

**The zooplankton community
in the deep bathyal and abyssal zones
of the eastern North Atlantic.
Preliminary results and data lists from
MOCNESS hauls during cruise 08 of the
RV "POLARSTERN"**

Werner Beckmann

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W. Beckmann

Institut für Hydrobiologie und Fischereiwissenschaft der Universität Hamburg, Zeiseweg 9, 2000 Hamburg 50, Federal Republic of Germany

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ABSTRACT

During September 1985, four hauls were made with a 1 m² MOCNESS equipped with 333 μ m mesh nets to collect zooplankton from depths between 3400 and 4700 m in the eastern North Atlantic. These depths ranged from 220 to 1500 m above the sea floor. Data lists for 30 of the samples are presented. The preliminary results and performance of the device are discussed.

The biomass and total numerical abundance fell well within the relatively wide ranges reported in the very limited body of literature. Calanoid copepods constituted the most important taxonomic group with relative numerical abundances of 41 to 82.5 % . Chaetognaths and ostracods followed in order of abundance. Vertical gradients in abundance were apparent for smaller taxonomic groups within the Copepoda. In the discussion, special attention is paid to differences in the structure of the plankton community relative to the distance from the bottom.

1. INTRODUCTION

The multidisciplinary German research program, BIOTRANS (Biologischer Vertikaltransport und Energiehaushalt in der bodennahen Wasserschicht der Tiefsee), focuses on ecological processes at the bottom and in the overlying 500 m of the water column in the deep bathyal and upper abyssal zones (THIEL 1986). One important aspect of our zooplankton investigations is the vertical gradients of both abundance and taxonomic composition relative to the distance from the bottom. Several authors reported increases in zooplankton or micronekton abundance with depth within 100 m of the deep-sea floor (WISHNER 1980a; ANGEL & BAKER 1982; SMITH 1982; ELLIS 1983; HARGREAVES 1984, 1985; HARGREAVES et al. 1984; DOMANSKI 1986; ROE 1986; ROE et al. 1986; SMITH et al. 1986). Gradients in abundance are obviously accompanied by distinct changes in the taxonomic structure of the pelagic community (for zooplankton see WISHNER 1980b; ROE 1986).

The survey described herein encompassed the zone from about 200 to 1500 m above the bottom and yielded the first detailed information on the zooplankton community structure within the upper parts of the bottom nepheloid layer. In the area chosen for the BIOTRANS project, the thickness of this layer was found to be as much as 1000 m (NYFFELER & GODET 1986).

Quantitative data from below 2000 m on the total amount of zooplankton and its taxonomic composition are extremely rare in the literature. Most relevant research was restricted to major taxonomic groups, such as calanoid copepods (e.g. GRICE & HÜLSEMANN 1965, 1967; WHEELER 1970) or ostracods (ANGEL 1983). Exceptions are the first ecological near-bottom study of WISHNER (1980b), the comprehensive work of VINOGRADOV (1968), and a small amount of data provided by COLMAN (1962), GREZE (1963), and SCOTTO DI CARLO et al. (1984). Therefore, complete data lists for the sample series from the deep bathyal and abyssal zones are regarded as useful and presented in the Appendix.

2. MATERIAL AND METHODS

2.1. Sampling and sorting procedures

During the first leg (BIOTRANS III) of cruise 08 (ANTARKTIS IV) of the RV "POLARSTERN", 30 zooplankton samples were obtained from four hauls with a MOCNESS (Multiple Opening/Closing Net Environmental Sensing System; WIEBE et al. 1976, 1985) in the Northeast Atlantic at depths between 3400 and 4700m (BECKMANN 1986). At the optimal angle of 45°

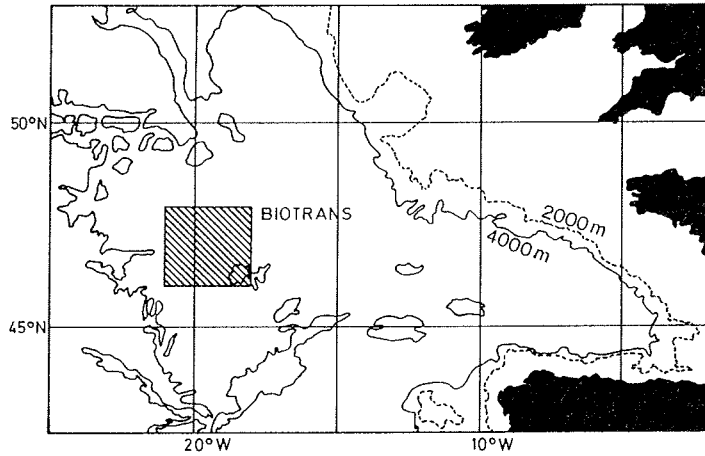
between its frame and the direction of water flow, the system filters an area of 1 m². The angle of the frame to the vertical axis is measured with an inclinometer attached to the apparatus, and this value plus the angle of deviation of the towing direction from the horizontal axis remained between 32° and 58° during the hauls. Hence, an optimal filtration efficiency of the nets is assumed.

The 1m² MOCNESS was equipped with nine 333µm nets, which were sequentially operated via a conductor cable. In order to stabilize the device, it was lowered to the maximum depth with the first net open. Samples from this net, which moved through nearly the entire water column, have not been considered in the study. The ship's speed during the tows was 1.5 to 2.5 knots.

Unfortunately, the sampling strategy was greatly influenced by some technical constraints. There was no opportunity to directly measure actual distances from the bottom. Moreover, repeated sampling within distinct depth ranges was often hampered by problems with the winch. During hauling, the winch had to be stopped often, and sometimes the towing cable had to be paid out again in order to wind it up correctly. In most cases, samples were taken during similar time intervals.

Figure 1 shows the sites of the MOCNESS tows, and Table 1 summarizes relevant data for each station. Samples were preserved in a 4% formalin-seawater solution buffered with hexamethylenetetramine. Biomass wet weights were determined using the method of TRANTER (1962). Large organisms (≥ 1.5 cm) were removed before weighing. Samples from nets 2 and 9, i.e., the first and last ones taken during each haul, were excluded from biomass determinations because of a significantly increased rate of contamination during passage through the shallower layers.

A main problem in sorting deep-sea zooplankton is the reliable separation of animals that had been alive at time of collection from molts and carcasses. This is difficult because the organisms remain in the nets for a long time, up to eight hours during this study, before they can be preserved. In order to distinguish living from dead copepods, the criteria of WHEELER (1967) were applied: the condition of the swimming legs and the presence of tissue in the first antennae. WISHNER (1980b) counted all specimens containing any traces of organs or tissues as living, taking into account tow durations of up to 17 hours. Among the specimens caught during the BIOTRANS investigation, several individuals with tissue remains in their bodies had to be regarded as dead prior to collection. However, to a certain extent, the categories "alive" and "dead" remain subjective.



BATHYMETRY

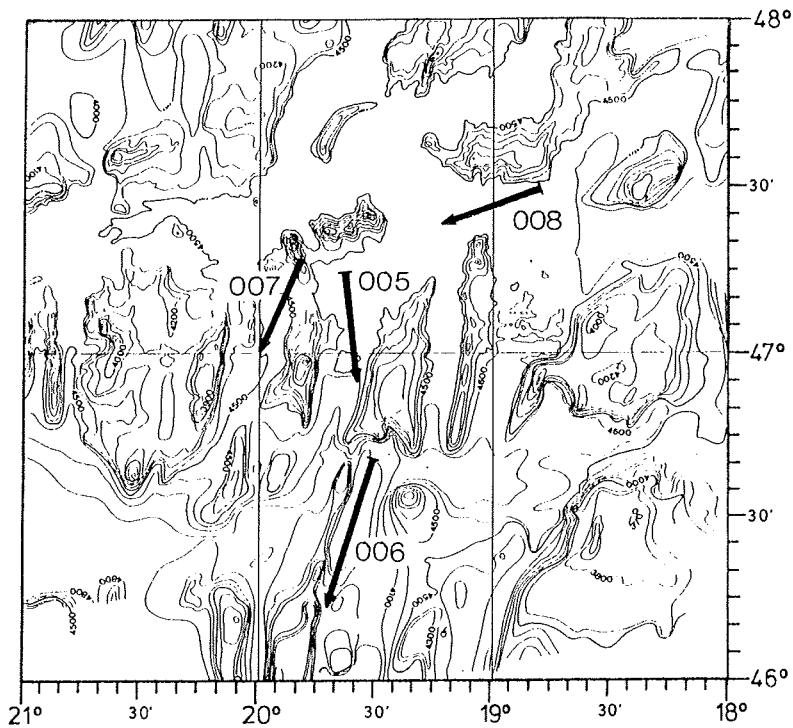


Figure 1: Locations of MOCNESS tows during the first leg of cruise 08 of the RV "Polarstern".
 Above: Investigation area in the West European Basin.
 Below: Bathymetric chart of the same area (HEINRICH 1986)

Table 1: Data on the sampling with the MOCNESS in the deep Northeast Atlantic in September 1985 during cruise ANTARKTIS IV/1a (BIOTRANS III) of the RV "Polarstern"

DAB : Depth range above the bottom (m)

VOL : Calculated water volume filtered (m³)

- 1) Haul: MOC-1-005
 Station 08/005
 Date: 08/09-09-1985
 Position: 47°15'N; 19°37'W - 46°55; 19°35'W

Net	Sampling time	Depth range (m)	DAB	VOL
2	22.08-22.27	4348-4322	240-265	1150
3	22.27-22.47	4338-4258	250-330	1180
4	no sample, loss of cod-end bucket			
5	23.07-23.27	4318-4284	270-305	1340
6	23.27-23.48	4300-4338	275-240	1390
7	23.48-00.07	4324-4182	240-385	1420
8	00.07-00.27	4180-4208	375-350	1290
9	00.27-00.47	4220-4194	325-350	1430

- 2) Haul: MOC-1-006
 Station 08/010
 Date: 11-09-1985
 Position: 46°42'N; 19°30'W - 46°13'N; 19°42'W

Net	Sampling time	Depth range (m)	DAB	VOL
2	03.28-03.48	4630-4712	320-240	1440
3	03.48-05.27	4730-4504	220-445	6930
4	05.27-06.29	4716-4516	235-435	4010
5	06.29-06.59	4534-4444	415-505	1860
6	06.59-07.27	4516-4256	435-695	2350 ±20%
7	07.27-07.48	4256-3904	695-1030	1420 ±20%
8	07.48-08.08	3904-3564	1030-1370	1430 ±20%
9	08.08-08.28	3564-3374	1320-1510	1740 ±20%

- 3) Haul: MOC-1-007
 Station 08/020
 Date: 14-09-1985
 Position: 47°17'N; 19°49'W - 47°02'N; 20°00'W

Net	Sampling time	Depth range (m)	DAB	VOL
2	04.38-04.59	3920-4100	555-395	1120
3	04.59-05.19	4100-4200	395-305	1270
4	05.19-05.39	4200-4260	305-255	1310
5	05.39-05.54	4200-4240	275-335	1040
6	05.54-06.14	4200-4100	335-435	1390
7	06.14-06.33	4100-4000	435-545	1460
8	06.33-06.54	4000-3900	545-660	1560
9	06.54-07.14	3900-3970	660-585	1520

Table 1 (continued)

4) Haul: MOC-1-008
 Station 08/023
 Date: 16-09-1985
 Position: 47°30'N; 18°48'W - 47°24'N; 19°13'W

Net	Sampling time	Depth range (m)	DAB	VOL
2	no quantitative sample, net damage			
3*	04.49-05.11	4186-4230	410-365	1570
4*	05.11-05.31	4200-4146	395-450	1480
5	05.31-05.54	4204-4146	395-450	1470
6*	05.54-06.04	4145-4088	450-510	700
7*	06.04-06.24	4072-4152	525-445	1280
8	06.24-06.44	4172-4064	455-535	1300
9*	06.44-07.04	4032-4072	565-525	1310

* slight net damages near cod-end bucket

In the Appendix, the counts of living deep-sea specimens, contaminants, and dead animals are compiled separately for each of the 30 samples according to the taxa. Since a detailed taxonomic evaluation of the material is still in an initial phase, additional remarks on most of the groups precede the lists.

2.2. Calculation of water volumes filtered

Generally, the MOCNESS is equipped with a flow meter. This and the continuous measurement of the angle of the net frame to the vertical axis with an inclinometer enable a fairly good estimation of the water volume filtered by each net, if the deviation of the towing direction from the horizontal axis is included in the calculations (WIEBE *et al.* 1985). Flow meter data were not available during this study. Therefore, the volume was estimated using several other parameters, such as ship's speed, wire length at opening and at closing the nets, depth change of the system, and angle of the frame to the vertical axis. While lowering or raising the MOCNESS, the changes in the area filtered relative to that calculated for the angles detected by the inclinometer were considered. In four cases (Haul 6, nets 6 through 9), some of the data needed for the volume calculation were somewhat inaccurate, and the reported volumes may deviate up to 20% .

