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DISTRIBUTION OF THE ZOOBENTHOS ON THE DUTCH CONTINENTAL SHELF: THE WESTERN FRISIAN FRONT, BROWN BANK AND BROAD FOURTEENS (1992/1993)

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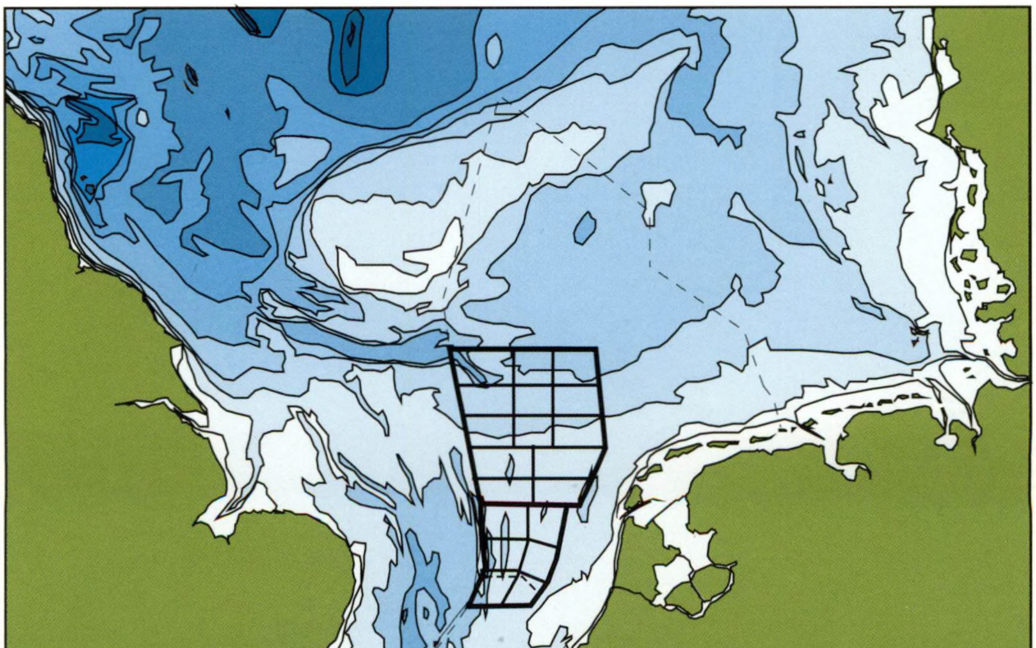

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DISTRIBUTION OF THE ZOOBENTHOS ON THE DUTCH CONTINENTAL SHELF: THE WESTERN FRISIAN FRONT, BROWN BANK AND BROAD FOURTEENS (1992/1993).

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SUMMARY

This report presents the results of the 1992 and 1993 surveys of the MILZON-BENTHOS II project. The aim of the research program was to study the spatial distribution of the zoobenthos in the area of the Broad Fourteens, Brown Bank (Southern North Sea) and the western Frisian Front (transition Southern-Central North Sea).

The fieldwork was carried out in spring 1992 and 1993 and included sediment sampling at 82 stations. From these samples the meiobenthos, the macrobenthos and selected sediment parameters, such as median grain size, the mud content, chlorophyll-a and POC, were analyzed. Additional data from 3 stations located in the area, which were sampled during the EXP*BMN program 1992 (Duineveld & Belgers, 1993; Huys & De Smet, 1993), have been incorporated in the results.

The investigated area can be described as follows. The southern part of the area is situated in medium to coarse sand, with depths around 30 m at the Broad Fourteens and between 20 and 40 m around the Brown Bank area. Further north, around 53°30' N, between the 30 and 40 m isobaths, a rather sharp boundary separates the sandy Southern Bight from the muddy Frisian Front area and Central North Sea. The north-west corner of the research area covered a sandy part of the Cleaver Bank, whereas the north-eastern area was located in the muddy Oyster Ground (depth >40 m). The north-western part of the area, investigated in 1993, included the Western Mud Hole and partly the Botney Ground and one station was situated in the Botney Cut.

The results of the zoobenthos survey can be summarized as follows:

* - In total 14 permanent (= real) meiobenthic taxa were found in the whole area. The density of the meiobenthos varied between 412 and 6815 ind./10 cm² with an average value of 1783 ind./10 cm².
- The Nematoda formed the most dominant taxon of the meiobenthos, accounting for 82 % of the total density. Highest densities were found in the muddy areas (western Frisian Front and Oyster Ground), whereas they were lowest in the southern area. The sandy southern part (Brown Bank and Broad Fourteens) and the Cleaver Bank contained relatively high densities of the meiobenthic taxa Copepoda (interstitial), Gastrotricha, Turbellaria, Annelida, Hydrozoa and Tardigrada. The Frisian Front area was marked by high Nematoda densities and relatively high abundances of Halacarida and Kinorhyncha, whereas the Oyster Ground contained high densities of Nematoda, burrowing Copepoda and the presence of Kinorhyncha, Rotifera and Priapulida.
- The meiobenthic diversities ($Hill_{0-\infty}$) were highest in the southern sandy area and the Cleaver Bank, whereas they were lowest in the western Frisian Front and in the Oyster Ground.

* - From 85 sorted macrobenthos samples in total 160 species were identified. The taxa of the Polychaeta and Crustacea represent the main part of the identified macrobenthic species.
- The macrobenthic density varied between 257 and 4126 ind./m² (mean: 1308 ind./m²). The biomass of the macrobenthos showed values between 1 and 136 g AFDW/m² (mean: 18 g AFDW/m²). In the northern part the density was higher than in the area of the Southern Bight. Highest biomass values were found in the north and in the south-western part of the investigated area. About 40 % of the total density was made up by the Polychaeta. The biomass of the Echinodermata formed 52 % of the total biomass.
- The number of macrobenthic species per boxcore sample ($Hill_0$) varied between 11 and 33, with the lowest values occurring in the south-eastern part of the studied area. Stations with relatively low values of the diversity numbers $Hill_1$ to $Hill_\infty$ were situated in the north, where a few species numerically dominate the macrobenthic assemblage.

* The observed zoobenthos composition showed high correlations with the sediment composition, especially with median grain size, mud content and, to a less extent, with the waterdepth. In areas where the sediment has a high mud content and a low median grain size, the macrobenthic assemblages were characterized by a high total biomass, total density and species richness. On the contrary, these areas revealed low meiobenthic diversity values, as a result of the absence of many meiobenthic taxa.

In order to get more information about the spatial distribution of the meio- and macrobenthic assemblages, the stations were classified using the TWINSPAN-cluster analysis based on taxon-level for the meiobenthic density, respectively on species-level for the macrobenthic density. Meio- and macrobenthos clusters showed in general the same distribution; two clusters in the northern muddy area and two clusters in the medium to coarser sandy area in the south. The borders of the two southern meio- and macrobenthos clusters did not coincide perfectly, probably due to different critical grain size ranges for both groups. The meiobenthos seems to be more sensitive to the range of median grain sizes between 250 and 300 μm, whereas the macrobenthos reacts to changes between 200 and 250 μm.

The clusters of the meio- and macrobenthos can be described as follows:

* In the north cluster 1 of the macrobenthos showed the highest values of the total density and biomass, whereas in the south (cluster 4) the lowest values of the density and biomass were found. In the central area between these two clusters the macrobenthos was intermediate in terms of density and biomass (clusters 2 & 3).
* The meiobenthos was represented in relatively high densities but with low diversities in the north in the western Frisian Front and Oyster Ground area (cluster 1). This area is surrounded by an area, around the 30 and 40 m isobaths, with lower densities but still impoverished in taxa (cluster 2). In the south total densities were generally lower, but a more diverse assemblage could be found (cluster 3), especially in the coarsest sandy parts (cluster 4).

The distribution of the meio- and macrobenthic assemblages in the Southern Bight as well as in the southern part of the Oyster Ground and the Frisian Front area seemed to be relatively stable in the period between 1988 and 1993 (MILZON-BENTHOS I+II).

The clusters of the meio- and macrobenthos of the total MILZON-BENTHOS area 1988-1993 were situated as follows:

* The macrobenthos showed two assemblages in the muddy sand area of the Oyster Ground and Frisian Front (clusters I & II), a coastal assemblage (cluster III) and an assemblage of coarse sand area (cluster IV).
* The meiobenthos showed an assemblage (cluster I) of stations in the muddy fine grained sand (Oyster Ground, Frisian Front and near river outflows). Cluster II is concentrated in the coastal area, in the fine-medium sandy area between 53° N and the 30 m isobath and in the less muddy parts of the northern area. Cluster III is mainly found in the Southern Bight, whereas cluster IV is found in the coarsest sediments.

SAMENVATTING

Dit rapport geeft een verslag van de resultaten van de inventarisaties van 1992 en 1993 van het MILZON-BENTHOS II project. Het doel van het onderzoeksprogramma was om de ruimtelijke verspreiding van het zoöbenthos van de Breeveertien, Bruine Bank (Zuidelijke Noordzee) en het westelijke Friese Front (overgang Zuidelijke-Centrale Noordzee) te bestuderen.

Het veldwerk vond in het voorjaar van 1992 en 1993 plaats, waarbij op 82 stations bodemmonsters werden genomen. Van deze monsters werden meiobenthos, macrobenthos en enkele geselecteerde sediment parameters (mediane korrelgrootte, slibgehalte, chlorofyl-a en POC) geanalyseerd. Aanvullende data van 3 in hetzelfde gebied gelegen stations, bemonsterd gedurende het EXP*BMN programma 1992 (Duineveld & Belgers, 1993; Huys & De Smet, 1993), zijn in de resultaten geïntegreerd.

Het betrokken gebied kan als volgt worden omschreven. Het zuidelijke deel bestaat uit medium tot grofzandige gebieden, met dieptes van rond de 30 m in de Breeveertien en tussen de 20 en 40 m rond de Bruine Bank. Verder naar het noorden, ter hoogte van 53°30' N, tussen de 30 en 40 m dieptelijnen, scheidt een tamelijk scherpe grens de zandige Zuidelijke Noordzee van het slibrijke Friese Front gebied en de Centrale Noordzee. De noordwest hoek van het studiegebied bedekte het zandige deel van de Klaverbank, terwijl het noordoostelijke deel in de uit fijn slib bestaande Oestergronden lag (> 40 m diep). Het noordwestelijke deel van het gebied, dat in 1993 werd bemonsterd, omvatte tevens de Western Mud Hole en gedeeltelijk de Botney Ground, met tevens één station in de Botney Cut.

De resultaten van de studie aan het zoöbenthos kunnen als volgt worden samengevat:

* - In totaal zijn 14 permanente (= echte) meiobenthische taxa in het gebied van 1992/93 gevonden. De dichtheid van het meiobenthos varieerde tussen 412 en 6815 ind./10 cm^2, met een gemiddelde van 1783 ind./10 cm^2.

- De Nematoda vormden het meest dominante taxon in het meiobenthos, waarbij ze verantwoordelijk waren voor 82 % van de totale dichtheid. De hoogste dichtheden werden in slibrijke gebieden aangetroffen (westelijke Friese Front en Oestergronden), terwijl de laagste dichtheden gevonden werden in het zuidelijke gebied. Het zandige zuidelijke deel (Bruine Bank en Breeveertien) en de Klaver Bank bevatten hogere dichtheden van de meiobenthische taxa Copepoda (interstitiëel), Gastrotricha, Turbellaria, Annelida, Hydrozoa en Tardigrada. Het Friese Front werd gekenmerkt door hoge Nematoda dichtheden, hogere aantallen aan Halacarida en Kinorhyncha, terwijl de Oestergronden gekenmerkt werden door hoge dichtheden aan Nematoda en gravende Copepoda alsmede door de aanwezigheid van Kinorhyncha, Rotifera en Priapulida.
- De meiobenthische diversiteit ($Hill_{0-\infty}$) was het hoogst in het zandige zuidelijke gebied en in de Klaverbank, terwijl ze het laagst was in westelijke Friese Front en in de Oestergronden.

* - In de 85 onderzochte macrobenthos monsters werden 160 soorten gedetermineerd. De taxa Polychaeta en Crustacea vertegenwoordigden een meerderheid van het aantal gevonden macrobenthos soorten.

- De macrobenthos dichtheid varieerde tussen 257 en 4126 ind./m^2 (gemiddeld: 1308 ind./m^2). De biomassa van het macrobenthos vertoonde waarden tussen 1 en 136 g AFDW/m^2 (gemiddeld: 18 g AFDW/m^2). In het noordelijke gebied was de dichtheid hoger dan in het gebied in de Zuidelijke Bocht. De hoogste biomassa waarden werden in het noorden en in het zuidwestelijke deel aangetroffen. Circa 40 % van de totale dichtheid werd gevormd door de Polychaeta. De Echinodermata vormden 52 % van de totale biomassa.

- Het aantal macrobenthos soorten per boxcore ($Hill_0$) varieerde tussen 11 en 33, waarbij de laagste waarden gevonden zijn in het zuidoostelijke deel van het onderzoeksgebied. Stations met een lage diversiteit ($Hill_1$ tot $Hill_\infty$) zijn in het noorden gevonden, waar een paar soorten dominant zijn.

