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- Data Report -

by

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C O N T E N T S

Summary

The active field phase of the "Warmwassersphäre des Atlantiks" research project at the University of Kiel, which began in 1981 was continued in 1983. During this year the work was carried out as a part of the French - German "Topogulf" program. R.V. "Poseidon" surveyed the northern part of the area under investigation located over the Mid-Atlantic Ridge (cruise P104). Two CTD sections along the eastern and the western flanks of the ridge and two other ones perpendicular to them were arranged to form a closed box between the Azores and 49°N. A second box further to the north could not be completed because of the unfavorable weather conditions. The French R.V. "Le Suroît" surveyed the area south of 40°N. This data are not included in the present report.

The long term current meter moorings 265 and 280 were recovered by R.V. "Poseidon" and F.R.V. "Anton Dohrn". The French R.V. "Jean Charcot" replaced mooring 265 when she laid four clusters of three moorings each along 48°N between 20°W and 35°W. The cluster centered at 25°W, to which belonged mooring 265, was equipped by the Institut für Meereskunde, Kiel, three other clusters by the Centre Oceanologique de Bretagne, Brest. Only the records of current meters recovered in 1983 are presented here.

During the "Anton Dohrn" - cruise AD129 an XBT section from the Grand Banks of Newfoundland to the Hebridean shelf was taken. As in previous years satellite-tracked drifting buoys were launched. All data obtained on board R.V. "Poseidon" and F.R.V. "Anton Dohrn" are presented in this report. After the processing of the complete "Topogulf" data set a French - German report will be published.

Zusammenfassung

Die aktive Feldphase für den Sonderforschungsbereich "Warmwassersphäre des Atlantiks" der Universität Kiel, die im Sommer 1981 begann, wurde 1983 fortgesetzt. In diesem Jahr wurden die Arbeiten im Rahmen des deutsch-französischen "Topogulf"-Progammes ausgeführt. F.S. "Poseidon" war mit fünf CTD-Schnitten an dem Programm beteiligt (Reise P104). Mit dem Ziel, geschlossene Boxen zu bilden, wurden die Schnitte parallel und senkrecht zu

den Flanken des Mittelatlantischen Rückens gelegt. Die südliche Box lag nördlich der Azoren bis 49°N. Eine weitere Box in Norden konnte wegen der ungünstigen Wetterbedingungen nicht geschlossen werden. Das französische F.S. "Le Suroît" arbeitete in zwei Boxen südlich der Azoren. Diese Daten sind in den vorliegenden Bericht nicht mit eingeschlossen.

Die Langzeitverankerungen 265 und 280 konnten von F.S. "Poseidon" und F.F.S. "Anton Dohrn" aufgenommen werden. Das französische F.S. "Jean Charcot" ersetzte im Rahmen der Auslegung von vier Verankerungsgruppen mit je drei Strommesserketten die Verankerung 265. Die Geräte waren auf 48°N zwischen 20°W und 35°W zentriert. Die Verankerungsgruppe bei 25°W, zu der die Verankerung 265 zählt, wurde vom Institut für Meereskunde, Kiel bestückt, die übrigen drei vom Centre Oceanologique de Bretagne, Brest. In diesem Bericht werden nur die Registrierungen der 1983 aufgenommenen Geräte dargestellt.

Wie in den Jahren zuvor kamen satellitengeortete Driftkörper zum Einsatz. Während der "Anton Dohrn"-Reise AD129 wurde ein XBT-Schnitt von den Grand Banks zu den Hebriden gelegt. Alle während des Jahres 1983 an Bord von F.S. "Poseidon" und F.F.S. "Anton Dohrn" gewonnenen Daten werden in dem vorliegenden Datenband vorgestellt. Nach dem Abschluß der "Topogulf"-Arbeiten wird ein gemeinsamer deutsch-französischer Datenband den gesamten Datensatz zusammenfassen.

1. Introduction

In summer 1981 the active field phase of the research project "Warmwassersphäre des Atlantiks" began. This is a combined effort of physical oceanography groups at the University of Kiel to investigate the processes of heat transfer in the upper oceanic layers with temperatures exceeding 8° - 10° C. These layers cover a depth range up to 800 m and extend from the equator to the Subpolar Front. The North Atlantic warmwatersphere is especially important for the European climate because the North Atlantic Current displaces it anomalously far poleward.

The field-work in 1981 and 1982 yielded an abundant data set of CTD- and XBT-profiles. Sections were carried out along the Mid-Atlantic Ridge north of the Azores and from the ridge to the European shelf. Furthermore mapping surveys were performed in two boxes between the Azores and 46°N.

A repeated section showed, that the North Atlantic Current, in the area of the Mid-Atlantic Ridge, is a well defined, permanent feature. It crosses the ridge between the Azores and the Subpolar Front with an estimated volume transport of about 27 Sv. This transport is concentrated in a variable number of current branches with a width generally less than 100 km. Long term moored current meter measurements supported the impression that geostrophic calculations with meridionally constant reference levels do not yield adequate estimates of the volume transport. To get some further insight into the reliability of reference level assumptions, the 1983 survey was planned to provide sections which form closed large scale boxes. The inclusion of conservation of mass and dissolved substances in the transport calculation should allow more accurate estimates. Furthermore the sections parallel and perpendicular to the ridge should yield information on the influence of the bottom topography on the current structure.

Similar ideas had lead the group of M. Arhan and A. Colin de Vérdière belonging to the Centre Oceanologique de Bretagne (COB) to establish the "Topogulf"-program. Their program included CTD measurements, moored current meter work and the use of SOFAR floats. Close cooperation with this group resulted in a CTD survey from 24°N to 53°N carried out on board R.V. "Le Suroît" and R.V. "Poseidon" (Figure 1). Unfortunatly weather conditions did not allow us to close the most northern box.

The current meter work was mainly done by the COB group on board R.V. "Jean Charcot". Twelve current meter moorings were laid to be recovered in 1984 (Figure 2). Two long term moorings were recovered, mooring 265/3 by R.V. "Poseidon" and mooring 280/2 by F.R.V. "Anton Dohrn". On the way to and from mooring location 280, XBTs were launched between the slope of the Grand Banks of Newfoundland and the Hebridean shelf edge.

In this report only the data obtained on board R.V. "Poseidon" and F.R.V. "Anton Dohrn" are presented. After the recovery of the moorings in 1984 a complete French-German report on the "Topogulf" data will be published.

Ship	Cruise No.	Observation Period	Area	Activity
R.V. "Poseidon"	104/1,2	06 Sept. - 13 Oct. 83	Mid Atlantic Ridge north of the Azores	CTD, XBT, launching and recovering of sat.-tracked drifters, recovering of mooring 265/3
F.R.V. "Anton Dohrn"	129/2	12-21 Nov.83	Newfoundland to Hebrides	XBT, recovery of mooring 280/2

Table 1: Cruises carried out during 1983.

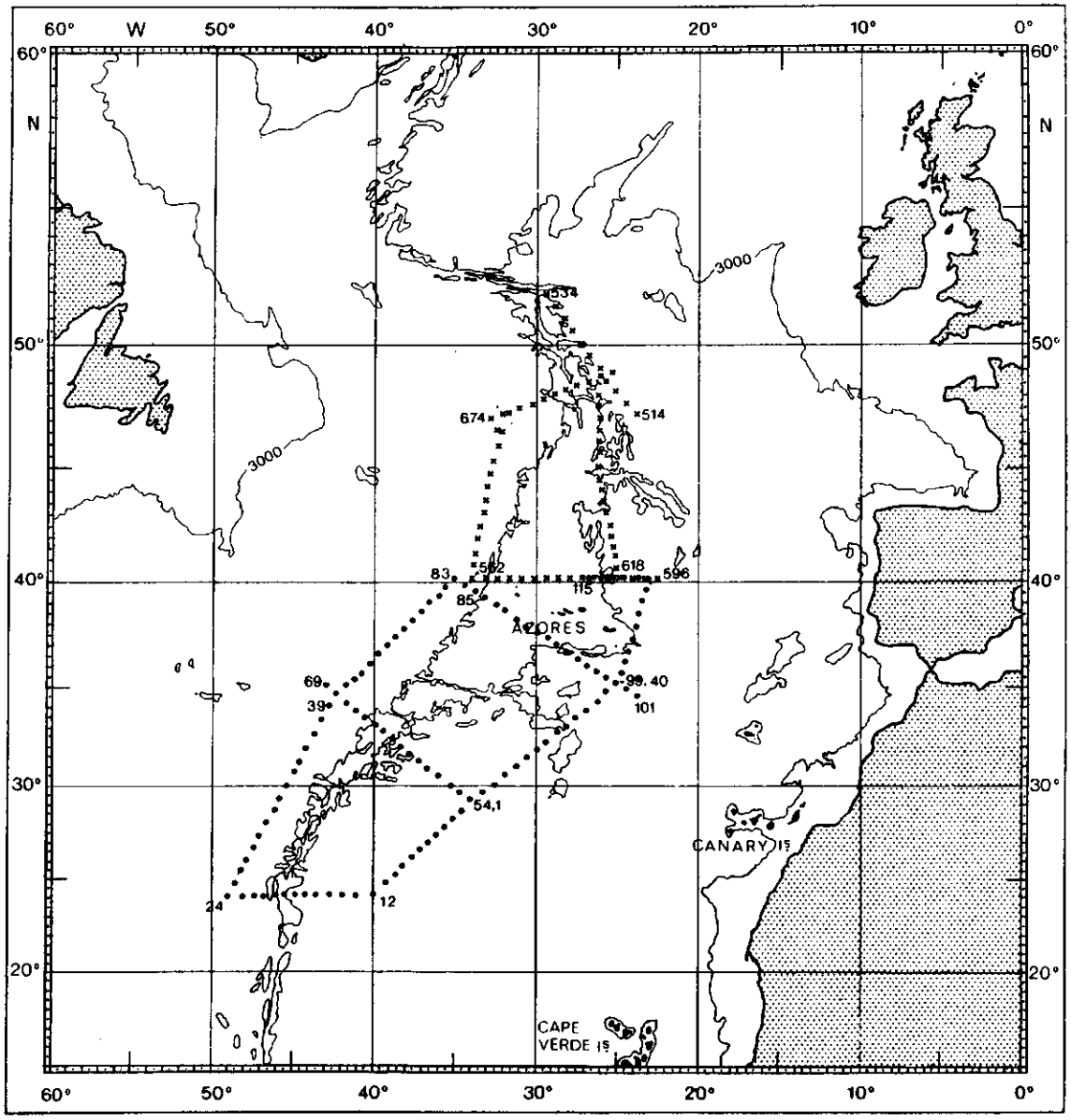


Fig. 1: Location of CTD-Stations carried out by R.V. "Le Suroît" and R.V. "Poseidon" during the "Topogulf"-experiment

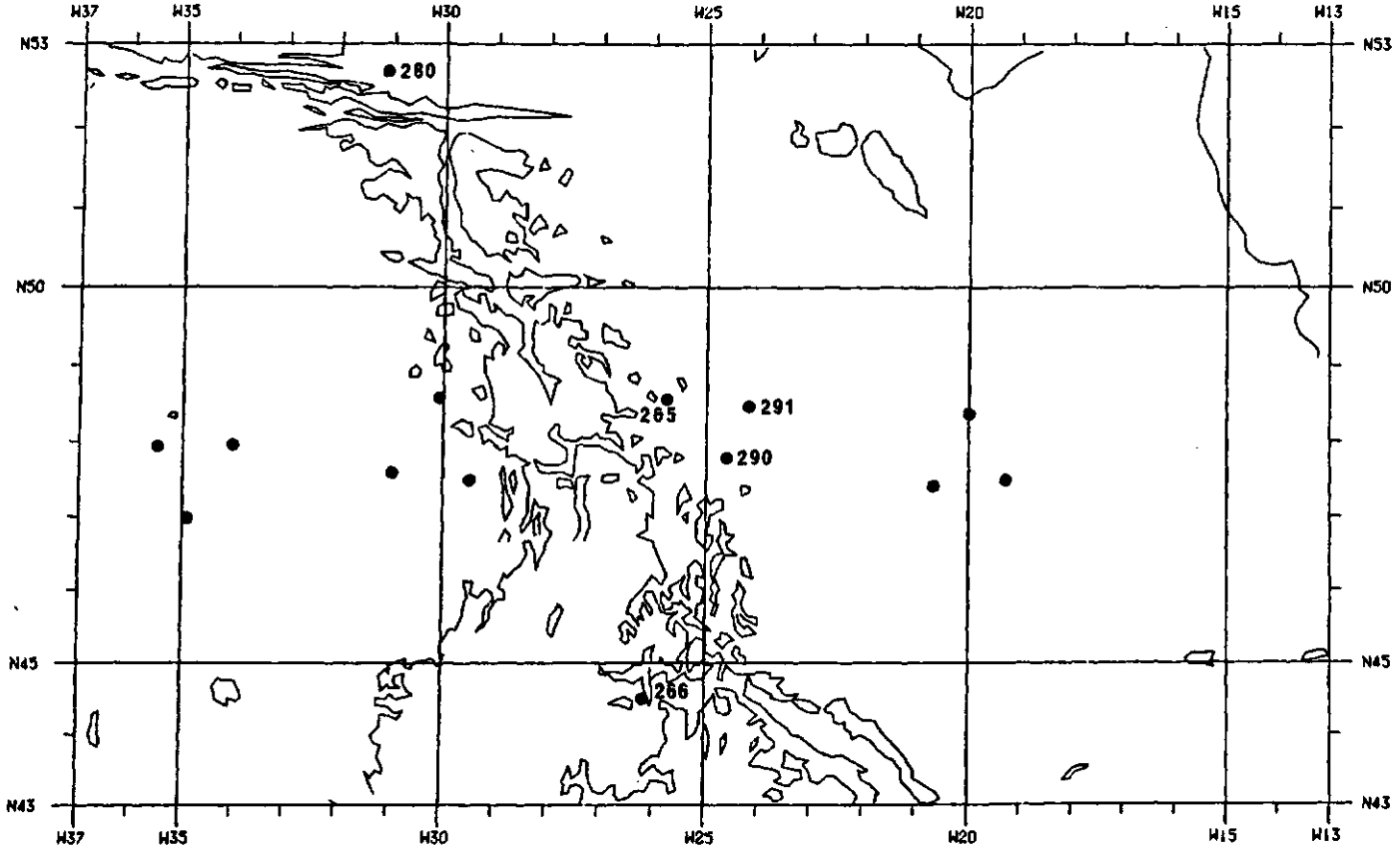


Fig. 2: Location of current meter moorings deployed during the "Warmwassersphäre"-program and during the "Topogulf"-experiment

2. Hydrographic measurements

The CTD-system used in this project consisted of a "Multisonde" which is manufactured by "Meereselektronik", Trappenkamp, West Germany. It is a commercialized version of a system which was developed in the Institute of Applied Physics at the University of Kiel (KROEBEL et al., 1976). Because the obtained raw data showed a high noise level, intensive despiking with objective methods and by hand was necessary. The applied data processing is documented in a flow diagram (Figure 3). Further details, especially the use of the median filter is reported in SY (1983). Technical data of the "Multisonde" according to manufacturer's declaration and the quality of the final CTD data are shown in Table 2. Due to oscillations in salinity with a vertical length scale up to 150 m which are originated by the instrument, the accuracy of this parameter is not better than $0.02 * 10^{-3}$.

To check the laboratory calibration and to identify a possible drift of the instrument during the use at sea, reference measurements were carried out using a "General Oceanic" rosette water sampler with 12 bottles. The samples have been analysed with a "Guildline Autosal Laboratory Salinometer". The calculation of salinity was done using the practical salinity formula (UNESCO,1981). The in situ pressure comparison was restricted to a zero pressure level check. Temperature comparisons gave no significant deviations from the laboratory calibration.

Oxygen measurements were carried out by means of "Winckler Titration" on water samples collected with the rosette water sampler. Because of problems with the sampling bottles a mean error of 0.08 ml/l or 3% has to be taken into account (for the concentration range between 4 and 7 ml/l).

The measurements are presented in chapter 6.1 by a station list, a station map (figure 6) and vertical sections of temperature, salinity, density and oxygen (figures 7a - o).

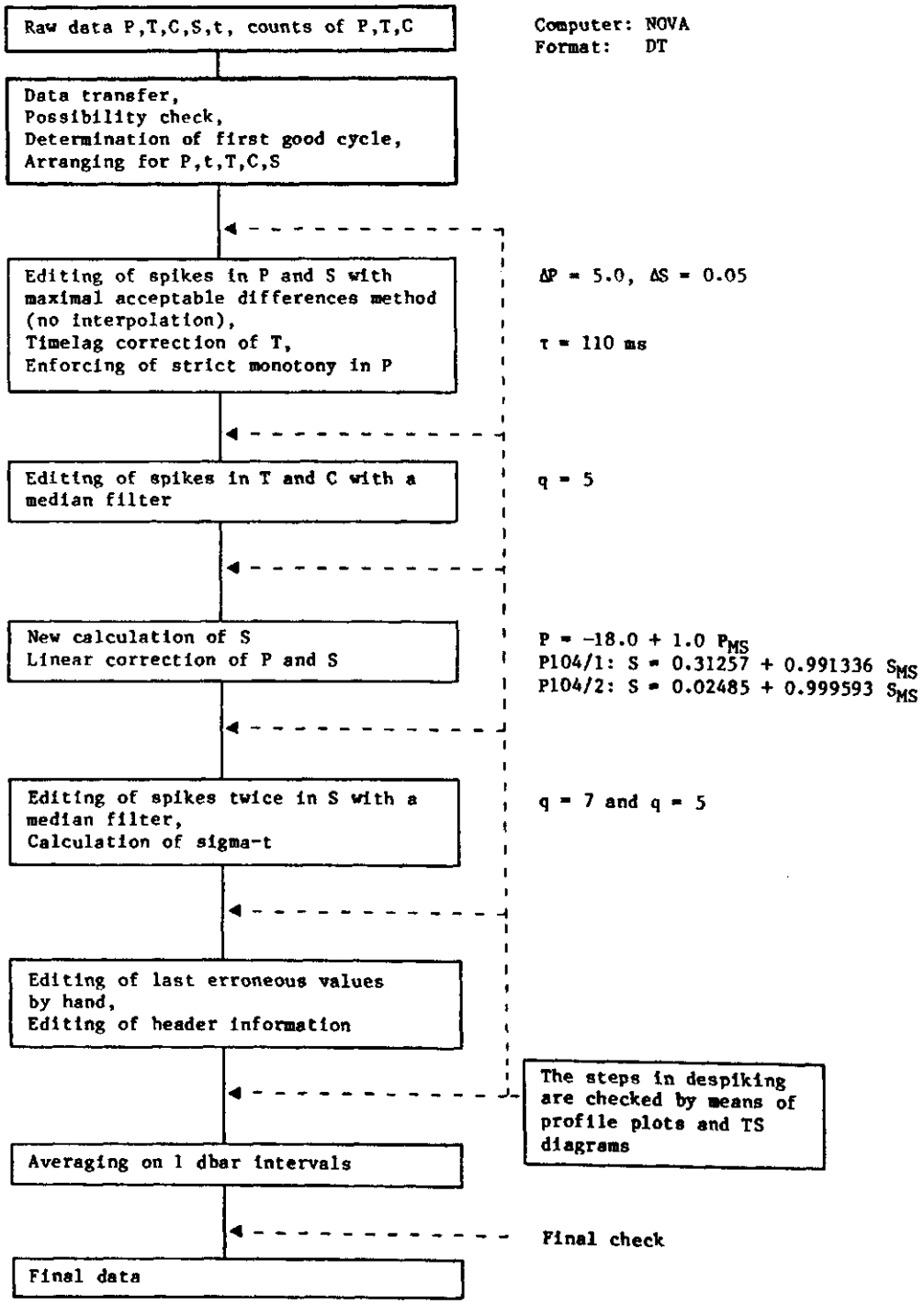


Fig. 3: CTD-Processing of the data collected during cruise P 104.

	According to manufacturer's declaration	Final data
Pressure:		
Principle	Strain-Gauge Pressure Cell	
Range	0 - 6000 dbar	
Resolution	0.2 dbar	1.0 dbar
Accuracy	0.35 % of range	3.5 °/₀₀
Temperature:		
Principle	Platinum Resistance	
Range	-2.0 °C - +35.0 °C	
Time lag	60 ms (without protecting sheat)	
Resolution	1 mK	
Long Term Stability	±5 mK/0.5 y	
Accuracy	±5 mK	±10 mK
Conductivity:		
Principle	Symmetric Electrode Cell	
Range	5 - 55 mS/cm	
Resolution	2 µS/cm	
Long Term Stability	±10 µS/cm/0.5 y	
Accuracy	±5 µS/cm	
Salinity:		
Accuracy		$\pm 0.02 * 10^{-3}$

Table 2: Technical data of the "Multisonde" MS 35 used during P104 and quality of final CTD data

3. XBT measurements

During the "Poseidon"-cruise XBTs were used to increase the horizontal resolution to 10 or 15 nm. The data were collected with a Sippican-Plessey analogue recorder or with a digital recording system consisting of a Commodore CBM 8032 with its periphery. The appropriate interface to the launcher and the software was supplied by W. Emery, UBC, Vancouver, Canada. The probes reached a depth of about 800 m (T7). The accuracy of the data is given with ± 0.1 K. Within this range the data correlate with the sea surface temperature measurements. To obtain further information on the accuracy of the data XBT records were compared with the temperature records of the "Multisonde" at the same station. Analog and digital records were treated separately, because the analog recorder showed some malfunctions. The depth dependent mean differences of 49 analog and 16 digital records are shown in figure 4. The error T(XBT)-T(CTD) is significantly larger with the analog than with the digital recorder. For more detail see HINRICHSEN (in prep.).

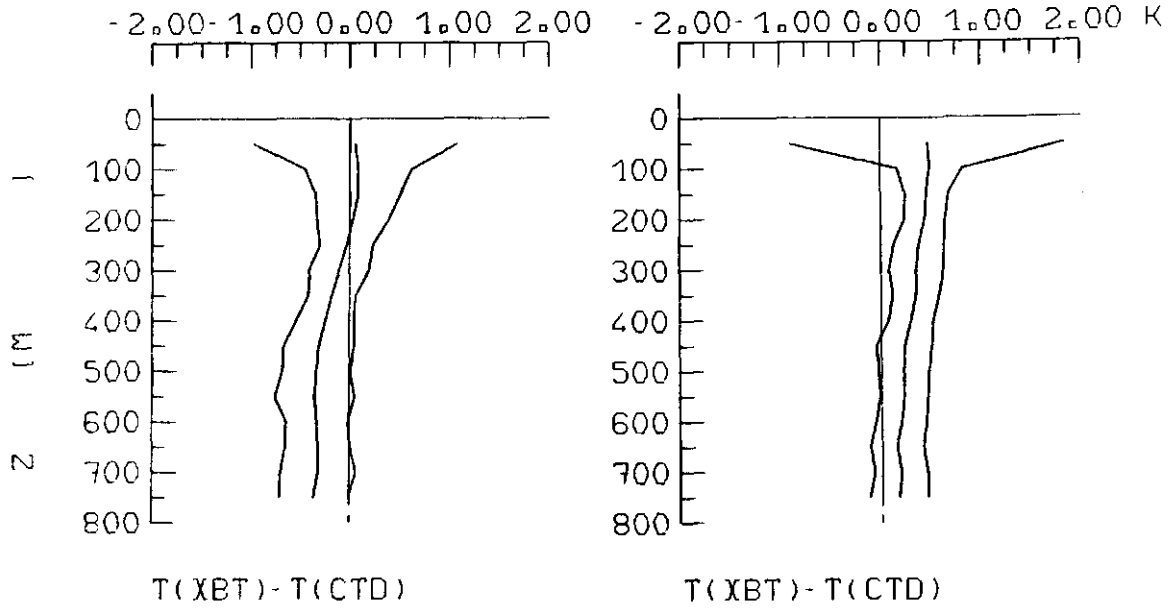


Fig. 4: Average differences between XBT records and temperature profiles measured at the same location with the "Multisonde". 16 digital records (left) and 49 analog records (right) are used for the comparison.

During the "Anton Dohrn"-cruise no time for CTD measurements was available. Consequently only XBTs could be launched. A T4 version reaching to a depth of about 500 m was used.

The location of the drops are shown in maps (Chapter 6.1, figures 8, 10) and station lists, the data are presented in vertical sections (Figures 9a,b, 11).

4. Drifting buoy measurements

The investigation of the large scale surface current field requires appropriate current measurements. Satellite-tracked drifting buoys can yield this information. Therefore 15 drifting buoys were launched in 1983. A short term experiment with 6 buoys is not included in this report. In order to show the area covered by the observations during 1983 the tracks of the buoys from launching in 1983 or from 1 January 1983 when launched before until 31 December 1983 are presented in figure 12. Table 3 indicates date and location of the beginning and the end of the tracks shown in figure 12.

The drogues were located at 100 m depth. It should be noted, that all buoys which were recovered in earlier years had lost their drogues because of corrosion of the sail cloth due to rust from the iron yards. In the following years drogues were built in the Institut für Meereskunde. Protection against corrosion was considered with greatest care. However, there is still evidence that drogues might be lost. The longest time period after which a drifter was recovered with its drogue in good shape was four months. Investigations on the changes of the buoy tracks due to the loss of the drogue are not yet conclusive. Probably the loss occurs during a change of weather conditions. In this case the onset of a period of strong wind increases the strain on the drogue causing the possible break of tether, shackle etc. simultaneously with a change in the near surface current regime. Both affect the characteristics of the tracks and are difficult to separate. To date no definite life expectance of the drouges can be given.

