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STD, Current Meter, and Drogue Observations in Rosario Strait, January - March 1974

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF FIGURES (Continued)

LIST OF FIGURES (Continued)

LIST OF FIGURES (Continued)

LIST OF FIGURES (Continued)

LIST OF FIGURES (Continued)

LIST OF FIGURES (Continued)

LIST OF FIGURES (Continued)

LIST OF FIGURES (Continued)

STD, CURRENT METER, AND DROGUE OBSERVATIONS IN ROSARIO STRAIT, JANUARY - MARCH 1974

James D. Schumacher
R. M. Reynolds

Summaries of STD measurements, current meter and drogue data from Rosario Strait and adjacent waters during January to March 1974 are presented as computer-generated plots and as contours of temperature, salinity, and sigma-t. Some tidal and wind data has been included to aid in data interpretation.

1. INTRODUCTION

During the spring and fall of 1974, the Pacific Marine Environmental Laboratory (PMEL) participated with National Ocean Survey (NOS) in a projected 5-year operation to study tides and circulation in Puget Sound and adjacent regions. Spring operations were conducted in Rosario Strait and vicinity (see Section 6, Fig. 1) from the NOAA Ship McARTHUR (OPR-509-MA-74). PMEL was responsible for collection and analyses of salinity-temperature-depth (STD) data, drogue data, and for some special analyses of current meter data furnished but not routinely done by NOS. A summary of cruise dates and operations is given in Table 1. This report is intended to provide data which may be useful. All STD and current meter data are to be forwarded to NODC under the heading OPR-MA-509-1974. Figures 1 through 45 are placed in Section 6.

Table 1. Cruise Dates and Operations

Cruise No.	Date	Operation
1	Feb. 5-7:	90 STD casts, including a 25-hr series across the southern end of Rosario Strait (STA 25-STA 29). Drogue Series I - two sets (3 each) of drogues tracked, southern Rosario Strait.
2	Feb. 25-28:	29 STD casts (reoccupation of all stations) Drogue Series II - a set of three drogues tracked on either side of Cypress Island.
3	Mar. 18-20:	94 STD casts, including a 25-hr series across the northern end of Rosario Strait (STA 31-STA 34). Drogue Series III - two sets (3 each) of drogues tracked, northern Rosario Strait.

2. STD MEASUREMENTS

A Plessey Model 9006 STD system was used to measure temperature, salinity and depth. The STD sensors were lowered at 30m/min to within a few meters of the bottom, as determined by a pinger attached to the STD cage. Data were recorded in an analog format on an x_1-x_2-y recorder (Esterline Angus) and were also recorded in digital format at a rate of 0.5 sec/scan, on a Plessey Model 8114A Digital Data Logger. Except for calibration purposes, data were recorded only during descent.

For determining STD calibrations, a Nansen bottle was placed above the STD sensors and was tripped at a depth where the analog trace indicated nearly constant values of temperature and salinity. The bottles were allowed to equilibrate for a period of 5 minutes. The reversing thermometers used were calibrated by the National Oceanographic Instrumentation Center, and salinity was determined on a laboratory inductive

salinometer (Hytech Model 6220). Resulting corrections were 0.01°C and +0.01°/$_{oo}$. These values were applied during the initial processing of the digital data. Changes in corrections during the spring operations were not detected. Information pertaining to STD stations is given in Table 2.

3. DROGUE OPERATIONS

Drogues were deployed to examine Largrangian trajectories of the near-surface currents in Rosario Strait. The drogues used during these operations (see Section 6, Fig. 2) were designed to minimize interaction with wind, while maintaining ease of operation and identification. Drogues were released from a small boat in sets of three, and positions were taken approximately every 30 min using sextants.

4. CURRENT METER MEASUREMENTS

Current meters used during these operations were Aanderaa meters (RCM-4) which record averages of speed and instantaneous readings of direction every 10 minutes. The current meter data were furnished by NOS. Location, depth and period of operation for each current meter is given in Section 6. (Depth is given as minus (-) when measured from sea surface and plus (+) when measured from sea floor.) The processing and presentation of current meter data generally follows the procedures and formats developed in previous reports (Halpern, Holbrook and Reynolds, 1973; Halpern, Holbrook and Reynolds, 1974).

Table 2. Location of STD Stations Rosario Strait*

Sta.#	Approximate Location	Position		Sounding (m)
145	Strait of Juan de Fuca	48°20.6'	122°51.3'	106
146		48°22.3'	122°45.7'	98
147		48°23.7'	122°42.1'	87
148	Northwest Pass	48°25.0'	122°41.1'	90
29	South end Rosario Strait	48°25.9'	122°40.9'	82
28	" " " "	48°25.7'	122°42.0'	78
27	" " " "	48°25.8'	122°43.2'	77
26	" " " "	48°25.4'	122°45.2'	74
25	" " " "	48°25.5'	122°47.1'	70
834	Lopez Pass	48°28.4'	122°45.1'	71
835		48°29.5'	122°44.4'	151
836	Thather Pass	48°32.1'	122°45.3'	81
30	Blakely Island	48°34.3'	122°45.8'	73
837	Sinclair Island	48°37.1'	122°43.8'	53
838		48°38.9'	122°43.6'	105
31	North end Rosario Strait	48°39.5'	122°43.7'	91
32	" " " "	48°40.0'	122°42.7'	91
33	" " " "	48°40.4'	122°41.8'	79
34	" " " "	48°40.7'	122°40.8	61
840	Clark Island	48°42.4'	122°44.5'	94
843	Matia Island	48°45.1'	122°46.7'	101
844	Sucia Island	48°46.8'	122°51.0'	147
35	Strait of Georgia	48°48.7'	122°54.4'	191

* February, March 1974

5. DATA PRESENTATION

5.1 STD Data

The STD data were translated, edited, and corrected to provide average values of temperature and salinity at 1 m intervals by PMEL programs (Halpern, Holbrook and Reynolds, 1973) at University of Washington facilities. Sigma-t was computed from the averaged temperature and salinity. These data were used for all subsequent work. The STD data presented as two longitudinal STD transects were taken for each cruise. The time of these stations is shown on tidal elevation curves (Fig. 5, 6 and 7). The STD data collected in a time-series format across the northern and southern ends of Rosario Strait are presented as composite vertical profiles of temperature, salinity, and sigma-t for each station. Contour intervals are nominally $0.2^{o}C$, $0.2^{o}/_{oo}$, and 0.2 gm/l for temperature, salinity, and sigma-t, respectively, but, in some cases, 0.1 contours are included as dashed lines to show details.

5.2 Drogue Data

Sextant fixes were converted to latitudes and longitudes. These were interpolated by a cubic fit between fixes to yield continuous position and velocity values, and piecewise continuous accelerations. The ensuring trajectories are shown in Figures 14.1 to 16.6 where initial times of release (+), and recovery (*) locations are given and the trajectories are marked at half-hour intervals. During Series II, all drogues were redeployed and are so noted, as was Drogue 101 during Series I. Also shown on drogue trajectory figures are relative water

height measured at Anacortes and wind velocity measured on the NOAA Ship McARTHUR (position given on figures).

5.3. Current Meter Data

The following presentations of the data have been selected as being the most descriptive for a wide variety of users. For each current meter there are 5 pages of data presentation in Section 6, which include standard statistics, speed and direction histograms, time series of speed, direction, v, and u components of velocity, progressive vector diagrams, and spectra of the velocity.

5.3.1 Histogram and Statistics

Speeds and directions were grouped into 1.5 cm/sec and 6^{o} intervals, respectively. These data are presented as the actual number of observations in each interval.

5.3.2 Time Series

Time series plots are the hourly averages of the speed, direction (true), v, and u components of velocity (north and east respectively).

5.3.3 Progressive Vector Diagrams

Progressive vector diagrams were constructed by vector addition of the hourly averaged east and north components of velocity. The plots begin with a circle and are marked every 24 hrs by an asterisk. The diagrams do not represent real water particle trajectories since the observations were taken at a single point. The scales of the diagrams are adjusted so all plots are the same size.

5.3.4 Spectra

The velocity spectra (see Halpern, et al., 1973), which were plotted in log-log format, were all computed from Cooley-Tukey Fourier transforms using the perfect Daniell frequency window. Dashed vertical lines corresponding to the diurnal, inertial, and semidiurnal frequencies are marked on the diagrams. By use of a fast Fourier transform algorithm which required that none of the prime factors of the total number of points be greater than 97, raw periodograms, defined so that the sum over positive frequencies was equal to the total variance, were computed for the 10-min averaged U_{10} and V_{10} series. Because on a log-log plot periodogram ordinates are closer together as the frequency increases, averaging over more frequency bands was done for larger values of the frequency.

For each frequency the complex-valued horizontal velocity vector can be represented in the hodograph plane by two-counter-rotating circular motions, each with its own amplitude and phase, viz:

$$W(\sigma) = U(\sigma) + iV(\sigma) = A\, e^{i(\alpha t + \beta)}\, B\, e^{-(\alpha t + \beta)}$$

where $W(\sigma)$ is the complex horizontal velocity vector at frequency σ, A and B are real-valued amplitudes, α and β are the phases, and $e^{i\sigma t}$ and $e^{-\sigma t}$ are vectors of unit magnitude rotating in the counter-clockwise (positive) direction and clockwise (negative) direction, respectively. The rotary spectrum (lower plot), defined as the sum of the spectra of the counter-rotating vectors, was computed from the Fourier coefficients using the perfect Daniell window of varying widths. The total kinetic energy is equal to the integral overall frequencies of the two-sided

rotary spectrum. For each frequency the trajectory in the hodograph plane of the velocity vector is an ellipse (or in the limiting cases, a circle or a straight line). For example, if A = 0 there is energy only in the negative component and the tip of the vector rotates in the clockwise direction describing a circle. If A = B, then the trajectory consists of a straight line and the motion in the complex U, V-plane consists of rectilinear oscillations. If $A \neq B$ the shape of the curve is an ellipse and the tip of the vector rotates with the sense associated with the larger amplitude.

Section 6. Figures

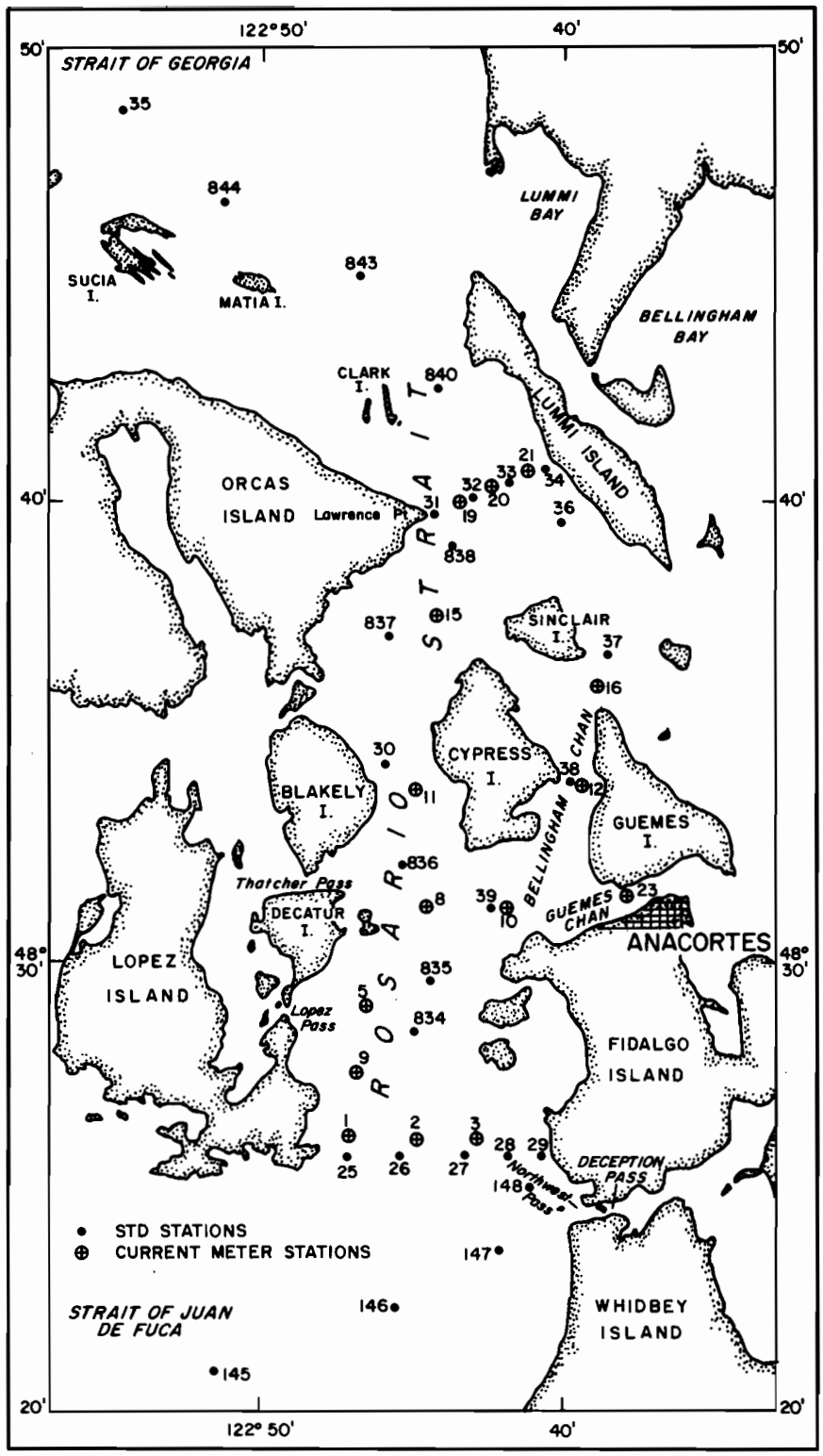


Figure 1. Operations area, spring 1974

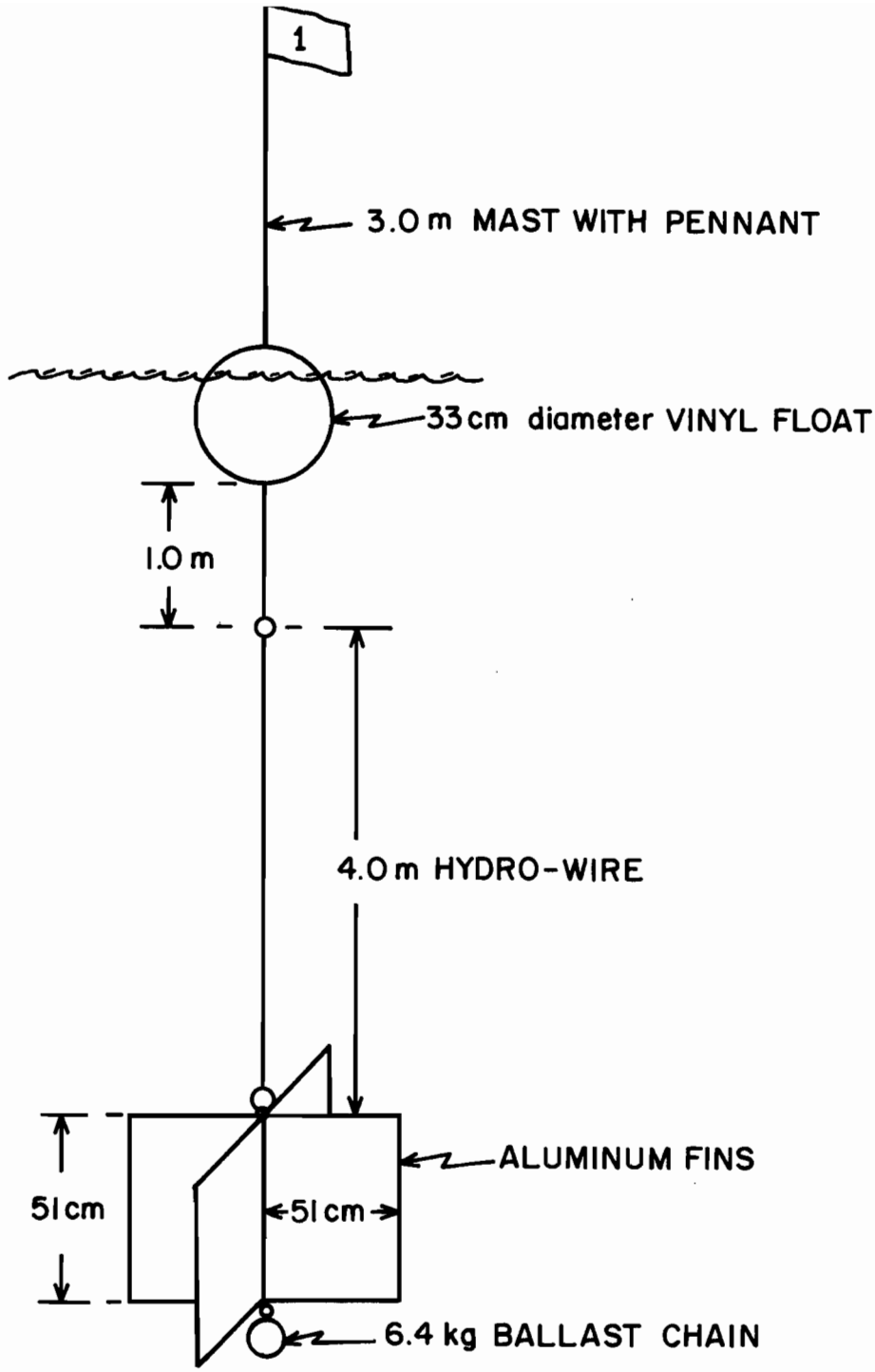


Figure 2. Drogue and surface float used for Lagrangian current studies.

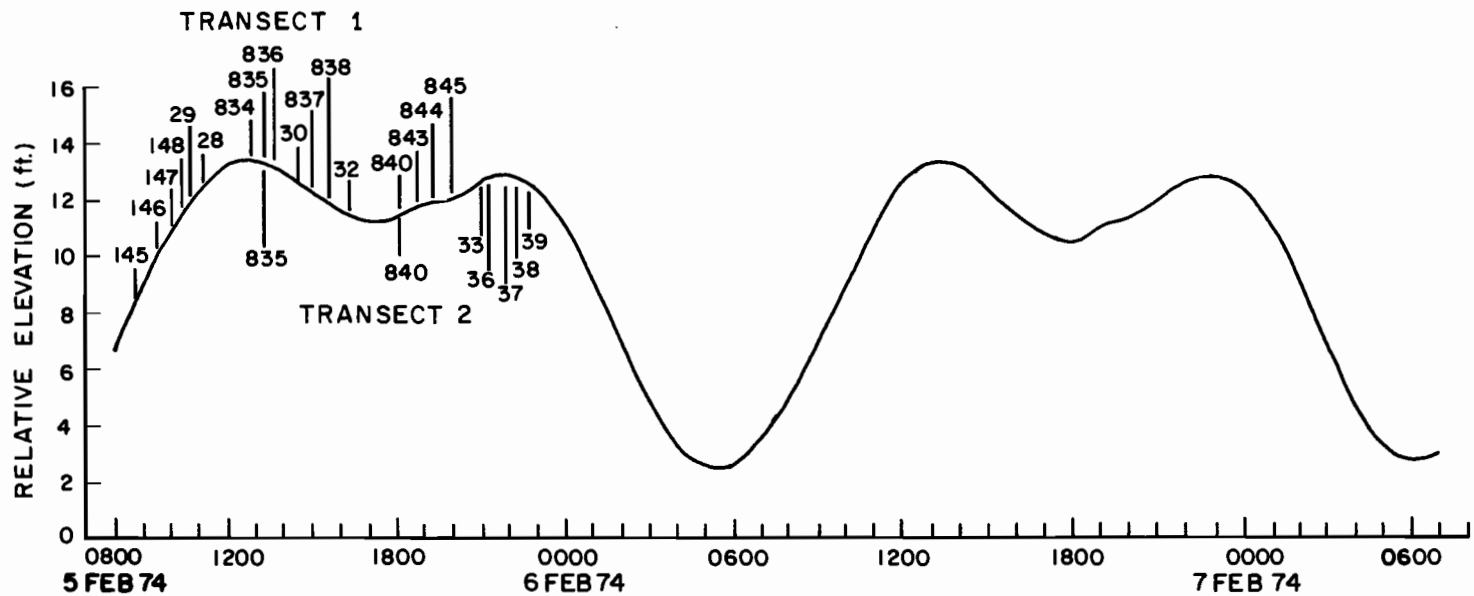


Figure 3. Tidal heights measured at Anacortes, 5-6 February 1974. The times of STD casts during the period are also shown.

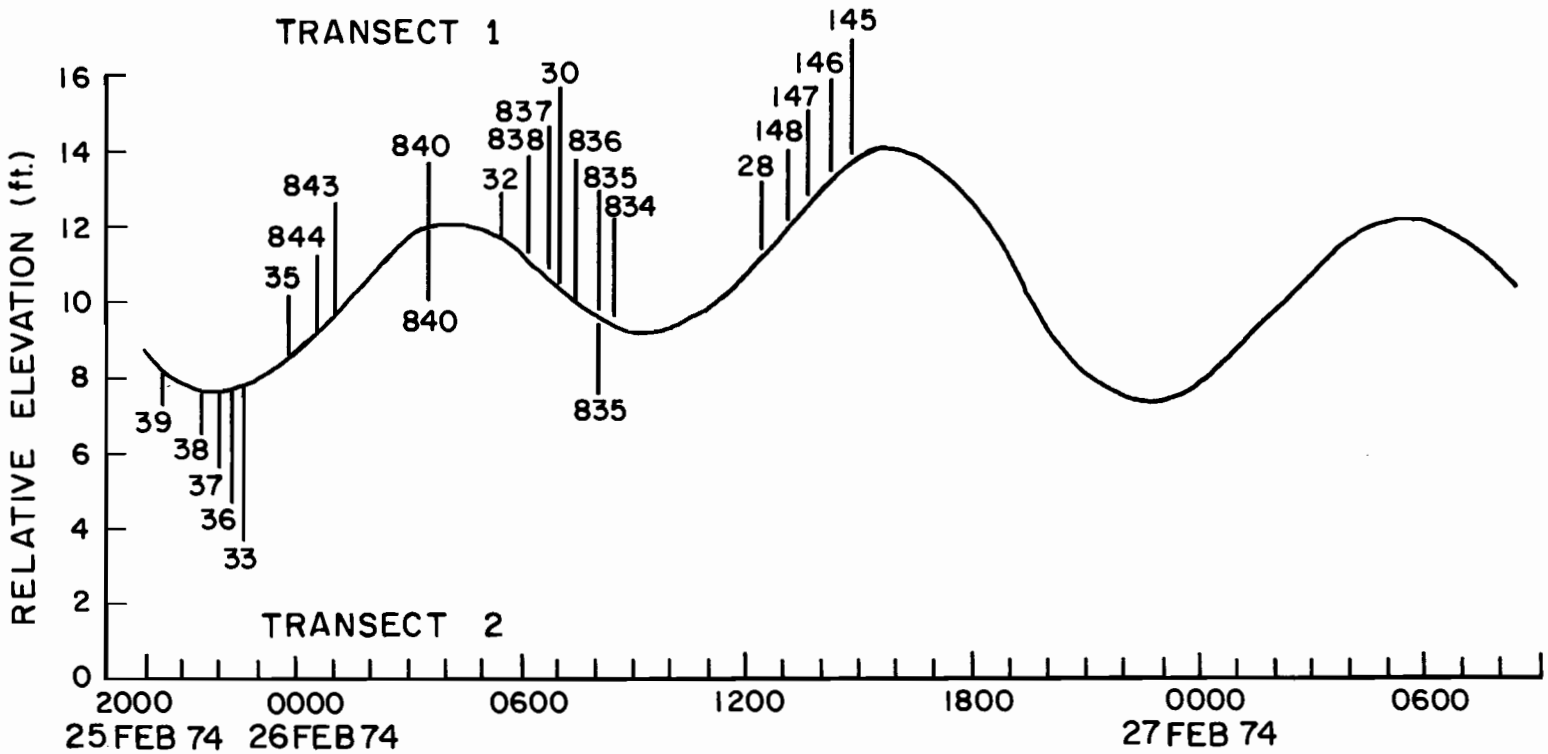


Figure 4. Tidal heights measured at Anacortes, 25-26 February 1974. The times of STD casts during the period are also shown.

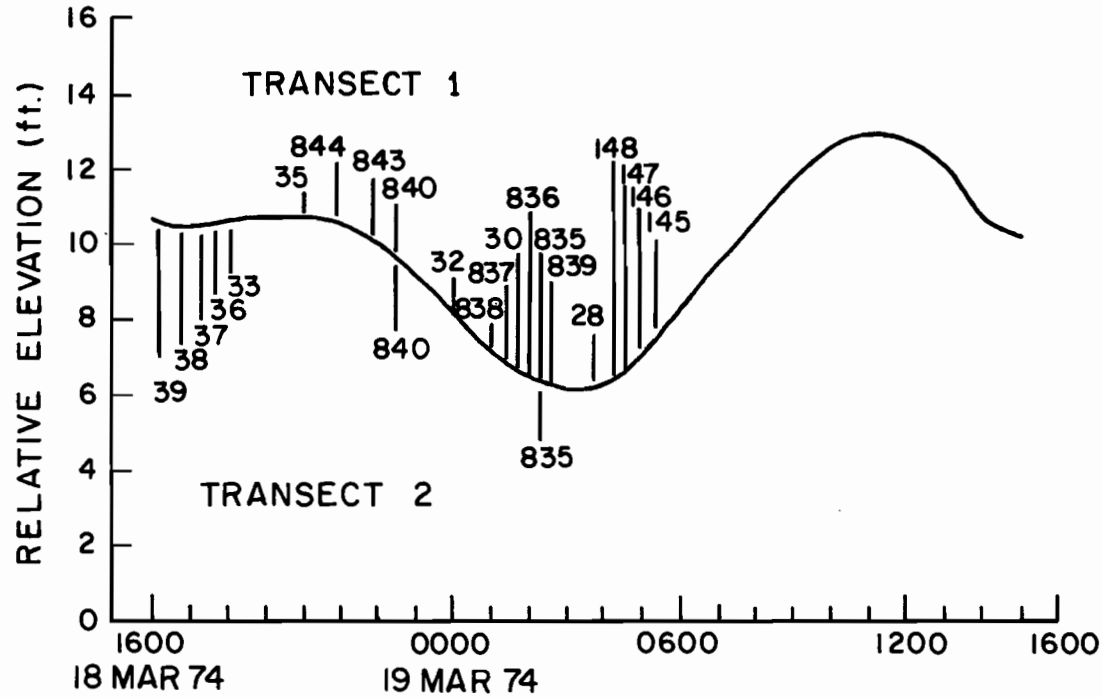


Figure 5. Tidal heights measured at Anacortes, 18-19 March 1974. The times of STD casts during the period are also shown.

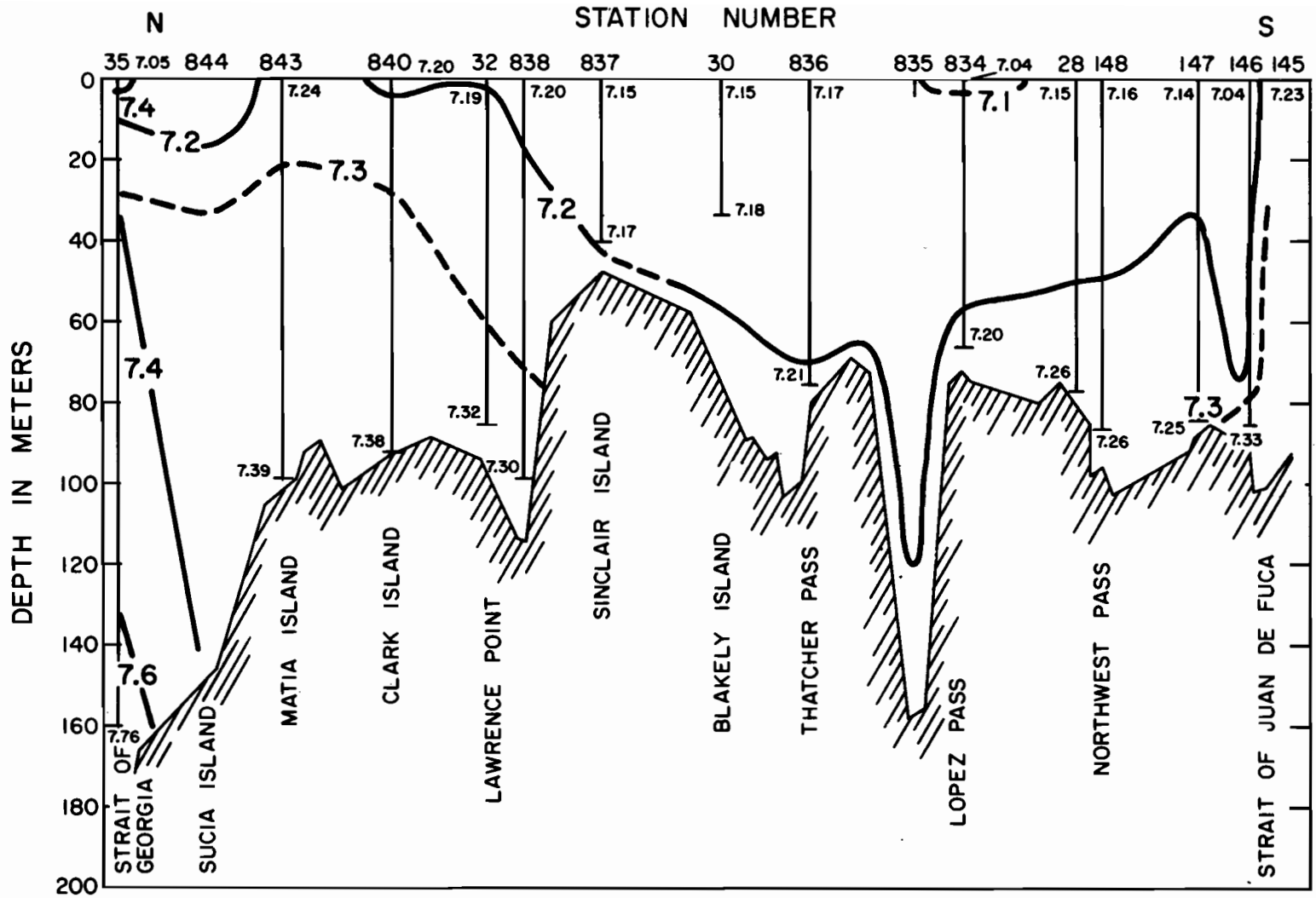


Figure 6.1. Transect #1. Longitudinal section of temperature in Rosario Strait, 5 February 1974.

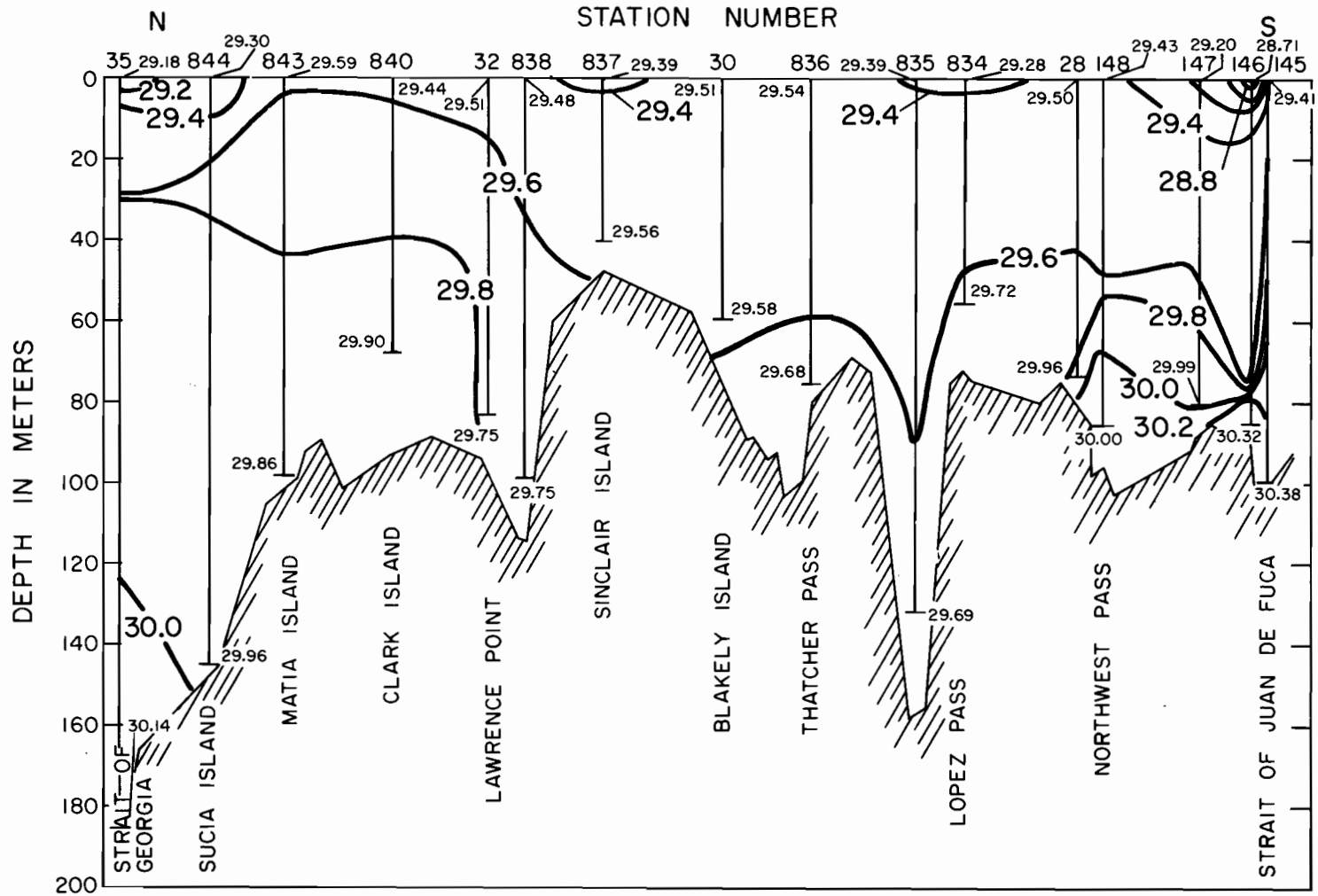


Figure 6.2. Transect #1. Longitudinal section of salinity in Rosario Strait, 5 February 1974.

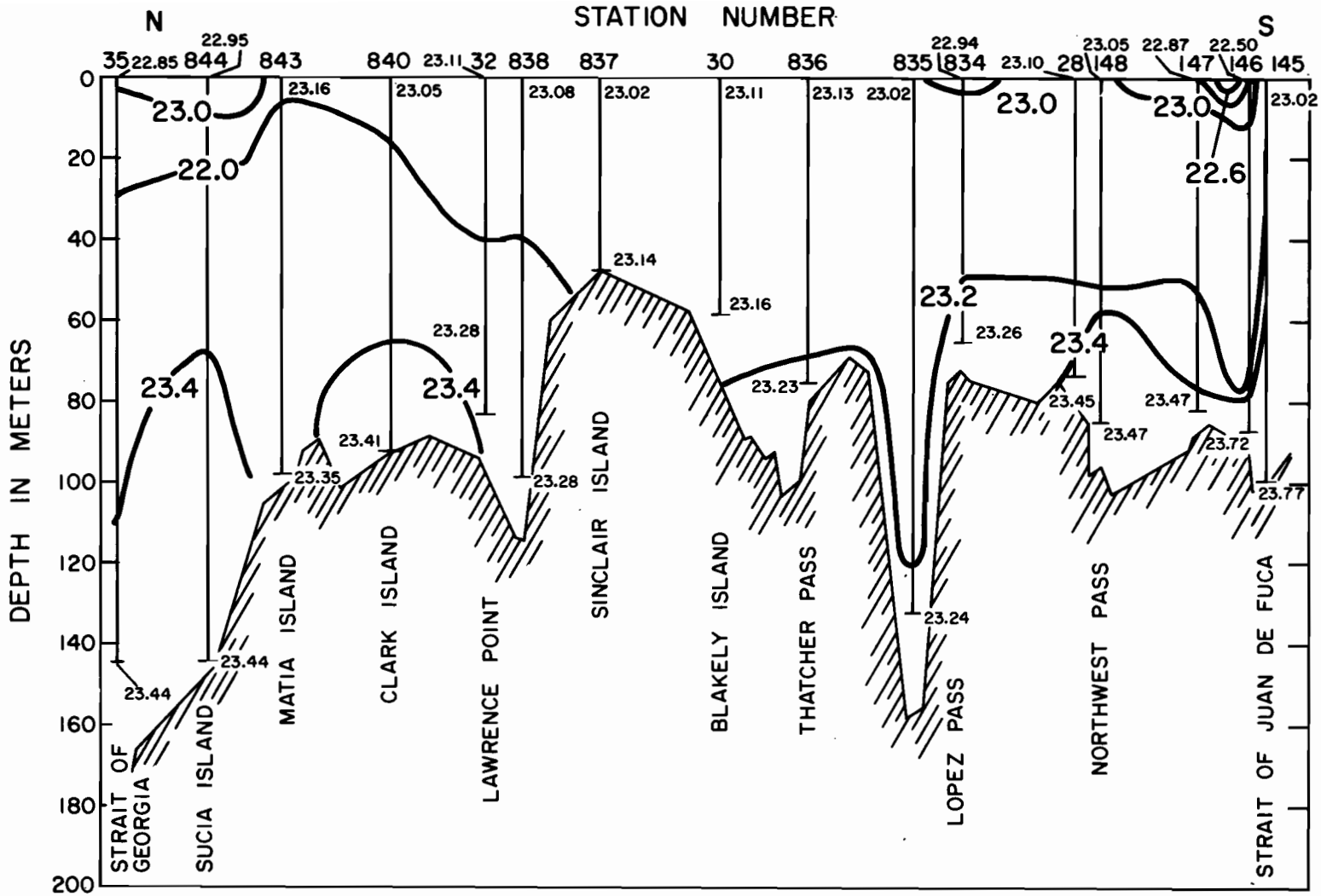


Figure 6.3. Transect #1. Longitudinal section of sigma-t in Rosario Strait, 5 February 1974.

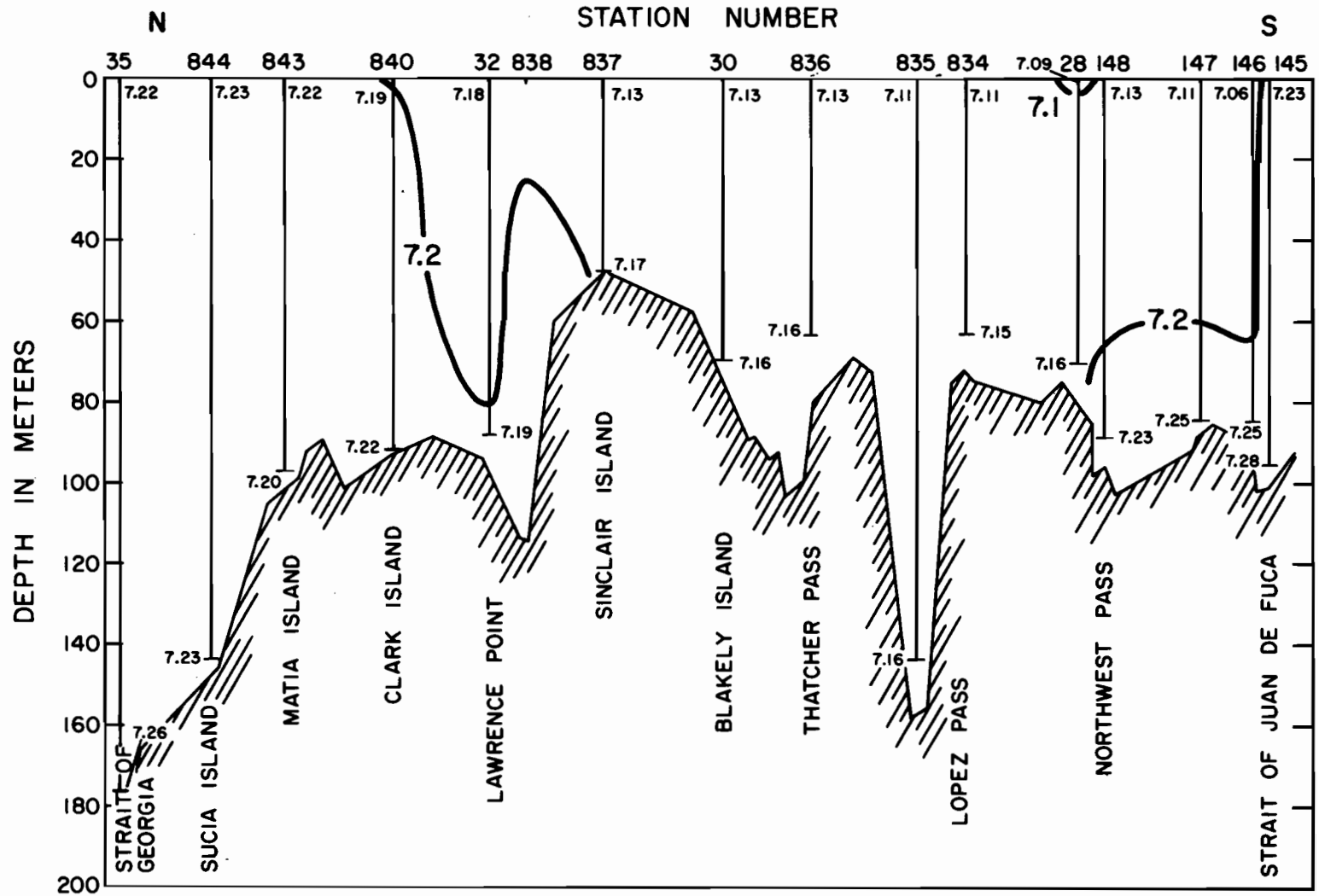


Figure 7.1. Transect #1. Longitudinal section of temperature in Rosario Strait, 25-26 February 1974.

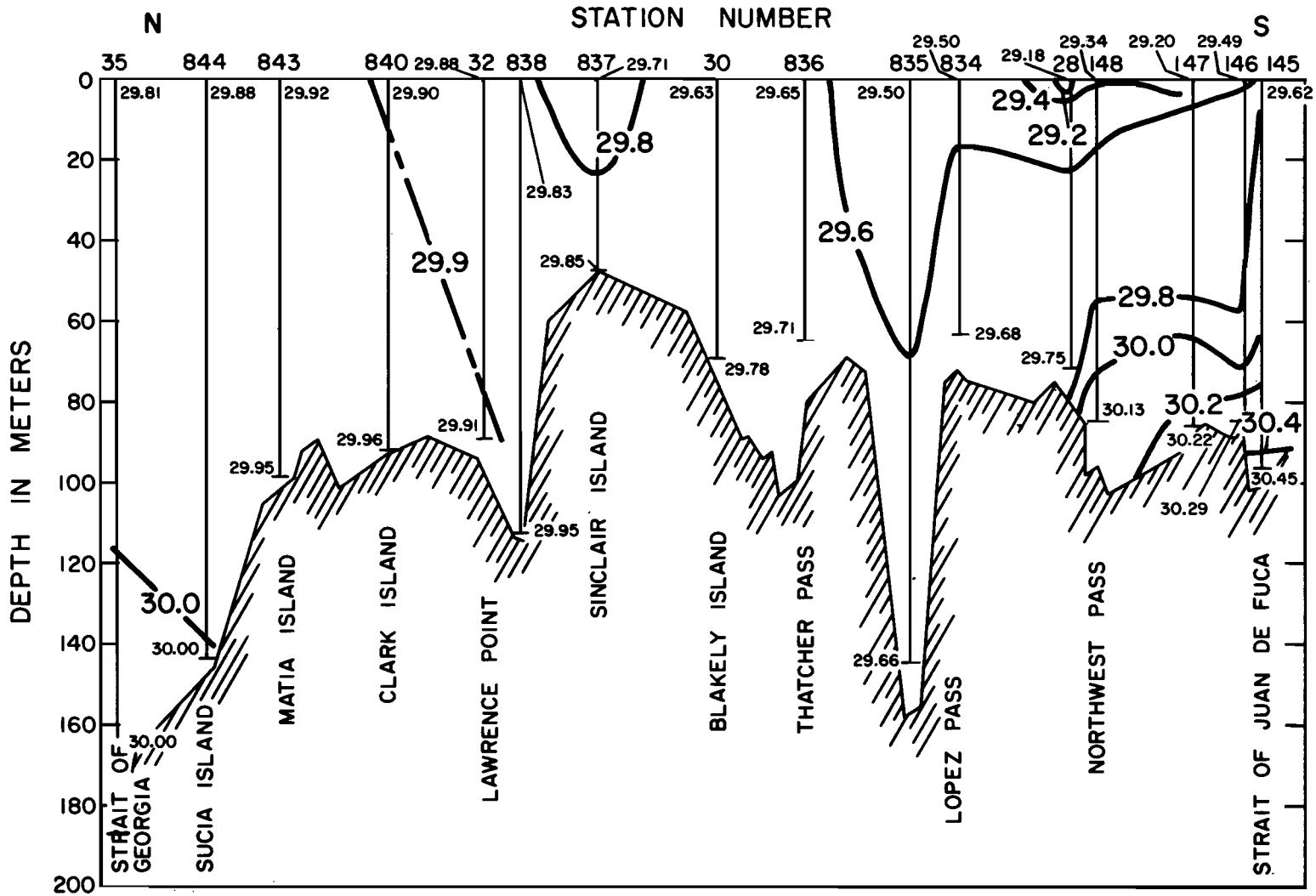


Figure 7.2. Transect #1. Longitudinal section of salinity in Rosario Strait, 25-26 February 1974.

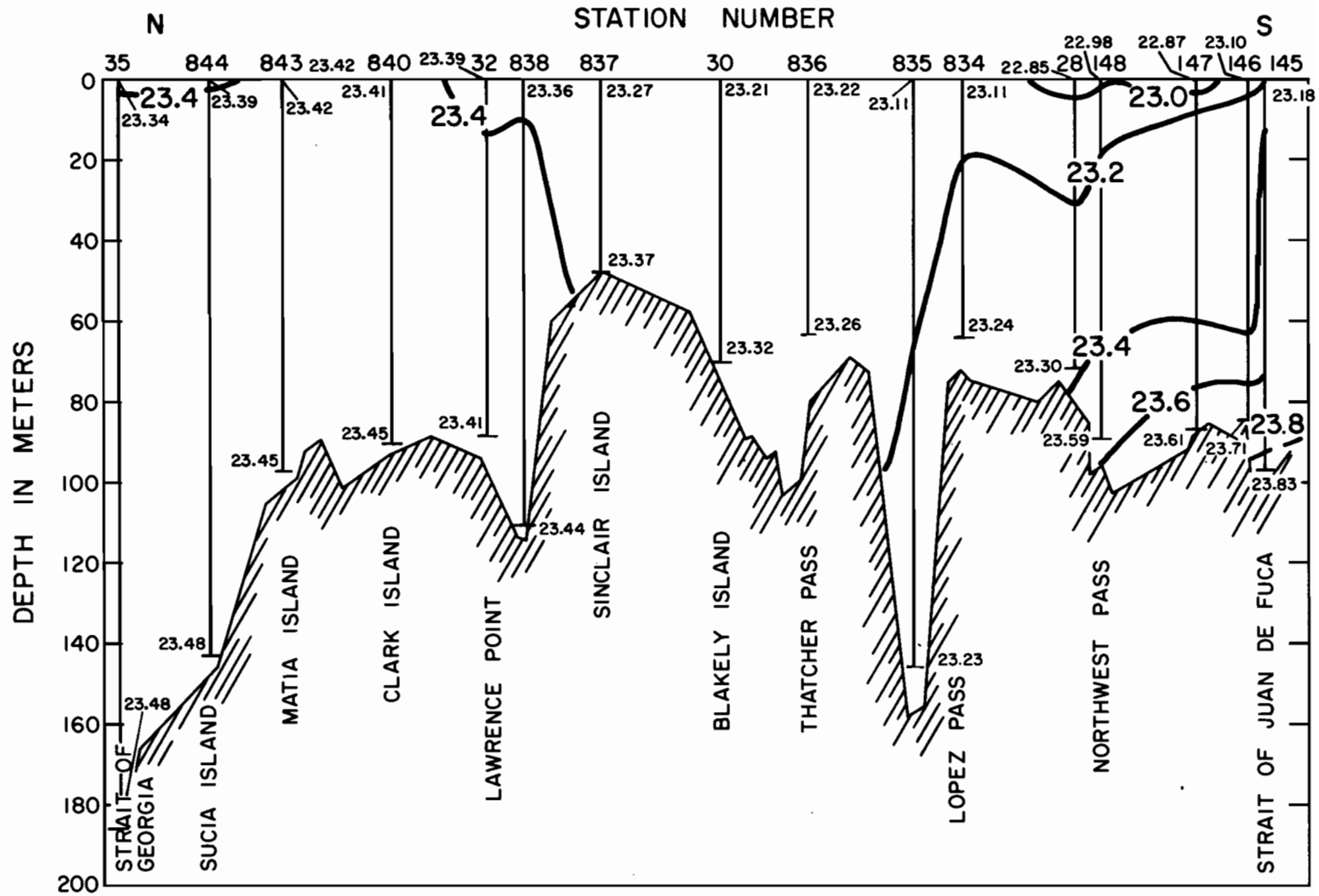


Figure 7.3. Transect #1. Longitudinal section of sigma-t in Rosario Strait, 25-26 February 1974.

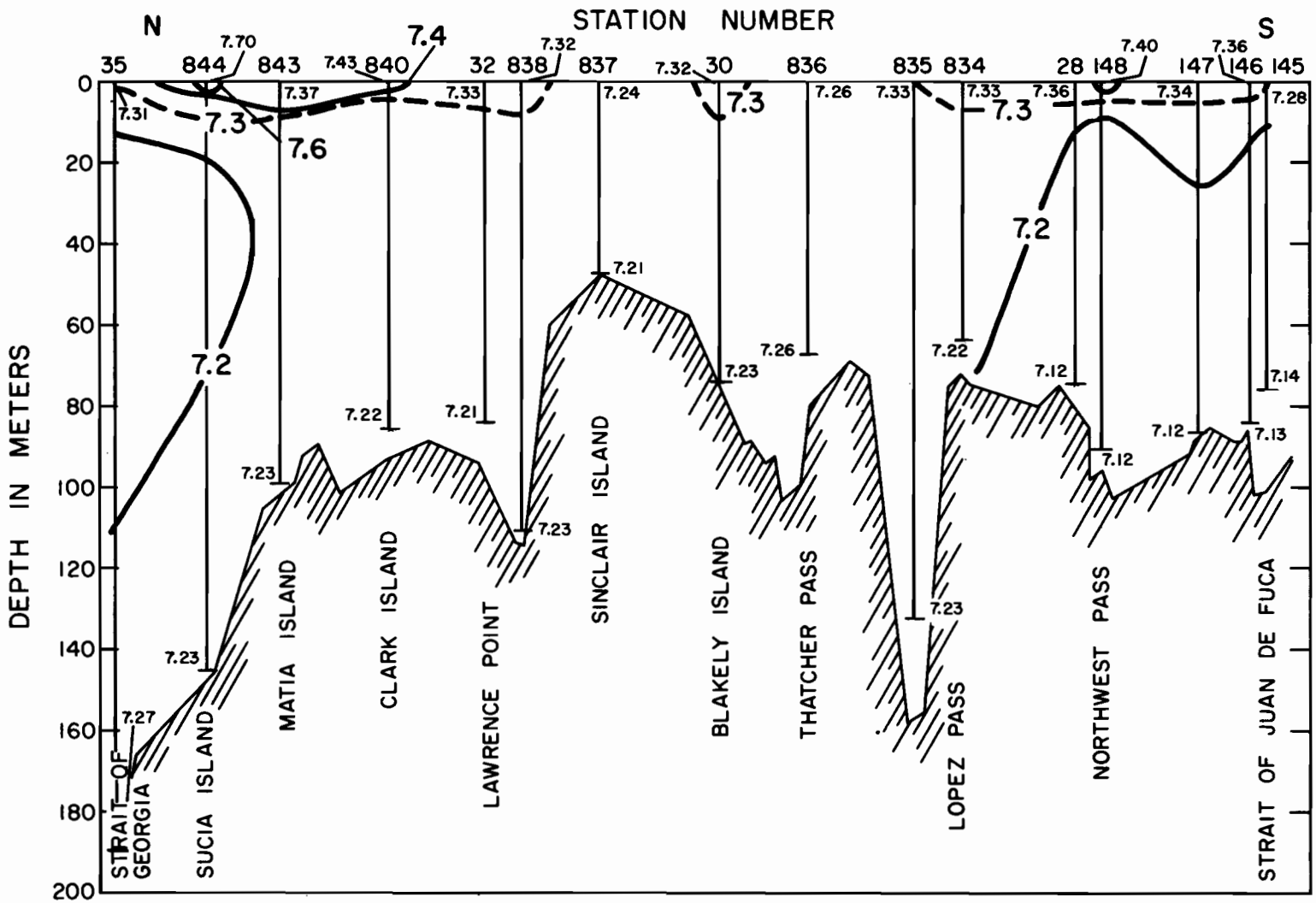


Figure 8.1. Transect #1. Longitudinal section of temperature in Rosario Strait, 18-19 March 1974.

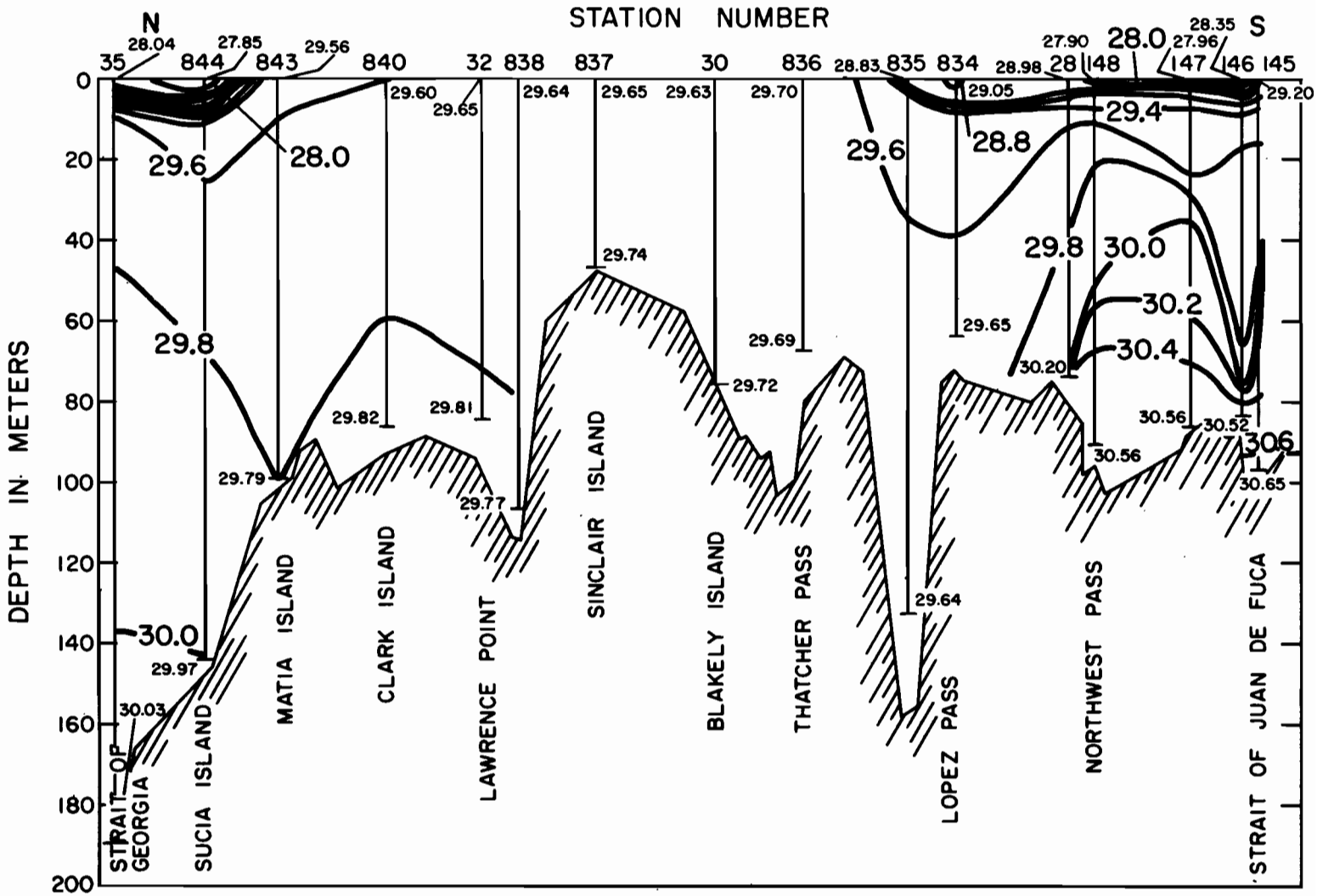


Figure 8.2. Transect #1. Longitudinal section of salinity in Rosario Strait, 18-19 March 1974.

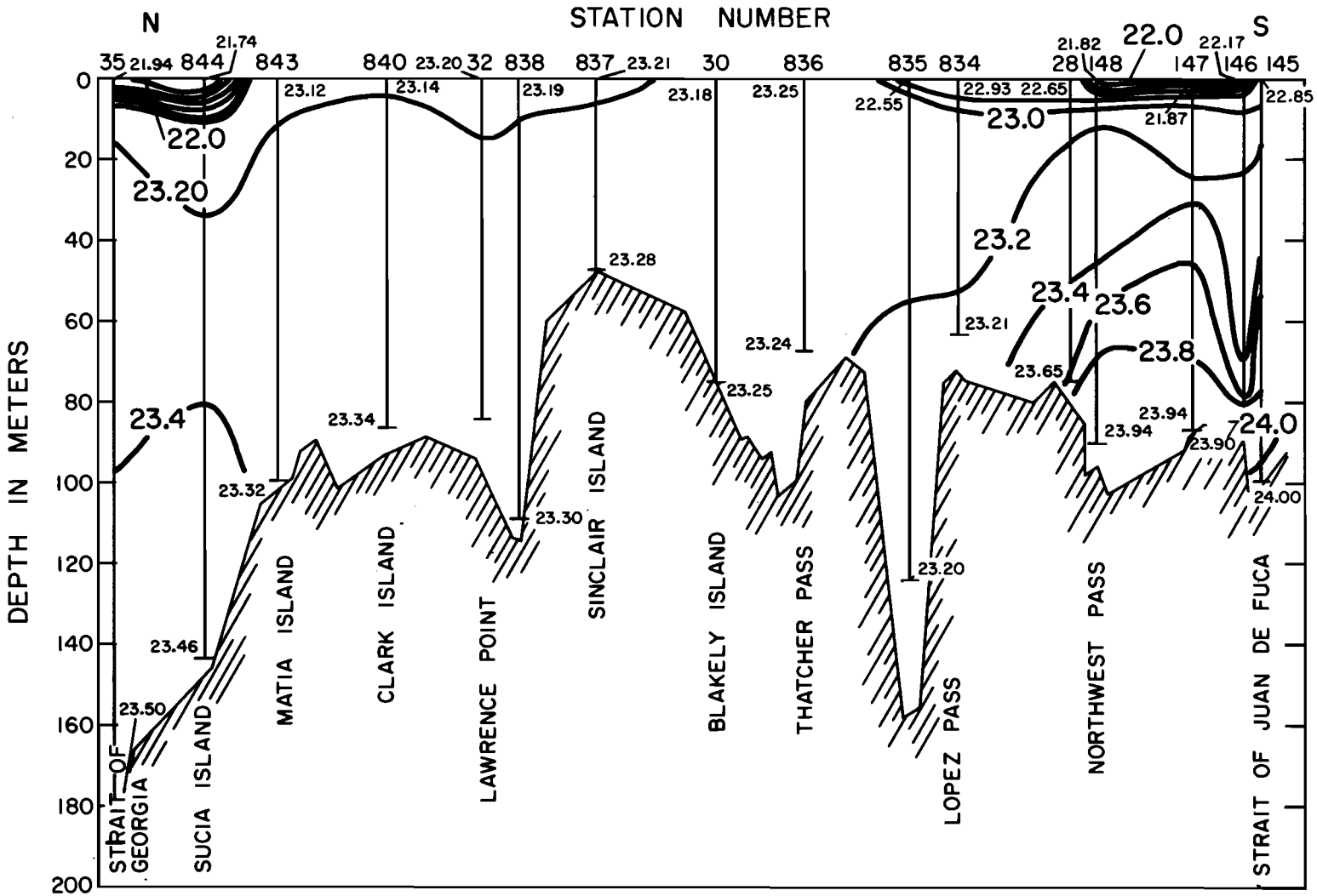


Figure 8.3. Transect #1. Longitudinal section of sigma-t in Rosario Strait, 18-19 March 1974.

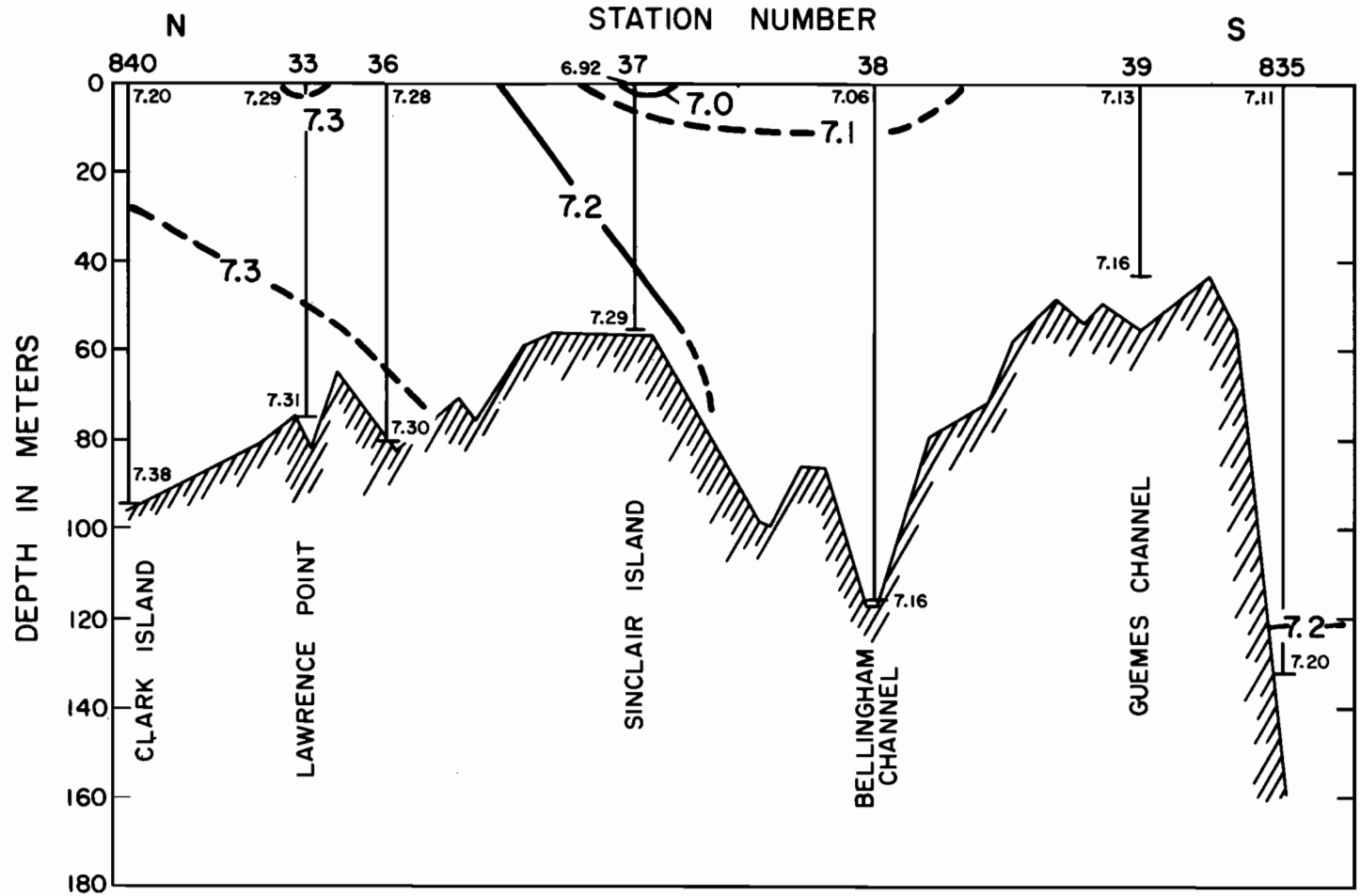


Figure 9.1. Transect #2. Longitudinal section of temperature in Rosario Strait, Bellingham Channel, 5 February 1974.

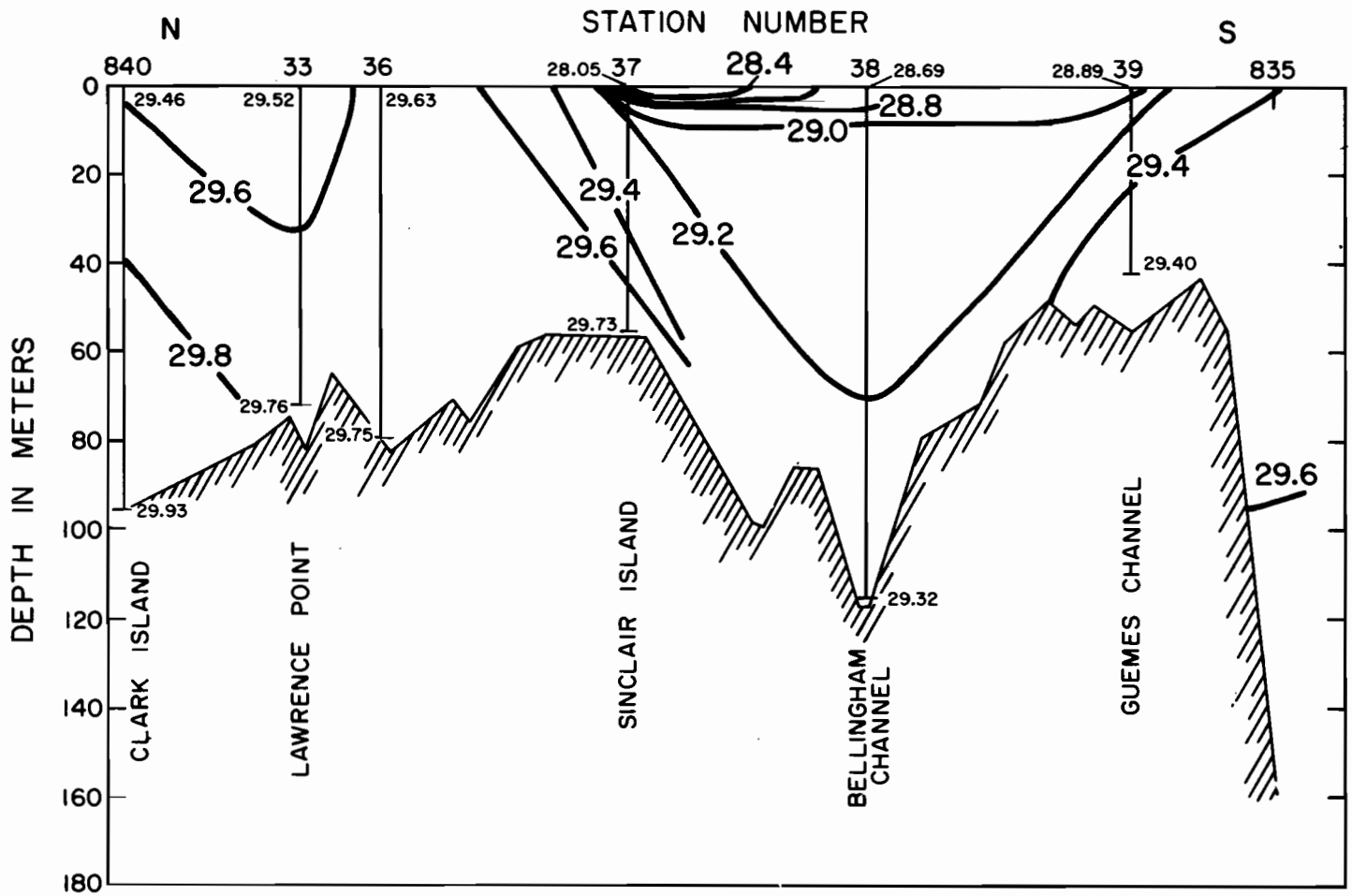


Figure 9.2. Transect #2. Longitudinal section of salinity in Rosario Strait, Bellingham Channel, 5 February 1974.

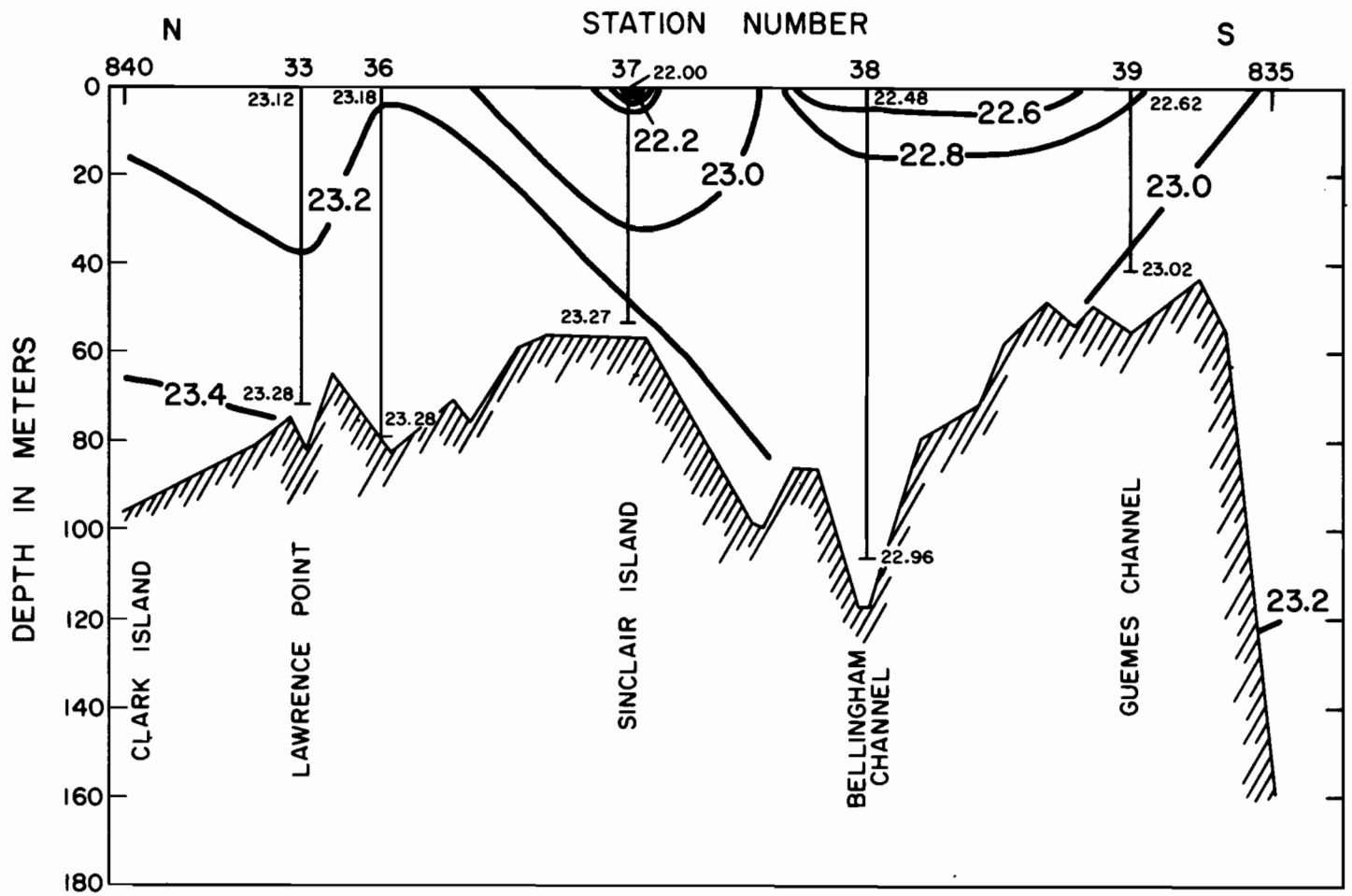


Figure 9.3. Transect #2. Longitudinal section of sigma-t in Rosario Strait, Bellingham Channel, 5 February 1974.

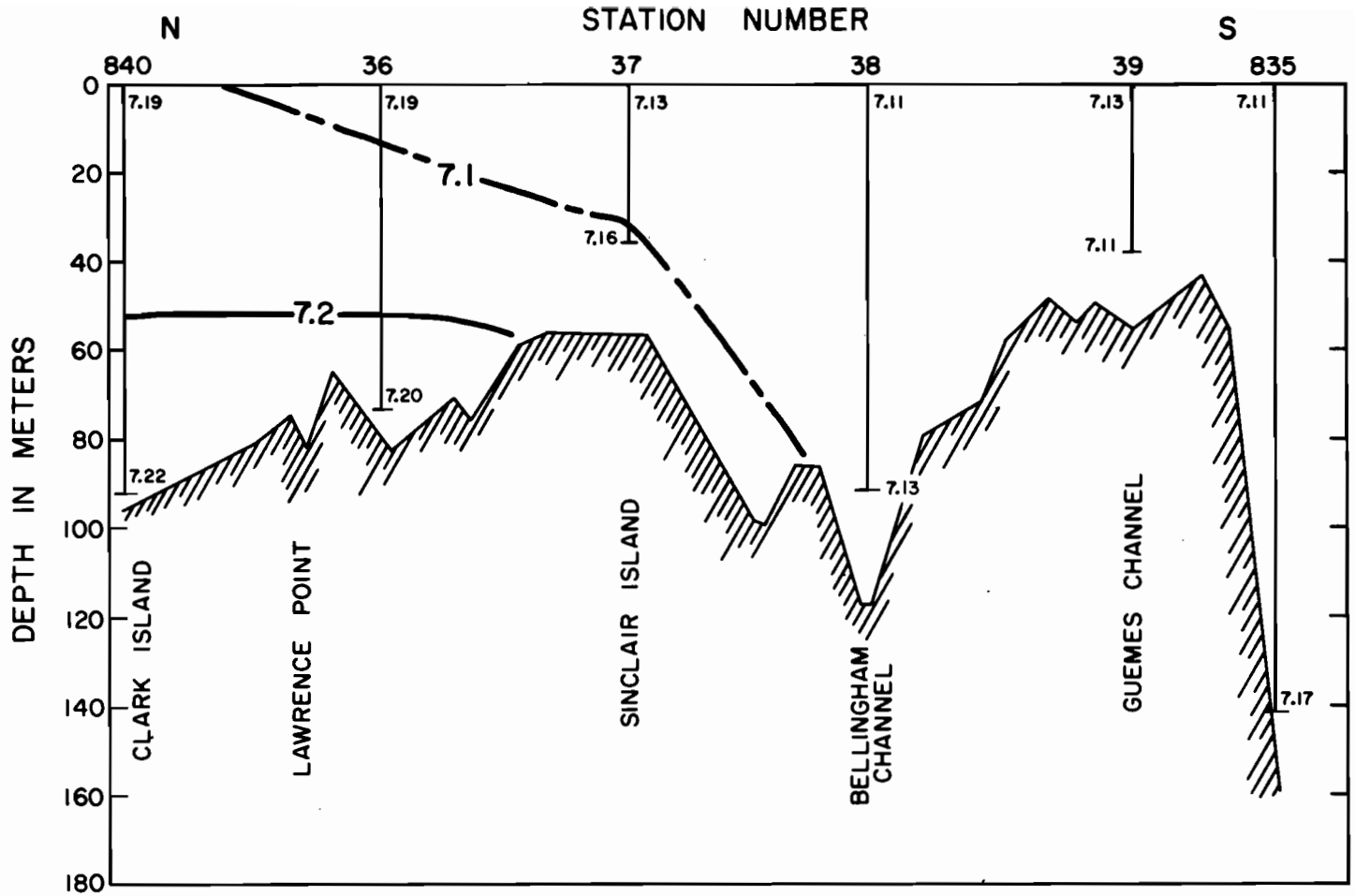


Figure 10.1. Transect #2. Longitudinal section of temperature in Rosario Strait, Bellingham Channel, 25 February 1974.

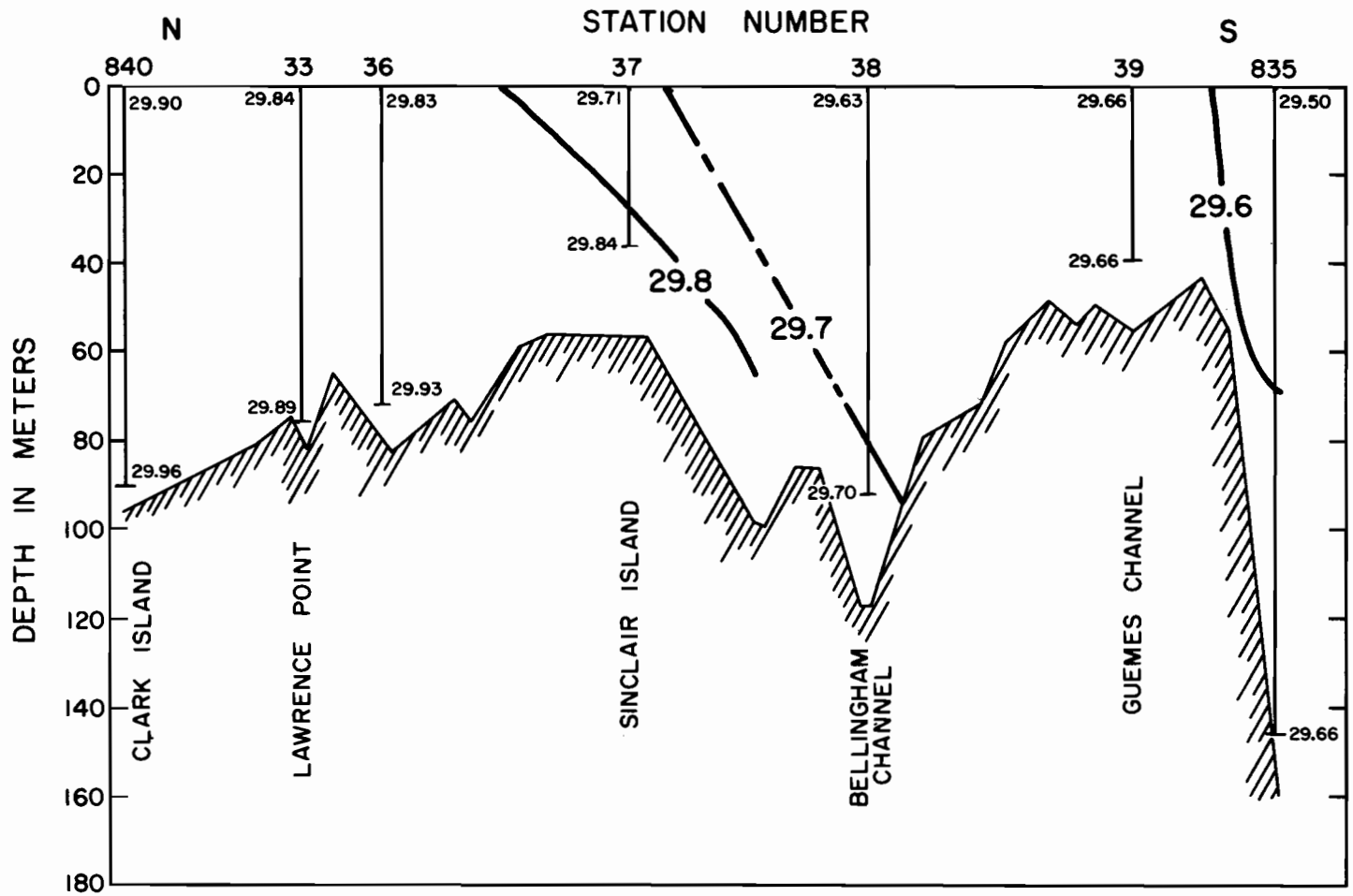
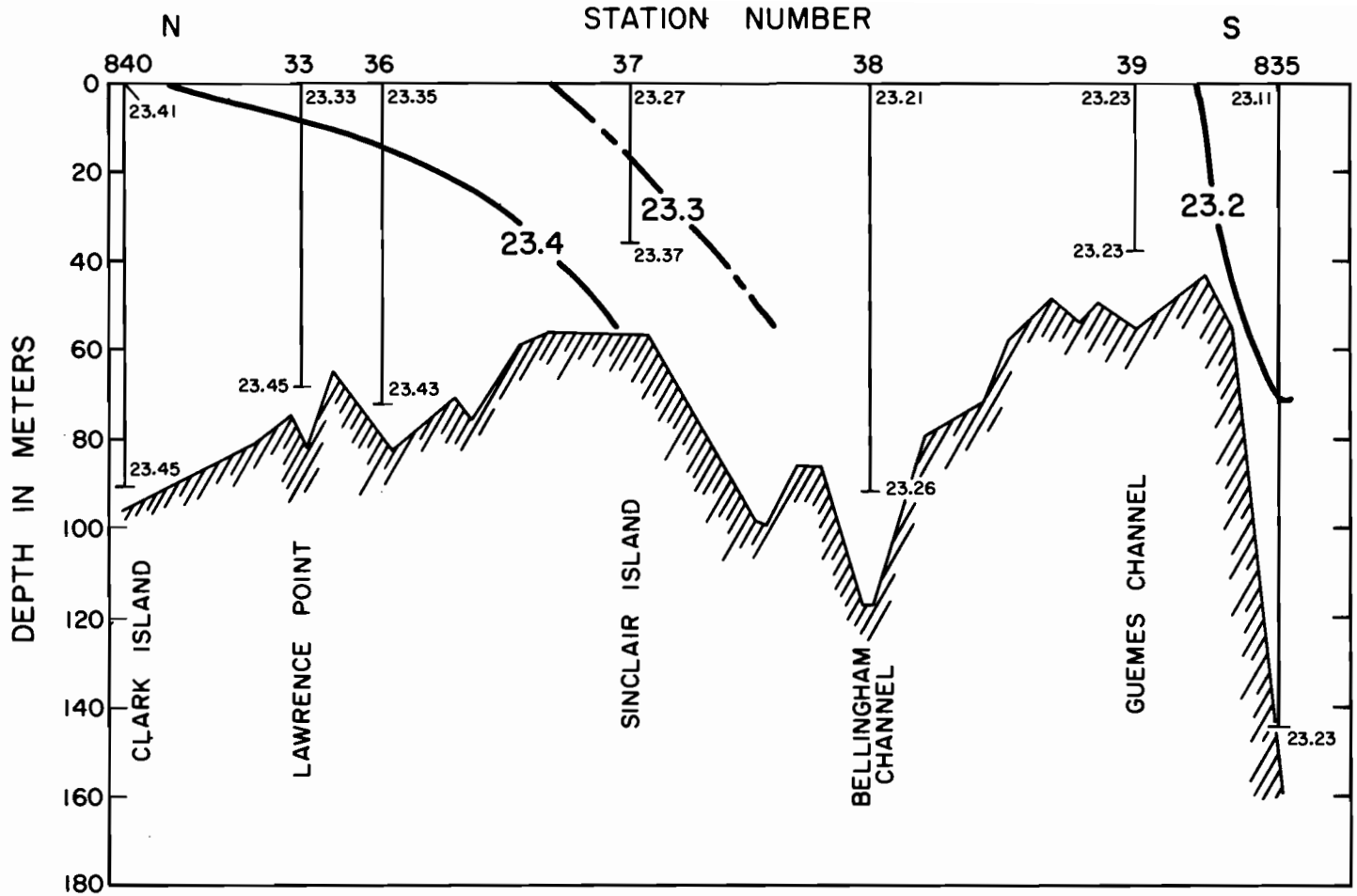


Figure 10.2. Transect #2. Longitudinal section of salinity in Rosario Strait, Bellingham Channel, 25 February 1974.



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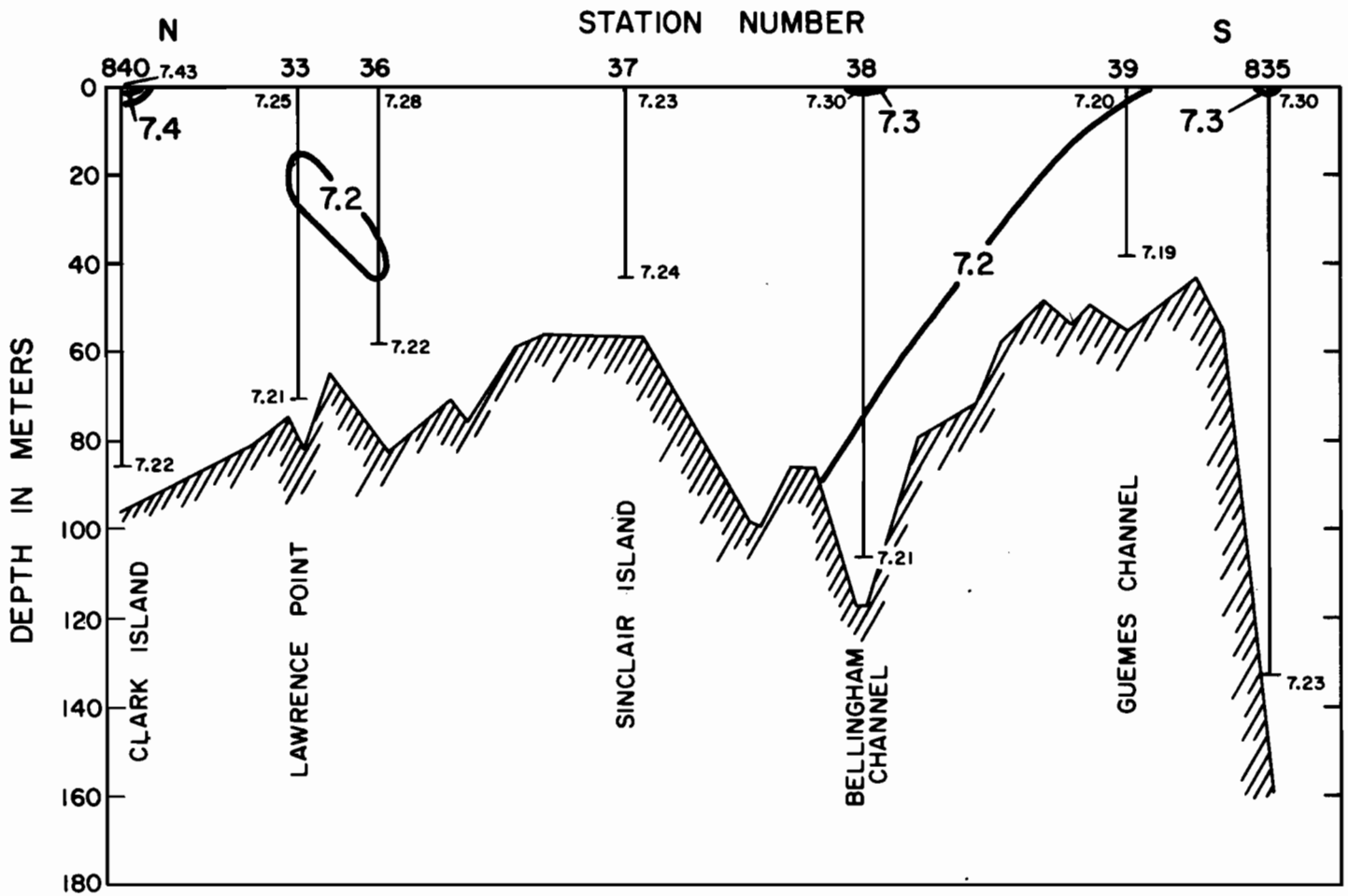
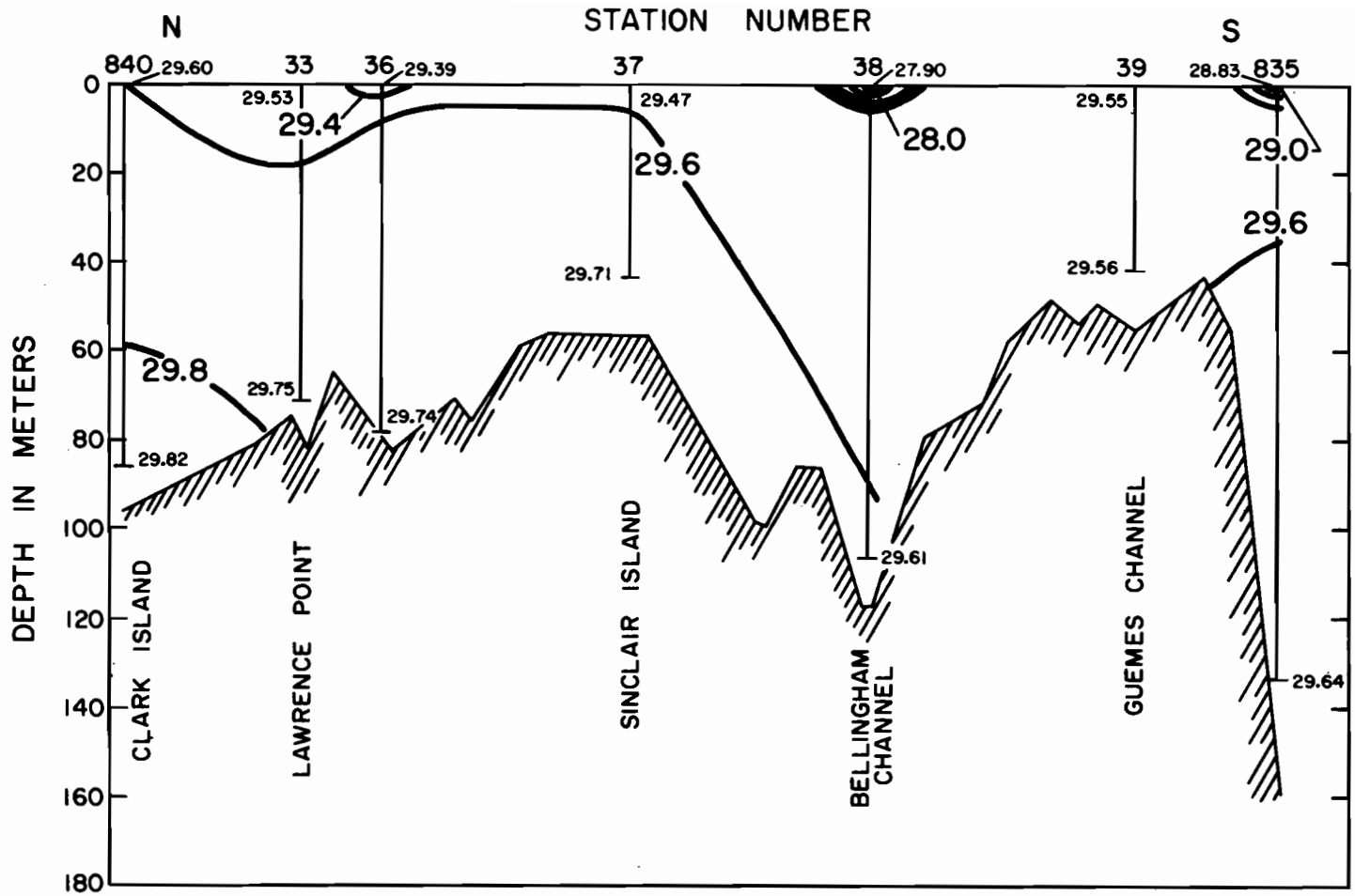


Figure 11.1. Transect #2. Longitudinal section of temperature in Rosario Strait, Bellingham Channel, 18-19 March 1974.