* De waargenomen samenstelling van het zoöbenthos vertoonde hoge correlaties met de sediment samenstelling vooral met de mediane korrelgrootte, het slibgehalte en, in mindere mate, met de waterdiepte. Gebieden met een hoog slibgehalte en een lage mediane korrelgrootte, werden bevolkt door macrobenthische gemeenschappen die gekarakteriseerd worden door een hoge totale biomassa, totale dichtheid en soortenrijkdom. Daarentegen vertoonde de meiobenthische diversiteit lage waarden in deze gebieden, als gevolg van de afwezigheid van veel meiobenthische taxa.

Om meer informatie te verkrijgen over de ruimtelijke verspreiding van de meio- en macrobenthos gemeenschappen, zijn de stations geclassificeerd met behulp van de TWINSPAN-clustering methode gebaseerd op taxon-niveau voor de meiobenthos dichtheid, respectievelijk op soortsniveau voor de macrobenthos dichtheid. Meio- en macrobenthos clusters vertoonden in het algemeen dezelfde ruimtelijke verdeling; twee clusters in het noordelijke slibrijke gebied en twee clusters in het medium tot grofzandige gebied in het zuiden. De grenzen van de twee zuidelijke meio- en macrobenthos clusters kwamen niet geheel overeen, waarschijnlijk als gevolg van verschillen in de kritische korrelgrootte grenzen voor beide groepen. Het meiobenthos lijkt gevoeliger te zijn in het korrelgrootte bereik tussen 250 en 300 μm, terwijl het macrobenthos reageert op verschillen tussen 200 en 250 μm.

De clusters van het meio- en macrobenthos kunnen als volgt worden omschreven:

* In het noorden vertoonde cluster 1 van het macrobenthos de hoogste waarden van de totale dichtheid en biomassa, terwijl in het zuiden (cluster 4) de laagste waarden van de dichtheid en biomassa gevonden zijn. In het centrale gebied tussen deze twee clusters was het macrobenthos gemiddeld wat betreft de dichtheid en biomassa (clusters 2 & 3).
* Het meiobenthos was in het noorden in het westelijke Friese Front en de Oestergronden in relatief hoge dichtheden aanwezig, maar de diversiteit was laag (cluster 1). Rond dit gebied, ter hoogte van de 30 en 40 m dieptelijnen, ligt een gebied met lagere dichtheden maar nog steeds arm aan taxa (cluster 2). In het zuiden waren de dichtheden in het algemeen lager, maar werd er een gemeenschap met een hogere diversiteit aangetroffen (cluster 3), vooral in de gebieden met het grofste zand (cluster 4).

De verspreiding van de meio- en macrobenthische gemeenschappen in de Zuidelijk Bocht alsook in het zuidelijke deel van de Oestergronden en het Friese Front leken relatief stabiel te zijn gebleven in de periode tussen 1988 en 1993 (MILZON-BENTHOS I+II).

De clusters van het meio- en macrobenthos van het totale MILZON-BENTHOS 1988-1993 gebied werden in de volgende gebieden gevonden:

* Het macrobenthos vertoonde twee gemeenschappen in het slibrijke gebied van de Oestergronden en het Friese Front (clusters I & II), een kustgemeenschap (cluster III) en een gemeenschap van in grofzandige gebieden gelegen stations (cluster IV).
* Het meiobenthos gaf een gemeenschap (cluster I) te zien in het slibrijke fijnzandige gebied (Oester Gronden, Friese Front en in de buurt van riviermondingen). Cluster II is geconcentreerd in het kustgebied, in het fijn-medium zandige gebied tussen 53° N en de 30 m dieptelijn en in de slibarmere gebieden in het noorden. Cluster III wordt voornamelijk aangetroffen in de Zuidelijk Bocht, terwijl cluster IV in de grofste sedimenten voorkomt.

1 PREFACE

The MILZON-BENTHOS II (MILieuZONering/Environmental Zonation) project (1991-1993) was carried out under commission of the North Sea Directorate of the Ministry of Transport, Public Works and Water Management (RWS-DNZ) as a continuation of the MILZON-BENTHOS I project (1988-1989) (Zevenboom & Leewis, 1987; Zevenboom, 1993). The aim of the project is to map in great detail the spatial distribution of the zoobenthos in the Dutch part of the North Sea and, on basis of this information, to classify homogenous areas. Within the framework of these projects the Dutch coastal area has been surveyed in the years 1988-89 (Groenewold & van Scheppingen, 1989; 1990; van Scheppingen & Groenewold, 1990), the area north of the Dutch Wadden islands, the Oyster Ground and Frisian Front area in 1991 (Holtmann & Groenewold, 1992). Together with the investigation of 1992 and 1993, which covered the area west of the Frisian Front, the Broad Fourteens and the Brown Bank (this report), almost the total Dutch Continental Shelf (DCS) of the North Sea was studied in the course of the MILZON-BENTHOS I+II projects.

The achievement of a deeper understanding of the functioning of the North Sea ecosystem is necessary in order to carry out an appropriate and efficient management of the North Sea. This knowledge is of importance not only in the assessment of the effect of human activities (e.g. discharges into the sea, offshore mining, fishery etc.), but also in relation to the drafting/framing of international conventions/treaties. Benthic ecosystem information has already played a dominant role in determining the Environmental Zone on the Dutch Continental Shelf, which is part of the Water System Management Plan North Sea 1991-1995. Furthermore a "stable and diverse benthic ecosystem" is one of the policy aims in this plan.

The objectives of the project in 1992/93 are to:

1. Make an inventory of the macrozoobenthos (species composition, density and biomass) and meiozoobenthos (taxon composition and density) in the area west of the Frisian Front, in the Broad Fourteens and the Brown Bank.
2. Determine the heterogeneity in the spatial distribution of the meio- and macrozoobenthos, by quantifying the natural variability in meio- and macrobenthos assemblages.
3. Distinguish several assemblages by statistical analysis.
4. Compare and integrate the present data with overlapping stations of the long term monitoring program of Rijkswaterstaat (EXP*BMN project) as well as with the survey area that has already been mapped (MILZON-BENTHOS I project).

2 INTRODUCTION

2.1 General abiotic features

The Dutch Continental Shelf (DCS) of the North Sea is a rather diverse area in terms of water depth and sediment composition. In the southern part (the Southern Bight), the depth ranges from 0 m (coastline) to 30 m. Beyond the 30 m isobath at approximately 53° N, a narrow zone with increasing depths separates this shallow southern part from the deeper northern area (Oyster Ground, Botney Ground)(Figs. 1 and 2). Further north, the depth gradually increases to about 50 m, with a deeper spot (50-60 m) in the Oyster Ground (Puzzle Hole) as well as in the Botney Ground (Botney Cut). Between these two Grounds a relatively shallow (30-40 m) area is found, running north into the sand and gravel area of the Cleaver Bank. The northern border of the Oyster Ground is formed by the shallow and sandy Dogger Bank (10-30 m).

Strong tidal currents occur in offshore parts in the Southern Bight, where the bottom sediment can generally be characterized as medium to coarse sands with small mud contents. Near to the coast this is sometimes mixed with mud, while in some areas the sediment consists of gravel. In the area north of the 30 m isobath, called the Frisian Front area (de Gee et al., 1991), tidal current velocities decrease sharply, resulting in the deposition of mud and detritus on the bottom. This muddy area is rich in organic material and in macrobenthic fauna (Creutzberg et al., 1984). North of the 40 m isobath, in the fine-grained silty area of the Oyster Ground, tidal currents are weak. In summertime, under favourable conditions, stratification of the water column can occur in these areas with low current velocities. The upper warmer layer is separated from the colder bottom layer by a thermocline, restricting exchange between the two layers. In the Southern Bight the strong tidal currents prevent such a stratification.

In the Dutch part of the Southern and Central North Sea, several water masses are formed as a result of the tidal movement and the influence of predominantly westerly winds. Depending on its origin, these water masses are: continental coastal water (mixture of Atlantic Ocean- and continental river water), English Channel water (unmixed Atlantic Ocean water) and Central North Sea water (unmixed Atlantic Ocean water) (Lee, 1970) (Fig. 3). Fronts mark the boundaries between the water masses, which can differ in biological as well as chemical characteristics (Pingree & Griffiths, 1978).

2.2 General biotic features

Since the introduction of the concept of large-scale marine assemblages at the beginning of this century, interest in the composition of the zoobenthos in the North Sea and its relationship with the abiotic environment (depth, sediment composition, salinity etc.) has increased. In 1986 the Benthos Ecology Working Group of ICES studied the distribution of marine bottom assemblages in the North Sea. This synoptic mapping of the infauna of the North Sea therefore should act as a basis for all further comparisons on natural and anthropogenic changes in the benthos since it is the first synoptic overview.

More detailed investigations have been carried out during the subsequent MILZON-BENTHOS projects I+II, which showed results that were generally in line with those of the synoptic mapping of ICES. Due to the finer sampling grid, the MILZON-BENTHOS I project (1988-1989) revealed the presence of three benthic zones parallel to the Dutch coast, both of the meio- as well as of the macrobenthos (Groenewold & van Scheppingen, 1989; 1990; van Scheppingen & Groenewold, 1990). The results of the MILZON-BENTHOS II project (1991) in the area north of the Dutch Wadden islands, around the Frisian Front and the Oyster Ground, were comparable with those of the ICES survey (Holtmann & Groenewold, 1992). In the sandy area of 1991 stations were found to contain a relatively low macrobenthos biomass and density and low meiobenthos density, whereas the muddy northern area was characterized by a rich zoobenthos assemblage in terms of macrobenthos density and biomass and also of meiobenthos density (Holtmann & Groenewold, 1992).

2.3 Acknowledgements

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3 MATERIAL AND METHODS

3.1 Sampling

In the period 27 April to 22 May 1992 and 24 May to 4 June 1993, sediment samples were collected at a total of 82 stations with the R/V Holland (Groenewold & Holtmann, 1992; 1993). Additional data from another 3 stations (N 50, N 70 and META 1) located within the present study area, which were sampled on 31 March 1992 during the EXP*BMN program (Duineveld & Belgers, 1993; Huys & De Smet, 1993), have been incorporated in the dataset (Fig. 2). These samples have been treated in the same way as the ones collected for this survey. All stations had at least a distance of 2 nautical miles from operational or abandoned drilling locations (drilled since 1985). The existence of peat-banks in the Brown Bank area of 1992 (compartments 6, 7 and 8), caused the extra limited condition that 3 shallow (stations 1-3) and 3 deeper (stations 4-6) stations had to be selected.

Prior to sampling, the investigated area was divided into 19 homogeneous compartments in terms of sediment composition and water depth, under the surmise that there exists a relationship between the zoobenthos and the environment (Duineveld et al., 1990; Künitzer et al., 1992)(Figs. 1 and 2). Depending on the surface area of the compartment, 3-6 stations were selected according to the "stratified random sampling"-method.

The following parameters were collected for investigation:
* macrozoobenthos (species, density, biomass)
* meiozoobenthos (taxa, density)
* median grain size and mud content
* POC (Particulate Organic Carbon) content of the sediment
* chl.-a (chlorophyll-a) content of the sediment
* visual oxidized layer of the sediment

At each station two Reineck boxcore samples were taken with a surface of 0.068 m^2 (at some stations it was 0.078 m^2). The required minimal depth of the boxcore samples was set at 15 cm. One boxcore was subsampled for meiobenthos (1 core of minimal 15 cm depth and ϕ of 3.4 cm), sediment grain size (1 core of 10 cm depth and ϕ of 3.4 cm), and for POC and chlorophyll-a content (2 cores each of 3 cm depth and ϕ of 11 mm). These subsample cores were also used for visual observations of the "oxidized layer". The other boxcore sample was used for macrobenthos analysis. For this purpose, the sample was washed on board through a sieve with round holes of 1 mm diameter. The macrobenthic residue as well as the entire meiobenthos subsample were preserved in a borax-buffered solution of 4-6 % formaldehyde in seawater. The subsamples collected for sediment grain size analysis, mud content (fraction $< 63\ \mu m$), chlorophyll-a and POC analyses were immediately frozen at -20°C and analyzed within 6 months after sampling.

3.2 Treatment of samples

The subsamples collected for sediment grain size, mud content (fraction $< 63\ \mu m$), chlorophyll-a and POC contents were analyzed at the analytical department of RWS-National Institute for Coastal and Marine Management (RIKZ) in Middelburg. Procedures were according to the standard regulations for meio- and macrobenthos in the Southern North Sea (Holtmann, 1990a & b).

In the laboratory, rose-bengal was added to the meio- and macrobenthic samples to facilitate sorting. The meiofauna was separated by means of decantation through a 38 μm sieve and sorted at taxon level (densities/10 cm²).