5. Moored current meter measurements

The moored current meter measurements were planned with the objective of obtaining long term statistics at selected locations and to study the relevant processes causing the observed fluctuations. Therefore three current meter moorings were laid in 1982 along the Mid-Atlantic Ridge north of the Azores up to the Charlie-Gibbs-Fracture-Zone. Moorings 265/3 and 280/2 represent the continuation of a time series which began in 1980 and 1981, respectivly. Mooring 266/3 could not be recovered during two attempts and has to be accepted as lost.

The resulting observation periods since 1980 are summarized in figure 5. The data is presented in chapter 6.2.2. Information on the moorings is given in table 4 and simple statistics in table 5. For a comparison the statistics of the hourly original data as well as of the low and lowlow passed data is shown. The data is presented as time series plots of velocity components, temperature and pressure figures 13a-f and as progressive vector diagrams (Figure 14a,b).

The low passed time series are filtered with a Lanczos square taper with 121 weights at a time interval of 1 hour and a half power period of 40 hours. By this filter tides and inertial motion should be suppressed. Then daily averages are calculated and plotted. From the daily averages lowlow passed time series are calculated with a Lanczos square taper with 15 days half power period and 45 weights. High frequency noise due to mooring motions is not to be expected because subsurface mooring techniques are used with the shallowest bouancy float at about 200 m below the sea surface.

The influence of low frequency current fluctuations on the mooring can be seen in the pressure records. Vertical displacements range up to 180 m at a nominal depth of 218 m for mooring 265/3 and to 380 m at a nominal depth of 438 m for mooring 280/2. Displacements of this range require a correction of the temperature record. Therefore vertical temperature gradients

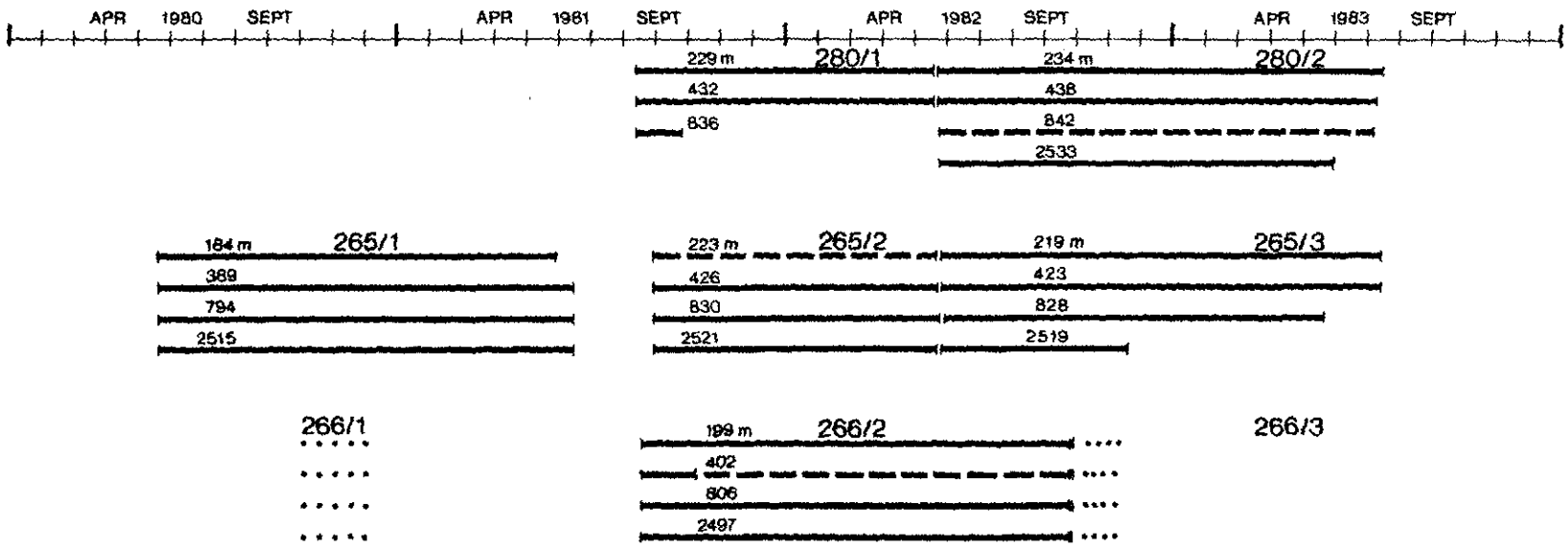


Fig. 5: Observation periods of moored current meters since 1980 on the location shown in figure 2. The broken lines indicate the loss of the rotor and consequently only a temperature record. Lines made from points stand for lost current meters.

are deduced for the depth ranges of the current meter as averages of temperature profiles obtained with a CTD in the vicinity of the moorings when they were laid and recovered. The depth changes of current meters without pressure sensors were derived by simple geometric arguments under the assumption of a rigid mooring wire. Although the fluctuations seem important the effect of the correction is hardly visible in the scale of the presented plots. As the current fluctuations are dominated by motions of low vertical order a correction of the current components by the vertical current gradient was rejected. The error induced in the current measurements due to the fact that the current meter follows the current was estimated as negligible.

In the moorings Aanderaa current meters RCM 4 and RCM 5 were used. AANDERAA (1978) gives an accuracy in speed of 1 cm/s or 2 % at a speed ranging from 6 to 100 cm/s. The records were not affected by the relatively large threshold of 2.5 cm/s. The accuracy of the thermistors is given as 0.05 K. At the deepest current meters the resolution was increased by introducting a smaller range from 2.6 °C to 5.9 °C. The accuracy of the pressure sensor is given with 1 % of the range. It results an accuracy of 7 m for 265301 and 21 m for 280202.

6. Data Presentation

6.1 Hydrography

6.1.1 Cruise P104/1,2

S T A T I O N L I S T

Station Nr.	Date 1983	Time (GMT)	Latitude	Longitude	Depth (m)	Remarks
			F.S. "Poseidon" Cruise P104/1			
504	11.09.	0800-0848	48°19.0'N	11°50.6'W		DR 3529 recovered
505	12.09.	1516-1820	47°29.9'N	19°22.1'W	4545	MS
506	"	2210	47°24.0'N	20°15.0'W	4524	XBT 1
507	13.09.	0006	47°20.9'N	20°45.0'W	4442	XBT 2
508	"	0205	47°17.8'N	21°15.0'W	4303	XBT 3
509	"	0412	47°14.2'N	21°45.0'W	4362	XBT 4
510	"	0615	47°11.0'N	22°15.0'W	4131	XBT 5
511	"	0833	47°07.9'N	22°45.0'W	3901	XBT 6
512	"	1020	47°05.0'N	23°15.0'W	3530	XBT 7
513	"	1252	47°02.0'N	23°45.0'W	3371	XBT 8
514	"	1408-1705	47°00.0'N	24°00.0'W	3205	MS,XBT 9,TR
515	"	1835	47°12.9'N	24°14.2'W	3340	XBT 10
516	"	2030-0155	47°28.0'N	24°28.5'W	3623	MS,XBT 11,TR
517	14.09.	0428	47°44.1'N	24°47.6'W	3597	XBT 12
518	"	0630-0900	47°58.7'N	25°05.1'W	3786	MS,
	"	0905	48°00.0'N	25°05.5'W	3800	XBT 13
519	"	1120	48°11.1'N	25°24.4'W	3429	XBT 14
520	"	1349-1632	48°22.0'N	25°43.0'W	3792	MS,XBT 15,TR
521	"	1950-2003	48°33.6'N	26°06.0'W	3727	Attempt to recover V 265/3,XBT 16
522	"	2240-0029	48°55.0'N	26°06.5'W	3556	MS,XBT 17
523	15.09.	0255	49°09.8'N	26°22.1'W	3529	XBT 18
524	"	0528-0730	49°25.0'N	26°38.0'W	3280	MS,XBT 19
525	"	1030	49°39.0'N	26°55.0'W	3567	XBT 20
526	"	1230-1459	49°54.0'N	27°11.2'W	3503	MS,BG,XBT 21
527	"	1653	50°08.7'N	27°27.2'W	2984	XBT 22
528	"	1900-2045	50°21.8'N	27°44.3'W	3698	MS,XBT 23
529	"	2240	50°36.0'N	28°02.0'W	3498	XBT 24
530	16.09.	0033-0230	50°48.6'N	28°15.8'W	2875	MS,BG,XBT 25
531	"	0434	51°04.2'N	28°34.3'W	2978	XBT 26
532	"	0638-0856	51°19.0'N	28°52.0'W	3537	MS,XBT 27
533	"	1045	51°33.0'N	29°09.2'W	2522	XBT 28
534	"	1233-1353	51°47.0'N	29°25.8'W	2186	MS,BG,XBT 29
535	"	1536	51°01.0'N	29°43.0'W	3613	XBT 30
536	"	1706	52°16.2'N	29°53.5'W	3380	XBT 31
537	18.09	1025-1032	48°00.2'N	31°57.9'W	3852	DR 3571 launched
538	"	1600-1755	47°00.0'N	32°00.3'W	3942	MS,XBT 32
539	"	2000	46°39.0'N	32°05.6'W	3658	XBT 33
540	"	2130-2300	46°22.0'N	32°11.0'W	4099	MS,XBT 34
541	19.09.	0045	46°04.0'N	32°16.4'W	3658	XBT 35
542	"	0235-0425	45°46.0'N	32°22.0'W	3689	MS,XBT 36
543	"	0620	45°25.4'N	32°28.7'W	3618	XBT 37
544	"	0803-0935	45°09.0'N	32°33.0'W	3624	MS,
	"	0940-0955	45°07.0'N	32°33.8'W	3628	DR 3575 launched, XBT 38
545	"	1130	44°50.3'N	32°37.5'W	3560	XBT 39
546	"	1257-1502	44°33.0'N	32°43.0'W	3170	MS,XBT 40,TR
547	"	1641	44°16.1'N	32°47.6'W	3695	XBT 41
548	"	1820-1955	43°59.1'N	32°52.9'W	3824	MS,XBT 42
549	"	2135	43°41.9'N	32°56.8'W	3577	XBT 43
550	"	2330-0103	43°25.0'N	33°01.9'W	3554	MS,XBT 44

STATION LIST

Station Nr.	Date 1983	Time (GMT)	Latitude	Longitude	Depth (m)	Remarks
551	20.09.	0258	43°08.8'N	33°07.2'W	3634	XBT 45
552	"	0450-0640	42°52.0'N	33°12.0'W	3558	MS,XBT 46
553	"	0855	42°33.2'N	33°17.7'W	3445	XBT 47
554	"	1035-1215	42°16.7'N	33°21.3'W	3519	MS,
	"	1220	42°14.7'N	33°22.0'W	3521	DR 3574 launched,
	"	1223	42°14.3'N	33°22.1'W	3513	XBT 48
555	"	1406	41°59.7'N	33°27.3'W	-	XBT 49
556	"	1538-1725	41°43.0'N	33°31.0'W	3571	MS,XBT 50
557	"	1925	41°26.0'N	33°35.3'W	3671	XBT 51
558	"	2110-2250	41°09.4'N	33°41.5'W	3348	MS,XBT 52
559	21.09.	0037	40°52.0'N	33°45.9'W	3844	XBT 53
560	"	0214-0433	40°35.0'N	33°51.0'W	3430	MS,BG,XBT 54
561	"	0610	40°17.0'N	33°58.3'W	3789	XBT 55
562	"	0800-1030	40°00.0'N	34°00.3'W	3796	MS,XBT 56,TR
563	"	1200	40°01.0'N	33°37.0'W	3204	XBT 57
564	"	1333-1518	40°00.0'N	33°14.0'W	3413	MS,XBT 58
565	"	1657	40°00.2'N	32°48.8'W	2463	XBT 59
566	"	1824-1950	40°00.2'N	32°27.2'W	2085	MS,BG,XBT 60
567	"	2130	39°59.1'N	32°02.5'W	2122	XBT 61
568	"	2310-0104	39°59.8'N	31°40.3'W	2047	MS,XBT 62,TR
569	22.09.	0248	40°00.0'N	31°17.0'W	2056	XBT 63
570	"	0429-0610	39°59.9'N	30°54.6'W	2124	MS,BG,XBT 64
571	"	0745	40°00.5'N	30°31.0'W	2000	XBT 65
572	"	0915-1030	39°59.5'N	30°09.3'W	1841	MS,XBT 66
573	"	1206	39°59.6'N	29°45.3'W	1759	XBT 67
574	"	1355	40°00.3'N	29°17.8'W	2027	XBT 68
575	"	1516	39°59.7'N	28°59.2'W	1714	XBT 69
			F.S. "Poseidon" Cruise P104/2			
576	30.09.	0053-0220	39°59.1'N	30°09.3'W	1830	MS,XBT 70
577	"	0358	39°59.4'N	29°46.9'W	1849	XBT 71
578	"	0532-0640	40°00.0'N	29°24.5'W	1445	MS,XBT 72
579	"	0817	40°00.0'N	29°02.0'W	2038	XBT 73
580	"	1000-1135	40°00.0'N	28°37.8'W	2351	MS,XBT 74
581	"	1320	40°00.3'N	28°14.8'W	1930	XBT 75
582	"	1452-1610	39°59.6'N	27°52.1'W	2080	MS,XBT 76
583	"	1753	39°59.1'N	27°28.3'W	1928	XBT 77
584	"	1930-2040	39°59.9'N	27°05.5'W	1838	MS,XBT 78
585	"	2220	40°00.0'N	26°42.5'W	2241	XBT 79
586	01.10.	0007-0126	40°00.0'N	26°21.0'W	2783	MS,XBT 80
587	"	0315	40°00.2'N	25°57.8'W	2921	XBT 81
588	"	0457-0610	40°00.0'N	25°35.5'W	2334	MS,XBT 82
589	"	0805	40°00.0'N	25°17.6'W	3206	XBT 83
590	"	1000-1125	40°00.0'N	24°48.9'W	3411	MS,XBT 84
591	"	1240	40°01.2'N	24°26.1'W	3759	XBT 85
592	"	1609-1820	40°00.0'N	24°03.7'W	3842	MS,XBT 86
593	"	2005	40°00.0'N	23°40.1'W	3249	XBT 87
594	"	2135-0005	40°00.0'N	23°17.0'W	3423	MS,XBT 88
595	02.10.	0157	39°59.9'N	22°54.4'W	4187	XBT 89
596	"	0335-0555	39°59.8'N	22°31.6'W	3751	MS,XBT 90
597	"	0805	39°45.0'N	22°45.3'W	4178	XBT 91
598	"	1000-1214	39°30.0'N	22°59.8'W	3734	MS,XBT 92
599	"	1441	39°14.3'N	23°15.8'W	3994	XBT 93

STATION LIST

Station Nr.	Date 1983	Time (GMT)	Latitude	Longitude	Depth (m)	Remarks
600	02.10.	1643-1920	39°00.4'N	23°29.9'W	3801	MS,XBT 94
601	"	2125	38°45.0'N	23°44.7'W	3768	XBT 95
602	"	2305-0137	38°30.0'N	24°00.1'W	3655	MS,XBT 96
603	03.10.	0402	38°14.4'N	24°16.4'W	3495	XBT 97
604	"	0600-0740	38°00.4'N	24°29.6'W	3040	MS,XBT 98
605	"	1005	37°45.0'N	24°45.0'W	1713	XBT 99
606	"	1203-1344	37°30.4'N	24°59.5'W	1990	MS,XBT 100
607	"	1515	37°45.0'N	25°00.3'W	1739	XBT 101
608	"	1649	38°00.0'N	25°00.1'W	1922	XBT 102
609	"	1825	38°15.0'N	25°00.0'W	3113	XBT 103
610	"	2015	38°29.9'N	24°59.9'W	3352	XBT 104
611	"	2150	38°45.0'N	24°59.9'W	2519	XBT 105
612	"	2325	38°59.9'N	24°59.9'W	3533	XBT 106
613	04.10.	0111	39°15.0'N	24°59.9'W	3506	XBT 107
614	"	0243	39°30.0'N	25°00.1'W	3417	XBT 108
615	"	0420	39°45.0'N	25°00.1'W	3490	XBT 109
616	"	0552	40°00.0'N	25°00.1'W	3486	XBT 110
617	"	0725	40°15.0'N	25°00.1'W	3396	XBT 111
618	"	0904-1015	40°29.9'N	25°00.7'W	3400	MS,XBT 112
619	"	1150	40°44.5'N	25°04.0'W	3358	XBT 113
620	"	1328-1536	40°58.8'N	25°08.1'W	3090	MS,XBT 114
621	"	1701	41°13.0'N	25°13.4'W	3395	XBT 115
622	"	1825-1935	41°27.5'N	25°16.5'W	3483	MS,XBT 116
623	"	2055	41°42.2'N	25°20.8'W	3426	XBT 117
624	"	2220-0003	41°57.0'N	25°25.0'W	3395	MS,XBT 118
625	05.10.	0144	42°12.0'N	25°27.8'W	3321	XBT 119
626	"	0325-0438	42°26.3'N	25°27.2'W	3429	MS,XBT 120
627	"	0615	42°41.0'N	25°37.0'W	3135	XBT 121
628	"	0735-0910	42°56.0'N	25°41.0'W	3402	MS,XBT 122
629	"	1035	43°10.5'N	25°45.0'W	3255	XBT 123
630	"	1202-1337	43°24.9'N	25°49.0'W	2697	MS,XBT 124
631	"	1447	43°38.4'N	25°51.6'W	3201	XBT 125
632	"	1621-1750	43°53.0'N	25°56.6'W	3320	MS,XBT 126
633	"	1920	44°08.5'N	26°03.0'W	3021	XBT 127
634	"	2045-2210	44°23.0'N	26°05.9'W	3049	MS,XBT 128
635	"	2330	44°37.5'N	26°07.0'W	3130	XBT 129
636	06.10.	0053-0236	44°51.9'N	26°08.0'W	3069	MS,XBT 130
	"	0800-1000	44°28.7'N	26°07.1'W	3205	Attempt to recover V 266/3
637	"	1412	45°07.0'N	26°05.9'W	3174	XBT 131
638	"	1544-1715	45°21.7'N	26°06.4'W	2654	MS,XBT 132
639	"	1840	45°37.5'N	26°06.2'W	2810	XBT 133
640	"	2015-2140	45°52.0'N	26°06.5'W	2710	MS,XBT 134
641	"	2305	46°07.0'N	26°06.5'W	2971	XBT 135
642	07.10.	0040-0210	46°22.0'N	26°05.4'W	3164	MS,XBT 136
643	"	0342	46°37.2'N	26°05.9'W	2965	XBT 137
644	"	0507-0655	46°51.6'N	26°07.3'W	3071	MS,XBT 138
645	"	0826	47°07.0'N	26°06.5'W	2734	XBT 139
646	"	0950-1130	47°22.0'N	26°06.5'W	2840	MS,XBT 140
647	"	1246	47°36.8'N	26°06.4'W	2923	XBT 141
648	"	1408-1539	47°51.8'N	26°06.6'W	2706	MS,XBT 142
649	"	1719	48°06.8'N	26°07.2'W	-	XBT 143

S T A T I O N L I S T

Station Nr.	Date 1983	Time (GMT)	Latitude	Longitude	Depth (m)	Remarks
650	07.10.	1850-2015	48°22.0'N	26°06.5'W	2844	MS,XBT 144
651	"	2155	48°32.0'N	25°45.0'W	3486	XBT 145
652	"	2330-0114	48°43.0'N	25°23.5'W	2700	MS,XBT 146
653	08.10.	0252	48°39.5'N	25°42.7'W	3610	XBT 147
654	"	0411-0605	48°34.6'N	26°00.5'W	3404	MS,XBT 148
	"	0845-1010	48°33,5'N	26°06.5'W	3725	V 265/3 recovered
655	"	1150-1155	48°39.5'N	25°42.7'W	3633	DR 3572 launched
656	"	1553	48°28.4'N	26°26.8'W	2532	XBT 149
657	"	1805-1930	48°23.0'N	26°48.1'W	2881	MS,XBT 150
658	"	2147	48°17.0'N	27°10.0'W	2526	XBT 151
659	09.10.	0006-0129	48°12.0'N	27°30.0'W	2071	MS,XBT 152
660	"	0343	48°06.5'N	27°50.6'W	3250	XBT 153
661	"	0540-0710	48°01.0'N	28°11.3'W	2752	MS,XBT 154
662	"	0857	47°55.2'N	28°32.0'W	2606	XBT 155
663	"	1035-1217	47°50.0'N	28°53.0'W	3397	MS,XBT 156
664	"	1416	47°44.3'N	29°13.0'W	3442	XBT 157
665	"	1609-1743	47°39.0'N	29°33.3'W	3370	MS,XBT 158
666	"	1935	47°33.5'N	29°55.0'W	3423	XBT 159
667	"	2120-2255	47°28.0'N	30°16.0'W	3316	MS,XBT 160
668	10.10.	0043	47°22.0'N	30°37.0'W	3791	XBT 161
669	"	0217-0357	47°17.0'N	30°58.0'W	3328	MS,XBT 162
670	"	0545	47°12.6'N	31°19.1'W	3514	XBT 163
671	"	0730-0900	47°06.2'N	31°39.5'W	3458	MS,XBT 164
672	"	1055-1243	47°00.3'N	32°00.0'W	3952	MS,XBT 165
673	"	1415	46°53.8'N	32°22.8'W	4106	XBT 166
674	"	1601-1735	46°48.1'N	32°46.8'W	3804	MS,XBT 167
675	"	1840	46°39.5'N	32°36.2'W	3860	DR 3573 launched
676	"	1905	46°34.0'N	32°35.5'W	3892	XBT 168
677	"	2040-2150	46°22.0'N	32°25.0'W	4154	MS,XBT 169
678	"	2335	46°09.0'N	32°14.0'W	3525	XBT 170
679	11.10.	0147	45°55.8'N	32°03.0'W	3542	XBT 171
680	"	0350	45°42.8'N	31°52.0'W	3338	XBT 172
681	"	0610	45°29.8'N	31°41.5'W	3290	XBT 173
682	"	0832	45°17.0'N	31°31.0'W	3290	XBT 174
683	"	1045	45°03.5'N	31°20.0'W	3296	XBT 175
684	"	1252	44°50.0'N	31°09.0'W	3170	XBT 176
685	"	1455	44°37.2'N	30°59.0'W	2993	XBT 177
686	"	1700	44°24.0'N	30°48.5'W	2812	XBT 178
687	"	1850	44°11.0'N	30°37.8'W	2470	XBT 179
688	"	2025	43°57.5'N	30°27.0'W	2991	XBT 180
689	"	2150	43°44.5'N	30°16.5'W	2803	XBT 181
690	"	2310	43°31.5'N	30°06.0'W	3030	XBT 182
691	12.10.	0030	43°19.0'N	29°56.0'W	2473	XBT 183
692	"	0203	43°05.0'N	29°45.0'W	2215	XBT 184
693	"	0320	42°50.5'N	29°34.2'W	1745	XBT 185
694	"	0437	42°37.1'N	29°25.4'W	2241	XBT 186
695	"	0554	42°25.0'N	29°14.0'W	1543	XBT 187

Key words:

BG - Box grabs
DR - Drifting buoy work
MS - Multisonde CTD-station
TR - Tritium samples
V - Moored current meter worked
XBT - Expendable Bathythermograph

