

# EUROSQUID CRUISE 1994

## REPORT

Cruise 201, leg 9 of RV POSEIDON (POS 201/9)  
southwest of Portugal, 30 May - 22 June 1994

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## 1. SUMMARY

### 1.1 INTRODUCTION

The long-finned squids *Loligo forbesi* and *Loligo vulgaris* and the oceanic ommastrephid squids *Todarodes sagittatus* and *Illex coindetii* are of increasing importance in terms of ecology and fisheries in the EEC shelf waters and around banks, islands and seamounts in the North East Atlantic Ocean. However, knowledge on their life cycles, biology and distribution is still fragmentary. Their spawning grounds are completely unknown. Long-time investigations have recently been established to study the biology and the fishery potential of squid populations in the North East Atlantic. For example, in 1994 the ICES Working Group on Cephalopod Life Cycles and Fisheries was established to collect data on biology and fishery statistics of North East Atlantic cephalopods. Further, in 1993 a multinational EEC-Project was started to study the biology, population parameters, age, stock interactions, recruitment indices and current fisheries of commercially important cephalopods and to evaluate management models for future controlled fishery exploitation. The coverage of this project within the framework of the Agriculture and Agro-Industry Including Fisheries Programme of the EEC (AIR1-3003-92-0573) extends throughout the entire geographical range of the North East Atlantic waters relevant to the Common Fisheries Policy. Participating institutions are the University of Aberdeen, Scotland (Coordinator); the Scottish Marine Laboratory, Aberdeen, Scotland; the University of the Algarve in Faro, Portugal; the Instituto Nacional de Investigação das Pescas (IPIMAR) in Lisbon, Portugal; the University of the Azores in Horta, Azores, Portugal; the Instituto de Investigaciones Mariñas in Vigo, Spain; the University of Caen, France; and the Institut für Meereskunde in Kiel, Germany.

One of the main responsibilities of the Institut für Meereskunde Kiel is to coordinate and conduct oceanographic research cruises within the study region in order to sample the cephalopod fauna with standard plankton and trawl nets in selected target areas. The research cruise 201/9 of the German RV POSEIDON was a major contribution to this task.

### 1.2 CRUISE PROGRAMME

In 1994 biological working teams of the Institut für Meereskunde Kiel, the University of the Algarve, Faro and the IPIMAR in Lisbon evaluated a research programme for the RV POSEIDON to study the distribution and biology of squid and the accompanying nekton and zooplankton fauna in the waters southwest of Portugal and around some seamounts west of Portugal. Cephalopods were caught with a variety of plankton nets and fishery trawls like

Bongo net, MOCNESS, IKMT and pelagic fishery trawls to supply catch data from the study area to the EEC-Project.

Further studies investigated the hydrography and currents over the continental shelf and slope region southwest of Portugal (University of the Algarve, University of Wales). Additionally, hauls with a high-speed zooplankton videorecording system developed at the Institut für Meereskunde were made for *in situ* studies on the small-scale distribution of zooplankton and ichthyoplankton. Finally, the distribution of eel larvae (leptocephali) was investigated in the more oceanic parts (University of Rostock). All investigations obtained new results which will be published in international scientific journals.

The investigated area covered a region ranging from 34°55'N to 37°30'N and from 7°25'W to 14°12'W. The numbers and positions of the oceanographic stations are shown in Fig.1 (30 May-9 June 1994, sub-leg 1) and Fig. 2 (11-22 June 1994, sub-leg 2). Station lists are given in ANNEX 1 (sub-leg 1) and ANNEX 2 (sub-leg 2).

## 2. ITINERARY OF THE CRUISE

Leg 9 of expedition 201 of RV POSEIDON was divided into two sub-legs. Sub-leg 1 started in Portimão, Portugal at 30 May 1994 and ended again in Portimão at 9 June 1994. After two days in Portimão POSEIDON started the second sub-leg early in the morning of 11 June 1994 and returned to Lisbon in the morning of 22 June 1994. During the break in Portimão a major part of the scientific team was changed. The scientific stations are shown in Figs. 1 and 2, the station data are summarized in Annex 1 and 2, and the scientific participants are listed in chapter 4.

*Sub-leg 1.* In the morning of 30 May 1994 RV POSEIDON left Portimão harbour. Station work began at 10:18 hrs. local time with the first CTD-cast and a Bongo net trawl. In the following eight further CTD/Bongo stations were conducted in the coastal area of southwest Portugal. These stations were on positions of Portuguese long-term surveys on zooplankton investigations in the region. In the early morning of 31 May POSEIDON sailed in westerly direction to start an oceanographic/fishery station transect in oceanic waters and around several seamounts west of Portugal. These stations, always during dark hours, were the main project of the first sub-leg. The first of eleven stations far off the coast was reached in the late afternoon of 31 May (#538). It was started with a CTD-cast, followed by hauls with MOCNESS, pelagic Engel trawl (PT) and IKMT. The station was situated near Gorringe Bank and several fish trawlers and long-liners close by indicated a productive area. Weather conditions were fair and permitted a smooth operation of the scientific sampling programme. In the late night of 31 May POSEIDON sailed onwards to the west and reached the next

# Poseidon Cruise 201/9

CTD Stations - 1st Leg (30 May - 9 June 1994)

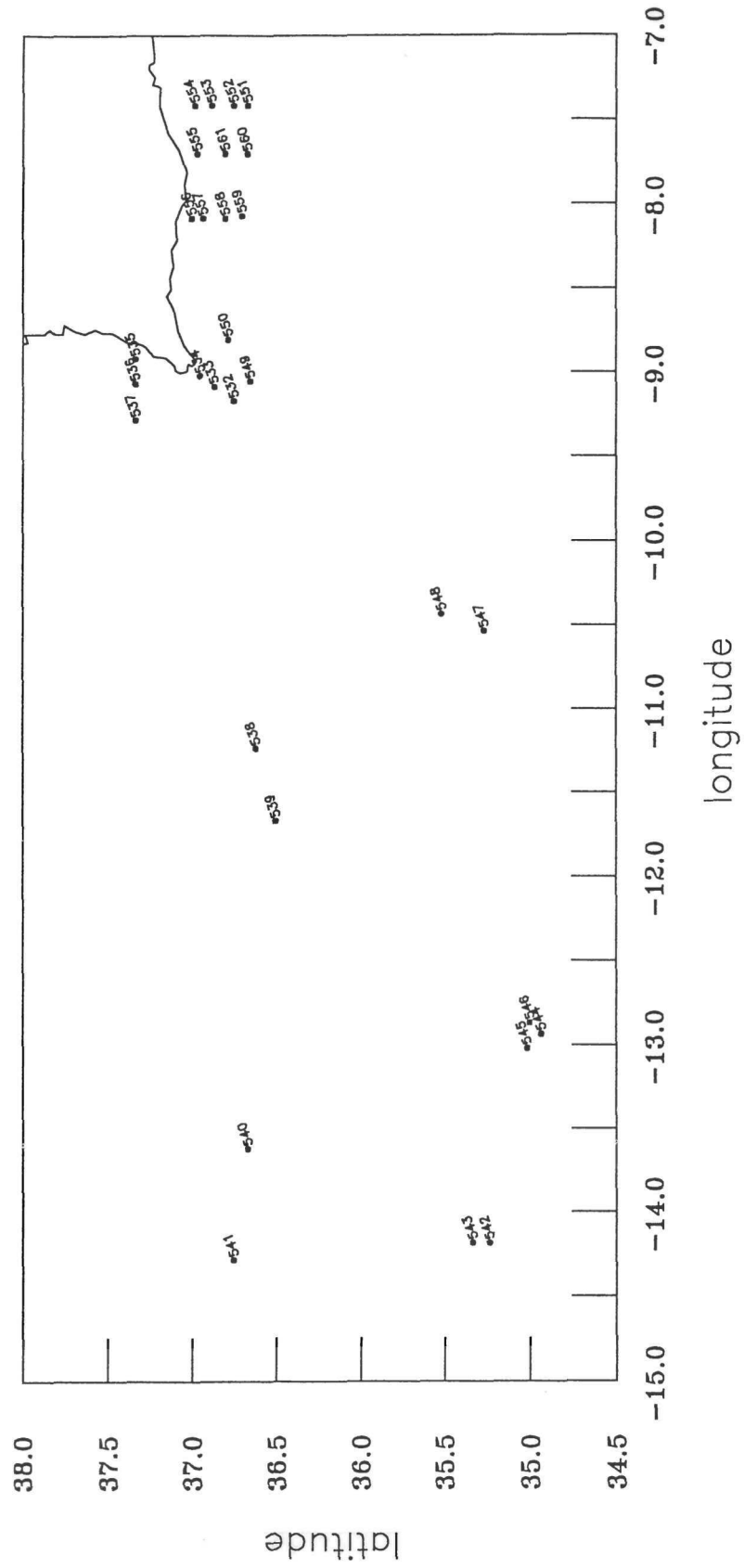


Fig. 1. POSEIDON cruise 201/9. Oceanographic stations of sub-leg 1.



# Poseidon Cruise 201/9

CTD Stations - 2nd Leg (11 June - 22 June 1994)

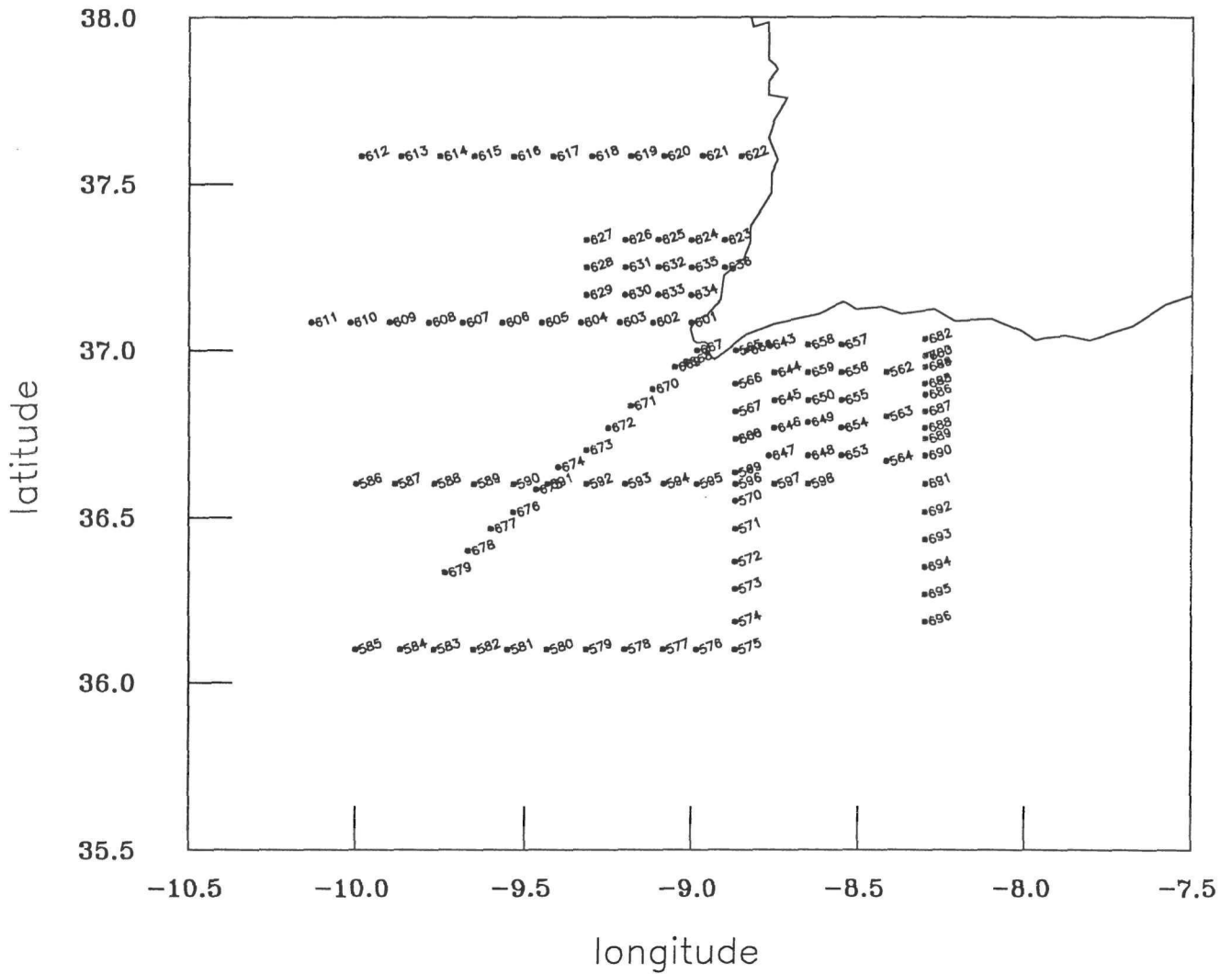


Fig. 2. POSEIDON cruise 201/9. Oceanographic stations of sub-leg 2.

station west of Gorringe Bank in the early morning of 1 June (#539). Here again IKMT, PT, MOCNESS and CTD were employed. In the morning of 1 June POSEIDON continued the westerly course and reached the next station east of Josephine Bank in the early evening of 1 June (#540). The same sampling programme was conducted here, again accompanied by fishery vessels nearby. The next station west of Josephine Bank (#541) was reached in the early morning of 2 June. After the same sampling programme the course track went to the south and two stations were performed in the northeast of the Unicorn Bank (#542, 543). In the evening of 3 June POSEIDON reached the Ampère Seamount. In this region three stations were performed (#544-546). Heavy weather conditions and rapidly changing bottom depths, however, stopped the scientific work in the area, and several stations planned in the western range could not be sampled. POSEIDON sailed eastwards hoping to get into calmer weather. In the early evening of 5 June suitable conditions were found in an oceanic region southwest off Portugal to continue work (#547, 548). The last two fishery stations were then conducted over the continental slope of southwest Portugal (#549, 550). In the night of 6 to 7 June they yielded rich samples with the fishery gears. The area seemed to be very productive again which was indicated by dense surface swarms of fish and squid which could be observed from the vessel. During 8 and 9 June three CTD/Bongo station transects perpendicular to the Algarve coast were sampled before POSEIDON finally reached Portimão again in the morning of 9 June.

