CRUISE REPORT R.V. "PELAGIA"

OMEX LEG 2
LA CORUÑA, SPAIN, TO TEXEL, THE NETHERLANDS
5-24 SEPTEMBER 1995

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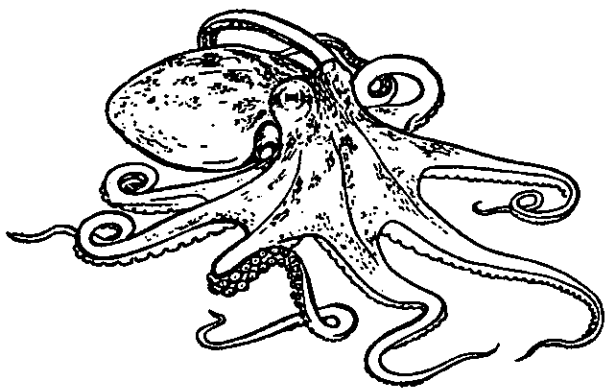


OCEAN MARGIN EXCHANGE PROGRAM
(OMEX)

CONTENTS

APPENDICES:

1. INTRODUCTION

The OMEX (Ocean Margin EXchange) programme is an EC-funded multidisciplinary research programme directed at understanding and quantifying the fluxes of energy and elements and particles, with special emphasis on the cycling of carbon, along a transect from the shelf, via the continental slope to the deep sea. The present expedition was carried out from September 5-24th 1995 with R.V. "Pelagia", as part of the Benthic Processes subproject of OMEX, and is a follow-up of cruises held in October 1993 with R.V. "Pelagia" and in May/June 1994 with R.V. "Darwin".
The objectives of the OMEX BP subproject are to carry out within the OMEX framework an interdisciplinary, integrated, concerted research programme with the aims:

-to understand, define, quantify and model the organic and inorganic particle transport and the accumulation, diagenetic and burial processes and fluxes and the time scales involved, in relation to the oceanographic conditions and benthic boundary layer dynamics along shelf-slope-abyssal plain transects in contrasting environments.

-to relate benthic community development and composition to settling, quantity and quality of organic matter input, to benthic boundary layer dynamics and redox conditions at and in the seabed, and to the seasonal variability of particulate organic matter input.

In relation to the particle transport studies, the cycling of carbon, the mineralisation and diagenetic processes taking place and the role of trace elements in the burial and mineralisation of organic matter at depocenters of an upwelling-influenced continental shelf-slope margin transect will be evaluated and modelled, as well as the relevant fluxes be determined. Mineralisation and burial rates of organic matter in the sediment are essential to estimate sinks of organic carbon in shelf, slope and margin environments and the fluxes of organic matter reaching the seabed form a prerequisite for the development and dynamics of the benthic community at and in the upper cm's of the seabed.

The OMEX research programme concentrates on the European Atlantic Margin, with special emphasis on the Goban Spur area. During the present cruise, data and sample material have been collected along three different transects (Fig. 1): In addition to the ongoing studies at Goban Spur, we included a transect off the NW Iberian (Galician) Margin and across the Meriadzek Terrace in order to study the spatial variability of the relevant parameters, and especially to link the long-term MAP record derived by Khripounoff and Vangriesheim (1995) from Meriadzek Terrace to the Goban Spur data.

During the cruise underway acoustic recording was done (section 3.1), however the major aim of the cruise was to collect data at stations along the transects regarding characteristics of the water column, the benthic boundary layer, and the surface sediments. Profiles of salinity, temperature, oxygen concentration and light transmission in the water column were obtained by CTD (section 3.2.1). Water samples from the water column and overlying water of sediment cores were analysed on board for oxygen and nutrient content, and occasionally for salinity (sections 3.2.2 to 3.2.4). Nutrients were further analysed in samples of surface waters and sediment pore waters. To study the distribution and composition of particles in the water column, particulate matter was collected from clear waters as well as from intermediate and bottom nepheloid layers, by filtration of CTD water samples, and by in situ filtration with submersible pumps (sections 3.2.5 and 3.2.6).

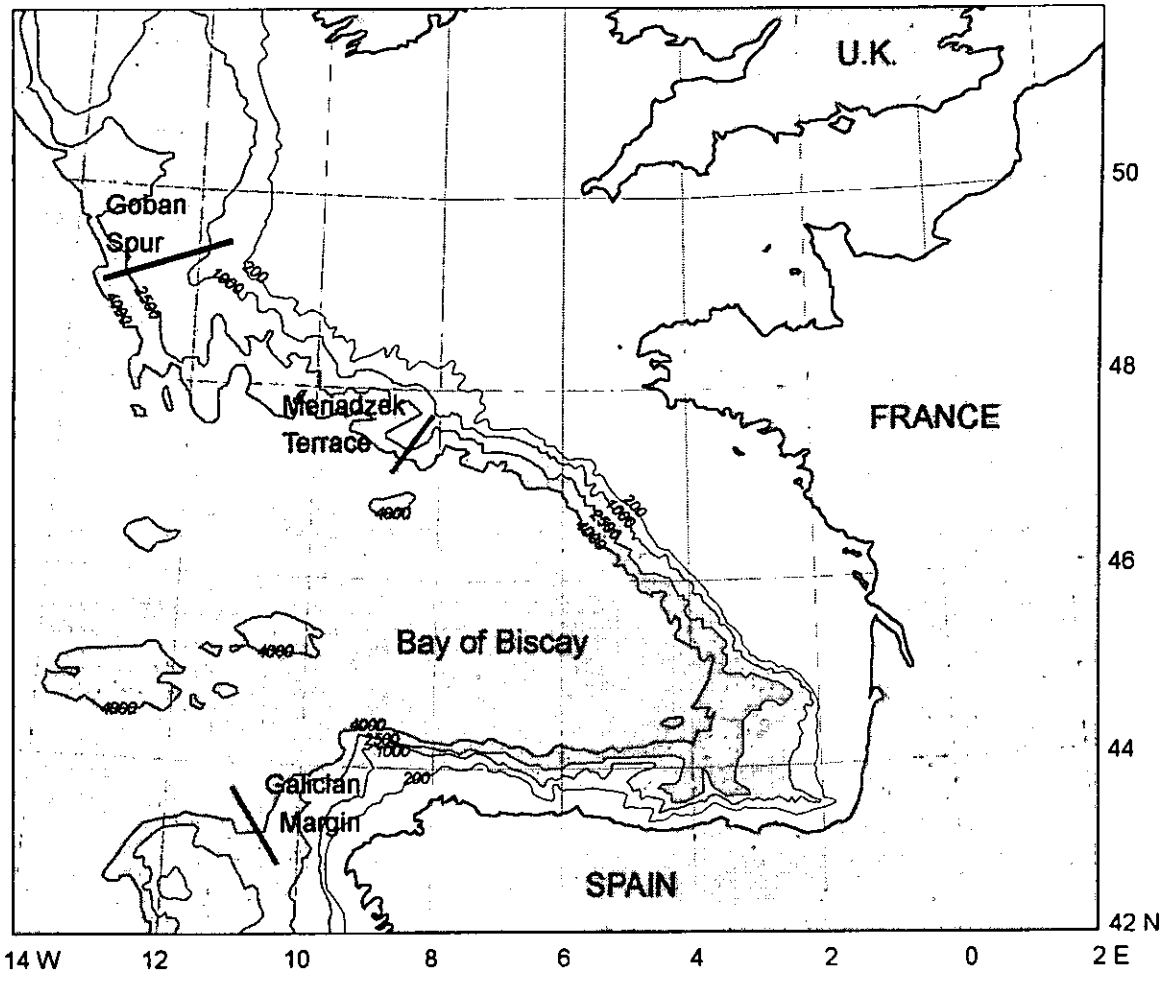


Fig.1. Location of the studied transects.

Current velocities in the benthic boundary layer, and concentration, size distribution and movement of particulate matter present in the BBL, were studied at all stations with the BIOPROBE (section 3.3.1). The long-term lander BOBO for studies of BOttom BOundary layer dynamics, which had been deployed on Goban Spur on June 8th, 1994, by R.V. "Darwin", was recovered on September, 19th (section (3.3.2).

Profiles of oxygen concentration and electrical resistivity in the bottom water and the surface sediment were measured in situ, by deployment of the TROL (Temperature Resistivity Oxygen Lander (section 3.4.1), as well as on board, in sediment cores obtained by box corer and multicorer (section 3.4.2). Concentrations and fluxes of nutrients in sediment pore-waters and the overlying water of sediment cores were also determined on board.

Additional subsamples of the box cores were taken for the assessment of benthic activity and biomass (section 3.5.1), and for study of live benthic foraminiferal assemblages (section 3.5.2).

Finally, box cores and piston cores were sampled and studied for determination of the sediment composition and age (section 3.6). In a later stage this will be used to determine sediment accumulation rates and burial rates of a.o. organic and inorganic carbon.

2. GENERAL CRUISE INFORMATION

A list of the scientific crew is included as Appendix A. Cruise tracks and a list of station positions and water depths are given in Appendix B and C.
Because of extremely bad weather conditions the R.V. "Pelagia" remained in the harbour of La Coruña until September 8th, when she left the harbour at 18.10 hrs. En route to station PE95-01 3.5 kHz recording was done in order to obtain information regarding regional sediment distribution. However, the weather was still bad and only poor quality results were obtained.
Station PE95-01 was started on September 9th at 06.00 hrs and was stopped because of deteriorating weather conditions around noon. Work on deck was resumed on September 10th, 08.00 hrs. After finishing this station, course was set to station PE95-02 while underway 3.5 kHz recording was done, still of variable quality because of high seas.
Station PE95-02 was started on September 10th and continued the next day. Here we encountered problems with the hydraulic system of the main cable winch, which were solved in the course of the day.
The station was abandoned on September 12th and course was set to the Meriadzek Terrace transect, where station PE95-03 was reached on September 13th. Subsequently station PE95-04 was occupied on September 14th from 14.30 till 18.30 hrs, when strongly increasing winds and waves forced us to again stop work to await better conditions. Work on station PE95-04 was resumed on September 15th, at 18.45 hrs, and was finished around noon the next day. Station PE95-05 was occupied on September 16th from 15.35 until 22.15 hrs. Here we had a short encounter with the Belgian Research Vessel "Belgica", which also did an OMEX survey.
The R.V. "Pelagia" then set course to Brest to disembark our marine technician W. Polman, who returned to the Netherlands for family reasons. The Brest pilot station was reached on Sunday September 17th at 14.00 hrs, and a pilot boat picked up the technician. R.V. "Pelagia" then set course to the stations of the OMEX transect at Goban Spur.
Station PE95-06 (OMEX station II), where BOBO was to be released after a one-year deployment, was reached on September 18th and station work was started at 20.45 hrs.
BOBO was released and recovered on September 19th, after which Station PE95-06 was finished. Station PE95-07 was occupied from September 19th, 13.50 hrs, until September 20th, 10.30 hrs. We then went to Station PE95-08 (OMEX station III), which was reached on September 20th at 10.10 hrs and abandoned the same day at 23.00 hrs. The last station, PE95-09 (OMEX station I) was occupied on September 21st, from 08.00 till 13.35 hrs, after which R.V. "Pelagia" set course to Texel under ideal weather conditions.
The expedition ended on Sunday, September 24th, when we safely arrived in the NIOZ harbour at Texel.

3. INITIAL RESULTS

3.1 PENETRATING ECHOSOUNDER RECORDING

3.5 kHz recording was done along the tracks and on stations, to relate sampling to the regional sedimentation patterns and distribution. Data were, because of the generally adverse weather conditions, of poor quality. Data recording was on a Dowty dry paper recorder with a setting of 1/2 second recording interval.

3.2 WATER COLUMN CHARACTERISTICS

3.2.1 CTD PROFILING

(Henk Franken, Tjeerd van Weering)

CTD data were collected at each station with a Seabird SBE 911 probe. The instrument was also equipped with an oxygen sensor, a SeaTech 25 cm transmissometer and a Chelsea fluorometer. Water samples where taken with a General Oceanics rosette sampler and 12 litre NOEX bottles. Reversing thermometers (for calibration) were mounted on three bottles and the values at the bottom recorded at each station.
The shipboard-derived CTD profiles including the transmissometer data are given for each station in Appendix D. The water column was sampled near the bottom (3 m above the seabed) and at every 1000 m level. Samples were made at fixed intervals over the last 1000 m (see Appendix E).

3.2.2 OXYGEN AND CALIBRATION

(Rikus Kloosterhuis)

Oxygen was measured on board, using the Winkler titration method with a modified automatic Metrohm titration unit, in order to calibrate the oxygen probe as part of the overlying water measurements. Oxygen samples were taken from the NOEX bottles mounted on the Rosette-CTD frame. NOEX bottles 1 to 5 were taken for near-bottom sampling. NOEX bottle 3 was closed by a "PETP" stopper whereas the other 4 were closed by the conventional Silicon stoppers. Oxygen samples were also taken from the overlying water in the box cores.
Volume-calibrated oxygen sample bottles (100 ml) were rinsed and carefully filled with water from the NOEX bottles, using proper tubing. Oxygen is directly complexated and precipitated by introducing 1 ml $MnCl_2$ (600 g/l) and 2 ml NaOH/KI (250 g + 350 g)/l. After good shaking, the stoppered oxygen bottles were stored under water. The oxygen precipitate was dissolved by introducing 0.8 ml 20 N sulfuric acid, and the yellow-brown iodate was titrated to transparent iodine. Titration endpoints were detected by a spectrophotometer (brown to colourless) and corresponding oxygen concentrations were calculated with NIOZ-made software (R. Koster). Samples were measured in duplicate. Sea water blanks were set at 0.0012 ml (needs correction later). Sampling temperatures were measured to correct for bottle volume. The titre was set in the beginning of the campaign by using pre-weighed potassium iodate solutions in calibrated bottles and was set for all titrations to 0.19548 N. The chemical blank was not detected. The stdv is just the mean error of the duplicates
All values are given in bottle cast spreadsheets (Appendix E). A plot of oxygen concentrations measured in water column samples at station PE95-04 is presented in Figure 2.

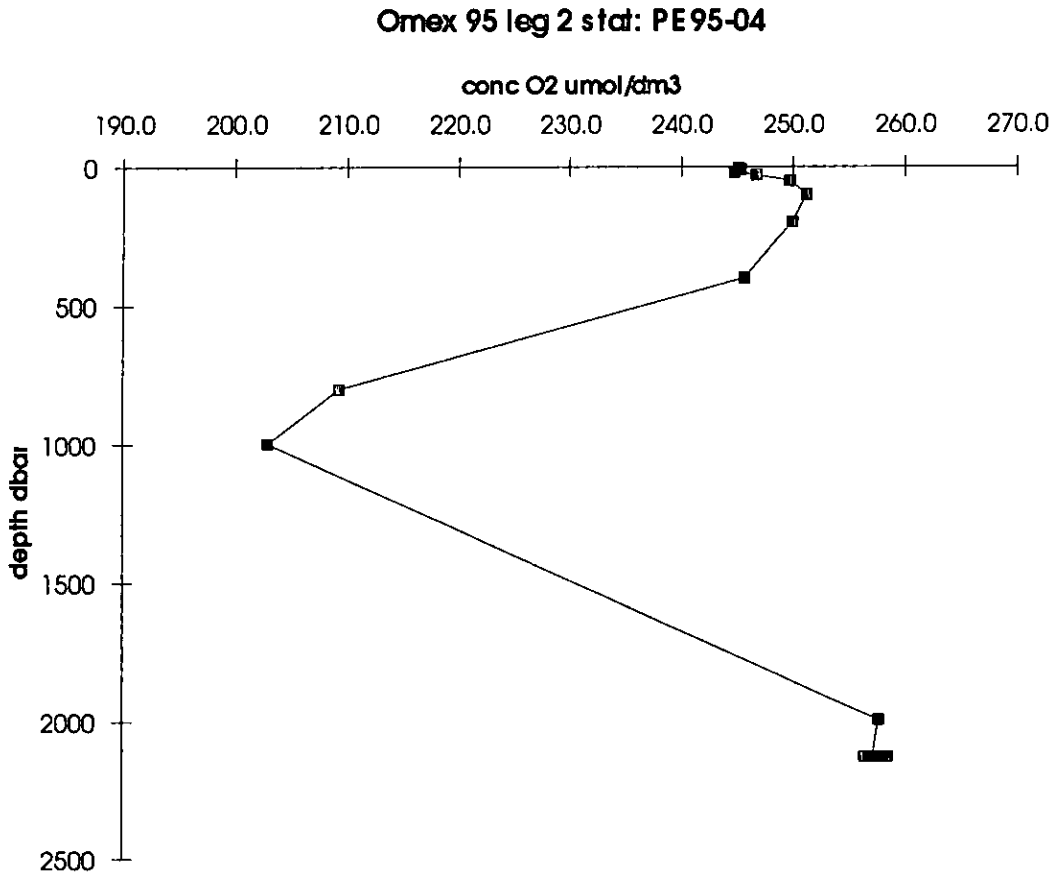


Fig. 2. Concentration of dissolved oxygen in water column samples at station PE95-04.

3.2.3 SALINITY CALIBRATION

Salinity was occasionally measured from the NOEX bottles in order to validate the conductivity probe from the CTD and from the Aquaflow unit. Measurements were performed on board using a Guildline Autosal (model 8400) salinity meter and salinity was calculated by software developed at NIOZ. Values are calibrated using standard sea water and are corrected for instrumental drift.

3.2.4 NUTRIENT ANALYSIS

(Karel Bakker and Jan Sinke).

About 850 samples were collected on this cruise by means of box coring and the CTD-Rosette sampler. Further we collected about three to four times a day surface water by use of the Aquaflow. All samples were analysed within 10 hours from sampling for the nutrients silicate, ammonium, phosphate, nitrate and nitrite. Some pore-water samples were analysed for iron and manganese with an autoanalyzer based on colorimetry. Upon return in the laboratory, the box-core waters will be further analysed for urea and sulphate so they are frozen (-18^{o}C) for this purpose.

Sampling procedure:
Immediately upon arrival of the CTD on deck, water samples were collected from the Rosette-bottles in polyethylene sample bottles, which were first rinsed three times with water from the Rosette bottles. After filtration over a 0.45 µm filter the samples were stored dark and cool at 4°C. Surface water collected by the Aquaflow, and overlying water and pore water from box cores, multicores and sediment incubations were filtrated likewise before measurements.

Methods:
The nutrients were measured colorimetrically as described by Grashoff (1983).
Silicate reacts with ammoniummolybdate to a yellow complex. After reduction with ascorbic acid the obtained blue silica-molybdenum complex was measured at 800 nm (oxalic acid was used to prevent formation of the blue phosphate-molybdenum).
Phosphate reacts with ammoniummolybdate at pH 1.0, and potassiumantimonyltartrate was used as an inhibitor. The yellow phosphate-molybdenum complex was reduced by ascorbic acid to a blue-coloured complex and measured at 880 nm.
Nitrate was mixed with a buffer imidazole at pH 7.5 and reduced by a copperized-cadmium coil (efficiency > 98%) to nitrite, and measured as nitrite (see nitrite). The reduction-efficiency of the cadmium-column was measured in each run.
Nitrite was diazotated with sulphanilamide and naftylethylenediamine to a pink-coloured complex and measured at 550 nm.
The difference of the last two measurements gave the nitrate content. The reduction-efficiency of the cadmium-column was measured in each run.
Standards were prepared by diluting stock solutions of the different nutrients in the same nutrient- depleted surface ocean water as used for the baseline water. The standards were kept dark and cool in the same refrigerator as the samples. Standards were prepared fresh every two days. Each run of the system had a correlation coefficient off at least 0.9998. The samples were measured from the surface to the bottom to get the smallest possible carryover-effects.
In every run a mixed nutrient standard containing silicate, phosphate and nitrate (a so-called nutrient-cocktail) was measured in duplo to obtain some statistical information. This cocktail in practice is used as a guide to check the performance of the analysis. This cocktail has been succesfully used for four years now.

Preliminary Results:
Except for the first station, all the CTD-bottles on this cruise were closed at the right depth considering the nutrient-profiles. At the last three stations, it was noticed that from the first 100 meters of the surface water downwards there was a slight decrease in nutrients with depth. The nutrient minimum layer was at 50 meter below the surface, where the water was almost depleted of nutrients.

3.2.5 SUSPENDED PARTICULATE MATTER
(Henko de Stigter)

For determination of the concentration and composition of suspended particulate matter in the water column, water samples collected with the CTD-Rosette sampler were filtered on board. At each station, two bottles filled at near-bottom depth were filtered, and one bottle for each subsequent 1000 m depth interval. At stations PE95-07 and PE95-08, where minima in light transmission profiles at intermediate depth suggested the presence of an intermediate

nepheloid layer, two additional Rosette bottles were collected for filtration. Immediately after the Rosette bottles had been sampled for analysis of nutrients and oxygen, the remaining content of the bottles was homogenised by turning over the Rosette bottles, and collected in 5 l polyethylene bottles (two for each Rosette bottle). The water was subsequently filtered through pre-weighed 0.45 µm Porethics polycarbonate filters, applying underpressure by use of a vacuum pump. After filtration of the sample, demi water was passed through the filter to remove salt, and the filter was stored dry in plastic petridishes for further analysis on land.

