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A COMPILATION OF MOORED CURRENT METER DATA AND ASSOCIATED OCEAN--ETC(U)

MAR 79 A SPENCER, C MILLS, R PAYNE

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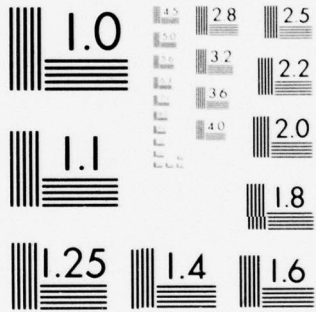
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Selected CTD data are presented as potential temperature and salinity values plotted against pressure, and as T-S diagrams.

ABSTRACT

Summaries of observations from moored stations taken during POLYMODE Array 1 are presented. Currents and water temperatures were measured at various depths, including 500, 800, 1000, 2000 and 4000 meters.

Data series are of 9 months duration from August 1974 to May 1975.

Low passed east and north current components are displayed as vector stick diagrams and progressive vector plots. Basic 1-hour current meter and temperature data are displayed as time series plots, spectral plots and in statistical tables.

Selected CTD data are presented as potential temperature and salinity values plotted against pressure, and as T-S diagrams.

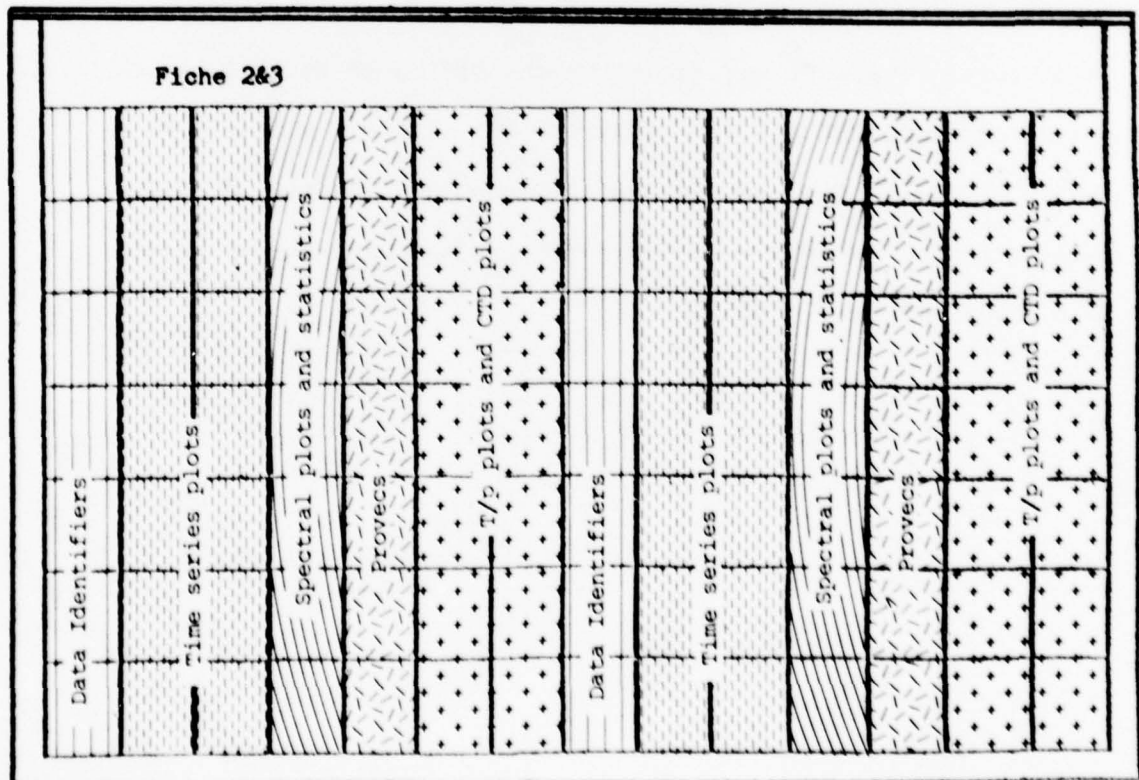
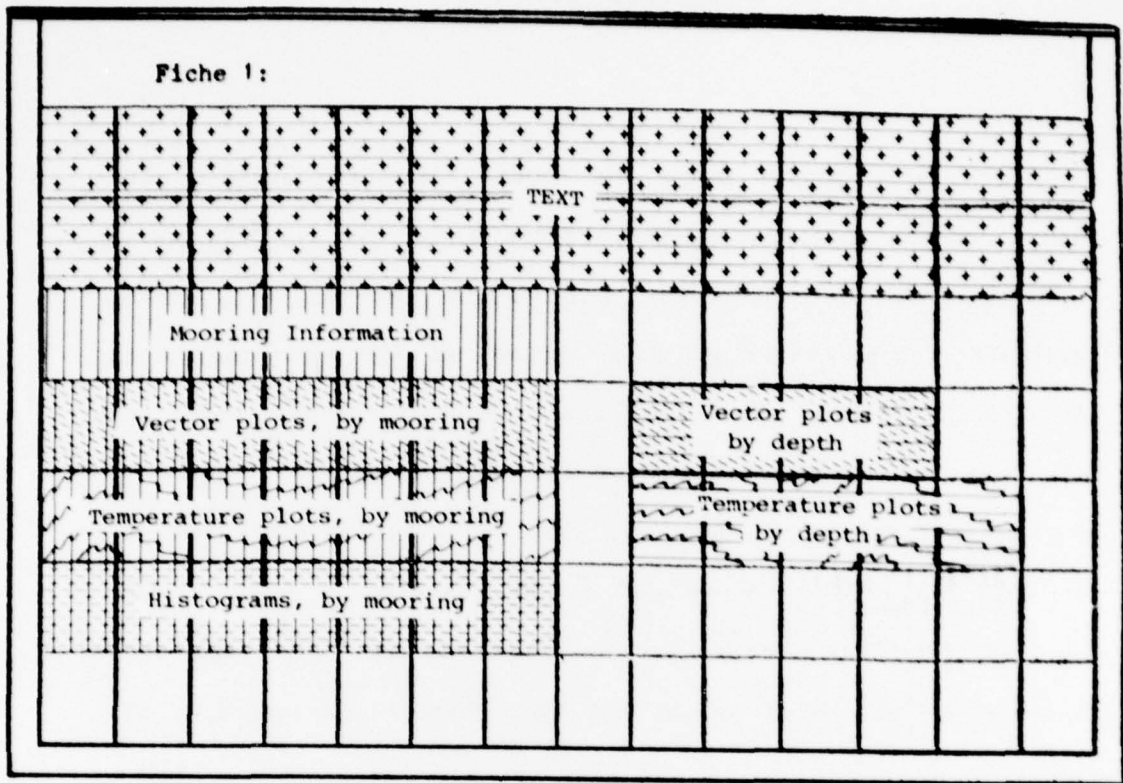
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Many people should share the credit for the excellent data return and the quality of data obtained during the POLYMODE Array 1 Experiment, in particular the people in the buoy group instrument shop and those who worked on the moorings, both hardware and design. The officers and crews of the R.V. Knorr and R.V. Chain deserve special mention for their willing assistance in mooring deployment and recovery. The principal investigator for the POLYMODE Array 1 experiment is Dr. William J. Schmitz, Jr. The T/P data is courtesy of Dr. Carl Wunsch. CTD data were recorded and processed by the W.H.O.I. Physical Oceanography CTD group.

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PREFACE

This volume is the nineteenth in a series of Data Reports presenting moored current meter and associated data collected by the W.H.O.I. Buoy Group.

Volumes I through XVIII present data from the years 1963-1971, and from several special experiments: the 1970 Pollard array, the 1973 IWEX array, the 1973 MODE array, the MODE Site moorings, the Saint Croix mooring measurements, the POLYMODE Array II experiment, and the 1978 JASIN array.

Volume XIX presents data from POLYMODE Array 1.

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		1967 measurements
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		1969b measurements
		1973 MODE Array
		1970 Measurements
		1976 mooring 592 Saint Croix
		1971 measurements
		1971-1975 MODE Site
		1975-1977 POLYMODE Array II
		1978 JASIN

Presentation

The report can be divided roughly into three parts: text, displays of current meter and T/P data as arrays, display and description of the data as individual records. The first two parts are included in the printed portion of this report; all three parts appear in the microfiche inside the back cover.

Sheet 1 of the microfiche contains the complete text. Sheets 2 and 3 contain displays of the individual data records with records 542-546 shown on sheet 2 and records 547-549 on sheet 3. The detailed layout of the data on the microfiche sheets is shown in the table of contents.

Introduction

The POLYMODE program is an international cooperative scientific investigation of the dynamics and statistics of the mesoscale motions in the sea, the energy sources of these motions, and their contribution to the general circulation of the ocean. POLYMODE includes theoretical investigations, experiments, and field observations. Of the field observations, the largest is the statistical geographic experiment designed to determine the distribution of energy levels and space and time scales of the eddy field throughout the western North Atlantic using current meter arrays, SOFAR float arrays, and hydrographic and XBT work.

Results from the Mid-Ocean Dynamics Experiment (MODE) and from a few other moorings suggested that mesoscale eddies might be an important factor in the North Atlantic circulation and that kinetic energy at deep levels (4000m) seemed to increase with decreasing distance from the Gulf Stream. POLYMODE Array 1 (see Fig.1 and Table 1. for locations and dates of moorings) was designed particularly to investigate energy levels east and north of the MODE-1 site. Selected results from Array 1 have been described by Schmitz (1976,1977,1978).

Current Meter Types

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

The VACM senses compass and vane information and computes a measure of east and north water current components each time a pair of rotor magnets passes the sensing diode, then sums these components through the entire recording interval, usually 15 minutes, thus giving a true vector average. One complete rotor revolution initiates eight 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. All variables are recorded on a cassette tape at the end of each recording interval. Temperatures are accurate to about $\pm .01^{\circ}\text{C}$ (Payne et al., 1976).

Temperature/Pressure Recorder

An instrument to record temperature, pressure and time (T/P) was developed in the Draper Laboratory at M.I.T. for MODE-1 and used extensively on the post-Mode moorings. The instrument stores a sample every 15 seconds and records the sum of 64 successive data samples every 16 minutes on a magnetic tape cassette (64 x 15 = 960 seconds = 16 minutes).

Temperatures have a resolution of .001°C (Wunsch and Dahlen, 1974). The absolute accuracy cannot be specified because the thermistors have not been calibrated since the original calibration by the manufacturer.

The pressure sensor is a strain gauge with a manufacturer specified accuracy of .03% of the scale range used (Wunsch and Dahlen, 1974). These sensors are recalibrated for each instrument deployment.

CTD

A device to measure conductivity, temperature, and pressure, manufactured by Neil Brown Instrument Systems, Inc. (Brown, 1975), was used at POLYMODE mooring sites to obtain vertical profiles of these quantities. Plots of temperature and salinity versus pressure, and T/S plots are included for each mooring site. The data were collected on R. V. Chain cruise 116. The plots are presented on fiche 2, columns 6 and 7 and on fiche 3, columns 13 and 14.

Time

Time from T/Ps, 850s and VACMs was measured using a quartz crystal oscillator with a manufacturer's specified accuracy of +1 second per day.

In this report time is denoted by year-month-day hour.minute.second.

Moorings

The POLYMODE Array 1 mooring configuration is shown in Figure 2 and a summary of mooring locations and durations is given in Table 1. The moorings were all of the intermediate type (Heinmiller, 1976). A complete list of the components of each mooring is shown on microfiche, in sheet 1, row C. The following abbreviations have been used on fiche and in Table 2:

VACM	Vector averaging current meter.
DT	VACM which also measures temperature. difference over a 1.74 m vertical separation.
850	Model 850 burst sampling current meter.
T/P	MIT temperature and pressure recorder.
3/8" chain & spheres	Refers to the indicated length of chain bolted every meter to a 16" or 17" glass sphere (in hard hat).
**	'Milliman samples', samples attached in position indicated to measure corrosion.
anchor	a Stimson anchor connected to one or two Danforth anchors with parachutes on the bridle.