2.3. Calculation of distances from the bottom

Depth ranges from the bottom for each net were determined by estimating the position of the MOCNESS relative to the ship's position and correlating the local water depths with the system's pressure meter records. The local water depths were determined with a Honeywell Elac echosounder and from detailed SEA BEAM maps (HEINRICH 1986). All hauls were conducted above flat plains with gradual topographic changes that generally did not result in depth differences greater than about 100 meters during a complete haul (Fig. 1). The distances calculated above the bottom were rounded off to the nearest five meters and should be accurate in the range of ± 20 m. The main source of error is an over-estimation of the distance of the MOCNESS from the ship, due to the assumption of a straight towing cable for the calculations.

3. RESULTS AND DISCUSSION

3.1. General problems encountered in quantitative sampling of deep-sea zooplankton

Many quantitative zooplankton data from depths below 2000 m have been obtained from vertical net hauls at sampling intervals of 1000 m or more (COLMAN 1962, GREZE 1963, GRICE & HÜLSEMANN 1965, 1967, VINOGRADOV 1968, KING *et al.* 1978, IANORA & SCOTTO DI CARLO 1981, SCOTTO DI CARLO *et al.* 1984). Sampling narrower depth strata increases the risk that the small water samples would be especially prone to small-scale variability (WISHNER 1980a). Moreover, unfavourable ratios of deep-sea organisms to contaminants from shallower layers are found because of the low deep-sea plankton abundance. SMITH (1985) and SMITH *et al.* (1986) caught deep bathyal and abyssal near-bottom zooplankton using the "slurp gun respirometer" operated from a submersible vehicle. Their goal was to collect zooplankton in good physiological condition, and the small water volumes sampled "may be insufficient to provide a good estimate of abundance due to spatial variations in macrozooplankton distribution" (SMITH 1985). WISHNER (1980a,b) used a small net with a 0.16 m² area at its opening attached to a deep tow system. However, animals collected during extremely long tows are badly damaged or have even decomposed before preservation.

Consequently, horizontally or obliquely towed multiple net systems with larger filtration areas are most suitable for profiles with a fine depth resolution. Thus, British researchers employed the RMT 1+8M (ROE & SHALE 1979) for sampling zooplankton and micronekton at bathyal and abyssal

depths (ANGEL & BAKER 1982; ANGEL 1983; HARGREAVES 1984, 1985; HARGREAVES et al. 1984; ELLIS 1985; DOMANSKI 1986; ROE 1986; ROE et al. 1986).

3.2. Sampling performance of the MOCNESS

The sampling performance of the MOCNESS will be briefly discussed because this apparatus has not been employed previously at such great depths.

For all four MOCNESS hauls, the data lists in the Appendix reveal a significantly greater number of organisms originating from shallower waters in nets 2 and 9 than in nets 3 through 8. Net 9 contained considerably more contaminants than net 2. The explanation is that while the MOCNESS is lowered and retrieved, the closing bar of net 9 is the most mobile because it is the uppermost one. Strong water pressure, such as that caused by wave action at the surface, may sometimes force it open, allowing organisms to enter the net. This means of contamination has already been postulated by SAMEOTO et al. (1980). A similar but less pronounced contamination would occur if net 2 were forced open while the device was being lowered. Its opening bar was the lowest one attached to the top beam of the MOCNESS by the toggle release.

In nets 3 through 8 only about 20 contaminant calanoid copepods were found. Considering the standing stock of over 30,000 calanoids per m² in the upper 1000 m of the water column near the sampling area during May 1985 (BECKMANN et al. 1987), the contamination rate of the MOCNESS must be regarded as very low (WIEBE et al. 1976).

3.3. Zooplankton abundance

Zooplankton biomass and numerical abundance were in the same order of magnitude as those reported in the sparse literature on depths greater than 2000 m (Table 2). The wet weights of two samples were very high, exceeding 1 g per 1000 m³ (Table 2; Fig. 2). This was due, at least in part, to large numbers of empty euthecosomatous pteropod shells, mainly those of Limacina retroversa FLEMING (see Appendix).

Net 4 always contained the least amount of living plankton. The loss of smaller organisms, such as calanoid copepods, due to slight net damage, may have occurred in nets 4 and 7 during haul 8 (Table 1). In these two samples, the relative abundances of calanoids were lower than in the other nets, but larger polychaete and chaetognath species were relatively more abundant. The data from nets 4 and 7 during haul 8 have therefore been omitted from Figures 2 through 9.

Table 2: Zooplankton data from the deep sea (net hauls from below 2000 m depth; all data per 1000 m³). DAB: Depth above bottom (m); B: Zooplankton biomass (g wet weight); Z: Total living zooplankton numbers; COP: Numbers of living copepods; CAL: Numbers of living calanoid copepods; COPEX: Numbers of copepod carcasses excluding contaminant taxa (see text)

- a): using conversion factors for displacement volume or dry weight (CUSHING *et al.* 1958)
 b): copepod biomass only
 c): probably including exoskeletons
 d): including many empty pteropod shells (see text)

Area	depth (m)	DAB	mesh (μ m)	B	Z	COP	CAL	COPEX	Authors
Eastern Tropical Pacific	2000-3000		212	2.55					KING <i>et al.</i> 1978
"	2700-2900	10- 100	183	0.93	67	52		379	WISHNER 1980a,b
"	2400-3000	10- 100	183	1.00	156	133		530	"
Equatorial Pacific	4200-4300	10- 100	183	0.13-0.15					WISHNER 1980a
"	4600-4700	10- 100	183	0.10-0.17					"
Tropical Pacific	2000-4000		380	0.09-0.61			180		VINOGRADOV 1968
"	4000-6000		380	0.06-0.37			80		"
"	6000-8000		380	0.02-0.09			50		"
North Pacific	2000-4000		380	1.03-30.0			1100		VINOGRADOV 1968
"	4000-6000		380	0.52-2.64					"
"	6000-8500		380	0.32-0.76			130		"
"	7000-8700	0-1700	380	0.31					"
Indian Ocean	2000-3000		380	0.31-1.30			190		VINOGRADOV 1968
"	3000-4000		380				110		"
"	2000-3000		239	1.6 ^{a)}					GRICE & HÜLSEMANN 1967
"	3000-4000		239	1.6 ^{a)}					
Red Sea	2200-2600	10- 100	183	0.03-0.22					WISHNER 1980a
Mediterranean Sea	2000-3000		170	<0.2	400	200			GREZE 1963
"	2000-3000		250	0.03 ^{a, b)}		400			IANORA & SCOTTO DI CARLO 1981
"	2000-3000		250	0.01	300	290			SCOTTO DI CARLO <i>et al.</i> 1984
West Atlantic	2200-4100		120				80-900	110-1000	WHEELER 1967
Northeast Atlantic	1970-4000	700-2700	230		1020 ^{c)}	820 ^{c)}			COLMAN 1962
"	1800-2900	10- 100	183	0.66					WISHNER 1980a
"	2400-2500	10- 100	183	0.81					"
"	2600-3200	10- 100	183	0.43	21-145	11-114		68-286	WISHNER 1980a,b
"	2000-3000		185	0.5 -1.7 ^{a)}					YASHNOV 1961 (i) VINOGRADOV 1968
"	3000-4000		185	0.2 -0.5 ^{a)}					
"	2000-3000		230	0.5 -2.0 ^{a)}					GRICE & HÜLSEMANN 1965
"	3000-4000		230	0.2 -0.5 ^{a)}					
"	2100-4000	5-2400	330	0.8 -5.2 ^{a)}					ANGEL & BAKER 198
"	≈5420	10- 90	320	0.04-0.2 ^{a)}					ROE <i>et al.</i> 1986
Haul 6 Nets 7-9	3370-4260	700-1510	333	0.36-0.72	240-380	170-295	160-290	190-320	this study
Hauls 5,7,8	3900-4350	240- 660	333	0.16-1.4 ^{d)}	75-400	45-300	45-300	90-460	"
Haul 6 Nets 2-6	4260-4730	220- 700	333	0.15-0.62	85-255	60-215	55-205	135-270	"

The abundances of living animals tended to exceed those reported by WISHNER (1980b), despite the smaller mesh-size she used and the shallower depths she sampled. The numbers of carcasses and exoskeletons were similar to those she reported (Table 2). Several explanations could be proposed:

- A high temporal and geographical plankton variability, as indicated by the few data available from the deep sea (Table 2). A seasonal effect seems unlikely as WISHNER (1980a,b) also collected her Northeast Atlantic samples during summer (July and August).
- Overestimation of the plankton abundance in this study by 1) underestimation of water volumes filtered; 2) inclusion of contaminants among chaetognaths and ostracods (see remarks in the Appendix); 3) counting carcasses as living copepods.
- Underestimation of living zooplankton by WISHNER (1980b), in spite of her exact volume calculations, due to 1) the seven-fold smaller mouth opening of her nets, which enabled some zooplankters to escape; 2) failure to count copepods that were alive at time of capture but were killed and completely decomposed during the tows of up to 17 hours, double the time of the hauls reported here. Dead:living ratios reported by WISHNER tended to increase with increasing tow duration. Her ratios for depths greater than 2000 m exceed those found in 26 of the 30 samples from my investigation, which were more similar to those calculated from the data of WHEELER (1970; Table 2). Only the ratios for haul 5, net 9; haul 6, net 4; and haul 7, nets 4 and 9 approximately conformed to WISHNER's (1980b) findings. According to WISHNER (1980b), the almost neutral buoyancy of exoskeletons may prevent them from accumulating near the deep-sea bottom. Furthermore, exoskeletons of surface-dwelling copepods are not usually found in the deep sea, possibly because they decompose rapidly in the warmer upper layers. Therefore, ratios of exoskeletons to living animals close to the sea bed are not expected to be higher than those found in overlying strata, except when near-bottom discontinuity layers (McCAVE 1986) are present. Exoskeletons of surface-dwelling copepods in my samples may be those of specimens that entered the nets as the MOCNESS was lowered and died and decomposed during the haul. When the number of these exoskeletons was subtracted from the total number (Table 2), only 2 ratios of dead to living copepods, those for haul 6, net 4, and haul 7, net 9, exceed two of the four found by WISHNER (1980b) below 2000 m.

3.4 Taxonomic composition and vertical distribution patterns

Gymnopleid copepods (Calanoida) were the main group within the zooplankton community, accounting for 41 to 82.5 % of the total counts of living specimens. They were followed in abundance by chaetognaths, ostracods, and podopleid copepods in decreasing order (Table 3). This order is expected to remain unchanged even if contaminants among the chaetognaths and ostracods are excluded. Similarly, COLMAN (1962) found chaetognaths and ostracods to follow copepods in rank of abundance between 2000 and 4000 m in the Bay of Biscay.