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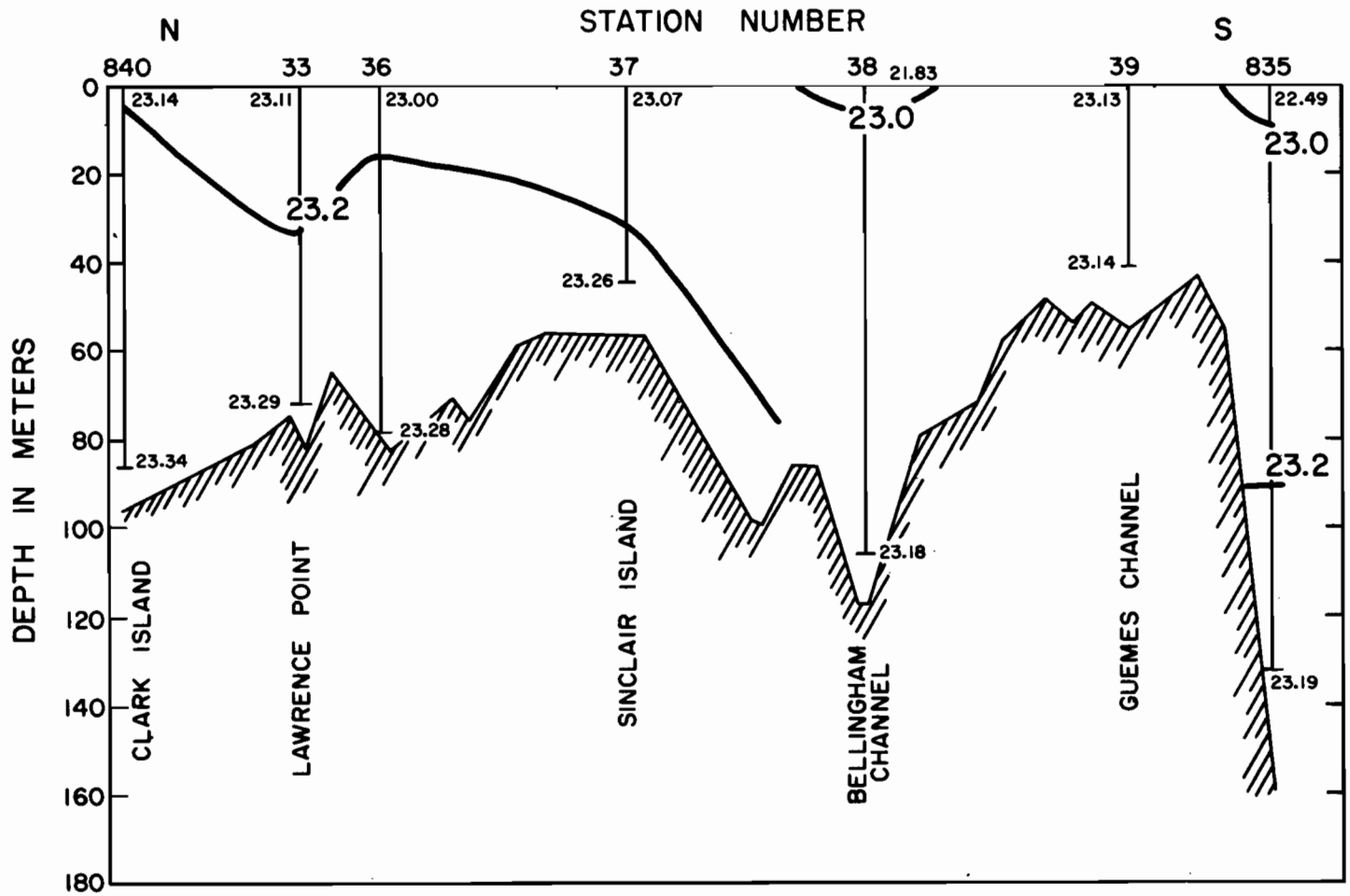


Figure 11.3. Transect #2. Longitudinal section of sigma-t in Rosario Strait, Bellingham Channel, 18-19 March 1974.