Current Meter Data Processing

Data recorded on magnetic tape in the current meters (1/4" 2-track cartridges in Model 850's and 1/8" 4-track cassettes in VACM's) were transcribed to 9-track computer compatible tape at W.H.O.I. The data were then converted to scientific units (decoded) and stored on magnetic tape in Maltais format (Maltais, 1969)

Editing the data included selecting start and stop times, adjusting the nominal depth of some records to agree with information supplied by the T/Ps, applying corrections to temperature indicated by post cruise thermistor calibrations, correcting the temperatures to a constant depth, computing vector averaged components for the data from burst sampling Model 850 instruments, removing erroneous records and interpolating through the resulting gaps in the data.

Some of the displays show low-passed data. For these, a symmetrical running Gaussian filter with a half width of 24 hours and a window of width 24 hours was applied to the basic data.

Table 2 indicates which variables are presented. The abbreviations are as follows:

v	current vector
t	temperature
p	pressure
s	current speed

Current meter data quality

Overall, the data return was about 72%. A total of 9 moorings with 37 current meters and 23 T/P recorders was set. Seven moorings with 31 current meters and 20 T/P recorders were recovered. Seven of the Model 850 current meters ran out of magnetic tape before the end of deployment and so achieve less than 100% data return. For the current meters recovered, the data return was about 95%. Five of the T/P recorders returned no data. Overall data return for the recovered T/P recorders was about 70%.

Minor problems with the current meters and other problems affecting the data are noted in the statistics sections on micro-fiche (fiche 2 and 3, columns 4 and 11).

POLYMODE Array 1 temperature corrections

Because of the occasional high currents seen by parts of this array and the resulting depth variations of the moorings, it was desirable to attempt to correct to a constant depth the temperatures from both T/P's and current meters. To make this correction it was necessary to know both the depth of an individual instrument as a function of time and the temperature gradient between its measured depth and the nominal depth to which the temperature was to be corrected. Current meter depths were interpolated from T/P pressures. Temperature gradients were obtained from CTD profiles made in the vicinity of each mooring on the setting cruise.

There is no way to determine the accuracy of the corrections; no one was there to make observations during the periods of high currents. Applying the corrections, however, yields temperatures which appear to be a better approximation of temperature at a constant depth than do the uncorrected temperatures.

Temperatures were corrected down to depths of either 1000 or 2000 meters depending on how much depth variation there was on the mooring. Below 2000 meters temperature gradients are too small to make the correction worthwhile.

Data Identifiers

The following example will illustrate the scheme that is used to insure that each data series has a unique identifier:

5427B1DG24A

- 542 - The first three digits are the mooring number.
- 7 - The relative instrument position starting at the top of the mooring. 1 denotes the top instrument.
- B - The position of the letter in the alphabet indicates the amount of editing that has been done. The symbol \$ means no editing has been done.
- { 1DG24 - a 1-day subsampled Gaussian filtered series, the filter
IDGAU24 having a half width of 24 hours.
- A - Additional editing has been done after the series was filtered.

Analysis and Display Programs

Statistics. (STATS)

A number of statistical quantities are computed for both the current meter and T/P recorder parameters. For the scalar variables, means, standard error, variance, kurtosis, skewness, minima and maxima are computed. Mathematical expressions used to compute these parameters can be found in earlier data reports, for example Tarbell, Payne and Walden (1977). In addition, covariance, correlation coefficient, orientation (of principal axes), major axis, minor axis and ellipticity are computed for east and north vector components of current. These are described in Tarbell, Spencer and Payne (1978).

Progressive Vector Diagram. (PROVEC)

The progressive vector displacements are plotted. These are derived by multiplying the average speed in an interval by the interval length and joining the resulting vectors head-to-tail. The plot begins with an asterisk (*). All following month boundaries are indicated by the symbol + .

Variable vs. time plot. (DISPLO)

This is a diagram of any variable plotted as a function of time.

Vector Stick plots. (DISPLO)

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

Histogram plots. (HISTO)

Histogram plots are presented in which the frequency of occurrence of values is plotted against the value of the variable. The frequency is expressed as a percentage of the total. The variables presented are speed and direction.

Spectra.

The program TIMSAN (Time Series Analysis) (Hunt 1977) uses the Fast Fourier Transform algorithm of Singleton (1969) and is restricted to data segments of length N points, where N must be an even number which has no prime factor larger than 5, and must be less than 8000 points.

The number of degrees of freedom for the first 40 plotted points is given by $\nu = a m s$, where m is the number of adjacent frequency bands being averaged, s is the number of independent data pieces being averaged, again as stated in the label, and a is 2 for temperature spectra and for Horizontal Kinetic Energy (HKE) spectra for which the EAST and NORTH components seem highly correlated.

The log-log plot is further averaged during plotting so that more and more points are averaged together as frequency increases. This eliminates the bunching together of points at high frequencies, increases the degrees of freedom of the high frequency estimates, and still permits low-frequency resolution.

Averaging is as follows:

Plotting Pts.	Frequency bands averaged over	Data points	Cumulative data pts.	Degrees freedom
First 40	5	200	200	10
Next 15	10	150	350	20
Next 6	25	150	500	50
Next 6	50	300	800	100

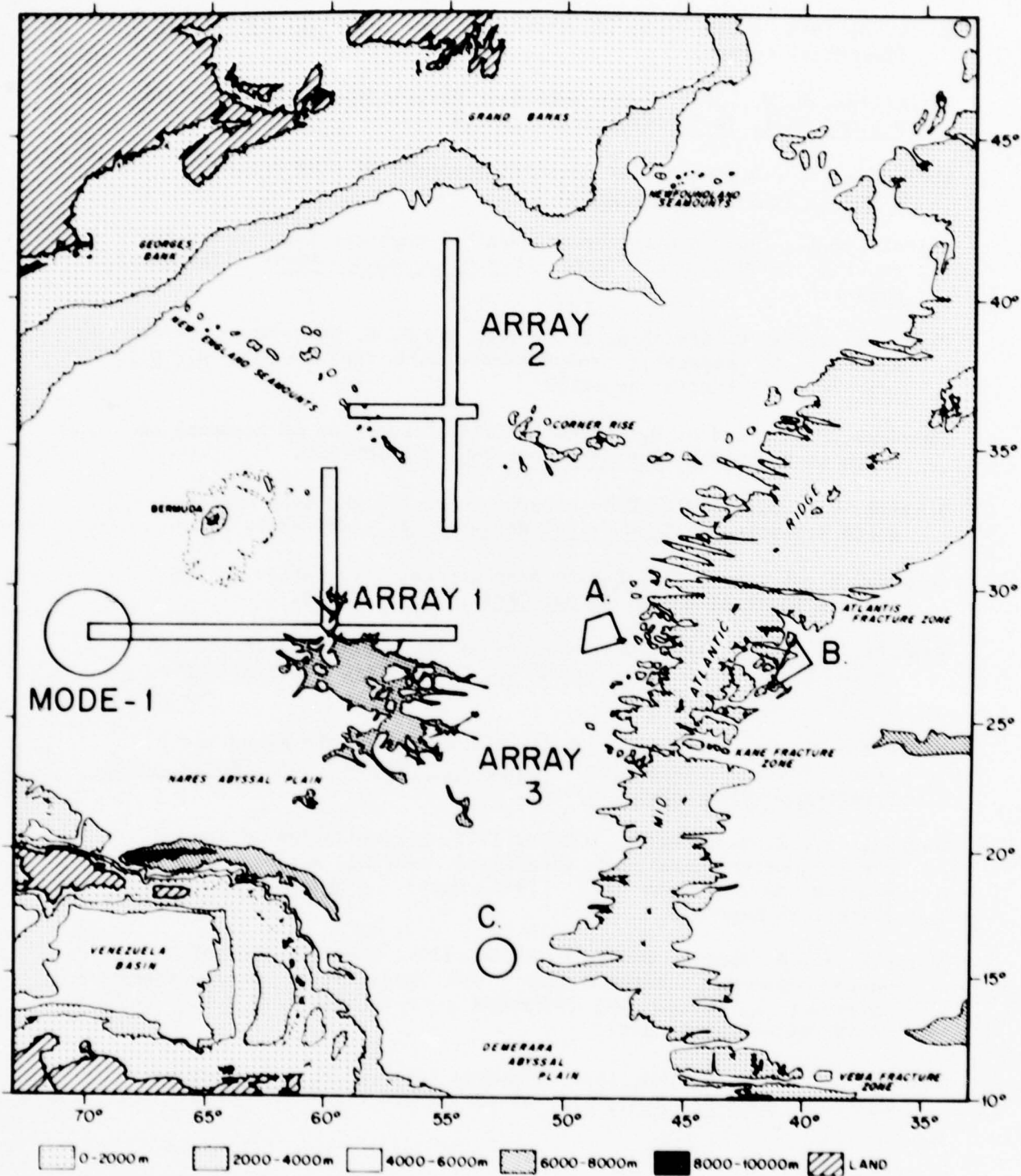
In this way, for example, 750 data points would be plotted as only 66 points. The m in the formula $v = a m s$ for degrees of freedom is, in this example, 10 times larger at the highest frequencies than at the lowest frequencies.

For $\nu \geq 30$, the confidence limits for the spectral estimates are given approximately by $(1 - \frac{2}{9\nu} \pm z\sqrt{\frac{2}{9\nu}})^3$ where $z = 1.28$ for 80% confidence limits, $z = 1.65$ for 90% , $z = 1.96$ for 95% and $z = 2.58$ for 99%. In the example above, if the HKE spectral plot label had indicated 2 pieces and averaging over 8 adjacent frequency bands then $\nu = 2 \times 2 \times 8 = 32$ for the lowest frequencies (assuming NORTH and EAST components are highly correlated) and $200 \times 32 = 6400$ for the highest frequencies. The 95% confidence intervals (i.e., 95% of the time one would expect the spectral estimates to vary no more than this much) would be (0.57, 1.55) at low frequencies, and (0.97, 1.03) at high frequencies.

For $\nu < 30$, one must obtain confidence intervals from Chi-squared distribution tables in standard statistical references.

References

- Brown, N., 1975, A precision CTD microprofiler. W.H.O.I. Ref. 75-18 (Technical Report).
- Heinmiller, R. H., 1976, Woods Hole Buoy Project Moorings, 1960-1974. W.H.O.I. Ref. 76-53 (Technical Report).
- Hunt, M., 1977, A program for spectral analysis of time series. W.H.O.I. Technical Memorandum 2-77.
- Maltais, J.A., 1969, A nine channel digital magnetic tape format for storing oceanographic data. W.H.O.I. Ref. 69-55 (Technical Report).
- Payne, R. E., A. L. Bradshaw, J. P. Dean and K. E. Schleicher, 1976, Accuracy of temperature measurements with the V.A.C.M. W.H.O.I. Ref. 76-94 (Technical Report).
- Saunders, P. M., and N. P. Fofonoff, 1976, Conversion of pressure to depth in the ocean. Deep Sea Research, 23, 109-112.
- Schmitz, W. J., Jr., 1976, Eddy kinetic energy in the deep western North Atlantic, J. Geophysical Research, 81, 4981-4982.
- Schmitz, W. J., Jr., 1977, On the deep general circulation in the western North Atlantic. J. Mar. Res., 35, 1, 21-28.
- Schmitz, W. J., Jr., 1978, Observations of the vertical distribution of low frequency kinetic energy in the western North Atlantic, J. Mar. Res., 36, 295-310.
- Singleton, R. C., 1969, An algorithm for computing the mixed radix Fast Fourier Transform. I.E.E.E. Trans. on Audio and Electroacoustics, AU-17, 93-103.
- Tarbell, S., R. Payne and R. Walden, 1977, A compilation of moored current meter data and associated mooring action data from mooring 592, Volume XIV (1976 data). W.H.O.I. Ref. 77-41 (Technical Report).
- Tarbell, S., A. Spencer and R. E. Payne, 1978. A compilation of moored current meter data and associated oceanographic observations, Volume XVII (POLYMODE Array II data). W.H.O.I. Ref. 78-49 (Technical Report).
- Wunsch, C., and J. Dahlen, 1974, A moored temperature and pressure recorder. Deep-Sea Res., 21, 145-154.