*Sub-leg 2.* In the morning of 11 June POSEIDON left Portimão to start the second sub-leg. Weather conditions throughout this sub-leg were excellent, and scientific station work went well during the whole time. Main purpose of this cruise part was a detailed study on hydrography and meso-scale distribution of squid and zooplankton in a target area approximately 100x100 miles off the southwestern tip of Portugal (see Fig. 2). In the beginning four traditional fishery survey stations of the Portuguese Fishery Institute (IPIMAR) were sampled with CTD and Bongo on a southerly transect off the Algarve coast. From the 12 to 20 June several long CTD-transects were conducted in the target area with alternating biological sampling (IKMT, MOCNESS) at their corner points. Additionally, undulating high speed hauls in the top 200 m layer with an ichthyoplankton videorecorder system were performed in coastal regions. In the morning of 21 June POSEIDON reached shallow waters again south of the Algarve to repeat four traditional IPIMAR CTD/Bongo stations. In the late morning of 21 June scientific work was stopped. Fine weather conditions allowed now a barbecue party on POSEIDON's working deck with plenty of excellent food and social gathering of crew and scientific team members while the ship started to sail to Lisbon. In the morning of 22 June POSEIDON reached the Tejo mouth and at 09:00 hours the ship moored in due time in Lisbon harbour. Scientific equipment had already been packed on the transect to Lisbon and was

discharged on the 22 June. At 23 June the chief scientist delivered the scientific responsibilities to his successor.

### 3. SCIENTIFIC REPORT AND FIRST RESULTS

#### 3.1 PHYSICAL OCEANOGRAPHY

The aim of this work was to observe the hydrography and currents over the continental shelf and slope region of southwestern Portugal in the vicinity of Cape São Vicente. The regime in this area is of particular interest because of the alternation of strong upwelling driven by equatorward winds and a warm coastal flow generated by winds blowing westward along the Algarve coast. During upwelling the cape is commonly the source of a major filament, a jet like extension of cold upwelled waters reaching up to 200 km offshore. It was intended to sample the structure of this filament, which is often well developed in June.

Measurements were made during the cruise with a SeaBird Seacat SBE 19-01 self contained conductivity-temperature-depth probe. A total of 156 casts were made, the first 33 during the first sub-leg of the cruise. Casts were made to the bottom or 520 m in deeper water since interest was concentrated on the upper layers. Water samples and digital reversing thermometer observations were taken on 27 casts to check the conductivity and temperature sensors of the CTD. Temperature appeared to be within the manufacturer's specification.

Port and starboard wind speed and direction plus wet and dry bulb temperatures, as well as ship's speed and heading, solar radiation, atmospheric pressure and sea temperature at 4m depth were logged at 4 minute intervals from the ship's sensors throughout sub-leg 2. The port direction sensor and starboard air temperature sensors malfunctioned throughout and could not be repaired during the cruise. Ship's thermosalinograph was also logged. The salinity sensor began to malfunction halfway through the leg possibly due to blockage of the sensor head. On 20 June the temperature reading also became erroneous.

Acoustic Doppler Current Profiler (ADCP) was operated throughout sub-leg 2 and recorded to disk every 5 minutes. It was impossible to examine data in much detail at sea but a preliminary look indicates that the system was functioning satisfactorily.

To support sampling operations, provisionally processed satellite AVHRR sea surface temperature images were transmitted to the ship from University of Wales whenever clear views of the region were available. During most of the time considerable cloud cover and haze prevented good images being obtained, but five were received at sea.

Conditions of weak easterly wind prevailed for most of the period, resulting in the prevalence of warm water flowing westward along the Algarve coast and northward along the

west coast. A narrow band of cool, low salinity water, presumably a remnant of earlier upwelling was observed both in AVHRR and CTD observations to extend along the shelf edge from northwest of Cape São Vicente to the Algarve. A typical downbowing towards the coast of nearshore isotherms and isohalines was seen in the CTD sections. The pattern of flow indicated is a nearshore poleward (westward along the Algarve) current, over the shelf edge a narrow equatorward (eastward) flow, and further offshore weaker poleward tendency. This pattern appears to be borne out by the preliminary analysis of a small sample of ADCP data off Cape São Vicente.

Examples of first results are shown in ANNEX 3: Sea surface temperature, air pressure, irradiance data and wind speed during sub-leg 2 (Figs. 6 to 9); sea surface temperature and salinity for the whole study region (Figs. 10 and 11); sea temperature, salinity and density depth profiles for the station transect southwest off Cape São Vicente (stations 667 to 679, Figs. 12 to 14); sea temperature, salinity, density and sound velocity depth profiles for station 540 near Josephine Bank (Fig. 15) and station 679 southwest off Cape São Vicente (Fig. 16).

Final results of the investigations on physical oceanography will be compiled by the University of the Algarve (RELVAS) and the University of Wales (BARTON, WILSON).

### 3.2 CEPHALOPODS

A total of 820 specimens were caught by the various nets. All specimens were measured (mantle length in mm) and, if possible, sex and maturity were determined. Preliminary identifications revealed 34 different taxa. The results are summarized in Table 1. With a total of 522 specimens the enoploteuthid squid *Pterygioteuthis giardi* was the most abundant species, followed by the ommastrephid squid *Todarodes sagittatus* (N = 65 specimens), the enoploteuthid squid *Pyroteuthis margaritifera* (N = 64) and the onychoteuthid squid *Onykia carriboea* (N = 58). Cephalopods were more abundant at oceanic stations and in the vicinity of seamounts than in regions closer to the coast. Loliginid squids were very rare and only paralarval stages were captured with Bongo net and MOCNESS at shallow coastal stations near the Algarve coast. Due to an electronical defect during its first operation an automatic Japanese jigging machine for sampling live cephalopods could not be used during the cruise.

Further work on the collection is under progress and will focus on final identifications, abundance and geographical and vertical distribution of the species. These investigations will be done in collaboration between IPIMAR in Lisbon, the University of the Algarve in Faro and the Institut für Meereskunde Kiel (de BRITO, da CUNHA, MORENO, PIATKOWSKI, QUINTELA).

Table 1. Cephalopod collection of the POSEIDON cruise.

Cephalopod Taxon	BONGO Net	MOCNESS	IKMT	Pelagic Trawl	Hand Jigging	TOTAL
<i>Sepiola rondeletii</i>	1		1			2
<i>Loligo vulgaris</i> (paralarvae)	5					5
<i>Alloteuthis</i> sp. (paralarvae)	2	1				3
<i>Abralia veranyi</i>			1			1
<i>Abraliopsis pfefferi</i>		1	1	21		23
<i>Ancistrocheirus lesueurii</i>			2			2
<i>Pyroteuthis margaritifera</i>			18	46		64
<i>Pterygioteuthis giardi</i>		1	90	431		522
Enoploteuthidae indet.				2		2
<i>Lampadioteuthis megaleia</i>				1		1
<i>Histioteuthis meleagroteuthis</i>				1		1
<i>Histioteuthis</i> sp.				1		1
<i>Todarodes sagittatus</i>			15	47	3	65
<i>Todaropsis eblanae</i>				3		3
Ommastrephidae indet.			1	4		5
<i>Ctenopteryx sicula</i>			2	4		6
<i>Onychoteuthis banksi</i>			1	2	1	4
<i>Onykia caribboea</i>			1	57		58
<i>Ancistroteuthis lichtensteini</i>				2		2
Onychoteuthidae indet.		1	1			2
<i>Gonatus</i> sp.		1				1
<i>Brachioteuthis riisei</i>			1	3		4
<i>Taningia danae</i>			2			2
Octopoteuthidae indet.				1		1
Lepidoteuthidae indet.				2		2
Mastigoteuthidae indet.			2	2		4
<i>Helicocranchia pfefferi</i>	1	3				4
<i>Taonius pavo</i>				1		1
Taoniinae indet.		4				4
Oegopsida indet.		2	2	4		8
Octopodinae indet.		3				3
<i>Argonauta argo</i>			1	1		2
<i>Octopus vulgaris</i>	1	8		1		10
Octopodidae indet.		2				2
<b>TOTAL</b>	<b>10</b>	<b>27</b>	<b>142</b>	<b>637</b>	<b>4</b>	<b>820</b>

### 3.3 FISH

Investigations on fish concentrated on the fish fauna composition sampled by the pelagic Engel trawl and the study of leptocephali larvae (Anguilliformes) captured by all nets.

The thirteen hauls taken with the pelagic Engel trawl in the oceanic region and in the vicinity of various seamounts revealed at least 12 different species. Catch biomass varied considerably between less than 1 and 206 kg per haul. Horse mackerel (Carangidae, *Trachurus picturatus*) was most abundant in terms of numbers and biomass. At Station 539 near Gorringe Bank ca. 70 kg were yielded; at Station 550 over the continental slope southwest of Portugal 42 kg were captured. Mackerel (Scombridae, *Scomber japonicus*) was also abundant with 121 kg at Station 550. The silver scabbardfish, *Lepidopus caudatus* (Trichiuridae) occurred frequently at stations near banks and seamounts, particularly near the Ampère Seamount (Station 546) with 120 specimens (113 kg). Typical length-frequency diagrams of the three most abundant fish species are shown in Figs. 3 to 5. Further common species near seamounts were the boar-fish (*Capros aper*), the snipefish (*Macroramphosus scolopax*), the longfin cigarfish (*Cubiceps gracilis*), and the perciform *Centracanthus cirrus*.

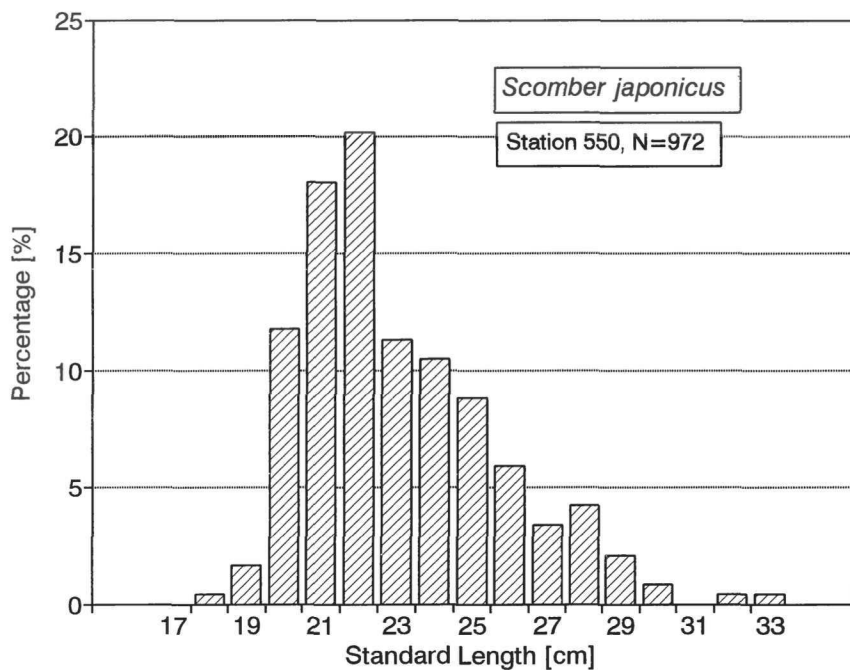


Fig. 3. Length-frequency distribution of *Scomber japonicus* at Station 550.