3.2.6 SUBMERSIBLE PUMPS

(Wim Boer)

The in-situ particle filter sampler (CHALLENGER OCEANICS MARK II) is designed to filter over 1000 litre of water in one hour at midwater depths in the open ocean. It provides sufficient quantities of particulate material for an analysis. Different filter types and porosities can be used and there is also a possibility of including in-line scavengers behind the filter for the simultaneous extraction of dissolved species. The sampled volume depends on the concentration of the suspended particulate matter, the duration of pumping and the diameter, porosity and matrix of the filters. The pump can be used safely down to 5000 m water depth.
In this cruise, the pumps were used to obtain sufficient quantities of suspended particulate matter for a.o the calibration of the transmissometer, and for SEM study of the particulates on the filters.

Methods and problems:
The filters used were polycarbonate filters with pores of 0.4 µm. As these are very fragile, air in the system sometimes caused the filters to break, probably immediately after the pumps entered the water. Entering of air in the system was prevented by priming with water from the inlet (filling from the outlet gave problems). Still some air would remain in the system, also when it was pre-pumped for a few seconds. A simple plug in the outlet proved the best solution for this problem, because then the water could only enter through the inlet. This plug is automatically removed when the pumps start. As a last modification, a coarse supporting filter was added to give the membrane more mechanical strength; this would furthermore allow the O-ring to get better grip on the membrane so that it would not get loosened.
Another problem was a bad battery of pump 1 and 2. Pump 3 had not been tested yet, but will be in the lab.

Preliminary results:
An overview of the stations where the submersible pumps were applied is given below:

Cast no.	Sampling depth (m)	Pumping time (min)	Filtered volume (l)	Comments
PE95-02	2000	60	570	broken filter, battery (pump 1) empty after 30 min
PE95-03	2000	60	0	broken filter, battery (pump 2) empty after 0 min
PE95-05	1000	30	135	good filter
PE95-07	1125	30	521	broken filter
PE95-08	1260	30	259	good filter
PE95-09	200	30	252	good filter

Modifications of the methods, compared with those mentioned in the manual, gave a better working system. Good results were obtained during good weather conditions. The volume filtered was about 250 litre in half an hour. This probably will contain about 6-15 mg of material (assuming a SPM concentration of 20 - 50 µg/l). In comparison, a complete CTD-bottle (12 l) provides 25 times less material (0.2 - 0.5 mg). The filters were stored at 4°C, to be weighed and studied by SEM upon return.

3.3 BENTHIC BOUNDARY LAYER CHARACTERISTICS

3.3.1 BIOPROBE MEASUREMENTS

(Anja Cuesta-Linke)

Aim of the study is to qualify and quantify benthic boundary layer transport processes. During the cruise a particle camera (focused at 40 cm height above the sea floor) and a SeaTech transmissometer were successfully deployed by means of the Bioprobe at five stations during this OMEX cruise (one station at the Iberian slope, one station at the Meriadzek Terrace and three stations at the main OMEX transect at Goban Spur, for locations see Appendix C).
Light transmission in the lower water column varied between 65 and 85% and decreased within the last one meter above sea floor by 0.1 to 0.5 %. There is evidence that the transmissometer underestimated particle fluxes close to the sea floor where aggregates occurred.
Average flow velocity at 40 cm height above the sea floor was about 12 cm/s at the Iberian slope and at the Meriadzek Terrace. Slightly decreasing flow velocities with depth were found at the OMEX transect from PE 95-09 (18 cm/s) via PE 95-06 (16 cm/s) to PE 95-07 (15 cm/s). This corresponds with decreasing flow velocities with depth encountered in the OMEX transect in August 1995. These, however, showed lower values, ranging from 1.5 to 8 cm/s. Higher flow velocities were encountered at 50 m height above the bottom, ranging from 20 cm/s (at the Iberian slope and at Meriadzek Terrace) up to 40 - 50 cm/s (at the OMEX transect).
Primarily results show low aggregate abundances and particle sizes (up to 5 mm) at the OMEX transect. Samples taken in August `95 showed higher abundances, and up to 2 cm long stringers. Despite low flow velocities the deep stations at the Iberian slope and Meriadzek Terrace were characterized by slightly higher aggregate abundances.
Station PE 95-06 showed an intermediate flow velocity (16 cm/s) compared with high velocities found in autumn/winter 1993/1994 (30-35 cm/s) and low flow velocities in summer 1994 and 1995 (below 10 cm/s). The data suggest that this station is characterized by strongly changing flow conditions during summer and winter and is located along the suspension-interface feeder belt at the middepth areas of continental margins.

3.3.2 BOBO LANDER

(Tjeerd van Weering, Henk Franken)

BOBO (BOttom BOundary Lander) was released on September 19th, 1995, after it had been deployed during the OMEX cruise with R.V. "Charles Darwin" on June 8th, 1994. The lander is equipped with an acoustic current meter which measures current velocities and directions at 25, 50 75 and 100 cm above the seabed every six minutes. Simultaneous recording of the salinity and temperature of the nearbed seawater is made by a SeaCat CT probe. Two Camera Alive camera's for still photography are mounted for the observation of changes at the seabed during the deployment, and for the study of the variability of the particle distribution two

SeaTech transmissometers are mounted at 100 and 200 cm above the seabed. Data are stored in a central data command and processing unit (CPU), as well as in the individual instruments.
Upon transmission of the enable code the acoustic release gave a good response with accurate indication of the distance. The lander was released at 08.40 hrs and came to the surface at 09.05 hrs. The flash light worked well, but no radiotransmission was received. Two days later the transmitter mounted on BOBO suddenly started transmission. The lander frame was intact and was only very slightly overgrown by marine organisms. Anodes mounted on the frame were intact, but anodes mounted on the individual instruments were nearly completely dissolved. CT sensors were covered by a whitish substance, most likely Al-oxide.
The central data loggers' anodised surface layer was nearly gone and deep corrosion pits had formed. The central data logger's hard disk could for some reason not be read, and thus we did not know how much data had been recorded. (At NIOZ it proved that approximately 6 months of data - including a two week non-recording interval - had been recorded.) CT data have been recorded from the moment of deployment until 23rd of December; recording stopped because of power failure. Analyses and further processing will be done at NIOZ.
The underwatercamera's had failed, most likely because of pressure-induced malfunctioning of the connector cables. An on-deck test showed that the system functioned well under aerial conditions.

3.4 SEABED CHEMISTRY

3.4.1 TROL DEPLOYMENTS

(Willem Helder, Henk Franken)

During this cruise the profiling TROL (Temperature Resistivity Oxygen Lander) was equipped with 5 single-cathode oxygen microelectrodes, a four-wire resistivity probe to determine the sediment formation factor (F) and, as a novelty, with an ISFET (Ion Sensitive Field Effect Transistor) probe to measure pore water profiles of pH. The ISFET probe as well as the O_2 sensors had a common reference electrode which consisted of an Ag/AgCl wire housed in a small tube containing 3M KCl and KCl crystals and connected to outside seawater by means of a porous membrane in the bottom of the tube.
Deployments of TROL were done at stations PE95-02, PE95-03, PE95-04, PE95-06, PE95-07 and PE95-09 (for positions see App. C), covering a depth range of 675 - 4950 m. At station PE95-05 TROL deployment was cancelled because the box core sample indicated the presence of large numbers of "gravel" in the sediment and at the sediment surface, which would easily have damaged the fragile probes. At station PE95-08 deployment was not possible because the battery capacity of TROL was still too low at the scheduled time.
Based on the results of the first deployment at station PE95-02, three of the oxygen electrodes were changed because of their high outputs (> 2500 pA) at the seafloor (depth 4950 m, 244.1 μM O_2). At all following stations the same set of oxygen electrodes was used with the following general, temperature- and pressure-dependent characteristics: output in the overlying bottom water (220-265 μM O_2): < 1500 pA, and 0- output in anoxic sediment: < 125 pA.
Some examples of TROL oxygen profiles are given in Figure 3.

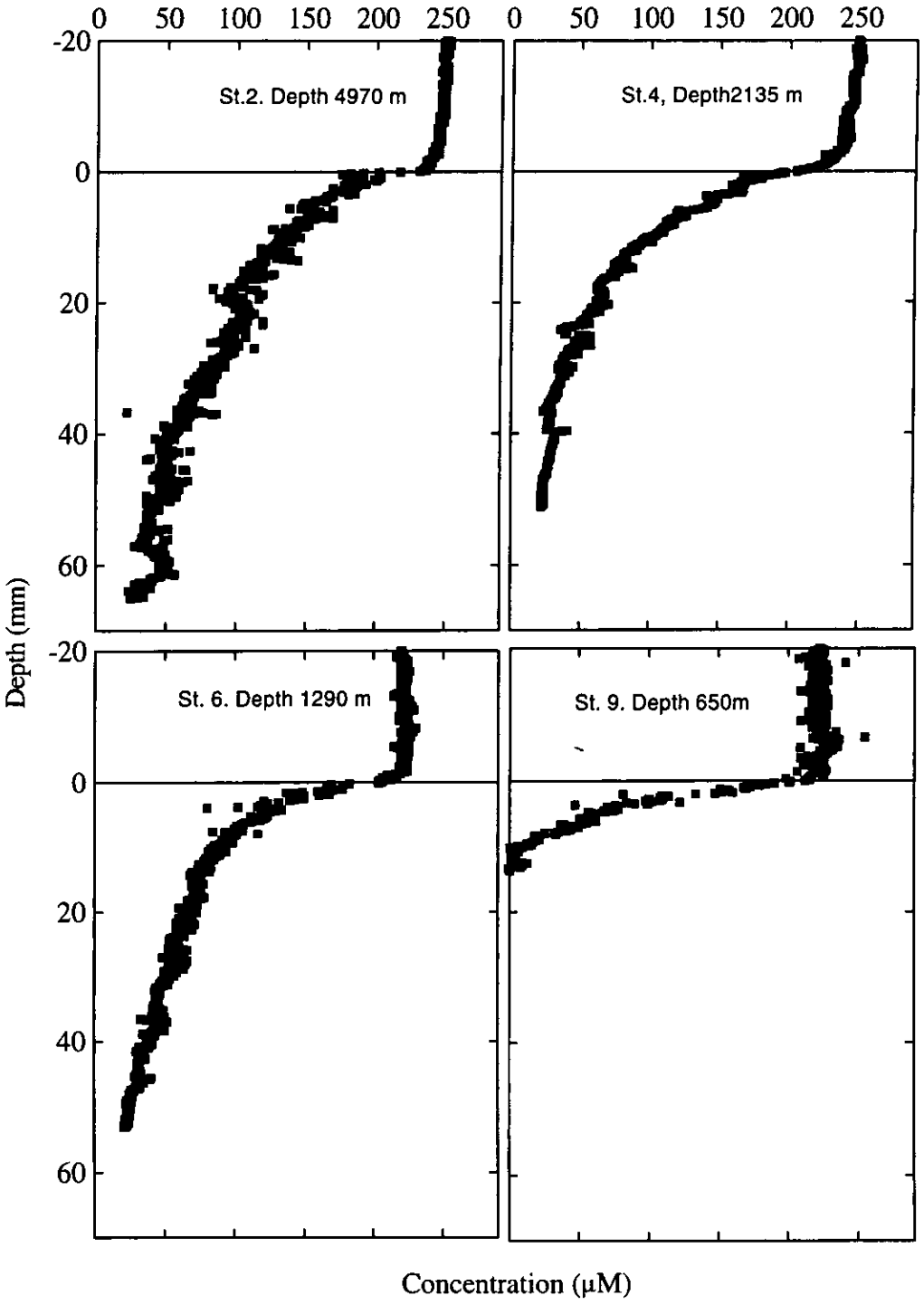


Fig. 3. TROL profiles of oxygen in sediment pore waters at stations PE95-02 (Galician Margin), PE95-04 (Meriadzek Terrace, and PE95-06 and -09 (Goban Spur)

The TROL profiles will be modelled with a reaction diffusion model to calculate oxygen fluxes across the sediment-water interface.
From the resistivity profiles the formation factor (F) was derived by :

$$F_Z = R_Z/R_O,$$

where F_z is formation factor at depth z in the sediment and R_Z and R_O are the resistivity at depth z and in the overlying water respectively.
F is related to the porosity (ϕ) by: $F = A\phi^{-n}$ ($2<n<3$, going from sandy sediments to clays).
Figure 4 gives the F profiles of all TROL stations:

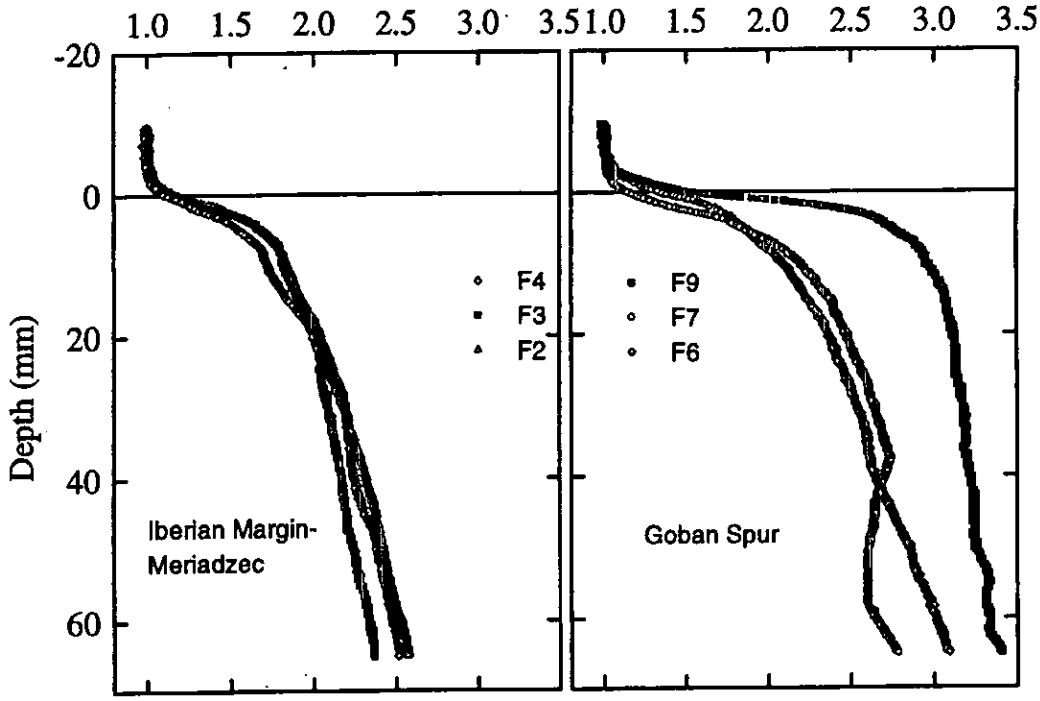


Fig. 4. *TROL profiles of formation factor (F) in surface sediments.*

At the Iberian Margin and Meriadzek Terrace (stations 95-02, -03 and -04) F profiles are similar and have lower values than at the stations at the Goban Spur (95-06, 07 and 09). Especially at station PE 95-09 F values are high, related to the sandy nature and associated low porosity.

Preliminary results from the pH-ISFET sensor mounted on the TROL indicate that the sensor response is fast enough to detect pH changes across the sediment-water interface, but that all profiles have a continuous drift. More laboratory research with respect to the origin and the magnitude of this drift phenomena is needed.

3.4.2 EARLY DIAGENESIS

(Lutz Lohse, Maria Belzunce Segarra and Rikus Kloosterhuis)

Organic matter deposited at the seafloor can either be mineralised or be buried in the sediment. In order to provide accurate estimates of organic matter turnover rates, we studied carbon and nitrogen mineralisation rates. The release and uptake of redox sensitive compounds (e.g. oxygen, nitrate etc.) within the sediments and across the sediment-water interface can be used to calculate the mineralisation rates. Organic matter which survives mineralisation may become buried. The percentage of this fraction may depend on environmental (e.g. oxygen minima), microbial (e.g. relation between oxic and anoxic consortia of micro-organisms) and sedimentary parameters (e.g. specific surface area of the mineral fraction).

In order to identify key locations of organic matter deposition the research was carried out along various transects along the European continental shelf break. All measurements took place in a thermostated container at *in-situ* temperature.

The following parameters were studied.

- porosity
- resistivity
- sediment particle surface area
  (in collaboration with L.M. Mayer, Univ. of Maine, USA)
- organic carbon and nitrogen content
- solid iron and manganese

- depth distribution of :
  - oxygen
  - ammonium
  - nitrate/nitrite
  - phosphate
  - sulphate
  - dissolved manganese and iron
  - silicate
  - ΣCO_2 (only at stns 6, 7, 8 and 9)
  - pH

- sediment-water exchange of ammonium, nitrate, nitrite, phosphate, silicate and CO_2

Sampling

Sediment cores were obtained by boxcoring (stations 1 & 2) and by multicoring (stations 3 to 9). The multicorer became available during this cruise and led to a significant improvement of the preservation of the sediment-water interface.

Pore water components were sampled in the following intervals:

intervals (in mm)			
0 - 2.5	10 - 15	30 - 40	70 - 90
2.5 - 5	15 -20	40 -50	90 - 110
5 - 7.5	20 - 25	50 - 60	110 - 130
7.5 - 10	25 - 30	60 - 70	130 - 150

Oxygen profiling
Oxygen profiles were obtained by using Clark-type oxygen microelectrodes (Diamond Inc., type 737). The electrodes were inserted into the sediment in steps of 100 to 500 µm by a computerised micromanipulator. All measurements were carried out in 10 cm ∅ sediment cores.

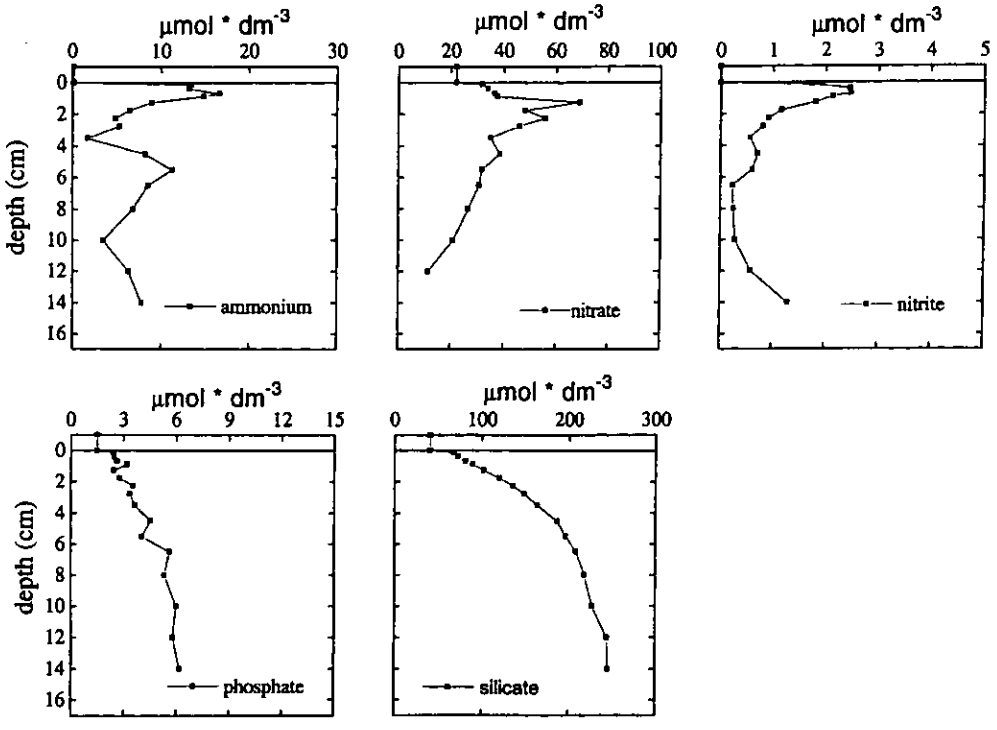
Sediment-water fluxes
Sediment-water fluxes were estimated by monitoring the concentration of solutes in overlying water of 3 to 4 sediment cores (10 cm ∅). In order to preserve the microtopography at the sediment-water interface, the overlying water was not replaced by filtered bottom water. Instead, additional bottom water samples were monitored for concentration changes of nutrients.
All sediment-water fluxes were performed while the overlying water was stirred. To minimise pressure gradients at the sediment-water interface the water column was stirred by a clockwise-anticlockwise rotating small magnetic stirrer. Previous experiments have shown that the diffusive boundary layer created by this stirring device ranges in thickness between 300 and 500 µm.