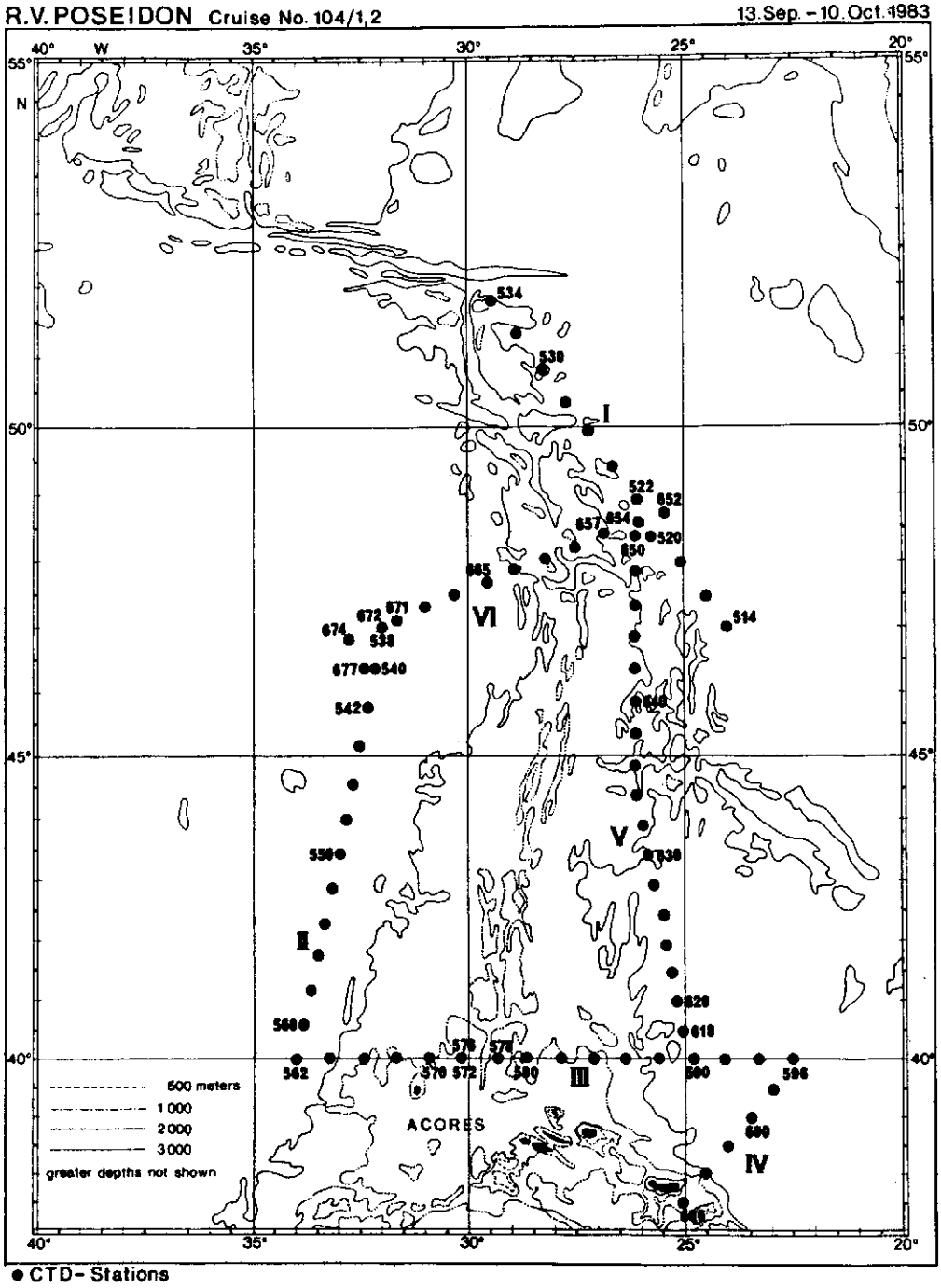
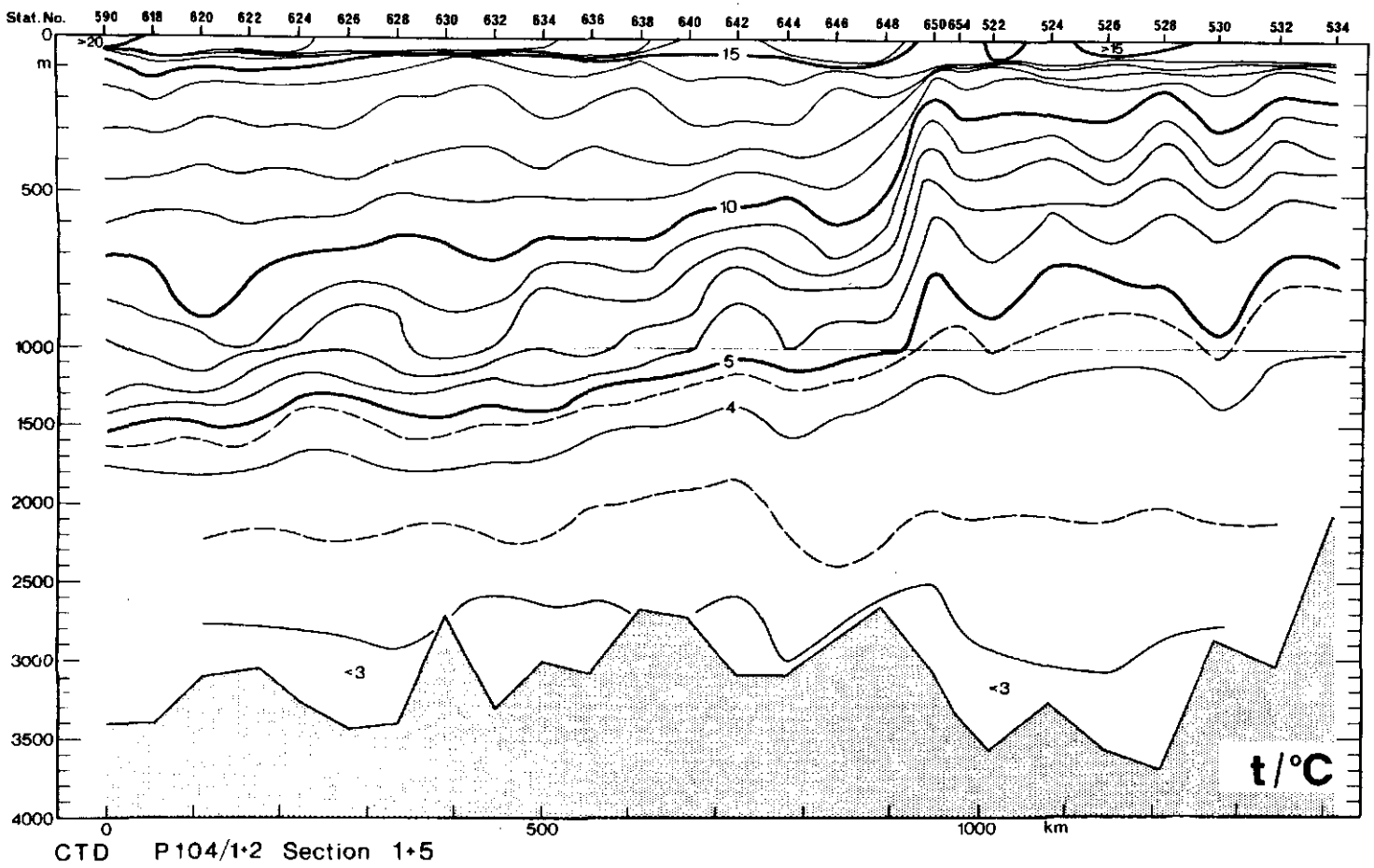


Fig. 6: Location of CTD stations during the cruise P104 1/2

Fig. 7a-o: Vertical sections of temperature, salinity, density and oxygen corresponding to station map (Figure 6)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0
m
500
1000
1500
2000
2500
3000
3500
4000
>20
15
10
5
4
<3
<3
>15
t/°C
0
500
1000
km
CTD P104/1+2 Section 1+5

Figg. 7a:

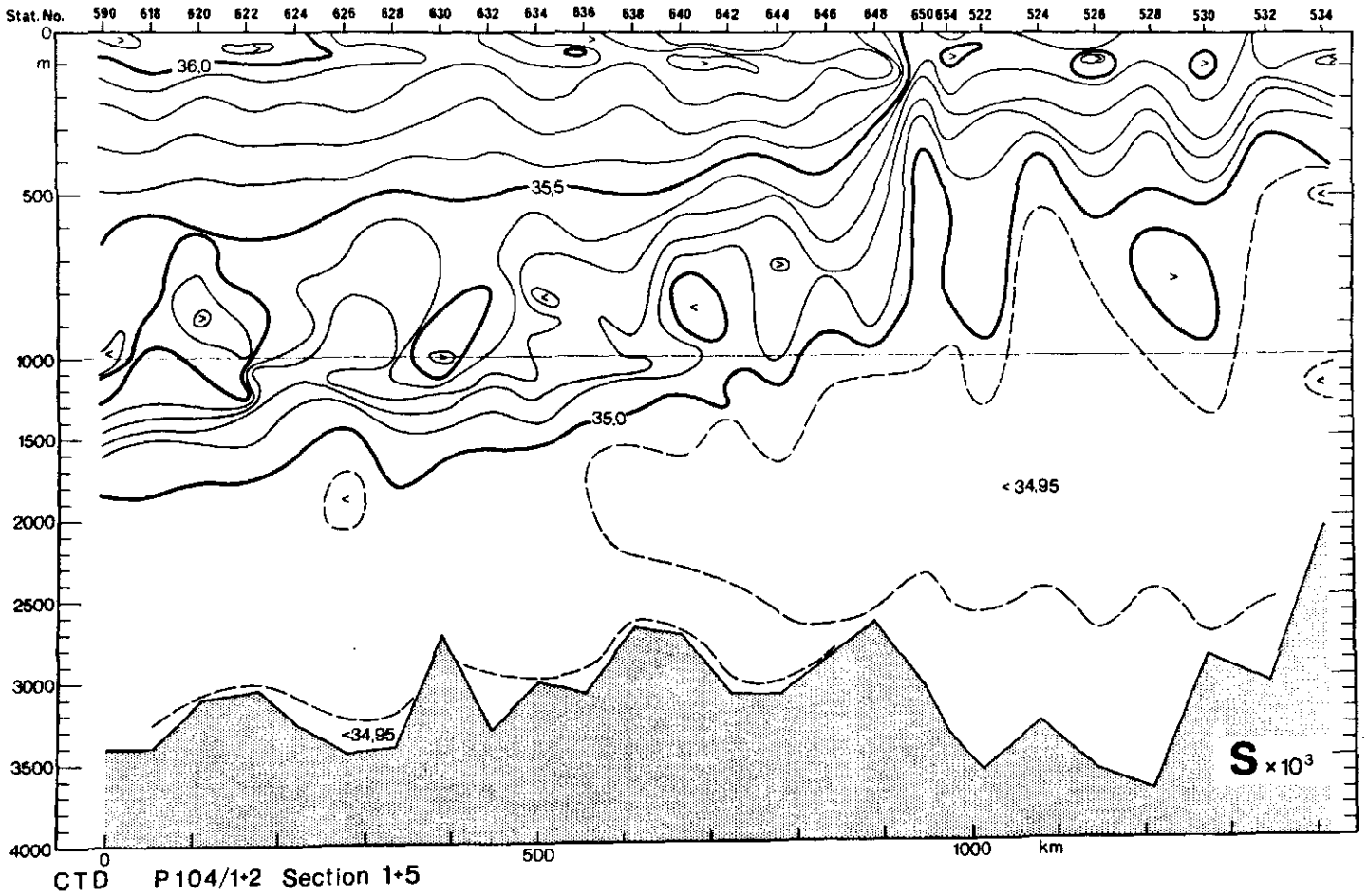

Stat.No. 590 618 620 622 624 626 628 630 632 634 636 638 640 642 644 646 648 650 654 522 524 526 528 530 532 534
0
m
500
1000
1500
2000
2500
3000
3500
4000
36,0
35,5
35,0
< 34,95
< 34,95
S × 10³
0
500
1000
km
CTD P 104/1+2 Section 1+5

Fig. 7b:

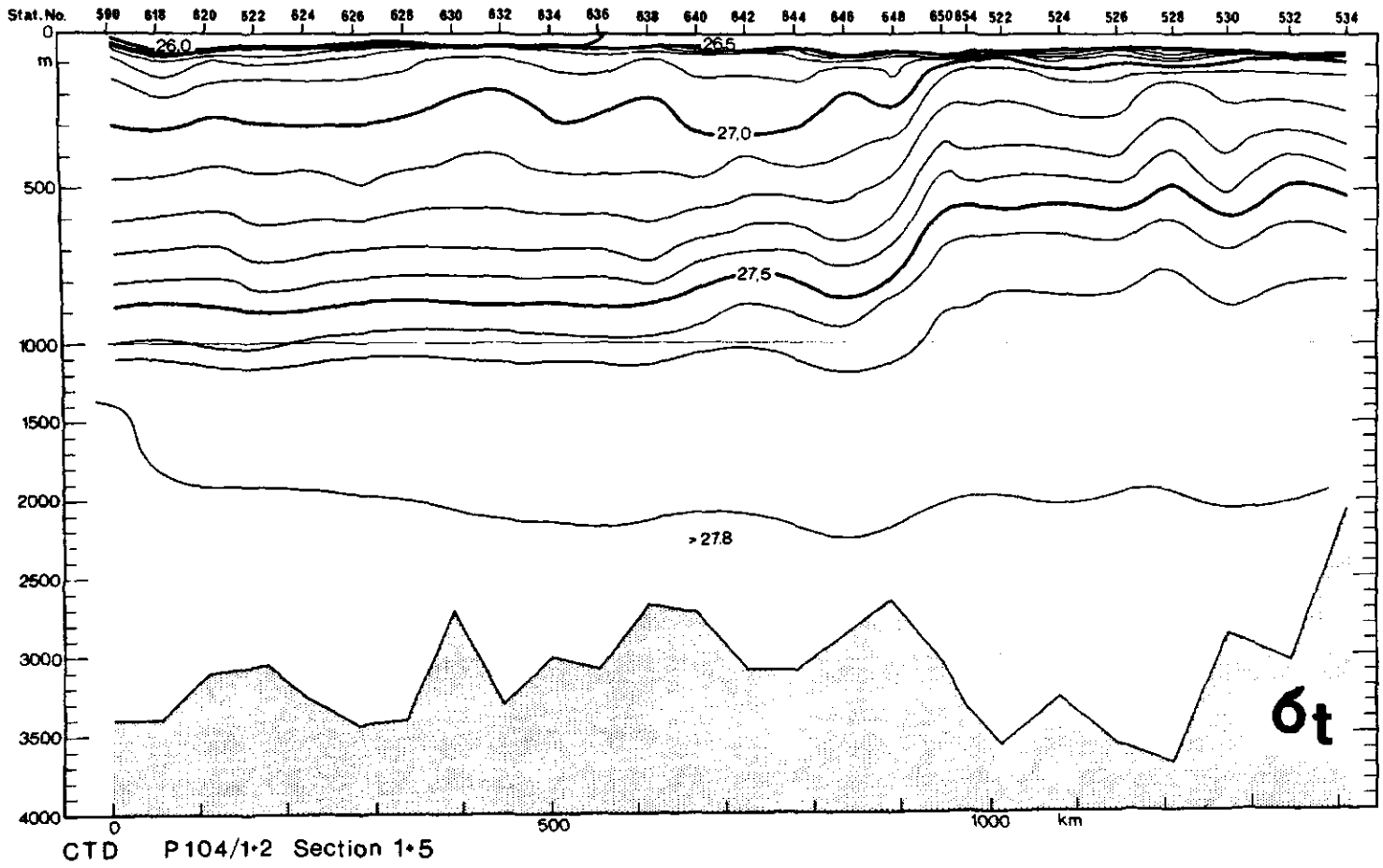

Stat.No.
618 620 622 624 626 628 630 632 634 636 638 640 642 644 646 648 650 654 522 524 526 528 530 532 534
0
m
500
1000
1500
2000
2500
3000
3500
4000
26,0
26,5
27,0
27,5
> 27,8
σt
0
500
1000
km
CTD P104/1+2 Section 1+5

Fig: 7e:

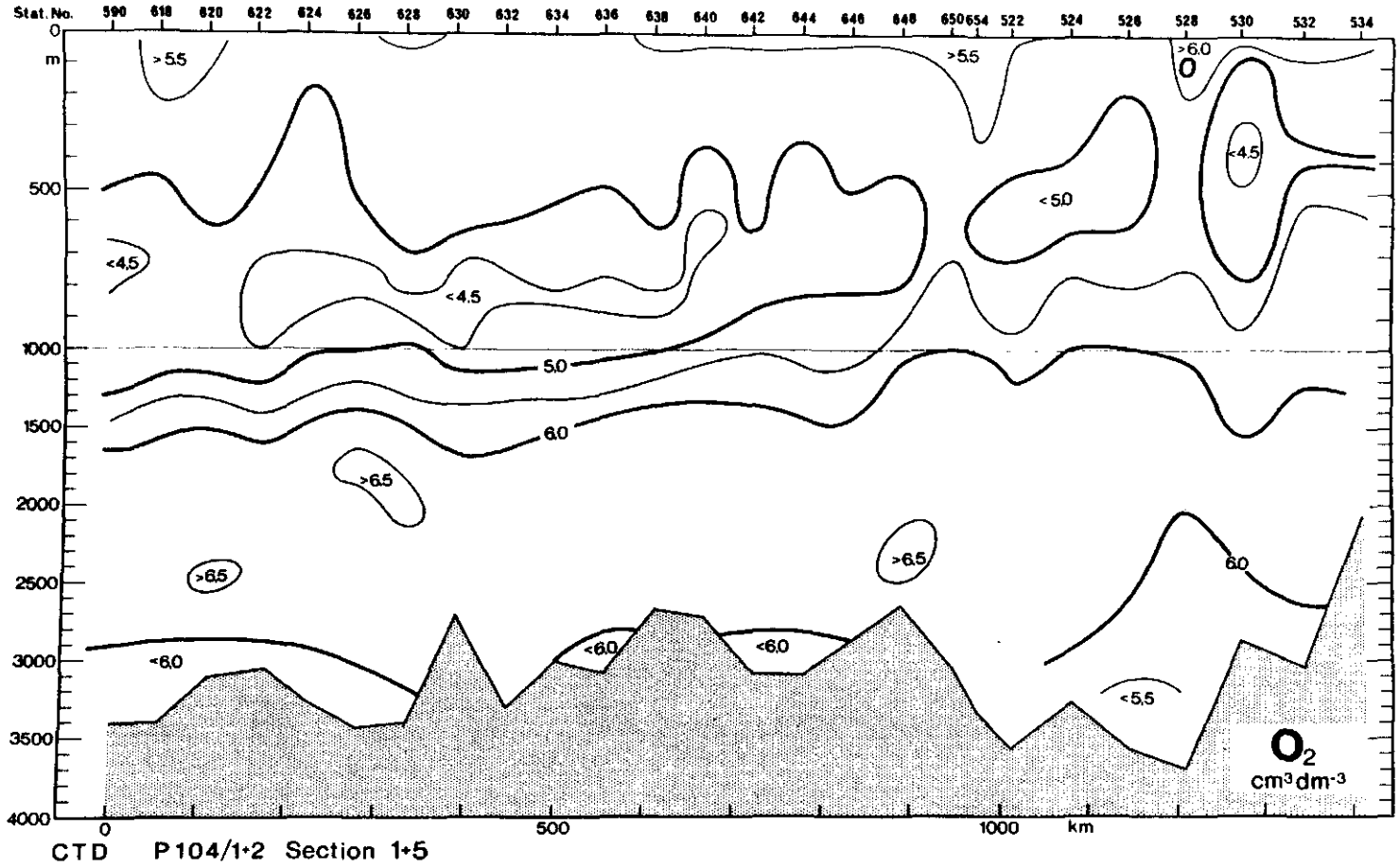
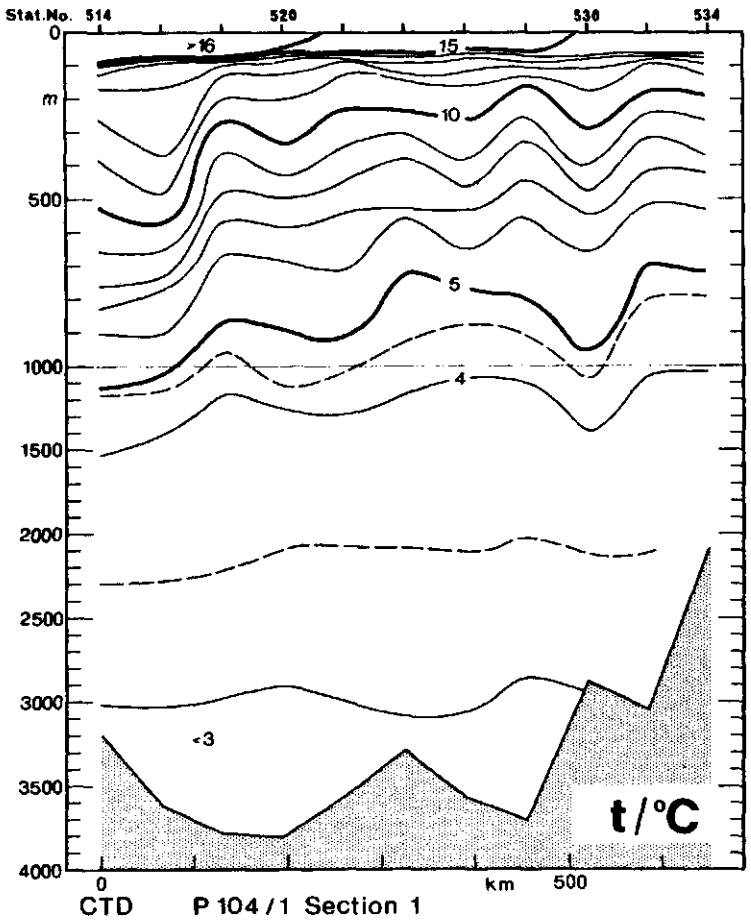

Stat. No. 590 618 620 622 624 626 628 630 632 634 636 638 640 642 644 646 648 650 654 522 524 526 528 530 532 534
0
m
500
1000
1500
2000
2500
3000
3500
4000
>5.5
>5.5
>6.0
O
<4.5
<4.5
<5.0
<4.5
5.0
6.0
>6.5
>6.5
6.0
<6.0
<6.0
<6.0
<5.5
O2
cm3 dm-3
0
500
1000
km
CTD P104/1+2 Section 1+5

Fig. 7d:


Stat.No. 514
520
530
534
0
m
500
1000
1500
2000
2500
3000
3500
4000
>16
15
10
5
4
<3
t/°C
0
km
500
CTD P 104/1 Section 1

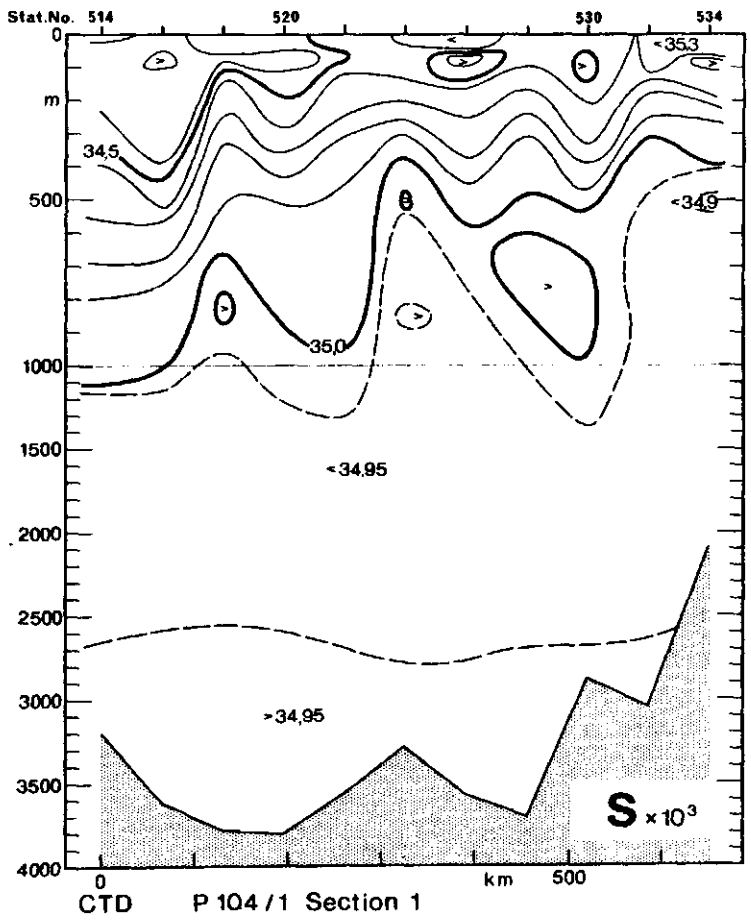
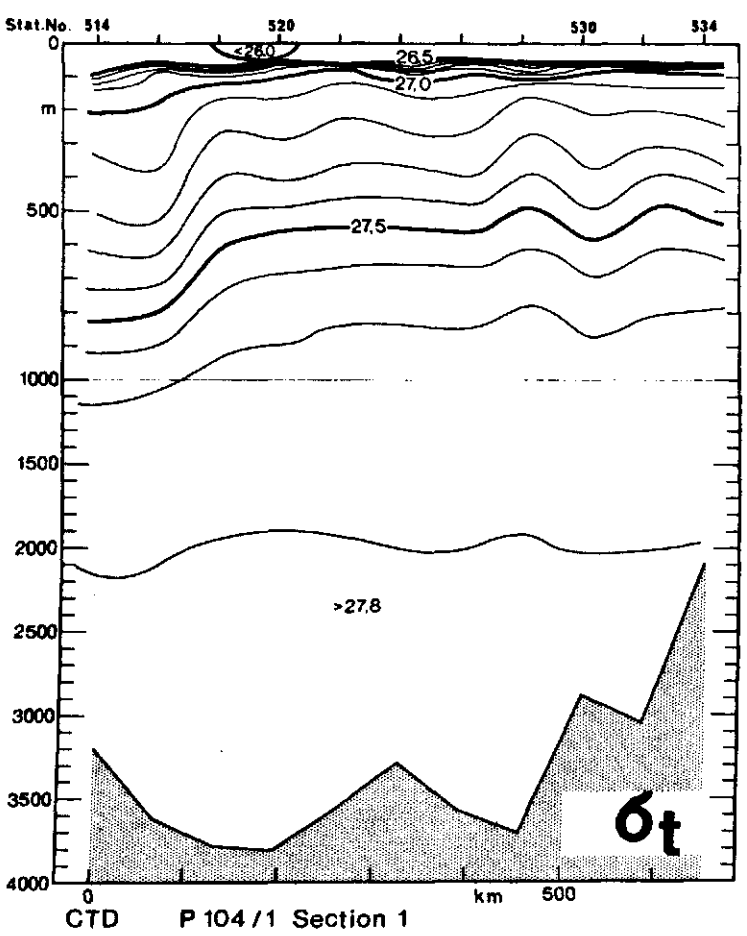