Prior to sorting, the macrobenthos samples were fractionated over a set of 4 nested stainless steel sieves with 0.5 mm as the smallest mesh size. The roughly equal particle size in the four residues improved the efficiency of sorting organisms from the debris. Density (individuals/m²) and biomass (g Ash-Free Dry Weight/m²) were, if possible, recorded at the species level and otherwise at higher taxonomic level. For some groups of macrofauna (Bivalvia, Echinoidea) the sizes of individuals were noted and, if clearly discernible, the juvenile species were recorded, but not further used for data analysis. The biomass (g AFDW/m²) of the macrobenthos was determined by drying the organisms at 60°C for at least 60 hours and subsequently incinerating them at 520°C for 4 hours. Some representatives of the Crustacea (amphipods, isopods and cumaceans), were assigned an average individual AFDW (0.3-0.5 mg) which was derived from data obtained during the MILZON-BENTHOS I+II projects (Duineveld and Holtmann, pers. comm.).

More information about sampling and sample treatment on board the ship can be found in the cruise reports of MILZON-BENTHOS II 1992 and 1993 (Groenewold & Holtmann, 1992; 1993).

3.3 Sediment classification

The grain size distribution of the sand fraction in the sediment was analyzed by means of a Malvern (RIKZ-Middelburg). The contribution of the mud fraction (%, particles < 63 μm) was determined separately. The sediment types were classified on basis of the median grain size as follows:

Characterization of the sedimenttype according to the median grain size (after Gullentops et al., 1977).

< 175 µm	Very fine sand
175 - 250 µm	Fine sand
250 - 300 µm	Fine-medium sand
300 - 350 µm	Medium-coarse sand
> 350 µm	Coarse sand

3.4 Statistical analysis

3.4.1 Diversity

The zoobenthic diversity in the investigated area is expressed by Hill's diversity numbers (Hill, 1973). The relationship between the commonly used measures of diversity and Hill's numbers is as follows:

$Hill_0 = N_0$ = the number of species/taxa
$Hill_1 = N_1$ = exp(H') (H' = Shannon-Wiener index; Shannon & Weaver, 1949)
$Hill_2 = N_2$ = 1/SI (SI = Simpson index of dominance; Simpson, 1949).
$Hill_\infty = N_\infty$ = the reciprocal of the proportional abundance of the most common species/taxa

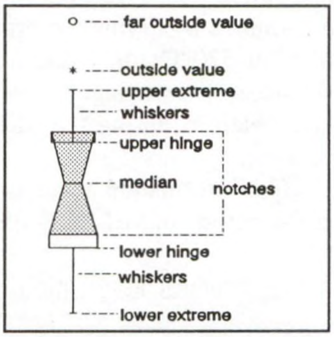
3.4.2 Classification of assemblages

3.4.2.1 TWINSPAN

All stations were classified into groups by means of the FORTRAN program TWINSPAN (Hill, 1979) using the taxon, respectively species abundance of the meio- and macrozoobenthos. Within the TWINSPAN method, the stations are ordered along an ordination axis according to their faunal characteristics. This axis is split in two parts and each set of stations is separately classified again and so on. This leads to a dichotomous division of the total set of stations up to a preset level.

The resulting clusters of the classification of the 1992/93 area were numbered from 1 to 4 and of the 1988-1993 area from I to IV. For meio- and macrobenthos identical symbols were used for comparable TWINSPAN clusters.

To illustrate the differences between the clusters with respect to selected biotic and abiotic parameters, notched box and whisker plots were drawn using SYSTAT 5.0 (SYSTAT inc. IL, USA). Because these plots show the medians and their simultaneous confidence intervals (the notches) of the different groups, they allow a direct assessment of significant differences (at a 95 % confidence level) between median values of the groups (McGill et al., 1978).



notched box and whisker plot

3.4.2.2 Multi-dimensional scaling (MDS)

Another method to classify several stations, is non-metric multi-dimensional scaling (MDS) ordination (Kruskal & Wish, 1978). Prior to MDS ordination all data were log(x+1) transformed, in order to prevent numerically dominant species/taxa to swamp the other data, which is usually desirable for density and biomass data (Clarke & Green, 1988). The faunal (dis)similarity between the stations was calculated with the Bray-Curtis similarity index, whereas dissimilarity in terms of abiotic data was based on Euclidean distances. Separate data of meio- and macrobenthos as well as (a combination) of environmental parameters were used for similarity analyses. The resulting (dis)similarity matrices between the stations were utilized as input for the MDS ordination. In the MDS plot, the dissimilarity ranking is preserved as Euclidean distances. For simplicity only the first two axes of the multidimensional ordination were plotted.

The stress factor expresses the accuracy with which the dissimilarity of the stations is presented by the two dimensional MDS plot; increasing stress denotes less accuracy.

By replacing the stations symbols in the MDS plot by symbols of variable size representing values of abiotic parameters, the relation between the stations ordination and the selected parameter is visualized.

3.4.3 Correlations

In order to gain more insight into the factors influencing the zoobenthos distribution, linear correlations (Pearsons r) between abiotic and biotic parameters were tested for significance ($P < 0.05$). The Spearman rank correlation was used to calculate the correlation between the benthic assemblages and the abiotic parameters (Clarke & Ainsworth, 1993).

Prior to the calculations of Pearsons or Spearman rank correlation, all data were log(x+1)-transformed.

4 RESULTS

4.1 The investigated area

4.1.1 Environmental parameters

Depths in the investigated area of the MILZON-BENTHOS II 1992/93 project were recorded, but not corrected for differences due to the tidal cycle (mean tidal amplitude ± 1.5 m). Fig. 4 shows these results in combination with the official hydrographic soundings (isobaths). In the southern part depths ranged generally between 20 and 30 m, with the exception of the Brown Bank area (compartments 6-8, Table 1 and Fig. 4). Further north, in the compartments 11-13, the depth increased from circa 30 m to 40 m in the vicinity of the western Frisian Front. In the northern part of compartments 18 and 19 (Oyster Ground) depth increased from 40 m to 50 m. In the north-west corner (compartment 17) the part of the Botney Cut with depths over 50 m lies just within the study area.

The median grain size of the sediment decreased from south to north (Fig. 5). South of the 30 m isobath, the sediment consists of locally coarse to predominantly medium/fine sand with a low mud content (0-10 %), except for some deeper stations in the Brown Bank area. Between the 30 and 40 m isobath the mud percentage (< 63 μm) of the sediment increases rapidly with maximum levels surpassing 20 % at Botney Cut (Fig. 6). The Oyster Ground sediment consists of fine sand with a mud percentage of 5-10 %. In the extreme north-eastern part of the investigated area the Cleaver Bank is just visible, with coarse sand and low mud contents.

High concentrations of chlorophyll-a and POC in the upper 3 cm of the sediment were found near the Frisian Front area, Botney Cut and in some parts of the Brown Bank (Figs. 7 and 8, Table 2). However, measurements took place at various times over a 2 month period (Groenewold & Holtmann, 1993). Lowest POC contents were invariably found in the sandy sediment south of the 30 m isobath and in the Cleaver Bank area (Fig. 8).

Fig. 9. shows the depth of the "oxidized layer" based on visual observations of the subsample cores. In the western Frisian Front area and in the Oyster Ground area, only a few centimetres of aerated sediment were observed. In the sandy sediment of the Southern Bight a deeper visual "oxygen layer" was found. Values of the oxygen penetration in the Frisian Front area, measured with a microelectrode, are much lower (0.45 cm in August and 1.85 cm in February) (Lohse et al., 1993), than the visual "oxidized layer" observed during the MILZON-BENTHOS II project 1992/93.

4.1.2 Correlations among the abiotic parameters

The matrix of the correlation coefficients (Pearsons r) between the abiotic parameters is given in Table 3. A very high correlation was found between the sediment parameters mud and median grain size. In deep areas the sediment consisted of a low median grain size with a relatively high mud content. A significant correlation was also found between the sediment composition and the amount of Particulate Organic Carbon (POC) in the sediment. The chlorophyll-a content of the sediment only correlated with the mud percentage and the content of POC.

4.2 Meiobenthos

4.2.1 Taxon composition and diversity

The present survey revealed the presence of 14 permanent meiobenthic taxa over the whole study area (Table 4). Species belonging to the permanent taxa are considered to spent their juvenile and adult life stage in the meiobenthic size range (38 μ - $\pm$ 1 mm). An additional number of 13 temporary (e.g. juvenile macrobenthos) taxa were found. Appendix 1 presents the densities of both types. Meiofaunal densities of the EXP*BMN stations 2-6 (N 50), 7-7 (N 70) and 3-6 (META 1) were given by Huys & de Smet (1993)(Appendix 3.1). Only the permanent taxa have been used for further analyses.

The Nematoda turned out to be the dominant group, accounting on average for 82 % of the total meiobenthos density (min: 44.6 %, max: 99.6 %)(Table 5). Copepoda ranked second in contribution to the total abundance (mean: 9 %). The soft-bodied taxa Gastrotricha and Turbellaria together formed 5 % of the total meiobenthic abundance. All other taxa represented about 2.5 % of the total.

Means and ranges of Hill's diversity numbers for taxa composition of the meiofauna were as follows:

$Hill_0 = N_0 = 3.0 - 11.0$ (mean = 7.0)
$Hill_1 = N_1 = 1.0 - 3.9$ (mean = 1.8)
$Hill_2 = N_2 = 1.0 - 3.0$ (mean = 1.4)
$Hill_\infty = N_\infty = 1.0 - 2.2$ (mean = 1.2)

The distributions of Hill's numbers ($Hill_{0-\infty}$)(Figs. 10-13) show that taxon diversity was highest in the coarse and medium/fine sandy sediments in the southern part of the study area and in the Cleaver Bank. Diversity was low(est) in the western Frisian Front and in the Oyster Ground. Considering the whole area, Hill's diversity numbers decreased rapidly with increasing order due to the high Nematoda numbers. This is especially valid in the western Frisian Front and Oyster Ground where most individuals belonged to the Nematoda.

4.2.2 Density

Total and mean density and respective taxon densities are given in Table 6. High meiobenthic densities were found in the western Frisian Front (east side > 3500 ind./10 cm^2) and Oyster Ground area with a maximum of 6815 ind./10 cm^2 (Fig. 14). Densities below 1000 ind./10 cm^2 were only recorded in the southern sandy area. On average, 1783 ind./10 cm^2 were present in the study area (median: 1472 ind./10 cm^2).

The distribution of the Nematoda (Fig. 15) showed a pattern similar to the total meiobenthos density in the northern area (western Frisian Front and Oyster Ground), but the higher total densities in the southern area (Brown Bank and Broad Fourteens) were only partly due to the Nematoda densities.

Copepoda comprised bigger mud dwelling and burrowing forms (well suited for muddy substrates) and small interstitial specimen (adapted to the interstices in coarser sand). Representatives of the latter category were most abundant in the coarser sandy southern area and the Cleaver Bank area (Fig. 16). 85 % of all Copepoda in the 1992/93 area belonged to the interstitial Copepoda and were mainly found in the sandy sediment, whereas the bigger burrowing Copepoda predominated in the muddy western Frisian Front and Oyster Ground (Fig. 17 a/b).

The ratio between Nematoda and Copepoda (N/C ratio) was relatively high in the western Frisian Front and Oyster Ground and also in the area directly south of the 30 m isobath. The ratio was rather low in the medium-coarse sandy parts (range: 1 to 832, mean 67) (Fig. 18).

Of the other taxa, Gastrotricha (generally preferring a fine-medium (~ 250 μm) sand type) hardly occurred in the western Frisian Front and Oyster Ground, but they were abundant in the sandy Southern Bight (Fig. 19). Turbellaria were present in relatively high densities in the sandy southern area, but also occurred in the muddy parts (Fig. 20).

The taxa of the Annelida, Archiannelida and Oligochaeta, were scarce and primarily present in sandy substrates, whereas Polychaeta were present everywhere with no clear pattern in area distribution (Figs. 21, 22 and 23).

Hydrozoa and Tardigrada were mainly found in the sandy areas (Figs. 24 and 25). Ostracoda were found both in the sandy part as well as in the muddy part (Fig. 26). Halacarida were scarce and found mainly in the sand (Fig. 27).

Kinorhyncha (Fig. 28) and Priapulida (1 specimen at 2 stations in the western Frisian Front area) were restricted to the muddy parts. Rotifera were found twice: 14 ind./10 cm^2 on station 13-2 and 1 ind./10 cm^2 on station 16-3.

4.2.3 Correlations among the meiobenthos

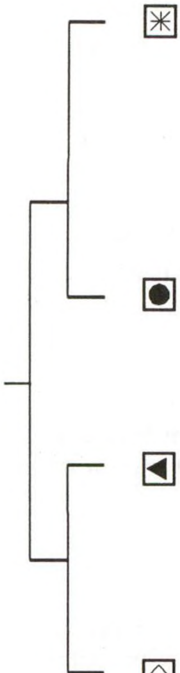
Within the meiobenthos several taxa were positively correlated to each other (Table 7). Nematoda, Ostracoda and Kinorhyncha appeared in higher densities in areas with high total meiobenthic densities. On the contrary, interstitial Copepoda and Gastrotricha were present in low densities in these areas. Interstitial Copepoda, Gastrotricha, Turbellaria, Archiannelida, Hydrozoa and Tardigrada were positively correlated to each other, especially in areas with coarser sand and a low mud content. The diversity was generally high in these latter areas, while most taxa were found in relatively high densities, except Nematoda and Kinorhyncha. Therefore the total density was often rather low. Halacarida and Rotifera did not correlate with any parameter and were thus excluded from the table.