12.1 Time Series I - Southern end Rosario Strait

6-7 February 1974

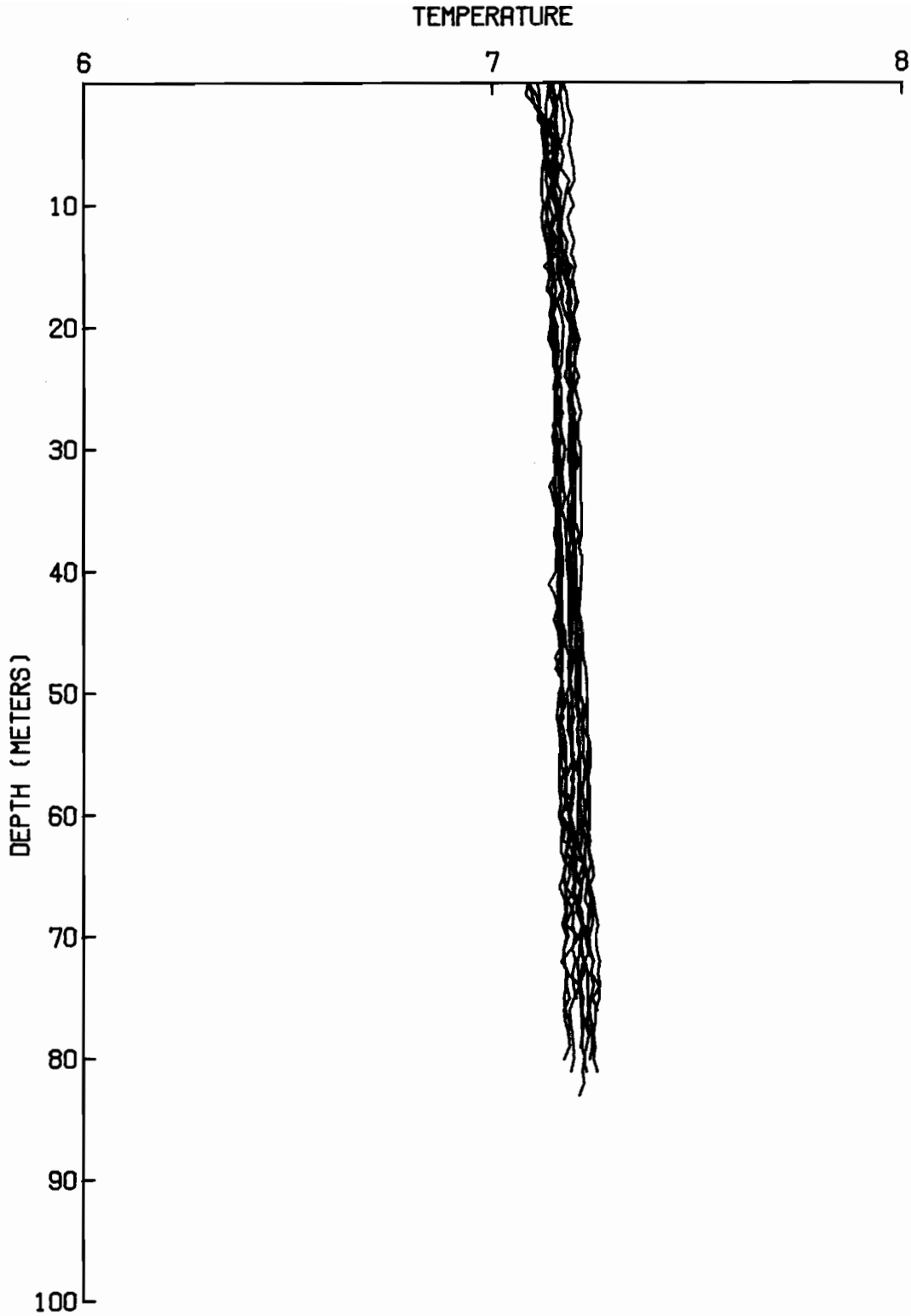


Figure 12.1a. 0035 6 Feb 74 to 1514 7 Feb 74 STATION 29

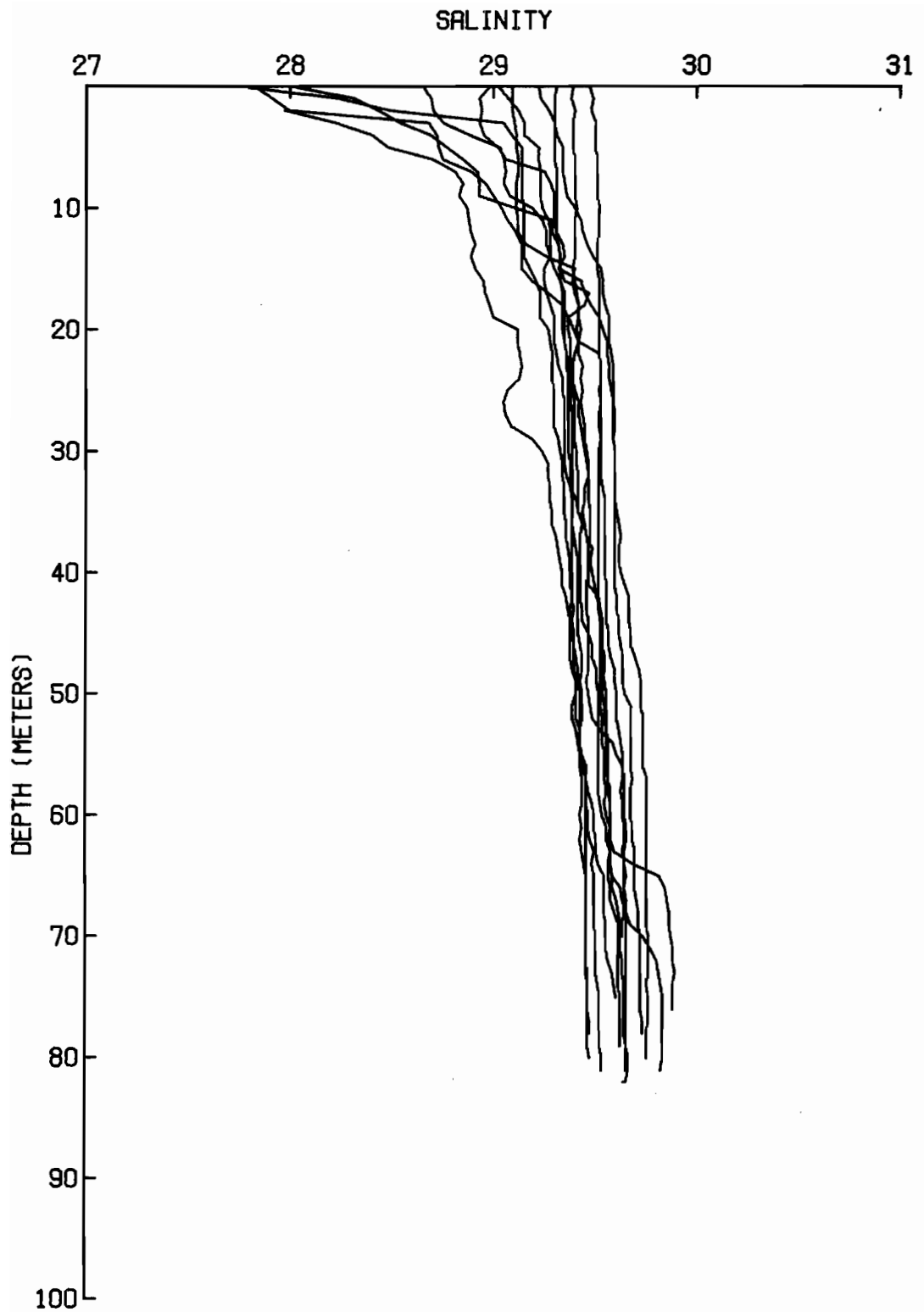


Figure 12.1b. 0035 6 Feb 74 to 0514
7 Feb 74 STATION 29

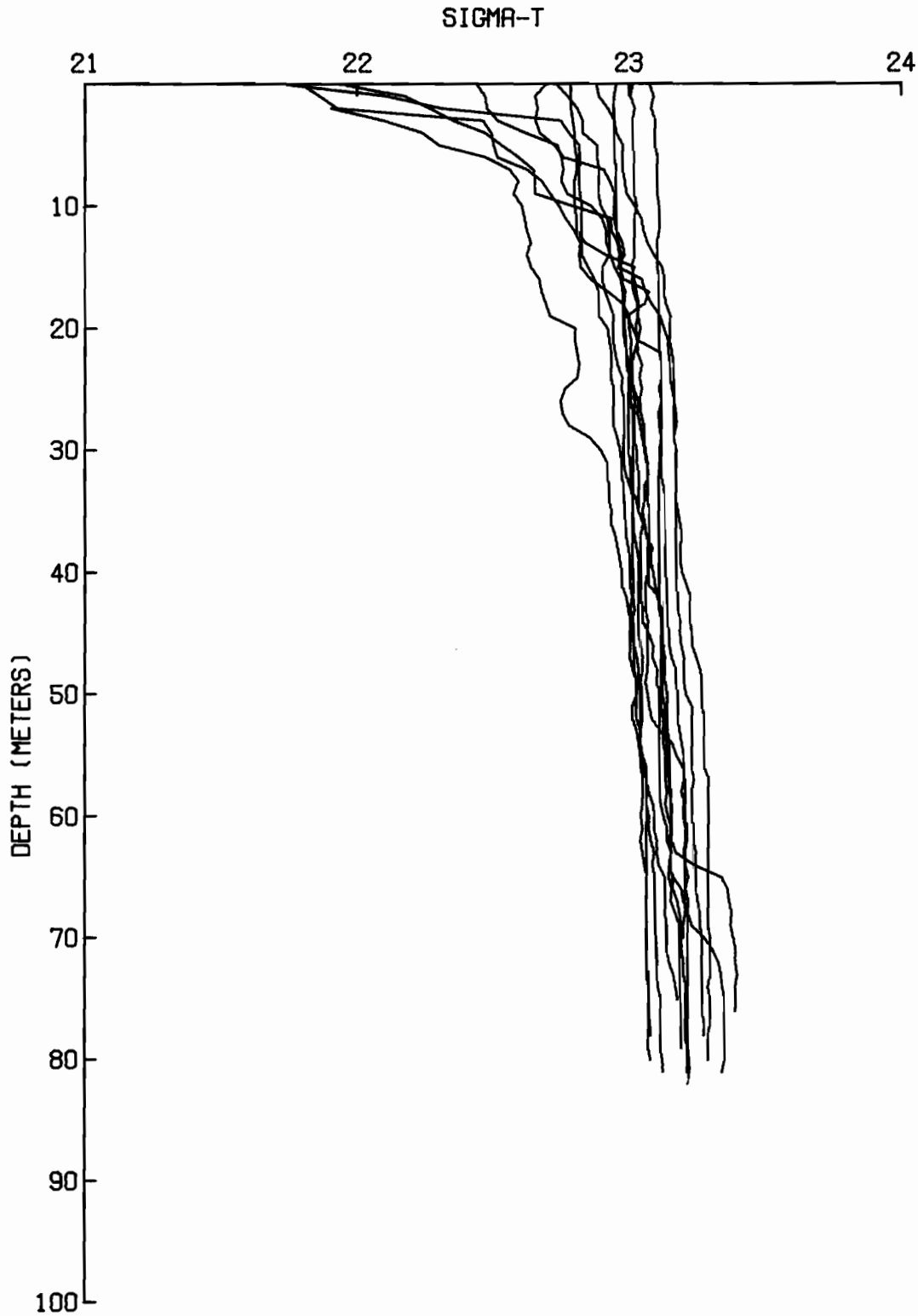


Figure 12.1c. 0035 6 Feb 74 to 0514
7 Feb 74 STATION 29

12.2 Time Series I - Southern end Rosario Strait

6-7 February 1974

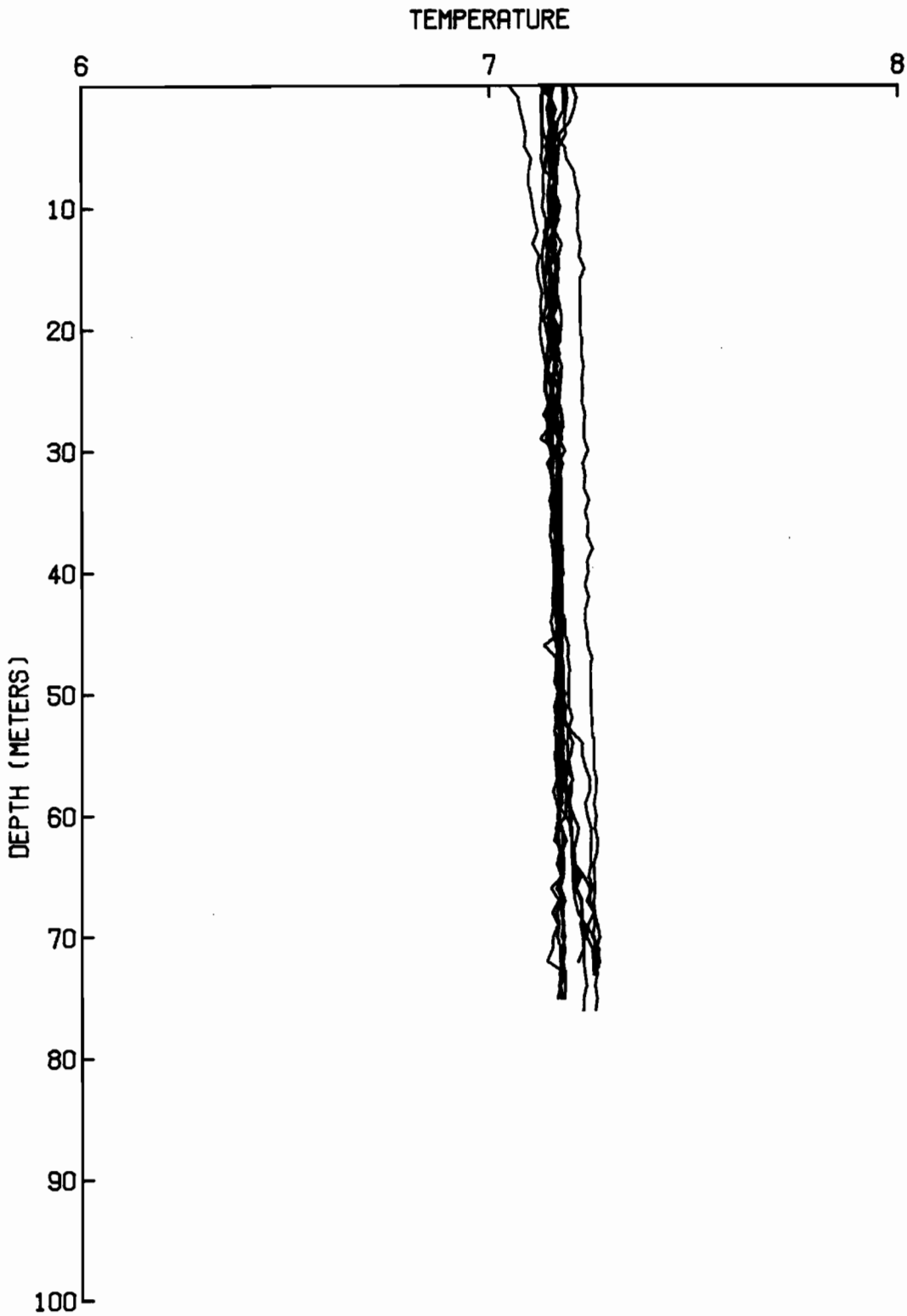


Figure 12.2a. 0624 6 Feb 74 to 0459 7 Feb 74 STATION 28

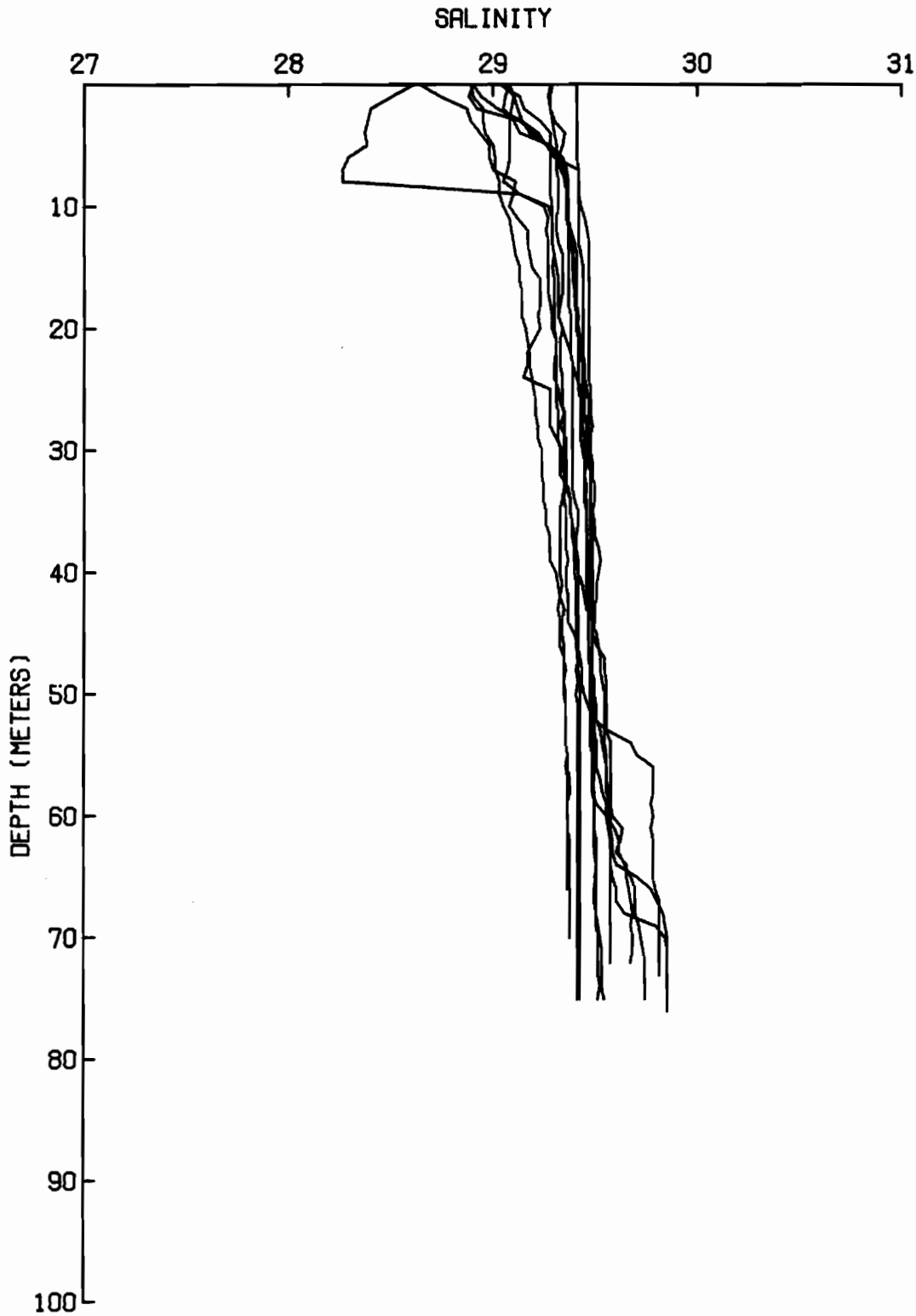


Figure 12.2b. 0624 6 Feb 74 to 0459 7 Feb 74 STATION 28

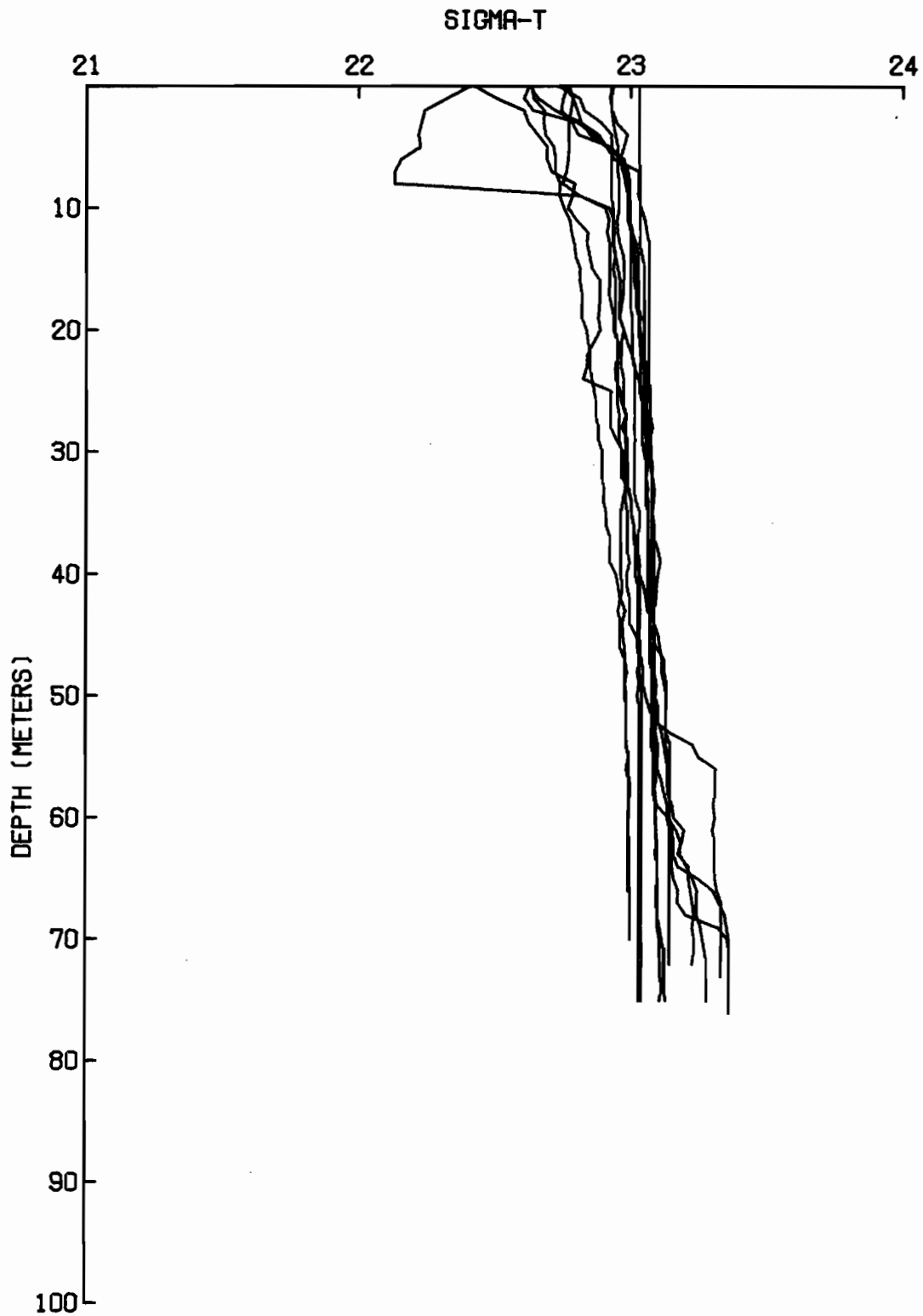


Figure 12.2c. 0624 6 Feb 74 to 0459 7 Feb 74 STATION 28

12.3 Time Series I - Southern end Rosario Strait

6-7 February 1974

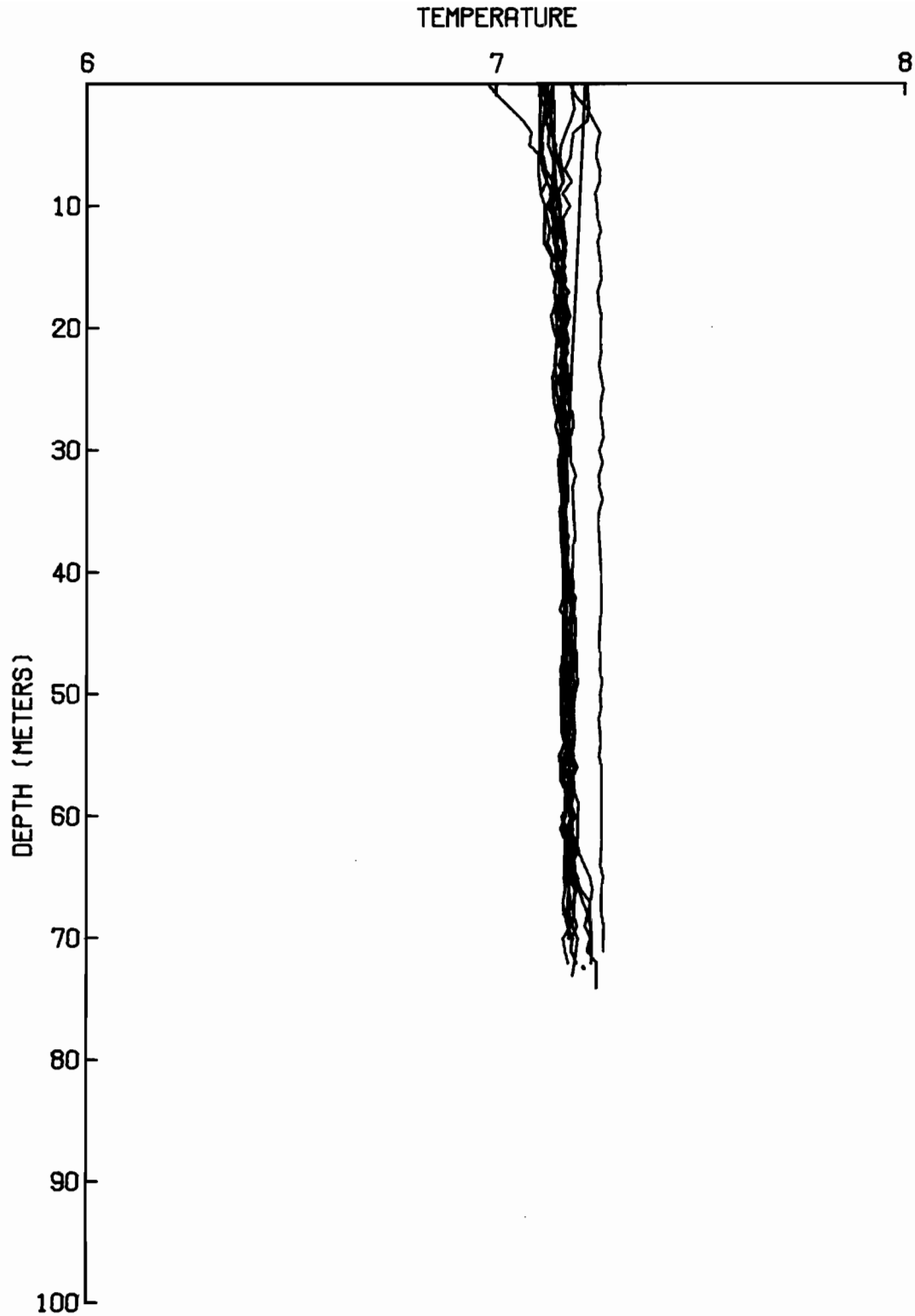


Figure 12.3a. 0606 6 Feb 74 to 0443 7 Feb 74 STATION 27

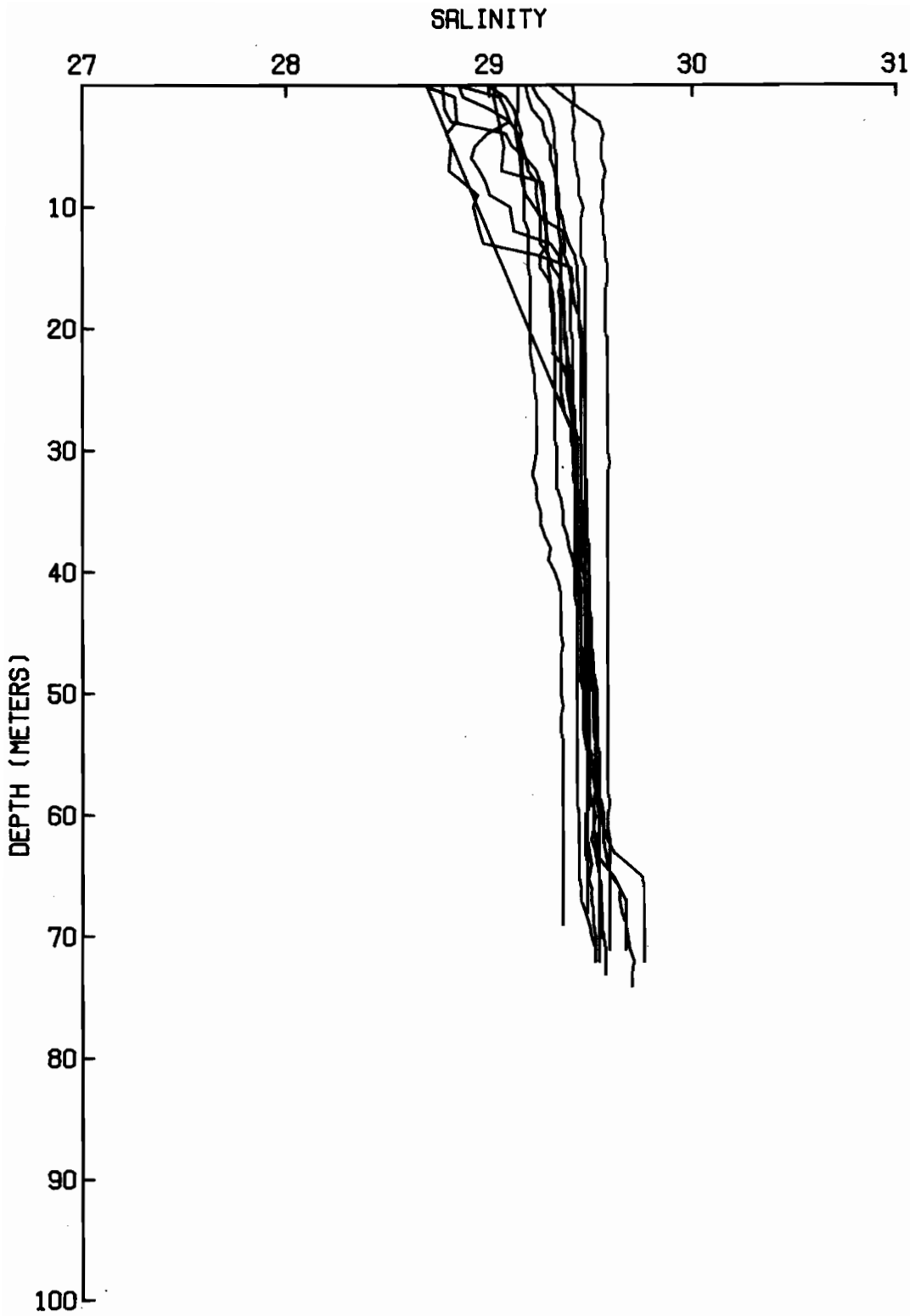


Figure 12.3b. 0606 6 Feb 74 to 0443
7 Feb 74 STATION 27

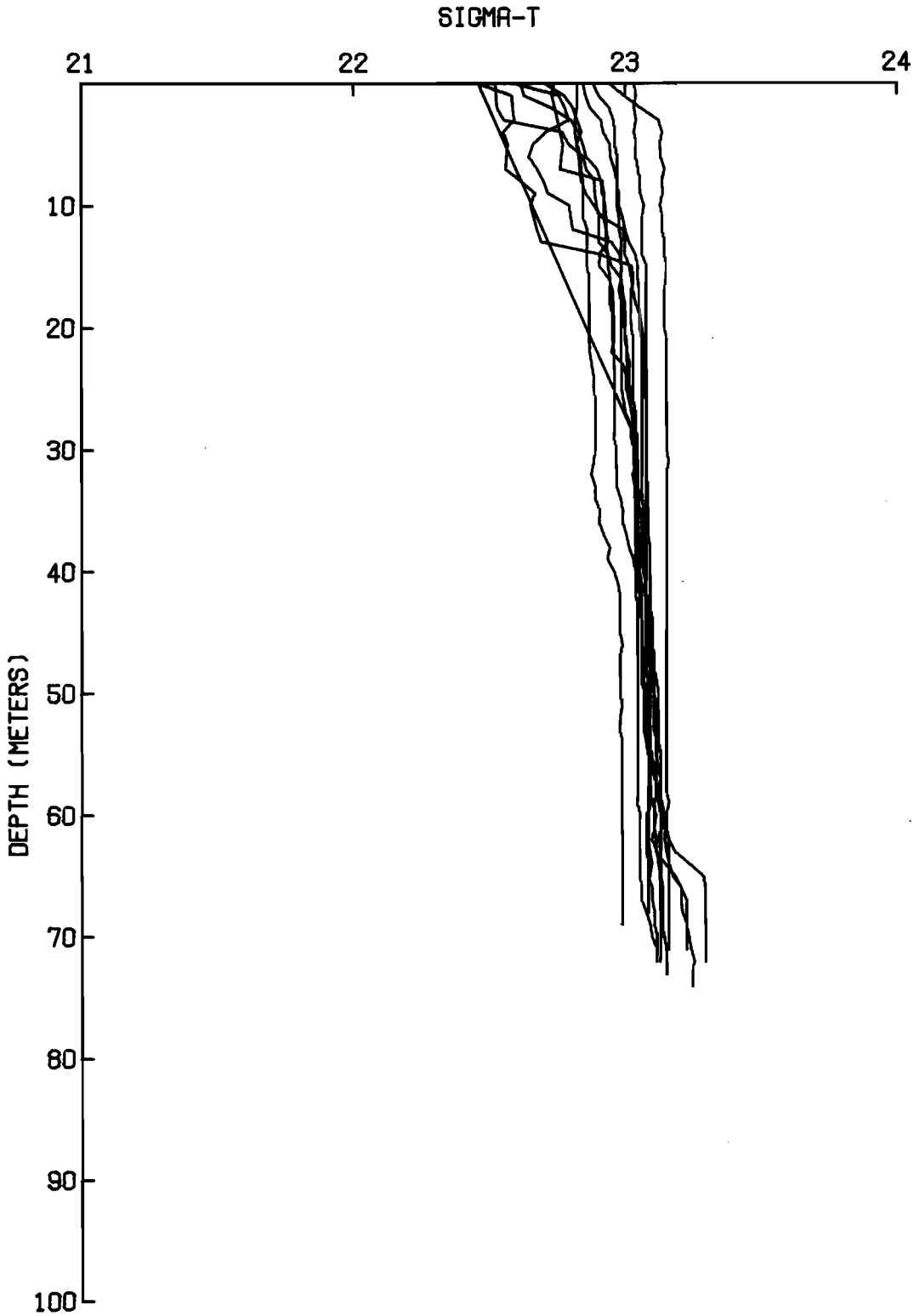


Figure 12.3c. 0606 6 Feb 74 to 0443 7 Feb 74 STATION 27

12.4 Time Series I - Southern end Rosario Strait

6-7 February 1974

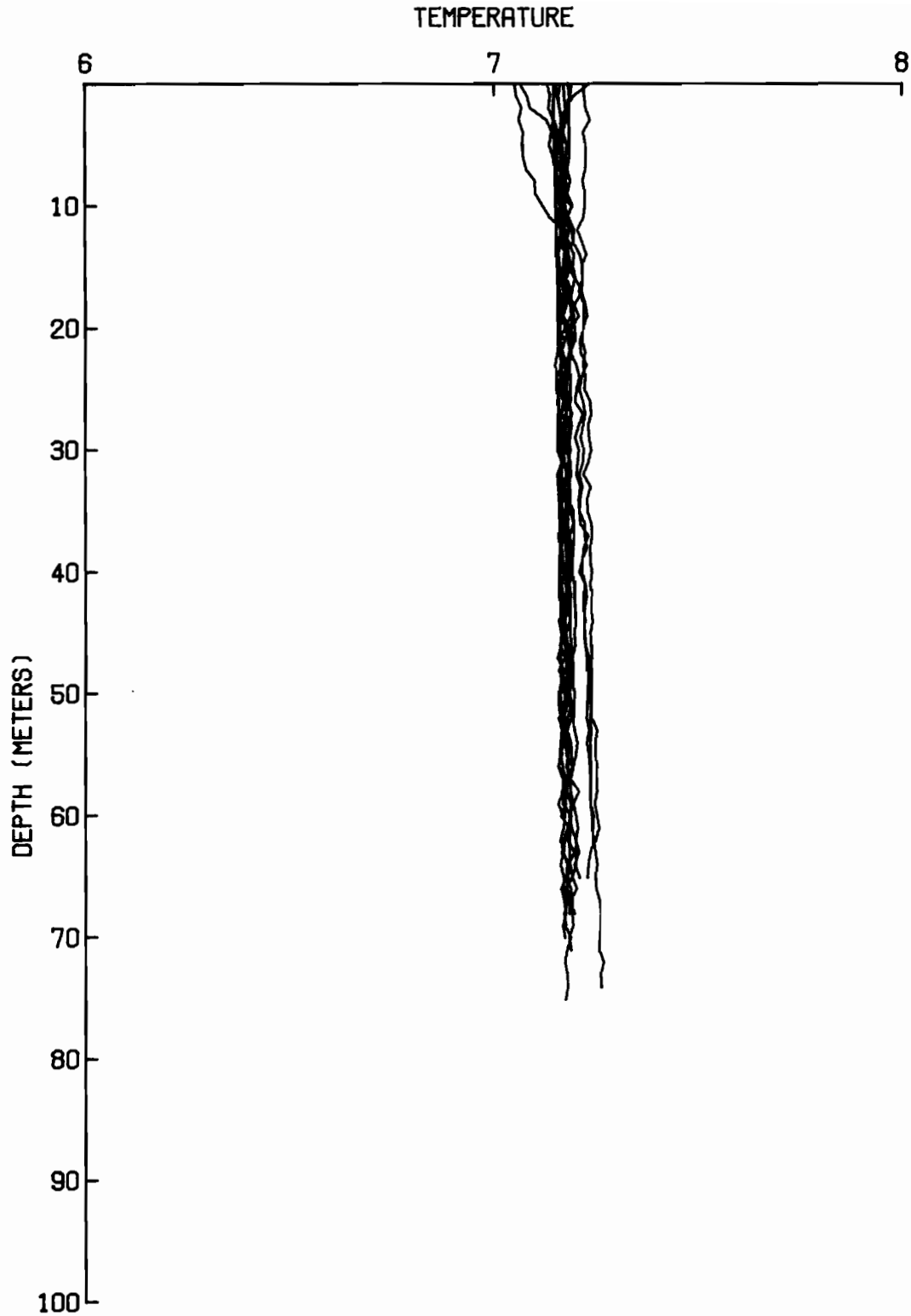


Figure 12.4a. 0549 6 Feb 74 to 0425
7 Feb 74 STATION 26

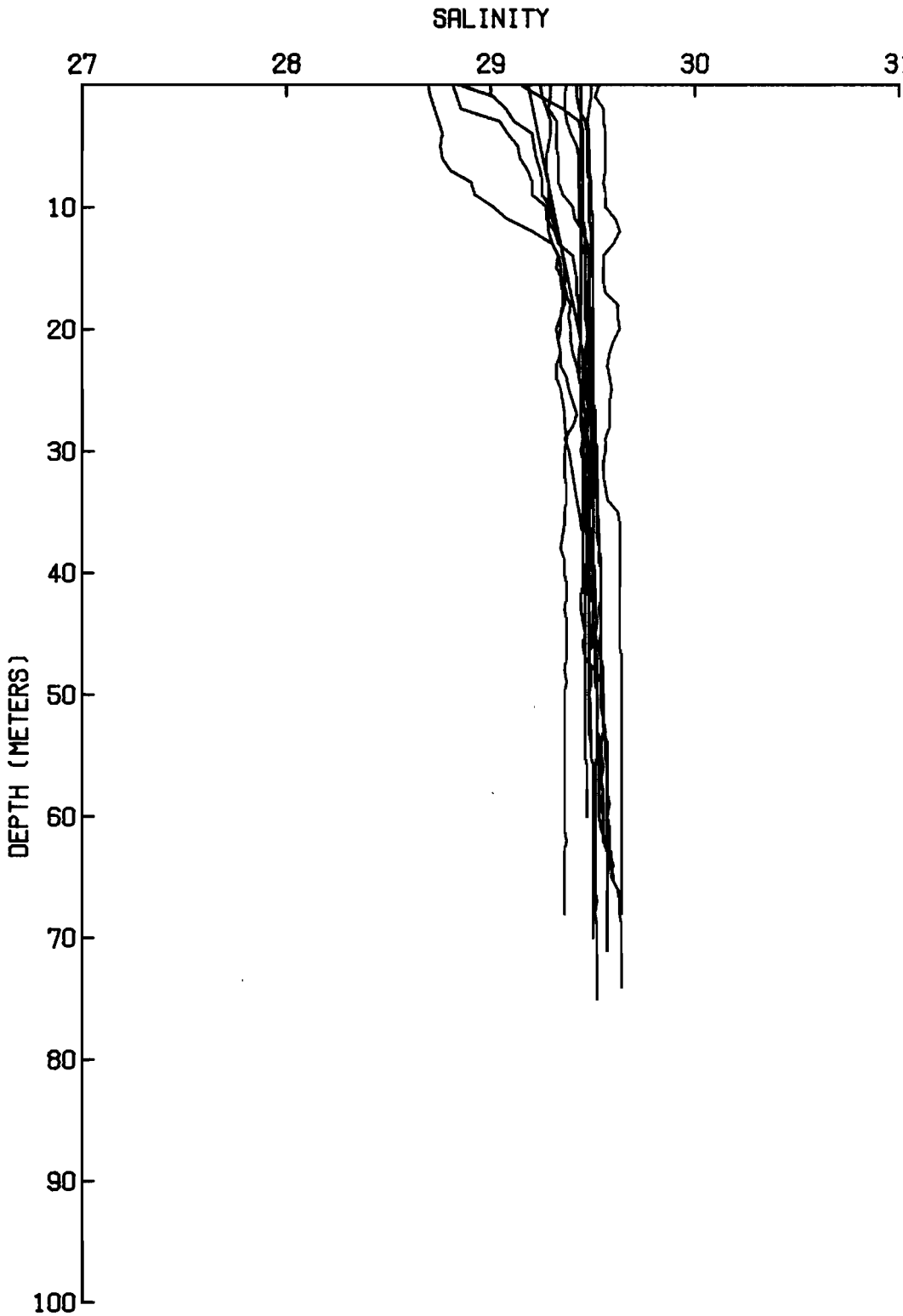


Figure 12.4b. 0549 6 Feb 74 to 0425 7 Feb 74 STATION 26

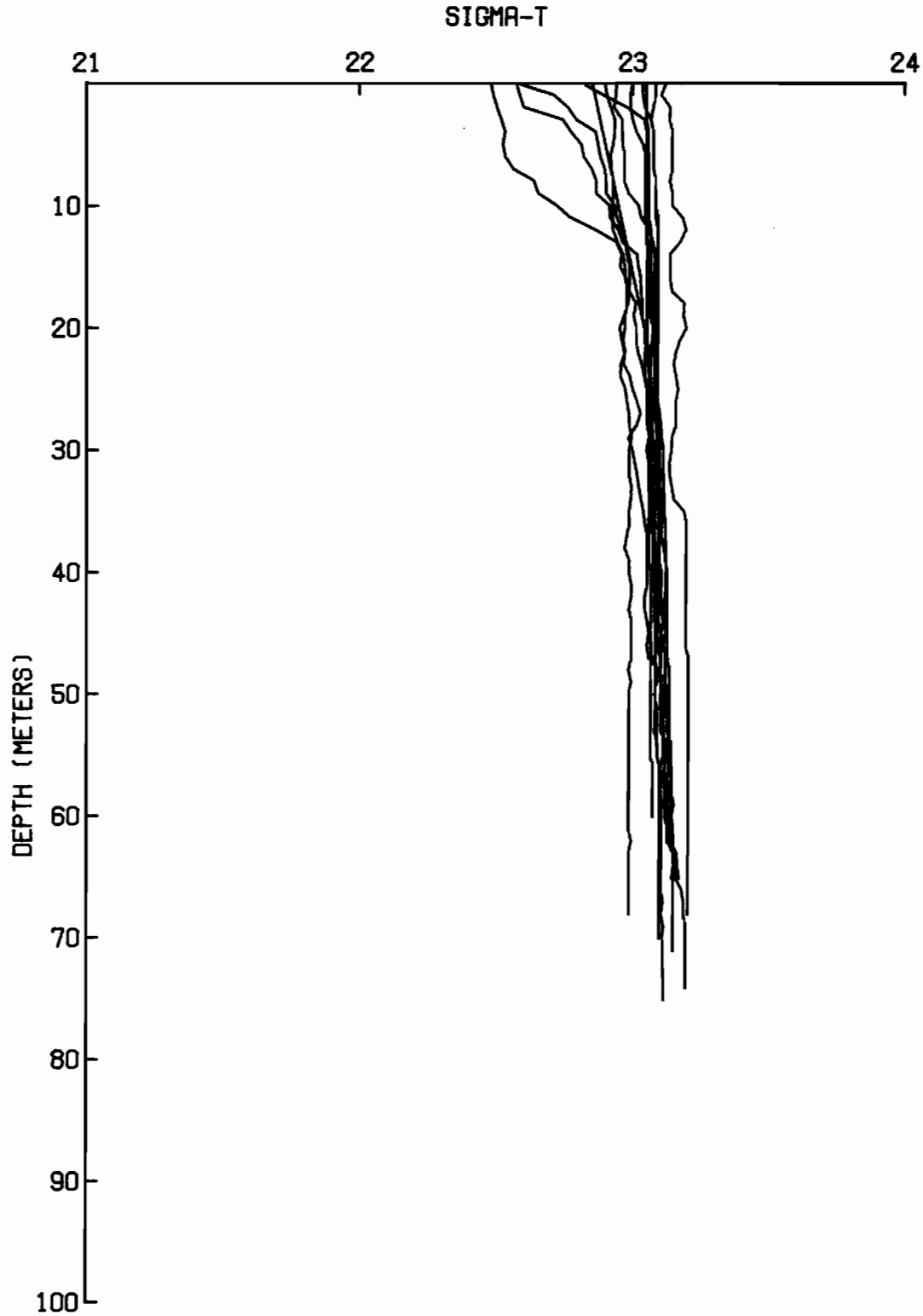


Figure 12.4c. 0549 6 Feb 74 to 0425 7 Feb 74 STATION 26

12.5 Time Series I - Southern end Rosario Strait

6-7 February 1974

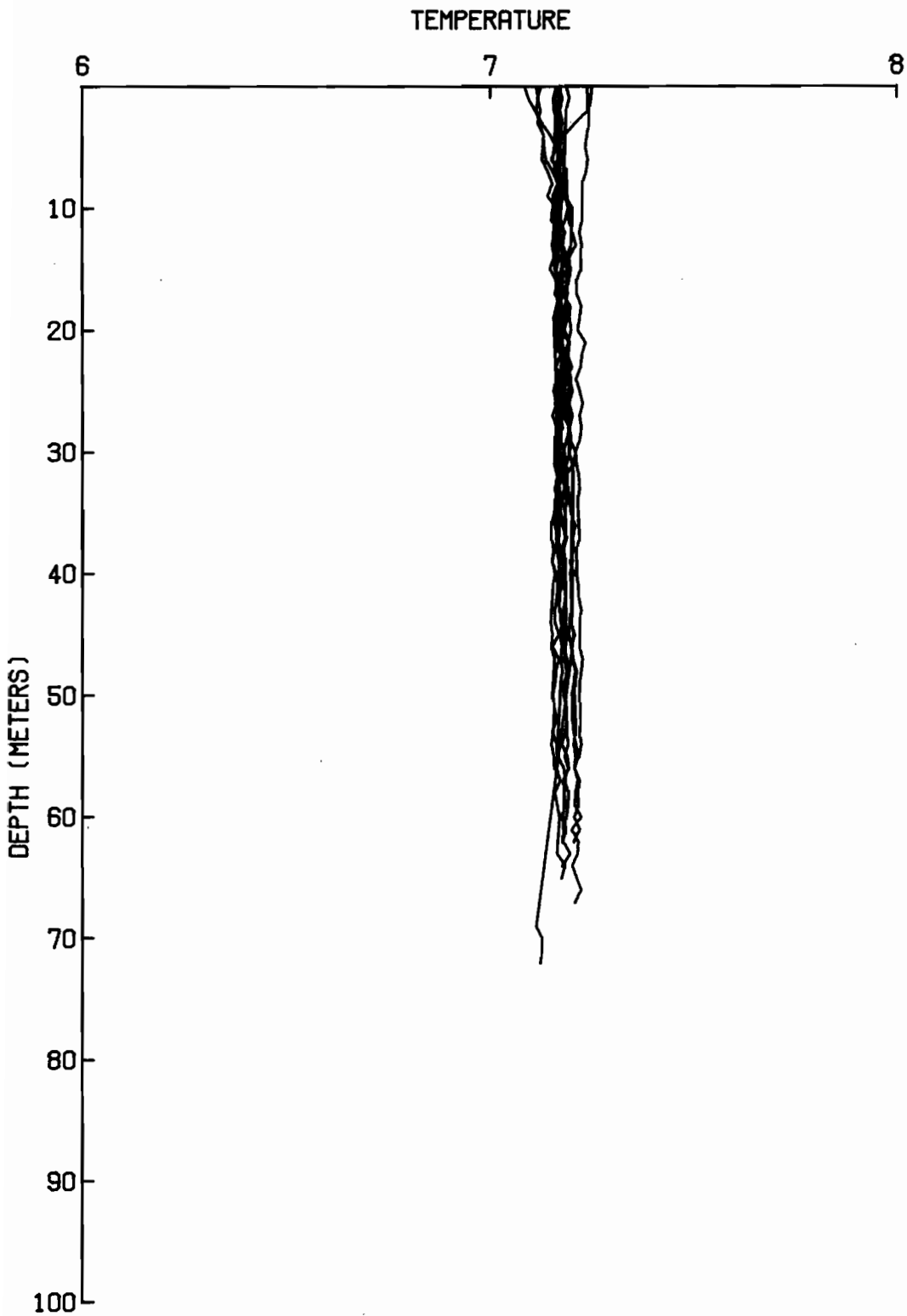


Figure 12.5a. 0535 6 Feb 74 to 0402 7 Feb 74 STATION 25

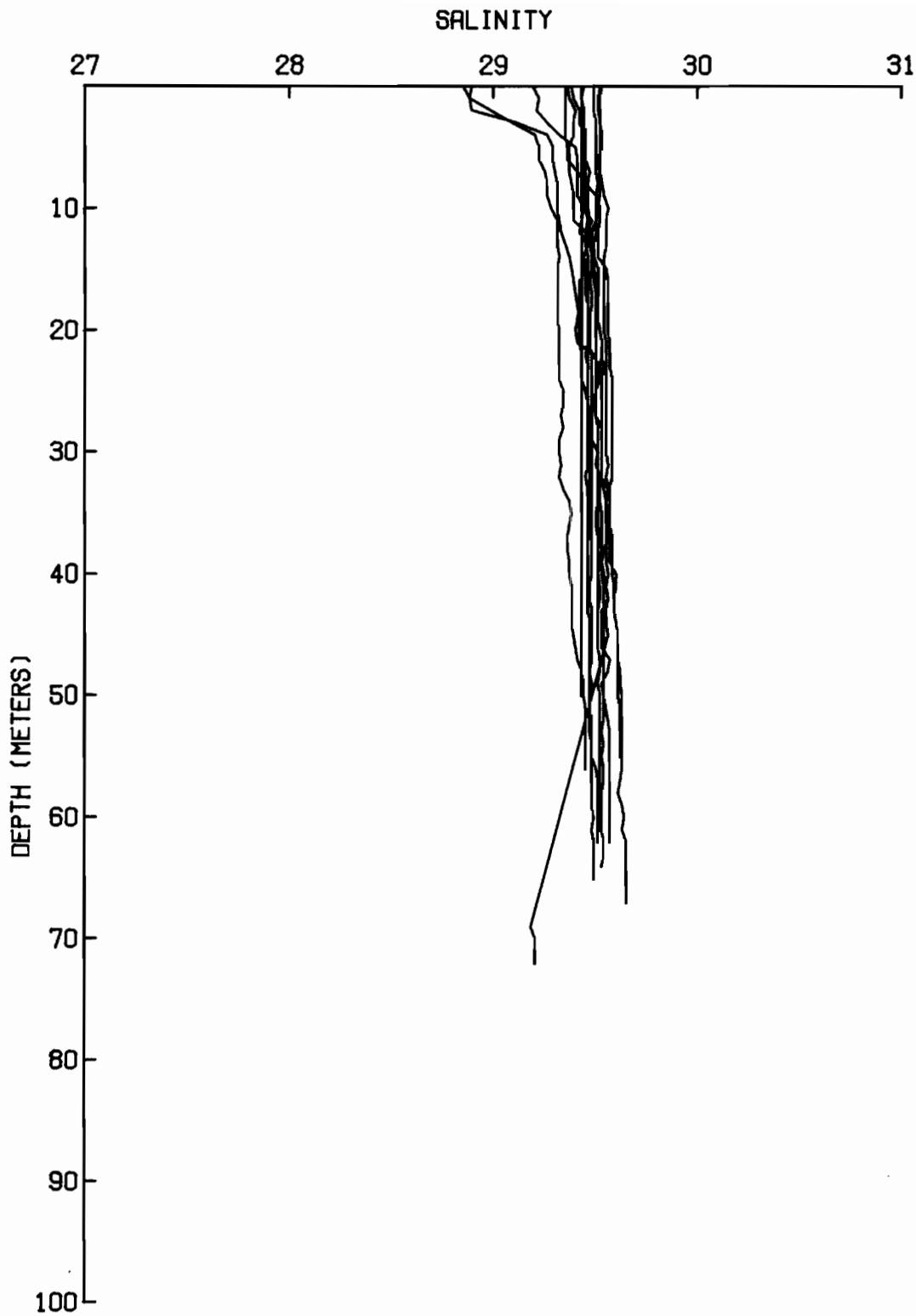


Figure 12.5b. 0535 6 Feb 74 to 0402 7 Feb 74 STATION 25

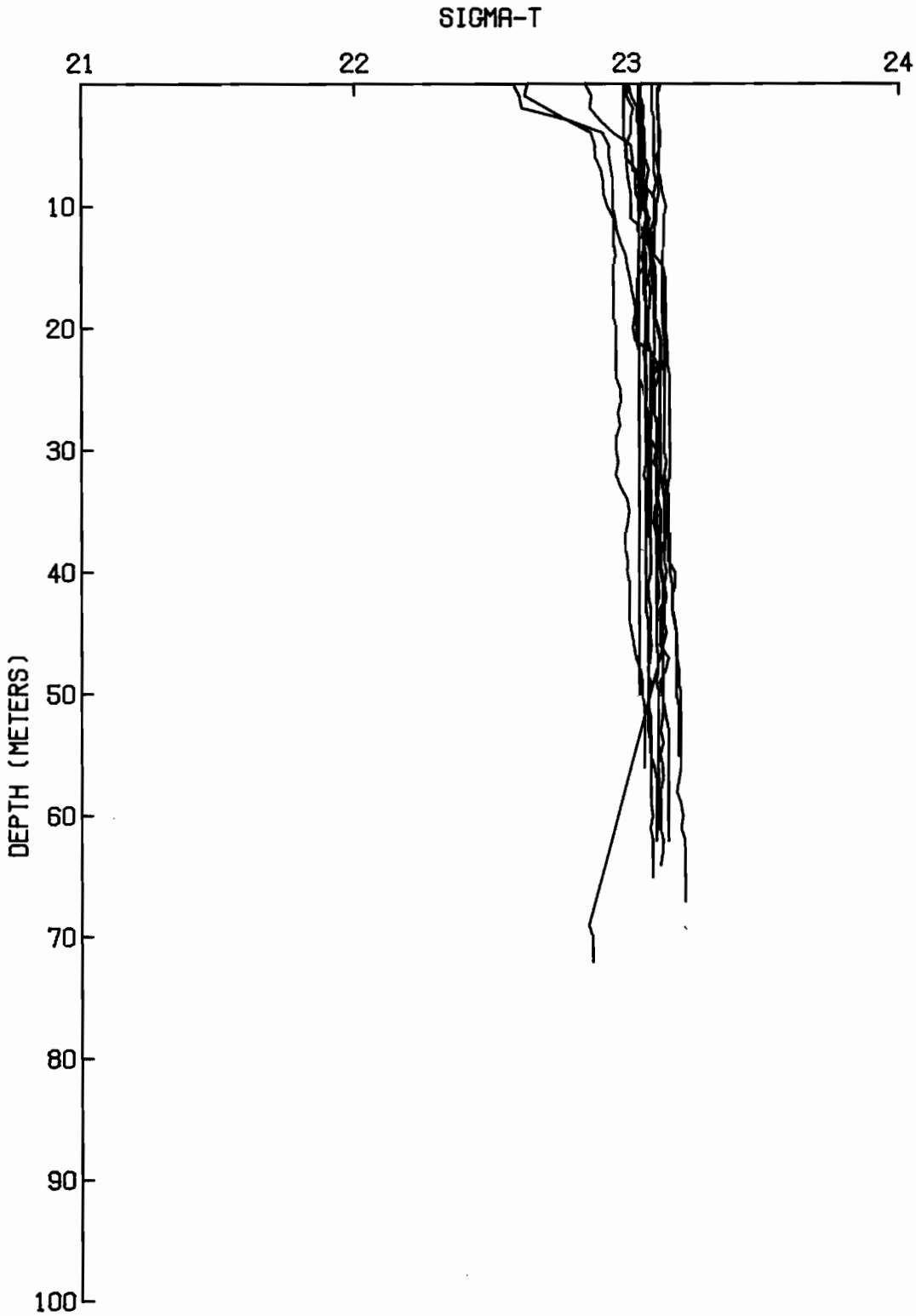


Figure 12.5c. 0535 6 Feb 74 to 0402 7 Feb 74 STATION 25

13.1 Time Series II - Northern end Rosario Strait

19-20 March 1974

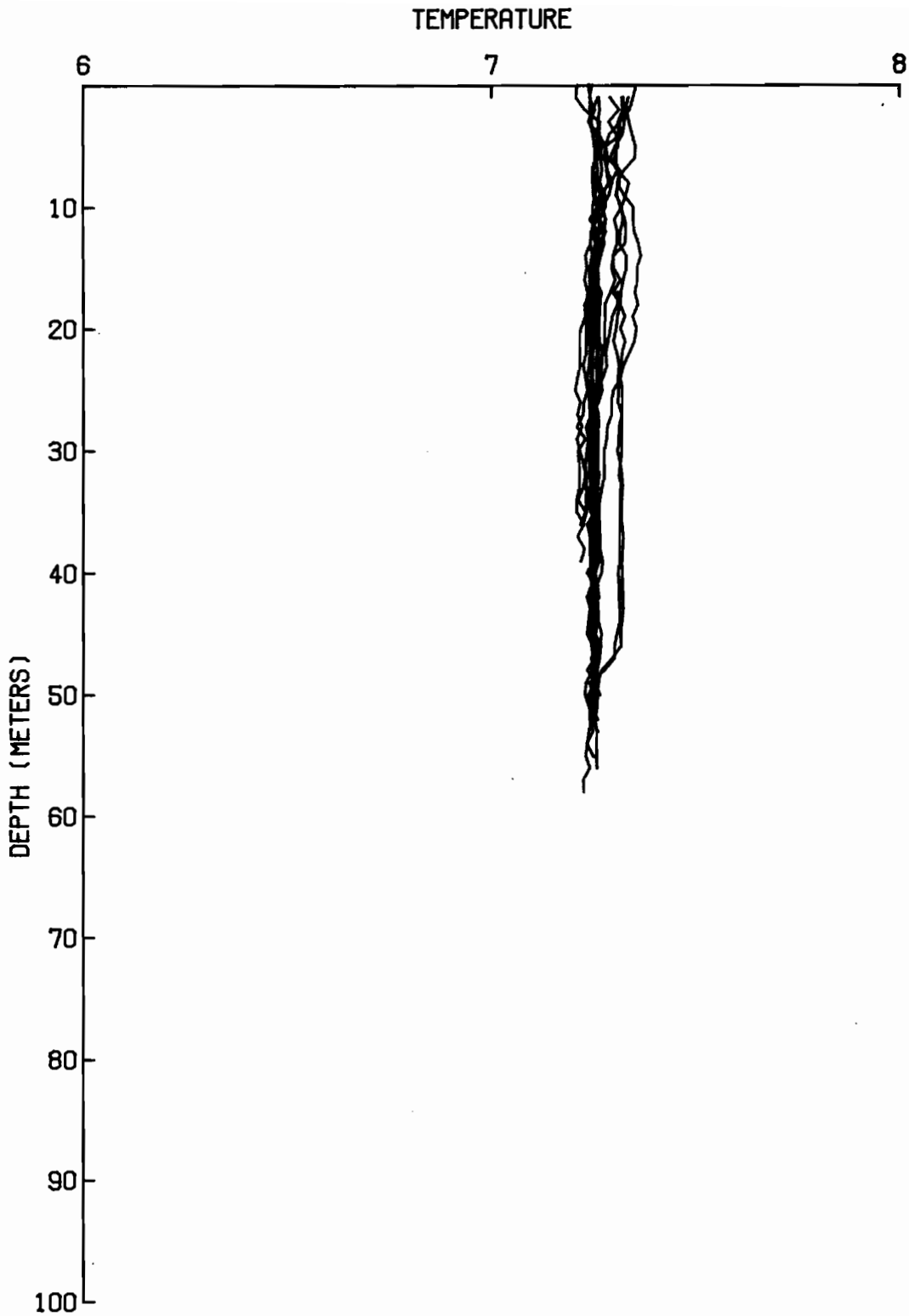


Figure 13.1a. 0814 19 Mar 74 to 0540 20 Mar 74 STATION 34

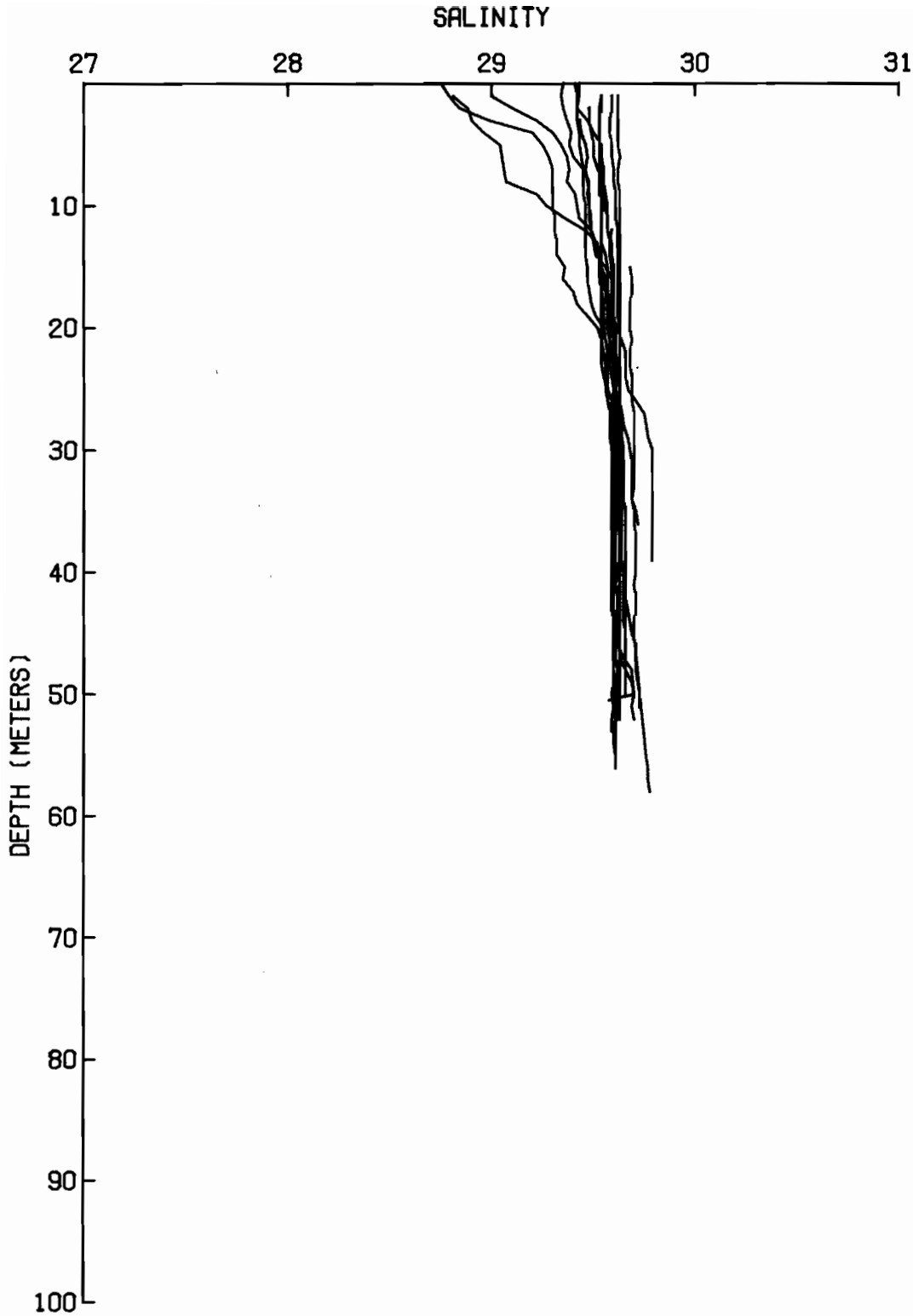


Figure 13.1b. 0814 19 Mar 74 to 0540 20 Mar 74 STATION 34

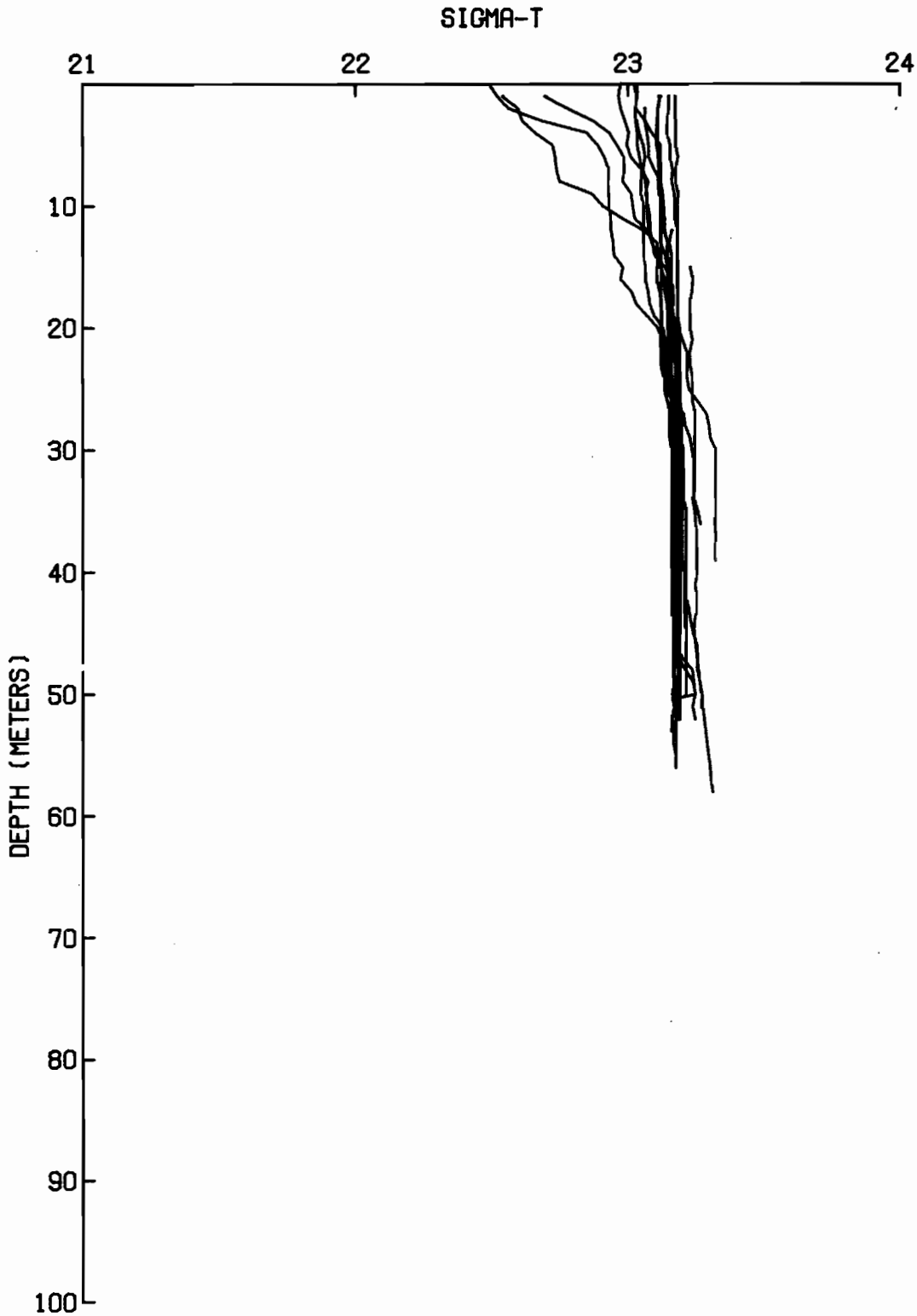


Figure 13.1c. 0814 19 Mar 74 to 0540
20 Mar 74 STATION 34

13.2 Time Series II - Northern end Rosario Strait

19-20 March 1974

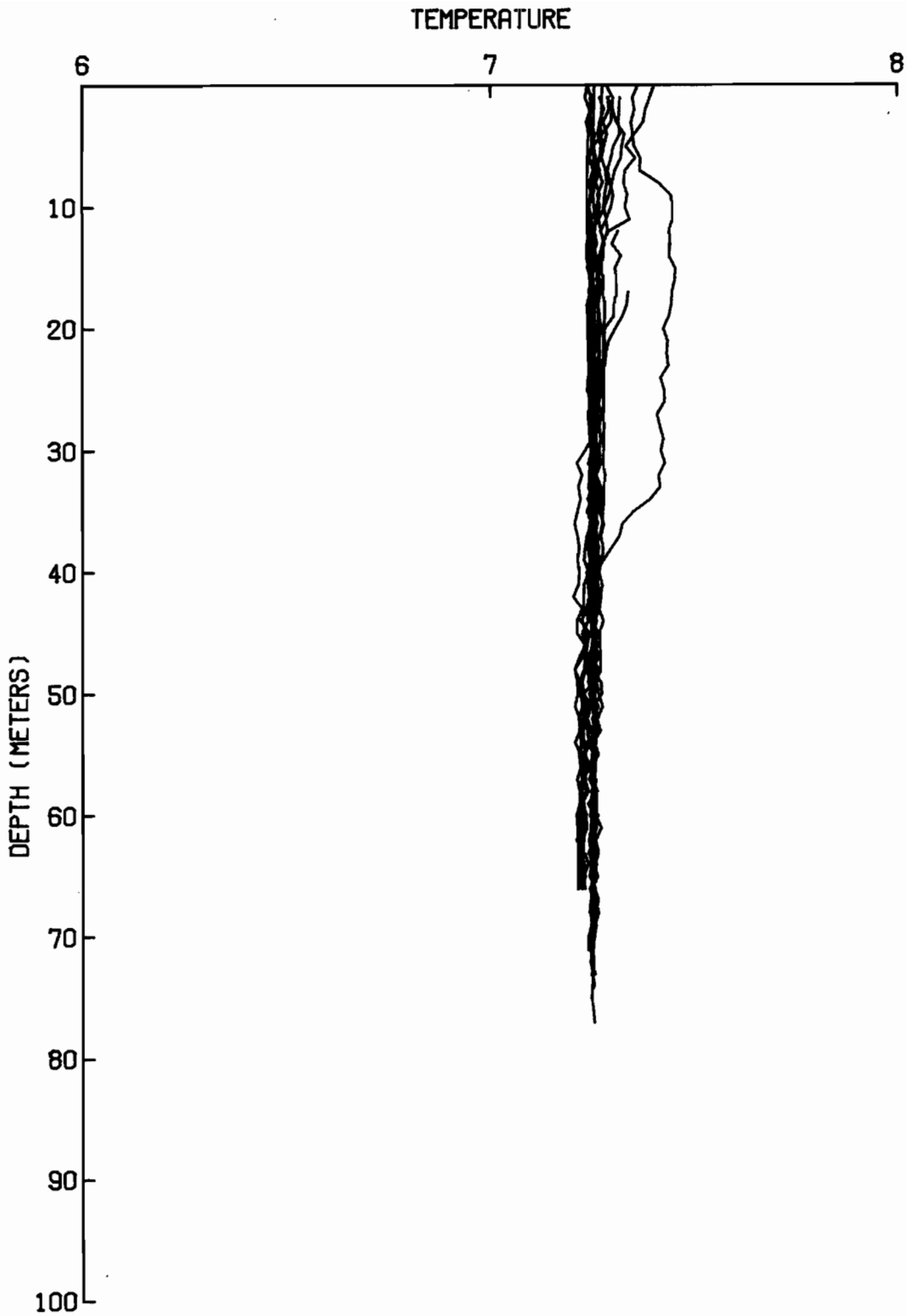


Figure 13.2a. 0800 19 Mar 74 to 0527
20 Mar 74 STATION 33

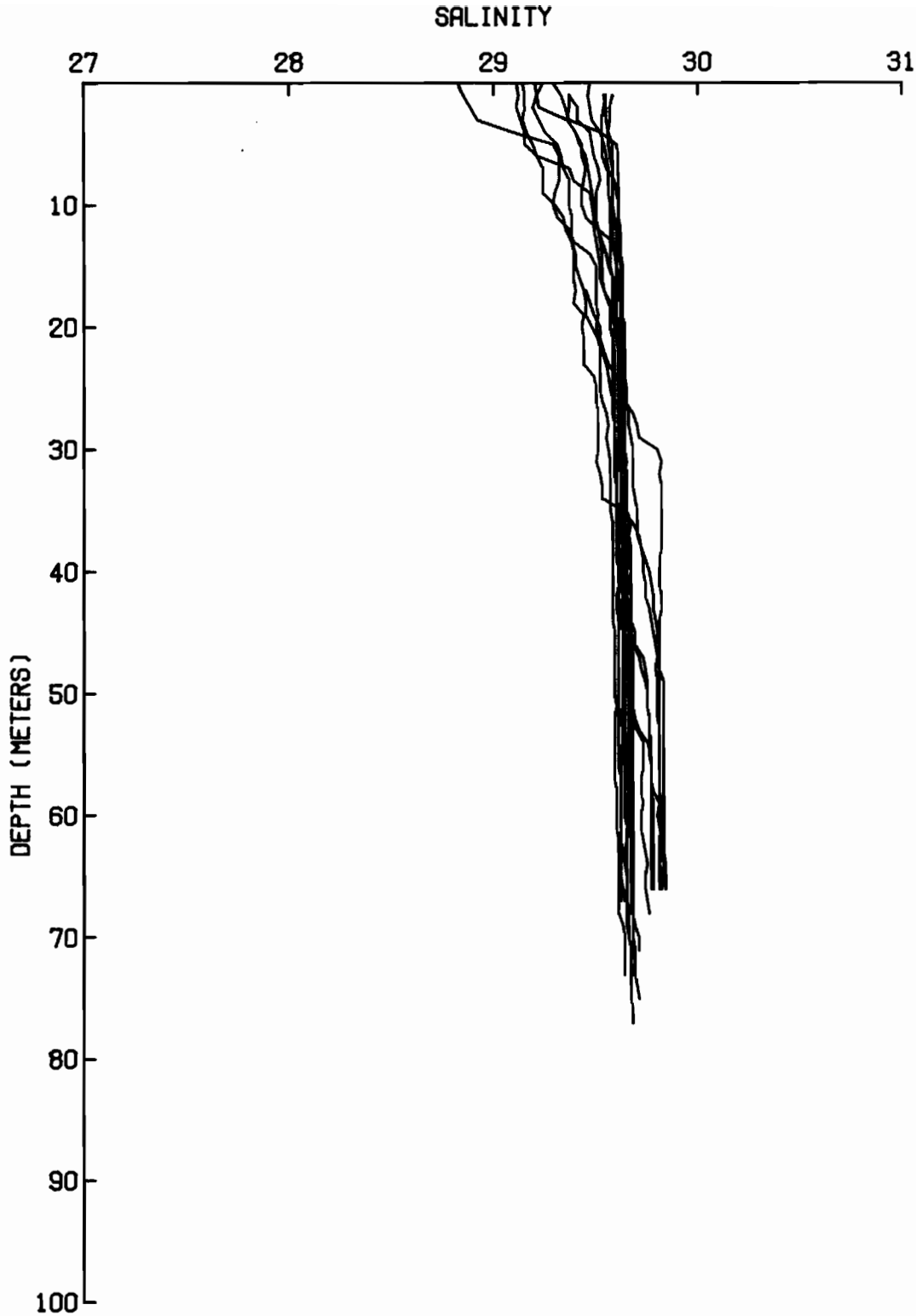


Figure 13.2b. 0800 19 Mar 74 to 0527 20 Mar 74 STATION 33

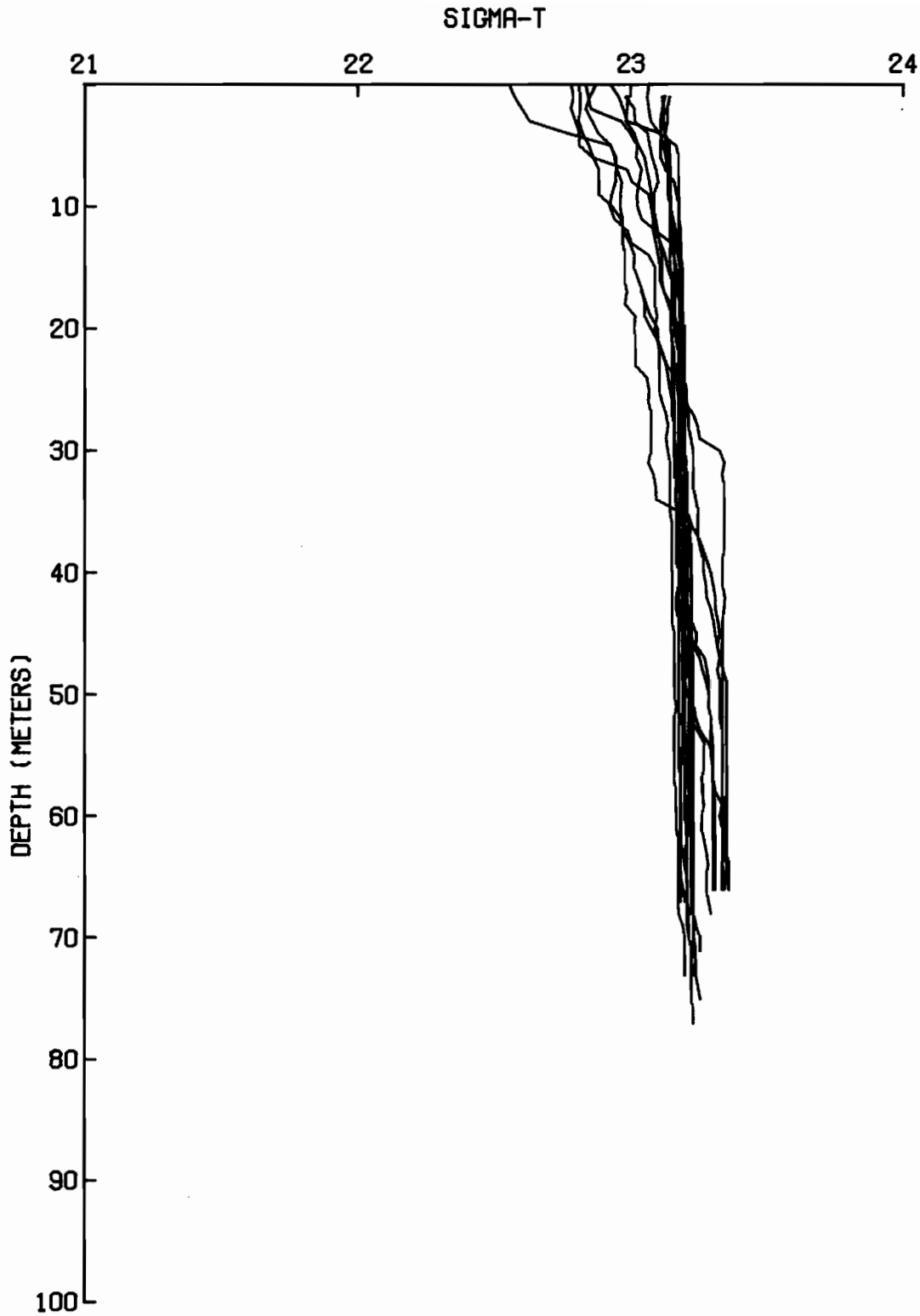


Figure 13.2c. 0800 19 Mar 74 to 0527
20 Mar 74 STATION 33

13.3 Time Series II - Northern end Rosario Strait

19-20 March 1974

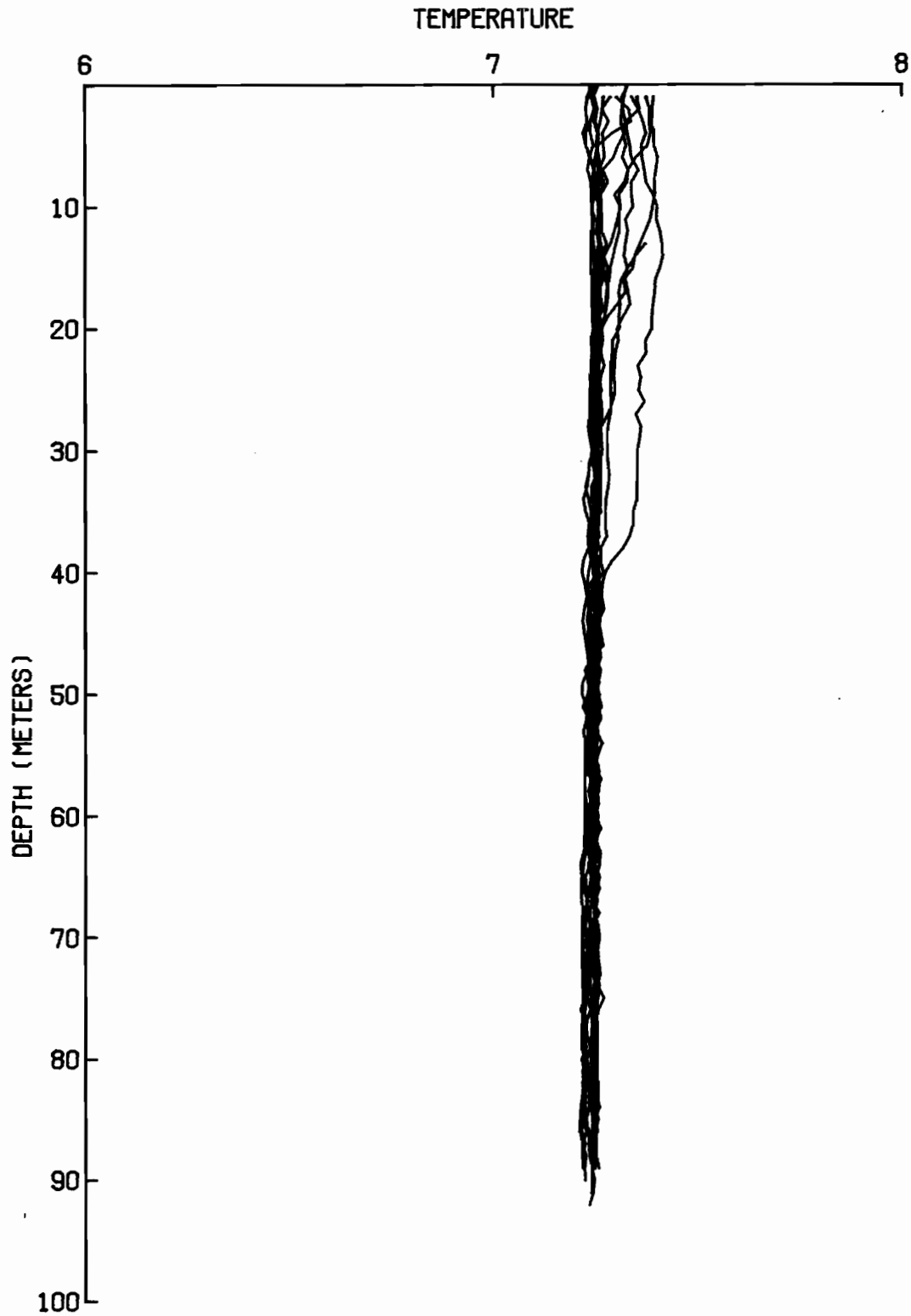


Figure 13.3a. 9741 19 Mar 74 to 0512 20 Mar 74 STATION 32

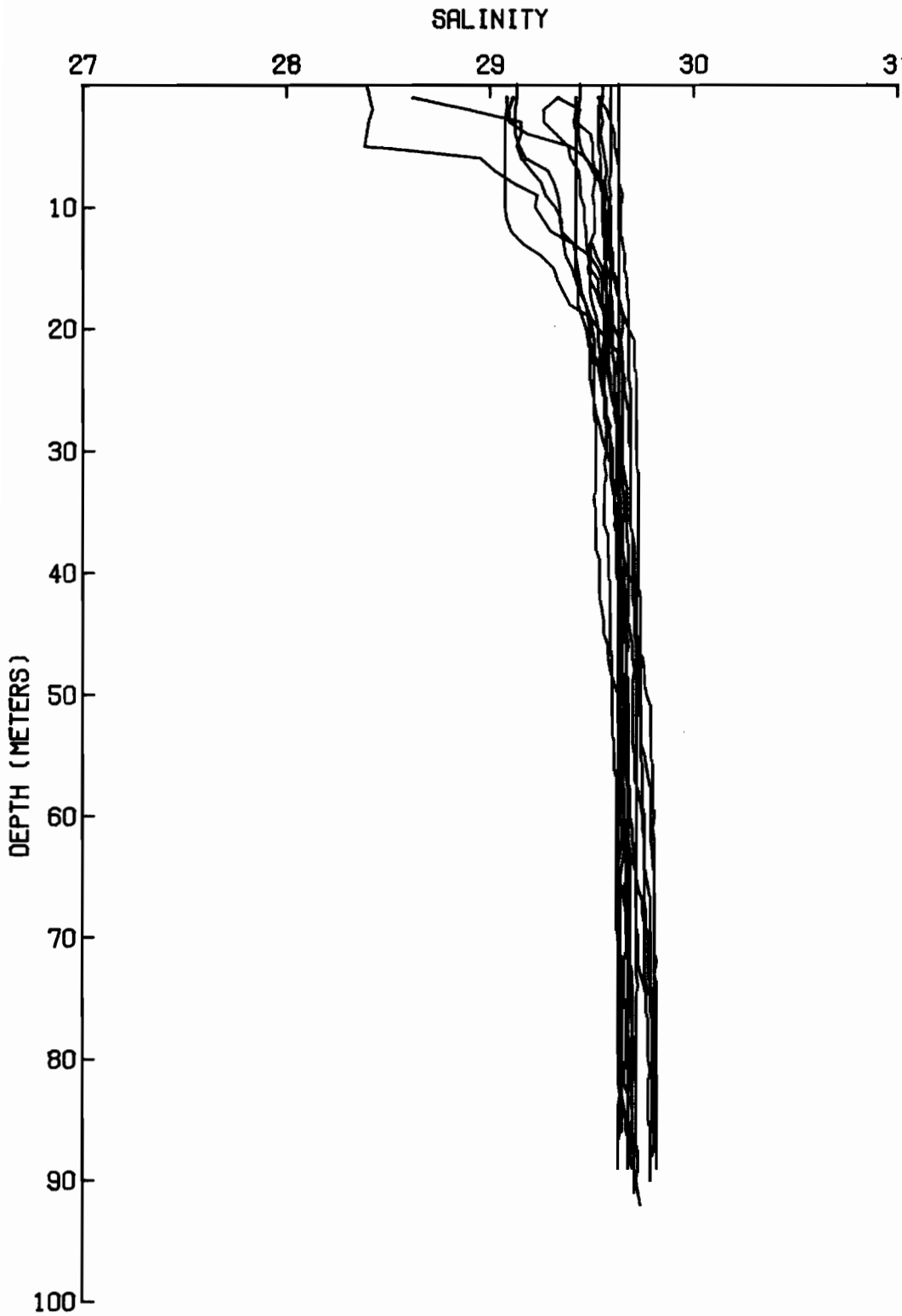


Figure 13.3b. 0741 19 Mar 74 to 0512 20 Mar 74 STATION 32

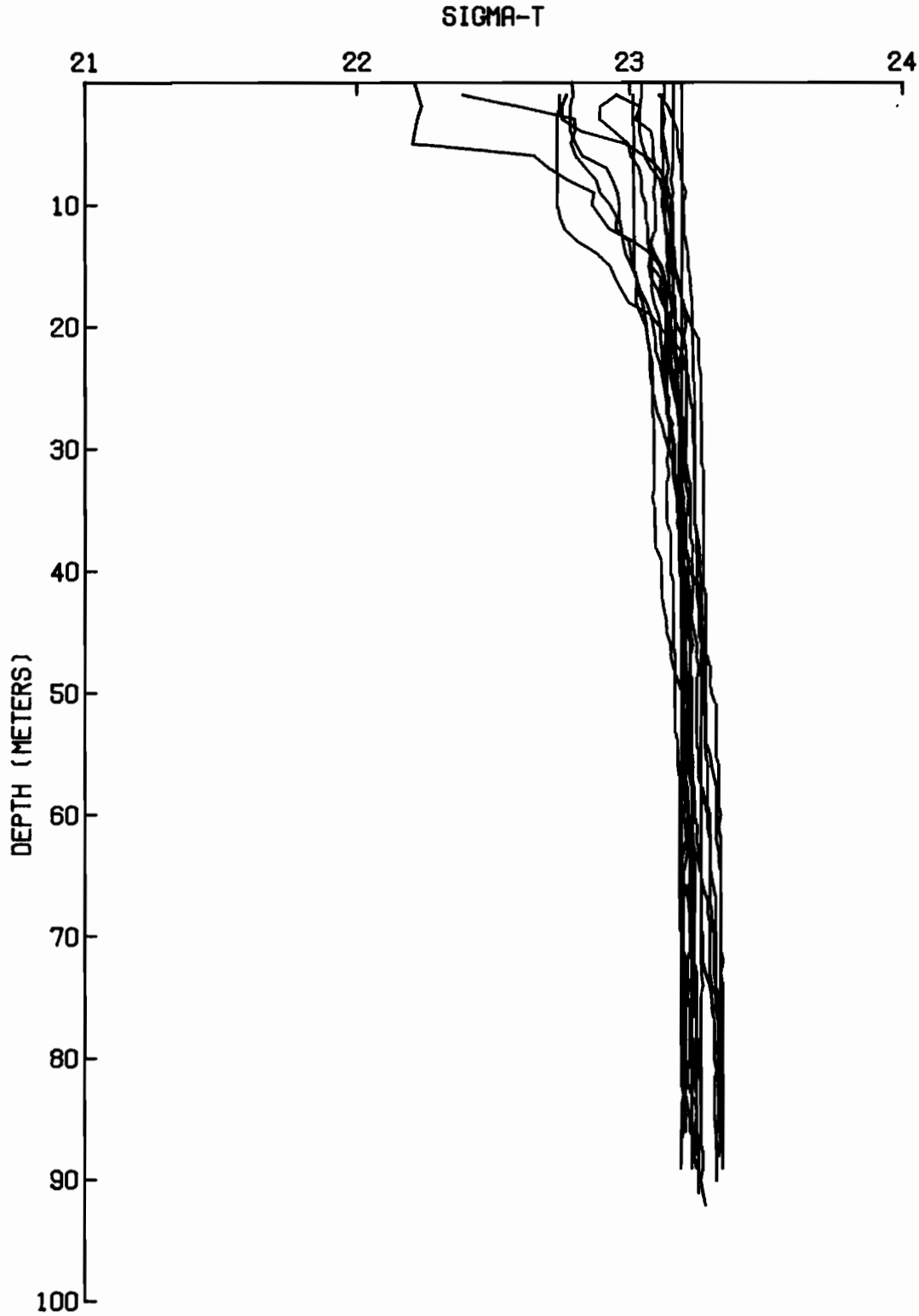


Figure 13.3c. 0741 19 Mar 74 to 0512
20 Mar 74 STATION 32

13.4 Time Series II - Northern end Rosario Strait

19-20 March 1974

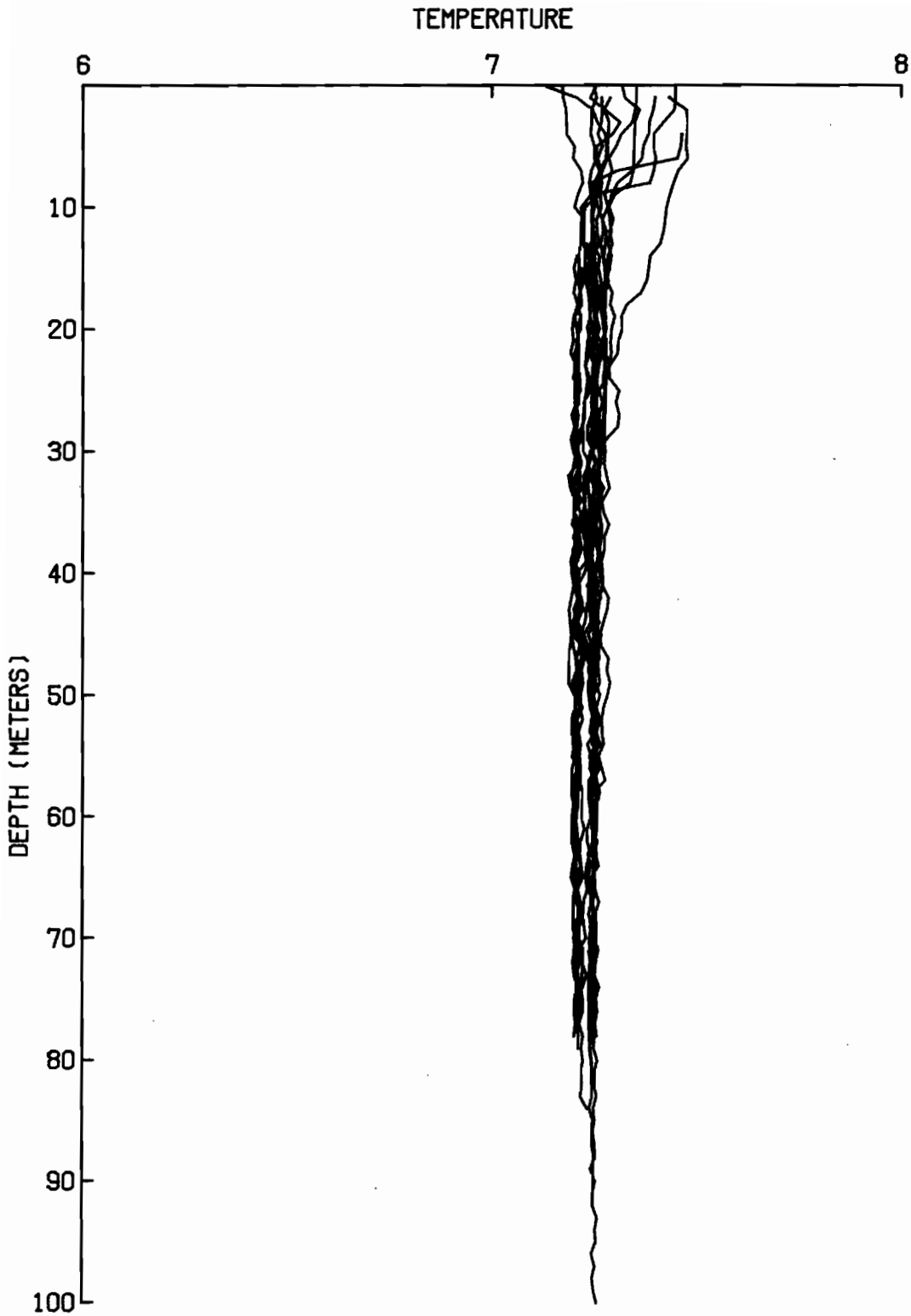


Figure 13.4a. 0718 19 Mar 74 to 0451 20 Mar 74 STATION 31

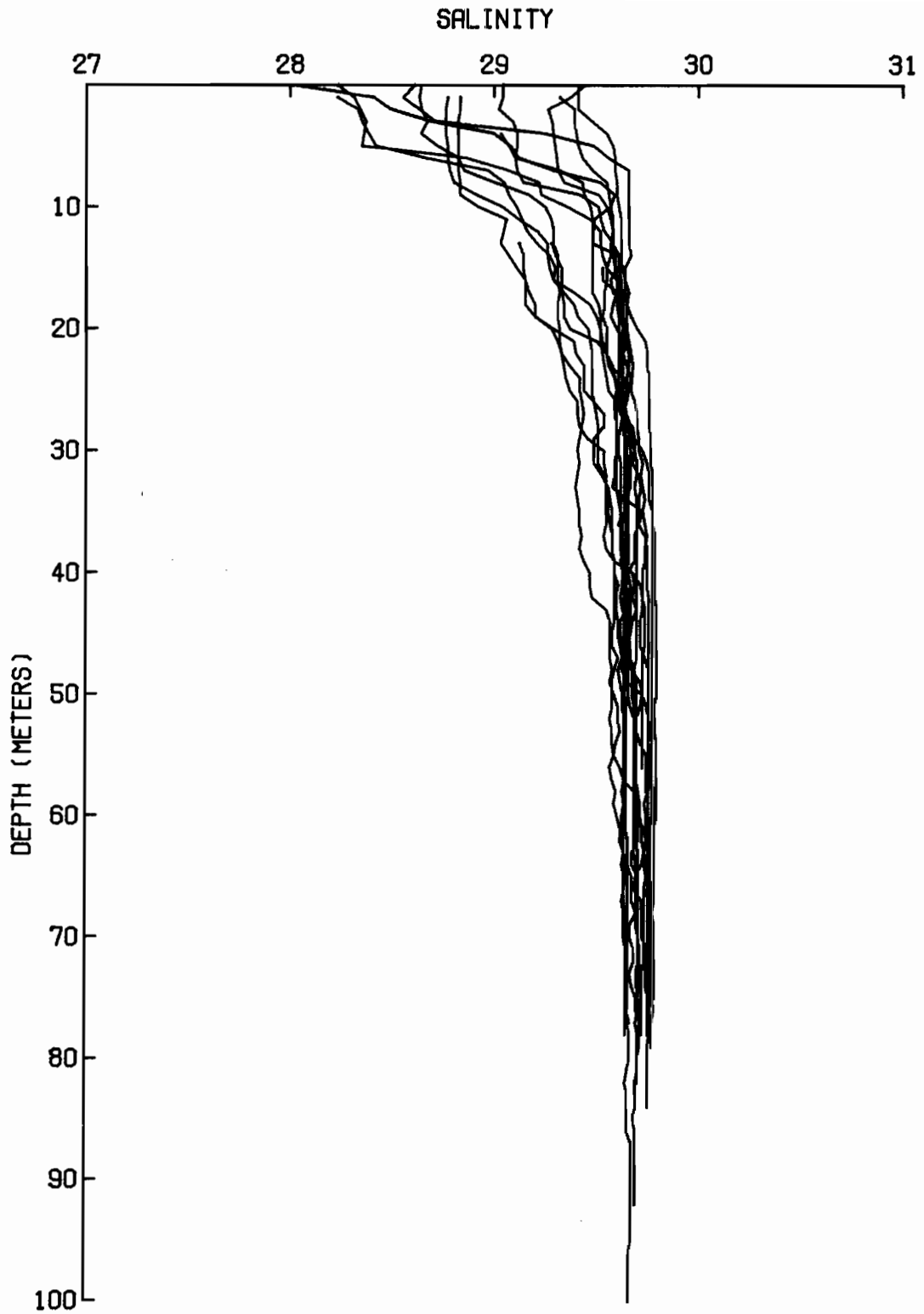


Figure 13.4b. 0718 19 Mar 74 to 0451 20 Mar 74 STATION 31

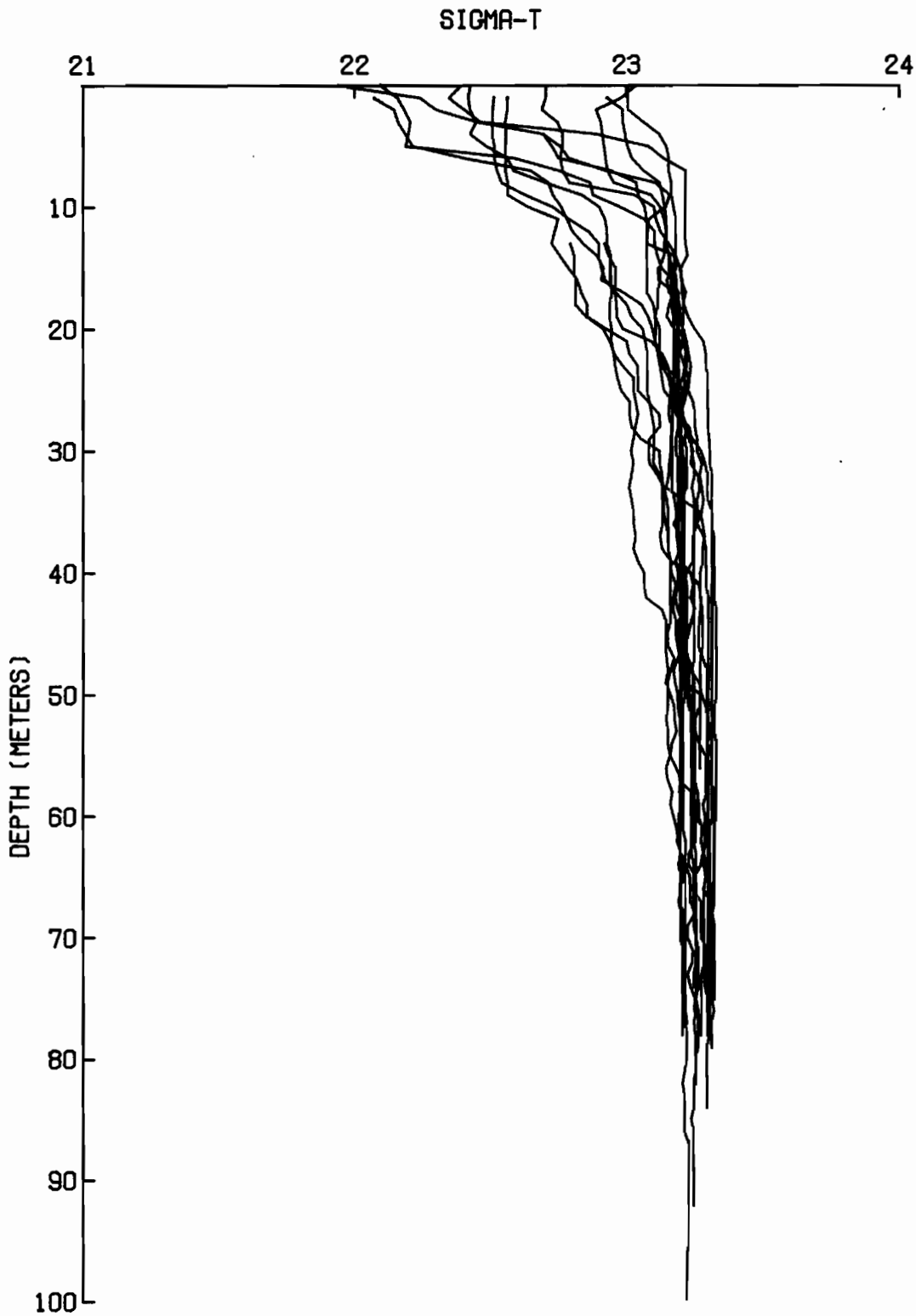


Figure 13.4c. 0718 19 Mar 74 to 0451 20 Mar 74 STATION 31

Drogue Series I Southern Rosario Strait,

6 February 1974

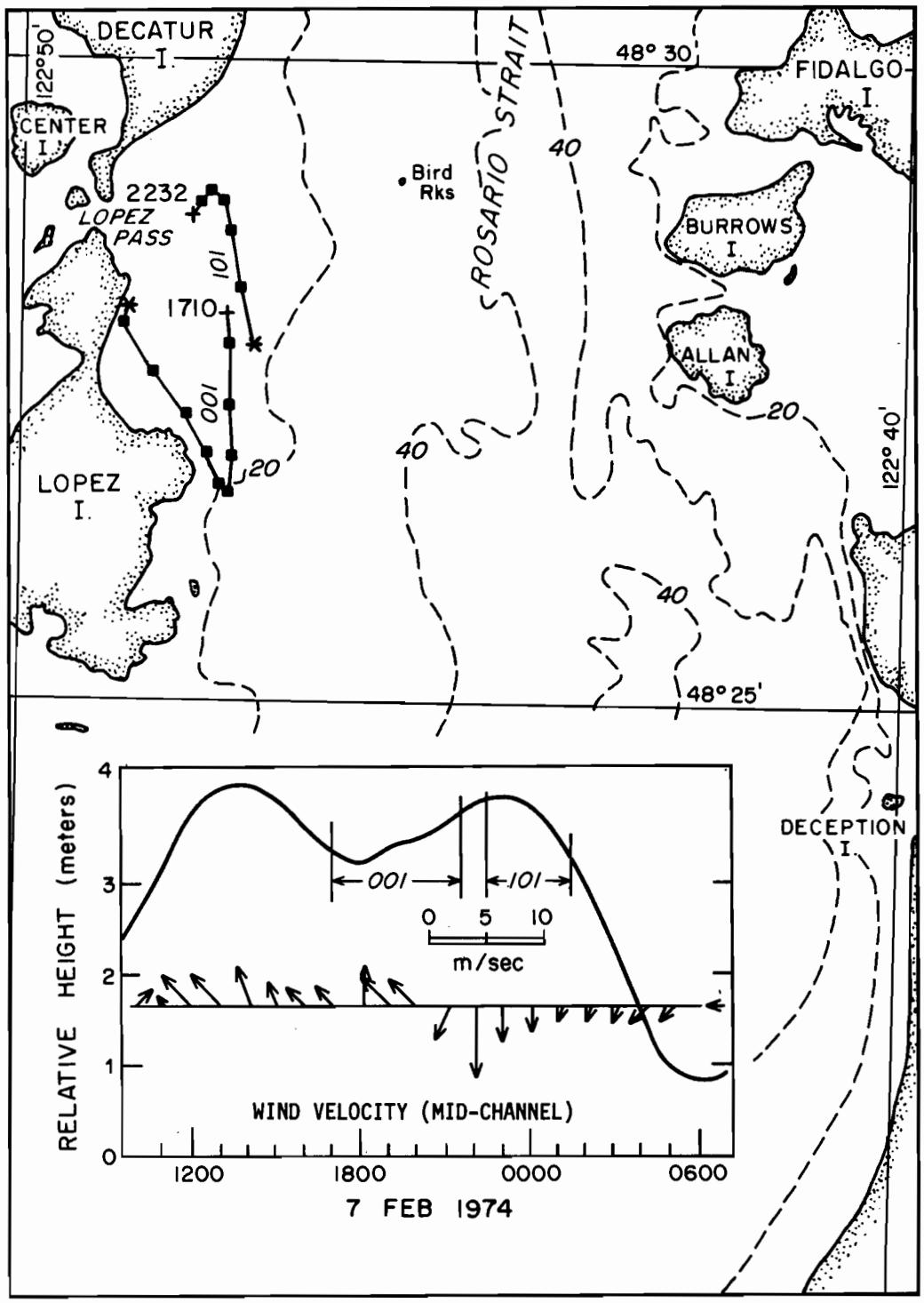


Figure 14.1. Drogue Series I Southern Rosario Strait, 6 February 1974 Drogue 001 (redeployed as 101)

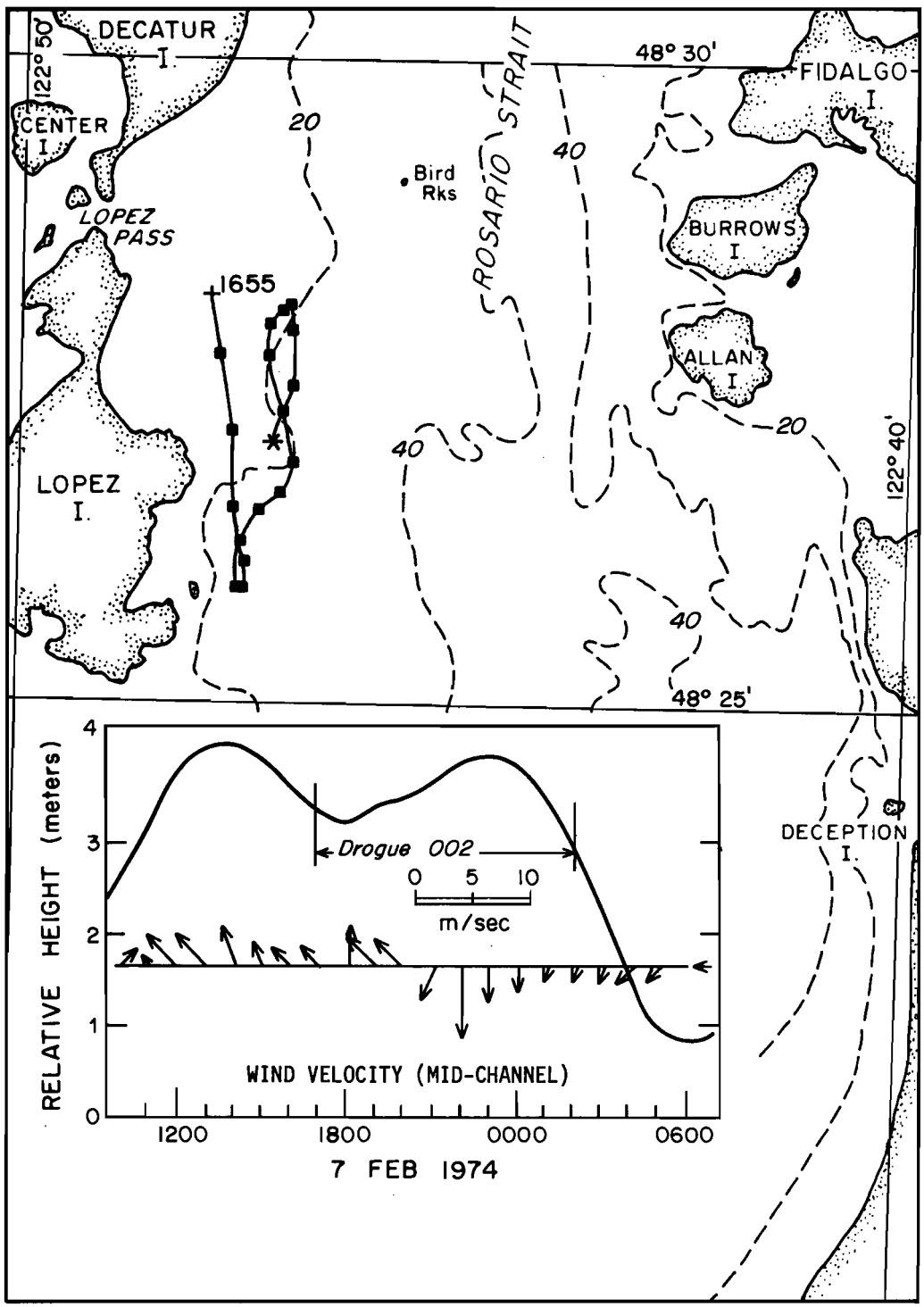


Figure 14.2. Drogue Series I Southern Rosario Strait, 6 February 1974 Drogue 002

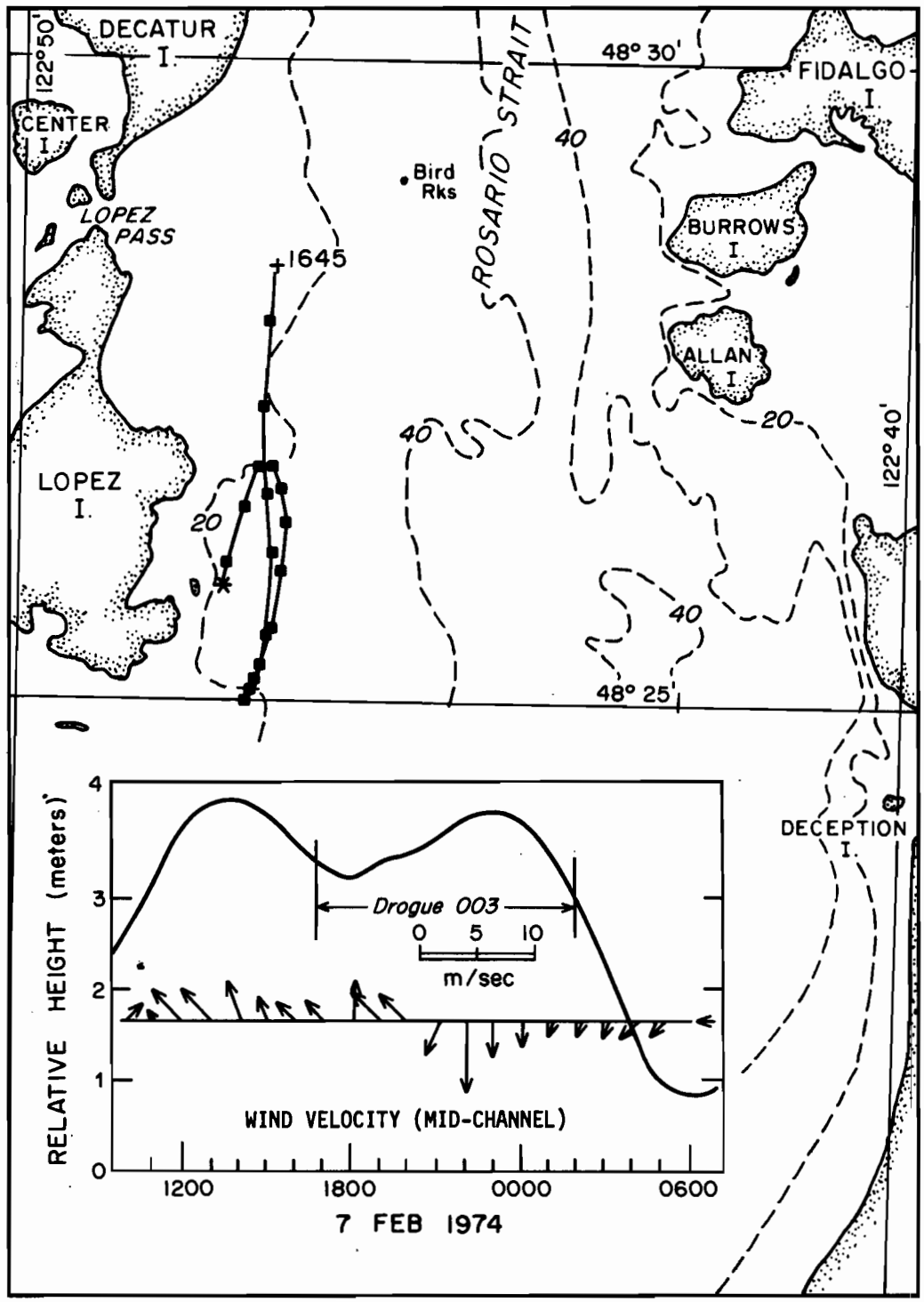


Figure 14.3. Drogue Series I Southern Rosario Strait, 6 February 1974 Drogue 003

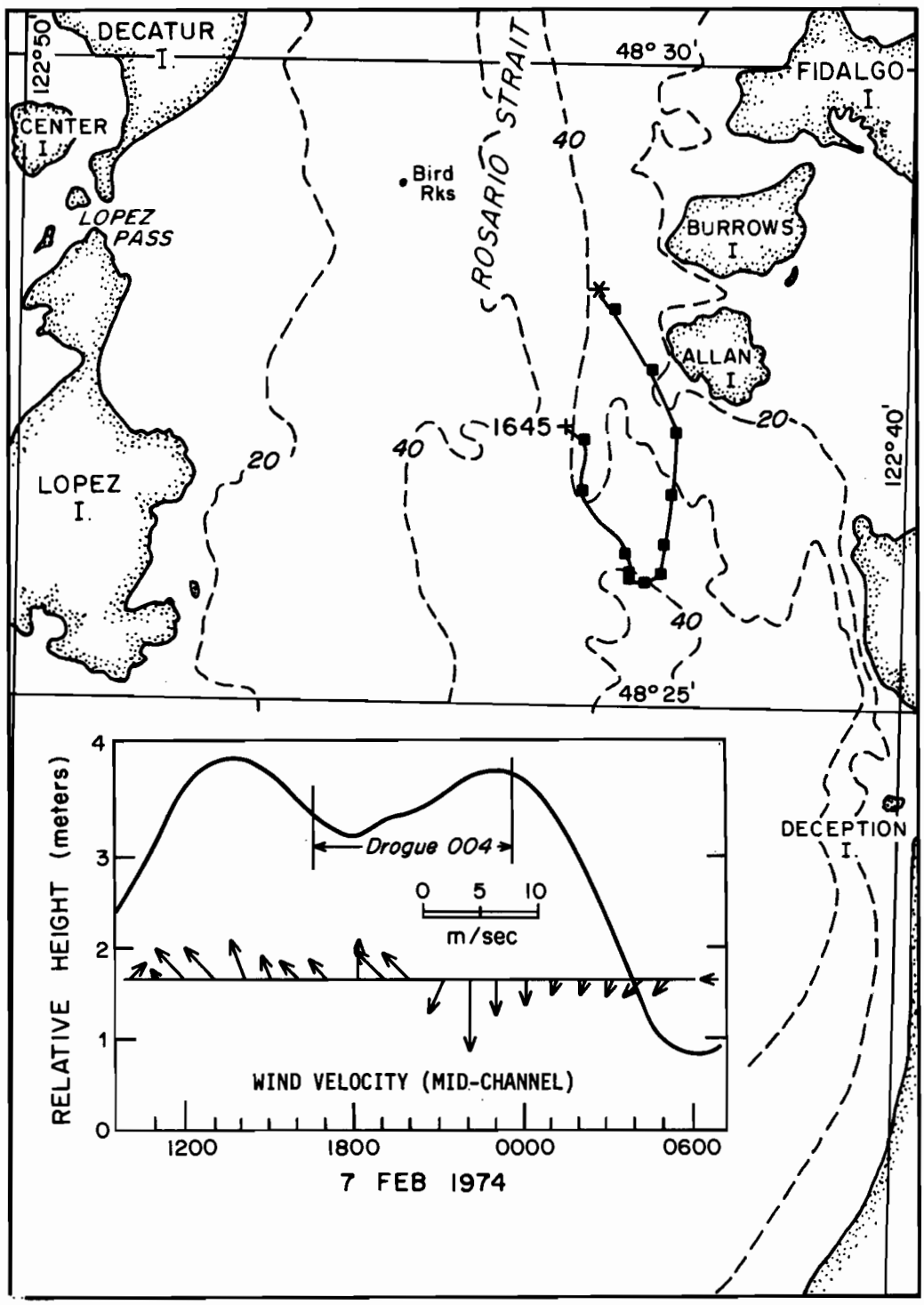


Figure 14.4. Drogue Series I Southern Rosario Strait, 6 February 1974 Drogue 004

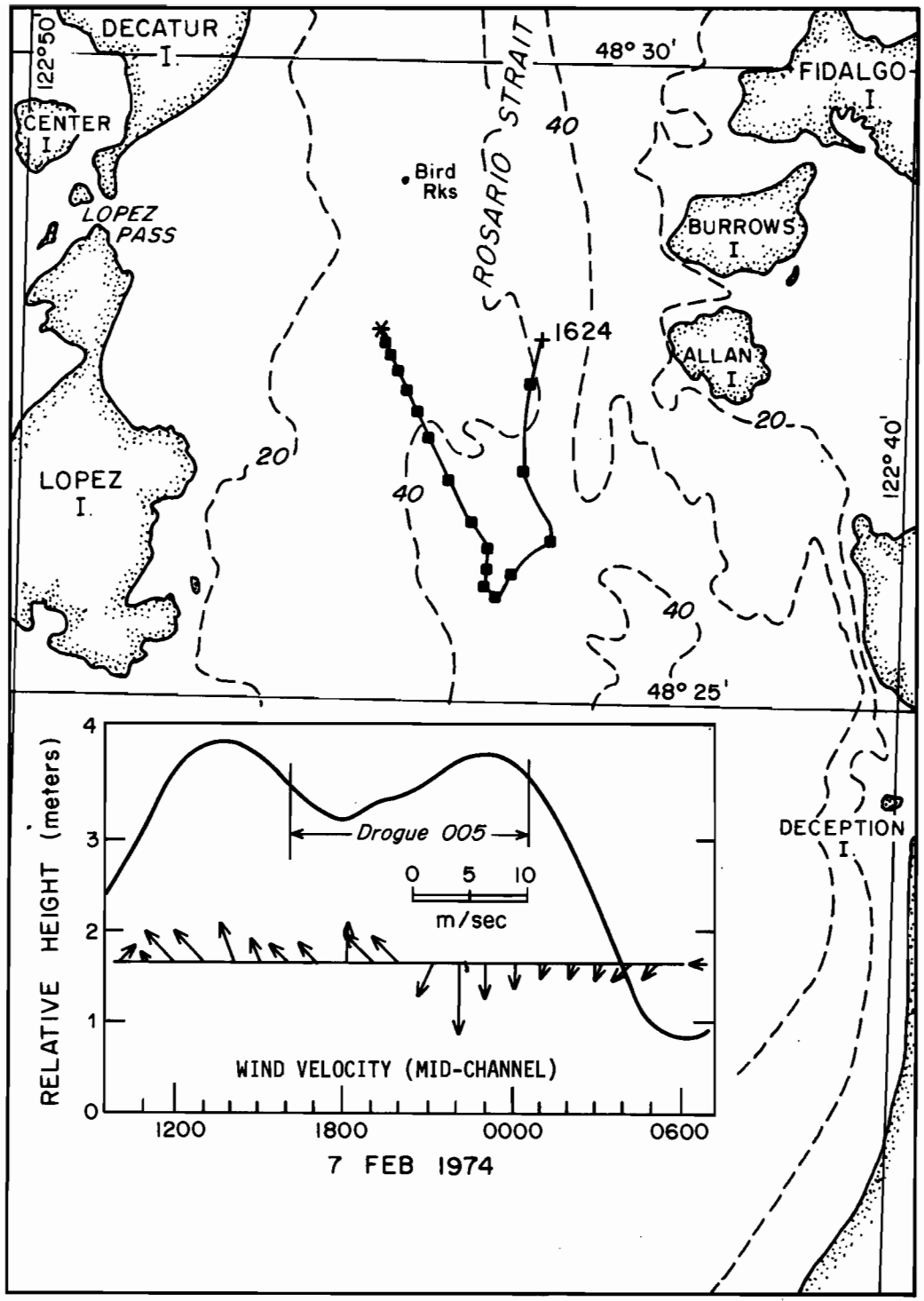


Figure 14.5. Drogue Series I Southern Rosario Strait, 6 February 1974 Drogue 005

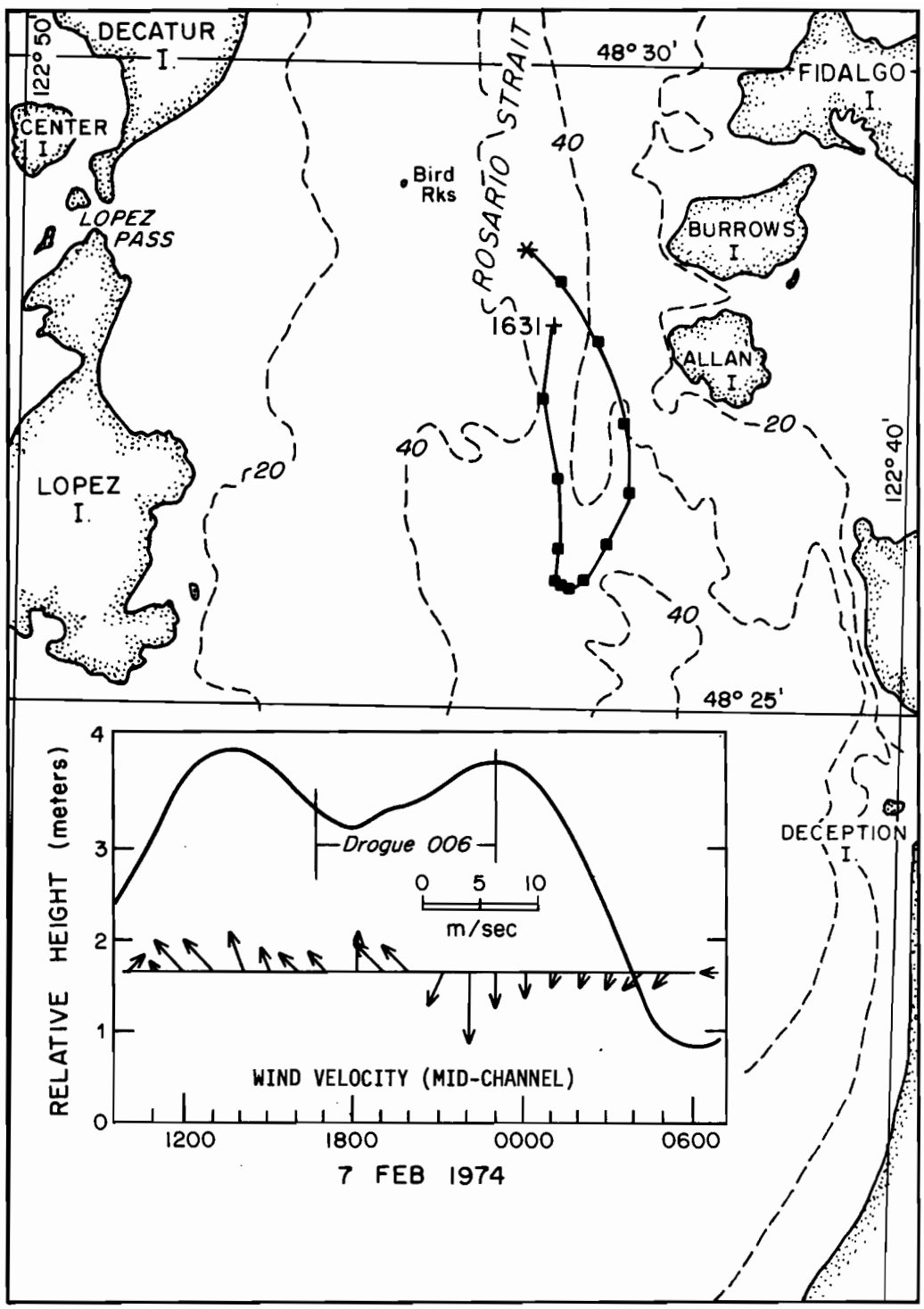


Figure 14.6. Drogue Series I Southern Rosario Strait, 6 February 1974 Drogue 006

Drogue Series II Cypress Island,

28 February 1974

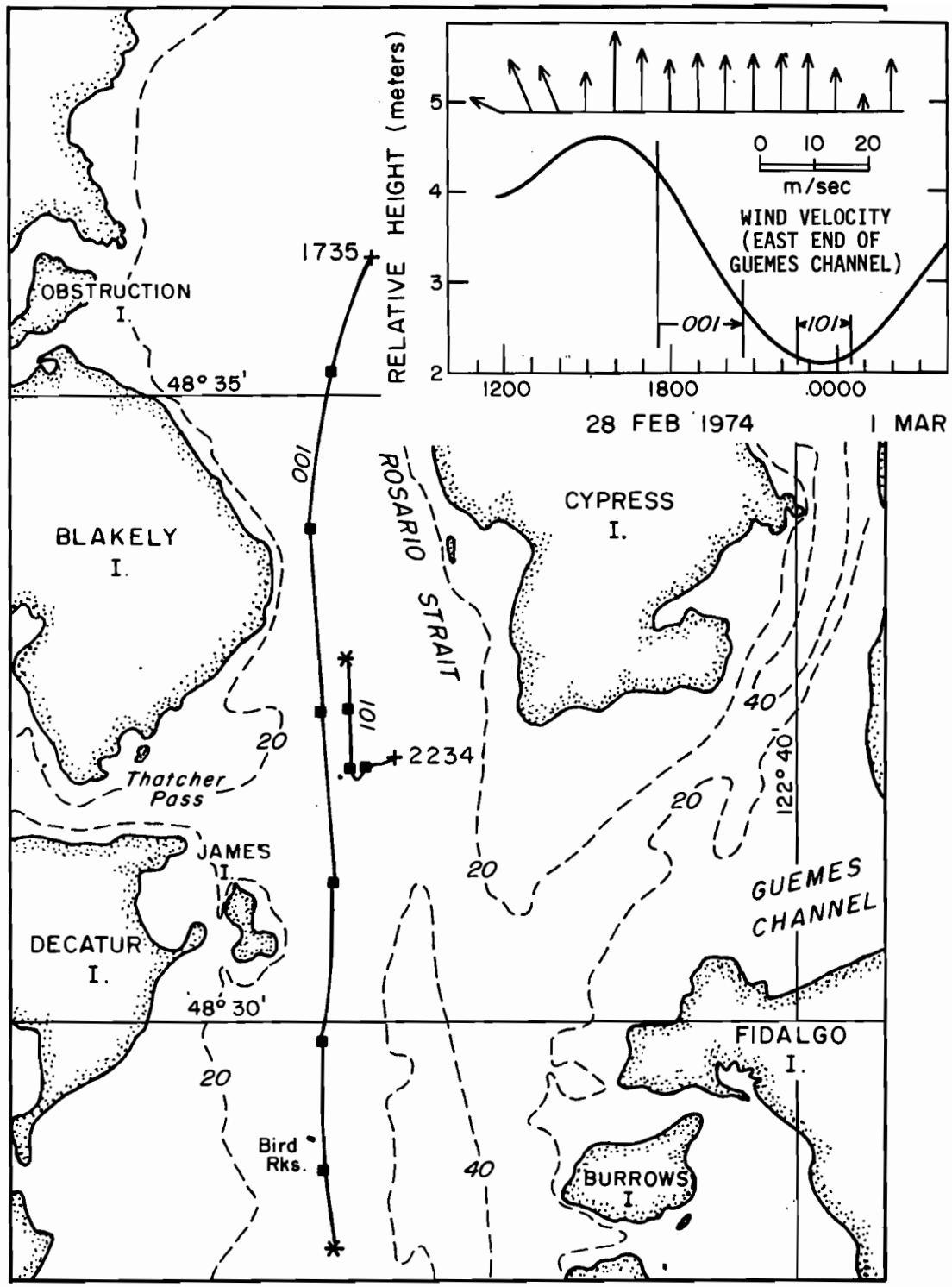


Figure 15.1. Drogue Series II Cypress Island, 28 February 1974
Drogue 001 (redeployed as 101)

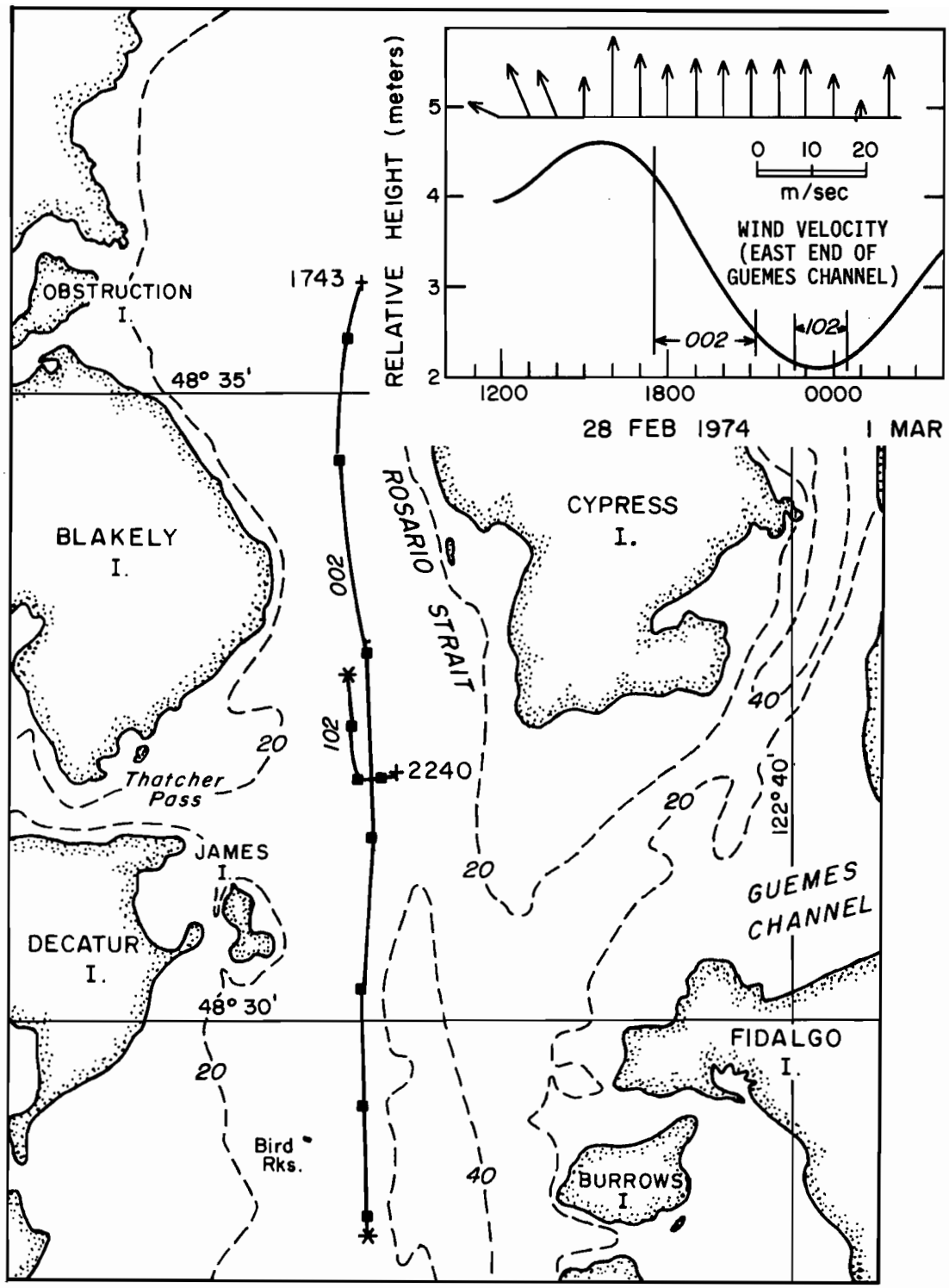


Figure 15.2. Drogue Series II Cypress Island, 28 February 1974
Drogue 002 (redeployed as 102)

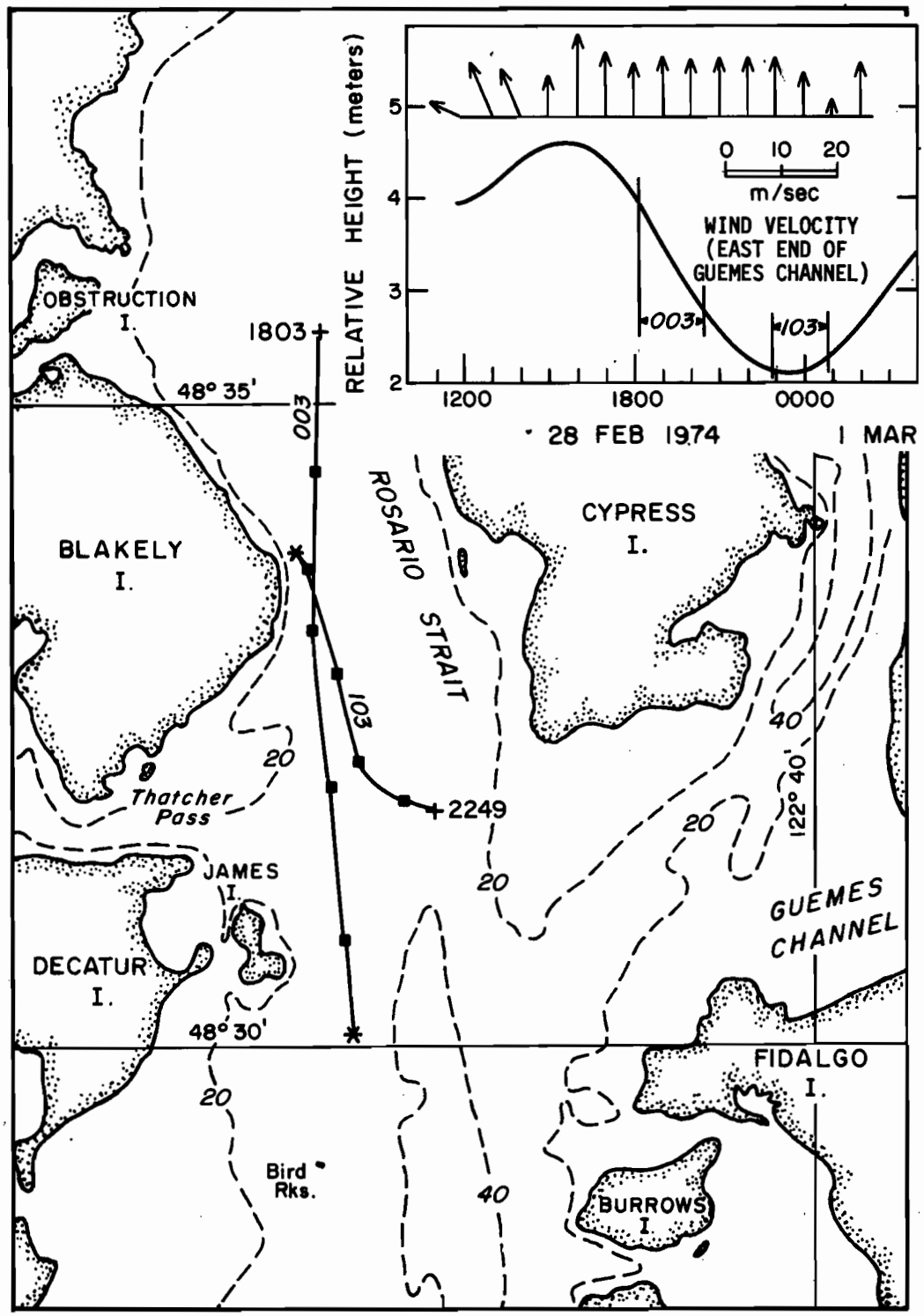


Figure 15.3. Drogue Series II Cypress Island, 28 February 1974
Drogue 003 (redeployed as 103)

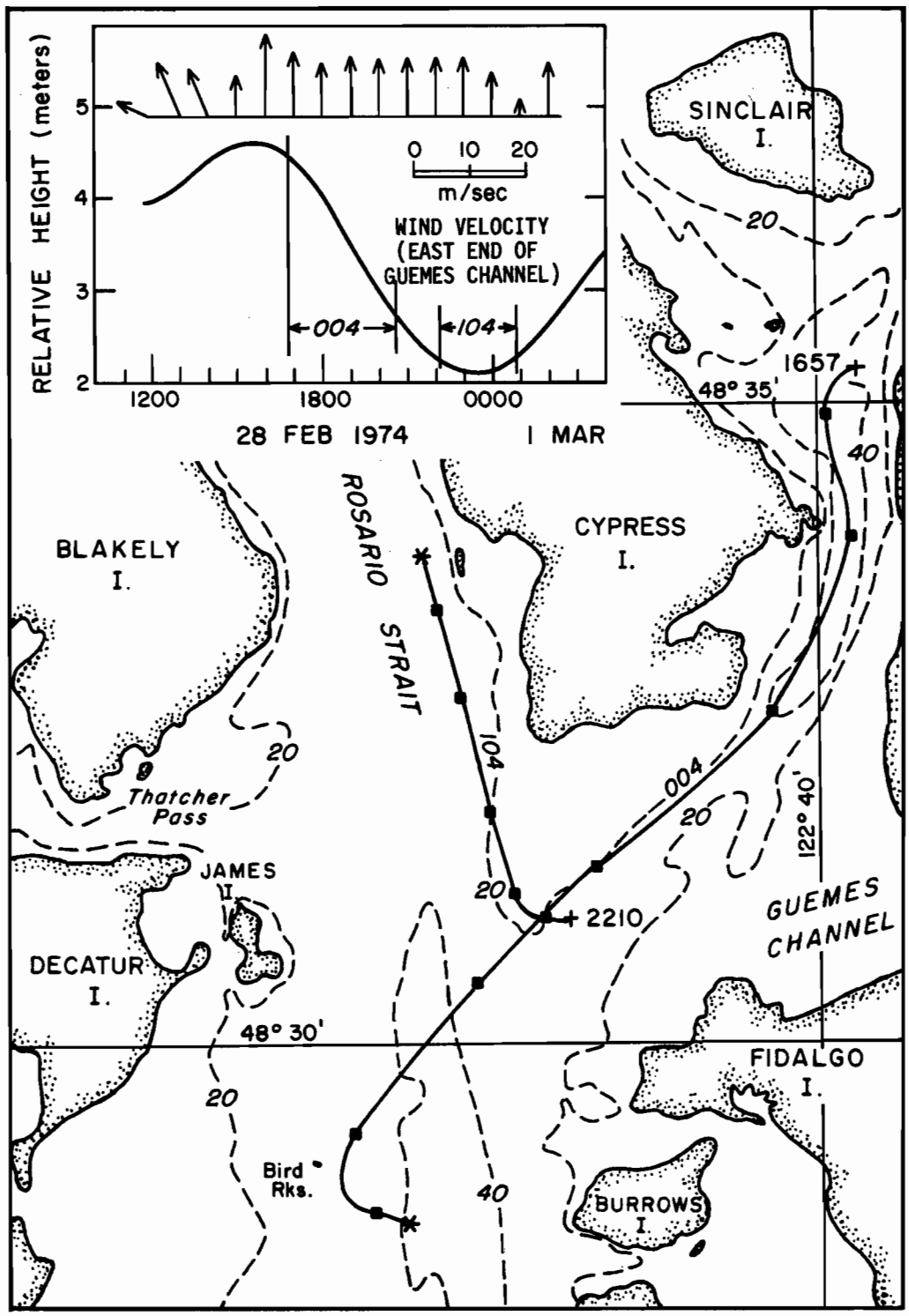


Figure 15.4. Drogue Series II Cypress Island, 28 February 1974
Drogue 004 (redeployed as 104)

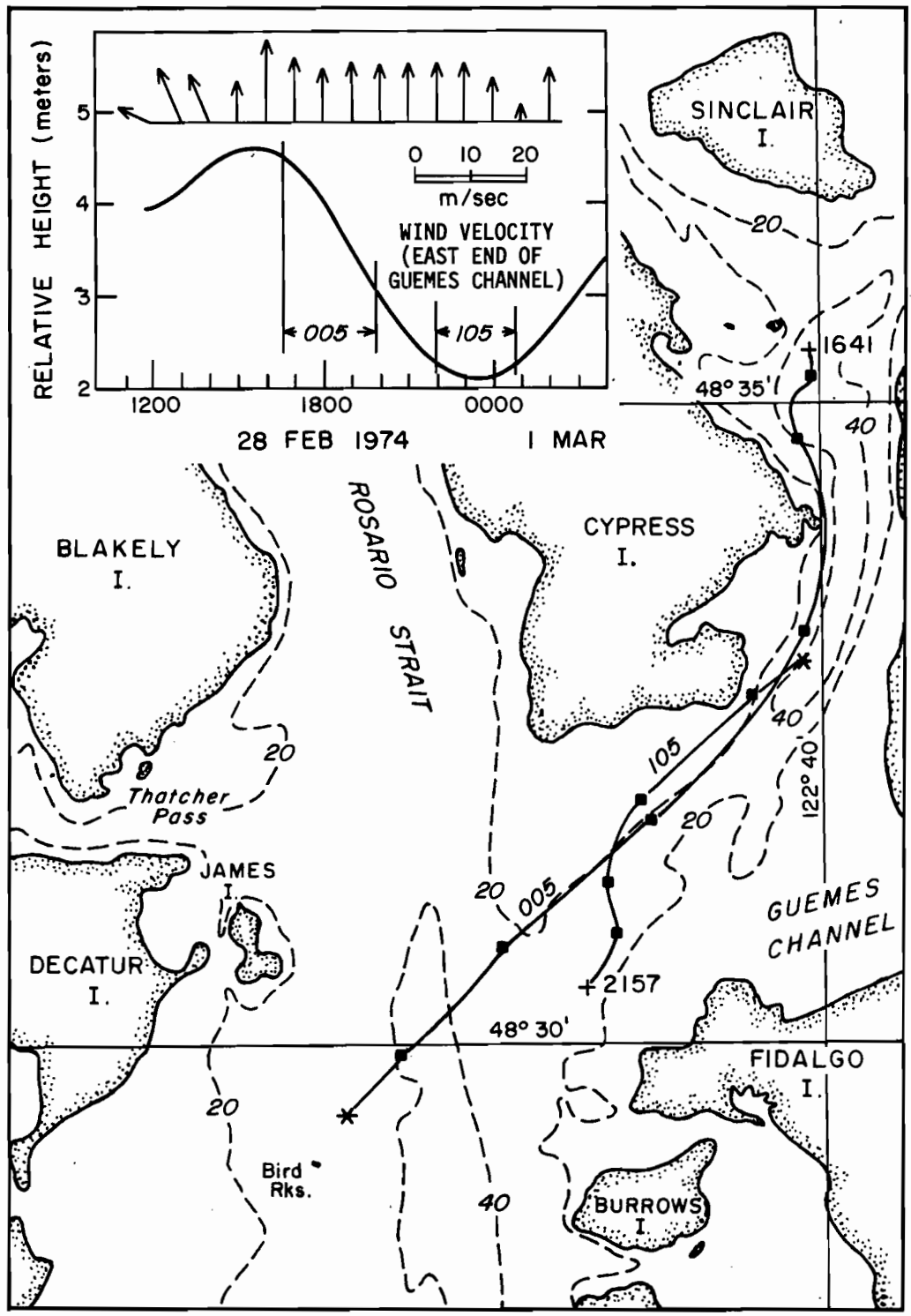


Figure 15.5. Drogue Series II Cypress Island, 28 February 1974
Drogue 005 (redeployed as 105)

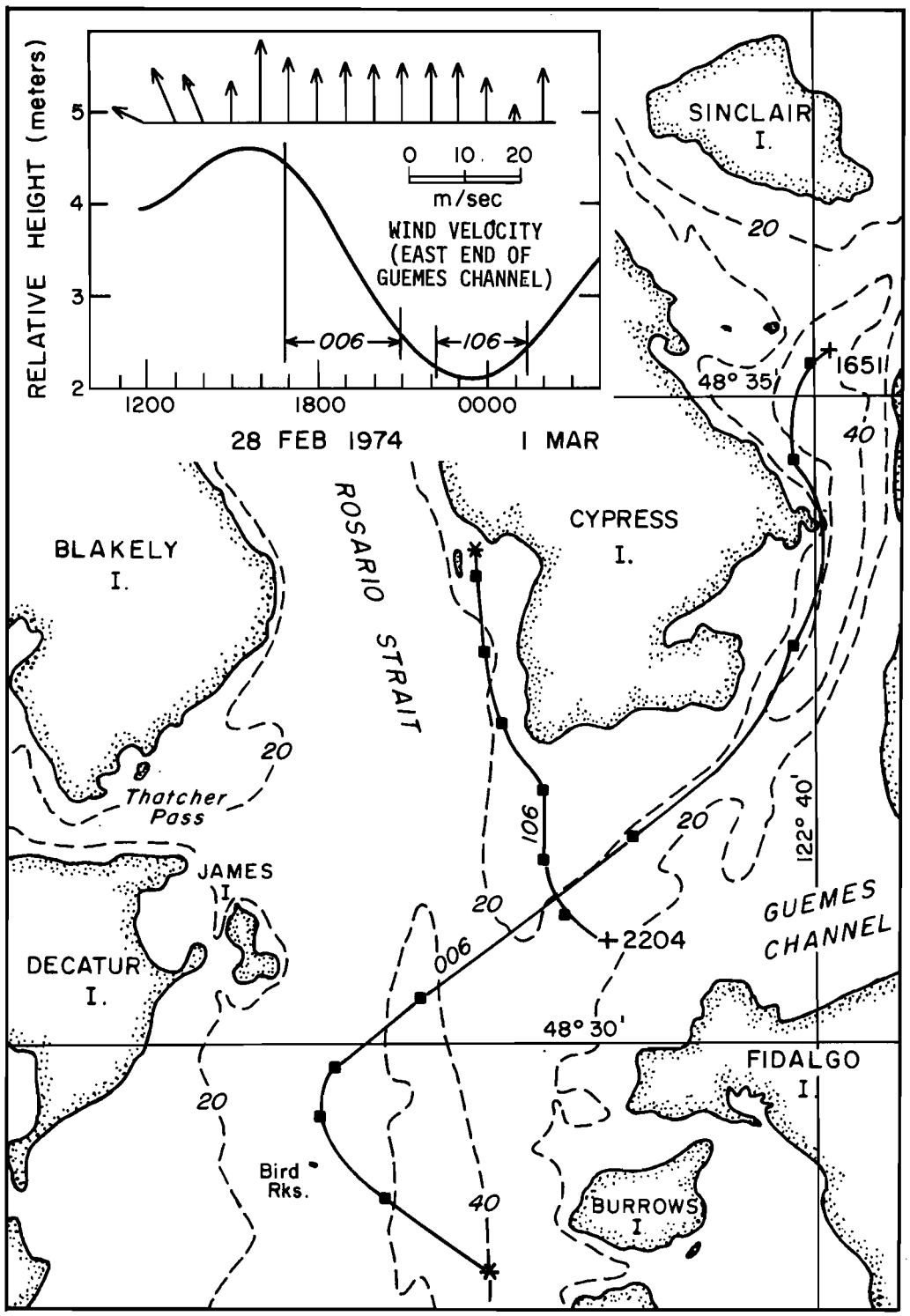


Figure 15.6. Drogue Series II Cypress Island, 28 February 1974
Drogue 006 (redeployed as 106)

Drogue Series III Northern Rosario Strait

19 March 1974

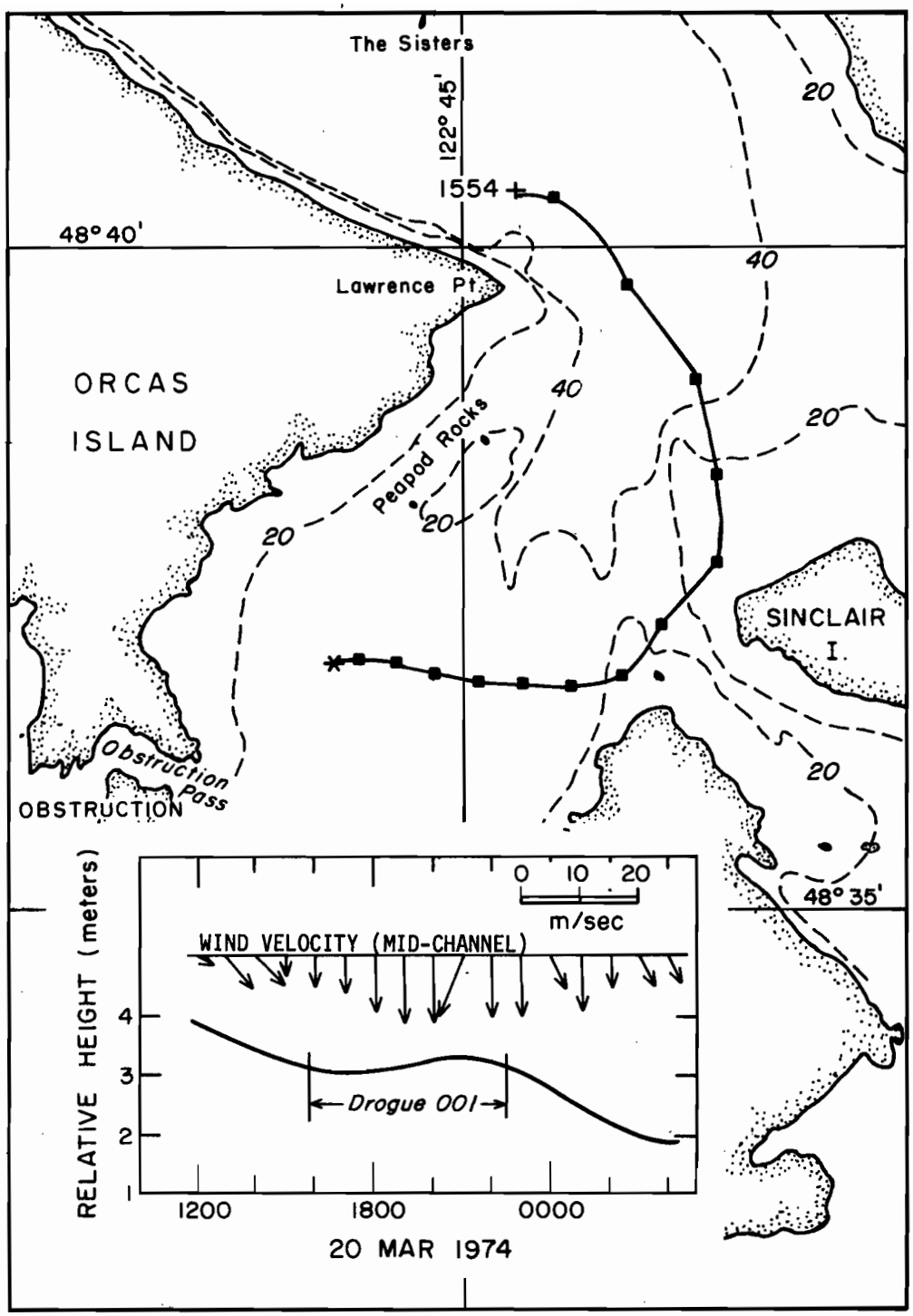


Figure 16.1. Drogue Series III Northern Rosario Strait, 19 March 1974 Drogue 001

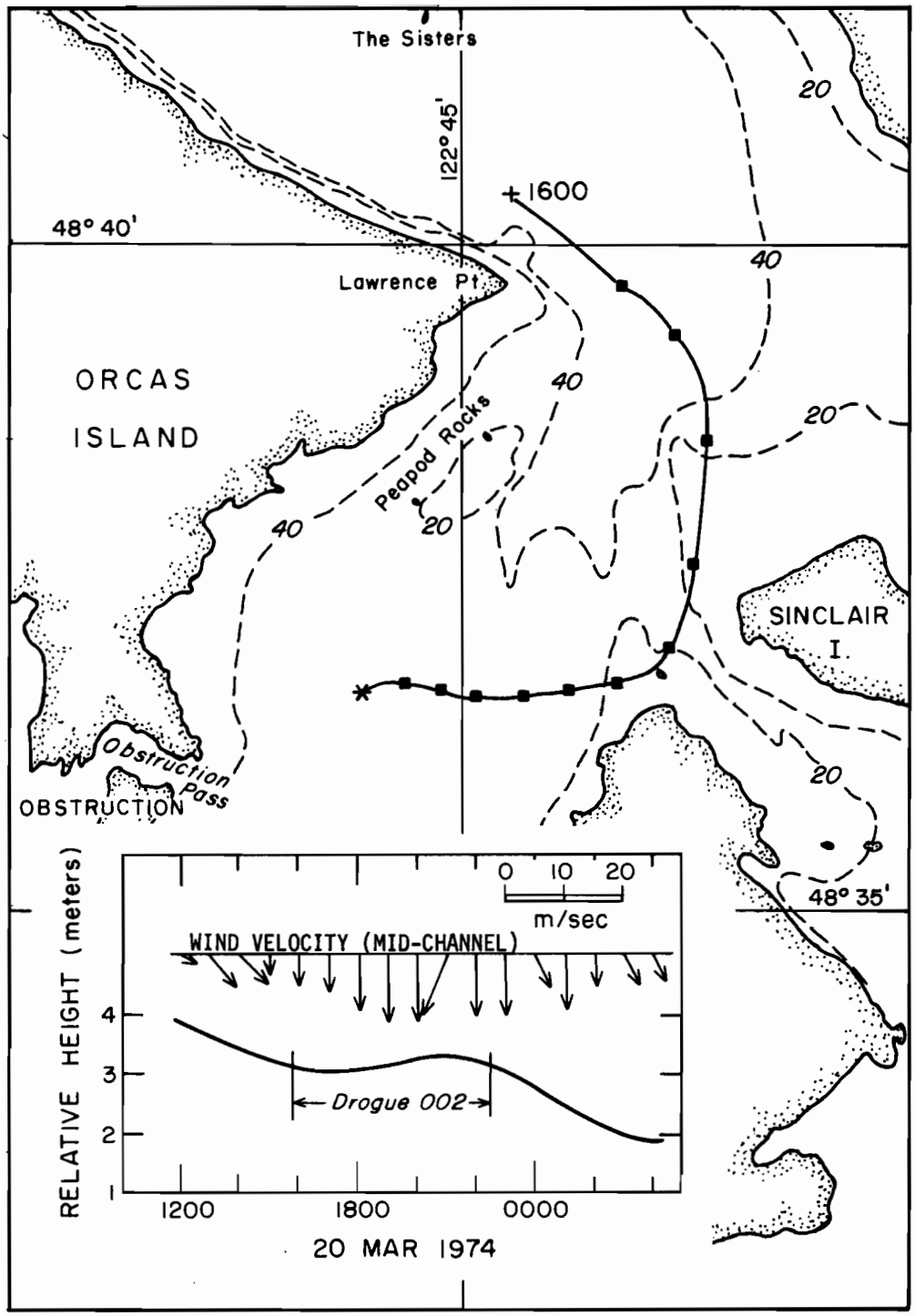


Figure 16.2. Drogue Series III Northern Rosario Strait, 19 March 1974 Drogue 002

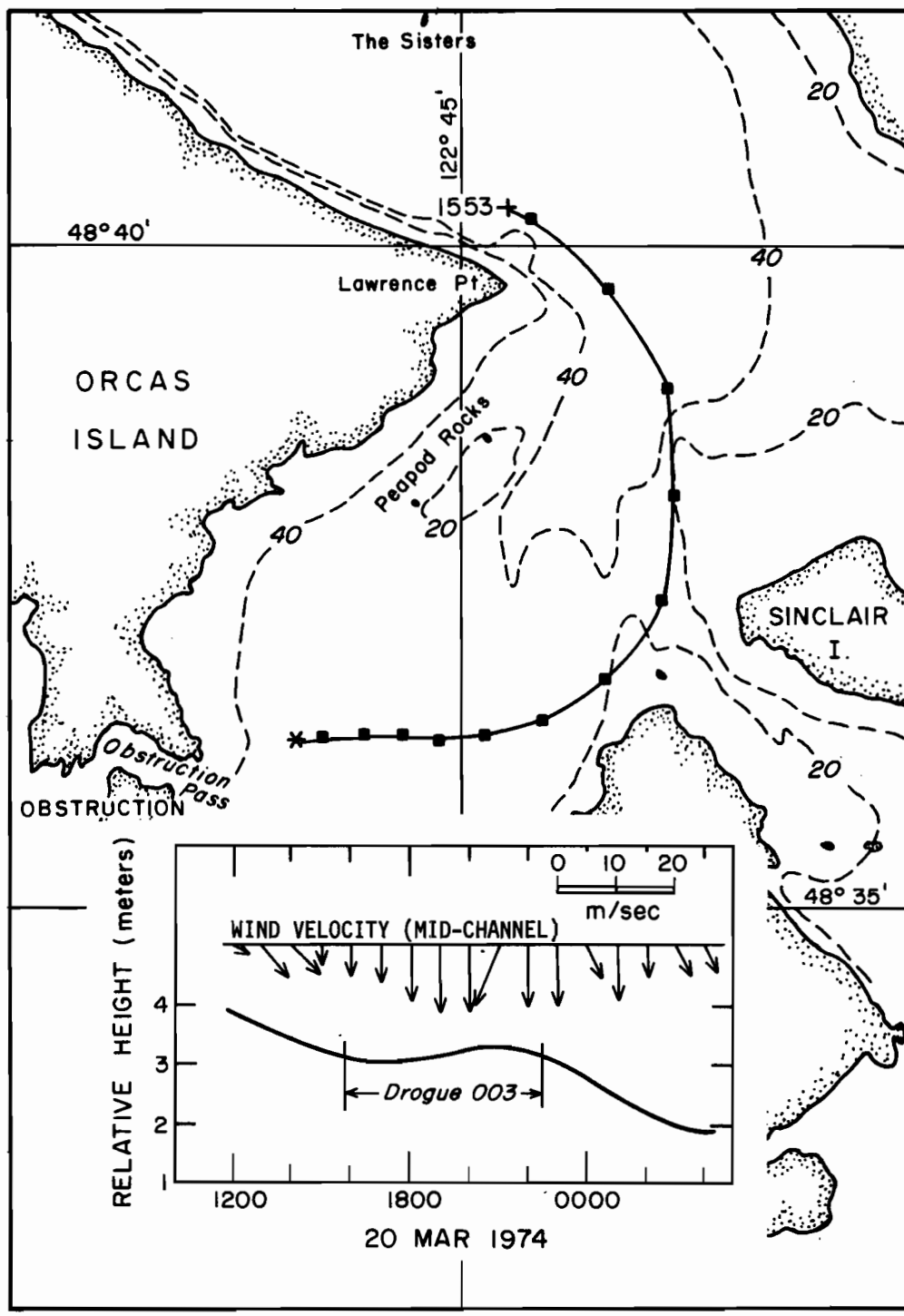


Figure 16.3. Drogue Series III Northern Rosario Strait, 19 March 1974 Drogue 003

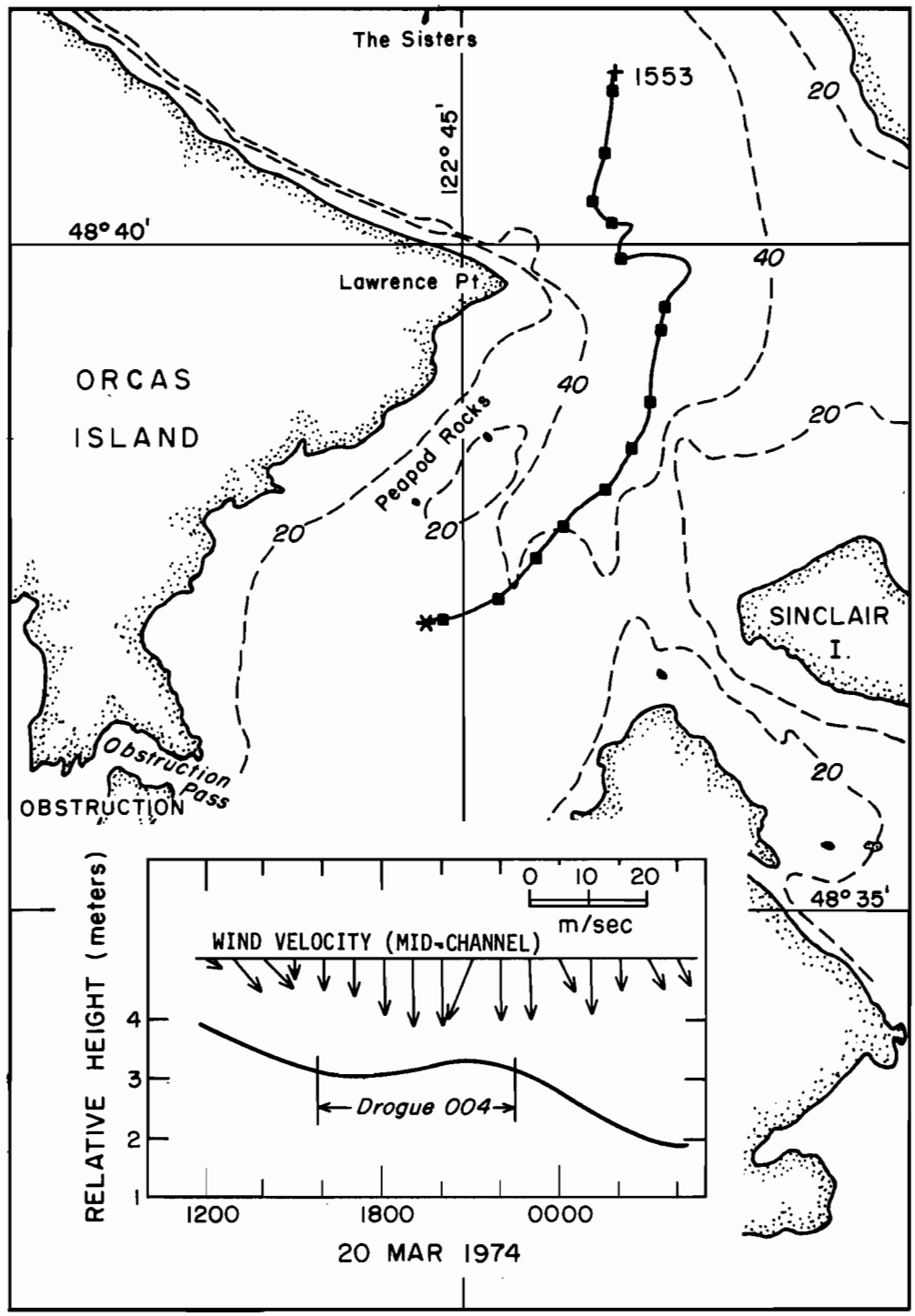


Figure 16.4. Drogue Series III Northern Rosario Strait, 19 March 1974 Drogue 004

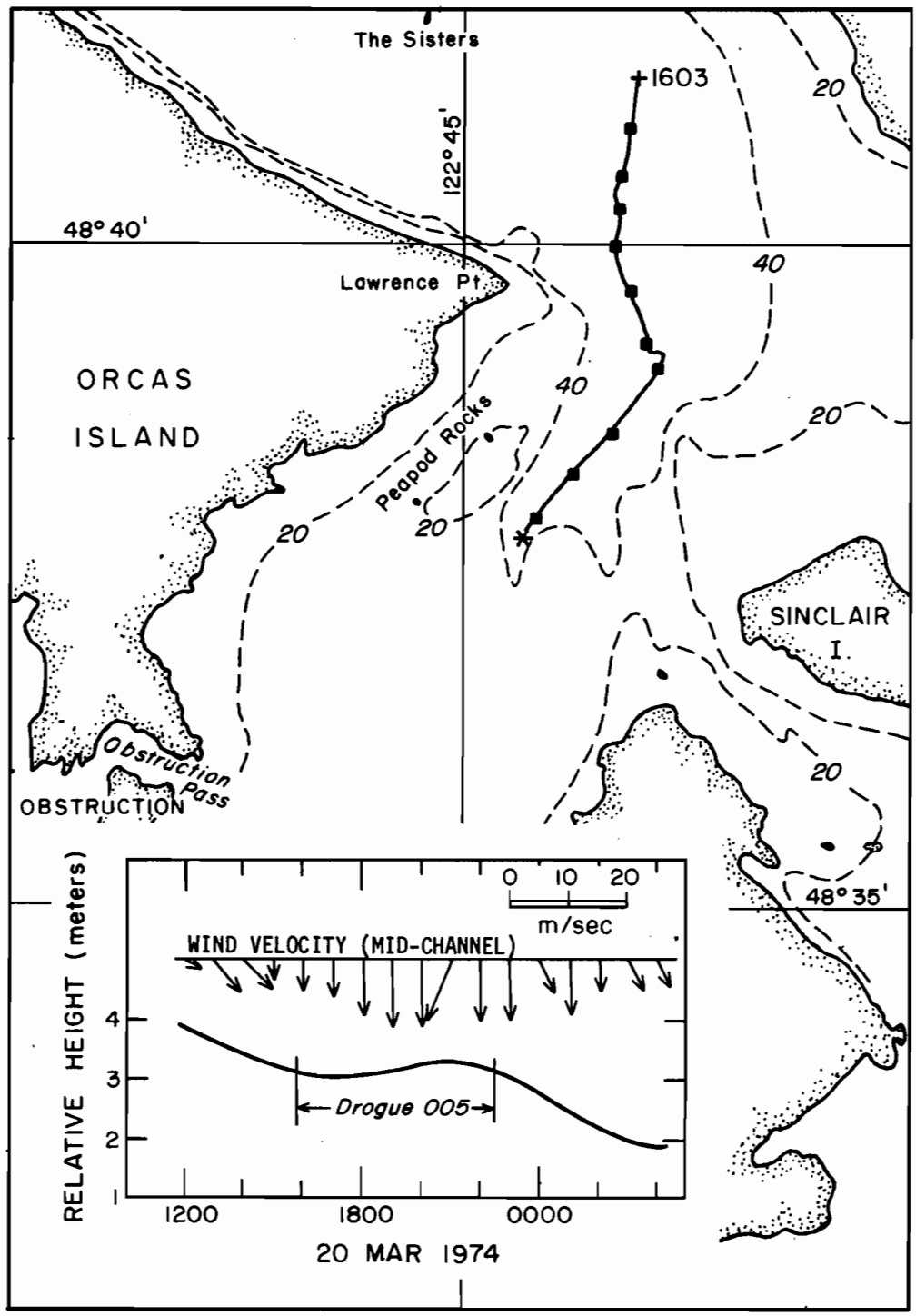


Figure 16.5. Drogue Series III Northern Rosario Strait, 19 March 1974 Drogue 005

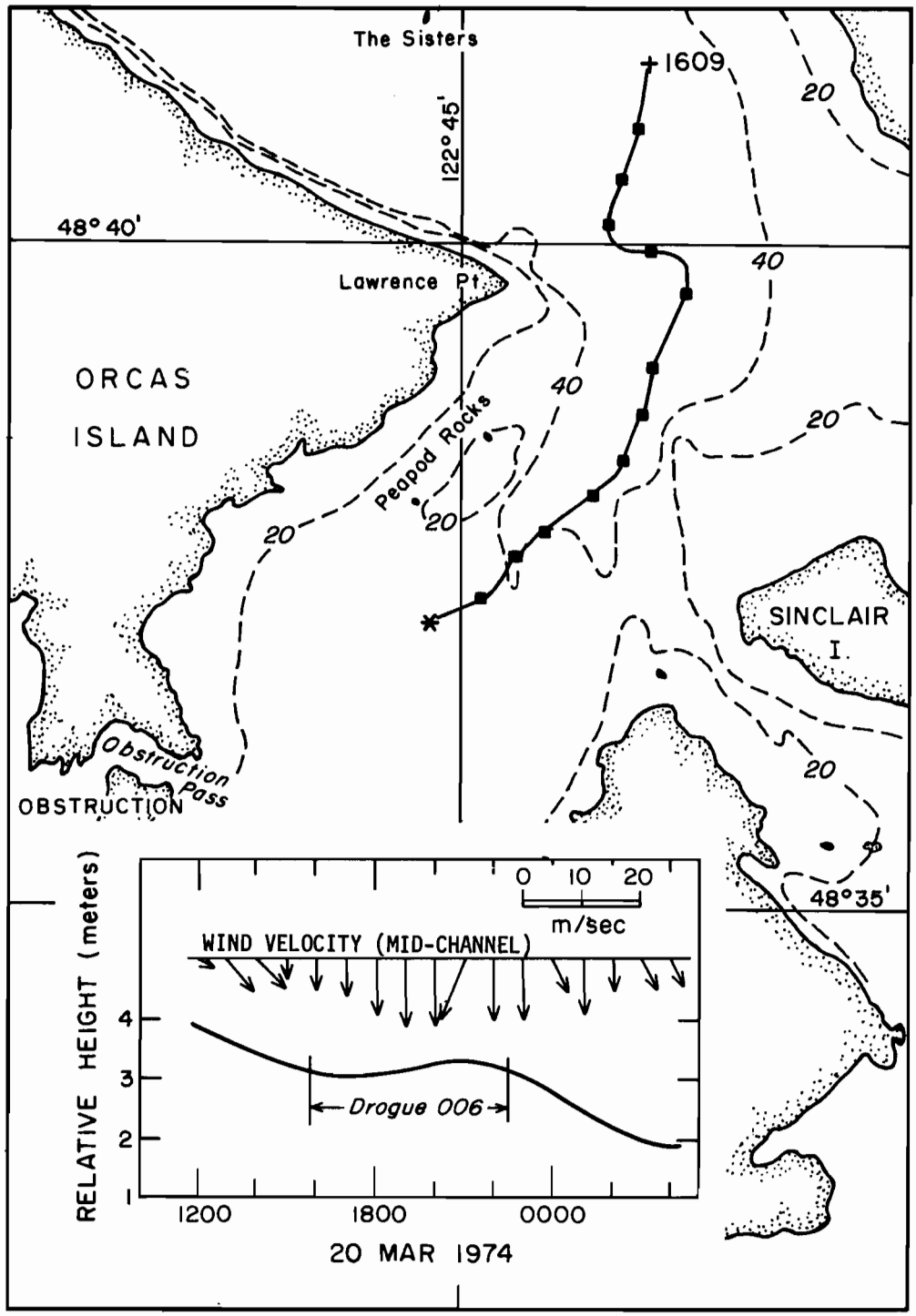
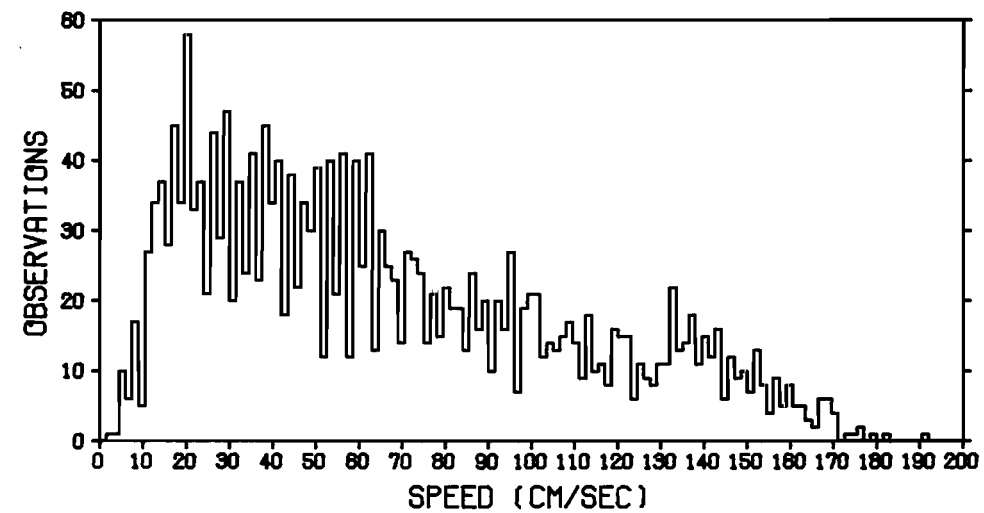


Figure 16.6. Drogue Series III Northern Rosario Strait, 19 March 1974 Drogue 006

STATISTICS OF 74 SAN JUAN 1 LAT 48 26.12N LONG 122 47.00W
DEPTH - 5.0 METERS NUMBER OF OBSERVATIONS = 2190
OBSERVATION PERIOD 15.2 DAYS FROM 1752 GMT 29 JAN 74

	MEAN (CM/SEC)	VARIANCE (CM/SEC)2	ST-DEV (CM/SEC)	SKEW	KURT	MAX (CM/SEC)	MIN (CM/SEC)
S	67.67	1805.51	42.49	.599	2.34	191.00	3.00
U	1.34	1165.76	34.14	.964	3.75	144.70	-137.95
V	-17.11	4924.26	70.17	.091	2.35	158.71	-189.59

S = SPEED
U = EAST-WEST COMPONENT OF VELOCITY, EAST = POSITIVE U
V = NORTH-SOUTH COMPONENT OF VELOCITY, NORTH = POSITIVE V



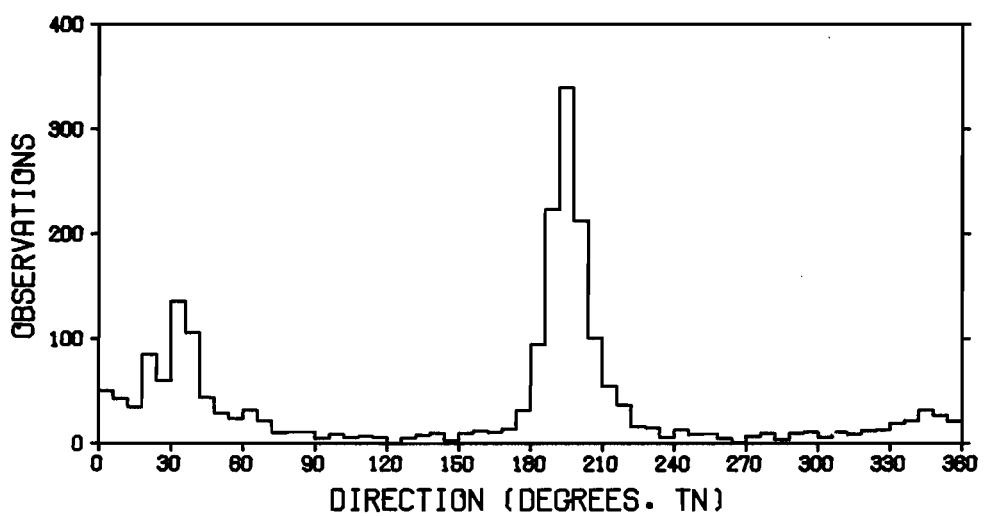


Figure 17.0. Current Meter Station 1 (-5m):
Standard Statistics and Histograms

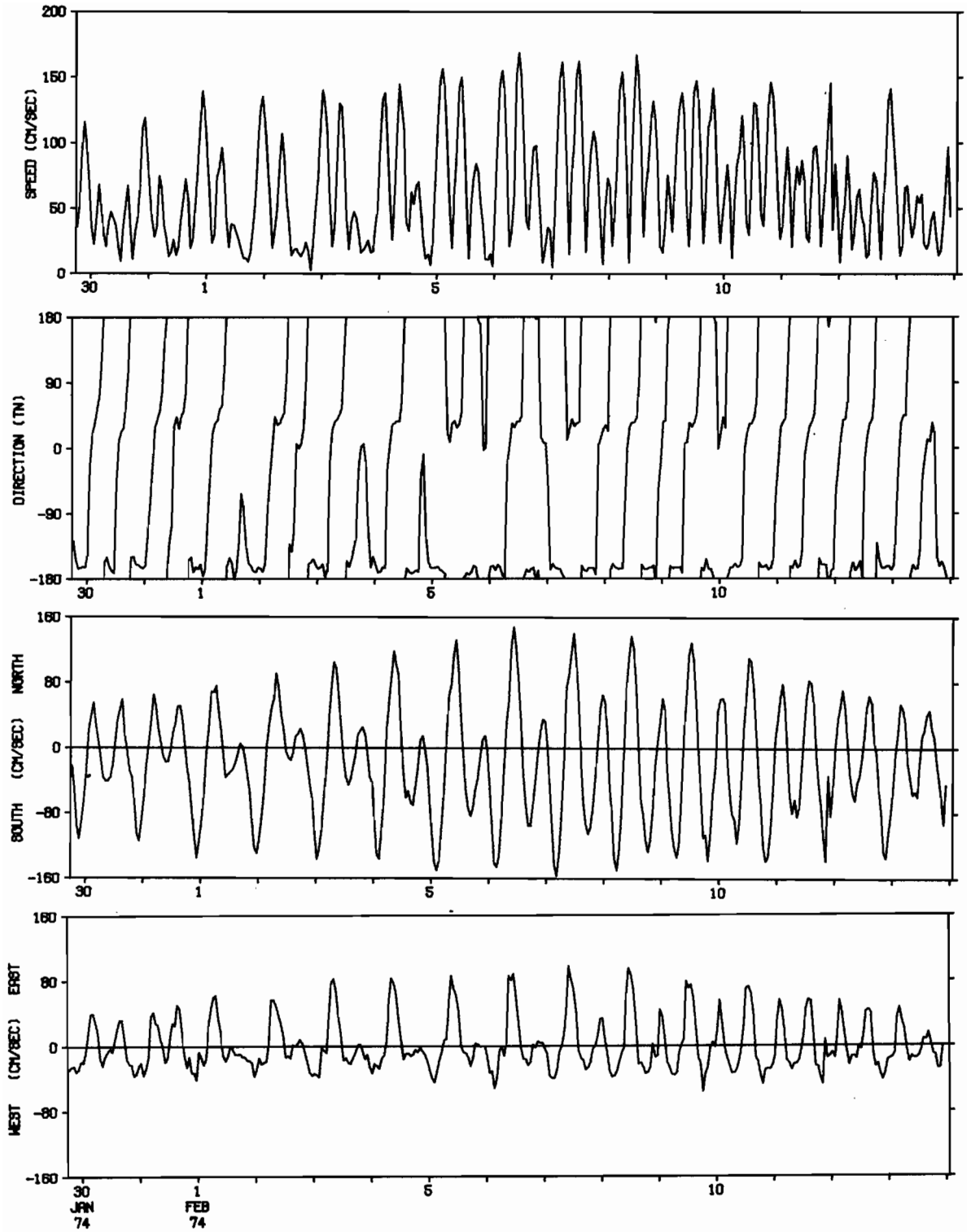


Figure 17.1. Current Meter Station 1 (-5m): Time Series

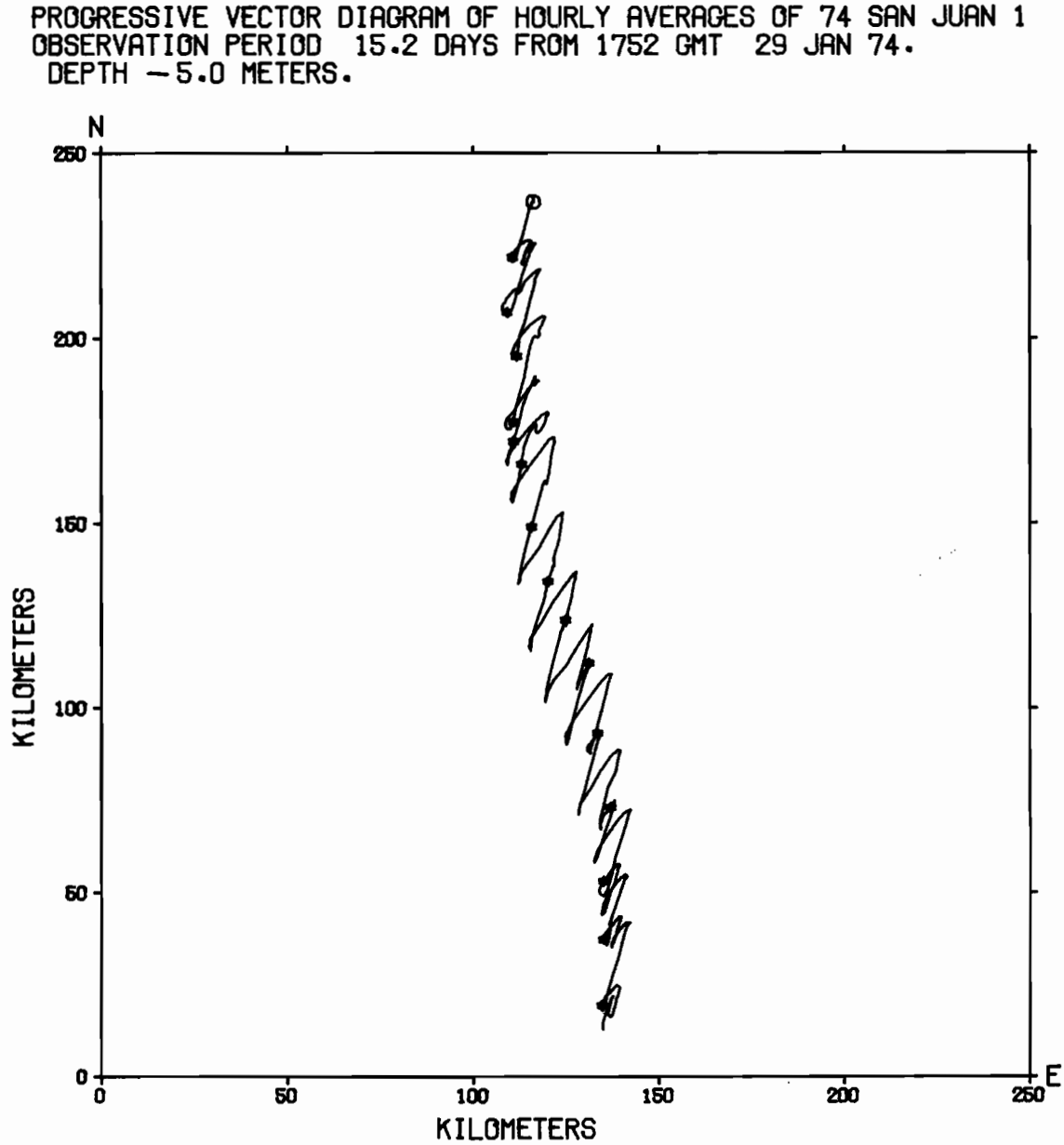


Figure 17.2. Current Meter Station 1 (-5m):
Progressive Vector Diagram (PVD)

