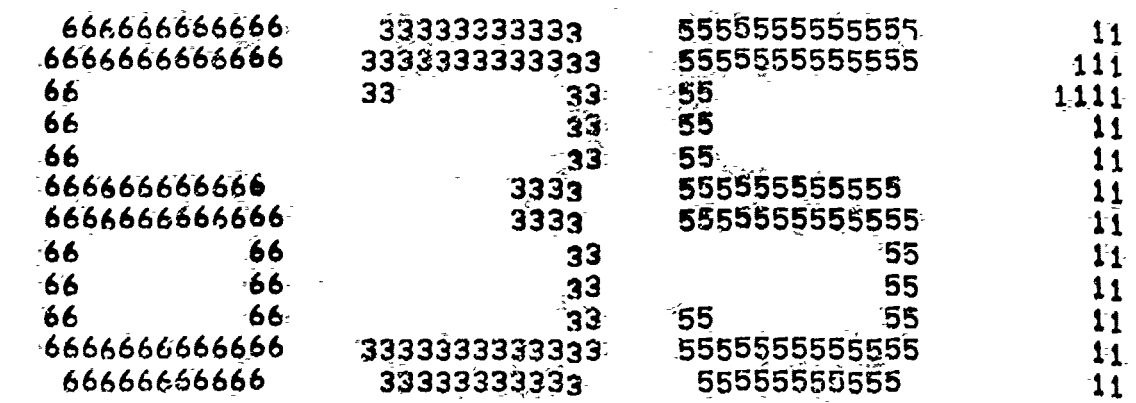


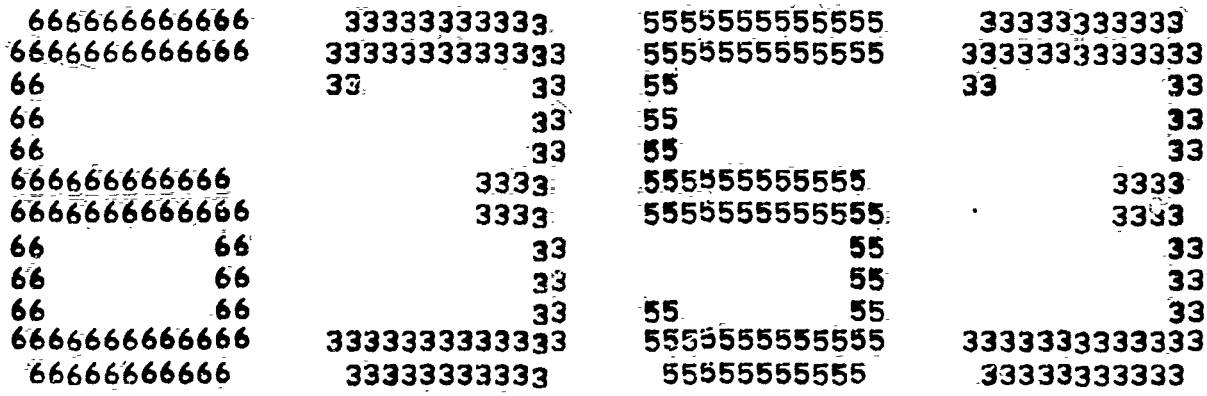






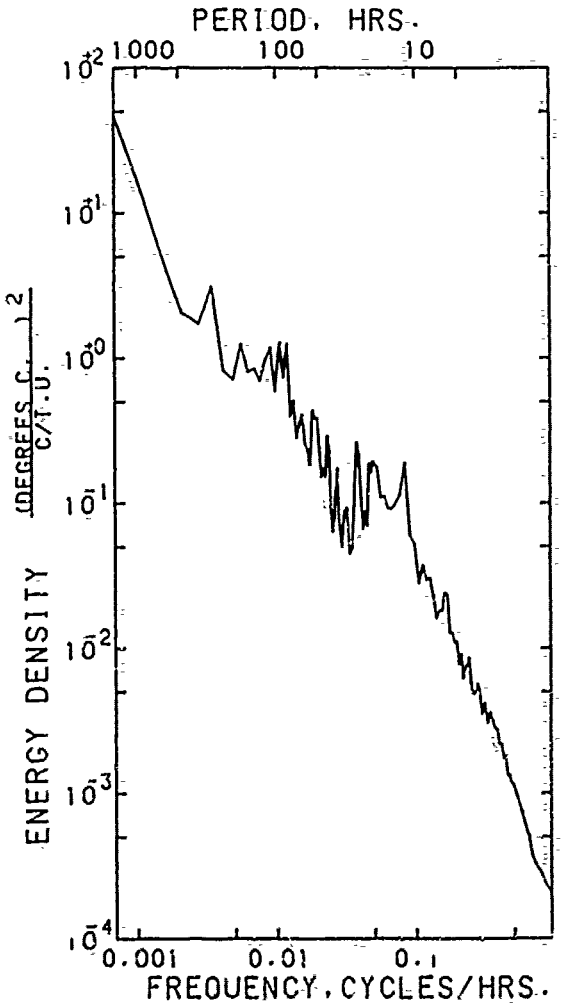




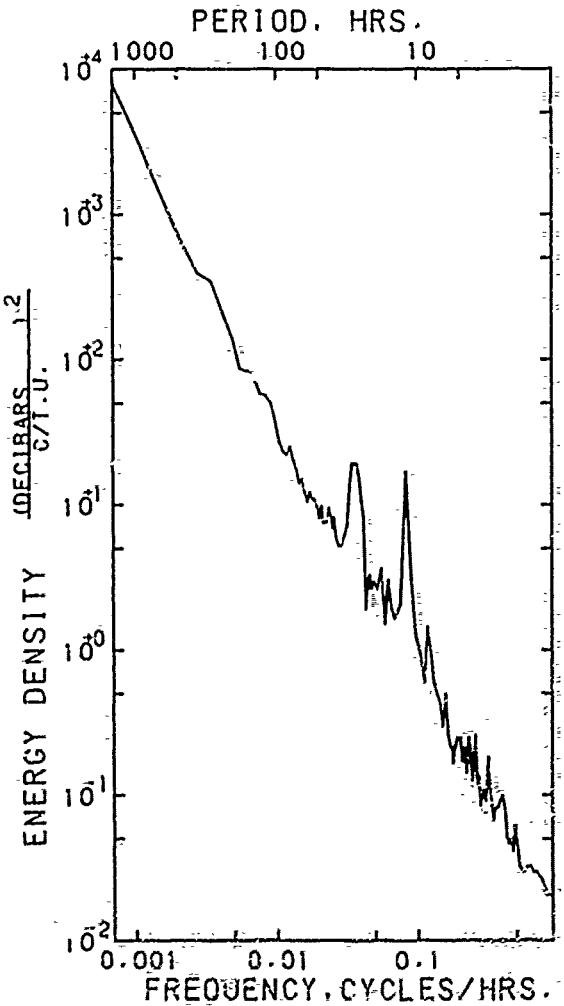

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DATA/ 6341$1920

VARIABLE	TEMPERATURE	PRESSURE	
UNITS	DEGREES C.	DBARS	
MEAN	17.229	410.792	SAMPLE SIZE = 17690 POINTS
STD. ERR.	.923E-2	.200	
VARIANCE	1.506	707.892	SPANNING RANGE
STD. DEV.	1.227	26.606	FROM 77- XI -18 17.24.00
KURTOSIS	12.771	13.037	TO 78- XII-16 19.32.00
SKEWNESS	-3.236	3.200	
MINIMUM	11.987	386.369	DURATION 393.09 DAYS
MAXIMUM	18.321	551.941	