Table 3: Relative numerical abundances of major taxa in the different hauls (living specimens; Radiolaria excluded)

	Haul 5		Haul 6		Haul 7		Haul 8		TOTAL %
	%	%-range	%	%-range	%	%-range	%	%-range	
Coelenterata	2.7	0.3- 4.1	1.4	0.3- 2.3	2.2	0 - 3.5	1.8	0.4- 4.6	1.8
Polychaeta	1.5	0.5- 2.6	1.0	0.6- 2.1	1.1	0 - 2.6	1.7	1.0- 2.8	1.3
Ostracoda	9.7	6.8-15.6	9.6	5.0-14.7	9.2	2.1-21.6	9.2	6.5-12.5	9.5
Podoplea	2.7	1.9- 4.7	4.1	1.8- 6.8	3.9	1.0- 6.6	1.9	0.9- 2.9	3.3
Gymnoplea	70.9	63.4-79.2	71.6	61.2-80.5	58.9	41.2-70.8	72.5	60.2-82.5	69.8
Malacostraca	1.3	0 - 2.7	1.2	0 - 2.4	2.2	0.6- 3.6	1.0	0.3- 2.2	1.3
Chaetognatha	10.6	6.8-15.1	11.0	5.1-19.8	22.2	14.2-30.4	10.9	6.3-24.1	12.5
others	0.8	0.2- 1.7	0.1	0 - 0.5	0.3	0 - 1.0	1.1	0 - 2.7	0.5

Table 4: Relative numerical abundances of calanoid copepod taxa among all living calanoids in the different hauls

	Haul 5		Haul 6		Haul 7		Haul 8		TOTAL %
	%	%-range	%	%-range	%	%-range	%	%-range	
Megacalanidae	0.1	0 - 0.5	0.1	0 - 0.3	0.3	0 - 2.2	0	0	0.1
Aetideidae	0.4	0 - 1.0	0.9	0 - 2.8	0.9	0 - 4.1	0.8	0 - 1.0	0.8
Euchaetidae	1.5	0 - 3.6	1.6	0 - 4.9	1.6	0 - 4.9	1.5	0 - 3.6	1.5
Metridiidae	48.1	40.8-68.5	36.2	18.5-63.0	51.5	41.7-62.9	22.8	13.0-35.7	37.7
Lucicutiidae	9.5	5.8-13.7	8.4	2.5-15.5	16.9	11.5-25.0	9.2	3.9-18.5	9.8
Heterorhabdidae	0.7	0 - 1.8	2.9	0.4- 9.3	4.6	1.3- 9.0	2.7	0.6- 5.6	2.6
Augaptilidae	2.3	0.5- 4.8	2.5	1.3- 4.4	2.7	0 - 5.3	2.7	1.2- 6.1	2.5
Arietellidae:									
<i>Phyllopus</i> sp.	1.8	0.6- 3.6	0.8	0.3- 2.2	1.4	0 - 2.9	1.0	0 - 4.6	1.2
Bathypontiidae:									
<i>Foxtonia barbatula</i>	4.0	0 - 6.0	4.9	0.6- 8.4	2.4	1.1- 6.3	7.6	4.6-10.6	5.0
not identified	31.8	12.6-36.2	41.7	15.7-58.5	17.8	10.1-25.0	51.6	27.7-71.6	38.8

No distinct trends were detected in the vertical distributions of zooplankton biomass (Fig. 2), total individual numbers (Fig. 3), or the abundance of any major taxa. Such trends, however, were apparent for smaller taxonomic groups within the Copepoda.

Calanoida

On the family level, members of the Metridiidae were predominant in most samples, accounting for 13 to 68.5 % in relative abundance among all living calanoids. Apart from this family and the fraction of unidentified specimens, only Lucicutiidae exceeded 10 % in relative abundance (Table 4). Both Metridiidae and Lucicutiidae (Figs. 4, 5) increased in relative abundance toward the bottom. A corresponding increase in absolute numbers of lucicutiids is likely to occur, but this cannot be said for metridiids due to a combination of plankton variability and certain inaccuracies in the calculation of water volumes filtered, particularly for haul 6, nets 6 to 9, which sampled the upper layers (Table 1, see above).

In the water column of the North Pacific Ocean, ARASHKEVICH (1966, cited in VINOGRADOV 1968) found metridiids and lucicutiids to decrease in abundance between 500 and 8500 m. The abundance of metridiids between 2000 and 6000 m (2000-4000 m: 180 specimens per 1000 m³; 4000-6000 m: 70 specimens per 1000 m³) was similar in order of magnitude to, or possibly slightly higher than the data presented here.

Like the Heterorhabdidae (Fig. 6), the bathypontiid Foxtonia barbatula HÜLSEMANN & GRICE decreased in abundance with depth (Fig. 7). F. barbatula has to be looked upon as one of the more common deep bathypelagic organisms (Table 4). In the Northeast Atlantic, HÜLSEMANN & GRICE (1963) and GRICE & HÜLSEMANN (1965) caught the species between 2000 and 4750 m, and from the western Indian Ocean, it has been found at depths between 1900 and 3000 m (GRICE & HÜLSEMANN 1967).

Siphonostomatoida and Misophrioida

Two other copepod genera exhibited conspicuous vertical changes in abundance. Specimens of the siphonostomatoid genus Hyalopontius SARS clearly became less abundant with depth (Fig. 8). Members of eight Hyalopontius species have thus far been collected only between 1900 and 4060 m depth in the Northeast Atlantic (HÜLSEMANN 1965, BOXSHALL 1979).

Specimens of the misophrioid genus Benthomisophria SARS increased in numerical abundance with depth (Fig. 9). According to BOXSHALL & ROE (1980), two species, B. palliata and B. cornuta, inhabit depths from 2000 m to the bottom and increase in abundance within the 500 m of the sea floor. The data presented here corroborate this.