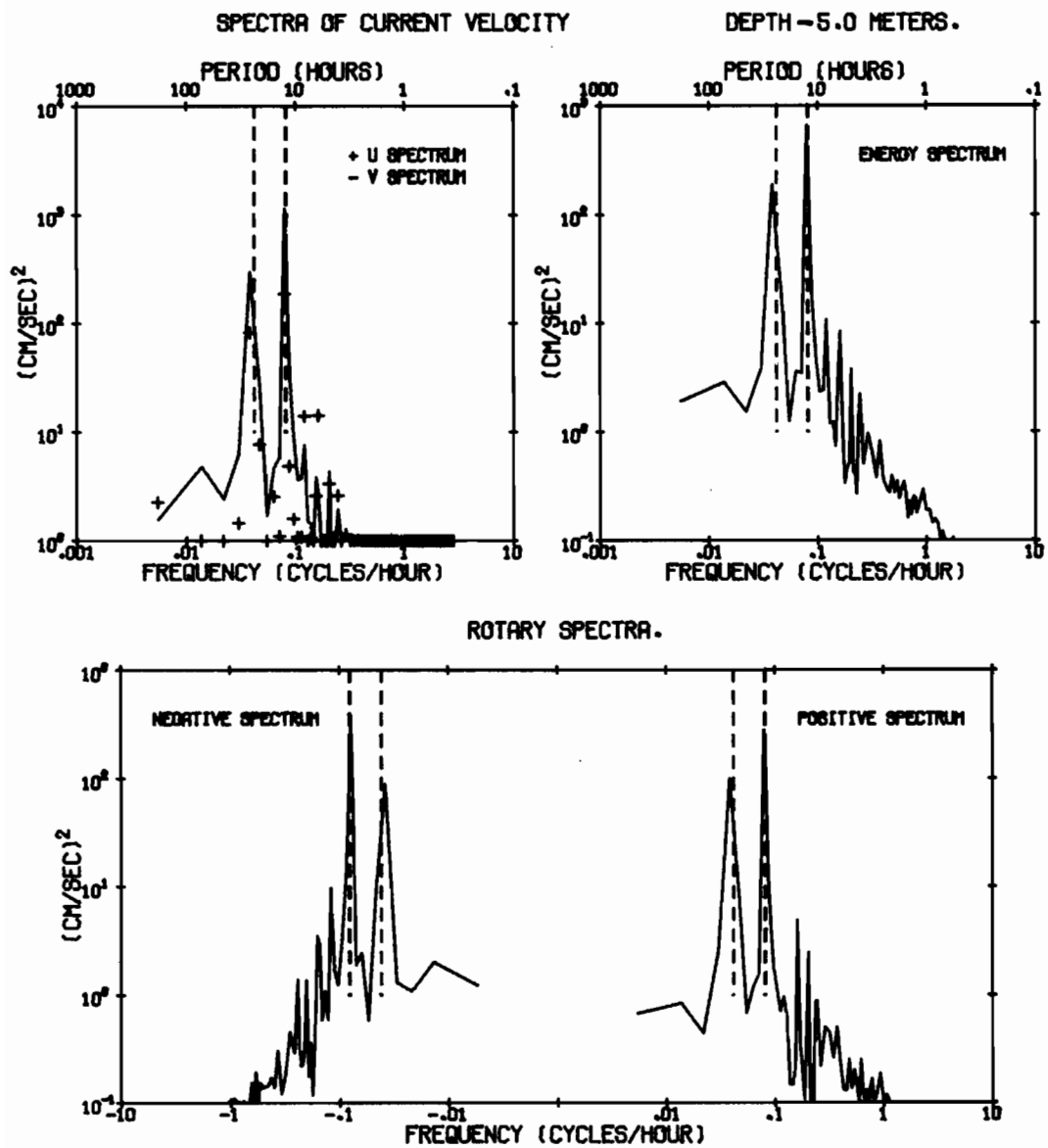


Figure 17.3. Current Meter Station 1 (-5m): Spectra

STATISTICS OF 74 SAN JUAN 1 LAT 48 26.12N LONG 122 47.00W
DEPTH -20.0 METERS NUMBER OF OBSERVATIONS = 2190
OBSERVATION PERIOD 15.2 DAYS FROM 1752 GMT 29 JAN 74

	MEAN (CM/SEC)	VARIANCE (CM/SEC)2	ST-DEV (CM/SEC)	SKEW	KURT	MAX (CM/SEC)	MIN (CM/SEC)
S	63.44	1579.98	39.75	.601	2.59	260.00	0.00
U	-.75	1044.88	32.32	.445	4.03	129.78	-110.23
V	-14.86	4338.02	65.86	.101	2.43	157.04	-255.25

S = SPEED
U = EAST-WEST COMPONENT OF VELOCITY, EAST = POSITIVE U
V = NORTH-SOUTH COMPONENT OF VELOCITY, NORTH = POSITIVE V

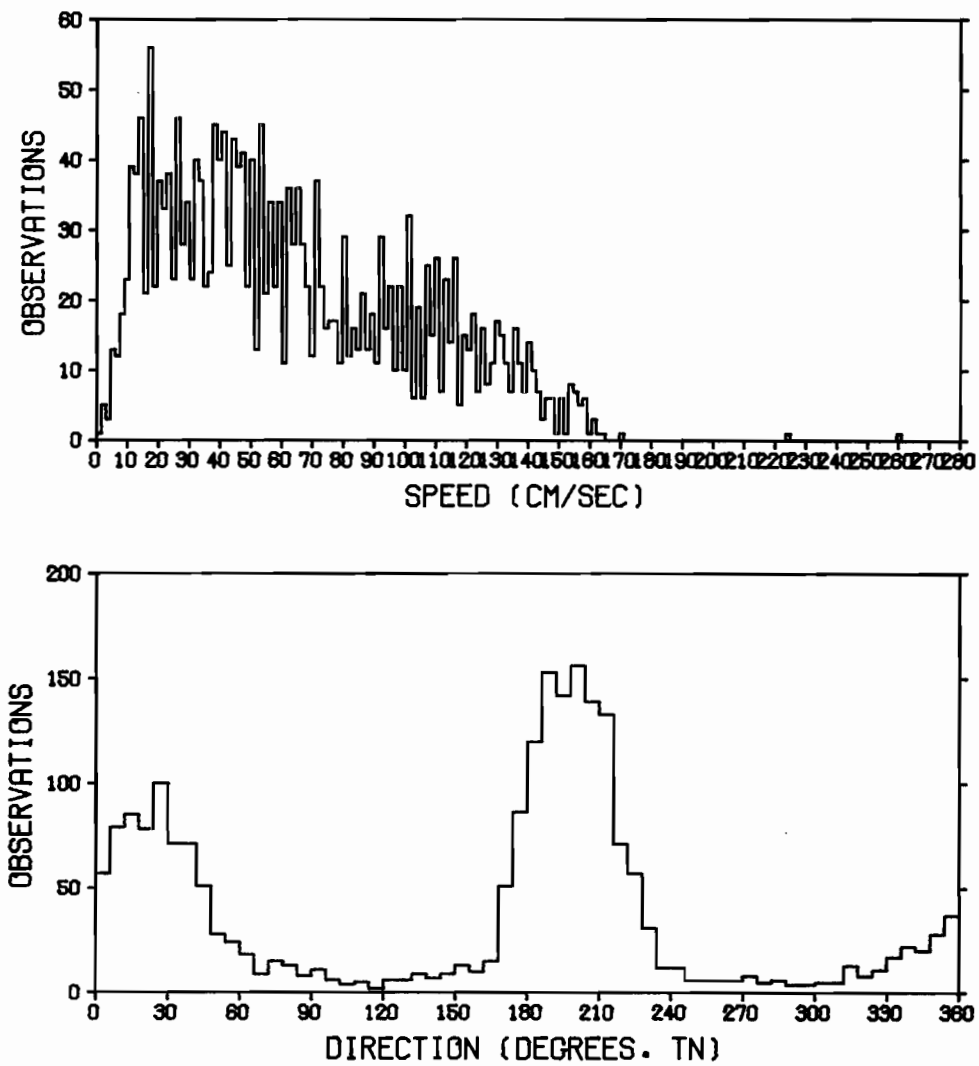


Figure 18.0. Current Meter Station 1 (-20m):
Standard Statistics and Histograms

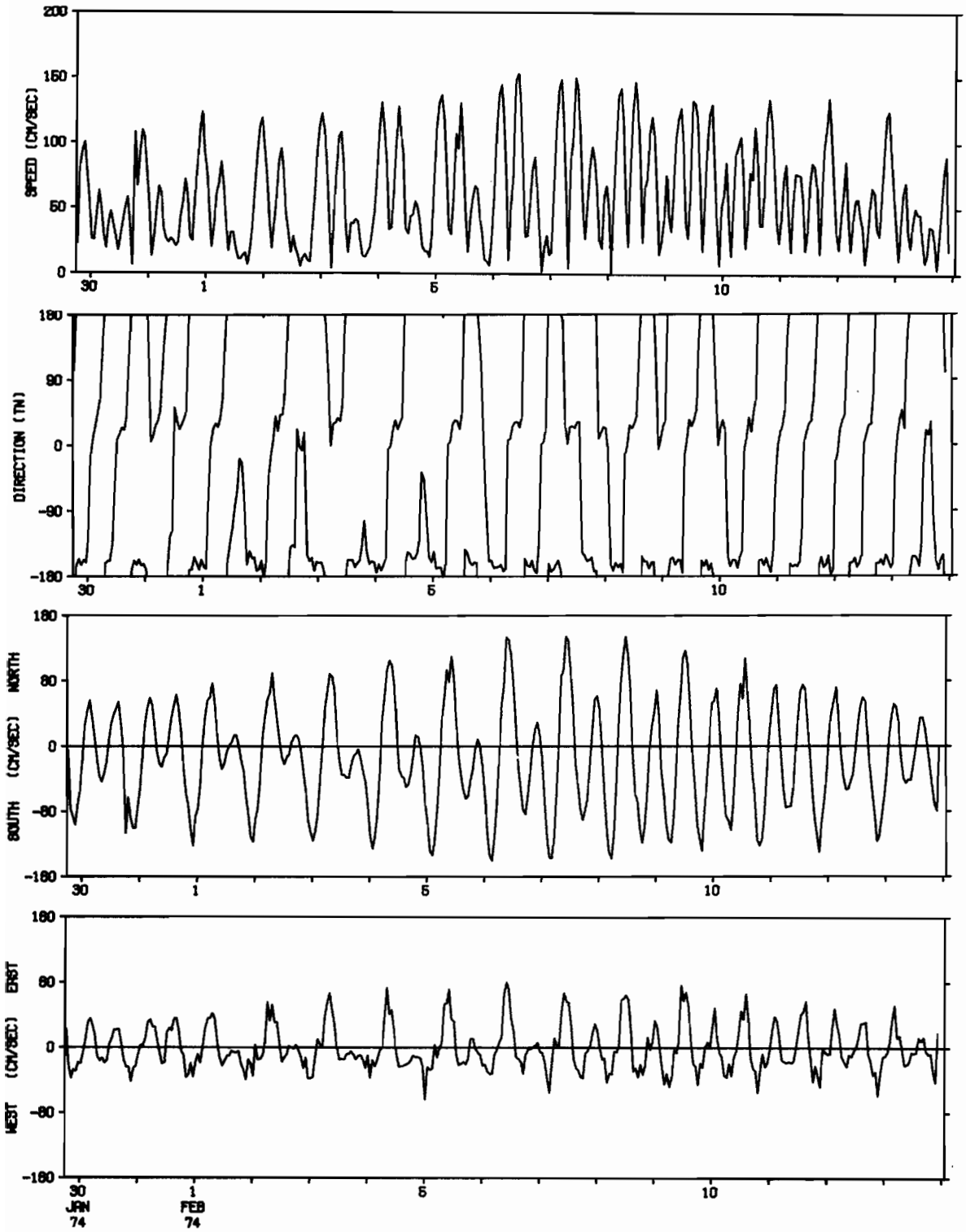


Figure 18.1. Current Meter Station 1 (-20m): Time Series

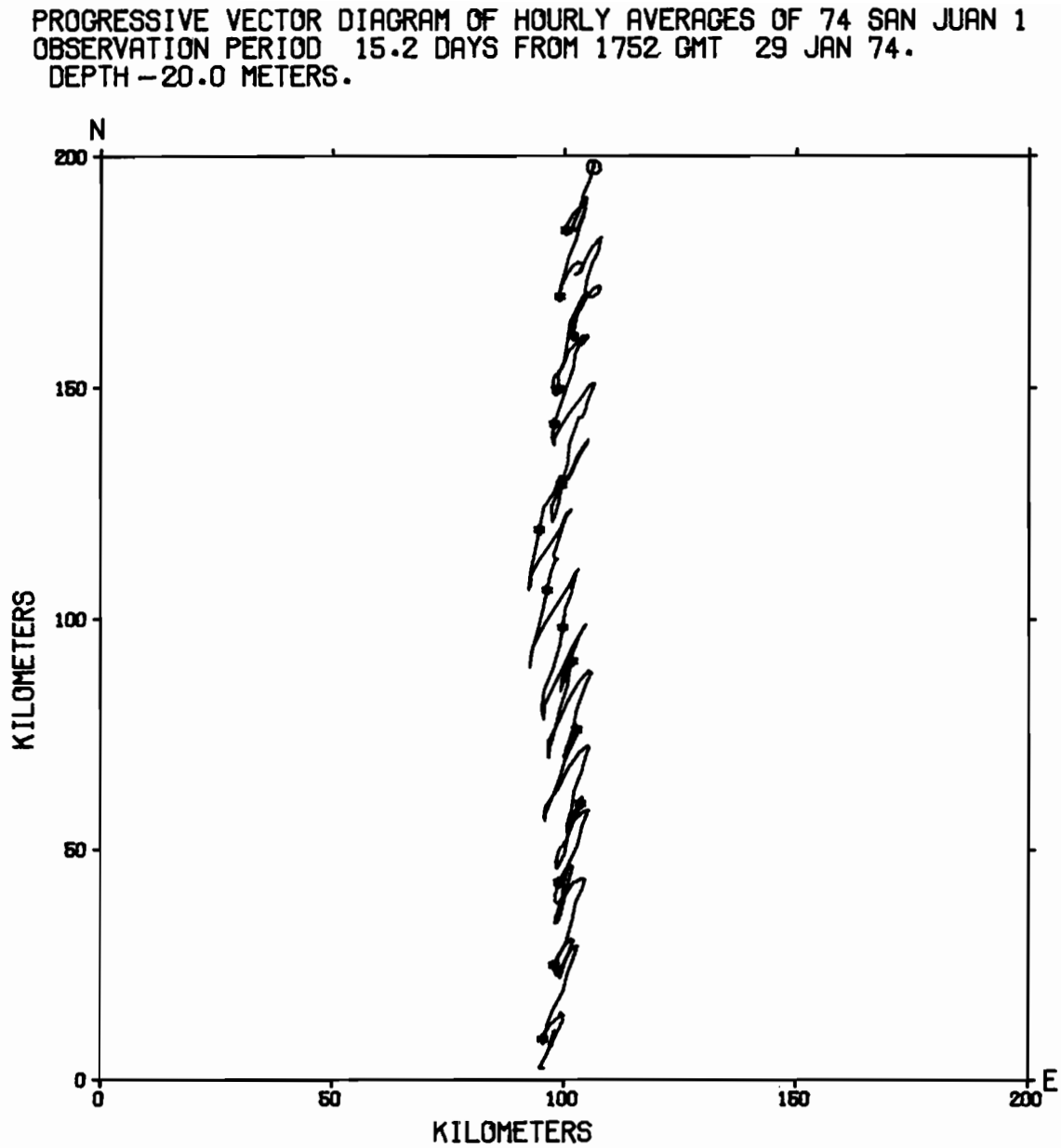


Figure 18.2. Current Meter Station 1 (-20m):
Progressive Vector Diagram (PVD)

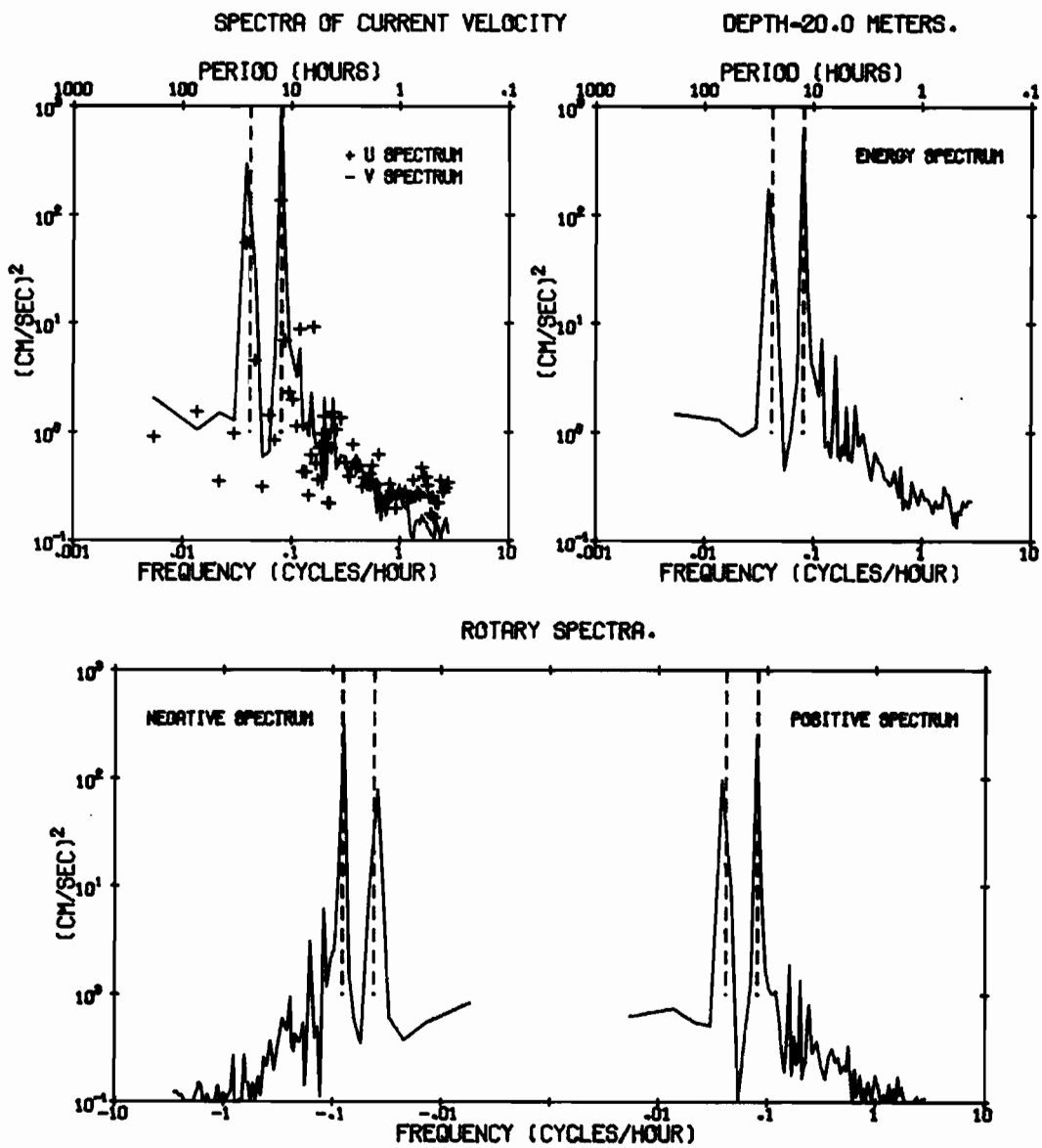


Figure 18.3. Current Meter Station 1 (-20m): Spectra

STATISTICS OF 74 SAN JUAN 1 LAT 48 26.12N LONG 122 47.00W
DEPTH +16.0 METERS NUMBER OF OBSERVATIONS = 2170
OBSERVATION PERIOD 15.1 DAYS FROM 1824 GMT 29 JAN 74

	MEAN (CM/SEC)	VARIANCE (CM/SEC)2	ST-DEV (CM/SEC)	SKEW	KURT	MAX (CM/SEC)	MIN (CM/SEC)
S	56.97	1218.96	34.91	.614	2.43	164.00	3.00
U	-.95	1123.41	33.52	.016	4.68	139.61	-126.06
V	-10.32	3234.30	56.87	.125	2.42	142.26	-147.00

S = SPEED
U = EAST-WEST COMPONENT OF VELOCITY, EAST = POSITIVE U
V = NORTH-SOUTH COMPONENT OF VELOCITY, NORTH = POSITIVE V

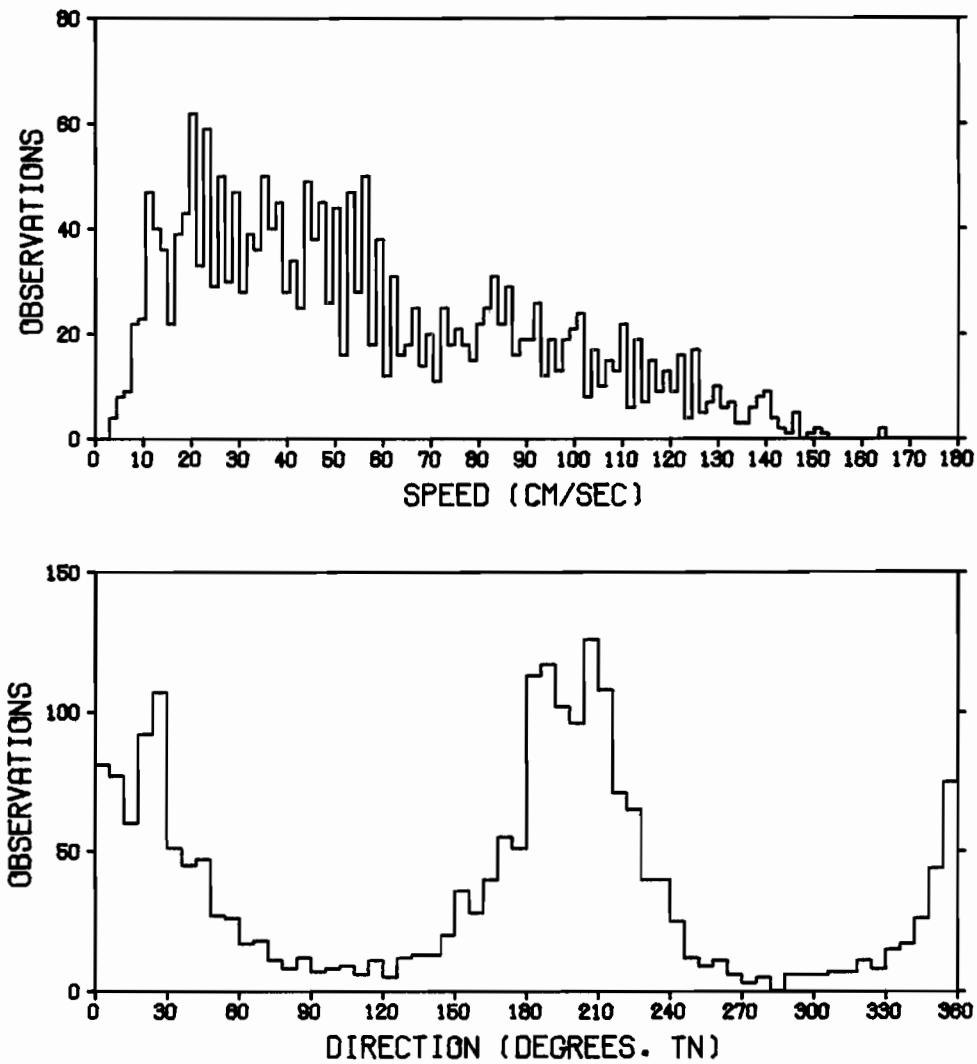


Figure 19.0. Current Meter Station 1 (+16m):
Standard Statistics and Histograms

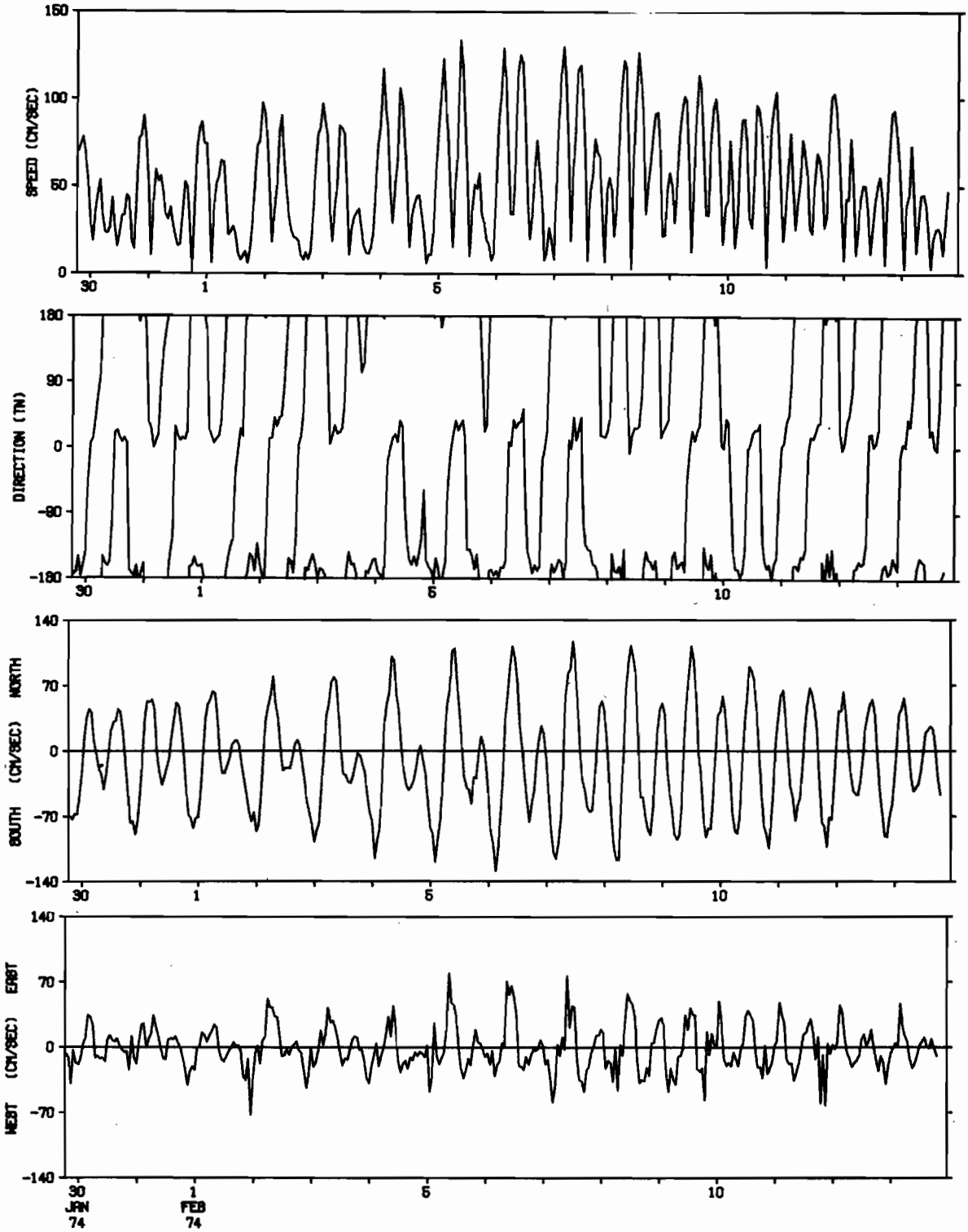


Figure 19.1. Current Meter Station 1 (+16m): Time Series

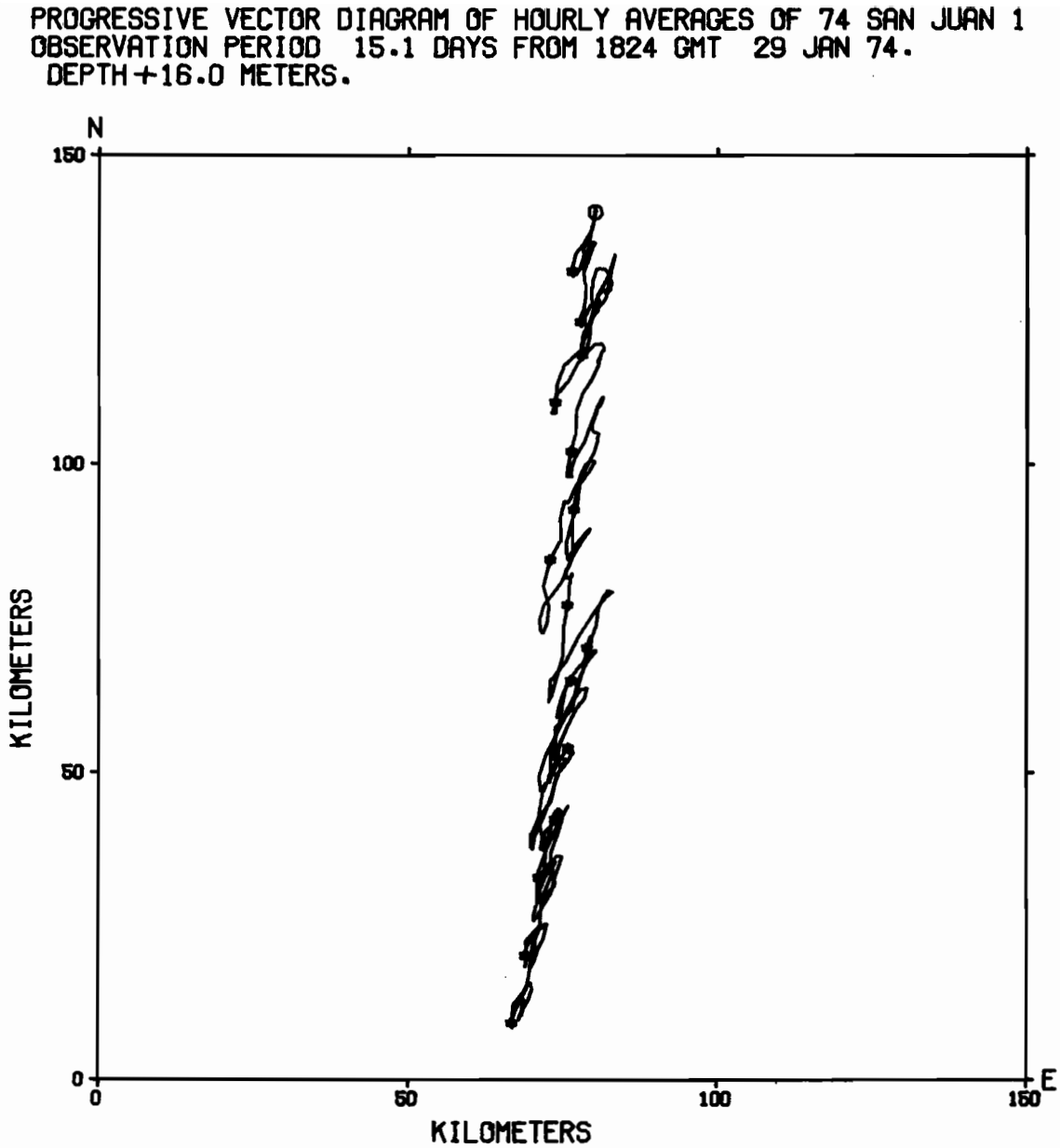


Figure 19.2. Current Meter Station 1 (+16m): Progressive Vector Diagram (PVD)

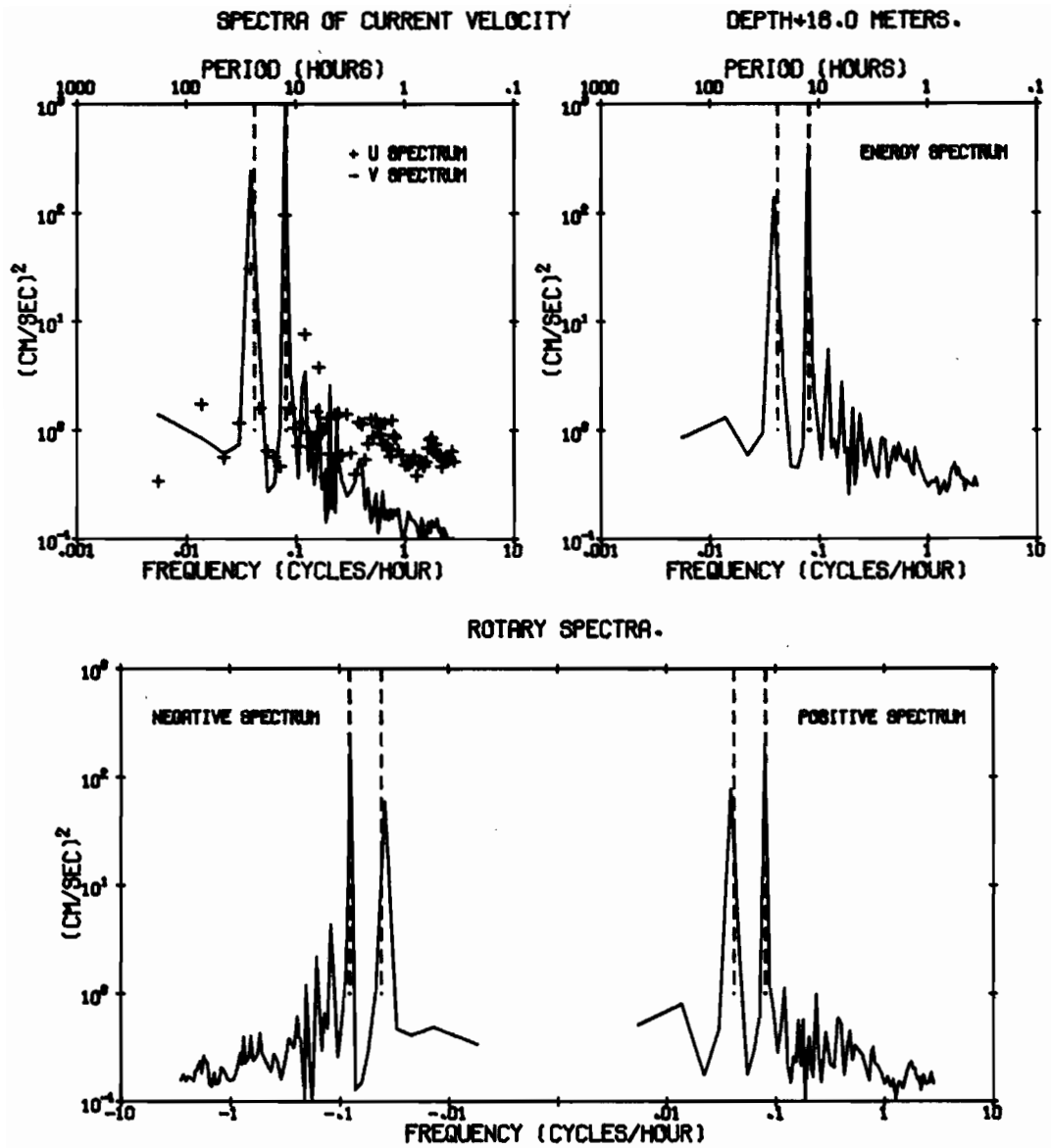
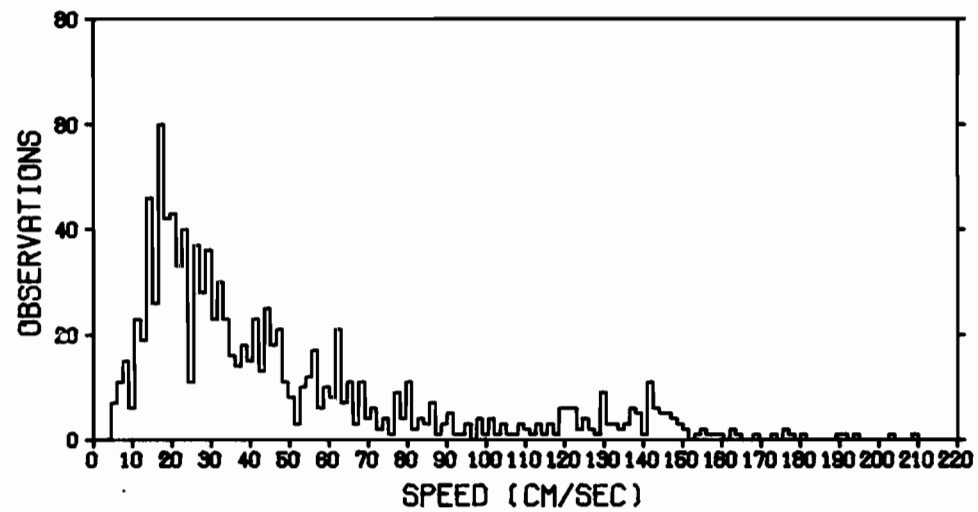


Figure 19.3. Current Meter Station 1 (+16m): Spectra

STATISTICS OF 74 SAN JUAN 2 LAT 48 25.90N LONG 122 44.80W
DEPTH —5.0 METERS NUMBER OF OBSERVATIONS = 1075
OBSERVATION PERIOD 7.5 DAYS FROM 2350 GMT 29 JAN 74

	MEAN (CM/SEC)	VARIANCE (CM/SEC)2	ST-DEV (CM/SEC)	SKEW	KURT	MAX (CM/SEC)	MIN (CM/SEC)
S	48.28	1575.14	39.69	1.505	4.55	209.00	5.00
U	-7.45	227.01	15.07	1.365	16.87	156.00	-62.96
V	-13.44	3442.77	58.68	-.949	3.18	102.94	-203.67

S = SPEED
U = EAST-WEST COMPONENT OF VELOCITY, EAST = POSITIVE U
V = NORTH-SOUTH COMPONENT OF VELOCITY, NORTH = POSITIVE V



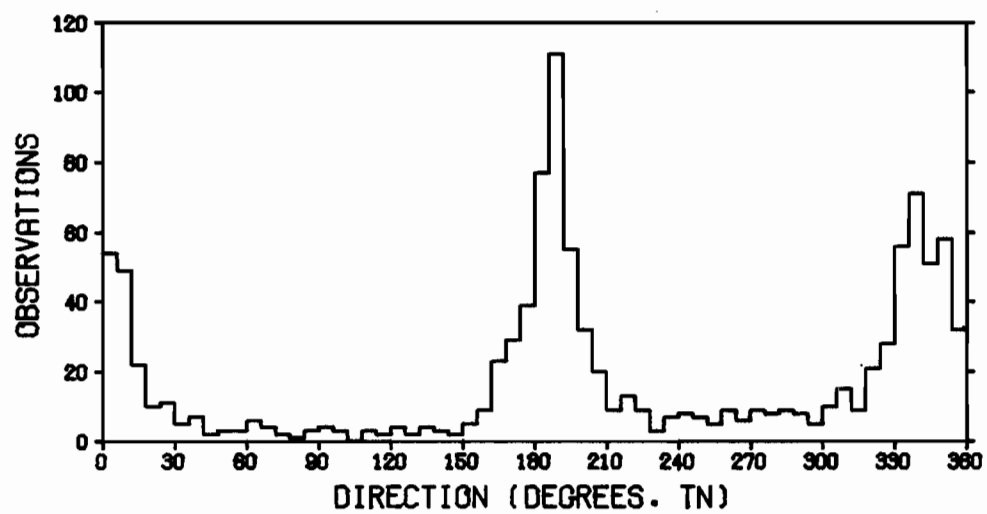


Figure 20.0. Current Meter Station 2 (-5m):
Standard Statistics and Histograms

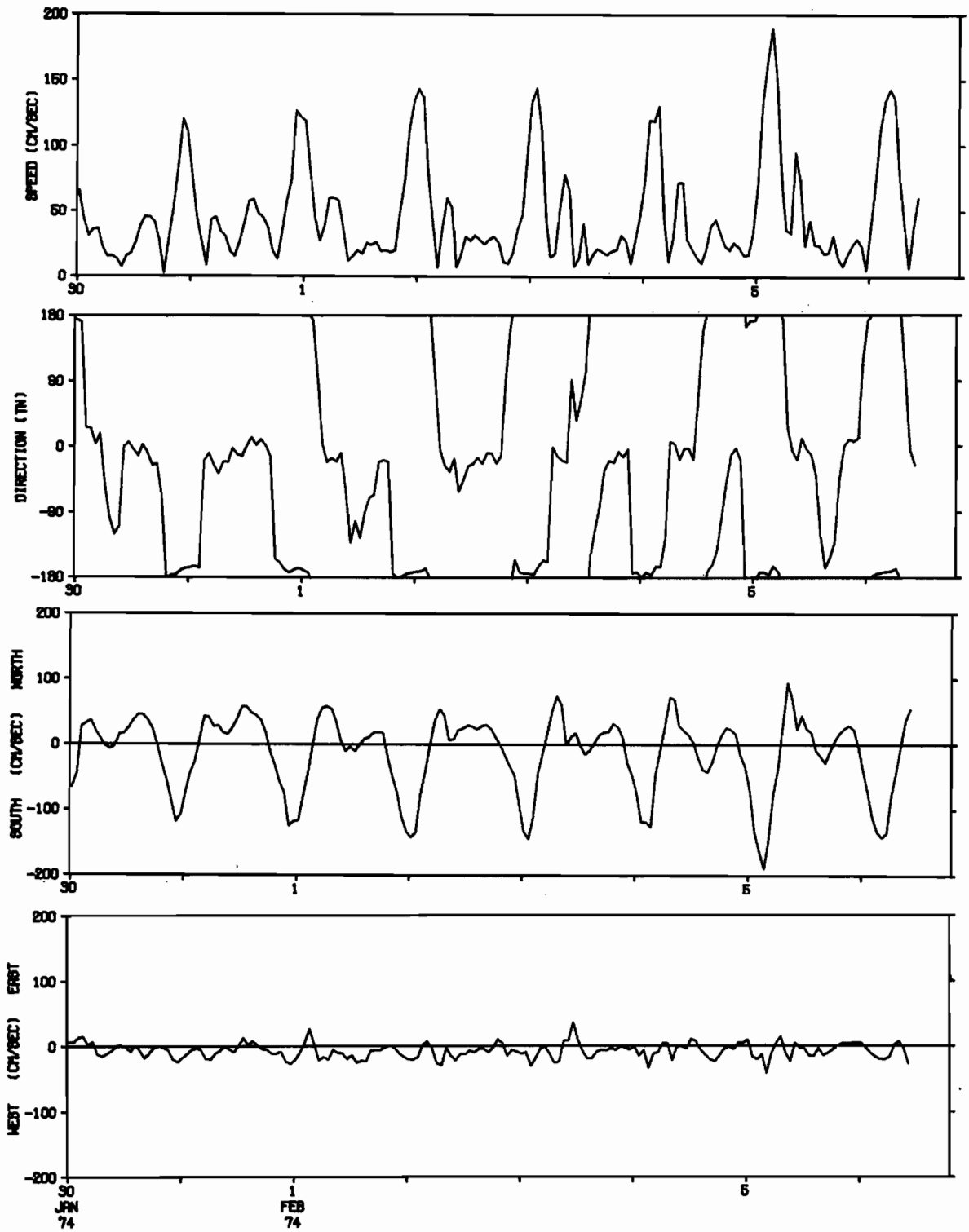


Figure 20.1. Current Meter Station 2 (-5m): Time Series

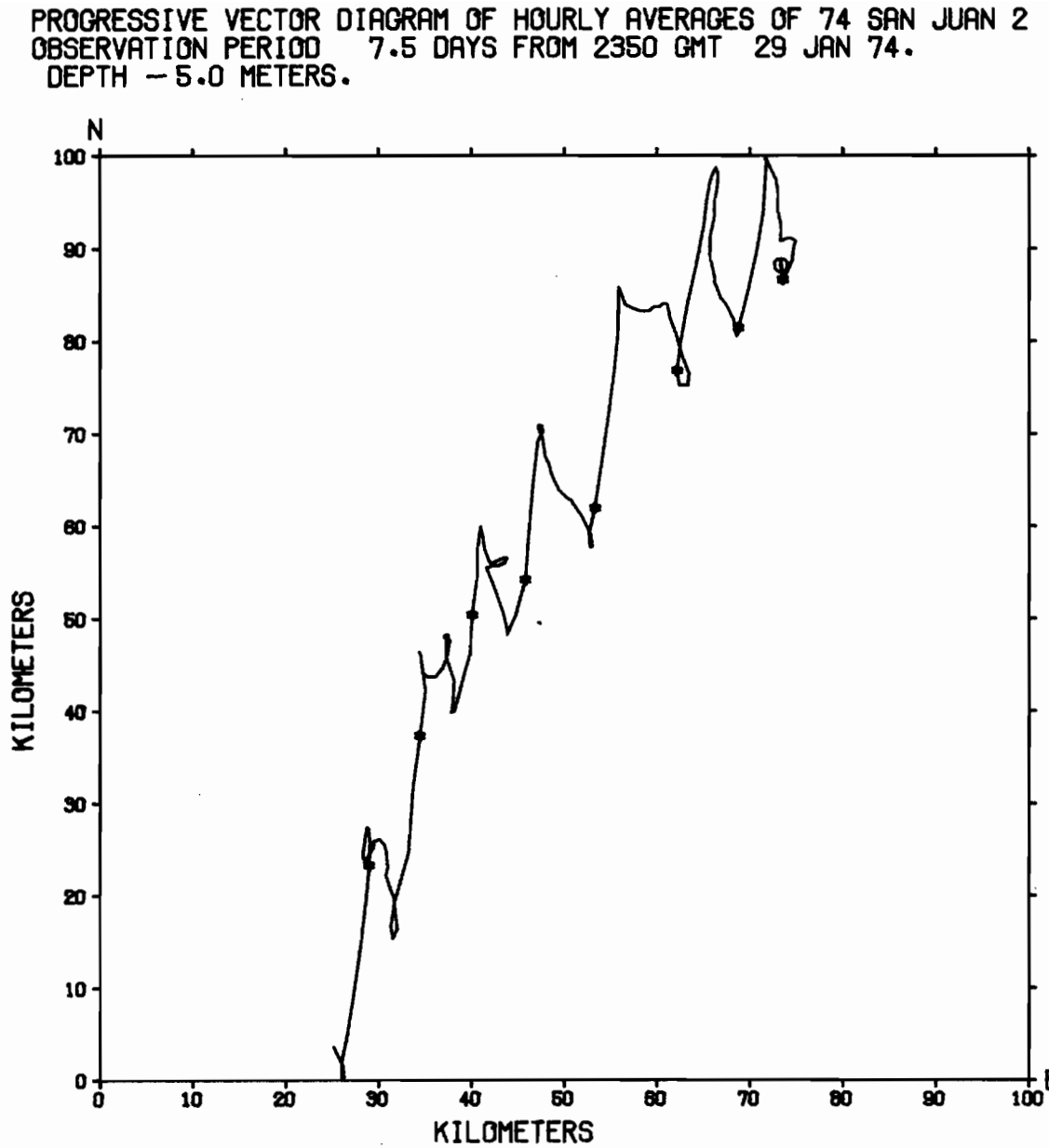


Figure 20.2. Current Meter Station 2 (-5m): Progressive Vector Diagram (PVD)

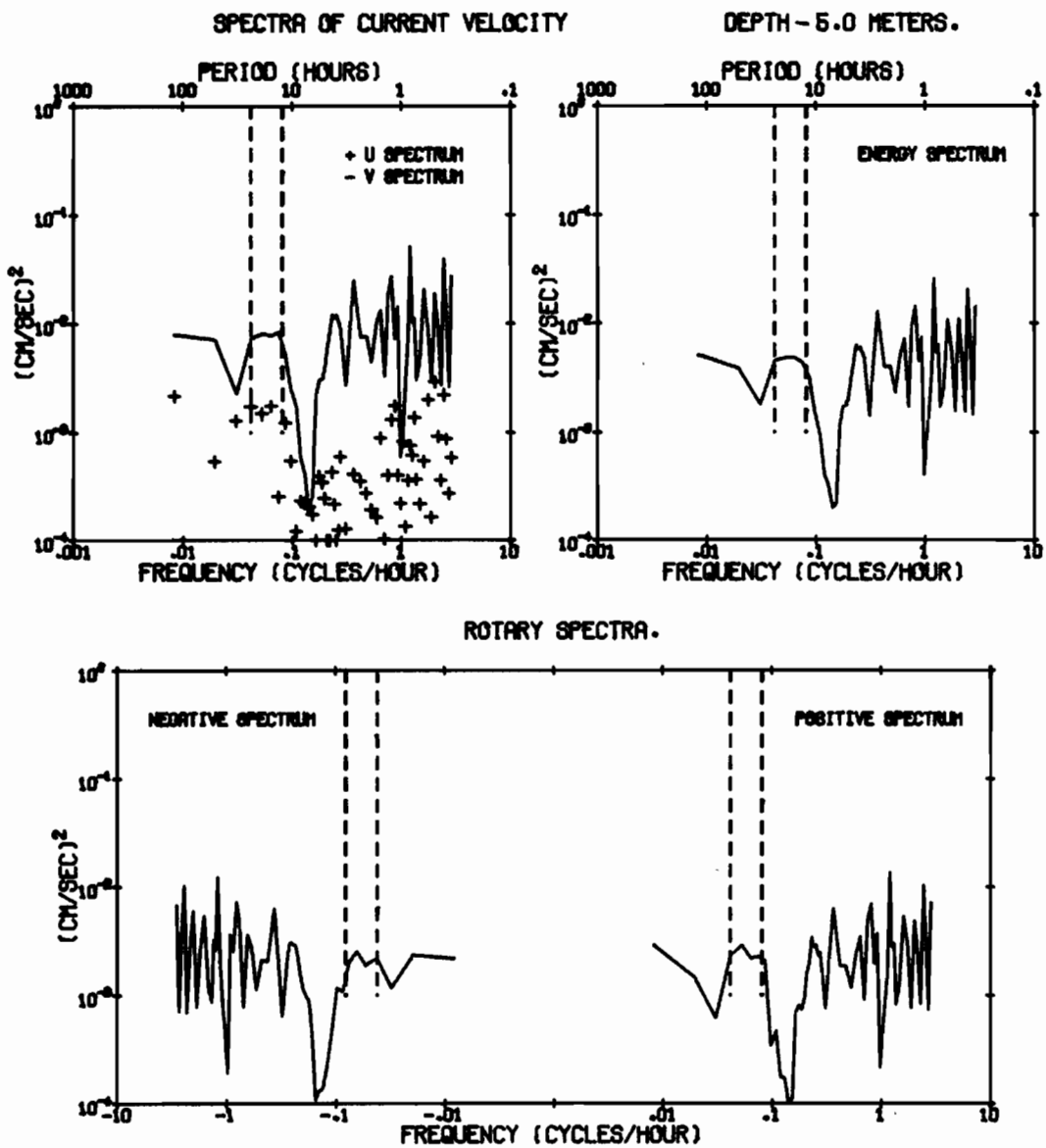


Figure 20.3. Current Meter Station 2 (-5m): Spectra

STATISTICS OF 74 SAN JUAN 3 LAT 48 26.05N LONG 122 43.00W
DEPTH - 5.0 METERS NUMBER OF OBSERVATIONS = 2170
OBSERVATION PERIOD 15.1 DAYS FROM 2100 GMT 30 JAN 74

	MEAN (CM/SEC)	VARIANCE (CM/SEC)2	ST-DEV (CM/SEC)	SKEW	KURT	MAX (CM/SEC)	MIN (CM/SEC)
S	44.63	800.23	28.29	.985	3.22	140.00	4.00
U	5.92	344.31	18.56	-.215	4.10	76.04	-107.52
V	-4.48	2392.54	48.91	-.474	2.63	100.19	-135.82

S = SPEED
U = EAST-WEST COMPONENT OF VELOCITY, EAST = POSITIVE U
V = NORTH-SOUTH COMPONENT OF VELOCITY, NORTH = POSITIVE V

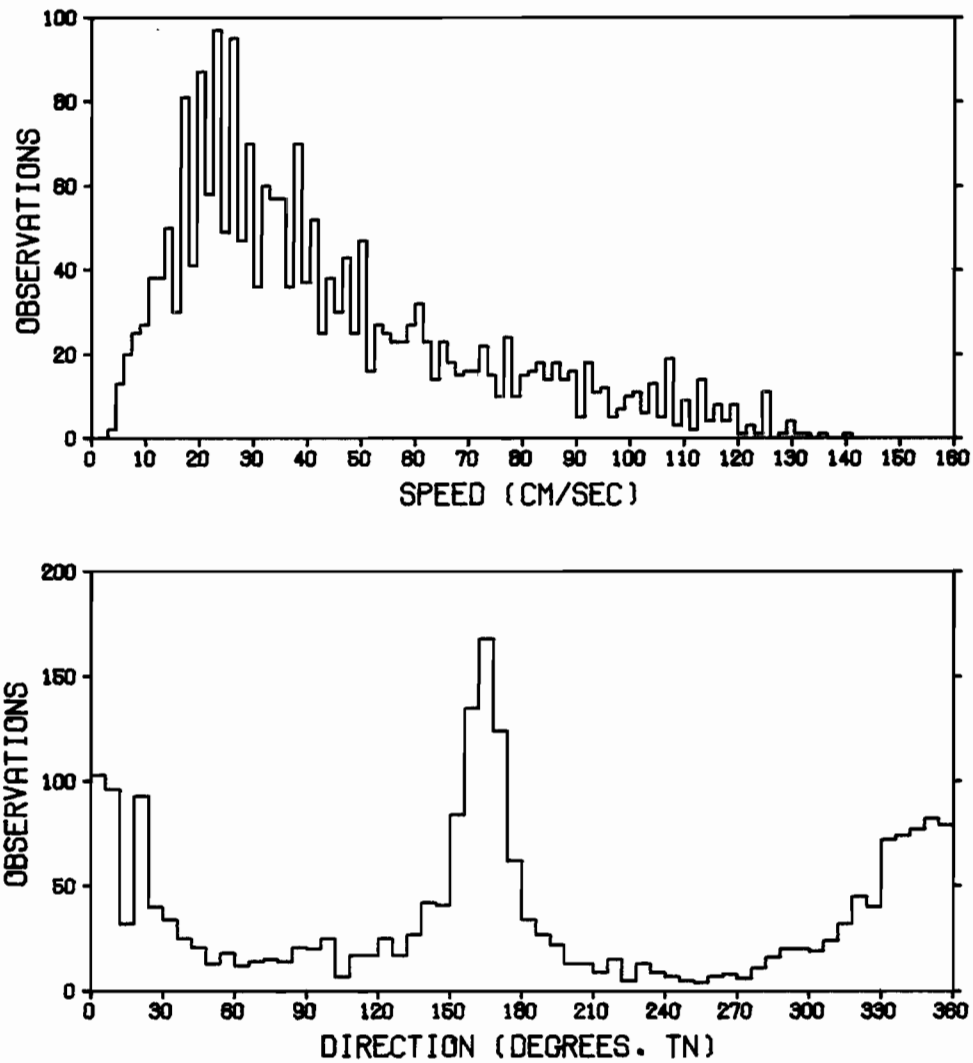


Figure 21.0. Current Meter Station 3 (-5m):
Standard Statistics and Histograms

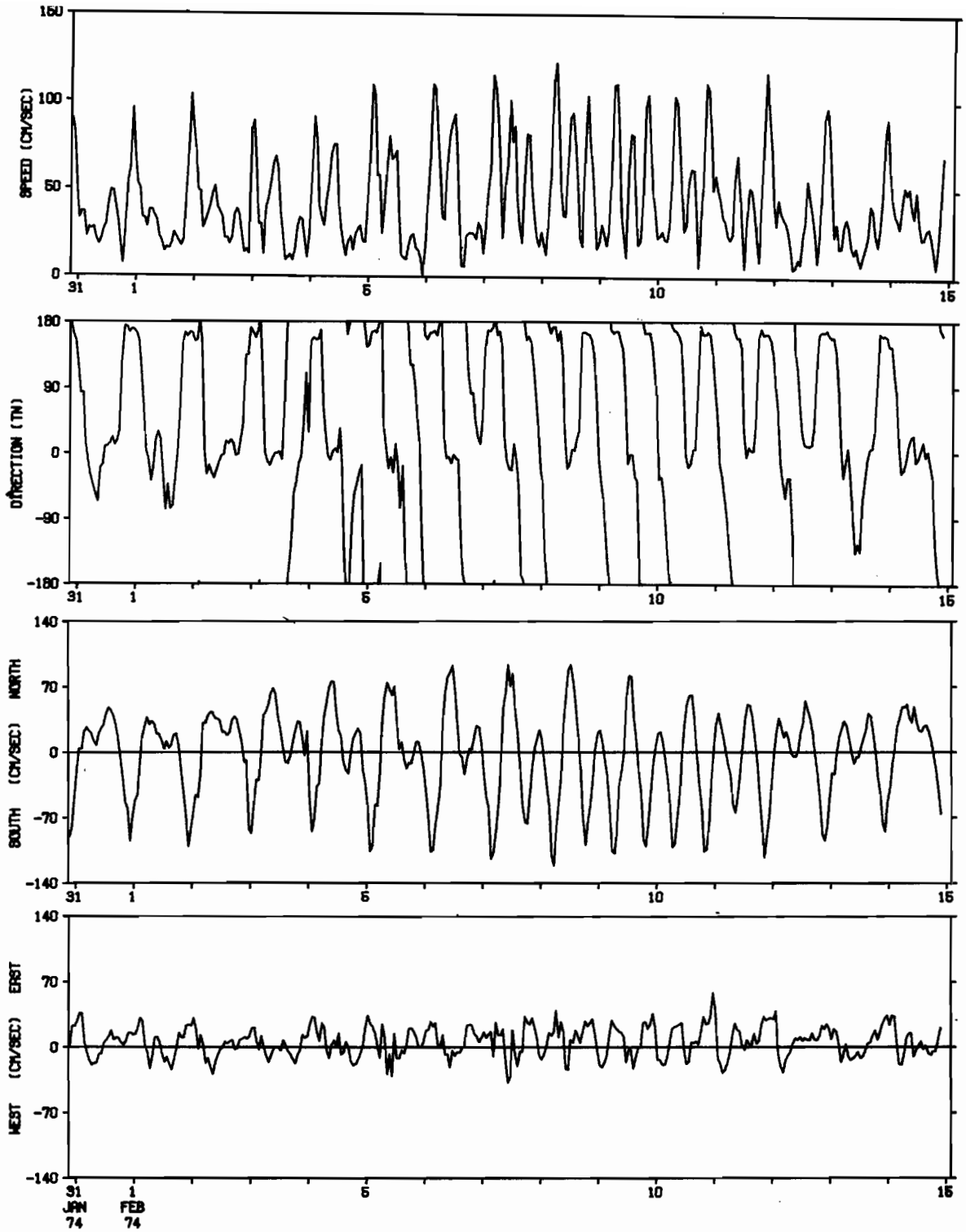


Figure 21.1. Current Meter Station 3 (-5m): Time Series

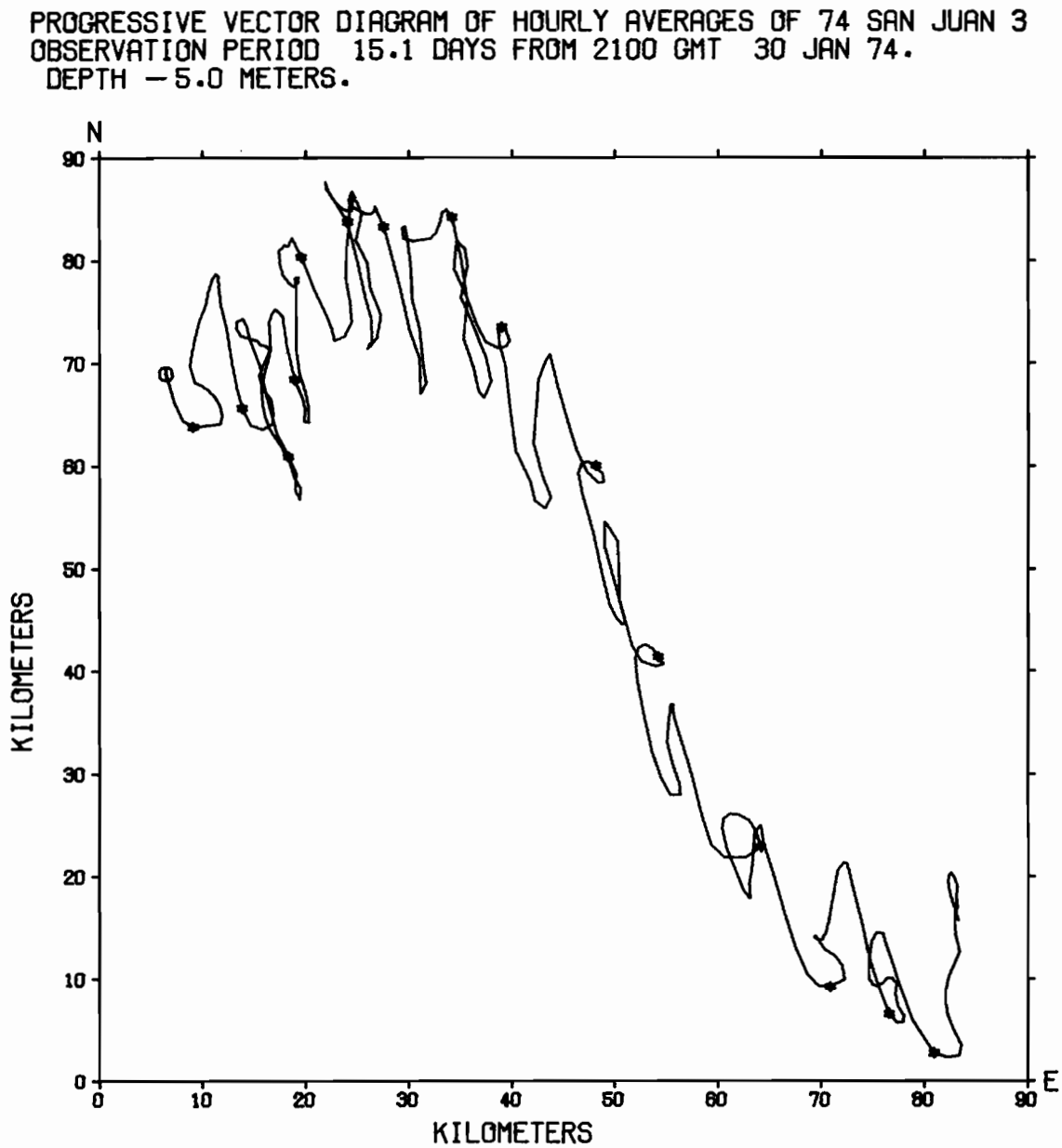


Figure 21.2. Current Meter Station 3 (-5m): Progressive Vector Diagram (PVD)

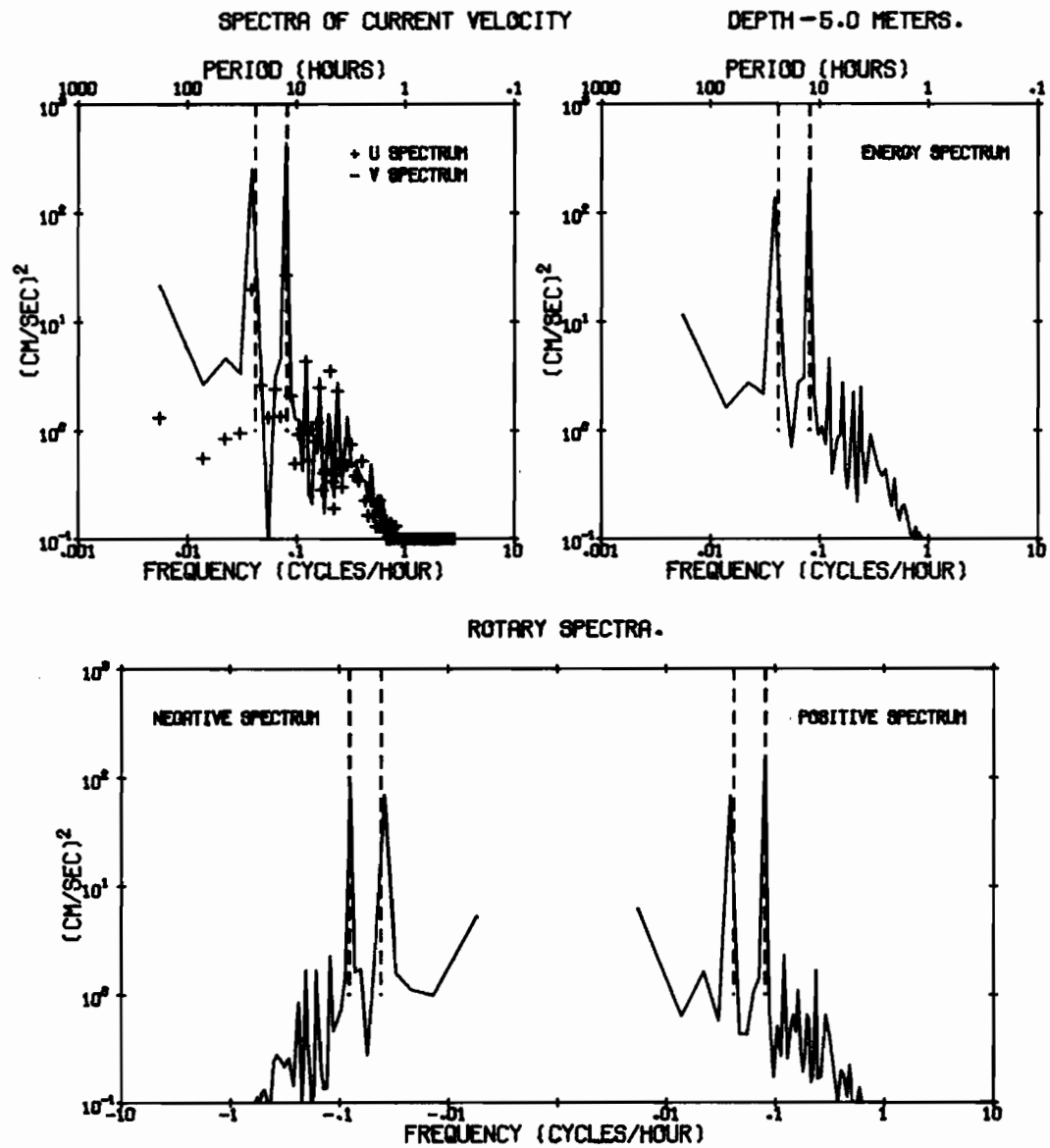
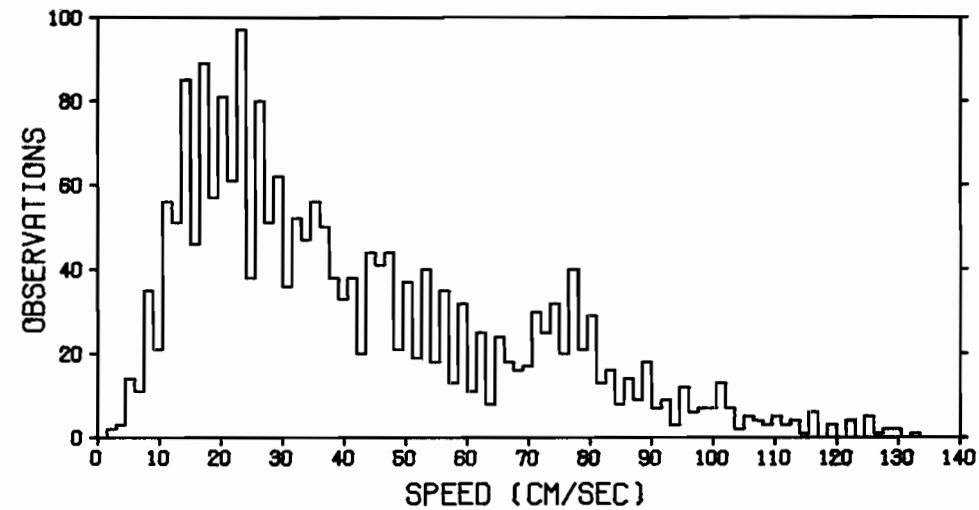


Figure 21.3. Current Meter Station 3 (-5m): Spectra

STATISTICS OF 74 SAN JUAN 3 LAT 48 26.05N LONG 122 43.00W
DEPTH +16.0 METERS NUMBER OF OBSERVATIONS = 2170
OBSERVATION PERIOD 15.1 DAYS FROM 2104 GMT 30 JAN 74

	MEAN (CM/SEC)	VARIANCE (CM/SEC)2	ST-DEV (CM/SEC)	SKEW	KURT	MAX (CM/SEC)	MIN (CM/SEC)
S	42.08	699.50	26.45	.889	3.08	133.00	3.00
U	9.06	608.64	24.67	.917	3.83	115.36	-49.30
V	-5.07	1753.90	41.88	-.281	2.57	91.65	-129.98

S = SPEED
U = EAST-WEST COMPONENT OF VELOCITY, EAST = POSITIVE U
V = NORTH-SOUTH COMPONENT OF VELOCITY, NORTH = POSITIVE V



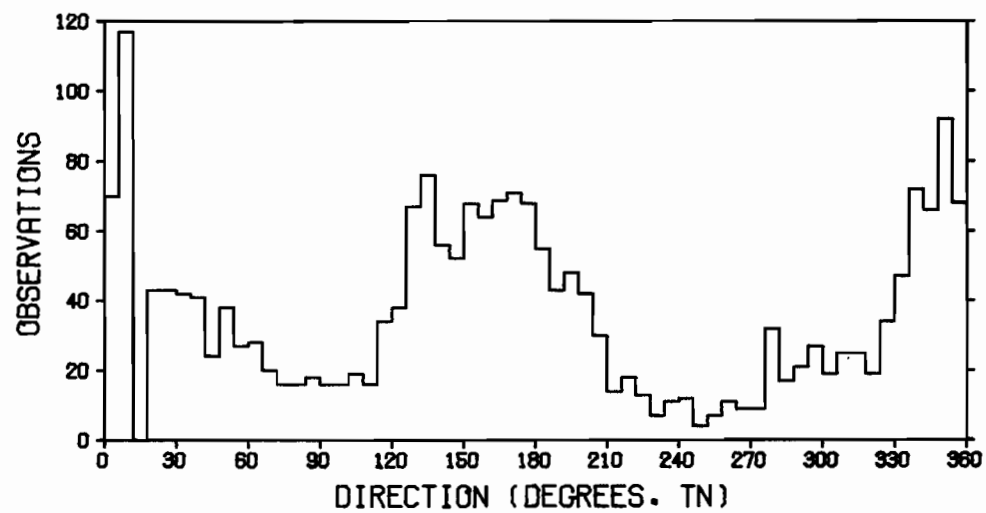


Figure 22.0. Current Meter Station 3 (+16m):
Standard Statistics and Histograms

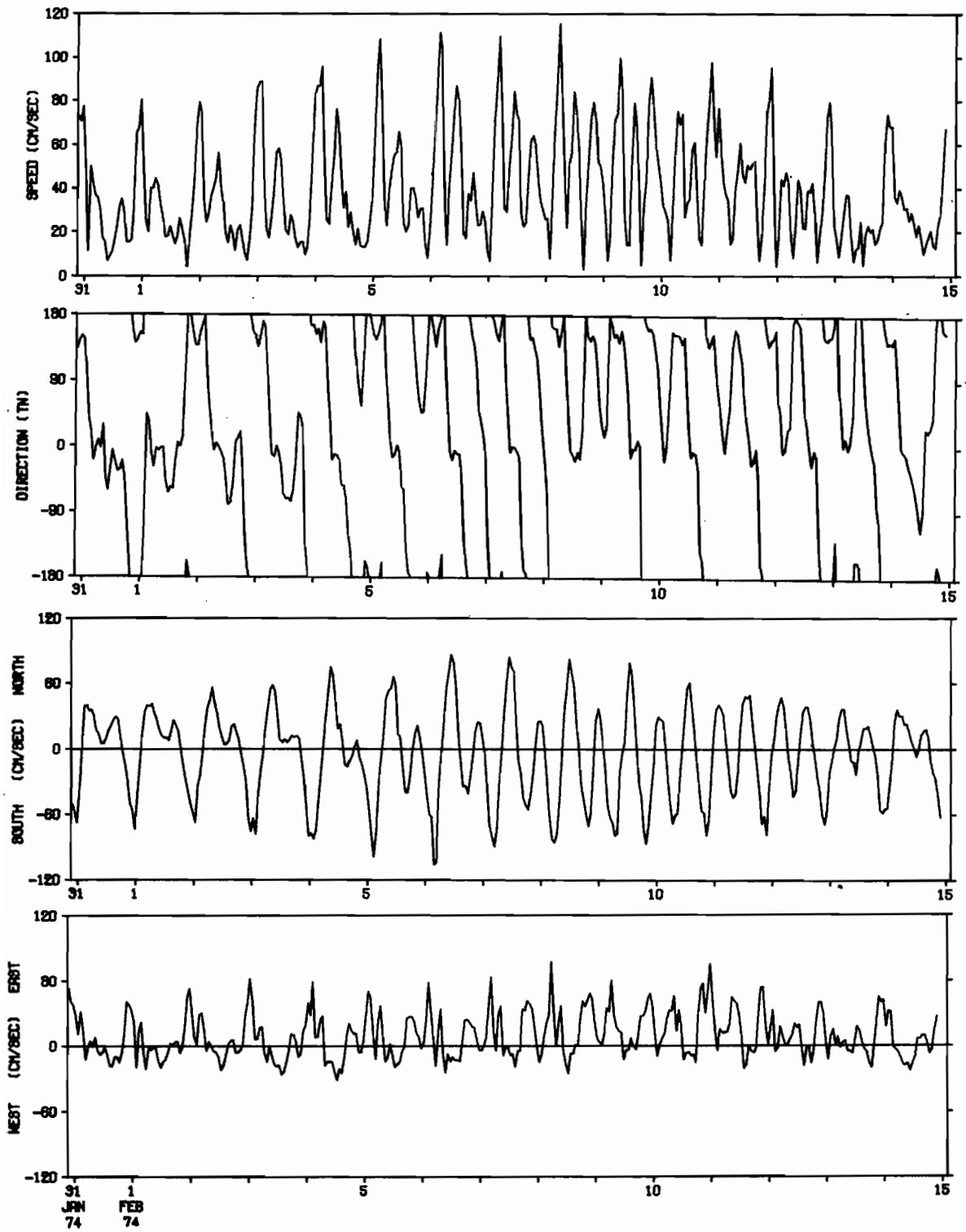


Figure 22.1. Current Meter Station 3 (+16m): Time Series

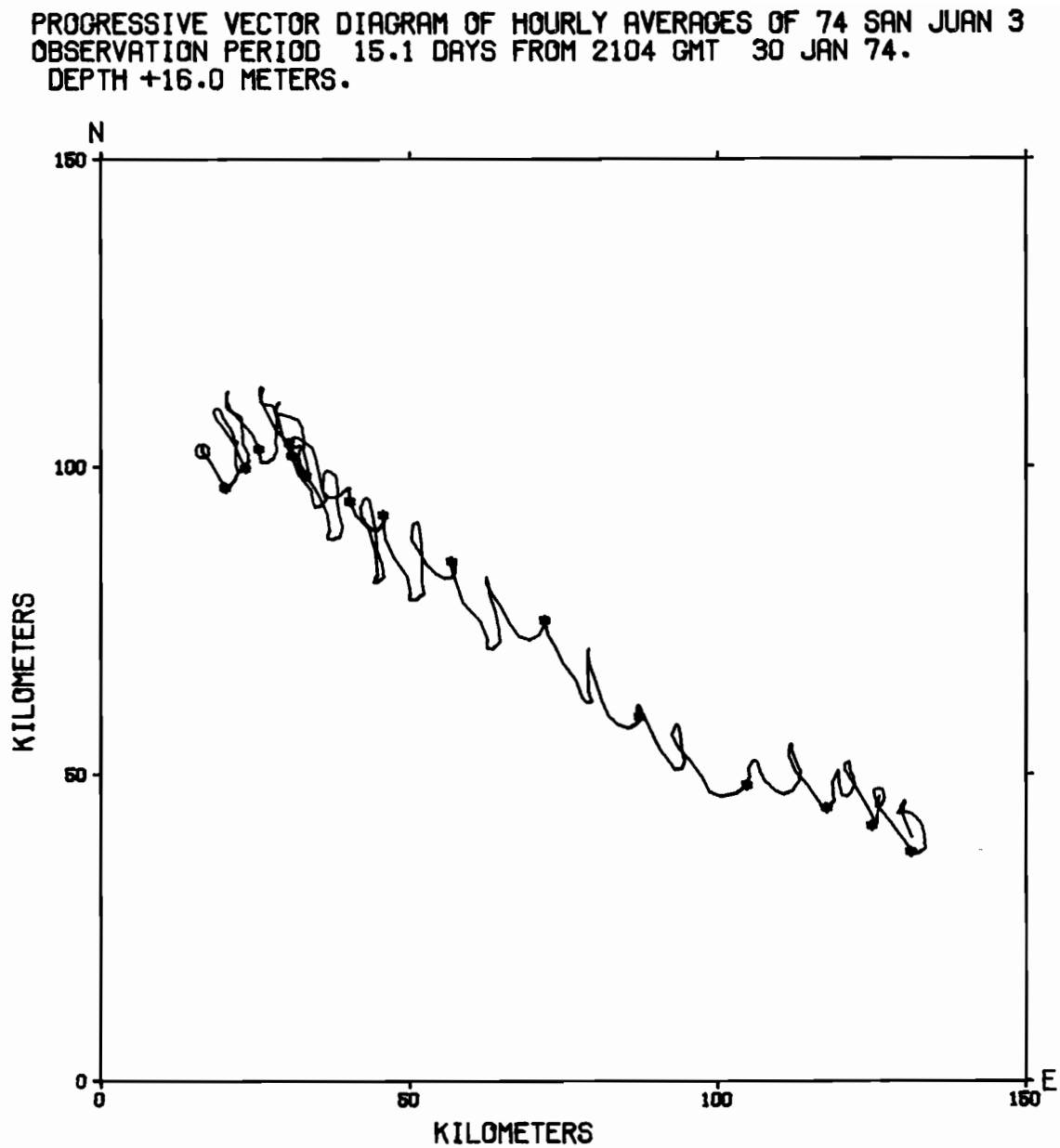


Figure 22.2. Current Meter Station 3 (+16m): Progressive Vector Diagram (PVD)

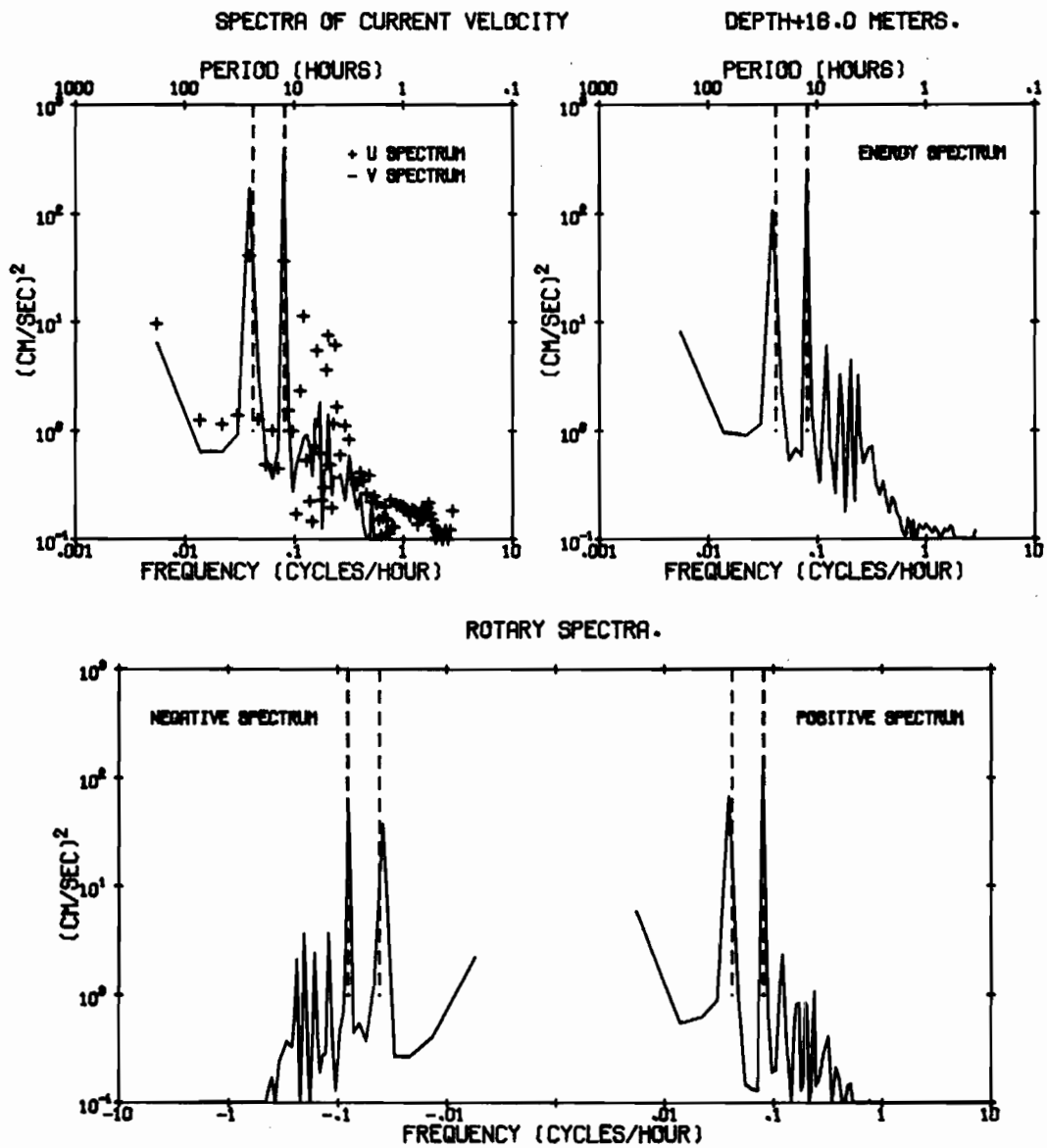
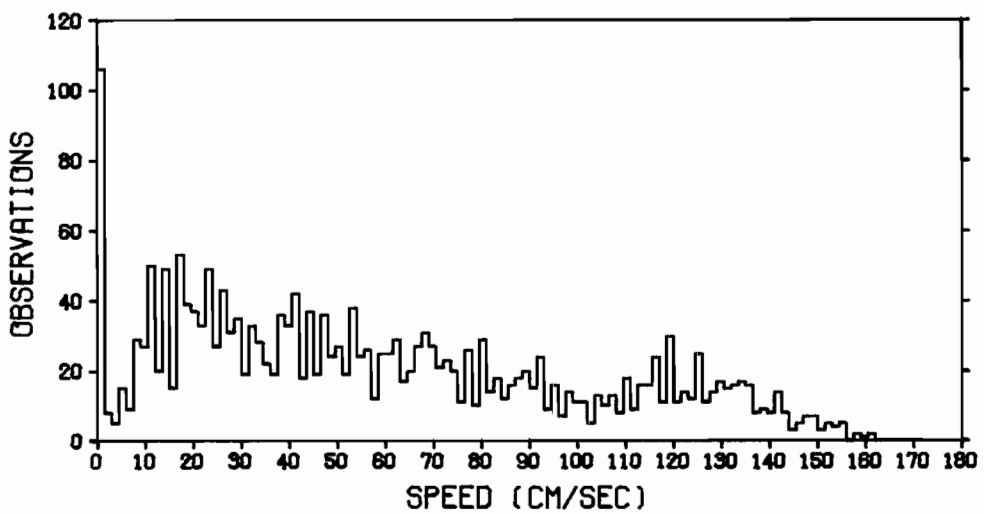


Figure 22.3. Current Meter Station 3 (+16m): Spectra

STATISTICS OF 74 SAN JUAN 5 LAT 48 28.90N LONG 122 46.50W
DEPTH -5.0 METERS NUMBER OF OBSERVATIONS = 2170
OBSERVATION PERIOD 15.1 DAYS FROM 2320 GMT 30 JAN 74

	MEAN (CM/SEC)	VARIANCE (CM/SEC)2	ST-DEV (CM/SEC)	SKEW	KURT	MAX (CM/SEC)	MIN (CM/SEC)
S	59.76	1740.57	41.72	.492	2.15	162.00	0.00
U	-11.80	329.75	18.16	-.794	3.33	37.75	-91.84
V	-7.00	4794.25	69.24	-.032	2.36	161.38	-155.62

S = SPEED
U = EAST-WEST COMPONENT OF VELOCITY, EAST = POSITIVE U
V = NORTH-SOUTH COMPONENT OF VELOCITY, NORTH = POSITIVE V



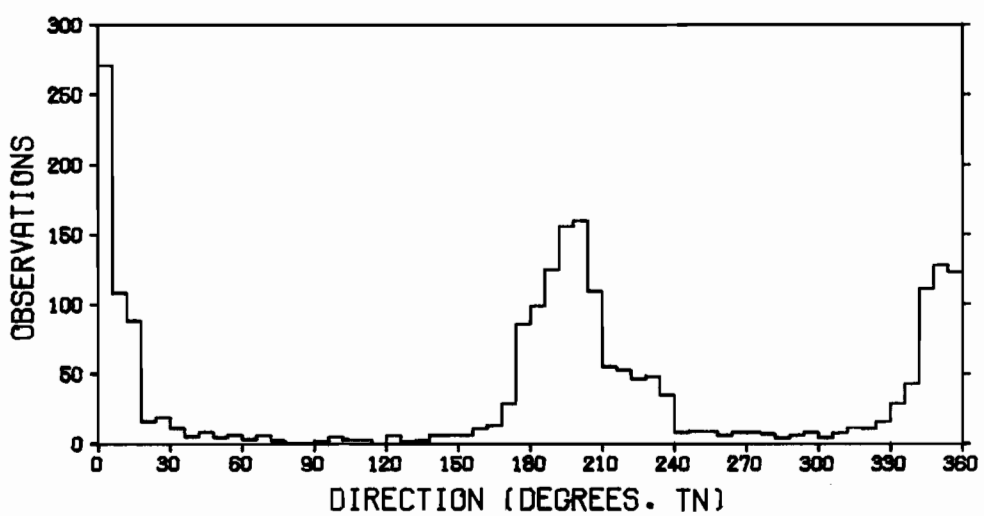


Figure 23.0. Current Meter Station 5 (-5m): Standard Statistics and Histograms

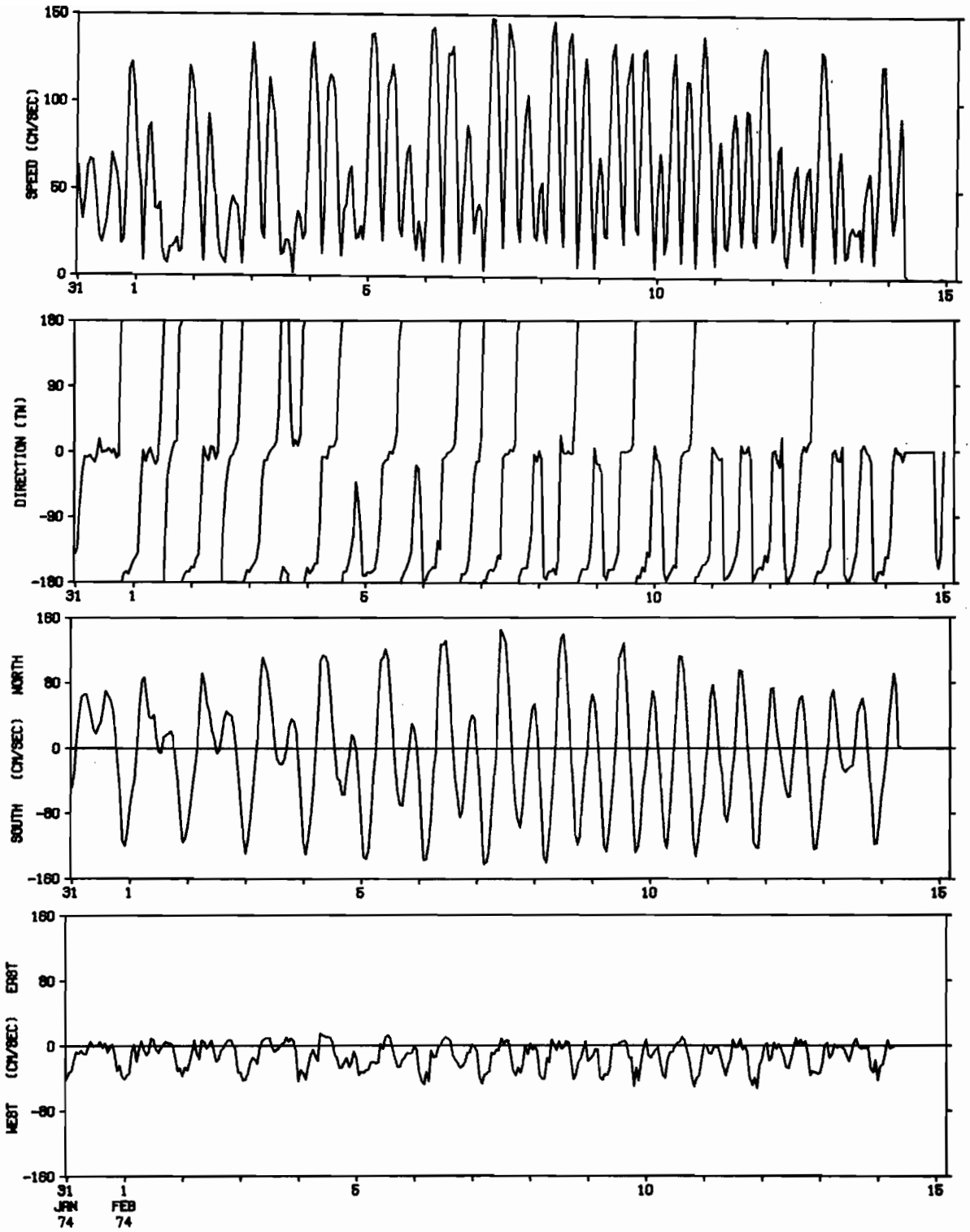


Figure 23.1. Current Meter Station 5 (-5m): Time Series

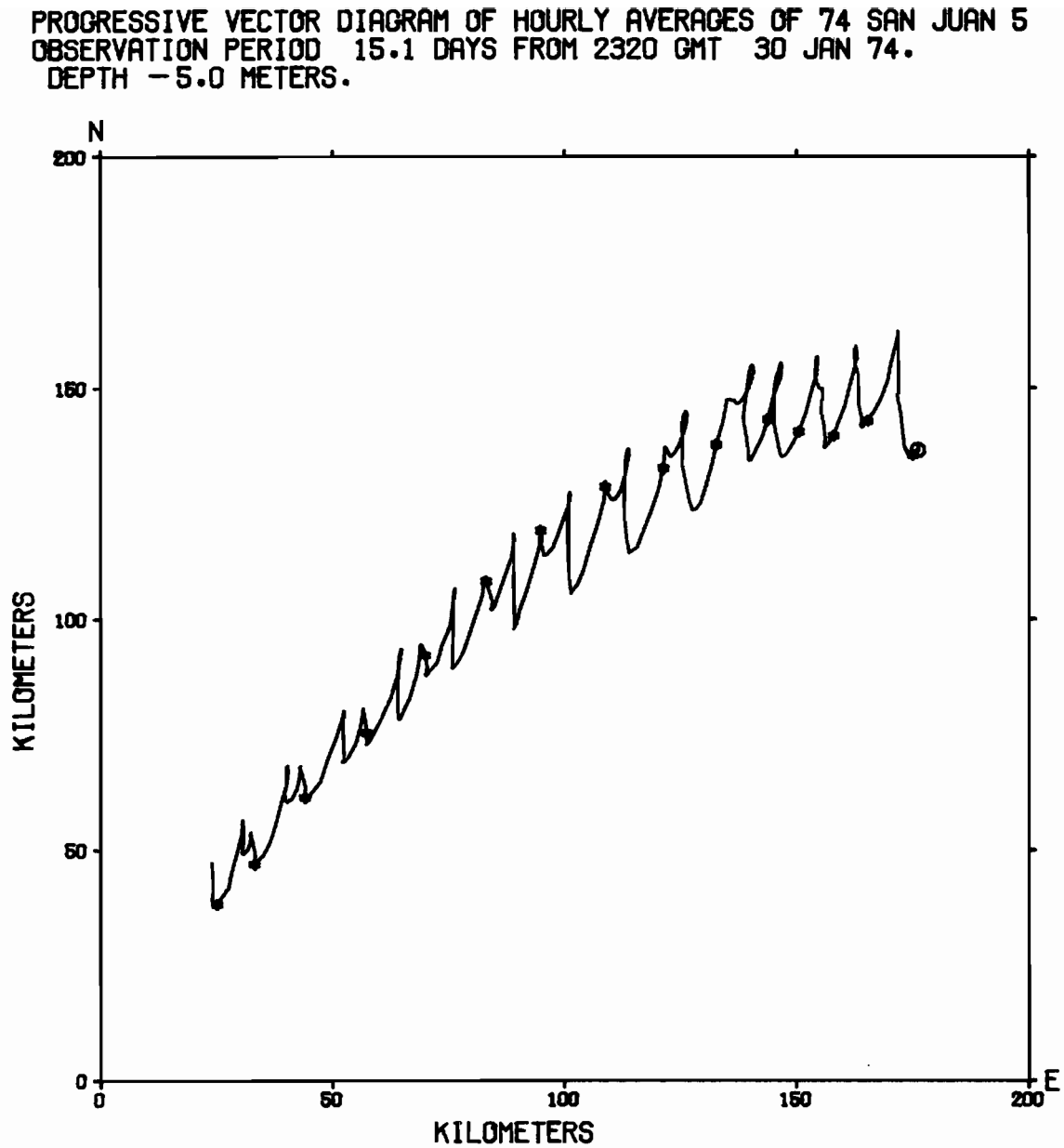


Figure 23.2. Current Meter Station 5 (-5m): Progressive Vector Diagram (PVD)