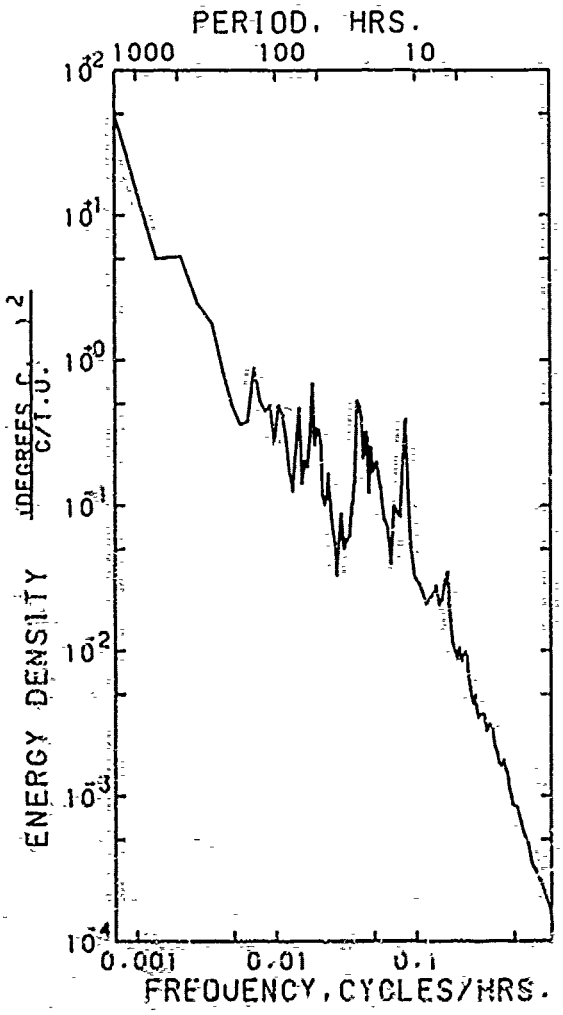
AUTO SPECTRUM
6341$1920 TEMPERATURE
407 METERS
77-XI-18 TO 78-XI-09
2 PIECES WITH 4000 ESTIMATES
PER PIECE. AVERAGED OVER
3 ADJACENT FREQUENCY BANDS



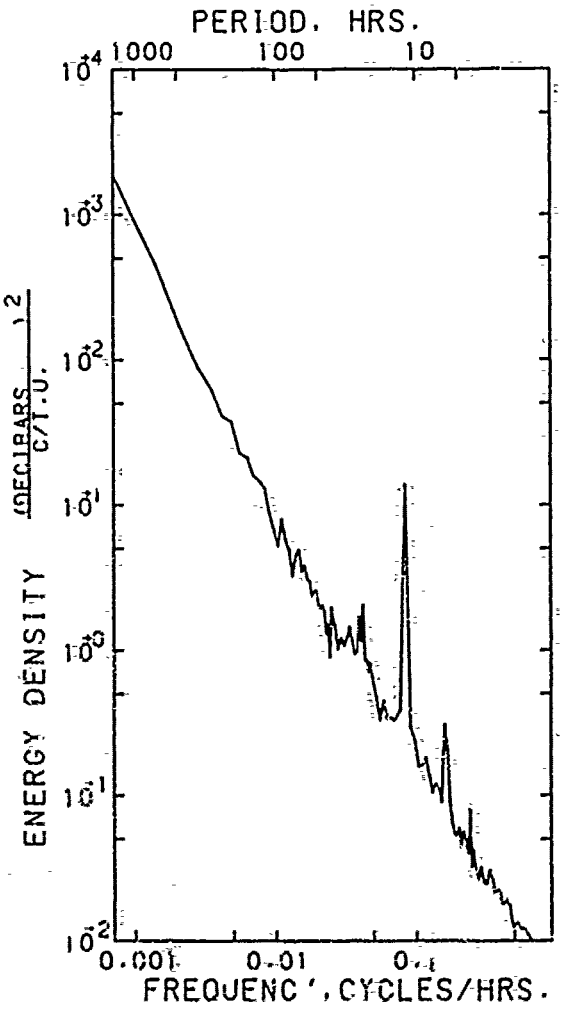
AUTO SPECTRUM
6341$1920 PRESSURE
407 METERS
77-XI-18 TO 78-XI-09
2 PIECES WITH 4000 ESTIMATES
PER PIECE. AVERAGED OVER
3 ADJACENT FREQUENCY BANDS