4.2.4 Meiobenthic assemblages

4.2.4.1 TWINSPAN ordination

TWINSPAN-classification, based on taxon abundance (Copepoda split into burrowing and interstitial groups), of the combined stations of the 1992/93 area resulted in the formation of 4 clusters (Table 8; Figs. 29 and 30). Table 8 represents the mean values of the meiobenthic and abiotic parameters per meiobenthos TWINSPAN cluster. Clusters 1 (western Frisian Front and Oyster Ground) & 2 (around the 30 and 40 m isobaths) were situated in the deeper northern muddy area, whereas the clusters 3 & 4 were found in the sandy Southern Bight, with cluster 4 in the coarsest parts. Characteristic for the 'north-south division' were burrowing Copepoda (>20 ind./10 cm^2) (clusters 1 & 2), whereas Gastrotricha (>10 ind./10 cm^2), interstitial Copepoda and Tardigrada were characteristic for the clusters 3 & 4. The box and whisker plots of Fig. 31 illustrate the differences between the meiobenthic clusters (Table 8) .

The EXP*BMN stations of 1992, N 70 and META 1 were grouped in the same clusters as the stations surrounding them (cluster 3), whereas N 50 was grouped in the nearby cluster 1.



cluster 1 = The western Frisian Front and part the Oyster Ground, consisting of muddy very fine sand with relatively high contents of mud and POC, and intermediate chlorophyll-a contents. Total meiobenthic as well as Nematoda densities were very high, resulting in low diversities. Copepoda mainly consisted of burrowing forms. Kinorhyncha were characteristic for this area, whereas Archiannelida, Hydrozoa, Tardigrada and Halacarida were absent. Gastrotricha were scarce.

cluster 2 = Mainly the northern part around the 30 and 40 m isobaths, with sediments built up of fine sand with still relatively high mud-, chlorophyll-a and POC content. Densities were intermediate. All taxa, except the Nematoda, were generally low in density or even absent, consequently resulting in low diversities.

cluster 3 = Most stations belong to the fine-medium grained sandy southern part with low mud- and POC contents. One station is found in the western Frisian Front. Chlorophyll-a contents were intermediate. Diversities were higher than those of the first two clusters. The interstitial taxa appeared in higher densities than in the north. Half of the investigated stations were grouped in this cluster.

cluster 4 = A group of stations with low mud-, chlorophyll-a- and POC contents situated in the medium-coarse sandy areas in the south, in the eastern corner of compartments 5 and 13 (coarse relict Pleistocene sand), and in the Cleaver Bank. Diversities were relatively high. All taxa, except Nematoda, Kinorhyncha and Priapulida, were present in relatively high densities. Copepoda were found to be mainly interstitial.

4.2.4.2 MDS ordination

Fig. 32 shows the MDS plot of the dissimilarity between the stations in the investigated area. Stations are marked with the symbols of the TWINSPAN clusters. The stress value was 0.10, giving a plot which is unlikely to mislead (Warwick & Clarke, 1993). The four station groups distinguished by TWINSPAN can also be distinguished in the MDS plot, although they do not form 4 highly segregated groups. The first division in TWINSPAN (clusters 1/2 <-> 3/4) occurs at the first dimension axis of the MDS plot.

4.3 Macrobenthos

4.3.1 Species composition and diversity

From 85 boxcore samples a total of 160 species were identified (Table 9 and 10). The majority of the species belonged to the Polychaeta (59 species) and Crustacea (57 species). From the taxon of the Mollusca 26 species and of the Echinodermata 8 species were found. The remaining 10 taxonomic groups were not identified to species level. The most common species, i.e. those being present at more than 25 % of the stations, are listed in Table 11.

The number of species per boxcore sample ($Hill_0$) varied between 11 and 33 (Table 12, Fig. 33), with the lowest values occurring in the south-eastern part of the studied area (compartments 1, 2 and 3), at stations with medium to coarse sand. The diversity numbers $Hill_1$ to $Hill_\infty$ are given in Figs. 34-36. Stations with relatively low values for these diversity numbers are situated in the north, where a few species numerically dominate the macrobenthic assemblage. Examples of these species are the polychaete Magelona papillicornis, the bivalve Mysella bidentata, the decapod Callianassa subterranea and the ophiuroid Amphiura filiformis.

4.3.2 Density and biomass

The data on the macrobenthos abundance and biomass are given in Appendix 2. All data of the EXP*BMN project 1992 can be found in Appendix 3.2. The total density of macrofauna ranged from 257 to 4126 ind./m² (mean: 1308 ind./m²) (Fig. 37). In the northern part the total density was consistently higher than in the area of the Southern Bight, where the macrobenthic abundance seemed to be more heterogeneous. Total macrofaunal biomass ranged from 1 to 136 g AFDW/m² with a mean value of 18 g AFDW/m². Fig. 38 shows that higher biomass values were generally found in the north and in the south-western part of the area.

The distribution of the density and biomass of the four major taxa Polychaeta, Crustacea, Mollusca and Echinodermata are given in Figs. 39-42 and in Figs. 43-46 respectively. The spatial distribution of the most common species are shown in Figs. 47-74 (alphabetized consecutively per taxon).

The Polychaeta were found at all stations, with higher densities south to the 30 m isobath. From the total macrobenthic density, 40 % belongs to the Polychaeta (Table 12). The taxon of the Crustacea showed higher abundances in the centre of the study area caused by high densities of the amphipods Bathyporeia elegans and Bathyporeia guilliamsoniana (Figs. 63 and 64). The distribution of the Crustacea biomass showed higher values in the north because in this area many specimens of Callianassa subterranea (Fig. 65) were found. In the northern part of the area high densities of the taxa Mollusca and Echinodermata were found, corresponding with high abundances of the bivalve Mysella bidentata (Fig. 60) and the brittle-star Amphiura filiformis (Fig. 70). Frequently high values of the Mollusca and Echinodermata biomass were caused by a single adult specimen of a large-sized species such as Echinocardium cordatum (Fig. 71) and the bivalves Ensis siliqua or Lutraria lutraria, or by the dominance of a single species, as Amphiura filiformis (Fig. 70). About 52 % of the total biomass in the whole area was formed by the taxon Echinodermata (Table 12).

4.3.3 Correlations among the macrobenthos

Between the macrobenthic parameters many positive correlations were found (Table 13). The total macrofaunal density showed close relationships with almost all of the measured macrobenthic factors. In areas with a high macrobenthic abundance, stations with a high species number ($Hill_0$) and high biomass were found (cf. TWINSPAN clustering in section 4.3.4.1). The Polychaeta (density and biomass), the Crustacea density as well as the biomass of the Mollusca and Echinodermata showed no correlation with the other macrobenthic parameters. This could be expected considering that these parameters of the taxa showed no clear distribution pattern (cf. Figs. 39-42 and 43-46). Negative correlations were found between the diversity numbers ($Hill_{1-\infty}$) and total macrobenthos density.

4.3.4 Macrobenthic assemblages

4.3.4.1 TWINSPAN ordination

Using TWINSPAN classification based on species abundance, the stations of the 1992/93 area were grouped into four clusters (Fig. 75). The characteristic 'indicator species' of the TWINSPAN clustering are given in Fig. 76. The geographical position of the clusters in Fig. 75 shows a high degree of spatial segregation between clusters. First the whole area can be split into a northern and a southern part along the 30 m depth line. Two northern clusters (1 & 2) with 23 stations around the area of the Frisian Front and the Oyster Ground in the north and clusters 3 & 4 with 59 stations in the area of the Broad Fourteens and the Brown Bank in the south. At the second division level of TWINSPAN, in the north the deeper stations with high mud content of cluster 1 were separated from cluster 2 and in the south the sandy area of cluster 4 from cluster 3. In Fig. 77, notched box and whisker plots illustrate the differences between the four macrobenthic clusters in terms of abiotic and biotic parameters as given in Table 14.

The two stations META 1 and N 50 of the EXP*BMN project 1992, incorporated in the dataset of MILZON-BENTHOS II 1992/93, belong to the same cluster as the area around the stations (cluster 4), but in compartment 7 station N 70 was grouped into a northern cluster (cluster 3).

Since the distribution of the clusters formed four well-defined adjacent areas with different sediment types (Table 14 and Fig. 77), the four clusters can be described as follows:

- ⊠ cluster 1 = The deep area of the Oyster Ground and the western part of the Frisian Front area, with sediments composed of muddy very fine sand with a relatively high content of mud and POC and low chlorophyll-a content. Cluster 1 has the highest average density and biomass and the lowest diversity numbers ($Hill_{1-\infty}$), which are presented in Table 14.
- ■ cluster 2 = The muddy very fine sand area, around the 30 m isobath, with an intermediate mud, chlorophyll-a and POC content. Cluster 2 has the highest diversity numbers ($Hill_{1-\infty}$).
- ◀ cluster 3 = The shallow, fine sand area south of the Frisian Front, with the highest content of chlorophyll-a and an intermediate POC content. Cluster 3 has the highest average species richness.
- ◇ cluster 4 = The shallow fine-medium sand area in the south covers almost the whole area of the Broad Fourteens and the Brown Bank. The sandy sediment has low contents of mud, chlorophyll-a and POC. Cluster 4 has the lowest average values for macrobenthic density, biomass and for species richness.

The most abundant species of each cluster, i.e. those found at more than 60 % of the stations, are listed in Table 15 (Figs. 47-74). These macrobenthic species can be used to describe the main assemblages of the MILZON-BENTHOS II area 1992/93. In the northern part with muddy fine sand, an Amphiura filiformis-, Callianassa subterranea- and Mysella bidentata- assemblage (cluster 1) and a Callianassa subterranea-, Cultellus pellucidus-, Lumbrineris latreilli-, Magelona papillicornis- and Nephtys hombergii- assemblage was found (cluster 2). In the southern part, the area with fine sand showed a Chaetozone setosa-, Magelona papillicornis- and Spiophanes bombyx- assemblage (cluster 3) and the medium to coarse sand area was characterized by the macrobenthic species Nephtys cirrosa and Scoloplos armiger (cluster 4).

4.3.4.2 MDS ordination

The macrobenthos was also classified by MDS. Fig. 78 shows the first two axes of the MDS plot, based on the dissimilarity between the stations, using the macrobenthos abundance (stress value: 0.16). The locations are marked with the same symbols as chosen for the clusters of the TWINSPAN classification. The MDS plot produces in general the same grouping as found by TWINSPAN. On the first axis of the MDS plot clusters 1 & 2 were separated from clusters 3 & 4 and the second axis of MDS corresponded with the second division of the TWINSPAN classification. This indicates a high degree of dissimilarity between the four TWINSPAN assemblages.

4.4 Comparison with ICES and MILZON-BENTHOS I+II

4.4.1 Meiobenthos

The most extensive study into the spatial distribution of the meiobenthos in the North Sea, the synoptic mapping of the zoobenthos of the Benthos Ecology Working Group of ICES, was carried out in 1986. 14 stations of this program were situated in the MILZON-BENTHOS II 1992/93 area. Therefore these ICES stations were incorporated into the present dataset, in order to assess possible changes in the meiobenthic assemblages after TWINSPAN analysis based on taxon densities (Fig. 79). Comparison with Fig. 29 (without ICES stations) shows that these classifications match fairly well in the Southern Bight. The ICES stations belong to the same clusters as adjacent stations without changing the original pattern. The only exception is formed by ICES station 31, with a totally different meiobenthic composition (high Nematoda density, low diversity) than the area around this station. In the northern muddy part, the ICES stations effected cluster 1, in the area of the Oyster Ground and western Frisian Front, to extend southward (30 m isobath), westward (Botney Ground) and northward (40 m isobath). The ICES stations in the north caused the enlargement of the group of deeper, muddy stations with fine grained sediment (cluster 1) characterized by relatively high Nematoda densities and, except Copepoda and Kinorhyncha, low densities or absences of the remaining taxa.

In order to compare the present results on meiobenthos with those from the previous MILZON surveys (MILZON-BENTHOS I+II) in other parts of the Dutch Continental Shelf (Groenewold & van Scheppingen, 1989; 1990; Holtmann & Groenewold, 1992), all data were combined for a TWINSPAN analysis (Figs. 80 and 81). The classification of the present study area fits well into the pattern found on basis of the combined results from MILZON-BENTHOS I+II (Holtmann & Groenewold, 1992). (These new TWINSPAN cluster groupings are marked with Roman numerals). Cluster I stations were all situated in muddy fine grained sediment, with high total and Nematoda densities (Fig. 82 a/b) and low densities of most other taxa (Fig. 82 c-e) resulting in low diversities ($Hill_{1-\infty}$). They were found in the near coastal area in the vicinity of the river outflows (North Sea Channel and Rhine), in the Oyster Ground and in the Frisian Front, which extends westward into the western Frisian Front area. The cluster II assemblage is concentrated in the coastal area, in the fine-medium coarse sand area between 53° N and the 30 m isobath, and also in the less muddy Oyster Ground and western Frisian Front parts. The main part of the investigated Southern Bight west of the Dutch coastal area (including the Brown Bank and Broad Fourteens) and south of the 30 m isobath belongs to the relatively diverse ($Hill_{0-\infty}$) cluster III (medium-coarse sand, low mud contents, lowest Nematoda densities and highest Gastrotricha densities). The most diverse assemblage (cluster IV), is found in the coarsest sediments, in the south and in the relict Pleistocene sands around Texel/Vlieland and Borkum. In overlapping compartments most of the stations from two different sampling years belonged to the same clusters as the adjacent stations, indicating that in the period between 1988 and 1992 (Southern Bight) as well as between 1991 and 1993 (Frisian Front/Oyster Ground), the composition and densities of the meiobenthic taxa have remained relatively stable.