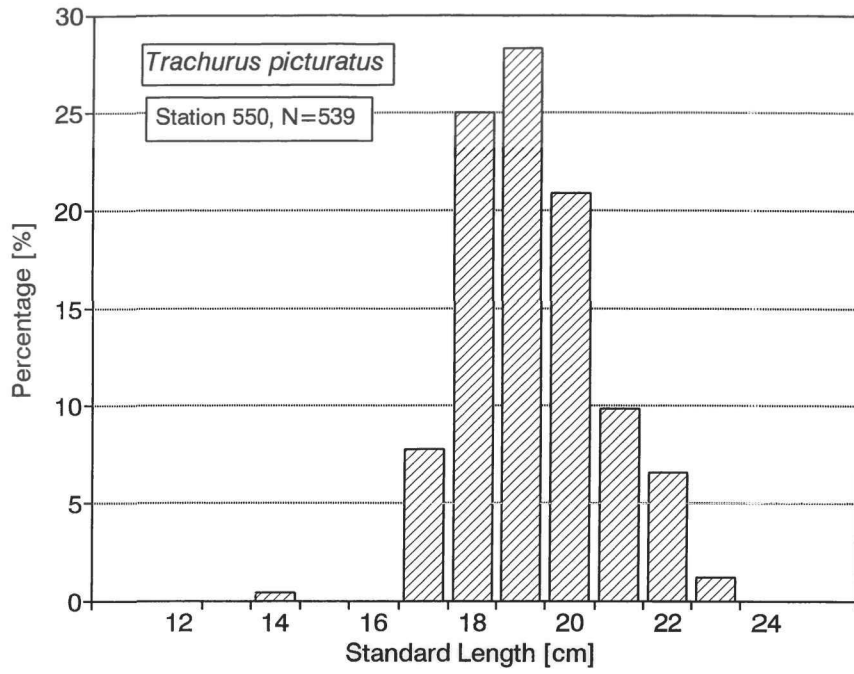


Fig. 4. Length-frequency distribution of *Trachurus picturatus* at Station 550.

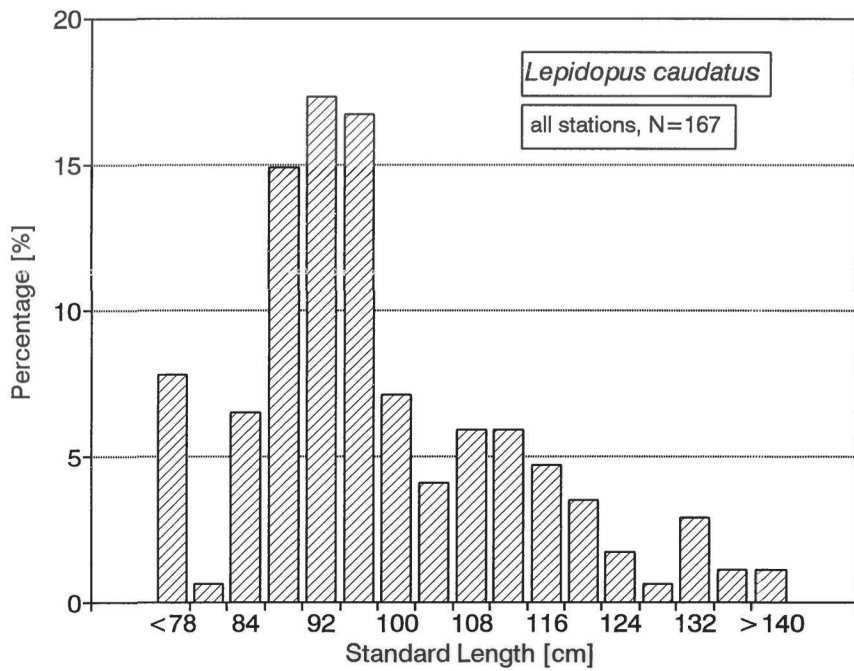


Fig. 5. Length-frequency distribution of *Lepidopus caudatus*; all stations.

At the more oceanic stations typical midwater fishes dominated the fish fauna, like the transparent hatchetfish (*Sternopteryx diaphana*), the white barracudina (*Notolepis rissoi*) and the myctophids with the horned lanternfish (*Ceratoscopelus maderensis*). Further work on the fish fauna is in progress in collaboration between IPIMAR in Lisbon and the Institut für Meereskunde Kiel (da CUNHA, MORENO, WIELAND).

Within the order Anguilliformes seven species of 5 families were identified. All of these were leptocephali stages and known to be common in the area. Altogether 143 specimens were caught with total lengths ranging from 26 to 480 (!) mm. The pelagic Engel trawl was the most efficient net to catch the leptocephali. The IKMT yielded a considerable number, too, whereas only few specimens were obtained by Bongo net and MOCNESS catches. The following taxa have been identified so far:

Family Anguillidae	<i>Anguilla anguilla</i> (N=12)	TL = 65-81 mm
Family Congridae	<i>Gnathophis</i> sp. (N=113)	TL = 72-150 mm
	<i>Conger conger</i> (N=12)	TL = 112-150 mm
Family Nemichthyidae	<i>Nemichthys scolopaceus</i> (N=2)	TL = 48-480 mm
Family Nettastomatidae	<i>Nettastoma melanura</i> (N=1)	TL = 26 mm
Family Synphobranchidae	<i>Synphobranchus kaupi</i> (N=1)	TL = 54 mm
	<i>Hoplunnis punctata</i> (N=1)	TL = 110 mm
Unidentified	(N=1)	TL = 157 mm

Further studies on the leptocephali collection will concentrate on taxonomy, histology and genetic studies (STREHLOW, University of Rostock).

### 3.4 ZOOPLANKTON AND MIKRONEKTON

Sorting of the numerous zooplankton/micronekton samples is still under progress. The samples of the 27 Bngo net hauls, 23 MOCNESS hauls and 33 IKMT hauls will be evaluated to study the meso- and fine-scale distribution patterns of zooplankton and micronekton. This work will focus on copepods and euphausiids. Results will be compared with older Portuguese collections from the region (de BRITO *et al.*, University of the Algarve).

During the cruise also a high-speed zooplankton videorecording system was tested to study the small-scale distribution patterns of ichthyoplankton. This system is a development of the Institut für Meereskunde Kiel. Eight hauls were conducted at stations over the continental slope of Portugal. The system was towed with up to 5 knots ship's speed. Undulating hauls were performed down to a maximum depth of 200m. The gear worked without problems and the analysis of the videorecordings and zooplankton samples obtained during the cruise will be done and the Institut für Meereskunde Kiel (MEES *et al.*).



#### 4. SCIENTIFIC PARTICIPANTS

##### 4.1 1st sub-leg Portimão - Portimão (30 May - 9 June):

PIATKOWSKI, Uwe, Dr., chief scientist	- IfM
de BRITO, Helena Maria Santos Villa, scientist	- UALG
CAVACO, Paulo Jorge Pintassilgo, student	- UALG
da CUNHA, Manuela Morais	scientist - IPIMAR
JAROSCH, Dirk, technician	- IfM
da PALMA, Jorge Afonso Martins, student	- UALG
QUINTELA, João Granjo Pires, scientist	- UALG
ROHLF, Norbert, student	- IfM
STREHLOW, Beate, Dr., scientist	- URO
WIELAND, Kai, scientist	- IfM

##### 4.2 2nd sub-leg Portimão - Lisbon (11 June - 22 June):

PIATKOWSKI, Uwe, Dr., chief scientist	- IfM
BARTON, Eric Desmond, Prof., scientist	- UWAL
DOMINGUES, Pedro, scientist	- UALG
LÜTHJE, Rudi, technician	- IfM
MATTOS, George Olavo, scientist	- UALG
MEES, Svend, technician	- IfM
MORENO, Ana, scientist	- IPIMAR
RELVAS, Paulo José Almeida, scientist	- UALG
STREHLOW, Beate, Dr., scientist	- URO
WIELAND, Kai, scientist	- IfM
WILTON, Ray, technician.	- UWAL

##### 4.3 Abbreviations of Insitutes

IfM	- Institut für Meereskunde, University of Kiel, Germany
IPIMAR	- Instituto Português de Investigação Marítima, Lisbon, Portugal
UALG	- Universidade do Algarve, UCTRA, Faro, Portugal
URO	- University of Rostock, Department of Fishery Biology, Rostock, Germany
UWAL	- University of Wales, Bangor, Wales, United Kingdom

## 5. EQUIPMENT USED DURING THE CRUISE AND HAUL NUMBERS

### 5.1 SUB-LEG 1:

- CTD (SeaBird Seacat SBE 19-01 self contained conductivity-temperature-depth probe), 33 hauls
- ADCP (Acoustic Current Doppler Profiler), several recordings of current profiles
- Bongo net (with 335 and 500 $\mu$ m meshes), 24 hauls
- IKMT (with 4mm meshes in codend), 10 hauls
- MOCNESS (with 335 $\mu$ m meshes), 11 hauls
- Pelagic Engel trawl, 308 meshes (with ca. 10 mm meshes in codend), 13 hauls

### 5.1 SUB-LEG 2:

- CTD (SeaBird Seacat SBE 19-01 self contained conductivity-temperature-depth probe), 123 hauls
- ADCP (Acoustic Current Doppler Profiler), continuous recordings of current profiles
- Bongo net (with 335 and 500 $\mu$ m meshes), 13 hauls
- IKMT (with 4mm meshes in codend), 23 hauls
- IPR (Ichthyoplankton-Videorecorder system), 8 hauls
- MOCNESS (with 335 $\mu$ m meshes), 12 hauls

## 6. FINAL REMARKS, ACKNOWLEDGEMENTS

The collaboration between the scientific working teams and between “science“ and the master and the ship’s crew was excellent and was without any problems. All obstacles like harsh weather conditions, tiresome night stations and technical problems with some equipment were overcome by the untiring engagement of the crew and the scientific participants. The international team work between scientists from Germany, Portugal and the UK was particularly stimulating and resulted into an immense amount of new research data. Definitely, the cruise was an ever memorable and enjoyable experience to everybody. Thanks to everyone!

ANNEX 1: Station table of POSEIDON cruise 201/9, sub-leg 1 (Portimão - Portimão,  
30 May - 8 June 1994)

BON : Bongo net (with 335 and 500µm meshes)  
 CTD : SeaBird Seacat SBE 19-01  
 IKMT : Isaac Kidds Midwater Trawl (with 4mm meshes in codend)  
 MOC : MOCNESS (Multiple Opening Closing Net Environmental Sensing System with 335µm meshes)  
 PT : Pelagic Engel trawl, 308 meshes (with ca. 10 mm meshes in codend)

Date	Station	Time local	Position N	W	Bottom depth (m)	Gear	Haul depth (m)	
30.05.94	529	10:18	36°57.0'	08°45.0'	108	CTD	0-80	
		10:33	36°56.9'	08°45.4'		BON	0-104	
		10:50	36°56.7'	08°45.8'				
	530	12:06	35°50.0'	08°44.1'	329	CTD	0-280	
		12:30	36°50.1'	08°45.7'		BON	0-300	
		13:15	36°50.5'	08°47.2'				
	531	14:18	36°43.0'	08°45.0'	742	CTD	0-300	
		14:51	36°43.2'	08°45.4'		BON	0-300	
		15:39	36°42.8'	08°47.6'				
	532	18:00	36°45.0'	09°10.0'	755	CTD	0-300	
		18:41	36°44.9'	09°10.1'		BON	0-300	
		19:36	36°45.4'	09°12.6'				
	533	20:35	36°52.0'	09°04.0'	193	CTD	0-165	
		20:48	36°51.7'	09°04.6'		BON	0-250	
		21:34	36°52.2'	09°06.9'				
	534	22:20	36°57.0'	09°00.0'	97	CTD	0-80	
		22:28	36°56.5'	09°00.7'		BON	0-90	
		22:45	36°57.1'	09°01.0'				
	31.05.94	535	01:35	37°20.0'	08°55.1'	64	CTD	0-50
			01:45	37°20.2'	08°54.9'		BON	0-60
01:53			37°19.8'	08°55.7'				
536		02:56	37°20.0'	09°05.0'	181	CTD	0-150	
		03:11	37°20.0'	09°04.8'		BON	0-200	
		03:51	37°20.0'	09°07.8'				
537		04:56	37°20.0'	09°17.0'	820	CTD	0-300	
		05:12	37°20.0'	09°17.0'		BON	0-300	
		06:19	37°18.2'	09°20.6'				
538		18:00	36°37.0'	11°14.0'	1114	CTD	0-300	
		18:20	36°36.9'	11°14.3'	1129	MOC1	0-200	
		18:31				MOC2	200-175	
		18:36				MOC3	175-150	
		18:41				MOC4	150-125	
		18:47				MOC5	125-100	
		18:53				MOC6	100-75	
	18:58				MOC7	75-50		
	19:03				MOC8	50-25		
	19:08				MOC9	25-0		
		19:12	36°35.2'	11°16.9'	1114			