DATA/ 6351$1920

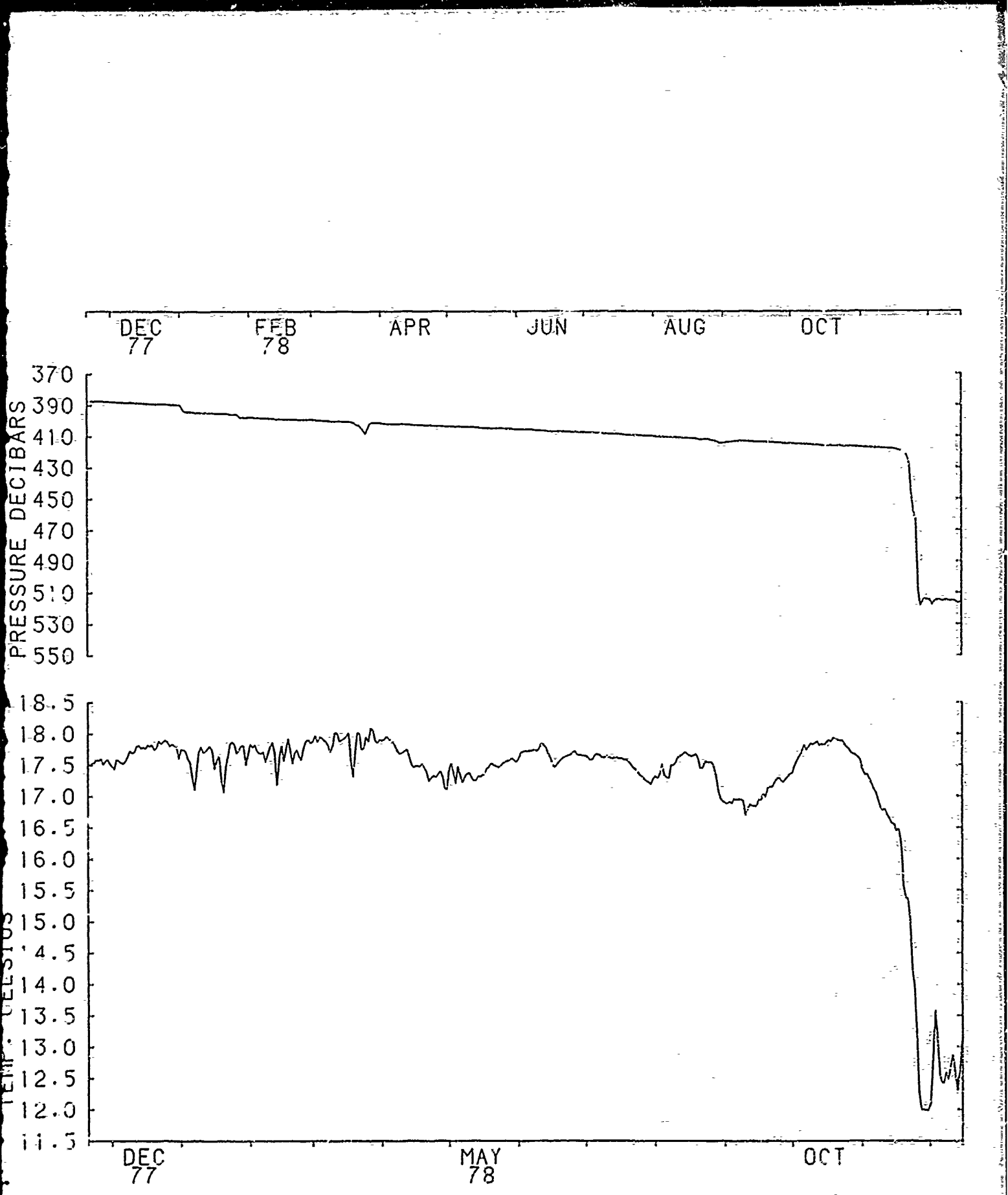
VARIABLE	TEMPERATURE	PRESSURE	
UNITS	DEGREES C.	DBARS	
MEAN	17.163	425.844	SAMPLE SIZE = 17700 POINTS
STD. ERR.	.767E-2	.755E-1	
VARIANCE	1.040	100.923	SPANNING RANGE
STD. DEV.	1.020	10.046	FROM 77- XI -18 17.24.00
KURTOSIS	12.845	17.920	TO 78- XII-17 00.52.00
SKEWNESS	-3.120	3.269	
MINIMUM	11.895	414.929	DURATION 393.31 DAYS
MAXIMUM	18.271	498.096	



