WHOI-93-01

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Woods Hole Oceanographic Institution

A Compilation of Moored Current Meter Data from SYNOP Arrays One and Two (September 1987 to July 1991)

Volume XLIV

by

Susan A. Tarbell, Scott E. Worrilow and Nelson G. Hogg

November 1992

Technical Report

Funding was provided by Office of Naval Research under Contract No. N00014-85-C-0001 and the National Science Foundation under Grant No. OCE86-08258.

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Approved for Distribution:

James Luyten, Chairman
Department of Physical Oceanography

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Preface

This volume is the 44th in a series of technical reports presenting data collected by moored current meters. Associated data collected by other instruments are also included. Only the volumes covering data gathered since 1978 are listed here.

A data directory and bibliography for the years 1963–1978 has been published as WHOI technical report 79-88. A technical memorandum, WHOI-3-88, describes the current meter data processing system.

Volume No.	WHOI Ref. No.	Author	Experiment
XVIII	79-65	Tarbell, S., M. G. Briscoe and R. A. Weller	1978 JASIN
XXI	79-85	Mills, C., and P. Rhines	1978 W.B.U.C
XXIII	80-40	Tarbell, S. and R. Payne	1978 POLYMODE
XXVIII	81-73	Mills, C., S. Tarbell, W. B. Owens and R. Payne	1978 L.D.E
XXIX	82-16	Levy, E. *et al.*	1979 INDEX
XXX	82-43	Levy, E., S. Tarbell and N. P. Fofonoff	1979 GSE/NSOI
XXXI	83-30	Levy, E. and S. Tarbell	1981 WESPAC
XXXII	83-46	Levy, E.	1979 Vema Channel
XXXIII	84-6	Spencer, A., D. Chausse and W. B. Owens	1981 NPBC
XXXIV	84-16	Levy, E. and P. L. Richardson	1983 SEQUAL I
XXXV	84-36	Tarbell, S., N. J. Pennington and M. G. Briscoe	1982–4 LOTUS
XXXVI	84-37	Levy, E., and P. L. Richardson	1983–4 SEQUAL II
XXXVII	85-7	Levy, E., and P. L. Richardson	1984 SEQUAL III
XXXVIII	85-39	Tarbell, S., E. T. Montgomery and M. G. Briscoe	1983–4 LOTUS
XXXIX	86-14	Levy, E., and S. Tarbell	1983–4 HEBBLE
XL	87-19	Tarbell, S., P. L. Richardson and J. Price	1984–6 Canary Basin
XLI	87-20	Levy, E., and S. Tarbell	1983–5 Zonal Pacific
XLII	90-30	Luyten, J., *et al.*	1985–7 Agulhas
XLIII	91-18	Crescenti, G. H., S. Tarbell and R. A. Weller	1988–9 SESMOOR

Acknowledgments

A great many people contributed to the success of this program—too many to list individually. Members of the (former) WHOI Buoy Group were responsible for preparing instruments and mooring hardware and the at-sea operations—work which was done with great care and precision.

We would also like to thank Peter Cornillon and Tong Lee of the University of Rhode Island for permission to include plots of Gulf Stream tracks that they digitized from infrared satellite images.

Special thanks go to the officers and crew of the RV *Knorr*, the RRS *Charles Darwin*, and the RV *Oceanus* for their handling of the deployment and recovery of the two arrays. A very special thanks to the officers and crew of the C.S.S. *Dawson* (operated by the Bedford Institute of Oceanography) for the interruption of their normally scheduled work to chase and retrieve successfully the upper part of a broken mooring.

Finally, we are very grateful to the Office of Naval Research (contract N00014-85-C-0001, NR 083-004) and the National Science Foundation (grant OCE86-08258) for their generous support.

Organization of the Fiche Pages

Fiche 1—A copy of all of the printed pages and the composite plots.

The following five fiche contain plots of the data from each individual time series. The fiche are organized so that all the plots from a given time series are located in a column, and all the types of displays are located across the seven rows, as indicated below.

Row 1	Data identifier and depth in meters
Row 2	Statistics from the basic and filtered series
Row 3	Histograms for each of the variables in the time series
Row 4	Progressive vector plots for each series
Row 5	A plot of several variables versus time
Row 6	Velocity and temperature spectral diagrams
Row 7	Spectral diagrams for either pressure or salinity

Fiche 2—set 1—data 8571 to 8602

Fiche 3—set 1—data 8611 to 8642

Fiche 4—set 1—data 8651 to 8676

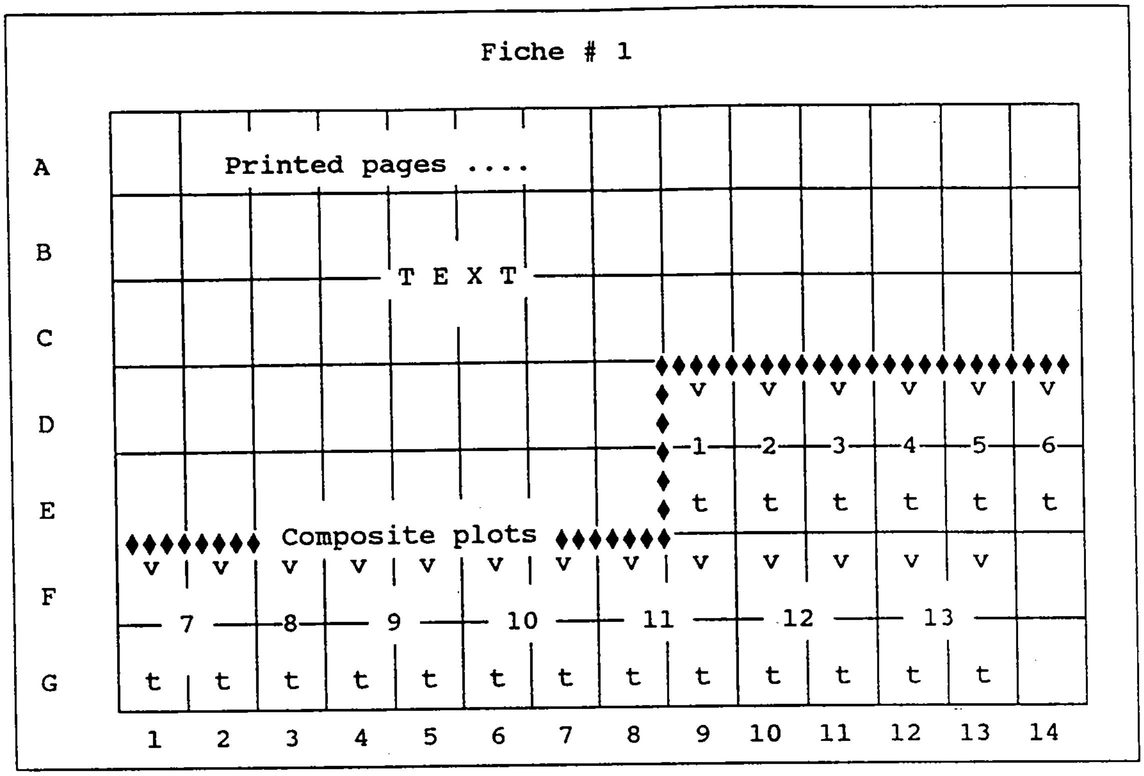
Fiche 5—set 1, 2—data 8681 to 8924

Fiche 6—set 2—data 8931 to 8964; also array plots and the three cruise reports

Fiche 7—Gulf Stream axis plots for first setting

Figure 1a shows the layout of fiche 1 and an example of fiche 2 through 5.

Figure 1b shows the layout of fiche 6 and 7.



v = velocity,pressure plots; t = temperature,salinity plots
1-13 = mooring position number

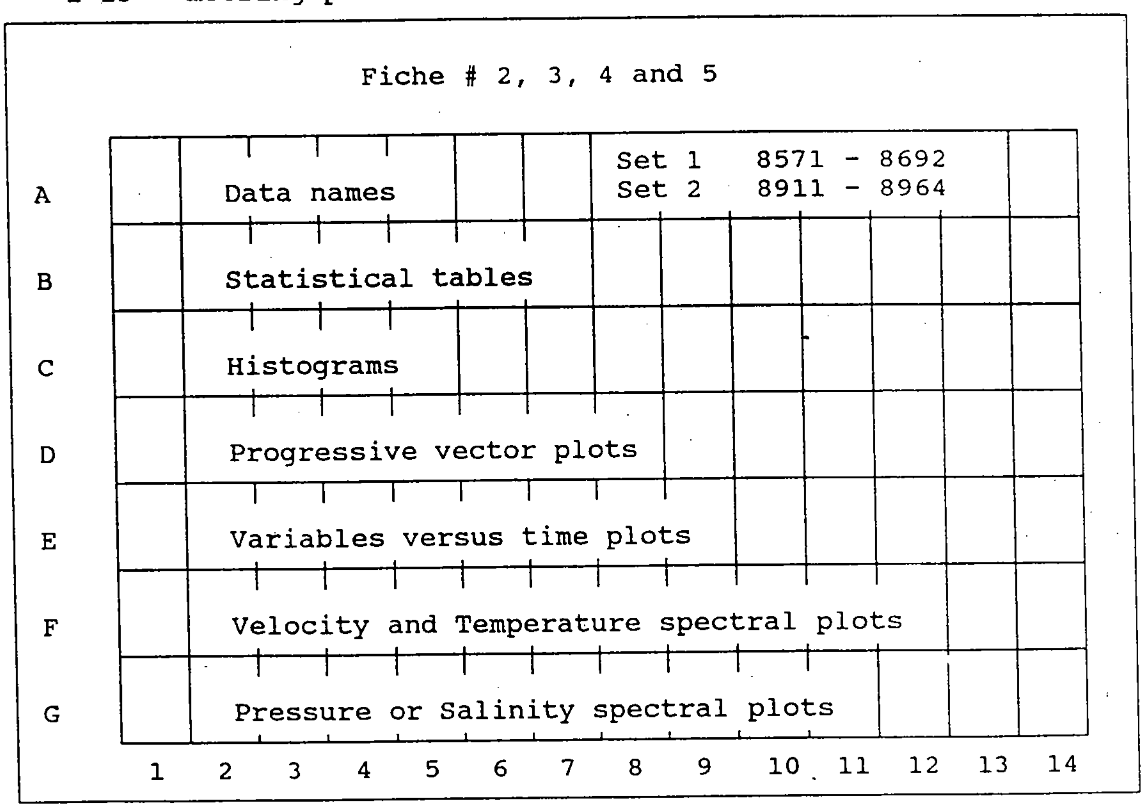
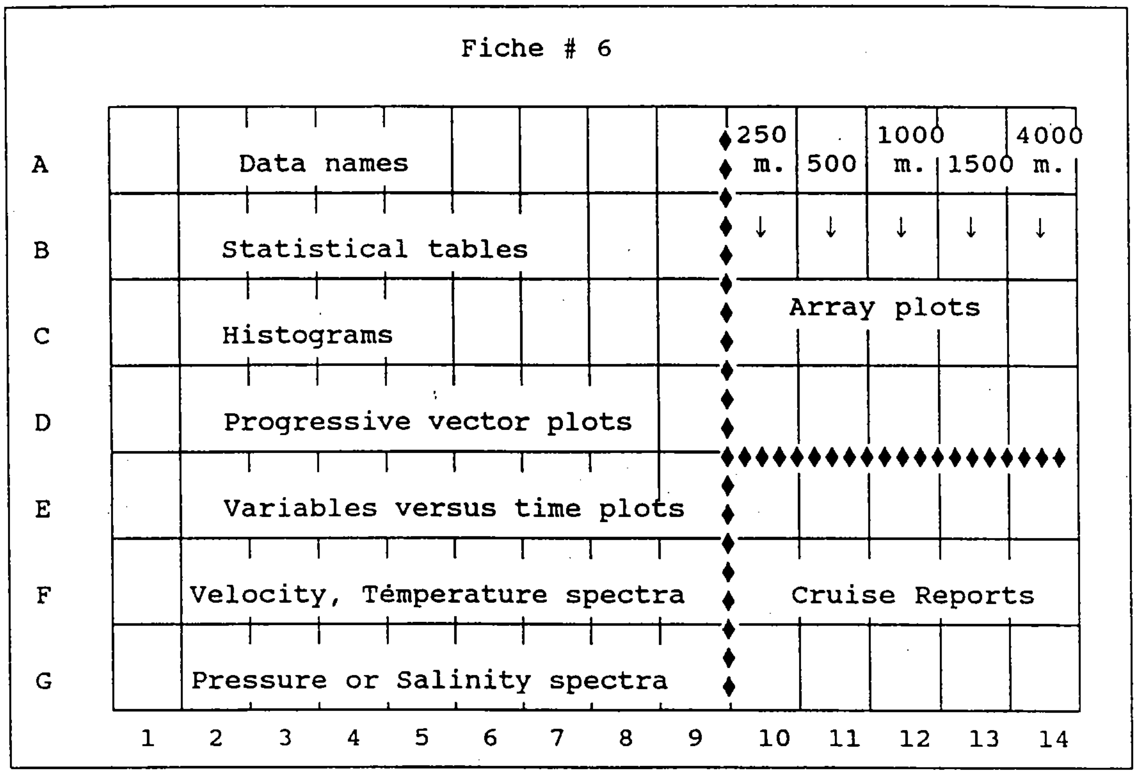


Figure 1 (a): Organization of fiche pages 1-5



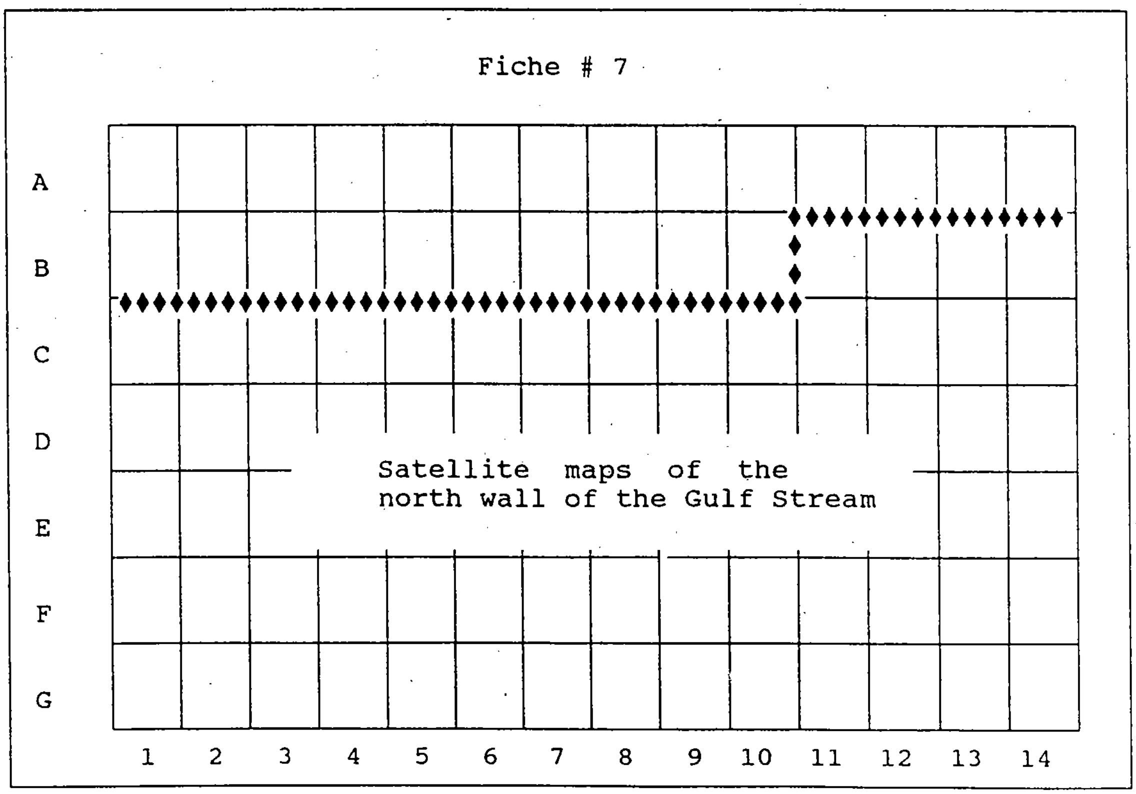


Figure 1 (b): Organization of fiche pages 6 and 7

1 Introduction

SYNoptic Ocean Prediction experiment (SYNOP) is a large, multi-investigator study of the Gulf Stream, whose ultimate goal is to learn enough about the dynamics of its fluctuations that useful predictions might be made. The Office of Naval Research and the National Science Foundation (and the Canadian Government) have supported a variety of activities at a number of institutions in this endeavor. This technical report summarizes the performance of one of the moored array components of SYNOP. This particular array straddled the Stream just east of 55W with the particular objectives of: 1) studying the dynamical balances of the Stream in a region where it is well away from topographic constraints (*i.e.* strong slopes or rough bottom topography); 2) studying its radiation of energy; and 3) gaining an understanding of its coupling to the mean flow through the estimation of potential vorticity fluxes and their divergences.

The moored array was accomplished in two settings. The first (Fig. 2a) contained 42 instruments on 13 moorings and was in place for almost two years from fall 1987 to summer 1989. The second (Fig. 2b) was a subset of the first and remained on location for an additional two years. During the first setting three moorings at the north end and three at the southern extremity contained additional current meters at a nominal depth of 250m whose purpose was to observe near-surface baroclinic structures. An additional modification of the standard design was to include conductivity sensors at the 500m instruments on the seven moorings which formed the central axis of the array.

Even though the moorings were modified to reduce drag, the upper instruments experienced downward excursions of up to several hundred meters in the strong currents of the Gulf Stream. The statistics and plots included in this report have not been corrected for this motion. However, a scheme has been developed to correct both temperatures and velocities, within the thermocline, to a constant reference level (Hogg, 1991) and these corrected data can be obtained from the authors.

2 Moorings

The moorings in this experiment were "standard" intermediate moorings (Heinmiller, 1976) and included fairing (on some of the moorings), Argos transmitters, radios and lights mounted in syntactic foam spheres.

Table 1 is a description of mooring 895, which is a typical intermediate mooring and, in general, describes the configuration of the other moorings in this array.

Table 2 lists the mooring locations, depths, and duration.

Figure 2a shows the relative mooring locations for the first setting. The location map has bathymetric contours at 1000 through 4000 meters. The identification map has bathymetric lines for 1000 through 5000 meters. Figure 2b is the same, but for the second setting of SYNOP.

Mooring 861 in the first array broke loose on December 5, 1988. The track of the drifting portion of the mooring showed that the mooring became caught in an eddy. It made a loop about 50 miles in diameter and six days after breaking loose was back within eight miles of the original mooring site. It was picked up two days after that, still in the eddy. The section on telemetry has details on location and recovery. The mooring failure was caused by a wire termination boot coming loose and allowing the wire to escape.

During the recovery of the second setting, the release on mooring 895 would respond but would not fire. A dragging operation recovered the upper part of the mooring leaving one instrument and one release on station. See Cruise Report on fiche 6 for more details.

Pressure sensor measurements indicated that we had depth problems on two of the moorings in the second setting. Both mooring 893 and 896 had pressure sensors at two levels. It quickly became apparent that in both cases the sensor in the upper instrument showed pressures 100m lower than was planned in the mooring design. Post cruise calibrations were run on the pressure sensors to eliminate the possibility of identical pressure sensor failure. As all the pressure sensors passed the tests it was decided that there must have been two identical wire measuring failures. Therefore, the depths of the four affected instruments were corrected to compensate for this problem.

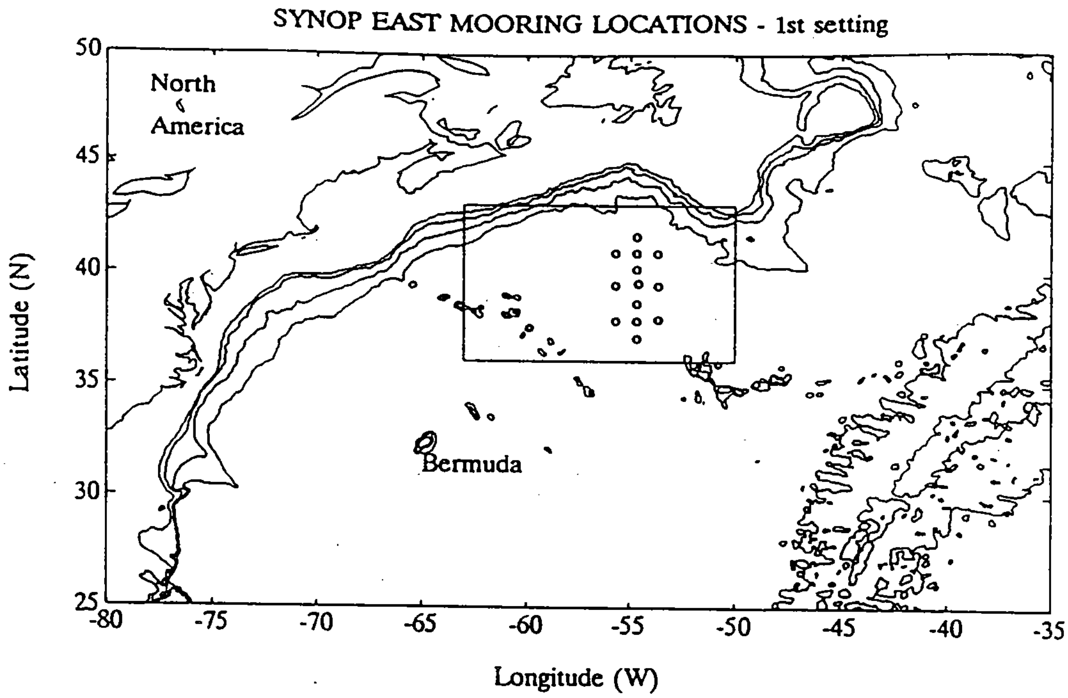
Table 1: SYNOP East—Mooring 895, Mooring Position 9

Item #	Length	Item	Water Depth
1	60-inch	syntactic foam sphere including	499m
		Argos transmitter	
		light	
		radio	
2	2m	3/8-inch chain	
3		VACM with conductivity	504m
4	400m	3/16-inch wire with fairing	
5		Benthos transponder	907m
6	93m	3/16-inch wire	
7		VACM with pressure	1003m
8	486m	3/16-inch wire	
9	9m	1/2-inch chain with	
		9, 17-inch glass spheres in hard hats	
10		VACM with conductivity	1503m
11	1000m	3/16-inch wire	
12	3m	1/2-inch chain with	
		3, 17-inch glass spheres in hard hats	
13	1000m	3/16-inch wire	
14	455m	3/16-inch wire	
15	22m	1/2-inch chain with	
		22, 17-inch glass spheres in hard hats	
16	1m	3/8-inch chain	
17		Model 850 current meter	4003m
18	3m	3/8-inch chain	
19		release	4008m
20	5m	1/2-inch chain	
21	500m	1/4-inch wire	
22	500m	1/4-inch wire	
23	200m	1/4-inch wire	
24	84 m	1/4-inch wire	
25	20m	3/4-inch plaited nylon	
26	5m	1/2-inch chain	
27		Anchor—3500-lb mace with Danforth	5334m

Table 2: SYNOP East—Mooring Information

Mooring #	EXP/BUOY	Lat (N)	Lon (W)	Water Depth (m)	Duration From 9/87 Day	Duration To 8/89 Day	Current Meter Nominal Depths (m)				
Setting # 1											
1	857	41 36.2	54 39.0	4877	20	24	269	522			4018
2	858	40 51.4	53 41.6	5090	21	23	244	497			3992
3	859	40 51.7	54 40.0	5062	21	24	247	500	1008	1516	3995
4	860	40 52.4	55 40.2	5091	22	25		485			3996
5	861	40 08.0	54 40.2	5193	23	23		499	1007	1510	3997
6	862	39 23.0	53 38.9	5252	24	22		485			3997
7	863	39 24.0	54 34.8	5258	25	21		499	1006	1510	3996
8	864	39 23.8	55 40.4	5259	27	20		484			3995
9	865	38 34.9	54 40.3	5331	27	19		500	1007	1511	3997
10	866	37 52.3	53 40.0	5386	28	17	246	500			3995
11	867	37 48.1	54 39.9	5375	29	16	252	505	1012	1520	3999
12	868	37 00.2	54 40.2	5404	29	15	247	500			3996
13	869	37 48.0	55 39.9	5339	30	13		497			4008
					Duration 8/89	7/91					
Setting # 2											
7	896	39 24.2	54 34.5	5260	22	18		602	1102	1502	4001
9	895	38 34.9	54 39.8	5334	19	19		504	1003	1503	4003
10	894	37 50.1	53 43.1	5389	18	17		493			4008
11	893	37 47.9	54 39.9	5380	17	17		605	1105	1505	4005
12	892	37 00.3	54 40.1	5406	16	16		501	1001	1501	4001
13	891	37 48.2	55 39.7	5342	14	16		503			4003

(1) The first column is the experiment mooring number.
(2) The second column is the Buoy Group's consecutive mooring number.
(3) The depths were computed using program NOYFB (Moller, 1976).
(4) The 600 and 1100 m depths were caused by wire measuring error.