Date	Station	Time local	Position N	W	Bottom depth (m)	Gear	Haul depth (m)	
31.05.94	538	20:20	36°36.4'	11°14.6'	1280	PT	100-40	
		21:25	36°34.2'	11°19.7'	1158			
		23:02	36°37.2'	11°13.8'	1092	IKMT	125-0	
01.06.94	539	23:46	36°35.7'	11°16.6'	1300			
		01:22	36°35.0'	11°34.2'	178	IKMT	126-0	
		01:55	36°34.8'	11°36.6'	278			
		03:05	36°34.3'	11°37.0'	498	PT	100-25	
		04:35	36°27.8'	11°41.5'	711			
		05:09	36°27.8'	11°41.8'	720	MOC1	0-200	
		05:19				MOC2	200-175	
		05:25				MOC3	175-150	
		05:30				MOC4	150-125	
		05:36				MOC5	125-100	
	05:42				MOC6	100-75		
	05:47				MOC7	75-50		
	05:53				MOC8	50-25		
	05:59				MOC9	25-0		
	06:05		36°29.4'	11°39.7'	730			
	06:07		36°29.4'	11°39.7'	730	CTD	0-300	
	540	18:00		36°40.0'	13°36.6'	3314	CTD	0-300
		18:16		36°40.0'	13°36.8'	3306	MOC1	0-200
		18:31					MOC2	200-175
		18:37					MOC3	175-125
18:43						MOC4	150-125	
18:49						MOC5	125-100	
18:55						MOC6	100-75	
19:01						MOC7	75-50	
19:07						MOC8	50-25	
19:13						MOC9	25-0	
02.06.94	541	19:19	36°43.3'	13°37.6'	3306			
		20:20	36°40.5'	13°36.8'	3188	PT	165-25	
		21:55	36°44.9'	13°42.7'	2570			
		23:08	36°40.2'	13°37.2'	3304	IKMT	125-0	
		23:42	36°41.2'	13°39.0'	3188			
		03:19	36°40.6'	14°12.6'	203	IKMT	125-0	
		03:49	36°41.0'	14°14.7'	225			
		04:40	36°39.0'	14°13.3'	197	PT	130-42	
		05:40	36°42.0'	14°18.0'	222			
		06:06	36°42.8'	14°15.6'	228	MOC1	0-200	
		06:20				MOC2	200-175	
		06:27				MOC3	175-150	
		06:33				MOC4	150-125	
		06:38				MOC5	125-100	
		06:46				MOC6	100-75	
06:51				MOC7	75-50			
06:57				MOC8	50-25			
07:02				MOC9	25-0			
542	07:08		36°45.0'	14°17.4'	285			
	07:11		36°45.1'	14°17.5'	286	CTD	0-250	
	18:00		35°11.0'	14°23.0'	4142	CTD	0-380	

Date	Station	Time local	Position N	W	Bottom depth (m)	Gear	Haul depth (m)			
02.06.94	542	18:19	33°13.7'	14°10.9'	4142	MOC1	0-200			
		18:31				MOC2	200-175			
		18:36				MOC3	175-150			
		18:41				MOC4	150-125			
		18:46				MOC5	125-100			
		18:51				MOC6	100-75			
		18:57				MOC7	75-50			
		19:03				MOC8	50-25			
		19:10				MOC9	25-0			
		19:18				35°13.5'	14°21.5'	4146		
		20:07				35°12.0'	14°22.8'	4192	PT	200-118
		20:26				35°12.9'	14°22.7'			
		21:30				35°15.9'	14°22.5'	4295	PT	186-35
		22:46				35°20.7'	14°22.0'			
03.06.94	543	23:50	35°18.2'	14°22.5'	4309	IKMT	125-0			
		00:13	35°20.1'	14°22.1'	4310					
		00:55	35°19.3'	14°22.4'	4315	IKMT	125-0			
		01:20	35°16.4'	14°22.7'	4258					
		02:00	35°19.3'	14°22.4'	4318	MOC1	0-200			
		02:12				MOC2	200-175			
		02:17				MOC3	175-150			
		02:23				MOC4	150-125			
		02:29				MOC5	125-100			
		02:35				MOC6	100-75			
		02:40				MOC7	75-50			
		02:45				MOC8	50-25			
		02:51				MOC9	25-0			
		02:57	35°16.2'	14°22.6'	4257					
03:03	35°16.2'	14°22.6'	4257	CTD	0-300					
04.06.94	544	18:00	34°55.6'	12°55.7'	724	CTD	0-180			
		18:17	34°55.8'	12°55.9'	738	MOC1	0-200			
		18:28				MOC2	200-175			
		18:34				MOC3	175-150			
		18:40				MOC4	150-125			
		18:45				MOC5	125-100			
		18:51				MOC6	100-75			
		18:57				MOC7	75-50			
		19:02				MOC8	50-25			
		19:08				MOC9	25-0			
		19:16	34°58.2'	12°55.1'	410					
		20:20	34°51.9'	12°55.5'	3966	PT	180-35			
		23:00	35°03.0'	12°55.0'	194					
		04.06.94	545	00:10	35°00.8'	12°55.1'	1003	IKMT	125-0	
00:35	34°59.8'			12°55.2'	1100					
01:40	34°59.8'			13°01.2'	1583	IKMT	125-0			
02:14	34°57.6'			13°01.5'	2281					
03:05	34°58.4'			13°01.2'	2044	PT	184-35			
04:23	35°04.2'			13°01.7'	1488					

Date	Station	Time local	Position N	W	Bottom depth (m)	Gear	Haul depth (m)	
04.06.94	545	04:55	35°03.7'	13°01.7'	1243	MOC1	0-200	
		05:08				MOC2	200-175	
		05:14				MOC3	175-150	
		05:20				MOC4	150-125	
		05:26				MOC5	125-100	
		05:32				MOC6	100-75	
		05:38				MOC7	75-50	
		05:44				MOC8	50-25	
		05:50				MOC9	25-0	
	546	05:55	35°00.7'	13°01.3'	1333			
		06:00	35°00.7'	13°01.3'	1350	CTD	0-300	
		18:00	35°00.0'	12°51.9'	2240	CTD	0-300	
		18:16	35°00.2'	12°51.9'	1970	MOC1	0-200	
		18:30				MOC2	200-175	
		18:36				MOC3	175-150	
		18:42				MOC4	150-125	
		18:48				MOC5	125-0	
		19:06	35°02.4'	12°50.5'	1970			
		20:11	35°01.5'	12°51.9'	750-120	PT	180-35	
05.06.94	547	21:37	35°06.4'	12°52.0'	1410			
		18:00	35°15.8'	10°32.1'	4282	CTD	0-300	
		18:15	35°15.8'	10°32.1'	4250	BON	0-150	
		19:05	35°18.7'	10°31.4'				
		19:34	35°16.0'	10°32.2'	4300	BON	0-75	
		20:11	35°18.7'	10°31.7'				
		20:53	35°16.9'	10°32.2'	4368	PT	174-15	
	548	22:10	35°20.9'	10°31.7'	4217			
		23:31	35°26.4'	10°27.7'	4108	PT	184-25	
		06.06.94	01:03	35°32.4'	10°27.2'	4136		
			02:18	35°25.5'	10°27.6'	4175	BON	0-150
03:10	35°28.4'		10°26.8'	4008				
03:13	35°28.7'		10°26.8'	4008	BON	0-75		
03:50	35°30.9'		10°26.4'	4100				
03:52	35°30.9'		10°26.4'	4100	CTD	0-300		
549	18:00		36°39.0'	09°03.0'	1100	CTD	0-300	
	18:17		36°38.7'	09°02.5'	1107	MOC1	0-200	
	18:30					MOC2	200-175	
	18:35					MOC3	175-150	
	18:41					MOC4	150-125	
	18:47				MOC5	125-0		
	19:04	36°36.9'	09°00.0'	1172				
	20:00	36°40.0'	09°03.7'	816	PT	210-25		
07.06.94	550	21:30	36°44.6'	09°07.8'	670			
		22:27	36°43.2'	09°06.8'	891	IKMT	125-0	
		23:02	36°41.7'	09°05.3'	944			
		01:02	36°44.8'	08°47.6'	686	IKMT	125-0	
		01:45	36°46.4'	08°49.2'	542			
		02:33	36°44.7'	08°47.5'	662	PT	173-17	
		04:25	36°50.6'	08°52.9'	150			

Date	Station	Time local	Position N	W	Bottom depth (m)	Gear	Haul depth (m)	
07.06.94	550	05:20	36°49.2'	08°51.9'	384	MOC1	0-200	
		05:38				MOC2	200-175	
		05:47				MOC3	175-150	
		05:54				MOC4	150-125	
		06:00				MOC5	125-100	
		06:05				MOC6	100-75	
		06:11				MOC7	75-50	
		06:16				MOC8	50-25	
		06:21				MOC9	25-0	
	551	06:27	36°46.8'	08°48.2'	502			
		06:32	36°46.8'	08°48.2'	507	CTD	0-300	
	552	16:00	36°40.0'	07°25.0'	536	CTD	0-300	
		16:15	36°39.9'	07°24.9'	536	BON	0-300	
	553	17:13	36°37.5'	07°22.0'	511			
		18:10	36°44.9'	07°24.9'	550	CTD	0-300	
		18:30	36°44.9'	07°24.9'	548	BON	0-300	
	554	19:14	36°46.9'	07°26.2'	530			
		20:09	36°52.9'	07°24.9'	422	CTD	0-300	
		20:23	36°52.9'	07°24.9'	425	BON	0-300	
	08.06.94	555	21:08	36°53.3'	07°27.1'	436		
			07:10	37°00.0'	07°25.1'	98	CTD	0-75
07:17			37°00.0'	07°25.3'	98	BON	0-90	
556		07:35	36°58.7'	07°25.7'	101			
		09:00	36°58.0'	07°41.9'	125	CTD	0-100	
		09:09	36°58.0'	07°42.0'	129	BON	0-135	
557		09:28	36°57.0'	07°42.1'	176			
		12:00	37°00.2'	08°05.0'	25	CTD	0-10	
		12:05	37°00.1'	08°05.1'	26	BON	0-20	
558		12:11	36°59.8'	08°05.3'	30			
		12:52	36°56.0'	08°04.9'	43	CTD	0-35	
		12:58	36°56.0'	08°04.9'	44	BON	0-42	
559		13:08	36°55.6'	08°05.0'	49			
		14:02	36°48.0'	08°04.9'	431	CTD	0-280	
		14:18	36°48.2'	08°04.8'	404	BON	0-300	
560		15:08			720			
		15:48	36°42.0'	08°03.9'	757	CTD	0-300	
		16:02	36°42.2'	08°03.6'	755	BON	0-300	
561		17:09	36°41.9'	07°58.6'	724			
		18:35	36°39.9'	07°41.9'	755	CTD	0-300	
		18:48	36°39.9'	07°41.9'	758	BON	0-300	
562	19:29	36°41.0'	07°43.4'	746				
	20:29	36°47.9'	07°41.9'	558	CTD	0-300		
	20:40	36°47.9'	07°41.9'	559	BON	0-300		
		21:22	36°49.3'	07°43.2'	550			

ANNEX 2: Station table of POSEIDON cruise 201/9, sub-leg 2 (Portimão - Lisbon,  
11-21 June 1994)

BON : Bongo net (with 335 and 500µm meshes)  
 CTD : SeaBird Seacat SBE 19-01  
 IKMT : Isaac Kidds Midwater Trawl (with 4mm meshes in codend)  
 IPR : Ichthyoplankton-Videorecorder system  
 MOC : MOCNESS (Multiple Opening Closing Net Environmental Sensing System with 335µm meshes)

Date	Station	Time local	Position N	W	Bottom depth (m)	Gear	Haul depth (m)
11.06.94	562	10:20	36°56.1'	08°25.1'	92	CTD	0-70
		10:34	36°56.2'	08°24.8'	91	BON	0-70
		10:47	36°55.9'	08°24.2'	91		
	563	12:07	36°48.2'	08°25.0'	291	CTD	0-270
		12:22	36°48.3'	08°24.7'	284	BON	0-300
		13:28	36°48.7'	08°21.3'	419		
	564	14:30	36°40.0'	08°25.0'	743	CTD	0-520
		15:10	36°40.3'	08°25.4'	733	BON	0-300
		16:37	36°40.7'	08°30.8'	927		
	565	19:30	37°00.0'	08°52.0'	70	CTD	0-55
		19:45	37°00.0'	08°52.1'	71	BON	0-63
		19:55	37°00.0'	08°51.6'	70		
		20:00	37°00.0'	08°51.5'	70	BON	0-64
		20:08	37°00.1'	08°51.2'	70		
		20:17	36°59.9'	08°51.8'	70	BON	0-64
		20:29	37°00.1'	08°51.3'	71		
	566	21:08	36°54.5'	08°52.0'	116	CTD	0-108
	567	21:58	36°49.2'	08°52.1'	377	CTD	0-350
	568	23:05	36°43.7'	08°52.0'	694	CTD	0-520
	12.06.94	569	00:28	36°38.4'	08°52.0'	803	CTD
02:04			36°37.6'	08°51.5'	1004	IKMT	150-0
02:39			36°32.7'	08°52.0'	1125		
570		02:58	36°32.9'	08°52.0'	1127	CTD	0-520
		04:07	36°32.8'	08°52.1'	1128	IKMT	195-0
		04:41	36°27.8'	08°52.1'	2188		
571		05:00	36°27.6'	08°52.0'	2190	CTD	0-500
572		06:10	36°22.2'	08°51.9'	2712	CTD	0-520
573		07:28	36°16.7'	08°52.0'	2762	CTD	0-520
574		08:46	36°11.4'	08°52.0'	2900	CTD	0-520
575		10:05	36°06.0'	08°52.0'	3432	CTD	0-520
576		11:19	36°06.0'	08°58.6'	3618	CTD	0-520
577		12:42	36°06.0'	09°05.4'	3738	CTD	0-520
578		14:00	36°06.0'	09°12.2'	3970	CTD	0-520
579		15:17	36°05.9'	09°19.9'	4035	CTD	0-520
580		16:38	36°06.0'	09°25.8'	4119	CTD	0-520
581		18:05	36°05.9'	09°32.6'	3998	CTD	0-520
		18:58	36°05.9'	09°32.6'	3999	CTD	0-520
582		20:08	36°06.0'	09°39.5'	4066	CTD	0-520