POLYMODE ARRAY 1

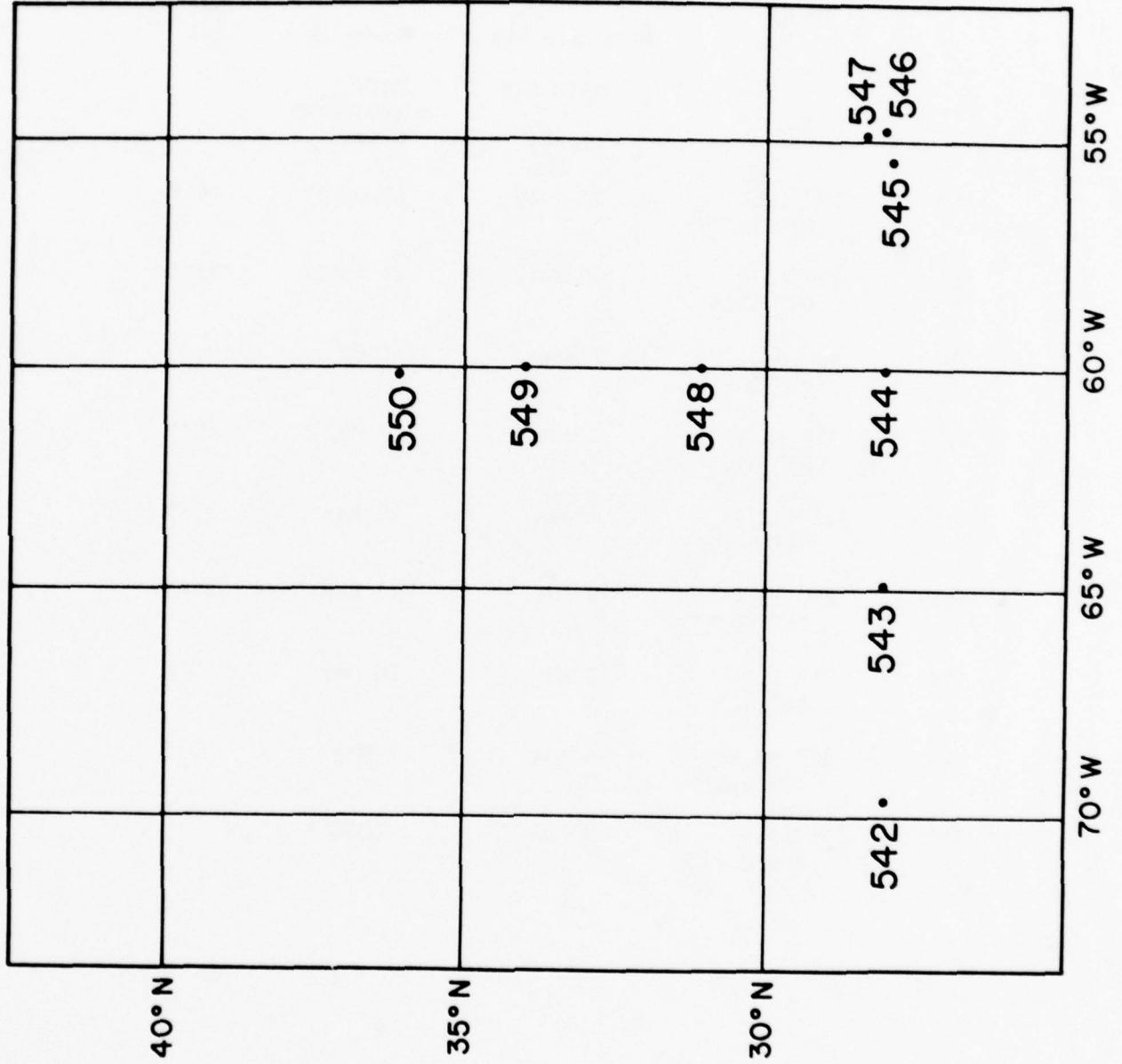


Table 1

Summary of Mooring Locations and Dates

Mooring #	Location (° N) (° W)	Cruise	Cruise	Bottom Depth (m)
		Chain 116	Knorr 49	
		DATE SET (1974)	DATE RECOVERED (1975)	
542	28° 1.4' 69° 38.95'	27 July	26 April	5462
543	27° 57.6' 64° 57.8'	30 July	27 April	5363
544	28° 0.0' 60° 5.8'	1 Aug	LOST	
545	27° 50.2' 55° 34.5'	2 Aug	12 May	6015
546	27° 53.8' 54° 53.2'	3 Aug	12 May	5773
547	28° 12.6' 54° 56.6'	3 Aug	13 May	5785
548	31° 1.5' 60° 4.3'	5 Aug	10 May	5550
549	33° 59.28' 60° 0.57'	6 Aug	1 May	4687
550	36° 2.6' 60° 2.4'	7 Aug	LOST	

Table 2
Summary of Presented Data

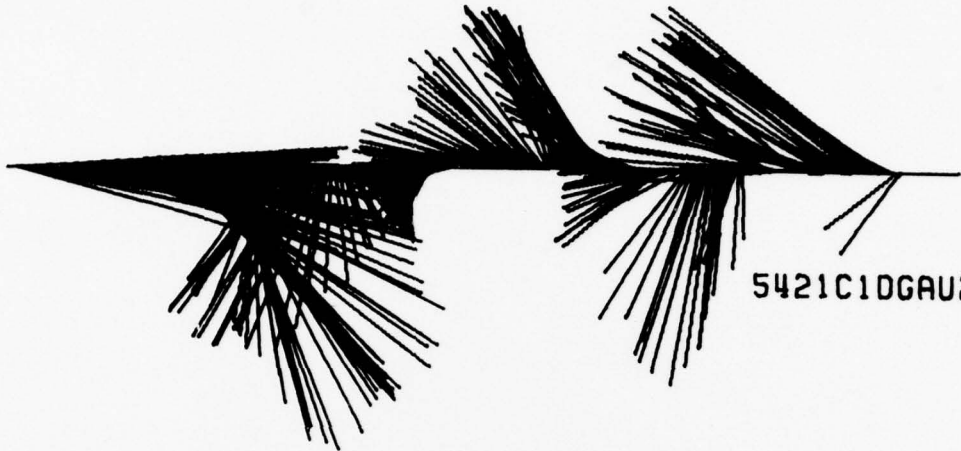
Record #	Type of inst.	Depth (corrected) (m)	Variables	Duration (days)	Dates (1974 - 1975)
5421	DT	492	v, t	271	Jul.28 - Apr.26
5422	T/P	793	t, p	270	Jul.29 - Apr.25
5423	T/P	991	t, p	89	Jul.29 - Oct.27 ('74)
5424	850	1496	v, t	209	Jul 28 - Feb.22
5426	T/P	3497	t, p	270	Jul.29 - Apr.25
5427	850	3988	v	215	Jul.28 - Feb.28
5428	T/P	3991	t, p	270	Jul.29 - Apr.25
5431	VACM	498	v, t	270	Jul 30 - Apr.27
5432	T/P	798	t, p	268	Aug.01 - Apr.27
5433	VACM	998	v, t	270	Jul.30 - Apr.27
5434	VACM	1998	v, t	270	Jul.30 - Apr.27
5435	850	3999	v	237	Jul.30 - Mar.25
5436	T/P	4002	t	268	Aug.01 - Apr.27
5451	VACM	492	v, t	282	Aug 02 - May 12
5452	T/P	791	t, p	275	Aug.04 - May 6
5453	DT	990	v, t	282	Aug.02 - May 12
5454	VACM	1986	v, t	282	Aug.02 - May 12
5455	T/P	1989	t, p	281	Aug.04 - May 12
5456	850	3987	v	239	Aug.02 - Mar.29
5457	T/P	3990	t	281	Aug.04 - May 12
5457	T/P	3990	p	105	Aug.04 - Nov.17 ('74)

Table 2 cont.

Record #	Type of Inst.	Depth (corrected) (m)	Variables	Duration (days)	Dates (1974 - 1975)
5461	VACM	526	v, t	282	Aug.03 - May 12
5462	T/P	826	t, p	280	Aug.05 - May 12
5463	VACM	1024	v, t	282	Aug.03 - May 12
5464	T/P	1421	t, p	280	Aug.05 - May 12
5465	DT	2021	v, t	282	Aug.03 - May 12
5466	T/P	3026	t, p	280	Aug.05 - May 12
5467	850	4031	v	237	Aug.03 - Mar.28
5468	T/P	4034	t, p	280	Aug.05 - May 12
5471	VACM	496	v, t	281	Aug.04 - May 12
5473	VACM	996	v, t	282	Aug.04 - May 13
5474	VACM	1996	v, t	281	Aug.04 - May 12
5475	850	4000	v	239	Aug.03 - Mar.31
5481	VACM	517	v, t	276	Aug.06 - May 10
5482	T/P	817	t, p	276	Aug.06 - May 10
5483	VACM	1017	s, t	276	Aug.05 - May 09
5485	DT	2018	v, t	276	Aug.06 - May 10
5486	VACM	4018	v, t	215	Aug.06 - Mar.09
5491	VACM	512	v, t	266	Aug.07 - May 01
5492	T/P	812	t, p	265	Aug.08 - May 01
5493	DT	1012	v, t	266	Aug.07 - May 01
5494	850	2012	v, t	236	Aug.07 - Mar.31
5495	DT	4012	v, t	266	Aug.07 - May 01