4.4.2 Macrobenthos

13 stations of the ICES investigation (1986), located in the area of MILZON-BENTHOS II (1992/93), have been included in the data of the present investigation (Fig. 2), looking for possible changes of the macrobenthic assemblages. The results of ICES station 51 (only two samples) were not used for comparison. Fig. 83 shows the TWINSPAN classification of the combined data. The 5 replicate samples, taken at one ICES location, are found in nearly all cases in the same cluster, therefore only one symbol for the ICES stations was printed. The classification shows in general the same pattern as the clustering without the ICES locations (Fig. 75). Almost all stations of the ICES survey were grouped into the same cluster as the adjacent MILZON stations. Only some differences are found. In the north, the station ICES 42 belongs to the southern cluster (cluster 4; cf. Holtmann & Groenewold, 1992) and in the south the station of the EXP*BMN 1992 (N 70) was found in a cluster of the northern area (MILZON cluster 2).

In order to compare the MILZON-BENTHOS II (1992/93) project with the investigations of MILZON-BENTHOS from 1988 to 1991, the TWINSPAN classification was used for the whole area. The compartments in the east of the present study area (compartments 1 to 5, 13, 16 and 19) overlapped with the area of earlier MILZON-BENTHOS investigations. The 513 stations of MILZON-BENTHOS I+II were also split into 4 clusters (I-IV) (Figs. 84 and 85). Taking the characteristic species into account, the following assemblages can be distinguished:

In the muddy sand area of the Oyster Ground and the Frisian Front two clusters can be described as Callianassa subterranea, Amphiura filiformis, Pholoe minuta and Harpinia antennaria assemblages (clusters I & II). A coastal assemblage, characterized by the species Magelona papillicornis, Tellina fabula, Nephtys cirrosa, Lanice conchilega and Urothoe poseidonis (cluster III), an assemblage of coarse sand area in the Southern Bight (cluster IV).

The stations in the overlapping compartments were found in the same clusters (cluster I in the north and clusters III & IV in the south). This shows that the macrobenthic assemblages remained unchanged in the period between 1988 and 1992 in the Southern Bight (compartments 1 to 5 and 13) and between 1991 and 1993 in the area around the Oyster Ground and the Frisian Front (compartments 16 and 19).

4.5 Correlations between the zoobenthos and the environment

4.5.1 Separate zoobenthic components and abiotic parameters

The sediment characteristics and selected benthic parameters were correlated, using Pearson's correlation coefficient (Tables 7 and 13). This gives an idea about the relations between the separate meio- and macrofauna components and the environment. The chlorophyll-a content showed no correlations with any of the zoobenthos factors.

The total meiobenthic density correlated with most of the measured abiotic parameters (Table 7). The median grain size showed a significant positive correlation with several taxa (especially with interstitial Copepoda, Gastrotricha, Turbellaria, Hydrozoa and Tardigrada), whereas the same taxa were negatively correlated with areas enriched with mud and POC. The meiobenthic diversity was highest in shallow coarse sand areas and lowest in deeper muddy areas. Nematoda and Kinorhyncha on the contrary, were concentrated in deeper areas with high mud- and POC contents.

Table 13 presents the correlations between the macrobenthos and the abiotic parameters. Stations with high total density, high density of Mollusca and Echinodermata, high total biomass, high Crustacea biomass and high species richness ($Hill_0$) were concentrated in deeper areas with a high mud content and low median grain size. The amount of organic material (POC) correlated positively with some macrobenthic parameters (total density, density of Mollusca, total biomass and biomasses of Polychaeta and Crustacea). No correlation was found between any of the sediment parameters and the diversity numbers $Hill_{1-\infty}$ of the macrobenthos.

4.5.2 Total benthic fauna and abiotic parameters

The relation between abiotic parameters and differences in the total fauna was determined in two ways.

First, by correlating the TWINSPAN scores on the first axis, with selected abiotic parameters of the stations. The scores or positions of the stations on the ordination axis, as shown in Fig. 86 and 87, were compared with the environmental parameters of those stations, using the Spearman rank correlation method. The median grain size showed the highest correlation with the benthic fauna, whereas the mud content also seemed to influence the benthic assemblages (Table 16).

Second, by correlating the dissimilarities between the stations on basis of the fauna with the dissimilarities of their abiotic properties (Clarke & Ainsworth, 1993). Table 17 shows the Spearman rank correlation between biotic and abiotic station similarities (cf. section 3.3.3). Both meio- and macrobenthos seemed to correlate best with the median grain size of the sediment. A combination of median grain size and mud content, with an important role of the water depth, seem to provide the best environment to explain the (dis)similarity between the stations in the MILZON-BENTHOS II 1992/93 area. These correlations are also illustrated in the 2-dimensional plots of Fig. 88 a/b.

4.6 Relations between the meio-and macrobenthos

Table 18 shows the correlations between the separate meio- and macrobenthos components. The taxon of the Nematoda, which presented 80 % of the meiobenthos, was positively correlated with the total macrobenthic density and biomass. The total meiobenthos density and the N/C ratio also showed a positive relationship with the macrobenthos, as was also observed earlier during the MILZON-BENTHOS I project (van Scheppingen & Groenewold, 1990). Besides the Nematoda and Kinorhyncha (only found in the muddy northern part) all the other meiobenthic taxa appear to be negatively correlated with the macrobenthos. The diversity of the macro- and meiobenthos showed a negative correlation; the areas with high meiobenthic diversity ($Hill_{1-\infty}$), showed low densities, biomasses and numbers of species ($Hill_0$) of the macrobenthos. This was also found in the MILZON-BENTHOS II project 1991 (Holtmann & Groenewold, 1992).

The distribution of the TWINSPAN clusters for the meio- and macrobenthos showed in general the same pattern (Figs. 29 and 75): two northern assemblages in the muddy sand area and two southern assemblages in the medium-coarser sand area. However in the south of the investigated area the meiobenthos clusters seemed to be more heterogenous (Fig. 29). This can partly be explained by the fact that the zoobenthos are strongly tied to specific sediment types (see high correlations) which are heterogeneously distributed in the southern part of the study area (cf. Figs. 5 and 6). The meiobenthos taxa responsible for the TWINSPAN division in clusters 3 & 4 (cf. Fig. 30), for example interstitial Copepoda, Archiannelida, Oligochaeta and Hydrozoa, were mainly found in medium-coarser sand (median grain size > 300 μm). The macrobenthos seemed to be more sensitive to differences in the median grain size between 200 and 250 μm. Some dominant macrobenthic species like Tellina fabula and Magelona papillicornis were only found in an area with a median grain size between 200 and 250 μm (macrobenthos cluster 3) and found to be 'indicator species' of TWINSPAN classification. The MDS-ordination (Figs. 32 and 78) also emphasizes the general similarity in cluster pattern.

5 DISCUSSION

5.1 Meiobenthos

Due to their small size and the use of wide meshed sieves the study of the meiobenthos in the North Sea was started much later (Smidt, 1951) than the study of the macrobenthos (Petersen, 1914). Although considerable effort has been put in meiobenthos studies in the North Sea (Heip et al., 1990), few studies have been carried out on the spatial distribution of the meiobenthos on the Dutch Continental Shelf. Smol et al. (1989) studied the meiobenthos in TiO_2 waste dumping-area just south of the MILZON-BENTHOS 1992/93 study area. The sediment composition coincided with those of the stations of compartments 1 and 6. The composition of the meiobenthos was quite comparable among these two areas: relatively high densities of the main taxa Nematoda, Copepoda, Gastrotricha and Turbellaria and also higher densities of the remaining taxa.

In the synoptic mapping of the infauna of the ICES stations in 1986 Huys et al. (1992) determined the meiobenthos on taxon level and additionally determined the Copepoda on species level. TWINSPAN analysis of the ICES data, based on copepod species composition, showed five main assemblages in the North Sea. Two of them were situated in the present study area. A clearly distinctive Southern Bight assemblage was found south of the 30 m isobath, containing relatively high numbers of harpacticoid Copepoda with a majority of interstitial species. In this area nematode numbers were relatively low. In the western Frisian Front/Botney Ground/Oyster Ground area an assemblage was found that formed a transition between the (Dutch) coastal and deepwater (north of the Dogger Bank) copepod associations. The other meiobenthic taxa were present especially in the medium to coarse sand of the Southern Bight assemblage. These patterns coincide with the results found in the present study. The Southern Bight, south of the 30 m isobath, together with station 17-1 on the coarse sandy Cleaver Bank showed the highest diversity ($Hill_{1-\infty}$), highest densities of (interstitial) Copepoda, Gastrotricha, Turbellaria, Hydrozoa and Tardigrada in comparison with the deeper stations in the silty western Frisian Front, Oyster Ground and Botney Ground. In general the meiobenthic community seems to remain relatively stable in composition, although larger year to year fluctuations in densities and even in copepod composition occasionally occur at some stations, as was found in the EXP*BMN studies of 1991 and 1992 (Huys & De Smet, 1993).

In the Southern Bight (present study) the meiobenthic assemblages seem to be more patchy distributed than the macrobenthos, probably due to the differences in sensitivity to interstitial space between the sand particles. The range between 250 and 300 μm is therefore critical for the meiobenthos and acts a selection criterium for the presence or absence of the interstitial meiobenthic species/taxa.

The N/C ratio, a still discussible tool for detecting the presence of certain forms of pollution (Raffaelli, 1987; Coull et al., 1981; Lambshead, 1984; Huys et al., 1992), can only be used to give an indication in areas with the same sediment composition. They will therefore be only valuable for comparison with future spatial distribution investigations.

The different sampling method used in shallower/deeper peat-banks in the Brown Bank in order to get more detailed information about the distribution of the meiofauna in the area did not show any clear differences in zoobenthos composition or density.

5.2 <u>Macrobenthos</u>

5.2.1 Relations between the macrobenthos and the environment

Many research programs were carried out to study the distribution of macrobenthic assemblages in the North Sea and found high correlations between the species distribution and the sediment composition. Salzwedel et al. (1985) compared for the German Bight the types of sediment with the distribution of the macrofauna. In 1984, Creutzberg et al. published the results of the macrobenthic fauna in the Frisian Front area and found a rich benthic macrofauna, corresponding with the zonation of the sediment. Künitzer et al. (1992) reports that most of the macrobenthic species are restricted to a special sediment and therefore these species are limited in their distribution.

The bottom of the Southern North Sea shows a major gradient in sediment composition: the Southern Bight contains medium-coarse grained sediment, which in northern direction is replaced by finer-grained sand. All these sandy bottoms contain little mud, except for some local patches. The macrobenthos composition found in this study follows a similar gradient. Besides the abiotic factors, such as hydrographic circumstances, depth and sediment structure, interactions with other species and food availability play an important role in the stability of the species distribution in the North Sea (Künitzer et al., 1992; Heip & Craeymeersch, 1994).

The area studied during the MILZON-BENTHOS II project 1992/93, presented in this report, covered a part of the North Sea with different types of sediment. Also in this particular area we found a clear relation between the distribution of macrobenthic species and the sediment type. The muddy area north of the 30 m depth line contained other assemblages than south of the 30 m isobath, corresponding with the different sediment composition. The sandy station on the Cleaver Bank (17-1) in the north-western part of the research area belonged to the cluster of the southern part (MILZON cluster 4). The macrobenthic composition found at this station was typical for assemblages in sandy sediments, a striking example of the close relationship between sediment grain size and macrobenthos. In the same compartment one station was situated in the Botney Cut (17-3), with a depth of 53 m. This station had a macrobenthic assemblage with high abundance and biomass values (MILZON cluster 1). The Oyster Ground, in the north-eastern part of the study area (compartments 18 and 19), belonged to a macrobenthic cluster (MILZON cluster 1) being rich in terms of species richness, biomass and density, as also found earlier in the MILZON-BENTHOS project 1991 (Holtmann & Groenewold, 1992). In the south only one deeper station (7-4) of the Brown Bank was found in another cluster (MILZON cluster 3) than the area around this station, because of the high mud content of this station. The area of the Brown Bank in the compartments 6, 7 and 8 contained an assemblage typical for a coarse sand assemblage (MILZON cluster 4). In order to get more detailed information about the distribution of the macrobenthic fauna in the area of the peat-banks at the Brown Bank other sampling methods have to be used.