Date	Station	Time local	Position N	W	Bottom depth (m)	Gear	Haul depth (m)
12.06.94	583	21:17	36°06.0'	09°46.2'	4154	CTD	0-520
	584	22:30	36°05.9'	09°53.2'	4205	CTD	0-510
	585	23:40	36°06.0'	10°00.0'	4218	CTD	0-520
13.06.94		00:21	36°05.9'	10°00.2'	4218	IKMT	75-0
		01:31	36°10.9'	10°00.0'	4290		
	586	04:04	36°30.9'	10°00.0'	3869	IKMT	80-0
		05:35	36°37.4'	10°00.0'	3471		
		06:00	36°35.9'	10°00.0'	3480	CTD	0-520
	587	07:20	36°36.0'	09°53.1'	3428	CTD	0-520
	588	08:45	36°36.0'	09°46.0'	3528	CTD	0-520
	589	09:57	36°36.0'	09°39.4'	3358	CTD	0-510
	590	11:07	36°36.0'	09°32.5'	3120	CTD	0-520
	591	12:20	36°36.0'	09°25.8'	2298	CTD	0-510
	592	13:40	36°36.0'	09°19.0'	2150	CTD	0-520
	593	14:56	36°36.0'	09°12.2'	1837	CTD	0-510
	594	16:30	36°36.1'	09°05.5'	2163	CTD	0-520
	595	18:00	36°36.0'	08°58.8'	1625	CTD	0-520
	596	19:17	36°36.0'	08°52.0'	1680	CTD	0-520
597	20:37	36°35.9'	08°45.2'	926	CTD	0-520	
598	21:55	36°35.9'	08°38.6'	1042	CTD	0-520	
14.06.94	599	00:02	36°38.4'	08°52.0'	803	CTD	0-520
		00:39	36°38.4'	08°52.0'	805	IKMT	75-0
		01:53	36°38.5'	08°44.6'	803		
	600	02:17	36°39.4'	08°44.8'	856	IKMT	75-0
		03:29	36°42.6'	08°49.8'	719		
		03:55	36°43.2'	08°52.0'	695	CTD	0-520
	601	08:52	37°05.0'	09°00.0'	62	CTD	0-60
	602	09:53	37°05.4'	09°06.7'	98	CTD	0-85
	603	10:52	37°05.0'	09°13.4'	1380	CTD	0-520
	604	12:14	37°05.0'	09°20.3'	1445	CTD	0-520
	605	13:28	37°05.0'	09°07.0'	1011	CTD	0-520
	606	14:38	37°05.0'	09°33.8'	1732	CTD	0-520
	607	15:48	37°04.9'	09°40.5'	2235	CTD	0-500
	608	17:20	37°05.0'	09°47.2'	3079	CTD	0-500
	609	18:43	37°05.0'	09°53.8'	3230	CTD	0-520
610	20:05	37°04.9'	10°00.7'	3225	CTD	0-520	
	20:38	37°05.0'	10°00.8'	3231	IPR	0-200	
	21:20	37°09.3'	10°02.7'				
	21:28	37°09.7'	10°02.9'	3768	IPR	0-200	
	22:12	37°13.4'	10°04.5'				
15.06.94	611	23:28	37°05.0'	10°07.5'	3980	CTD	0-510
		00:21	37°04.7'	10°07.8'	3888	IKMT	80-0
		01:28	37°09.6'	10°07.7'	3832		
	612	05:29	37°29.6'	10°00.1'	2782	IKMT	100-0
		06:51	37°37.2'	10°00.8'	2700		
		07:32	37°35.0'	09°59.0'	2522	CTD	0-520
	613	08:57	37°35.1'	09°52.2'	2805	CTD	0-520
	614	10:05	37°34.9'	09°45.4'	2840	CTD	0-520
	615	11:19	37°35.0'	09°38.6'	1580	CTD	0-520
	616	12:29	37°35.0'	09°31.8'	1306	CTD	0-520
617	13:48	37°35.0'	09°24.9'	954	CTD	0-520	

Date	Station	Time local	Position N	W	Bottom depth (m)	Gear	Haul depth (m)	
15.06.94	618	15:01	37°35.0'	09°18.1'	672	CTD	0-520	
	619	16:10	37°35.0'	09°11.4'	448	CTD	0-440	
	620	17:25	37°35.0'	09°04.6'	273	CTD	0-260	
	621	18:22	37°34.9'	08°57.6'	150	CTD	0-140	
	622	19:15	37°34.9'	08°51.6'	77	CTD	0-65	
	623	21:30	37°20.1'	08°54.0'	60	CTD	0-55	
	624	22:22	37°20.0'	09°00.0'	134	CTD	0-130	
16.06.94	625	23:16	37°20.0'	09°06.2'	228	CTD	0-220	
	626	00:20	37°20.0'	09°12.5'	413	CTD	0-410	
	627	01:32	37°20.0'	09°19.1'	838	CTD	0-520	
	628	02:39	37°15.1'	09°19.0'	764	CTD	0-520	
	629	03:43	37°10.0'	09°19.0'	901	CTD	0-520	
	630	05:04	37°10.0'	09°12.5'	908	CTD	0-520	
	631	06:00	37°15.0'	09°12.5'	270	CTD	0-260	
	632	07:05	37°15.0'	09°06.1'	168	CTD	0-165	
	633	08:10	37°10.0'	09°06.0'	127	CTD	0-120	
	634	09:08	37°10.0'	08°59.8'	66	CTD	0-60	
	635	10:00	37°15.0'	08°59.9'	98	CTD	0-95	
	636	10:52	37°15.0'	08°54.2'	50	CTD	0-45	
			11:05	37°15.2'	08°54.2'	50	MOC1	0-40
			11:12				MOC2	40-0
			11:19	37°15.9'	08°54.1'	47		
			12:13	37°15.0'	08°54.1'	45	IKMT	35-0
			12:59	37°18.5'	08°54.1'	47		
			13:20	37°17.4'	08°54.1'	41	MOC1	0-39
			13:23				MOC2	39-35
			13:28				MOC3	35-30
			13:33				MOC4	30-25
			13:39				MOC5	25-20
			13:44				MOC6	20-15
			13:49				MOC7	15-10
			13:55				MOC8	10-5
			14:01				MOC9	5-0
			14:08	37°15.1'	08°54.2'	45		
	637	15:37	37°17.5'	09°00.0'	117	IPR	200-0	
		17:40	37°17.5'	09°13.7'	436			
	638	18:35	37°12.2'	09°12.5'	504	IPR	200-0	
		20:12	37°12.2'	09°00.4'				
	639	20:41	37°14.8'	09°00.0'	103	MOC1	0-97	
		20:45				MOC2	97-75	
		20:51				MOC3	75-50	
		20:56				MOC4	50-25	
		21:02				MOC5	25-20	
		21:07				MOC6	20-15	
		21:12				MOC7	15-10	
		21:17				MOC8	10-5	
		21:22				MOC9	5-0	
		21:28	37°14.8'	09°02.2'	112			
		22:25	37°14.9'	08°59.7'	107	IKMT	95-0	
		23:08	37°19.0'	08°59.7'	118			

Date	Station	Time local	Position N	W	Bottom depth (m)	Gear	Haul depth (m)	
17.06.94	640	01:07	37°14.7'	09°06.0'	205	IKMT	150-0	
		01:33	37°18.2'	09°06.4'	226			
	641	02:35	37°14.9'	09°12.5'	250	MOC1	0-200	
		03:00	37°16.3'	09°12.6'	339			
		03:57	37°14.8'	09°12.4'	348	IKMT	150-0	
		04:26	37°18.6'	09°12.8'	388			
		05:13	37°15.0'	09°12.5'	262	MOC1	0-200	
		05:27				MOC2	200-175	
		05:33				MOC3	175-150	
		05:38				MOC4	150-125	
		05:44				MOC5	125-100	
		05:49				MOC6	100-75	
		05:55				MOC7	75-50	
	06:00				MOC8	50-25		
	06:06				MOC9	25-0		
	642	06:13	37°18.2'	09°12.7'	570			
		07:45	37°15.3'	09°19.0'	793	IKMT	150-0	
		08:15	37°19.9'	09°18.8'	835			
		08:26	37°20.0'	09°18.9'	837	MOC1	0-202	
		08:59	37°18.3'	09°18.7'	800			
		643	14:50	37°01.0'	08°44.9'	50	CTD	0-50
		644	15:42	36°56.0'	08°44.9'	103	CTD	0-100
		645	16:40	36°51.0'	08°45.0'	347	CTD	0-340
		646	17:37	36°46.0'	08°45.0'	573	CTD	0-520
		647	18:43	36°40.9'	08°45.0'	877	CTD	0-520
		648	19:38	36°41.1'	08°38.9'	725	CTD	0-520
	649	20:55	36°45.9'	08°39.0'	625	CTD	0-520	
		22:00	36°51.0'	08°39.0'	270	CTD	0-260	
		22:30	36°51.0'	08°39.1'	257	MOC1	0-200	
		22:40				MOC2	200-175	
		22:45				MOC3	175-150	
		22:50				MOC4	150-125	
		22:56				MOC5	125-100	
23:01					MOC6	100-75		
23:06					MOC7	75-50		
23:12					MOC8	50-25		
23:17					MOC9	25-0		
18.06.94		23:25	36°52.9'	08°41.2'	107			
		00:27	36°51.4'	08°39.9'	206	IKMT	134-0	
		01:12	36°52.9'	08°43.3'	105			
	651	02:15	36°46.1'	08°39.0'	588	MOC1	0-200	
		02:29				MOC2	200-175	
		02:35				MOC3	175-150	
		02:40				MOC4	150-125	
		02:45				MOC5	125-0	
	652	03:11	36°48.4'	08°41.5'	357			
		04:15	36°46.9'	08°41.2'	498	IKMT	135-0	
		04:47	36°47.8'	08°43.2'	410			
06:34		36°42.9'	08°40.3'	740	IKMT	130-0		
07:10		36°44.7'	08°41.7'	678				

Date	Station	Time local	Position N	W	Bottom depth (m)	Gear	Haul depth (m)	
18.06.94	652	08:00	36°41.1'	08°38.9'	745	MOC1	0-200	
		08:15				MOC2	200-0	
		08:41	36°43.4'	08°39.4'	740			
	653	09:35	36°41.0'	08°33.0'	1426	CTD	0-520	
	654	10:45	36°46.0'	08°33.0'	832	CTD	0-520	
	655	11:48	36°51.0'	08°33.0'	372	CTD	0-360	
	656	12:44	36°56.0'	08°33.0'	73	CTD	0-70	
	657	13:37	37°01.0'	08°33.0'	45	CTD	0-40	
	658	14:36	37°01.0'	08°38.9'	53	CTD	0-50	
	659	15:28	36°55.9'	08°39.0'	88	CTD	0-80	
	660	16:22	37°01.0'	08°39.1'	52	MOC1	0-47	
		16:26			56	MOC2	47-40	
		16:31				MOC3	40-35	
		16:36				MOC4	35-30	
		16:41				MOC5	30-25	
		16:46				MOC6	25-20	
		16:51				MOC7	20-0	
		17:00	37°00.9'	08°41.2'	49			
		17:28	37°01.0'	08°39.1'	52	IKMT	49-0	
		18:09	37°00.8'	08°42.4'	47			
		661	19:05	36°56.0'	08°39.2'	91	MOC1	0-84
			19:10				MOC2	84-75
			19:15				MOC3	75-47
			19:23				MOC4	47-25
			19:29				MOC5	25-20
			19:35				MOC6	20-15
			19:40				MOC7	15-10
	19:46					MOC8	10-5	
	19:51					MOC9	5-0	
	19:56		36°57.1'	08°41.5'	91			
20:45	36°56.8'	08°40.3'	92	IKMT	90-0			
21:17	36°57.6'	08°42.0'	89					
662	21:55	36°53.5'	08°42.0'	106	IPR	200-0		
19.06.94	663	23:55	36°42.6'	08°42.3'	758			
		00:02	36°42.9'	08°42.0'	743	IPR	200-0	
664	01:02	36°43.4'	08°35.7'	747				
	01:08	36°43.7'	08°35.5'	748	IPR	200-0		
665	02:56	36°52.9'	08°36.0'	108				
	03:05	36°53.4'	08°36.3'	105	IPR	80-0		
666	03:35	36°53.4'	08°39.3'	103				
	07:07	37°00.1'	08°51.3'	70	BON	0-62		
	07:28	37°00.3'	08°50.0'	66				
	07:33	37°00.2'	08°49.8'	62	BON	0-60		
	07:57	37°00.0'	08°51.2'	66				
	08:05	37°00.0'	08°51.6'	66	BON	0-63		
	08:26	37°00.4'	08°50.1'	65				
	08:32	37°00.4'	08°50.1'	65	CTD	0-60		
667	10:07	37°00.0'	08°59.0'	32	CTD	0-30		
668	10:36	36°58.3'	09°00.7'	68	CTD	0-65		
669	11:03	36°56.5'	09°02.6'	100	CTD	0-95		