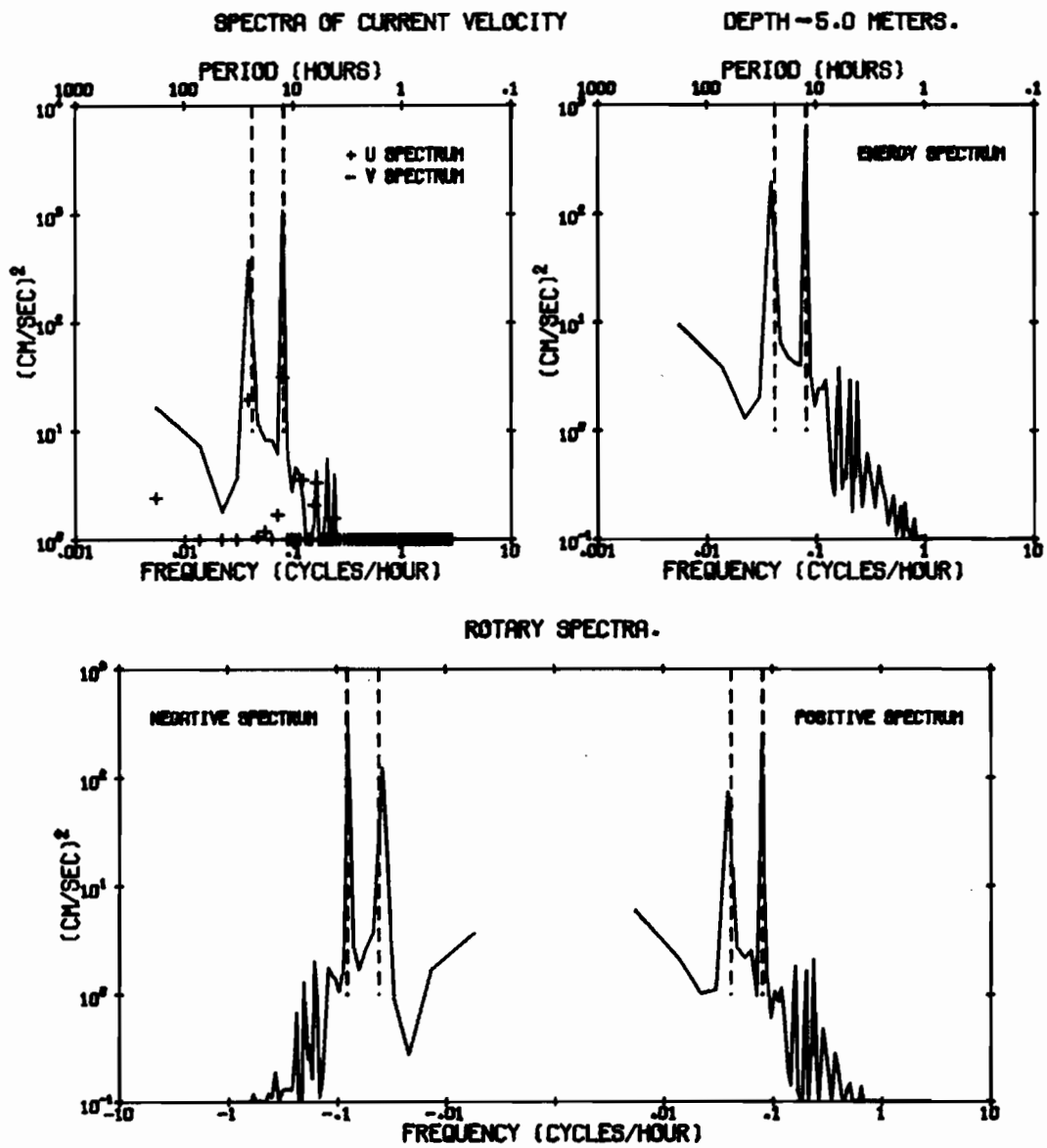


Figure 23.3. Current Meter Station 5 (-5m): Spectra

STATISTICS OF 74 SAN JUAN 5 LAT 48 28.90N LONG 122 46.50W
DEPTH +16.0 METERS NUMBER OF OBSERVATIONS = 2170
OBSERVATION PERIOD 15.1 DAYS FROM 2312 GMT 30 JAN 74

	MEAN (CM/SEC)	VARIANCE (CM/SEC)2	ST-DEV (CM/SEC)	SKEW	KURT	MAX (CM/SEC)	MIN (CM/SEC)
S	56.03	1654.70	40.68	.582	2.15	169.00	2.00
U	-4.93	1557.80	39.47	.447	5.94	159.01	-149.44
V	-4.75	3189.30	56.47	.030	2.62	153.00	-146.74

S = SPEED
U = EAST-WEST COMPONENT OF VELOCITY, EAST = POSITIVE U
V = NORTH-SOUTH COMPONENT OF VELOCITY, NORTH = POSITIVE V

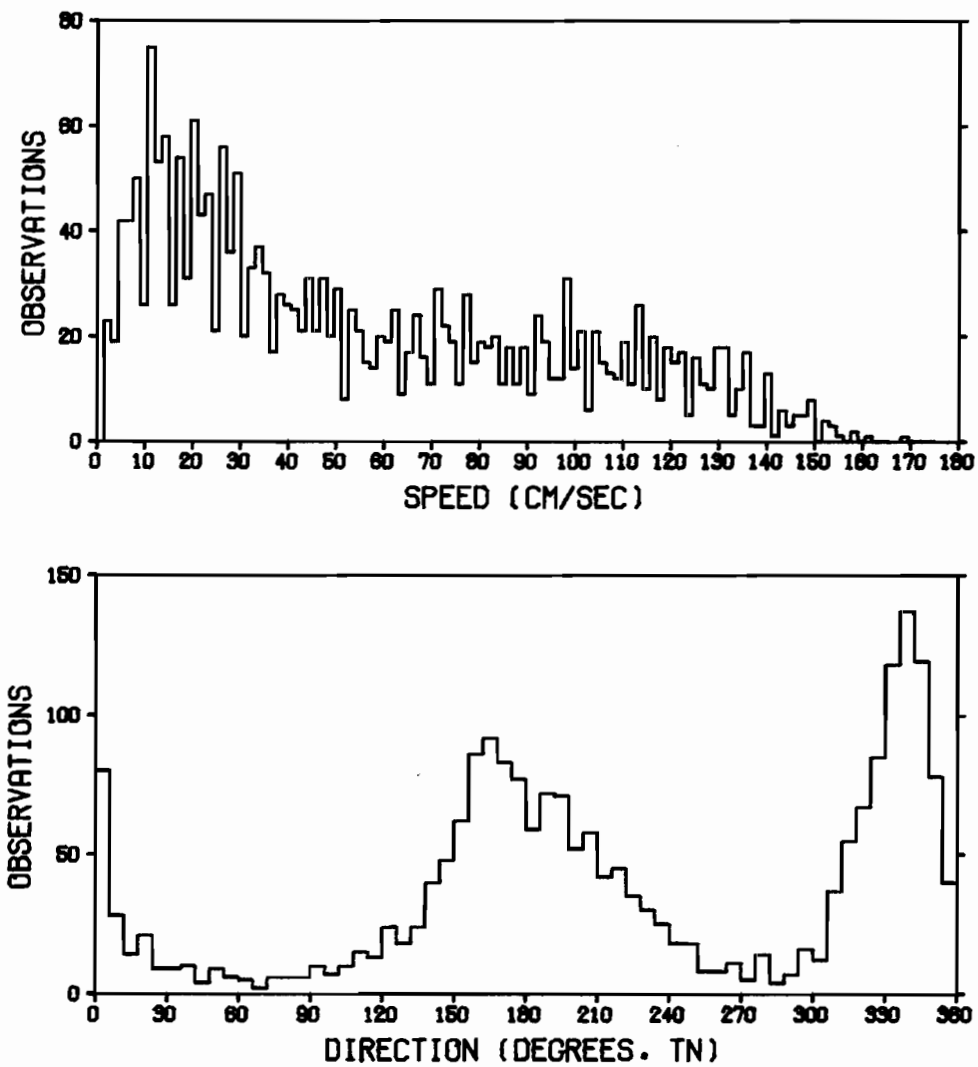


Figure 24.0. Current Meter Station 5 (+16m):
Standard Statistics and Histograms

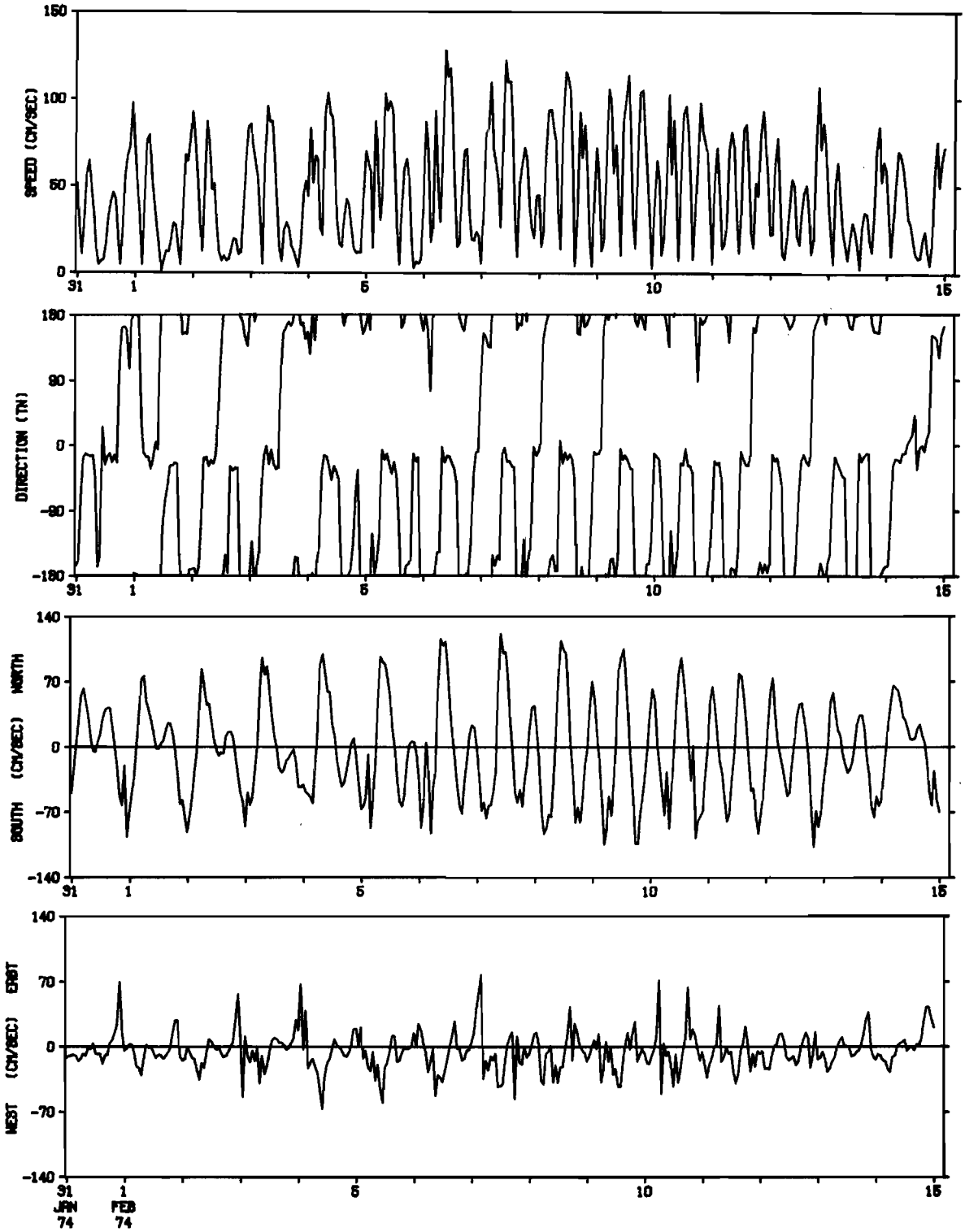


Figure 24.1. Current Meter Station 5 (+16m): Time Series

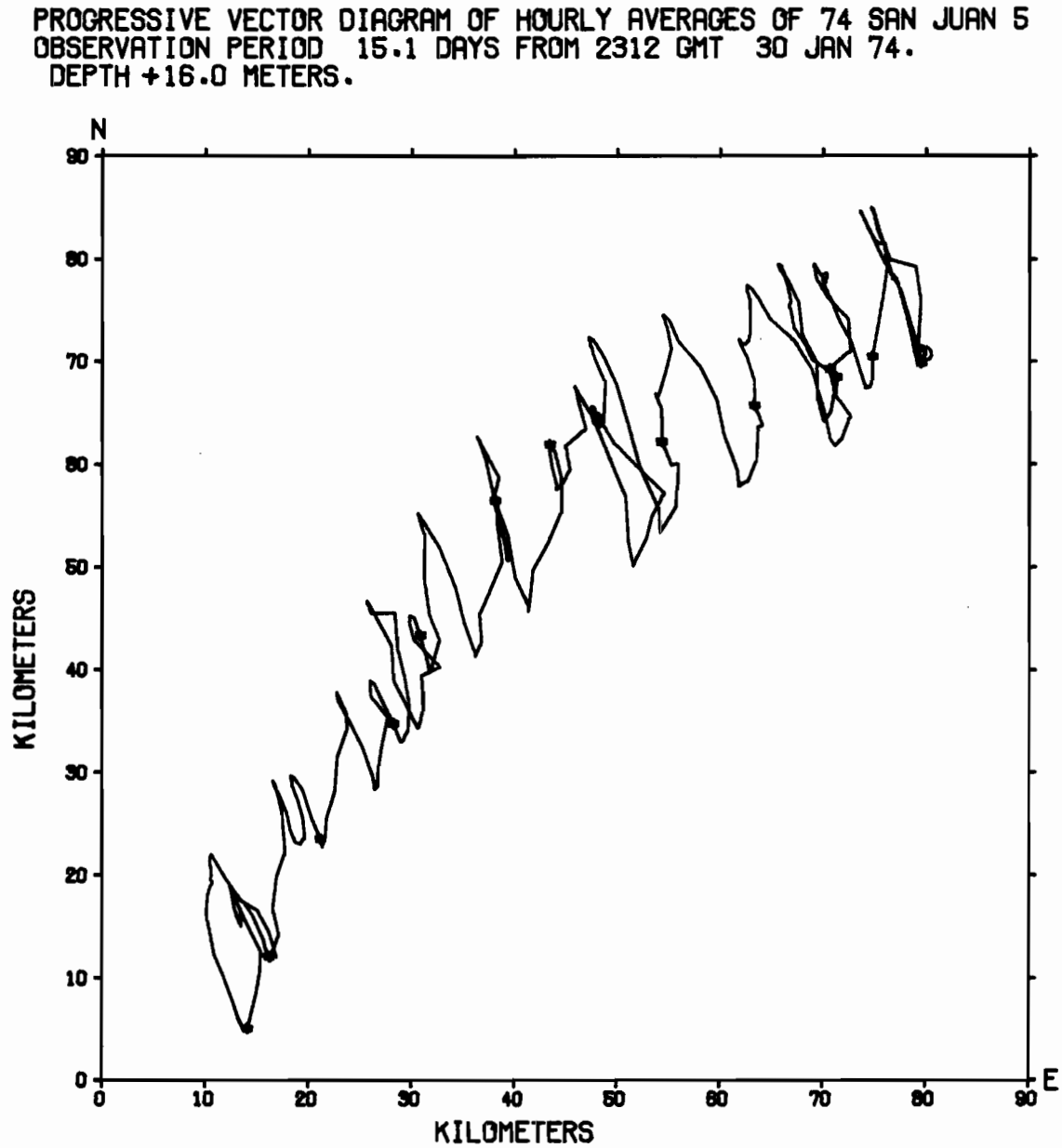


Figure 24.2. Current Meter Station 5 (+16m): Progressive Vector Diagram (PVD)

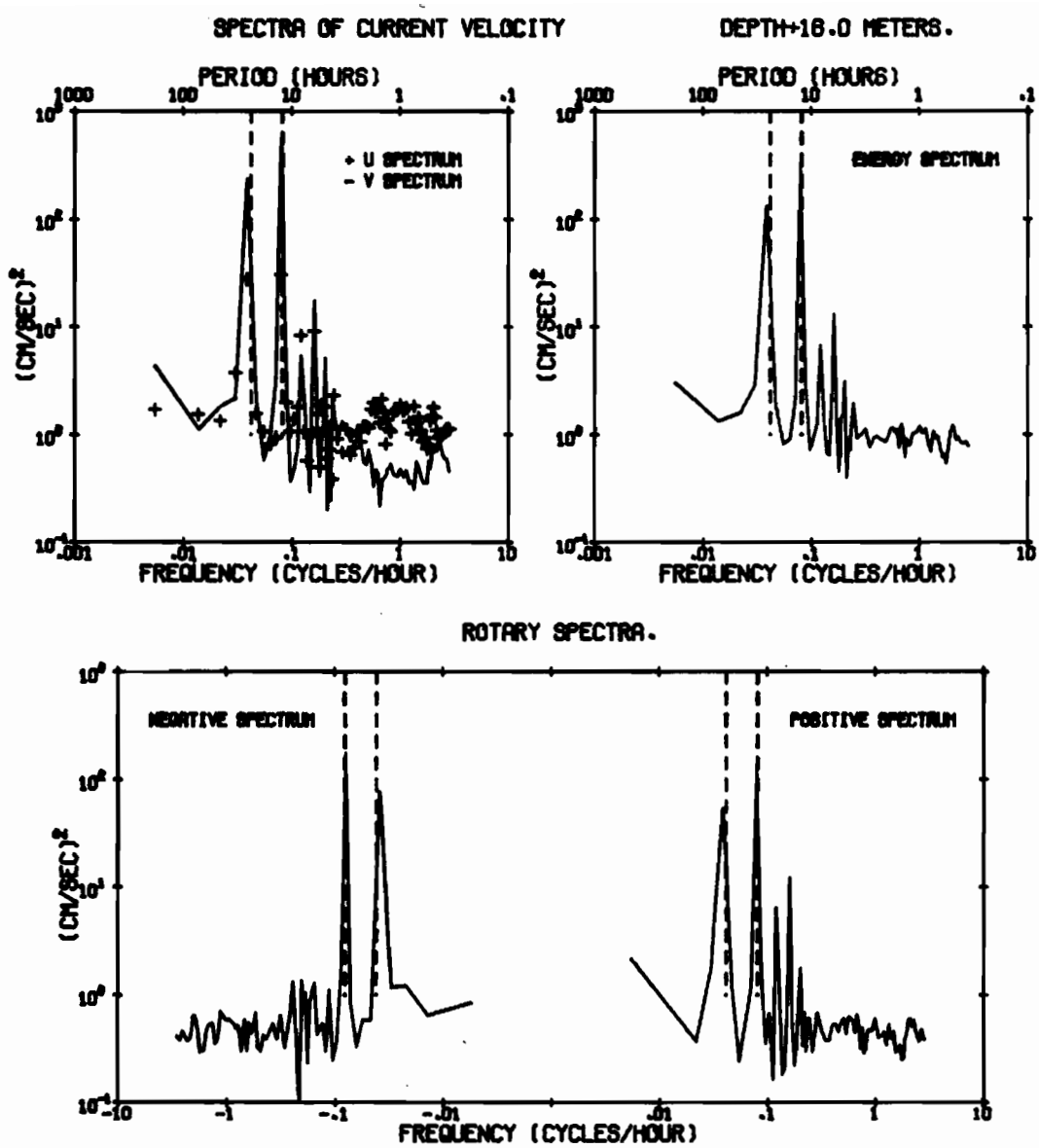


Figure 24.3. Current Meter Station 5 (+16m): Spectra

STATISTICS OF 74 SAN JUAN 8 LAT 48 31.35N LONG 122 44.90W
DEPTH -5.0 METERS NUMBER OF OBSERVATIONS = 2440
OBSERVATION PERIOD 16.9 DAYS FROM 1700 GMT 15 FEB 74

	MEAN (CM/SEC)	VARIANCE (CM/SEC)2	ST-DEV (CM/SEC)	SKEW	KURT	MAX (CM/SEC)	MIN (CM/SEC)
S	70.67	2244.75	47.38	.304	1.86	184.00	0.00
U	-1.91	222.75	14.92	.836	18.84	147.64	-114.01
V	-6.29	6972.71	83.50	-.071	2.11	163.19	-183.74

S = SPEED
U = EAST-WEST COMPONENT OF VELOCITY, EAST = POSITIVE U
V = NORTH-SOUTH COMPONENT OF VELOCITY, NORTH = POSITIVE V

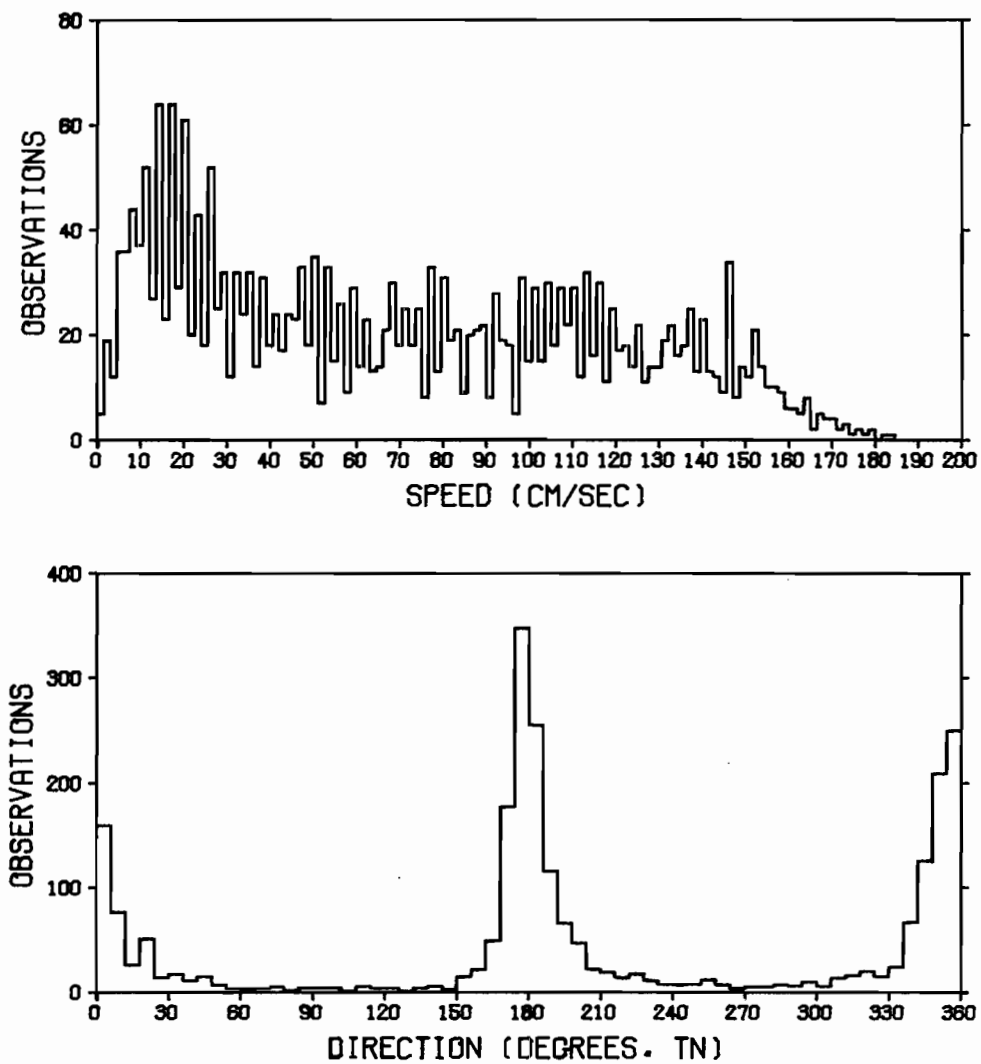


Figure 25.0. Current Meter Station 8 (-5m):
Standard Statistics and Histograms

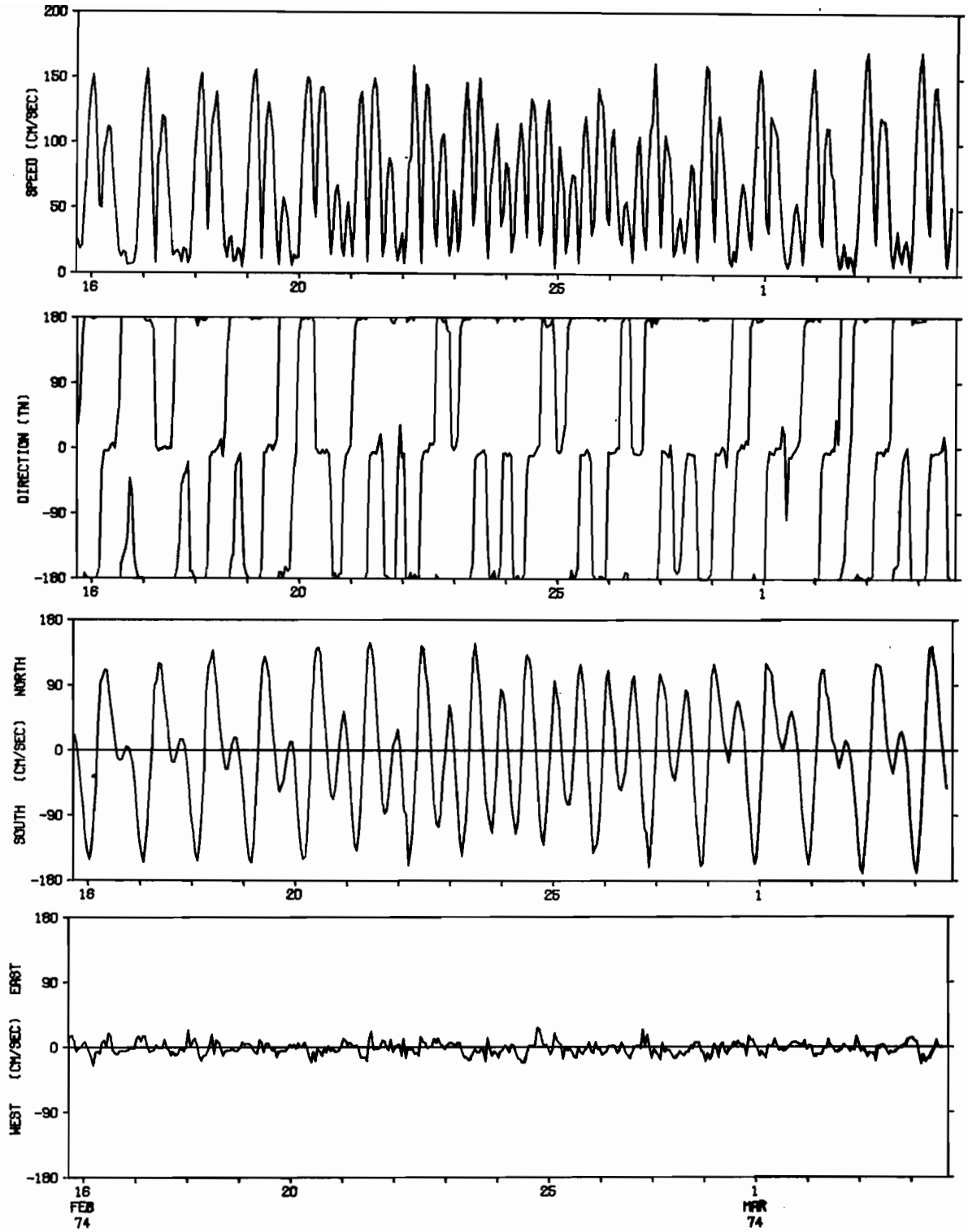


Figure 25.1. Current Meter Station 8 (-5m): Time Series

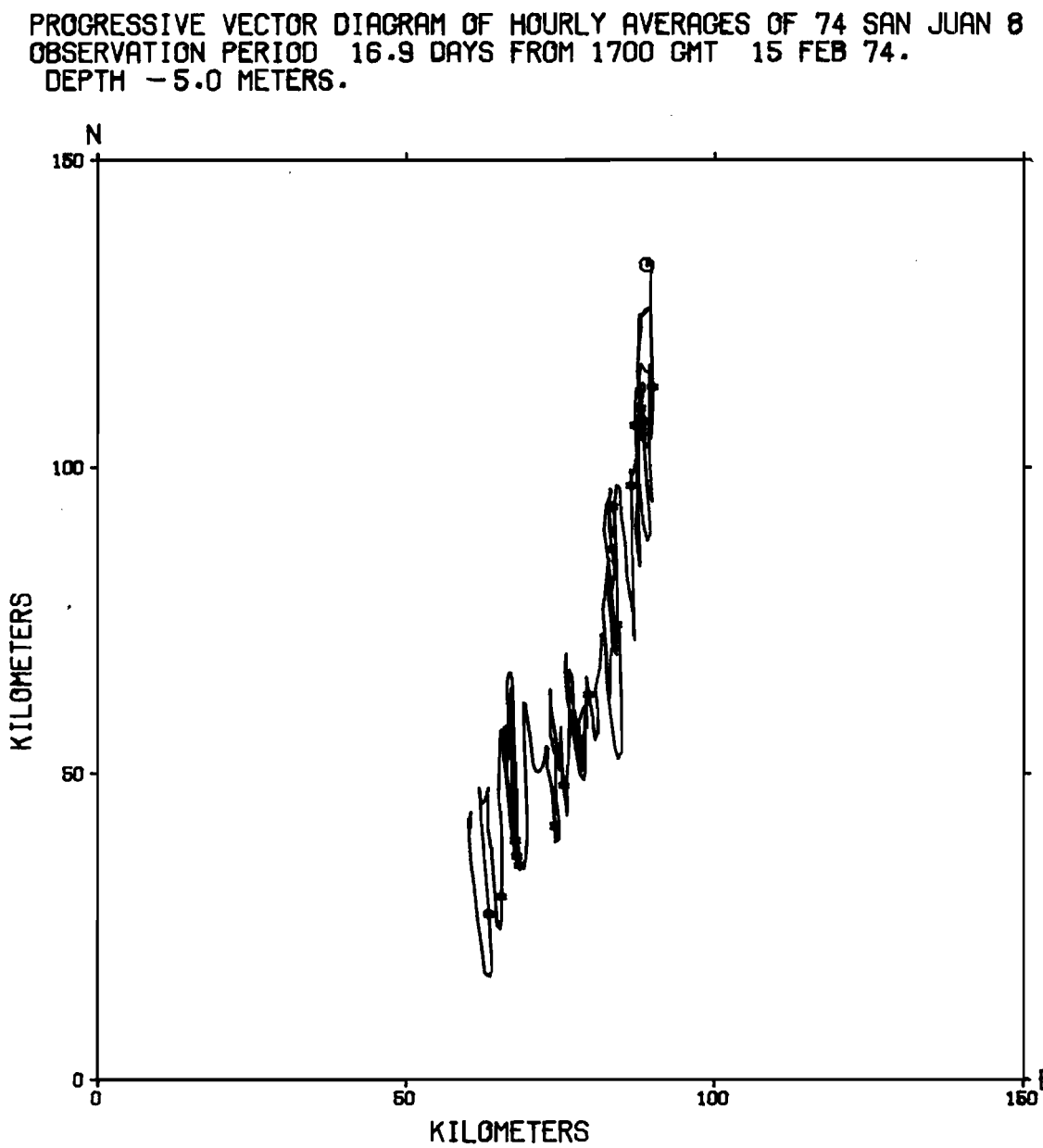


Figure 25.2. Current Meter Station 8 (-5m): Progressive Vector Diagram (PVD)

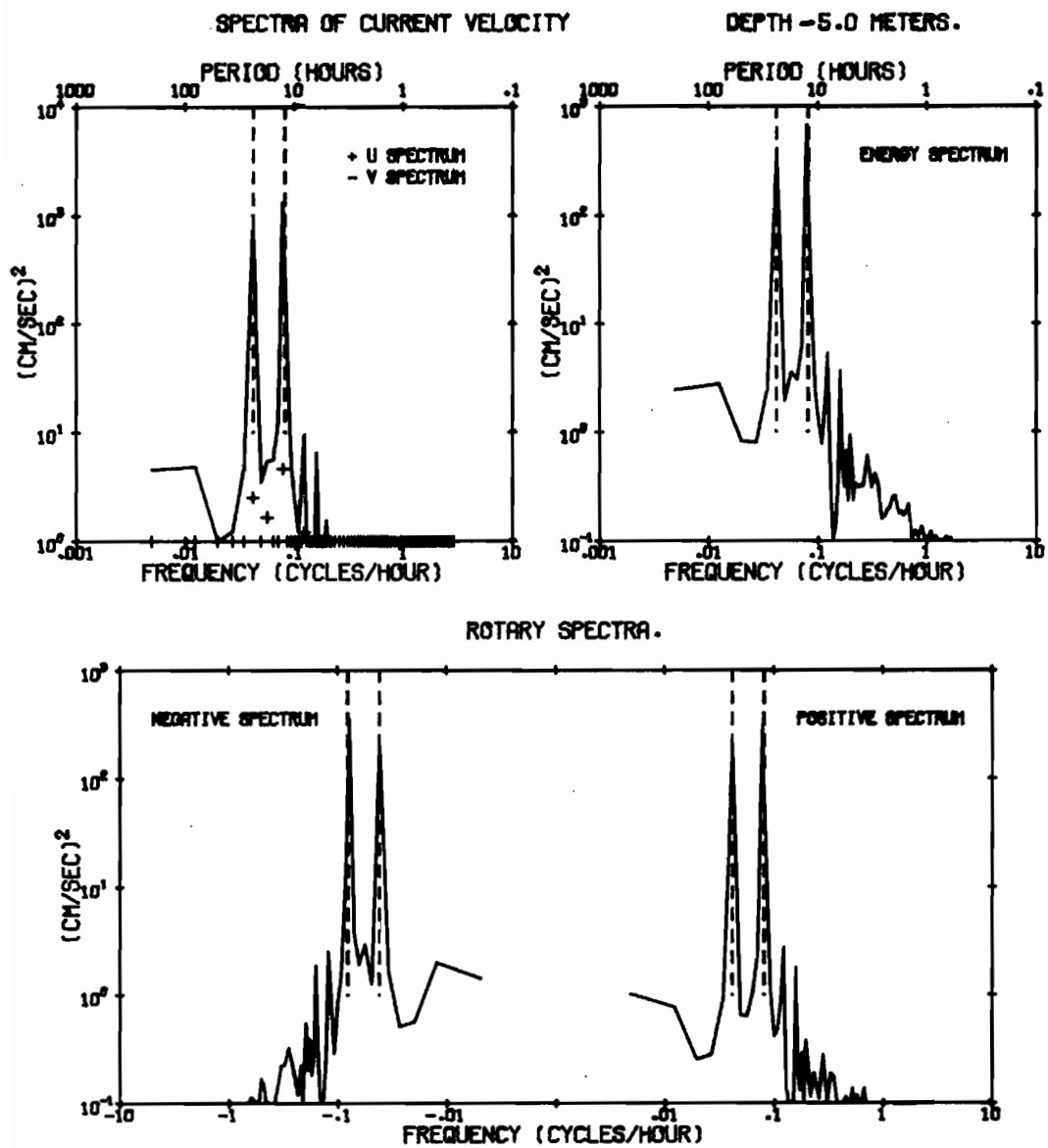


Figure 25.3. Current Meter Station 8 (-5m): Spectra

STATISTICS OF 74 SAN JUAN 8 LAT 48 31.35N LONG 122 44.90W
DEPTH -23.0 METERS NUMBER OF OBSERVATIONS = 2440
OBSERVATION PERIOD 16.9 DAYS FROM 1702 GMT 15 FEB 74

	MEAN (CM/SEC)	VARIANCE (CM/SEC)2	ST-DEV (CM/SEC)	SKEW	KURT	MAX (CM/SEC)	MIN (CM/SEC)
S	64.83	2032.09	45.08	.387	2.12	258.18	0.00
U	-.26	231.36	15.21	-.504	20.46	146.57	-178.91
V	-10.79	5887.57	76.73	-.017	2.17	187.00	-178.33

S = SPEED
U = EAST-WEST COMPONENT OF VELOCITY. EAST = POSITIVE U
V = NORTH-SOUTH COMPONENT OF VELOCITY. NORTH = POSITIVE V

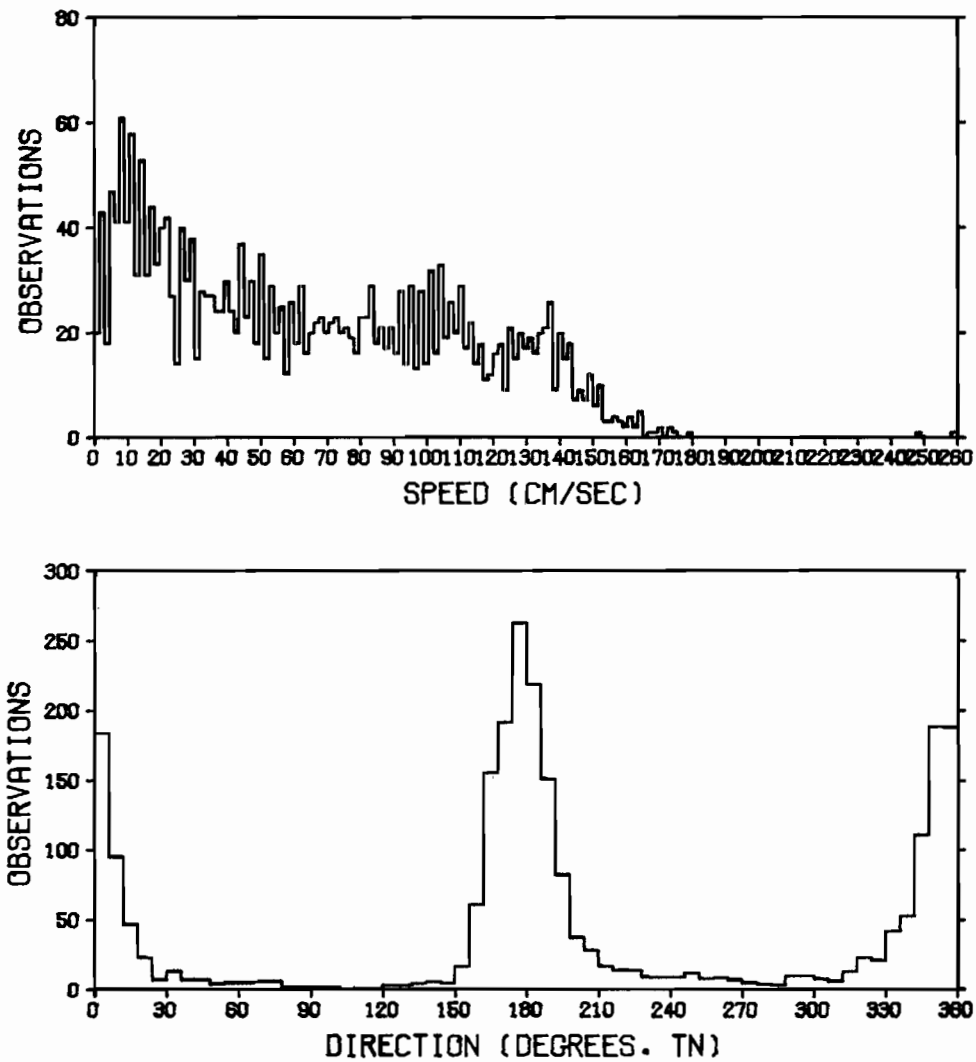


Figure 26.0. Current Meter Station 8 (-23m): Standard Statistics and Histograms

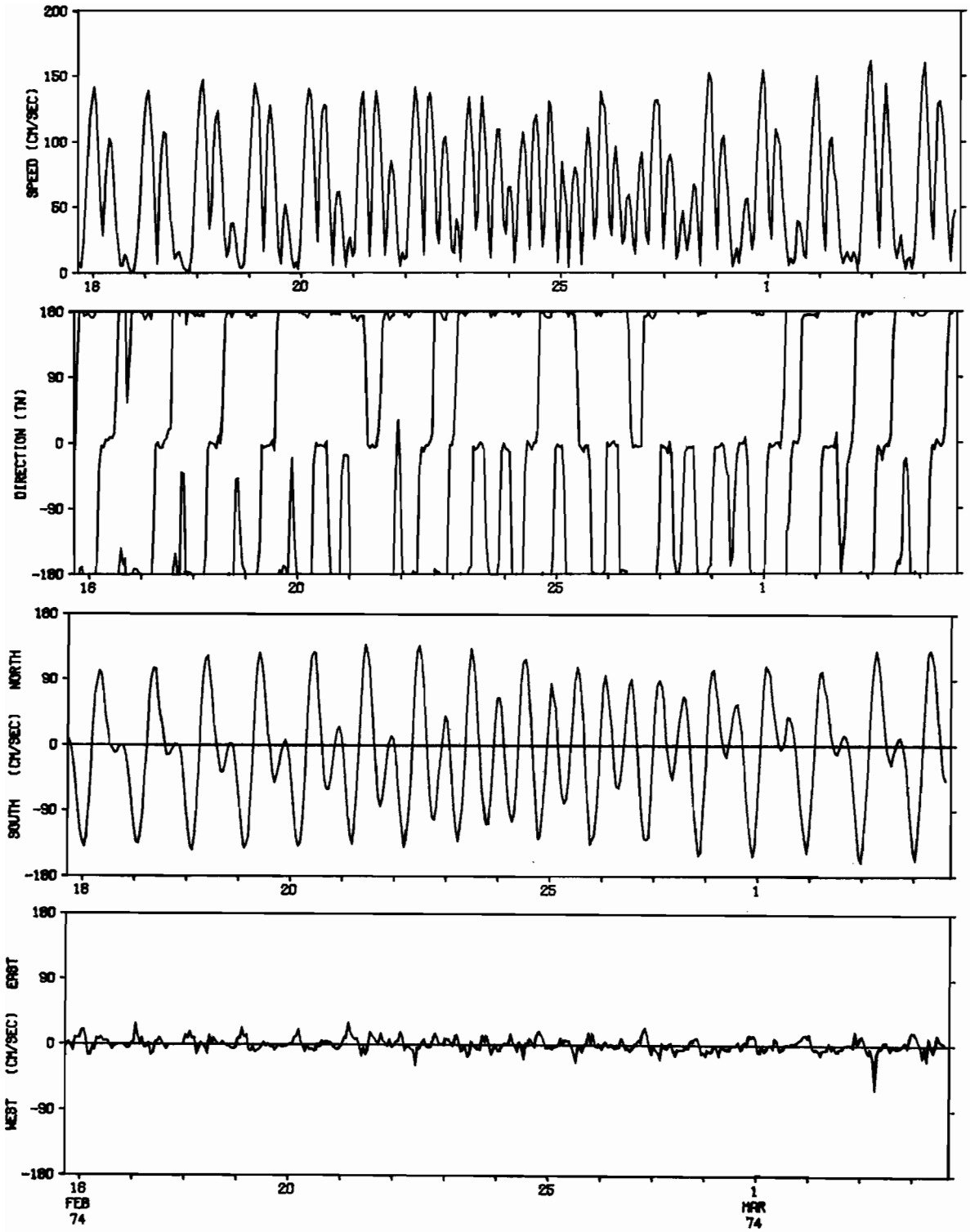


Figure 26.1. Current Meter Station 8 (-23m): Time Series

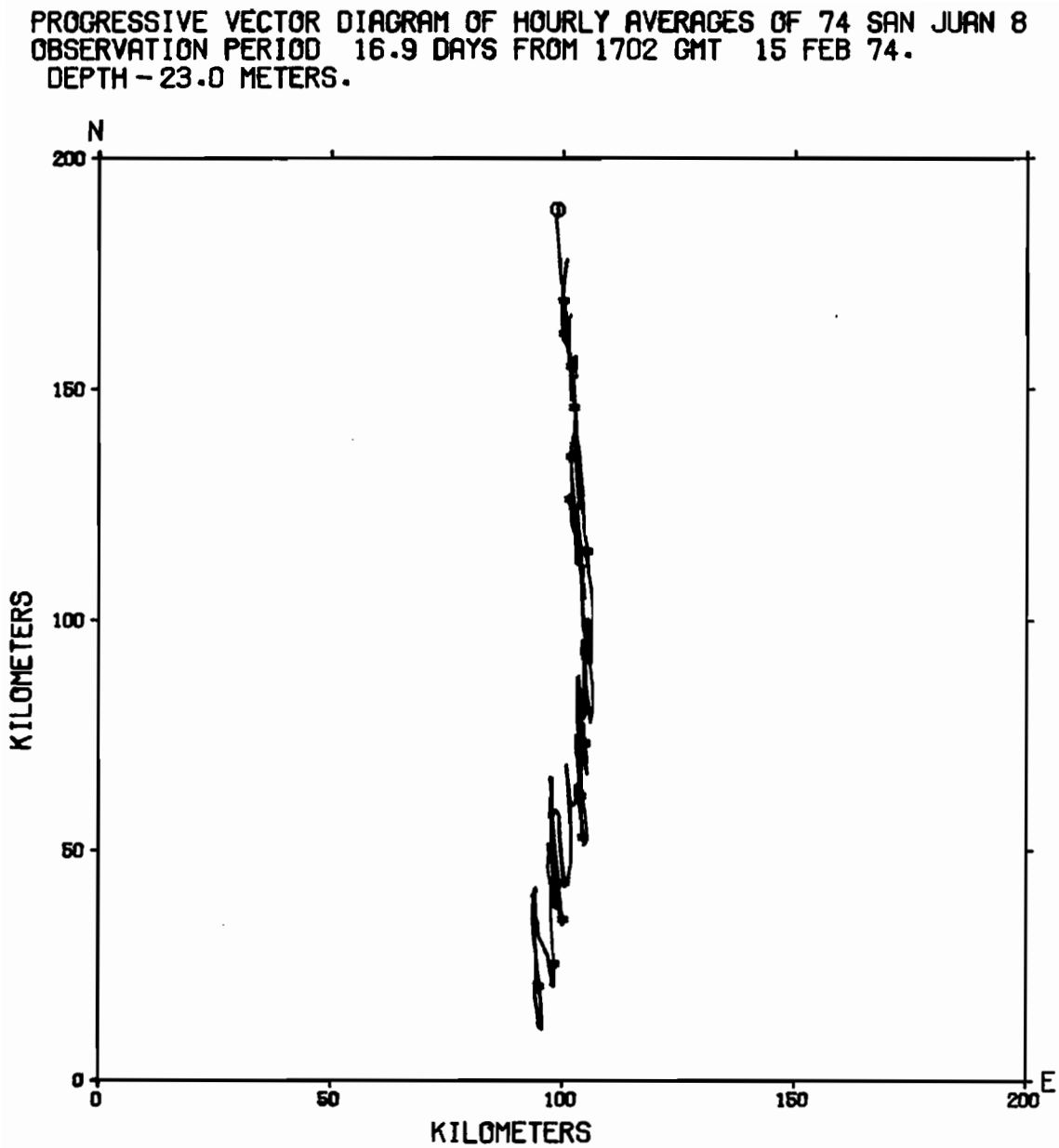


Figure 26.2. Current Meter Station 8 (-23m): Progressive Vector Diagram (PVD)

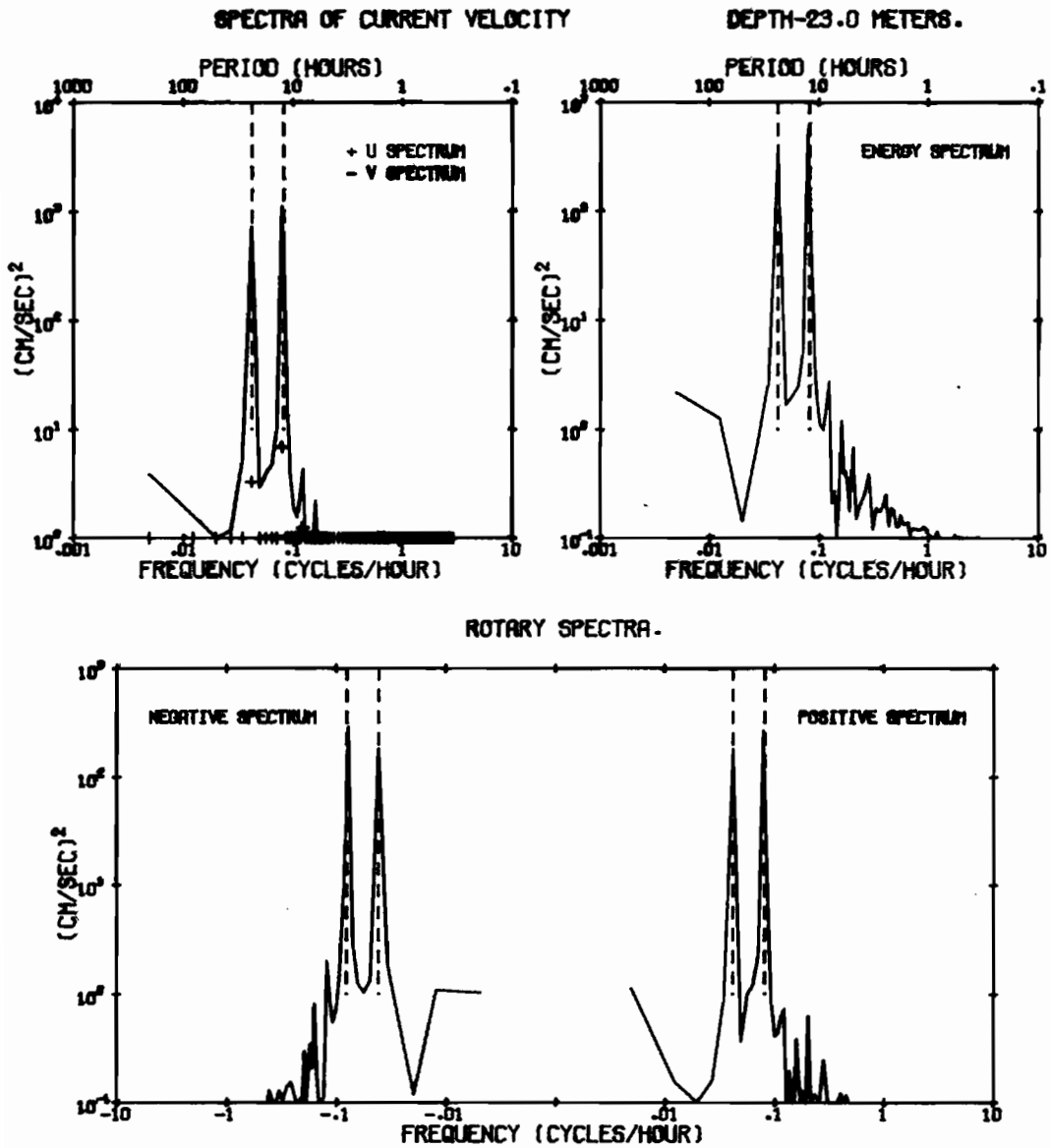
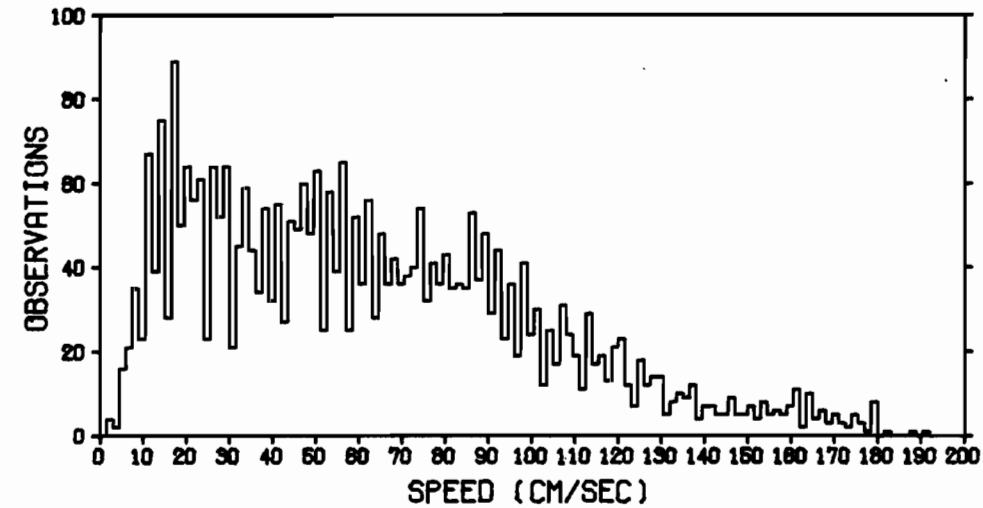


Figure 26.3. Current Meter Station 8 (-23m): Spectra

STATISTICS OF 74 SAN JUAN 9 LAT 48 27.08N LONG 122 46.95W
DEPTH -5.0 METERS NUMBER OF OBSERVATIONS = 3332
OBSERVATION PERIOD 23.1 DAYS FROM 1754 GMT 12 MAR 74

	MEAN (CM/SEC)	VARIANCE (CM/SEC)2	ST-DEV (CM/SEC)	SKEW	KURT	MAX (CM/SEC)	MIN (CM/SEC)
S	63.29	1515.62	38.93	.666	2.89	191.00	2.00
U	-4.05	178.97	13.38	.253	4.72	65.97	-69.33
V	-23.75	4761.52	69.00	.009	2.18	132.52	-190.54

S = SPEED
U = EAST-WEST COMPONENT OF VELOCITY, EAST = POSITIVE U
V = NORTH-SOUTH COMPONENT OF VELOCITY, NORTH = POSITIVE V



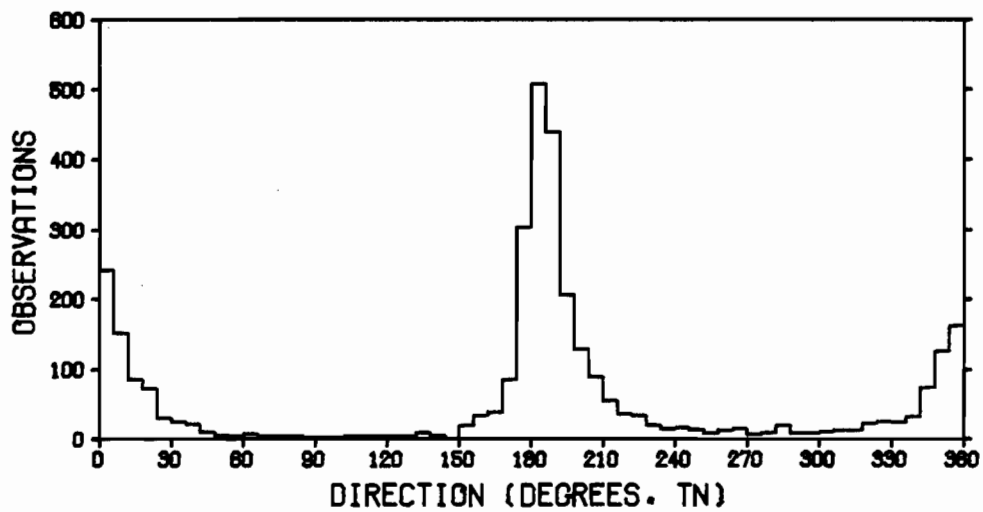


Figure 27.0. Current Meter Station 9 (-5m): Standard Statistics and Histograms

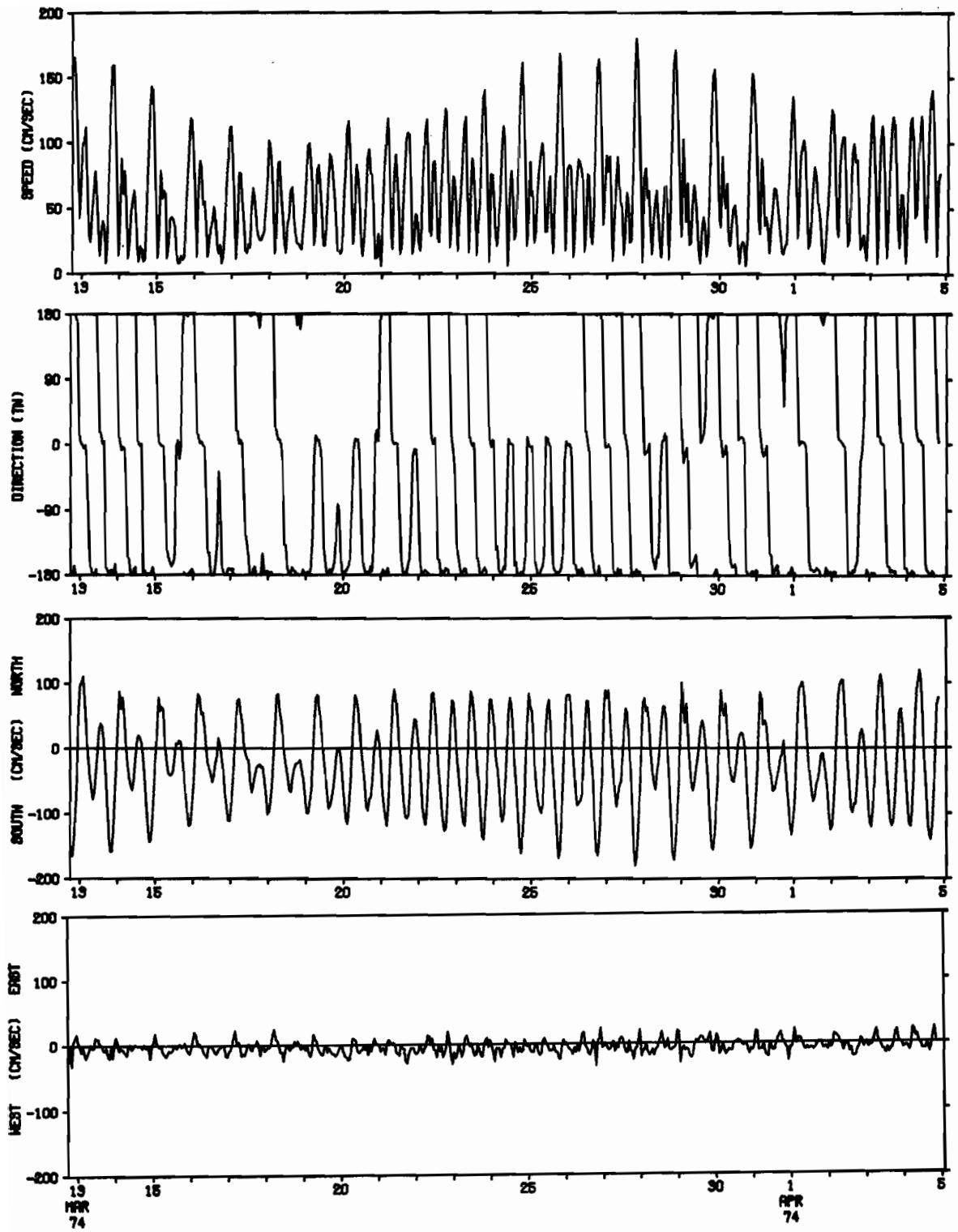


Figure 27.1. Current Meter Station 9 (-5m): Time Series

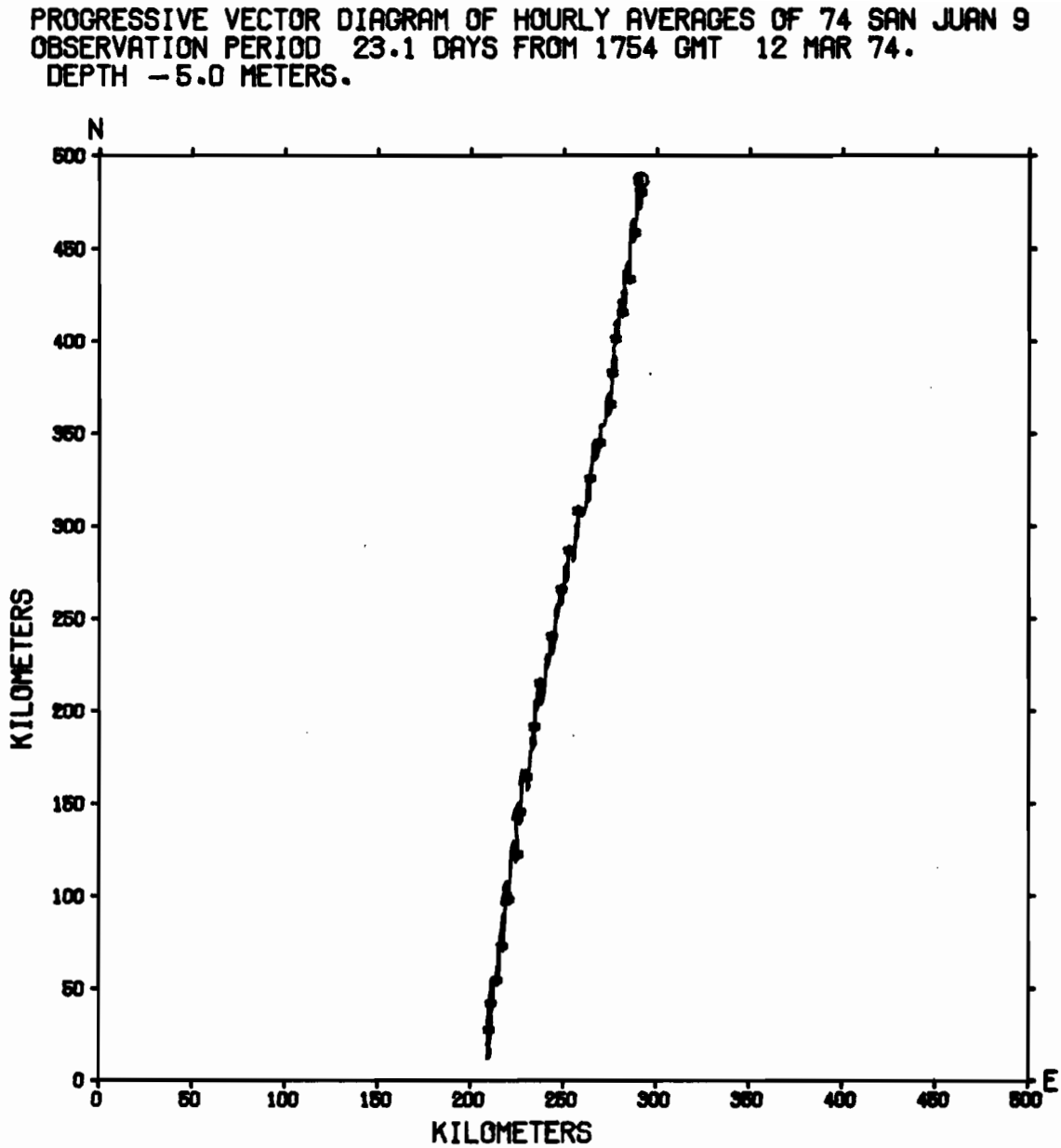


Figure 27.2. Current Meter Station 9 (-5m):
Progressive Vector Diagram (PVD)

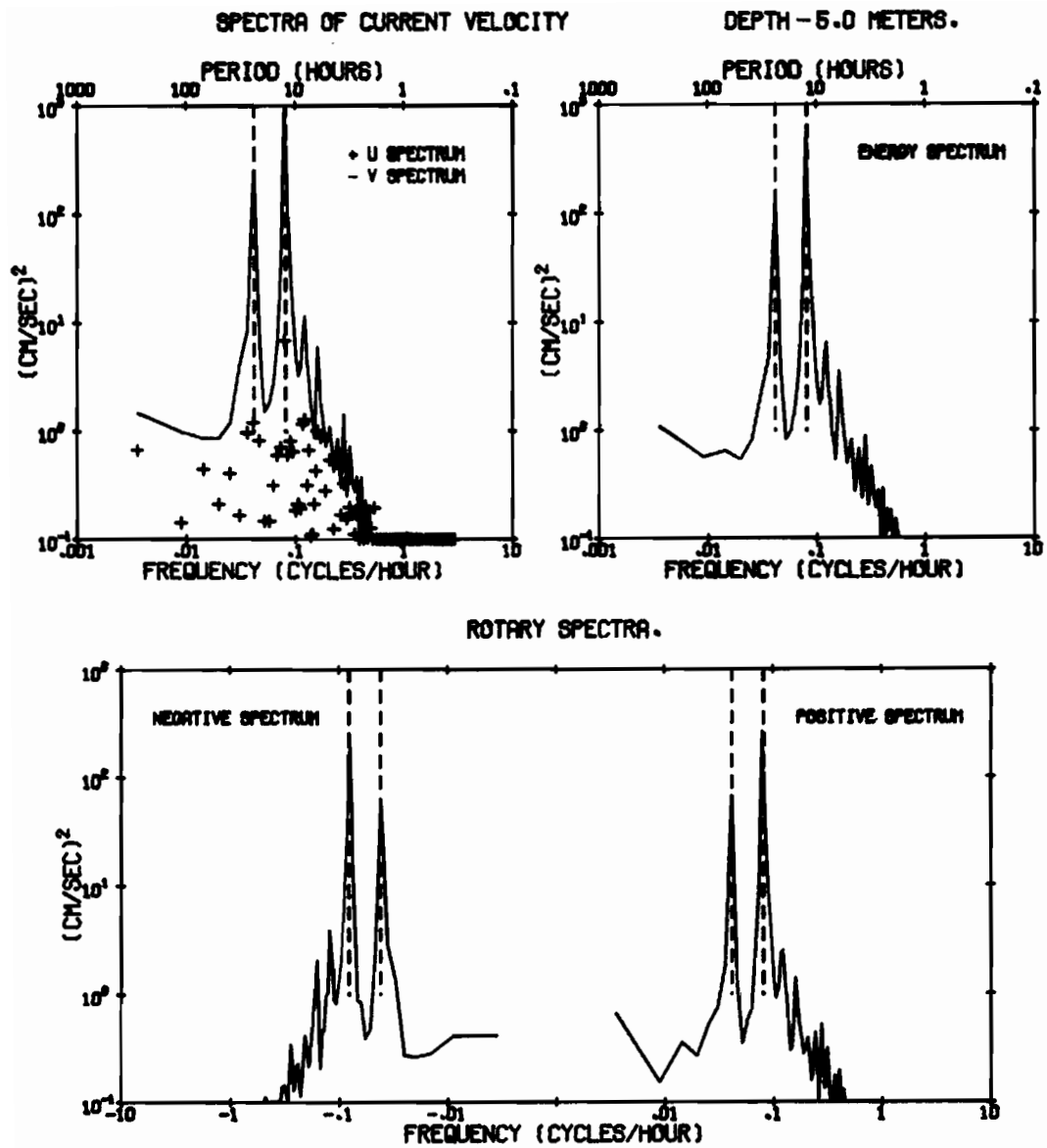


Figure 27.3. Current Meter Station 9 (-5m): Spectra

STATISTICS OF 74 SAN JUAN 9 LAT 48 40.87N LONG 122 47.90W
DEPTH -5.0 METERS NUMBER OF OBSERVATIONS = 4032
OBSERVATION PERIOD 28.0 DAYS FROM 2120 GMT 29 JAN 74

	MEAN (CM/SEC)	VARIANCE (CM/SEC)2	ST-DEV (CM/SEC)	SKEW	KURT	MAX (CM/SEC)	MIN (CM/SEC)
S	57.02	1480.33	38.48	.601	2.45	177.00	0.00
U	-5.09	157.42	12.55	-.885	5.93	57.90	-102.88
V	-13.99	4353.02	65.98	-.132	2.23	142.91	-175.29

S = SPEED
U = EAST-WEST COMPONENT OF VELOCITY, EAST = POSITIVE U
V = NORTH-SOUTH COMPONENT OF VELOCITY, NORTH = POSITIVE V

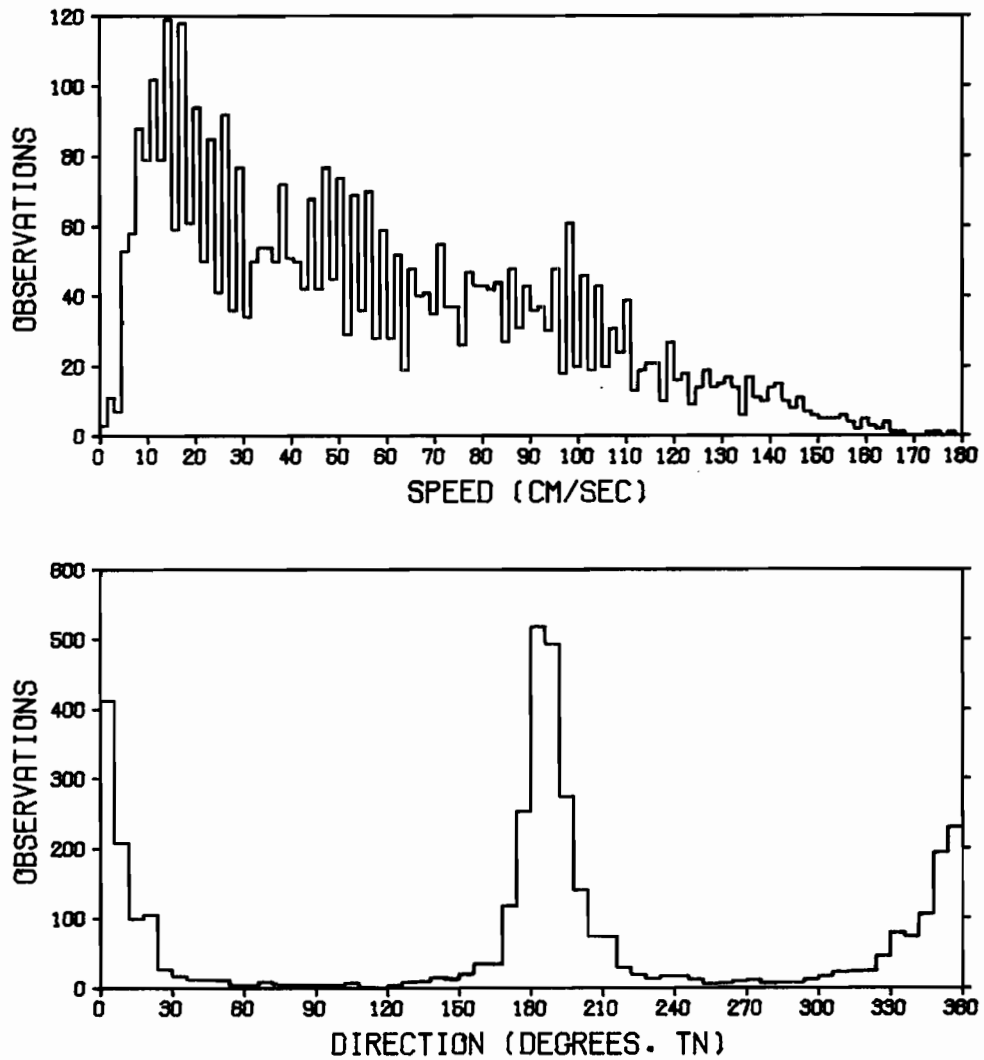


Figure 28.0. Current Meter Station 9 (-5m):
Standard Statistics and Histograms

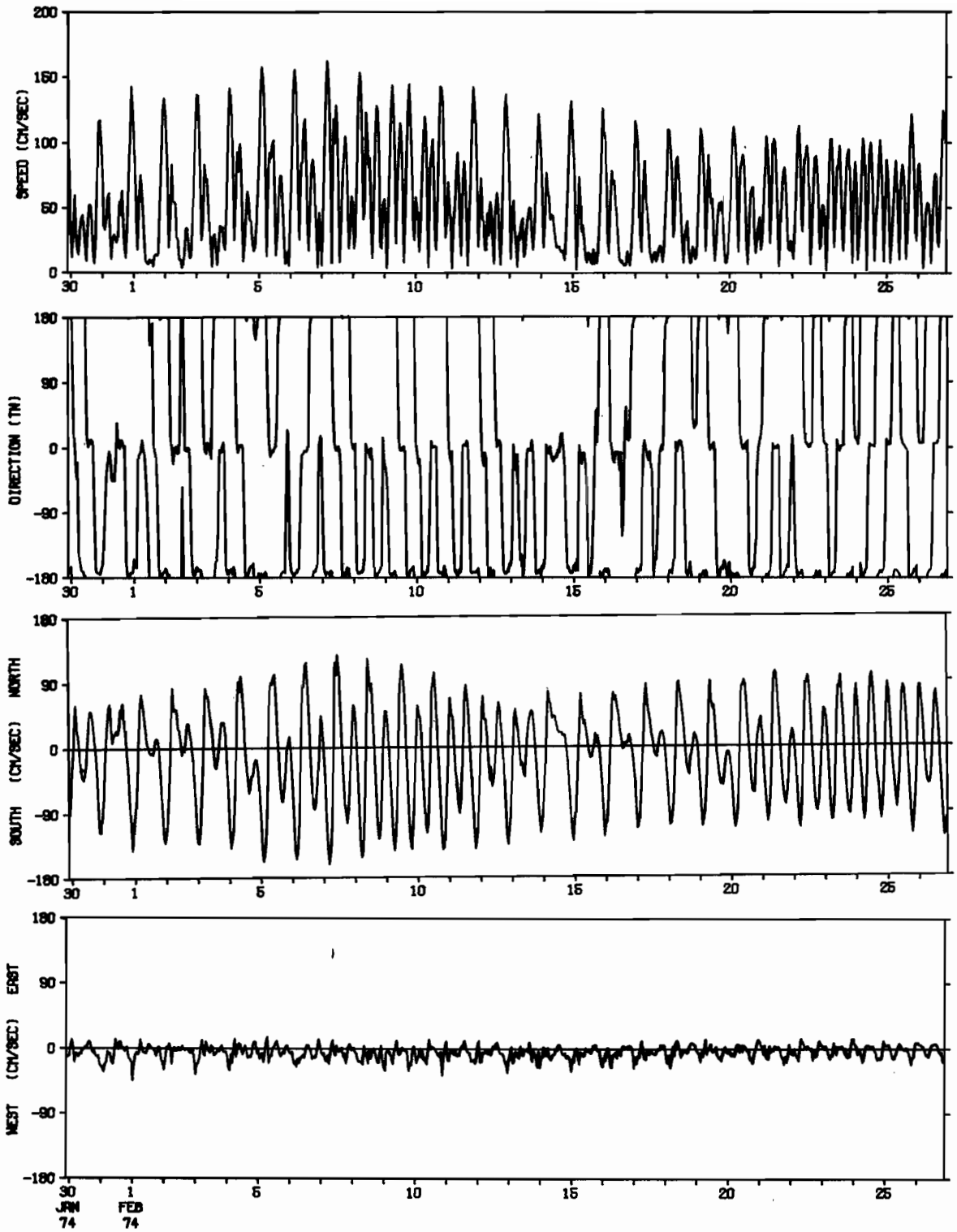


Figure 28.1. Current Meter Station 9 (-5m): Time Series

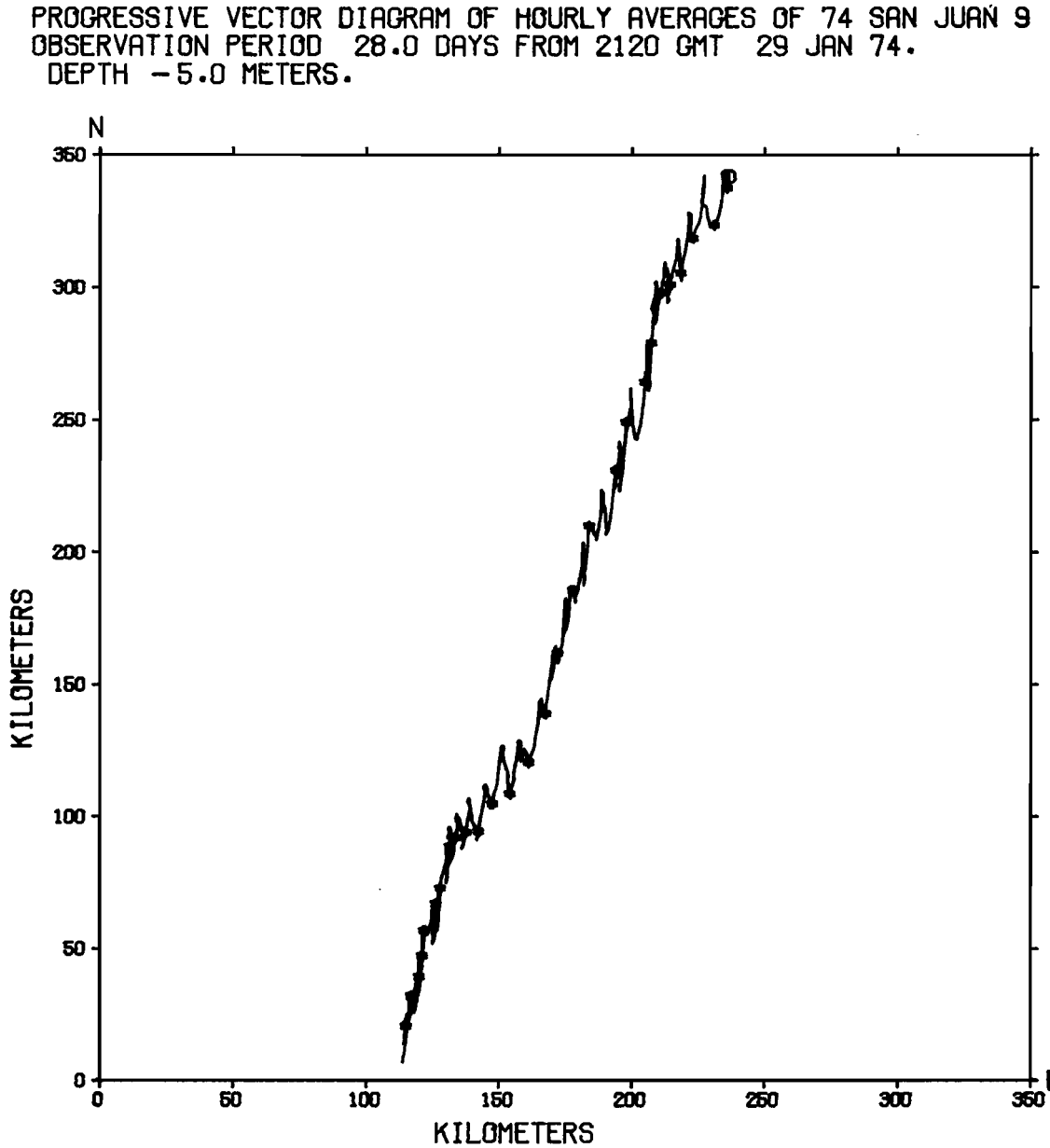


Figure 28.2. Current Meter Station 9 (-5m):
Progressive Vector Diagram (PVD)

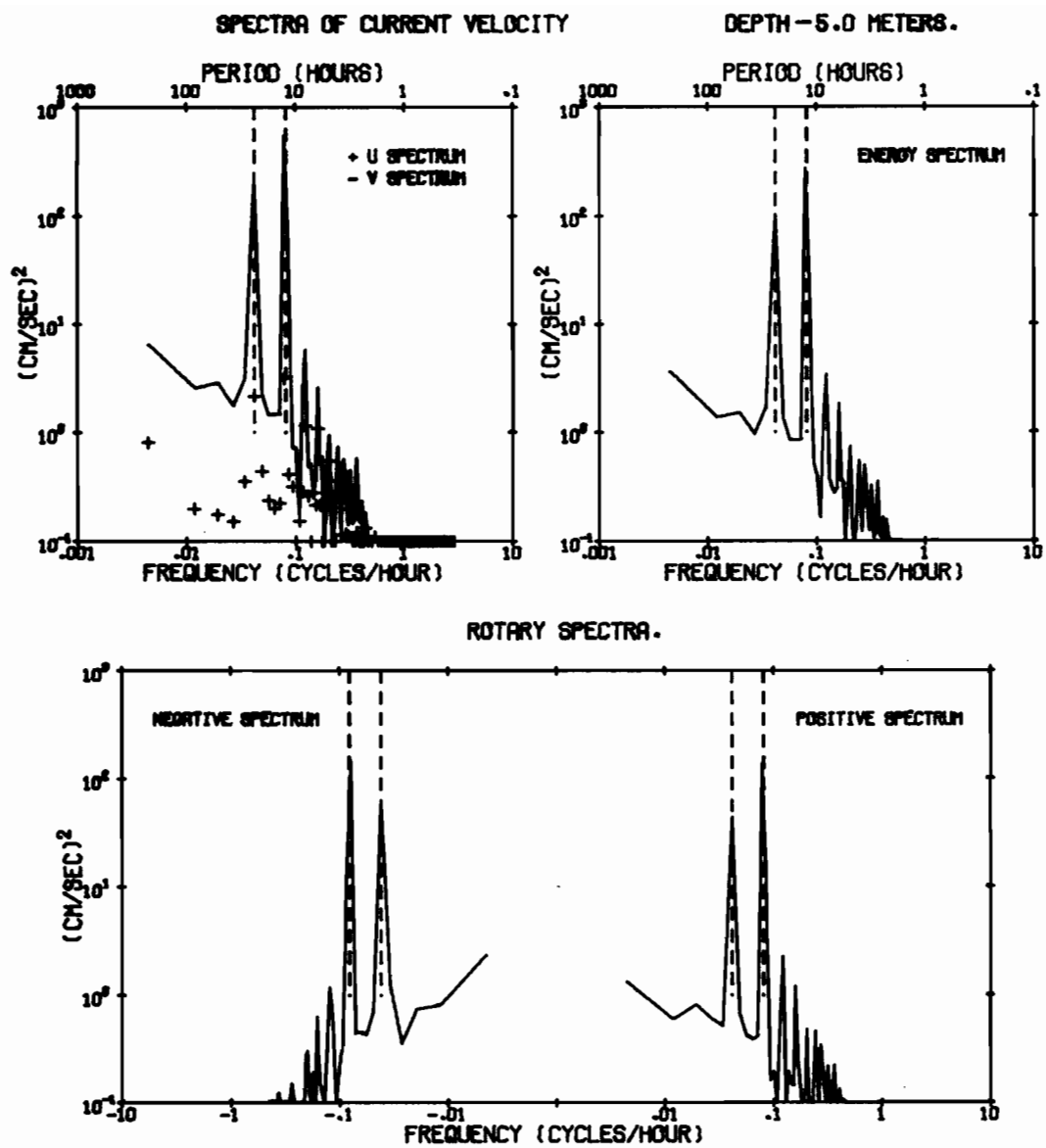
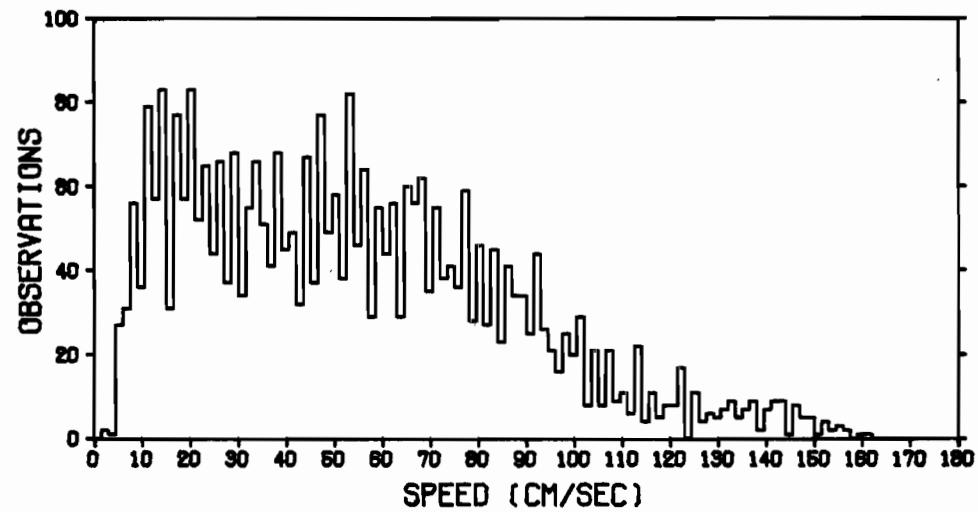


Figure 28.3. Current Meter Station 9 (-5m): Spectra

STATISTICS OF 74 SAN JUAN 9 LAT 48 27.08N LONG 122 46.95W
DEPTH +10.0 METERS NUMBER OF OBSERVATIONS = 3332
OBSERVATION PERIOD 23.1 DAYS FROM 1754 GMT 12 MAR 74

	MEAN (CM/SEC)	VARIANCE (CM/SEC)2	ST-DEV (CM/SEC)	SKEW	KURT	MAX (CM/SEC)	MIN (CM/SEC)
S	54.60	1089.79	33.01	.648	2.91	161.00	3.00
U	5.97	130.59	11.43	-.428	2.97	42.76	-28.56
V	-21.98	3421.06	58.49	.029	2.15	102.00	-158.43

S = SPEED
U = EAST-WEST COMPONENT OF VELOCITY, EAST = POSITIVE U
V = NORTH-SOUTH COMPONENT OF VELOCITY, NORTH = POSITIVE V