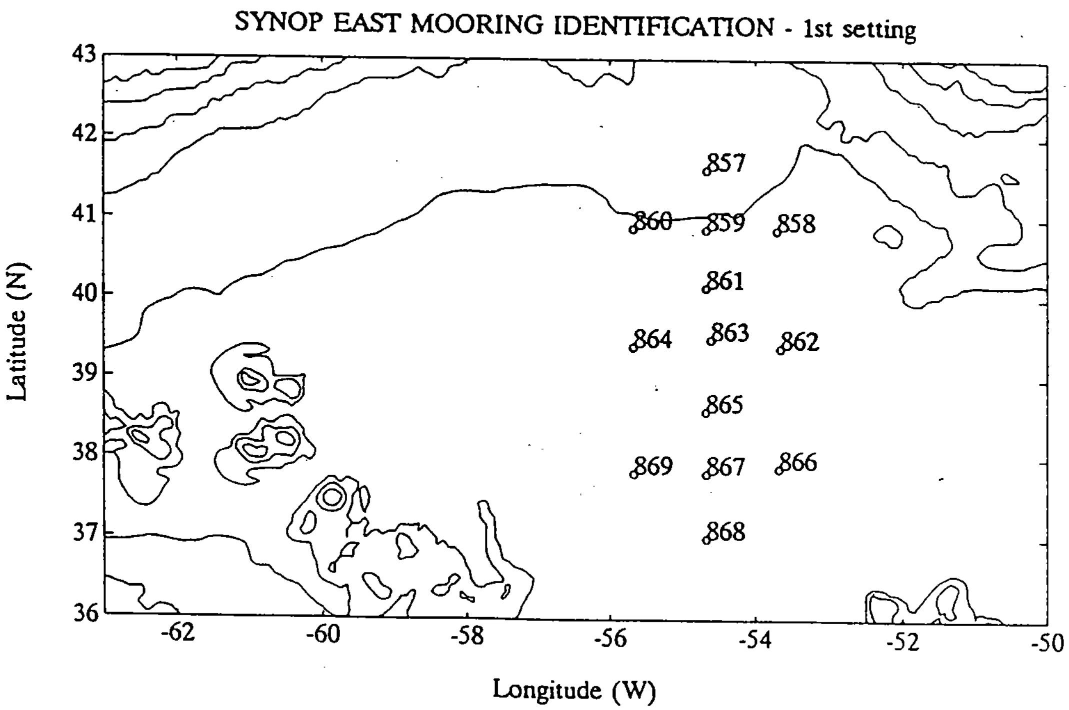
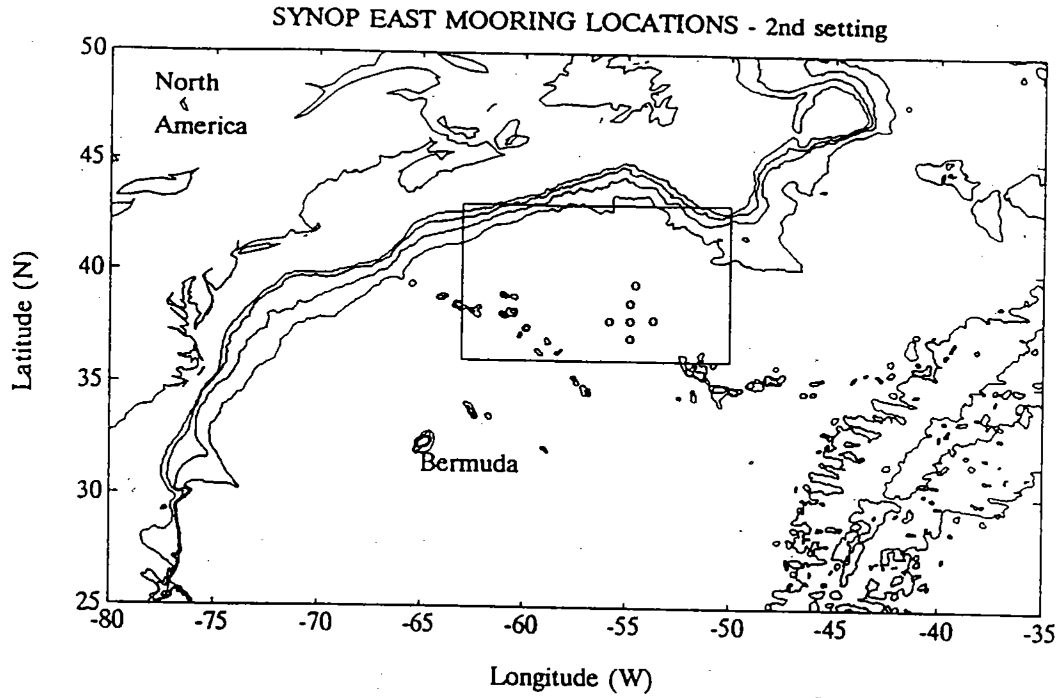


Figure 2: (a) SYNOP East, Setting #1



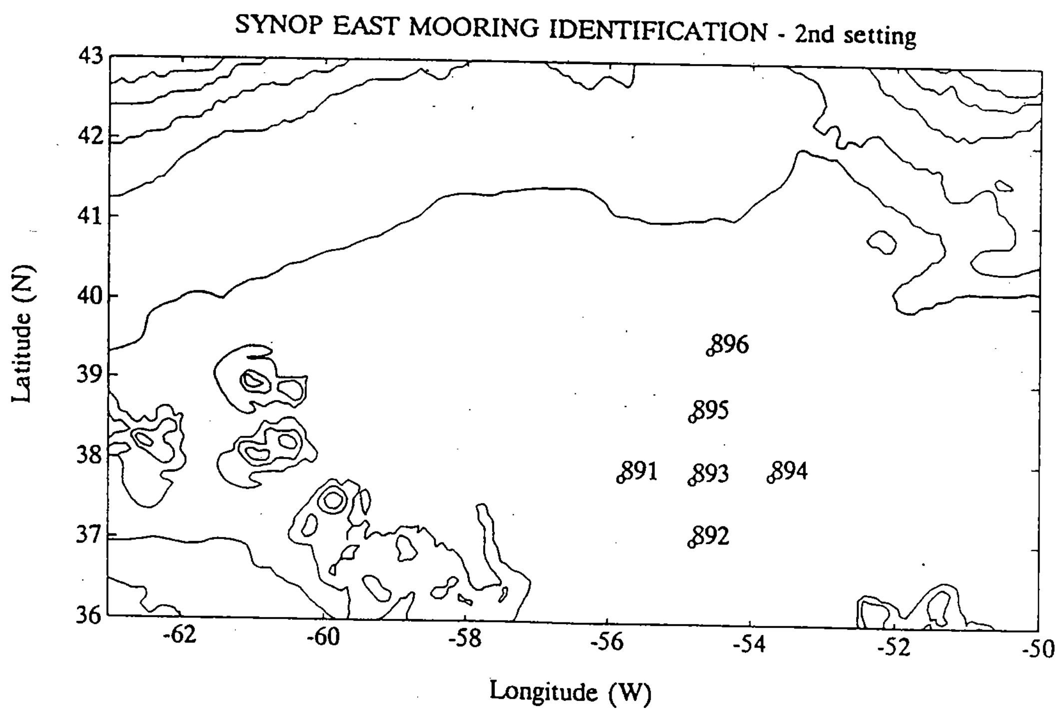


Figure 2: (b) SYNOP East, Setting #2

3 Current Meters

The current meters used in this experiment were vector averaging current meters (VACMs) and burst sampling Model 850 current meters. The VACMs were developed at WHOI in the early 1970's and were built by EG&G Ocean Products. The Model 850, the father of the VACM, was originally built by Geodyne and in the mid-70s extensively modified at WHOI to take advantage of the newly developed low-power integrated-circuit technology. Both instruments use the same mechanical externals to measure current flow, direction and temperature. They both use a Savonius rotor to measure current flow, an external vane to measure the instrument's orientation to the current, and an internal compass to measure the instrument's orientation to magnetic north. They both measure temperature with a thermistor mounted in the end cap of the instrument. Payne *et al.* (1976) discussed the accuracy of the temperature measurements. Tables 3a and 3b show the drift rates for each thermistor in millidegrees per year and the deviation from the 'fit' line.

Each instrument has a crystal-controlled time reference with an accuracy to within one second per day. The 'clock' is synchronized with Universel Temps Coordonne (UTC) before deployment and the accrued error recorded after recovery. Tables 4a and 4b show the clock drift for each instrument over both deployments. The time between the clock reference points was more than a month longer than the actual deployment. All measurements, except one, showed the clocks were within the instrument specifications. A few instruments had failed before recovery so clock accuracy for those instruments is not known.

The VACM continously sums vector increments of water flow sensed by the rotor and vane. At regular intervals, for this deployment every half hour, it records on a magnetic tape cassette the accumulated east–west and north–south velocities. The calibration of the VACM and its recording technique were discussed by McCullough (1975).

There were 42 VACMs deployed in the first SYNOP array, 14 in the second array. All 56 of the VACMs recorded temperature, 20 (19 from the first setting, one from the second setting) instruments averaged temperature over the full length of the recording cycle. The remaining 36 (23 + 13) VACMs had a modification which allows extra variables to be measured in a time sharing or multiplexed mode. The temperature from these multiplexed instruments was averaged for 15 minutes or one half of the recording interval. The other half of the multiplexed circuit measured either pressure or conductivity. Twenty-four (16 + 8) of the instruments measured pressure, the remaining 12 (7 + 5) measured conductivity.

Table 3(a): Historical Drift of Thermisters

Setting # 1

Data Name	Therm Number	# of Cals	# of Days	MD/YR Drift	Fit Deviation
8571	5115	4	2232	−0.20	0.6947
8572	114	6	3009	0.27	1.2910
8573	273	4	1443	0.82	1.8733
8581	5025	5	2720	−0.24	1.3484
8582	5064	4	2827	−0.31	1.8289
8583	314	4	1367	0.09	1.4065
8591	5522	4	2820	−0.22	1.0000
8592	113	7	3009	0.40	1.5529
8593	5005	5	1951	−0.35	1.2544
8594	237	3	2269	0.23	1.0618
8595	434	6	2157	0.07	1.8217
8601	5101	4	2205	−0.08	1.2718
8602	164	5	1948	0.14	1.2204
8611	74	6	3016	0.22	0.8266
8612	5124	3	2090	−0.03	1.5194
8613	135	4	2269	0.34	1.4866
8614	157	4	2416	0.19	1.0971
8621	5125	4	2398	−0.32	1.3704
8622	246	4	1771	−0.67	0.9835
8631	56	5	3261	0.30	1.0307
8632	5032	4	1951	0.06	1.3116
8633	419	5	2165	−0.36	1.9111
8634	158	5	3786	−0.28	4.4351
8641	5518	4	2090	0.34	0.8851
8642	166	4	1858	0.44	0.7466
8651	121	5	3498	0.31	2.6496
8652	5096	4	1951	0.29	1.7642
8653	508	4	2184	−0.11	1.0470
8654	134	6	2123	−0.09	1.6042

Table 3(a): Historical Drift of Thermisters (Continued)

Data Name	Therm Number	# of Cals	# of Days	MD/YR Drift	Fit Deviation
8661	5007	4	2205	−0.26	0.3088
8662	5528	5	2398	0.30	1.1106
8663	263	5	1443	−0.05	1.3896
8672	5063	4	2398	−0.39	1.4963
8673	102	5	3352	0.27	1.0079
8674	152	4	1293	0.89	1.0913
8675	429	6	1598	−0.20	1.8572
8676	330	14	1281	0.46	2.9257
8681	5506	4	2637	0.25	1.8298
8683	53	6	4025	0.48	2.7572
8692	516	5	2808	−0.42	1.9111

Table 3(b): Historical Drift of Thermisters

Setting #2

Data Name	Therm number	# of Cals	# of Days	MD/YR Drift	Fit Deviation
8911	5543	6	3441	0.05	2.0048
8912	442	6	3278	−0.14	2.0955
8921	60	5	2793	0.52	1.0110
8922	5538	5	3343	0.17	1.9163
8923	806	4	2212	0.69	0.4533
8924	439	6	2885	−0.39	2.4840
8931	780	5	2436	1.56	1.9135
8932	5541	5	3441	0.07	2.2146
8933	5547	5	2574	0.38	2.2820
8934	154	4	3108	0.23	1.4905
8941	5546	5	3021	0.06	1.6907
8942	130	4	3002	0.16	0.2430
8951	781	5	2436	0.32	1.3845
8952	5502	6	2237	0.21	0.8623
8953	769	5	2443	0.48	1.2293

Table 3(b): Historical Drift of Thermisters (Continued)

Setting #2

Data Name	Therm Number	# of Cals	# of Days	MD/YR Drift	Fit Deviation
8961	787	4	2204	1.77	1.5193
8962	5536	8	3021	0.17	2.5107
8963	5510	6	2237	−0.12	1.6390
8964	70	6	2676	−0.18	2.4254

Column 3 indicates the number of calibration baths. There are seven calibration points for each bath at 0, 5, 10, 15, 20, 25 and 30 degrees.

Column 4 is the number of days between the first and last calibration.

Column 5 is the drift rate of the thermistor in Millidegrees per year.

Column 6 is a measure of the deviation about the 'fit' line.

Table 4(a): Clock Drift

Setting # 1

Data Name	Depth (m)	Instrument id.	Clock Drift min	sec
8571	269	V-139P	6	59
8572	522	V-5102C	5	49
8573	4018	V-716	2	28
8581	244	V-112P	5	47
8582	497	V-106P		12
8583	3992	V-138	−4	26
8591	247	V-127P	2	27
8592	500	V-5104C	3	44
8593	1008	V-435P		56
8594	1516	V-199	−12	26
8595	3995	V-117		−29
8601	485	V-107P	–	—
8602	3996	V-661	12	30
8611	499	V-5108C	–	—
8612	1007	V-120P		−59
8613	1510	V-373	4	28
8614	3997	V-165	−12	04
8621	485	V-201P	2	42
8622	3997	V-715		28
8631	499	V-5113C	6	36
8632	1006	V-195P	1	48
8633	1510	V-180	1	44
8634	3996	V-714		−3
8641	484	V-179P	7	27
8642	3995	V-717	−7	30
8651	500	V-5101C	−7	23
8652	1007	V-108P	2	04
8653	1511	V-537	−2	10
8654	3997	V-718	−2	50
8661	246	V-326P	–	—
8662	500	V-185P	6	59
8663	3995	V-380	15	35
8671	250	ENG		
8672	252	V-588P	4	32
8673	505	V-5107C		26

Table 4(a): Clock Drift (Continued)

Setting # 1

Data Name	Depth (m)	Instrument id.	Clock Drift min	sec
8674	1012	V-712	−1	00
8675	1520	V-713	–	—
8676	3999	V-193	–	—
8681	247	V-114P	10	42
8682	500	V-5106C	4	01
8683	3996	V-680	3	12
8691	497	V-178P		06
8692	4008	V-378		47

Table 4(b): Clock Drift

Setting # 2

Data Name	Depth (m)	Instrument id.	Clock Drift min	sec
8911	505	V-325P	7	04
8912	4003	M-256	1	00
8921	501	V-386C	–	—
8922	1001	V-177P	6	17
8923	1501	V-5110	1	50
8924	4001	M-238	4	41
8931	605	V-5108C	5	55
8932	1105	V-141P	−1	16
8933	1505	V-113P		−47
8934	4005	M-260	3	17
8941	493	V-182P	−5	07
8942	4003	M-250	−4	08
8951	504	V-5116C	1	23
8952	1003	V-164P	–	—
8953	1503	V-5114C		−15
8954	4003	M-207	–	—
8961	602	V-433C	–	—
8962	1102	V-109P	0	46
8963	1502	V-204P	9	25
8964	4001	M-227	−9	01

Note: A minus sign (−) means instrument clock time is less than calendar time.

The Model 850 measures in the burst mode described by Webster (1968). At one-hourly time intervals (for this experiment) the instrument turned on and began recording on a magnetic tape cartridge a sequence of 7 strobes and then turned off. The first strobe contains temperature information, the second strobe has the time word. The remaining strobes contain pairs of rotor counts and compass/vane readings. Each strobe is 5.27 seconds apart. The rotor counts for each strobe are counted for 5.19 seconds and paired with an instantaneous compass and vane reading.

There were rotor problems in two of the model 850s caused by weak connections between the read switch and some of the magnets on the rotor. This caused a loss of rotor counts affecting the magnitude of the velocity and may have slightly affected the resultant direction as each rotor count causes a value to be accumulated and stored in the instrument's east and north registers. Both instruments were tested in the lab to determine the extent of the weakness. It was found that a few of the magnets never activated the read switch. Other magnets sometimes activated the read switch. Tests were not done to determine the effect of water, temperature and pressure on the sensitivity of the marginal magnets. Because of the uncertainty of the *in situ* behavior of the magnets, a conservative estimate of velocity correction was used. Table 5 lists the total number of affected magnets for each instrument, the number of magnets that were bad and never activated the read switch, the number of marginal magnets and the correction that was applied to the speeds.

Table 5: Model 850 Rotor Magnet Problems

Data Name	Inst Id.	Total Affected	# Bad	# Marginal	Correction Applied to Speed
8912	M-256	5	2	3	× 1.449
8924	M-238	7	5	2	× 1.786

4 Emergency Data Telemetry

Transmitters were placed on the uppermost sphere of all the subsurface moorings. There were 13 moorings in the first deployment and six in the second deployment. If any of the moorings broke loose during either phase of the experiment, a signal would be received by a NOAA satellite. That signal would then be processed by Service Argos and stored on their computer. Personnel at WHOI checked the Service Argos computer about twice a week. On December 5, 1988, a signal was observed from the transmitter on mooring 861.

We could not find any ships capable of recovering the mooring that were in the area south of Nova Scotia. However, the people at Bedford Institute of Oceanography came to our rescue and diverted the C.S.S. *Dawson* from work in the Gulf of St. Lawrence to pick up WHOI personnel and equipment at Cape Breton and then to recover the drifting part of the mooring.

Other assistance was provided by Commander Stephen Osmer and Dr. Murphy of the International Ice Patrol out of Groton, Connecticut They loaned us their 400 mHz R.D.F. (radio direction finder) to aid in the location of the Argos transmitter. Aid was also provided by Jennifer Clark of the NOAA National Ocean Service in the form of a series of ocean surface temperature maps that showed the location of the Gulf Stream and its eddies.

By December 12th, a week after receiving the first signal signifying that the mooring had failed, the top part of the mooring had been recovered by WHOI personnel, the crew of the C.S.S. *Dawson*, and Captain Robin Heath.

5 Data Processing

Data from instrument cassettes (VACMs) and cartridges (Model 850s) were transcribed to 9-track magnetic tapes using an LSI-11 computer. The data were then transferred from the 9-track tapes to VAX disc in the BUOY format (Maltais, 1969).

Each time series went through a sequence of programs (Tarbell *et al.*, 1988) that checked the time base and converted the data into scientific units. Then the quality of the data was determined (Tables 6a and 6b). Next the individual variables were edited to remove miscellaneous bad points and the launch and retrieval transients removed. See Tables 7a and 7b for data durations. Finally the Best Basic Version (BBV) was created by linearly interpolating through gaps in the data to make an evenly spaced time series. This series is the basis for all further processing.

6 Computation of Salinity

Salinity was computed in three steps. The first step was to low-pass filter the conductivity values to match better the time response of the temperature sensors. The mismatch is caused by a time lag in the temperature sensor. A MATLAB program looked for and removed any spikes in either the temperature or conductivity values.

The second step was to adjust the pressure values from the nearest pressure measuring instrument on the mooring to reflect the probable pressure at the conductivity sensor. Where necessary the pressure values were corrected for pressure drift (Table 8).

The third step was to create the salinity variable with a MATLAB procedure adapted from the standard Unesco procedure given by Fofonoff and Millard (1983).

7 Creation of Low-passed Series

A low-passed version of the data was created by applying a Butterworth filter instead of our more usual Gaussian filter. The Butterworth filter is a two-pole filter with frequency cutoff designed to pass periods longer than 40 hours. The actual filter was constructed using MATLAB's "BUTTER" and "FILTFILT" routines contained in the Signal Processing Toolbox.

Table 6(a): Synop East—Comments About Data

Setting # 1

Exp. #	Data Name	Depth (m)	Days of Data	Comments
1	8571	269	704	Velocity short due to grassy growth in rotor. Pressure data corrected for sensor drift of 8 decibars. Grassy fouling on the mooring line fairing appeared to impair mooring performance after April 1989.
	8572	522	704	Conductivity adjusted for thermister time lag, then salinity computed using pressure from 8571, temperature and conductivity from 8572.
	8573	4018	559	Series short due to battery failure.
2	8581	244	702	Pressure data corrected for sensor drift of 28 decibars. Grassy fouling on the mooring line fairing appeared to impair mooring performance after April 1989.
	8582	497	702	Good
	8583	3992	528	Series short—reason unknown. Use with *caution.* 554 points interpolated into the data. Maximum interpolated gap was 92 hours.
3	8591	247	701	Pressure data corrected for sensor drift of −18 decibars.
	8592	500	701	Conductivity adjusted for thermister time lag, then salinity computed using pressure from 8593, temperature and conductivity from 8592.
	8593	1008	701	Good
	8594	1516	701	Good
	8595	3995	701	Good

Table 6(a): Synop East—Comments About Data (Continued)

Setting # 1

Exp. #	Data Name	Depth (m)	Days of Data	Comments
4	8601	485	633	Series short due to battery failure. Pressure data corrected for sensor drift of 16 decibars.
	8602	3996	701	Good
5	8611	499	436	Mooring failed Dec 4, 1988. Recovered adrift Dec 12, 1988. Conductivity adjusted for thermister time lag, then salinity created using pressure from 8612, temperature and conductivity from 8611.
	8612	1007	436	Mooring failed Dec 4, 1988. Surviving mooring line did not have enough buoyancy to keep this instrument at its proper depth.
	8614	3997	698	Good data, instrument apparently was maintained at correct depth due to twenty-two, 17-inch glass spheres above it in the mooring line.
6	8621	485	690	Good
	8622	3997	690	Good
7	8631	499	695	Conductivity adjusted for thermister time lag, then salinity created using pressure from 8632, temperature and conductivity from 8631.
	8632	1006	695	Pressure data corrected for sensor drift of 30 decibars.
	8633	1510	423	Series short—reason unknown.
	8634	3996	696	Good

Table 6(a): Synop East—Comments About Data (Continued)

Setting # 1

Exp. #	Data Name	Depth (m)	Days of Data	Comments
8	8641	484	693	Pressure data corrected for sensor drift of 31 decibars.
	8642	3995	693	Good
9	8651	500	690	Conductivity adjusted for thermister time lag, then salinity created using pressure from 8652, temperature and conductivity from 8651.
	8652	1007	690	Caution: bad speeds from March 18 to 29, 1989. Velocity data processed in two pieces (536 and 142 days.) Pressure data corrected for sensor drift of −16 decibars.
	8653	1511	690	Good
	8654	3997	690	Good
10	8661	246	639	Series short due to battery failure.
	8662	500	688	Pressure data corrected for sensor drift of −9 decibars.
	8663	3995	688	Good
11	8671	250		Engineering instrument.
	8672	252	687	Use with caution—290 points interpolated into the data. Maximum interpolated gap was 88 hours. Pressure data corrected for sensor drift of 30 decibars.
	8673	505	687	Conductivity adjusted for thermister time lag, then salinity created using pressure from 8672, temperature and conductivity from 8673.

Table 6(a): Synop East—Comments About Data (Continued)

Setting # 1

Exp. #	Data Name	Depth (m)	Days of Data	Comments
	8674	1012	687	Use speed with extreme care—rotor very sticky.
	8675	1520	687	Good
	8676	3999	478	Use with caution—series short and of poor quality due to tape advance problems. 1125 points interpolated into the data. Maximum interpolated gap was 13 hours.
12	8681	247	685	Five days of zero speeds after June 6, 1989.
	8682	500	0	No data—tape advance problems.
	8683	3996	684	Good
13	8691	497	682	Pressure data corrected for sensor drift of 16 decibars.
	8692	4008	682	Vane was missing when instrument was recovered, may have been lost during recovery process.

Table 6(b): Synop East—Comments About Data

Setting #2

Exp. #	Data Name	Depth (m)	Days of Data	Comments
13	8911	V-325 P	505	Velocity short—rotor badly damaged.
	8912	M-256	4003	Compass stuck first few months. Two of 16 magnets could not activate the read switch. Three magnets were marginal—could sometimes activate read switch. Speeds multiplied by 1.449.
12	8921	V-386 C	501	Short—battery failure.
	8922	V-177 P	1001	Good—beautiful eddy.
	8923	V-5110	1501	Good
	8924	M-238	4001	Compass was stuck first few months. Five of 16 magnets did not activate read switch. Two magnets intermittently activated the switch. Speeds multiplied by 1.736.
11	8931	V-5108C	605	Good—depth changed to reflect pressure information.
	8932	V-141 P	1105	Pressure values indicate instrument is 100 decibars lower than design depth. Post-cruise pressure test indicated pressure sensor was okey. Depth changed to reflect pressure information.
	8933	V-113 P	1505	Good
	8934	M-260	4005	Compass was stuck first few months. Compass values were all zero after Dec 1990; rotor had a faulty read switch after June 1990.