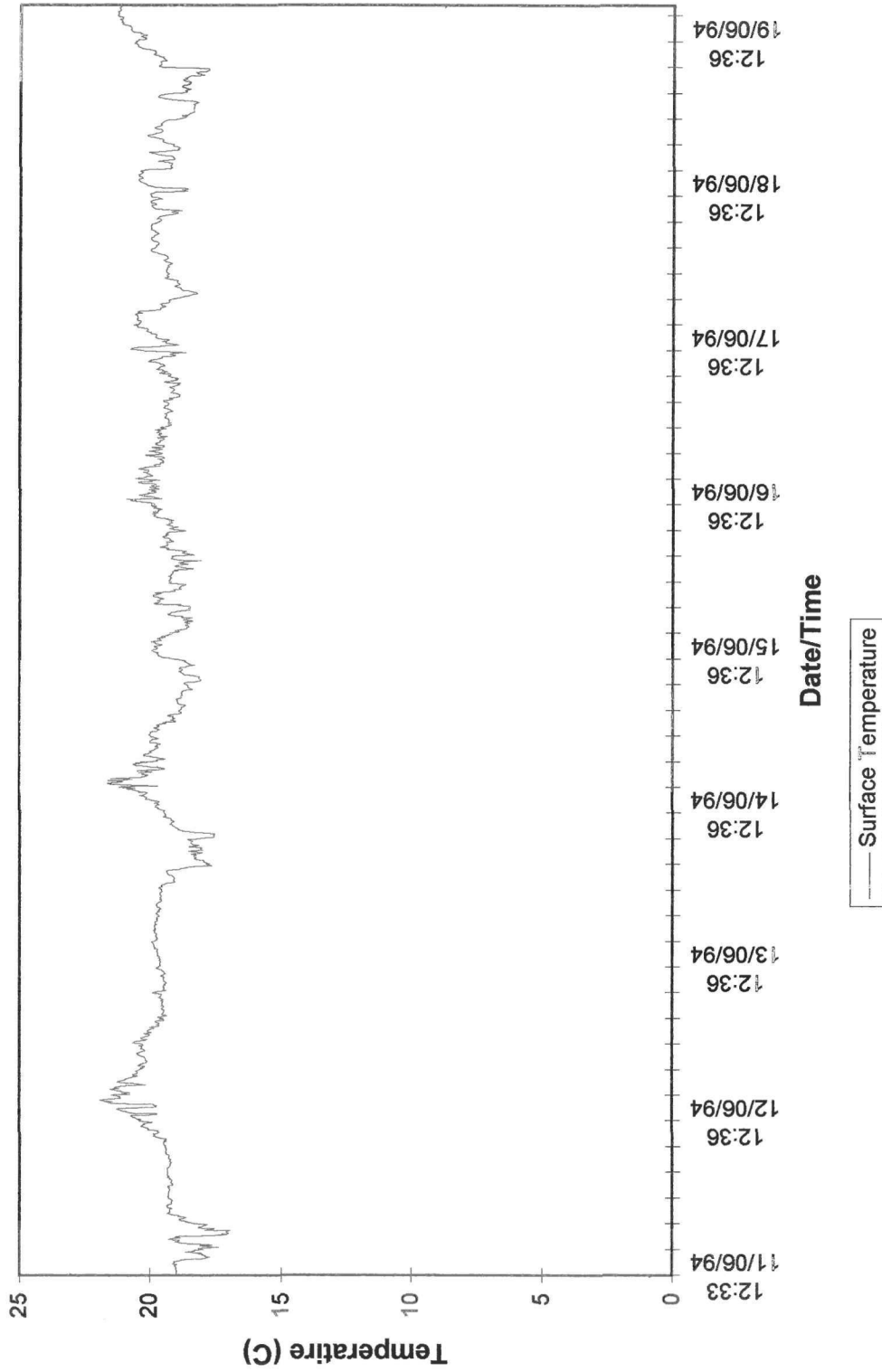
Date	Station	Time local	Position N	W	Bottom depth (m)	Gear	Haul depth (m)	
19.06.94	670	11:43	36°53.4'	09°06.5'	572	CTD	0-520	
	671	12:49	36°49.5'	09°10.8'	641	CTD	0-520	
	672	13:52	36°46.0'	09°15.0'	831	CTD	0-520	
	673	15:16	36°42.0'	09°19.1'	1065	CTD	0-520	
	674	16:21	36°38.6'	09°23.3'	1582	CTD	0-520	
	675	17:26	36°35.0'	09°27.4'	2523	CTD	0-520	
	676	18:24	36°31.3'	09°31.5'	3088	CTD	0-520	
	677	19:30	36°27.6'	09°35.7'	3432	CTD	0-520	
	678	20:40	36°23.6'	09°40.0'	3572	CTD	0-520	
	679	21:47	36°20.3'	09°44.1'	3665	CTD	0-520	
			22:00	36°20.4'	09°44.2'	3681	MOC1	0-200
			22:13				MOC2	200-175
			22:18				MOC3	175-150
			22:24				MOC4	150-125
			22:30				MOC5	125-100
			22:36				MOC6	100-75
			22:41				MOC7	75-50
			22:46				MOC8	50-25
			22:51				MOC9	25-0
			22:57	36°21.9'	09°40.9'	3610		
		23:41	36°22.1'	09°40.6'	3611	IKMT	155-0	
20.06.94		00:29	36°24.8'	09°35.2'	3439			
	680	01:46	36°28.2'	09°28.5'	3223	IKMT	100-0	
		02:30	36°29.9'	09°24.7'	3046			
	681	03:45	36°32.9'	09°18.0'	2361	IKMT	80-0	
		04:34	36°34.7'	09°14.1'	2323			
	682	12:00	37°01.4'	08°18.0'	25	CTD	0-20	
	683	12:30	36°59.0'	08°18.0'	51	CTD	0-50	
	684	13:02	36°56.5'	08°18.0'	76	CTD	0-75	
	685	13:35	36°54.0'	08°18.0'	93	CTD	0-90	
	686	14:08	36°51.5'	08°18.0'	112	CTD	0-110	
	687	14:40	36°49.0'	08°18.0'	219	CTD	0-210	
	688	15:19	36°46.4'	08°17.9'	482	CTD	0-480	
	689	16:03	36°44.0'	08°18.0'	770	CTD	0-500	
	690	16:46	36°41.5'	08°17.9'	669	CTD	0-520	
	691	17:48	36°46.5'	08°18.0'	937	CTD	0-500	
	692	18:54	36°31.4'	08°17.9'	1496	CTD	0-500	
	693	19:54	36°26.4'	08°18.0'	1129	CTD	0-520	
	694	20:53	36°21.5'	08°18.0'	1720	CTD	0-520	
	695	21:52	36°16.5'	08°18.0'	1786	CTD	0-520	
	696	22:50	36°11.5'	08°18.0'	1340	CTD	0-520	
		23:32	36°11.3'	08°18.3'	1361	IKMT	100-0	
21.06.92		00:27	36°13.9'	08°22.4'	1447			
	697	01:36	36°16.6'	08°18.2'	1805	IKMT	105-0	
		02:54	36°20.3'	08°24.3'	2167			
	698	08:00	36°54.0'	08°18.0'	95	CTD	0-90	
		08:09	36°54.1'	08°17.9'	90	BON	0-80	
		08:32	36°54.7'	08°16.5'	92			
	699	09:12	36°56.5'	08°18.0'	78	CTD	0-75	

Date	Station	Time local	Position N	W	Bottom depth (m)	Gear	Haul depth (m)
21.06.94	699	09:21	36°56.5'	08°18.0'	73	BON	0-68
		09:41	36°57.0'	08°16.5'	64		
	700	10:09	36°58.9'	08°18.0'	54	CTD	0-50
		10:17	36°59.0'	08°18.0'	50	BON	0-45
		10:35	36°59.4'	08°18.0'	54		
		10:54	36°59.0'	08°18.0'	54	BON	0-48
		11:10	36°59.0'	08°17.0'	48		

ANNEX 3: Selected first results of meteorological and hydrographic investigations obtained during POSEIDON cruise 201/9

- Fig. 6: Sea surface temperature during sub-leg 2.
- Fig. 7: Air pressure during sub-leg 2.
- Fig. 8: Irradiance during sub-leg 2.
- Fig. 9: Wind speed during sub-leg 2.
- Fig. 10: Sea surface temperature of the whole investigated area.
- Fig. 11: Sea surface salinity of the whole investigated area.
- Fig. 12: Sea temperature depth profile of station transect southwest off Cape São Vicente (stations 667 to 679).
- Fig. 13: Salinity depth profile of station transect southwest off Cape São Vicente (stations 667 to 679).
- Fig. 14: Density depth profile of station transect southwest off Cape São Vicente (stations 667 to 679).
- Fig. 15: Sea temperature, salinity, density and sound velocity depth profiles of station 540 near Josephine Bank.
- Fig. 16: Sea temperature, salinity, density and sound velocity depth profiles of station 679 southwest off Cape São Vicente.