Figure 2: Zooplankton biomass

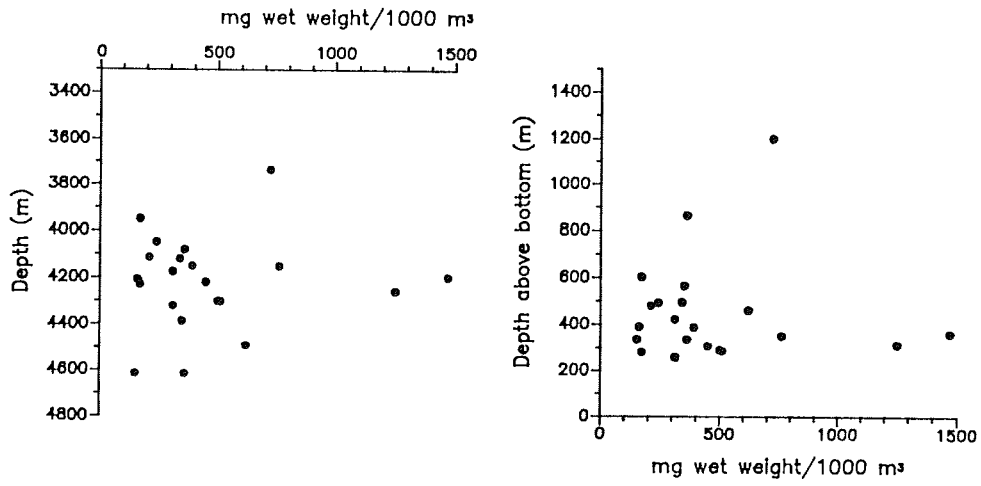


Figure 3: Total living zooplankton

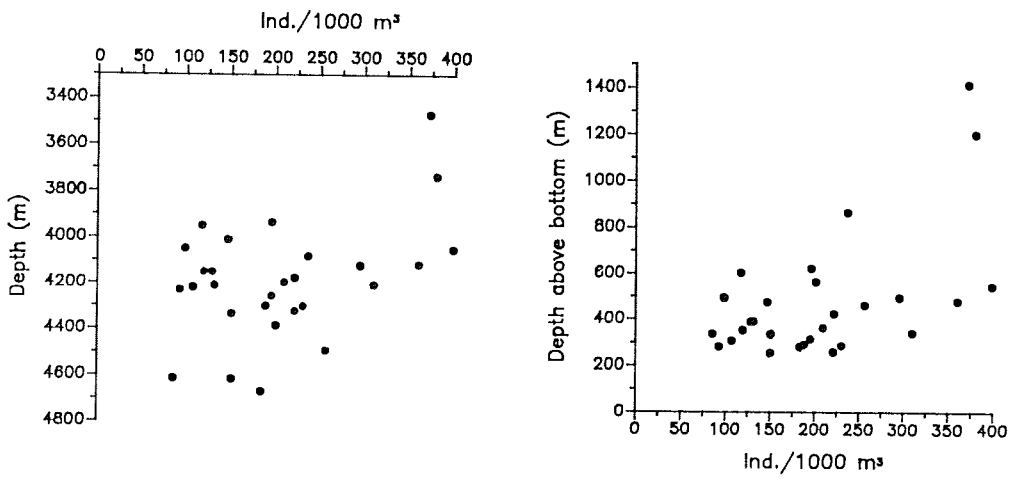


Figure 4a: Living Metridiidae

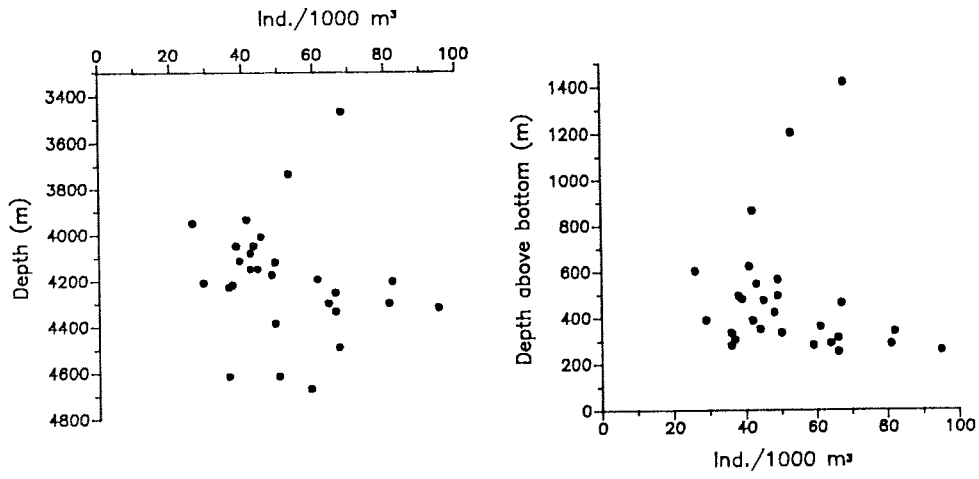


Figure 4b: Living Metridiidae;
relative abundances

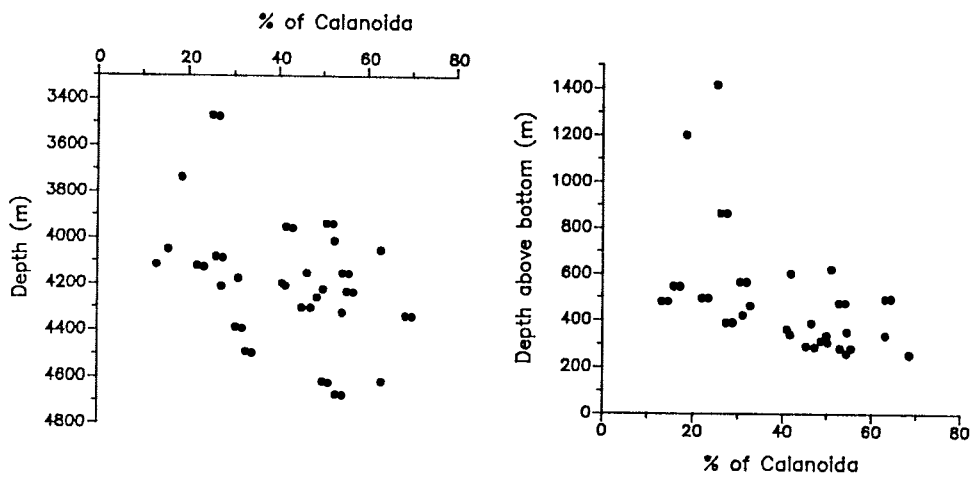


Figure 5a: Living Lucicutiidae

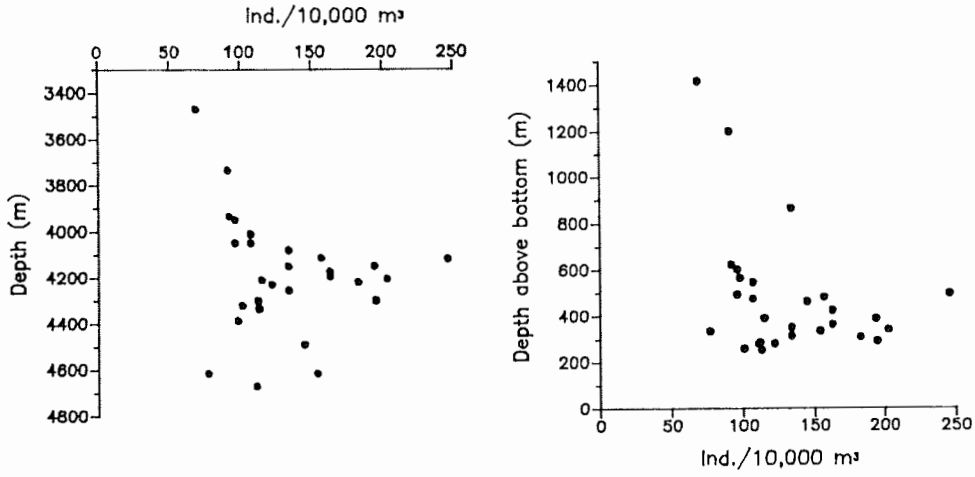


Figure 5b: Living Lucicutiidae;
relative abundances

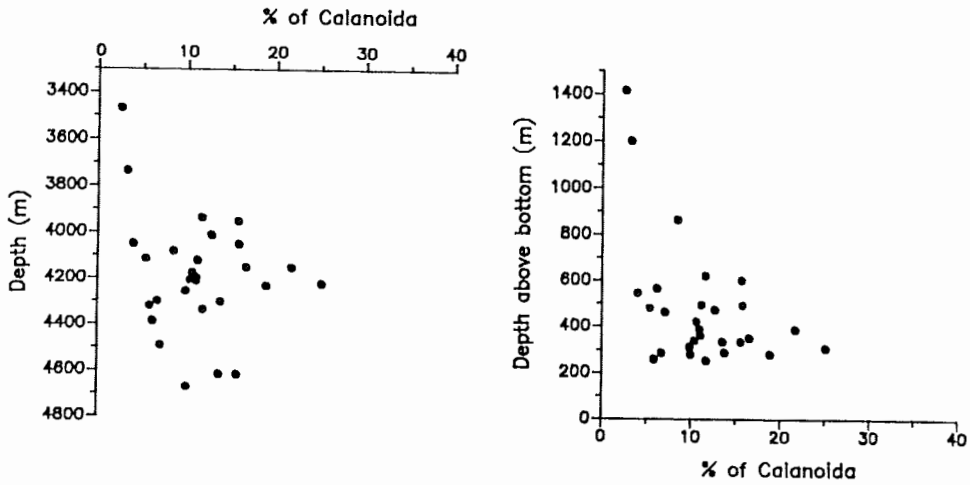


Figure 6: Living Heterorhabdidae

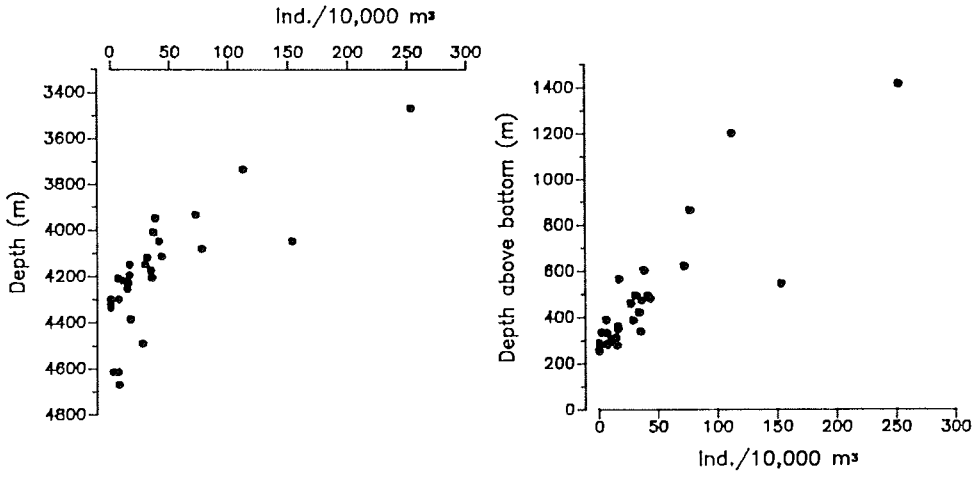


Figure 7: Living *Foxtonia barbatula*

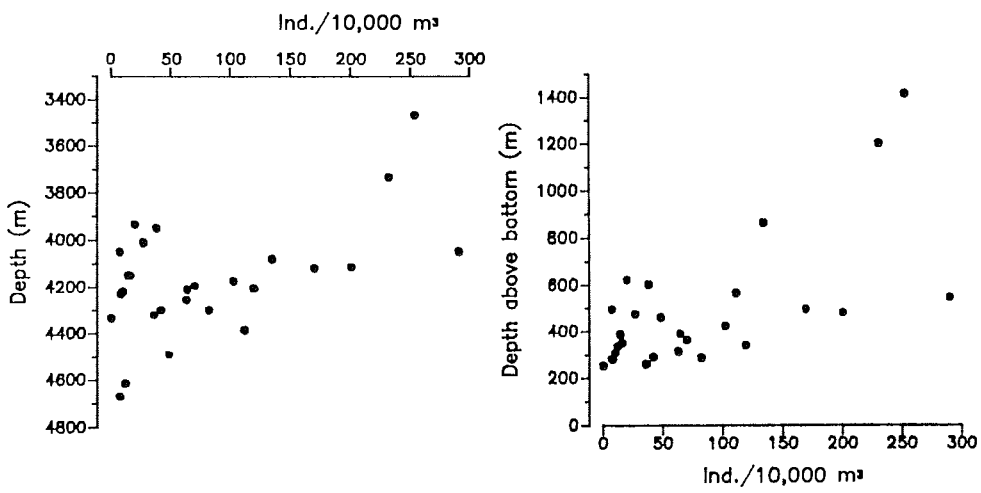


Figure 8: Living *Hyalopontius* sp.;
 open circles: exoskeletons

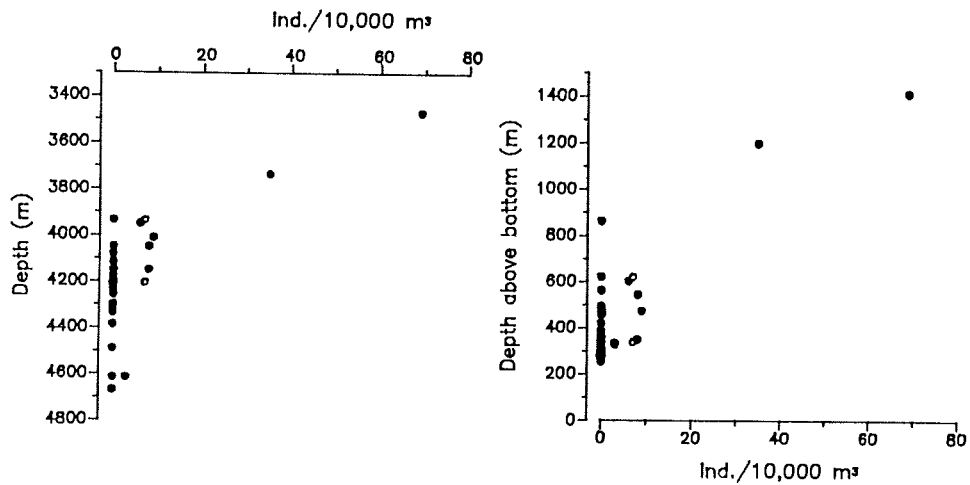
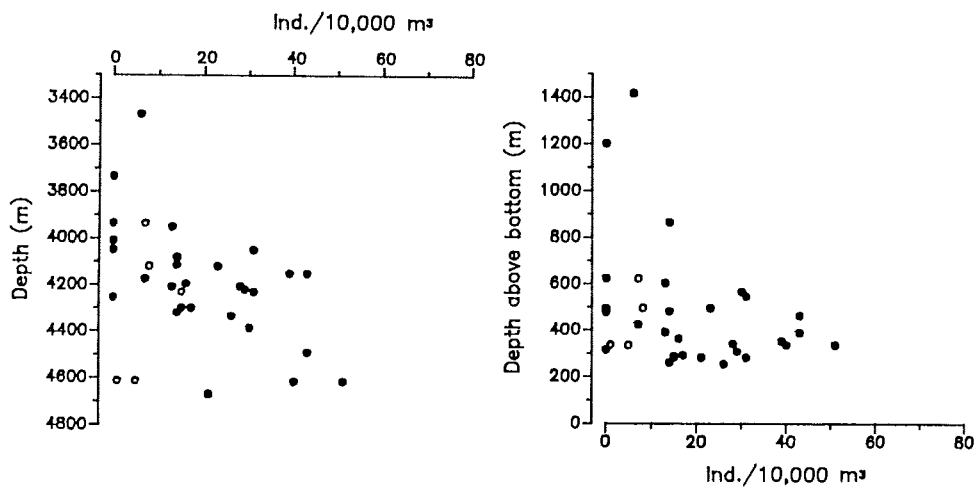


Figure 9: Living *Benthomisophria* sp.;
 open circles: exoskeletons



3.5. Concluding remarks

The general decrease in zooplankton abundance with depth in the deep sea may be reversed, at least locally or temporarily, close to the bottom (WISHNER 1980a; ANGEL & BAKER 1982; ROE 1986). The taxonomic composition changes abruptly near the bottom since there are many species endemic to benthopelagic habitats (GRICE 1972; WISHNER 1980b; ROE 1986). A comparison of the BIOTRANS data between 200 and 1500 m from the abyssal bottom with those from within 100 m of the sea floor (WISHNER 1980b, SMITH *et al.* 1986) indicates fundamental changes in the relative abundances of the major groups that occur about 100 to 200 m above the deep-sea floor. More than 200 m from the bottom, chaetognaths and ostracods follow copepods in order of abundance, while just above the bottom, Malacostraca seem to be next important.

The data from this investigation also indicate vertical changes in the zooplankton community structure within the upper parts of the bottom nepheloid layer. The relative proximity of the sea bed may be a contributing cause of this, even at this fairly great distance. Vertical gradients can be detected for small taxonomic groups and are probably less pronounced than those within 100 or 200 m of the bottom. A comprehensive evaluation of vertical faunal zonation in the deep bathyal and abyssal plankton communities, however, requires an analysis on the specific level. Relevant results from directly overlying depths indicate associated changes in predator-prey relationships. In profiles from the bathyal Northeast Atlantic, ANGEL (1983) found marked changes in the species composition of the ostracod fauna coinciding with changes in the abundance of different predatory micronektonic groups at depths of 1900, 2200, 2700, and 3500 m.

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6. APPENDIX

6.1. Remarks

In the following tables, the numerical counts of living, dead, and contaminant specimens belonging to various taxa in each of the 30 MOCNESS-samples are presented. Some explanatory comments on different groups are necessary.

Foraminiferans were considered to be contaminants, as most of them were very small. Radiolarians, which are more common in the deep sea, were often broken and could not be counted in many cases. They are therefore excluded from the numerical data on total zooplankton. An "x" in the tables indicates that specimens were present but not counted.

Other taxa, such as Ostracoda and Chaetognatha, surely include some contaminants from surface water layers, but only a more detailed taxonomic evaluation will yield exact information. All specimens in these groups were counted as living, so their relative abundances and total numbers in the zooplankton may be somewhat overestimated. Relative abundances of other taxa are correspondingly underrated.

Ostracods were often fragmented. In most samples, the valves were more numerous than the internal remains of the animals. The counts include only complete specimens and internal remains. No attempt was made to estimate the number of "dead" ostracods. Specimens of hyperiid amphipods were considered contaminants.

A fairly good separation of autochthonous from contaminant specimens and living animals from carcasses and exoskeletons was possible for copepods. The numbers of dead animals include those of taxa considered to be contaminants from shallower layers.

Harpacticoid contaminants included specimens of the genus Microsetella, while most of the endemic living and dead animals could be assigned to the genus Aegisthus. Living Oithonidae, Oncaeiidae, and Corycaeiidae were regarded as contaminants in view of their small body sizes and relatively great abundances in shallower layers (BECKMANN, unpublished data). A few isolated Mormonilla specimens were included in the cyclopoid counts.

Among the living Calanoida, some small unidentified epipelagic forms were considered to be contaminants along with individuals of the following taxa:

- Genus Calanus (Fam. Calanidae)
- Genus Eucalanus, Rhincalanus nasutus GIESBRECHT (Fam. Eucalanidae)

- Mecynocera clausi THOMPSON (Fam. Calocalanidae)
- Genus Centropages (Fam. Centropagidae)
- Genus Pleuromamma (mainly P. gracilis CLAUS) and Metridia lucens BOECK (Fam. Metridiidae)
- Lucicutia flavicornis CLAUS (Fam. Lucicutiidae)
- Family Candaciidae
- Genus Acartia (Fam. Acartiidae)

Euthecosomatous pteropods were represented mainly by empty shells of the species Limacina retroversa FLEMING.

The following abbreviations are used in the data lists:

- No.liv : Number of specimens counted as "living"
- %tz : Relative abundance among total living zooplankton (only values ≥ 2 % considered)
- %cal : Relative abundance among living calanoid copepods (only values ≥ 2 % considered)
- No.ex : Number of exoskeletons (molts and organisms dead at the time of capture) or empty shells (Pteropoda, Euthecosomata)
- No.cont : Number of living specimens regarded as contaminants from shallower layers.