Table 6(b): Synop East—Comments About Data (Continued)

Setting # 2

Exp. #	Data Name	Depth (m)	Days of Data	Comments
10	8941	V-182 P	493	Use temperature and pressure with caution. Temperature and pressure required *extensive* editing. Instrumentation vibration and a loose wire caused many erroneous temperature, pressure, and compass and vane values. East and north components and rotor counts were unaffected by the problem as the broken wire did not affect compass/vane values going into the vector computer, just those values going to tape.
	8942	M-250	4003	Compass was stuck first few months.
9	8951	V-5116C	504	Good
	8952	V-164 P	1003	Short due to battery failure. 1.5-month rotor dropout Nov, Dec 1989
	8953	V-5114C	1503	Good
	8954	M-207	4003	Not yet recovered.
7	8961	V-433 C	602	Good—depth changed to reflect pressure information.
	8962	V-109 P	1102	Rotor died a month early. Pressure values indicate instrument is 100 decibars lower than design depth. Post cruise pressure test indicates pressure sensor is okey. Depth changed to reflect pressure information.
	8963	V-204 P	1502	Good
	8964	M-227	4001	Compass was stuck at beginning of record.

Table 7(a): Data Return

Setting #1

Exp #	Data Name	Depth (m)	Days Set	Number of data days Vel	Temp	Press	Cond	Comments (also see data quality)
1	8571	269	704	566	704	704	—	growth in rotor
	8572	522	704	704	704	—	704	
	8573	4018	704	559	559	—	—	battery failure
2	8581	244	702	702	702	702	—	
	8582	497	702	702	702	702	—	
	8583	3992	702	528	528	—	—	short, reason unknown
3	8591	247	701	701	701	701	—	
	8592	500	701	701	701	—	701	
	8593	1008	701	701	701	701	—	
	8594	1516	701	701	701	—	—	
	8595	3995	701	701	701	—	—	
4	8601	485	701	633	633	633	—	battery failure
	8602	3996	701	701	701	—	—	
5	8611	499	436	436	436	—	436	upper mooring failure
	8612	1007	436	436	436	436	—	upper mooring failure
	8613	1510	436	436	436	—	—	upper mooring failure
	8614	3997	698	698	698	—	—	
6	8621	485	690	690	690	690	—	
	8622	3997	690	690	690	—	—	
7	8631	499	695	695	695	—	695	
	8632	1006	695	695	695	695	—	
	8633	1510	695	423	423	—	—	short, reason unknown
	8634	3996	695	695	695	—	—	
8	8641	484	693	693	693	693	—	
	8642	3995	693	693	693	—	—	
9	8651	500	690	690	690	—	690	
	8652	1007	690	678	690	690	—	section where rotor = 0
	8653	1511	690	690	690	—	—	
	8654	3997	690	690	690	—	—	
10	8661	246	688	640	640	640	—	battery failure
	8662	500	688	688	688	688	—	
	8663	3995	688	688	688	—	—	
11	8671	250	—	—	—	—	—	engineering instrument
	8672	252	687	687	687	687	—	
	8673	505	687	687	687	—	687	
	8674	1012	687	0	687	—	—	rotor problems
	8675	1520	687	687	687	—	—	
	8676	3999	687	478	478	—	—	tape advance problems

Table 7(a): Data Return (Continued)

Setting #1

Exp #	Data Name	Depth (m)	Days Set	Number of data days Vel	Temp	Press	Cond	Comments (also see data quality)
12	8681	247	685	685	685	685	—	
	8682	500	685	0	0	—	—	tape advance problems
	8683	3996	685	685	685	—	—	
13	8691	497	682	682	682	682	—	
	8692	4008	682	682	682	—	—	

Table 7(b): Data Return

Setting #2

Exp #	Data Name	Depth (m)	Days Set	Number of data days Vel	Temp	Press	Cond	Comments (also see data quality)
13	8911	503	699	131	699	699	—	rotor broken
	8912	4003	699	612	699	—	—	compass stuck
12	8921	501	699	354	354	—	354	battery failure
	8922	1001	699	699	699	699	—	
	8923	1501	699	699	699	—	—	
	8924	4001	699	639	699	—	—	compass stuck
11	8931	605	699	699	699	—	699	
	8932	1105	699	699	699	699	—	
	8933	1505	699	699	699	699	—	
	8934	4005	699	220	699	—	—	faulty read switch
10	8941	493	696	696	696	696	—	poor quality temp/pressure
	8942	4003	696	611	696	—	—	compass stuck
9	8951	504	698	698	698	—	698	
	8952	1003	698	~200	255	255	—	rotor problem
	8953	1503	698	698	698	—	698	
	8954	4003	—	—	—	—	—	not yet recovered
7	8961	602	695	695	695	—	695	
	8962	1102	695	645	695	695	—	rotor died a month early
	8963	1502	695	695	695	695	—	
	8964	4001	695	671	695	—	—	compass stuck

8 Data Identifiers

Each time series is identified by a mooring number, a sequential instrument position number, a letter to indicate the data version, and numbers to indicate the sampling rate. Therefore, 8612B1800 identifies data from the second instrument on mooring 861; the version is B, and the sampling rate is one record every half hour (1800 seconds). 8683A1DB24 is a time series that has had the Butterworth filter (B) applied to the third instrument on mooring 868; the filter has a half width of 24 hours (24) and is subsampled once a day (1D).

In special cases, additional letters are inserted between the data name and the sampling rate. The velocity data for 8652 had to be processed in two sections as there was a 10-day period of no speeds in the data. Therefore, a letter was used between the data name and the data version number. 8652A contains the first 537 days of the mooring, 8652B the last 143 days. A full-length temperature series, 680 days, is called 8652T.

9 Pressure

Corrections to the data to compensate for drifting in the pressure strain gauge were needed in 10 of the 16 pressure measurements from the first deployment and none of the seven pressures from the second deployment.

The corrections were made using MATLAB procedures. In nine cases a single linear trend was either added or subtracted from the time series. The pressure data from instrument 8662 required a two-part correction—a linear trend for the first half of the record, and a bias for the second half. Table 8 shows the corrections that were applied, as well as the range of pressure each instrument measured.

Table 8: Pressure Information

Setting #1

Data #	Depth (m)	Pressure min	Pressure max	Range (diff)	Drift Correction (dbs)
8571	269	253	511	(258)	+ 8
8581	244	228	457	(229)	+28
8582	497	508	709	(201)	none
8591	247	281	643	(362)	−18
8593	1008	1039	1384	(345)	none
8601	485	502	762	(260)	+16
8612	1007	1039	1500	(461)	none
8621	485	514	825	(311)	none
8632	1006	1019	1664	(645)	+30
8641	484	491	858	(367)	+31
8652	1007	1041	1325	(284)	−16
8661	246	271	700	(429)	none
8662	500	527	964	(437)	−9
8672	252	252	492	(240)	+30
8681	247	265	375	(110)	none
8691	497	508	781	(273)	+16

Setting #2

Data #	Depth (m)	Pressure min	Pressure max	Range (diff)	Drift Correction (dbs)
8911	503	507	694	(187)	none
8922	1001	1009	1219	(210)	none
8932	1105	1116	1278	(162)	none
8933	1505	1520	1682	(162)	none
8941	493	492	978	(486)	none
8952	1003	1013	1422	(409)	none
8962	1102	1125	1972	(847)	none
8963	1502	1529	2360	(831)	none

10 Data Presentation

10.1 Histograms

The histograms of major variables are plotted as frequency of occurrences. There are 100 cells in the x-axis of almost all the variables. The exceptions are those series gathered by the Model 850 instrument during the second setting. Histograms of variables from those series have 50 cells on the x-axis. The data names are: 8912, 8924, 8934, 8942, 8954 and 8964.

In several instances the velocity is a different length than the auxilliary variables. In those cases, the suite of histograms for one time series may include 'N' samples for the velocity variables and 'X' samples for the temperature, pressure or salinity histograms. Histograms with different length variables are identified with a separate data name for the odd length variable. The statistical display will give the number of samples for each variable in the histogram.

The histogram for time series 8952 shows the effect a malfunctioning rotor will have on velocity histograms.

10.2 Statistics

The statistics for each variable from both the basic time series and the filtered time series are included. The equations used to derive the statistical parameters are described by Tarbell *et al.* (1988).

10.3 Progressive Vector Plots

Current vectors are placed head to tail to show the path a particle would have traveled in a perfectly homogeneous flow. The plot begins with an asterisk followed by annotated triangles at the first of each month. The input time series is the Butterworth filtered series which has been subsampled to one point a day.

10.4 Spectra

Plots of auto-spectra for the east and north components of velocity, temperature and pressure or salinity are shown. Further information about the program used to create these plots may be found in the W.H.O.I. program report PROSPECT (Hunt, 1982).

The data is prewhitened and recolored. Program PROSPECT allows averaging in increasingly large groups. The frequency-averaging sequence for this set of data is:

Number of Frequencies	Number of Groups	Number of Frequencies	Number of Groups
3	40	300	30
6	15	600	15
15	6	1500	6
30	30	3000	30
60	15	6000	15
150	6	15000	6

Table 9 lists the number of points in each piece.

Table 9: Spectral Information

Setting #1

Data Name	Velocity Points Piece	Velocity Total Points	Temperature Points Piece	Temperature Total Points	P=press, S=salinity	Points Piece	Total Points
8571	27104	27192	33792	33795	P	33792	33795
8572	33792	33794	33792	33794	S	33792	33794
8573	26656	26834	26656	26834			
8581	33696	33698	33696	33698	P	33696	33698
8582	33696	33698	33696	33698	P	33696	33698
8583	25350	25351	25350	25351			
8591	33696	33696	33696	33696	P	33696	33696
8592	33614	33694	33614	33694	S	33614	33694
8593	33614	33694	33614	33694	P	33614	33694
8594	33614	33694	33614	33694			
8595	33614	33694	33614	33694			
8601	30400	30417	30400	30417	P	30400	30417
8602	33614	33650	33614	33650			
8611	20900	20957	20900	20957	S	20900	20957
8612	20900	20957	20900	20957	P	20900	20957
8613	20900	20957	20900	20957			
8614	33462	33506	33462	33506			
8621	33396	33456	33396	33456	P	33396	33456
8622	33396	33455	33396	33455			
8631	33396	33406	33396	33406	S	33396	33406
8632	33396	33406	33396	33406	P	33396	33406
8633	20328	20328	20328	20328			
8634	33396	33411	33396	33411			
8641	33212	33266	33212	33266	P	33212	33266
8642	33212	33266	33212	33266			
8651	33124	33168	33124	33168	S	33124	33168
8652	25688	25753	25688	25753	P	6860	6864
8653	33124	33168	33124	33168			
8654	33124	33168	33124	33168			
8661	30618	30706	30618	30706	P	30618	30706
8662	32946	33027	32946	33027	P	32946	33027
8663	32946	33026	32946	33026			
8672	32946	32978	32946	32978	P	32946	32978
8673	32946	32978	32946	32978	S	32946	32978

Table 9: Spectral Information (Continued)

Data Name	Velocity points Piece	Velocity Total Points	Temperature Points Piece	Temperature Total Points	P=press, S=salinity	Points Piece	Total Points
8674	32946	32978	32946	32978			
8675	32946	32978	32946	32978			
8676	22950	22956	22950	22956			
8681	32832	32882	32832	32882	P	32832	32882
8683	32832	32835	32832	32835			
8691	32670	32738	32670	32738	P	32670	32738
8692	32670	32739	32670	32739			

Setting #2

Data Name	Velocity Points Piece	Velocity Total Points	Temperature Points Piece	Temperature Total Points	P=press, S=salinity	Points Piece	Total Points
8911	6292	6294	33534	33555	P	33534	33555
8912	14688	14689	16758	16777			
8921	17000	17008	17000	17008	S	17000	17008
8922	33534	33555	33534	33555	P	33534	33555
8923	33534	33555	33534	33555			
8924	15300	15337	16758	16777			
8931	33534	33554	33534	33554	S	33534	33554
8932	33534	33555	33534	33555	P	33534	33555
8933	33534	33554	33534	33554	P	33534	33554
8934	5202	5281	16758	16777			
8941	33396	33410					
8942	14592	14665	16698	16705			
8951	33462	33506	33462	33506	S	12240	12243
8952			12240	12243	P	12240	12243
8953	33462	33506	33462	33506	S	12240	12243
8961	33320	33362	33320	33362	S	33320	33362
8962	30976	30982	33320	33363	P	33320	33363
8963	33320	33363	33320	33363	P	33320	33363
8964	16100	16105	16660	16681			

10.5 Variables vs. Time

All plots of variables versus time are from the Butterworth filtered series with a half-width of 24 hours.

Stick plots, which show individual current vectors as arrows along the time scale are included. The plots showing all of the variables from individual time series include two presentations of the stick plots. They show the conventional display where North is in the up direction and a display where the sticks have been rotated so that East is in the up direction.

The plot for time series 8952 shows the area in the data where the rotor malfunctioned.

10.6 Array Plots (Fiche 6)

The current vectors in this display were created using the Butterworth filter with a half width of ten days and subsampling one point every tenth day. The vectors are drawn in a geographic frame with the base of each vector starting at the specified mooring position. There are two pages for each of the instrument depths for each deployment. There is some overlap in the dates between deployments. The 4000-meter array plot has no overlap between deployments as the Model 850 compasses did not work at the beginning of the series.

10.7 Gulf Stream Tracks (Fiche 7)

The Gulf Stream tracks represent the north wall of the Gulf Stream as digitized by Tong Lee at the University of Rhode Island (URI) and are presented courtesy of Peter Cornillon also at URI. The information was taken from infrared satellite images; therefore, it is not complete for those days where cloud cover obscured the ocean.

Geographic traces of the Gulf Stream tracks were plotted over vector arrows from the time series collected at 500 meters by Nick Fofonoff at WHOI. Each page covers a period of ten days and shows the data available for each of those ten days.

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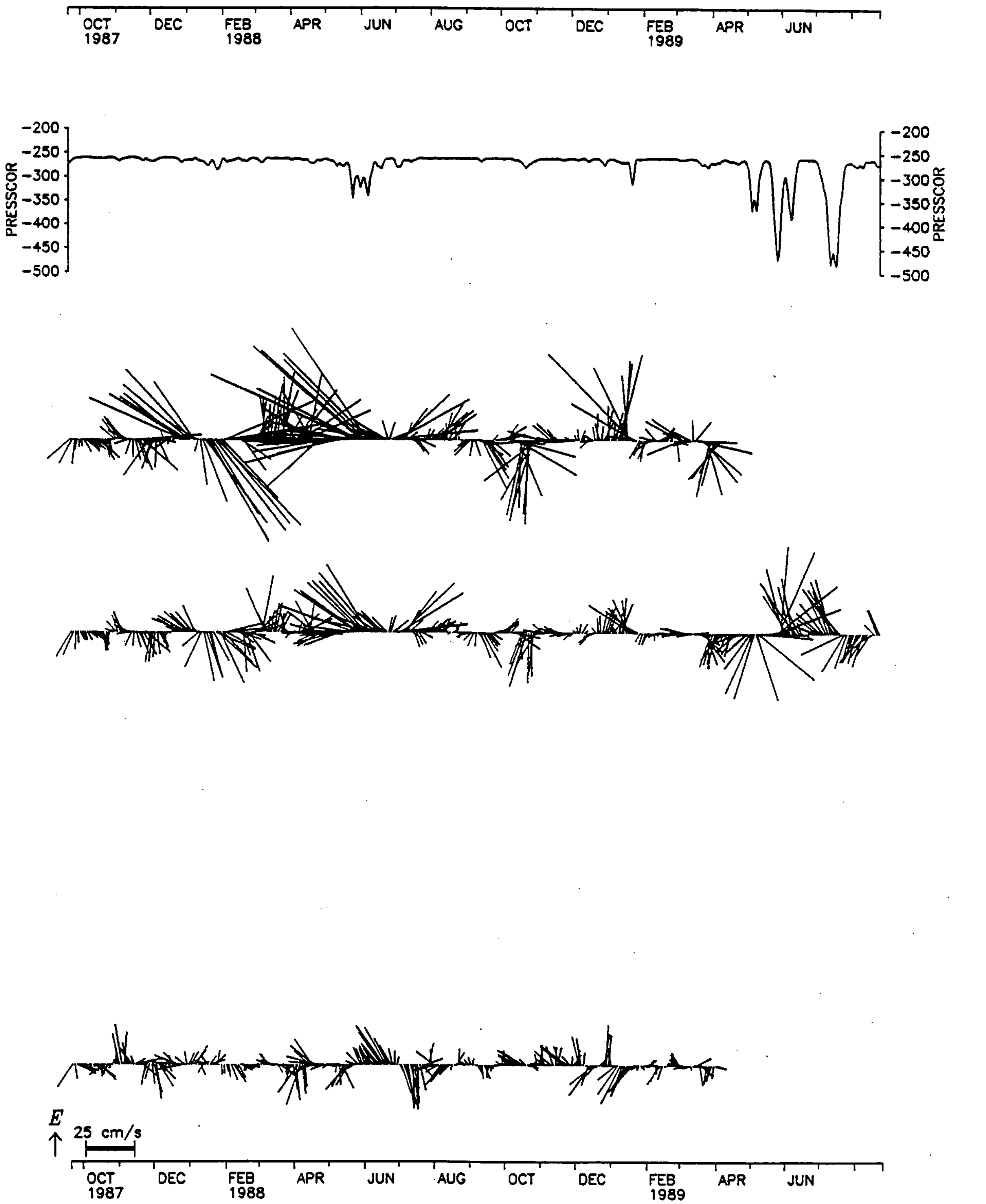
Composite Plots by Mooring

* *Mooring 857* * *SYNOP EAST – 1*

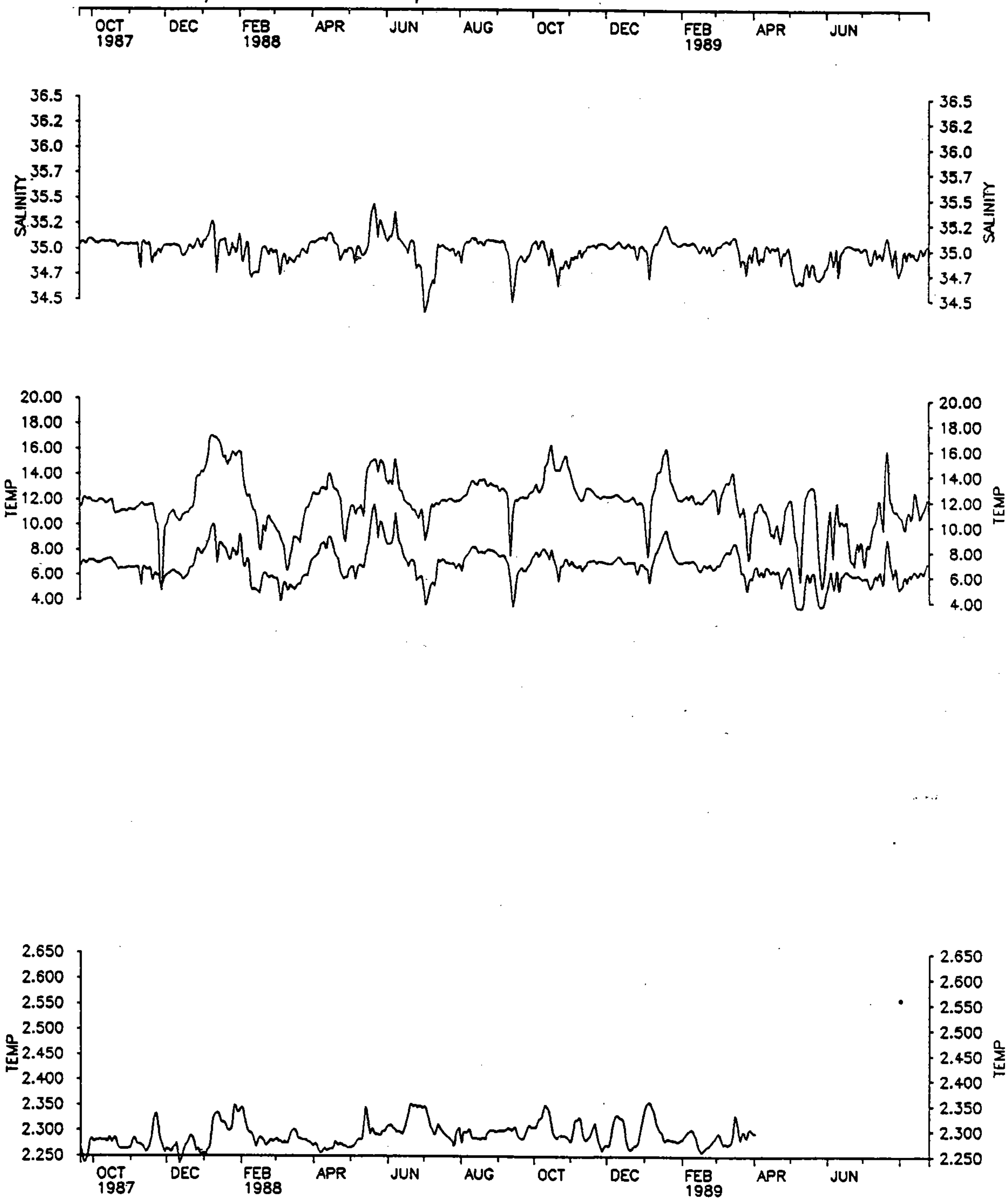
* Current Vectors * depths are 269,522, 4018 meters



* Mooring 857 * SYNOP EAST – 1

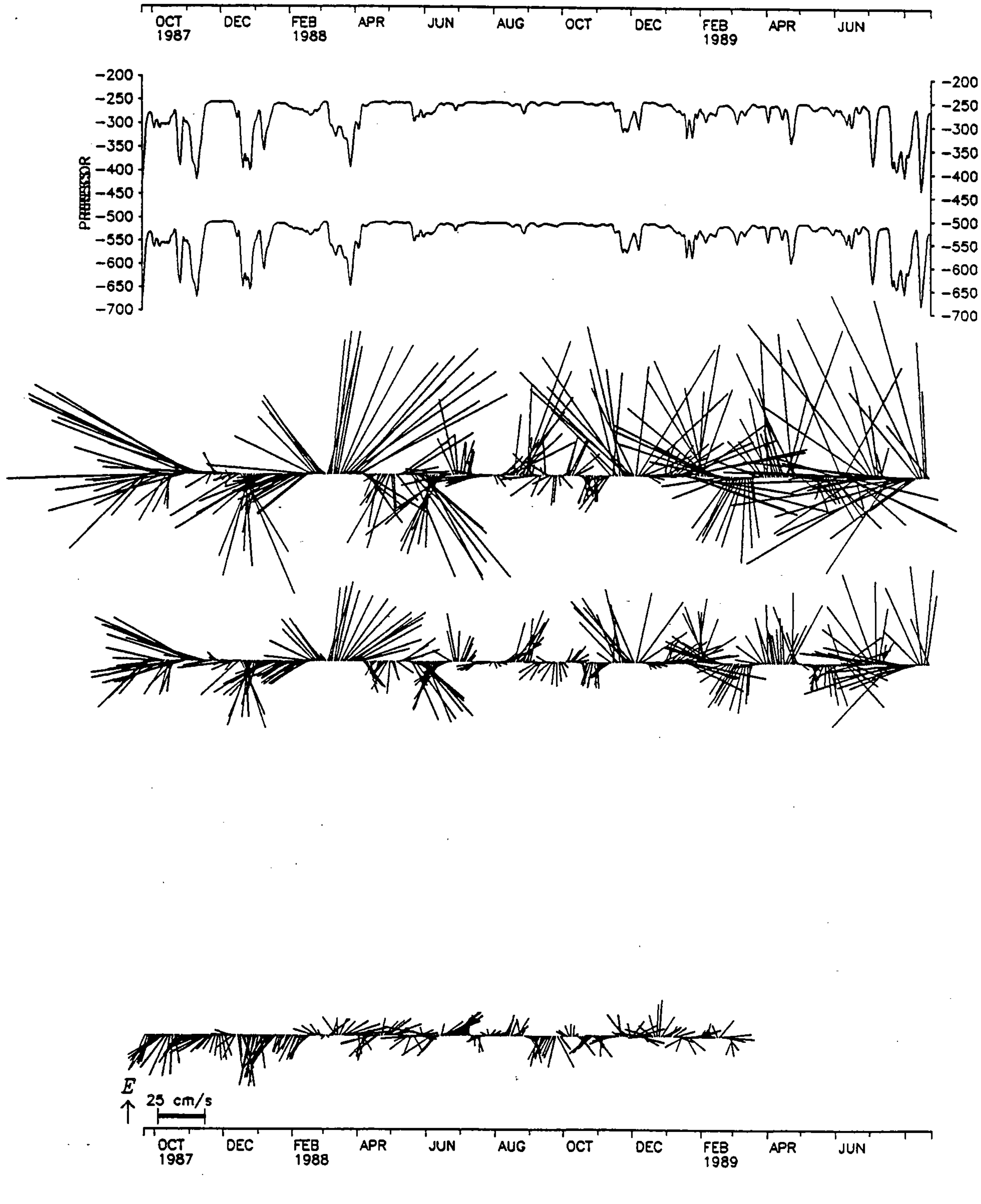
* Temperatures * depths are 269, 522 , 4018 meters

* Salinity * depth is 522 m.