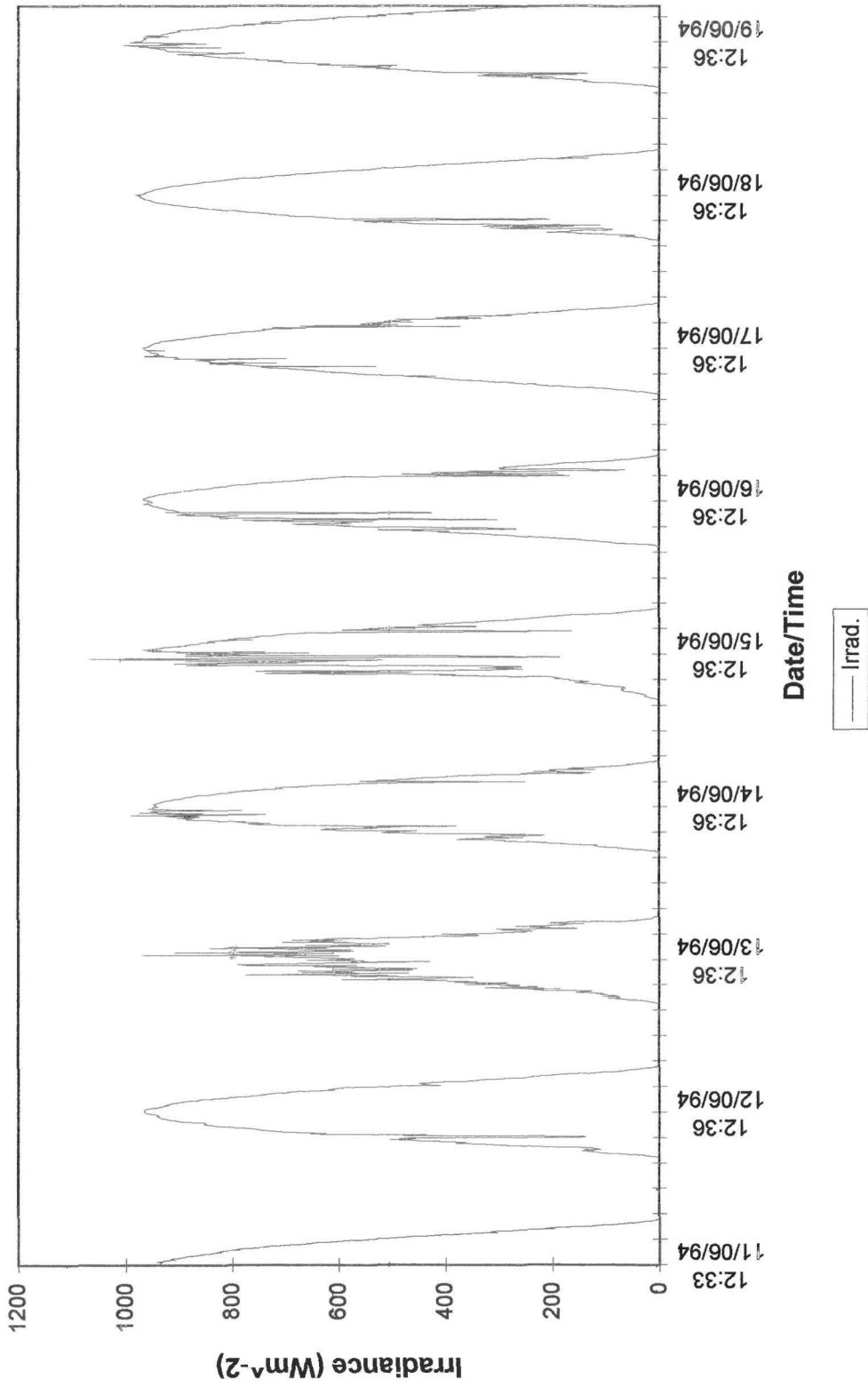
### Surface Temperature June 1994



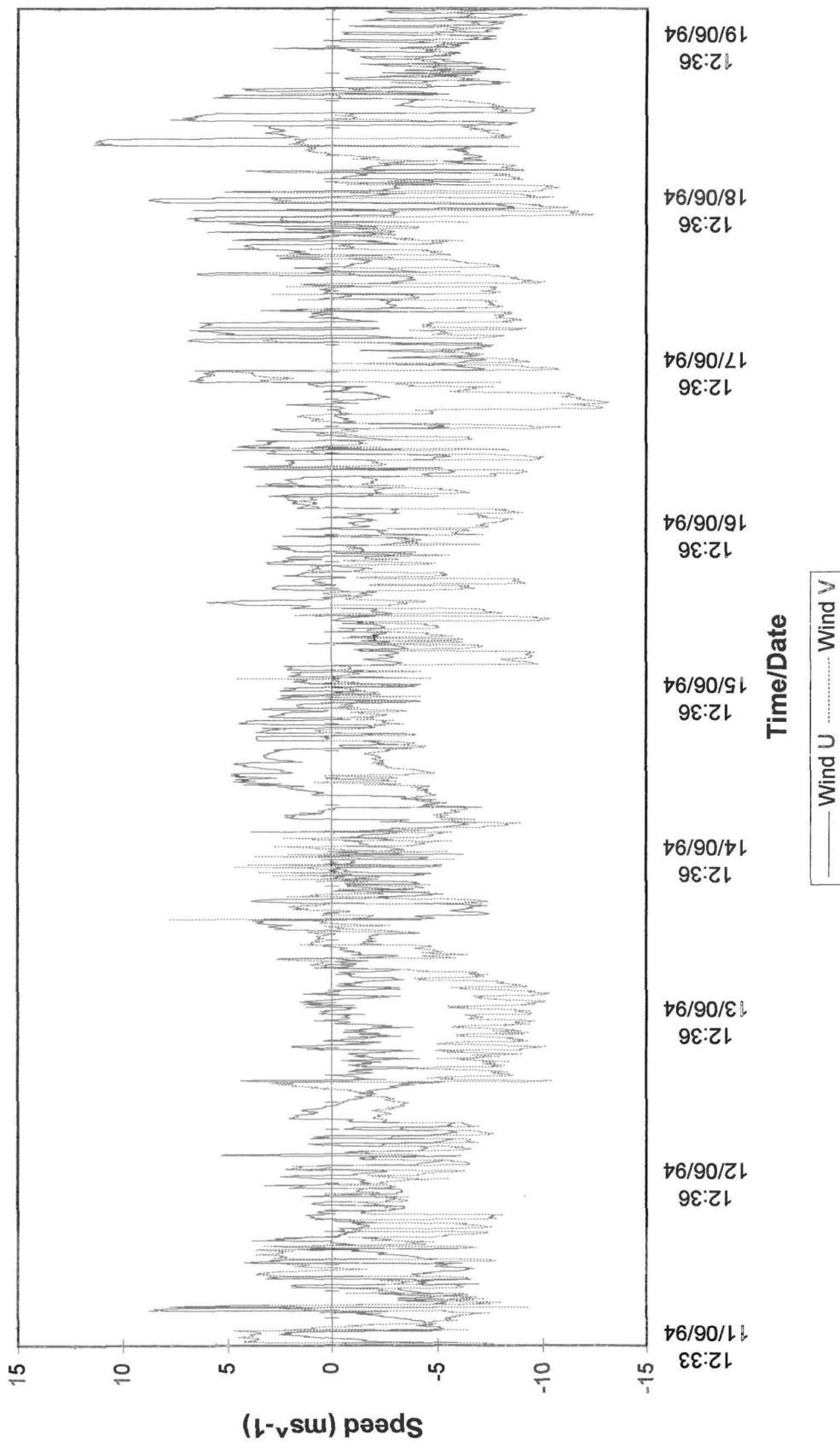




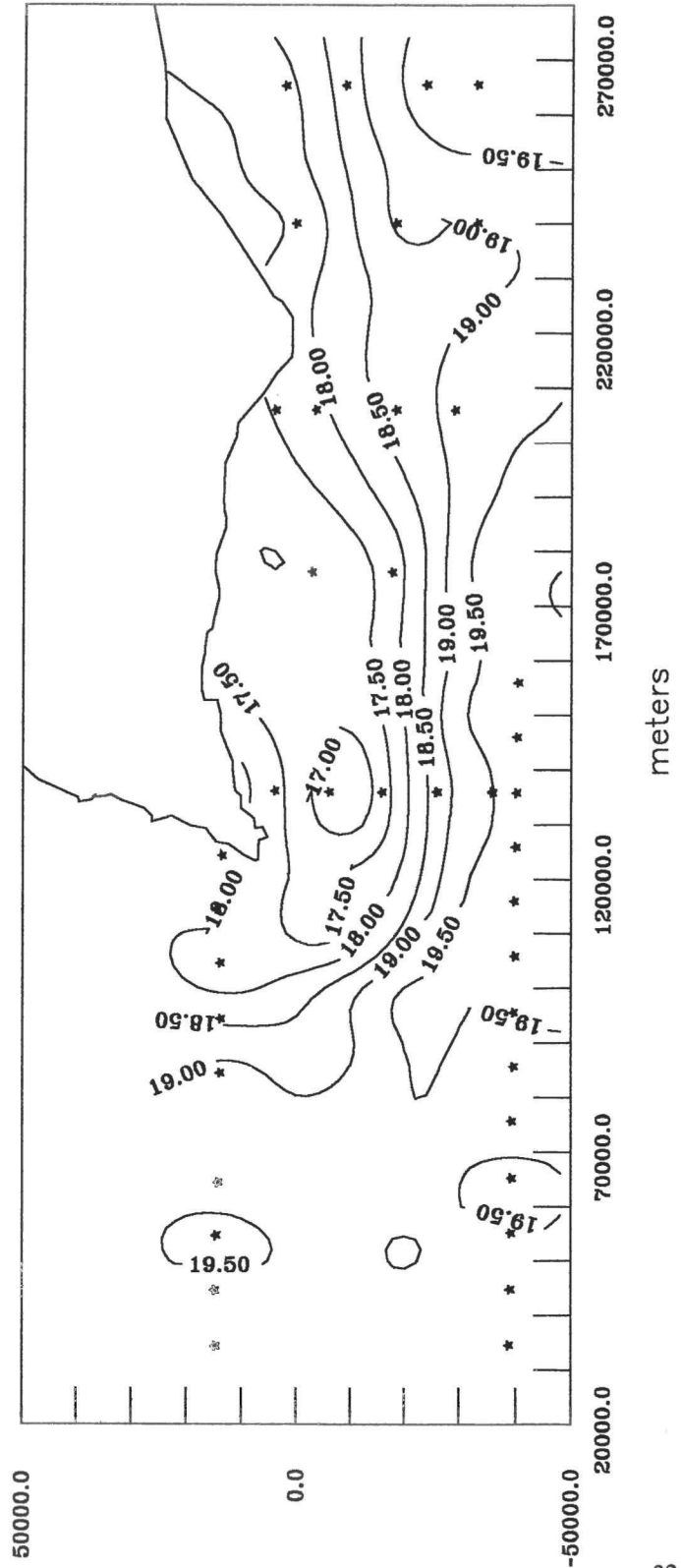
Irradiance Data June 1994



Met Data June 1994

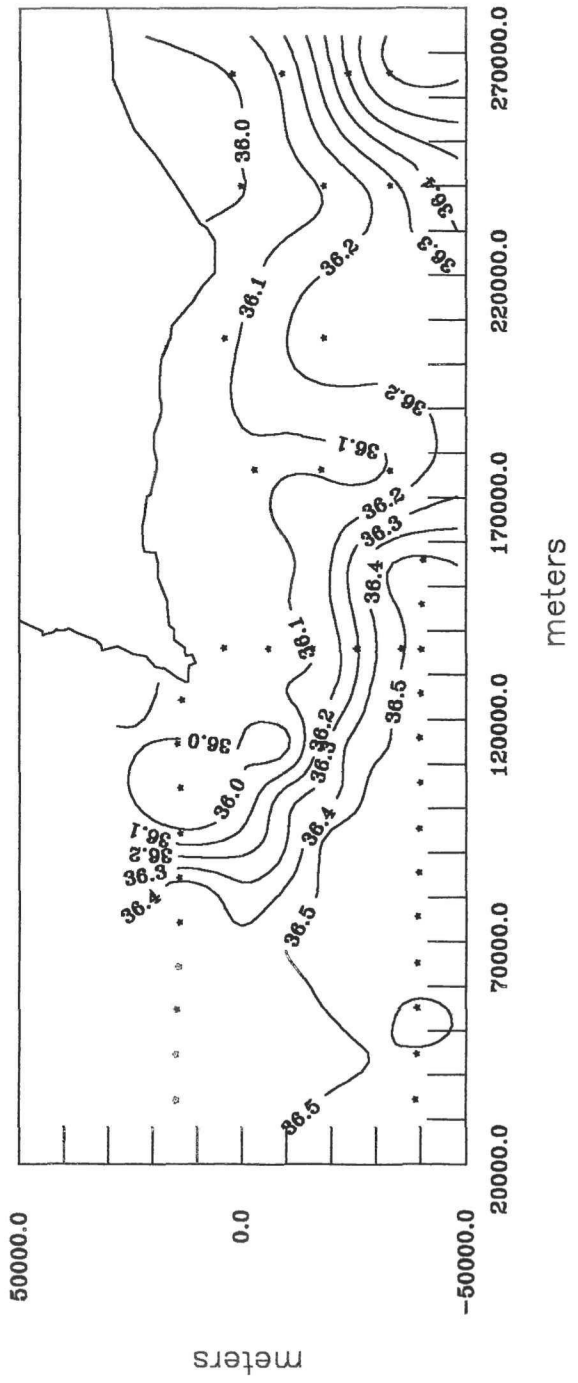


Poseidon Cruise 201/9  
Temperature Field (index 10)



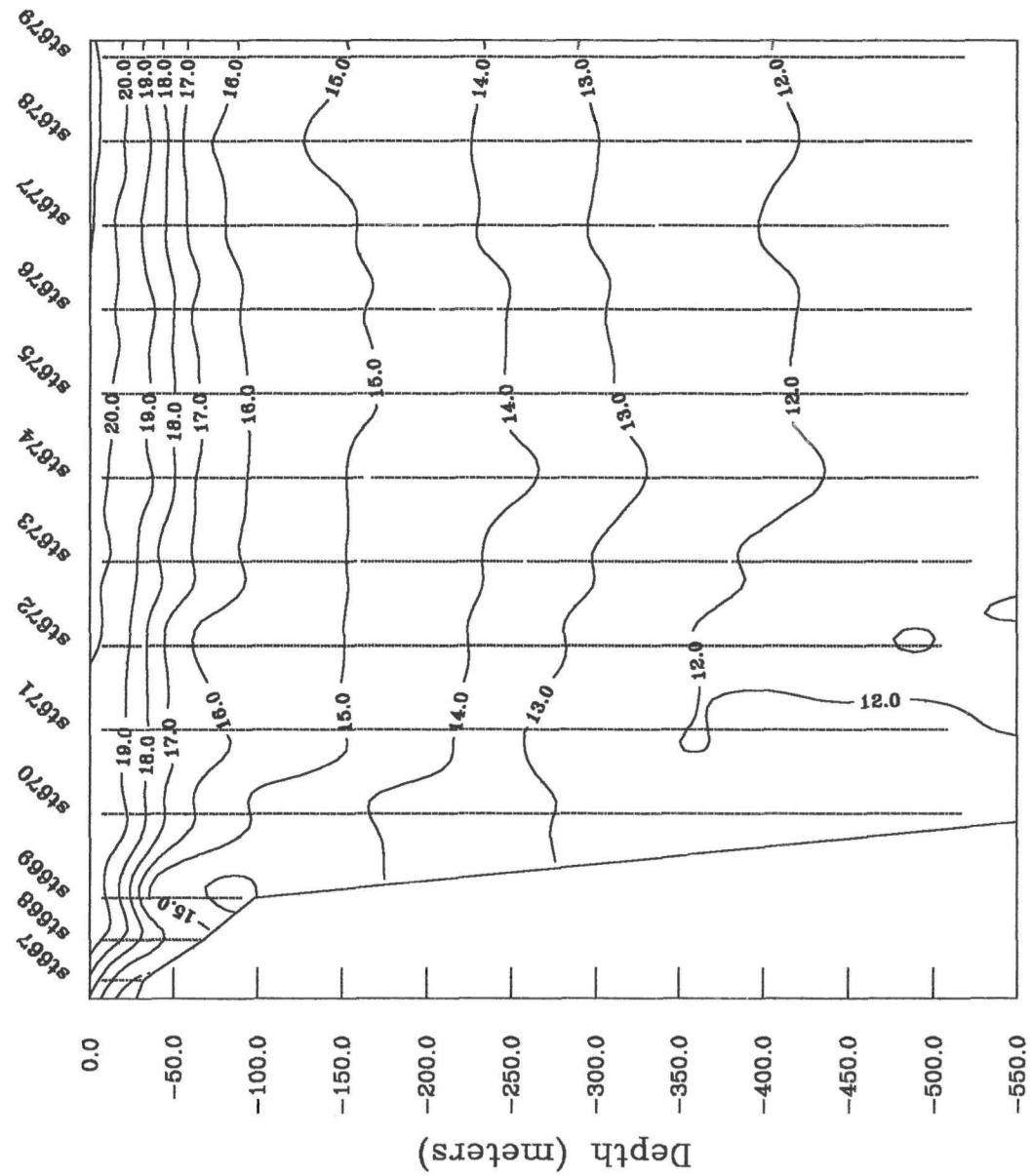
# Poseidon Cruise 201/9

Salinity Field (index 10)