MOC-1-005/ NET 2	No.liv	%tz	%cal	No.ex	No.cont
Foraminifera					23
Radiolaria	11				
Medusae	1				
Siphonophora	3				
Polychaeta	2				
Pteropoda Euthecosomata				164	
Ostracoda	16	9.3			(?)
Harpacticoida	3			1	1
Misophrioida:					
<u>Benthomisophria sp.</u>	3				
Siphonostomatoida:					
<u>Hyalopontius sp.</u>					
Cyclopoida (Oithonidae, Oncaeiidae, Corycaeiidae)				5	13
Copepoda indet.	2				
Copepoda nauplii					
Calanoida (total number)	111	64.5		234	50
Calanidae: <u>Calanus sp.</u>				3	
Megacalanidae					
Eucalanidae					
Calocalanidae:					
<u>Mecynocera clausi</u>					9
Aetideidae	1				
Euchaetidae	1			2	
Centropagidae:					
<u>Centropages sp.</u>					4
Metridiidae	76		68.5	17	6
Lucicutiidae	13		11.7	3	2
Heterorhabdidae				1	
Augaptilidae	2			7	
Arietellidae:					
<u>Phyllopus sp.</u>	4		3.6	3	
Candaciidae					
Bathypontiidae:					
<u>Foxtonia barbatula</u>				8	
Acartiidae: <u>Acartia sp.</u>				1	6
not identified	14		12.6	189	23
Euphausiacea					
Decapoda					
Mysidacea					
Isopoda	1				
Amphipoda					
Malacostraca indet.	1			1	
Malacostraca larvae?				2	
Chaetognatha	26	15.1			(?)
Appendicularia					
Thaliacea					
others	3?				
Total number	172			407	87

MOC-1-005/ NET 3	No.liv	%tz	%cal	No.ex	No.cont
Foraminifera					3
Radiolaria	5				
Medusae	3				
Siphonophora	5	2.3			
Polychaeta	1				
Pteropoda Euthecosomata				95	
Ostracoda	15	6.8			(?)
Harpacticoida	5	2.3		2	
Misophrioida:					
<u>Benthomisophria sp.</u>	2				
Siphonostomatoida:					
<u>Hyalopontius sp.</u>					
Cyclopoida (Oithonidae, Oncaeiidae, Corycaeidae)				3	4
Copepoda indet.	1				
Copepoda nauplii					1
Calanoida (total number)	168	75.7		207	4
Calanidae: <u>Calanus sp.</u>				1	1
Megacalanidae					
Eucalanidae					
Calocalanidae:					
<u>Mecynocera clausi</u>					
Aetideidae				1	
Euchaetidae	2			1	
Centropagidae:					
<u>Centropages sp.</u>				4	
Metridiidae	76		45.2	19	1
Lucicutiidae	23		13.7	2	
Heterorhabdidae				2	
Augaptilidae	8		4.8	5	
Arietellidae:					
<u>Phyllopus sp.</u>	1			1	
Candaciidae					
Bathypontiidae:					
<u>Foxtonia barbatula</u>	5		3.0	13	
Acartiidae: <u>Acartia sp.</u>					1
not identified	53		31.5	158	1
Euphausiacea					
Decapoda					
Mysidacea					
Isopoda	2				
Amphipoda				1	
Malacostraca indet.	4			11	
Malacostraca larvae?				1	
Chaetognatha	15	6.8			(?)
Appendicularia					
Thaliacea					
others	1				
Total number	222			320	12

MOC-1-005/ NET 5	No.liv	%tz	%cal	No.ex	No.cont
Foraminifera					21
Radiolaria	6				
Medusae	1?				
Siphonophora	6				
Polychaeta	4				
Pteropoda Euthecosomata				213	
Ostracoda	23	7.5			(?)
Harpacticoida	4				
Misophrioida:					
<u>Benthomisophria sp.</u>	2				
Siphonostomatoida:					
<u>Hyalopontius sp.</u>					
Cyclopoida (Oithonidae, Oncaeiidae, Corycaeiidae)				2	6
Copepoda indet.					
Copepoda nauplii				3	1
Calanoida (total number)	229	74.4		274	41
Calanidae: <u>Calanus sp.</u>				4	7
Megacalanidae					
Eucalanidae					
Calocalanidae:					
<u>Mecynocera clausi</u>					10
Aetideidae					
Euchaetidae	4			1	
Centropagidae:					
<u>Centropages sp.</u>					5
Metridiidae	108		47.2	15	4
Lucicutiidae	15		6.6	1	1
Heterorhabdidae	1				
Augaptilidae	5		2.2	3	
Arietellidae:					
<u>Phyllopus sp.</u>	2			1	
Candaciidae					
Bathypontiidae:					
<u>Foxtonia barbatula</u>	11		4.8	6	
Acartiidae: <u>Acartia sp.</u>				1	2
not identified	83		36.2	242	12
Euphausiacea					
Decapoda					
Mysidacea					
Isopoda					
Amphipoda					
Malacostraca indet.				2	
Malacostraca larvae?					
Chaetognatha	38	12.3			(?)
Appendicularia					
Thaliacea					
others					
					1 Nemertini; 6 cm length
Total number	308			494	69

MOC-1-005/ NET 6	No.liv	%tz	%cal	No.ex	No.cont
Foraminifera					7
Radiolaria	8				
Medusae					
Siphonophora	1				
Polychaeta	8	2.6			
Pteropoda Euthecosomata				121	
Ostracoda	21	6.8			(?)
Harpacticoida	4			2	
Misophrioida:					
<u>Benthomisophria sp.</u>	2				
Siphonostomatoida:					
<u>Hyalopontius sp.</u>					
Cyclopoida (Oithonidae, Oncaeiidae, Corycaeiidae)					5
Copepoda indet.					
Copepoda nauplii				1	
Calanoida (total number)	243	79.2		281	8
Calanidae: <u>Calanus sp.</u>				3	
Megacalanidae					
Eucalanidae					
Calocalanidae:					
<u>Mecynocera clausi</u>					5
Aetideidae				1?	
Euchaetidae	2				
Centropagidae:					
<u>Centropages sp.</u>				2	1
Metridiidae	132		54.3	15	
Lucicutiidae	14		5.8	1	
Heterorhabdidae				1	
Augaptilidae	4			2	
Arietellidae:					
<u>Phyllopus sp.</u>	3				
Candaciidae					
Bathypontiidae:					
<u>Foxtonia barbatula</u>	5		2.1	14	
Acartiidae: <u>Acartia sp.</u>					
not identified	83		34.2	242	2
Euphausiacea					
Decapoda					
Mysidacea					
Isopoda					
Amphipoda	2				
Malacostraca indet.				1	
Malacostraca larvae?				2	
Chaetognatha	25	8.1			(?)
Appendicularia					6
Thaliacea					
others	1				
Total number	307			408	26

MOC-1-005/ NET 7	No.liv	%tz	%cal	No.ex	No.cont
Foraminifera					9
Radiolaria	9				
Medusae					
Siphonophora	9	3.2			
Polychaeta	3				
Pteropoda Euthecosomata				268	
Ostracoda	24	8.7			(?)
Harpacticoida	7	2.5			
Misophrioida:					
<u>Benthomisophria sp.</u>					
Siphonostomatoida:					
<u>Hyalopontius sp.</u>					
Cyclopoida (Oithonidae, Oncaeiidae, Corycaeidae)				1	10
Copepoda indet.					
Copepoda nauplii				1	
Calanoida (total number)	193	69.7		287	20
Calanidae: <u>Calanus sp.</u>				9	2
Megacalanidae					
Eucalanidae					
Calocalanidae:					
<u>Mecynocera clausi</u>					5
Aetideidae					
Euchaetidae				5	
Centropagidae:					
<u>Centropages sp.</u>					4
Metridiidae	94		48.7	21	1
Lucicutiidae	19		9.8	2	
Heterorhabdidae	2			9	
Augaptilidae	1			5	
Arietellidae:					
<u>Phyllopus sp.</u>	7		3.6		
Candaciidae					
Bathypontiidae:					
<u>Foxtonia barbatula</u>	9		4.7	6	
Acartiidae: <u>Acartia sp.</u>					
not identified	61		31.6	230	8
Euphausiacea					
Decapoda					
Mysidacea					
Isopoda	1				
Amphipoda	1				
Malacostraca indet.					
Malacostraca larvae?				1	
Chaetognatha	33	11.9			(?)
Appendicularia					
Thaliacea					
others	6	2.2			
Total number	277			558	39

MOC-1-005/ NET 8	No.liv	%tz	%cal	No.ex	No.cont
Foraminifera					3
Radiolaria	8				
Medusae	1				
Siphonophora	10	3.7			
Polychaeta	5				
Pteropoda Euthecosomata				224	
Ostracoda	26	9.7			(?)
Harpacticoida	5			2	1
Misophrioida:					
<u>Benthomisophria sp.</u>	2				
Siphonostomatoida:					
<u>Hyalopontius sp.</u>					
Cyclopoida (Oithonidae, Oncaeidae, Corycaeidae)				6	10
Copepoda indet.	1				
Copepoda nauplii					
Calanoida (total number)	191	71.0		289	18
Calanidae: <u>Calanus sp.</u>					
Megacalanidae	1				
Eucalanidae					
Calocalanidae:					
<u>Mecynocera clausi</u>					6
Aetideidae	2				
Euchaetidae	2				
Centropagidae:					
<u>Centropages sp.</u>					1
Metridiidae	78		40.8	14	1
Lucicutiidae	21		11.0	8	
Heterorhabdidae	2			1	
Augaptilidae	5		2.6	9	
Arietellidae:					
<u>Phyllopus sp.</u>	3				
Candaciidae					
Bathypontiidae:					
<u>Foxtonia barbatula</u>	9		4.7	11	
Acartiidae: <u>Acartia sp.</u>					3
not identified	68		35.6	246	7
Euphausiacea					
Decapoda	3				
Mysidacea					
Isopoda	2				
Amphipoda				1	
Malacostraca indet.					
Malacostraca larvae?				2	
Chaetognatha	21	7.8			(?)
Appendicularia					1
Thaliacea					
others					
					2; 1 Cephalopoda; 4 cm length
Total number	269			524	33

MOC-1-005/ NET 9	No.liv	%tz	%cal	No.ex	No.cont
Foraminifera					11
Radiolaria	29				(?)
Medusae	4				
Siphonophora	9	2.0			(?)
Polychaeta	6				
Pteropoda Euthecosomata				294	4
Ostracoda	69	15.6			(?)
Harpacticoida	4			4	
Misophrioida:					
<u>Benthomisophria sp.</u>	4				
Siphonostomatoida:					
<u>Hyalopontius sp.</u>				1	
Cyclopoida (Oithonidae, Oncaeiidae, Corycaeidae)				29	47
Copepoda indet.	3				
Copepoda nauplii					2
Calanoida (total number)	281	63.4		891	145
Calanidae: <u>Calanus sp.</u>				100	44
Megacalanidae					
Eucalanidae				2	1
Calocalanidae:					
<u>Mecynocera clausi</u>					13
Aetideidae	3				
Euchaetidae	10		3.6	33	(?)
Centropagidae:					
<u>Centropages sp.</u>				51	19
Metridiidae	117		41.6	121	32
Lucicutiidae	29		10.3	5	6
Heterorhabdidae	5			9	
Augaptilidae	7		2.5	4	
Arietellidae:					
<u>Phyllopus sp.</u>	5			2	
Candaciidae					
Bathypontiidae:					
<u>Foxtonia barbatula</u>	17		6.0	22	
Acartiidae: <u>Acartia sp.</u>					1
not identified	88		31.3	542	29
Euphausiacea					
Decapoda	5				(?)
Mysidacea					
Isopoda					
Amphipoda	3			1	4
Malacostraca indet.					
Malacostraca larvae?	1			4	
Chaetognatha	53	12.0			(?)
Appendicularia					16
Thaliacea					4
others	1				
Total number	443			1224	233

MOC-1-006/ NET 2	No.liv	%tz	%cal	No.ex	No.cont
Foraminifera					32
Radiolaria	18				
Medusae	1				
Siphonophora	3				
Polychaeta	4				
Pteropoda Euthecosomata				101	
Ostracoda	31	11.8			(?)
Harpacticoida	7	2.7		1	
Misophrioida:					
<u>Benthomisophria sp.</u>	3				
Siphonostomatoida:					
<u>Hyalopontius sp.</u>					
Cyclopoida (Oithonidae, Oncaeiidae, Corycaeiidae)				8	7
Copepoda indet.	1				
Copepoda nauplii					
Calanoida (total number)	161	61.2		235	54
Calanidae: <u>Calanus sp.</u>				3	2
Megacalanidae					
Eucalanidae					
Calocalanidae:					
<u>Mecynocera clausi</u>					7
Aetideidae					
Euchaetidae					
Centropagidae:					
<u>Centropages sp.</u>					7
Metridiidae	85		52.8	20	4
Lucicutiidae	16		9.9	6	
Heterorhabdidae	1				
Augaptilidae	3			1	
Arietellidae:					
<u>Phyllopus sp.</u>	2			2	
Candaciidae					
Bathypontiidae:					
<u>Foxtonia barbatula</u>	1				
Acartiidae: <u>Acartia sp.</u>					5
not identified	53		32.9	203	29
Euphausiacea					
Decapoda				1	
Mysidacea					
Isopoda					
Amphipoda					
Malacostraca indet.					
Malacostraca larvae?					
Chaetognatha	52	19.8			(?)
Appendicularia					11
Thaliacea					
others					
Total number	263			346	104