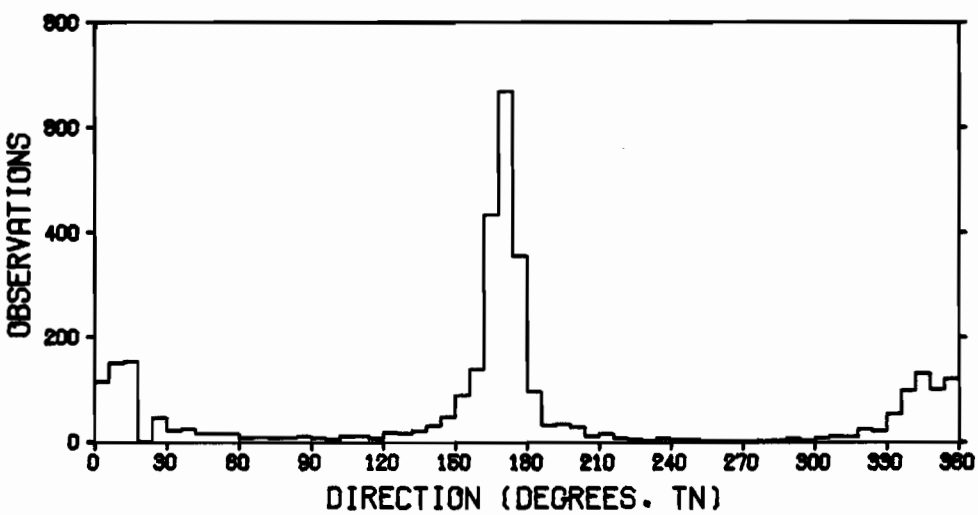


Figure 29.0. Current Meter Station 9 (+10m): Standard Statistics and Histograms

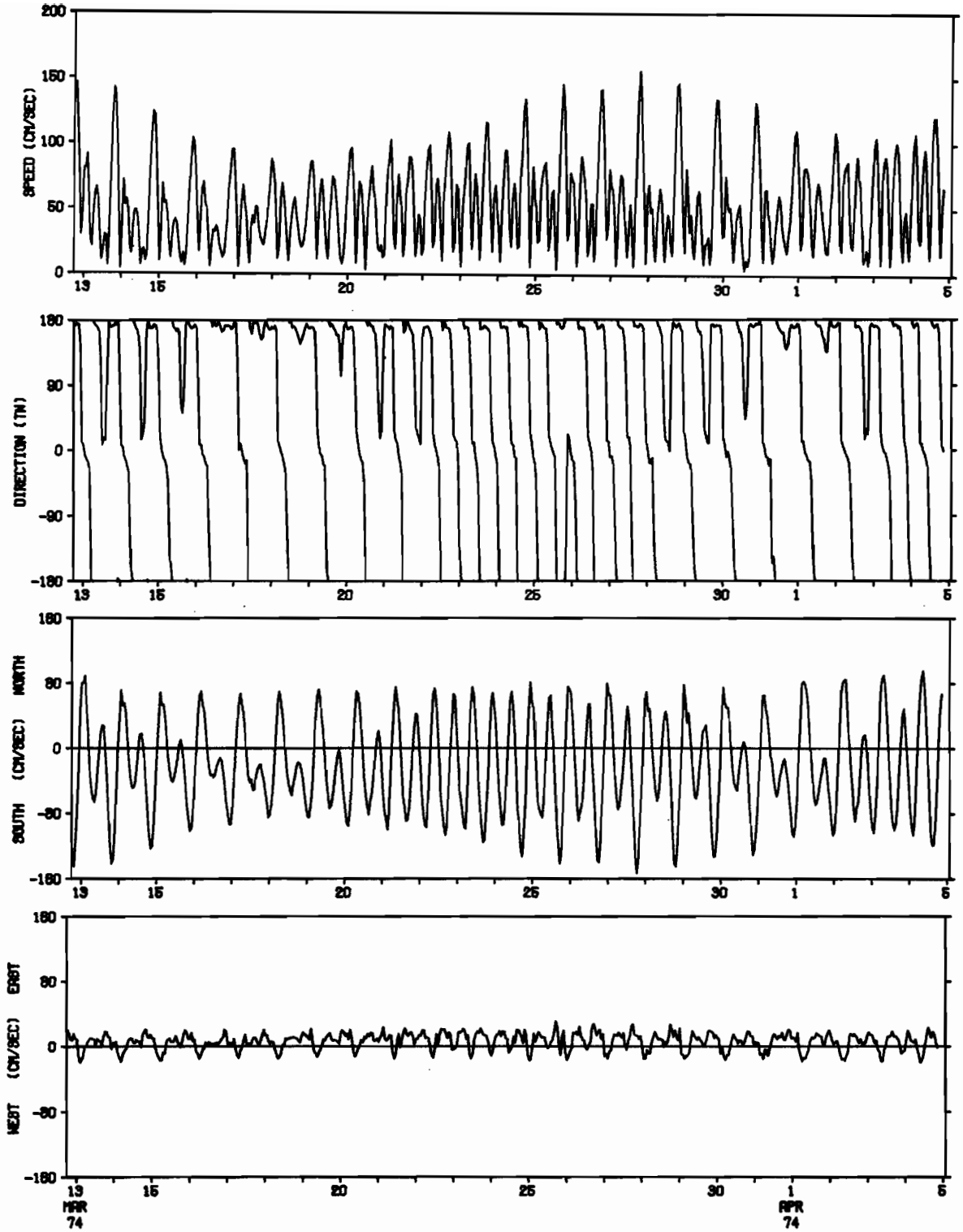


Figure 29.1. Current Meter Station 9 (+10m): Time Series

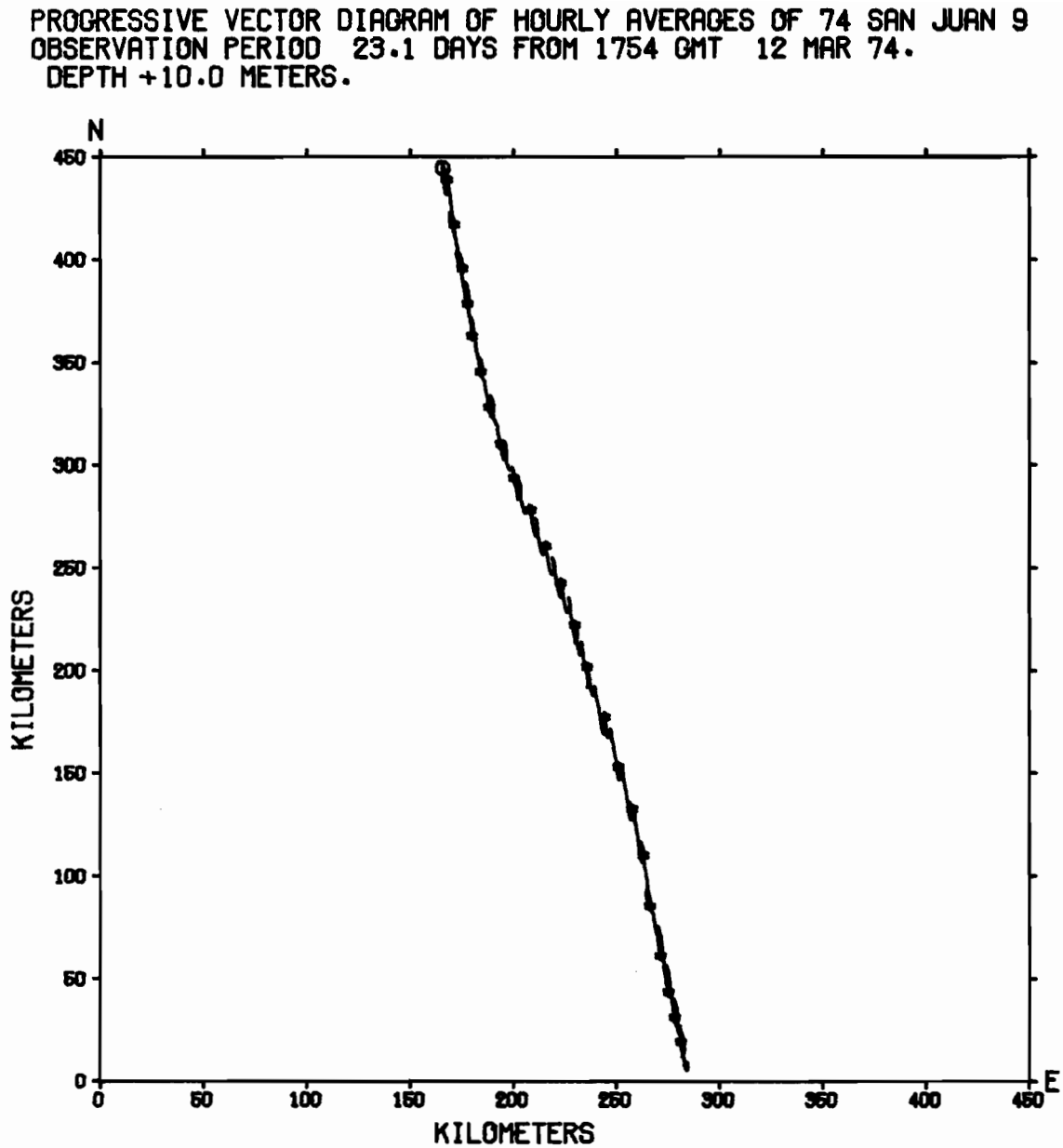


Figure 29.2. Current Meter Station 9 (+10m): Progressive Vector Diagram (PVD)

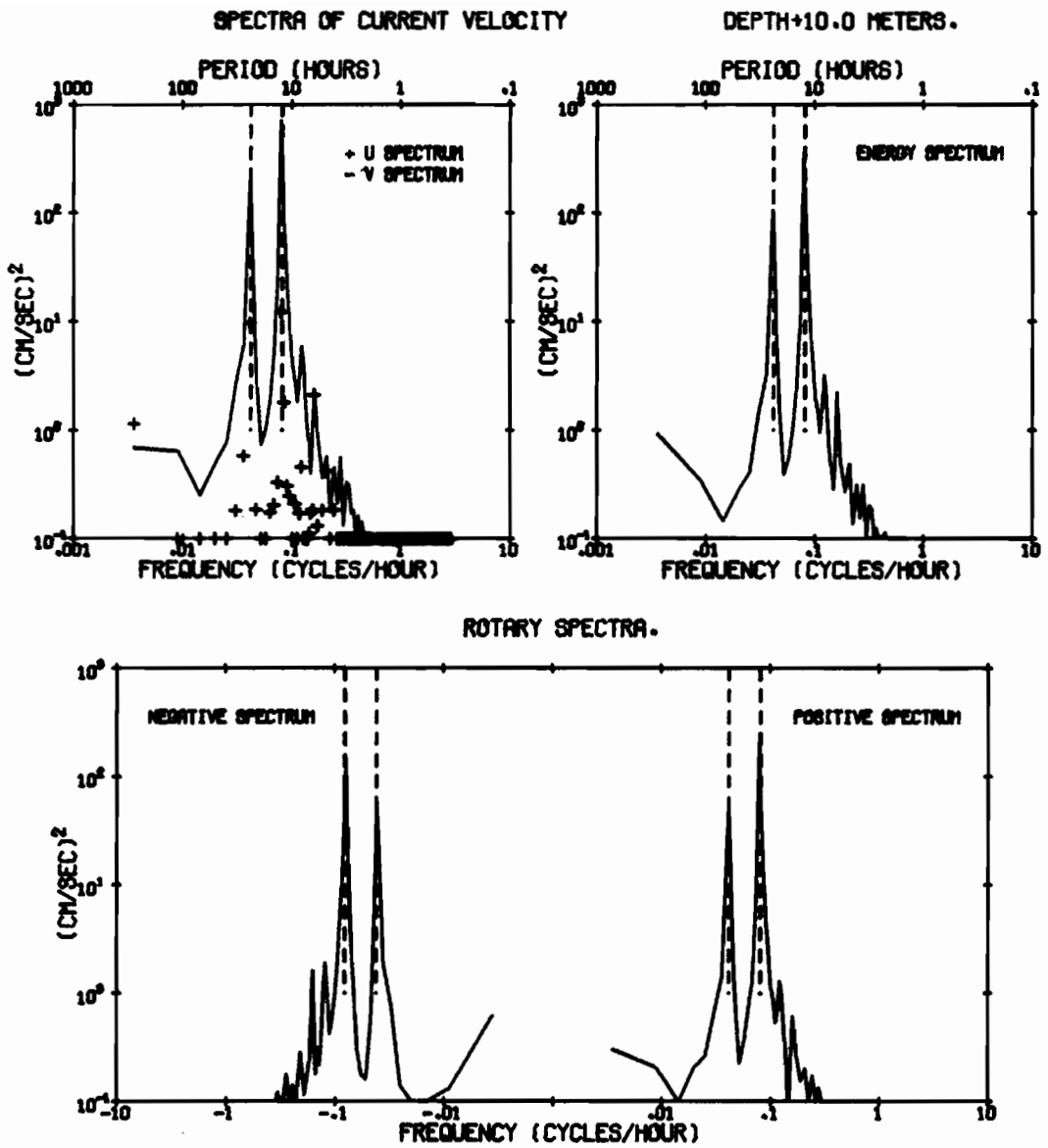
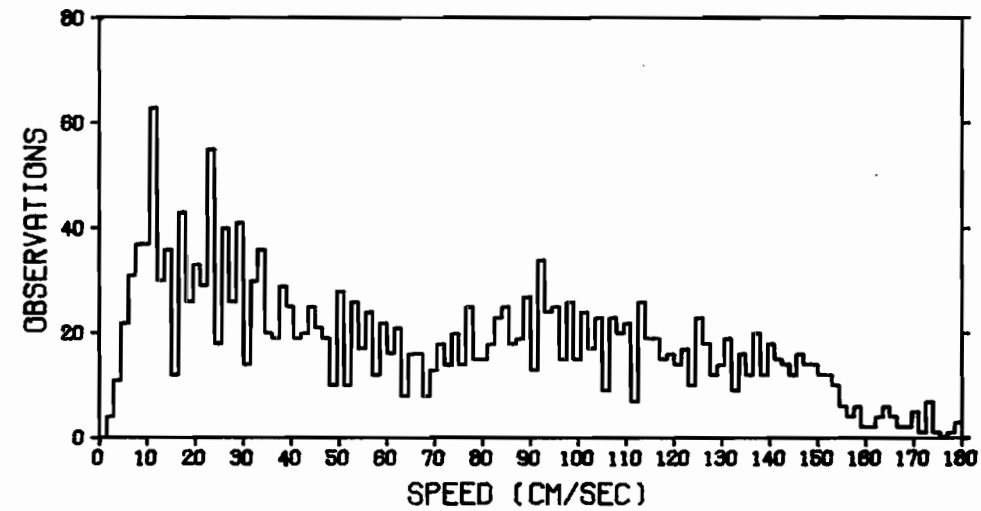


Figure 29.3. Current Meter Station 9 (+10m): Spectra

STATISTICS OF 74 SAN JUAN 10 LAT 48 31.32N LONG 122 42.13W
DEPTH +16.0 METERS NUMBER OF OBSERVATIONS = 2150
OBSERVATION PERIOD 14.9 DAYS FROM 1722 GMT 14 FEB 74

	MEAN (CM/SEC)	VARIANCE (CM/SEC)2	ST-DEV (CM/SEC)	SKEW	KURT	MAX (CM/SEC)	MIN (CM/SEC)
S	70.42	2123.91	46.09	.309	1.89	180.00	3.00
U	-5.51	3148.73	56.11	-.265	3.04	134.36	-165.97
V	-.45	3903.42	62.48	-.148	2.91	156.14	-178.56

S = SPEED
U = EAST-WEST COMPONENT OF VELOCITY, EAST = POSITIVE U
V = NORTH-SOUTH COMPONENT OF VELOCITY, NORTH = POSITIVE V



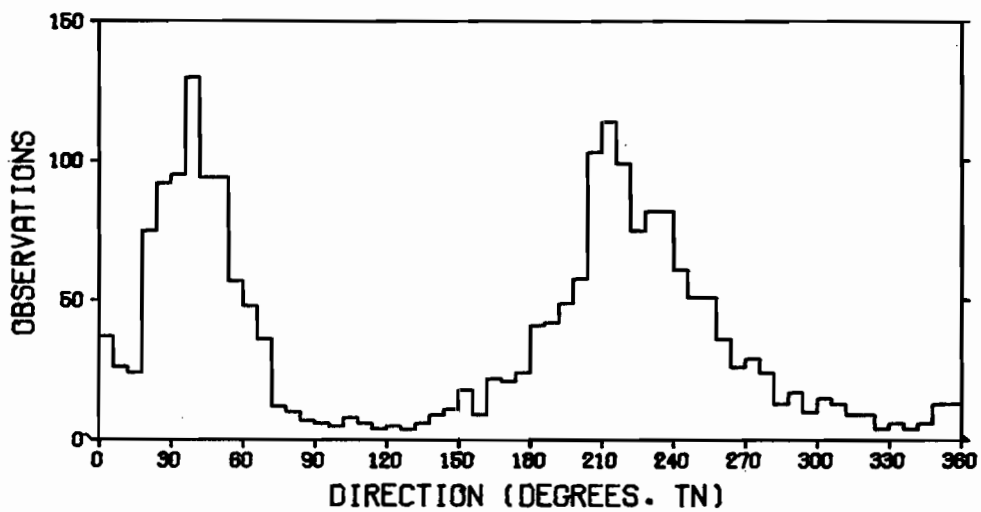


Figure 30.0. Current Meter Station 10 (+16m): Standard Statistics and Histograms

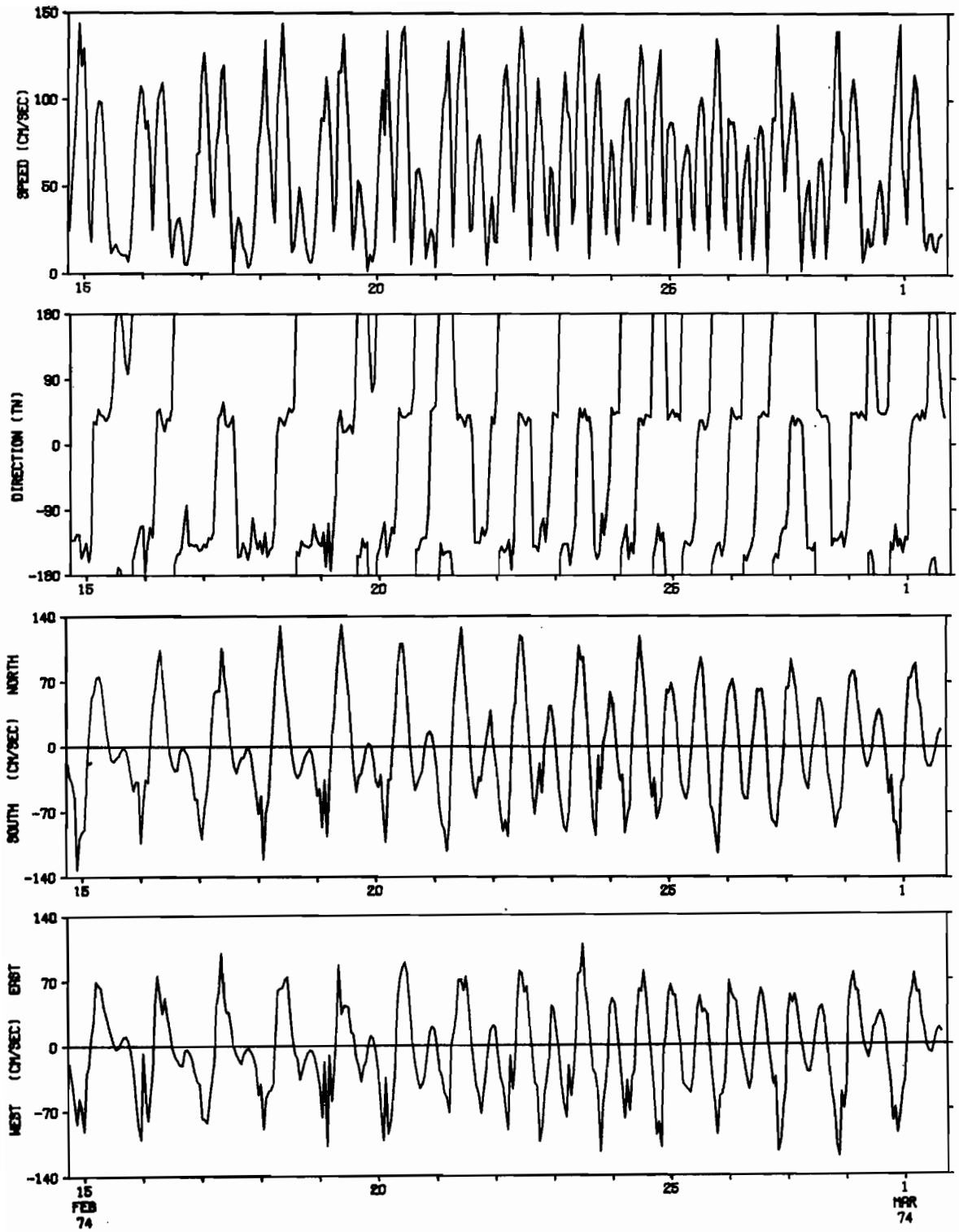


Figure 30.1. Current Meter Station 10 (+16m): Time Series

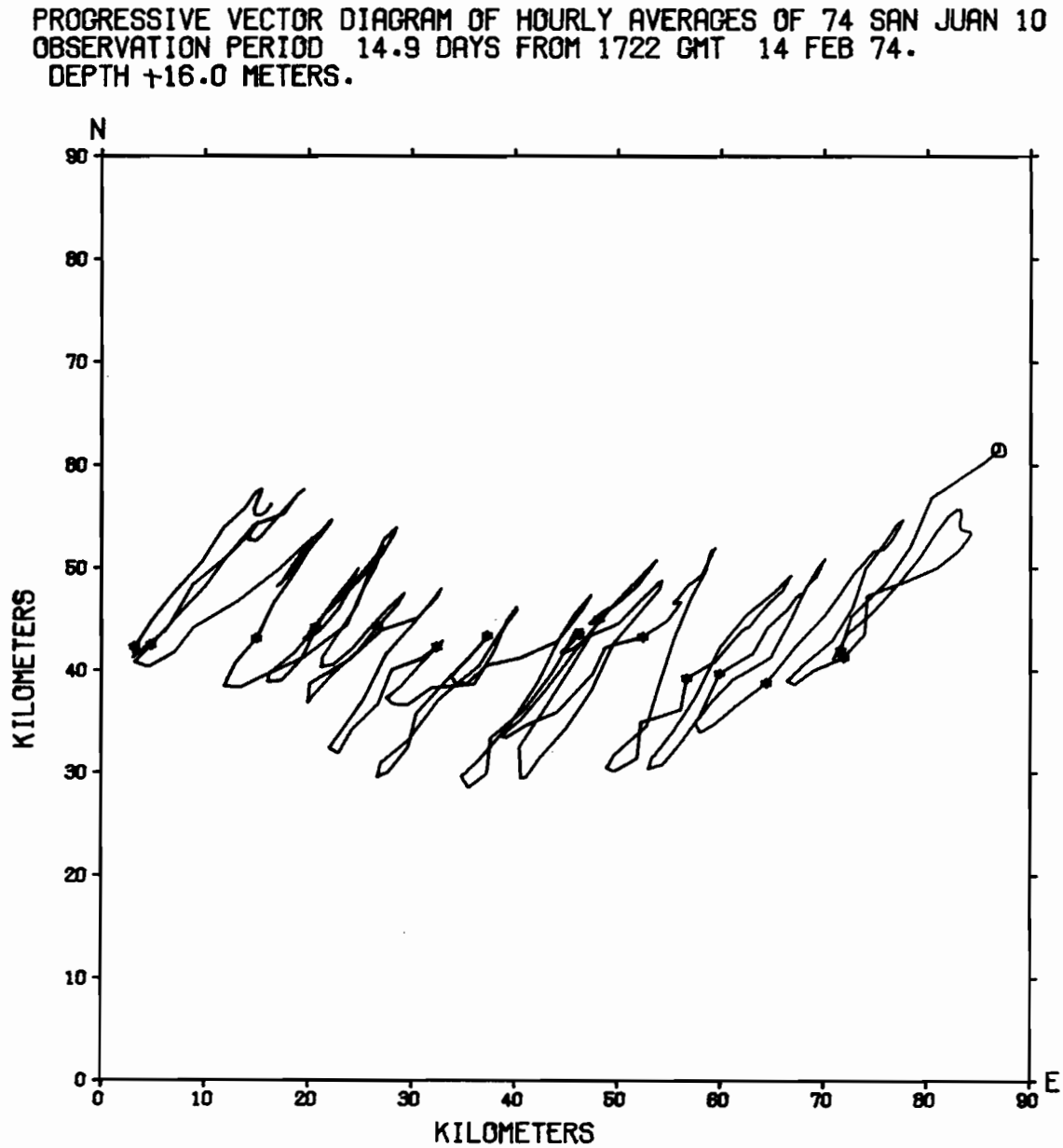


Figure 30.2. Current Meter Station 10 (+16m): Progressive Vector Diagram (PVD)

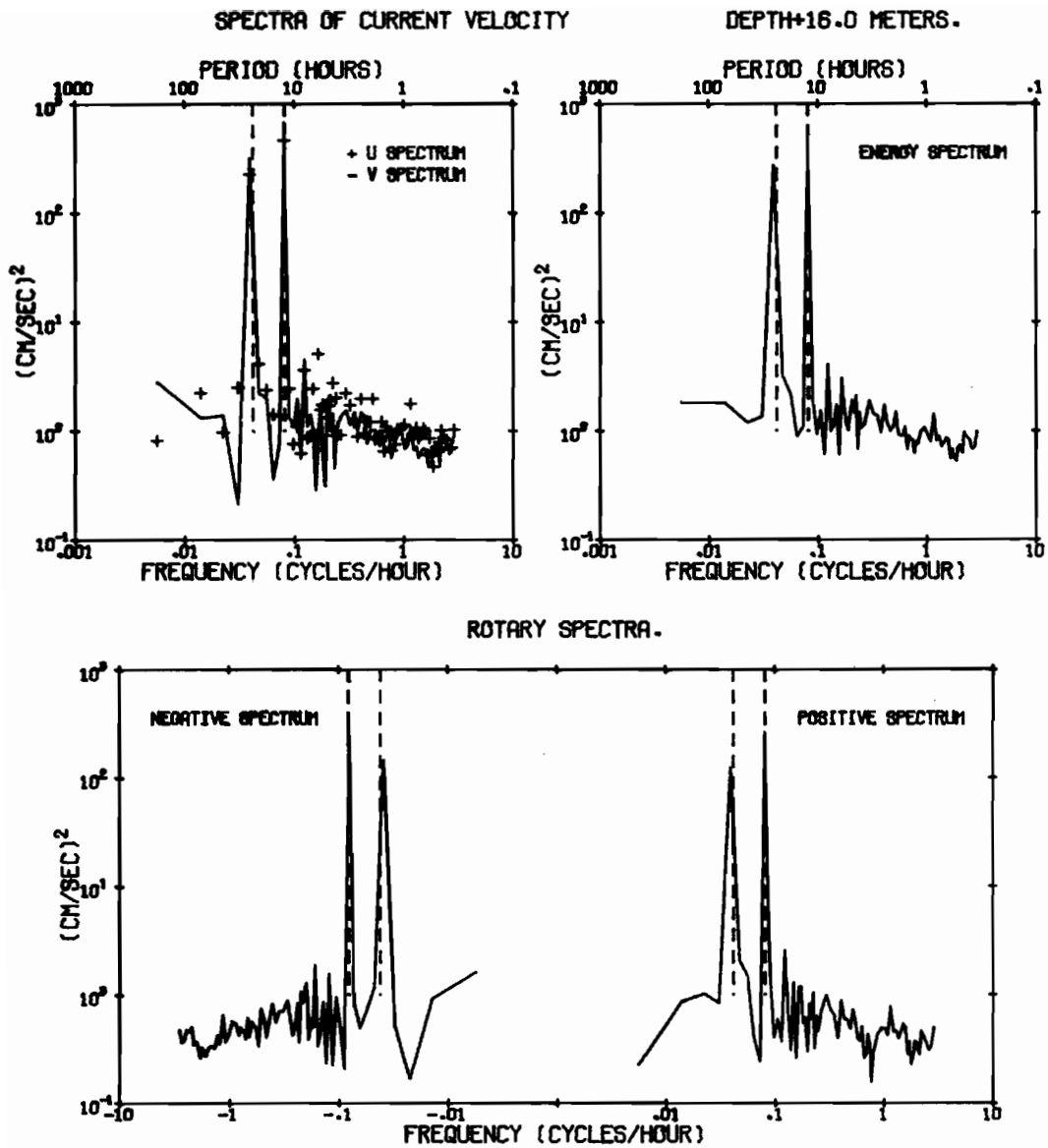
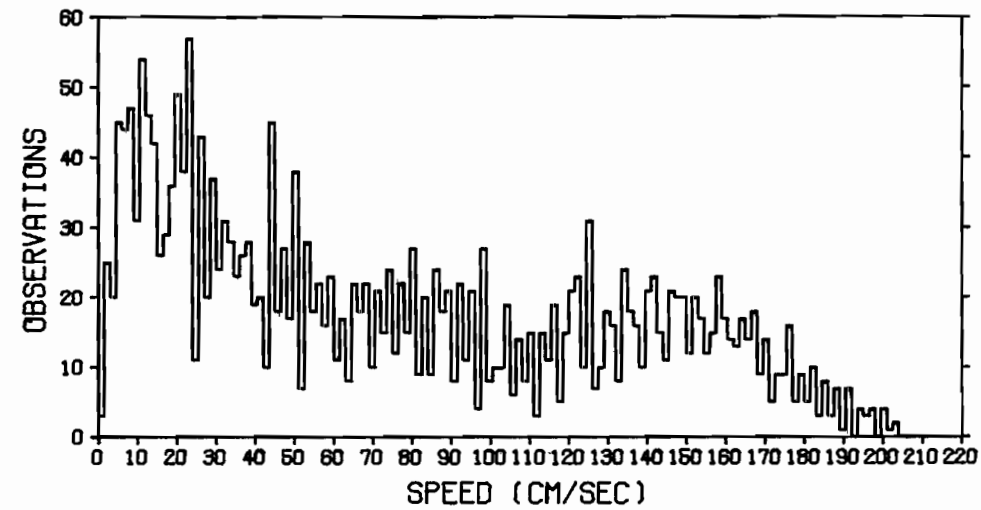


Figure 30.3. Current Meter Station 10 (+16m): Spectra

STATISTICS OF 74 SAN JUAN 11 LAT 48 33.65N LONG 122 44.85W
DEPTH -5.0 METERS NUMBER OF OBSERVATIONS = 2440
OBSERVATION PERIOD 16.9 DAYS FROM 1840 GMT 15 FEB 74

	MEAN (CM/SEC)	VARIANCE (CM/SEC)2	ST-DEV (CM/SEC)	SKEW	KURT	MAX (CM/SEC)	MIN (CM/SEC)
S	76.28	3051.37	55.24	.419	1.88	204.00	0.00
U	2.02	454.78	21.33	-.046	3.60	81.52	-76.78
V	.08	8410.57	91.71	-.004	2.33	202.86	-199.72

S = SPEED
U = EAST-WEST COMPONENT OF VELOCITY, EAST = POSITIVE U
V = NORTH-SOUTH COMPONENT OF VELOCITY, NORTH = POSITIVE V



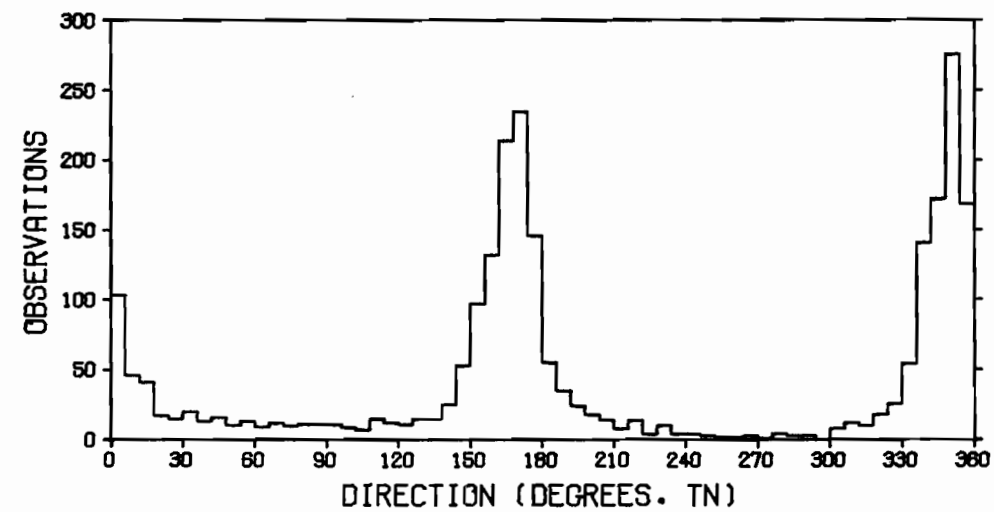


Figure 31.0. Current Meter Station 11 (-5m):
Standard Statistics and Histograms

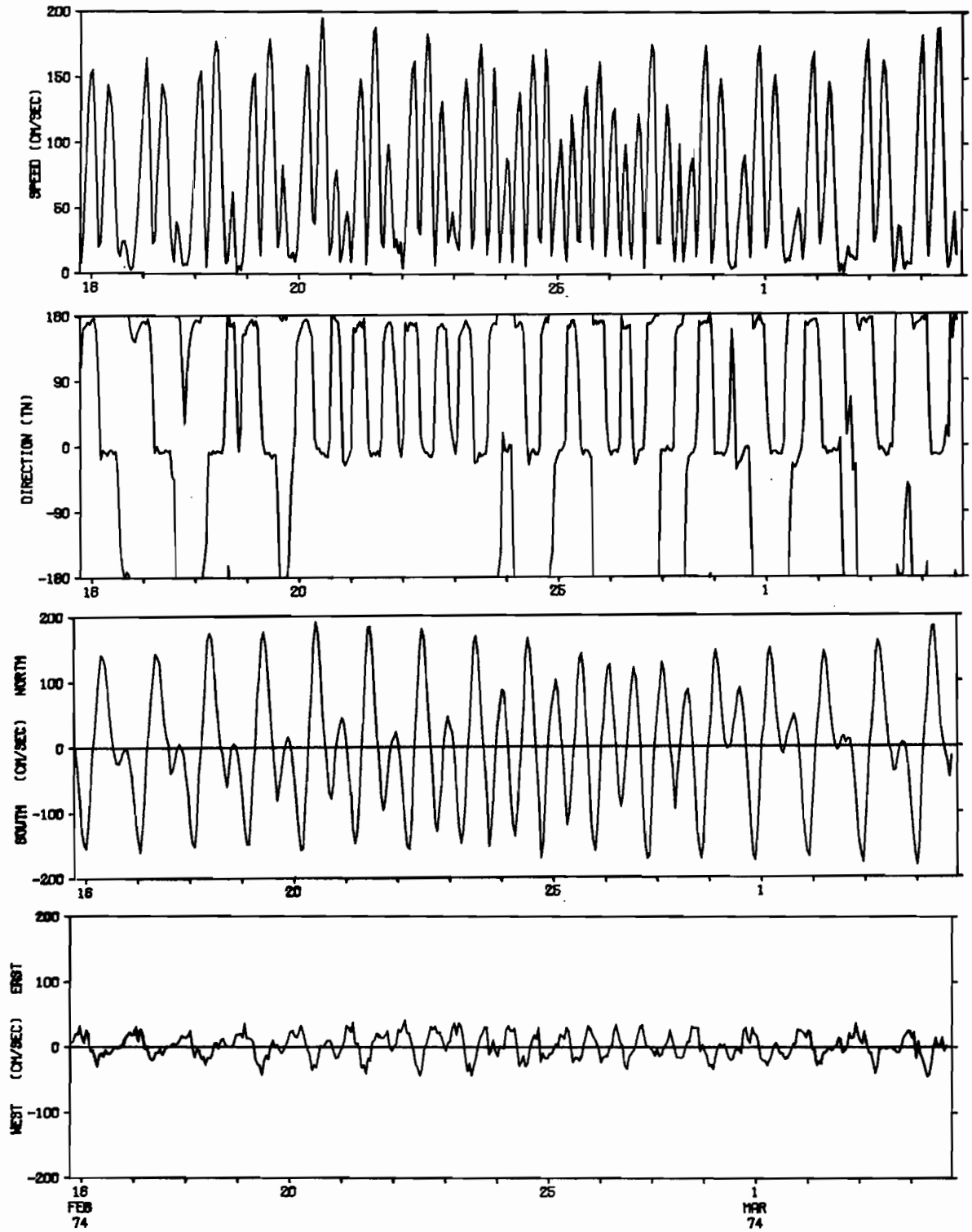


Figure 31.1. Current Meter Station 11 (-5m): Time Series

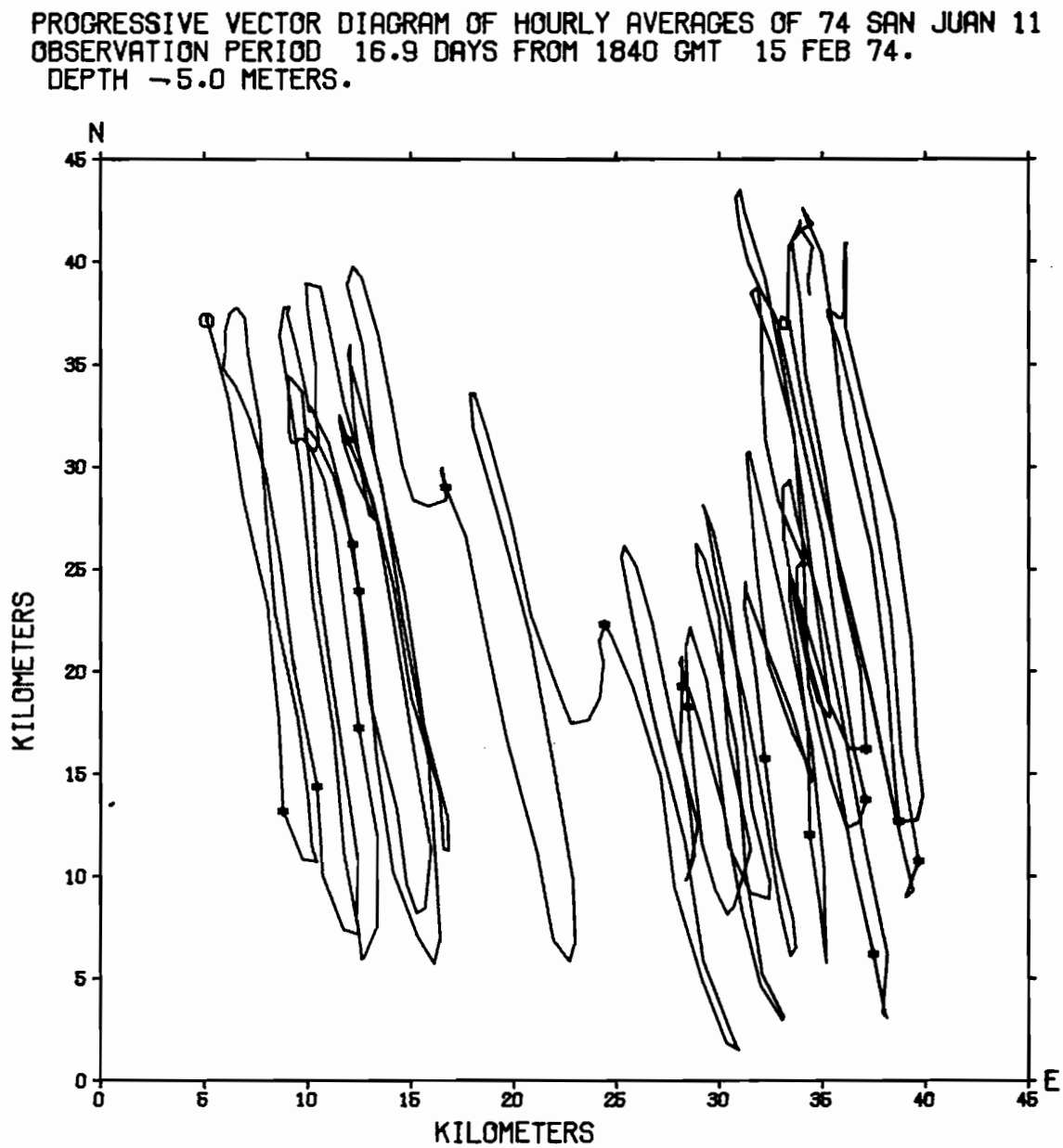


Figure 31.2. Current Meter Station 11 (-5m): Progressive Vector Diagram (PVD)

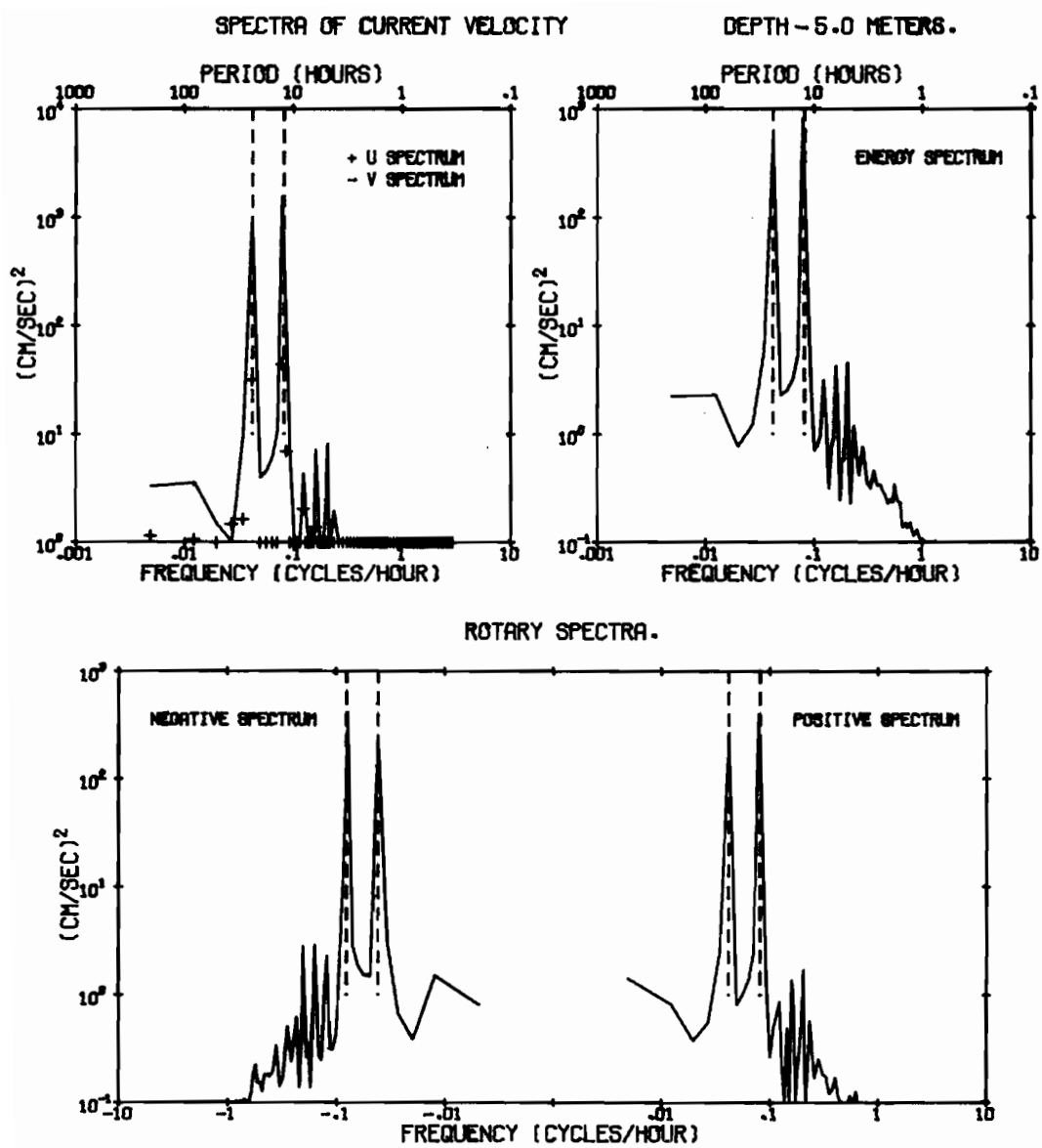


Figure 31.3. Current Meter Station 11 (-5m): Spectra

STATISTICS OF 74 SAN JUAN 11 LAT 48 33.65N LONG 122 44.85W
DEPTH -23.0 METERS NUMBER OF OBSERVATIONS = 2440
OBSERVATION PERIOD 16.9 DAYS FROM 1842 GMT 15 FEB 74

	MEAN (CM/SEC)	VARIANCE (CM/SEC)2	ST-DEV (CM/SEC)	SKEW	KURT	MAX (CM/SEC)	MIN (CM/SEC)
S	73.23	2811.97	53.03	.394	1.86	193.00	0.00
U	5.98	875.96	29.60	.449	5.81	156.24	-185.57
V	-2.25	7257.66	85.19	.010	2.30	184.50	-192.26

S = SPEED
U = EAST-WEST COMPONENT OF VELOCITY. EAST = POSITIVE U
V = NORTH-SOUTH COMPONENT OF VELOCITY. NORTH = POSITIVE V

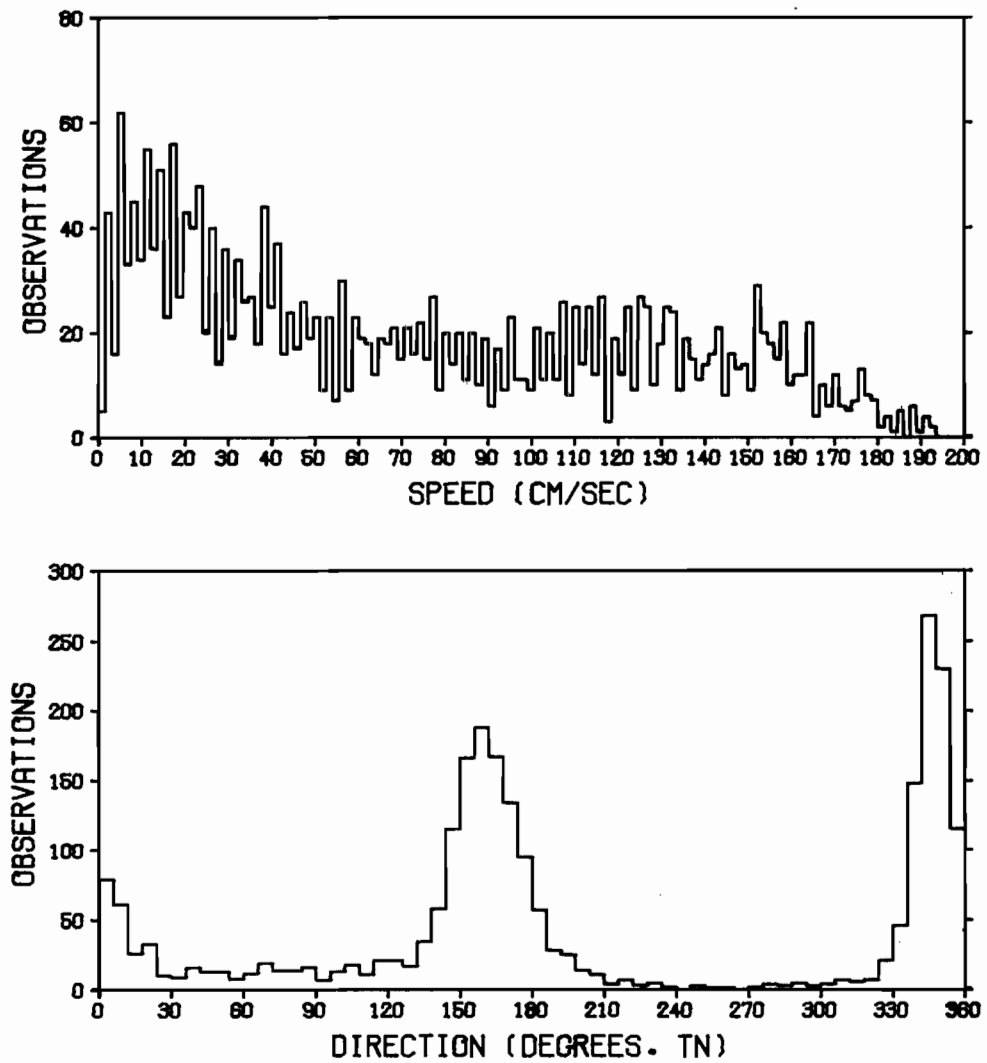


Figure 32.0. Current Meter Station 11 (-23m):
Standard Statistics and Histograms

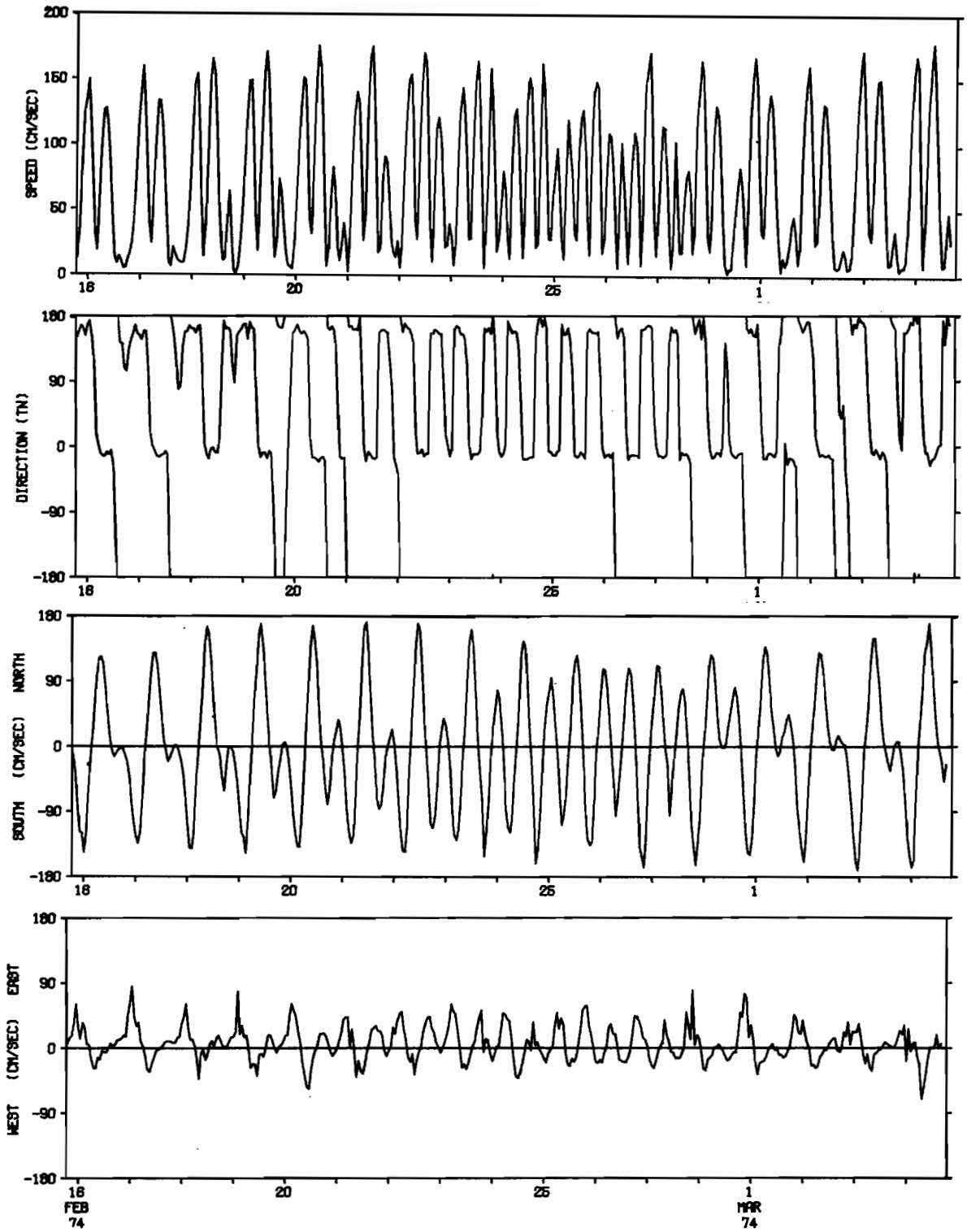


Figure 32.1. Current Meter Station 11 (-23m): Time Series

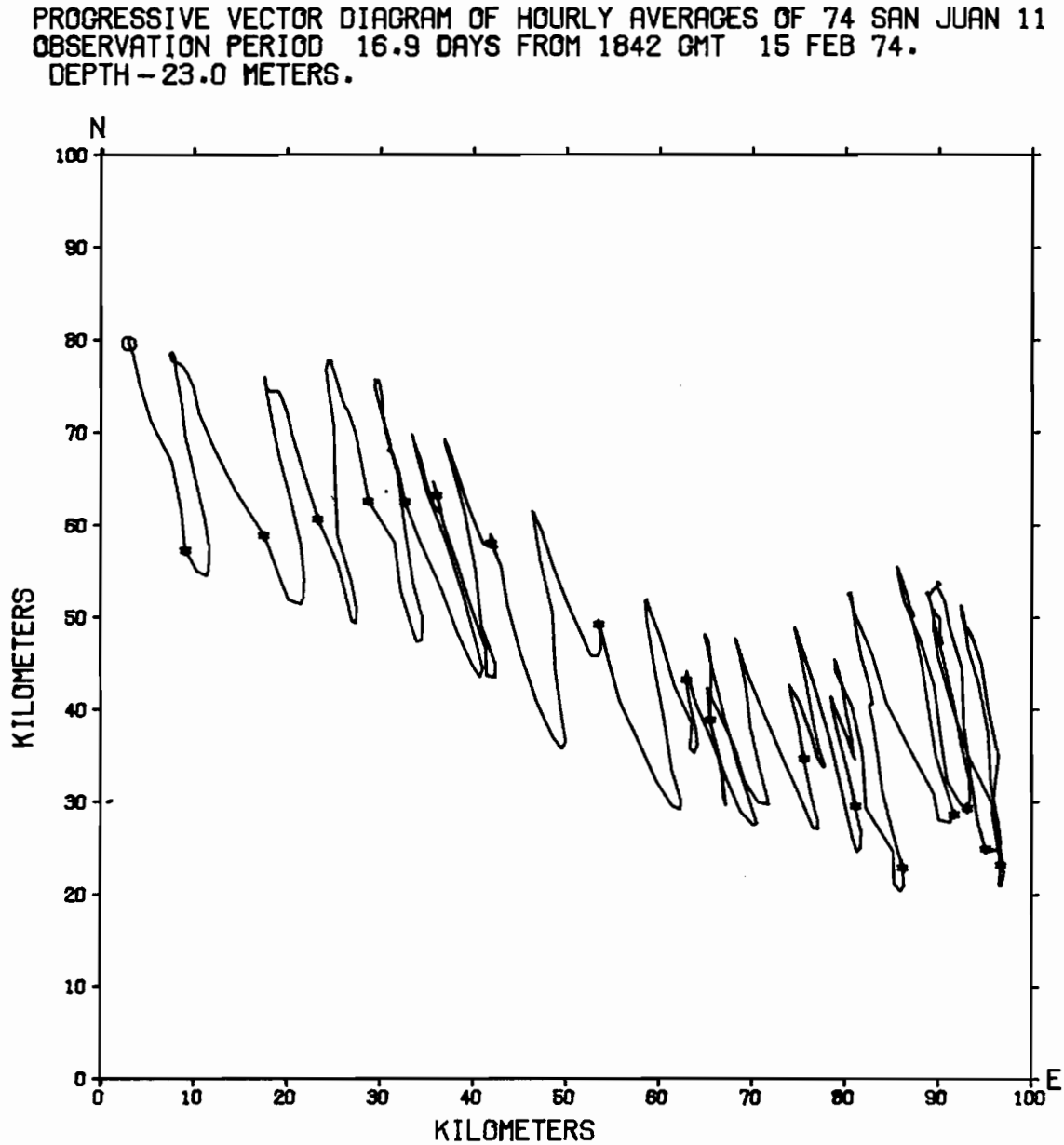


Figure 32.2. Current Meter Station 11 (-23m): Progressive Vector Diagram (PVD)

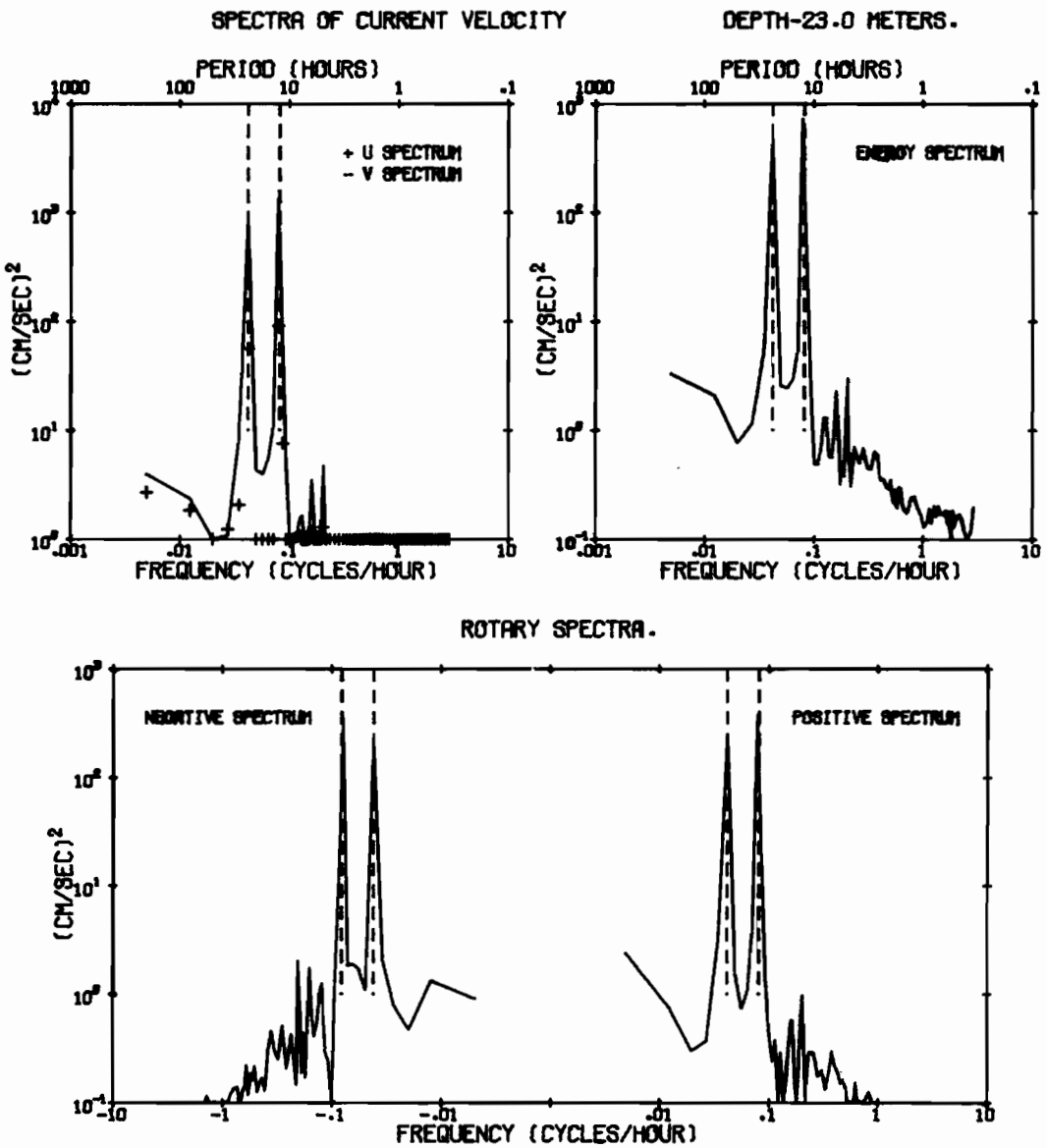
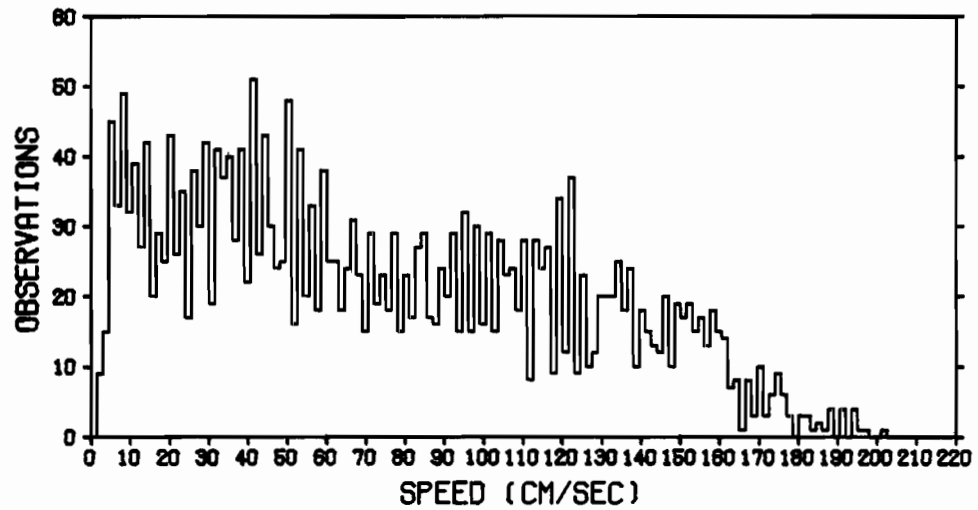


Figure 32.3. Current Meter Station 11 (-23m): Spectra

STATISTICS OF 74 SAN JUAN 12 LAT 48 34.00N LONG 122 39.60
DEPTH -22.0 METERS NUMBER OF OBSERVATIONS = 2700
OBSERVATION PERIOD 18.7 DAYS FROM 2204 GMT 15 FEB 74

	MEAN (CM/SEC)	VARIANCE (CM/SEC)2	ST-DEV (CM/SEC)	SKEW	KURT	MAX (CM/SEC)	MIN (CM/SEC)
S	74.67	2298.53	47.94	.375	2.06	202.00	2.00
U	10.94	376.19	19.40	-.192	10.33	111.47	-174.98
V	-6.64	7334.86	85.64	.058	2.17	191.61	-201.72

S = SPEED
U = EAST-WEST COMPONENT OF VELOCITY, EAST = POSITIVE U
V = NORTH-SOUTH COMPONENT OF VELOCITY, NORTH = POSITIVE V



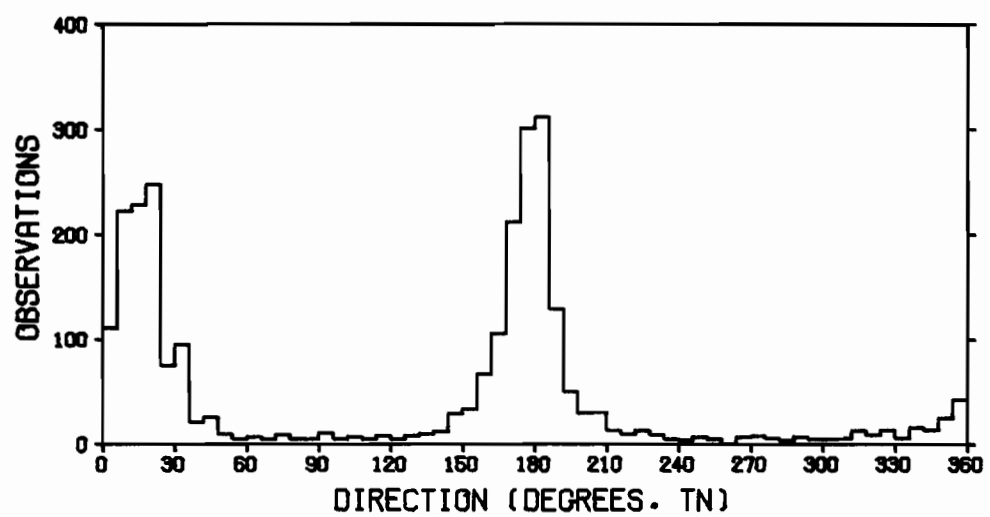


Figure 33.0. Current Meter Station 12 (-22m): Standard Statistics and Histograms

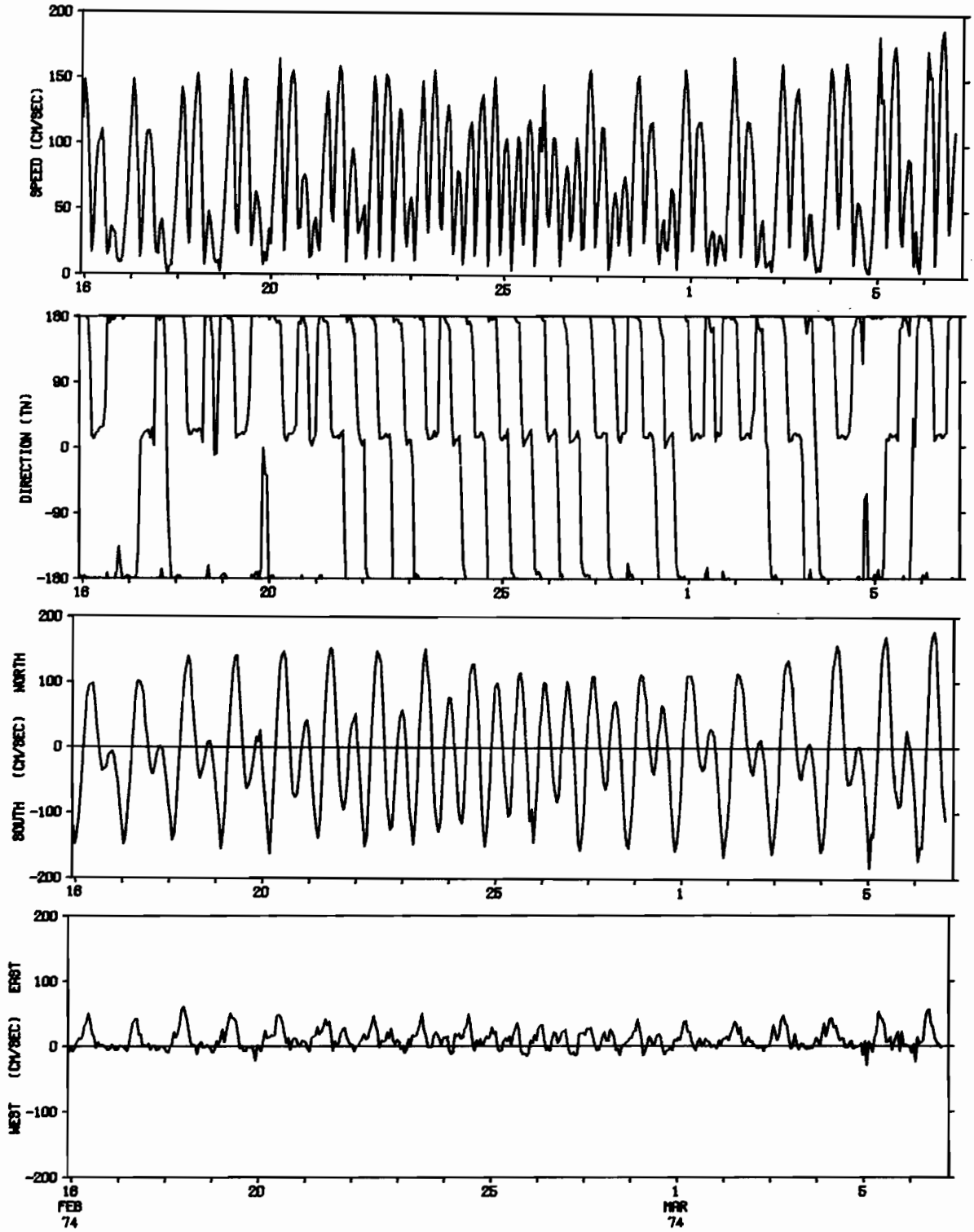


Figure 33.1. Current Meter Station 12 (-22m): Time Series

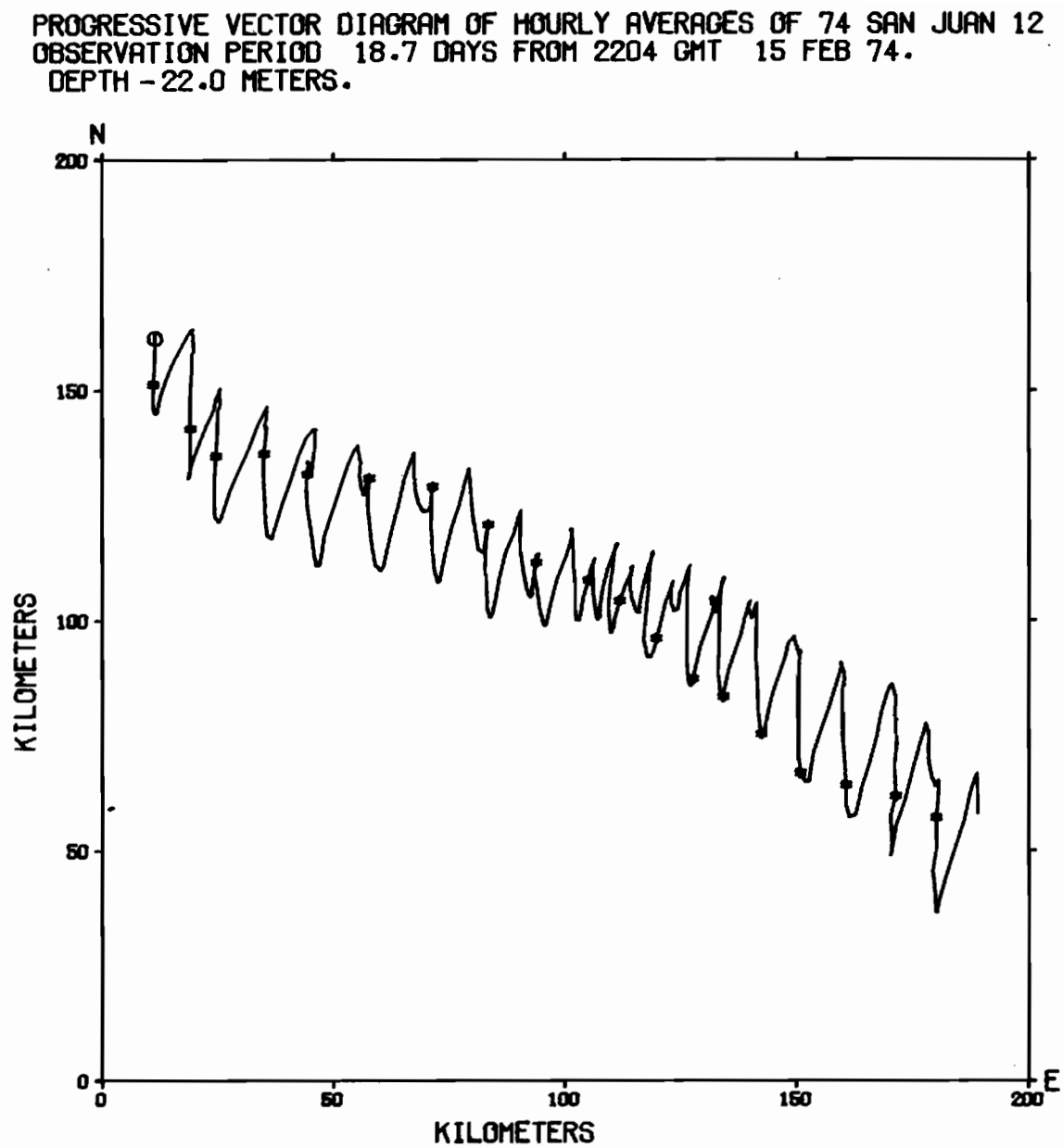


Figure 33.2. Current Meter Station 12 (-22m): Progressive Vector Diagram (PVD)

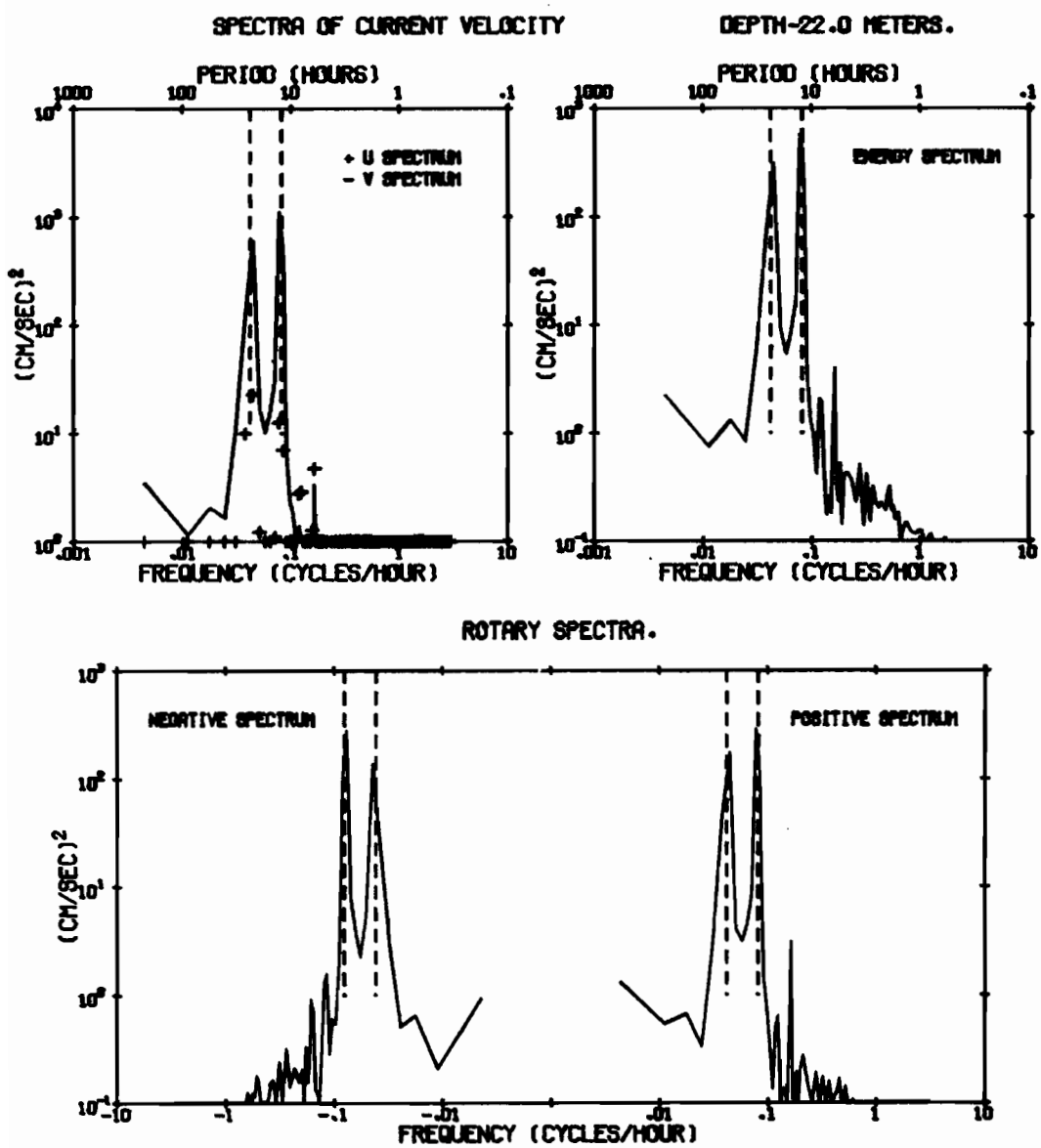


Figure 33.3. Current Meter Station 12 (-22m): Spectra

STATISTICS OF 74 SAN JUAN 15 LAT 48 37.29N LONG 122 45.00W
DEPTH -5.0 METERS NUMBER OF OBSERVATIONS = 2150
OBSERVATION PERIOD 14.9 DAYS FROM 0030 GMT 6 MAR 74

	MEAN (CM/SEC)	VARIANCE (CM/SEC)2	ST-DEV (CM/SEC)	SKEW	KURT	MAX (CM/SEC)	MIN (CM/SEC)
S	63.01	1660.99	40.76	.578	2.52	185.00	0.00
U	-6.57	2007.32	44.80	-.103	2.68	120.90	-180.99
V	-3.02	3571.53	59.76	-.006	2.45	160.41	-161.71

S = SPEED
U = EAST-WEST COMPONENT OF VELOCITY, EAST = POSITIVE U
V = NORTH-SOUTH COMPONENT OF VELOCITY, NORTH = POSITIVE V

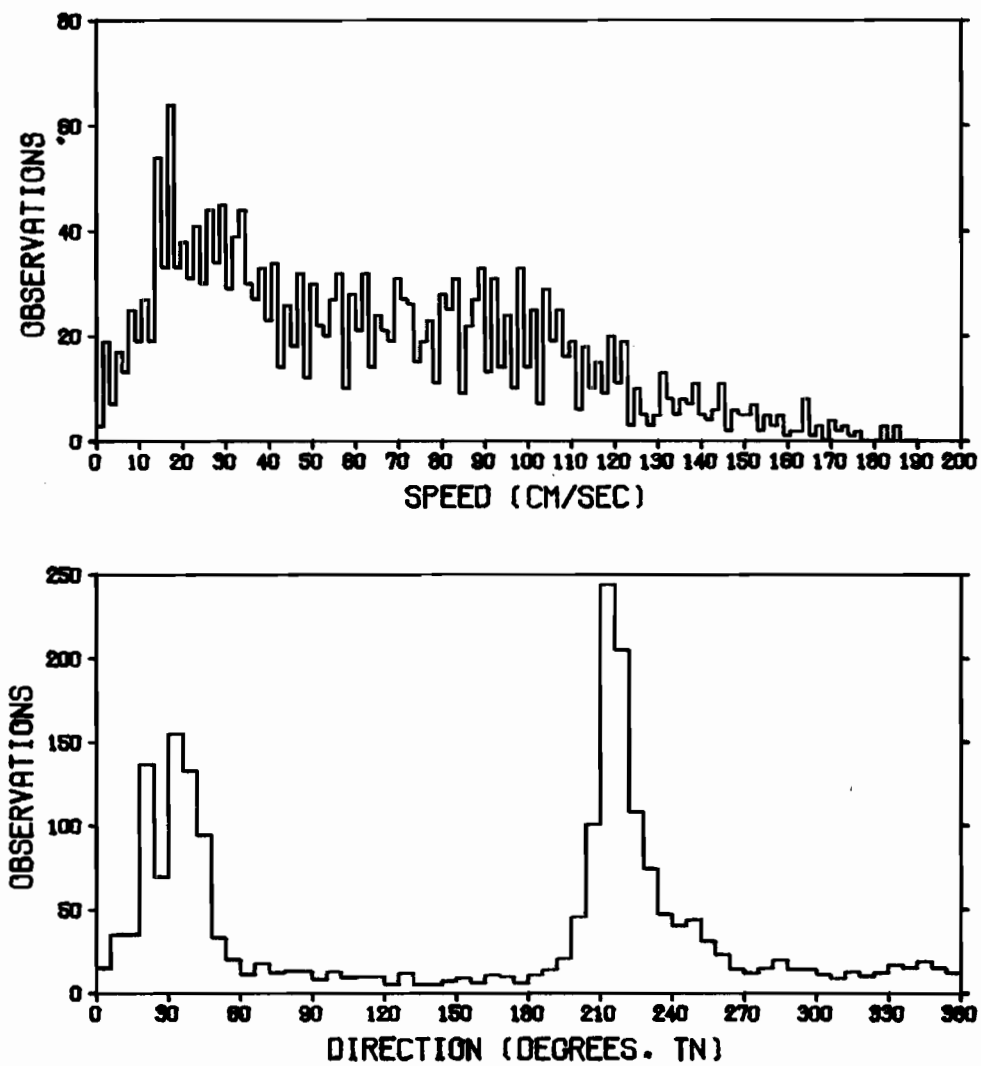


Figure 34.0. Current Meter Station 15 (-5m): Standard Statistics and Histograms

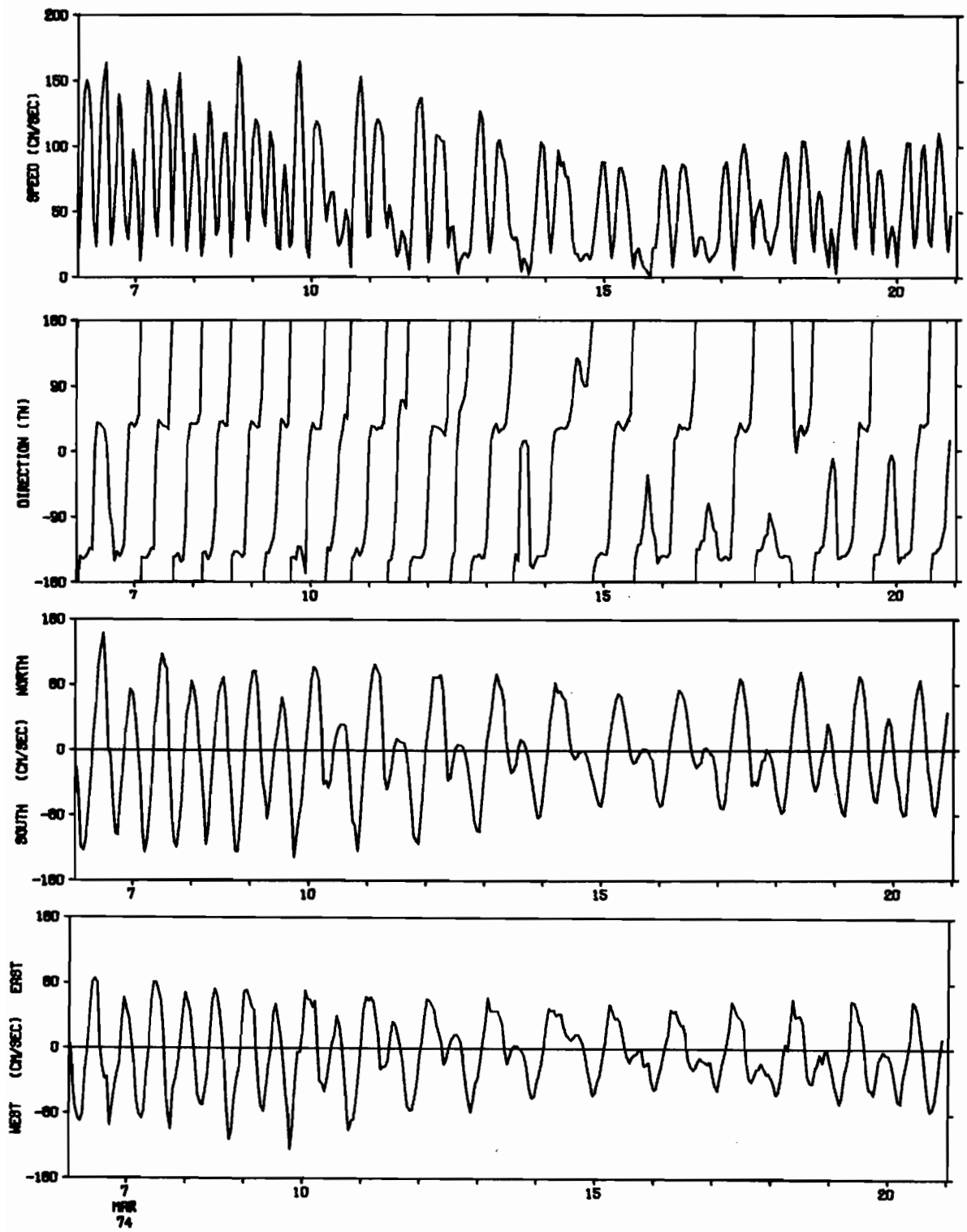


Figure 34.1. Current Meter Station 15 (-5m): Time Series

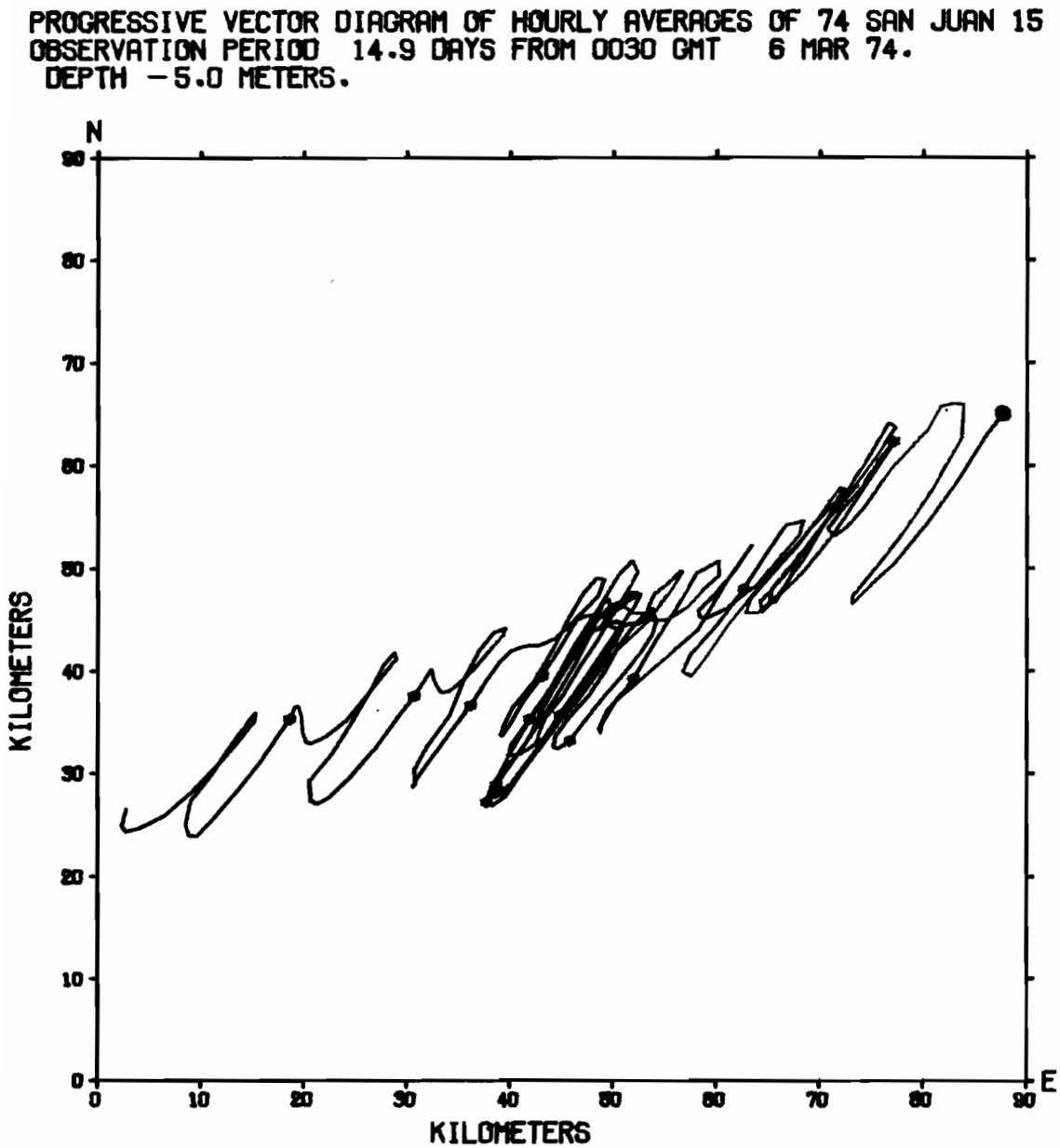


Figure 34.2. Current Meter Station 15 (-5m): Progressive Vector Diagram (PVD)

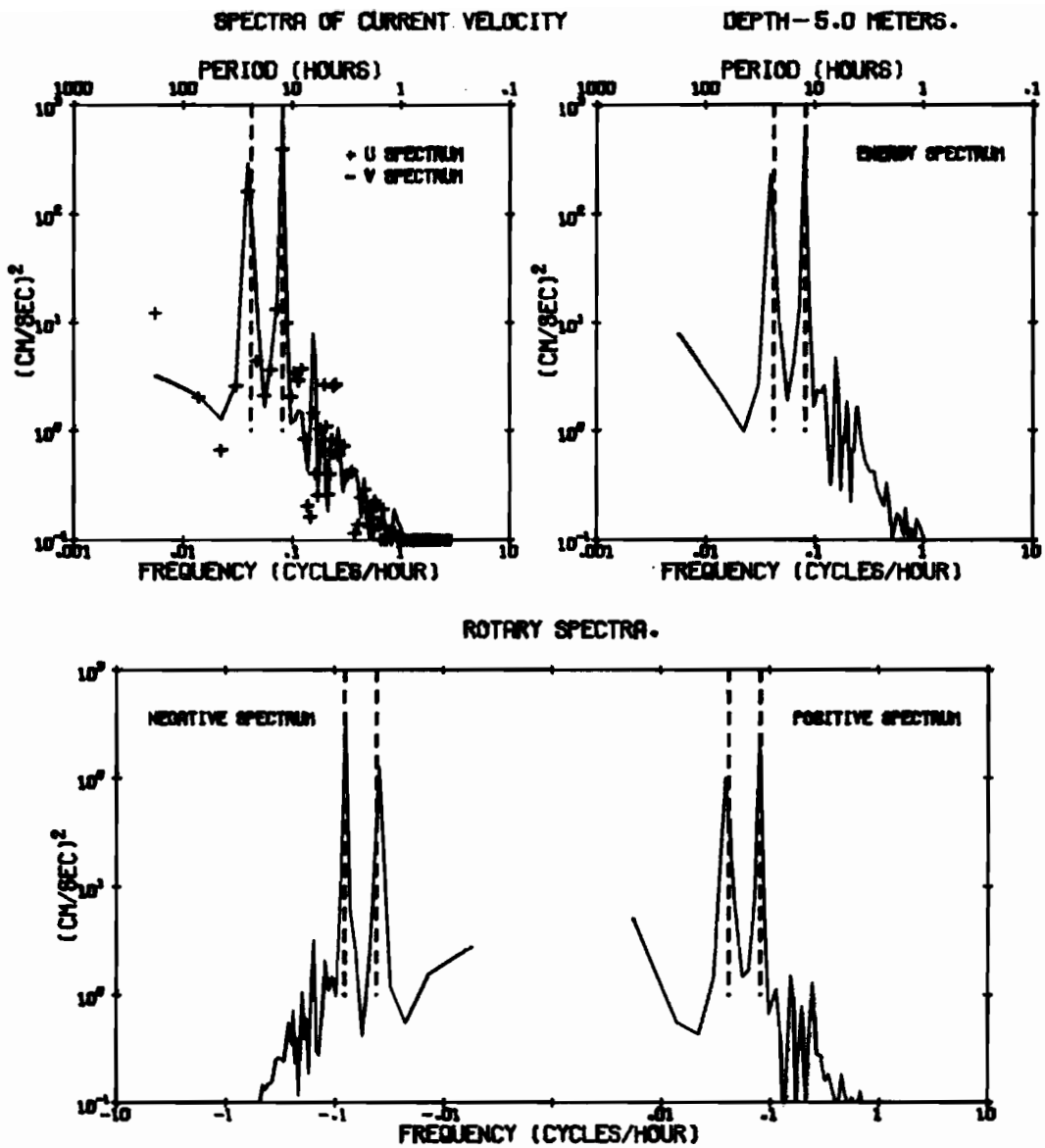
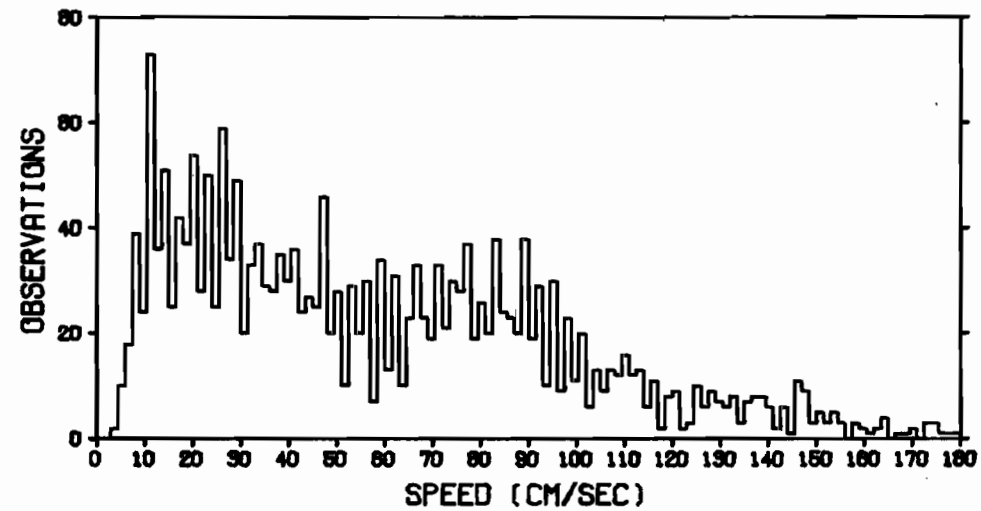


Figure 34.3. Current Meter Station 15 (-5m): Spectra

STATISTICS OF 74 SAN JUAN 15 LAT 48 37.29N LONG 122 45.00W
DEPTH-23.0 METERS NUMBER OF OBSERVATIONS = 2150
OBSERVATION PERIOD 14.9 DAYS FROM 0320 GMT 6 MAR 74

	MEAN (CM/SEC)	VARIANCE (CM/SEC)2	ST-DEV (CM/SEC)	SKEW	KURT	MAX (CM/SEC)	MIN (CM/SEC)
S	58.67	1462.52	38.24	.687	2.78	179.00	3.00
U	-7.87	2105.09	45.88	-.179	2.43	111.71	-148.24
V	-2.62	2731.14	52.26	.006	2.50	157.06	-134.05

S = SPEED
U = EAST-WEST COMPONENT OF VELOCITY, EAST = POSITIVE U
V = NORTH-SOUTH COMPONENT OF VELOCITY, NORTH = POSITIVE V