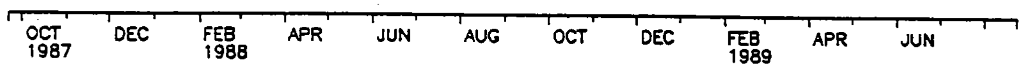
* Mooring 858 * SYNOP EAST – 2

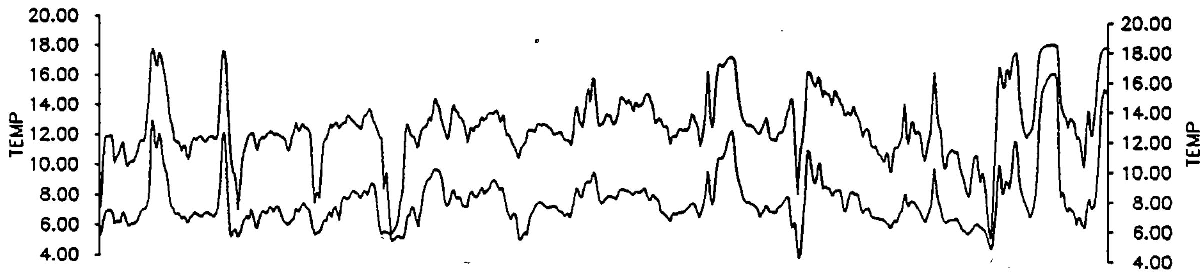
* Current Vectors * depths are 244,497, 3992 meters

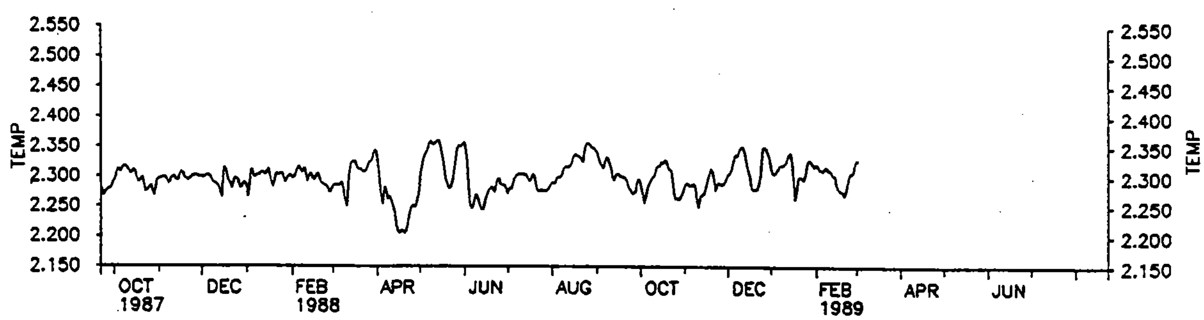


* *Mooring 858* * *SYNOP EAST – 2*

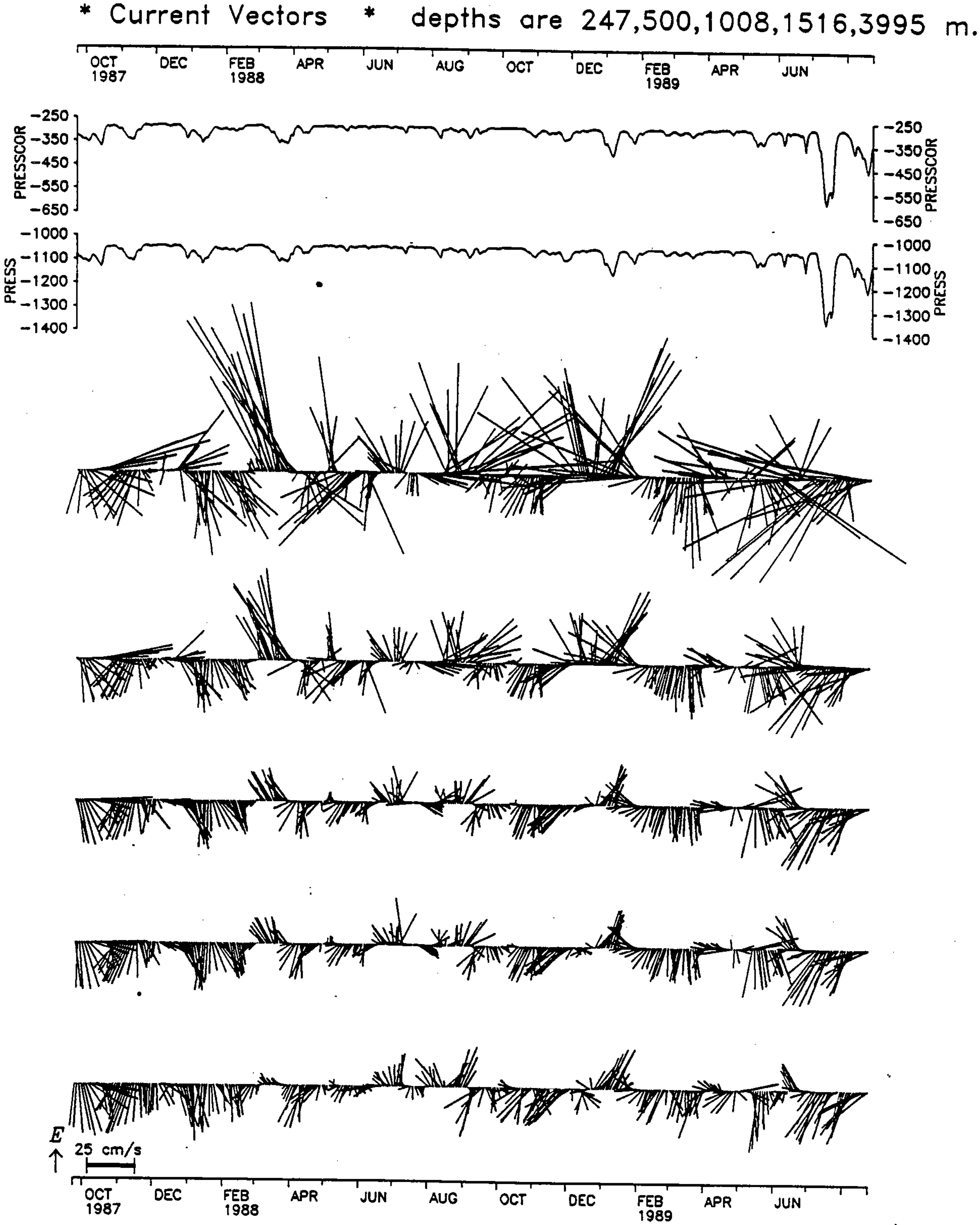
* Temperatures * depths are 244,497, 3992 meters





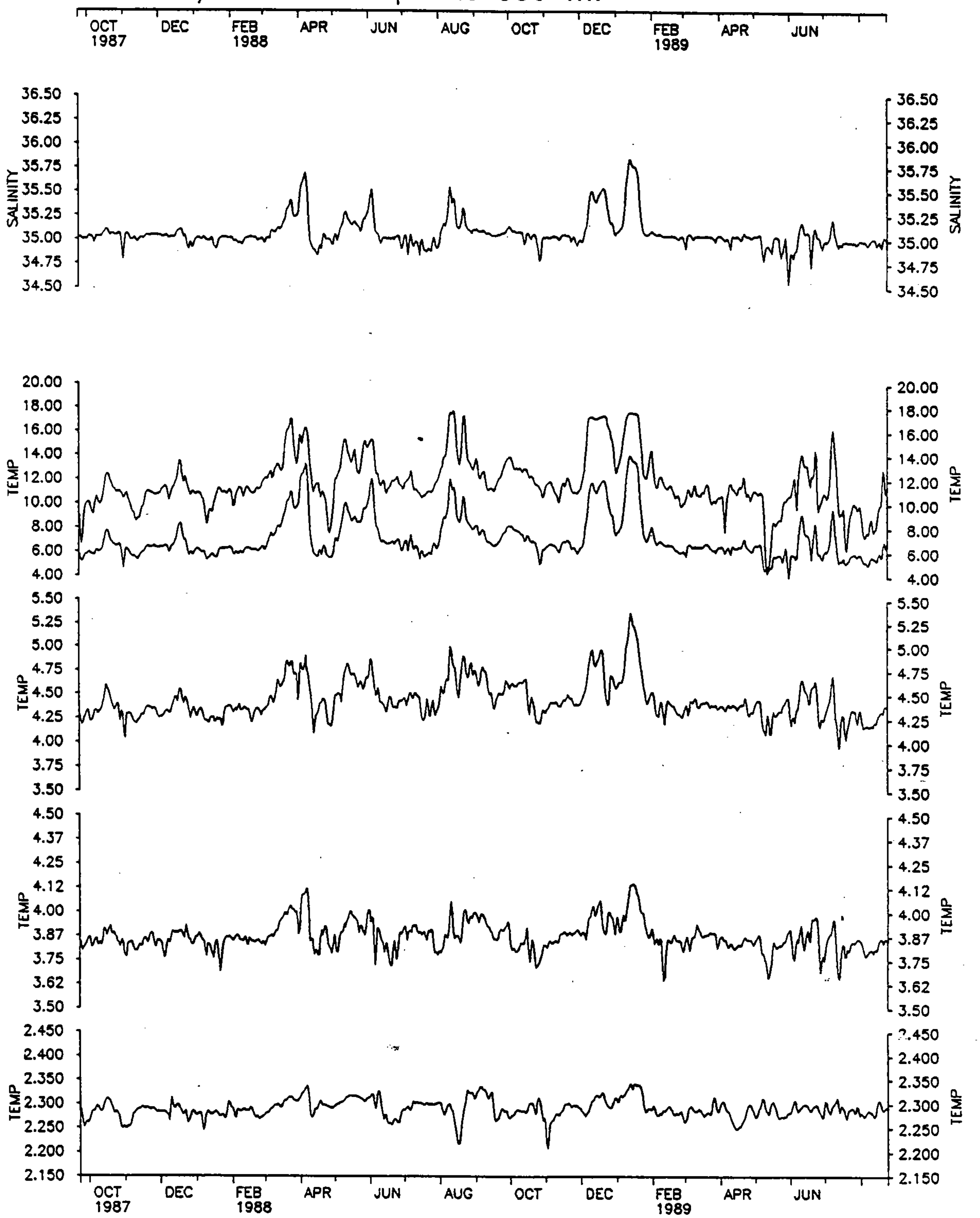


* Mooring 859 * SYNOP EAST - 3



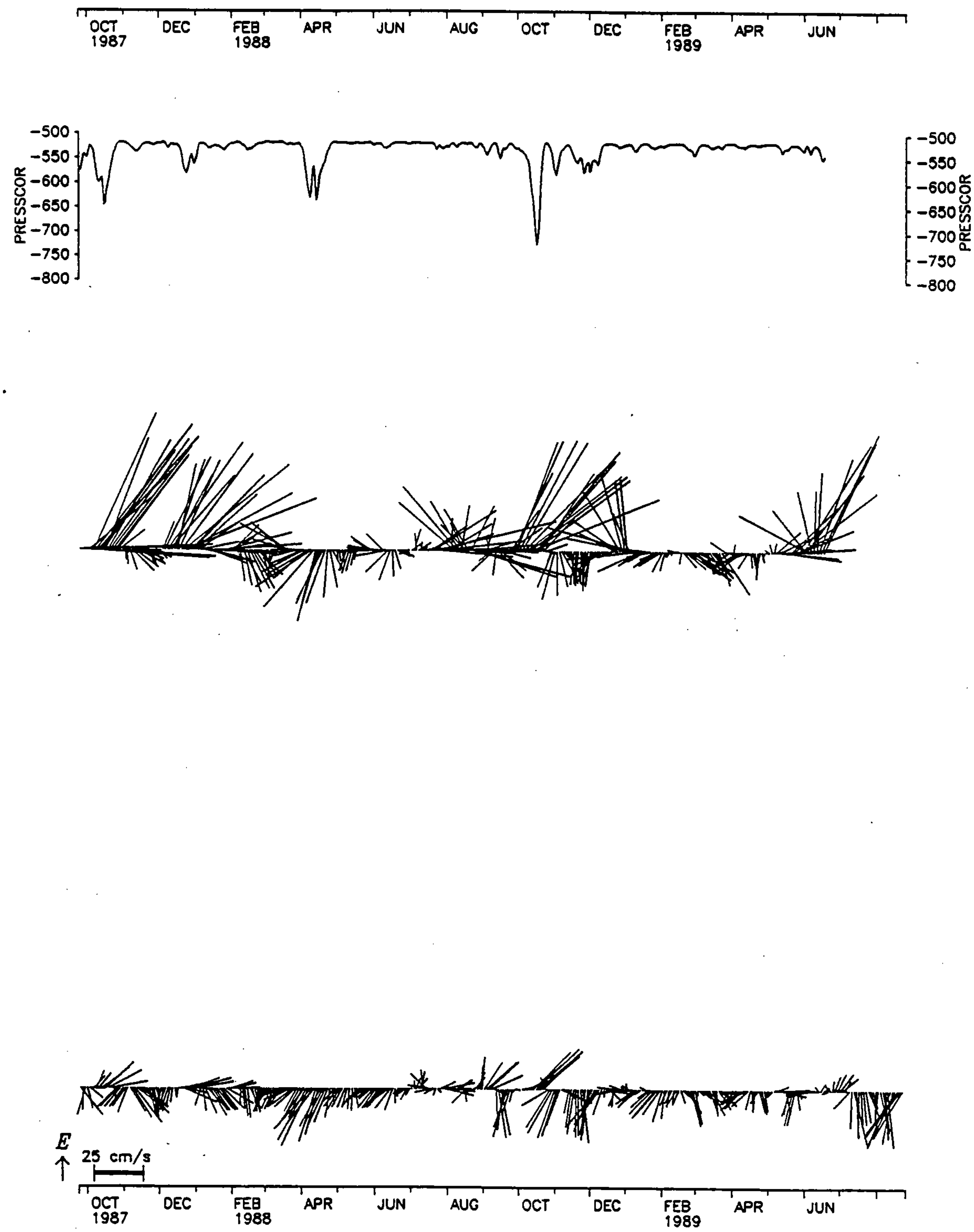
* Mooring 859 * SYNOP EAST - 3

* Temperatures * depths are 247,500,1008,1516,3995 meters
* Salinity * depth is 500 m.



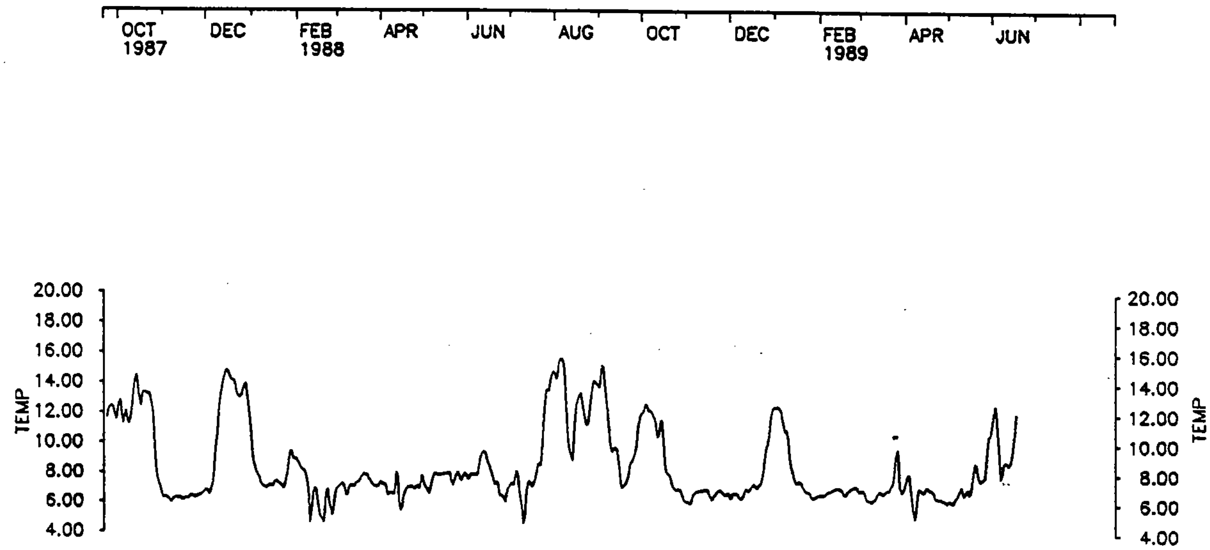
* Mooring 860 * SYNOP EAST - 4

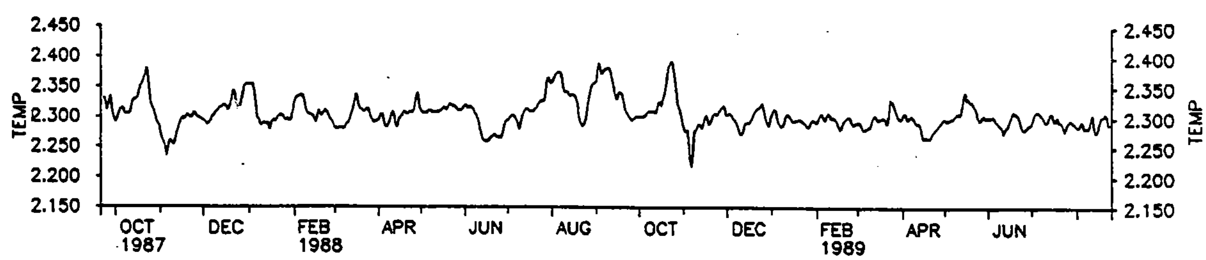
* Current Vectors * depths are 485 and 3996 meters



* *Mooring 860* * *SYNOP EAST – 4*

* Temperatures * depths are 485 and 3996 meters



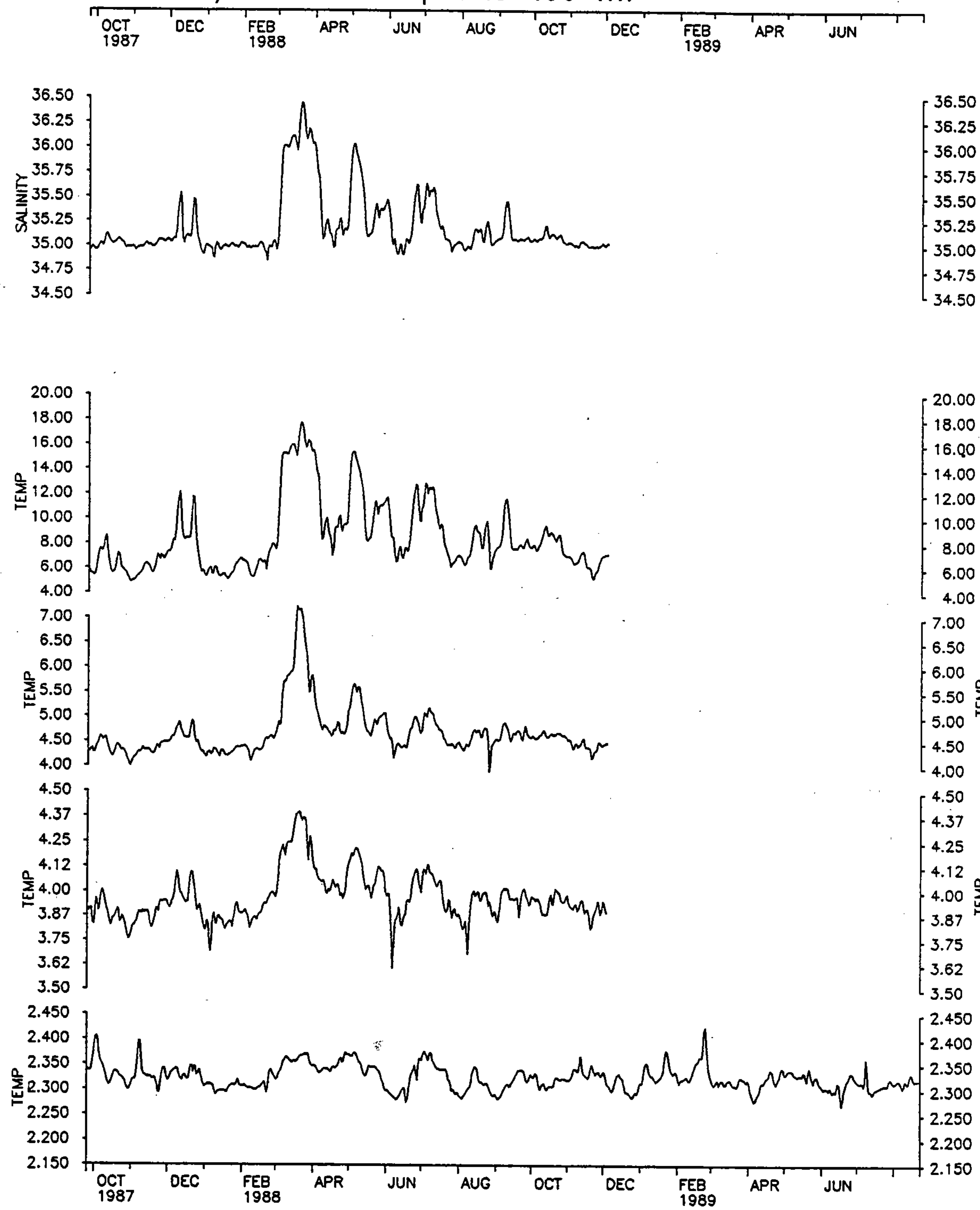


* *Mooring 861* * *SYNOP EAST – 5*

* Current Vectors * depths are 499,1007,1510,3997 meters

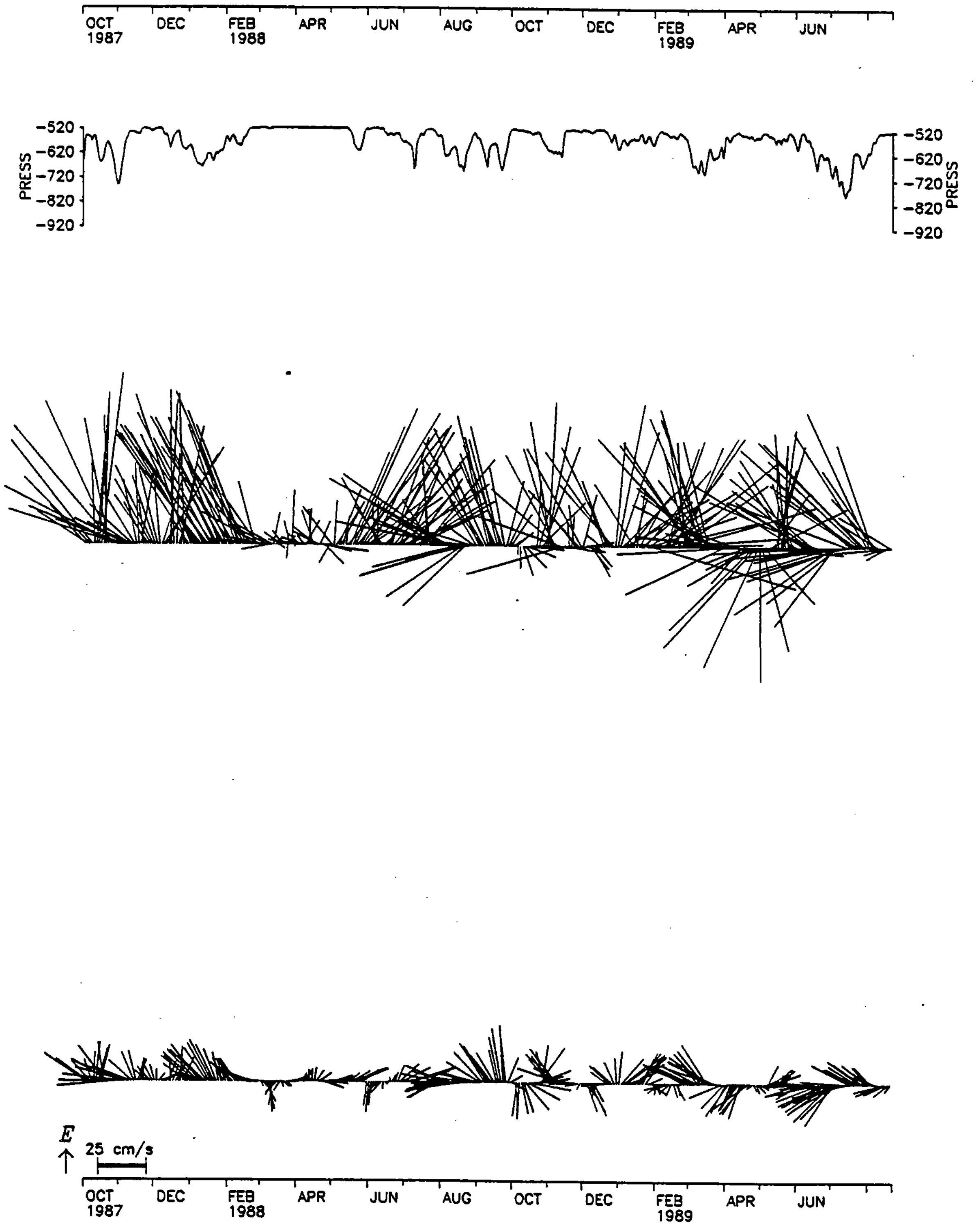
* Mooring 861 * SYNOP EAST – 5

* Temperatures * depths are 499,1007,1510,3997 meters
* Salinity * depth is 499 m.