CURRENT VECTORS FOR MOORING 542

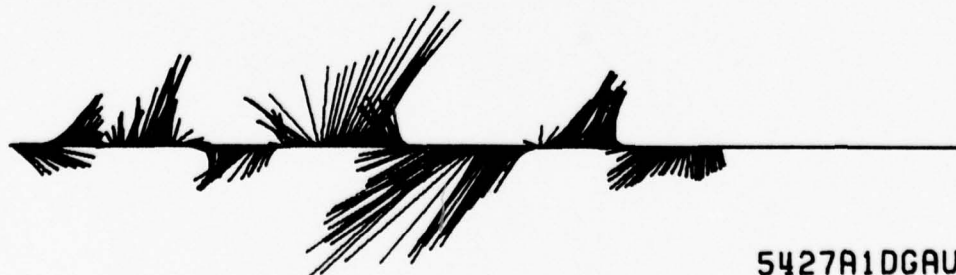
AUG 74 OCT DEC FEB 75 APR



NORTH



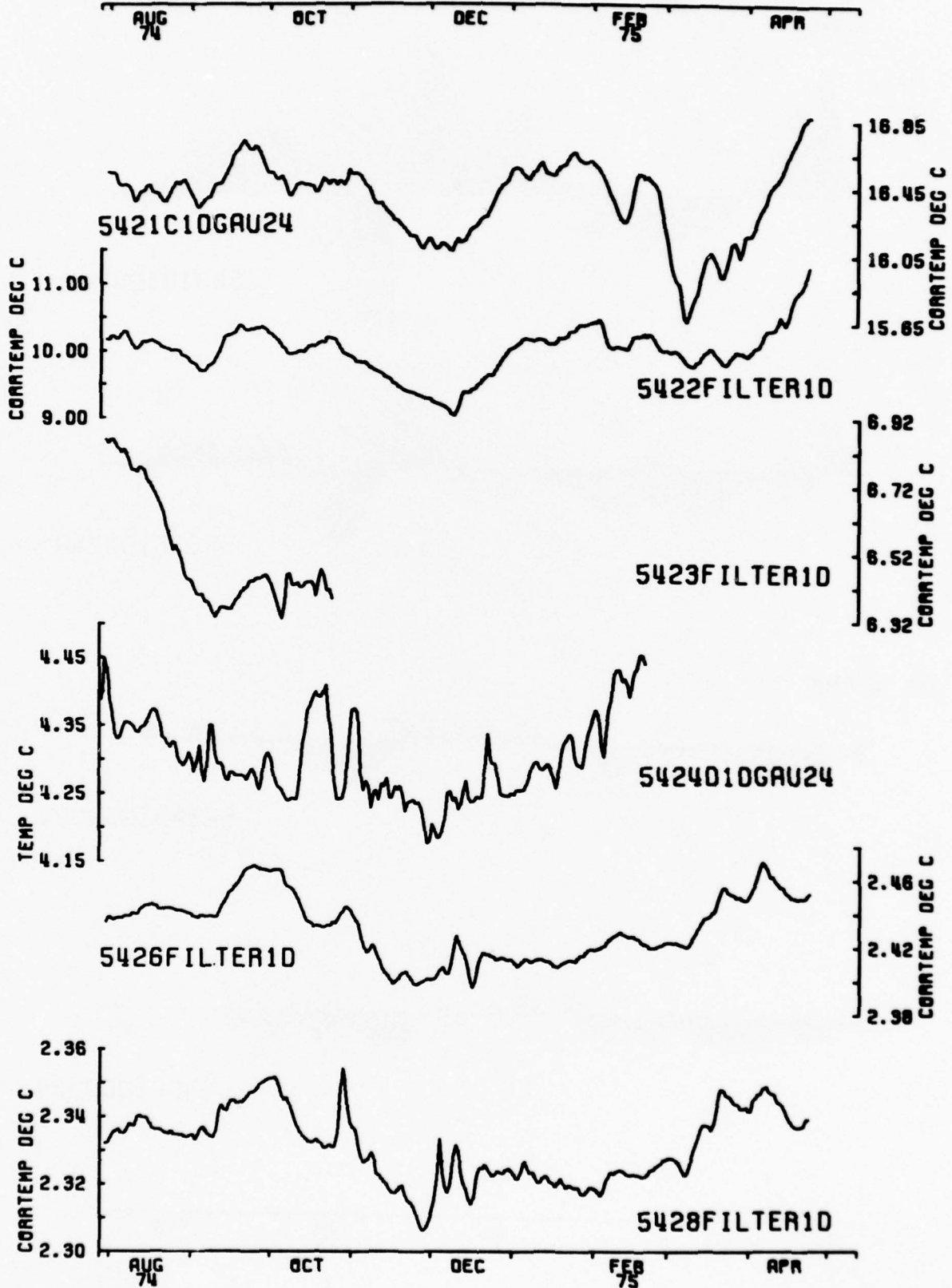
25 MM/SEC



AUG 74 OCT DEC FEB 75 APR

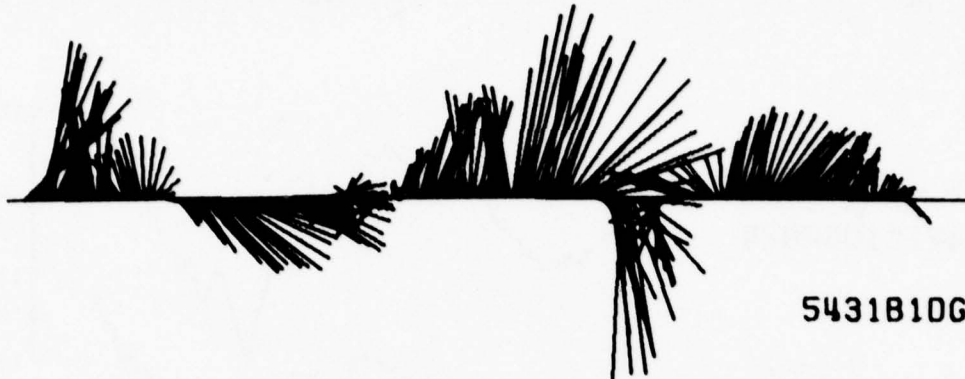
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TEMPERATURE RECORDS FOR MOORING 542