Preliminary results
Preliminary results of oxygen profiling are given in the table below. Qualitative examination of the profiles indicates that the total mineralisation is dominated by oxic processes. Most profiles reveal oxygen penetrations down to several centimetres. In general, the oxygen penetration was inversely correlated with water depth. Significant contribution of anoxic mineralisation processes was found at station PE95-09 (OMEX I).

transect	*station*	*water depth (m)*	*oxygen penetration (mm)*
Galician Margin	PE95-01	3383	
	PE95-02	4949	90
Meriadzek Terrace	PE95-03	4328	55
	PE95-04	2137	35
	PE95-05	1370	18
Goban Spur	PE95-06	1296	60
	PE95-07	2247	75
	PE95-08	3650	65
	PE95-09	651	22

Examples of pore water profiles of nitrate, nitrite, ammonium, phosphate and silicate are given in Figure 5. Our high-resolution pore water profiles show distinct ammonium peaks occurring in the upper 1 cm of the sediment column, particularly at deeper stations. There are some indications that these peaks are a sampling "artefact", either caused by decompression effects and/or the application of (well-established) pore water sampling methods (squeezing). A comparative study revealed that other methods used to obtain pore water (centrifugation) can reproduce these ammonium peaks. These results may be indicative for the potential lability of organic material in the sediment surface layer.

a. Galician Margin: station PE95-01 (3383 m)



b. Meriadzek Terrace: station PE95-03 (4328 m)

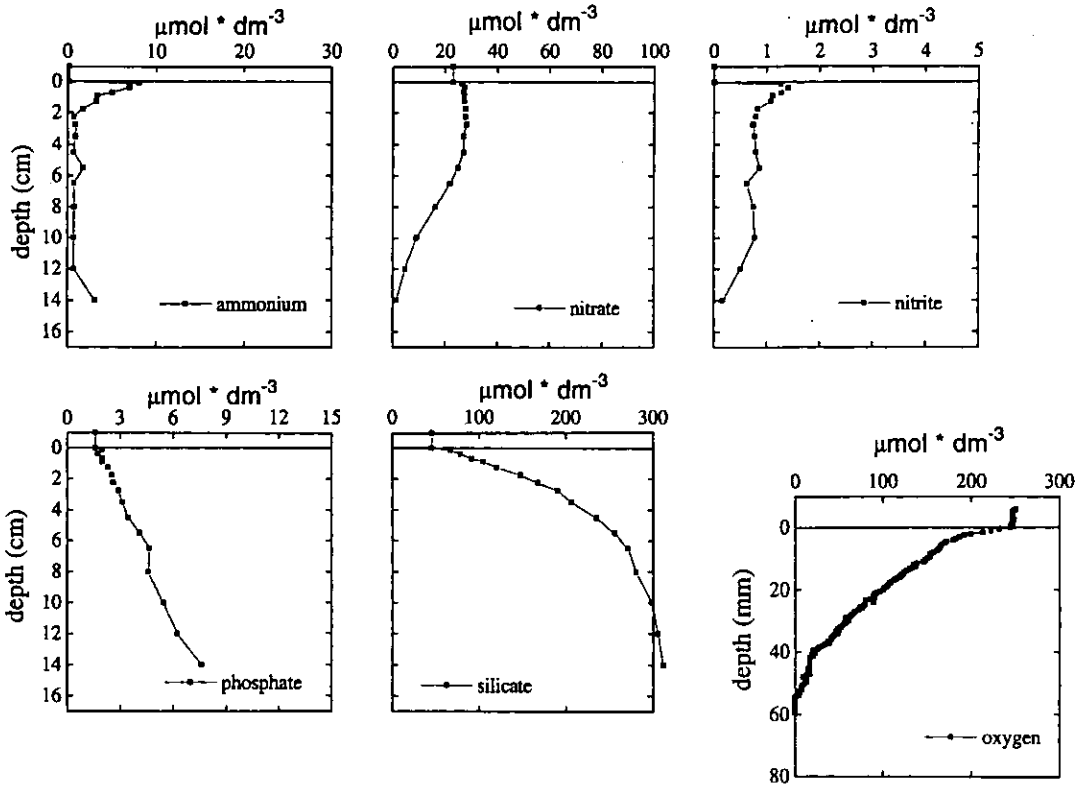


Fig. 5. Profiles of nutrients and oxygen in sediment pore waters at stations PE95-01 (a), PE95-03 (b) and PE95-06 (c, next page).

c. Goban Spur: station PE95-06 (1296 m)

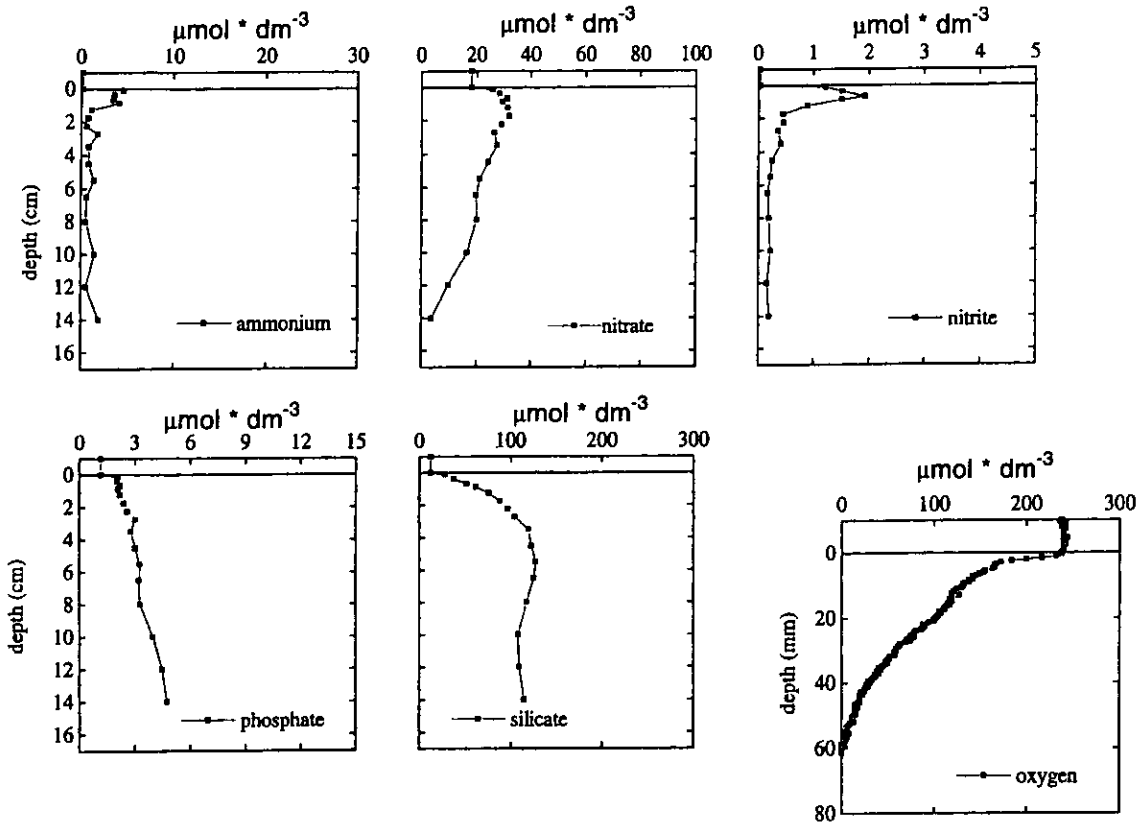


Fig. 5c.

3.5 BENTHIC COMMUNITY

3.5.1 BENTHIC ACTIVITY AND BIOMASS

(Anja Cuesta-Linke)

Benthic activity and biomass is subject to spatial and seasonal variations in response to pulses of particulate organic matter from primary production in the euphotic pelagic zone. To evaluate variabilities in activity and biomass on the NE European Continental Margin a series of expeditions was carried out during different seasons in preceeding years (one expedition in April 1988, two cruises in June/July 1993, and another two cruises in January and September 1994).

Data from these cruises already revealed pronounced seasonal variations on the OMEX Goban Spur transect (Celtic Sea), however probably affected by interannual variations. A comparison of data from the 1995 OMEX expedition of R.V. "Pelagia" with results from autumn cruises in 1993 and 1994 will lead to an increased understanding of assumed interannual variations in benthic activity and biomass. Moreover, the 1995 expedition will probably allow to define areas of production and depocentres of organic material by extending the area of investigation on the continental margin to the southeast (Meriadzek Terrace transect, Galician Margin)

During this cruise box cores were subsampled for benthic community studies by inserting 15-20 syringes of 1 cm diameter into the surface sediment and by taking 4-5 samples of other types. These subsequently were deepfrozen and will be analysed in Hamburg and Bremerhaven at AWI.
Changes in activity and biomass of the benthic infauna will be assessed by a series of biochemical assays:
* esteraseses with fluoresceindiaecetate, FDA (heterotrophic activity)
* total adenylates, ATP+ADP+AMP (biomass)
* desoxyribonucleic acid, DNA (biomass)
* phospholipids (biomass)
* particulate proteins (biomass)

The input of organic material to the benthos from phytoplankton blooms will be estimated by measuring sediment-bound chlorophyll a concentrations.

3.5.2 LIVE BENTHIC FORAMINIFERA
(Henko de Stigter)

At all stations, subsamples of box cores were collected for the study of living benthic foraminifera. The subsample was obtained by carefully inserting a 9 cm ∅ PVC tube in the sediment till at least 10 cm depth, leaving at least 1 cm of overlying seawater above the sediment surface. The sediment of the subsample was then carefully extruded from the PVC tube, taking care that the layer of fluff on top of the sediment was not lost with the overlying water, and sliced at 0.5 cm intervals till 2 cm depth, and then at 1 cm intervals till 10 cm depth. The wet volume of the slices was determined in a measuring cylinder by adding a fixed volume of Rose Bengal in ethanol solution (1.0 g/l), and subtracting the added from the total volume. The sediment slices with Rose Bengal solution were then stored in plastic jars for further treatment in the laboratory.

3.6. SEDIMENT CHARACTERISTICS
(Tjeerd van Weering, Henko de Stigter, Wim Boer, Aad Vaars)

At all stations during the cruise box cores were taken by means of a standard boxcorer, equipped with a cylindrical core barrel which is closed by a closing lid before raising of the core, and which yields cores with relatively undisturbed sediment surface and overlying water. Positions and water depths of the box-core positions are given in Appendix C.
Subsamples were made by slowly inserting PVC liners of 9 cm inner diameter in the sediment after siphoning off the overlying water. The subsamples were stored cool (4°C) for further study in the laboratory including a.o.: description of general sediment characteristics like composition, grainsize, and sedimentary structures, determination of the downcore variation in sediment porosity, dry density, ^{210}Pb activity, $CaCO_3$ and C_{org} content, and determination of the age and accumulation rate of the sediment. These parameters are studied to obtain insight in the long-term variation along the transect in sediment transport, accumulation, bioturbation, and in burial rate of a.o. organic and inorganic carbon. To obtain an immediate idea about the age and sedimentation accumulation rates of the box cores, on board determination of the foraminiferal fauna was done (see below).
At a few stations, especially along the Meriadzek transect, piston cores were made using a 12 m pipe with a 9 cm ∅ inner liner, in order to study the long term (downcore) variability of the parameters given before, and also to allow a comparison between the Meriadzek transect and

the OMEX transect at Goban Spur (where piston cores were collected in 1994), to obtain a better view on the spatial variability of the sediments along the Biscay Margin. On board analysis of the piston cores was done immediately after recovery including the measurement of magnetic susceptibility on whole cores. After opening the cores a macroscopic description was made and colours logged following the ODP sedimentology handbook procedure, while a split section of the core was immediately scanned by the Cortex XRF scanner for the downcore contents of calcium and a number of other elements (see below for results).

3.6.1 BIOSTRATIGRAPHY OF BOX CORES

(Henko de Stigter)

For the purpose of age determination of box core sediments, and additionally to study the composition and provenance of the coarse sediment fraction, sediment samples were collected from the surface and subsequent 5 cm vertical intervals of all box cores. The sediment was wet-sieved over a 150 µm sieve, and the >150 µm fraction was studied with a stereo microscope. Age determinations were made on the basis of coiling ratios of the planktonic foraminiferal species *Globorotalia hirsuta*, *Globorotalia truncatulinoides* and *Neogloboquadrina* spp.. In the area of investigation, these species are at present dominantly right-coiled. A shift to dominant left-coiling in *G. hirsuta* marks the Upper Holocene - Lower Holocene boundary (^{14}C AMS age 7000 yr B.P.), whereas a shift to dominant left-coiling in *Neogloboquadrina* spp. marks the Holocene - Pleistocene boundary (10,000 yr B.P.). A dominance of left-coiled *G. truncatulinoides* is observed in the Lower Holocene. A summary of preliminary stratigraphic results is presented in Figure 6.

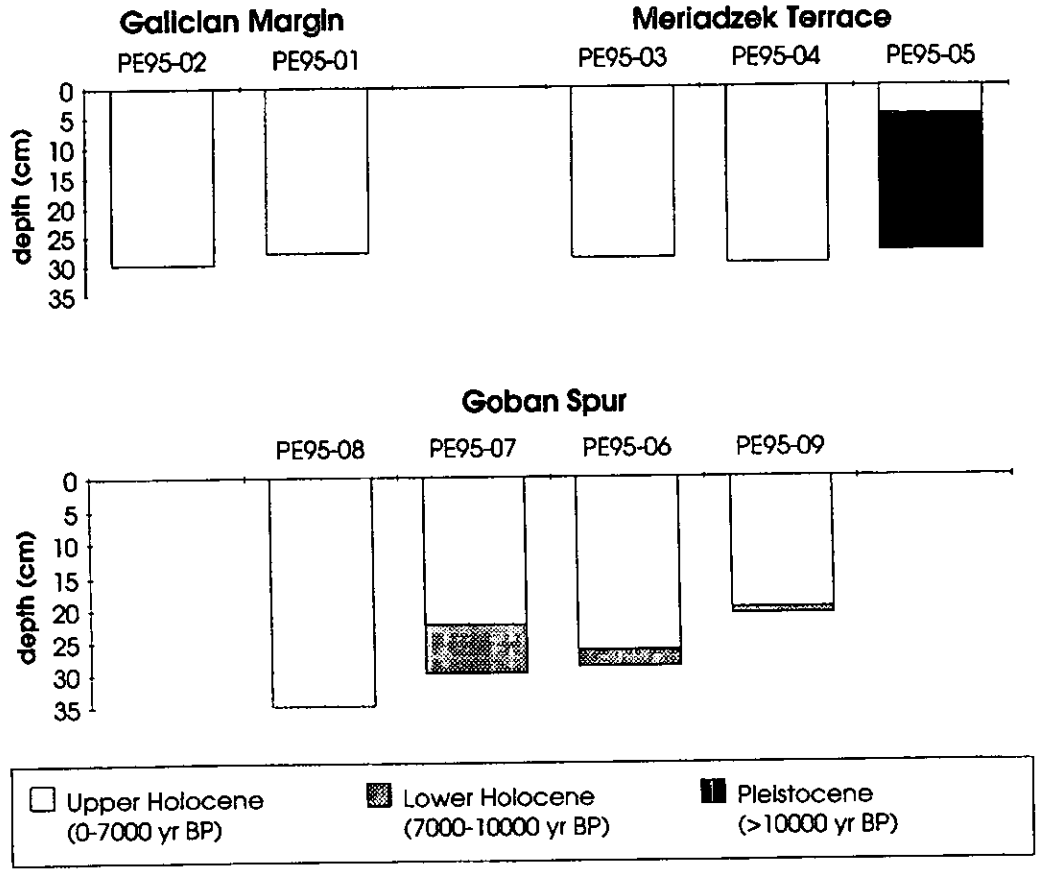


Fig. 6. Preliminary stratigraphy of box cores.

In the box cores from the Galician Margin only Upper Holocene sediments were retrieved. Dividing the core thickness of about 30 cm (minimum thickness of the Upper Holocene) by 7000 yr yields a sediment accumulation rate (SAR) of 4.3 cm/1000 yr. Probably only the upper part of the Upper Holocene is present in the cores, and thus the above value of SAR must be considered as a minimum value. Planktonic foraminifera are the main component of the > 150 μm fraction. Radiolarians and benthic foraminifera are common, but very subordinate relative to planktonic foraminifera. The outer shelf - upper slope benthic foraminifer *Cassidulina laevigata* is conspicuously present in core PE95-01, indicating downslope transport of sand-sized sediment. Biotite and other micaceous minerals, derived from the crystalline coastal ranges of Galicia, are also commonly observed.

Box cores PE95-03 and -04 from the base and lower slope of Meriadzek Terrace yielded only Upper Holocene sediments. Planktonic foraminifera are by far the most common component of the coarse fraction, whereas other microfossils like radiolarians and benthic foraminifera are of minor importance. Allochtonous elements were not observed. In core PE95-05 from the top of the Meriadzek Terrace, a thin layer (< 5 cm) of Upper Holocene sediment covers sediment of yet undifferentiated Pleistocene age. The sieve residue of the Holocene sediment is dominated by planktonic foraminifera, together with quartz and various other mineral and lithic grains derived from the underlying Pleistocene sediment. Quartz grains and planktonic foraminifera are the most common constituents of the Pleistocene sediment. Additionally, fragments of slate, mica flakes, volcanic ash particles and glauconite are common. Well-rounded quartz grains, mollusc fragments, echinoid spines and inner shelf benthic foraminifera (*Elphidium* spp., *Ammonia beccarii*, *Bulimina marginata*) indicate a shallow water origin of at least part of the Pleistocene sediment. A bed of iceberg dropstones was present on top of the box core, carrying a peculiar assemblage of sessile benthic foraminifera. At Goban Spur, the Upper-Lower Holocene boundary was encountered in box cores PE95-06, -07 and -09, at depths of, respectively, between 25-28 cm, 20-25 cm and at 20 cm below the sediment surface. Consequently, Upper Holocene sediment accumulation rates are respectively, between 3.6-4.0, 2.9-3.6, and 2.9 cm/1000 yr. In core PE95-08 from the Goban Spur only upper Holocene sediment is present, implying a minimum SAR value of 4.3 cm/1000 yr. In the sediments from the middle and lower slope, planktonic foraminifera are dominant; benthic foraminifera are relatively rare at these depths. In core PE95-09 benthic foraminifera (notably *Uvigerina mediterranea*) are abundantly present, together with planktonic foraminifera. Allochtonous benthic foraminifera (*Elphidium* spp., *Hyalinea balthica*), and quartz grains are present in considerable amount. Glauconite is a common component in these sediments.

3.6.2 MAGNETIC SUSCEPTIBILITY OF PISTON CORES

(Aad Vaars and Tjeerd van Weering)

All piston cores collected during the Pelagia OMEX 1995 cruise (PE95-02, PE95-03, 04 and 07) were scanned for their downcore magnetic susceptibility using a Bartington MS2C magnetic susceptibility meter and applying a 12 cm spool. Measuring at 5 cm intervals yielded no significantly lower resolution than measurements made at 1 cm intervals. Measurements have a relative value and are expressed as counts per second. Results of the measurements are shown in Figure 7 . Initial results show that the presence of Heinrich layers 1 and 2 is expressed by a perfectly clear peak in magnetic susceptibility, comparing well with published magnetic susceptibility records from the region. The presence of Heinrich 1 provides an additional age reference, as this layer is dated at 14,500 yr B.P..

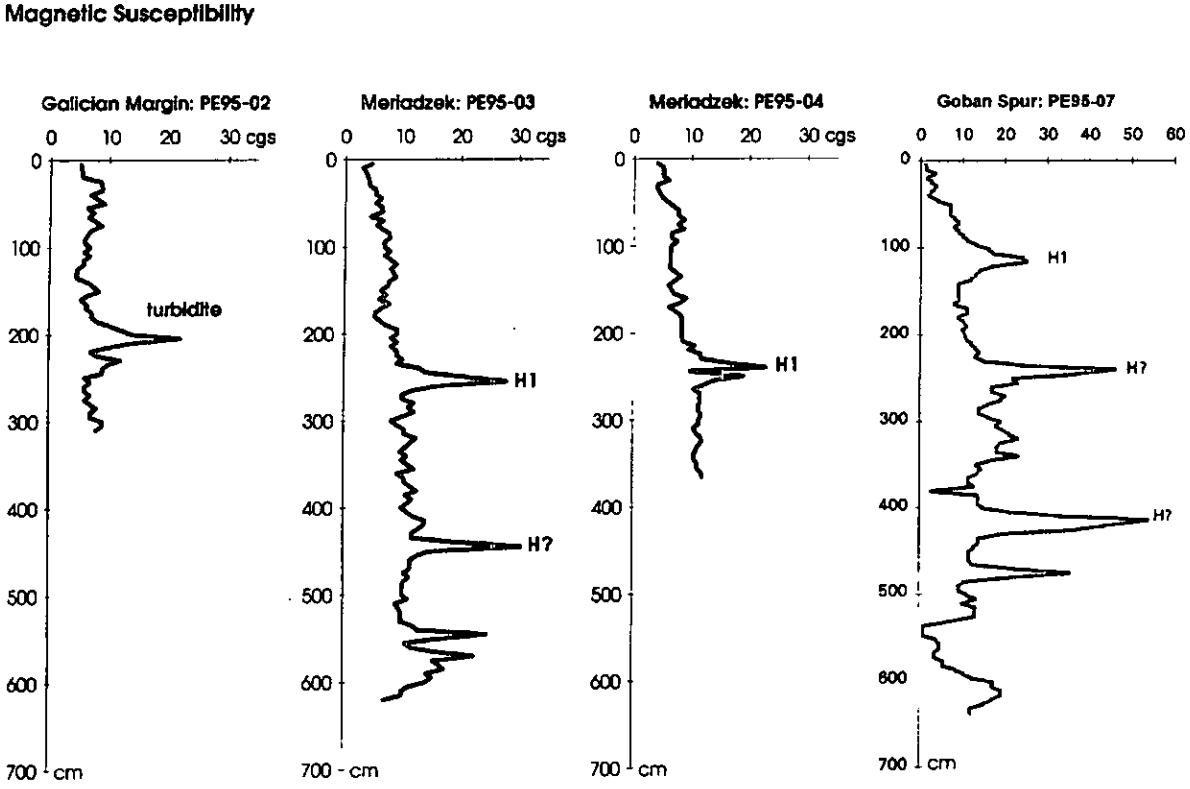


Fig. 7. Downcore variation in magnetic susceptibility of piston cores, and tentative interpretation.