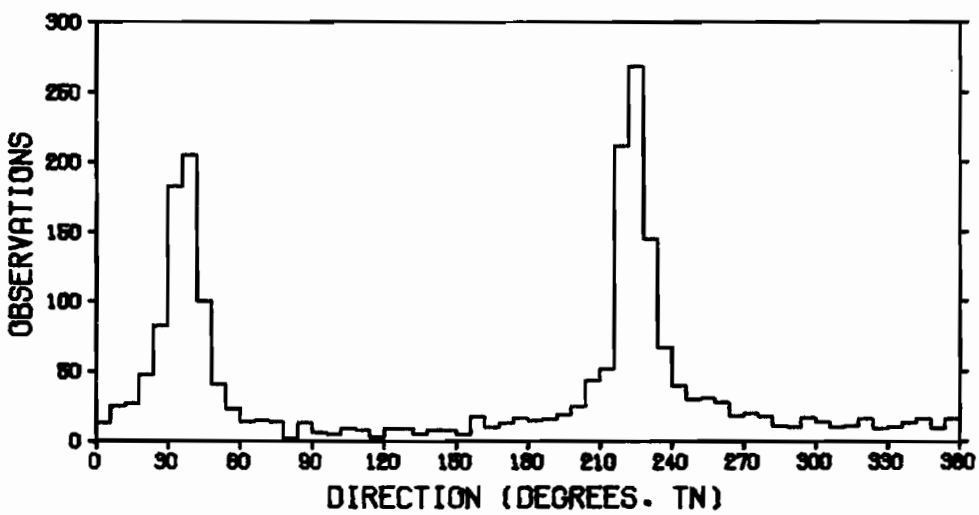


Figure 35.0. Current Meter Station 15 (-23m):
Standard Statistics and Histograms

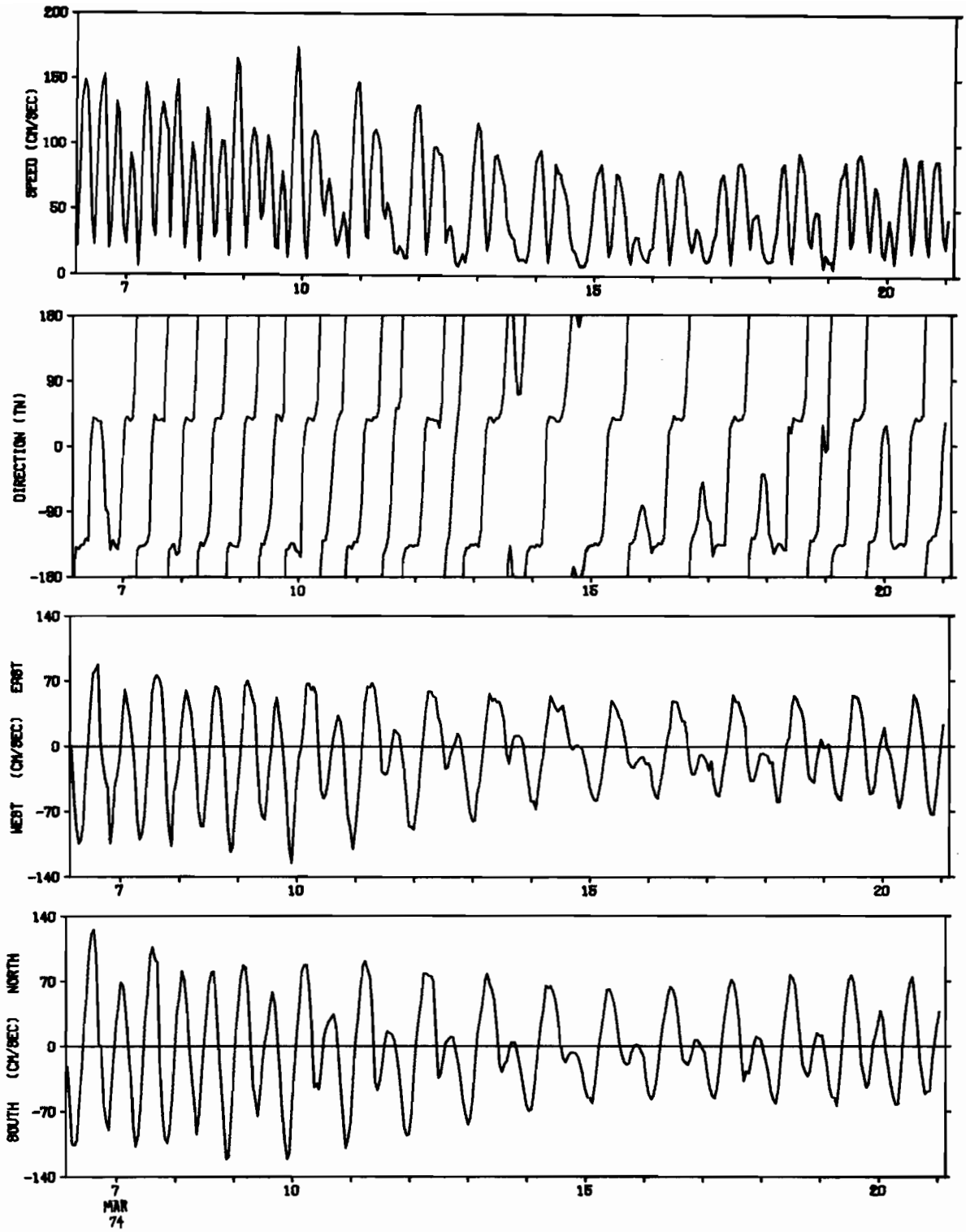


Figure 35.1. Current Meter Station 15 (-23m): Time Series

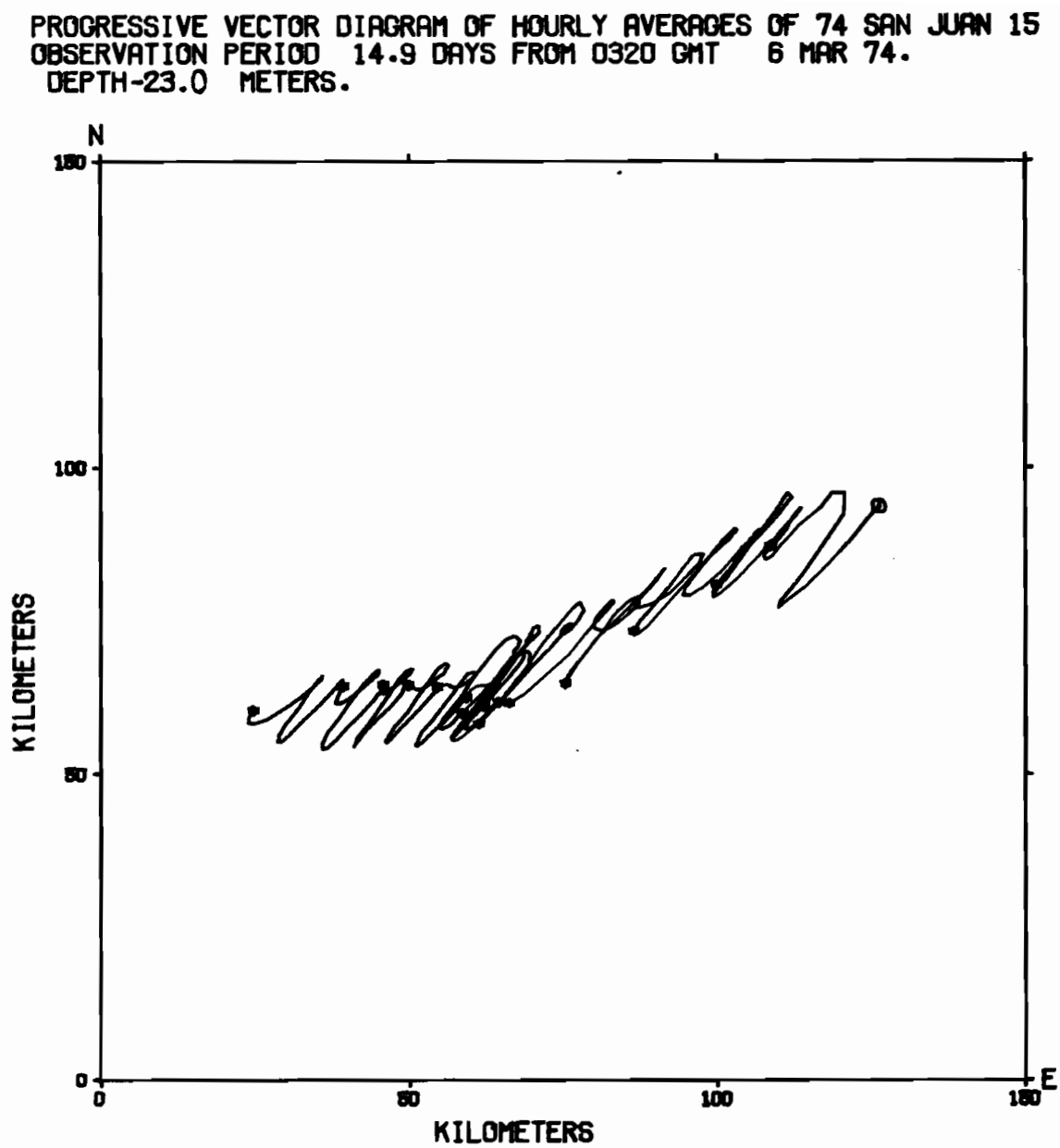


Figure 35.2. Current Meter Station 15 (-23m):
Progressive Vector Diagram (PVD)

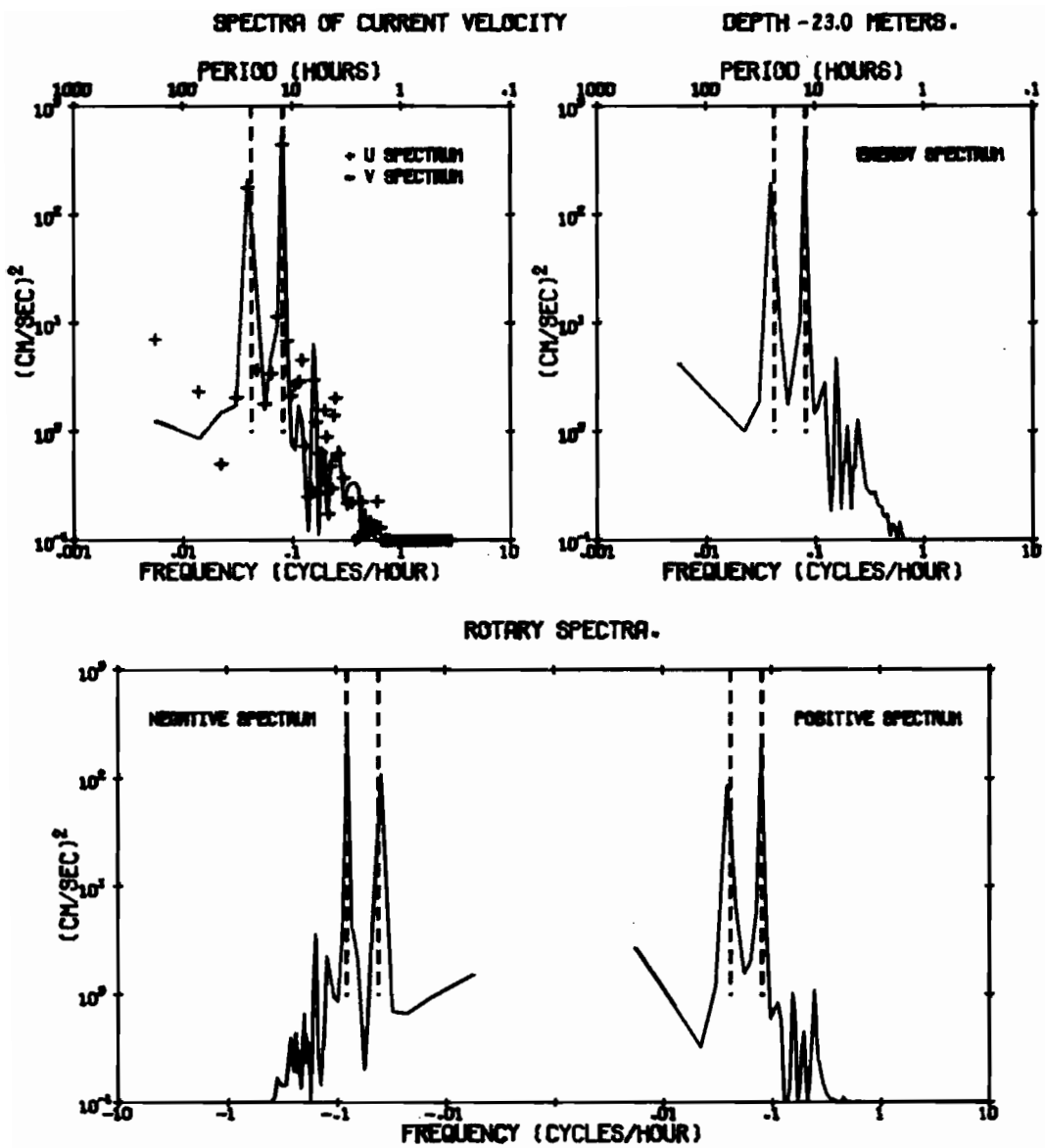


Figure 35.3. Current Meter Station 15 (-23m): Spectra

STATISTICS OF 74 SAN JUAN 15 LAT 48 37.29N LONG 122 45.00W
DEPTH +16.0 METERS NUMBER OF OBSERVATIONS = 2130
OBSERVATION PERIOD 14.8 DAYS FROM 0034 GMT 6 MAR 74

	MEAN (CM/SEC)	VARIANCE (CM/SEC)2	ST-DEV (CM/SEC)	SKEW	KURT	MAX (CM/SEC)	MIN (CM/SEC)
S	52.47	1082.02	32.89	.771	3.14	163.00	2.00
U	-5.74	1933.79	43.97	-.074	2.33	105.16	-119.95
V	-6.50	1826.30	42.74	-.098	2.63	127.79	-132.99

S = SPEED
U = EAST-WEST COMPONENT OF VELOCITY. EAST = POSITIVE U
V = NORTH-SOUTH COMPONENT OF VELOCITY. NORTH = POSITIVE V

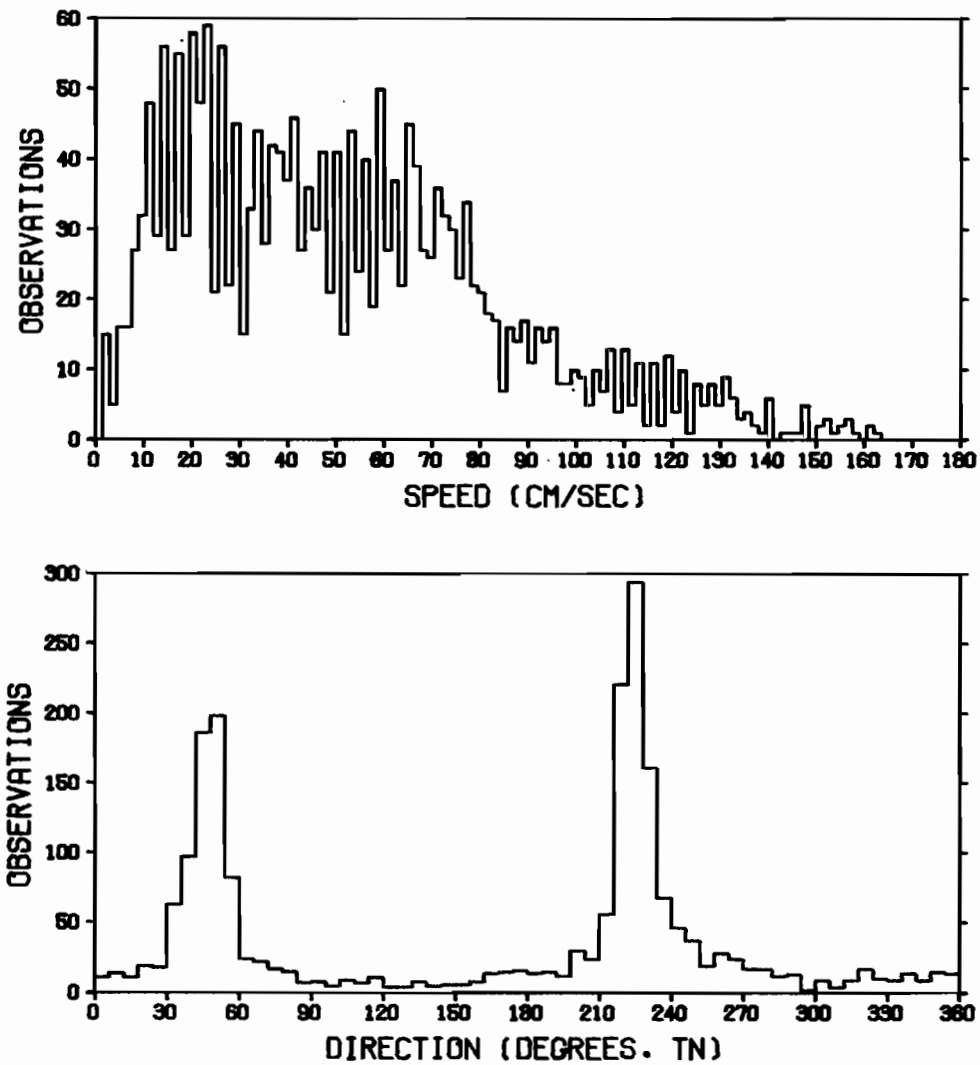


Figure 36.0. Current Meter Station 15 (+16m): Standard Statistics and Histograms

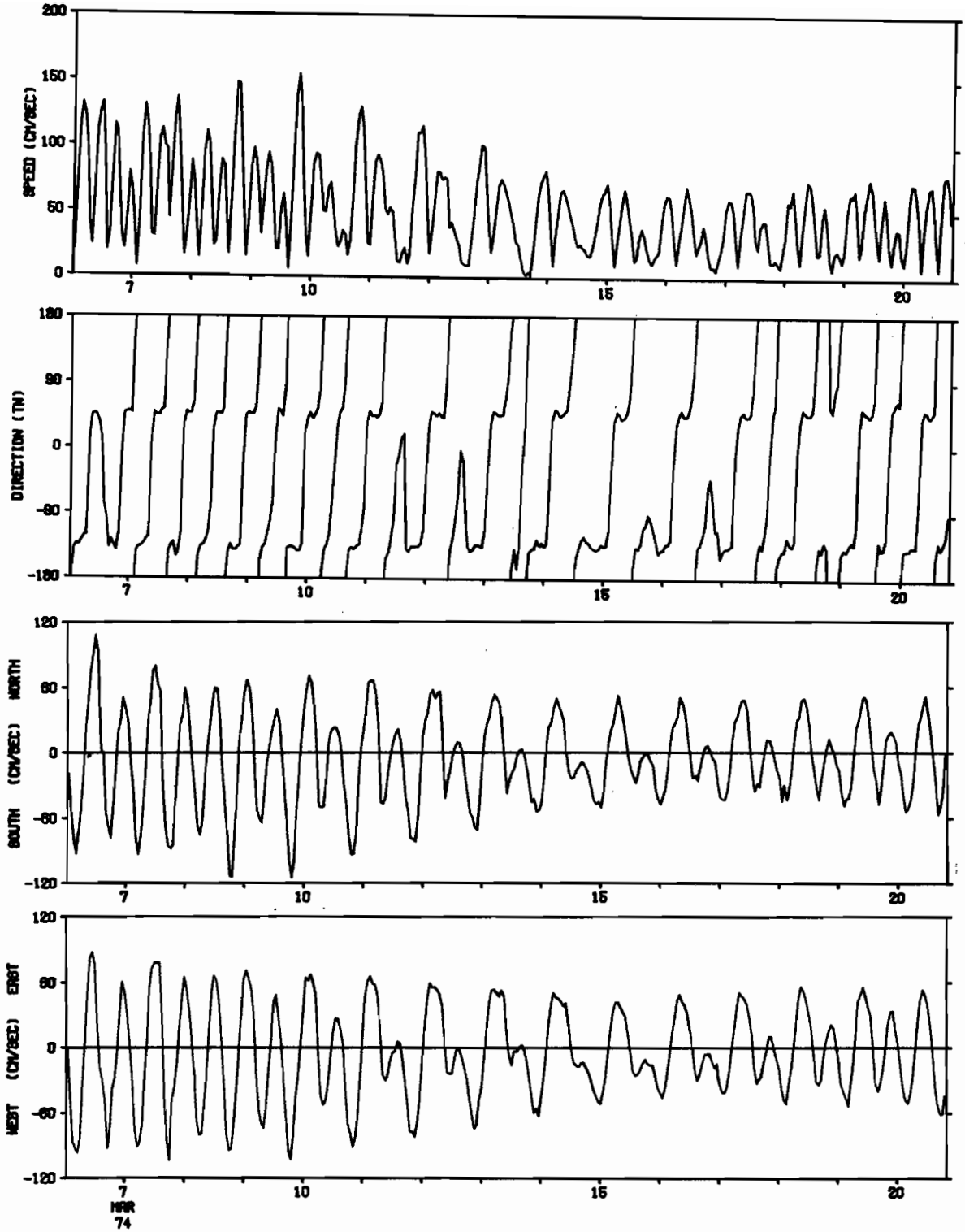


Figure 36.1. Current Meter Station 15 (+16m): Time Series

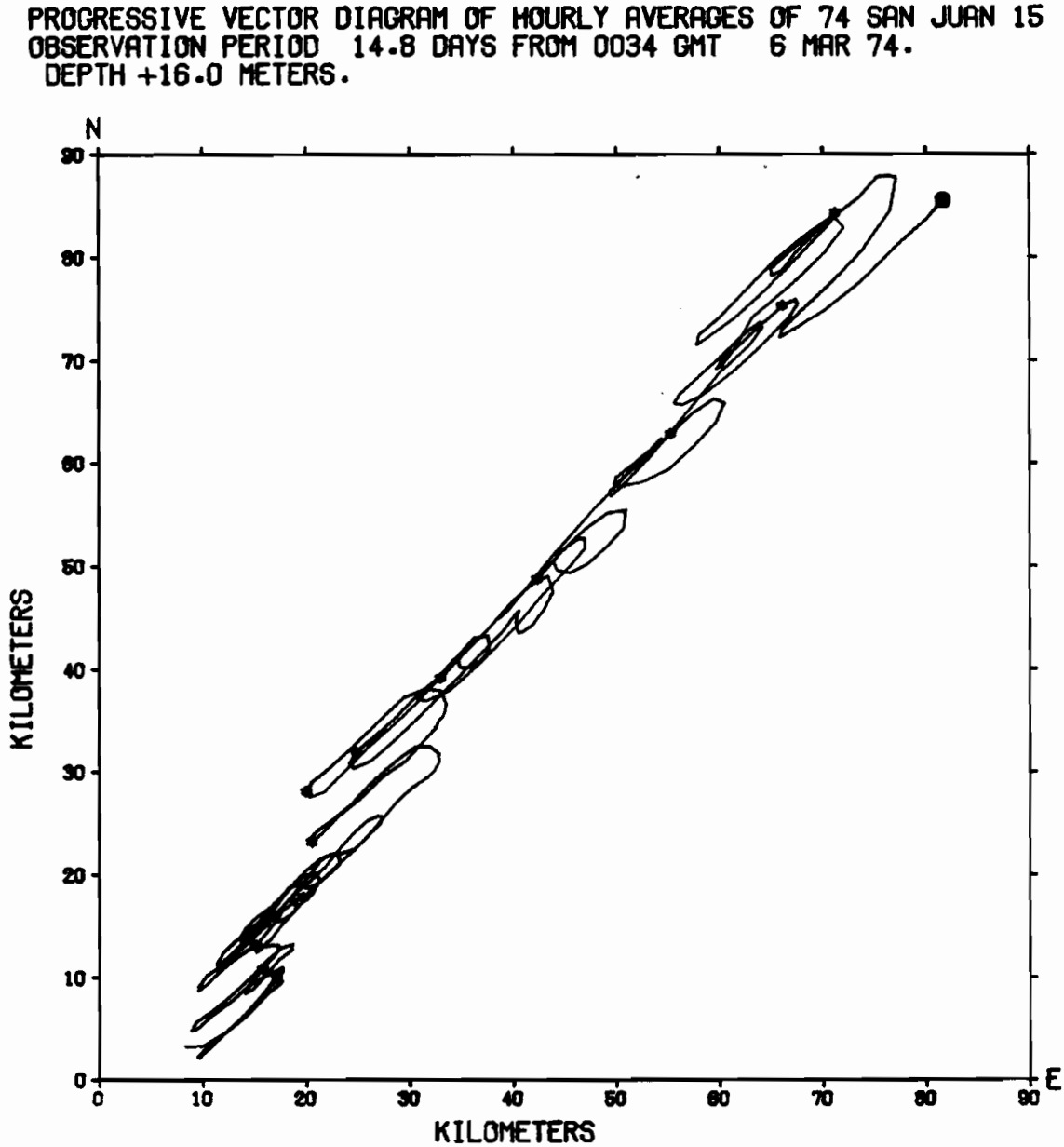


Figure 36.2. Current Meter Station 15 (+16m): Progressive Vector Diagram (PVD)

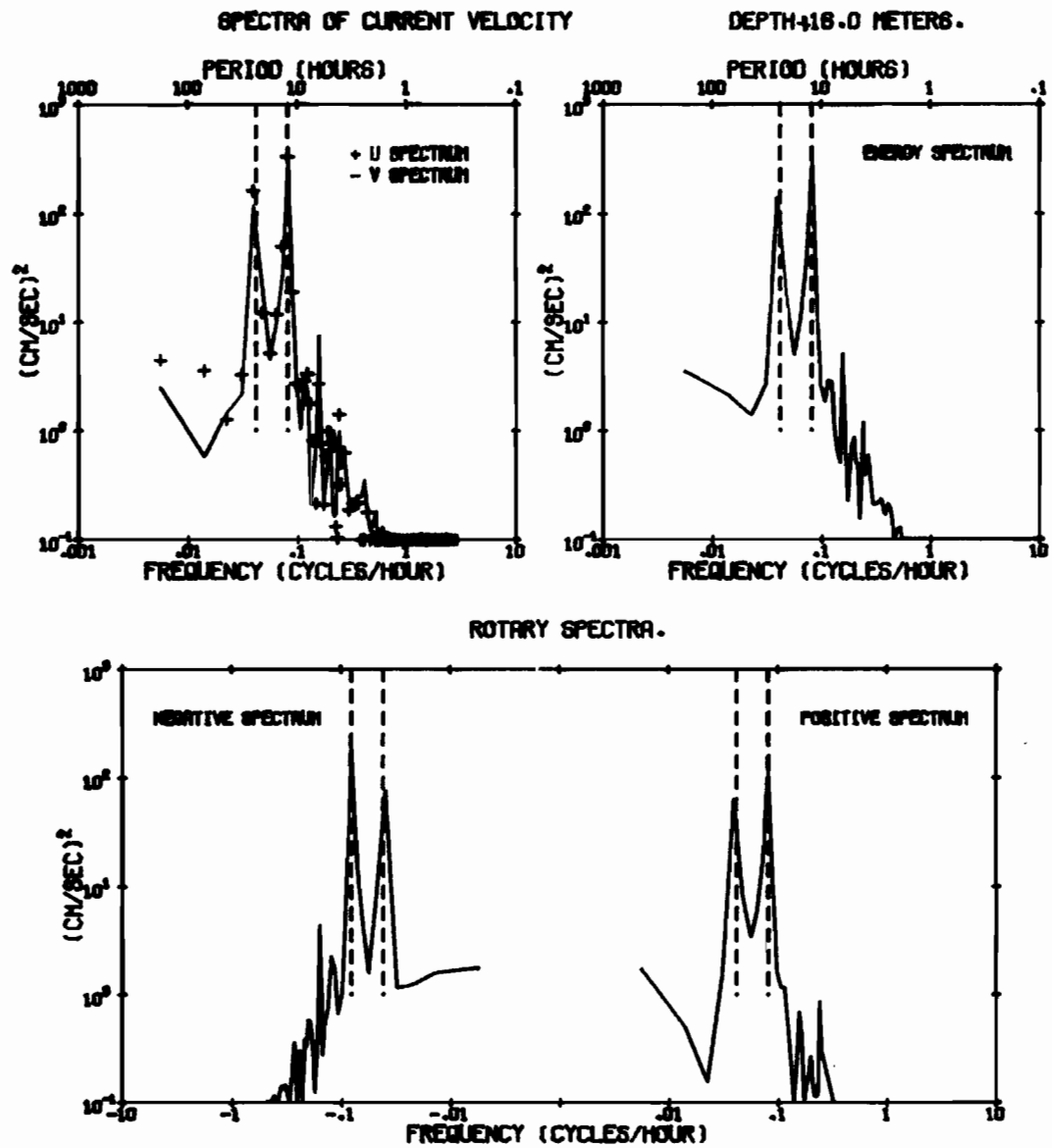


Figure 36.3. Current Meter Station 15 (+16m): Spectra

STATISTICS OF 74 SAN JUAN 16 LAT 48 36.01N LONG 122 38.99W
DEPTH +16.0 METERS NUMBER OF OBSERVATIONS = 2250
OBSERVATION PERIOD 15.6 DAYS FROM 2204 GMT 20 MAR 74

	MEAN (CM/SEC)	VARIANCE (CM/SEC)2	ST-DEV (CM/SEC)	SKEW	KURT	MAX (CM/SEC)	MIN (CM/SEC)
S	63.77	1371.11	37.03	.220	2.13	177.00	0.00
U	-7.86	2348.79	48.46	.456	2.25	119.49	-101.37
V	-9.55	2936.50	54.19	.521	2.50	157.72	-122.77

S = SPEED
U = EAST-WEST COMPONENT OF VELOCITY, EAST = POSITIVE U
V = NORTH-SOUTH COMPONENT OF VELOCITY, NORTH = POSITIVE V

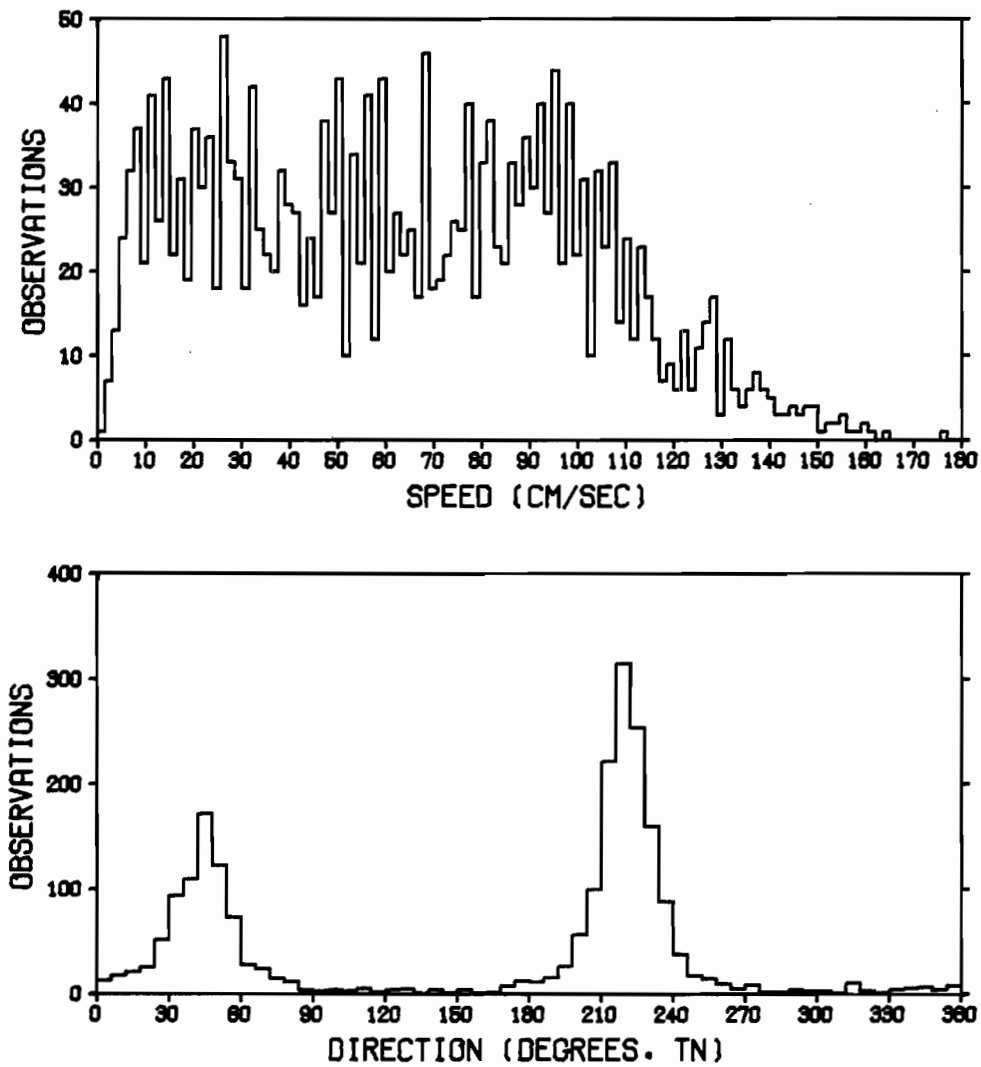


Figure 37.0. Current Meter Station 16 (+16m): Standard Statistics and Histograms

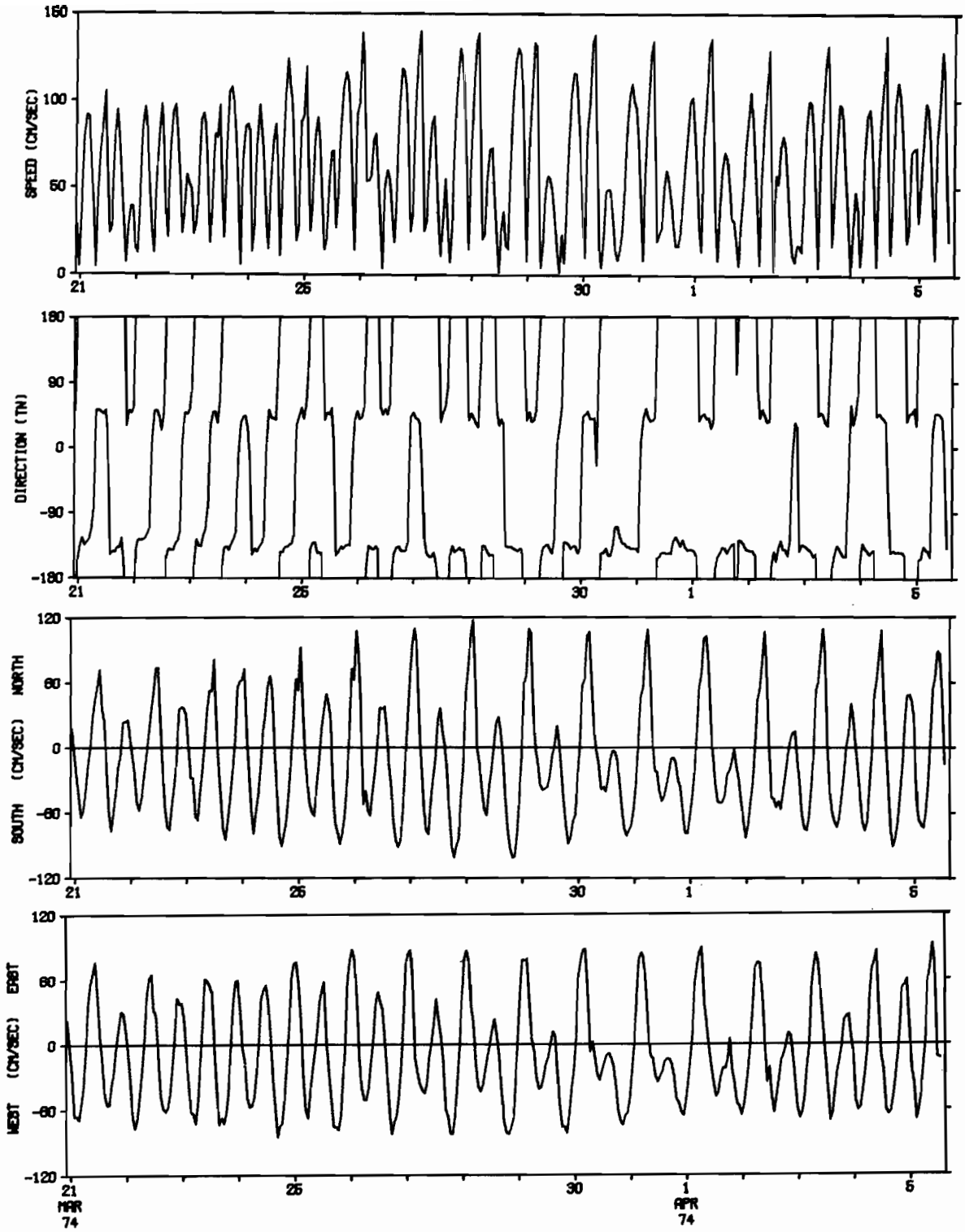


Figure 37.1. Current Meter Station 16 (+16m): Time Series

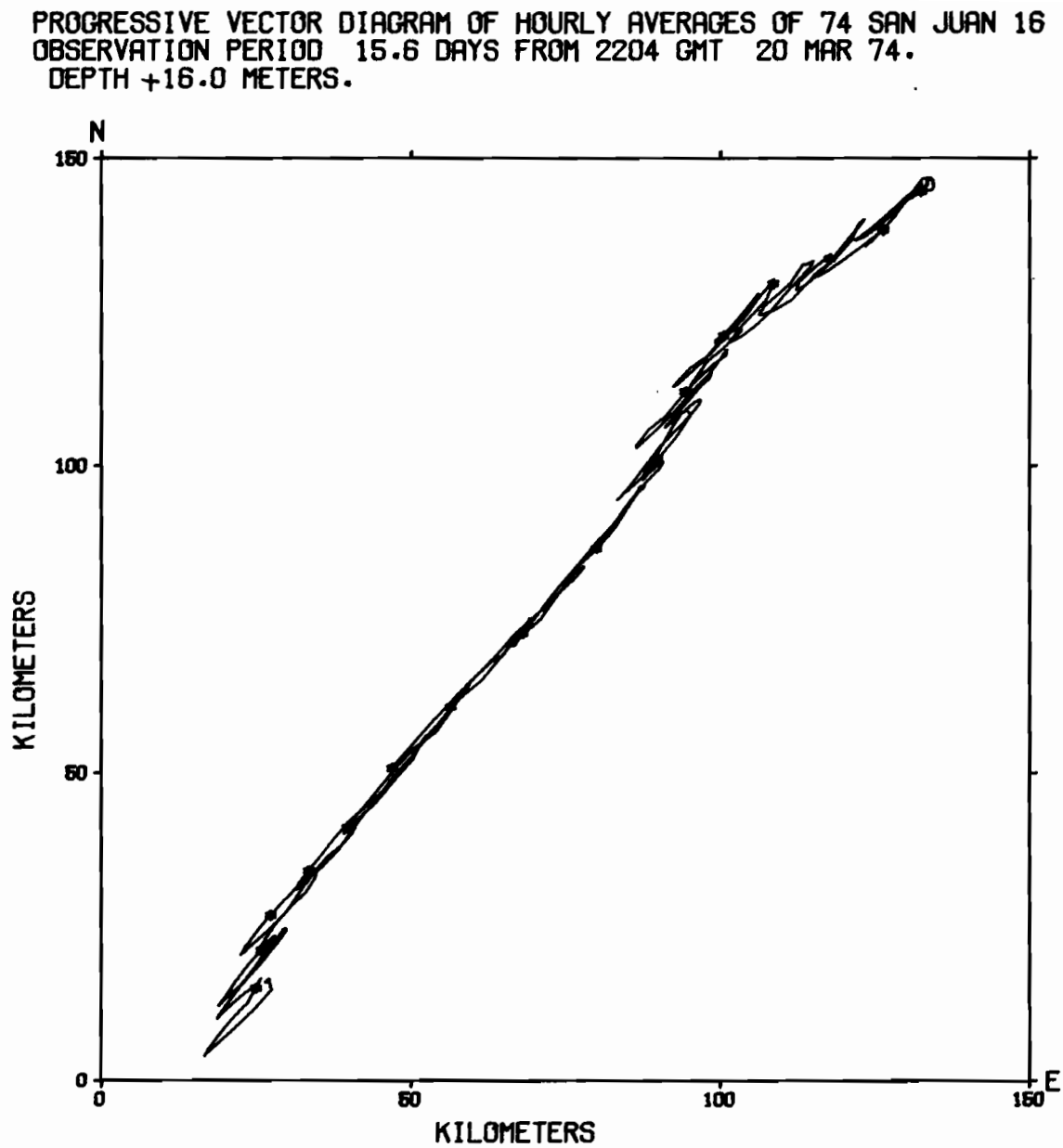


Figure 37.2. Current Meter Station 16 (+16m):
Progressive Vector Diagram (PVD)

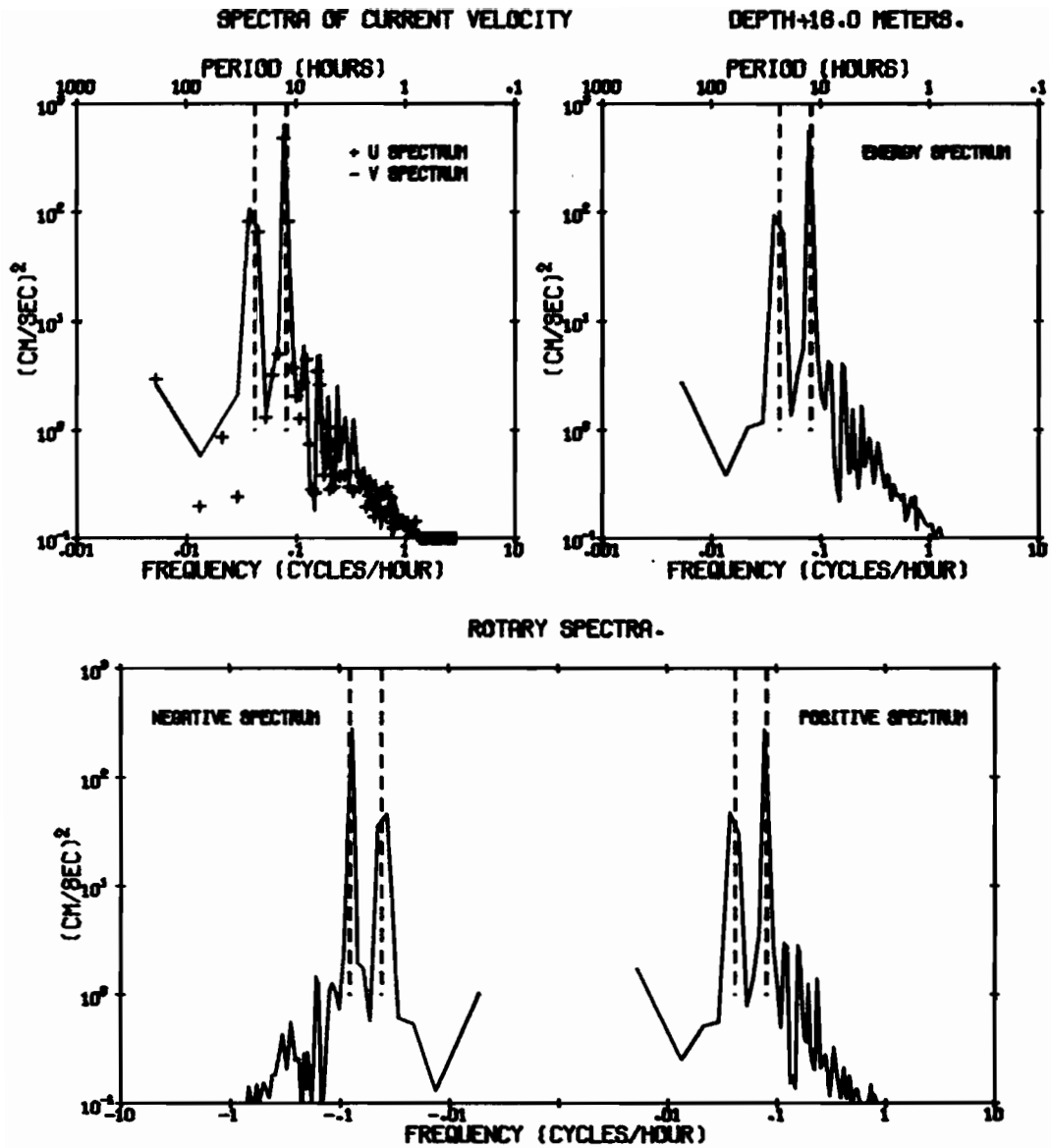


Figure 37.3. Current Meter Station 16 (+16m): Spectra

STATISTICS OF 74 SAN JUAN 16 LAT 48 36.01N LONG 122 38.99W
DEPTH -23.0 METERS NUMBER OF OBSERVATIONS = 2250
OBSERVATION PERIOD 15.6 DAYS FROM 2212 GMT 20 MAR 74

	MEAN (CM/SEC)	VARIANCE (CM/SEC)2	ST-DEV (CM/SEC)	SKEW	KURT	MAX (CM/SEC)	MIN (CM/SEC)
S	69.09	1642.71	40.53	.418	2.45	216.00	2.00
U	-10.85	2742.87	52.37	.543	2.41	151.23	-111.83
V	-7.94	3492.18	59.09	.546	2.62	167.54	-120.82

S = SPEED
U = EAST-WEST COMPONENT OF VELOCITY, EAST = POSITIVE U
V = NORTH-SOUTH COMPONENT OF VELOCITY, NORTH = POSITIVE V

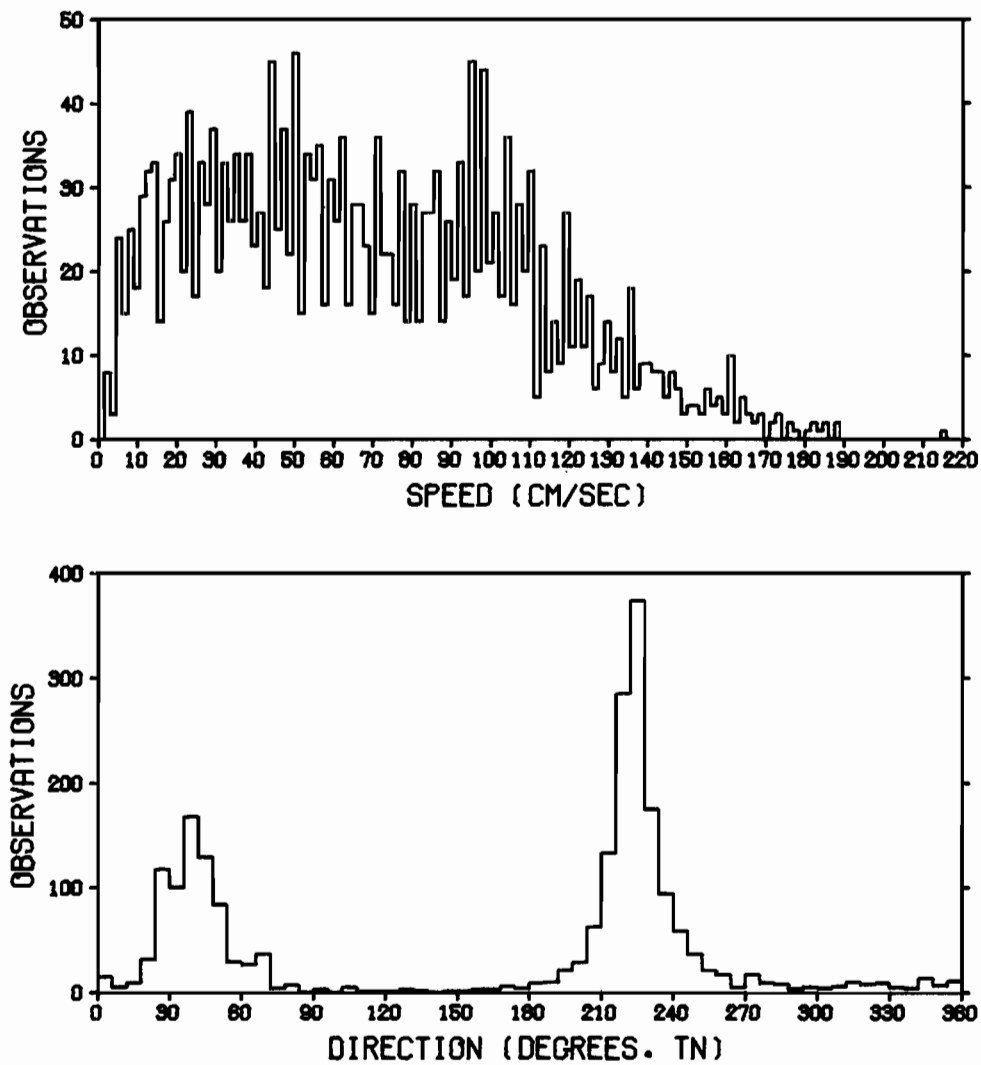


Figure 38.0. Current Meter Station 16 (-23m):
Standard Statistics and Histograms

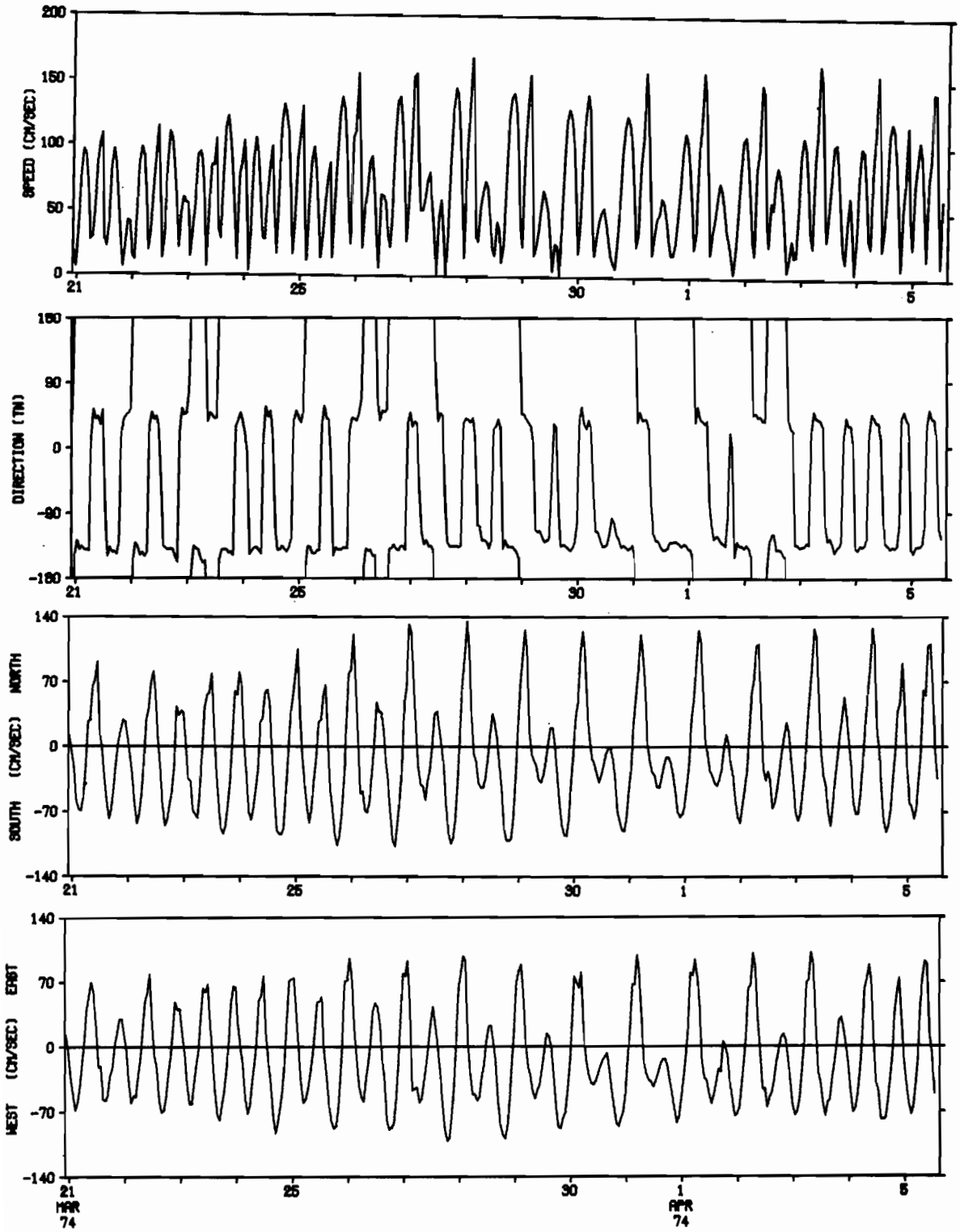


Figure 38.1. Current Meter Station 16 (-23m): Time Series

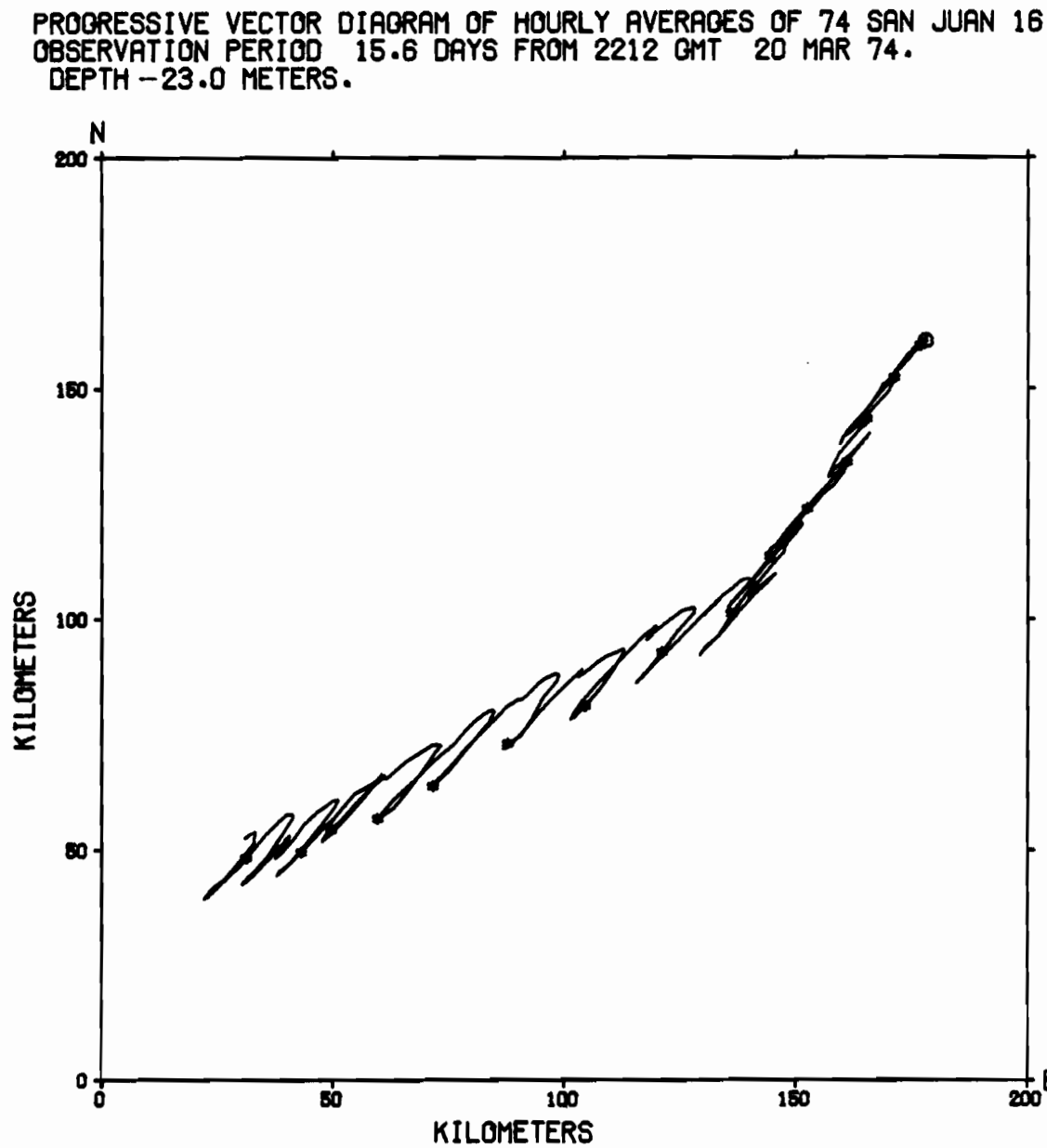


Figure 38.2. Current Meter Station 16 (-23m): Progressive Vector Diagram (PVD)

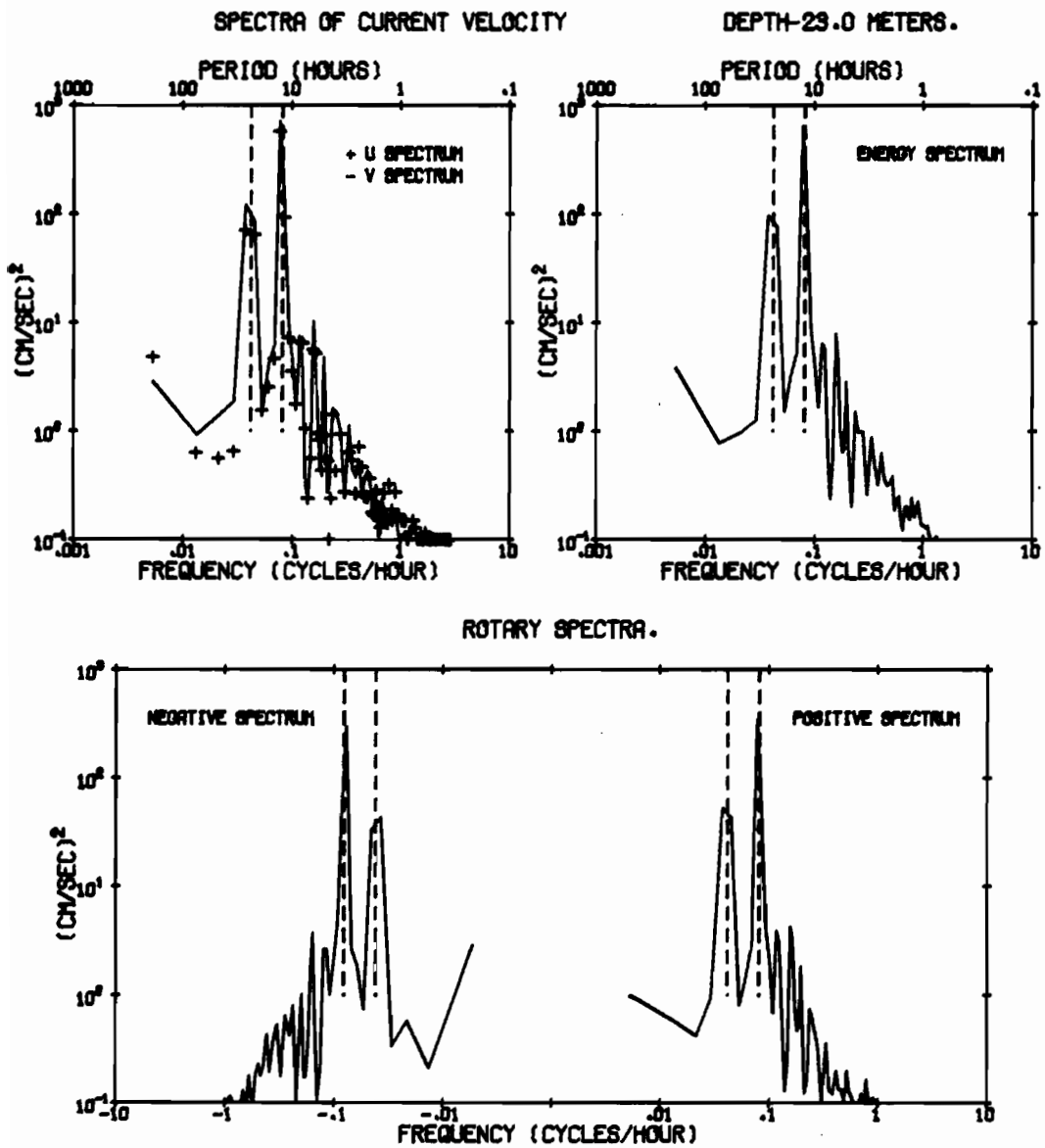


Figure 38.3. Current Meter Station 16 (-23m): Spectra

STATISTICS OF 74 SAN JUAN 19 LAT 48 38.85N LONG 122 42.83W
DEPTH -5.0 METERS NUMBER OF OBSERVATIONS = 2130
OBSERVATION PERIOD 14.8 DAYS FROM 2300 GMT 2 MAR 74

	MEAN (CM/SEC)	VARIANCE (CM/SEC)2	ST-DEV (CM/SEC)	SKEW	KURT	MAX (CM/SEC)	MIN (CM/SEC)
S	59.96	1133.52	33.67	.640	3.03	176.00	3.00
U	19.02	354.43	18.83	.132	3.91	94.11	-56.83
V	1.14	4011.49	63.34	.401	2.39	170.77	-119.47

S = SPEED
U = EAST-WEST COMPONENT OF VELOCITY, EAST = POSITIVE U
V = NORTH-SOUTH COMPONENT OF VELOCITY, NORTH = POSITIVE V

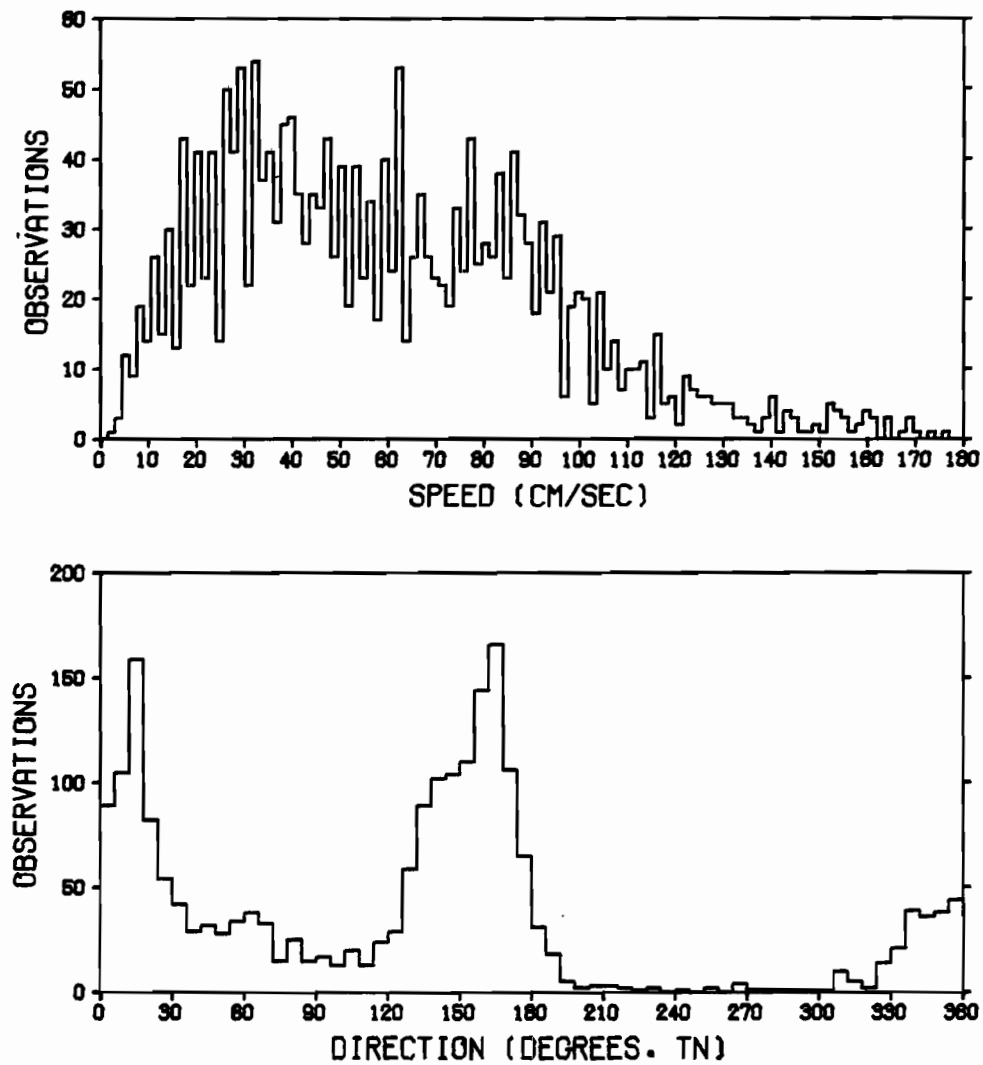


Figure 39.0. Current Meter Station 19 (-5m):
Standard Statistics and Histograms

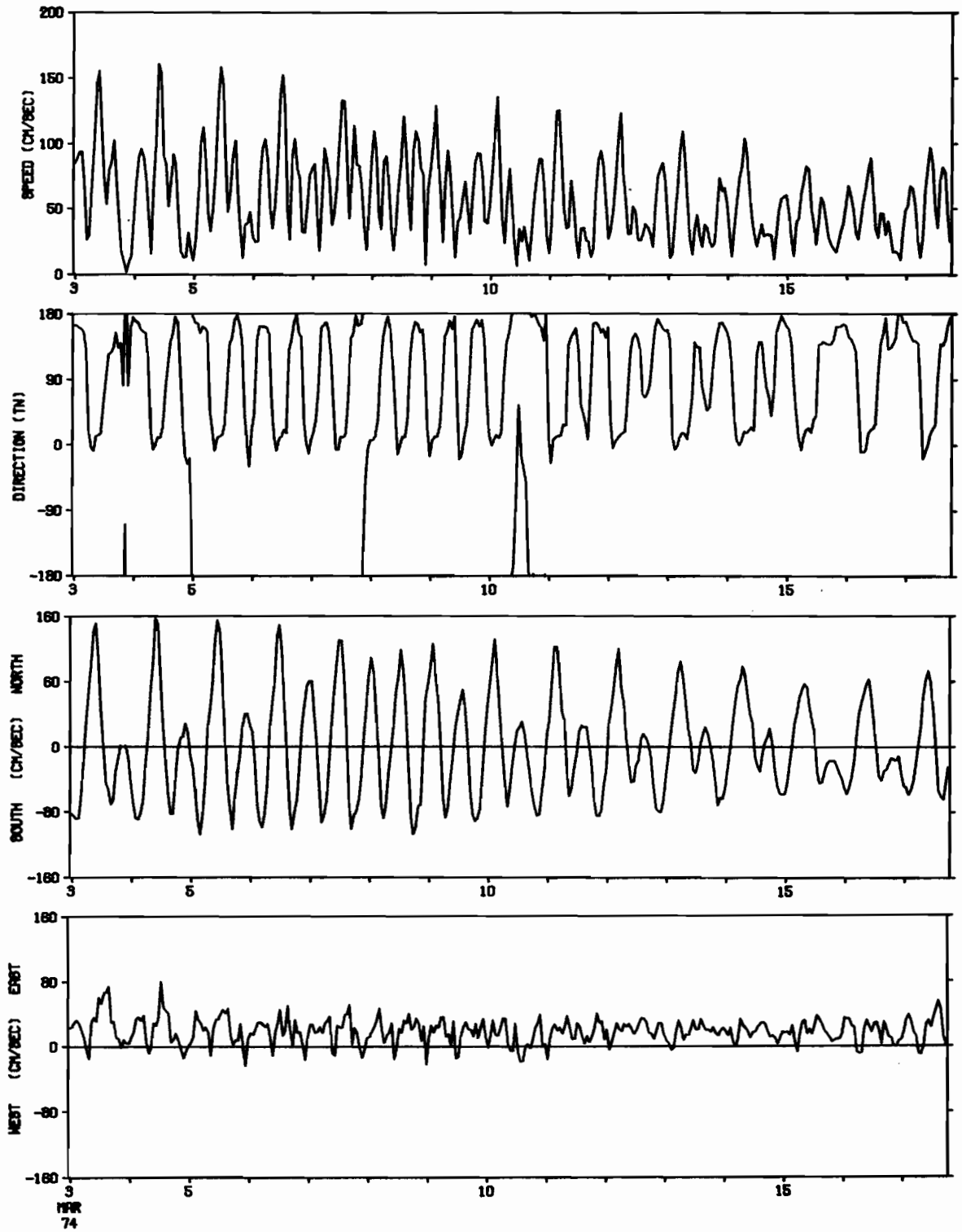


Figure 39.1. Current Meter Station 19 (-5m): Time Series

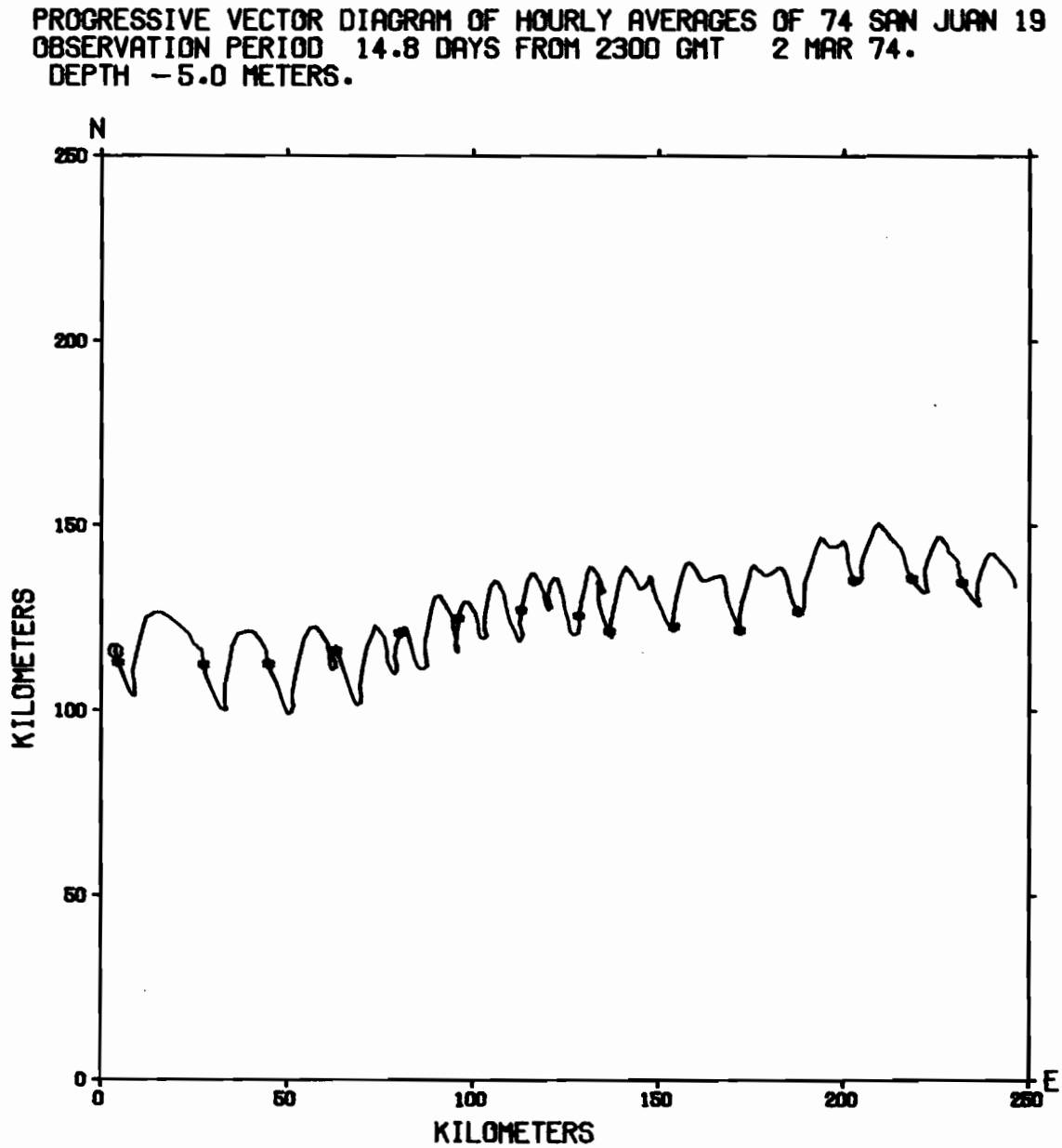


Figure 39.2. Current Meter Station 19 (-5m):
Progressive Vector Diagram (PVD)

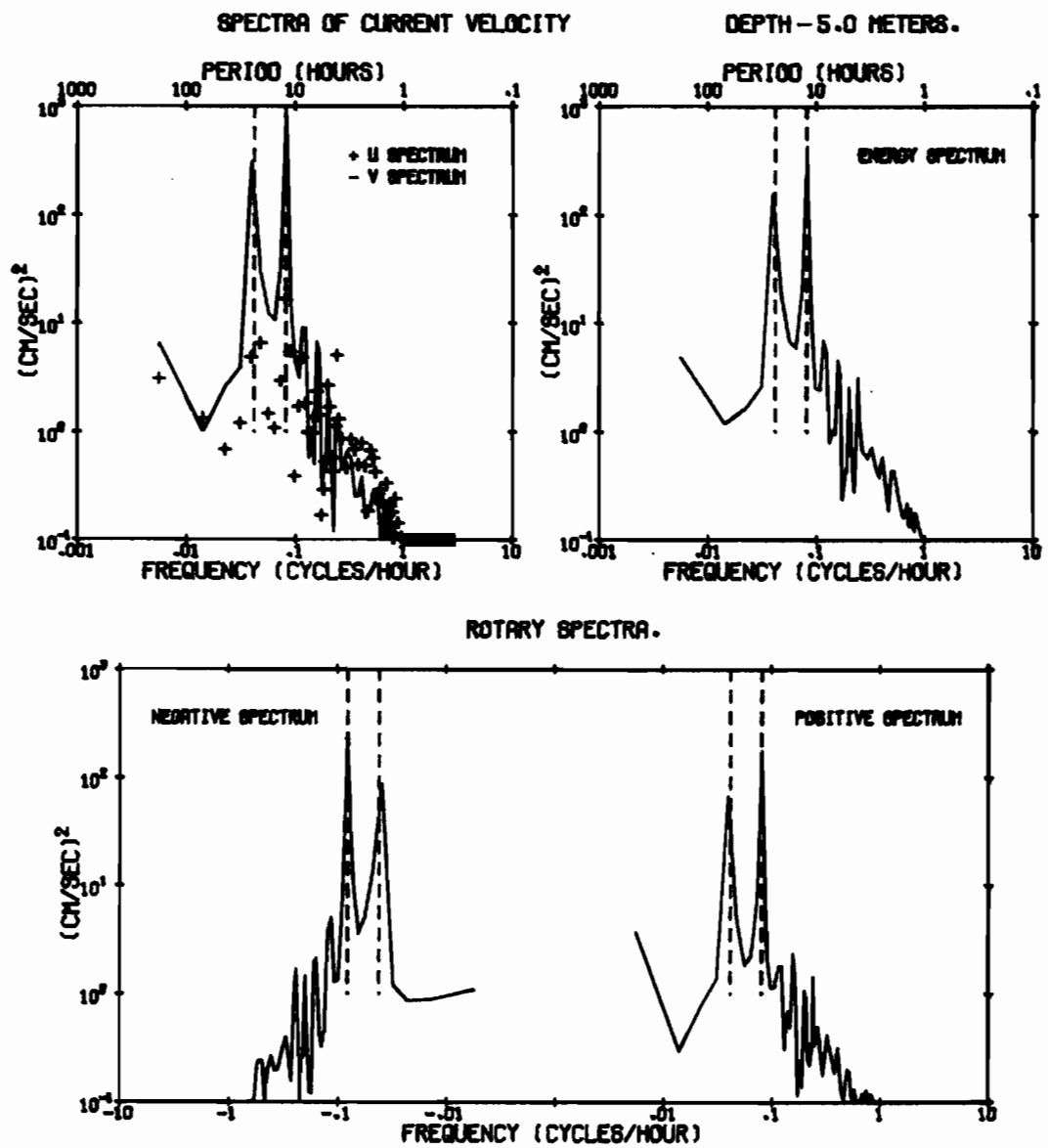


Figure 39.3. Current Meter Station 19 (-5m): Spectra

STATISTICS OF 74 SAN JUAN 19 LAT 48 38.85N LONG 122 42.83W
DEPTH +16.0 METERS NUMBER OF OBSERVATIONS = 2150
OBSERVATION PERIOD 14.9 DAYS FROM 2152 GMT 2 MAR 74

	MEAN (CM/SEC)	VARIANCE (CM/SEC)2	ST-DEV (CM/SEC)	SKEW	KURT	MAX (CM/SEC)	MIN (CM/SEC)
S	50.67	857.66	29.29	.513	2.50	141.00	0.00
U	11.87	368.98	19.21	.366	3.81	92.46	-60.74
V	-2.15	2910.10	53.95	.323	2.41	141.00	-124.98

S = SPEED
U = EAST-WEST COMPONENT OF VELOCITY, EAST = POSITIVE U
V = NORTH-SOUTH COMPONENT OF VELOCITY, NORTH = POSITIVE V

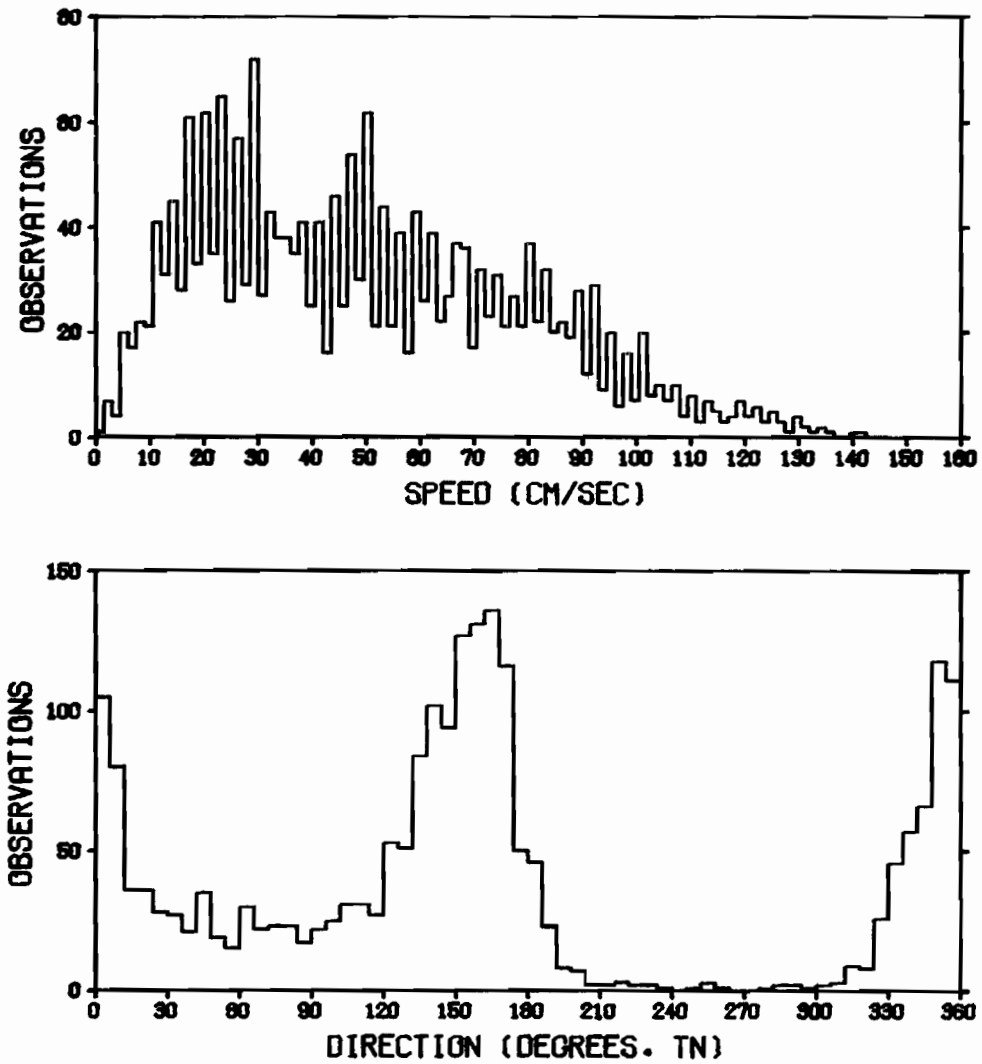


Figure 40.0. Current Meter Station 19 (+16m): Standard Statistics and Histograms

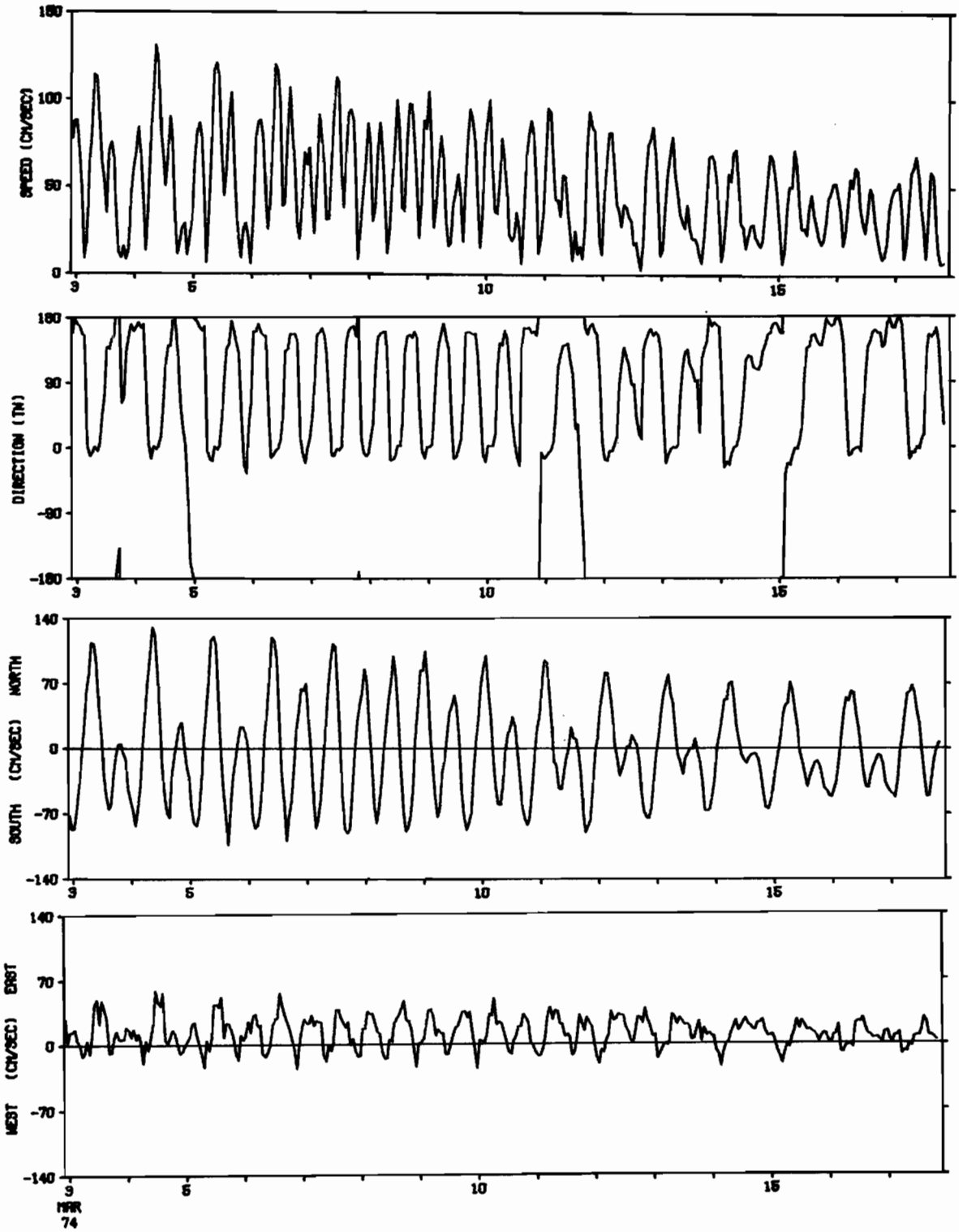


Figure 40.1. Current Meter Station 19 (+16m): Time Series

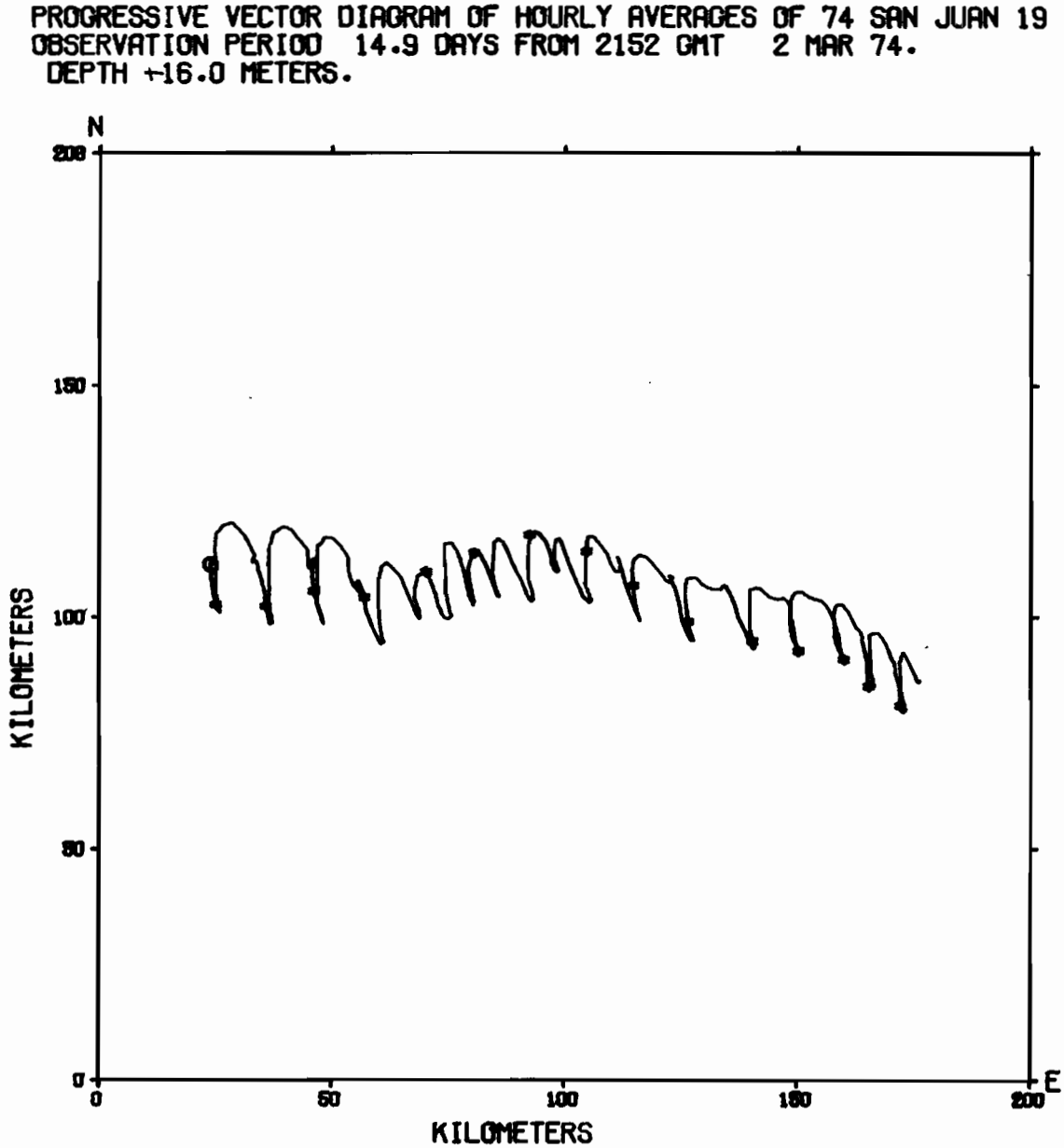


Figure 40.2. Current Meter Station 19 (+16m): Progressive Vector Diagram (PVD)

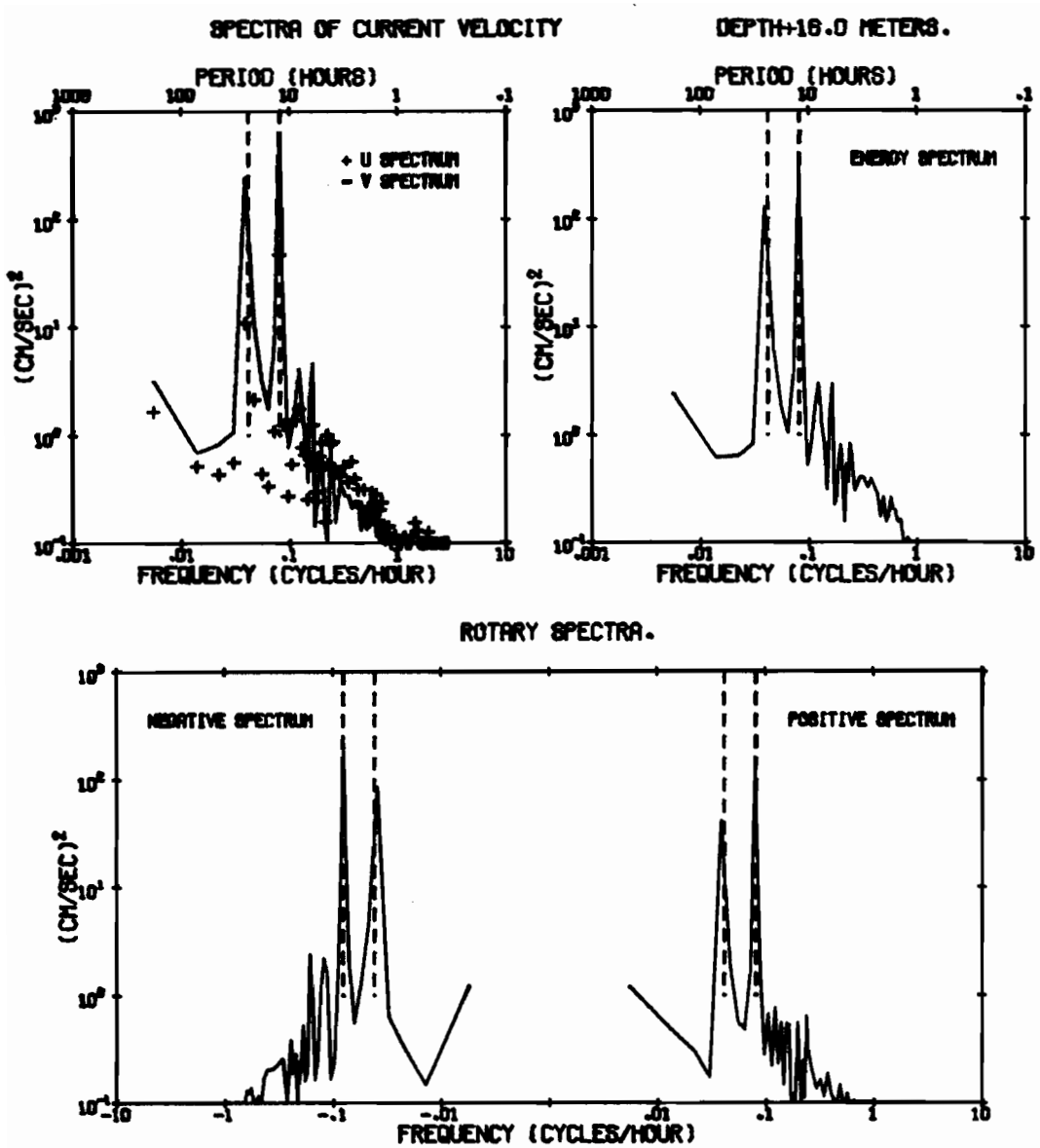


Figure 40.3. Current Meter Station 19 (+16m): Spectra

STATISTICS OF 74 SAN JUAN 20A LAT 48 40.40N LONG 122 42.30W
DEPTH -5.0 METERS NUMBER OF OBSERVATIONS = 5000
OBSERVATION PERIOD 34.7 DAYS FROM 2010 GMT 14 FEB 74

	MEAN (CM/SEC)	VARIANCE (CM/SEC)2	ST-DEV (CM/SEC)	SKEW	KURT	MAX (CM/SEC)	MIN (CM/SEC)
S	43.94	790.67	28.12	.864	3.14	146.00	0.00
U	8.08	314.49	17.73	-.160	2.96	72.16	-58.45
V	11.42	2211.60	47.03	.305	2.54	143.32	-97.05

S = SPEED
U = EAST-WEST COMPONENT OF VELOCITY, EAST = POSITIVE U
V = NORTH-SOUTH COMPONENT OF VELOCITY, NORTH = POSITIVE V