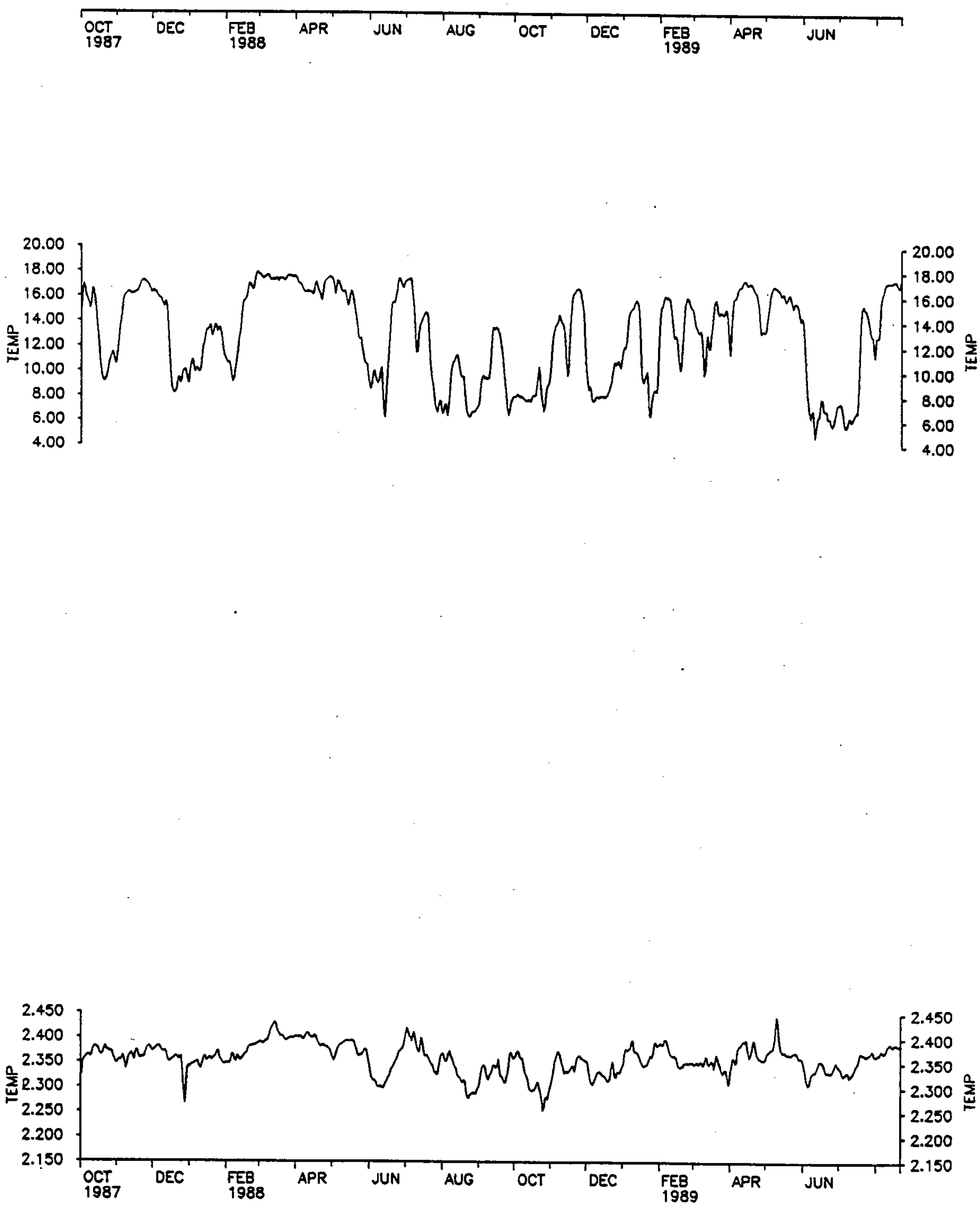
* *Mooring 862* * *SYNOP EAST – 6*

* Current Vectors * depths are 485 and 3997 meters



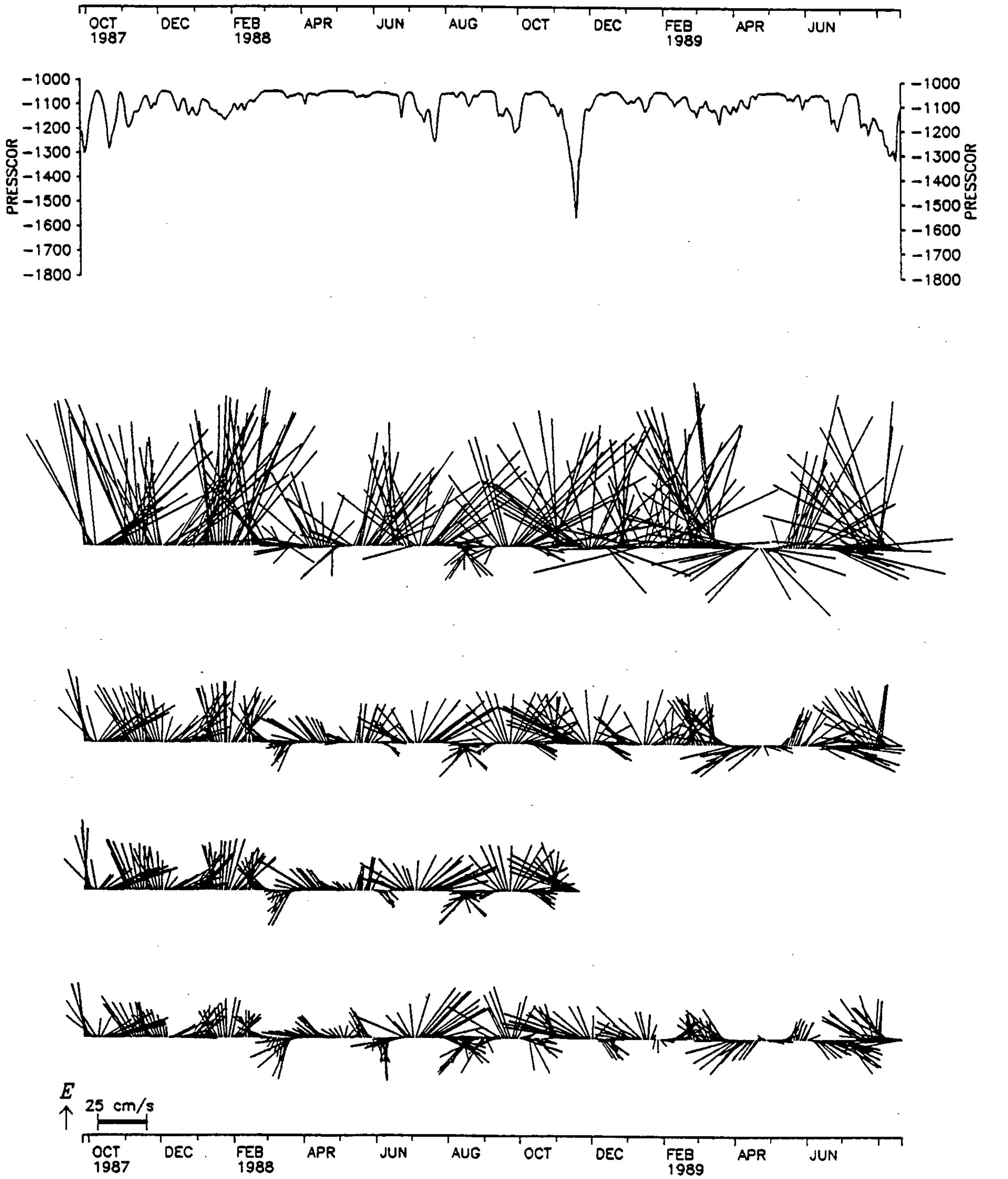
* *Mooring 862* * *SYNOP EAST – 6*

* Temperatures * depths are 485 and 3997 meters



* Mooring 863 * SYNOP EAST – 7

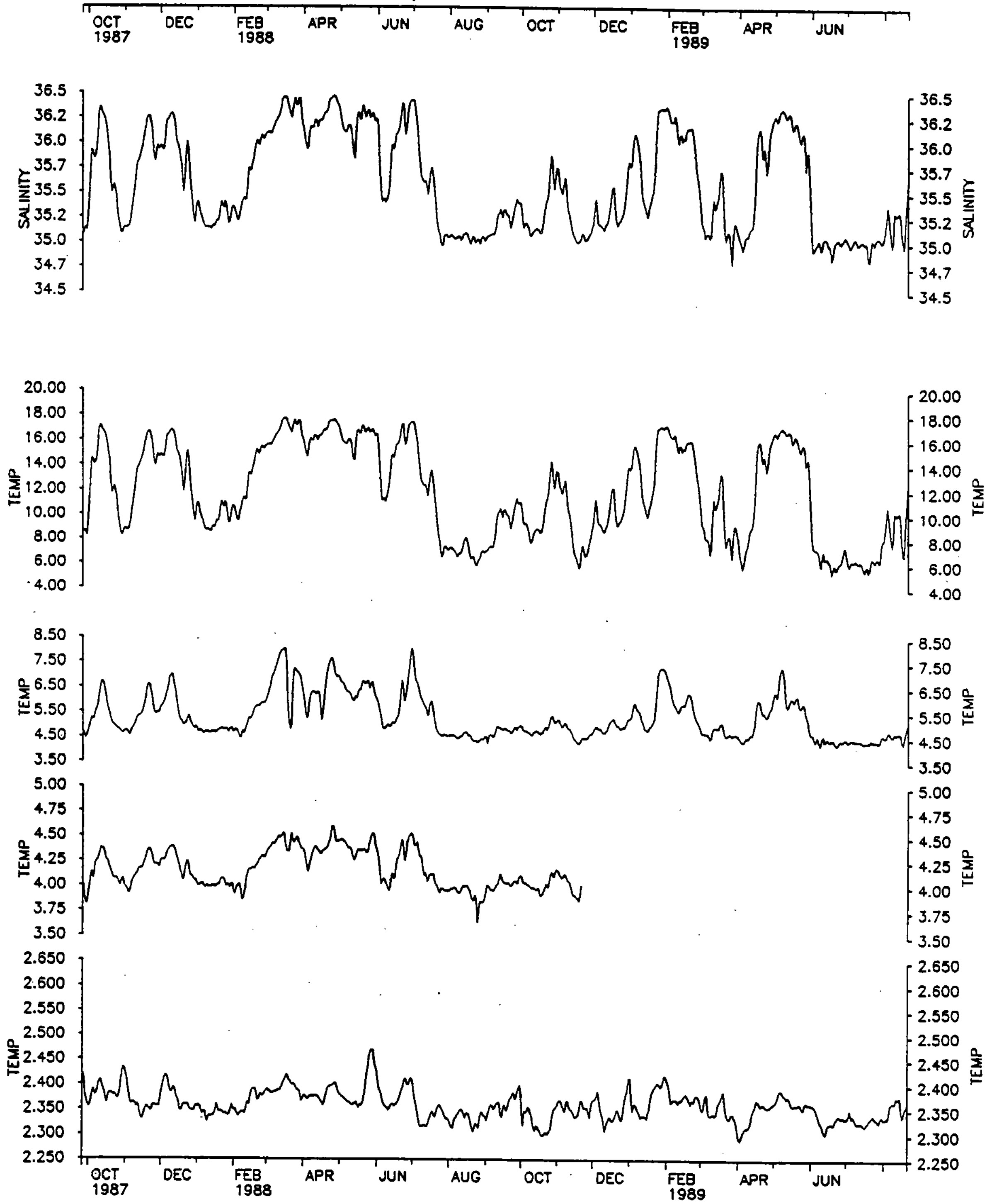
* Current Vectors * depths are 499,1006,1510,3996 meters



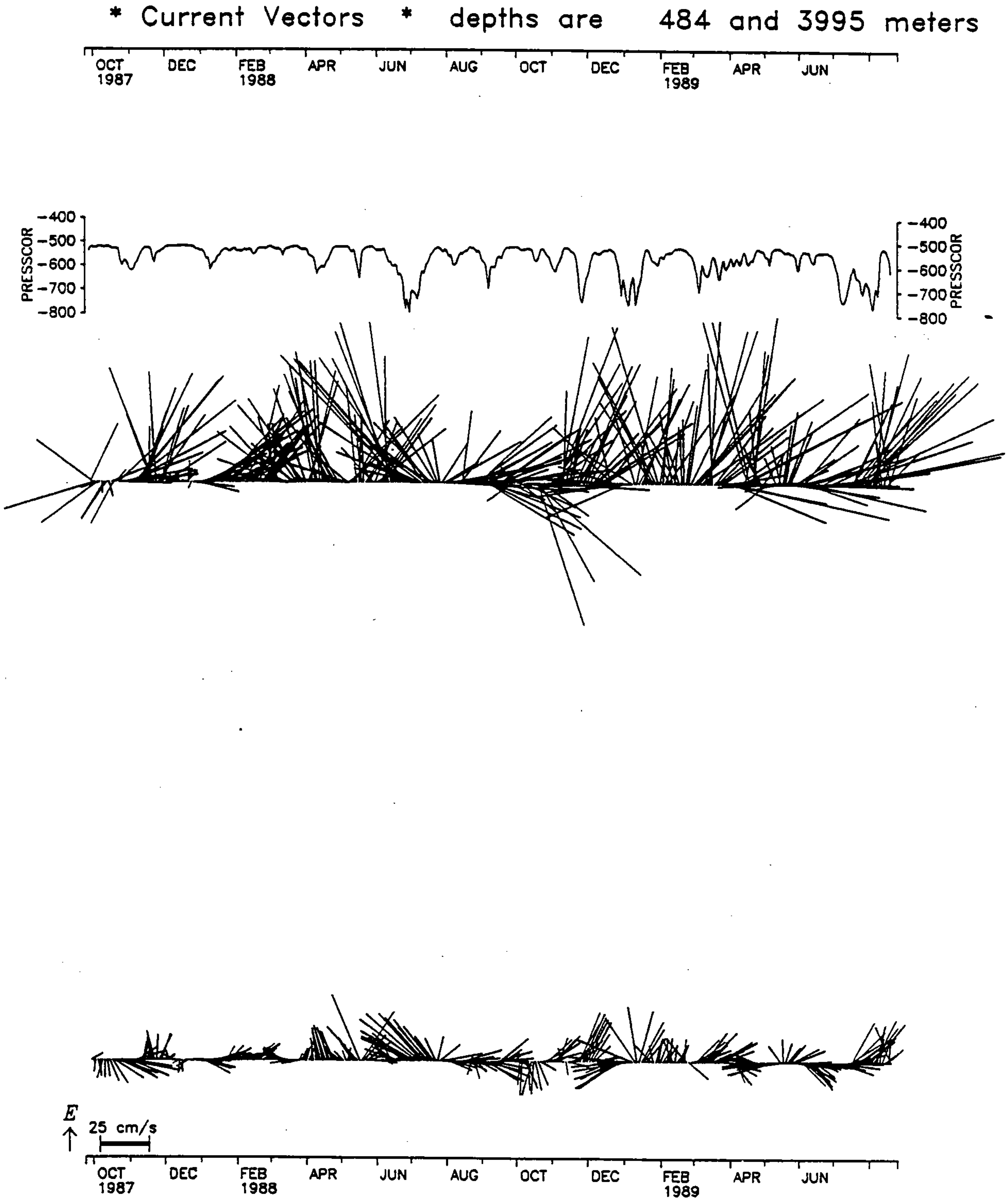
* *Mooring 863* * *SYNOP EAST – 7*

* Temperatures * depths are 499,1006,1510,3996 meters

* Salinity * depth is 499 m.

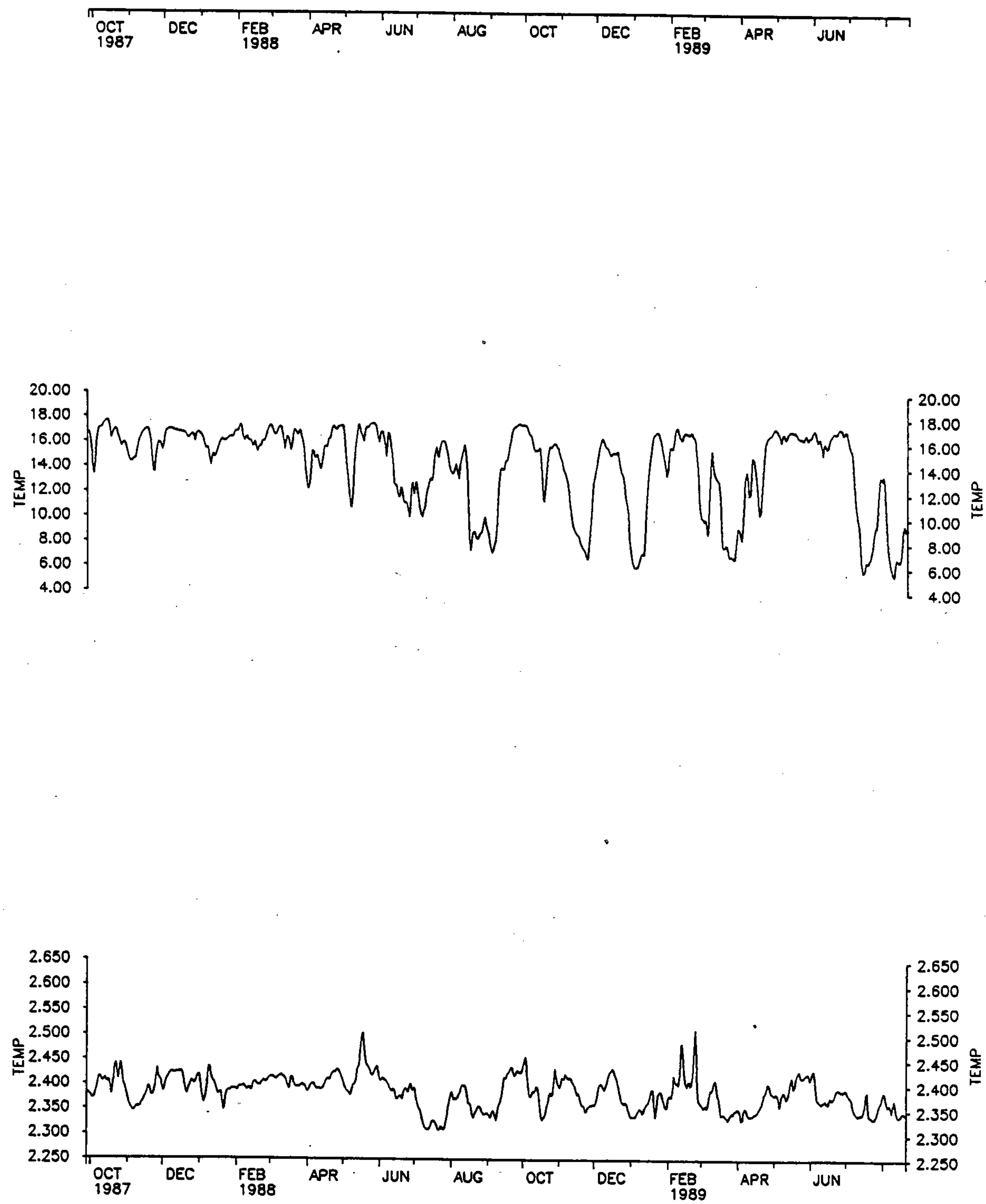


* Mooring 864 * SYNOP EAST - 8



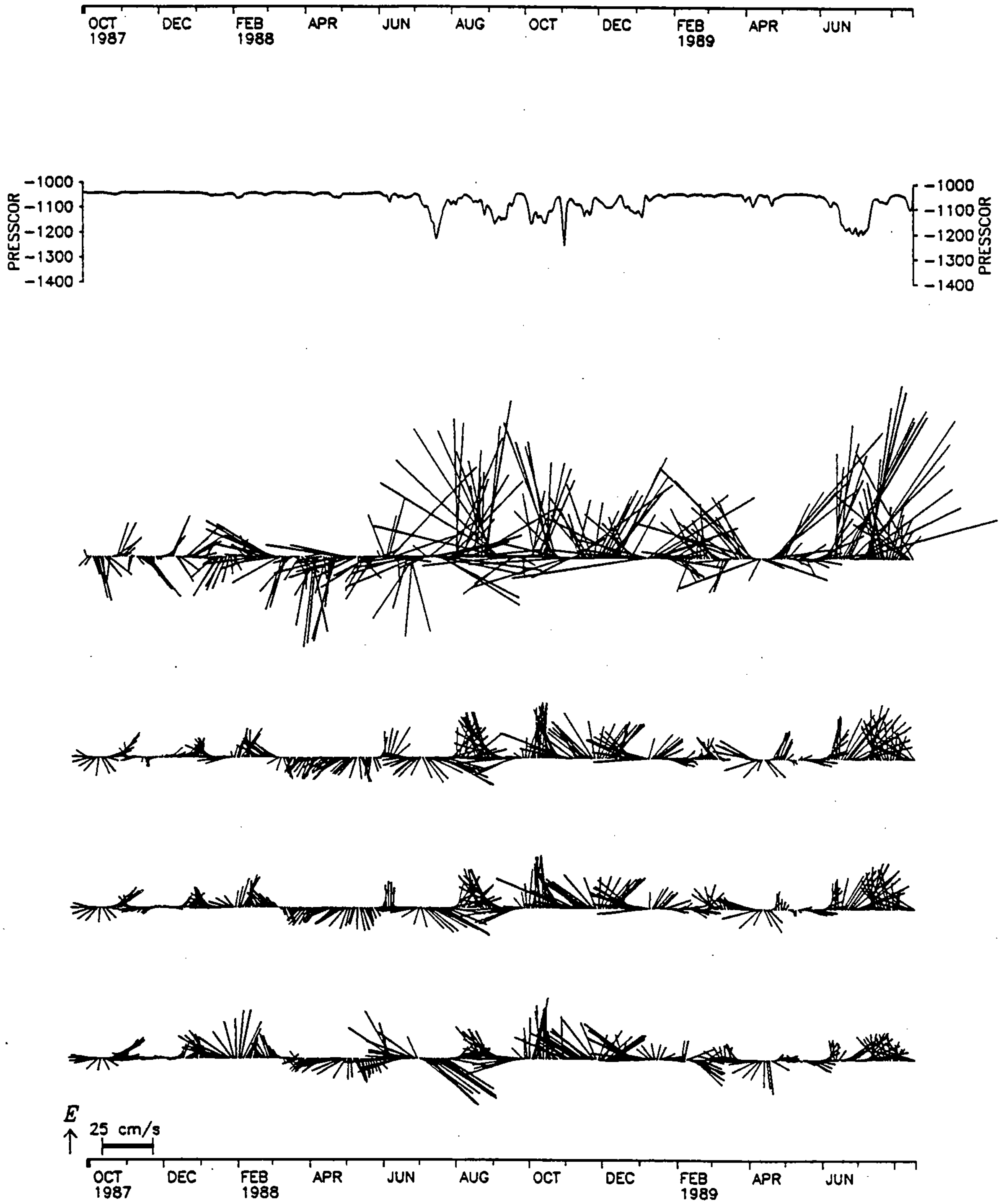
* *Mooring 864* * *SYNOP EAST – 8*

* Temperatures * depths are 484 and 3995 meters



* *Mooring 865* * *SYNOP EAST* – *9*

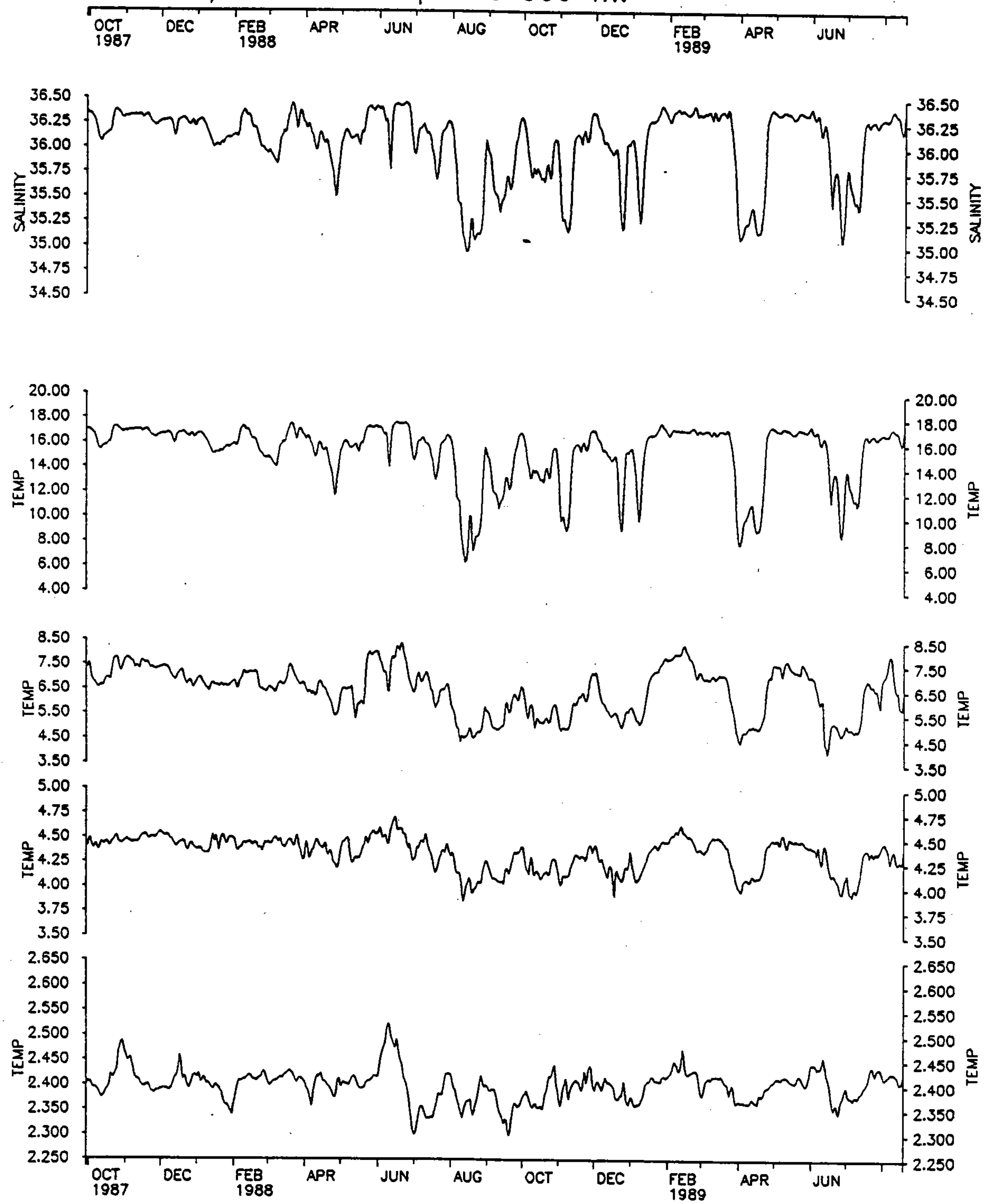
*** Current Vectors * depths are 500,1007,1511,3997 meters**