3.6.3 XRF ELEMENT SCANNING OF PISTON CORES

(Aad Vaars and Tjeerd van Weering)

Automated X-ray fluorescence element scans of split piston core sections were made by the CORTEX XRF scanner, developed by NIOZ. This instrument uses a KEVEX X-ray source and can measure elements even at very low abundances. It requires however, a smooth sediment surface; irregularities in the scanned surface may result in erroneous readings. All piston cores collected during the cruise (PE95-02 from the Galician Margin, PE 95-03 and -04 from Meriadzek Terrace, and PE 95-07 from the Goban Spur transect) were opened and split and subsequently measured by the XRF scanner at 1 cm intervals. Measurements have a relative value and must be calibrated upon return in the laboratory to calculate an absolute content.

Downcore variation in Ca and Fe in the piston cores is shown in Figure 8. High Ca values are characteristically observed in the upper part of all piston cores, and correspond to the Holocene and late Glacial. In the cores from the Meriadzek Terrace and slope, high Ca values extend down to almost 270 cm, compared to only 120 cm in piston core PE95-07 from Goban Spur. This indicates that average late Glacial to Holocene sediment accumulation rates on Meriadzek Terrace and slope are roughly two times higher than on Goban Spur, confirming the preliminary results of age determination obtained for the box cores. High Ca values are also observed in the lower part of core PE95-07, below 575 cm. This most likely corresponds with the previous warm climatic interval of oxygen isotopic stage 5, dated between 72,000 and 125,000 yr B.P. This Ca-rich interval is not found in cores PE95-03 and -04.

Conspicuous peaks in the Ca record correlate with the Heinrich layers as interpreted from the magnetic susceptibility curves. Interestingly, the Heinrich layers apparently correspond to minima in the Fe record. It remains to be studied in detail to what extent this is caused by anomalous redox conditions or by the specific composition of the of ice rafted debris (IRD), deposited during the sudden input of the melting icebergs held responsible for development of the Heinrich layers.

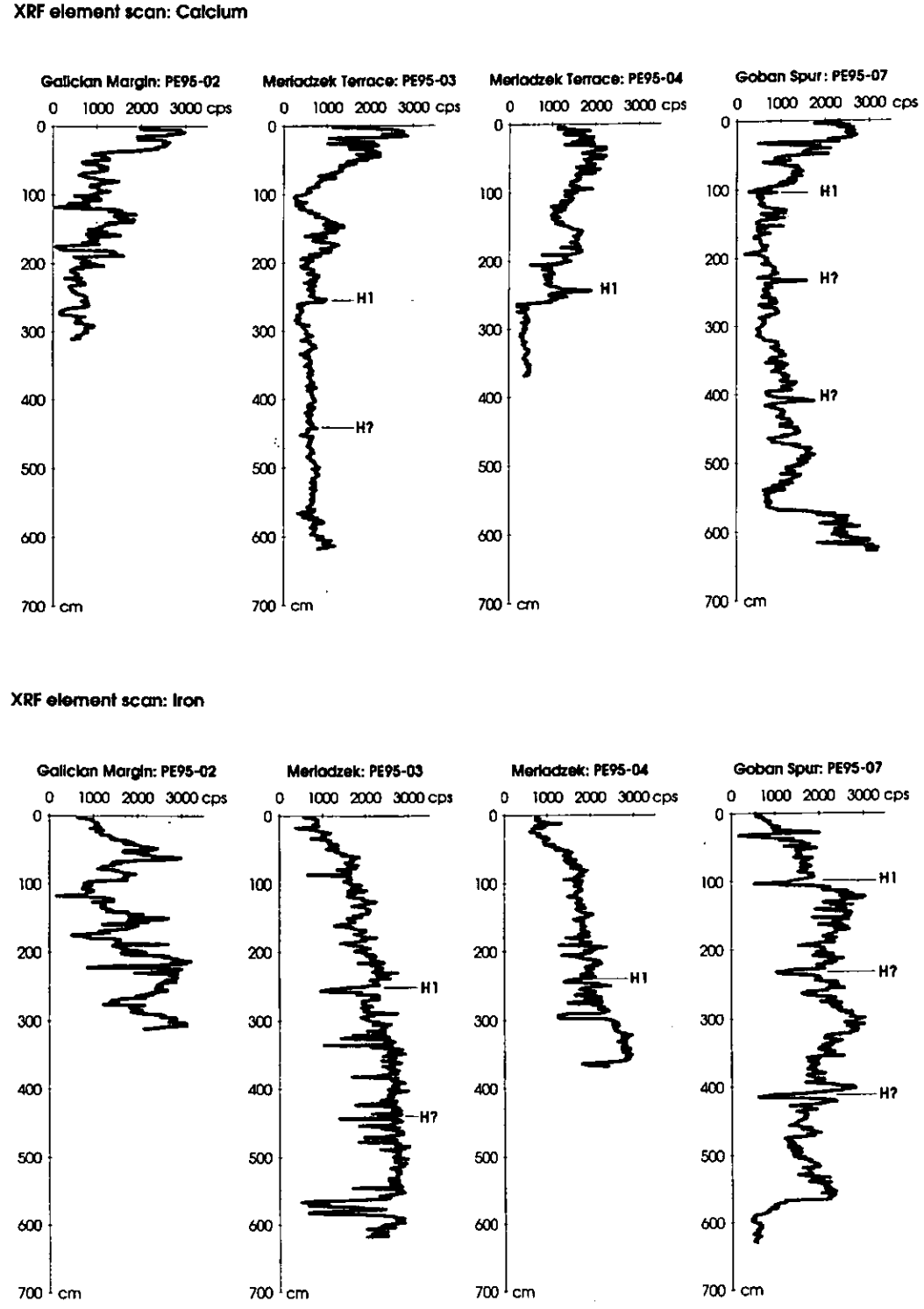


Fig.8. Downcore variation in Ca and Fe content (in counts per second) of piston cores, and possible position of Heinrich layers.

APPENDIX A
SHIPBOARD SCIENTIFIC CREW

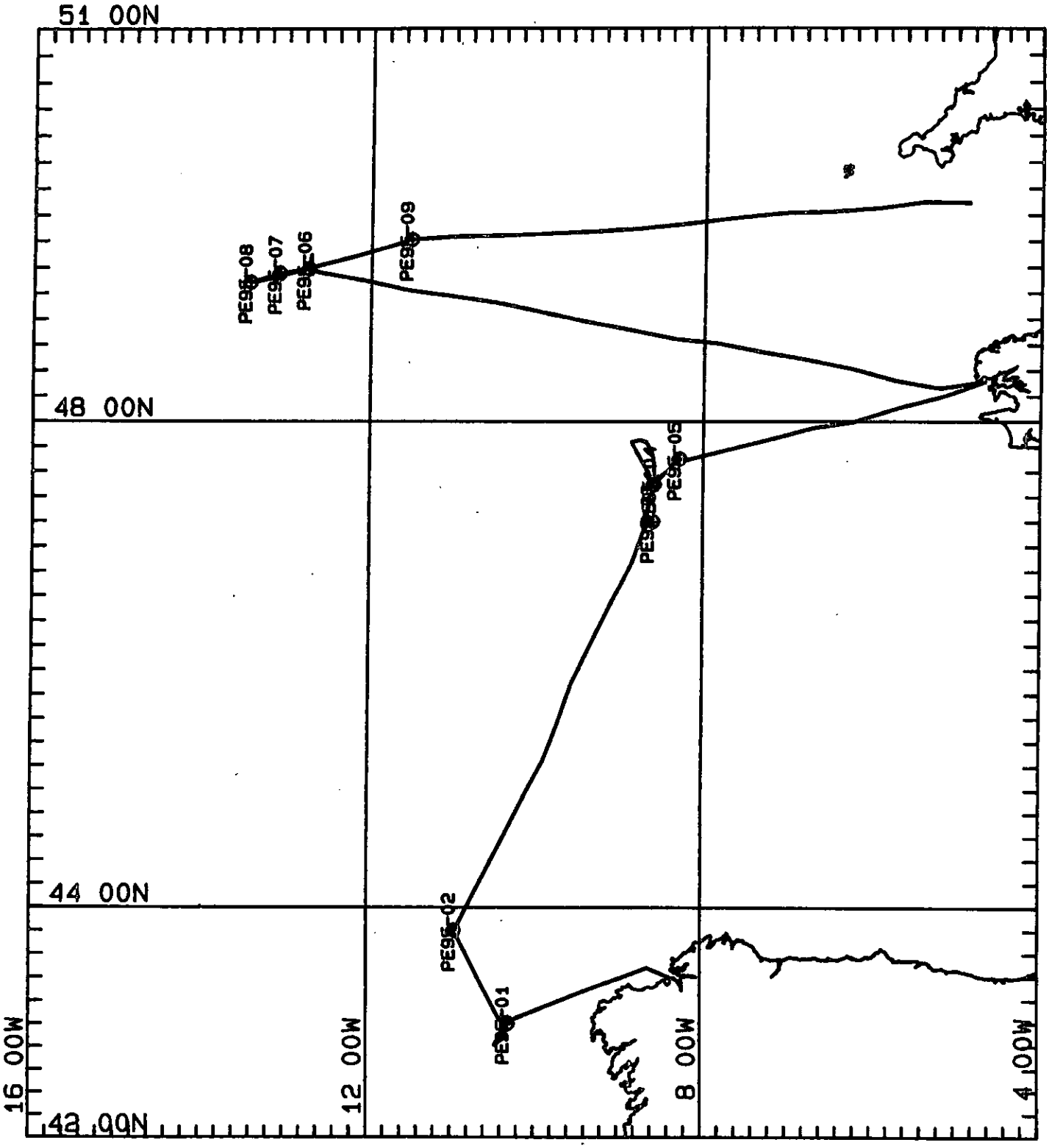
K.M.H. Bakker	-NIOZ-	Texel- Dept.Marine Chemistry & Geology
M.J. Belzunce Segarra	-IIM	Vigo
W. Boer	-NIOZ-	Texel- Dept.Marine Chemistry & Geology
A. Cuesta-Linke#	-GEOMAR-	Kiel- Dept. Marine Biology
H. Franken	-NIOZ-	Texel- Dept.Electronic Engineering
W. Helder	-NIOZ-	Texel- Dept.Marine Chemistry & Geology
H.T. Kloosterhuis	-NIOZ-	Texel- Dept.Marine Chemistry & Geology
L. Lohse	-NIOZ-	Texel- Dept.Marine Chemistry & Geology
W. Polman*	-NIOZ-	Texel- Marine Technician
J. Sinke	-NIOO-	Yerseke- Chemistry Dept.
H.C. de Stigter	-NIOZ-	Texel- Dept.Marine Chemistry & Geology
A.J. Vaars	-NIOZ-	Texel- Dept.Marine Chemistry & Geology
Tj.C.E. van Weering	-NIOZ-	Texel- Dept.Marine Chemistry & Geology
C. Willems	-NIOZ-	Texel- Marine Technician

Sampling water column and bottom sediments for respectively Dr.L.Thomson (GEOMAR) and Dr.T.Soltwedel (AWI/GEOMAR)

* Disembarked Brest 17/9 because of personal reasons

APPENDIX B

MAPS OF STATIONS & TRACKLINES



MERCATOR PROJECTION

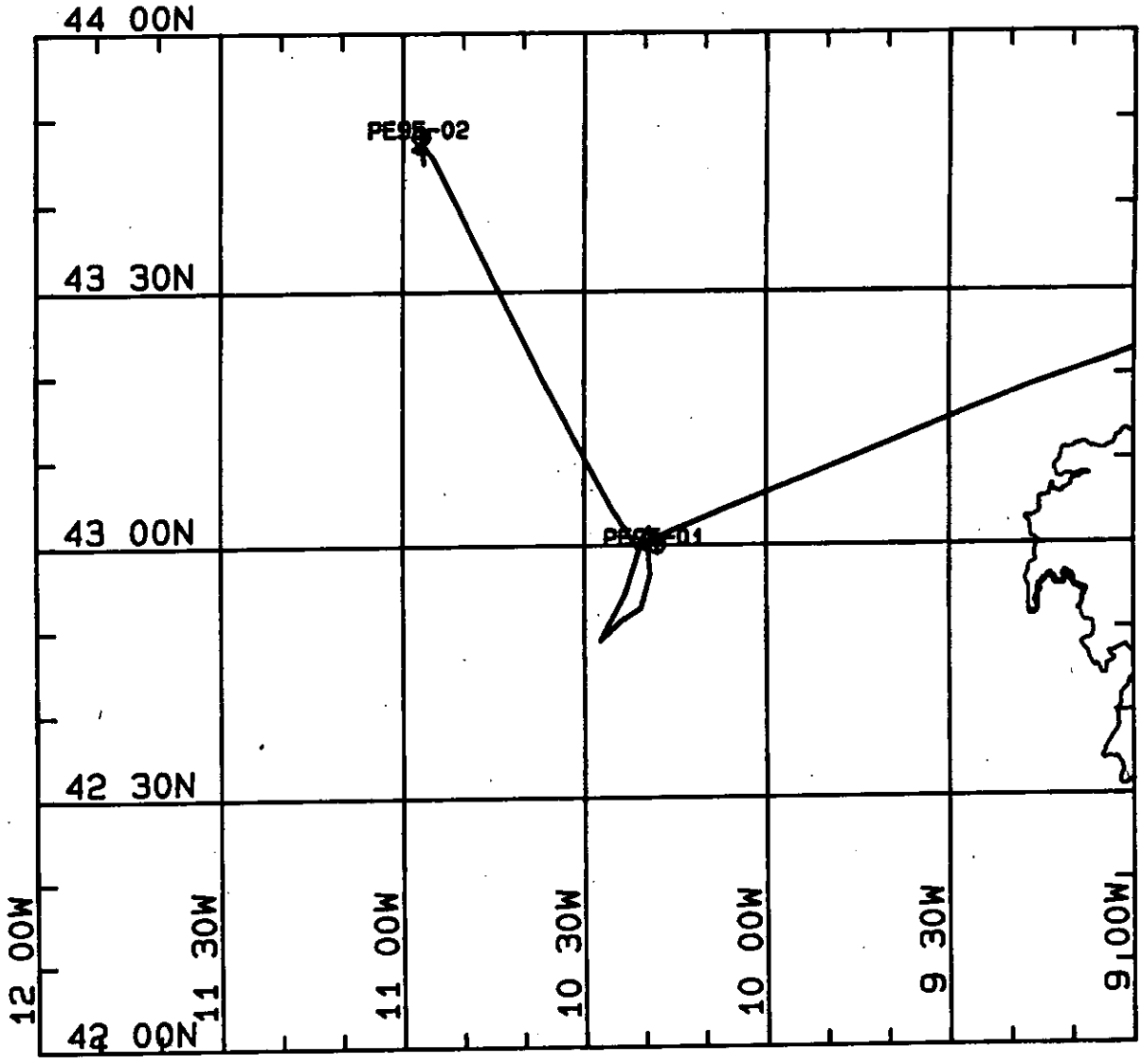
GRID NO. 1

SCALE 1 TO 4779944 (NATURAL SCALE AT LAT. 50)

INTERNATIONAL SPHEROID PROJECTED AT LATITUDE 62

OMEX 95 leg 2 _____

GALICIAN MARGIN



MERCATOR PROJECTION

GRID NO.

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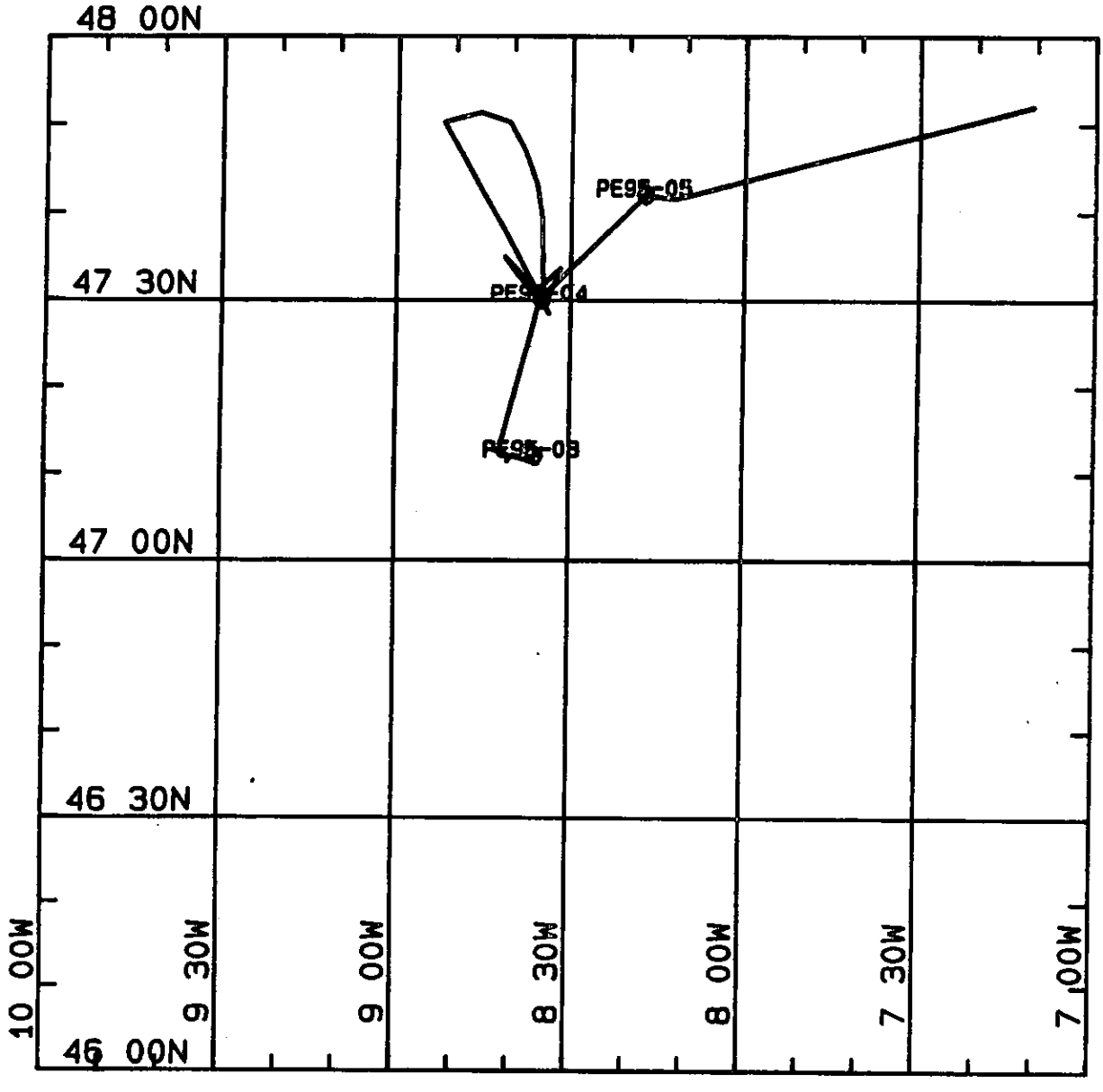
INTERNATIONAL SPHEROID PROJECTED AT LATITUDE 62

OMEX 95 leg 2 _____

MERIADZEK TERRACE



MERCATOR PROJECTION

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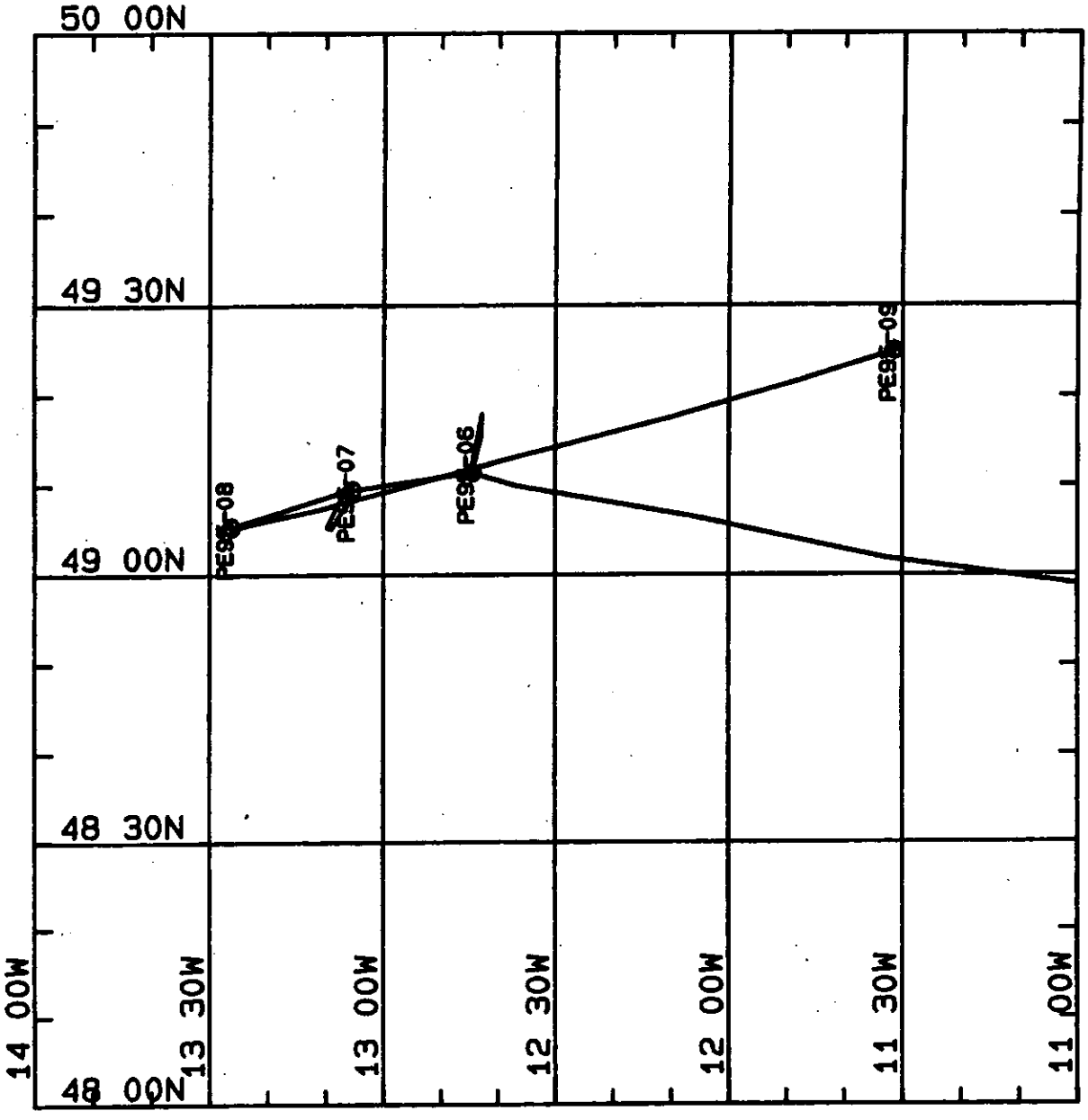
GOBAN SPUR



MERCATOR PROJECTION

GRID NO.