Stat.No. 514
520
530
534
0
m
500
1000
1500
2000
2500
3000
3500
4000
<35,3
34,5
<34,9
35,0
<34,95
>34,95
S x 10³
0
km
500
CTD P 104/1 Section 1

Fig. 7e:


Stat.No. 514
520
530
534
0
m
500
1000
1500
2000
2500
3000
3500
4000
<26,0
26,5
27,0
27,5
>27,8
σt
0
km
500
CTD P 104/1 Section 1

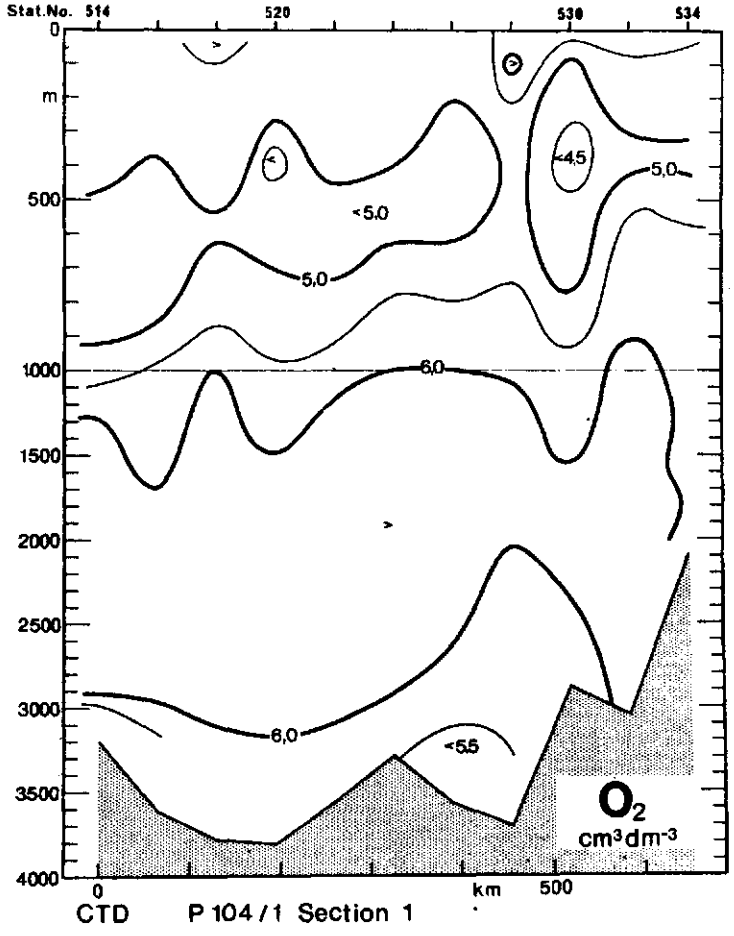
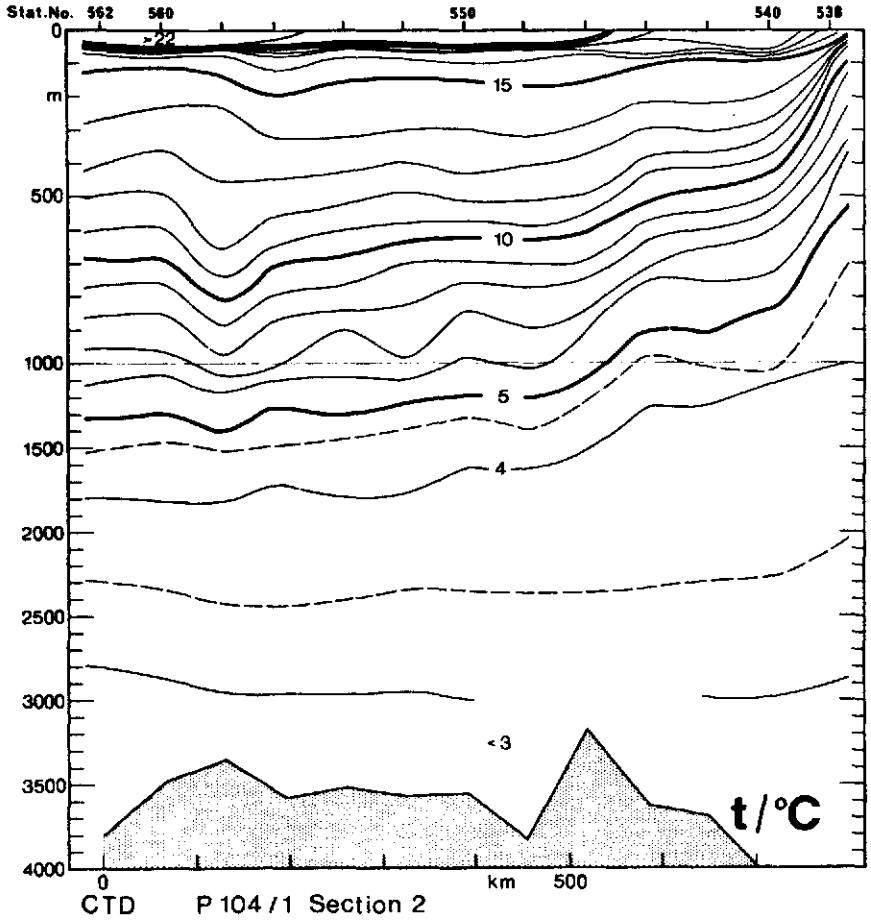

Stat.No. 514
520
530
534
0
m
500
1000
1500
2000
2500
3000
3500
4000
<4,5
5,0
<5,0
5,0
6,0
6,0
<5,5
O2
cm³dm⁻³
0
km
500
CTD P 104/1 Section 1

Fig. 7f:


Stat.No. 562 560 550 540 538
0
m
500
1000
1500
2000
2500
3000
3500
4000
>22
15
10
5
4
<3
t/°C
0
km
500
CTD P 104/1 Section 2

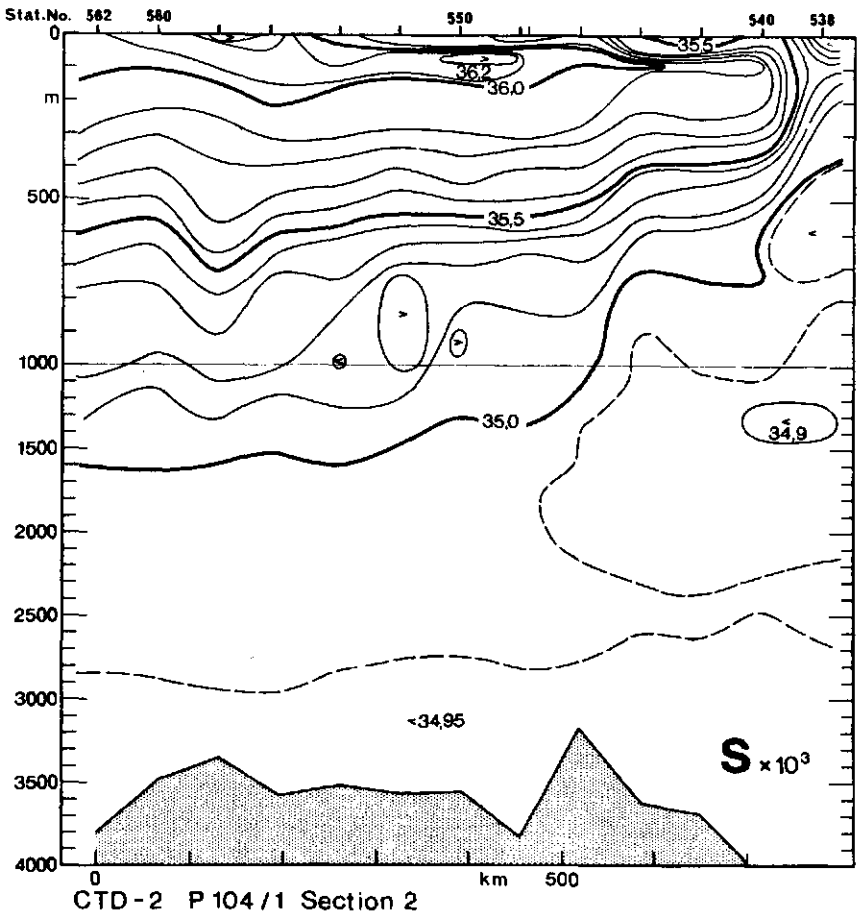
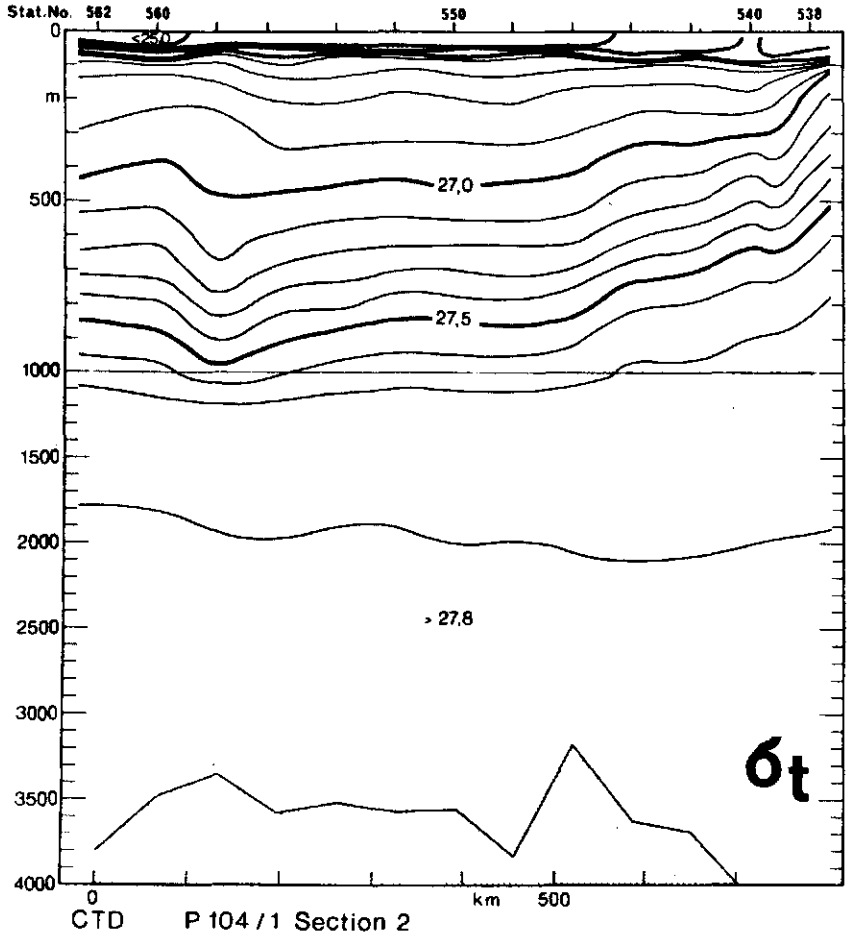

Stat.No. 562 560 550 540 538
0
m
500
1000
1500
2000
2500
3000
3500
4000
35,5
36,2
36,0
35,5
35,0
34,9
<34,95
S x 10³
0
km
500
CTD-2 P 104/1 Section 2

Fig. 7g:


Stat.No. 562 560 550 540 538
0
m
500
1000
1500
2000
2500
3000
3500
4000
27,0
27,5
> 27,8
σt
0
km
500
CTD P 104 / 1 Section 2

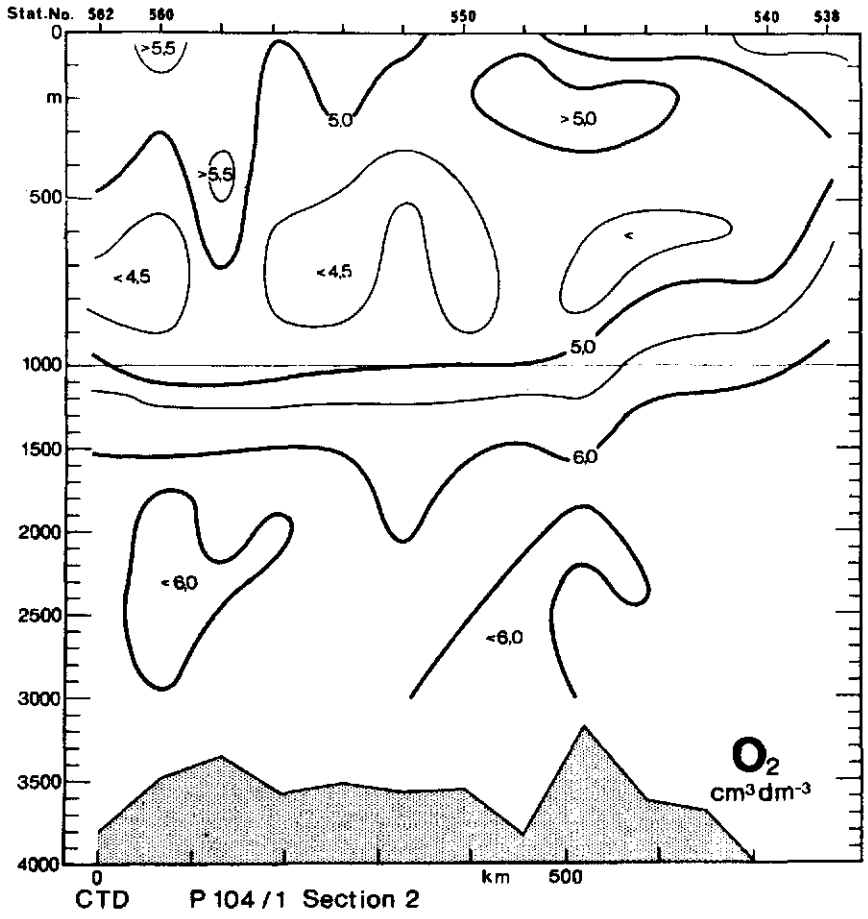

Stat.No. 562 560 550 540 538
0
m
500
1000
1500
2000
2500
3000
3500
4000
>5,5
5,0
>5,5
>5,0
<4,5
<4,5
5,0
6,0
<6,0
<6,0
O2
cm³ dm⁻³
0
km
500
CTD P 104 / 1 Section 2

Fig. 7h:

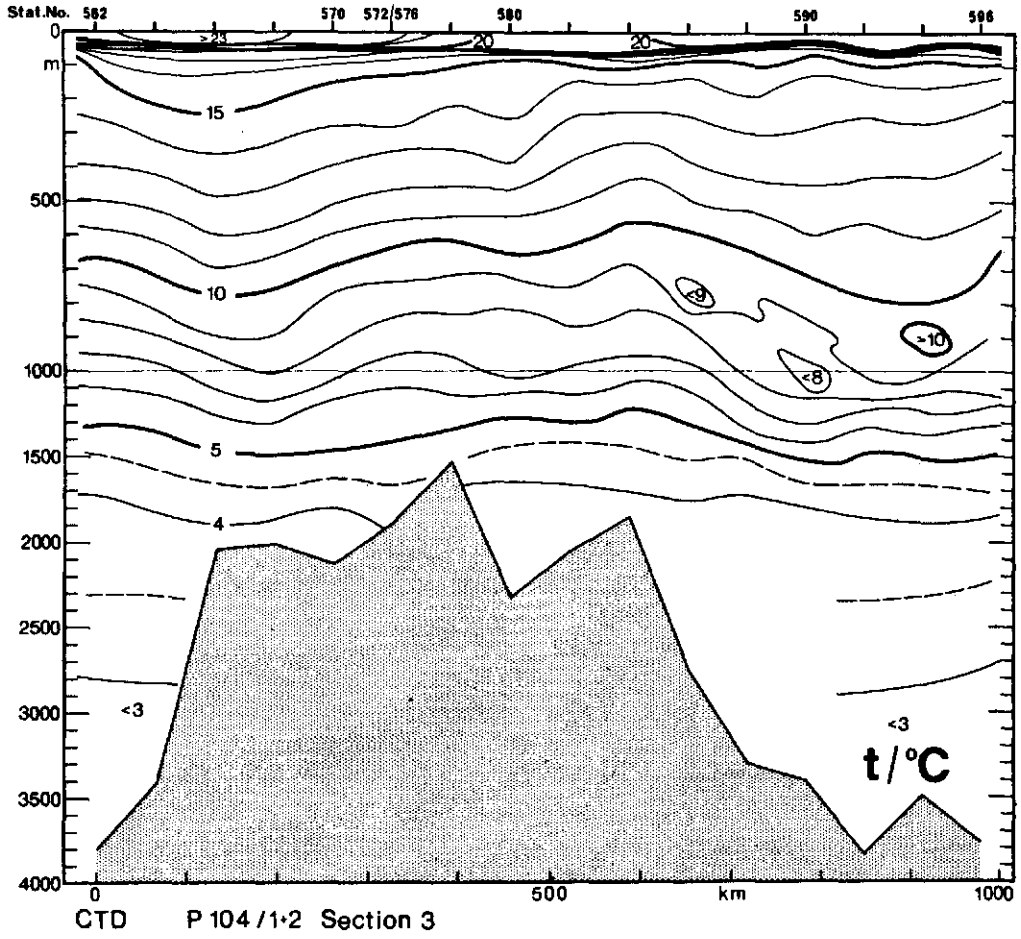

Stat.No. 562
570
572/576
580
590
596
0
m
500
1000
1500
2000
2500
3000
3500
4000
>25
20
20
15
10
5
4
<3
<9
>10
<8
<3
t/°C
0
500
km
1000
CTD P 104/1-2 Section 3

Fig. 7i:

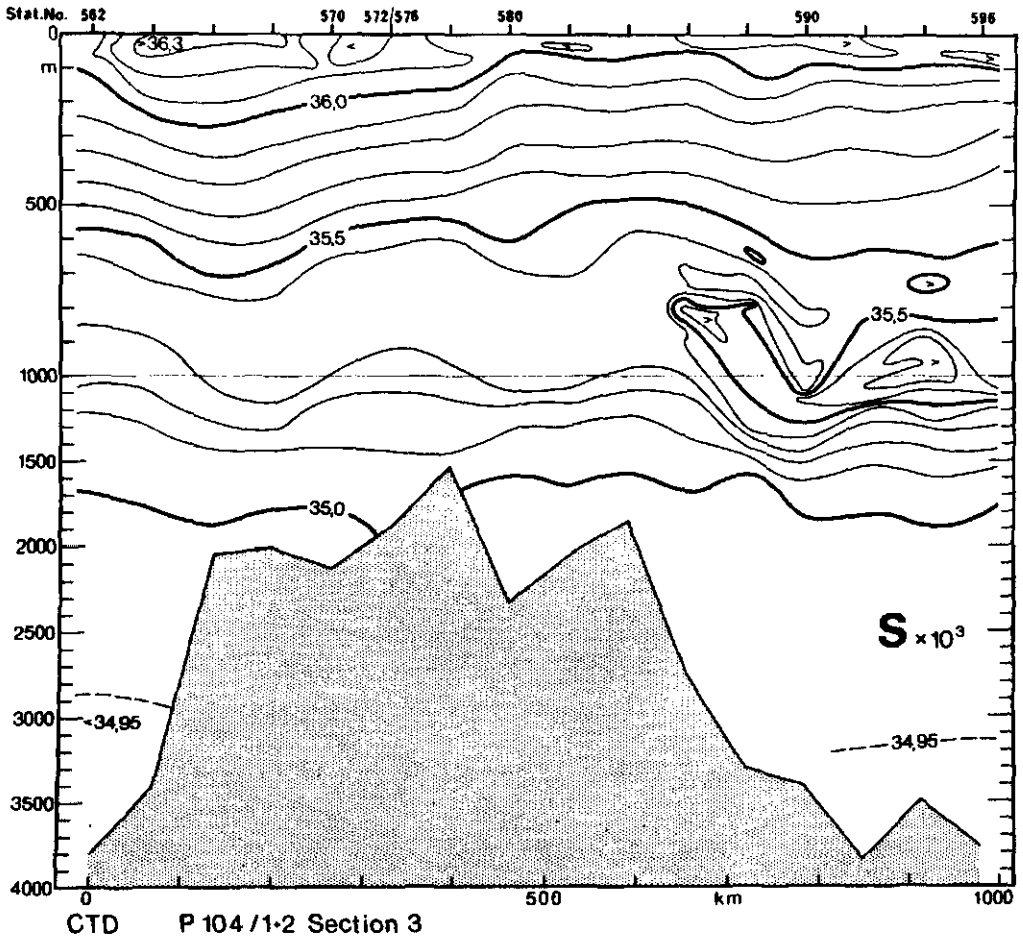

Stat.No. 562
570
572/576
580
590
596
0
m
500
1000
1500
2000
2500
3000
3500
4000
<36,3
36,0
35,5
35,5
35,0
<34,95
34,95
S ×10³
0
500
km
1000
CTD P 104/1-2 Section 3

Fig. 7j:

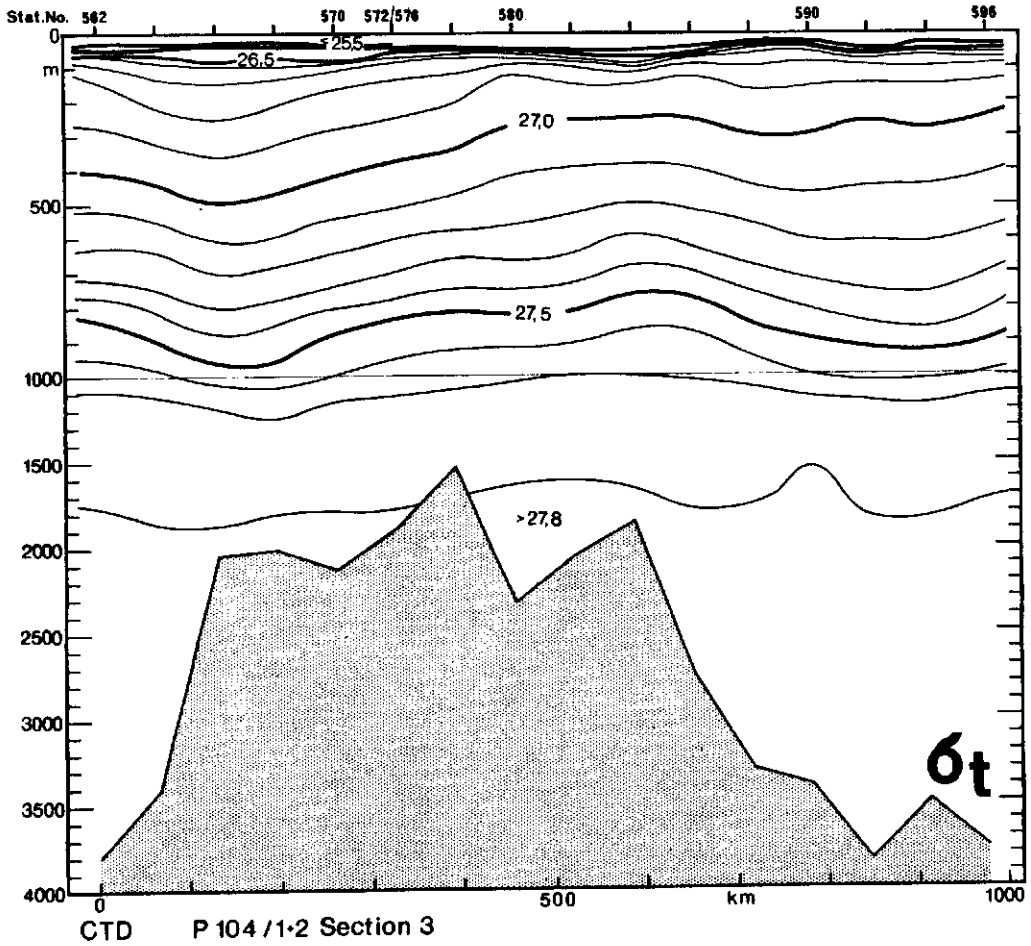

Stat.No. 562
570
572/576
580
590
595
0
m
≤25,5
26,5
27,0
500
27,5
1000
1500
>27,8
2000
2500
3000
3500
4000
0
500
km
1000
σt
CTD P 104/1-2 Section 3

Fig. 7k:

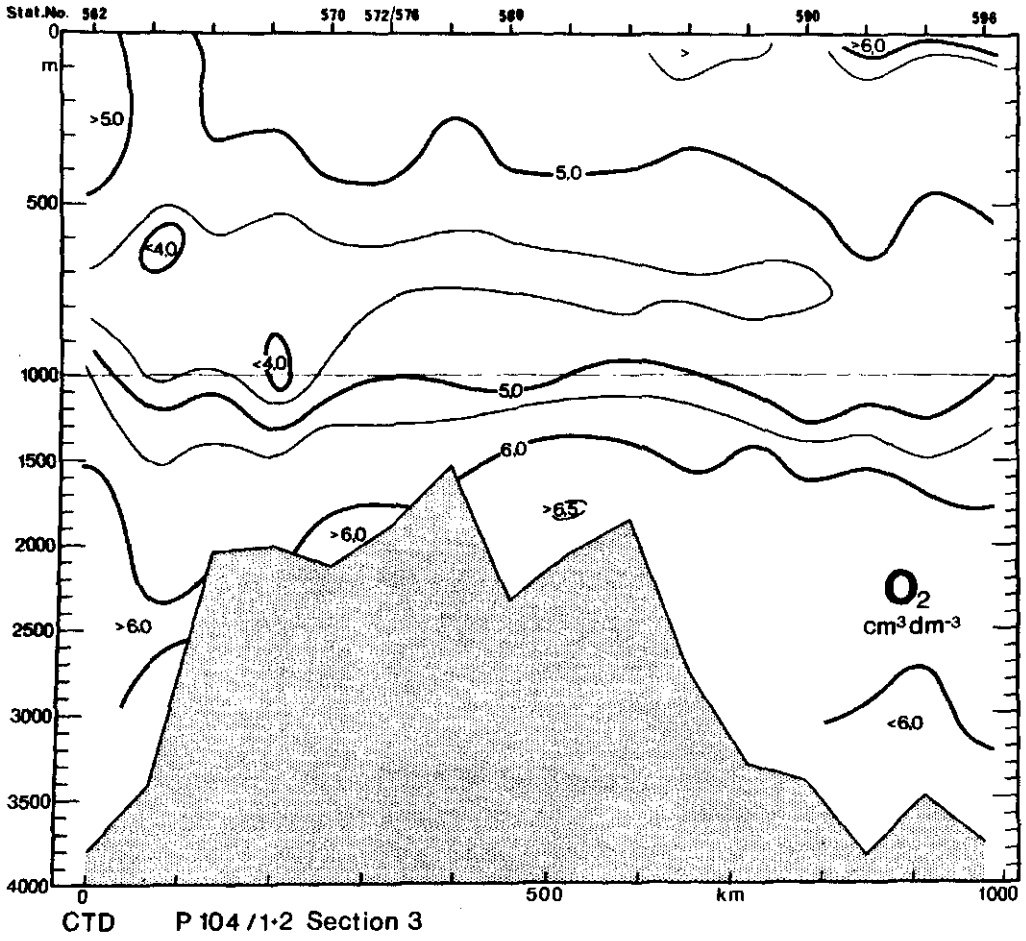
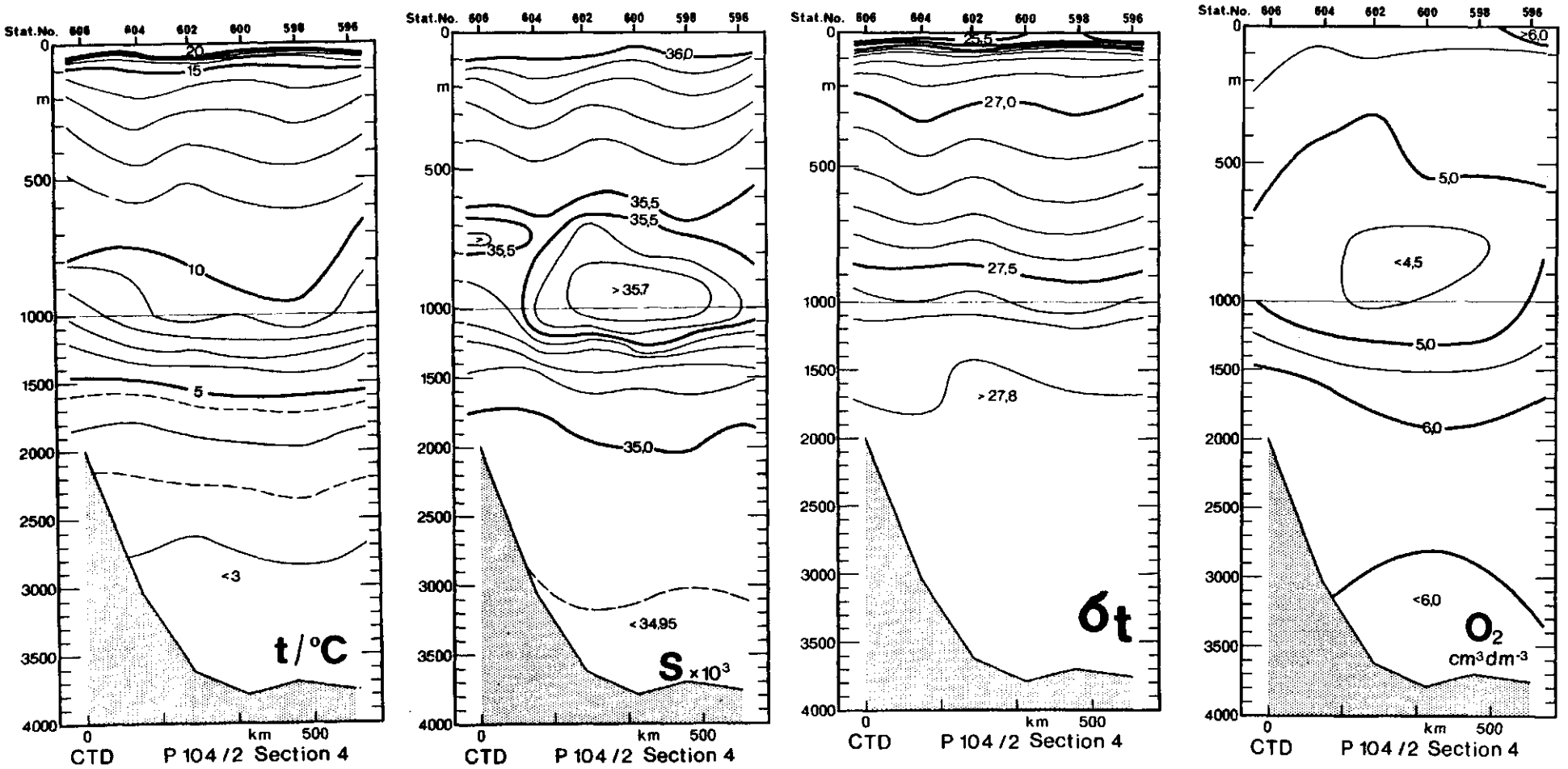

Stat.No. 562
570
572/576
580
590
596
0
m
500
1000
1500
2000
2500
3000
3500
4000
>5.0
5.0
<4.0
<4.0
5.0
6.0
>6.5
>6.0
>6.0
>6.0
O2
cm3 dm-3
<6.0
0
500
km
1000
CTD P 104 /1-2 Section 3

Fig. 7 1: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15
10
5
<3
t/°C
CTD P 104/2 Section 4
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35,5
35,5
>35,7
35,0
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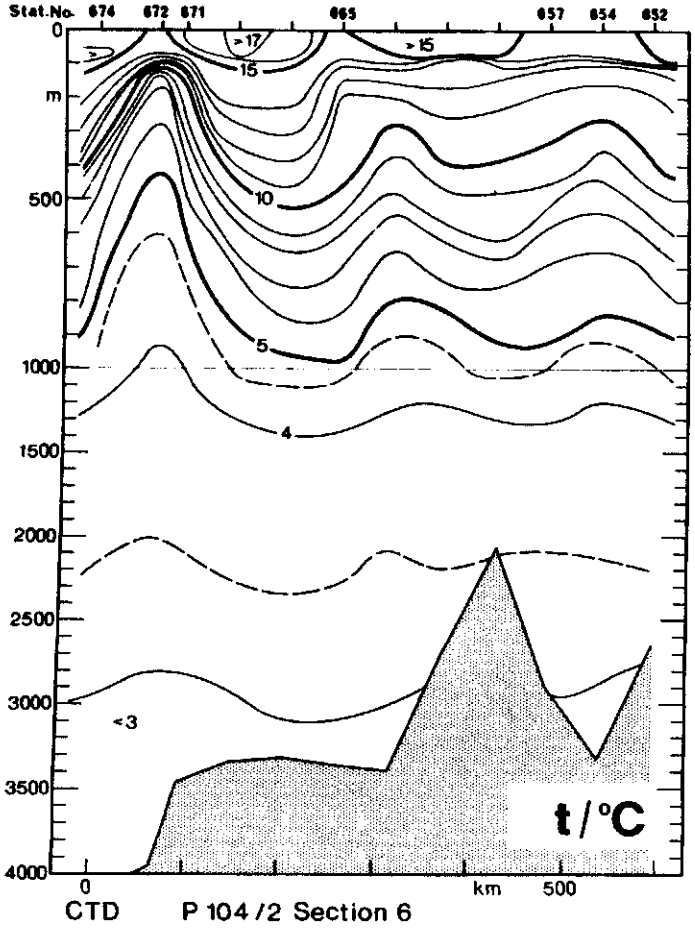
S x10³
CTD P 104/2 Section 4
25,5
27,0
27,5
>27,8
σt
CTD P 104/2 Section 4
>6,0
5,0
<4,5
5,0
6,0
<6,0
O₂
cm³dm⁻³
CTD P 104/2 Section 4
0
500
1000
1500
2000
2500
3000
3500
4000
km

Fig. 7m: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m
500
1000
1500
2000
2500
3000
3500
4000
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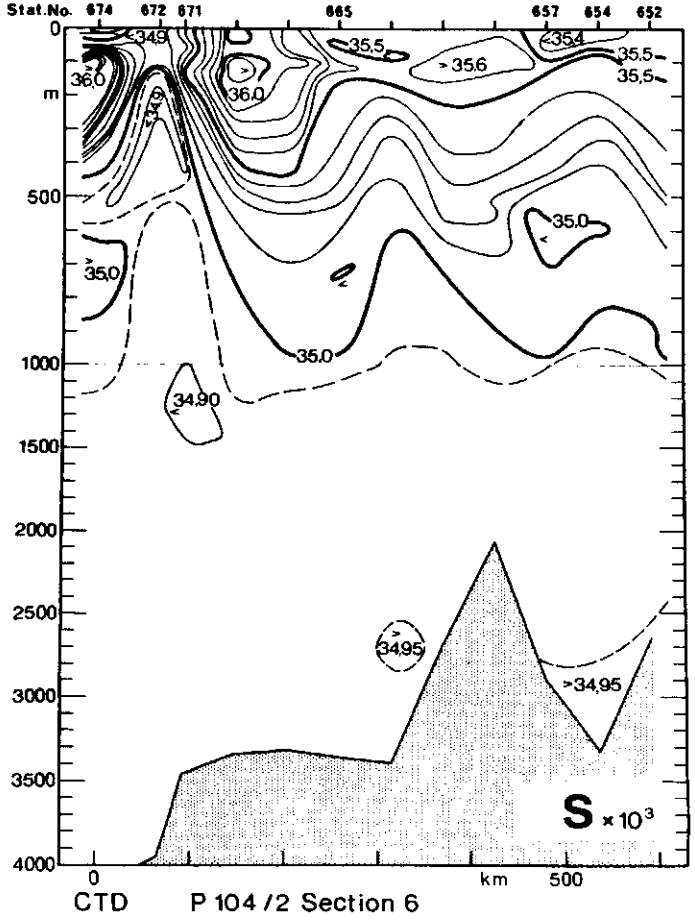
15
>15
10
5
4
<3
t/°C
0
km
500
CTD P 104/2 Section 6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m
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1000
1500
2000
2500
3000
3500
4000
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35,5
>35,6
<35,4
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35,5
36,0
36,0
<34,9
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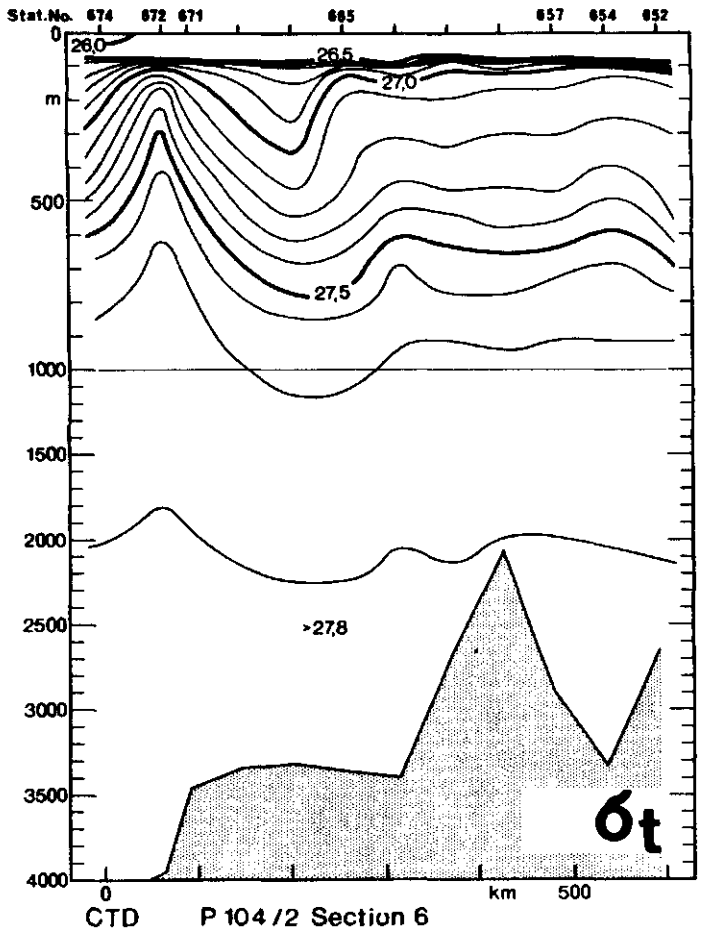
<34,90
>34,95
>34,95
S x 10³
0
km
500
CTD P 104/2 Section 6

Fig. 7n: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1500
2000
2500
3000
3500
4000
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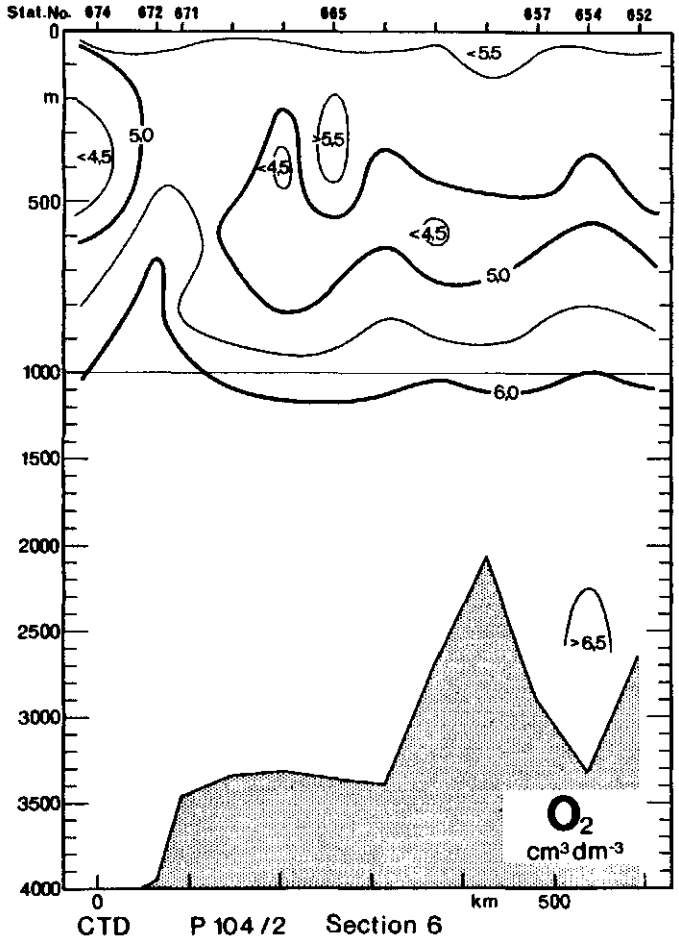
26,5
27,0
27,5
>27,8
σt
0
km
500
CTD P 104/2 Section 6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2000
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O2
cm3dm-3
0
km
500
CTD P 104/2 Section 6

Fig. To:

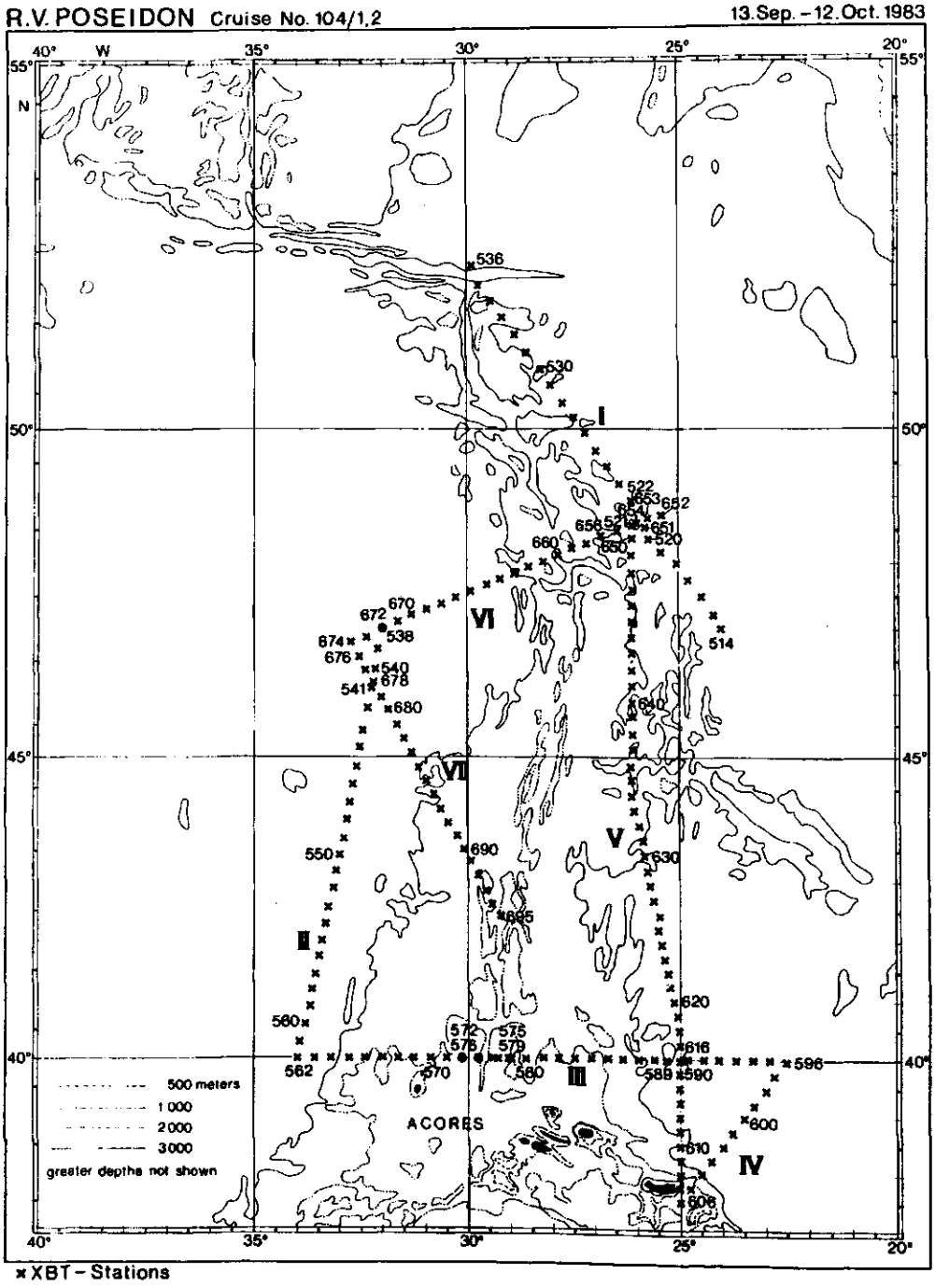
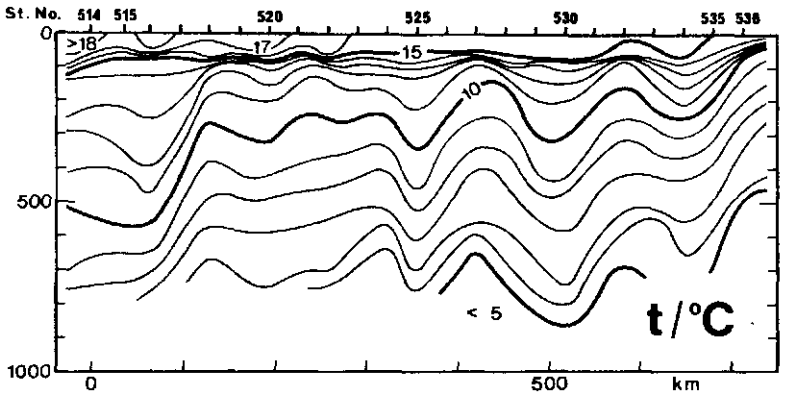
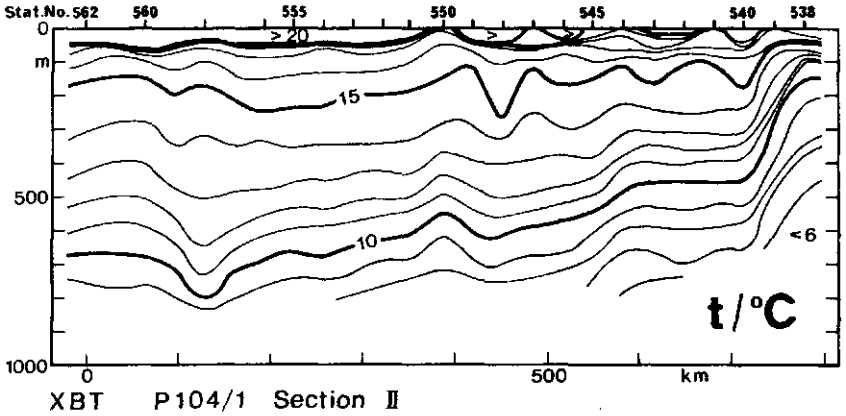


Fig. 8: Location of the XBT drops during the cruise P104

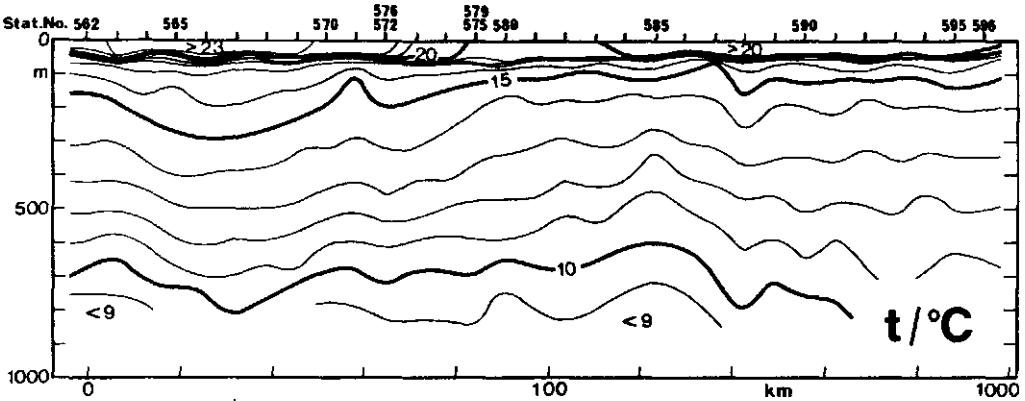
Fig. 9a,b: Vertical temperature section from XBT-drops corresponding station map (Figure 8)



XBT P104/1 Section I

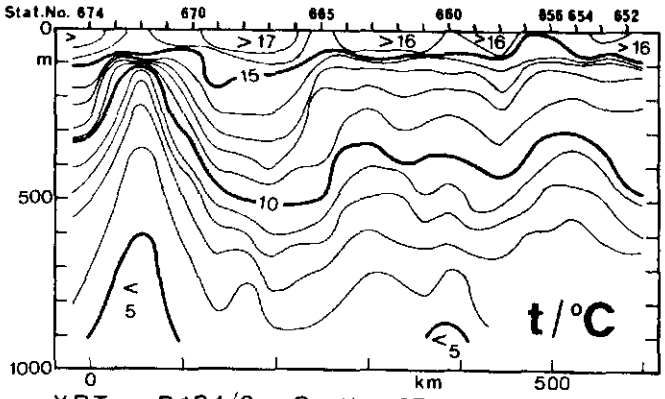


XBT P104/1 Section II

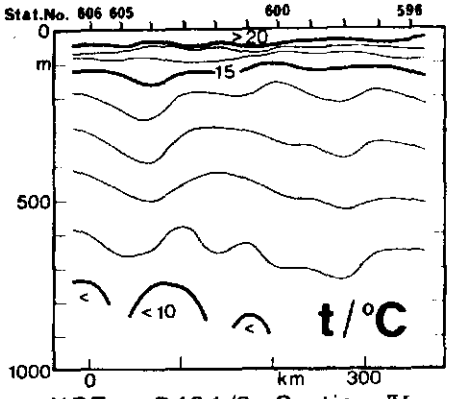


XBT P104/1,2 Section III

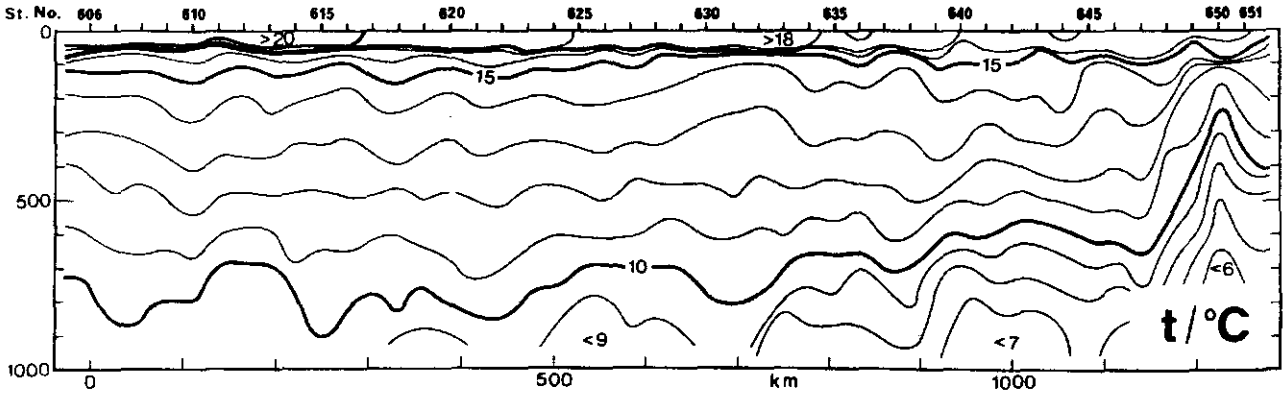
Fig. 9a:



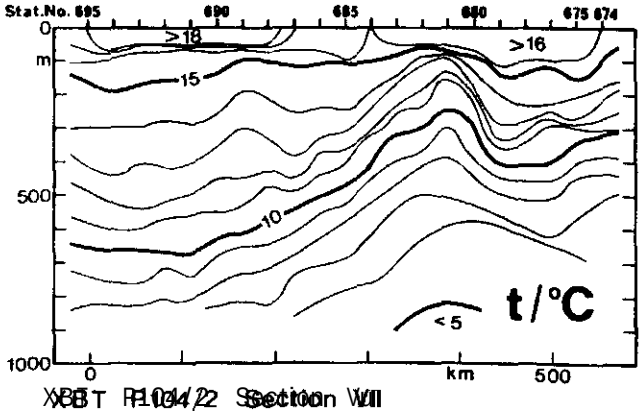
XBT P 104/2 Section VI



XBT P 104/2 Section IV



XBT P 104/2 Section V



XBT P 104/2 Section VII

Fig. 99:

6.1.2 Cruise AD129/2

S T A T I O N L I S T

Date 1980	Time (GMT)	Station	XBT-No.	Latitude	Longitude	Depth (m)
			F.S. "Anton Dohrn" Cruise 129/2			
12.11.	0500	97	93	48°17.5'N	50°00.0'W	205
"	0646	98	94	48°23.5'N	49°31.0'W	298
"	0825	99	95	48°28.5'N	49°01.6'W	1440
"	1009	100	96	48°35.0'N	48°34.0'W	1840
"	1153	101	97	48°41.8'N	48°05.0'W	2160
"	1341	102	98	48°48.5'N	47°36.8'W	2440
"	1532	103	99	48°55.5'N	47°08.0'W	2680
"	1725	104	100	49°02.0'N	46°37.5'W	2850
"	1907	105	101	49°10.0'N	46°09.5'W	3000
"	2055	106	102	49°18.0'N	45°40.0'W	2960
"	2237	107	103	49°23.0'N	45°12.0'W	2880
13.11.	0026	108	104	49°30.0'N	44°43.0'W	3200
"	0215	109	105	49°37.6'N	44°14.0'W	3640
"	0407	110	106	49°44.5'N	43°44.0'W	4175
"	0557	111	107	49°53.0'N	43°14.5'W	4275
"	0744	112	108	49°59.8'N	42°46.0'W	4280
"	0933	113	109	50°03.0'N	42°14.0'W	4360
"	1122	114	110	50°09.0'N	41°47.0'W	4360
"	1315	115	111	50°18.0'N	41°17.0'W	4380
"	1505	116	112	50°29.5'N	40°48.5'W	4375
"	1659	117	113	50°37.5'N	40°19.0'W	4075
"	1843	118	114	50°43.0'N	39°49.5'W	4285
"	2031	119	115	50°49.0'N	39°18.2'W	4080
"	2217	120	116	50°55.0'N	38°47.0'W	4000
14.11.	0009	121	117	51°01.0'N	38°17.0'W	3970
"	0203	122	118	51°09.0'N	37°48.0'W	3640
"	0352	123	119	51°18.0'N	37°19.0'W	3660
"	0544	124	120	51°24.5'N	36°48.0'W	3580
"	0735	125	121	51°29.7'N	36°20.0'W	3840
"	0934	126	122	51°37.0'N	35°49.5'W	3800
"	1142	127	123	51°45.0'N	35°19.0'W	3480
"	1345	128	124	51°52.0'N	34°48.0'W	3700
"	1556	129	125	51°59.5'N	34°18.0'W	3175
"	1800	130	126	52°06.0'N	33°48.0'W	3510
"	2035	131	127	52°15.0'N	33°13.8'W	3800
"	2252	132	128	52°23.0'N	32°39.0'W	2930
15.11.	0101	133	129	52°28.0'N	32°06.0'W	2450
"	0255	134	130	52°34.5'N	31°35.0'W	4300
"	0944	135	131	52°42.0'N	31°06.4'W	3520
"	1112-1255	136	Recovery of mooring 280	52°41 9'N	31°01.2'W	
"	1428	137	132	52°49.0'N	30°30.0'W	3280
"	1625	138	133	52°58.0'N	30°00.0'W	3245
"	1825	139	134	53°05.0'N	29°29.0'W	3335
"	2029	140	135	53°14.0'N	28°55.0'W	3320
"	2232	141	136	53°24.0'N	28°23.0'W	3360

S T A T I O N L I S T

Date 1980	Time (GMT)	Station	XBT-No.	Latitude	Longitude	Depth (m)
16.11.	0029	142	137	53°33.0'N	27°53.0'W	3520
"	0207	143	138	53°43.0'N	27.28°0'W	3615
"	0403	144	139	53°50.5'N	26°53.5'W	3625
"	0557	145	140	53°56.0'N	26°20.5'W	3640
"	0745	146	141	54°02.0'N	25°47.0'W	3260
"	0935	147	142	54°09.0'N	25°15.0'W	3000
"	1126	148	143	54°18.0'N	24°42.0'W	3120
"	1316	149	144	54°27.5'N	24°12.0'W	3090
"	1502	150	145	54°35.0'N	23°41.0'W	3260
"	1640	151	146	54°42.0'N	23°09.5'W	3095
"	1824	152	147	54°49.5'N	22°37.0'W	3200
"	2010	153	148	54°58.0'N	22°05.0'W	3240
"	2152	154	149	55°06.5'N	21°32.0'W	2870
"	2337	155	150	55°14.0'N	21°00.5'W	2850
17.11.	0119	156	151	55°22.0'N	20°28.0'W	1520
"	0255	157	152	55°30.0'N	19°57.0'W	1270
"	0435	158	153	55°36.5'N	19°25.0'W	1565
"	0611	159	154	55°44.4'N	18°54.0'W	1550
"	0751	160	155	55°51.8'N	18°20.7'W	1340
"	0930	161	156	55°59.0'N	17°48.0'W	1320
"	1108	162	157	56°07.0'N	17°16.0'W	710
"	1245	163	158	56°14.0'N	16°43.5'W	510
"	1425	164	159	56°22.0'N	16°11.0'W	536
"	1609	165	160	56°30.0'N	15°37.0'W	433
"	1743	166	161	56°38.9'N	15°04.4'W	259
"	1943	167	162	56°46.5'N	14°32.5'W	191
"	2115	168	163	56°54.0'N	13°59.0'W	187
"	2251	169	164	57°01.0'N	13°26.0'W	310
18.11.	0027	170	165	57°09.0'N	12°52.0'W	1720
"	0204	171	166	57°17.0'N	12°19.0'W	1875
"	0341	172	167	57°26.0'N	11°45.5'W	1880
"	0515	173	168	57°33.5'N	11°14.5'W	750
"	0652	174	169	57°42.3'N	10°40.5'W	2120
"	0830	175	170	57°50.0'N	10°05.0'W	2000
"	1006	176	171	57°58.0'N	9°31.5'W	390
"	1142	177	172	58°06.0'N	8°57.0'W	183

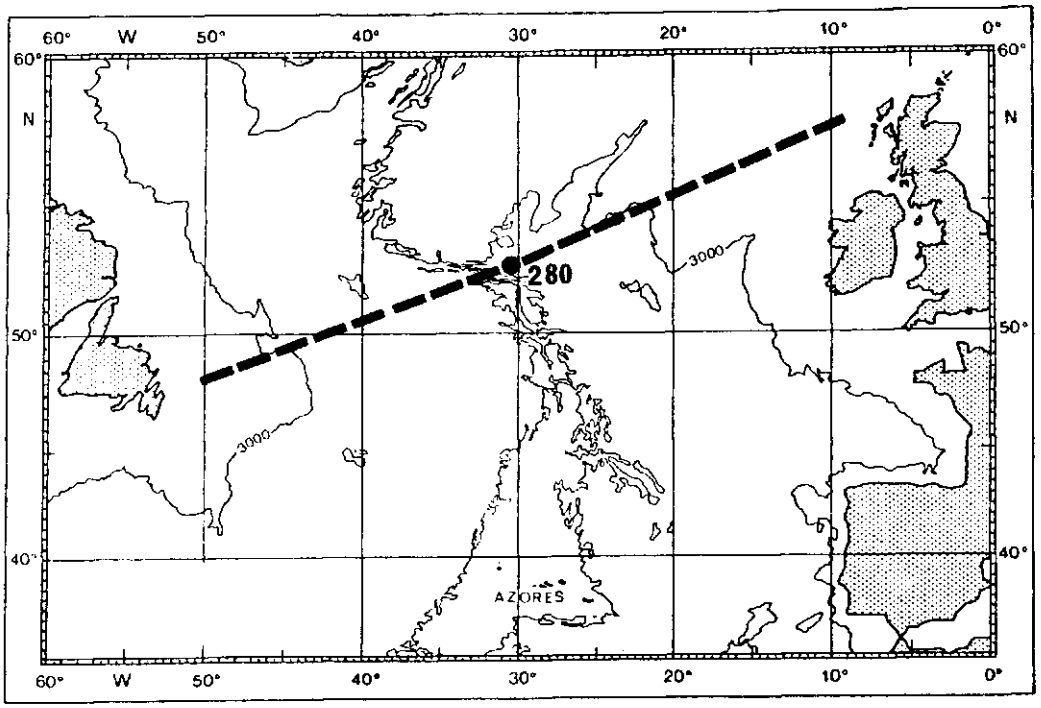


Fig. 10: Location of the XBT-section carried out during "Anton Dohrn" cruise AD129/2.

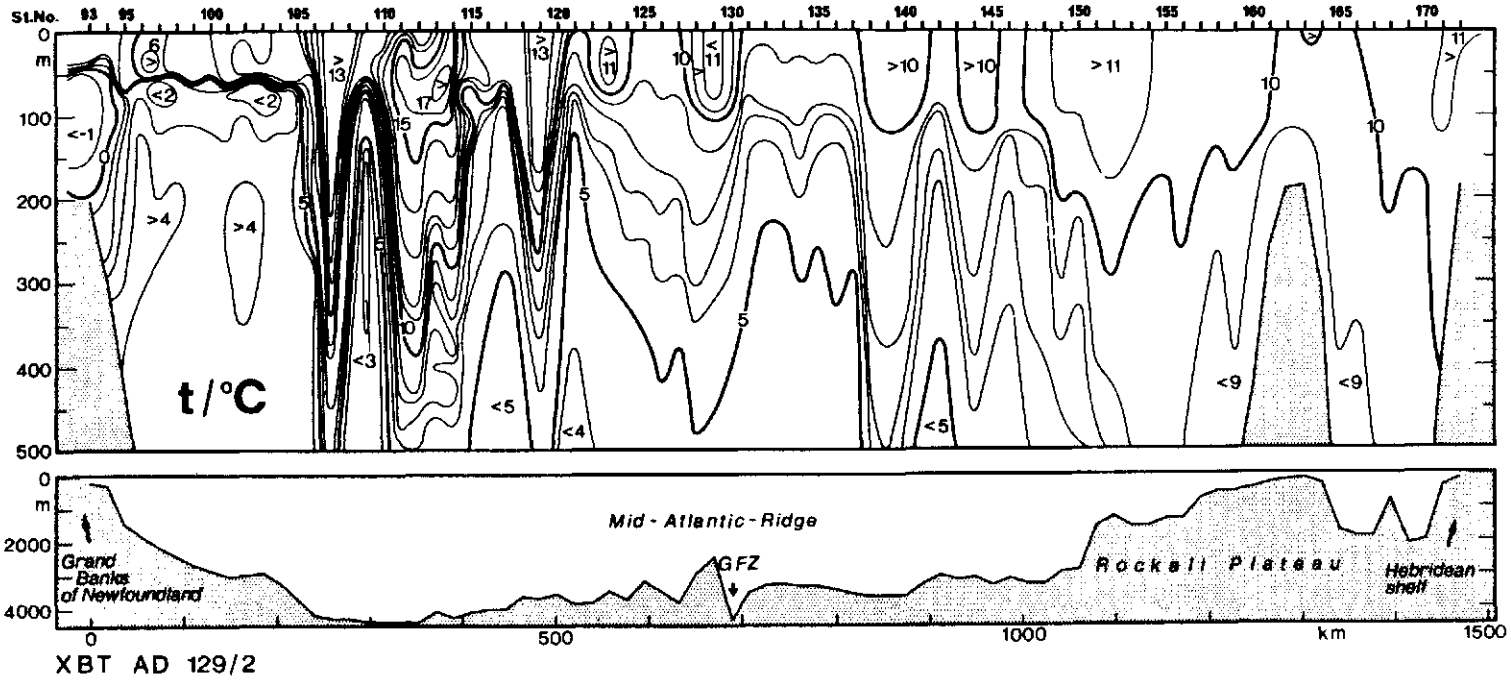


Fig. 11: XBT-section carried out during "Anton Dohrn" cruise AD129/2.

6.2 Currents

6.2.1 Drifting buoy tracks

	Begin			End		
Drifter No.	Date	Latitude (N)	Longitude (W)	Date	Latitude (N)	Longitude (W)
1304	01.01.83	30 42.00	55 46.62	19.03.83	18 23.10	63 27.96
1811	"	32 13.74	38 25.62	27.07.83	29 40.56	35 05.16
1812	"	27 07.02	51 01.80	28.09.83	31 44.46	58 55.26
1814	"	33 01.08	28 50.64	24.03.83	31 00.60	25 00.12
3512	"	41 14.22	31 47.64	01.01.84	37 23.28	31 39.36
3513	"	31 37.32	29 37.50	01.01.84	27 56.52	48 11.10
3514	"	24 02.40	49 25.68	01.01.84	30 20.52	59 30.24
3517	"	43 11.16	30 37.80	04.04.83	45 17.40	23 45.78
3520	"	45 39.84	23 57.48	22.02.83	48 14.22	23 49.50
3521	"	27 50.64	28 17.40	21.02.83	28 03.96	29 31.62
3522	"	48 43.92	28 52.02	18.11.83	39 20.34	13 34.08
3523	"	50 51.60	31 40.50	07.03.83	54 19.92	26 54.06
3524	"	45 32.10	31 10.44	24.07.83	43 48.54	18 30.06
3525	"	47 07.38	16 08.28	22.04.83	45 55.74	08 42.30
3526	"	49 52.02	38 27.54	13.09.83	55 36.30	21 06.30
3527	"	49 14.58	31 31.74	28.02.83	54 31.14	26 14.22
3528	"	52 11.94	42 24.36	01.01.84	54 45.18	19 53.64
3529	"	51 02.28	31 57.18	11.09.83	48 18.84	11 52.32
3530	"	50 08.52	44 56.04	05.10.83	53 28.26	20 50.88
3532	"	50 45.60	44 47.22	20.08.83	48 02.04	24 12.90
3533	"	49 46.86	42 04.14	31.10.83	60 58.14	17 53.22
3534	"	50 50.40	44 51.72	29.06.83	45 41.04	22 12.42
3535	"	50 17.64	39 02.52	04.09.83	59 30.66	14 30.54
3536	"	50 18.72	38 57.06	01.01.84	57 13.26	15 53.34
3537	"	49 21.24	33 46.26	01.01.84	55 01.02	08 43.20
3538	"	49 09.60	38 30.48	05.08.83	47 47.82	25 15.54
3540	"	43 44.04	23 27.60	29.10.83	25 10.44	26 08.04
3542	"	43 29.64	29 20.34	15.07.83	43 06.54	22 50.04
3543	"	41 27.90	20 10.14	22.06.83	38 26.88	16 49.86
3545	"	39 27.24	25 16.74	04.08.83	36 05.70	25 31.62
3550	"	21 31.62	32 32.58	02.09.83	25 15.60	66 20.04
3555	"	41 15.54	29 09.30	14.03.83	46 06.30	22 18.36
3556	01.01.83	38 28.98	25 06.96	08.09.83	29 27.96	30 00.96
3560	01.07.83	54 16.14	36 53.40	01.01.84	55 58.44	21 03.90
3561	"	54 33.96	36 55.50	"	55 31.44	33 12.18
3562	"	54 26.64	37 10.32	"	54 02.76	33 52.50
3563	09.07.83	51 30.78	31 45.30	"	54 55.08	17 38.46
3564	"	51 19.80	31 35.76	"	52 07.44	19 16.80
3565	"	51 16.92	31 40.08	04.11.83	57 55.44	07 09.84
3566	01.07.83	54 40.50	36 58.68	01.01.84	60 00.60	15 20.52
3567	09.07.83	51 24.24	31 42.60	"	55 43.32	15 23.52
3568	01.07.83	54 21.36	36 52.38	"	57 04.62	17 16.20
3569	09.07.83	51 59.52	31 41.94	"	58 34.20	15 25.20
3571	18.09.83	47 59.16	31 57.66	"	51 53.10	22 21.78
3572	08.10.83	48 39.00	25 50.40	"	53 12.78	21 36.72
3573	10.10.83	46 37.62	32 33.72	"	48 37.02	19 40.38
3574	27.09.83	41 56.10	33 17.40	"	42 46.20	28 05.40
3575	19.09.83	45 06.84	32 33.84	"	45 41.94	23 47.58

Table 3: Date and location of the beginning and the end of drifting buoy tracks during 1983.

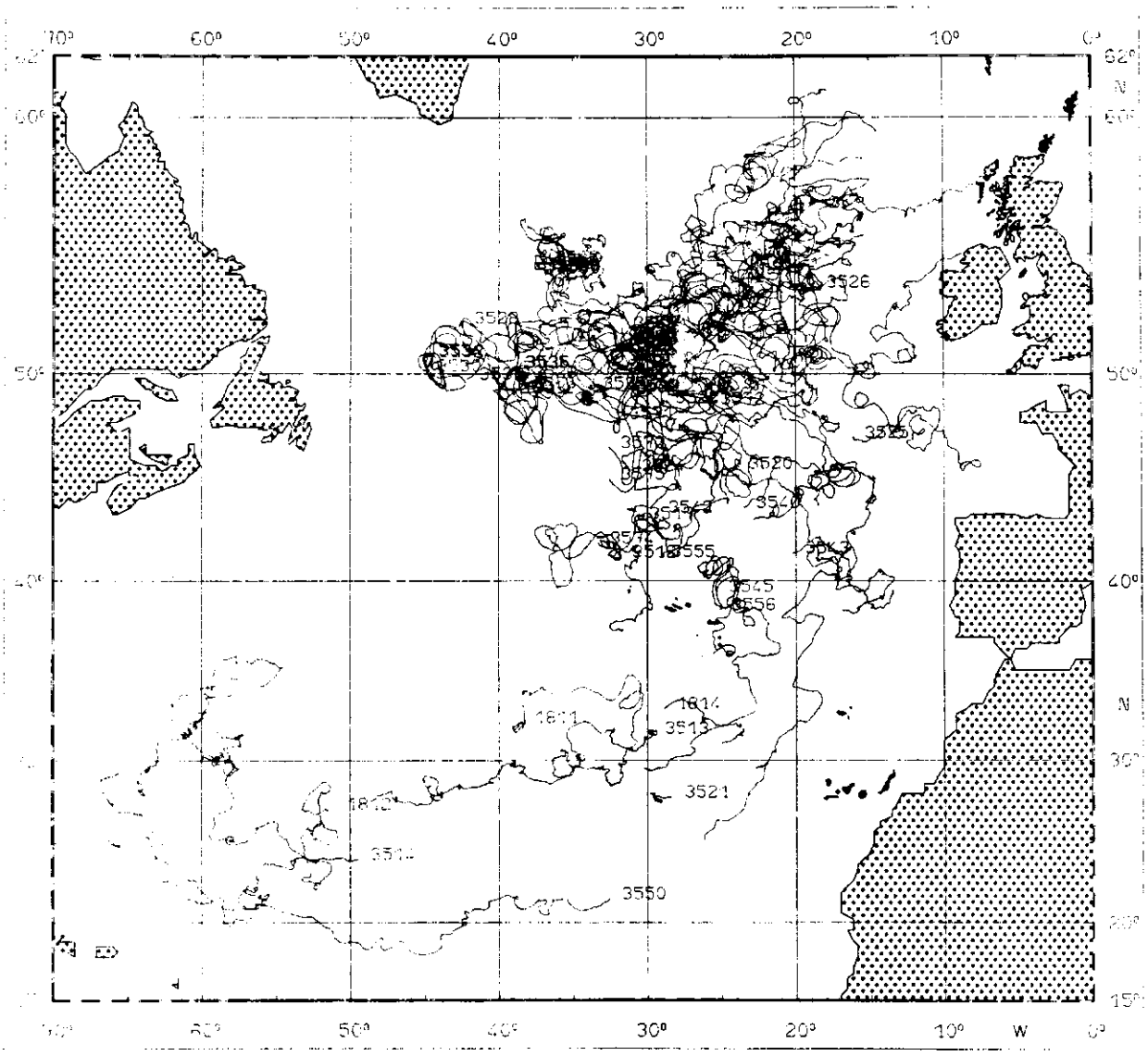


Fig. 12: Tracks of drifting buoys according to Table 3.

6.2.2.2 Moored current meter time series

Position		Water depth (m)	Mooring No.	Type of instrument	Instr. depth (m)	First value date	Last value date	Duration (days)	Record interval (min)
48°33.5'N	26°06.5'W	3732	265301	AVTP	219	21.05.82	12.07.83	417	60
			265302	AVT	423	21.05.82	14.07.83	419	60
			265303	AVT	828	21.05.82	18.05.83	362	60
			265304	AVTT	2519	21.05.82	18.11.82	181	60
52°41.9'N	31°01.1'W	3517	280201	AVT	234	19.05.82	16.07.83	423	60
			280202	AVTP	438	19.05.82	12.07.83	419	60
			280203	SPD	842	23.08.82	08.07.83	241	60
			280204	AVTT	2533	19.05.82	25.05.83	371	60

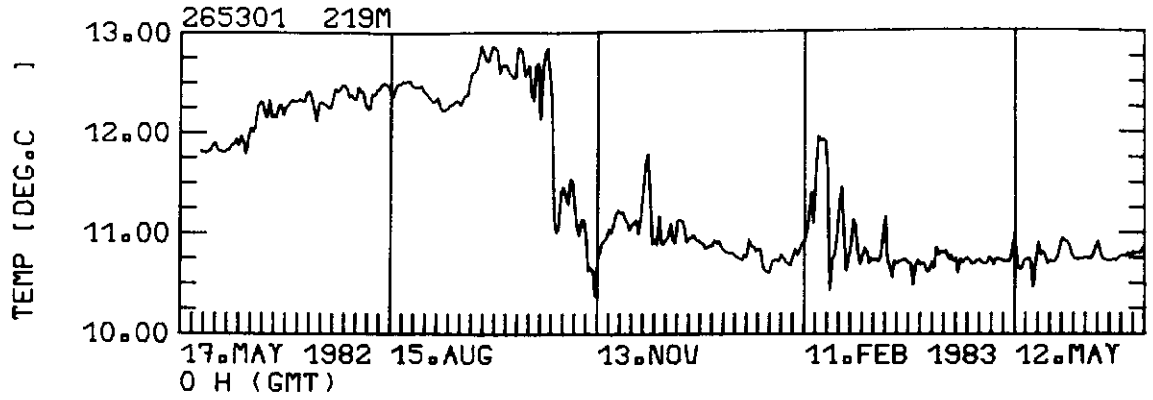
AVT = Aanderaa Current meter with thermistor
AVTT = Aanderaa Current meter with thermistor and two ranges
AVTP = Aanderaa Current meter with thermistor and pressure sensor
SPD = only speed record with interruptions available

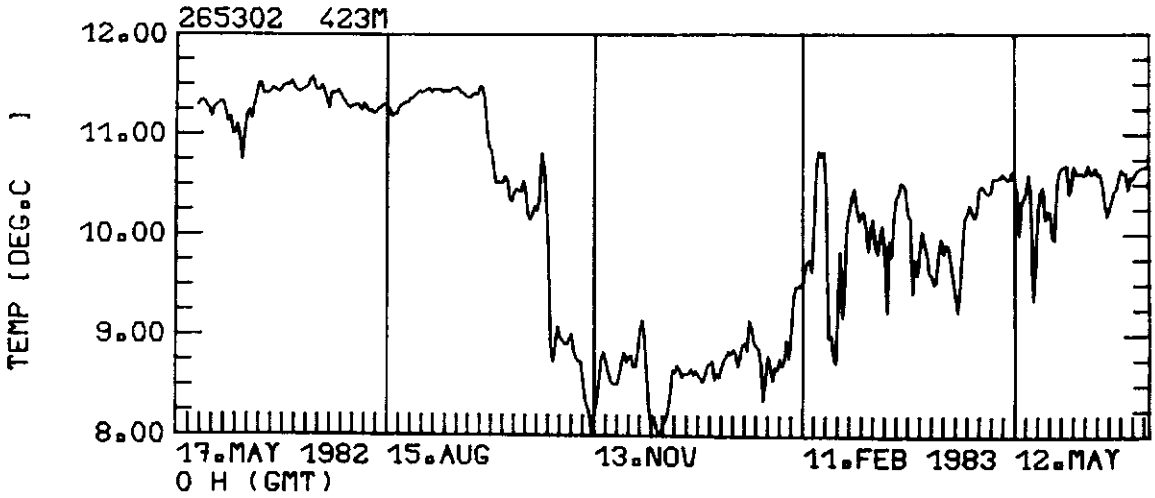
Table 4: Observation periods of current meter moorings.