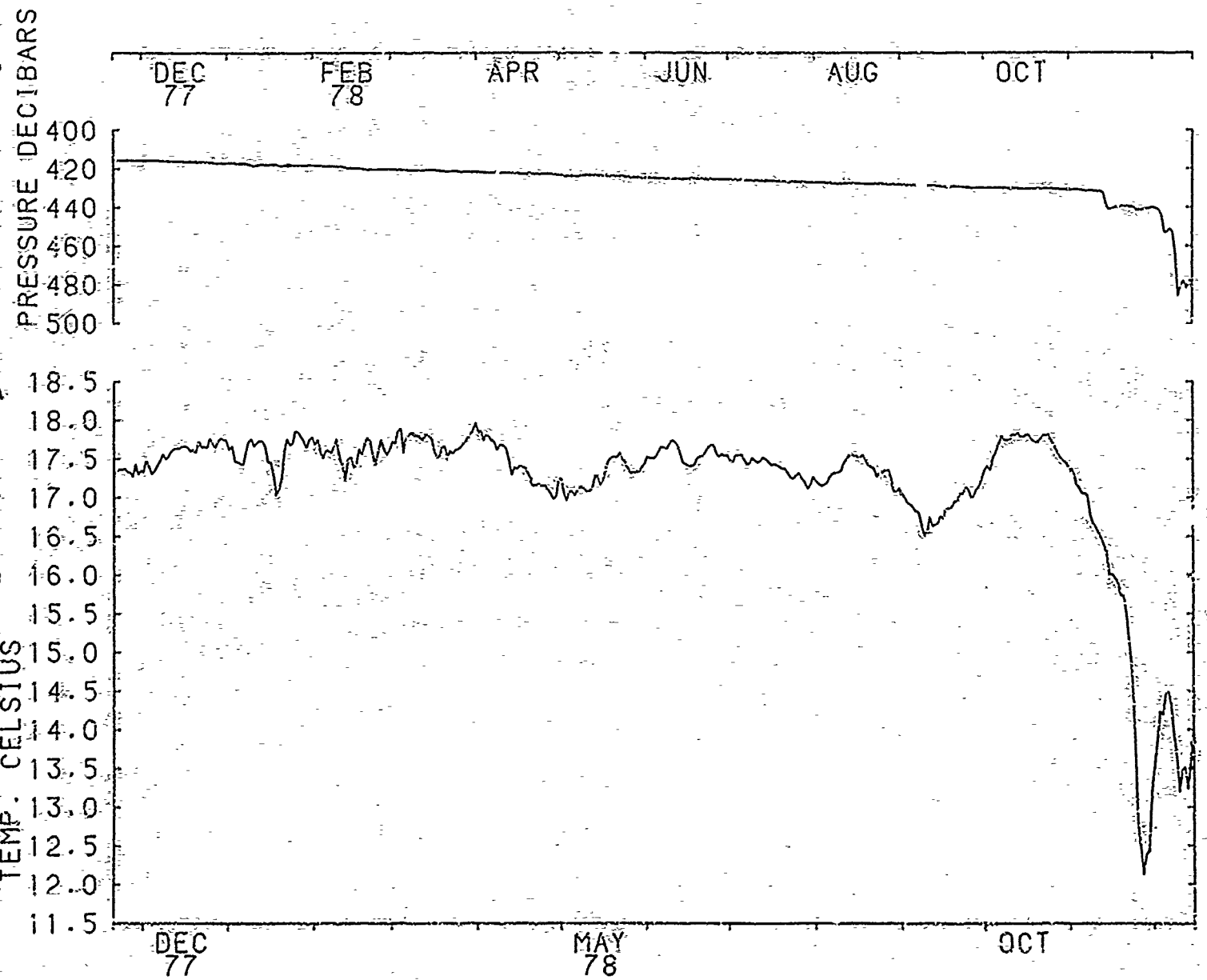
AUTO SPECTRUM
6351$1920 TEMPERATURE
422 METERS
77-XI-18 TO 78-XI-09
2 PIECES WITH 4000 ESTIMATES
PER PIECE. AVERAGED OVER
3 ADJACENT FREQUENCY BANDS



AUTO SPECTRUM
6351$1920 PRESSURE
422 METERS
77-XI-18 TO 78-XI-09
2 PIECES WITH 4000 ESTIMATES
PER PIECE. AVERAGED OVER
3 ADJACENT FREQUENCY BANDS



DATA 6541A1DCAU24



DATA 6351A1DGAU24