SCALE 1 TO 1433983 (NATURAL SCALE AT LAT. 50)

INTERNATIONAL SPHEROID PROJECTED AT LATITUDE 62

OMEX 95 leg 2 _____

APPENDIX C

POSITIONS OF CTD / TROL / BIOPROBE / SUBMERSIBLE PUMPS / MULTICORE / BOX CORE / PISTONCORE / **PER STATION (bottom)**

1. GALICIAN MARGIN TRANSECT

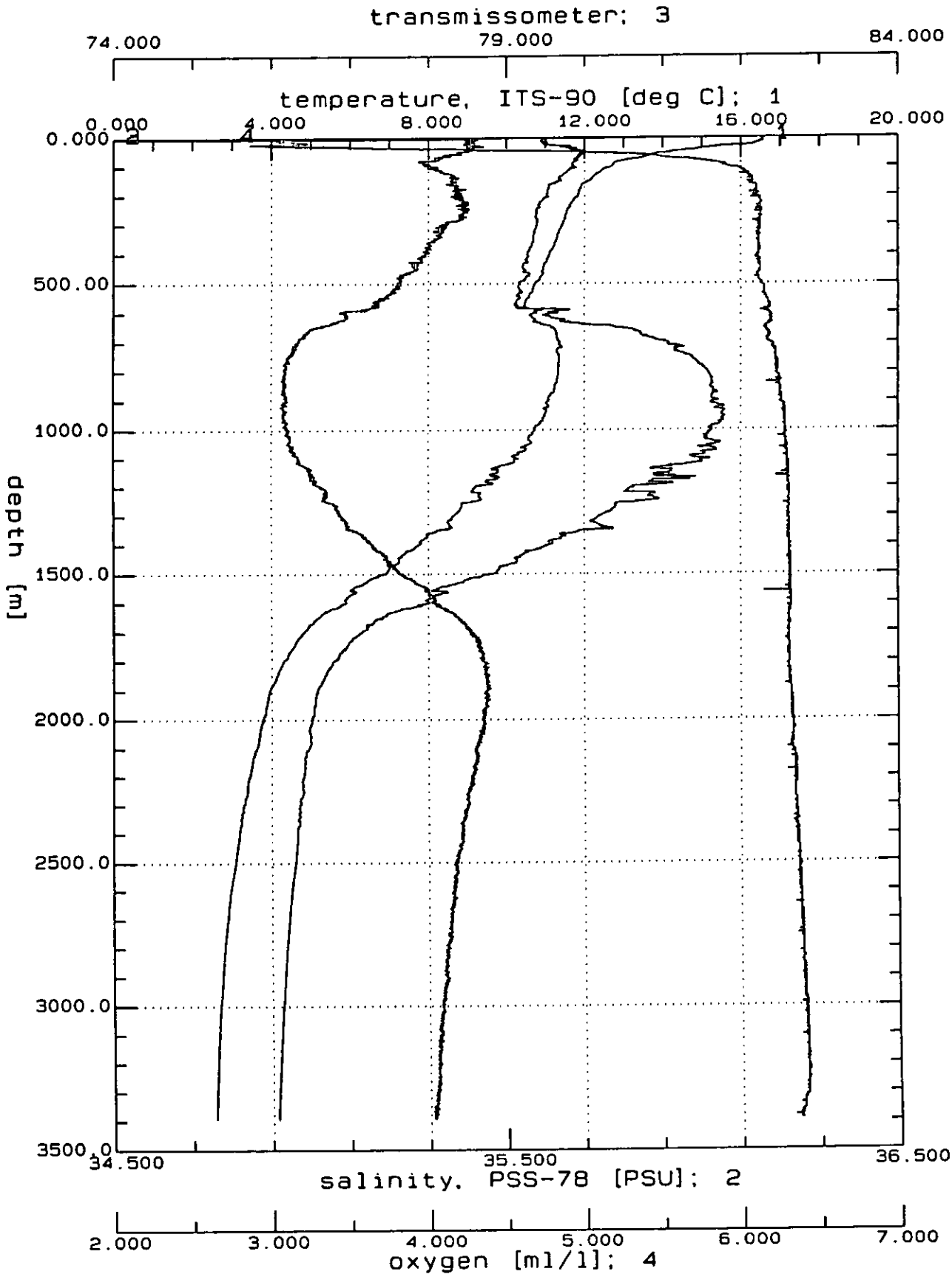
STATION	*ACTIVITY*	*LATITUDE*	*LONGITUDE*	*DEPTH (m)*
PE 95-01	CTD	42°59.98 N	10°21.09 W	3379
	BIOPROBE	43°00.03 N	10°20.98 W	3378
	BOX CHEM	43°00.04 N	10°21.19 W	3387
	BOX GEO	42°59.93 N	10°21.07 W	3377
PE 95-02	CTD	43°47.06 N	10°56.99 W	4975
	TROL	43°46.94 N	10°57.43 W	4950
	SUBM. PUMP	43°47.14 N	10°57.03 W	2000 (4950)
	BOX CHEM	43°46.78 N	10°57.71 W	4995
	BOX GEO	43°46.97 N	10°56.95 W	4946
	PISTON CORE	43°46.91 N	10°57.06 W	4945

2. MERIADZEK TERRACE TRANSECT

STATION	*ACTIVITY*	*LATITUDE*	*LONGITUDE*	*DEPTH (m)*
PE 95-03	CTD	47°12.00 N	08°40.04 W	4322
	TROL	47°12.02 N	08°40.44 W	4313
	SUBM. PUMP	47°11.49 N	08°39.84 W	2000 (4312)
	BOX CHEM	47°12.07 N	08°39.89 W	4317
	MULTICORE	47°11.85 N	08°39.98 W	4316
	BOX GEO	47°11.87 N	08°40.25 W	4327
	PISTON CORE	47°11.90 N	08°40.38 W	4323
PE 95-04	CTD	47°30.03 N	08°35.04 W	2138
	TROL	47°30.08 N	08°35.46 W	2145
	BIOPROBE	47°29.97 N	08°35.13 W	2153
	MULTICORE	47°29.88 N	08°35.03 W	2140
	MULTICORE	47°30.00 N	08°34.99 W	2136
	BOX GEO	47°29.98 N	08°34.97 W	2137
	PISTON CORE	47°30.03 N	08°34.94 W	2135
PE 95-05	CTD	47°42.00 N	08°17.00 W	1374
	BIOPROBE	47°42.02 N	08°16.99 W	1370
	SUBM. PUMP	47°41.99 N	08°17.12 W	1000 (1374)
	MULTICORE	47°41.99 N	08°16.99 W	1368 05MULC
	BOX GEO	47°41.97 N	08°17.00 W	1366

3. GOBAN SPUR TRANSECT

STATION	*ACTIVITY*	*LATITUDE*	*LONGITUDE*	*DEPTH (m)*
PE 95-06	CTD	49°11.47 N	12°44.69 W	1297
(= OMEX II)	BIOPROBE	49°11.45 N	12°44.52 W	1295
	TROL	49°11.48 N	12°49.77 W	1298
	MULTICORE	49°11.37 N	12°44.42 W	1294
	BOX GEO	49°11.40 N	12°44.42 W	1293
PE 95-07	CTD	49°09.42 N	13°05.35 W	2246
	BIOPROBE	49°09.57 N	13°15.59 W	2247
	TROL	49°09.55 N	13°05.74 W	2263
	SUBM. PUMP	49°09.53 N	13°05.37 W	1125 (2244)
	MULTICORE	49°09.47 N	13°05.30 W	2242
	BOX GEO	49°09.52 N	13°05.27 W	2244
	PISTON CORE	49°09.49 N	13°05.30 W	2242
PE 95-08	CTD	49°05.22 N	13°26.21 W	3650
(= OMEX III)	BIOPROBE	49°05.21 N	13°26.17 W	3650
	SUBM. PUMP	49°05.16 N	13°26.14 W	1260 (3650)
	MULTICORE	49°05.19 N	13°26.12 W	3648
	BOX GEO	49°05.17 N	13°26.16 W	3649
PE 95-09	CTD	49°24.88 N	11°31.37 W	650
(= OMEX I)	BIOPROBE	49°24.85 N	11°31.39 W	651
	TROL	49°24.95 N	11°32.04 W	668
	SUBM. PUMP	49°24.88 N	11°31.41 W	200 (651)
	MULTICORE	49°24.89 N	11°31.38 W	650
	BOX GEO	49°24.97 N	11°31.37 W	648



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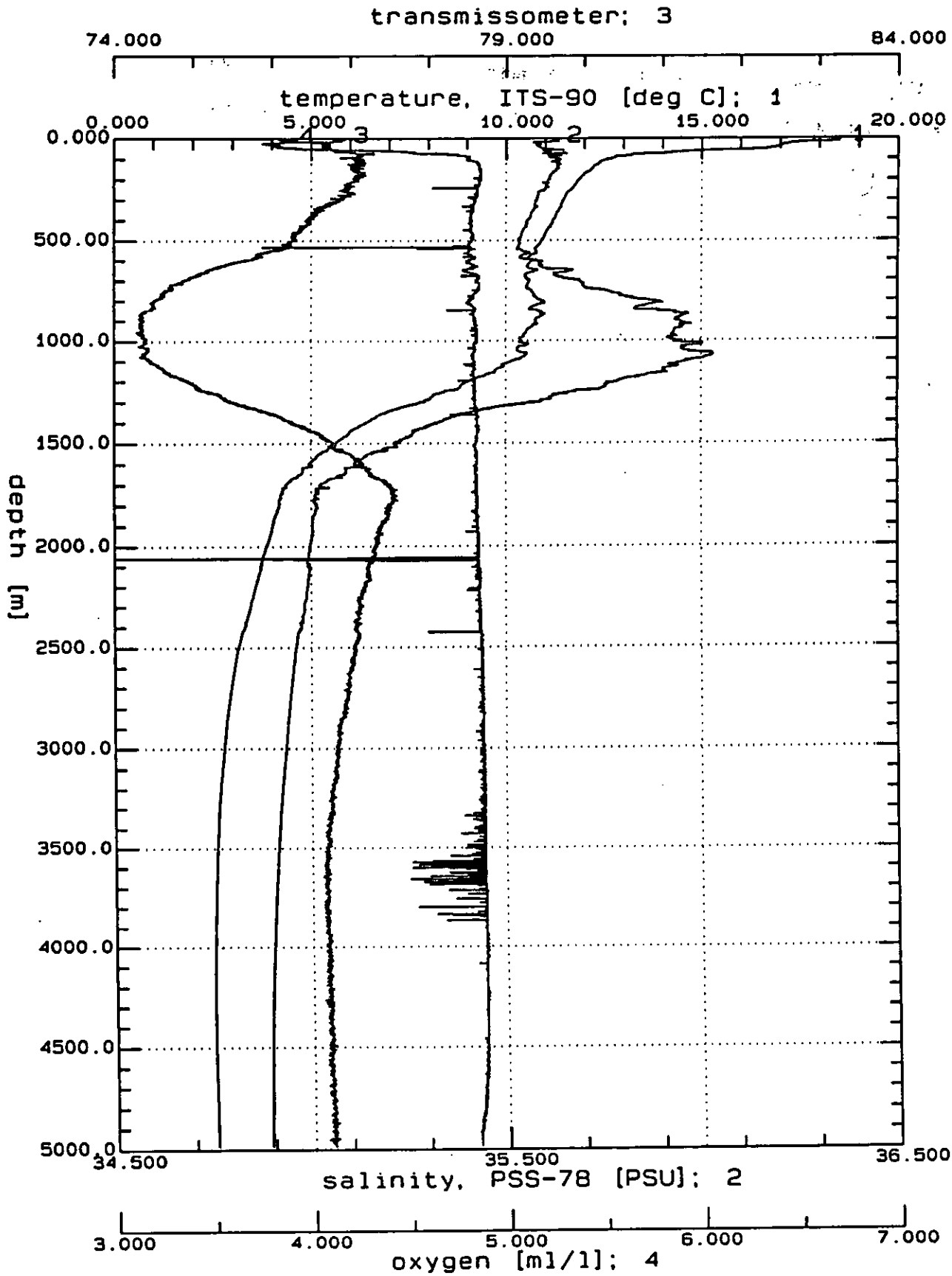

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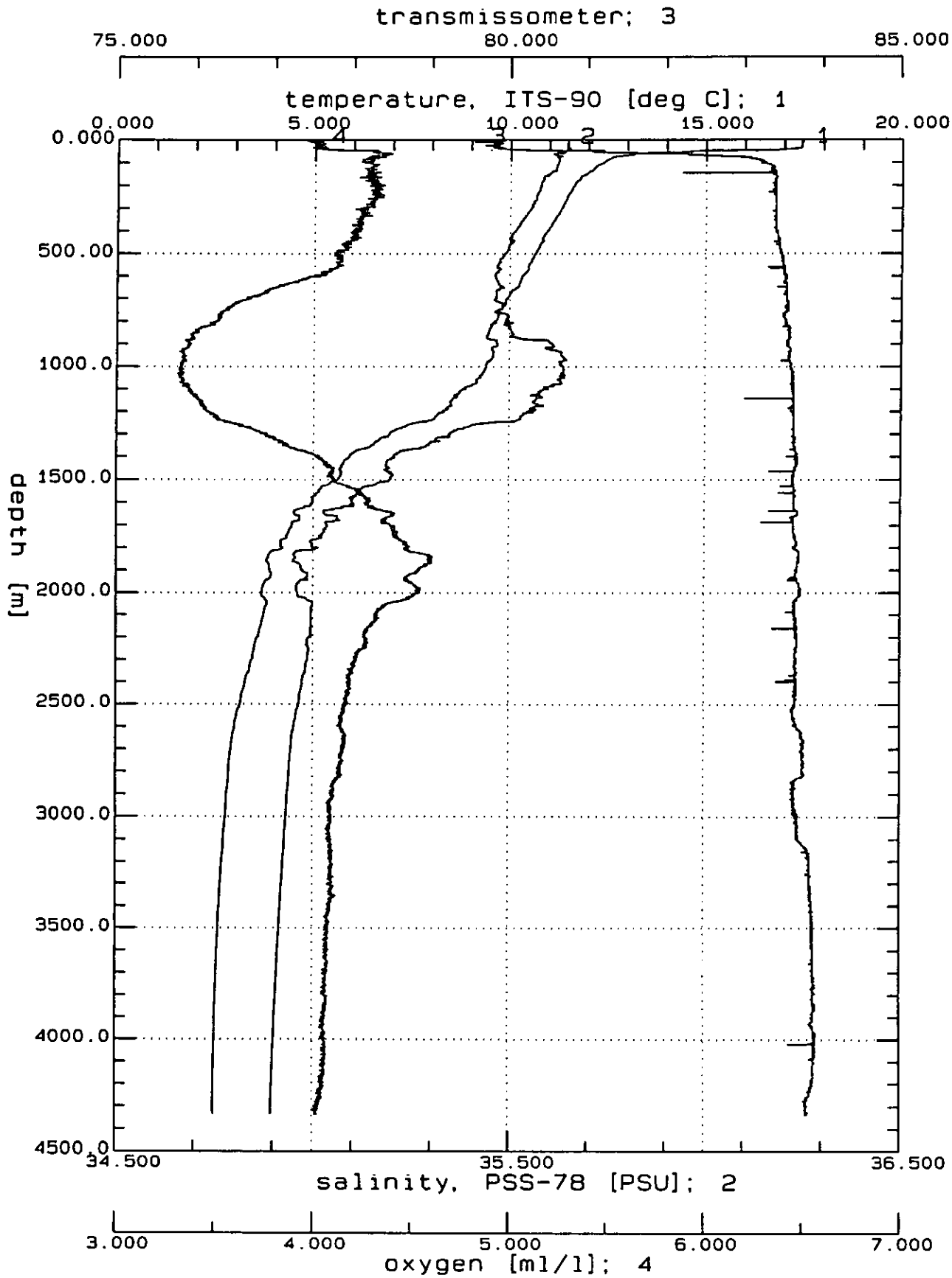

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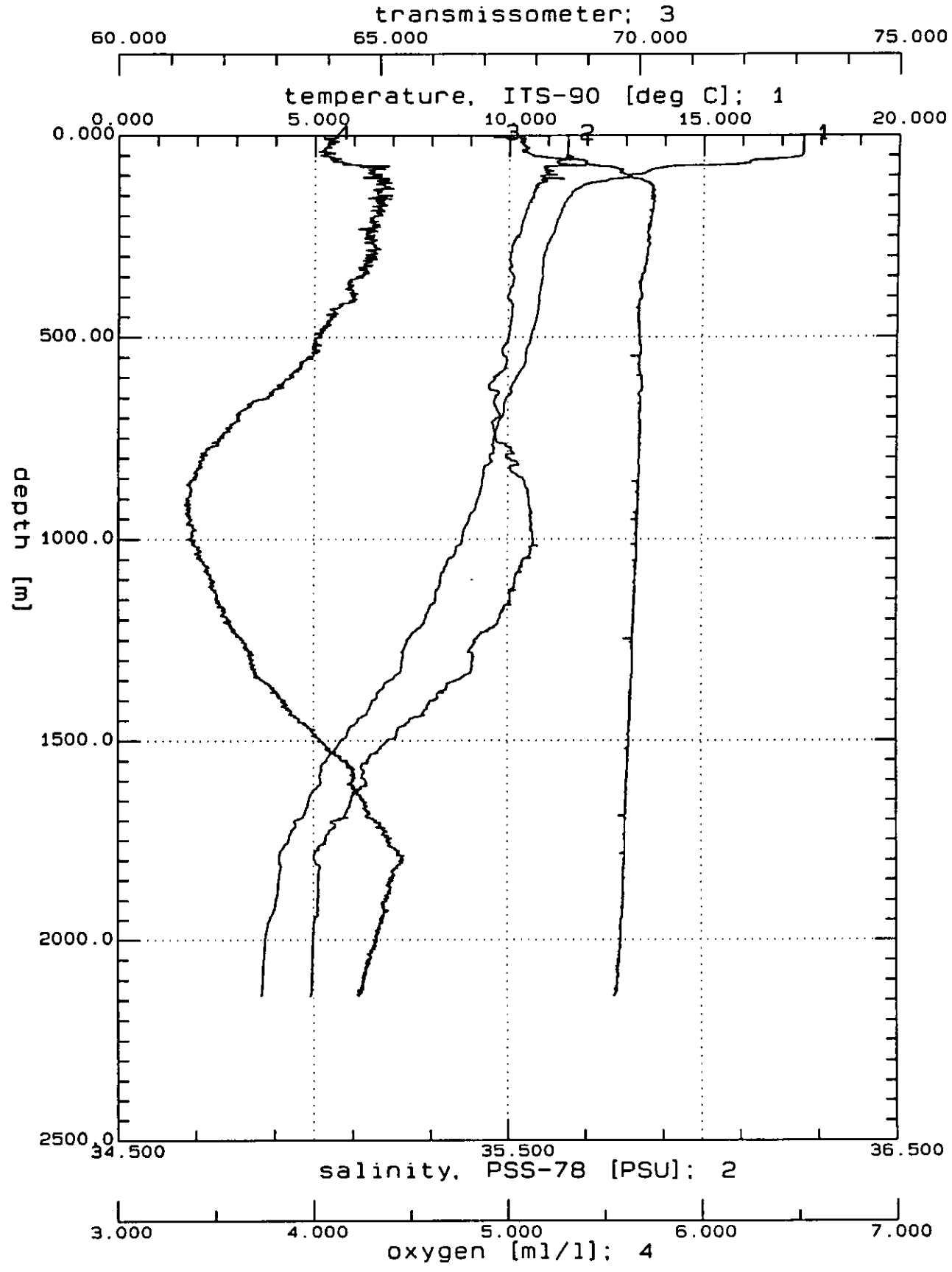