5.2.2 Stability of the macrobenthos

Comparing the present data with those of earlier investigations we can discern some light stability in time of the assemblages. In april 1986 the Benthos Ecology Working Group of ICES recorded a synoptic mapping of the infauna of the North Sea (de Wilde & Duineveld, 1988; Künitzer et al., 1992). In the area of MILZON-BENTHOS II project 1992/93 they found in the south a shallow coarse-sand assemblage (MILZON cluster 4) with <u>Scoloplos armiger</u> and <u>Nephtys cirrosa</u> as two of the most abundant species and a shallow fine-sand assemblage characterized by

Bathyporeia elegans, Spiophanes bombyx, Magelona papillicornis, Tellina fabula and Urothoe poseidonis (MILZON cluster 3). In the north they observed shallow muddy sand assemblages described by some of the species of the MILZON clusters 1 & 2, namely Amphiura filiformis, Mysella bidentata, Magelona papillicornis and Pholoe minuta (Duineveld et al., 1990). All macrobenthic species mentioned here have been found to be dominant in the respective MILZON clusters 1 to 4 (Table 13). The stability of the macrobenthos assemblages is also demonstrated by the results of the TWINSPAN classification of the MILZON-BENTHOS survey 1992/93 including the ICES data of 1986, where ICES locations grouped into the same assemblages as the adjacent MILZON stations (cf. 4.4.2).

Several investigations of the macrobenthos published the biomass distribution of the Southern North Sea (Creutzberg, 1984; Cadée, 1984; de Wilde et al., 1984), prior to the ICES survey. The biomass in the western area of the Frisian Front showed in the present study average values between 36 g AFDW/m² of cluster 1 and 15 g AFDW/m² of cluster 2 (Table 12). Similar high values of biomass were also found by de Wilde et al. (1984) (21.4 g AFDW/m²). Creutzberg et al. (1984) reported average biomass values of 13.2 g AFDW/m² at the Frisian Front. In the same year Cadée (1984) found at the Front values of 10.6 g AFDW/m² and south to the 30 m depth line an average biomass of 5.7 g AFDW/m², much lower than found during the MILZON project 1992/93 (MILZON cluster 4 in the south = 10.5 g AFDW/m²). The low biomass values in the latter two studies may have been due to the use of Van Veen grabs instead of boxcorers. By using the Van Veen grab deeper burrowing animals, which are common in the Oyster Ground, are easily missed.

6 CONCLUSIONS

Meiobenthos:

* High total densities, mainly Nematoda, were found in the muddy areas, especially the western Frisian Front area.
* Nematoda dominated the meiofauna (82 %).
* The medium-coarse sandy Southern Bight (south of the 53°30' latitude) showed the most diverse ($Hill_{1-\infty}$) meiobenthic assemblage.
* The results of the MILZON-BENTHOS II project 1992/93 in general showed a similar distribution of taxon density and composition as found during the ICES investigation in 1986.
* Four assemblages could be distinguished in the meiobenthos:
  In the deeper muddy northern parts two assemblages were found: in the western Frisian Front and Oyster Ground the meiobenthos was represented in relatively high densities but with low diversities (cluster 1). This area is surrounded by an area around the 30 and 40 m isobaths with lower densities but still impoverished in taxa (cluster 2).
  In the sandy Southern Bight total densities were generally lower, but a more diverse assemblage could be found (cluster 3), especially in the coarsest sandy parts (cluster 4).
* Between 1988 and 1993 (MILZON-BENTHOS I+II) the meiobenthic density and composition in the Southern Bight as well as the Central North Sea (southern part of the Oyster Ground and Frisian Front) seemed to be relatively stable on taxon level.
* In the period between 1988 and 1993 (MILZON-BENTHOS I+II) the meiobenthic assemblages of the Southern Bight and the southern part of the Oyster Ground seemed to be relatively stable. The following assemblages were found:
  - an assemblage (cluster I) of stations in the muddy fine grained sand (Oyster Ground, Frisian Front and near river outflows).
  - cluster II is concentrated in the coastal area, in the fine-medium coarse sand area between 53° N and the 30 m isobath and in the less muddy parts of the northern area.
  - cluster III is mainly found in the Southern Bight,
  - cluster IV is found in the coarsest sediments.

Macrobenthos:

* The total density (ind./m²), biomass (g AFDW/m²) and species richness of the macrobenthos showed higher values in the northern part of the area.
* The majority of the total density belongs to the taxon of the Polychaeta (40 %) and 52 % of the total biomass is represented by the Echinodermata.
* The macrobenthos can be divided into four assemblages:
  North of the 30 m depth line
  - an Amphiura filiformis-, Callianassa subterranea and Mysella bidentata- assemblage (cluster 1) and
  - a Callianassa subterranea-, Cultellus pellucidus-, Lumbrineris latreilli-, Magelona papillicornis- and Nephtys hombergii- assemblage (cluster 2).

  South of the 30 m depth line
  - a Chaetozone setosa-, Magelona papillicornis- and Spiophanes bombyx- assemblage (cluster 3) and
  - a Nephtys cirrosa- and Scoloplos armiger- assemblage (cluster 4).

* The results of the MILZON-BENTHOS II project 1992/93 shows the same distribution of species composition as found during the ICES investigation in 1986.
* In the period between 1988 and 1993 (MILZON-BENTHOS I+II) the macrobenthic assemblages of the Southern Bight and the southern part of the Oyster Ground seemed to be stable. The following assemblages were found:
  - two assemblages of the muddy sand area from the Oyster Ground and the Frisian Front, characterized by Callianassa subterranea, Amphiura filiformis, Pholoe minuta and Harpinia antennaria (clusters I & II),
  - a coastal assemblage characterized by Magelona papillicornis, Tellina fabula, Nephtys cirrosa, Lanice conchilega and Urothoe poseidonis (cluster III) and
  - an assemblage of the coarse sand area in the Southern Bight (cluster IV).

Meio-/macrobenthos:

* The distribution of the TWINSPAN clusters showed for the meio- and macrobenthos in general the same pattern, although in the southern part of the investigated area the macrobenthos clusters seemed to be more confined.
* The distribution of the meio- and macrobenthic assemblages showed a high relationship with the sediment composition, especially with median grain size, mud content and, to a less extent, with the water depth.
* The meiobenthos seems to be more sensitive to the range of median grain sizes between 250 and 300 μm, whereas the macrobenthos reacts to changes between 200 and 250 μm. This explained the different cluster distribution of meio- and macrobenthos in the southern part of the studied area.
* The total density of the meiobenthos and the Nematoda density showed positive correlations with the macrobenthos.
* The sampling method used in shallower/deeper peat-banks in the Brown Bank did not show any clear differences in zoobenthos composition or density. Therefore other sampling methods have to be used to get more detailed information about the distribution of the meio- and macrobenthic fauna in the area of the peat-banks at the Brown Bank.

7 RECOMMENDATIONS

The MILZON-BENTHOS I and II projects have resulted in a large dataset of the meio- and macrobenthos distribution on the Dutch Continental Shelf. In order to present all this information the results should be published in a benthic atlas. Such an atlas could serve two goals: provide information necessary for management policy in the North Sea as well as act as an information source for further investigation.

The aim of the MILZON-BENTHOS I+II research was to map the spatial distribution of the meio- and macrobenthos. More information about temporal changes of the zoobenthos in the Southern North Sea is to be expected from the long term monitoring program EXP*BMN, which started in spring 1990 (Holtmann et al., 1990c) and which has developed into a cooperative effort of the National Institute for Coastal and Marine Management (RIKZ), the North Sea Directorate of Rijkswaterstaat (RWS-DNZ), the Netherlands Institute for Sea Research (NIOZ) and the Netherlands Institute of Ecology/Centre for Estuarine and Coastal Ecology (NIOO/CEMO) (Duineveld, 1992; Duineveld & Belgers, 1993; Huys & De Smet, 1992; 1993). To check if the chosen stations of the monitoring program are still representative for the specific area, the mapping of the zoobenthos, as was carried out in the MILZON-BENTHOS I+II projects, needs to be repeated every 10-15 years. Because of the useful results presented in this report, it would be better to alter the present strategy of sampling fixed stations in the EXP*BMN project to a strategy of stratified random sampling.

The results from the MILZON-BENTHOS surveys were used in the decision of the establishment of the Environmental Zone in the Dutch area of the North Sea. It should be meaningful if the surrounding North Sea countries be brought together to join into a zoobenthos mapping program in the context of the closer cooperation and concern of the common North Sea environment.

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Tables

Tables :

Table 1a. Position, depth and sediment composition of the MILZON-BENTHOS II area 1992/93.
(* = stations sampled during EXP*BMN 1992)

STATION NUMBER	NR	GEOGRAPHICAL POSITION		DEPTH (m)	MEDIAN (μm)	MUD (%)
1-1	1	52-15-10 N	003-24-42 E	32.8	325.0	1.83
1-2	2	52-19-36 N	003-23-48 E	33.5	387.7	0.71
1-3	3	52-21-32 N	003-46-06 E	26.7	350.6	0.61
1-4	4	52-25-19 N	003-33-12 E	31.7	317.8	3.12
1-5	5	52-21-27 N	003-33-25 E	33.6	327.4	1.84
2-1	6	52-31-14 N	003-36-25 E	32.5	287.7	1.43
2-2	7	52-29-24 N	003-43-00 E	30.9	284.0	2.25
2-3	8	52-32-18 N	003-52-00 E	29.7	266.8	1.64
2-4	9	52-35-50 N	003-58-00 E	26.1	283.2	1.42
2-5	10	52-40-00 N	003-40-30 E	31.2	273.5	1.54
* 2-6 N 50	11	52-28-51 N	003-47-12 E	30.4	/	/
3-1	12	52-41-42 N	003-55-09 E	25.5	264.1	1.71
3-2	13	52-46-58 N	003-58-20 E	29.7	247.3	1.77
3-3	14	52-49-12 N	003-51-08 E	27.4	264.7	1.54
3-4	15	52-53-33 N	003-44-17 E	28.0	247.3	3.04
3-5	16	52-57-48 N	003-48-34 E	35.1	388.4	1.88
* 3-6 META 1	17	52-57-53 N	003-55-00 E	27.3	247.4	1.68
4-1	18	53-02-36 N	004-20-00 E	30.4	228.7	2.07
4-2	19	53-02-28 N	003-50-25 E	31.4	246.5	3.04
4-3	20	53-07-38 N	003-52-25 E	28.4	221.7	2.47
4-4	21	53-07-38 N	004-02-00 E	28.2	213.0	2.48
4-5	22	53-05-48 N	004-21-30 E	31.2	245.3	2.57
5-1	23	53-12-42 N	003-50-03 E	26.1	208.0	2.08
5-2	24	53-19-20 N	003-47-48 E	27.6	201.9	4.23
5-3	25	53-21-38 N	004-06-20 E	28.3	198.5	8.08
5-4	26	53-14-40 N	004-23-40 E	29.8	338.4	2.14
5-5	27	53-21-28 N	004-33-20 E	27.4	345.7	1.61
6-1	28	52-20-25 N	003-11-25 E	32.4	293.2	4.09
6-2	29	52-27-43 N	003-12-12 E	34.0	283.6	1.44
6-3	30	52-26-20 N	003-06-04 E	34.5	290.1	2.37
6-4	31	52-24-08 N	003-14-30 E	41.2	343.6	2.87
6-5	32	52-27-19 N	003-23-21 E	34.7	292.7	2.75
6-6	33	52-28-36 N	003-09-13 E	40.5	299.3	2.68
7-1	34	52-35-59 N	003-19-04 E	19.3	284.3	1.71
7-2	35	52-36-11 N	003-13-15 E	32.6	295.2	2.94
7-3	36	52-41-02 N	003-13-10 E	33.7	269.1	3.25
7-4	37	52-39-04 N	003-17-00 E	41.2	245.9	12.61
7-5	38	52-32-40 N	003-21-35 E	37.4	327.1	1.71
7-6	39	52-38-42 N	003-37-42 E	33.3	318.3	2.47
* 7-7 N 70	40	52-34-11 N	003-31-53 E	31.3	294.1	1.12
8-1	41	52-46-06 N	003-18-26 E	25.4	271.7	2.95
8-2	42	52-53-53 N	003-17-20 E	33.4	277.6	2.03
8-3	43	52-57-21 N	003-34-47 E	28.1	248.9	2.93
8-4	44	52-47-30 N	003-22-13 E	41.3	278.1	6.94
8-5	45	52-50-12 N	003-17-18 E	34.6	271.8	2.54
8-6	46	52-56-31 N	003-22-06 E	34.2	290.9	2.35
9-1	47	53-02-58 N	003-11-36 E	29.5	254.4	3.77
9-2	48	53-03-55 N	003-23-30 E	27.9	258.2	2.63
9-3	49	53-08-43 N	003-23-00 E	26.9	245.1	3.74
9-4	50	53-07-48 N	003-31-42 E	29.5	238.3	2.35
9-5	51	53-05-30 N	003-43-00 E	28.1	227.7	3.37