MOC-1-006/ NET 3	No.liv	%tz	%cal	No.ex	No.cont
Foraminifera					32
Radiolaria	45				
Medusae	1				
Siphonophora	14				
Polychaeta	8				
Pteropoda Euthecosomata				289	3
Ostracoda	115	11.0			(?)
Harpacticoida	18			3	1
Misophrioida:					
<u>Benthomisophria sp.</u>	35	3.4		1	
Siphonostomatoida:					
<u>Hyalopontius sp.</u>	2				
Cyclopoida (Oithonidae, Oncaeidae, Corycaeidae)				4	
Copepoda indet.	1				
Copepoda nauplii				2	1
Calanoida (total number)	689	66.2		1079	12
Calanidae: <u>Calanus sp.</u>				9	3
Megacalanidae	2			1	
Eucalanidae					
Calocalanidae:					
<u>Mecynocera clausi</u>					
Aetideidae	3				
Euchaetidae	5			3	
Centropagidae:					
<u>Centropages sp.</u>				10	3
Metridiidae	343		49.8	77	4
Lucicutiidae	107		15.5	26	
Heterorhabdidae	4			3	
Augaptilidae	9			20	
Arietellidae:					
<u>Phyllopus sp.</u>	6			6	
Candaciidae					
Bathypontiidae:					
<u>Foxtonia barbatula</u>	8			17	
Acartiidae: <u>Acartia sp.</u>					
not identified	202		29.3	907	2
Euphausiacea					
Decapoda					
Mysidacea					
Isopoda					
Amphipoda	5			1	
Malacostraca indet.	1			4	
Malacostraca larvae?				3	
Chaetognatha	152	14.6			(?)
Appendicularia					12
Thaliacea					
others					
Total number	1041			1386	61

MOC-1-006/ NET 4	No.liv	%tz	%cal	No.ex	No.cont
Foraminifera					8
Radiolaria	x				
Medusae					
Siphonophora	1				
Polychaeta	6				
Pteropoda Euthecosomata				150	42
Ostracoda	50	14.7			(?)
Harpacticoida	6			8	
Misophrioida:					
<u>Benthomisophria sp.</u>	16	4.7		2	
Siphonostomatoida:					
<u>Hyalopontius sp.</u>					
Cyclopoida (Oithonidae, Oncaeidae, Corycaeidae)				7	2
Copepoda indet.	1			1	
Copepoda nauplii					
Calanoida (total number)	230	67.6		1131	16
Calanidae: <u>Calanus sp.</u>				13	1
Megacalanidae				1?	
Eucalanidae				1	
Calocalanidae:					
<u>Mecynocera clausi</u>					2
Aetideidae	2				
Euchaetidae	2			13	
Centropagidae:					
<u>Centropages sp.</u>				16	4
Metridiidae	145		63.0	162	1
Lucicutiidae	31		13.5	25	
Heterorhabdidae	1			4	
Augaptilidae	3			14	
Arietellidae:					
<u>Phyllopus sp.</u>	5		2.2	5	
Candaciidae					
Bathypontiidae:					
<u>Foxtonia barbatula</u>	5		2.2	20	
Acartiidae: <u>Acartia sp.</u>					
not identified	36		15.7	857	8
Euphausiacea				3	
Decapoda	1				
Mysidacea					
Isopoda	1				
Amphipoda	5				1
Malacostraca indet.					
Malacostraca larvae?				7	
Chaetognatha	23	6.8			(?)
Appendicularia					6
Thaliacea					
others					
Total number	340			1309	75

MOC-1-006/ NET 5	No.liv	%tz	%cal	No.ex	No.cont
Foraminifera					3
Radiolaria	3?				
Medusae	1				
Siphonophora	6				
Polychaeta	6				
Pteropoda Euthecosomata				175	
Ostracoda	24	5.0			(?)
Harpacticoida	8			1	
Misophrioida:					
<u>Benthomisophria sp.</u>	8				
Siphonostomatoida:					
<u>Hyalopontius sp.</u>					
Cyclopoida (Oithonidae, Oncaeidae, Corycaeidae)				1	6
Copepoda indet.	1				
Copepoda nauplii					
Calanoida (total number)	383	80.5		297	19
Calanidae: <u>Calanus sp.</u>				4	3
Megacalanidae					
Eucalanidae					
Calocalanidae:					
<u>Mecynocera clausi</u>					2
Aetideidae					
Euchaetidae	2			1	
Centropagidae:					
<u>Centropages sp.</u>				10	5
Metridiidae	125		32.6	13	6
Lucicutiidae	27		7.0		
Heterorhabdidae	5			3	
Augaptilidae	17		4.4	3	
Arietellidae:					
<u>Phyllopus sp.</u>	1			1	
Candaciidae					
Bathypontiidae:					
<u>Foxtonia barbatula</u>	9		2.3	6	
Acartiidae: <u>Acartia sp.</u>					1
not identified	197		51.4	256	2
Euphausiacea					
Decapoda					
Mysidacea	2				
Isopoda	1				
Amphipoda	3				
Malacostraca indet.				2	
Malacostraca larvae?				2	
Chaetognatha	33	6.9			(?)
Appendicularia					6
Thaliacea					
others					
Total number	476			478	34

MOC-1-006/ NET 6	No.liv	%tz	%cal	No.ex	No.cont
Foraminifera					1
Radiolaria	3?				
Medusae	1				
Siphonophora	4				
Polychaeta	4				
Pteropoda Euthecosomata				200	
Ostracoda	40	8.5			(?)
Harpacticoida	6			1	
Misophrioida:					
<u>Benthomisophria sp.</u>	7				
Siphonostomatoida:					
<u>Hyalopontius sp.</u>					
Cyclopoida (Oithonidae, Oncaeidae, Corycaeidae)				1	3
Copepoda indet.	3				
Copepoda nauplii					2
Calanoida (total number)	378	80.4		339	13
Calanidae: <u>Calanus sp.</u>				5	2
Megacalanidae					
Eucalanidae					
Calocalanidae:					
<u>Mecynocera clausi</u>					2
Aetideidae					
Euchaetidae	3			1	
Centropagidae:					
<u>Centropages sp.</u>				8	1
Metridiidae	115		30.4	20	2
Lucicutiidae	23		6.1	1	
Heterorhabdidae	4				
Augaptilidae	12		3.2	5	
Arietellidae:					
<u>Phyllopus sp.</u>	4				
Candaciidae					
Bathypontiidae:					
<u>Foxtonia barbatula</u>	26		6.9	1	
Acartiidae: <u>Acartia sp.</u>					
not identified	191		50.5	298	6
Euphausiacea					
Decapoda	2				
Mysidacea					
Isopoda					
Amphipoda	1				
Malacostraca indet.					
Malacostraca larvae?				1	
Chaetognatha	24	5.1			(?)
Appendicularia					5
Thaliacea					
others					
Total number	470			542	24

MOC-1-006/ NET 7	No.liv	%tz	%cal	No.ex	No.cont
Foraminifera					7
Radiolaria	3?				
Medusae					
Siphonophora	3				
Polychaeta	7	2.1			
Pteropoda Euthecosomata				113	1
Ostracoda	34	10.1			(?)
Harpacticoida	6				
Misophrioida:					
<u>Benthomisophria sp.</u>	2				
Siphonostomatoida:					
<u>Hyalopontius sp.</u>					
Cyclopoida (Oithonidae, Oncaeiidae, Corycaeiidae)				3	14
Copepoda indet.	5				
Copepoda nauplii				6	
Calanoida (total number)	226	67.5		278	10
Calanidae: <u>Calanus sp.</u>					1
Megacalanidae					
Eucalanidae					
Calocalanidae:					
<u>Mecynocera clausi</u>					1
Aetideidae					
Euchaetidae	3				
Centropagidae:					
<u>Centropages sp.</u>				6	4
Metridiidae	59		26.1	16	1
Lucicutiidae	19		8.4		
Heterorhabdidae	11		4.9		
Augaptilidae	9		4.0	4	
Arietellidae:					
<u>Phyllopus sp.</u>	1				
Candaciidae					
Bathypontiidae:					
<u>Foxtonia barbatula</u>	19		8.4	11	
Acartiidae: <u>Acartia sp.</u>					
not identified	105		46.5	241	3
Euphausiacea					
Decapoda	1				
Mysidacea					
Isopoda	1				
Amphipoda	5			1	
Malacostraca indet.				1	
Malacostraca larvae?	1			2	
Chaetognatha	43	12.8			(?)
Appendicularia					2
Thaliacea					
others	1				
Total number	335			404	34

MOC-1-006/ NET 8	No.liv	%tz	%cal	No.ex	No.cont
Foraminifera					4
Radiolaria	3?				
Medusae	4				
Siphonophora	2				
Polychaeta	3				
Pteropoda Euthecosomata				94	
Ostracoda	43	7.9			(?)
Harpacticoida	5			2	
Misophrioida:					
<u>Benthomisophria sp.</u>					
Siphonostomatoida:					
<u>Hyalopontius sp.</u>	5				
Cyclopoida (Oithonidae, Oncaeiidae, Corycaeiidae)				1	7
Copepoda indet.				9	3
Copepoda nauplii					
Calanoida (total number)	410	75.5		379	16
Calanidae: <u>Calanus sp.</u>					
Megacalanidae				1	
Eucalanidae					
Calocalanidae:					
<u>Mecynocera clausi</u>					1
Aetideidae	8		2.0	1	
Euchaetidae	8		2.0	2	
Centropagidae:					
<u>Centropages sp.</u>				1	2
Metridiidae	76		18.5	6	
Lucicutiidae	13		3.2	1	
Heterorhabdidae	16		3.9	1	
Augaptilidae	14		3.4	8	
Arietellidae:					
<u>Phyllopus sp.</u>	2				
Candaciidae					
Bathypontiidae:					
<u>Foxtonia barbatula</u>	33		8.0	8	
Acartiidae: <u>Acartia sp.</u>					
not identified	240		58.5	350	13
Euphausiacea	1				
Decapoda	5				
Mysidacea					
Isopoda	1				
Amphipoda	5				
Malacostraca indet.					
Malacostraca larvae?				1	
Chaetognatha	59	10.9			(?)
Appendicularia					5
Thaliacea					
others					
Total number	543			486	35

MOC-1-006/ NET 9	No.liv	%tz	%cal	No.ex	No.cont
Foraminifera					38
Radiolaria	x				
Medusae	3				
Siphonophora	12				(?)
Polychaeta	5				
Pteropoda Euthecosomata				25	
Ostracoda	58	9.0			(?)
Harpacticoida	6			1	
Misophrioida:					
<u>Benthomisophria sp.</u>	1				
Siphonostomatoida:					
<u>Hyalopontius sp.</u>	12				
Cyclopoida (Oithonidae, Oncaeidae, Corycaeidae)				9	29
Copepoda indet.	3			1	
Copepoda nauplii					
Calanoida (total number)	471	72.7		628	89
Calanidae: <u>Calanus sp.</u>				30	49
Megacalanidae					
Eucalanidae					2
Calocalanidae:					
<u>Mecynocera clausi</u>					2
Aetideidae	13		2.8		
Euchaetidae	23		4.9	8	(?)
Centropagidae:					
<u>Centropages sp.</u>				37	7
Metridiidae	119		25.3	49	17
Lucicutiidae	12		2.5	1	1
Heterorhabdidae	44		9.3	7	(?)
Augaptilidae	8			2	
Arietellidae:					
<u>Phyllopus sp.</u>	4				
Candaciidae				1	1
Bathypontiidae:					
<u>Foxtonia barbatula</u>	44		9.3	15	
Acartiidae: <u>Acartia sp.</u>					
not identified	204		43.3	478	10
Euphausiacea					
Decapoda	2				
Mysidacea	1?				
Isopoda					
Amphipoda	4				6
Malacostraca indet.					
Malacostraca larvae?	2				
Chaetognatha	65	10.0			(?)
Appendicularia					
Thaliacea					2
others	3				
Total number	648			664	164