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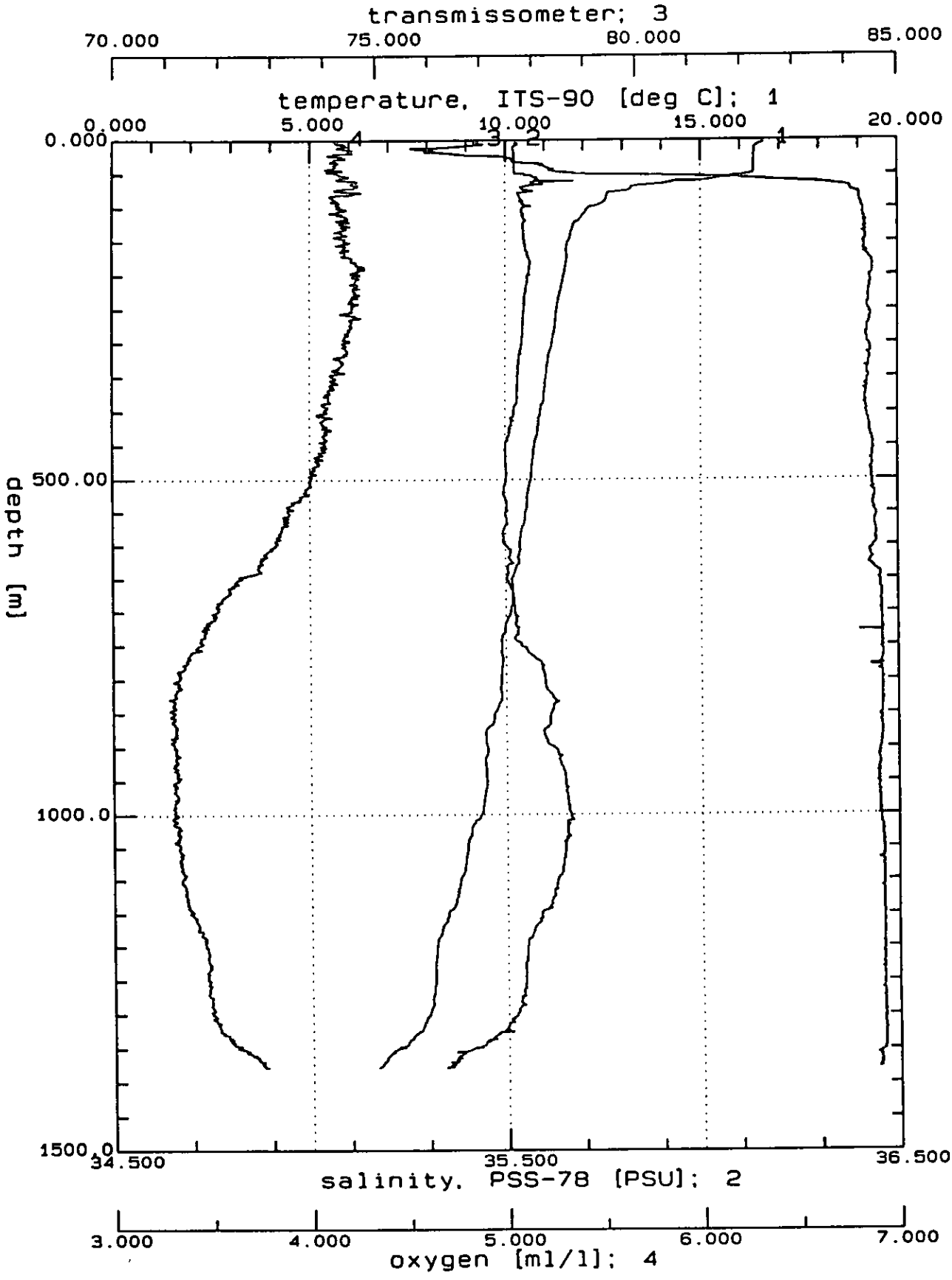

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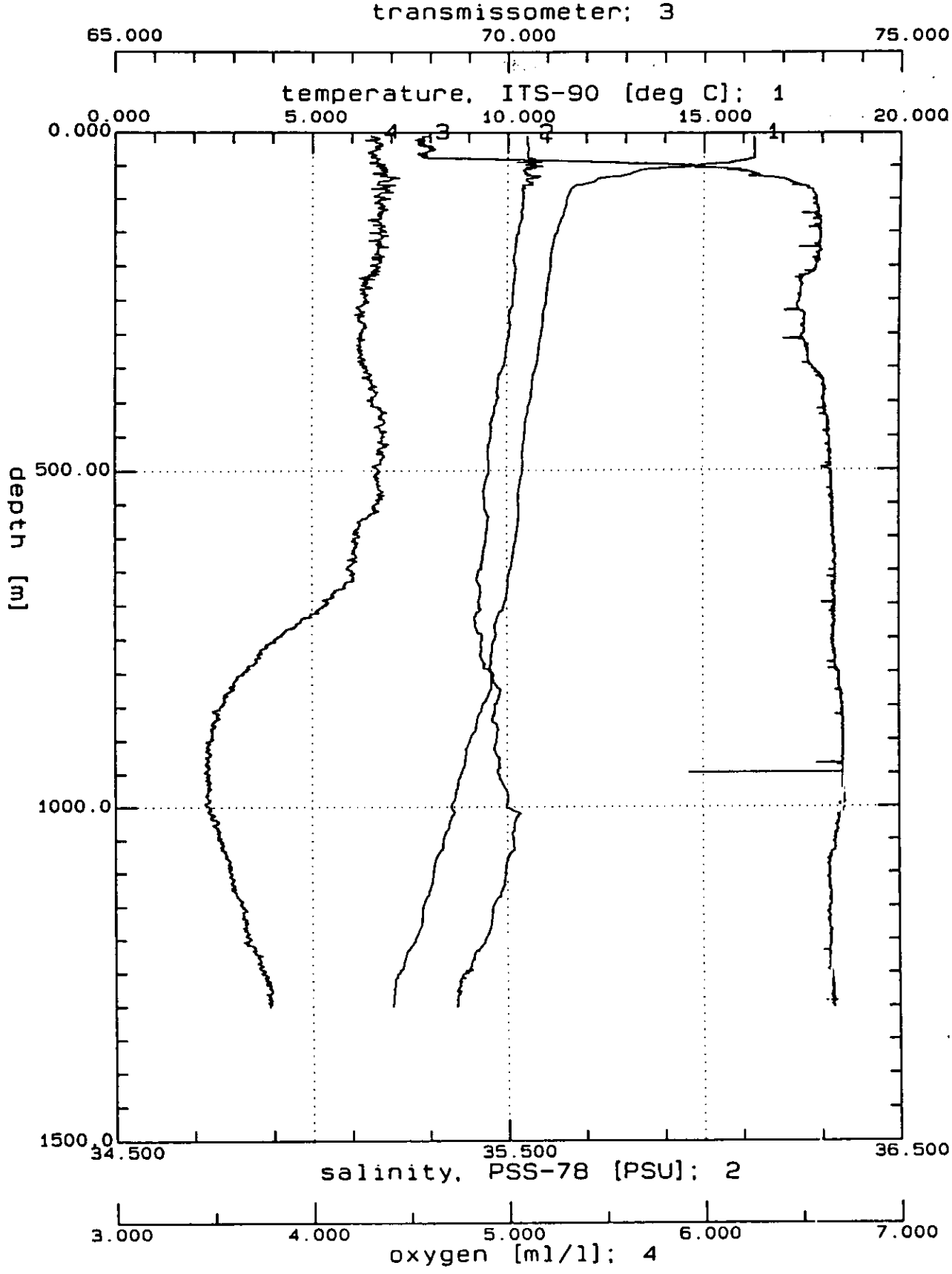

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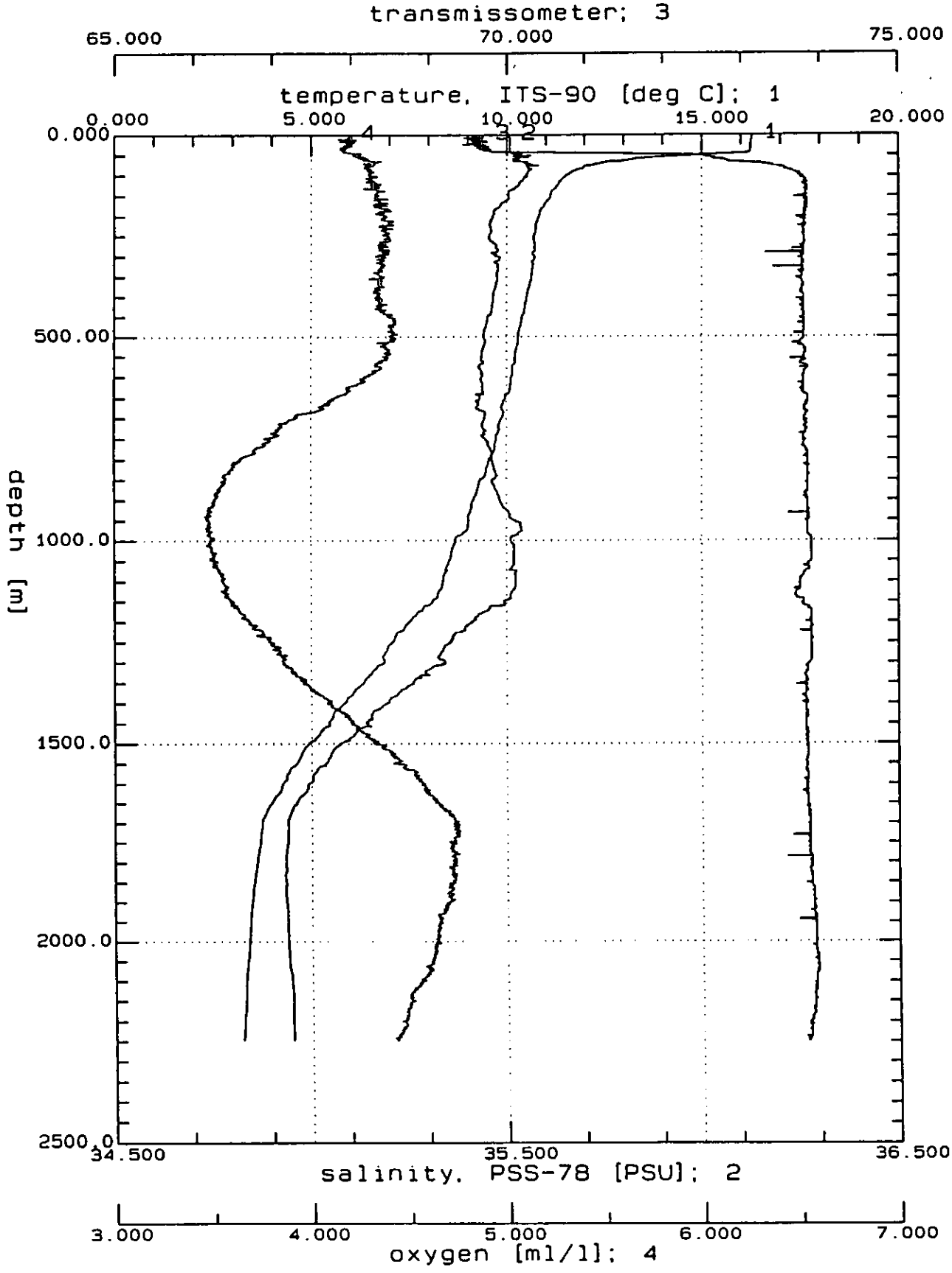

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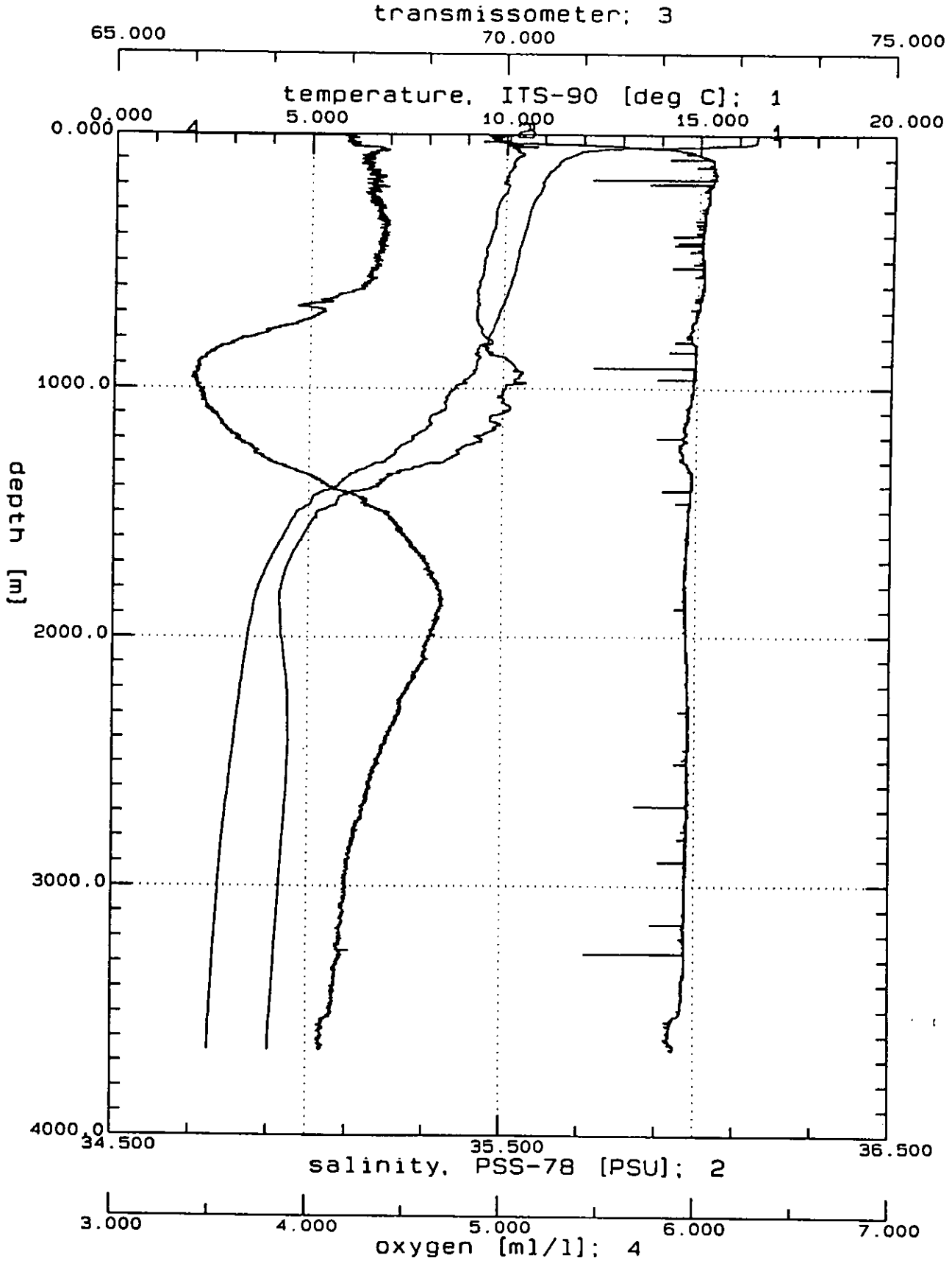

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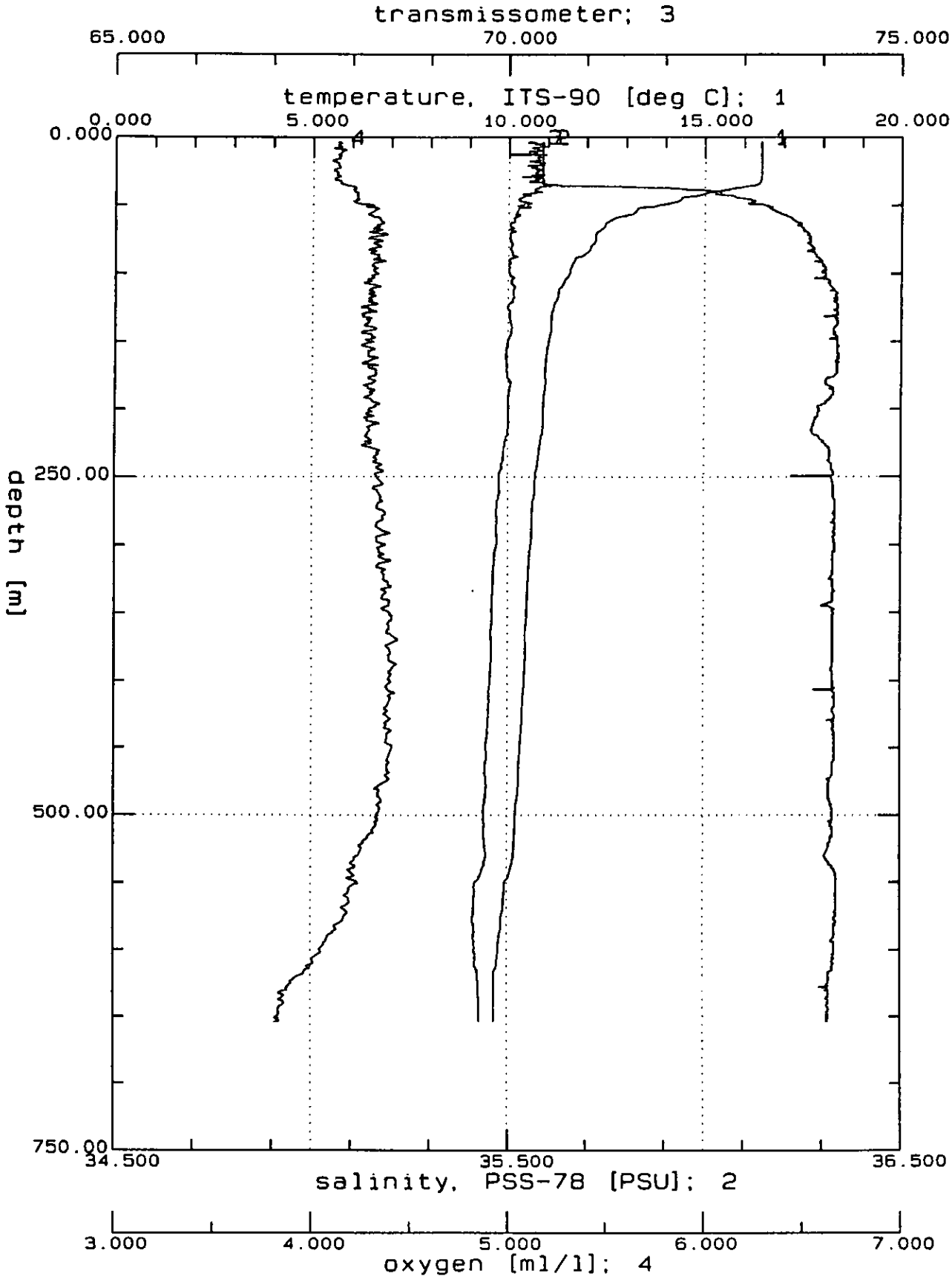

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* Number of Voltage Words = 4												
* System UpLoad Time = Sep 09 1995 04:57:55												
* Ship: Pelagia												
* Cruise: OMEX 1995 (part 2)												
* Date: 9/9/95												
* Time (GMT): 4:54												
* Station: PE95_01												
* Latitude: 43.00.00												
* Longitude: 10.21.15												
* Depth (m): 3383												
# nquan = 12												
# nvalues = 15												
# units = metric												
bottle	scan nr.	depth	pressure	conduct.	temp.	oxy [ml/l]	trans.	flur.	depth	salinity	density	flag
1	18057	3386.716	3443.513	3.2629	2.5706	4.0227	82.7453	0.2536	3384.321	34.9142	1043.435	0
2	18268	3387.999	3444.828	3.263	2.571	4.0112	82.74	0.3626	3385.603	34.9139	1043.441	0
3	18395	3388.617	3445.46	3.263	2.5711	4.0113	82.74	0.3037	3386.22	34.914	1043.443	0
4	18512	3388.033	3444.862	3.263	2.5712	4.0127	82.7433	0.2788	3385.636	34.914	1043.441	0
5	20469	3000.215	3047.759	3.2601	2.6899	4.0081	82.904	0.2834	2998.092	34.9282	1041.694	0
6	24471	2001.648	2028.56	3.326	3.804	4.1092	82.93	0.3471	2000.232	35.0054	1037.064	0
7	28922	1002.211	1013.251	3.9939	10.4679	2.9861	82.98	0.3218	1001.502	35.9659	1032.146	0
8	30079	798.4536	806.8511	4.0738	11.3187	2.9801	82.9243	0.3031	797.8887	36.0249	1031.11	0
9	31793	400.9613	404.7874	3.9908	11.1349	3.8163	82.7643	0.4939	400.6777	35.5551	1028.997	0
10	32755	202.218	204.0487	4.058	11.8675	4.0032	82.7827	0.5061	202.0747	35.6044	1027.998	0
11	33440	101.0875	101.9775	4.1494	12.7738	3.7173	82.2627	0.907	101.0161	35.6743	1027.416	0
12	33857	51.9873	52.4386	4.2604	13.8972	3.8467	81.1927	4.0742	51.9505	35.6964	1026.981	0
13	34104	30.8598	31.1261	4.3362	14.6925	3.9993	79.598	8.6945	30.8381	35.6735	1026.697	0
14	34352	19.3082	19.4743	4.4963	16.3775	4.0796	76.3147	11.668	19.2945	35.599	1026.207	0
15	34577	10.5811	10.672	4.5141	16.5695	4.0911	76.0553	11.2307	10.5735	35.5887	1026.115	0
16	35029	4.602	4.6414	4.5133	16.5631	4.1323	76.0427	11.0747	4.5987	35.5894	1026.091	0