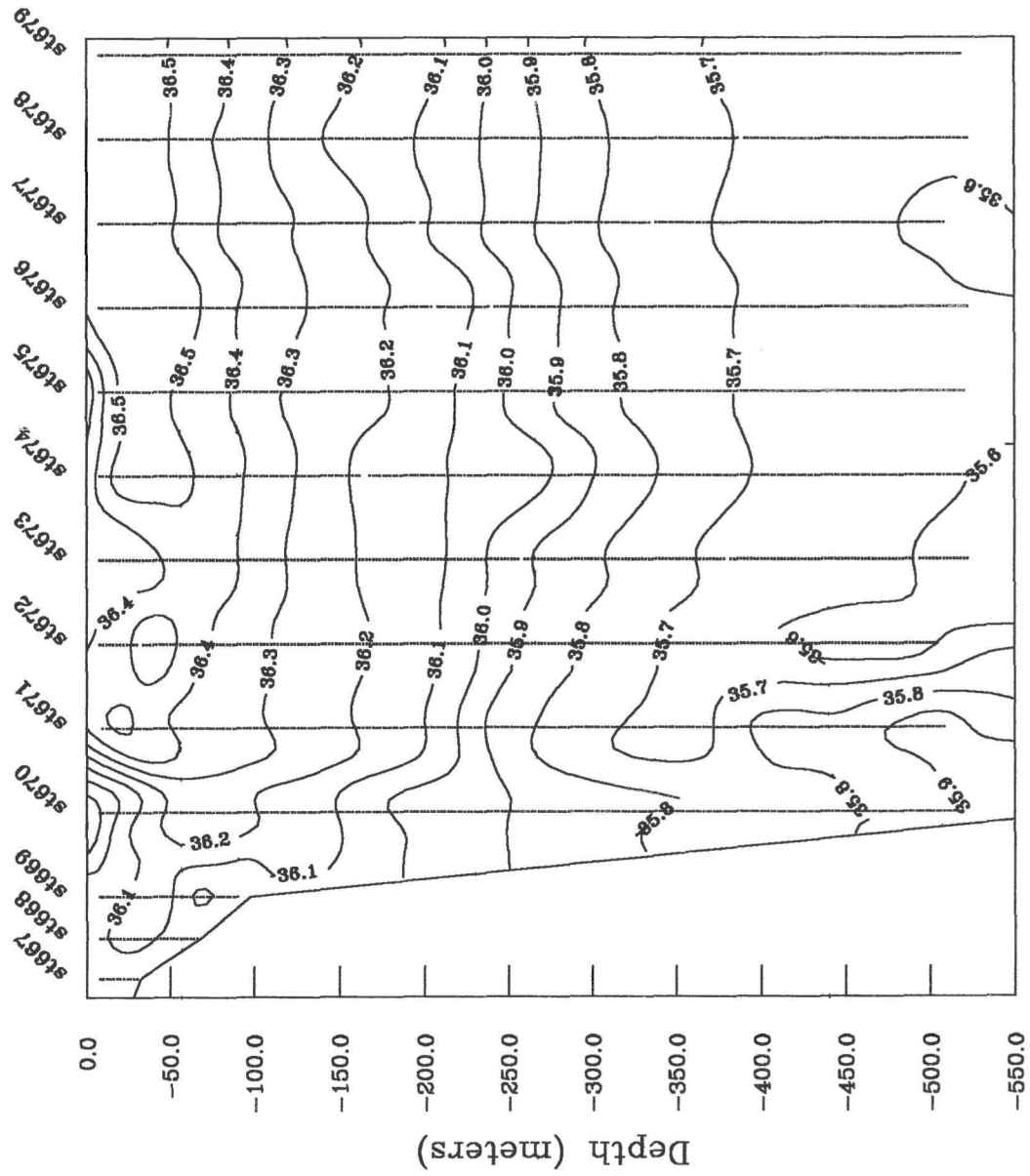


Poseidon Cruise 201/9

Section 12 --- Temperature

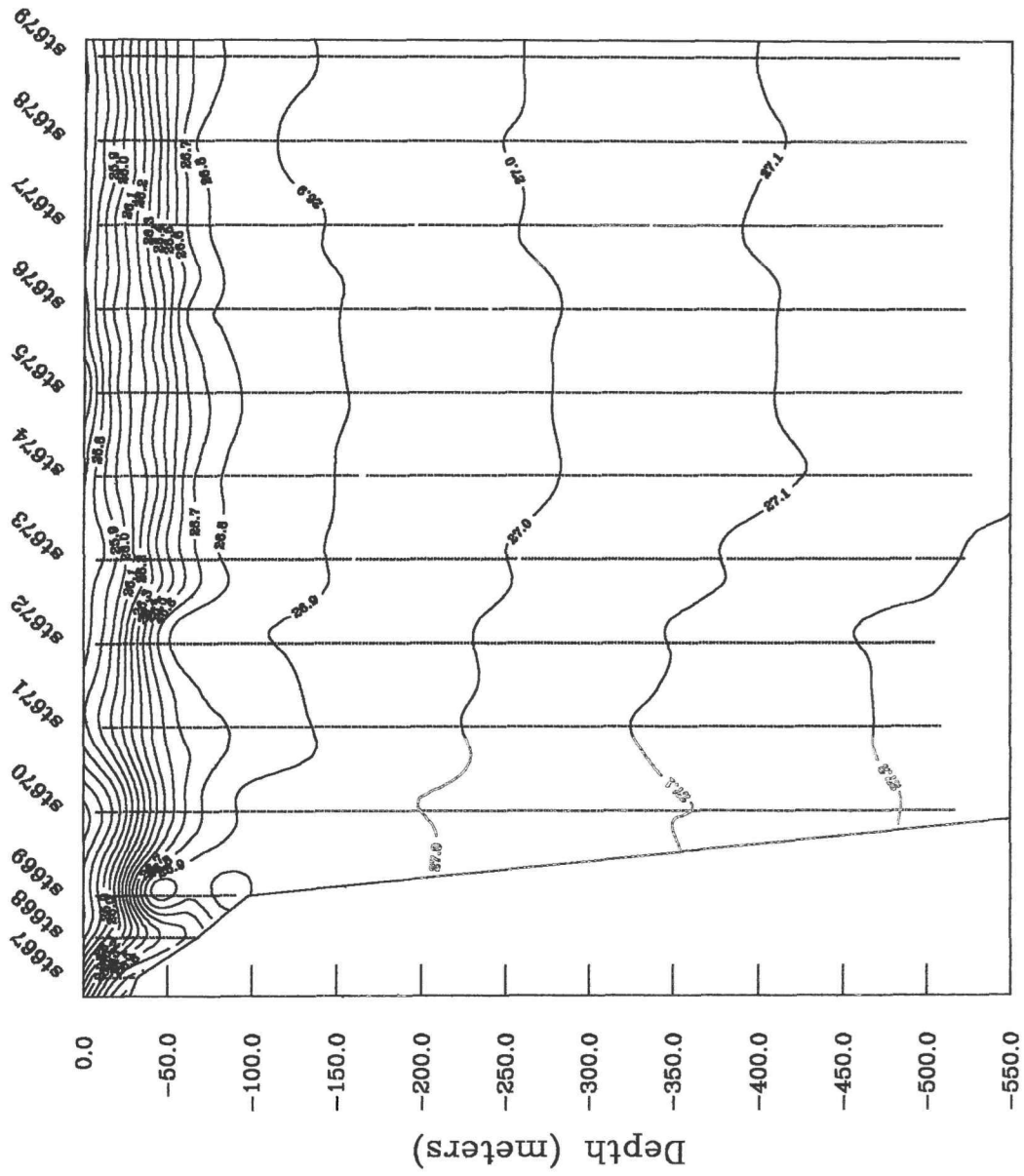


Poseidon Cruise 201/9  
Section 12 --- Salinity



Poseidon Cruise 201/9

Section 12 --- Density





ST540.CNU: Poseidon Cruise 2011/9

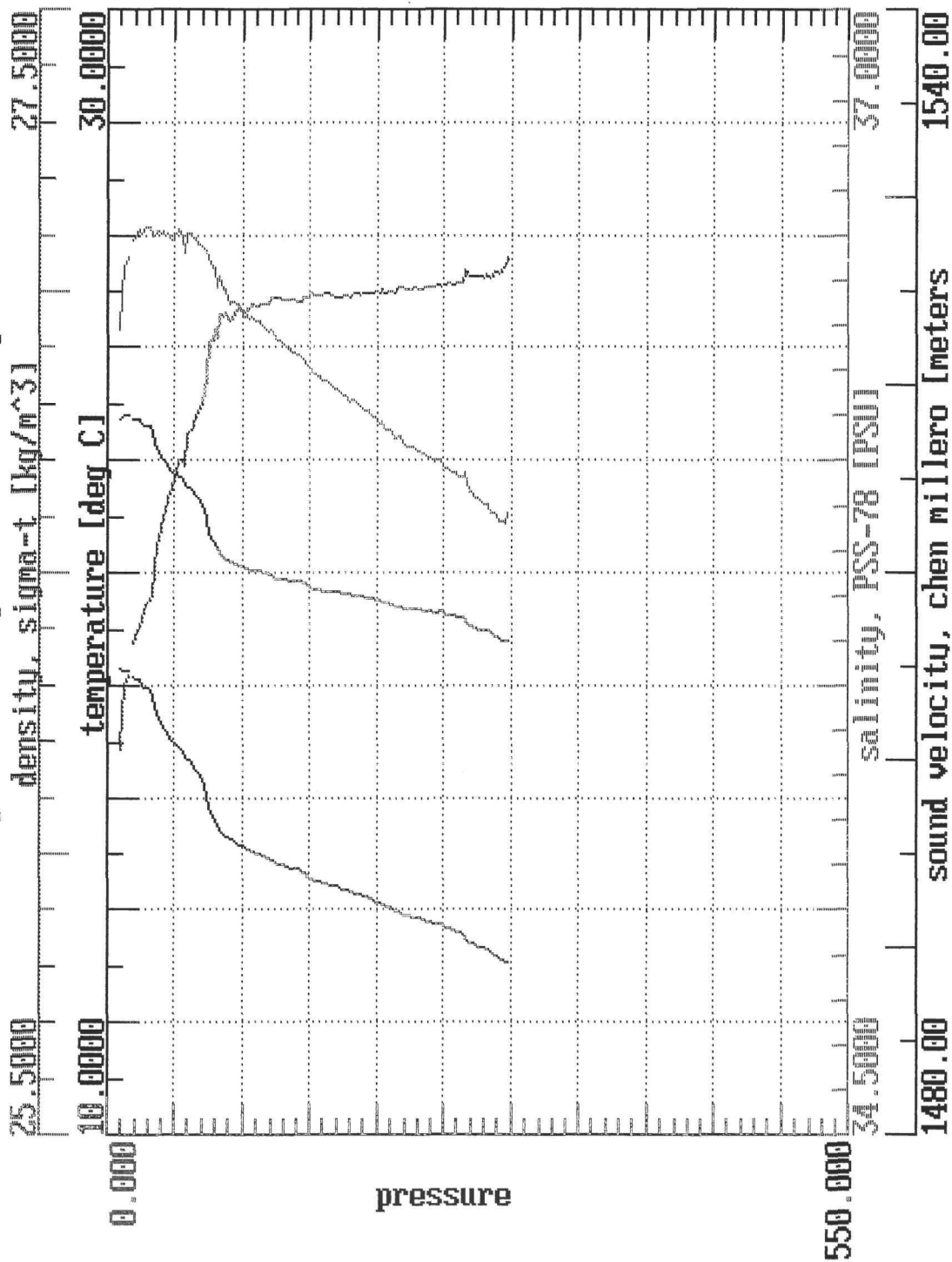


FIG. 16