MOC-1-007/ NET 2	No.liv	%tz	%cal	No.ex	No.cont
Foraminifera					9
Radiolaria	x				
Medusae	1				
Siphonophora	2				
Polychaeta	2				
Pteropoda Euthecosomata				95	
Ostracoda	12	7.4			(?)
Harpacticoida				1	
Misophrioida:					
<u>Benthomisophria sp.</u>					
Siphonostomatoida:					
<u>Hyalopontius sp.</u>	1				
Cyclopoida (Oithonidae, Oncaeidae, Corycaeidae)					9
Copepoda indet.	1				
Copepoda nauplii					
Calanoida (total number)	95	58.3		181	39
Calanidae: <u>Calanus sp.</u>				1	3
Megacalanidae					
Eucalanidae					
Calocalanidae:					
<u>Mecynocera clausi</u>					7
Aetideidae					
Euchaetidae	2		2.1		
Centropagidae:					
<u>Centropages sp.</u>				1	6
Metridiidae	50		52.6	12	4
Lucicutiidae	12		12.6		
Heterorhabdidae	4		4.2	1	
Augaptilidae	2		2.1	2	
Arietellidae:					
<u>Phyllopus sp.</u>					
Candaciidae					
Bathypontiidae:					
<u>Foxtonia barbatula</u>	3		3.2	8	
Acartiidae: <u>Acartia sp.</u>					12
not identified	22		23.2	156	7
Euphausiacea					
Decapoda				1	
Mysidacea					
Isopoda	1				
Amphipoda	4	2.5			1
Malacostraca indet.					
Malacostraca larvae?				2	
Chaetognatha	43	26.4			(?)
Appendicularia					
Thaliacea					
others	1				
Total number	163			280	58

MOC-1-007/ NET 3	No.liv	%tz	%cal	No.ex	No.cont
Foraminifera					x
Radiolaria	x				
Medusae					
Siphonophora	1				
Polychaeta	4	2.6			
Pteropoda Euthecosomata				28	1
Ostracoda	4	2.6			(?)
Harpacticoida	2			6	
Misophrioida:					
<u>Benthomisophria sp.</u>	5	3.3			
Siphonostomatoida:					
<u>Hyalopontius sp.</u>	1				
Cyclopoida (Oithonidae, Oncaeidae, Corycaeidae)				4	1
Copepoda indet.	1				
Copepoda nauplii					
Calanoida (total number)	103	68.2		263	9
Calanidae: <u>Calanus sp.</u>				21	2
Megacalanidae					
Eucalanidae					1
Calocalanidae:					
<u>Mecynocera clausi</u>					1
Aetideidae				1	
Euchaetidae				4	
Centropagidae:					
<u>Centropages sp.</u>				4	
Metridiidae	56		54.4	28	1
Lucicutiidae	17		16.5	4	
Heterorhabdidae	2			3	
Augaptilidae	3		2.9	8	
Arietellidae:					
<u>Phyllopus sp.</u>	3		2.9	8	
Candaciidae					
Bathypontiidae:					
<u>Foxtonia barbatula</u>	2			24	
Acartiidae: <u>Acartia sp.</u>					2
not identified	20		19.4	158	2
Euphausiacea					
Decapoda					
Mysidacea					
Isopoda					
Amphipoda	4	2.6		1	
Malacostraca indet.	1				
Malacostraca larvae?				1	
Chaetognatha	25	16.6			(?)
Appendicularia					1
Thaliacea					1
others					
Total number	151			303	13

MOC-1-007/ NET 4	No.liv	%tz	%cal	No.ex	No.cont
Foraminifera					x
Radiolaria	1				
Medusae					
Siphonophora	3	2.5			
Polychaeta	1				
Pteropoda Euthecosomata				42	2
Ostracoda	4	3.3			(?)
Harpacticoida	2				
Misophrioida:					
<u>Benthomisophria sp.</u>	4	3.3		2	
Siphonostomatoida:					
<u>Hyalopontius sp.</u>					
Cyclopoida (Oithonidae, Oncaeidae, Corycaeidae)				1	7
Copepoda indet.					
Copepoda nauplii					
Calanoida (total number)	85	70.8		231	29
Calanidae: <u>Calanus sp.</u>				8	7
Megacalanidae					
Eucalanidae					
Calocalanidae:					
<u>Mecynocera clausi</u>					9
Aetideidae	1?				
Euchaetidae	3		3.5	1	
Centropagidae:					
<u>Centropages sp.</u>				1	1
Metridiidae	47		55.3	28	3
Lucicutiidae	16		18.8	4	
Heterorhabdidae	2		2.4	3	
Augaptilidae				5	
Arietellidae:					
<u>Phyllopus sp.</u>				1	
Candaciidae					
Bathypontiidae:					
<u>Foxtonia barbatula</u>	1			9	
Acartiidae: <u>Acartia sp.</u>					3
not identified	15		17.6	171	6
Euphausiacea					
Decapoda					
Mysidacea					
Isopoda	1				
Amphipoda	2				
Malacostraca indet.	1				
Malacostraca larvae?				1	
Chaetognatha	17	14.2			(?)
Appendicularia					1
Thaliacea					
others					
Total number	120			277	39

MOC-1-007/ NET 5	No.liv	%tz	%cal	No.ex	No.cont
Foraminifera					4
Radiolaria	x				
Medusae					
Siphonophora					
Polychaeta	2				
Pteropoda Euthecosomata				69	
Ostracoda	6	5.4			(?)
Harpacticoida	2				1
Misophrioida:					
<u>Benthomisophria sp.</u>	3	2.7			
Siphonostomatoida:					
<u>Hyalopontius sp.</u>					
Cyclopoida (Oithonidae, Oncaeiidae, Corycaeiidae)					4
Copepoda indet.					
Copepoda nauplii					
Calanoida (total number)	76	68.5		103	17
Calanidae: <u>Calanus sp.</u>				2	4
Megacalanidae					
Eucalanidae					
Calocalanidae:					
<u>Mecynocera clausi</u>					4
Aetideidae					
Euchaetidae				1	
Centropagidae:					
<u>Centropages sp.</u>					1
Metridiidae	38		50.0	9	1
Lucicutiidae	19		25.0	2	
Heterorhabdidae	1			2	
Augaptilidae	4		5.3	4	
Arietellidae:					
<u>Phyllopus sp.</u>	1			1	
Candaciidae					
Bathypontiidae:					
<u>Foxtonia barbatula</u>	1			8	
Acartiidae: <u>Acartia sp.</u>				1	2
not identified	12		15.8	73	5
Euphausiacea					
Decapoda	1				
Mysidacea					
Isopoda					
Amphipoda	3	2.7			
Malacostraca indet.					
Malacostraca larvae?					
Chaetognatha	18	16.2			(?)
Appendicularia					2
Thaliacea					
others					
Total number	111			172	28

MOC-1-007/ NET 6	No.liv	%tz	%cal	No.ex	No.cont
Foraminifera					9
Radiolaria	x				
Medusae					
Siphonophora	4	2.2			
Polychaeta	1				
Pteropoda Euthecosomata				96	
Ostracoda	6	3.4			(?)
Harpacticoida	3				
Misophrioida:					
<u>Benthomisophria sp.</u>	6	3.4			
Siphonostomatoida:					
<u>Hyalopontius sp.</u>					
Cyclopoida (Oithonidae, Oncaeiidae, Corycaeiidae)					2
Copepoda indet.	2				
Copepoda nauplii					
Calanoida (total number)	125	70.2		190	5
Calanidae: <u>Calanus sp.</u>				1	2
Megacalanidae					
Eucalanidae					
Calocalanidae:					
<u>Mecynocera clausi</u>					
Aetideidae	1?				
Euchaetidae	2			1	
Centropagidae:					
<u>Centropages sp.</u>					2
Metridiidae	58		46.4	11	1
Lucicutiidae	27		21.6	3	
Heterorhabdidae	4		3.2	1	
Augaptilidae	4		3.2	5	
Arietellidae:					
<u>Phyllopus sp.</u>	3		2.4	1	
Candaciidae					
Bathypontiidae:					
<u>Foxtonia barbatula</u>	2			19	
Acartiidae: <u>Acartia sp.</u>					1
not identified	24		19.2	146	1
Euphausiacea					
Decapoda					
Mysidacea					
Isopoda					
Amphipoda	1				
Malacostraca indet.					
Malacostraca larvae?					
Chaetognatha	30	16.9			(?)
Appendicularia					
Thaliacea					
others					
Total number	178			286	16

MOC-1-007/ NET 7	No.liv	%tz	%cal	No.ex	No.cont
Foraminifera					4
Radiolaria	x				
Medusae					
Siphonophora	5	3.5			
Polychaeta	3	2.1			
Pteropoda Euthecosomata				65	1
Ostracoda	3	2.1			(?)
Harpacticoida	4	2.8		1	1
Misophrioida:					
<u>Benthomisophria sp.</u>					
Siphonostomatoida:					
<u>Hyalopontius sp.</u>					
Cyclopoida (Oithonidae, Oncaeidae, Corycaeidae)					2
Copepoda indet.	1				
Copepoda nauplii					
Calanoida (total number)	89	62.2		207	22
Calanidae: <u>Calanus sp.</u>				4	5
Megacalanidae	2		2.2		
Eucalanidae					
Calocalanidae:					
<u>Mecynocera clausi</u>					5
Aetideidae					
Euchaetidae				1	
Centropagidae:					
<u>Centropages sp.</u>					2
Metridiidae	56		62.9	25	1
Lucicutiidae	14		15.7	3	
Heterorhabdidae	6		6.7	1	
Augaptilidae				4	
Arietellidae:					
<u>Phyllopus sp.</u>	1				
Candaciidae					
Bathypontiidae:					
<u>Foxtonia barbatula</u>	1			16	
Acartiidae: <u>Acartia sp.</u>					3
not identified	9		10.1	153	6
Euphausiacea					
Decapoda	1				
Mysidacea					
Isopoda					
Amphipoda	1			1	
Malacostraca indet.				1	
Malacostraca larvae?				2	
Chaetognatha	36	25.2			(?)
Appendicularia					3
Thaliacea					
others					
Total number	143			277	33

MOC-1-007/ NET 8	No.liv	%tz	%cal	No.ex	No.cont
Foraminifera					5
Radiolaria					
Medusae	1				
Siphonophora	4	2.2			
Polychaeta	2				
Pteropoda Euthecosomata				91	
Ostracoda	25	13.7			(?)
Harpacticoida	7	3.8		1	
Misophrioida:					
<u>Benthomisophria</u> sp.	2				
Siphonostomatoida:					
<u>Hyalopontius</u> sp.	1				
Cyclopoida (Oithonidae, Oncaeidae, Corycaeidae)				1	3
Copepoda indet.	2			1	
Copepoda nauplii				4	
Calanoida (total number)	96	52.7		232	7
Calanidae: <u>Calanus</u> sp.				3	
Megacalanidae					
Eucalanidae				1	
Calocalanidae:					
<u>Mecynocera clausi</u>					2
Aetideidae					
Euchaetidae				2	
Centropagidae:					
<u>Centropages</u> sp.					1
Metridiidae	40		41.7	16	
Lucicutiidae	15		15.6	1	
Heterorhabdidae	6		6.3	2	
Augaptilidae	3		3.1	4	
Arietellidae:					
<u>Phyllopus</u> sp.	2		2.1		
Candaciidae					
Bathypontiidae:					
<u>Foxtonia barbatula</u>	6		6.3	32	
Acartiidae: <u>Acartia</u> sp.					3
not identified	24		25.0	171	1
Euphausiacea					
Decapoda					
Mysidacea					
Isopoda					
Amphipoda	3				
Malacostraca indet.					
Malacostraca larvae?					
Chaetognatha	39	21.4			(?)
Appendicularia					
Thaliacea					
others					
Total number	182			330	15

MOC-1-007/ NET 9	No.liv	%tz	%cal	No.ex	No.cont
Foraminifera					29
Radiolaria	6				
Medusae	1				
Siphonophora	7	2.4			
Polychaeta					
Pteropoda Euthecosomata				23	12
Ostracoda	64	21.6			(?)
Harpacticoida	2			6	
Misophrioida:					
<u>Benthomisophria sp.</u>				1	
Siphonostomatoida:					
<u>Hyalopontius sp.</u>				1	
Cyclopoida (Oithonidae, Oncaeiidae, Corycaeiidae)				35	20
Copepoda indet.	1			2	
Copepoda nauplii					
Calanoida (total number)	122	41.2		1028	90
Calanidae: <u>Calanus sp.</u>				212	43
Megacalanidae					
Eucalanidae				5	1
Calocalanidae:					
<u>Mecynocera clausi</u>					6
Aetideidae	5		4.1	12	
Euchaetidae	6		4.9	38	(?)
Centropagidae:					
<u>Centropages sp.</u>				67	7
Metridiidae	62		50.8	227	21
Lucicutiidae	14		11.5	15	2
Heterorhabdidae	11		9.0	29	(?)
Augaptilidae	5		4.1	13	
Arietellidae:					
<u>Phyllopus sp.</u>	1			2	
Candaciidae				1	1
Bathypontiidae:					
<u>Foxtonia barbatula</u>	3		2.5	20	
Acartiidae: <u>Acartia sp.</u>				1	4
not identified	15		12.3	386	5
Euphausiacea					1
Decapoda	3				
Mysidacea					
Isopoda	3				
Amphipoda				1	7
Malacostraca indet.					
Malacostraca larvae?					
Chaetognatha	90	30.4			(?)
Appendicularia					
Thaliacea					3
others	3				
Total number	296			1097	162