Table 1b. Position, depth and sediment composition of the MILZON-BENTHOS II area 1992/93.
(* = stations sampled during EXP*BMN 1992)

STATION NUMBER	NR	GEOGRAPHICAL POSITION		DEPTH (m)	MEDIAN (μm)	MUD (%)
10-1	52	53-12-43 N	003-26-36 E	34.4	208.1	9.34
10-2	53	53-14-55 N	003-20-37 E	26.7	211.3	2.92
10-3	54	53-21-00 N	003-22-18 E	28.2	187.2	6.49
10-4	55	53-17-00 N	003-31-18 E	26.6	198.9	3.93
10-5	56	53-18-20 N	003-42-58 E	27.4	343.2	3.33
11-1	57	53-31-30 N	003-18-21 E	34.3	124.1	11.70
11-2	58	53-26-02 N	003-12-03 E	29.2	167.0	6.02
11-3	59	53-30-00 N	003-29-46 E	32.7	127.2	12.19
12-1	60	53-25-31 N	003-44-02 E	30.4	167.8	6.05
12-2	61	53-30-24 N	003-53-45 E	30.8	152.7	11.98
12-3	62	53-33-58 N	003-37-40 E	37.2	115.2	16.82
13-1	63	53-32-14 N	004-24-31 E	28.0	205.1	10.92
13-2	64	53-24-47 N	004-32-33 E	30.0	360.6	0.30
13-3	65	53-23-36 N	004-06-48 E	28.0	201.3	11.32
14-1	66	53-41-01 N	003-00-11 E	42.3	194.9	7.96
14-2	67	53-37-40 N	003-09-38 E	39.2	122.4	11.78
14-3	68	53-42-20 N	003-13-28 E	43.4	127.7	13.56
14-4	69	53-38-09 N	003-29-52 E	40.0	139.1	13.80
15-1	70	53-45-20 N	003-37-50 E	37.6	181.4	5.26
15-2	71	53-37-11 N	003-57-57 E	37.9	120.1	15.55
15-3	72	53-38-54 N	003-38-52 E	39.9	134.5	11.38
16-1	73	53-40-19 N	004-06-07 E	40.5	154.7	15.46
16-2	74	53-43-27 N	004-13-38 E	41.0	149.2	15.72
16-3	75	53-37-40 N	004-16-37 E	37.0	118.3	19.48
16-4	76	53-46-36 N	004-29-31 E	41.0	125.8	16.73
17-1	77	54-00-39 N	003-02-41 E	40.9	290.7	2.16
17-2	78	54-00-21 N	003-25-08 E	43.2	188.0	4.38
17-3	79	53-51-49 N	003-11-30 E	53.2	106.0	32.79
18-1	80	53-59-47 N	003-55-17 E	46.5	132.7	9.59
18-2	81	53-52-24 N	003-39-04 E	34.1	208.3	2.06
18-3	82	53-51-31 N	003-52-24 E	39.1	157.3	5.59
19-1	83	53-58-40 N	004-14-05 E	44.5	115.7	8.40
19-2	84	53-50-42 N	004-09-06 E	42.0	139.7	7.39
19-3	85	53-59-46 N	004-23-24 E	44.5	116.4	9.45

Table 2a. Chlorophyll-a content (μg/g) and POC content (% C) of the upper 3 cm of the sediment and depth of the oxidized layer (cm) of the MILZON-BENTHOS II area 1992/93.
(/=values not available)
(* = stations sampled during EXP*BMN 1992)

STATION NUMBER	NUMBER	CHL.A (μg/g)	POC (% C)	O2 (cm)
1-1	1	0.83	0.0	10
1-2	2	0.19	0.0	22
1-3	3	0.00	0.2	10
1-4	4	0.37	0.2	22
1-5	5	0.42	0.2	23
2-1	6	0.12	0.1	21
2-2	7	0.22	0.1	23
2-3	8	0.00	0.2	19
2-4	9	0.00	0.1	23
2-5	10	0.13	0.1	23
* 2-6 N 50	11	0.11	0.0	/
3-1	12	0.12	0.2	20
3-2	13	0.16	0.2	20
3-3	14	0.15	0.1	17
3-4	15	1.79	0.2	20
3-5	16	2.09	0.3	3
* 3-6 META 1	17	0.51	0.0	/
4-1	18	0.00	0.2	20
4-2	19	1.15	0.1	21
4-3	20	1.08	0.3	20
4-4	21	1.44	0.2	5
4-5	22	0.00	0.1	17
5-1	23	1.84	0.0	5
5-2	24	1.54	0.0	3
5-3	25	14.15	0.6	2
5-4	26	0.00	0.0	30
5-5	27	0.00	0.0	17
6-1	28	0.27	0.0	20
6-2	29	0.56	0.0	17
6-3	30	5.93	0.0	21
6-4	31	0.68	0.0	20
6-5	32	0.26	0.0	/
6-6	33	4.17	0.0	20
7-1	34	0.30	0.0	25
7-2	35	0.59	0.0	10
7-3	36	1.01	0.0	10
7-4	37	0.81	0.1	13
7-5	38	1.00	0.0	20
7-6	39	0.36	0.0	22
* 7-7 N 70	40	0.52	0.0	/
8-1	41	0.51	0.0	22
8-2	42	0.22	0.0	22
8-3	43	2.79	0.0	/
8-4	44	4.95	0.0	4
8-5	45	0.23	0.0	20
8-6	46	0.21	0.0	21
9-1	47	0.11	0.0	21
9-2	48	0.27	0.0	19
9-3	49	10.20	0.0	21
9-4	50	0.38	0.0	18
9-5	51	1.77	0.5	20

Table 2b. Chlorophyll-a content (μg/g) and POC content (% C) of the upper 3 cm of the sediment and depth of the oxidized layer (cm) of the MILZON-BENTHOS II area 1992/93.
(/=values not available)
(* = stations sampled during EXP*BMN 1992)

STATION NUMBER	NUMBER	CHL.A (μg/g)	POC (% C)	O2 (cm)
10-1	52	0.78	0.2	3
10-2	53	0.24	0.0	/
10-3	54	0.25	0.0	21
10-4	55	0.53	0.0	8
10-5	56	0.75	0.0	5
11-1	57	1.58	0.3	6
11-2	58	0.95	0.1	4
11-3	59	1.48	0.4	5
12-1	57	0.25	0.1	9
12-2	58	2.58	0.4	7
12-3	59	1.57	0.5	4
13-1	60	33.33	1.5	14
13-2	61	0.28	0.2	20
13-3	62	20.89	0.8	10
14-1	63	1.58	0.3	3
14-2	64	0.86	0.4	7
14-3	65	0.83	0.5	1
14-4	66	1.34	0.5	5
15-1	67	0.17	0.2	6
15-2	68	1.32	0.5	4
15-3	69	0.97	0.4	6
16-1	70	1.01	0.7	3
16-2	71	1.29	0.5	3
16-3	72	1.31	0.6	3
16-4	73	0.45	0.4	10
17-1	74	0.13	0.1	30
17-2	75	0.39	0.2	5
17-3	76	3.31	1.0	1
18-1	77	0.57	0.3	7
18-2	78	0.00	0.2	9
18-3	79	0.26	0.3	6
19-1	80	0.28	0.3	6
19-2	81	0.35	0.4	7
19-3	82	0.32	0.3	5

Table 3. Correlations between the abiotic parameters, log(x+1) transformed, found in the MILZON-BENTHOS II area 1992/93. (n=85, α=0.001, r=0.347, 95 % reliability) *=significant

	abiotic parameters Depth	Median	Mud	Chl.a	POC	Ox.l.
Depth	1.00					
Median gr.size	-0.47*	1.00				
Mud content	0.55*	-0.86*	1.00			
Chl.a content	0.01	-0.18	0.40*	1.00		
POC content	0.35*	-0.64*	0.70*	0.50*	1.00	
Oxidized layer	-0.46*	0.67*	-0.70*	-0.30	-0.53*	1.00

Table 4. Systematics of the meiobenthos found in the MILZON-BENTHOS II area 1992/93 (relevant taxa are underlined).

Phylum Cnidaria
    Classis <u>Hydrozoa</u>

Phylum Plathyhelminthes
    Classis <u>Turbellaria</u>

Phylum <u>Gastrotricha</u>

Phylum <u>Kinorhyncha</u>

Phylum <u>Priapulida</u>

Phylum <u>Rotifera</u>

Phylum <u>Nematoda</u>

Phylum Annelida
    Classis <u>Polychaeta</u>
        Ordo <u>Archiannelida</u>
    Classis <u>Oligochaeta</u>

Phylum Arthropoda
    Classis Arachnida
        Fam. <u>Halacarida</u>
  Subphylum Crustacea
    Classis <u>Ostracoda</u>
    Classis Copepoda
        Ordo <u>Harpacticoida</u>

Phylum <u>Tardigrada</u>

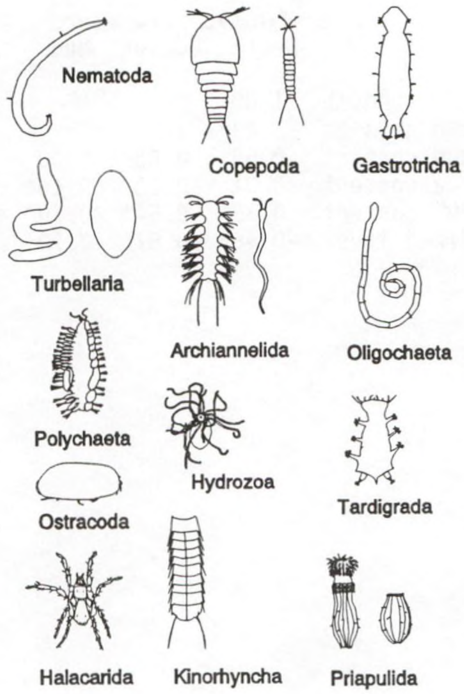


Table 5. Mean, median, minimum and maximum values of densities expressed in percentages, together with the corresponding standard deviation of the meiobenthic taxa in the MILZON-BENTHOS II area 1992/93.

	Mean	Median	Min.	Max.	St.dev.
Nematoda	82.38	85.56	44.64	99.64	15.25
Copepoda total	9.10	4.73	0.11	40.15	10.06
burrowing	1.02	0.73	0.00	4.81	1.10
interstitial	8.08	3.16	0.00	40.03	10.38
Gastrotricha	4.41	2.62	0.00	23.81	5.21
Turbellaria	1.74	1.21	0.00	6.95	1.73
Archiannelida	0.09	0.00	0.00	0.90	0.20
Oligochaeta	0.04	0.00	0.00	0.73	0.13
Polychaeta	0.23	0.12	0.00	1.42	0.30
Hydrozoa	0.32	0.00	0.00	3.46	0.61
Tardigrada	1.41	0.51	0.00	12.27	2.14
Ostracoda	0.21	0.08	0.00	2.44	0.41
Halacarida	0.02	0.00	0.00	0.49	0.06
Rotifera	0.01	0.00	0.00	0.66	0.07
Kinorhyncha	0.05	0.00	0.00	0.73	0.14
Priapulida	0.00	0.00	0.00	0.04	0.00

Table 6. Mean, median, minimum, and maximum values of densities (ind./10 cm²) with the standard deviation and presence (in percentages) of the meiobenthic taxa in the MILZON-BENTHOS II area 1992/93. The Nematoda/Copepoda (N/C) ratio is also given.