CURRENT VECTORS FOR MOORING 543

AUG 74 OCT DEC FEB 75 APR



5431810G24A



5433810G24A

NORTH



25 MM/SEC



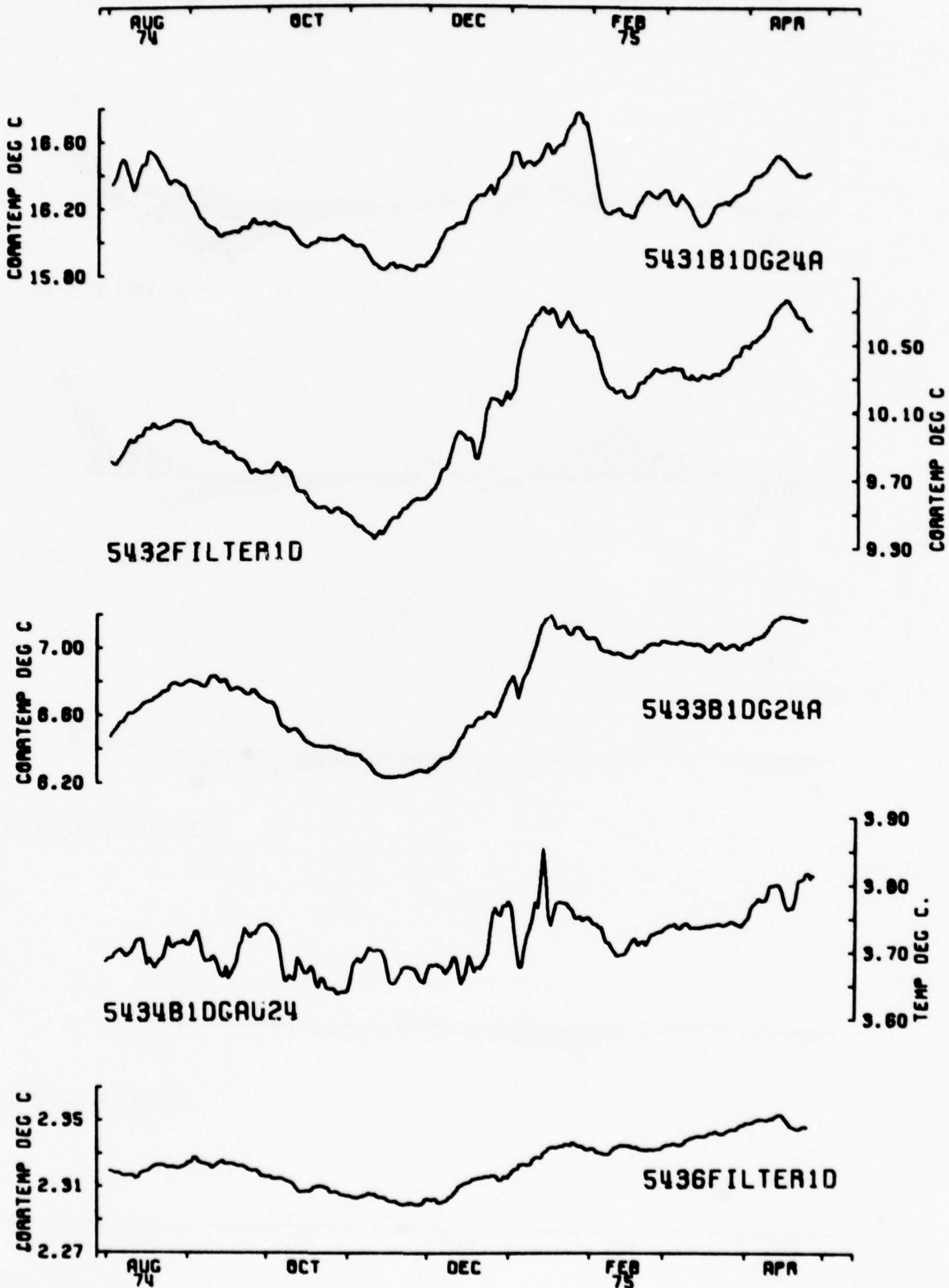
5434810GAU24



5435A10GAU24

AUG 74 OCT DEC FEB 75 APR

TEMPERATURE RECORDS FOR MOORING 543



CURRENT VECTORS FOR MOORING 545

AUG 74 OCT DEC FEB 75 APR



5451810G24A



5453810G24A

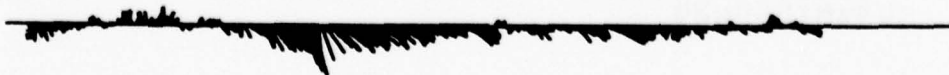
NORTH



25 MM/SEC



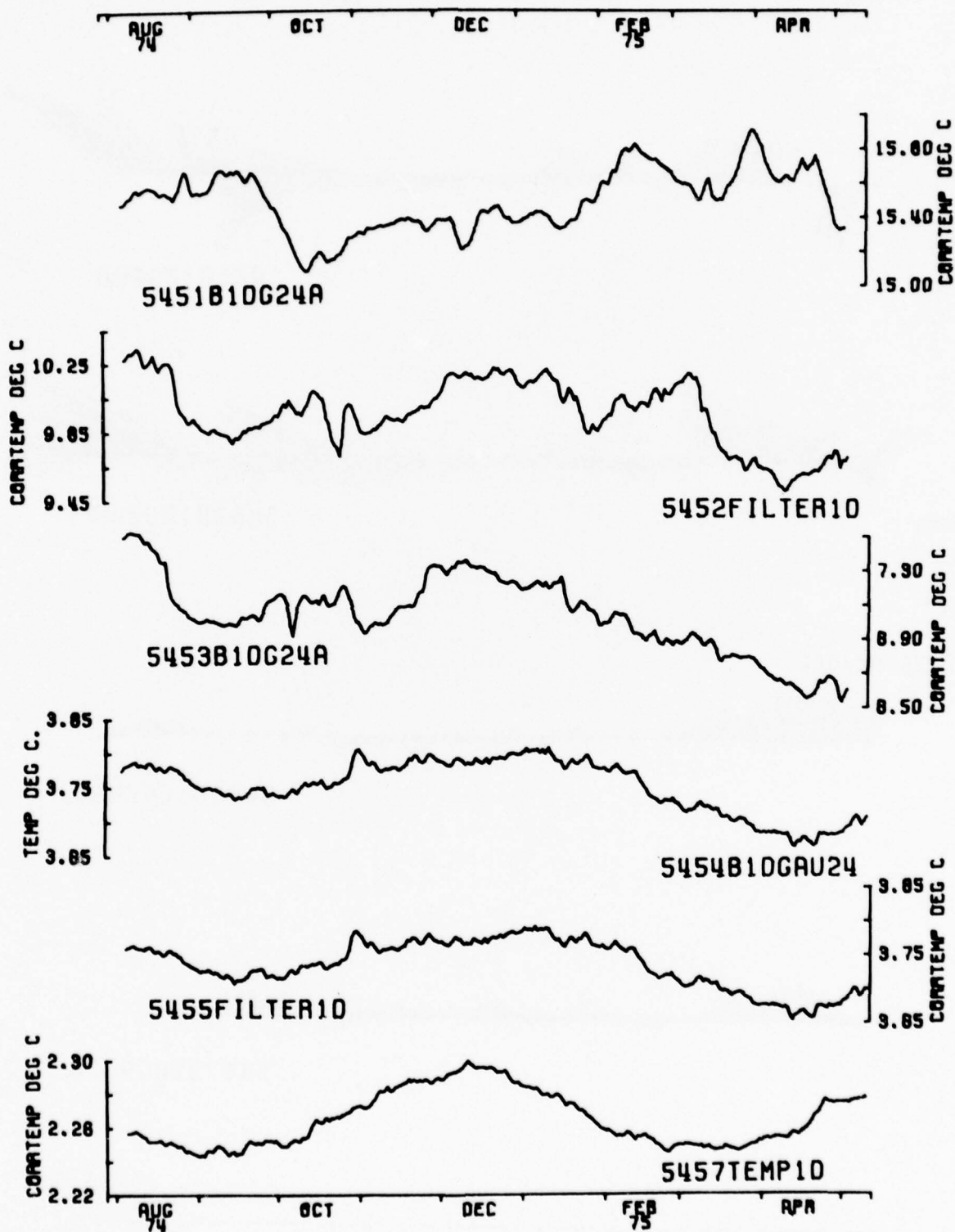
5454810GAU24



5456A10GAU24

AUG 74 OCT DEC FEB 75 APR

TEMPERATURE RECORDS FOR MOORING 545



CURRENT VECTORS FOR MOORING 546

AUG 74 OCT DEC FEB 75 APR



5461810G24A



5463810G24A

NORTH



25 MM/SEC



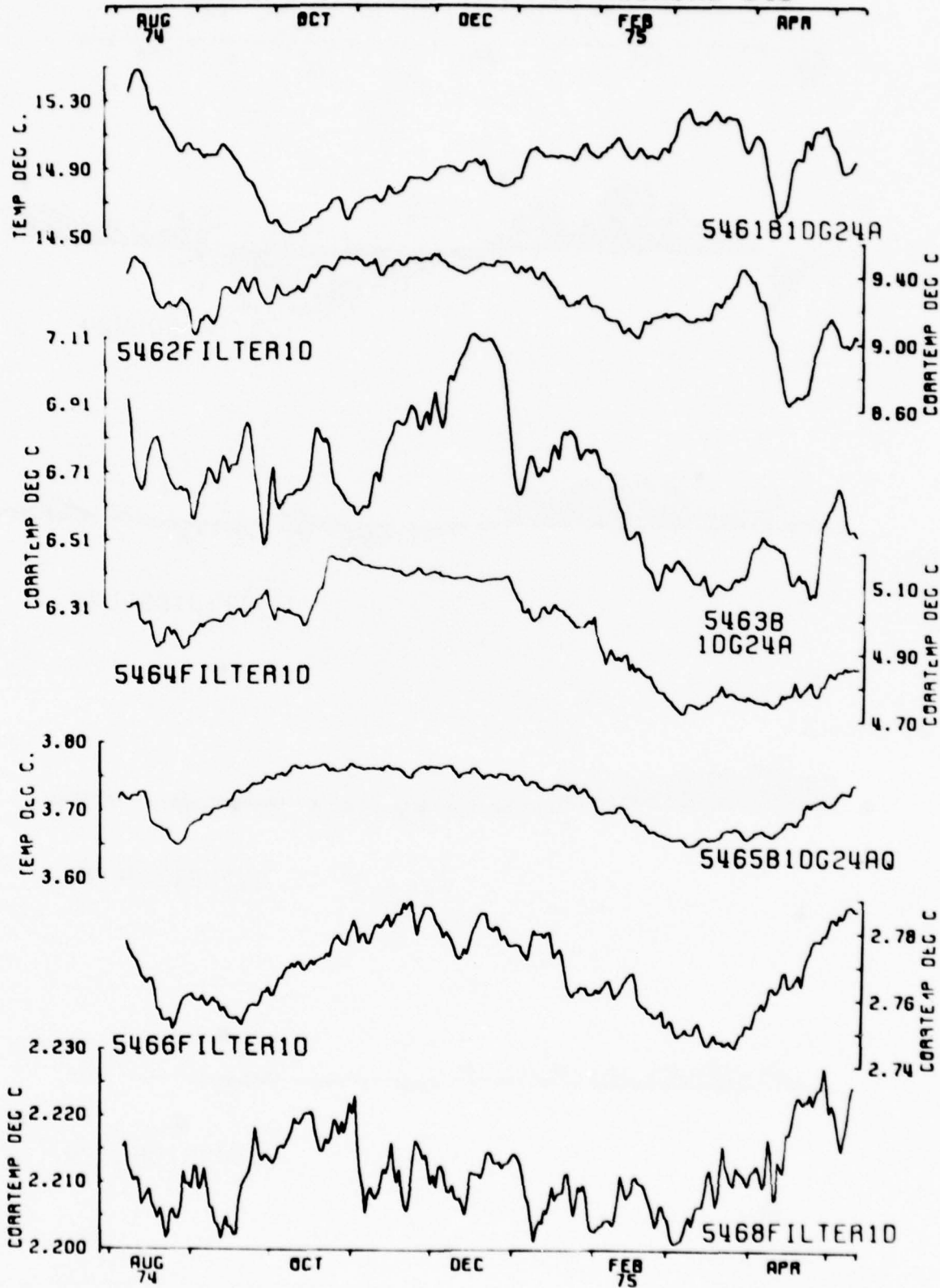
5465810G24A0



5467810GAU24

AUG 74 OCT DEC FEB 75 APR

TEMPERATURE RECORDS FOR MOORING 546



CURRENT VECTORS FOR MOORING 547

AUG 74 OCT DEC FEB 75 APR



NORTH

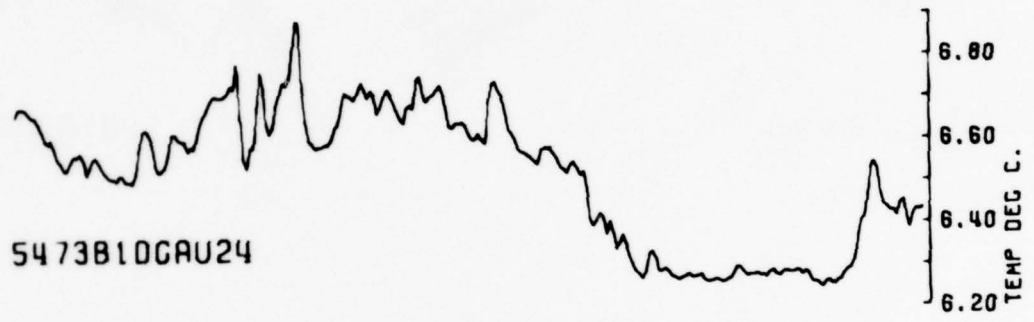
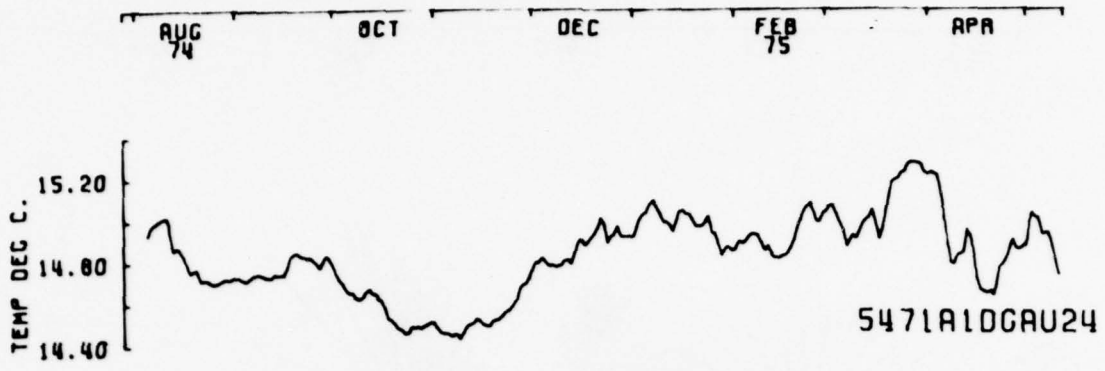


[25 MM/SEC



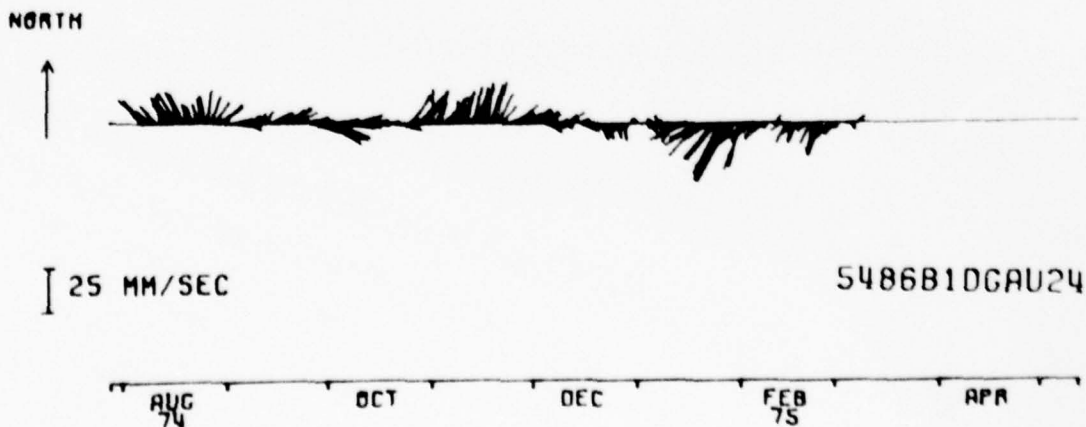
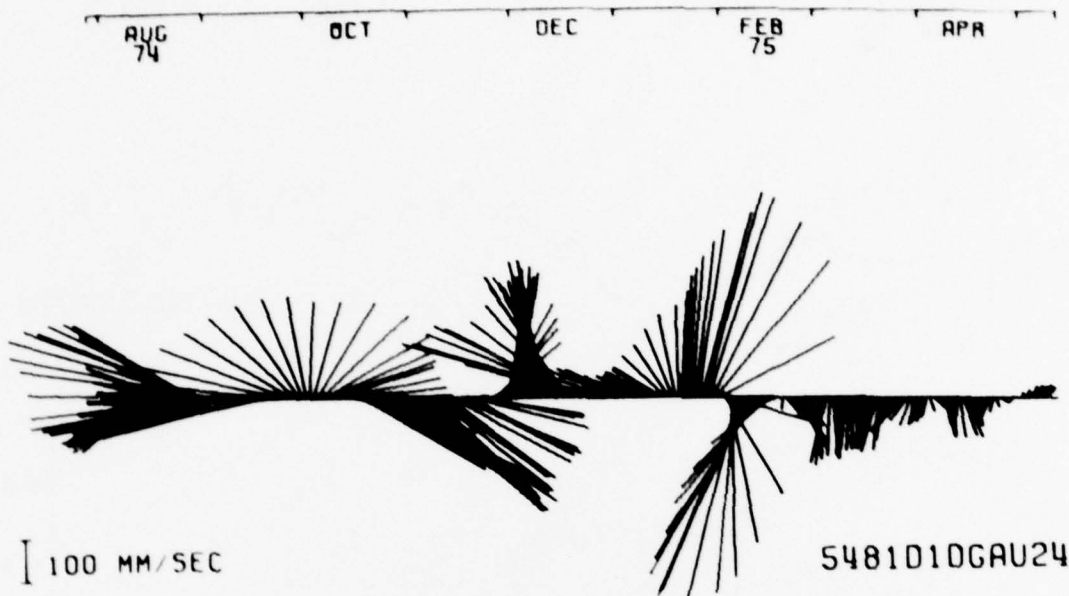
AUG 74 OCT DEC FEB 75 APR