PE95-01

Date	Station	Bottle	Depth	Temp	Salinity	Sal calib	O2 Winkler	Silicate	Ammonia	Phosphate	Nitrite	Nitrate	Remarks
9-09-95	PE95-01	nr.	m	oC	‰	‰	uM	uM	uM	uM	uM	uM	
	Pos	16	4,6	16,56	35,59		257,6	0,40	0,12	0,05	-0,01	0,08	
	43 00.00N	15	10,6	16,57	35,59		259,2	0,33	0,18	0,04	0,04	-0,01	
	10 21.15W	14	19,5	16,38	35,6		256,0	0,47	0,12	0,06	0,06	0,47	
		13	30,9	14,69	35,67		248,3	0,75	0,32	0,21	0,36	2,46	
		12	52	13,9	35,696	35,684	242,5	1,18	0,10	0,30	0,33	4,33	
	Depth	11	101,1	12,77	35,67		231,7	0,49	-0,01	0,05	-0,01	0,02	leaking
	3383 m	10	202,2	11,87	35,6		247,3	2,75	0,12	0,54	0,03	8,78	
		9	400,7	11,13	35,56		240,1	3,92	0,09	0,67	0,00	11,01	
		8	797,8	11,32	36,025	36,015	194,1	8,09	0,07	0,93	0,02	15,30	
		7	1001,5	10,47	35,97		190,8	9,24	0,09	1,00	-0,02	16,38	
		6	2000,3	3,8	35,005	34,998	262,0	18,77	0,13	1,26	-0,02	18,85	
		5	2998	2,69	34,93		258,1	36,30	0,10	1,44	0,00	21,43	
		4	3386	2,57	34,91			8,18	0,14	0,77	0,04	12,13	leaking
		3	3386	2,57	34,91			39,85	0,11	1,49	0,01	21,85	
		2	3386	2,57	34,914	34,907		40,66	0,11	1,49	-0,02	22,06	
		1	3384	2,57	34,91			40,54	0,13	1,48	0,00	22,07	
		Boxw 1					248,3	39,64	0,31	1,46	-0,01	21,77	
		Boxw.2						40,17	0,24	1,49	0,02	22,23	

PE95_02.XLS

* Sea-Bird SBE 9 Raw Data File:
* FileName = C:\SEASOFT\DATA\PE95_02.DAT
* Software Version 4.207
* Temperature SN = 1360
* Conductivity SN = 1204
* Number of Bytes Per Scan = 24
* Number of Voltage Words = 4
* System UpLoad Time = Sep 10 1995 16:43:44
* Ship: Pelagia
* Cruise: OMEX 1995 (part 2)
* Date: 10/09/95
* Time (GMT): 16:42
* Station: PE95_02
* Latitude: 43.47.15 N
* Longitude: 10.57.01 W
* Depth (m): 4949
# nquan = 12
# nvalues = 15
# units = metric

bottle	scan	depS [m]	pres. [db]	con [S/m]	temp	oxy [ml/l]	trans	fluor	depth [m]	salinity	density	
1	32536	4974.234	5076.324	3.3135	2.537	4.0996	78.6273	0.2721	4970.716	34.8914	1050.424	0
2	32621	4973.789	5075.865	3.3135	2.5372	4.0997	78.622	0.26	4970.272	34.8914	1050.422	0
3	32706	4974.692	5076.797	3.3135	2.5371	4.1007	78.63	0.3036	4971.174	34.8915	1050.426	0
4	32775	4974.703	5076.808	3.3135	2.5373	4.0985	78.6273	0.3342	4971.185	34.8913	1050.426	0
5	32842	4975.042	5077.159	3.3135	2.5371	4.1016	78.63	0.3054	4971.524	34.8913	1050.427	0
6	39683	4005.645	4078.713	3.2789	2.5088	3.9748	78.72	0.2544	4002.812	34.9015	1046.188	0
7	44333	3001.662	3049.24	3.2655	2.7466	3.9901	78.6093	0.2374	2999.539	34.9327	1041.694	0
8	48476	2000.15	2027.034	3.3239	3.791	4.1133	78.66	0.2963	1998.735	34.995	1037.051	0
9	52726	999.9455	1010.955	3.9887	10.4522	2.9648	78.61	0.3046	999.2381	35.9302	1032.111	0
10	53764	802.9494	811.4029	3.9895	10.6932	3.1025	78.53	0.2945	802.3814	35.7898	1031.072	0
11	55474	401.5941	405.427	4.0064	11.284	3.8081	78.4379	0.3653	401.3099	35.5663	1028.98	0
12	56376	200.2402	202.052	4.0618	11.8973	3.9974	78.46	0.4943	200.0983	35.6141	1027.991	0
13	56973	100.6701	101.5562	4.1275	12.621	4.0153	78.27	1.4298	100.5988	35.6087	1027.394	0
14	57415	52.3681	52.8227	4.475	16.1652	3.9526	76.4533	7.0713	52.3309	35.5858	1026.393	0
15	57760	30.1085	30.3683	4.5847	17.2765	3.9204	75.632	6.7624	30.0872	35.5733	1026.022	0
16	57988	18.9613	19.1244	4.646	17.8954	3.8516	76.226	3.8489	18.9478	35.5645	1025.814	0
17	58221	9.4161	9.497	4.6642	18.0708	3.8282	76.3347	3.3553	9.4095	35.5715	1025.734	0
18	58386	4.4507	4.4889	4.6638	18.0677	3.8414	76.3287	3.3697	4.4475	35.572	1025.713	0

Pe95-02

Date	Station	Bottle	Depth	Temp	Salinity	Sal calib	O2 Winkler	Silicate	Ammonia	Phosphate	Nitrite	Nitrate	Remarks
10-09-95	PE95-02	nr.	m	oC	‰	‰	uM	uM	uM	uM	uM	uM	
	Pos	**18**	4,4	18,07	35,57		243,9	0,42	0,54	0,05	0,05	0,01	
	43 47.15N	**17**	9,4	18,07	35,57		246,0	0,38	0,17	0,04	0,04	-0,01	
	10 57.01W	**16**	18,9	17,90	35,565	35,556	245,2	0,37	0,07	0,04	0,03	0,00	
		15	30,1	17,28	35,57		249,3	0,42	0,11	0,05	0,06	0,05	
		14	52,3	16,17	35,59		247,7	0,61	0,20	0,11	0,29	1,07	
	Depth	**13**	100,6	12,63	35,61		247,8	1,50	0,18	0,35	0,05	5,60	
	4949 m	**12**	200,1	11,90	35,614	35,607	247,7	2,88	0,14	0,54	0,01	8,99	
		11	401,3	11,28	35,57		235,9	4,18	0,13	0,71	0,03	11,78	
		10	802,4	10,69	35,79		196,7	8,15	0,12	0,97	0,02	16,01	
		9	999,2	10,45	35,93		191,2	9,33	0,16	1,00	0,00	16,69	
		8	1998,7	3,79	35,00		263,3	18,43	0,20	1,24	0,01	18,95	
		7	2999,5	2,75	34,93		252,9	34,83	0,20	1,44	0,00	21,28	
		6	4002,8	2,51	34,902	34,897	249,4	43,37	0,16	1,52	0,02	22,61	
		5	4971,5	2,54	34,89		251,6	45,46	0,16	1,52	0,01	22,80	
		4	4971,2	2,54	34,89		252,2	46,08	0,17	1,55	0,03	22,96	
		3	4971,2	2,54	34,892	34,888	249,1	45,90	0,18	1,54	0,00	22,95	
		2	4970,3	2,54	34,89		250,5	45,71	0,13	1,54	0,00	22,93	
		1	4970,7	2,54	34,89		251,1	45,60	0,13	1,60	0,01	22,80	
		Boxw 1					247,1	45,3	0,2	1,6	0,0	23,0	
		Boxw1						45,3	0,3	1,6	0,0	23,0	
		Boxw2					244,1	31,9	0,2	1,3	0,0	19,3	box leakir
		Boxw2						31,8	0,2	1,3	0,0	19,5	box leakir
		Multiw.											

PE95_03.BTL

* Sea-Bird SBE 9 Raw Data File:
* FileName = C:\SEASOFT\DATA\PE95_03.DAT
* Software Version 4.207
* Temperature SN = 1360
* Conductivity SN = 1204
* Number of Bytes Per Scan = 24
* Number of Voltage Words = 4
* System UpLoad Time = Sep 13 1995 10:09:15
* Ship: Pelagia
* Cruise: OMEX 1995 (part 2)
* Date: 13/09/95
* Time (GMT): 10:00
* Station: PE95_03
* Latitude: 47 11.96
* Longitude: 8 40.16
* Depth (m): 4322

bottle	scan nr.	depth	pressure	conduct.	temp.	oxy [ml/l]	trans.	flur.	depth	salinity	density
1	19657	4326.603	4408.809	3.2881	2.4921	4.0091	83.8073	0.2657	4323.543	34.8954	1047.602
2	19722	4328.514	4410.776	3.2882	2.4924	4.0103	83.81	0.3424	4325.453	34.8953	1047.611
3	19848	4327.794	4410.035	3.2882	2.4923	4.0107	83.8114	0.2913	4324.733	34.8953	1047.608
4	19887	4328.551	4410.814	3.2882	2.4925	4.0112	83.81	0.3372	4325.49	34.8952	1047.611
5	19950	4328.543	4410.805	3.2882	2.4927	4.0125	83.8127	0.2498	4325.481	34.8951	1047.611
6	21797	4004.095	4077.119	3.2789	2.5102	4.005	83.96	0.2831	4001.262	34.9015	1046.181
7	26503	3003.619	3051.242	3.2685	2.7795	3.9737	83.7857	0.3399	3001.495	34.9322	1041.697
8	30673	2000.537	2027.428	3.3129	3.6978	4.2268	83.884	0.3	1999.122	34.964	1037.043
9	34984	1000.002	1011.012	3.8507	9.3193	3.1031	83.894	0.3064	999.2941	35.6347	1032.099
10	35975	802.1109	810.5541	3.8587	9.632	3.2679	83.83	0.3074	801.5434	35.499	1031.044
11	37659	401.5066	405.3384	3.9715	10.9773	3.9693	83.76	0.3214	401.2225	35.5141	1028.998
12	38621	202.3977	204.23	4.0272	11.5837	4.0942	83.74	0.3956	202.2543	35.5729	1028.029
13	39242	103.2453	104.1548	4.0807	12.1363	4.0475	83.6953	0.4565	103.1721	35.6137	1027.506
14	40015	49.8326	50.2649	4.1662	13.0209	4.0436	82.8	3.8399	49.7972	35.6249	1027.097
15	40286	32.9921	33.277	4.406	15.4353	4.0326	80.7833	10.1855	32.9689	35.6325	1026.51
16	40532	19.7655	19.9356	4.6087	17.4372	3.9056	79.9553	4.9283	19.7515	35.6444	1025.991
17	40752	10.4701	10.5599	4.6142	17.4943	3.9494	79.9887	3.2587	10.4627	35.6453	1025.937
18	40971	3.7171	3.749	4.6223	17.576	3.9249	80.174	2.3019	3.7143	35.6456	1025.887

Pe95-03

Date	Station	Bottle	Depth	Temp	Salinity	Sal calib	O2 Winkler	Silicate	Ammonia	Phosphate	Nitrite	Nitrate	Remarks
13-09-95	PE95-03	nr.	m	oC	‰	‰	uM	uM	uM	uM	uM	uM	
	Pos	18	3,7	17,58		35,640	247,1	0,6	0,1	0,0	0,0	0,0	
	47 11.96N	17	10,5	17,49			246,5	0,6	0,2	0,0	0,0	0,0	
	8 40.16W	16	19,8	17,44			246,3	0,4	0,2	0,0	0,0	0,1	
		15	33	15,44			256,1	0,7	0,2	0,1	0,0	1,2	
		14	49,8	13,02			250,5	1,2	0,2	0,3	0,0	3,7	
	Depth	13	103,2	12,14			253,5	2,0	0,2	0,5	0,0	7,5	
	4328 m	12	202,3	11,58			253,2	2,9	0,2	0,6	0,0	9,2	
		11	401,2	10,98		35,509	246,2	4,2	0,2	0,7	0,0	11,6	
		10	801,5	9,63			206,3	8,5	0,2	1,1	0,0	17,0	
		9	999,3	9,32			200,0	9,9	0,2	1,1	0,0	17,7	
		8	1999,1	3,7			269,1	16,7	0,2	1,3	-0,1	18,7	
		7	3001,5	2,78			249,7	36,9	0,2	1,5	0,0	21,8	
		6	4001,3	2,51		34,898	247,3	43,2	0,2	1,6	0,0	22,9	
		5	4325,5	2,49			250,5	45,0	0,2	1,6	0,0	23,1	
		4	4325,5	2,49			246,8	45,4	0,2	1,6	0,0	23,0	
		3	4324,7	2,49		34,893	244,7	45,2	0,2	1,6	0,0	23,1	
		2	4325,5	2,49			244,5	45,1	0,2	1,6	0,0	23,1	
		1	4325,5	2,49			246,5	45,3	0,2	1,6	0,0	23,0	
		BC3-1					243,3	46,9	0,1	1,5	0,0	22,7	
		BC3-1						46,2	0,2	1,5	0,0	22,6	

* Sea-Bird SBE 9 Raw Data File:
* FileName = C:\SEASOFT\DATA\PE95_04.DAT
* Software Version 4.207
* Temperature SN = 1360
* Conductivity SN = 1204
* Number of Bytes Per Scan = 24
* Number of Voltage Words = 4
* System UpLoad Time = Sep 15 1995 16:47:06
* Ship: Pelagia
* Cruise: OMEX 1995 (part 2)
* Date: 15/09/95
* Time (GMT): 16:44
* Station: PE95-04
* Latitude: 47.499850
* Longitude: -8.5835
* Depth (m): 2137

bottle	scan nr.	depht	pressure	conduct.	temp.	oxy [ml/l]	trans.	flur.	depth	salinity	density
1	10214	2136.475	2165.895	3.3187	3.6724	4.2135	69.5829	0.3312	2134.964	34.9931	1037.687
2	10331	2134.447	2163.828	3.3187	3.6734	4.2058	69.586	0.3303	2132.937	34.9937	1037.678
3	10432	2135.651	2165.055	3.3187	3.6726	4.2045	69.585	0.3481	2134.14	34.9935	1037.684
4	10481	2135.584	2164.988	3.3186	3.6715	4.2036	69.578	0.2765	2134.074	34.9938	1037.684
5	10534	2136.07	2165.482	3.3185	3.6702	4.1981	69.5743	0.3053	2134.558	34.9936	1037.686
6	11538	2003.011	2029.948	3.3214	3.758	4.185	69.686	0.3844	2001.594	34.9988	1037.072
7	15526	1001.863	1012.898	3.7806	8.6551	3.2201	69.89	0.3461	1001.154	35.562	1032.172
8	16471	800.4644	808.8869	3.8709	9.7623	3.2977	69.84	0.3425	799.8981	35.4975	1031.012
9	18302	402.6508	406.4947	3.956	10.8259	3.9574	69.7267	0.3412	402.3658	35.5044	1029.024
10	19239	200.4763	202.2905	3.9979	11.3172	4.048	69.7847	0.4462	200.3344	35.5403	1028.046
11	19713	101.1882	102.0792	4.048	11.8481	4.0671	69.7213	0.6558	101.1167	35.5697	1027.519
12	20231	51.1919	51.6363	4.2594	13.988	3.9936	68.8947	3.9498	51.1556	35.6029	1026.886
13	20484	29.6503	29.9062	4.5677	17.0441	3.8269	67.8173	6.0617	29.6293	35.6301	1026.119
14	20679	19.8178	19.9885	4.6169	17.5163	3.8427	67.1053	6.7002	19.8038	35.6452	1025.973
15	20842	10.3595	10.4485	4.6163	17.514	3.8869	67.1313	6.909	10.3523	35.646	1025.932
16	21077	5.4347	5.4813	4.6158	17.5123	3.8735	67.174	6.7383	5.4309	35.6455	1025.91

Pe95-04

Date	Station	Bottle	Depth	Temp	Salinity	Sal calib	O2 Winkler	Silicate	Ammonia	Phosphate	Nitrite	Nitrate	Remarks
15-09-95	PE95-04	nr.	m	oC	‰	‰	uM	uM	uM	uM	uM	uM	
	Pos	**16**	5,4	17,51	35,65		245,1	0,5	0,2	0,1	0,0	0,1	
	47 29.99N	**15**	10,4	17,51	35,646	35,641	245,3	0,4	0,2	0,1	0,0	0,1	
	8 35.01W	**14**	19,8	17,51	35,65		244,7	0,6	0,2	0,0	0,0	0,0	
		13	29,6	17,04	35,63		246,7	0,8	0,2	0,1	0,1	0,8	
	Depth	**12**	51,2	13,99	35,6		249,7	1,3	0,2	0,3	0,1	3,3	
	2137 m	**11**	101,1	11,85	35,570	35,564	251,2	3,0	0,1	0,6	0,0	9,0	
		10	200,3	11,32	35,54		249,9	3,6	0,2	0,6	0,0	10,2	
		9	402,4	10,83	35,5		245,7	4,4	0,1	0,7	0,0	11,6	
		8	799,9	9,76	35,5		209,3	8,1	0,1	1,0	0,0	16,2	
		7	1001,2	8,65	35,56		202,9	10,7	0,1	1,1	0,0	17,7	
		6	2001,6	3,76	34,999	35,002	257,8	21,8	0,1	1,3	0,0	19,1	
		5	2134,6	3,67	34,99		257,3	23,2	0,1	1,3	0,0	19,4	
		4	2134,1	3,67	34,99		257,3	23,2	0,1	1,3	0,0	19,5	
		3	2134,1	3,67	34,994	34,993	256,5	23,4	0,1	1,3	0,0	19,4	
		2	2132,9	3,67	34,99		257,6	23,2	0,1	1,3	0,0	19,4	
		1	2135	3,67	34,99		258,6	23,0	0,1	1,3	0,0	19,3	
		BC4-1						23,7	0,1	1,3	0,0	19,4	
		Multiw.											

* Sea-Bird SBE 9 Raw Data File:
* FileName = C:\SEASOFT\DATA\PE95_05.DAT
* Software Version 4.207
* Temperature SN = 1360
* Conductivity SN = 1204
* Number of Bytes Per Scan = 24
* Number of Voltage Words = 4
* System UpLoad Time = Sep 16 1995 13:36:17
* Ship: Pelagia
* Cruise: OMEX 1995 (part 2)
* Date: 16/09/95
* Time (GMT): 13:40
* Station: PE95_05
* Latitude: 47.69915
* Longitude: -8.28425
* Depth (m): 1367

bottle	scan nr.	depth	pressure	conduct.	temp.	oxy [ml/l]	trans.	flur.	depth	salinity	density
1	6487	1371.704	1388.05	3.6083	6.8459	3.7109	84.6533	0.3966	1370.734	35.3626	1034.001
2	6560	1370.836	1387.168	3.6097	6.8593	3.7043	84.6571	0.2474	1369.866	35.3647	1033.997
3	6615	1371.548	1387.891	3.6091	6.8527	3.6836	84.6571	0.3053	1370.578	35.3645	1034.001
4	6658	1372.171	1388.524	3.6089	6.8512	3.6937	84.66	0.2761	1371.2	35.364	1034.004
5	6701	1371.553	1387.896	3.6095	6.8567	3.6985	84.6571	0.3675	1370.582	35.3652	1034.001
6	8424	1000.609	1011.627	3.8581	9.3729	3.1892	84.76	0.3222	999.9013	35.6581	1032.11
7	9478	800.6782	809.1035	3.8916	9.8777	3.1853	84.86	0.3906	800.1116	35.5965	1031.068
8	11434	402.2548	406.0942	3.9663	10.9138	3.8425	84.62	0.4939	401.9699	35.5231	1029.02
9	12546	201.0171	202.8365	4.0196	11.5241	3.9892	84.6933	0.4931	200.8748	35.5563	1028.021
10	13115	99.2735	100.1471	4.0692	12.0974	3.8843	84.564	0.77	99.2031	35.5402	1027.439
11	13656	50.6969	51.1373	4.473	16.1992	3.8515	79.9273	11.7967	50.6612	35.5386	1026.342
12	13896	29.6205	29.8761	4.4864	16.3611	3.9514	77.4353	19.2473	29.5995	35.5216	1026.197
13	14124	20.2333	20.4075	4.4935	16.4358	4.001	76.778	18.1373	20.2192	35.5215	1026.138
14	14313	9.9407	10.026	4.4902	16.409	4.0904	76.4727	17.7987	9.9337	35.5203	1026.098
15	14624	3.294	3.3222	4.5083	16.5875	4.0924	77.1953	12.468	3.2917	35.5236	1026.029

Pe95-05

Date	Station	Bottle	Depth	Temp	Salinity	Sal calib	O2 Winkler	Silicate	Ammonia	Phosphate	Nitrite	Nitrate	Remarks
16-09-95	Pos	nr.	m	oC	‰	‰	uM	uM	uM	uM	uM	uM	
	47 41.94N	15	3,3	16,59	35,524	35,532	254,7	0,8	0,2	0,1	0,1	0,5	
	8 17.06 W	14	9,9	16,41	35,52		255,4	0,8	0,2	0,1	0,1	0,5	
		13	20,2	16,44	35,522	35,529	254,4	0,8	0,1	0,1	0,1	0,5	
		12	29,6	16,36	35,52		251,7	0,9	0,2	0,1	0,1	0,6	
	Depth	11	50,7	16,2	35,54		248,7	0,9	0,2	0,1	0,1	1,4	
	1370 m	10	99,2	12,1	35,54		242,4	2,7	0,1	0,5	0,0	8,1	
		9	200,9	11,52	35,56		249,6	3,2	0,2	0,6	0,0	9,4	
		8	402	10,91	35,52		240,5	4,5	0,1	0,7	0,0	11,7	
		7	800,1	9,88	35,597	35,606	199,8	8,8	0,1	1,0	0,0	16,9	
		6	999,9	9,37	35,66		199,3	10,1	0,1	1,1	0,0	17,3	
		5	1370,6	6,86	35,37		224,3	-	0,1	1,3	0,0	19,4	
		4	1371,2	6,85	35,364	35,375		12,9	0,1	1,2	0,0	18,3	
		3	1370,6	6,85	35,36		223,8	12,9	0,1	1,2	0,0	18,3	
		2	1369,9	6,86	35,36			12,9	0,1	1,2	0,0	18,4	
		1	1370,7	6,85	35,36		225,1	13,0	0,1	1,2	0,0	18,3	
		Boxw					231,0						
		Multiw.											