* *Mooring 865* * *SYNOP EAST* – 9

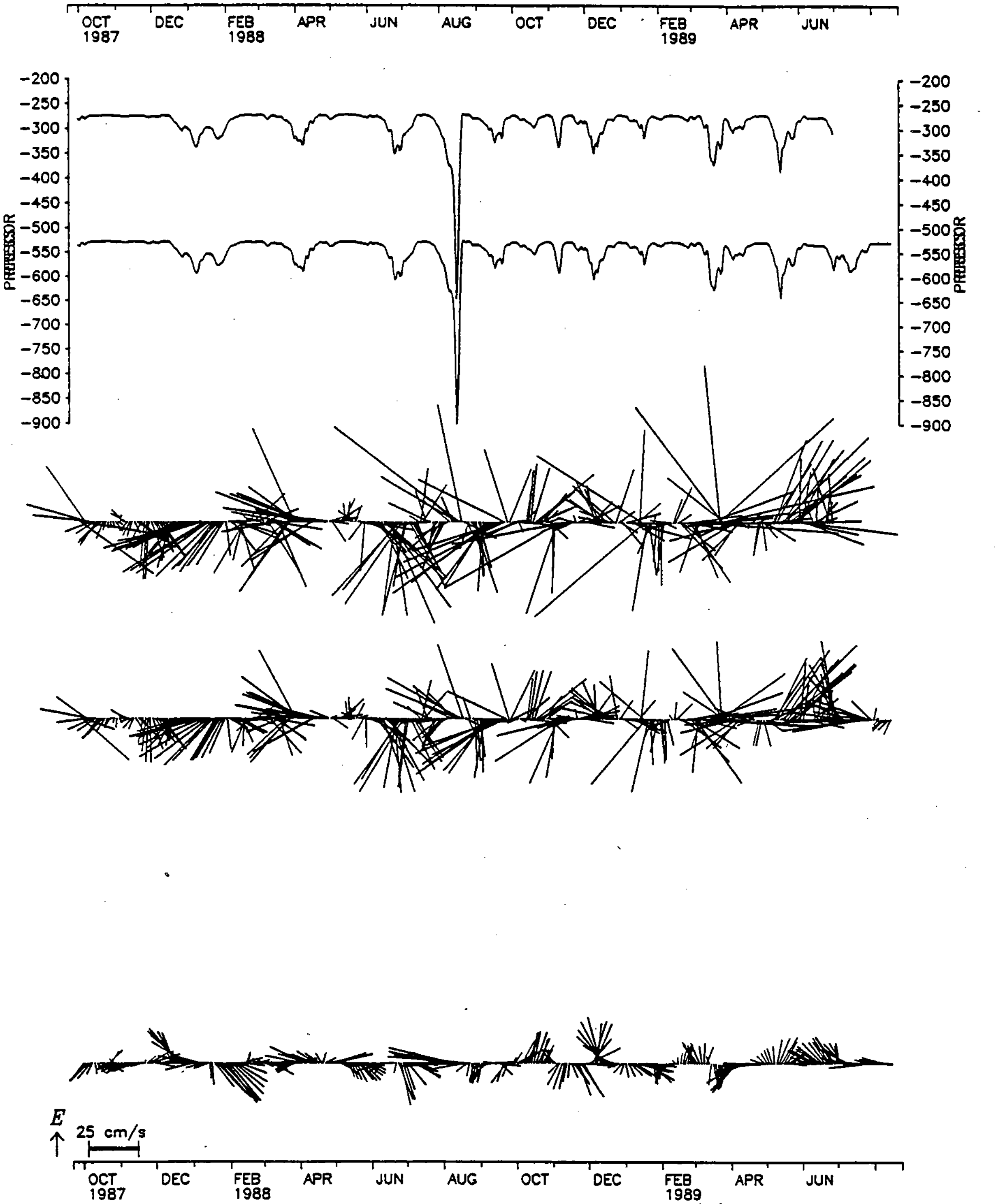
* Temperatures * depths are 500,1007,1511,3997 meters

* Salinity * depth is 500 m.



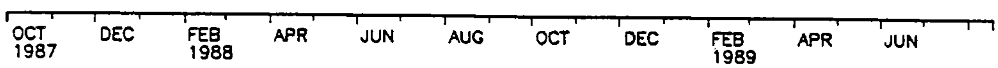
* Mooring 866 * SYNOP EAST – 10

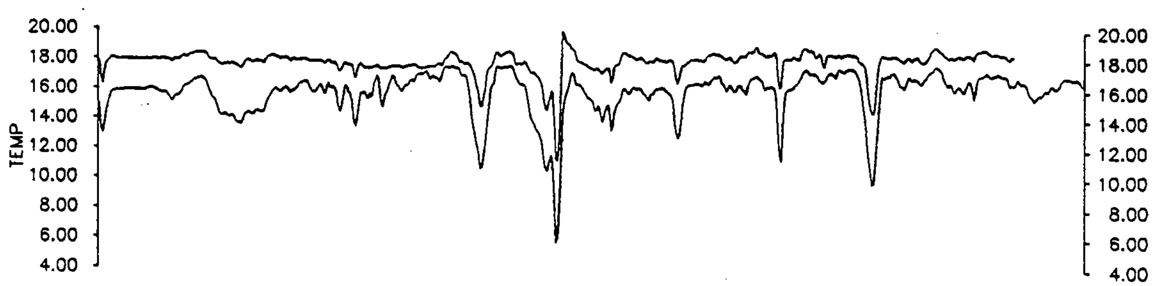
* Current Vectors * depths are 246, 500 , 3995 meters

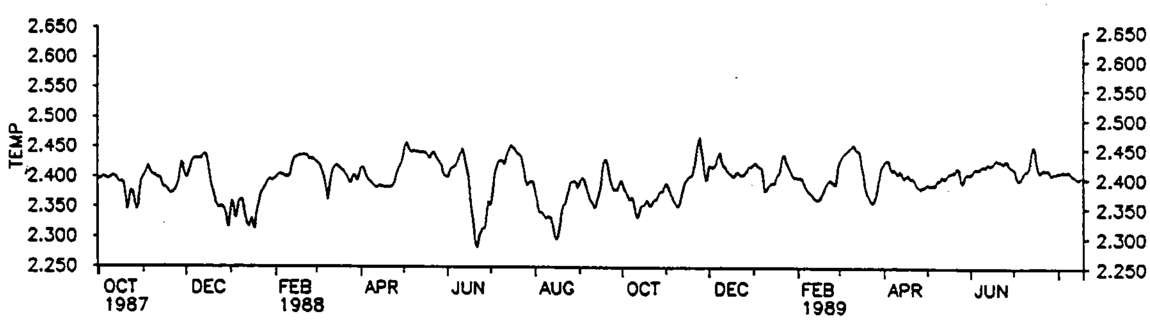


* *Mooring 866* * *SYNOP EAST – 10*

* Temperatures * depths are 246,500, 3995 meters

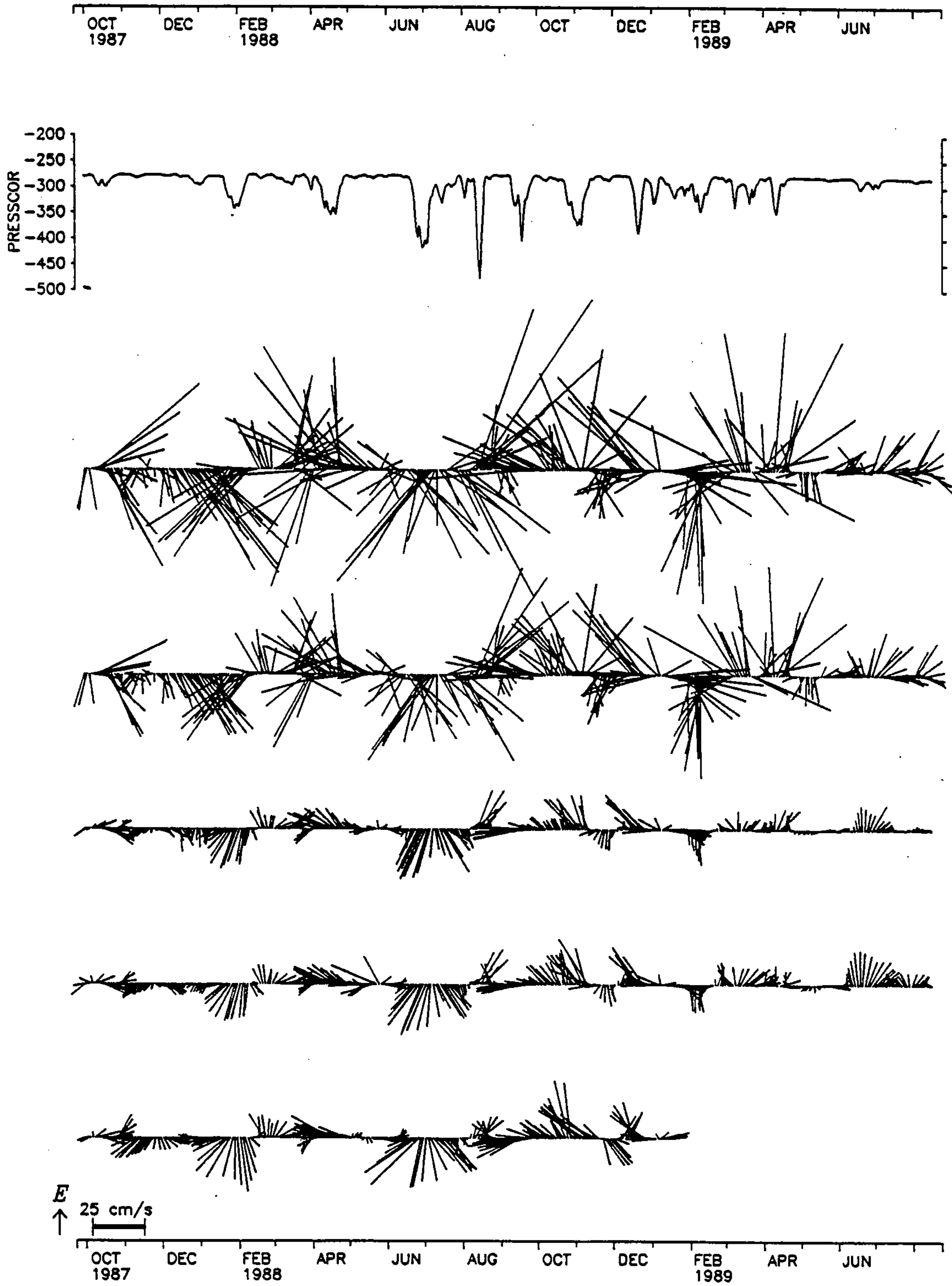






* Mooring 867 * SYNOP EAST – 11

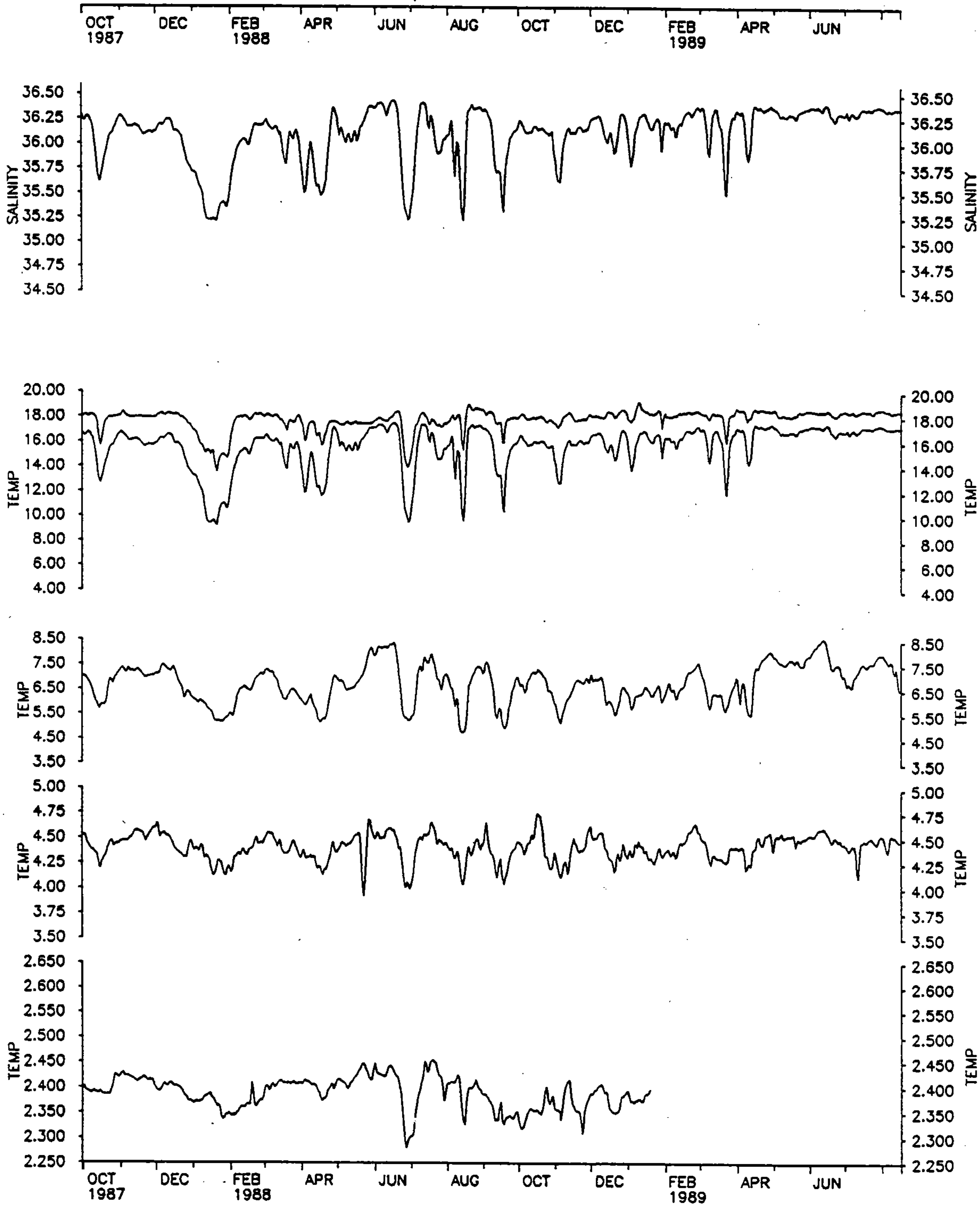
* Current Vectors * depths are 252,505,1012,1520,3999 m.



* *Mooring 867 * SYNOP EAST – 11*

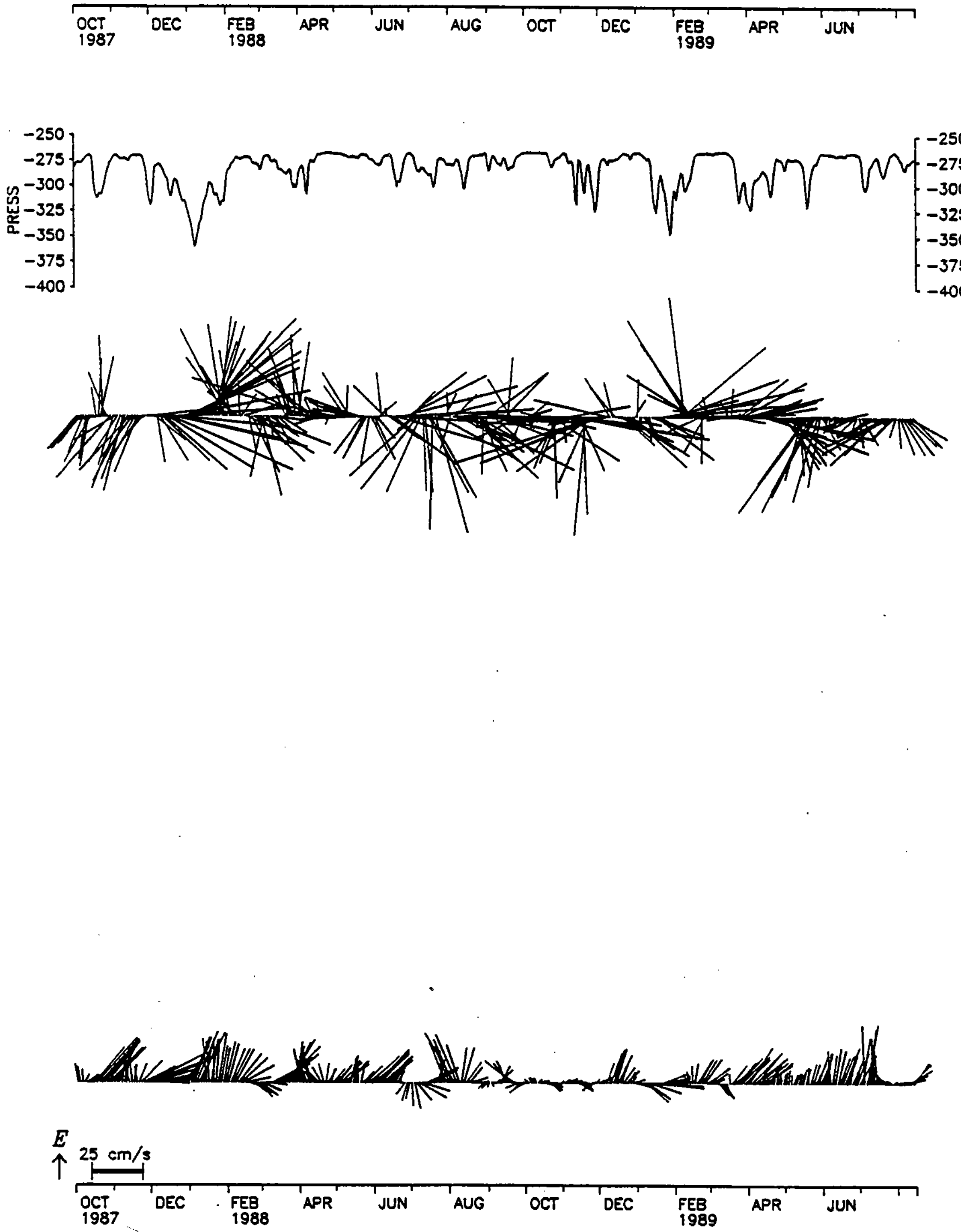
* Temperatures * depths are 252,505,1012,1520,3999 meters

* Salinity * depth is 505 m.



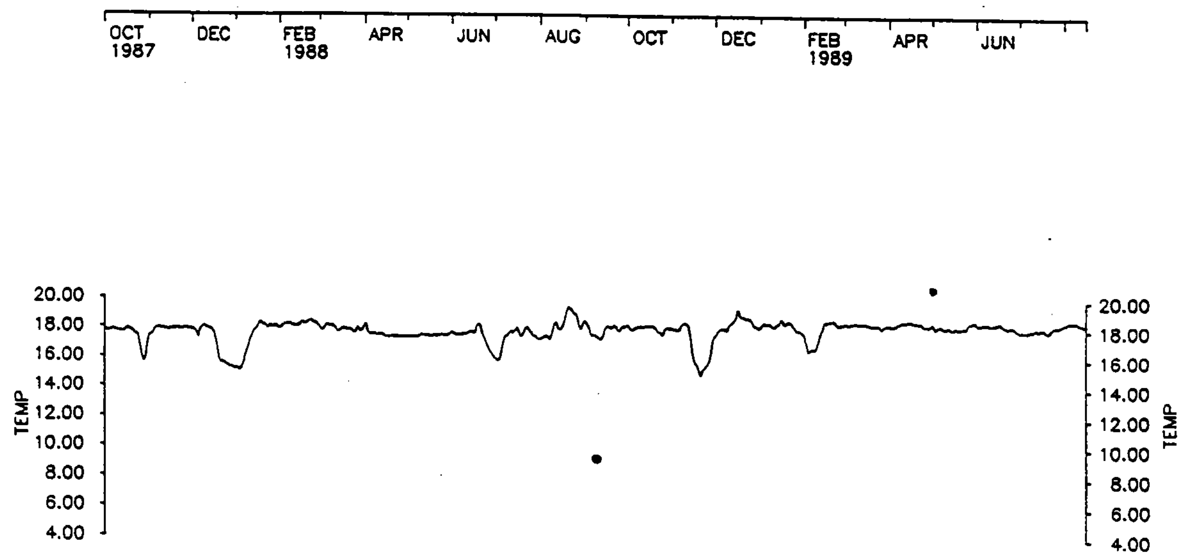
* Mooring 868 * SYNOP EAST – 12

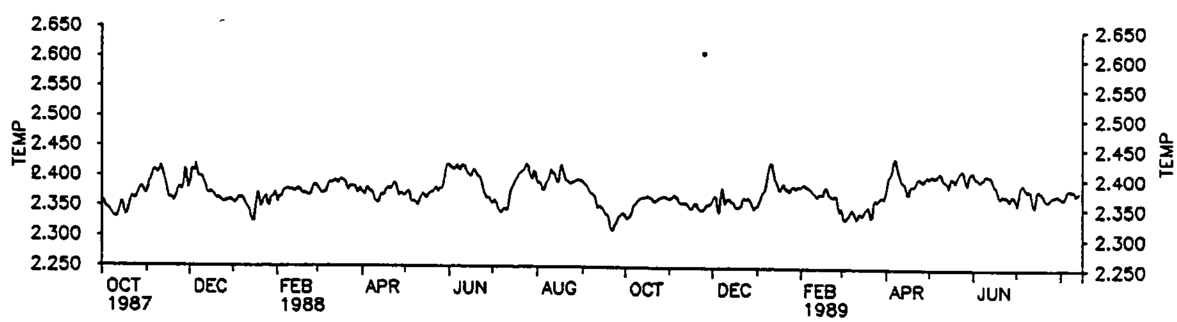
* Current Vectors * depths are 247 and 3996 meters