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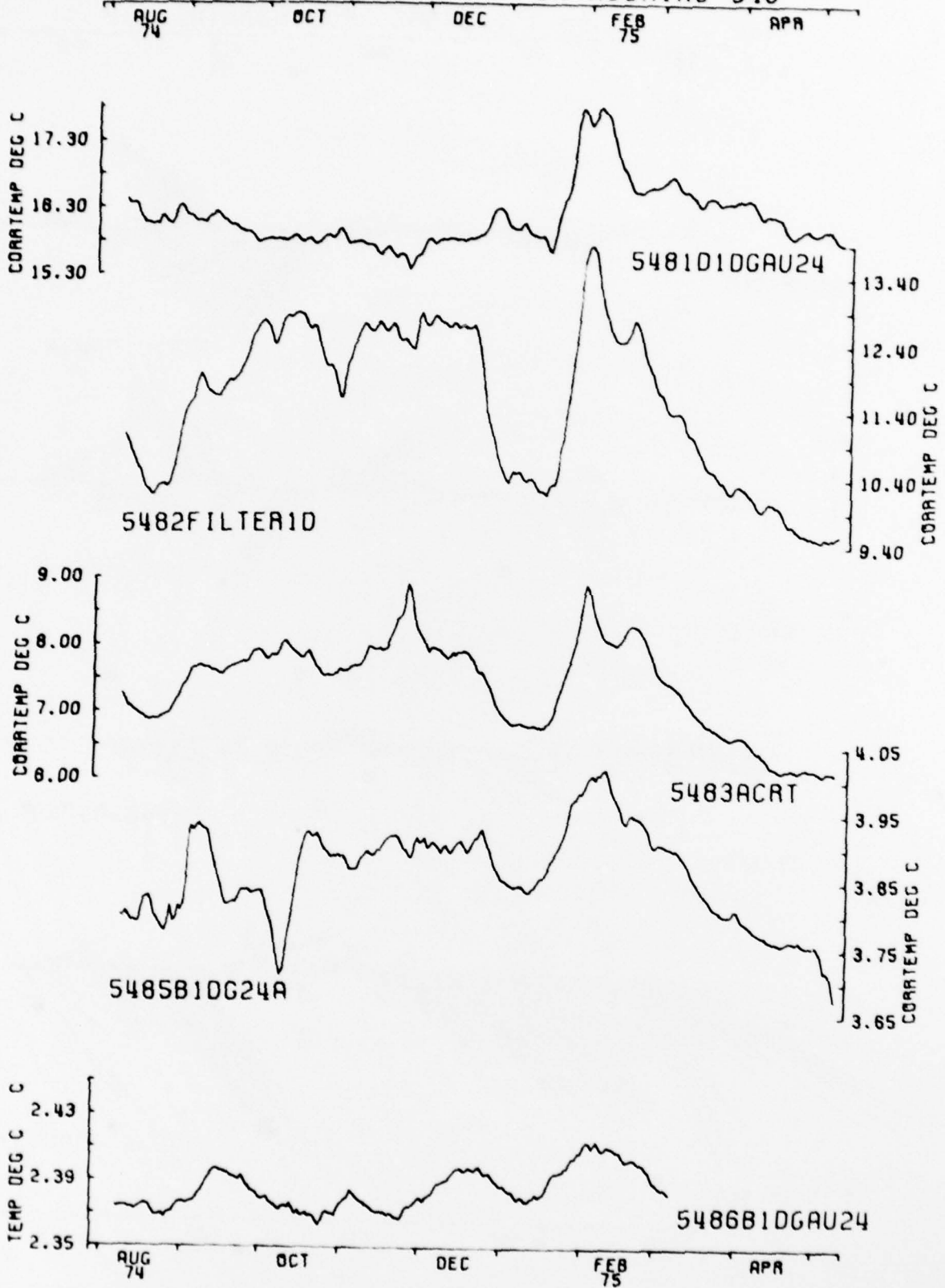


AUG 74 OCT DEC FEB 75 APR

CURRENT VECTORS FOR MOORING 548



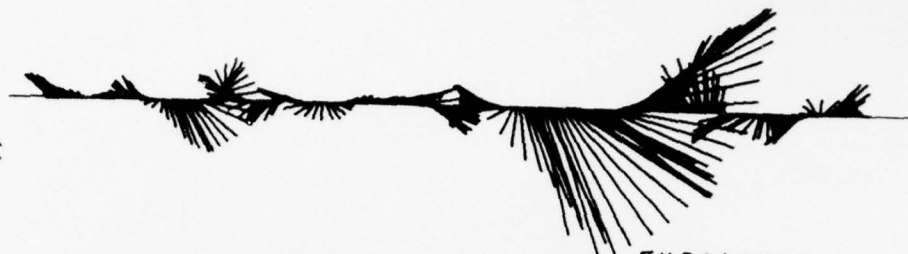
TEMPERATURE RECORDS FOR MOORING 548



CURRENT VECTORS FOR MOORING 549

AUG 74 OCT DEC FEB 75 APR

100 MM/SEC

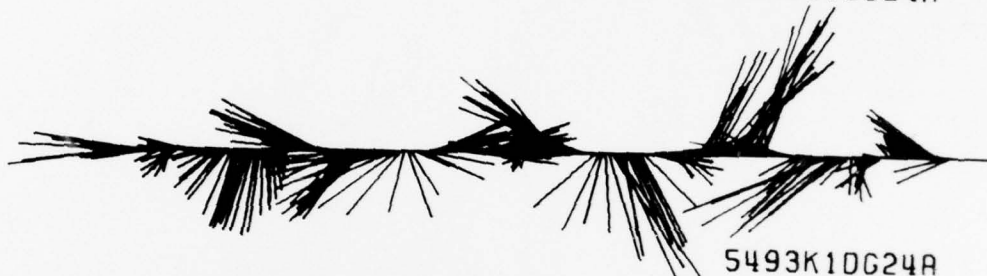


5491C10G24A

NORTH



25 MM/SEC



5493K10G24A

25 MM/SEC



5494B10G24A

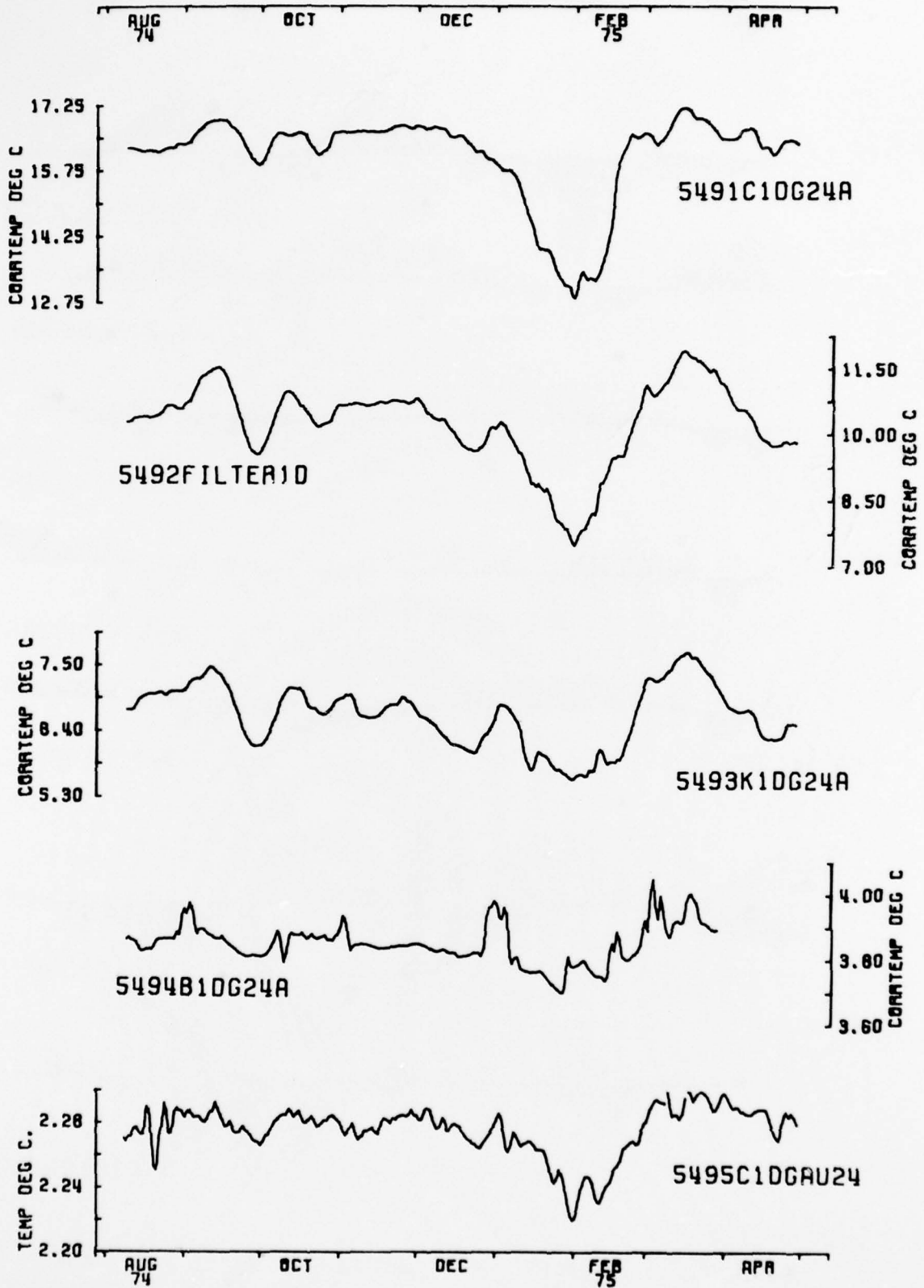
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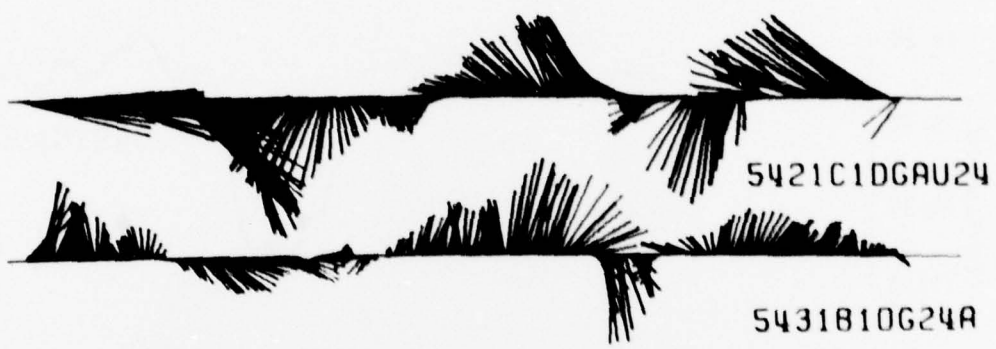
AUG 74 OCT DEC FEB 75 APR

TEMPERATURE RECORDS FOR MOORING 549



CURRENT VECTORS DEPTH: 500 METERS

AUG 74 OCT DEC FEB 75 APR



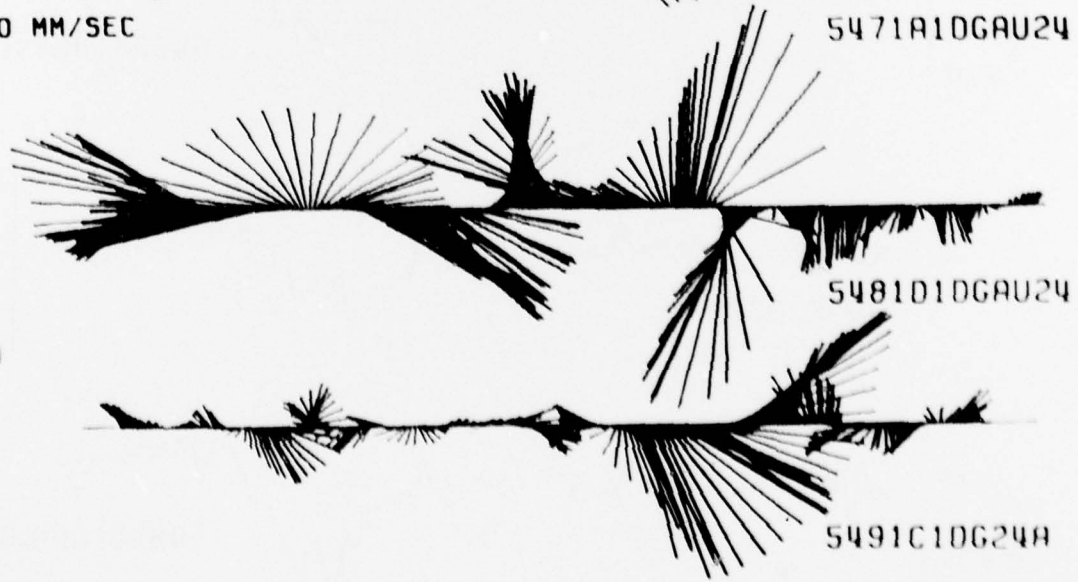
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↑