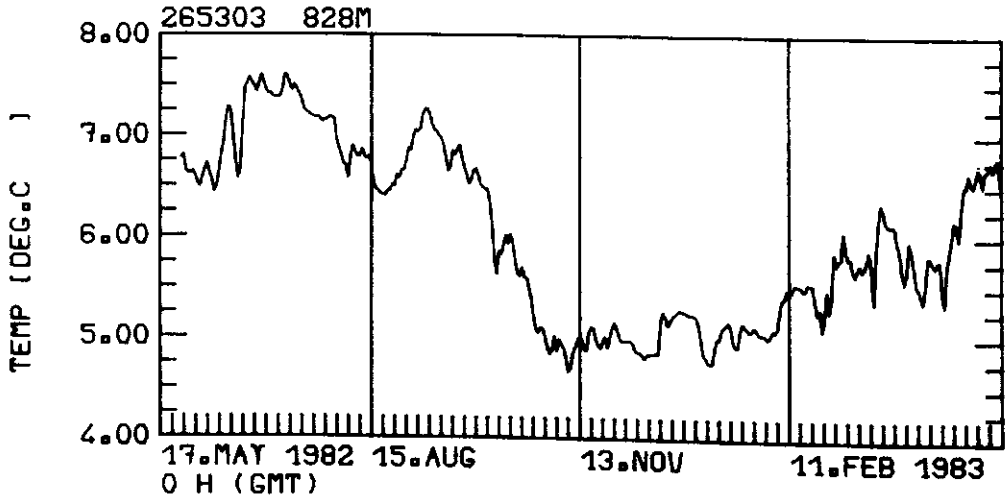
	Record duration Hours	Period	Hourly values Mean	Std.	Low Pass 40h HPP Mean	Std.	LowLow Pass 15 d HPP Mean	Std.
265301 T	10024	21.05.82 00.00	11.43	0.76	11.43	0.76	11.43	0.76
		-12.07.83 15.00	- 4.52	11.53	- 4.42	10.80	- 2.58	9.49
U			0.01	9.35	- 0.06	8.42	- 0.25	7.08
V								
265302 T	10072	21.05.82 00.00	10.18	1.06	10.16	1.06	9.95	1.06
		-14.07.83 15.00						
U			- 4.45	10.23	- 4.44	9.71	- 2.75	8.76
V			- 0.76	8.21	- 0.82	7.63	- 1.04	6.56
265303 T	8694	21.05.82 00.00	6.02	0.86	6.01	0.85	5.82	0.83
		-18.05.83 05.00						
U			- 0.77	6.35	- 0.57	3.95	0.55	3.46
V			- 0.16	5.41	- 0.12	3.33	- 0.62	2.78
265304 T	4345	21.05.82 00.00	3.18	0.05	3.18	0.04	3.20	0.02
		-18.11.82 00.00						
U			0.20	3.92	0.18	3.10	- 0.13	0.92
V			1.82	4.22	1.91	3.81	2.43	1.12
280201 T	10163	19.05.82 00.00	5.74	0.50	5.74	0.46	5.75	0.38
		-16.07.83 10.00						
U			9.41	9.24	9.52	8.09	8.69	7.20
V			1.36	7.59	1.22	6.06	0.22	4.31
280202 T	10079	19.05.82 00.00	4.63	0.30	4.63	0.28	4.65	0.26
		-12.07.83 22.00						
U			8.54	7.64	8.66	6.71	7.94	6.41
V			0.96	6.20	0.84	5.12	3.66	4.13
280203 SPD	5803	23.08.82 01.00	11.32	6.34	-	-	-	-
		-26.11.82 00.00						
		20.12.82 01.00						
		-28.02.83 00.00						
		23.04.83 01.00						
		-08.07.83 21.00						
280204 T	8916	19.05.82 00.00	2.85	0.07	2.85	0.05	2.85	0.05
		-25.05.83 11.00						
U			3.62	5.34	3.71	4.77	4.07	4.41
V			0.31	4.69	0.24	4.26	0.41	3.31

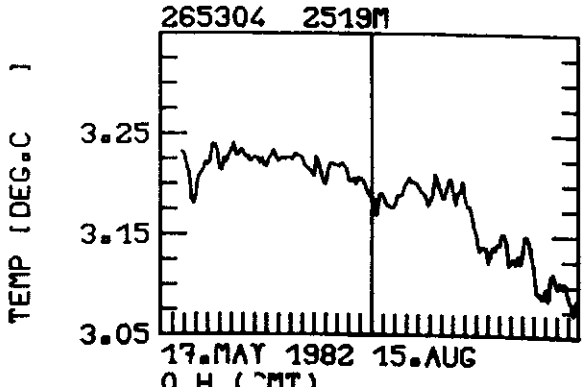
Table 5: Simple statistics of current meter time series. (T - temperature, U,V- eastward, northward current components, SPD - current speed, Std - standard deviation) For a comparison statistics of origianal, low and lowlow passed data is given.

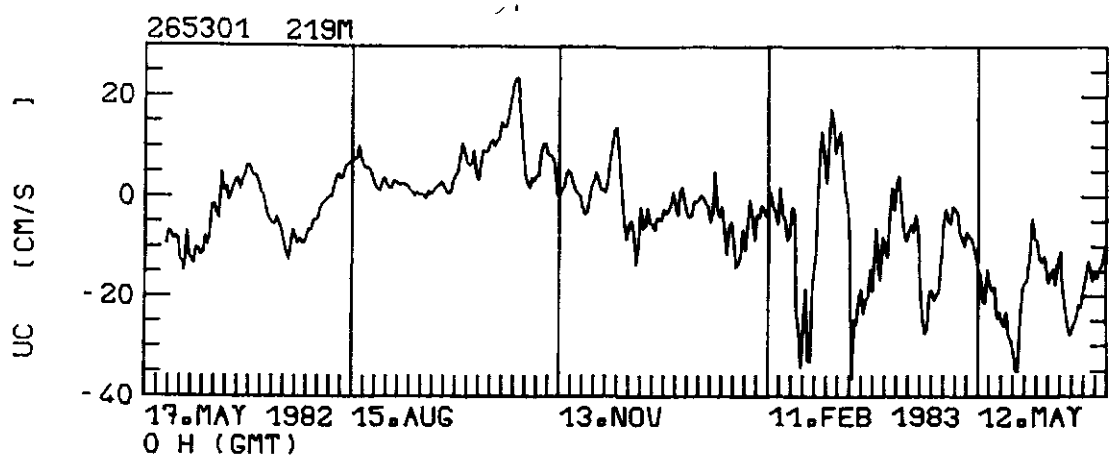
Fig. 13a-f: Time series plots of the moored current meter measurements at the mooring location 265 and 280 shown in figure 2. Except of 280203 where hourly values of the current speed are given, the plot repeseent daily averages.

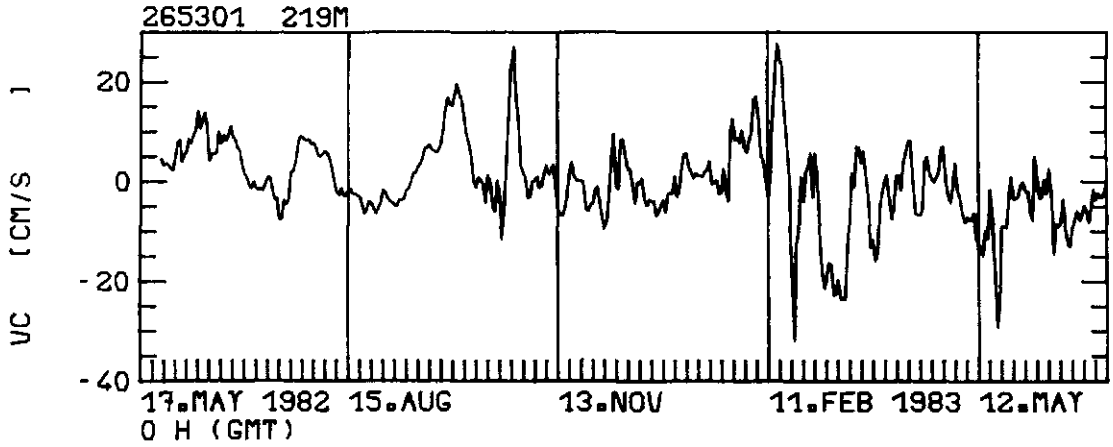

265301 219M
13.00
12.00
11.00
10.00
TEMP [DEG.C]
17.MAY 1982
15.AUG
13.NOV
11.FEB 1983
12.MAY
0 H (GMT)

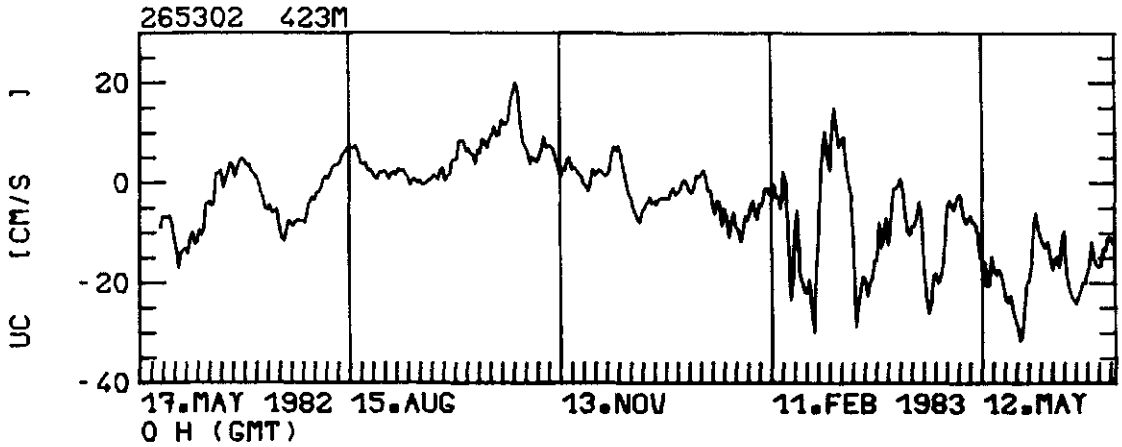

265302 423M
12.00
11.00
10.00
9.00
8.00
TEMP [DEG.C]
17.MAY 1982
15.AUG
13.NOV
11.FEB 1983
12.MAY
0 H (GMT)

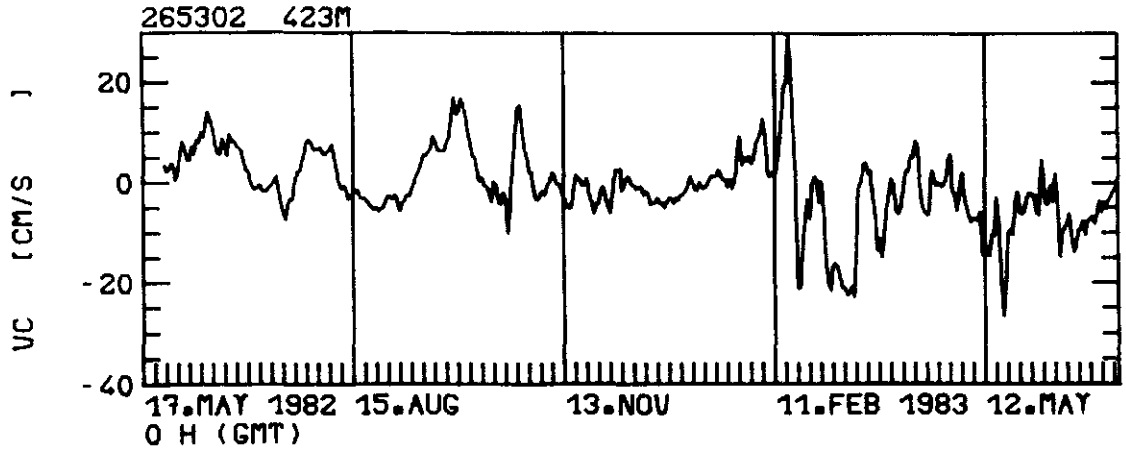

265303 828M
8.00
7.00
6.00
5.00
4.00
TEMP [DEG.C]
17.MAY 1982
15.AUG
13.NOV
11.FEB 1983
0 H (GMT)


265304 2519M
3.25
3.15
3.05
TEMP [DEG.C]
17.MAY 1982
15.AUG


265301 219M
UC [CM/S]
20
0
-20
-40
17.MAY 1982
15.AUG
13.NOV
11.FEB 1983
12.MAY
0 H (GMT)


265301 219M
UC [CM/S]
20
0
-20
-40
17.MAY 1982
15.AUG
13.NOV
11.FEB 1983
12.MAY
0 H (GMT)


265302 423M
UC [CM/S]
20
0
-20
-40
17.MAY 1982
15.AUG
13.NOV
11.FEB 1983
12.MAY
0 H (GMT)


265302 423M
UC [CM/S]
20
0
-20
-40
17.MAY 1982
15.AUG
13.NOV
11.FEB 1983
12.MAY
0 H (GMT)

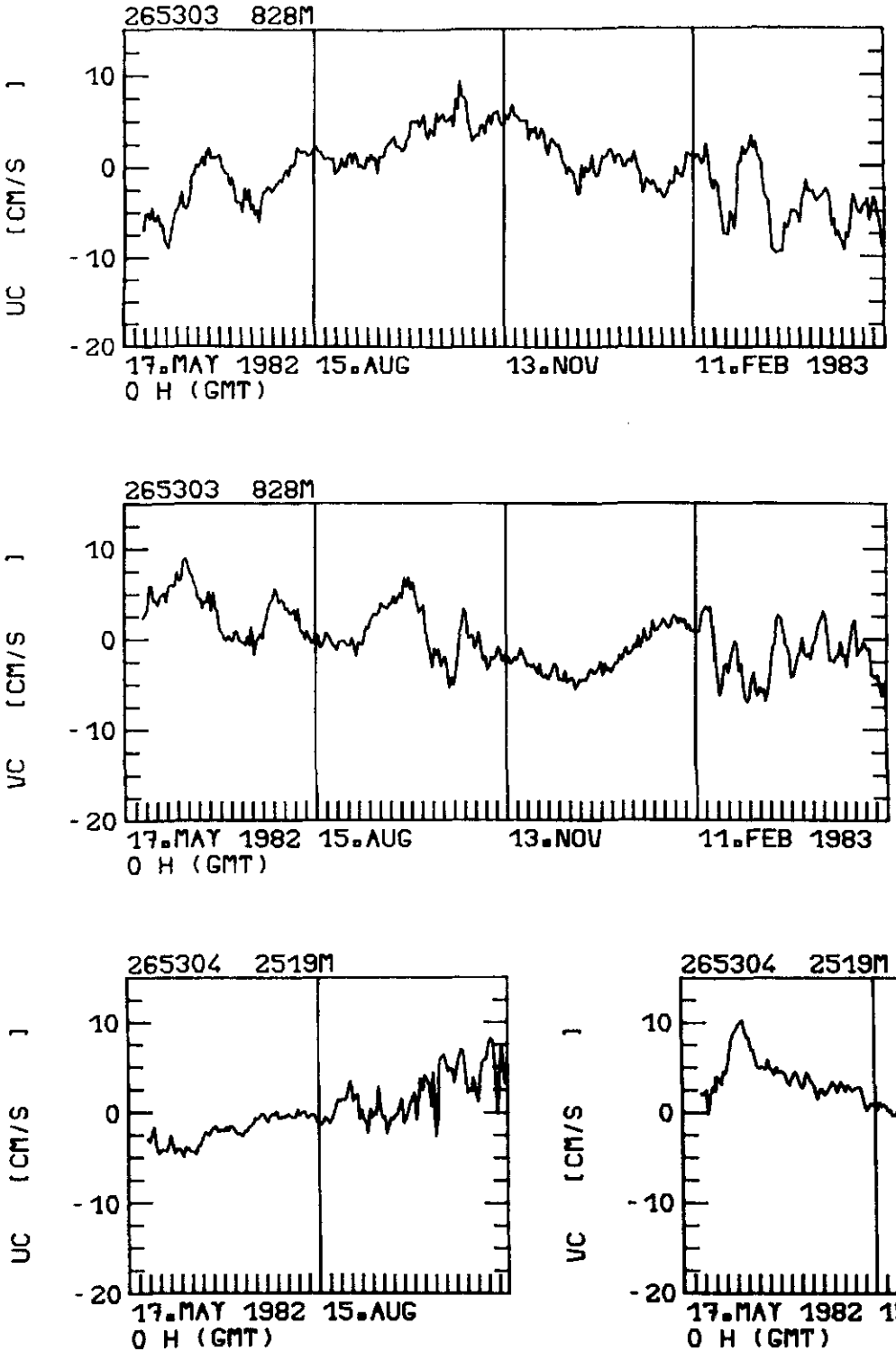
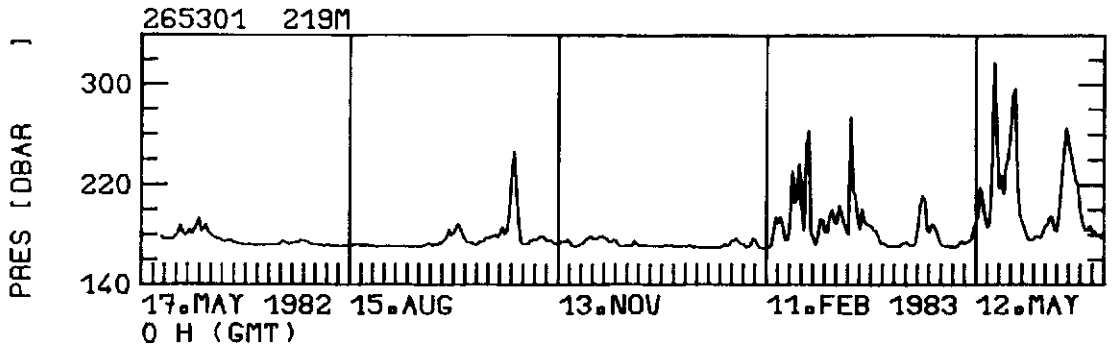
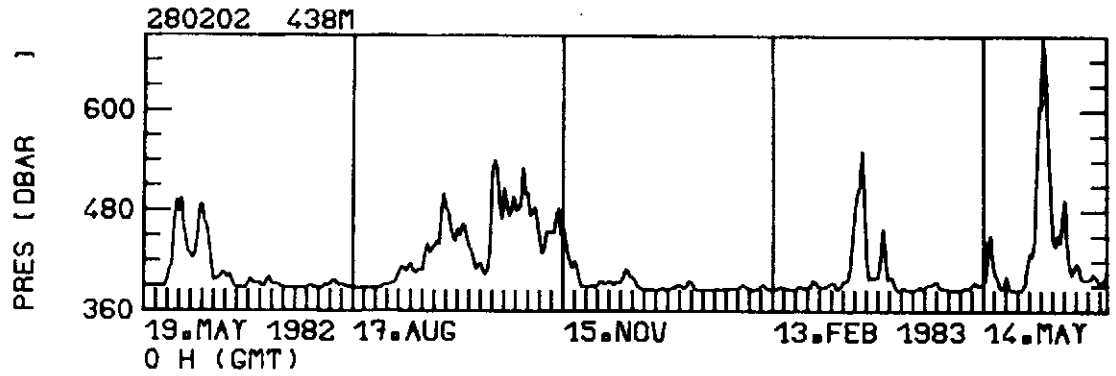
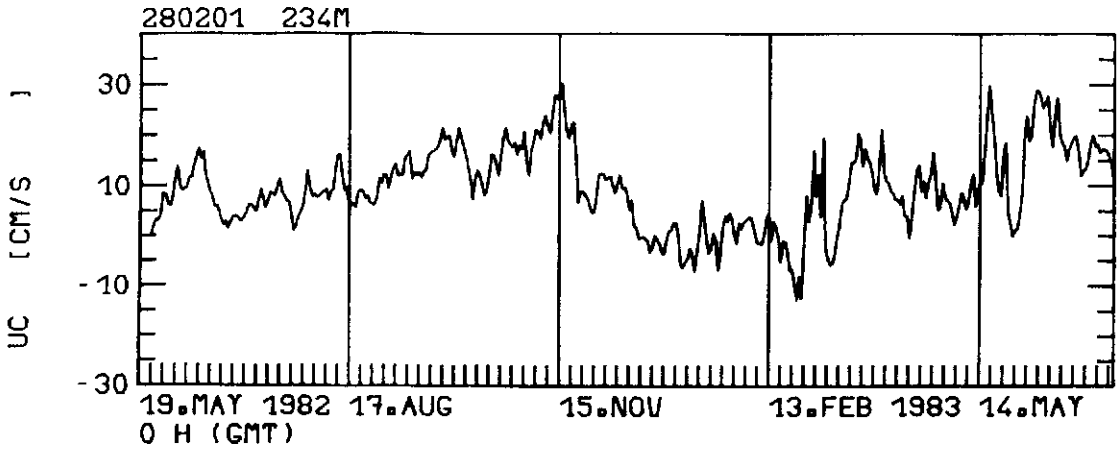
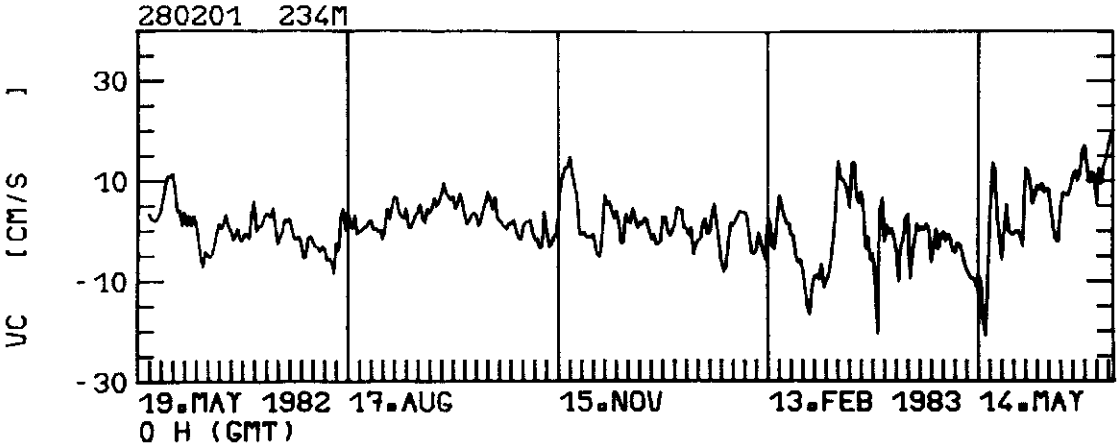

265303 828M
UC [CM/S]
10
0
-10
-20
17.MAY 1982
15.AUG
13.NOV
11.FEB 1983
0 H (GMT)
265303 828M
VC [CM/S]
10
0
-10
-20
17.MAY 1982
15.AUG
13.NOV
11.FEB 1983
0 H (GMT)
265304 2519M
UC [CM/S]
10
0
-10
-20
17.MAY 1982
15.AUG
0 H (GMT)
265304 2519M
VC [CM/S]
10
0
-10
-20
17.MAY 1982
15.AUG
0 H (GMT)

Fig. 13c:

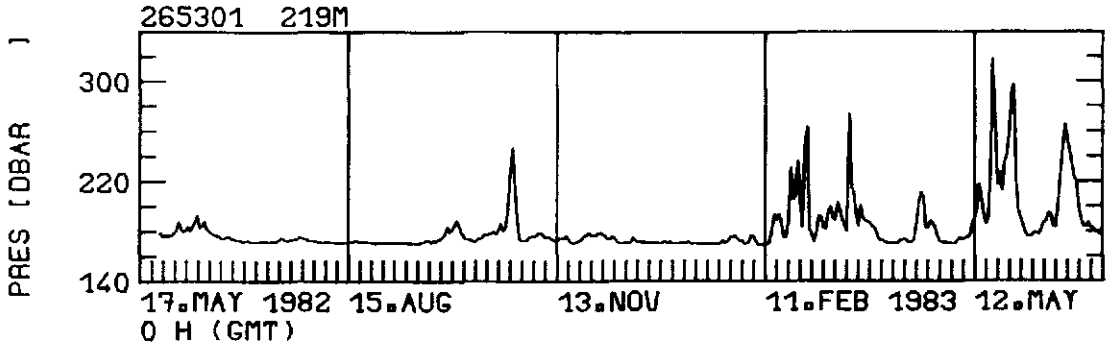

265301 219M
PRES [DBAR]
300
220
140
17.MAY 1982
15.AUG
13.NOV
11.FEB 1983
12.MAY
0 H (GMT)