* *Mooring 868 * SYNOP EAST – 12*

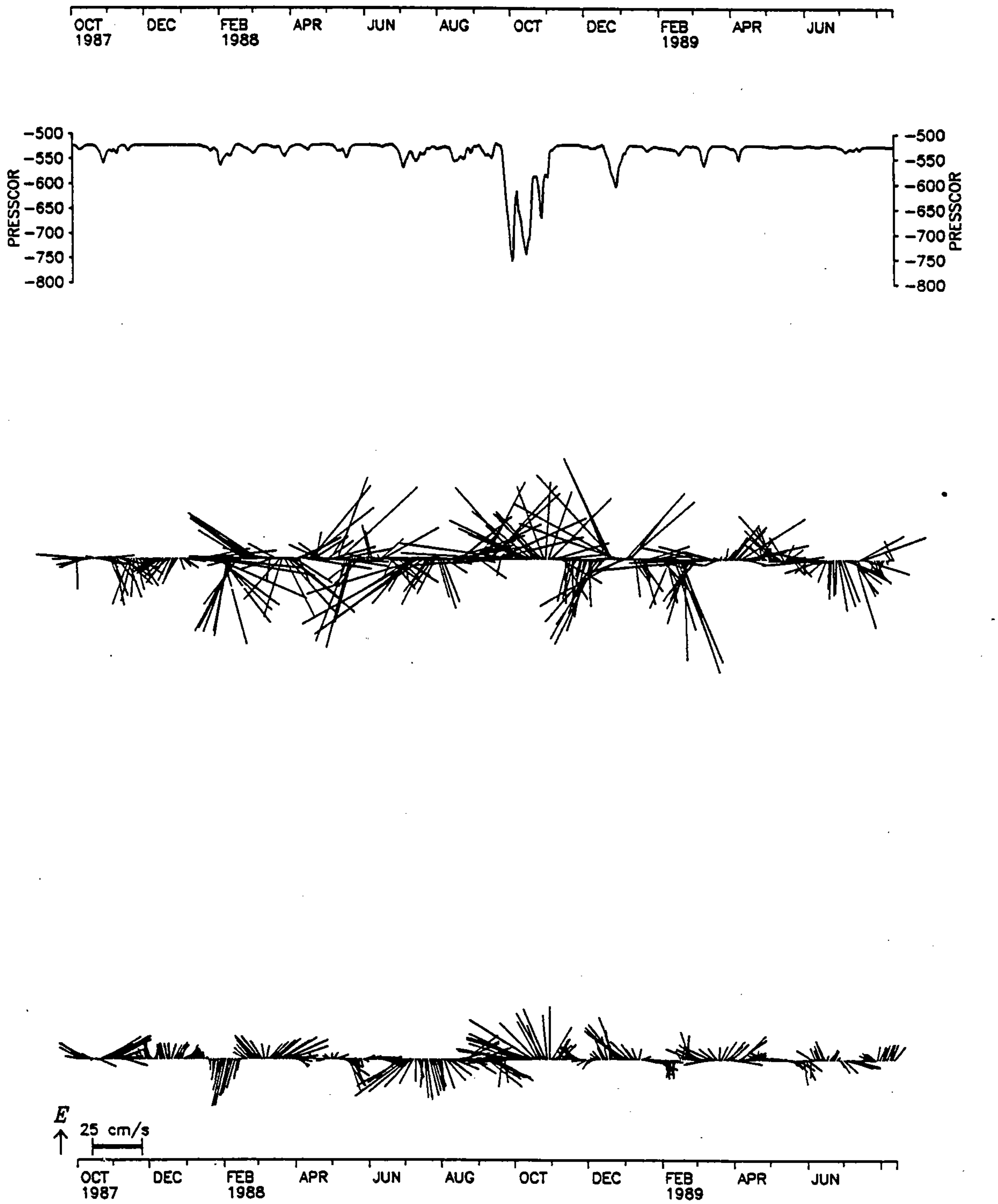
* Temperatures * depths are 257 and 3996 meters





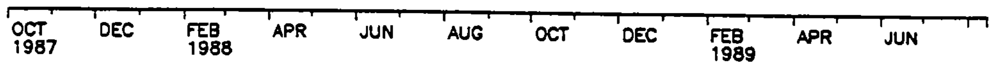
* *Mooring 869* * *SYNOP EAST – 13*

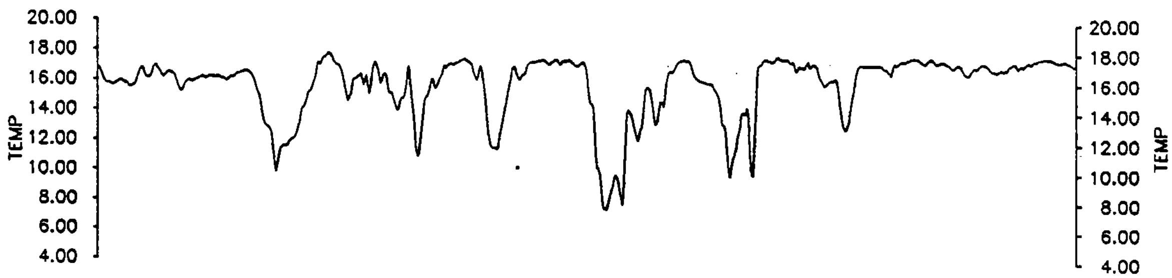
* Current Vectors * depths are 497 and 4008 meters

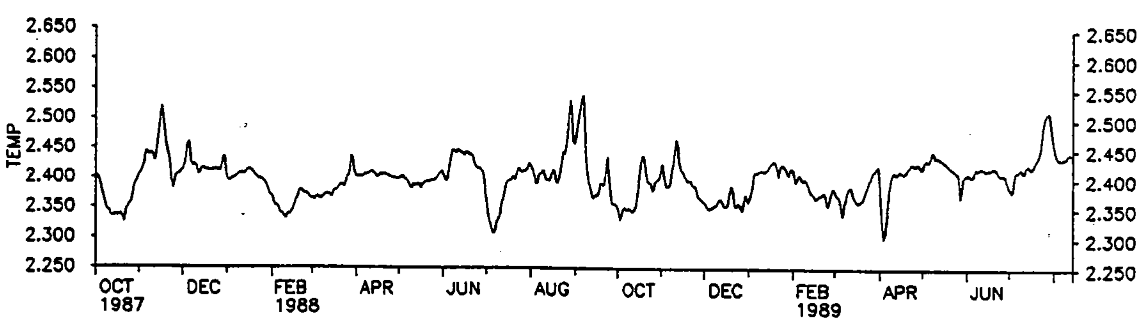


* *Mooring 869* * *SYNOP EAST – 13*

* Temperatures * depths are 497 and 4008 meters

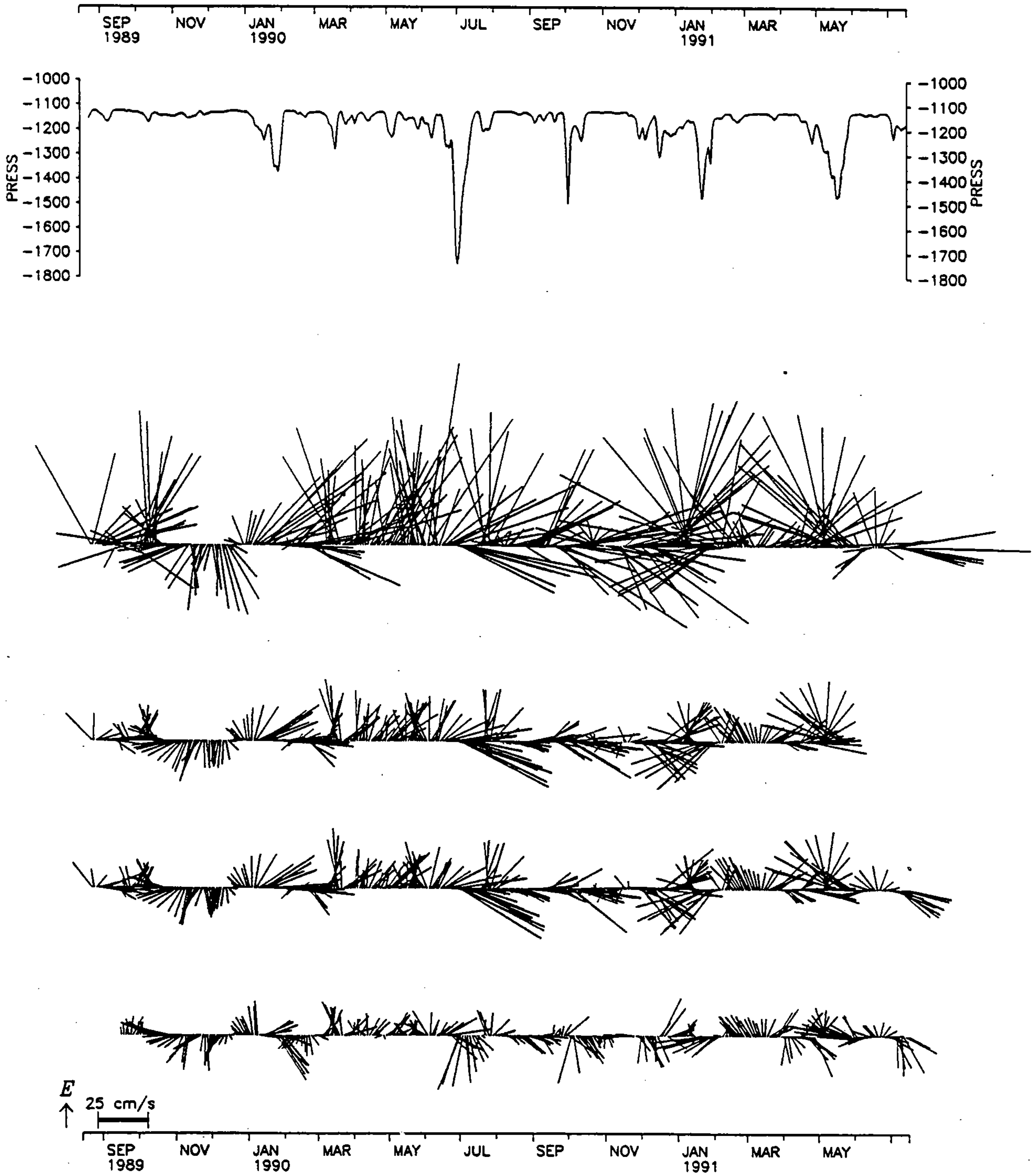






* *Mooring 896* * *SYNOP EAST – 7*

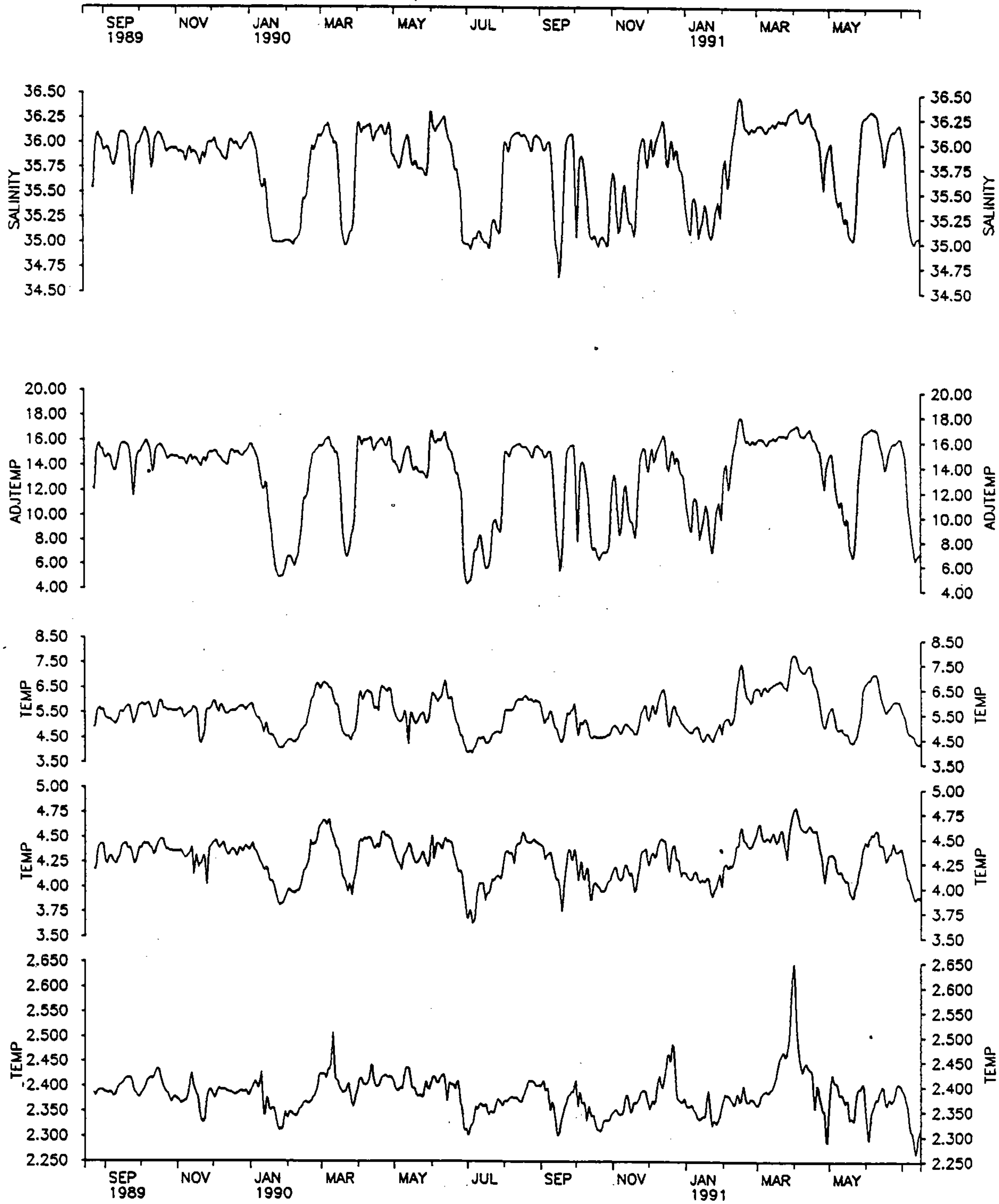
* Current Vectors * depths are 602,1102,1502,4001 meters



* *Mooring 896* * *SYNOP EAST – 7*

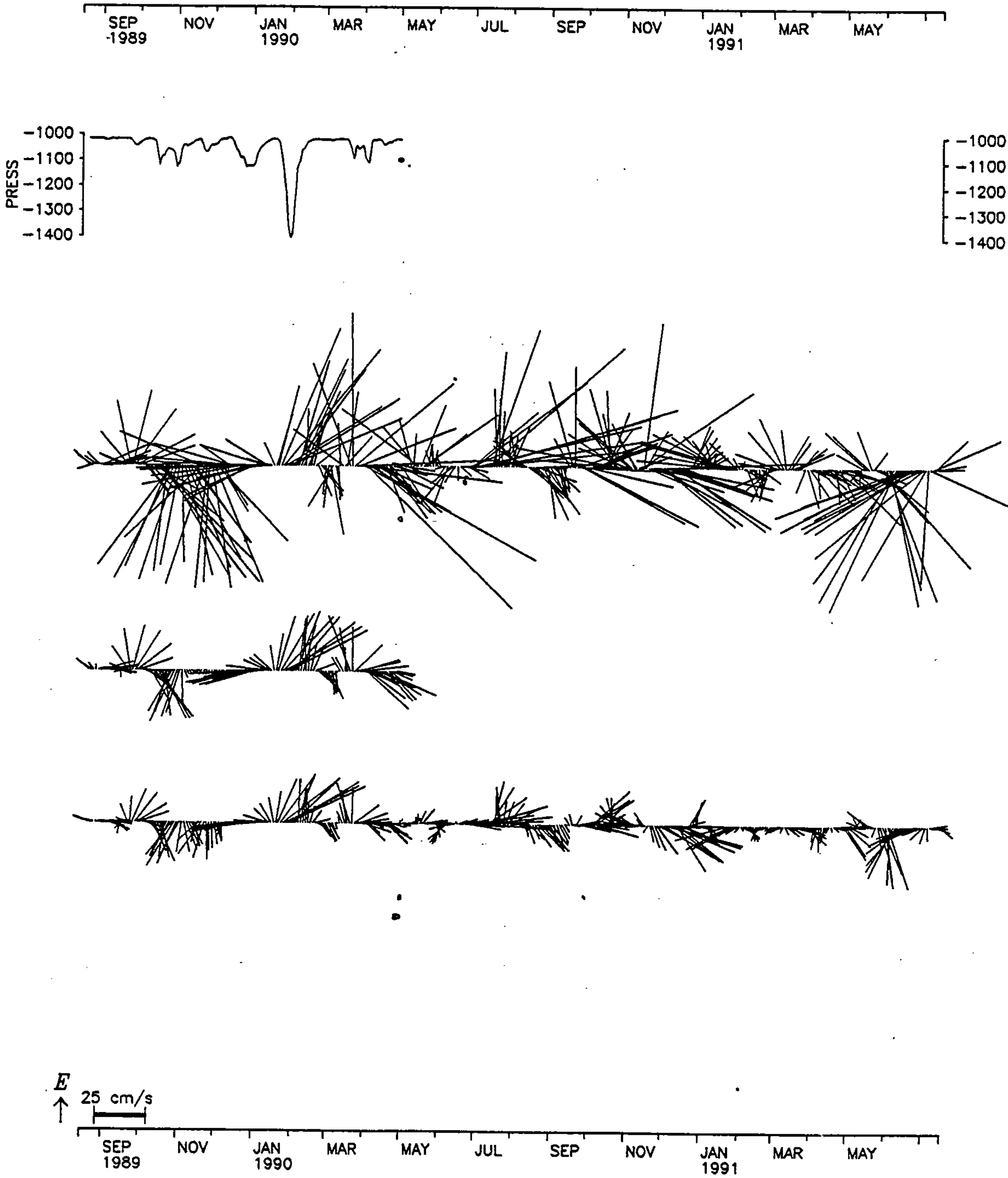
* Temperatures * depths are 602,1102,1502,4001 meters

* Salinity * depth is 602 m.



* *Mooring 895* * *SYNOP EAST – 9*

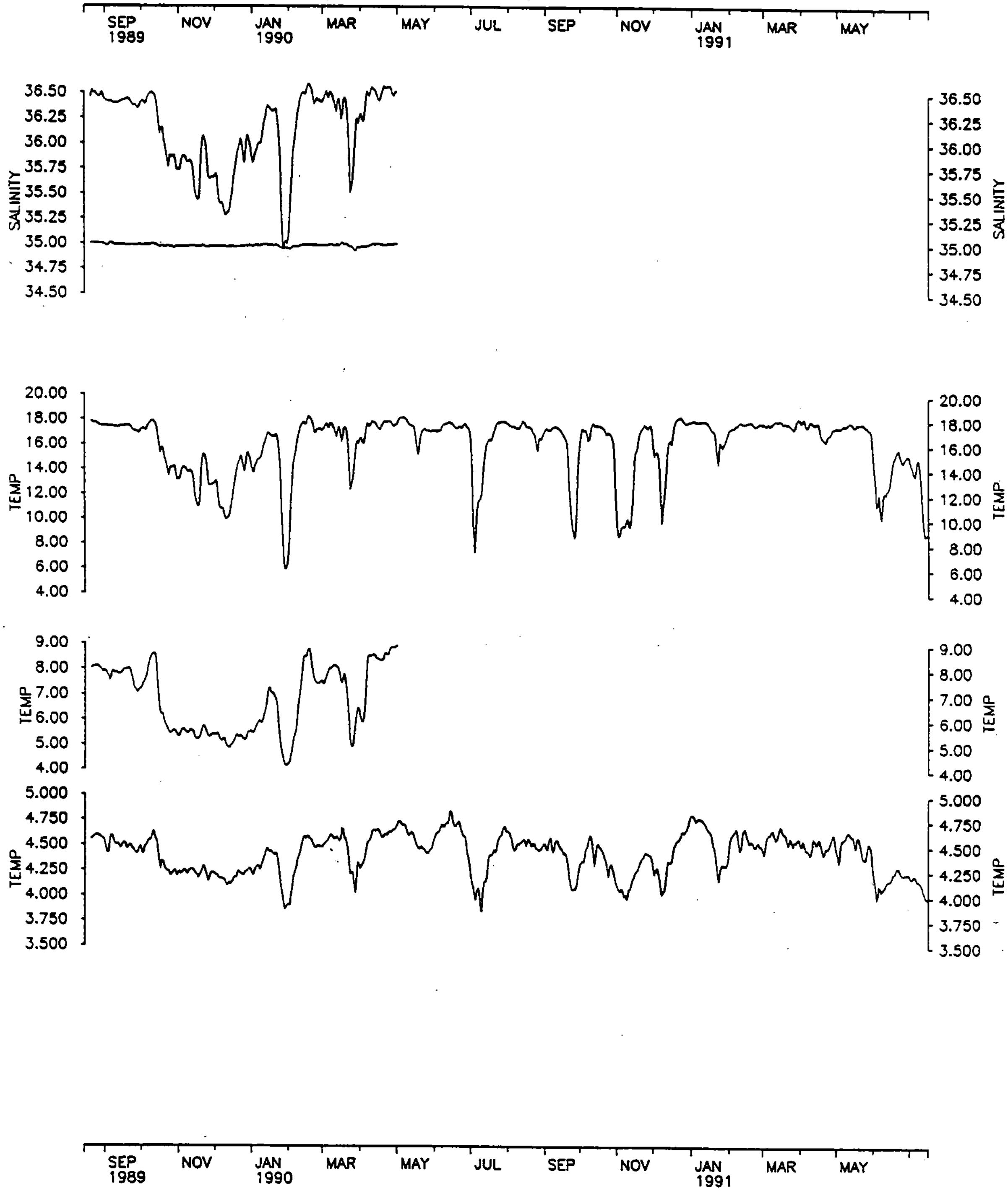
* Current Vectors * depths are 504,1003,1503 meters



* Mooring 895 * SYNOP EAST - 9

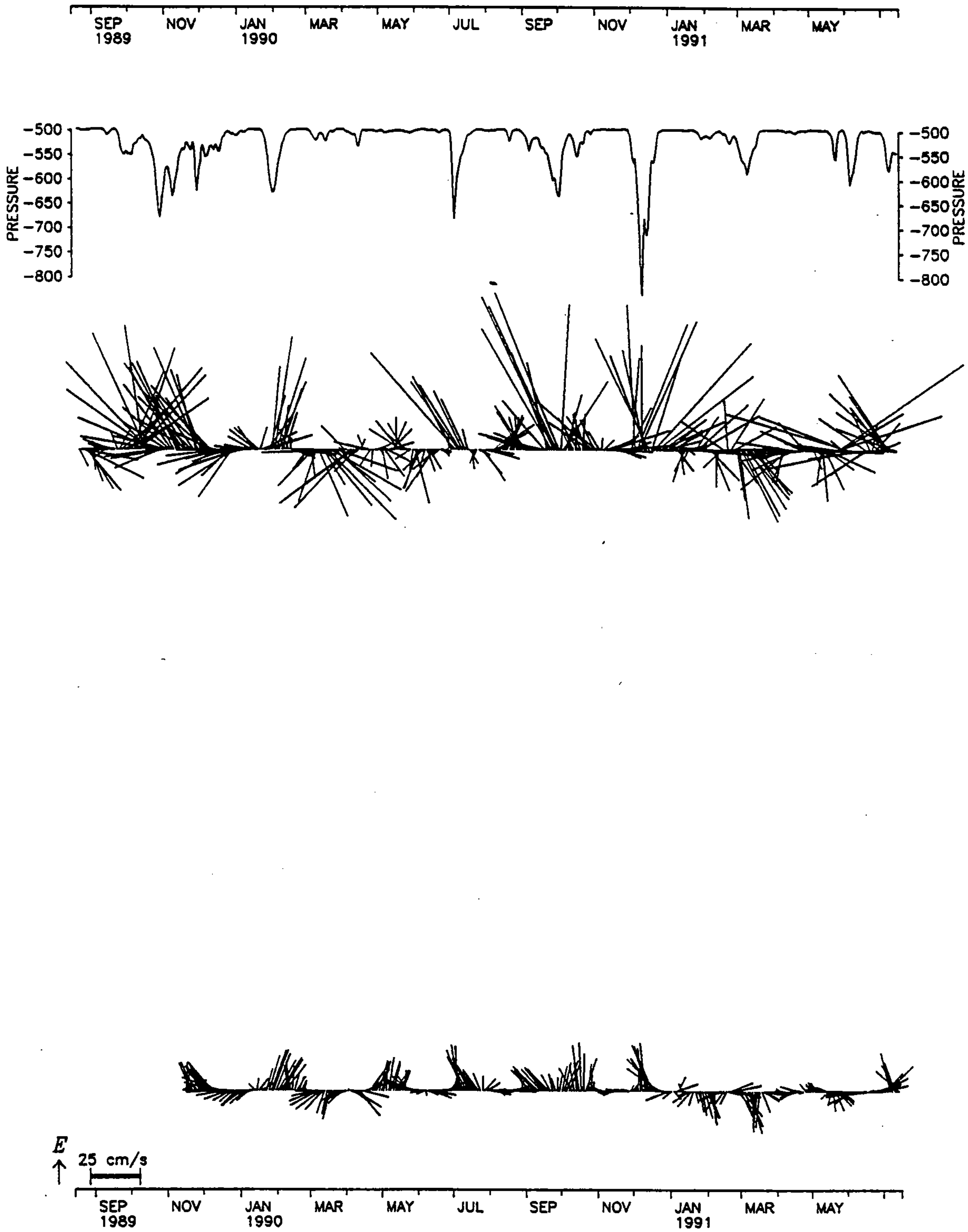
* Temperatures * depths are 504,1003,1503 meters

* Salinity * depths are 504,1003 m.