50 MM/SEC



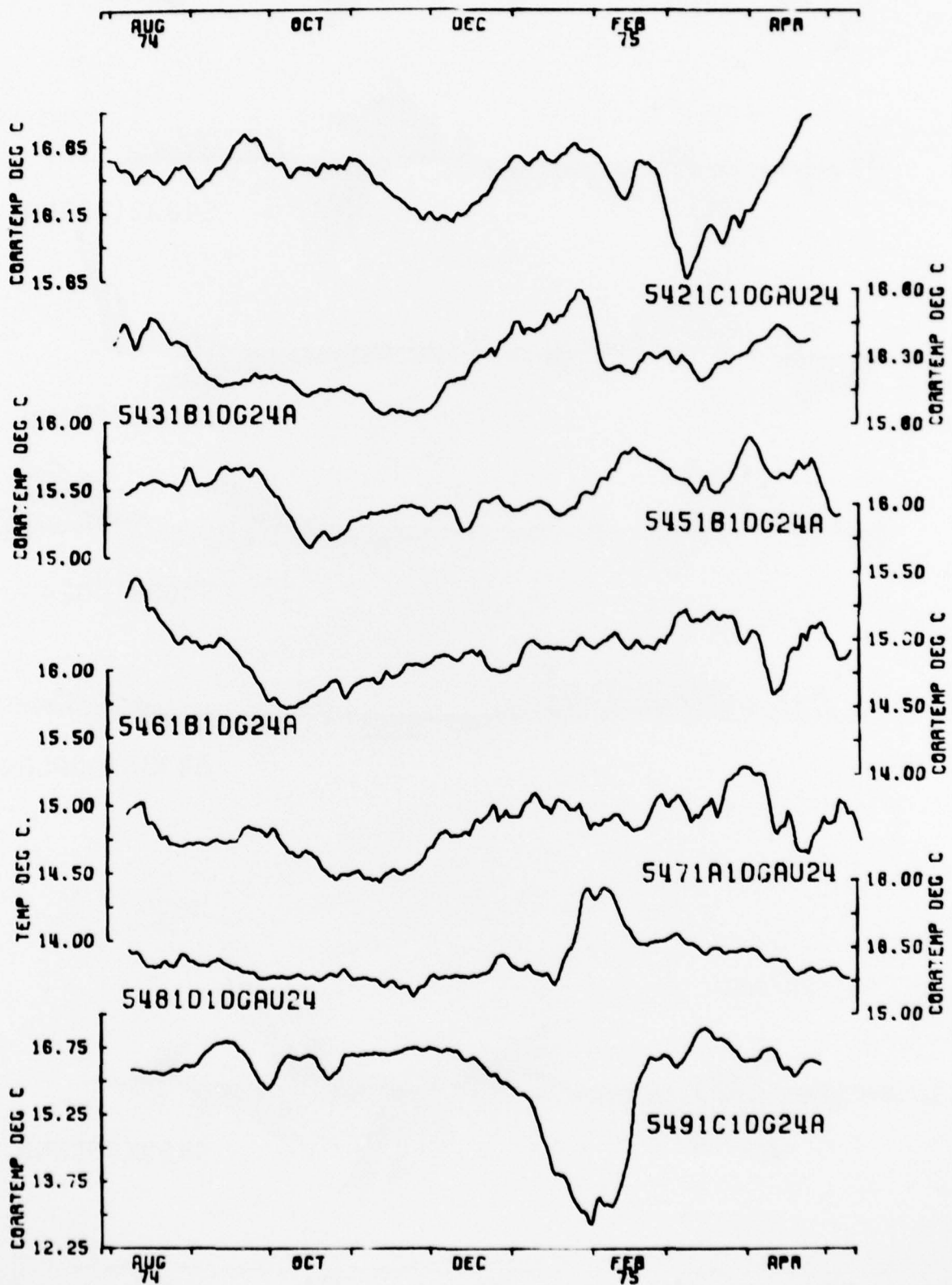
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100 MM/SEC