PE95_06.BTL

* Sea-Bird SBE 9 Raw Data File:
* FileName = C:\SEASOFT\DATA\BE95-06.DAT
* Software Version 4.207
* Temperature SN = 1360
* Conductivity SN = 1204
* Number of Bytes Per Scan = 24
* Number of Voltage Words = 4
* System UpLoad Time = Sep 18 1995 19:42:28
* Ship: Pelagia
* Cruise: OMEX 1995 (part 2)
* Date: 18/09/95
* Time (GMT): 19:37
* Station: PE95-06
* Latitude: 49.1899
* Longitude: -12.7418
* Depth (m): 1296

bottle	scan nr.	depth	pressure	conduct.	temp.	oxy. [ml/l]	trans.	flur.	depth	salinity	density
1	7958	1291.78	1306.922	3.6254	7.0593	3.7504	74.1913	0.3661	1290.866	35.3701	1033.61
2	8027	1291.971	1307.116	3.6254	7.0592	3.7499	74.1953	0.3962	1291.057	35.3704	1033.611
3	8073	1292.137	1307.284	3.6254	7.0597	3.7473	74.1921	0.4029	1291.223	35.3706	1033.611
4	8109	1292.164	1307.312	3.6255	7.0599	3.7598	74.19	0.378	1291.25	35.3705	1033.612
5	8167	1292.767	1307.924	3.6254	7.0594	3.7444	74.1933	0.4403	1291.853	35.3702	1033.614
6	9403	1001.065	1012.089	3.7667	8.5743	3.3615	74.476	0.3827	1000.356	35.497	1032.132
7	10463	800.8488	809.2763	3.8511	9.5846	3.4552	74.5247	0.3843	800.2822	35.4678	1031.023
8	12239	400.5077	404.3291	3.9217	10.5124	4.1999	74.542	0.3322	400.2243	35.4642	1029.042
9	13208	200.1395	201.9503	3.9738	11.0898	4.094	74.4687	0.4648	199.9978	35.5198	1028.071
10	13735	100.7607	101.6477	4.0152	11.541	4.0965	74.5333	0.6536	100.6891	35.5411	1027.553
11	14057	49.6502	50.0808	4.4056	15.5098	3.9644	72.6427	9.3169	49.615	35.5543	1026.507
12	14269	29.8678	30.1258	4.4798	16.2634	4.0732	69.5827	18.666	29.8467	35.5501	1026.243
13	14595	19.6141	19.7831	4.4811	16.2785	4.0968	69.5907	18.5187	19.6004	35.5522	1026.196
14	14764	10.4854	10.5753	4.4814	16.2842	4.0875	69.5873	17.9887	10.4779	35.5534	1026.155
15	14934	5.223	5.2677	4.4815	16.2867	4.0982	69.6273	17.56	5.2191	35.5541	1026.131

Pe95-06

Date	Station	Bottle	Depth	Temp	Salinity	Sal calib	O2 Winkler	Silicate	Ammonia	Phosphate	Nitrite	Nitrate	Remarks
	PE95-06	nr.	m	oC	‰	‰	uM	uM	uM	uM	uM	uM	
18-09-95		15	5	16,29	35,55		256,8	0,36	0,13	0,07	0,02	0,04	
	Pos	14	10	16,29	35,553	35,561	255,4	0,34	0,10	0,07	0,02	0,01	
	49 11.39N	13	20	16,28	35,55		256,3	0,41	0,11	0,07	0,03	0,05	
	12 44.51W	12	30	16,26	35,55		256,5	0,30	0,17	0,08	0,02	0,03	
	Depth	11	50	15,51	35,55		250,2	0,95	0,15	0,24	0,09	3,26	
	1296 m	10	101	11,54	35,541	35,550	250,7	3,03	0,13	0,64	0,03	9,91	
		9	200	11,09	35,52		250,0	3,59	0,21	0,66	0,02	10,67	
		8	400	10,51	35,46		256,1	4,19	0,17	0,73	0,01	11,61	
		7	800	9,58	35,468	35,480	210,2	8,25	0,14	1,03	0,02	16,51	
		6	1000	8,57	35,5		204,6	10,45	0,14	1,14	0,02	18,03	
		5	1292	7,06	35,37			12,17	0,08	1,17	0,02	18,39	
		4	1291	7,06	35,37		222,8	12,09	0,16	1,16	0,03	18,29	
		3	1291	7,06	35,371	35,380		12,11	0,20	1,17	0,03	18,33	
		2	1291	7,06	35,37		222,6	12,53	0,16	1,16	0,01	18,51	
		1	1291	7,06	35,37		222,6	12,23	0,20	1,16	0,03	18,28	
		Boxw					223,0						
		Multiw.											

PE95_07.BTL

* Sea-Bird SBE 9 Raw Data File:
* FileName = C:\SEASOFT\DATA\BE95-07.DAT
* Software Version 4.207
* Temperature SN = 1360
* Conductivity SN = 1204
* Number of Bytes Per Scan = 24
* Number of Voltage Words = 4
* System UpLoad Time = Sep 19 1995 11:52:15
* Ship: Pelagia
* Cruise: OMEX 1995 (part 2)
* Date: 19/09/95
* Time (GMT): 11:55
* Station: PE95_07
* Latitude: 49.15728
* Longitude: -13.0894
* Depth (m): 2247

bottle	scan nr.	depth	pressure	conduct.	temp.	oxy. [ml/l]	trans.	flur.	depth	salinity	density
1	10903	2244.515	2276.009	3.281	3.2393	4.376	73.8687	0.3232	2242.927	34.9518	1038.211
2	10956	2245.625	2277.14	3.281	3.2389	4.3784	73.87	0.3323	2244.036	34.9516	1038.216
3	11000	2245.394	2276.905	3.281	3.2389	4.3736	73.87	0.3302	2243.806	34.9518	1038.215
4	11044	2246.015	2277.538	3.281	3.2387	4.3825	73.866	0.3148	2244.426	34.9519	1038.218
5	11082	2246.007	2277.529	3.281	3.2384	4.3718	73.8687	0.2996	2244.418	34.9518	1038.218
6	12483	2001.483	2028.392	3.2853	3.4102	4.4906	74.02	0.2695	2000.068	34.9396	1037.071
7	16983	1126.509	1139.26	3.7399	8.2203	3.341	73.89	0.3189	1125.712	35.5092	1032.77
8	17023	1126.826	1139.581	3.7401	8.2222	3.3478	73.89	0.3434	1126.028	35.5095	1032.772
9	18226	1000.507	1011.523	3.7723	8.6123	3.3158	74.0971	0.3251	999.7986	35.5184	1032.139
10	19449	801.8236	810.2631	3.8446	9.5205	3.3893	74.09	0.4343	801.2565	35.464	1031.036
11	21555	398.1361	401.9323	3.9183	10.4792	4.1523	74.106	0.3377	397.8543	35.4627	1029.036
12	22770	202.4125	204.2451	3.9429	10.8249	4.1737	74.1329	0.3752	202.2691	35.4648	1028.088
13	23469	100.0064	100.8866	4.0211	11.5909	4.1112	74.0767	0.6891	99.9356	35.5519	1027.549
14	23906	49.1619	49.5887	4.3383	14.8698	3.9807	72.786	5.5895	49.1273	35.5236	1026.624
15	24200	29.524	29.7787	4.4723	16.2349	4.0737	69.5927	15.8847	29.5031	35.5091	1026.217
16	24416	21.1349	21.3169	4.4739	16.2554	4.0724	69.5733	14.472	21.1201	35.5081	1026.174
17	24625	9.6521	9.7349	4.4751	16.2736	4.0785	69.6387	8.577	9.6451	35.5066	1026.117
18	24751	4.4165	4.4541	4.4748	16.2727	4.0614	69.5493	5.6533	4.4133	35.5072	1026.095

Pe95-07

Date	Station	Bottle	Depth	Temp	Salinity	Sal calib	O2 Winkler	Silicate	Ammonia	Phosphate	Nitrite	Nitrate	Remarks
	PE95-07	nr.	m	oC	‰	‰	uM	uM	uM	uM	uM	uM	
19-09-95		24											
		23											
	Pos	22											
	49 09.44N	21											
	13 05.36W	20											
	2247 m	19											
		18	4,4	16,27	35,51		255,9	0,37	0,17	0,06	0,02	0,03	
	Depth	17	9,6	16,27	35,507	35,514	255,6	0,33	0,08	0,06	0,01	0,01	
	2247 m	16	21,1	16,26	35,51		255,7	0,14	0,11	0,05	0,02	-0,02	
		15	29,5	16,23	35,51		256,0	0,15	0,00	0,05	0,01	0,03	
		14	49,1	14,87	35,52		250,3	0,83	0,16	0,20	0,13	2,57	
		13	99,9	11,59	35,552	35,555	251,3	2,72	0,12	0,59	0,03	9,66	
		12	202,3	10,82	35,46		253,5	3,75	0,13	0,70	0,02	11,17	
		11	397,9	10,48	35,46		253,8	4,28	0,13	0,74	0,01	11,81	
		10	801,3	9,52	35,46		209,9	8,35	0,12	1,03	0,02	16,61	
		9	999,8	8,61	35,52		205,0	10,31	0,10	1,12	0,01	18,13	
		8	1126	8,22	35,51		209,8	11,15	0,14	1,12	0,02	17,96	} 17.97 NO_3+NO_2
		7	1125,7	8,22	35,51			11,04	0,07	1,13	0,02	17,98	
		6	2000,1	3,41	34,940	34,952	273,4	15,44	0,10	1,19	0,01	18,08	
		5	2244,4	3,24	34,95			22,16	0,13	1,27	0,03	19,18	
		4	2244,4	3,24	34,95		264,3	22,24	0,04	1,28	0,02	19,25	
		3	2243,8	3,24	34,95		264,1	22,29	0,15	1,27	0,01	19,27	
		2	2244	3,24	34,952	34,964	264,4	22,40	0,13	1,26	0,01	19,26	
		1	2242,9	3,24	34,95			22,24	0,09	1,28	0,02	19,25	
		Boxw					259,0						
		Multiw.											

* Sea-Bird SBE 9 Raw Dat File:
* FileName = C:\SEASOFT\DATA\PE95_08.DAT
* Software Version 4.207
* Temperature SN = 1360
* Conductivity SN = 1204
* Number of Bytes Per Scan = 24
* Number of Voltage Words = 4
* System UpLoad Time = Sep 20 1995 10:08:37
* Ship: Pelagia
* Cruise: OMEX 1995 (part 2)
* Date: 20/09/95
* Time (GMT): 10:10
* Station: pe95-08
* Latitude: 49.08840
* Longitude: -13.4364
* Depth (m): 3650

bottle	scan nr.	depth	pressure	conduct	temp.	oxy.[ml/l]	trans.	flur	depth	salinity	density
1	19773	3652.497	3716.062	3.2643	2.4861	4.0628	72.21	0.3056	3649.914	34.9025	1044.626
2	19843	3651.985	3715.536	3.2643	2.4859	4.0619	72.2071	0.3093	3649.402	34.9026	1044.624
3	19908	3652.083	3715.636	3.2643	2.4857	4.059	72.196	0.352	3649.499	34.9025	1044.624
4	19960	3652.41	3715.973	3.2643	2.4858	4.0628	72.1707	0.319	3649.827	34.9025	1044.626
5	20042	3651.435	3714.971	3.2642	2.4857	4.0616	72.208	0.4004	3648.852	34.9025	1044.621
6	20090	3651.625	3715.167	3.2642	2.4857	4.0517	72.206	0.3117	3649.042	34.9026	1044.622
7	23459	3003.022	3050.631	3.2635	2.7266	4.0881	72.38	0.1743	3000.898	34.9289	1041.701
8	28058	2002.863	2029.797	3.2888	3.4547	4.4035	72.38	0.2519	2001.446	34.9335	1037.066
9	31631	1268.967	1283.771	3.6039	6.8766	3.5636	72.3627	0.3438	1268.069	35.3325	1033.508
10	31666	1269.275	1284.084	3.6	6.8424	3.5644	72.372	0.2647	1268.377	35.3241	1033.508
11	33074	1001.088	1012.112	3.771	8.6152	3.2519	72.45	0.3008	1000.379	35.5009	1032.128
12	34181	801.4577	809.8929	3.8482	9.5549	3.3812	72.45	0.3922	800.8908	35.4666	1031.031
13	36137	400.7432	404.567	3.9232	10.5232	4.1743	72.48	0.3605	400.4595	35.4687	1029.044
14	37121	200.9245	202.743	3.9626	10.9861	4.1093	72.4827	0.3851	200.7823	35.508	1028.085
15	37835	101.0177	101.9072	3.9982	11.3888	4.0842	72.3687	0.7761	100.9464	35.5197	1027.566
16	38368	50.0763	50.5111	4.3354	14.8506	3.9875	71.3333	5.2548	50.0408	35.5141	1026.625
17	38621	30.1291	30.389	4.4926	16.4362	4.0223	69.5267	10.4287	30.1077	35.5094	1026.173
18	38805	19.9903	20.1623	4.4945	16.4583	4.0301	69.3013	9.0555	19.9761	35.5104	1026.123
19	39067	10.7383	10.8305	4.4967	16.4833	4.0407	69.3787	7.424	10.7307	35.511	1026.077
20	39240	4.1151	4.1503	4.5007	16.5266	4.0541	69.4953	5.5898	4.1122	35.5111	1026.037

Pe95-08

Date	Station	Bottle	Depth	Temp	Salinity	Sal calib	O2 Winkler	Silicate	Ammonia	Phosphate	Nitrite	Nitrate	Remarks
20-09-95	PE95-08	nr.	m	oC	‰	‰	uM	uM	uM	uM	uM	uM	
		20	4,1	16,53	35,51		253,8	0,72	0,11	0,07	-0,03	0,05	
	Pos	19	10,7	16,48	35,51		254,4	0,66	0,08	0,05	-0,02	0,03	
	49 05.30N	18	20	16,46	35,51		253,7	0,36	0,04	0,05	0,00	-0,02	
	13 26.18W	17	30,1	16,44	35,510	35,516	253,1	0,41	0,06	0,05	-0,02	0,08	
		16	50	14,85	35,51		251,3	1,52	0,12	0,33	0,20	4,35	
		15	100,9	11,39	35,52		249,4	3,25	0,10	0,65	0,04	10,46	
	Depth	14	200,8	10,99	35,51		251,9	3,50	0,05	0,67	0,06	10,69	
	3650 m	13	400,5	10,52	35,47		256,9	4,27	0,13	0,72	0,00	11,55	
		12	800,9	9,55	35,467	35,473	211,1	8,40	0,06	1,04	0,02	16,65	
		11	1000,4	8,62	35,50		204,8	10,22	0,11	1,14	-0,02	17,98	
		10	1268,4	6,84	35,32			11,49	0,07	1,18	-0,03	18,65	
		9	1268,1	6,88	35,33		225,1	11,58	0,10	1,17	-0,01	18,54	
		8	2001,5	3,45	34,934	34,944	275,2	14,36	0,12	1,19	0,00	18,01	
		7	3000,9	2,73	34,93		251,7	33,70	0,14	1,45	-0,01	21,53	
		6	3649	2,49	34,93			41,24	0,12	1,51	-0,02	22,63	
		5	3648,9	2,49	34,90			41,51	0,14	1,53	0,03	22,59	
		4	3649,8	2,49	34,90		249,8	41,63	0,16	1,53	0,00	22,75	
		3	3649,5	2,49	34,903	34,913	245,6	41,25	0,15	1,53	0,00	22,59	
		2	3649,4	2,49	34,90		247,5	41,84	0,14	1,53	0,03	22,66	
		1	3649,9	2,49	34,90			41,92	0,17	1,52	0,00	22,64	
		Boxw					244,5						
		Multiw.					244,5						

* Sea-Bird SBE 9 Raw Data File:
* FileName = C:\SEASOFT\DATA\PE95_09.DAT
* Software Version 4.207
* Temperature SN = 1360
* Conductivity SN = 1204
* Number of Bytes Per Scan = 24
* Number of Voltage Words = 4
* System UpLoad Time = Sep 21 1995 06:09:07
* Ship: Pelagia
* Cruise: OMEX 1995 (part 2)
* Date: 21/09/95
* Time (GMT): 06:00
* Station: pe95-09
* Latitude: 49.41485
* Longitude: -11.523680
* Depth (m): 651

bottle	scan nr.	depth	pressure	conduct.	temp.	oxy [ml/l]	trans.	flur.	depth	salinity	density
1	3520	650.3477	656.9517	3.8473	9.6552	3.7692	74.068	0.354	649.8877	35.4284	1030.3
2	3590	650.6053	657.2122	3.8473	9.655	3.7629	74.0333	0.3552	650.1451	35.4282	1030.301
3	3638	650.6614	657.2689	3.8472	9.6548	3.7527	74.0807	0.4054	650.2009	35.4279	1030.301
4	3685	650.389	656.9933	3.8473	9.6552	3.7539	74.0753	0.3756	649.9288	35.428	1030.3
5	3780	650.4253	657.0301	3.8473	9.6554	3.76	74.082	0.3312	649.9651	35.4279	1030.3
6	5012	401.2752	405.1045	3.91	10.4026	4.2342	74.1879	0.3659	400.9912	35.452	1029.056
7	6026	201.0849	202.9049	3.9528	10.8921	4.1195	73.936	0.3109	200.9425	35.5	1028.097
8	6678	100.4354	101.3196	4.0166	11.6004	4.1176	74.078	1.0374	100.3644	35.4984	1027.507
9	7069	50.8508	51.2923	4.415	15.6155	3.9797	72.062	8.1584	50.8149	35.543	1026.48
10	7387	31.1319	31.4006	4.4999	16.4227	4.0206	70.468	14.1847	31.1099	35.5853	1026.239
11	7628	31.2307	31.5003	4.5007	16.4296	4.0395	70.4427	15.032	31.2085	35.5861	1026.238
12	7885	20.4158	20.5916	4.5003	16.4313	4.0466	70.4247	13.9767	20.4013	35.5855	1026.189
13	8057	10.6537	10.7455	4.4997	16.4294	4.0774	70.462	15.1027	10.6464	35.5861	1026.147
14	8245	3.5441	3.5743	4.4995	16.4309	4.0459	70.412	14.362	3.5414	35.586	1026.114

Pe95-09

Date	Station	Bottle	Depth	Temp	Salinity	O2 Winkler	Silicate	Ammonia	Phosphate	Nitrite	Nitrate	Remarks
Date	Stat.	nr.	m	oC	‰	uM	uM	uM	uM	uM	uM	
21-09-95	PE95-09	14	3,5	16,43	35,586	253,7	0,45	0,21	0,07	0,01	0,05	
		13	10,7	16,43	35,586	253,3	0,47	0,17	0,07	0,04	0,00	
	Pos	12	20,4	16,43	35,586	253,2	0,36	0,18	0,07	0,04	0,00	
	49 24.89N	11	31,2	16,43	35,586		0,36	0,15	0,06	-0,03	0,09	
	11 31.42W	10	31,1	16,42	35,585	253,2	0,53	0,21	0,06	0,02	0,03	
		9	50,9	15,62	35,543	250,8	0,81	0,35	0,15	0,14	1,87	
		8	100,4	11,6	35,498	251,7	2,64	0,23	0,57	-0,02	9,49	
	Depth	7	201,1	10,89	35,5	248,5	4,05	0,22	0,68	0,02	11,18	
	651 m	6	401,3	10,4	35,452	255,1	4,71	0,19	0,73	0,02	11,79	
		5	650,4	9,66	35,428		7,69	0,24	0,96	-0,01	15,61	
		4	650,4	6,66	35,428	222,7	7,66	0,23	0,97	0,05	15,47	
		3	650,7	9,65	35,428	222,4	7,71	0,30	0,97	-0,03	15,53	
		2	650,6	9,66	35,428	222,6	7,63	0,36	0,97	-0,06	15,61	
		1	650,3	9,66	35,428		7,67	0,32	0,96	0,00	15,52	
		Boxw										
		Multiw.										