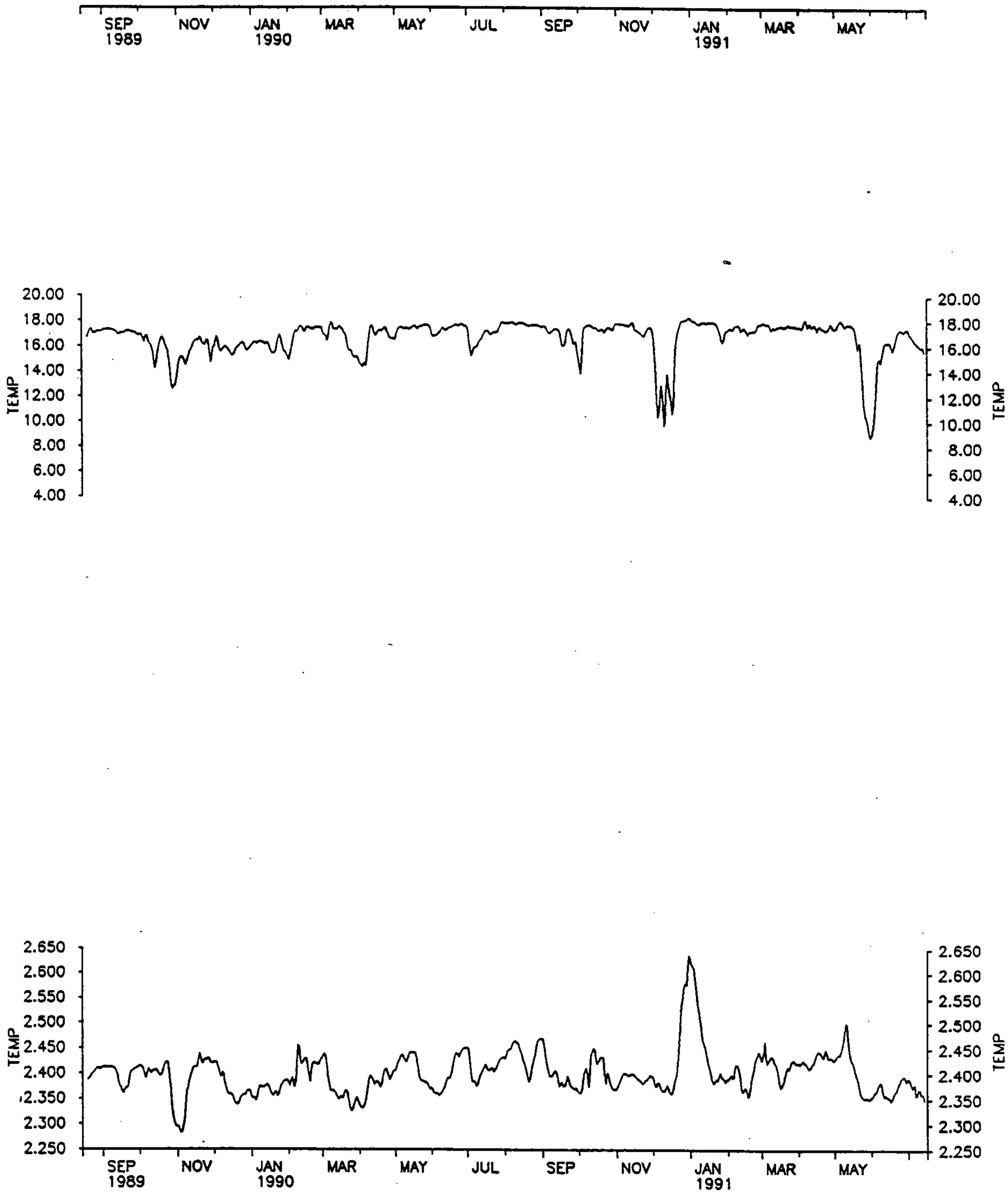
* Mooring 894 * SYNOP EAST - 10

* Current Vectors * depths are 493 and 4003 meters



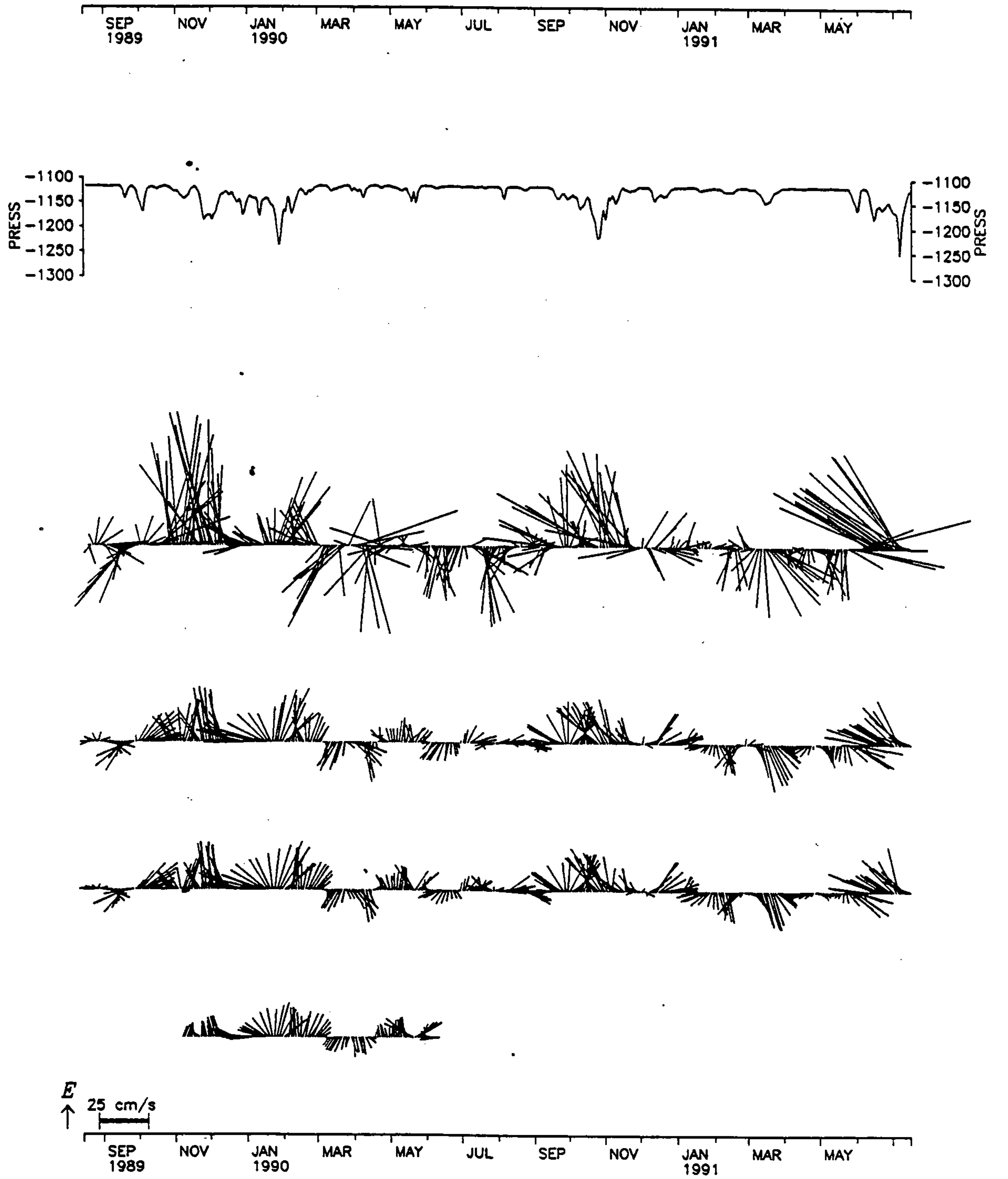
* *Mooring 894 * SYNOP EAST – 10*

* Temperatures * depths are 493 and 4003 meters



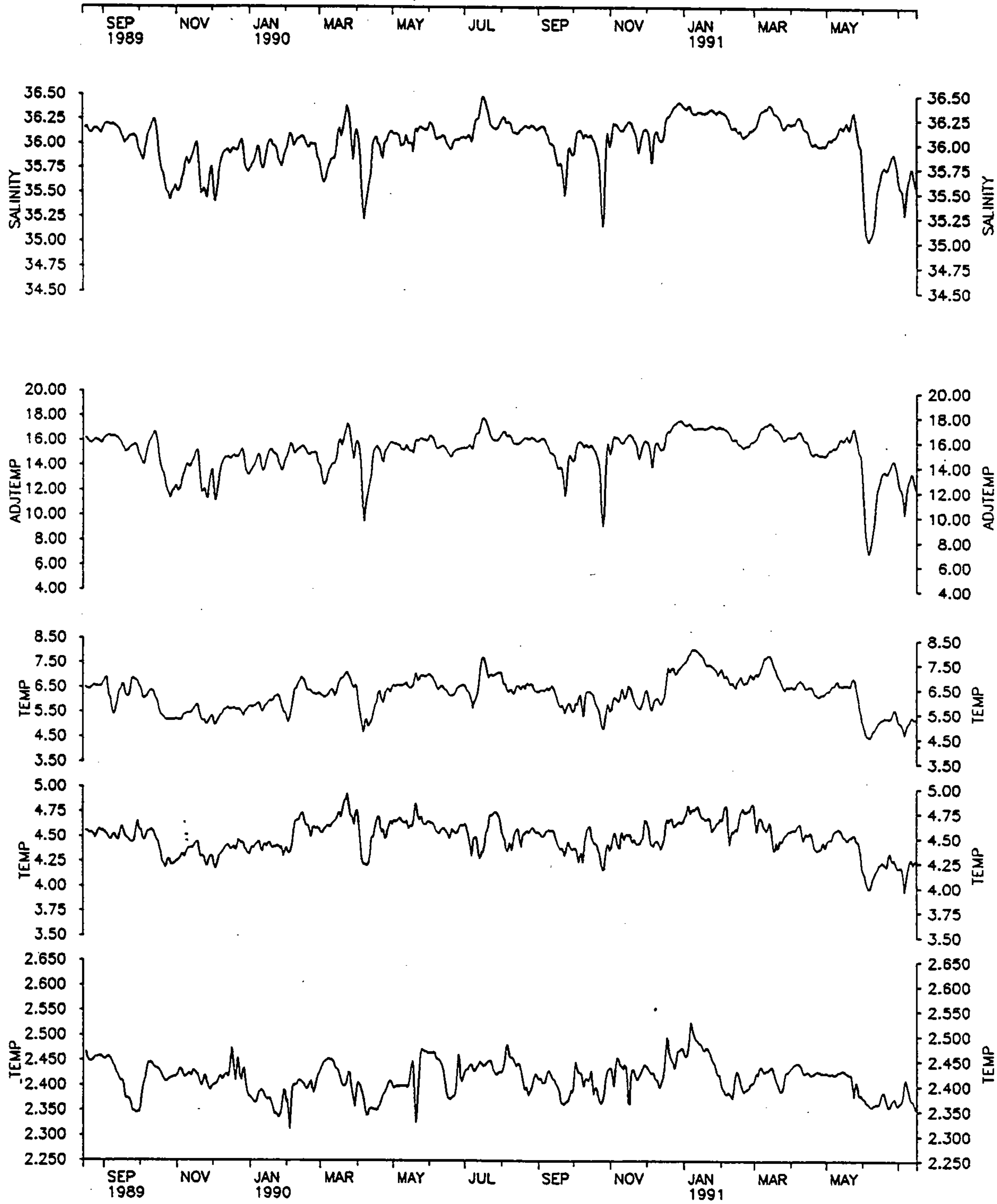
* Mooring 893 * SYNOP EAST – 11

* Current Vectors * depths are 605,1105,1505,4005 meters



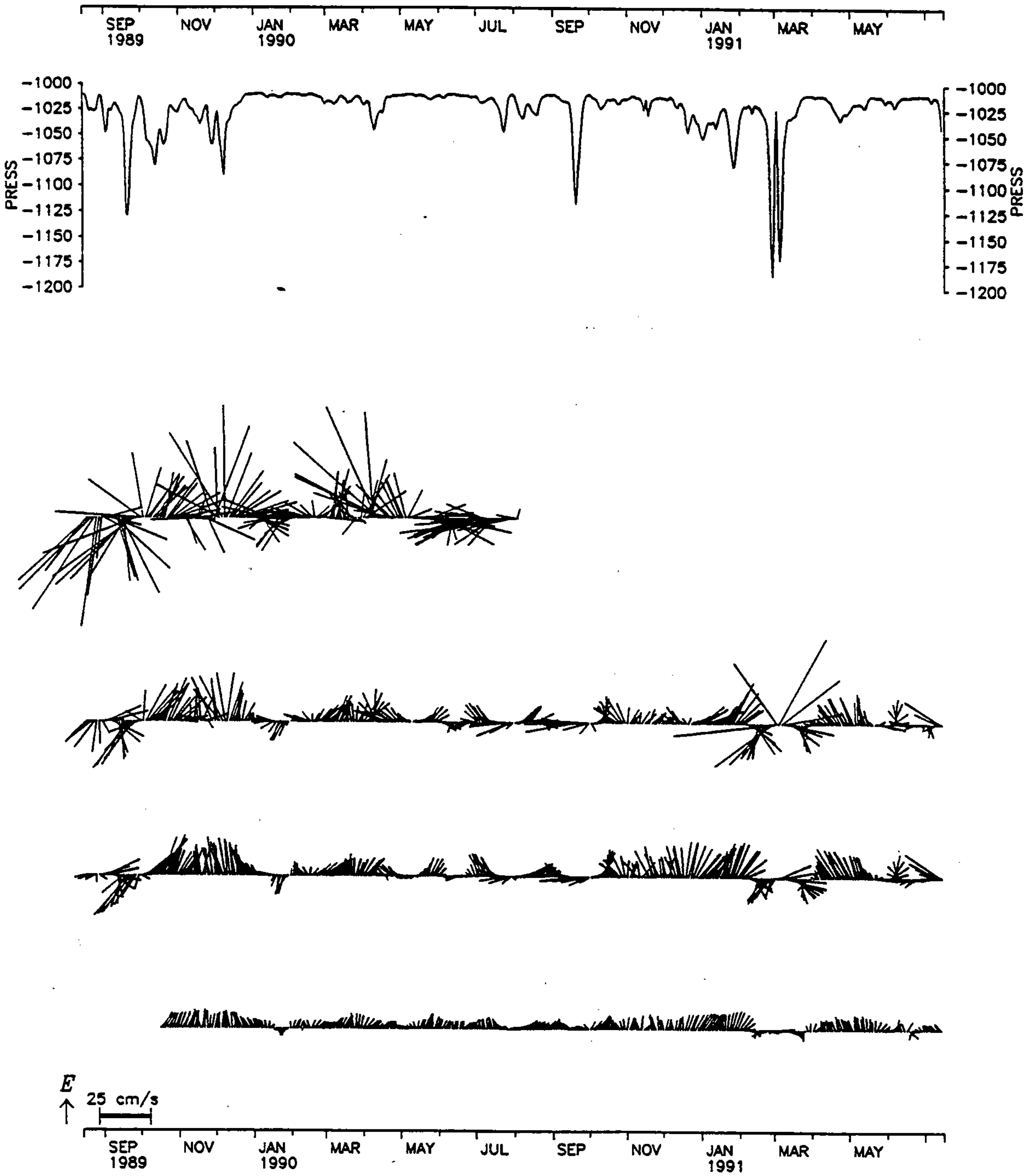
* Mooring 893 * SYNOP EAST – 11

* Temperatures * depths are 605,1105,1505,4005 meters
* Salinity * depth is 605 m.



* Mooring 892 * SYNOP EAST – 12

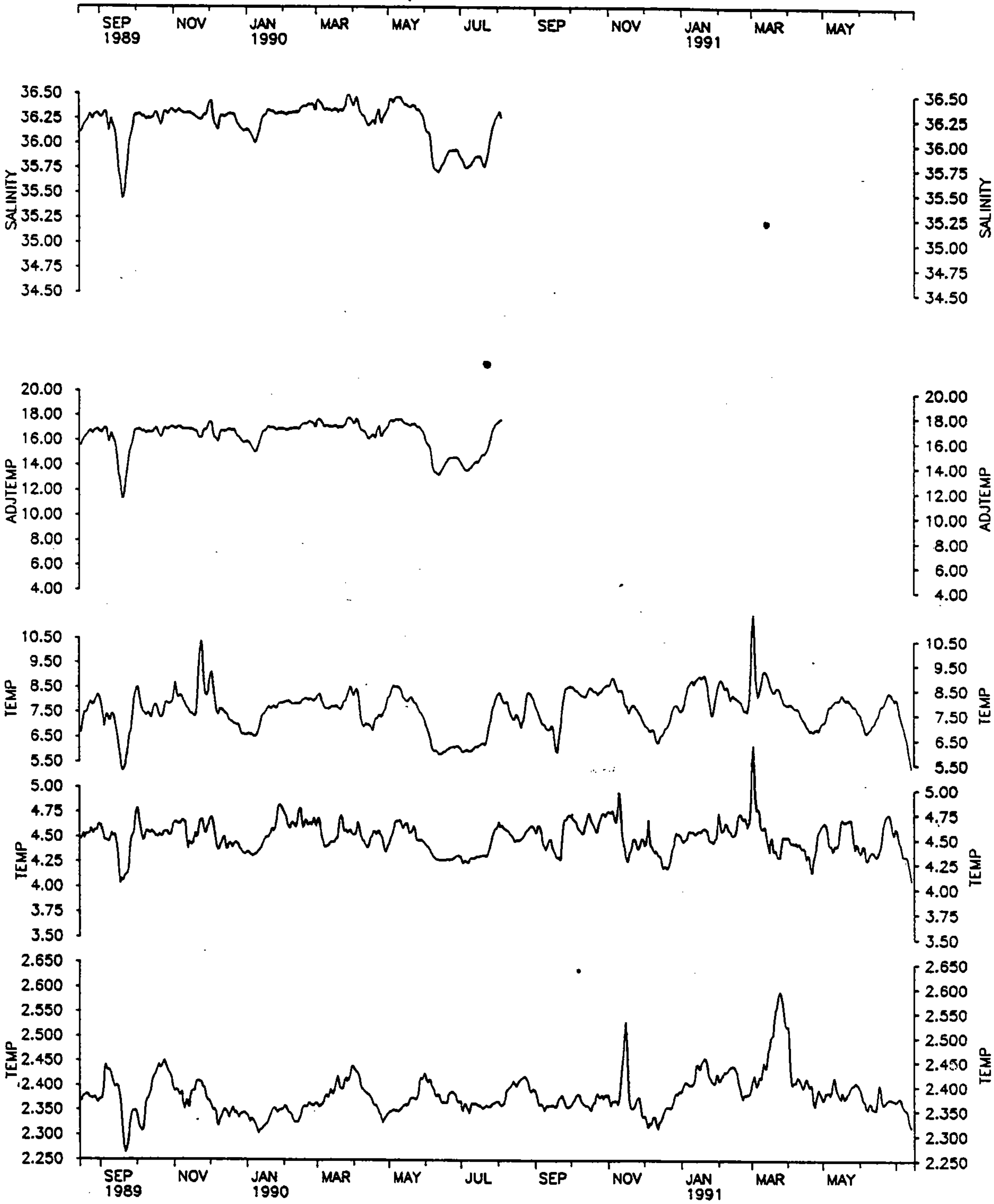
* Current Vectors * depths are 501,1001,1501,4001 meters



* *Mooring 892 * SYNOP EAST – 12*

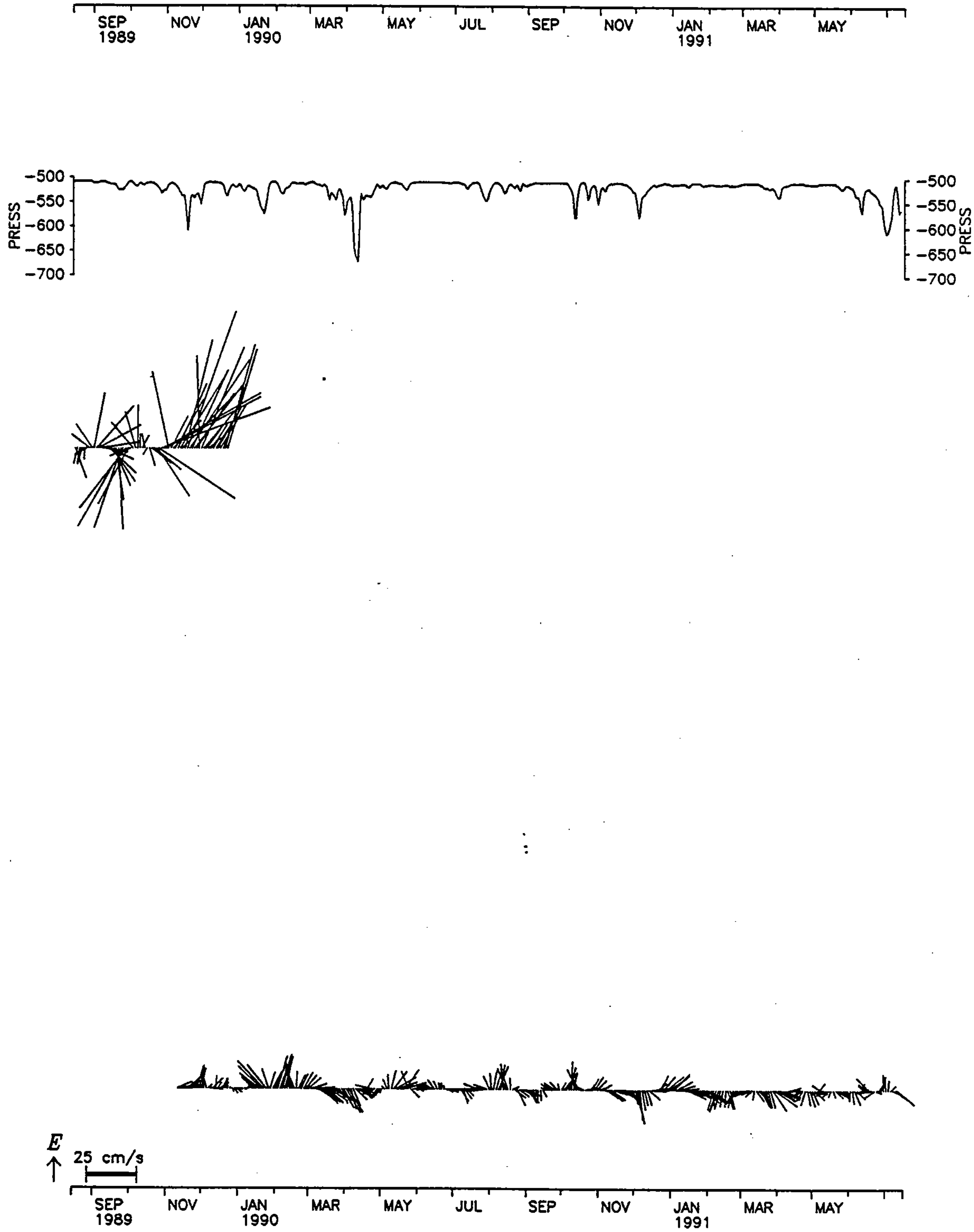
* Temperatures * depths are 501,1001,1501,4001 meters

* Salinity * depth is 501 m.



* *Mooring 891* * *SYNOP EAST – 13*

* Current Vectors * depths are 503 , 4003 meters



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REPORT DOCUMENTATION PAGE	1. REPORT NO. WHOI-93-01	2.	3. Recipient's Accession No.

4. Title and Subtitle	5. Report Date
A Compilation of Moored Current Meter Data from SYNOP Arrays One and Two (September 1987 to July 1991) Volume XLIV	November 1992
	6.
7. Author(s) Susan A. Tarbell, Scott E. Worrilow and Nelson G. Hogg	8. Performing Organization Rept. No. WHOI-93-01
9. Performing Organization Name and Address Woods Hole Oceanographic Institution Woods Hole, Massachusetts 02543	10. Project/Task/Work Unit No.
	11. Contract(C) or Grant(G) No. (C) N00014-85-C-0001, (G) OCE86-08258
12. Sponsoring Organization Name and Address Office of Naval Research and the National Science Foundation	13. Type of Report & Period Covered Technical Report
	14.

15. Supplementary Notes

This report should be cited as: Woods Hole Oceanog. Inst. Tech. Rept., WHOI-93-01.

16. Abstract (Limit: 200 words)

The Synoptic Ocean Prediction Experiment (SYNOP) was an ambitious, multi-faceted program focused on the dynamics and predictability of the Gulf Stream and its recirculations. The moored array component contained three arrays; one just downstream of Cape Hatteras (the "Inlet Array"), one near 68W (the SYNOP "Central Array") and one near 55W ("SYNOP East") to which this report is addressed. There were two settings of the SYNOP East array, the first, from fall 1987 to summer 1989, contained 42 current meters on 13 moorings straddling the mean axis of the Stream and extending north and south into the two recirculations. The second extended the southernmost six moorings for an additional two years until summer 1991. Performance was excellent and all instruments but one were recovered.

17. Document Analysis a. Descriptors

ocean currents
ocean temperature
moored instruments

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group

18. Availability Statement	19. Security Class (This Report)	21. No. of Pages
Approved for public release; distribution unlimited.	UNCLASSIFIED	87
	20. Security Class (This Page)	22. Price

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