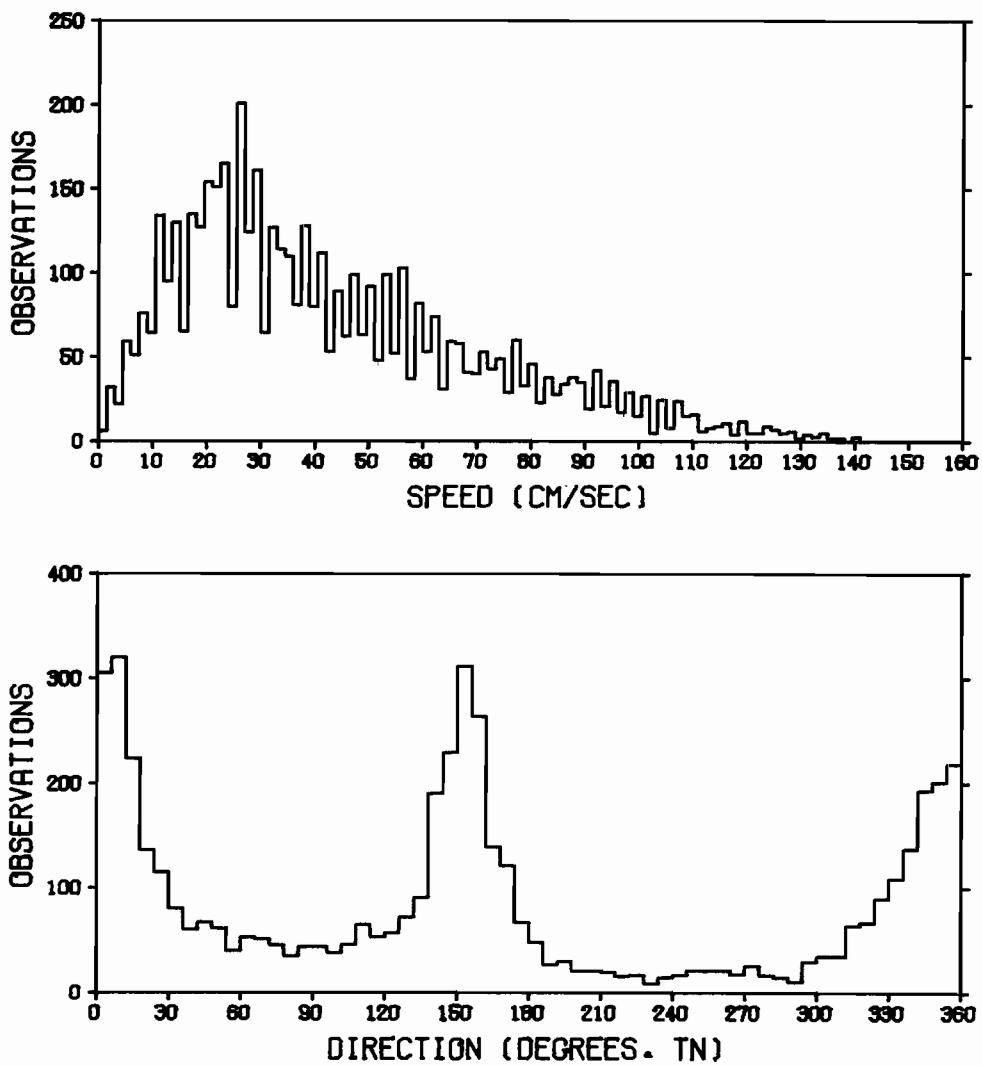


Figure 41.0A. Current Meter Station 20A (A and B represent consecutive data at that mooring for a total of 54.7 days from 14 February 1974 and were divided so that the number of observations could be entered into the computer program) (-5m): Standard Statistics and Histograms

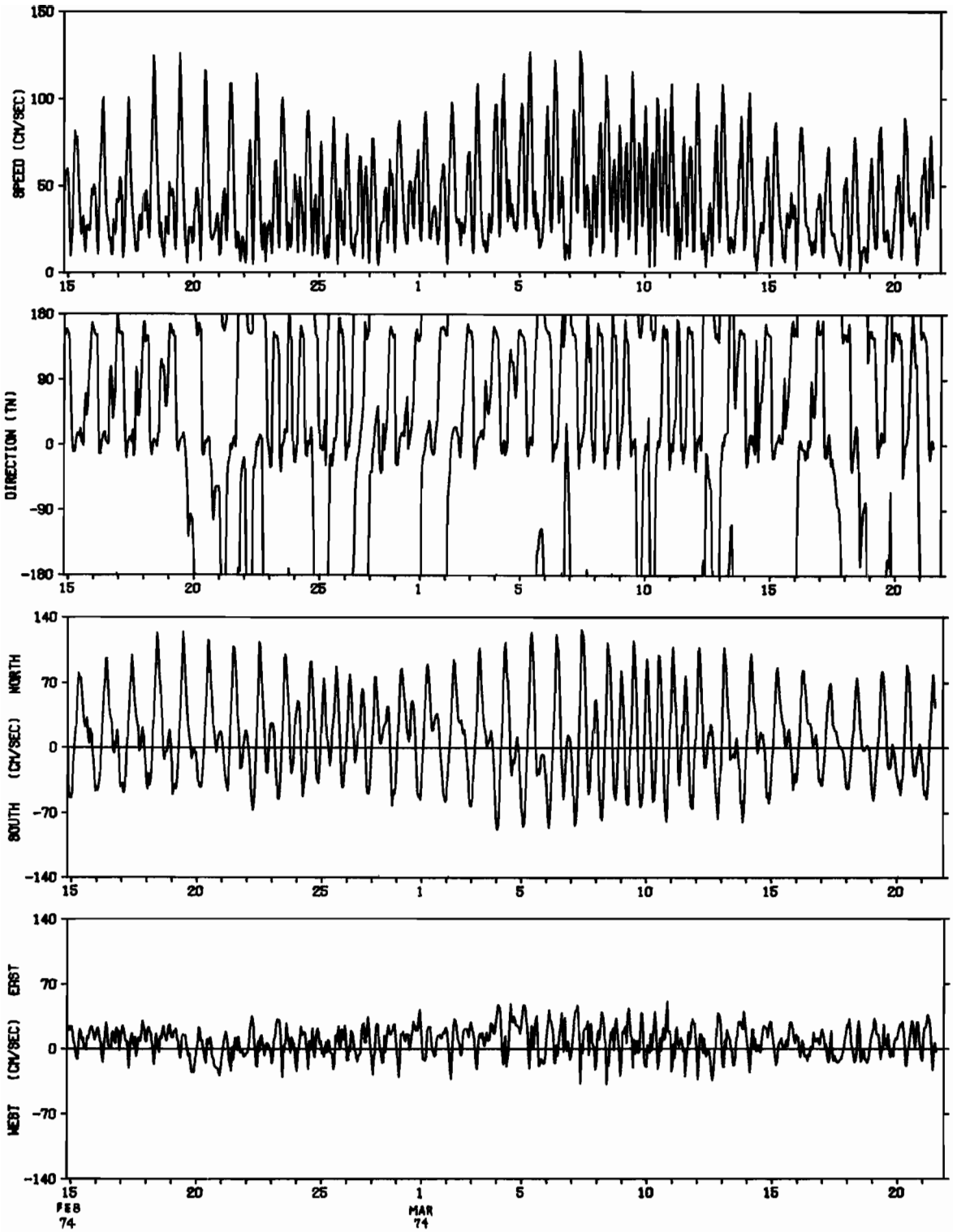


Figure 41.1A. Current Meter Station 20A (-5m): Time Series

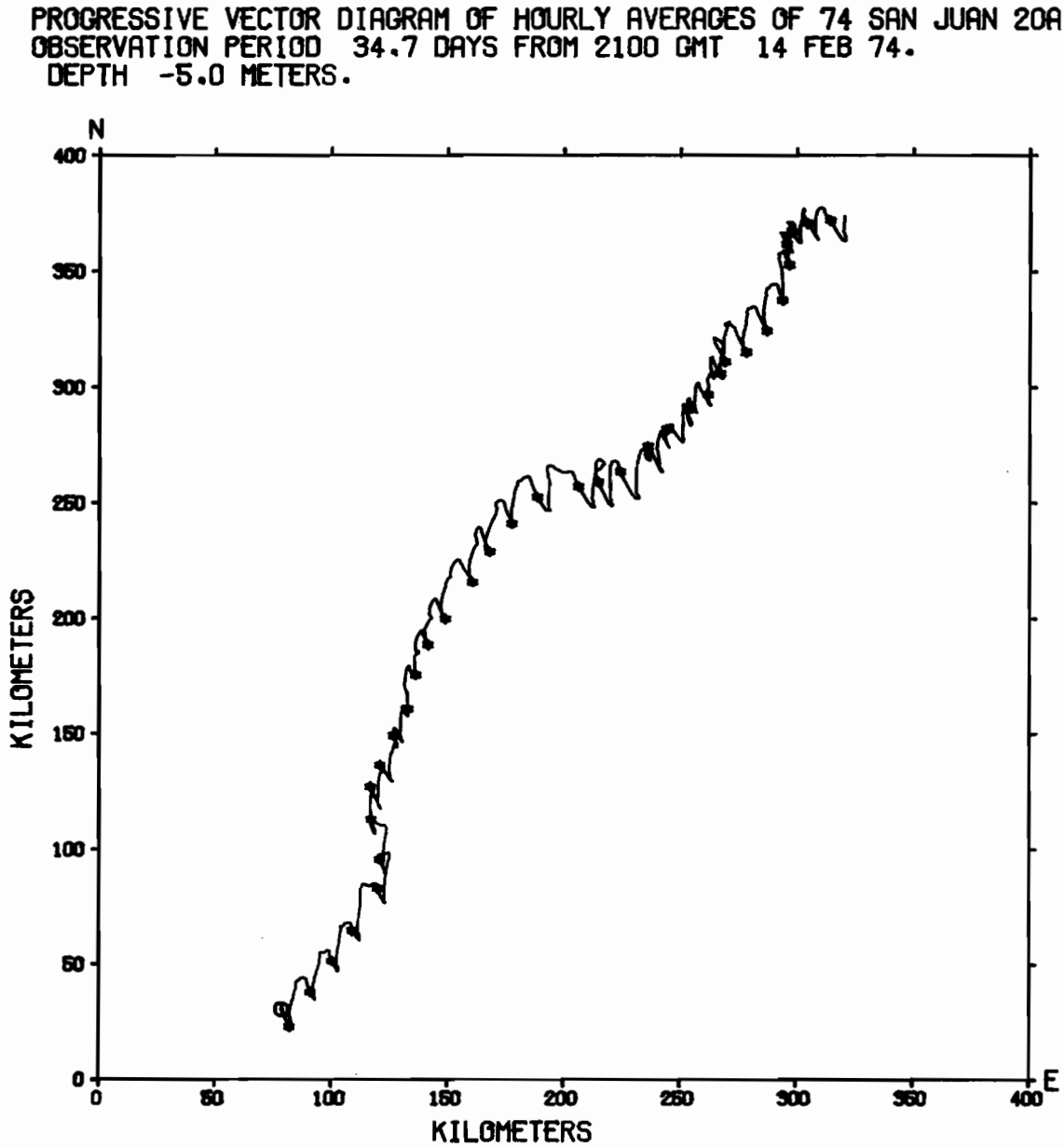


Figure 41.2A. Current Meter Station 20A (-5m):
Progressive Vector Diagram (PVD)

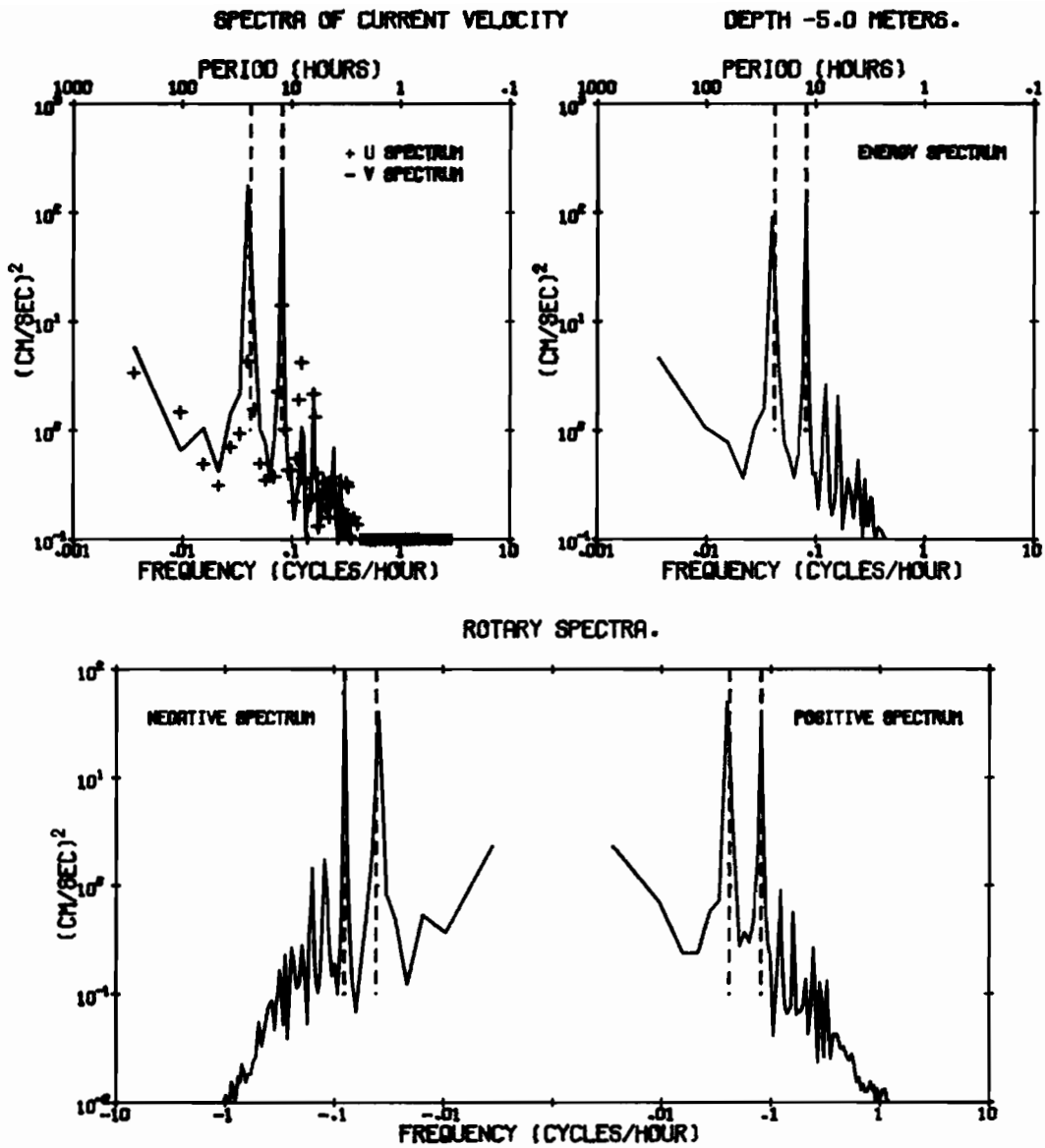
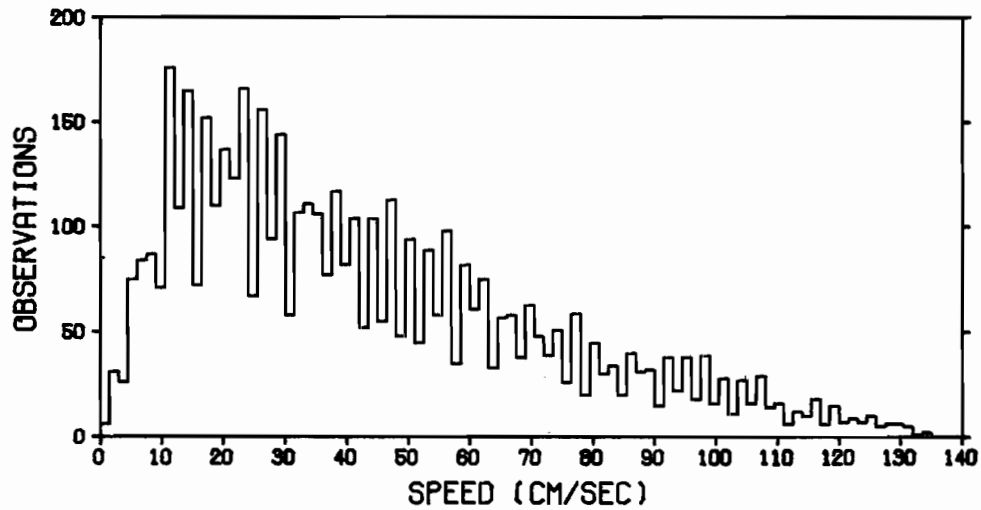


Figure 41.3A. Current Meter Station 20A (-5m): Spectra

STATISTICS OF 74 SAN JUAN 20B LAT 48 40.40N LONG 122 42.30W
DEPTH -5.0 METERS NUMBER OF OBSERVATIONS = 5000
OBSERVATION PERIOD 34.7 DAYS FROM 2010 GMT 6 MAR 74

	MEAN (CM/SEC)	VARIANCE (CM/SEC)2	ST-DEV (CM/SEC)	SKEW	KURT	MAX (CM/SEC)	MIN (CM/SEC)
S	43.90	847.31	29.11	.816	2.94	140.00	0.00
U	6.48	359.78	18.97	-.157	2.95	83.96	-58.45
V	9.29	2286.83	47.82	.362	2.60	138.96	-101.48

S = SPEED
U = EAST-WEST COMPONENT OF VELOCITY, EAST = POSITIVE U
V = NORTH-SOUTH COMPONENT OF VELOCITY, NORTH = POSITIVE V



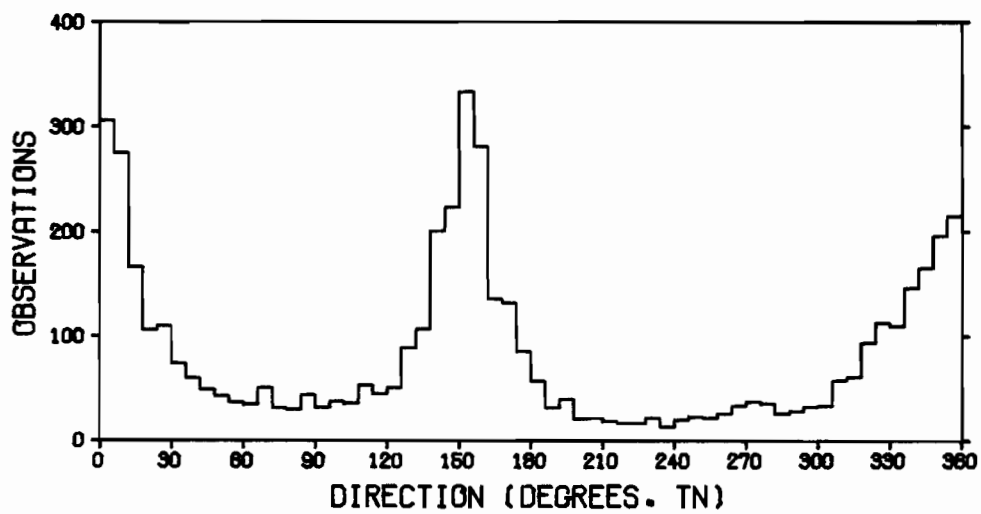


Figure 41.0B. Current Meter Station 20B (-5m): Standard Statistics and Histograms

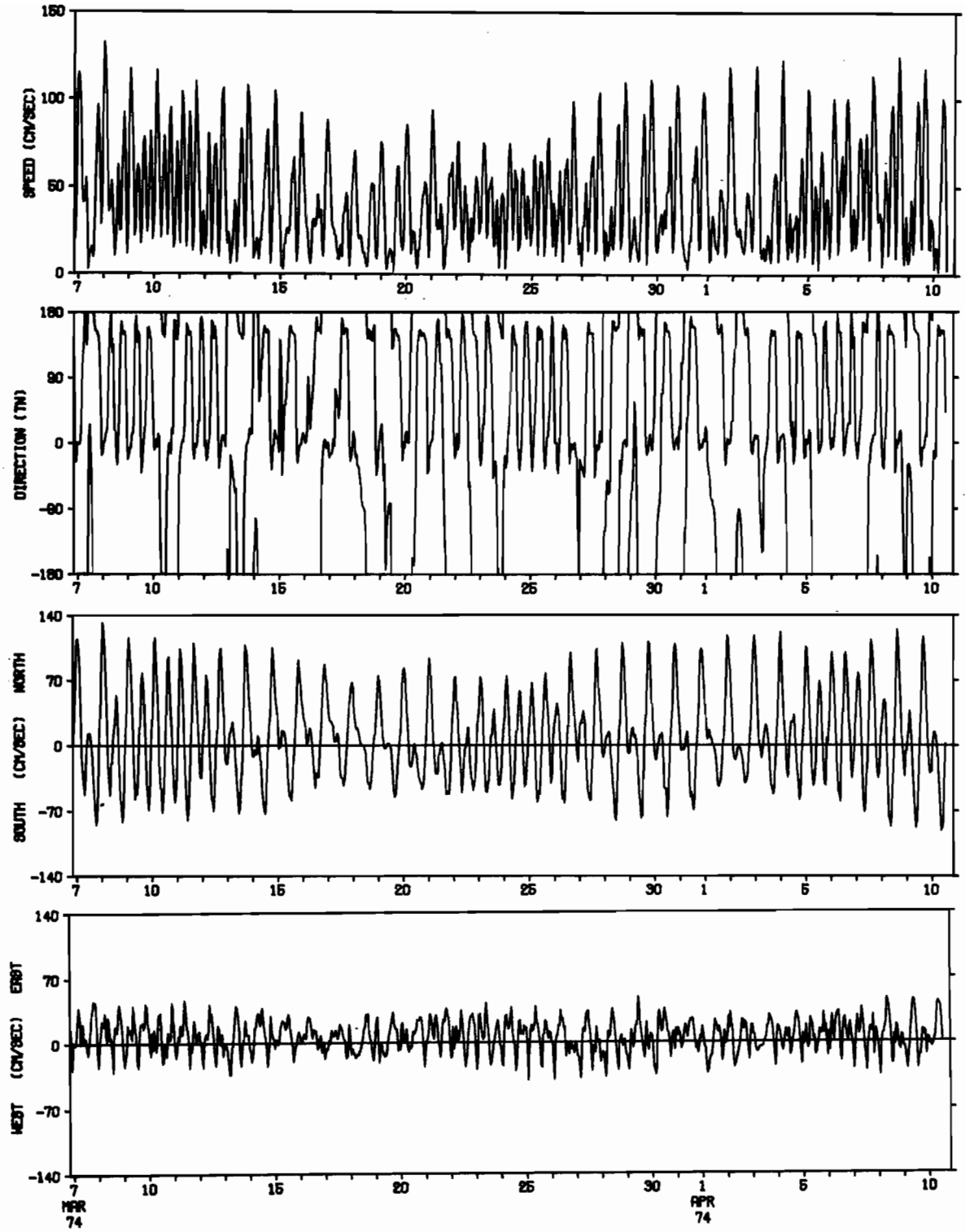


Figure 41.1B. Current Meter Station 20B (-5m): Time Series

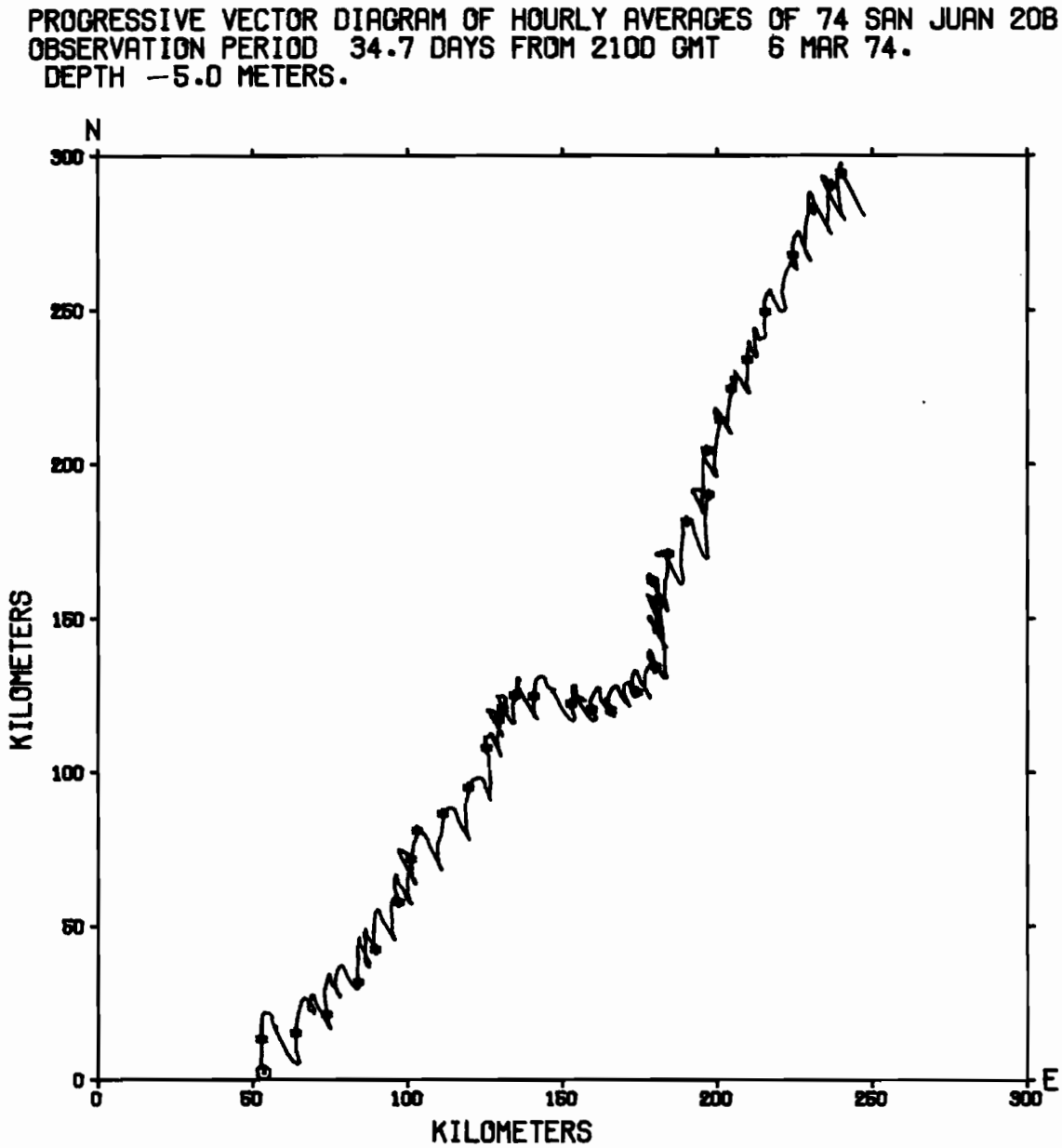


Figure 41.2B. Current Meter Station 20B (-5m):
Progressive Vector Diagram (PVD)

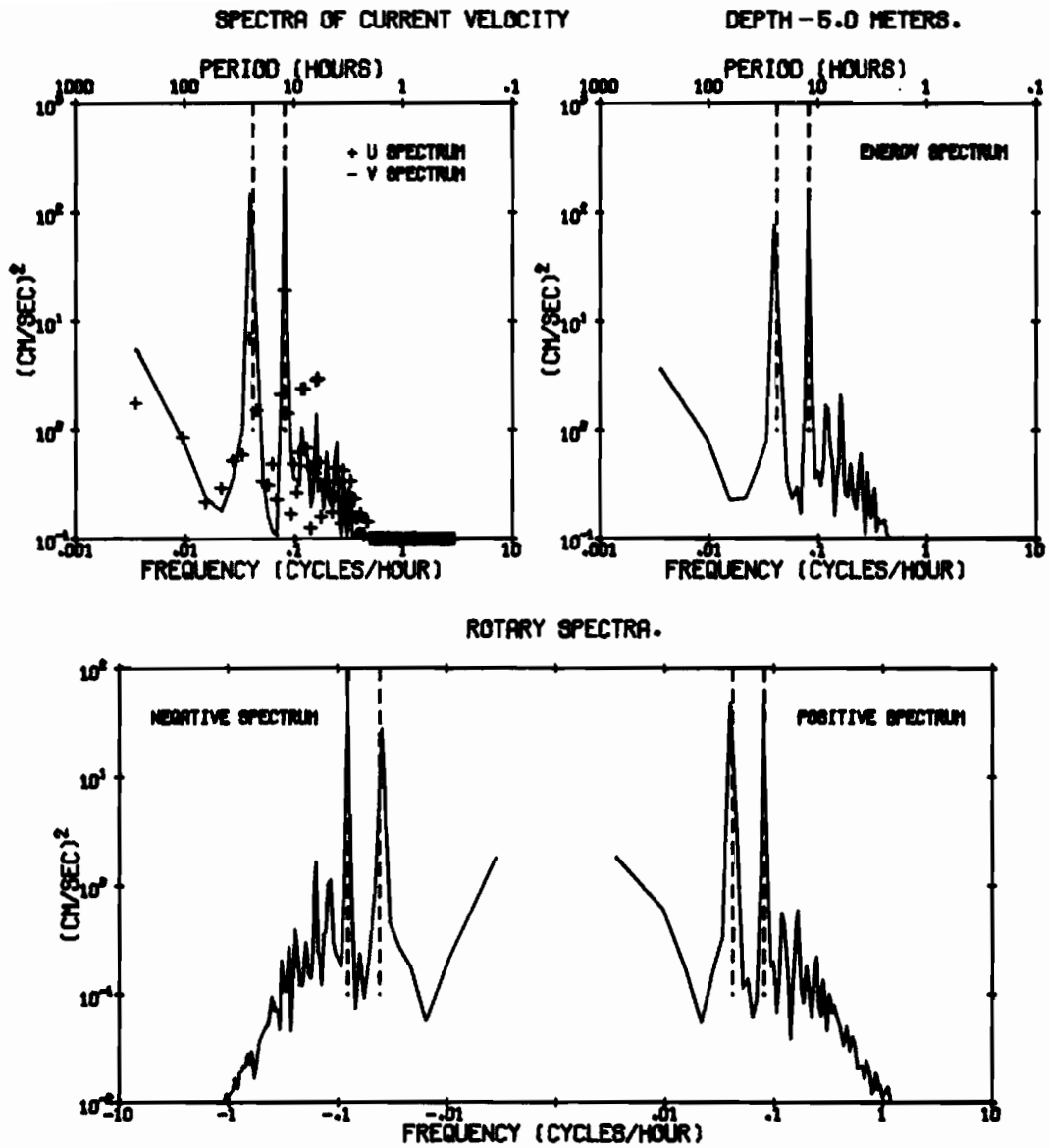


Figure 41.3B. Current Meter Station 20B (-5m): Spectra

STATISTICS OF 74 SAN JUAN 21 LAT 48 40.87N LONG 122 45.00W
DEPTH-23.0 METERS NUMBER OF OBSERVATIONS = 2288
OBSERVATION PERIOD 15.9 DAYS FROM 2142 GMT 3 MAR 74

	MEAN (CM/SEC)	VARIANCE (CM/SEC)2	ST-DEV (CM/SEC)	SKEW	KURT	MAX (CM/SEC)	MIN (CM/SEC)
S	29.60	437.76	20.92	1.073	3.68	117.00	0.00
U	6.83	384.74	19.61	.265	3.65	89.31	-52.63
V	.68	882.20	29.70	.190	3.09	92.83	-82.26

S = SPEED
U = EAST-WEST COMPONENT OF VELOCITY, EAST = POSITIVE U
V = NORTH-SOUTH COMPONENT OF VELOCITY, NORTH = POSITIVE V

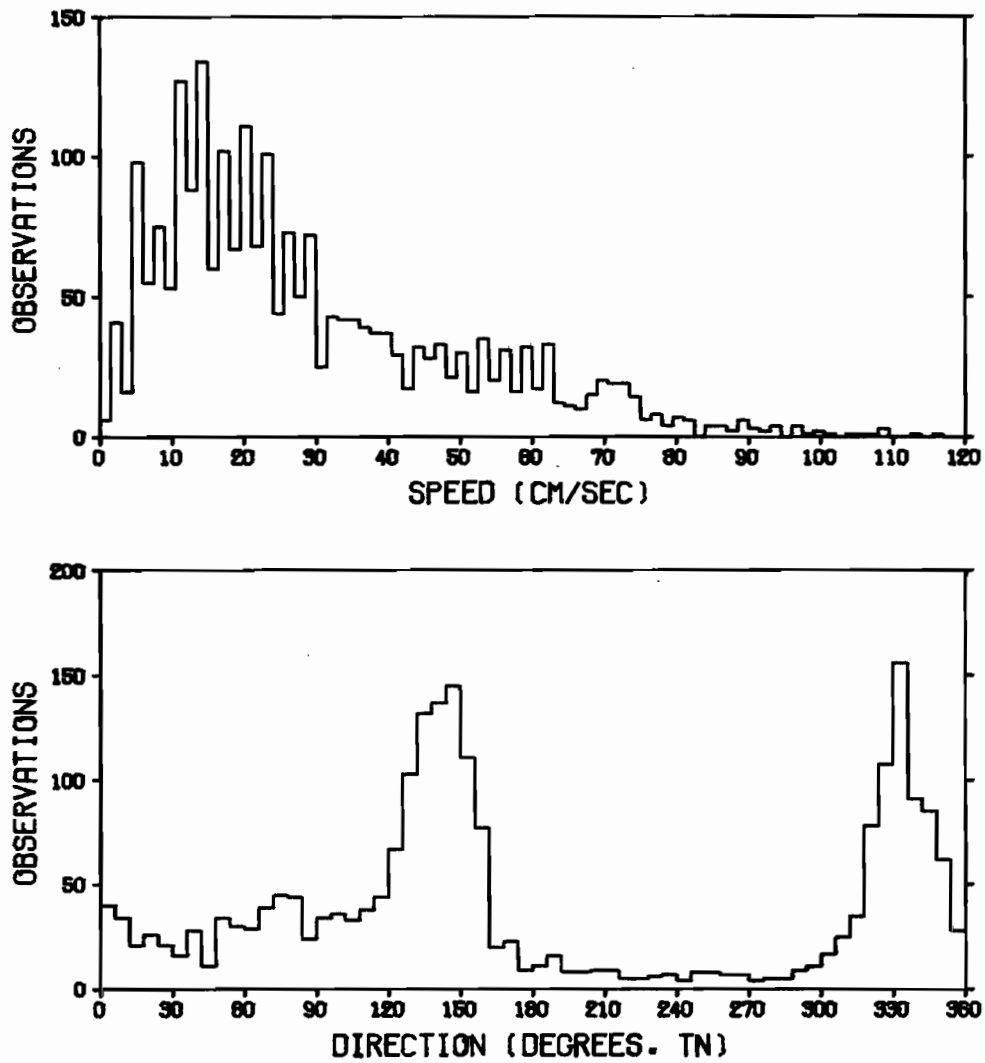


Figure 42.0. Current Meter Station 21 (-23m): Standard Statistics and Histograms

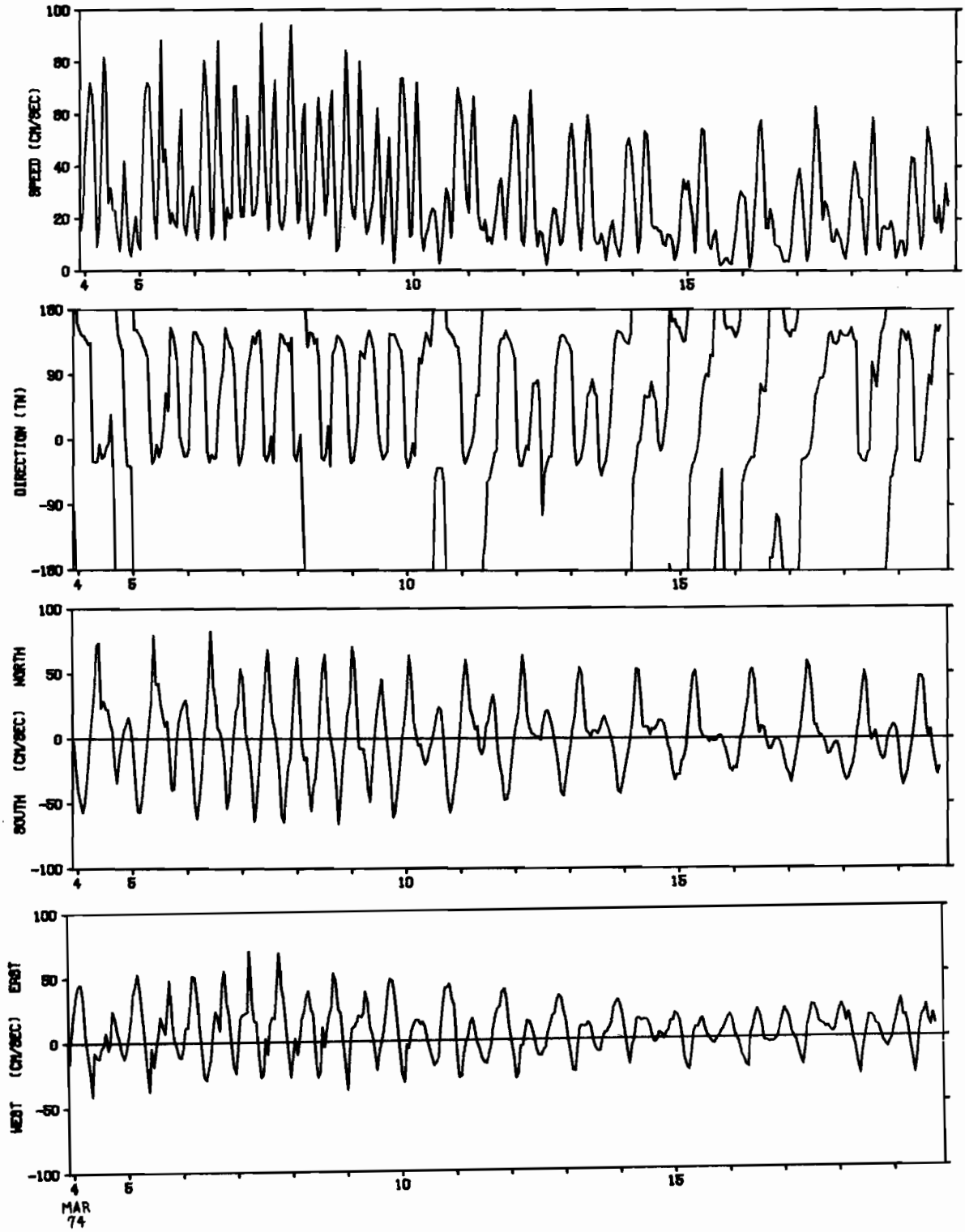


Figure 42.1. Current Meter Station 21 (-23m): Time Series

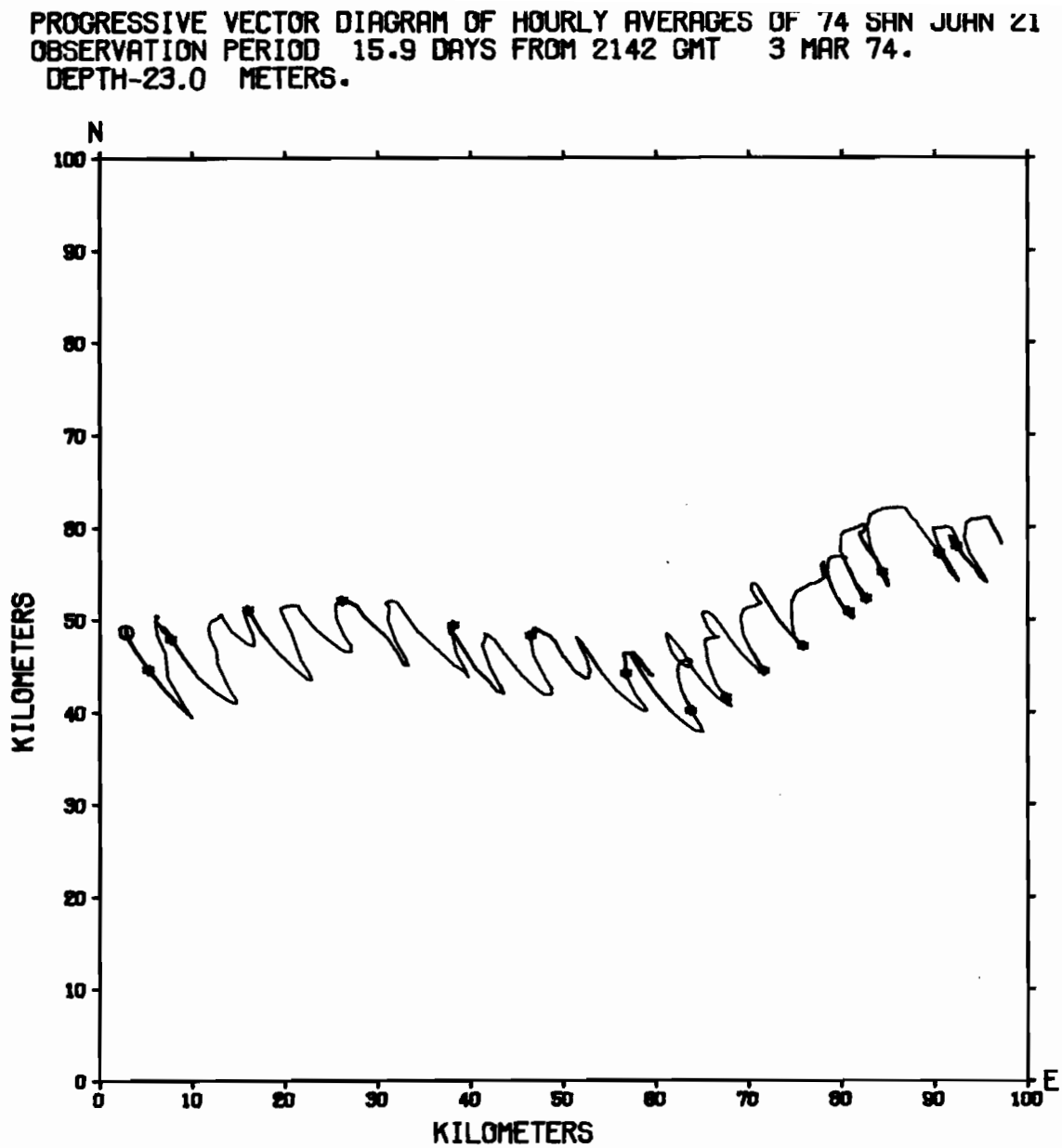


Figure 42.2. Current Meter Station 21 (-23m):
Standard Progressive Vector Diagram (PVD)

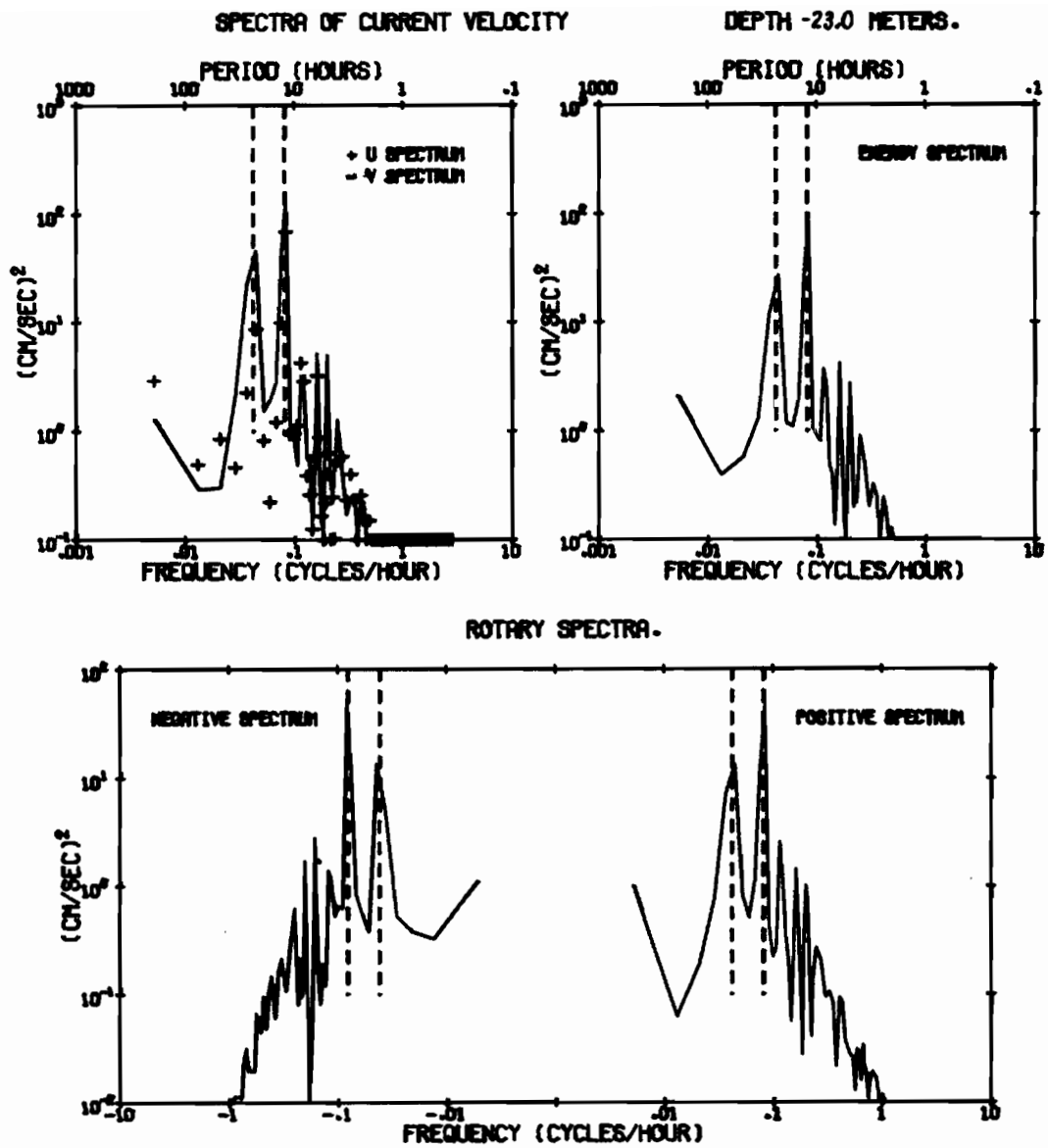


Figure 42.3. Current Meter Station 21 (-23m): Spectra

STATISTICS OF 74 SAN JUAN 21 LAT 48 40.87N LONG 122 45.00W
DEPTH +16.0 METERS NUMBER OF OBSERVATIONS = 2288
OBSERVATION PERIOD 15.9 DAYS FROM 2144 GMT 3 MAR 74

	MEAN (CM/SEC)	VARIANCE (CM/SEC)2	ST-DEV (CM/SEC)	SKEW	KURT	MAX (CM/SEC)	MIN (CM/SEC)
S	25.27	338.89	18.41	1.073	3.87	110.00	0.00
U	5.12	262.73	16.21	.106	3.73	84.30	-42.19
V	-1.92	684.74	26.17	.276	3.33	92.01	-86.71

S = SPEED
U = EAST-WEST COMPONENT OF VELOCITY, EAST = POSITIVE U
V = NORTH-SOUTH COMPONENT OF VELOCITY, NORTH = POSITIVE V

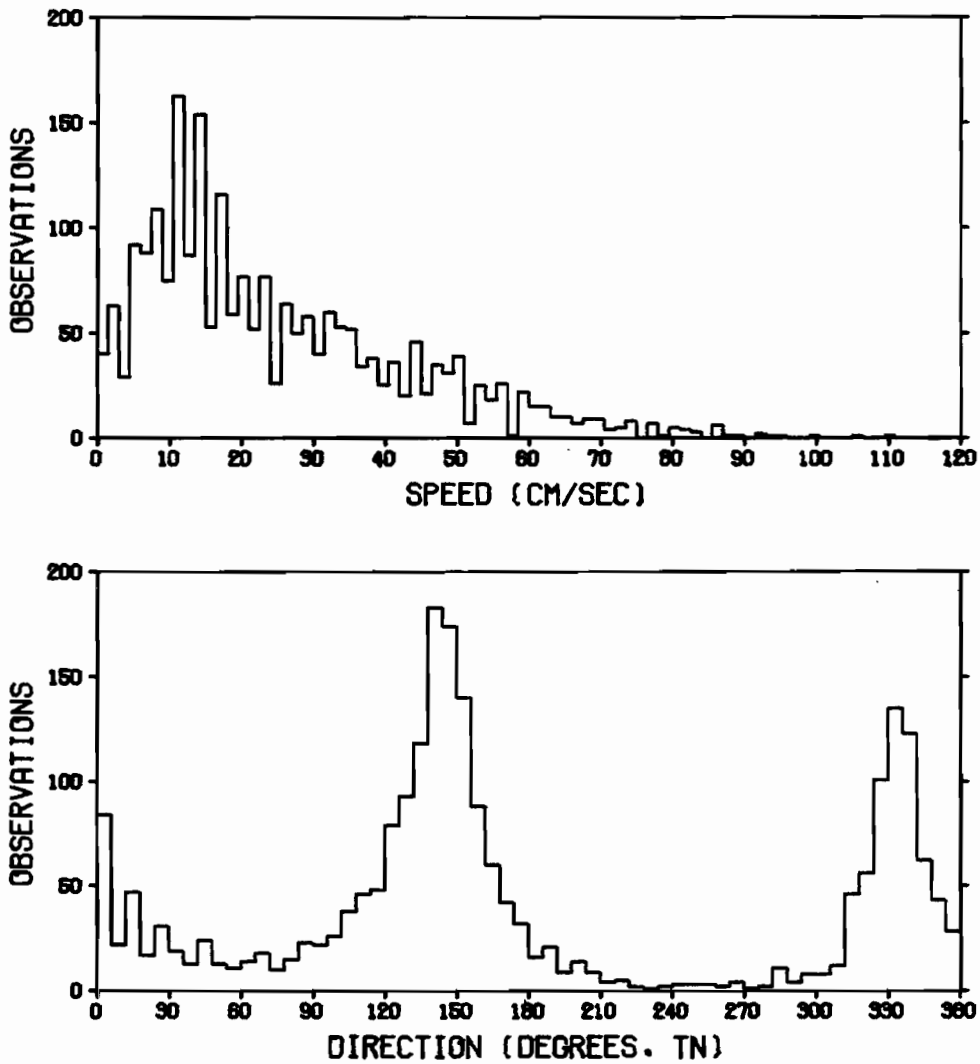


Figure 43.0. Current Meter Station 21 (+16m): Standard Statistics and Histograms

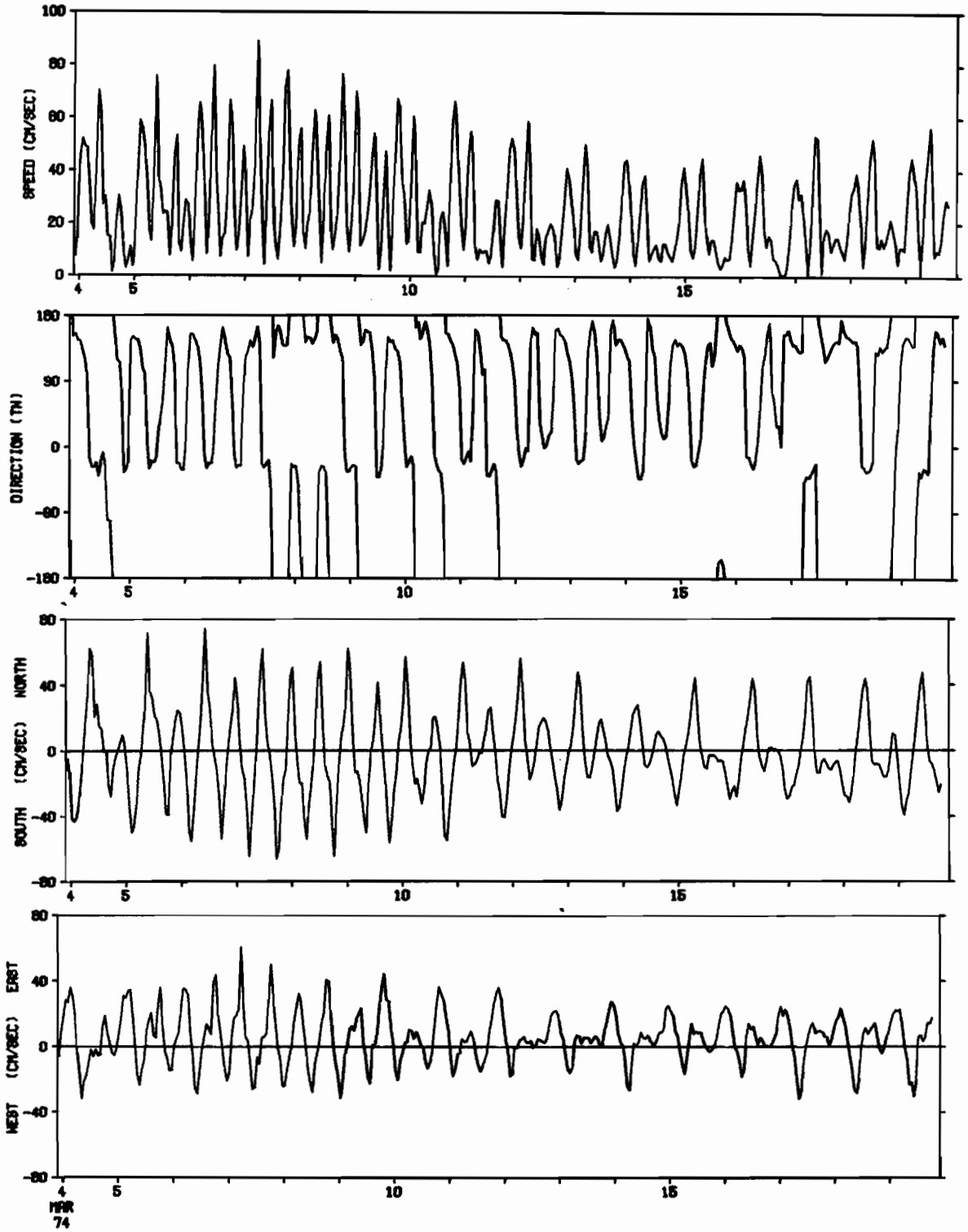


Figure 43.1. Current Meter Station 21 (+16m): Time Series

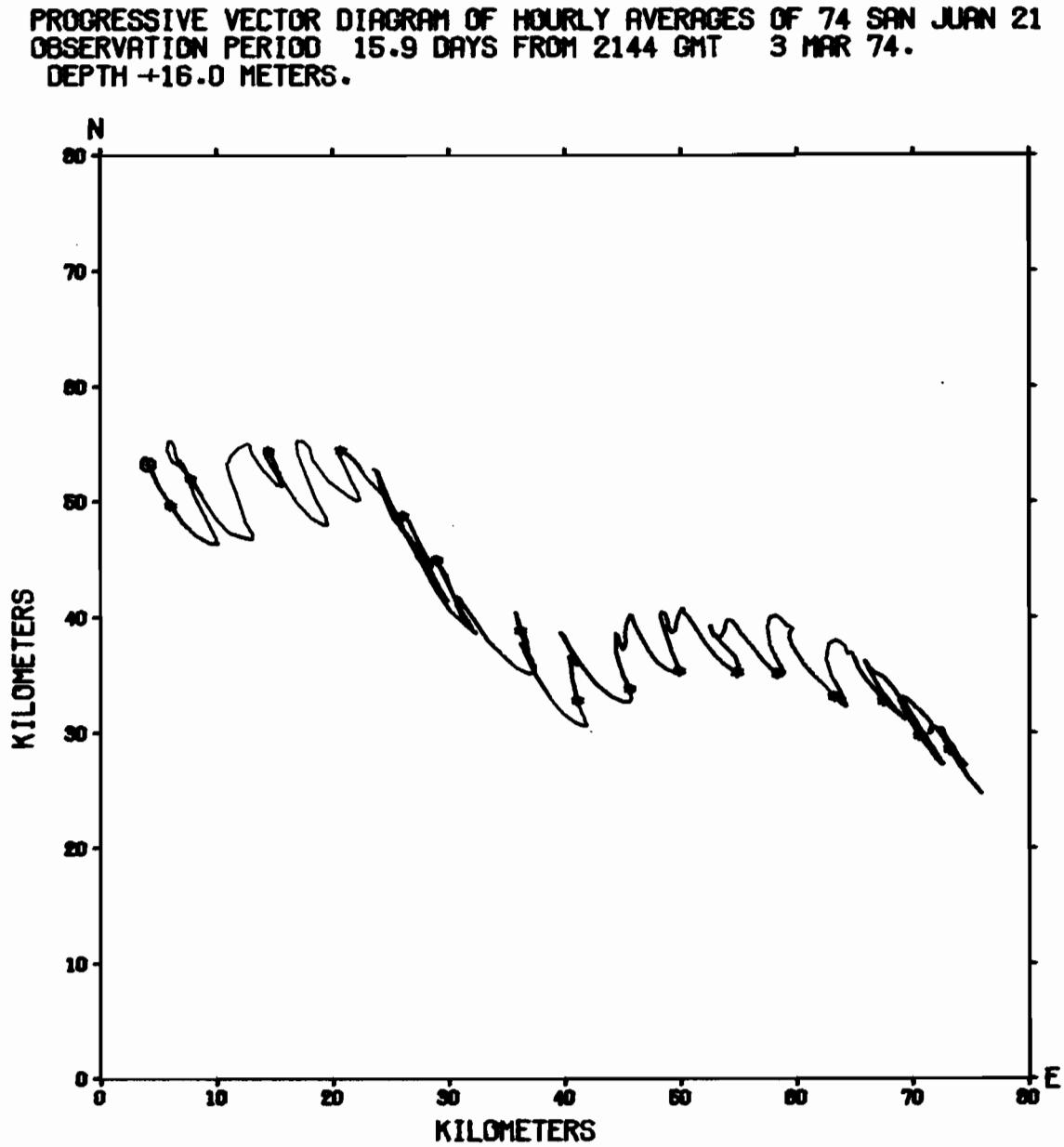


Figure 43.2. Current Meter Station 21 (+16m):
Progressive Vector Diagram (PVD)

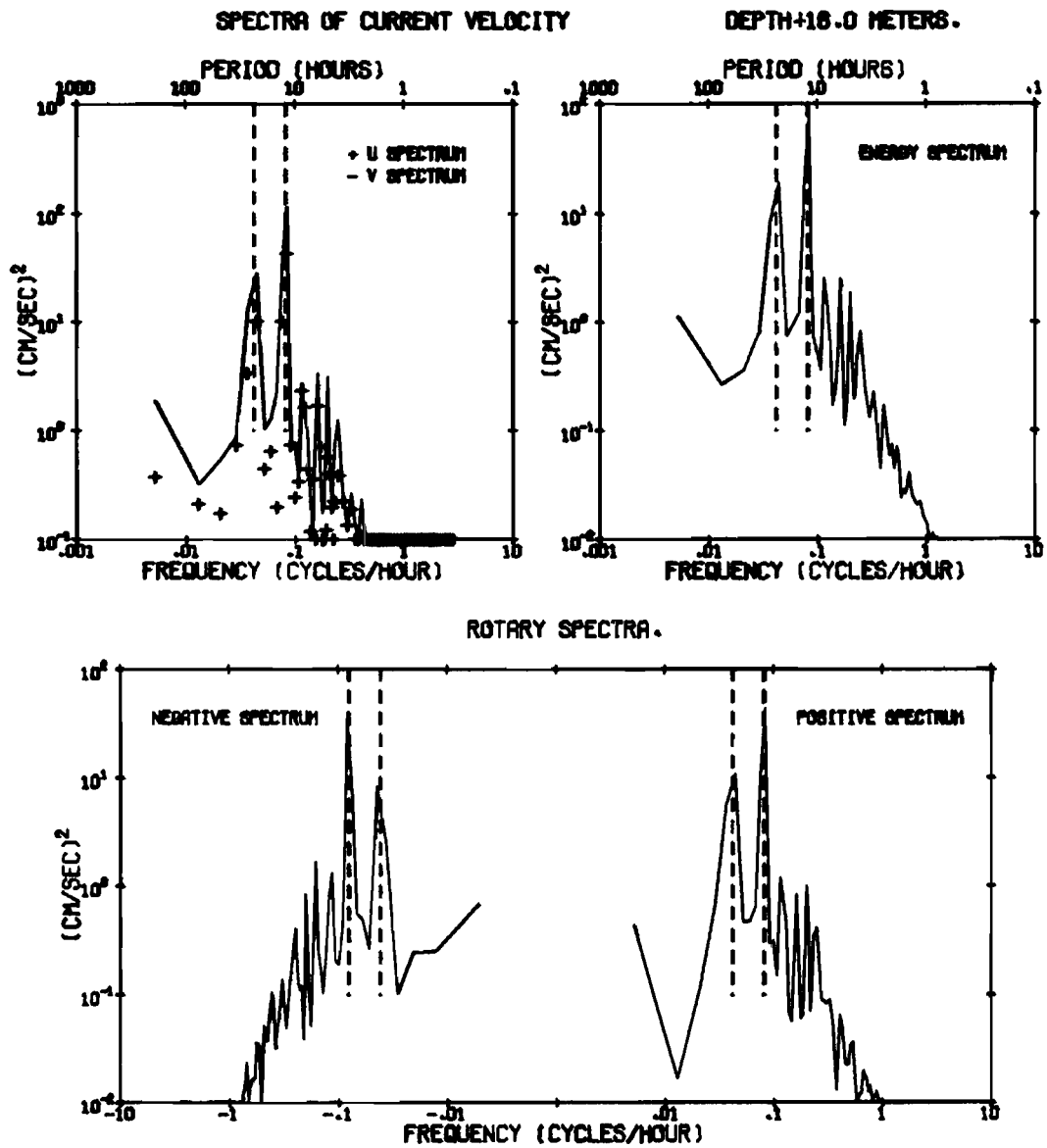


Figure 43.3. Current Meter Station 21 (+16m): Spectra

STATISTICS OF 74 SAN JUAN 23 LAT 48 31.43N LONG 122 37.89W
DEPTH -5.0 METERS NUMBER OF OBSERVATIONS = 2150
OBSERVATION PERIOD 14.9 DAYS FROM 1730 GMT 3 MAR 74

	MEAN (CM/SEC)	VARIANCE (CM/SEC)2	ST-DEV (CM/SEC)	SKEW	KURT	MAX (CM/SEC)	MIN (CM/SEC)
S	94.56	3172.60	56.33	.127	1.92	220.00	0.00
U	-18.00	10829.68	104.07	.224	1.99	201.23	-210.33
V	-13.24	784.97	28.02	-.401	3.70	85.61	-132.41

S = SPEED
U = EAST-WEST COMPONENT OF VELOCITY, EAST = POSITIVE U
V = NORTH-SOUTH COMPONENT OF VELOCITY, NORTH = POSITIVE V

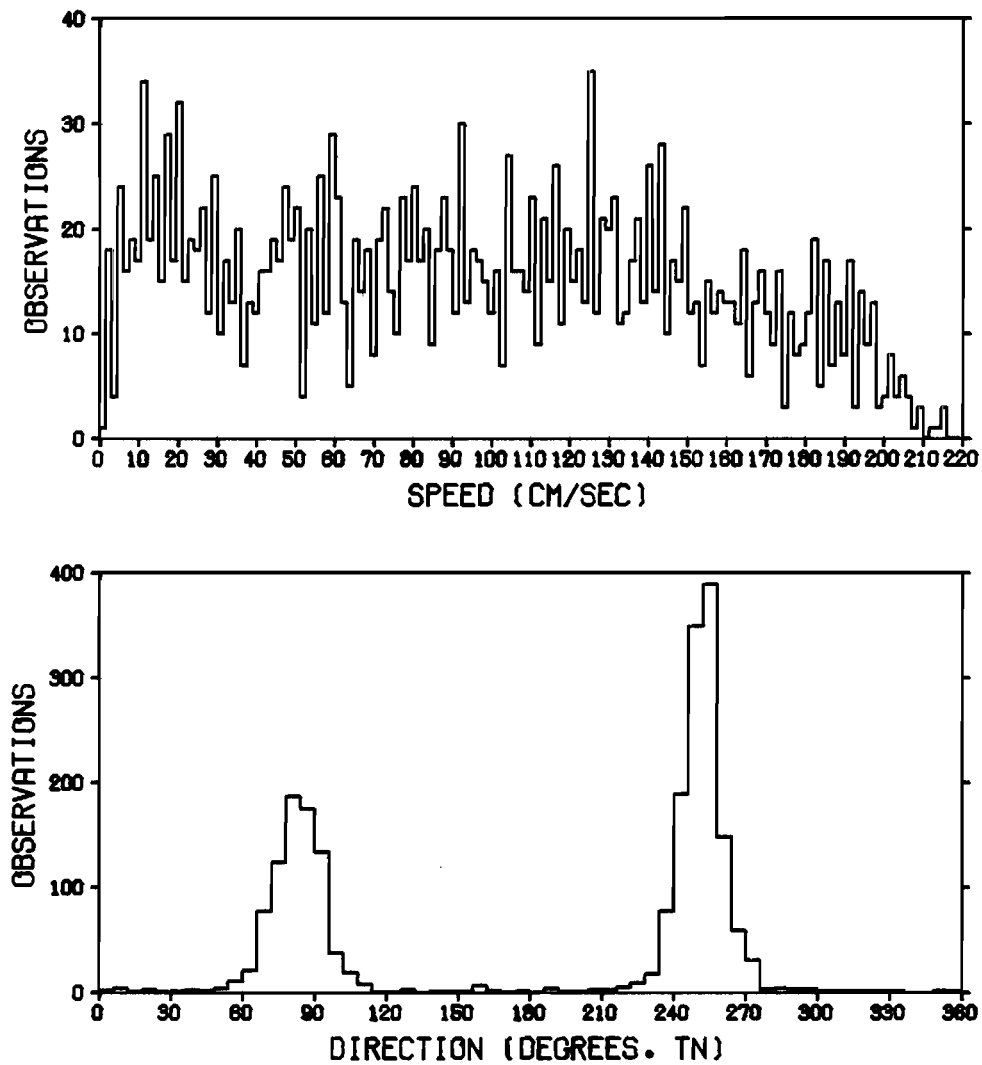


Figure 44.0. Current Meter Station 23 (-5m):
Standard Statistics and Histograms

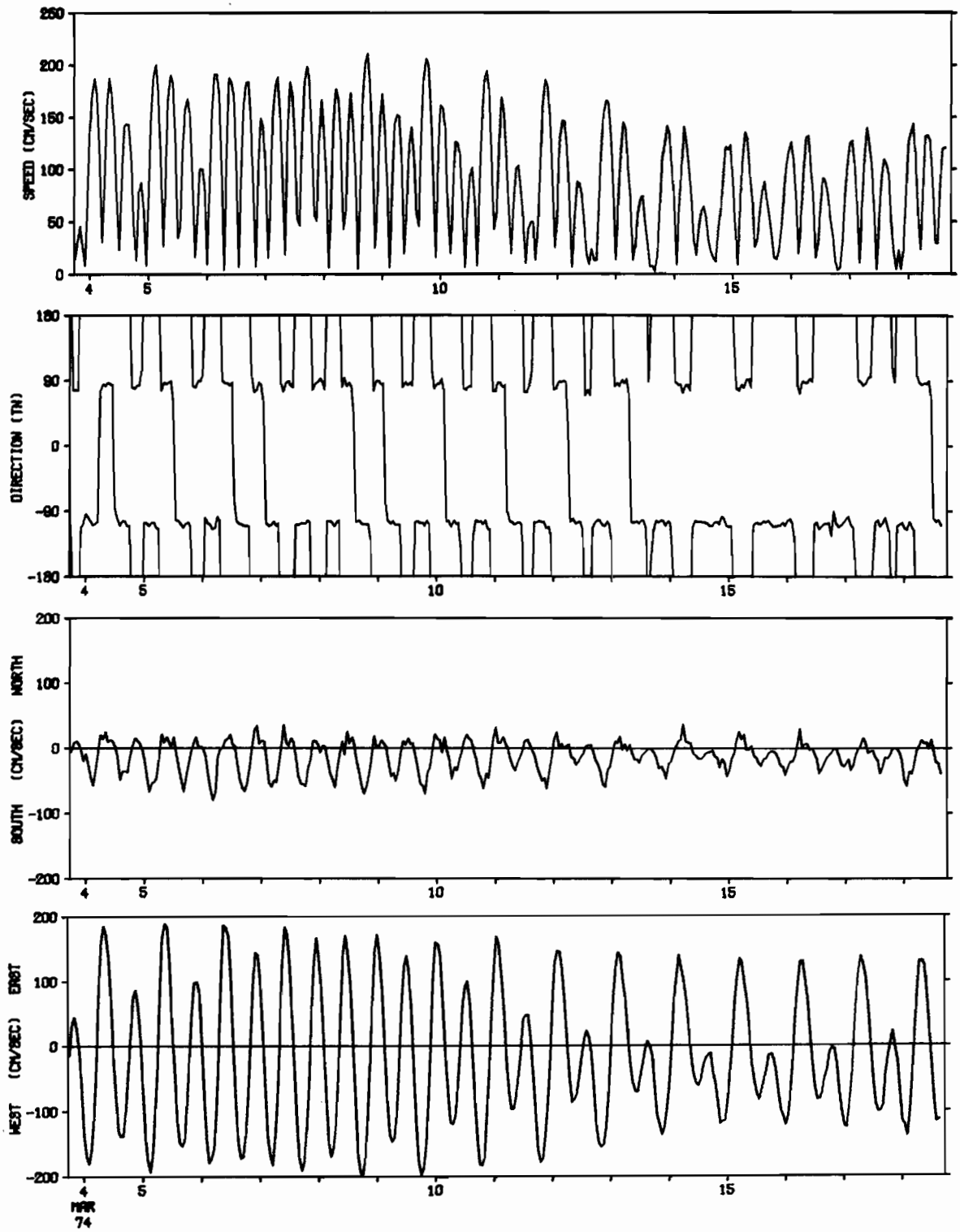


Figure 44.1. Current Meter Station 23 (-5m): Time Series

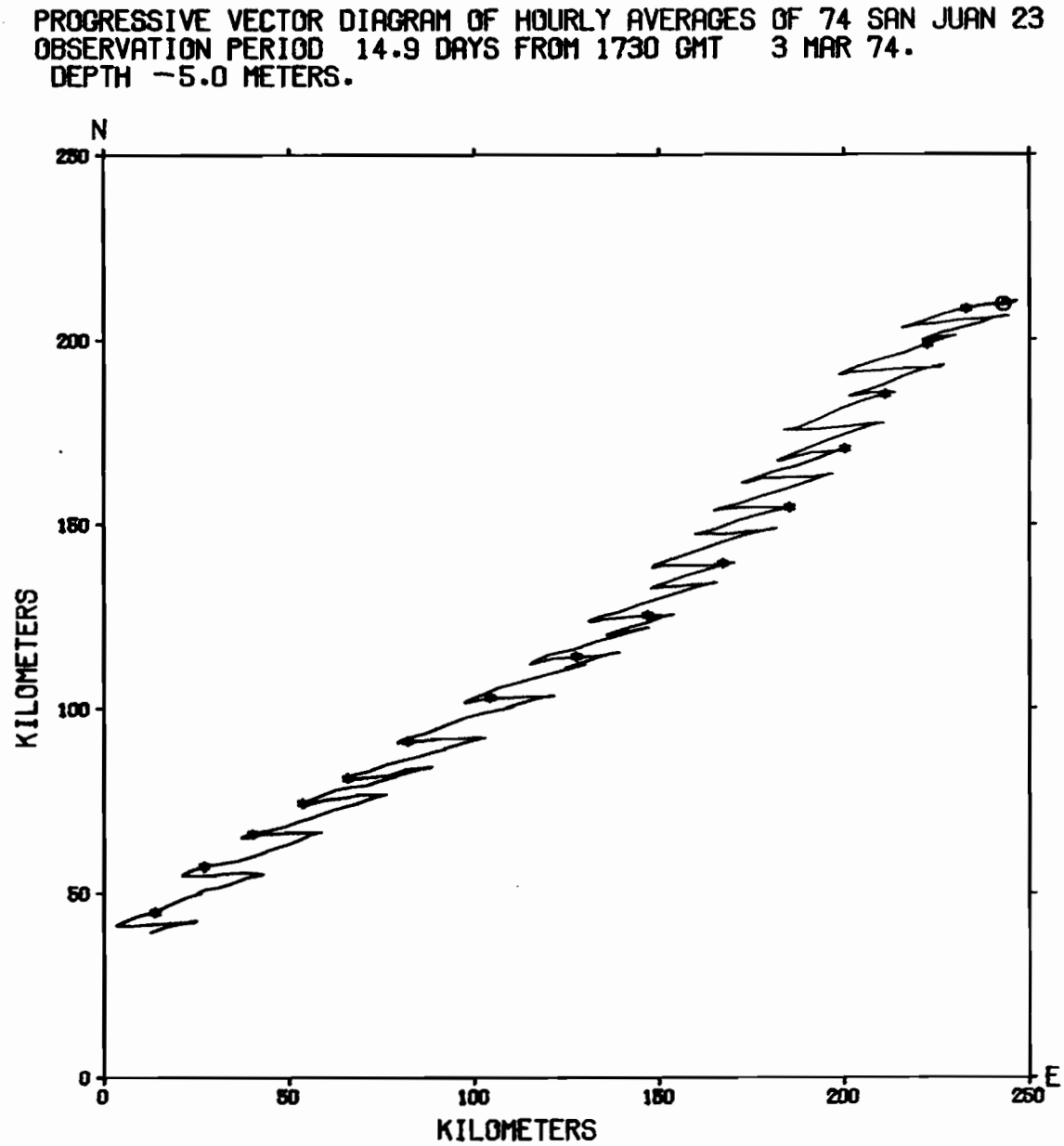


Figure 44.2. Current Meter Station 23 (-5m): Progressive Vector Diagram (PVD)

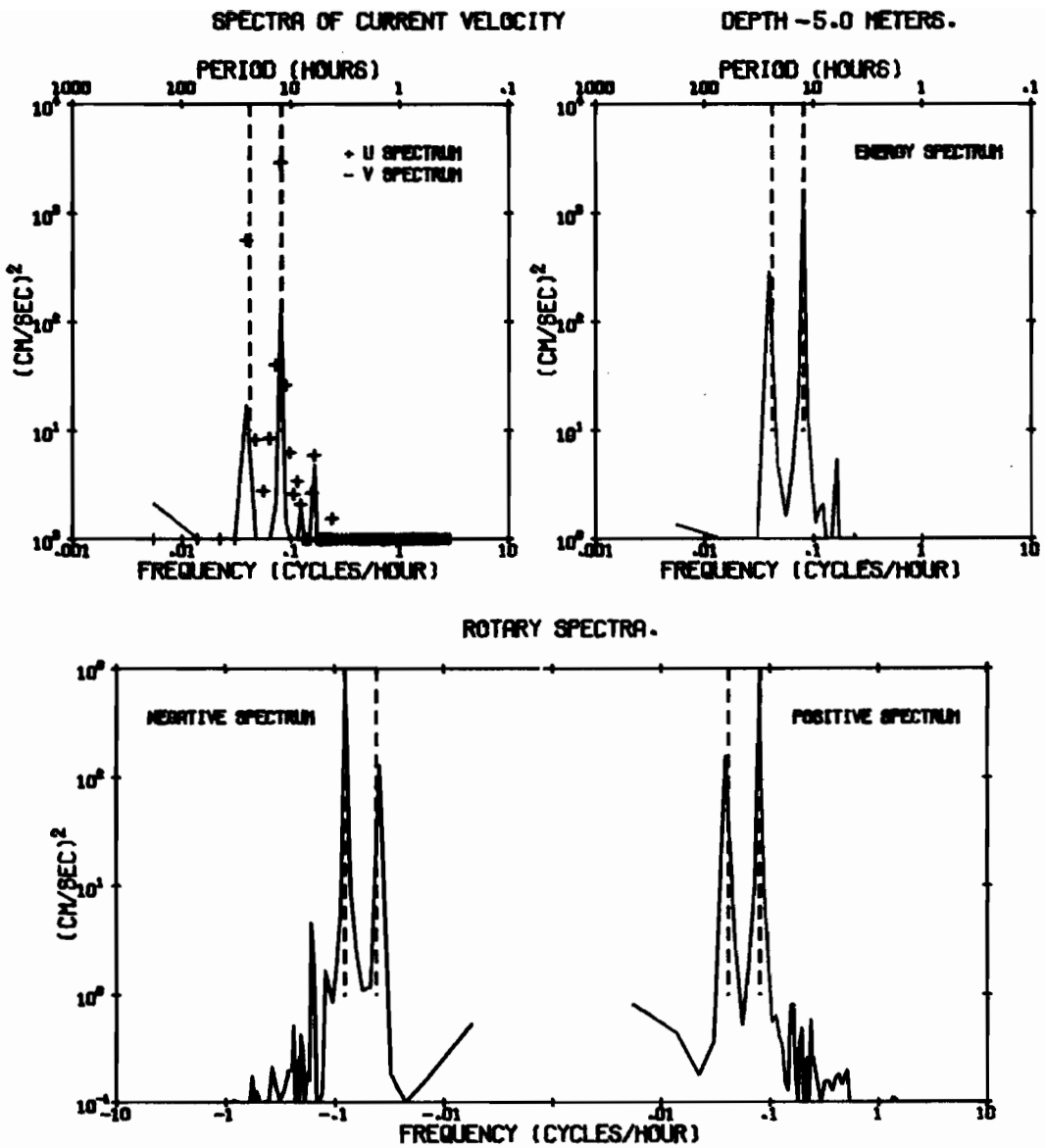


Figure 44.3. Current Meter Station 23 (-5m): Spectra

STATISTICS OF 74 SAN JUAN 23 LAT 48 31.43N LONG 122 37.89W
DEPTH +16.0 METERS NUMBER OF OBSERVATIONS = 2163
OBSERVATION PERIOD 15.0 DAYS FROM 1730 GMT 3 MAR 74

	MEAN (CM/SEC)	VARIANCE (CM/SEC)2	ST-DEV (CM/SEC)	SKEW	KURT	MAX (CM/SEC)	MIN (CM/SEC)
S	79.33	2153.39	46.40	.153	1.98	182.00	0.00
U	-14.56	7512.75	86.68	.212	1.98	165.09	-178.97
V	-3.88	707.06	26.59	.175	2.72	75.61	-87.39

S = SPEED
U = EAST-WEST COMPONENT OF VELOCITY, EAST = POSITIVE U
V = NORTH-SOUTH COMPONENT OF VELOCITY, NORTH = POSITIVE V

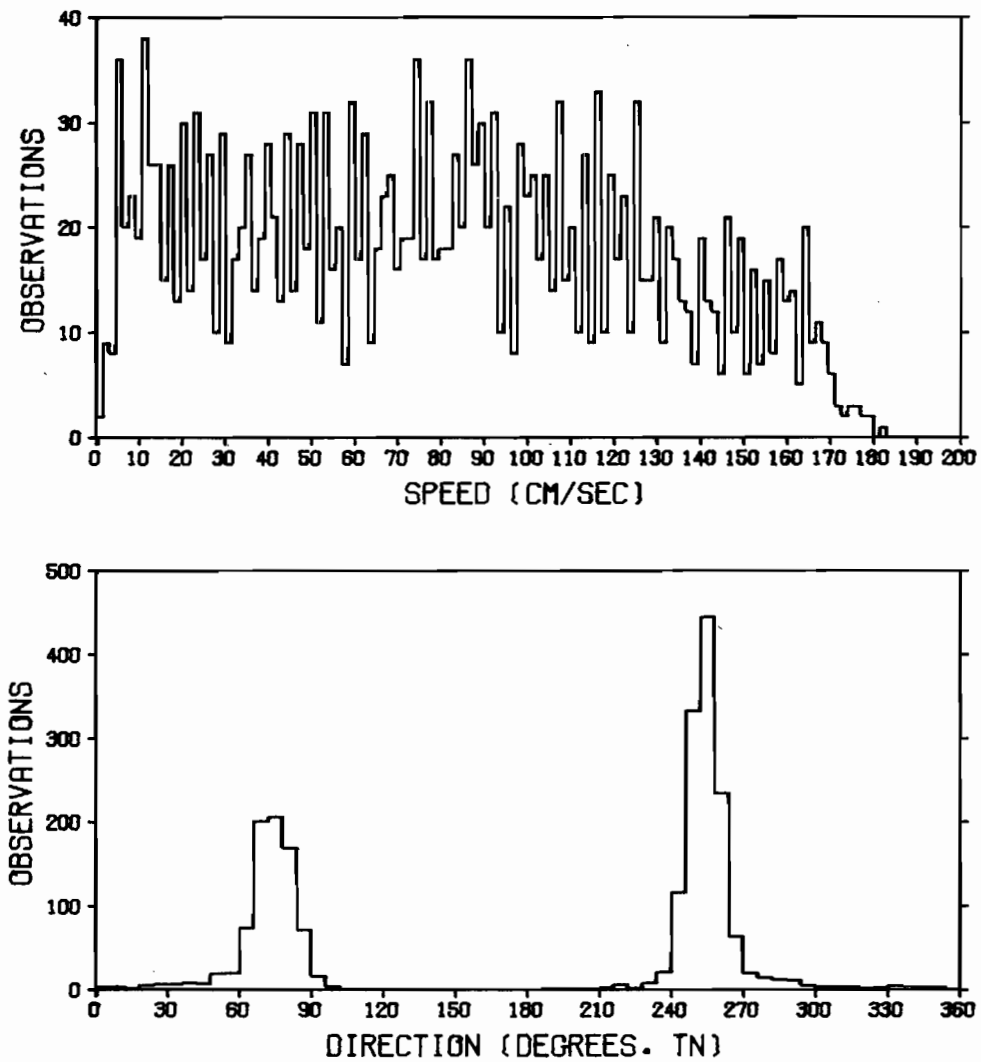


Figure 45.0. Current Meter Station 23 (+16m): Standard Statistics and Histograms

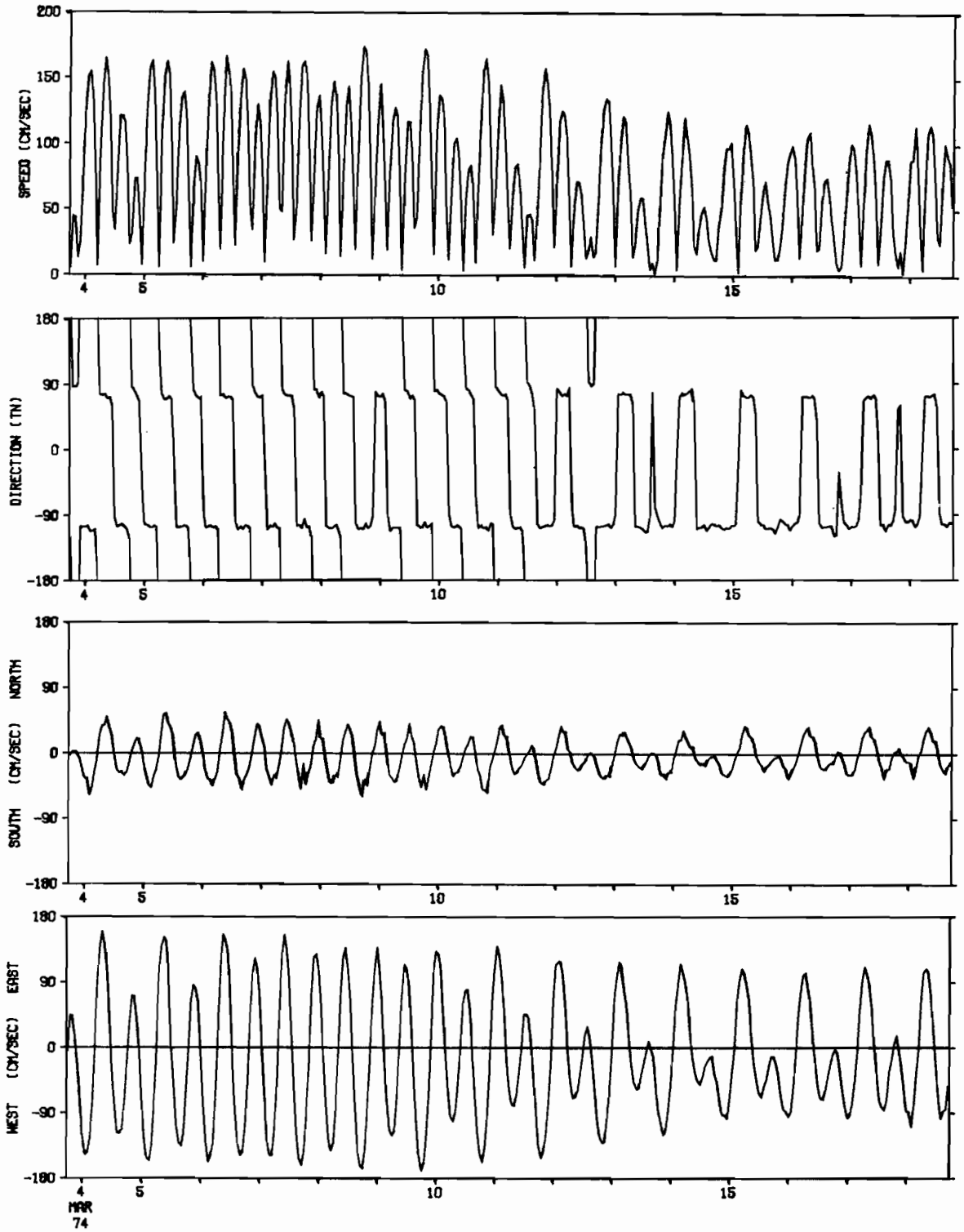


Figure 45.1. Current Meter Station 23 (+16m): Time Series

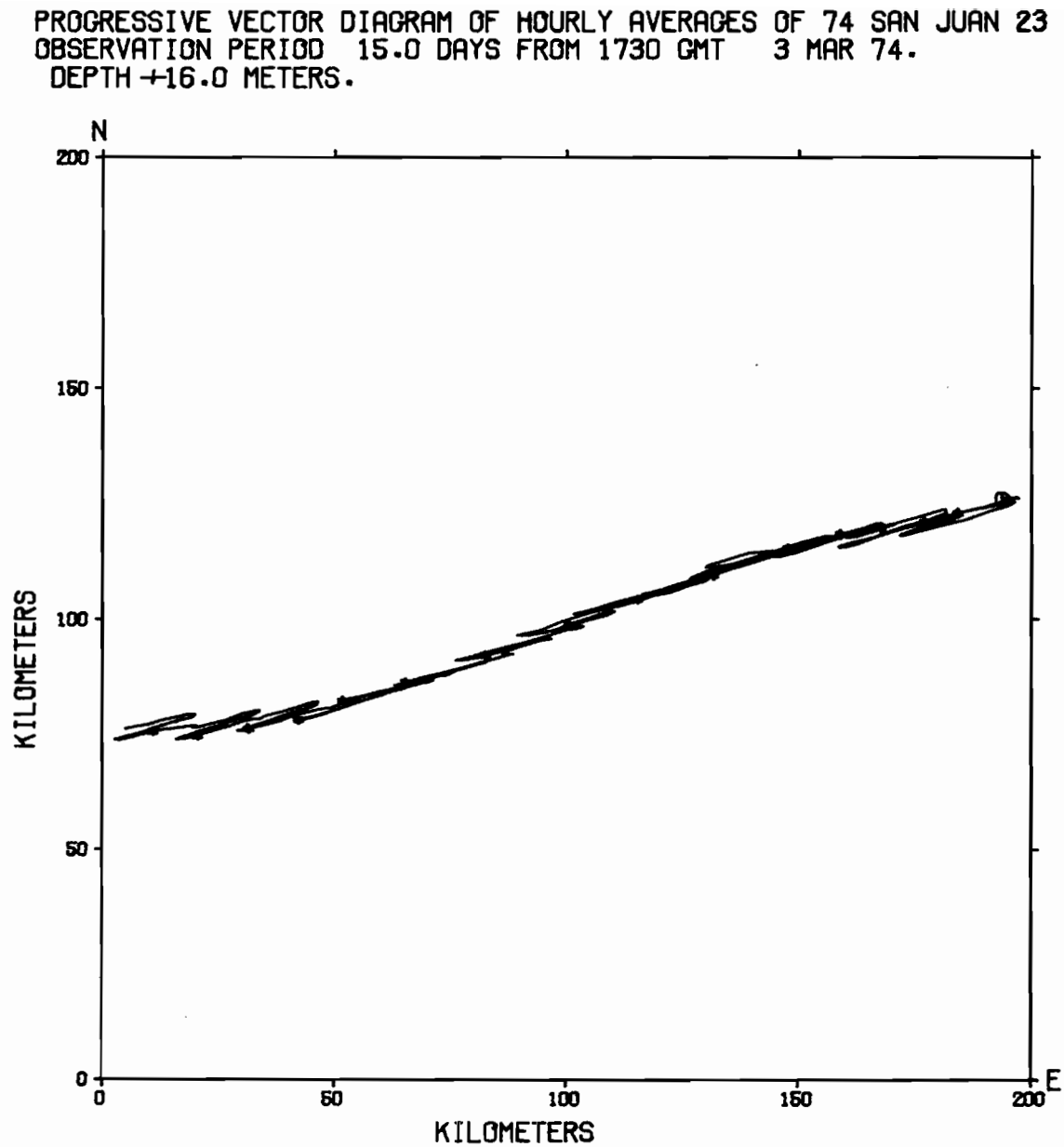


Figure 45.2. Current Meter Station 23 (+16m):
Progressive Vector Diagram (PVD)

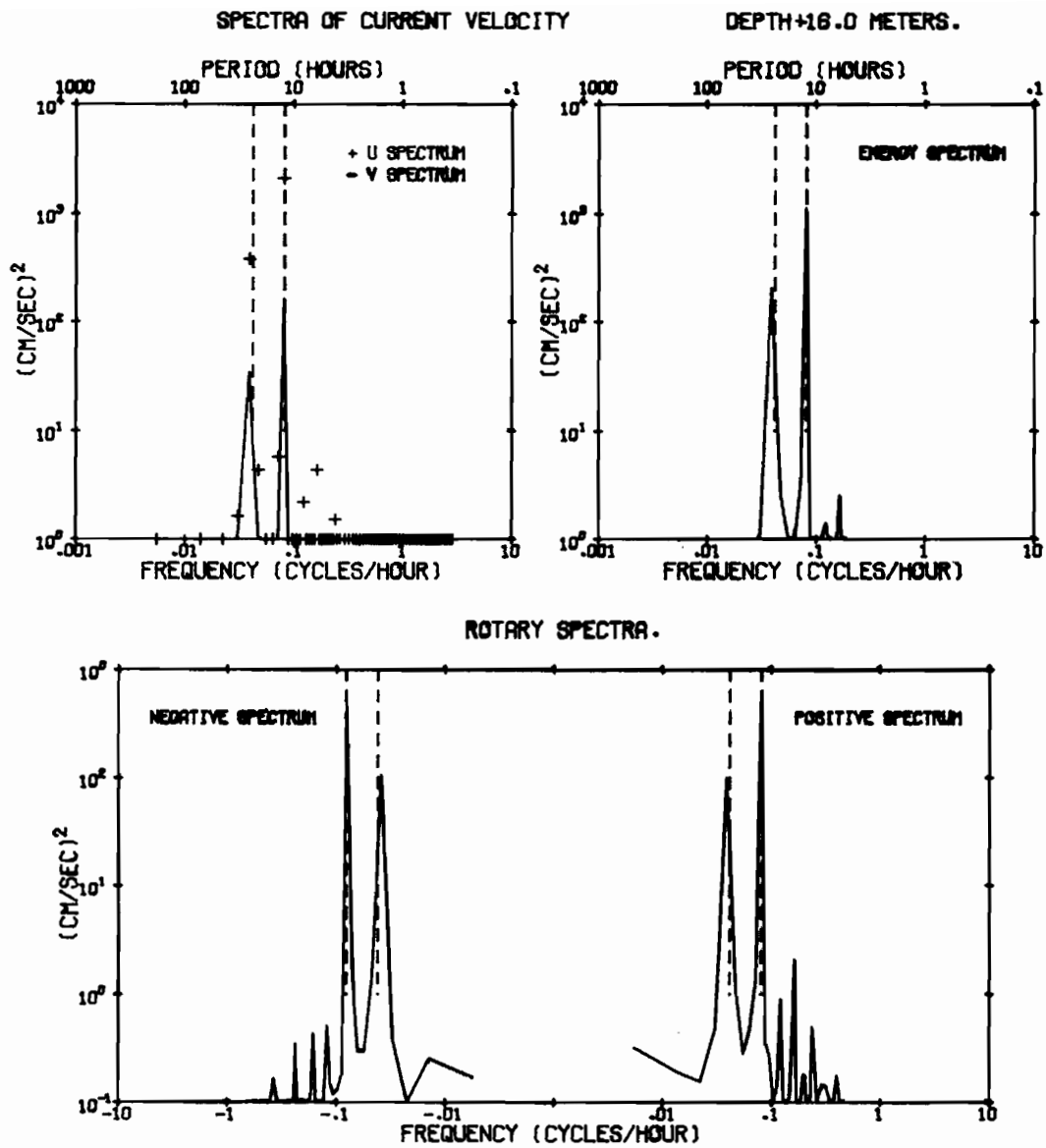


Figure 45.3. Current Meter Station 23 (+16m): Spectra

7. ACKNOWLEDGEMENTS

We thank Norman P. Laird and Dan Tracy for preparing and using the programs for computer reduction and plotting of the data. The continuous and enthusiastic support of Captain Austin Yeager and the officers and crew of the NOAA Ship McARTHUR is gratefully acknowledged. We also thank NOS for their tidal and current meter data.

8. REFERENCES

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