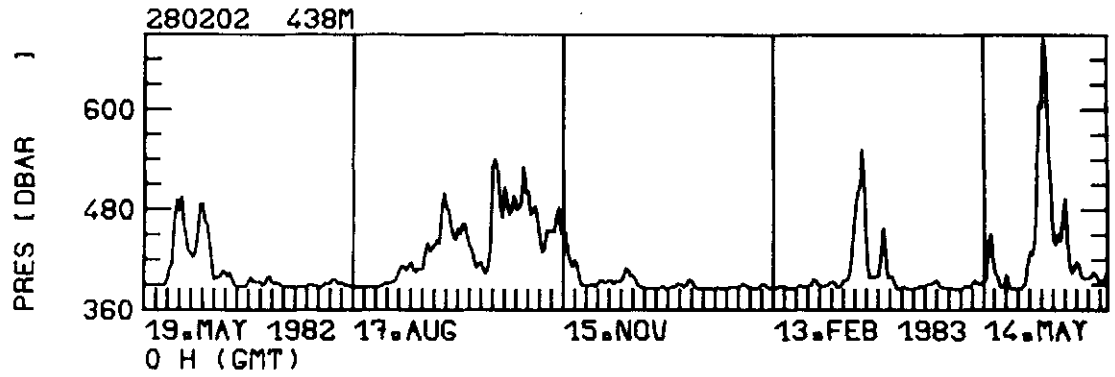

280202 438M
PRES [DBAR]
600
480
360
19.MAY 1982
17.AUG
15.NOV
13.FEB 1983
14.MAY
0 H (GMT)

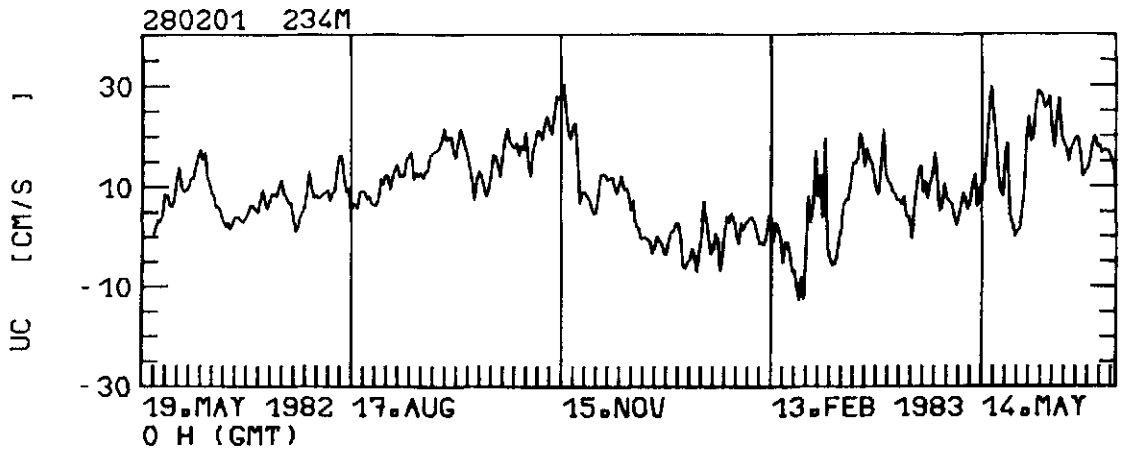

280201 234M
UC [CM/S]
30
10
-10
-30
19.MAY 1982
17.AUG
15.NOV
13.FEB 1983
14.MAY
0 H (GMT)

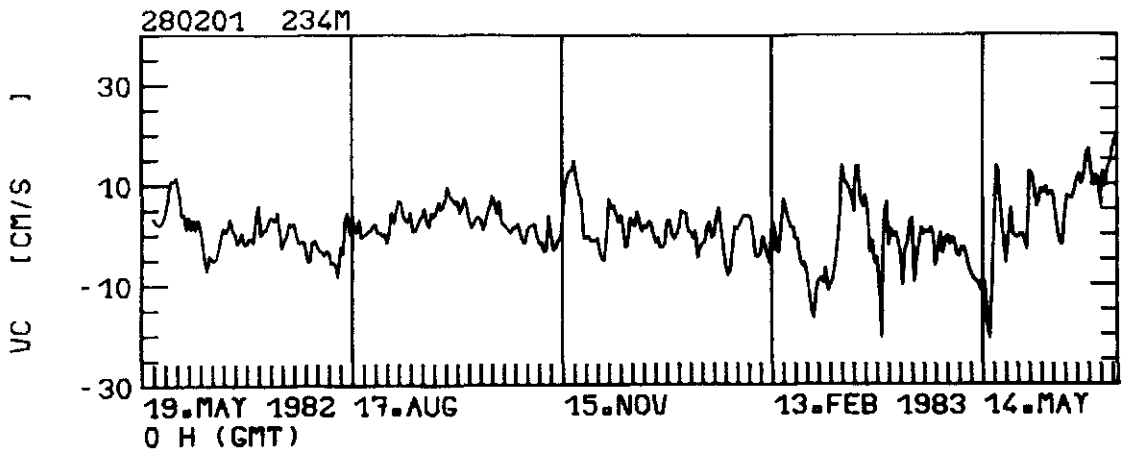

280201 234M
VC [CM/S]
30
10
-10
-30
19.MAY 1982
17.AUG
15.NOV
13.FEB 1983
14.MAY
0 H (GMT)

Fi - 133

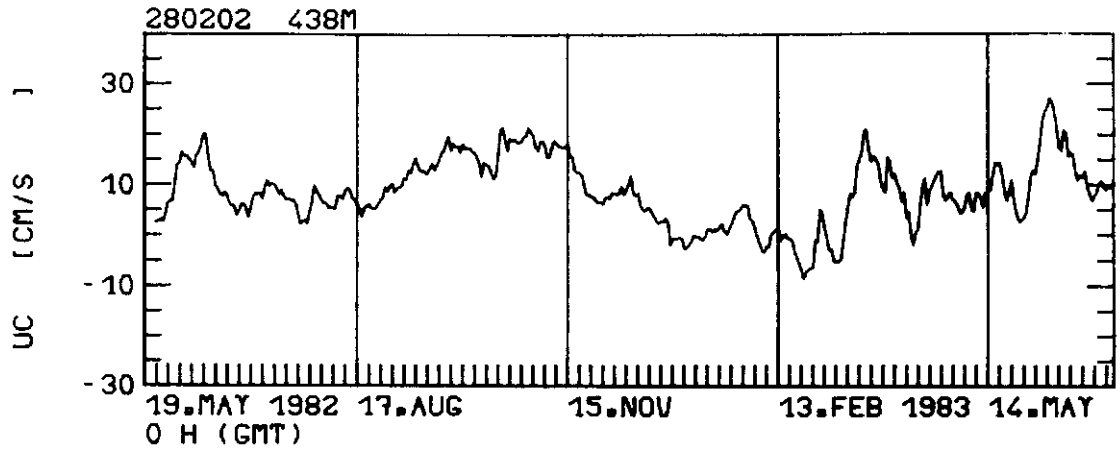

265301 219M
PRES [DBAR]
300
220
140
17.MAY 1982
15.AUG
13.NOV
11.FEB 1983
12.MAY
0 H (GMT)

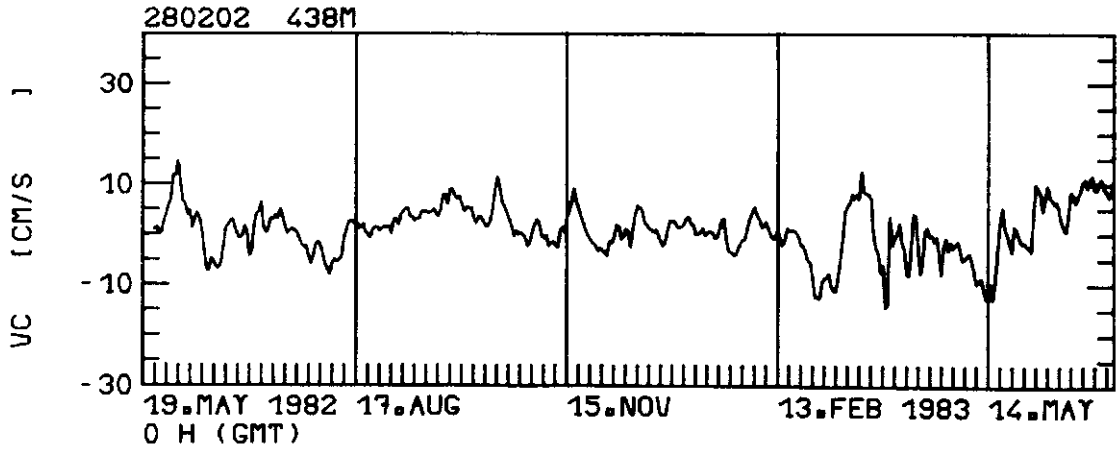

280202 438M
PRES [DBAR]
600
480
360
19.MAY 1982
17.AUG
15.NOV
13.FEB 1983
14.MAY
0 H (GMT)

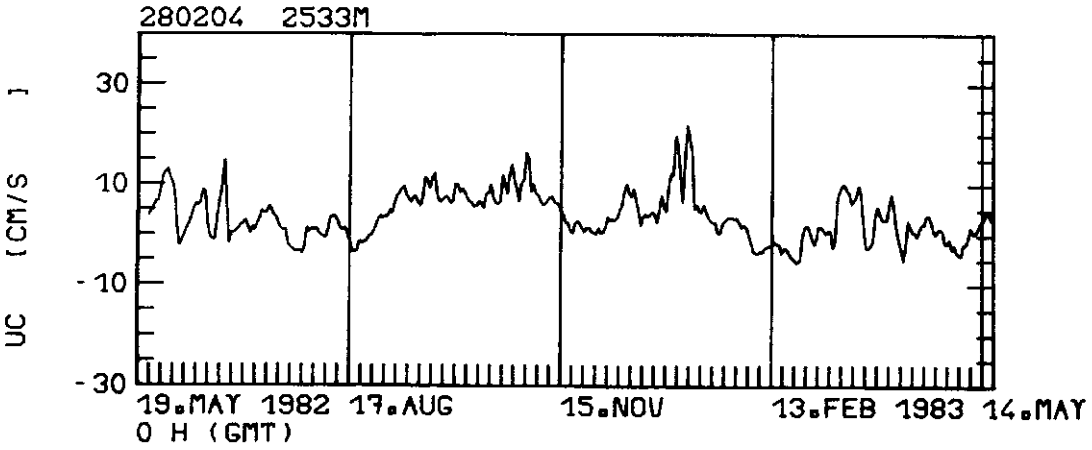

280201 234M
UC [CM/S]
30
10
-10
-30
19.MAY 1982
17.AUG
15.NOV
13.FEB 1983
14.MAY
0 H (GMT)

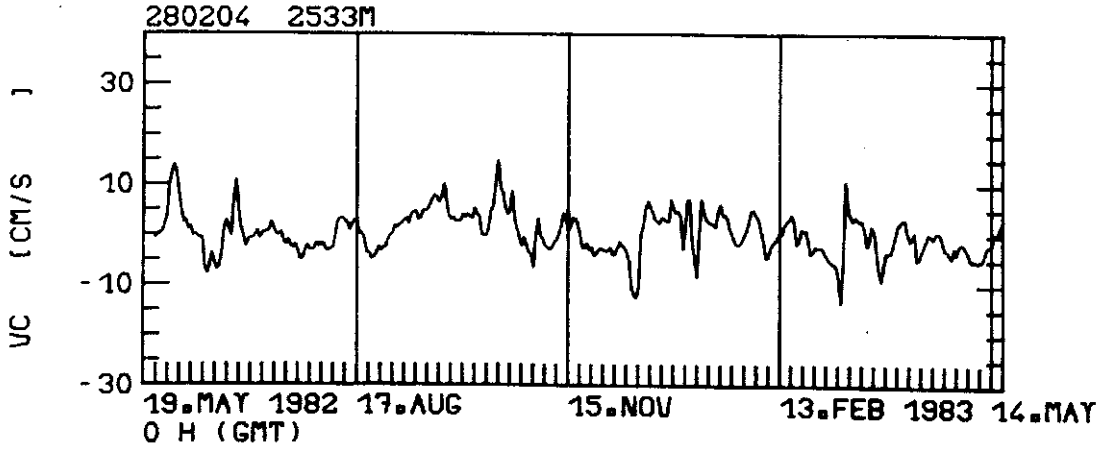

280201 234M
UC [CM/S]
30
10
-10
-30
19.MAY 1982
17.AUG
15.NOV
13.FEB 1983
14.MAY
0 H (GMT)

Fi · 133:


280202 438M
UC [CM/S]
30
10
-10
-30
19.MAY 1982
17.AUG
15.NOV
13.FEB 1983
14.MAY
0 H (GMT)


280202 438M
UC [CM/S]
30
10
-10
-30
19.MAY 1982
17.AUG
15.NOV
13.FEB 1983
14.MAY
0 H (GMT)


280204 2533M
UC [CM/S]
30
10
-10
-30
19.MAY 1982
17.AUG
15.NOV
13.FEB 1983
14.MAY
0 H (GMT)


280204 2533M
UC [CM/S]
30
10
-10
-30
19.MAY 1982
17.AUG
15.NOV
13.FEB 1983
14.MAY
0 H (GMT)

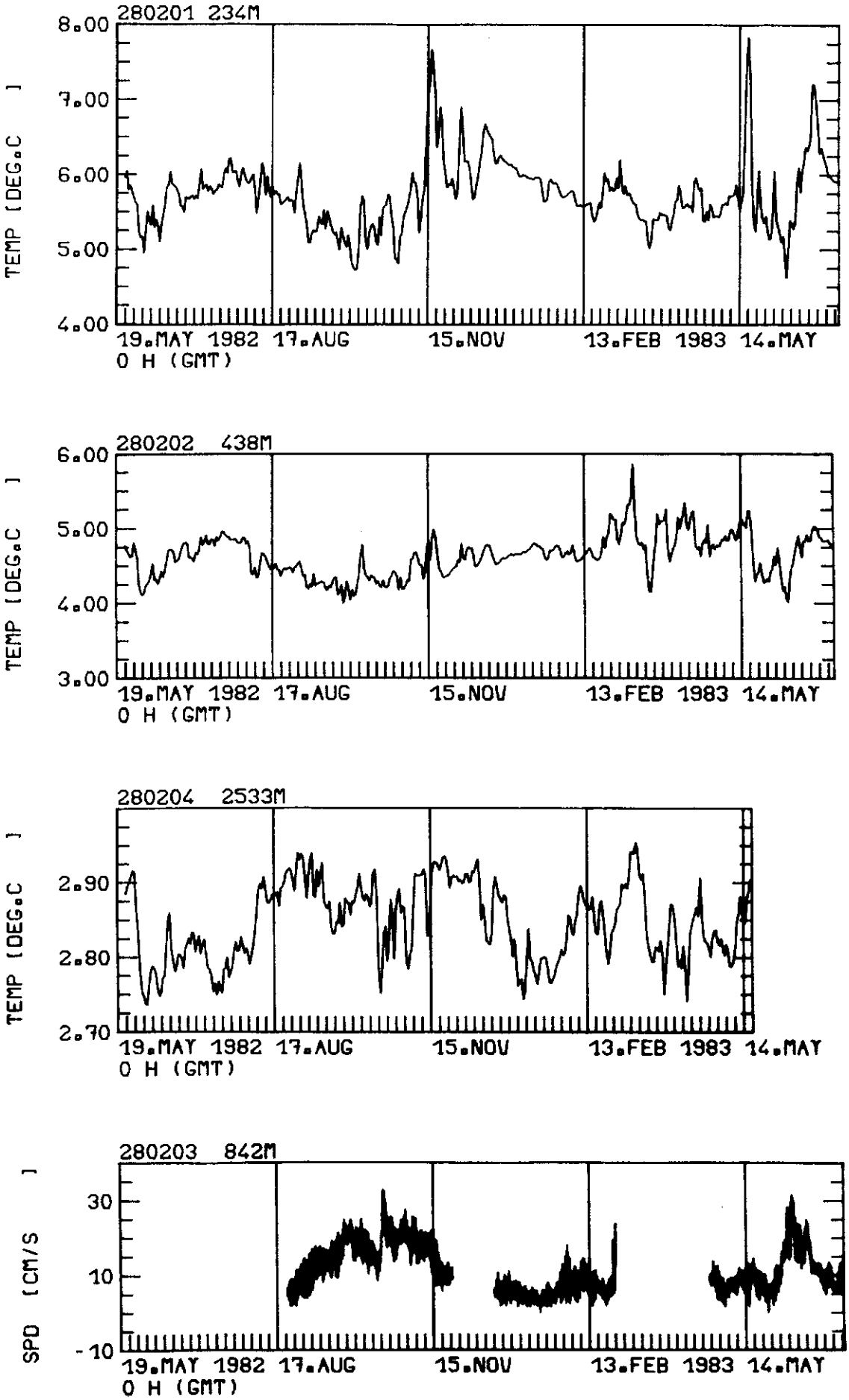
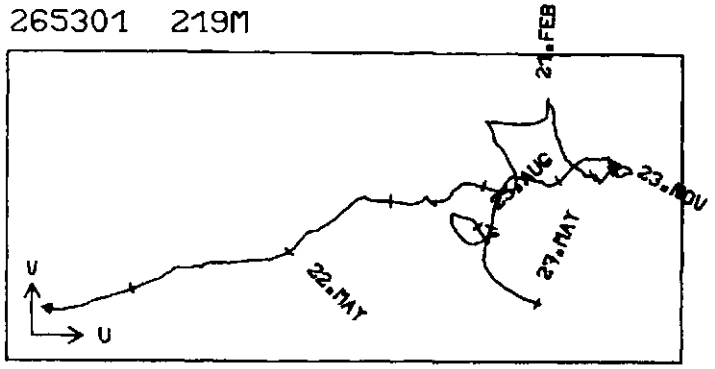
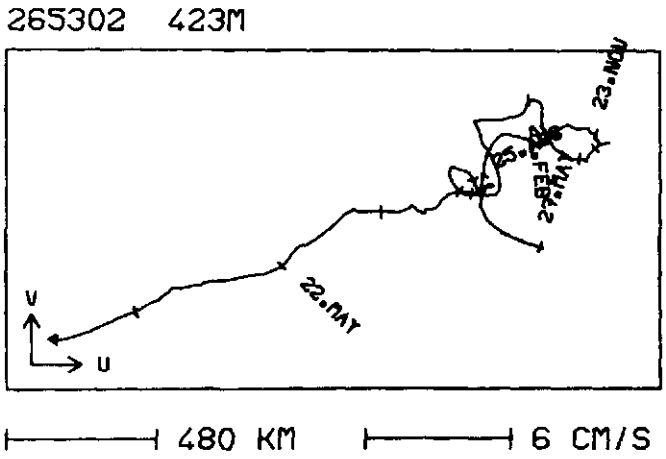
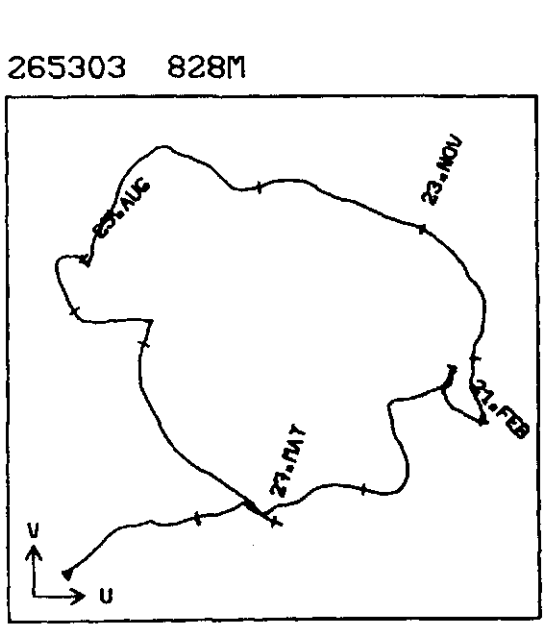

280201 234M
TEMP [DEG.C]
8.00
7.00
6.00
5.00
4.00
19.MAY 1982 17.AUG 15.NOV 13.FEB 1983 14.MAY
0 H (GMT)
280202 438M
TEMP [DEG.C]
6.00
5.00
4.00
3.00
19.MAY 1982 17.AUG 15.NOV 13.FEB 1983 14.MAY
0 H (GMT)
280204 2533M
TEMP [DEG.C]
2.90
2.80
2.70
19.MAY 1982 17.AUG 15.NOV 13.FEB 1983 14.MAY
0 H (GMT)
280203 842M
SPD [CM/S]
30
10
-10
19.MAY 1982 17.AUG 15.NOV 13.FEB 1983 14.MAY
0 H (GMT)

Fig. 13f:

6.2.3 Moored current meter progressive vector diagrams







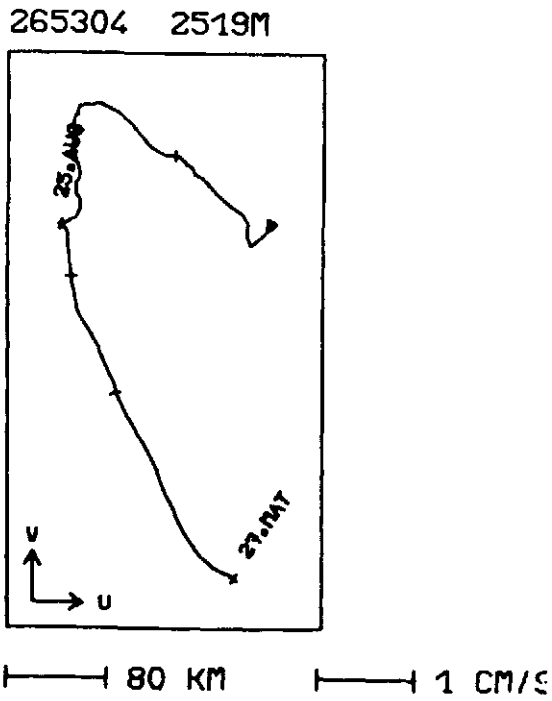
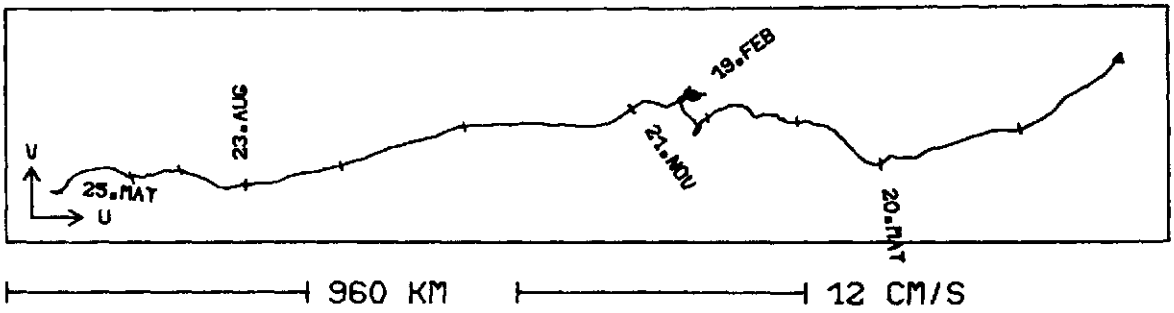


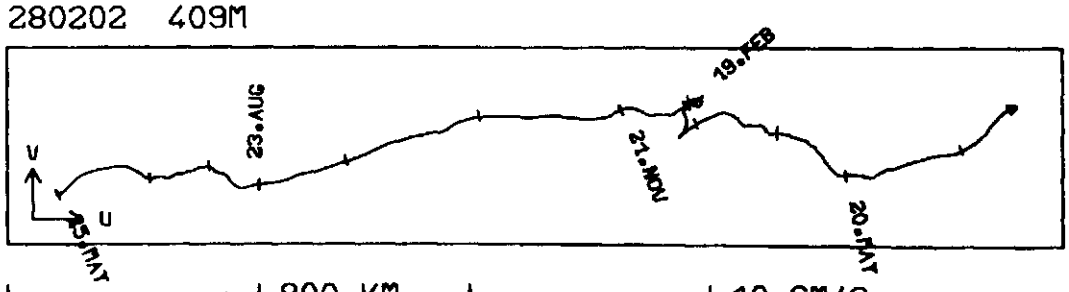
Fig. 14a:

Fig. 14a-b: Progressive vector diagrams of the time series shown in figure 13.

280201 234M



280202 409M



280204 2533M

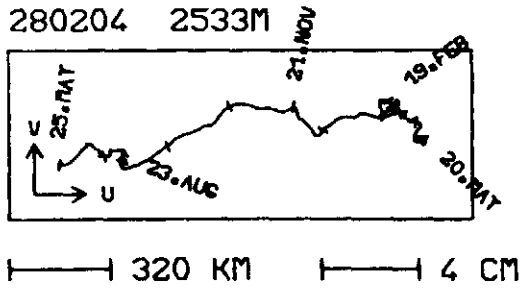


Fig. 14 b:

7. Acknowledgements

Numerous people have contributed to the results presented in this report. We appreciate their help even if it is not possible to mention everyone.

We are very grateful to the masters and their crews on the various ships which participated in this programme.

D. Carlsen, G. Kipping and U. Huenninghaus prepared the moorings, P. Meier and U. Koy the various Multisonde systems. On board R.V. "Poseidon" J. Holtorff ran the computer system. K.-H. Prien and D. Sperling supported the work at sea and H.H. Hinrichsen analysed the water samples. Frau Trier participated at the work at sea, processed the current meter data and typed the manuscript. Frau Oelrichs and Herr Eisele helped us with numerous advices to realize the drawings. Frau Schurbohm processed the satellite tracked drifting buoys. Frau Mempel carried out the photographic work.

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