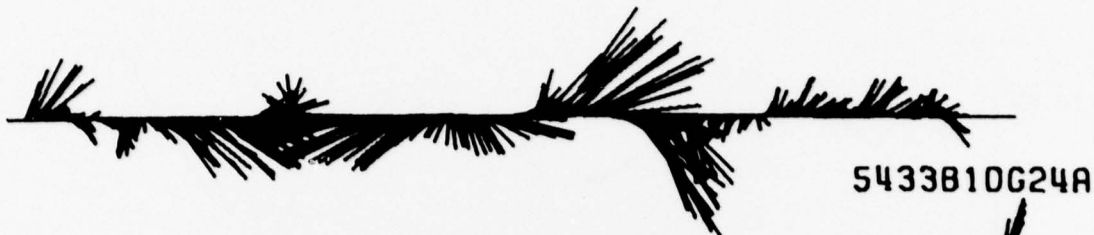
AUG OCT DEC FEB 75 APR

TEMPERATURE RECORDS AT 500 METERS



CURRENT VECTORS DEPTH: 1000 METERS

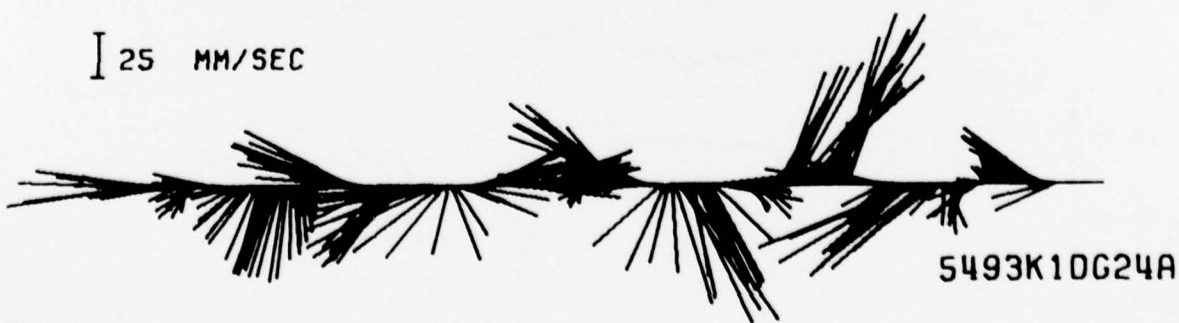
AUG 74 OCT DEC FEB 75 APR



NORTH



25 MM/SEC



AUG 74 OCT DEC FEB 75 APR

TEMPERATURE RECORDS AT 1000 METERS

AUG 74 OCT DEC FEB 75 APR



6.60
CORRTEMP DEG C
6.30



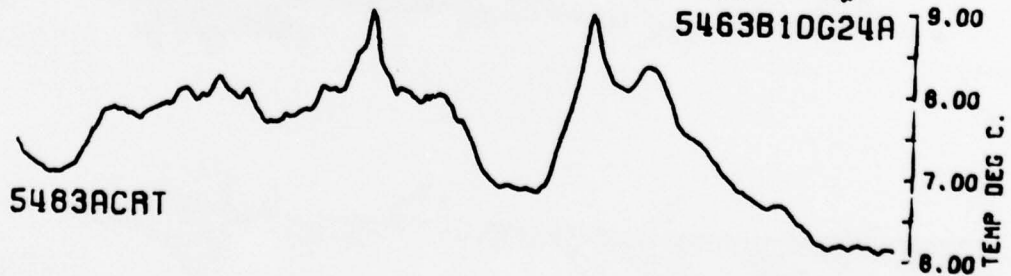
7.21
TEMP DEG C.
8.71
8.21



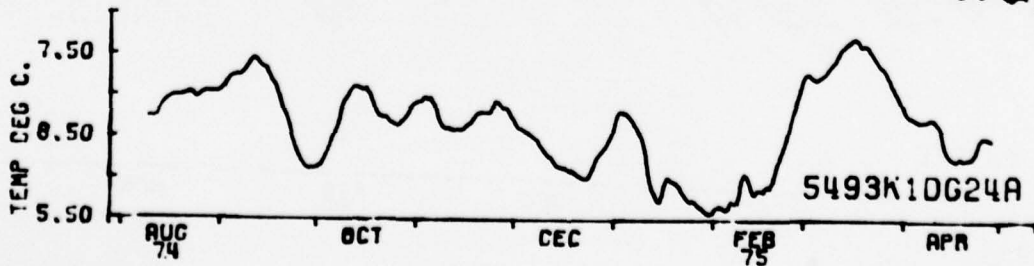
7.50
TEMP DEG C.
7.00
6.50



7.30
TEMP DEG C.
8.80
8.30



9.00
TEMP DEG C.
8.00
7.00
6.00



7.50
TEMP DEG C.
6.50
5.50

AUG 74 OCT DEC FEB 75 APR

CURRENT VECTORS DEPTH: 2000 METERS

AUG 74 OCT DEC FEB 75 APR

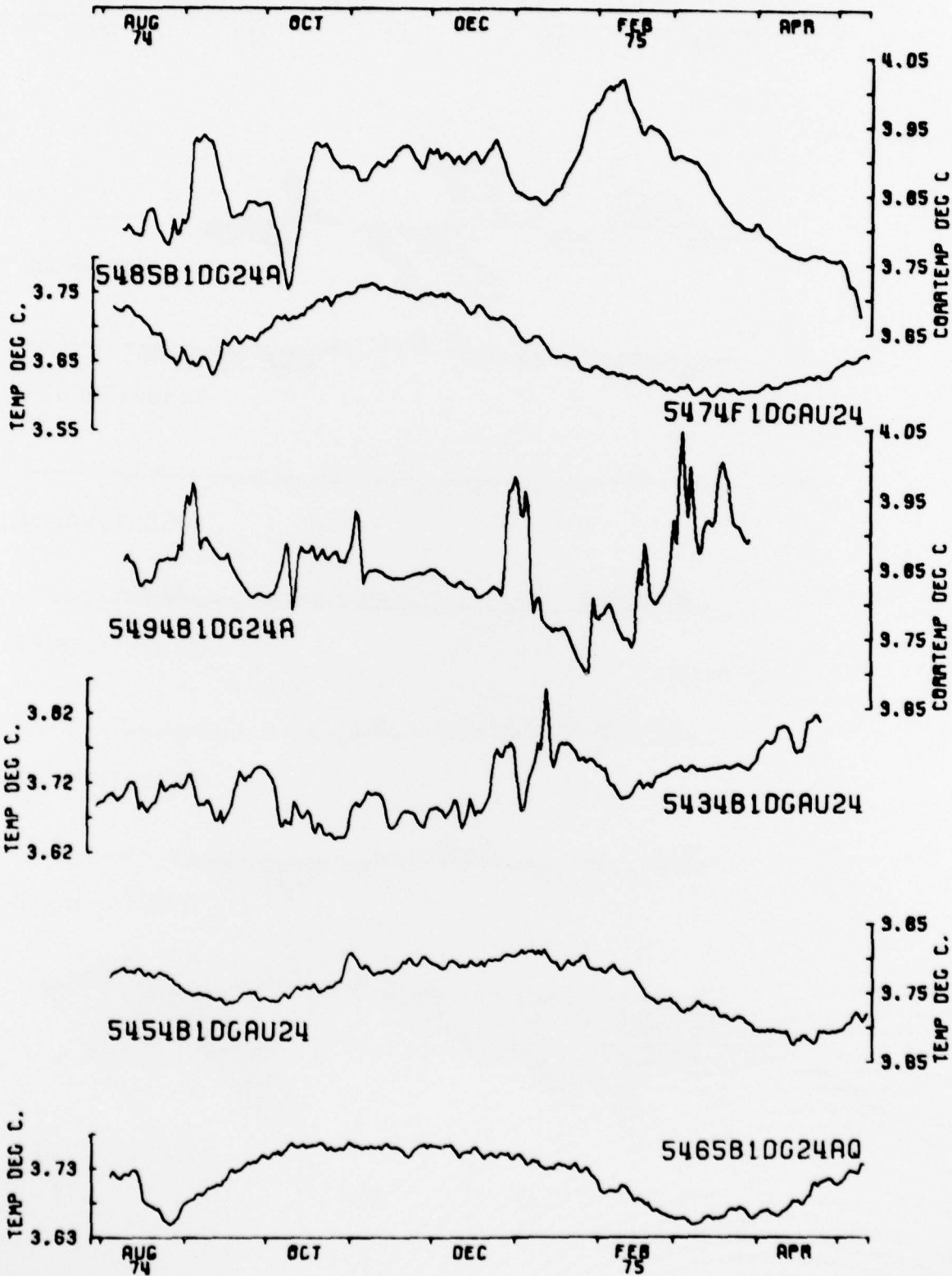


NORTH
↑

25 MM/SEC

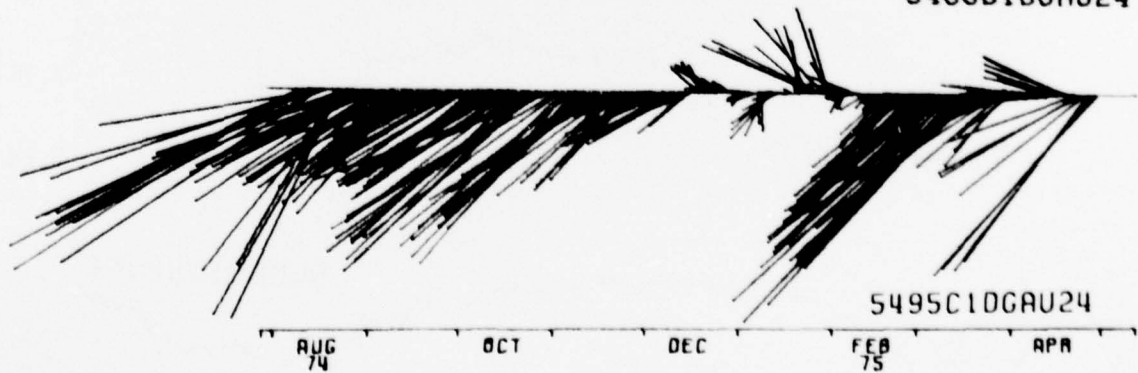
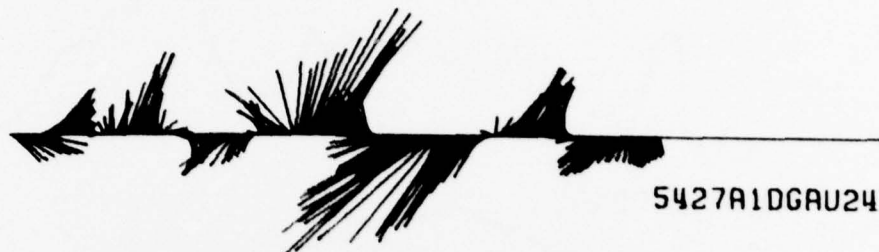
AUG 74 OCT DEC FEB 75 APR

TEMPERATURE RECORDS AT 2000 METERS

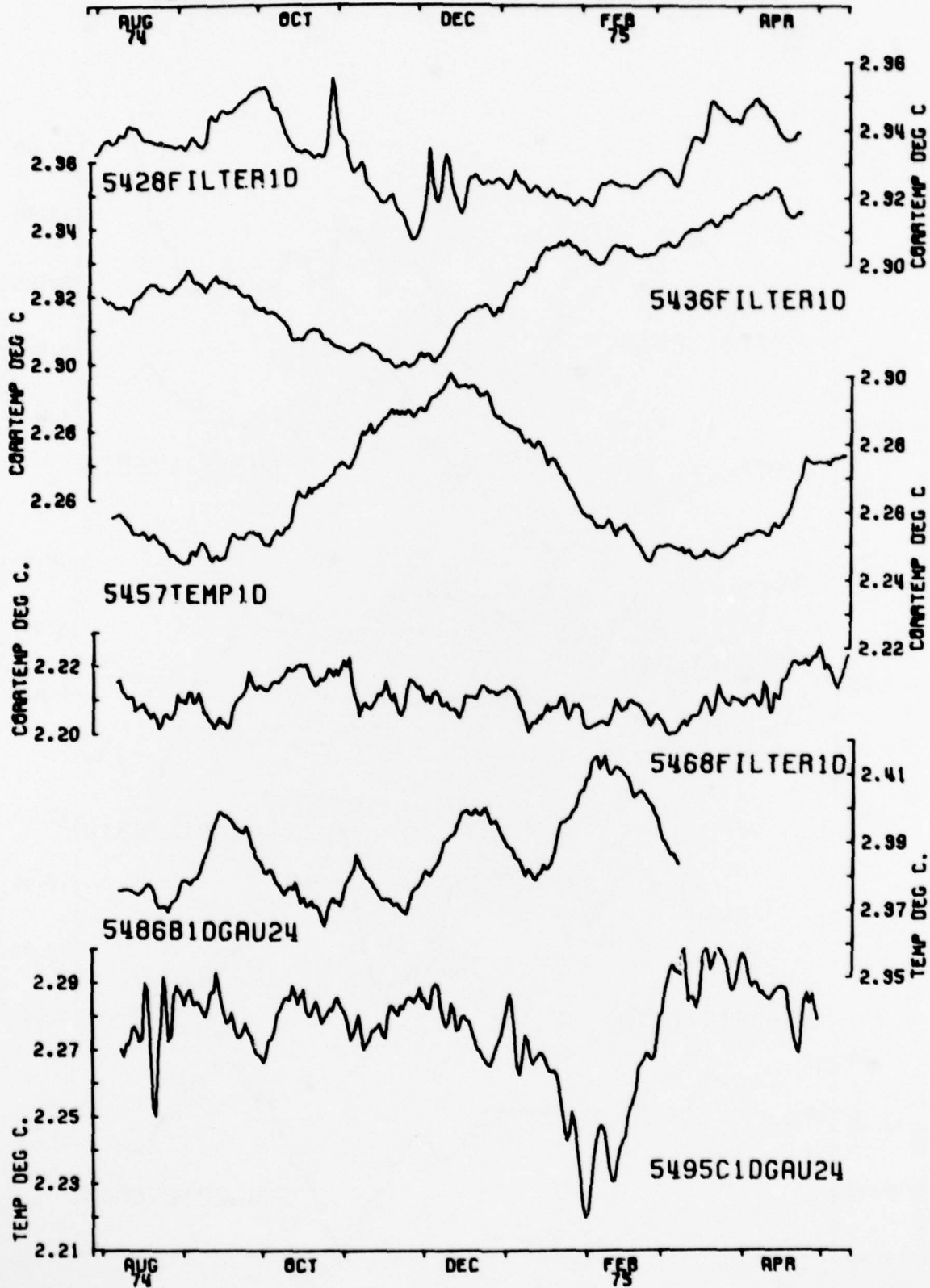


CURRENT VECTORS DEPTH: 4000 METERS

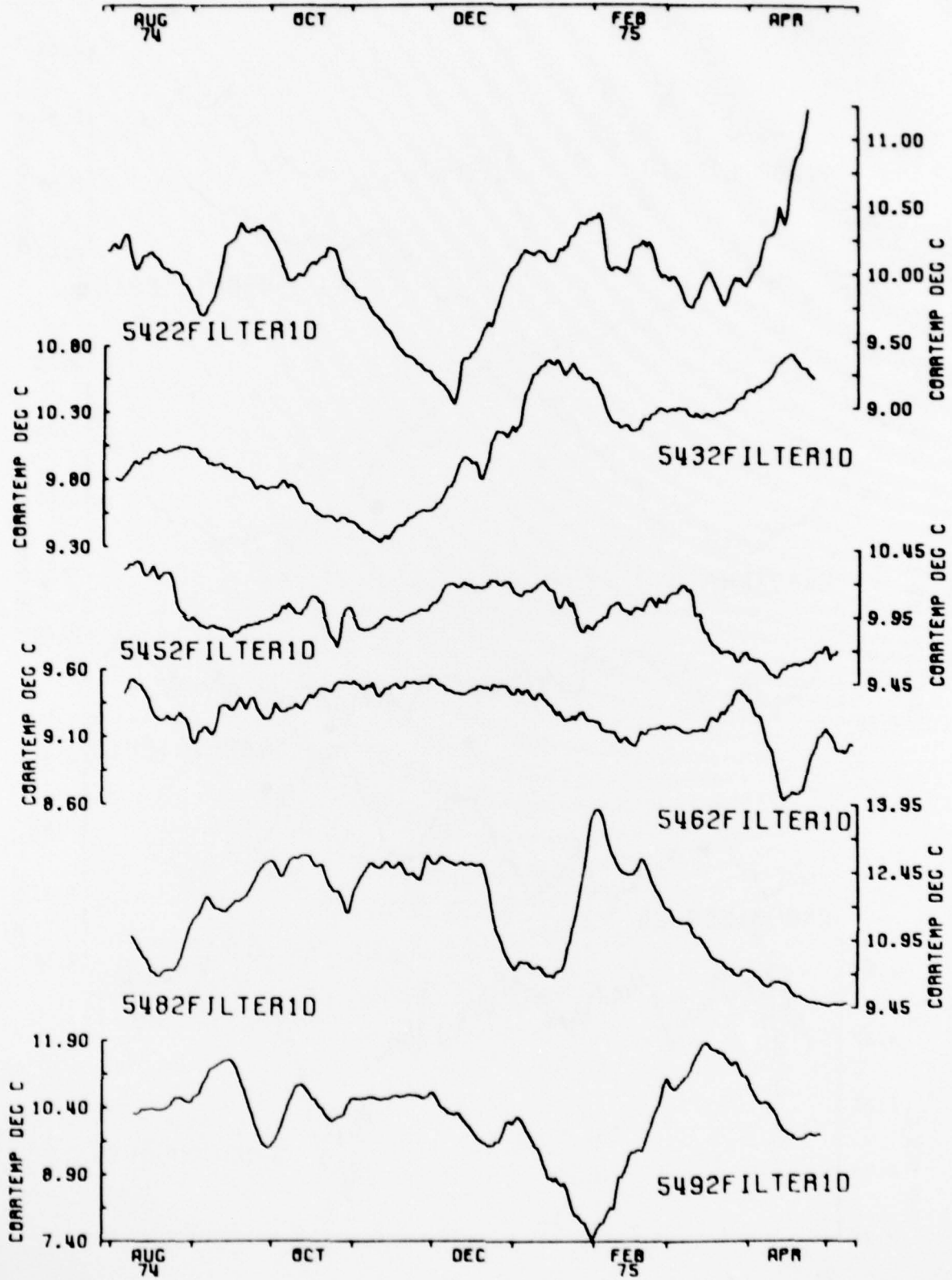
AUG 74 OCT DEC FEB 75 APR



TEMPERATURE RECORDS AT 4000 METERS



TEMPERATURE RECORDS AT 800 METERS



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(REVISED NOVEMBER 1978)

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