MOC-1-008/ NET 3	No.liv	%tz	%cal	No.ex	No.cont
Foraminifera					4
Radiolaria	x				
Medusae					
Siphonophora	2				
Polychaeta	2				
Pteropoda Euthecosomata				12	1
Ostracoda	14	6.8			(?)
Harpacticoida	3			1	2
Misophrioida:					
<u>Benthomisophria</u> sp.	2				
Siphonostomatoida:					
<u>Hyalopontius</u> sp.					
Cyclopoida (Oithonidae, Oncaeidae, Corycaeidae)				1	7
Copepoda indet.	1				
Copepoda nauplii				2	
Calanoida (total number)	165	80.1		180	26
Calanidae: <u>Calanus</u> sp.					3
Megacalanidae					
Eucalanidae					
Calocalanidae:					
<u>Mecynocera clausi</u>					2
Aetideidae	1				
Euchaetidae	3				
Centropagidae:					
<u>Centropages</u> sp.				1	4
Metridiidae	45		27.3	4	
Lucicutiidae	18		10.9		
Heterorhabdidae	1				
Augaptilidae	2				
Arietellidae:					
<u>Phyllopus</u> sp.	3				
Candaciidae					
Bathypontiidae:					
<u>Foxtonia barbatula</u>	10		6.1	7	
Acartiidae: <u>Acartia</u> sp.					4
not identified	82		49.7	168	13
Euphausiacea					
Decapoda	1			1	
Mysidacea					
Isopoda					
Amphipoda					
Malacostraca indet.					
Malacostraca larvae?					
Chaetognatha	14	6.8			(?)
Appendicularia					
Thaliacea					
others	2				
Total number	206			197	40

MOC-1-008/ NET 4	No.liv	%tz	%cal	No.ex	No.cont
Foraminifera					4
Radiolaria	x				
Medusae					
Siphonophora	5	4.6			
Polychaeta	3	2.8			
Pteropoda Euthecosomata				7	
Ostracoda	7	6.5			(?)
Harpacticoida	1			3	
Misophrioida:					
<u>Benthomisophria sp.</u>					
Siphonostomatoida:					
<u>Hyalopontius sp.</u>					
Cyclopoida (Oithonidae, Oncaeidae, Corycaeidae)					4
Copepoda indet.					
Copepoda nauplii					
Calanoida (total number)	65	60.2		149	33
Calanidae: <u>Calanus sp.</u>				4	4
Megacalanidae					
Eucalanidae					
Calocalanidae:					
<u>Mecynocera clausi</u>					2
Aetideidae					
Euchaetidae	1				
Centropagidae:					
<u>Centropages sp.</u>					8
Metridiidae	23		35.4	18	5
Lucicutiidae	12		18.5	10	1
Heterorhabdidae	3		4.6	4	
Augaptilidae	2		3.1	3	
Arietellidae:					
<u>Phyllopus sp.</u>	3		4.6		
Candaciidae					
Bathypontiidae:					
<u>Foxtonia barbatula</u>	3		4.6	7	
Acartiidae: <u>Acartia sp.</u>					9
not identified	18		27.7	103	4
Euphausiacea					
Decapoda					
Mysidacea					
Isopoda					
Amphipoda	1				
Malacostraca indet.					
Malacostraca larvae?				1	
Chaetognatha	26	24.1			(?)
Appendicularia					
Thaliacea					
others					
Total number	108			160	41

MOC-1-008/ NET 5	No.liv	%tz	%cal	No.ex	No.cont
Foraminifera					3
Radiolaria	x				
Medusae					
Siphonophora	5				
Polychaeta	8	2.5			
Pteropoda Euthecosomata				29	
Ostracoda	33	10.2			(?)
Harpacticoida	3				1
Misophrioida:					
<u>Benthomisophria sp.</u>	1				
Siphonostomatoida:					
<u>Hyalopontius sp.</u>					
Cyclopoida (Oithonidae, Oncaeidae, Corycaeidae)				4	5
Copepoda indet.					
Copepoda nauplii				1	
Calanoida (total number)	229	70.5		248	30
Calanidae: <u>Calanus sp.</u>				3	4
Megacalanidae					
Eucalanidae					
Calocalanidae:					
<u>Mecynocera clausi</u>					4
Aetideidae	2				
Euchaetidae	1				
Centropagidae:					
<u>Centropages sp.</u>				4	1
Metridiidae	71		31.0	6	5
Lucicutiidae	24		10.5		
Heterorhabdidae	5		2.2	1	
Augaptilidae	8		3.5		
Arietellidae:					
<u>Phyllopus sp.</u>	1				
Candaciidae					
Bathypontiidae:					
<u>Foxtonia barbatula</u>	15		6.6	7	
Acartiidae: <u>Acartia sp.</u>				1	7
not identified	102		44.5	226	9
Euphausiacea					
Decapoda					
Mysidacea	2				
Isopoda	2				
Amphipoda	3				
Malacostraca indet.					
Malacostraca larvae?					
Chaetognatha	36	11.1			(?)
Appendicularia					1
Thaliacea					
others	3				
Total number	325			282	40

MOC-1-008/ NET 6	No.liv	%tz	%cal	No.ex	No.cont
Foraminifera					6
Radiolaria	x				
Medusae					
Siphonophora	1				
Polychaeta	3				
Pteropoda Euthecosomata				27	
Ostracoda	17	6.7			(?)
Harpacticoida	2				1
Misophrioida:					
<u>Benthomisophria sp.</u>	1				
Siphonostomatoida:					
<u>Hyalopontius sp.</u>					
Cyclopoida (Oithonidae, Oncaeidae, Corycaeidae)				2	3
Copepoda indet.					
Copepoda nauplii				1	
Calanoida (total number)	208	82.5		81	15
Calanidae: <u>Calanus sp.</u>				1	1
Megacalanidae					
Eucalanidae					
Calocalanidae:					
<u>Mecynocera clausi</u>					3
Aetideidae					
Euchaetidae					
Centropagidae:					
<u>Centropages sp.</u>					1
Metridiidae	27		13.0	4	
Lucicutiidae	11		5.3	1	
Heterorhabdidae	3				
Augaptilidae	3				
Arietellidae:					
<u>Phyllopus sp.</u>	1				
Candaciidae					
Bathypontiidae:					
<u>Foxtonia barbatula</u>	14		6.7	2	
Acartiidae: <u>Acartia sp.</u>					1
not identified	149		71.6	73	9
Euphausiacea					
Decapoda					
Mysidacea					
Isopoda					
Amphipoda	1				
Malacostraca indet.					
Malacostraca larvae?	1			1	
Chaetognatha	16	6.3			(?)
Appendicularia					
Thaliacea					
others	2				
Total number	252			112	25

MOC-1-008/ NET 7	No.liv	%tz	%cal	No.ex	No.cont
Foraminifera					4
Radiolaria	x				
Medusae					
Siphonophora	2				
Polychaeta	5	2.8			
Pteropoda Euthecosomata				15	
Ostracoda	22	12.5			(?)
Harpacticoida				3	
Misophrioida:					
<u>Benthomisophria sp.</u>					
Siphonostomatoida:					
<u>Hyalopontius sp.</u>					
Cyclopoida (Oithonidae, Oncaeiidae, Corycaeiidae)					4
Copepoda indet.	3				
Copepoda nauplii				2	
Calanoida (total number)	115	65.3		156	30
Calanidae: <u>Calanus sp.</u>				2	4
Megacalanidae					
Eucalanidae					
Calocalanidae:					
<u>Mecynocera clausi</u>					5
Aetideidae	2?				
Euchaetidae	2			2	
Centropagidae:					
<u>Centropages sp.</u>				2	4
Metridiidae	41		35.7	9	2
Lucicutiidae	21		18.3	1	
Heterorhabdidae	2			2	
Augaptilidae	7		6.1	10	
Arietellidae:					
<u>Phyllopus sp.</u>				2	
Candaciidae					
Bathypontiidae:					
<u>Foxtonia barbatula</u>	7		6.1	8	
Acartiidae: <u>Acartia sp.</u>					6
not identified	33		28.7	118	9
Euphausiacea					2
Decapoda	2			1	
Mysidacea					
Isopoda					
Amphipoda				1	
Malacostraca indet.					
Malacostraca larvae?				3	
Chaetognatha	27	15.3			(?)
Appendicularia					
Thaliacea					
others					
Total number	176			181	40

MOC-1-008/ NET 8	No.liv	%tz	%cal	No.ex	No.cont
Foraminifera					5
Radiolaria	x				
Medusae	2				
Siphonophora	7				
Polychaeta	6				
Pteropoda Euthecosomata				30	
Ostracoda	40	10.5			(?)
Harpacticoida	5				
Misophrioida:					
<u>Benthomisophria sp.</u>	3			1	
Siphonostomatoida:					
<u>Hyalopontius sp.</u>					
Cyclopoida (Oithonidae, Oncaeidae, Corycaeidae)				1	8
Copepoda indet.	1				
Copepoda nauplii				2	1
Calanoida (total number)	287	75.1		171	18
Calanidae: <u>Calanus sp.</u>				4	2
Megacalanidae					
Eucalanidae					
Calocalanidae:					
<u>Mecynocera clausi</u>					4
Aetideidae	4?				
Euchaetidae	2			1	
Centropagidae:					
<u>Centropages sp.</u>				4	
Metridiidae	63		22.0	8	
Lucicutiidae	32		11.1	3	
Heterorhabdidae	4				
Augaptilidae	7		2.4	5	
Arietellidae:					
<u>Phyllopus sp.</u>					
Candaciidae					
Bathypontiidae:					
<u>Foxtonia barbatula</u>	22		7.7	6	
Acartiidae: <u>Acartia sp.</u>				1	3
not identified	153		53.3	139	9
Euphausiacea					
Decapoda					
Mysidacea					
Isopoda					
Amphipoda	1				
Malacostraca indet.					
Malacostraca larvae?				2	1
Chaetognatha	30	7.9			(?)
Appendicularia					7
Thaliacea					
others					1
Total number	382			207	41

MOC-1-008/ NET 9	No.liv	%tz	%cal	No.ex	No.cont
Foraminifera					7
Radiolaria	27				
Medusae	6				
Siphonophora	5				
Polychaeta	6				
Pteropoda Euthecosomata				11	1
Ostracoda	48	9.2			(?)
Harpacticoida	5				
Misophrioida:					
<u>Benthomisophria sp.</u>	4				
Siphonostomatoida:					
<u>Hyalopontius sp.</u>	1				
Cyclopoida (Oithonidae, Oncaeiidae, Corycaeiidae)				17	20
Copepoda indet.	1			1	
Copepoda nauplii				2	
Calanoida (total number)	360	69.1		372	138
Calanidae: <u>Calanus sp.</u>				65	57
Megacalanidae					
Eucalanidae				1	1
Calocalanidae:					
<u>Mecynocera clausi</u>					9
Aetideidae	2			2	
Euchaetidae	13		3.6	4	(?)
Centropagidae:					
<u>Centropages sp.</u>				30	28
Metridiidae	56		15.6	39	21
Lucicutiidae	14		3.9	1	2
Heterorhabdidae	20		5.6	9	(?)
Augaptilidae	10		2.8	1	
Arietellidae:					
<u>Phyllopus sp.</u>	7				
Candaciidae					
Bathypontiidae:					
<u>Foxtonia barbatula</u>	38		10.6	3	
Acartiidae: <u>Acartia sp.</u>					14
not identified	200		55.6	217	6
Euphausiacea					1
Decapoda	3				
Mysidacea					
Isopoda					
Amphipoda	3			1	
Malacostraca indet.					
Malacostraca larvae?				2	
Chaetognatha	65	12.5			(?)
Appendicularia					3
Thaliacea					1
others	14	2.7			
Total number	521			406	171

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Verkaufspreis/DM

- * **Sonderheft Nr. 1/1981** – „Die Antarktis und ihr Lebensraum“
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- Heft Nr. 1/1982** – „Die Filchner-Schelfeis-Expedition 1980/1981“
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- Heft Nr. 2/1982** – „Deutsche Antarktis-Expedition 1980/1981 mit FS ‚Meteor‘“
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