	Mean	Median	Min.	Max.	St.dev.	%
Density	1783.0	1472.0	412	6815	1213.8	
Taxa	7.2	7.0	4	12	1.9	
Nematoda	1540.0	1062.0	327	6711	1234.7	100
Copepoda total	131.0	65.0	1	1067	163.4	100
burrowing	20.1	8.0	0	238	32.3	92
interstitial	111.0	25.0	0	1067	169.1	78
Gastrotricha	54.1	33.0	0	293	66.3	84
Turbellaria	21.1	17.0	0	80	18.9	98
Archiannelida	1.3	0.0	0	15	3.1	28
Oligochaeta	0.8	0.0	0	12	2.4	22
Polychaeta	3.2	2.0	0	27	4.2	76
Hydrozoa	4.2	0.0	0	58	8.3	49
Tardigrada	21.2	5.0	0	296	41.4	69
Ostracoda	3.9	1.0	0	63	8.8	55
Halacarida	0.3	0.0	0	10	1.3	11
Rotifera	0.2	0.0	0	14	1.5	2
Kinorhyncha	1.8	0.0	0	36	5.7	17
Priapulida	0.0	0.0	0	1	0.2	2
N/C ratio	67.2	19.2	1	832	138.3	

Table 7. Correlations between the meiobenthos and the abiotic parameters, log (x+1) transformed, found in the MILZON-BENTHOS II area 1992/93. (n=85, α = 0.001, r=0.347, 95 % reliability) *=significant

	Total	Nem.	Cop.	Copbur.	Copint.	Gastr.	Turb.	Arch.	Oligo.	Poly.	Hydr.	Tard.	Ostr.	Kin.
Total	1.00													
Nematoda	0.96*	1.00												
Copepoda	0.13	-0.10	1.00											
,, burrowing	-0.30	-0.50*	0.78*	1.00										
,, interstitial	-0.30	-0.50*	0.78*	-0.52*	1.00									
Gastrotricha	-0.41*	-0.56*	0.39*	-0.62*	0.74*	1.00								
Turbellaria	-0.29	-0.41*	0.34	-0.45*	0.58*	0.76*	1.00							
Archiannelida	-0.05	-0.16	0.45*	-0.31	0.52*	0.41*	0.30	1.00						
Oligochaeta	0.16	0.10	0.34	-0.12	0.34	0.27	0.23	0.59*	1.00					
Polychaeta	0.07	-0.05	0 51*	-0.15	0.47*	0.24	0.22	0.50*	0.42*	1.00				
Hydrozoa	-0.15	-0.32	0.51*	-0.54*	0.67*	0.59*	0.42*	0.57*	0.33	0.46*	1.00			
Tardigrada	-0.18	-0.35*	0.63*	-0 47*	0 84*	0.67*	0.48*	0.47*	0.39*	0.40*	0.64*	1.00		
Ostracoda	0.42*	0.28	0.51*	0.16	0.25	0.02	-0.01	0.36*	0.38*	0.42*	0.30	0.33*	1.00	
Kinorhyncha	0.63*	0.63*	0.07	0.20	-0.49*	-0.49*	-0.42*	-0.07	0.01	-0.03	-0.27	-0.32	0.32	1.00
Depth	0.39*	0.45*	0.00	0.65	-0.32	-0.58*	-0.46*	-0.16	-0.10	-0.04	-0.41*	-0.31	0.20	0.47*
Median gr.size	-0.54*	-0.66*	0.40*	-0.70*	0.80*	0.80*	0.60*	0.46*	0.32	0.34	0.57*	0.75*	0.12	-0.57*
Mud content	0.52*	0.63*	-0.34	0.72*	-0.73*	-0.79*	-0.61*	-0.40*	-0.21	-0.23	-0.57*	-0.65*	-0.03	0.54*
Chl.a content	0.02	0.10	-0.34	0.19	-0.36*	-0.19	-0.07	-0.23	-0.20	-0.07	-0.36*	-0.25	-0.11	-0.02
POC content	0.39*	0.47*	-0.33	0.48*	-0.62*	-0.54*	-0.38*	-0.27	-0.16	-0.03	-0.38*	-0.62*	-0.04	0.41*
Oxidized layer	-0.41*	-0.54*	0.49*	-0.53*	0.77*	0.68*	0.58*	0.49*	0.22	0.40*	0.60*	0.62*	0.05	-0.35*
Taxa	0.04	-0.14	0.65*	-0.30	0.69*	0.51*	0.36*	0.66*	0.56*	0.67*	0.69*	0.68*	0.61*	-0.04
$Hill_1$	-0.43*	-0.64*	0.70*	-0.54*	0.89*	0.80*	0.66*	0.52*	0.26	0.43*	0.70*	0.77*	0.25	-0.36*
$Hill_2$	-0.39*	-0.62*	0.70*	-0.53*	0.85*	0.74*	0.60*	0.45*	0.18	0.40*	0.66*	0.71*	0.26	-0.34
$Hill_\infty$	-0.36*	-0.60*	0.69*	-0.53*	0.80*	0.68*	0.53*	0.40*	0.13	0.37*	0.64*	0.65*	0.28	-0.31
N/C ratio	0.30	0.50*	-0.91*	0.25	-0.88*	-0.57*	-0.46*	-0.45*	-0.26	-0.46*	-0.57*	-0.69*	-0.30	0.20

	Taxa	$Hill_1$	$Hill_2$	$Hill_\infty$	N/C
Depth	-0.17	-0.43*	-0.42*	-0.40*	0.17
Median gr.size	0.53*	0.77*	0.72*	0.67*	-0.60*
Mud content	-0.44*	-0.72*	-0.67*	-0.64*	0.54*
Chl.a content	-0.23	-0.29	-0.29	-0.29	0.33
Feo.a content	-0.19	-0.29	-0.27	-0.25	0.28
POC content	-0.34	-0.54*	-0.50*	-0.46*	0.47*
Oxidized layer	0.49*	0.74*	0.68*	0.61*	-0.65*

Table 8. Mean values and (/)standard deviation of the meiobenthic and abiotic parameters per meiobenthic TWINSPAN cluster of the MILZON-BENTHOS II 1992/93 area.

	Cluster 1		Cluster 2		Cluster 3		Cluster 4	
Symbol	[✱]		[●]		[◀]		[◇]	
Nr of locations	12		19		43		11	
	mean	/st.d.	mean	/st.d.	mean	/st.d.	mean	/st.d.
<u>Abiotic parameter</u>								
Depth (m)	39.9	/ 3.1	35.6	/ 7.6	30.9	/ 4.7	32.0	/ 3.7
Median gr. size (μm)	126.1	/11.6	181.7	/58.2	268.3	/37.8	320.2	/ 40.7
Mud content (%)	13.67	/ 3.28	8.94	/ 6.70	2.89	/ 2.28	2.02	/ 0.95
Chl-<u>a</u> content (μg/g)	0.99	/ 0.46	3.47	/ 7.88	1.56	/ 3.58	0.37	/ 0.50
POC content (% C)	0.45	/ 0.12	0.36	/ 0.37	0.09	/ 0.16	0.08	/ 0.10
Oxidized layer (cm)	5.00	/ 2.30	6.16	/ 4.69	17.18	/ 5.93	21.50	/ 5.82
<u>Meiobenthos</u>								
Total (ind./10 cm^2)	3480.3	/1540.2	2055.6	/1254.9	1101.3	/395.3	2125.5	/741.1
Nematoda	3383.8	/1513.9	2009.4	/1242.9	841.7	/361.1	1447.0	/592.5
Copepoda total	73.7	/ 57.5	24.8	/ 17.2	130.7	/121.9	378.6	/254.8
burrowing	72.0	/ 58.2	23.4	/ 16.1	6.8	/ 6.2	9.3	/ 16.5
interstitial	1.7	/ 4.9	1.4	/ 1.6	123.8	/122.8	369.3	/256.9
Gastrotricha	0.2	/ 0.4	8.0	/ 9.7	72.6	/ 66.9	120.1	/ 64.6
Turbellaria	6.2	/ 5.8	9.0	/ 8.0	26.3	/ 16.9	38.4	/ 25.6
Archiannelida	0.0	/ 0.0	0.0	/ 0.0	0.9	/ 2.0	6.4	/ 5.2
Oligochaeta	0.1	/ 0.3	0.2	/ 0.4	0.4	/ 1.6	4.3	/ 4.8
Polychaeta	2.2	/ 2.3	1.3	/ 1.8	2.7	/ 2.6	9.4	/ 7.5
Hydrozoa	0.0	/ 0.0	0.2	/ 0.4	4.2	/ 6.1	15.4	/ 15.2
Tardigrada	0.0	/ 0.0	0.9	/ 2.1	19.7	/ 23.0	84.9	/ 79.7
Ostracoda	4.0	/ 2.6	1.2	/ 2.3	2.0	/ 3.4	16.1	/ 19.7
Halacarida	0.0	/ 0.0	0.1	/ 0.2	0.1	/ 0.3	2.0	/ 3.2
Rotifera	0.1	/ 0.3	0.0	/ 0.0	0.0	/ 0.0	1.3	/ 4.2
Kinorhyncha	10.0	/ 11.1	0.6	/ 2.1	0.0	/ 0.0	1.7	/ 5.7
Priapulida	0.1	/ 0.3	0.1	/ 0.2	0.0	/ 0.0	0.0	/ 0.0
Nr of taxa ($Hill_0$)	6.1	/ 0.7	5.6	/ 1.4	7.4	/ 1.4	10.1	/ 1.4
$Hill_1$	1.16	/ 0.08	1.16	/ 0.09	2.27	/ 0.61	2.83	/ 0.50
$Hill_2$	1.06	/ 0.04	1.06	/ 0.04	1.72	/ 0.46	2.03	/ 0.44
$Hill_\infty$	1.03	/ 0.02	1.03	/ 0.02	1.37	/ 0.28	1.52	/ 0.27
N/C ratio	65.0	/ 54.3	166.2	/186.4	40.1	/127.9	4.8	/ 2.7

Table 9. Systematics of the macrobenthos found in the MILZON-BENTHOS II area 1992/92.
(dominant taxa are underlined)

Phylum Cnidaria

- Class Hydrozoa
- Class Anthozoa

Phylum Plathyhelminthes

Phylum Nemertinae

Symbols:

Phylum Mollusca

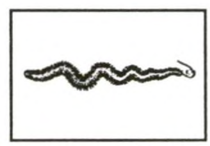
- Class Bivalvia
- Class Gastropoda

Phylum Sipunculida

Phylum Priapulida

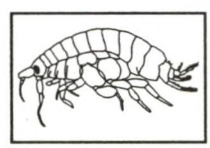
Phylum Annelida

- Class Polychaeta
  - Order Errantia
  - Order Sedentaria
- Class Oligochaeta



Phylum Arthropoda

- Subphylum Crustacea
  - Class Malacostraca
    - Order Decapoda
    - Order Mysidacea
    - Order Cumacea
    - Order Tanaidacea
    - Order Isopoda
    - Order Amphipoda



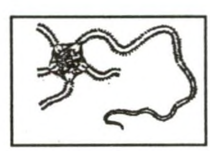
Phylum Tentaculata

- Class Phoronida

Phylum Enteropneusta

Phylum Echinodermata

- Class Echinoidea
- Class Asteroidea
- Class Ophiuroidea
- Class Holothurioidea



Phylum Acrania

- Family Branchiostoma

Table 10a. List of macrobenthic species (with shortening) found in the MILZON-BENTHOS II area 1992/93 and the number of lacation (n, %) were the species have been found. The mean values of density (ind./m²) and biomass (g/AFDW/m²) are given with their standard deviation.

I. POLYCHAETA : (59 species) (36.9 % of the total species)

				density		biomass	
		n	%	main	st.dev.	main	st.dev.
Anaitides groenlandica	(ANAIGROE)	4	4	0.8	3.8	0.0117	0.1045
Anaitides rosea	(ANAIROSE)	11	12	4.6	20.5	0.0020	0.0079
Anaitides subulifera	(ANAISUBU)	1	1	0.2	1.6	0.0001	0.0006
Aonides paucibranchiata	(AONIPAUC)	2	2	0.3	2.1	0.0001	0.0004
Aphrodite aculeta	(APHRACUL)	1	1	0.2	1.6	0.0001	0.0003
Aricidea jeffreysii	(ARICJEFF)	1	1	0.3	3.2	0.0003	0.0024
Aricidea minuta	(ARICMINU)	38	44	20.5	42.5	0.0050	0.0088
Chaetozone setosa	(CHAESETO)	35	41	21.5	66.0	0.0084	0.0242
Chaetopterus variopedatus	(CHAEVARI)	6	7	3.3	19.6	0.7231	3.7254
Diplocirrus glaucus	(DIPLGLAU)	7	8	1.9	7.1	0.0013	0.0054
Eteone flava	(ETEOFLAV)	1	1	0.2	1.4	0.0008	0.0078
Eteone foliosa	(ETEOFOLI)	3	3	0.5	2.7	0.0009	0.0051
Eteone longa	(ETEOLONG)	6	7	1.1	4.2	0.0012	0.0048
Eumida sanguinea	(EUMISANG)	5	5	2.9	15.4	0.0017	0.0099
Exogone hebes	(EXOGHEBE)	4	4	0.8	3.9	0.0002	0.0010
Exogone naidina	(EXOGNAID)	9	10	28.0	216.0	0.0009	0.0049
Gattyana cirrosa	(GATTCIRR)	3	3	1.2	8.2	0.0243	0.1572
Glycinde nordmanni	(GLYCNORD)	1	1	0.2	1.4	0.0005	0.0047
Glycera rouxii	(GLYCROUX)	2	2	1.0	8.1	0.0027	0.0244
Goniada maculata	(GONIMACU)	36	42	8.6	12.3	0.0358	0.0881
Gyptis capensis	(GYPTCAPE)	14	16	3.3	8.3	0.0023	0.0057
Harmothoe longisetis	(HARMLONG)	6	7	1.1	4.5	0.0010	0.0043
Harmothoe lunulata	(HARMLUNU)	17	20	8.7	22.8	0.0583	0.2576
Hesionura augeneri	(HESIAUGE)	7	8	2.4	8.7	0.0002	0.0009
Lanice conchilega	(LANICONC)	18	21	14.5	40.3	0.7707	2.9428
Lumbrineris latreilli	(LUMBLATR)	14	16	10.3	28.5	0.0305	0.0868
Magelona alleni	(MAGEALLE)	2	2	1.0	8.1	0.0019	0.0168
Magelona papillicornis	(MAGEPAPI)	43	50	67.2	198.6	0.1762	0.3391
Mediomastus fragilis	(MEDIFRAG)	4	4	1.5	8.7	0.0003	0.0017
Nephtys cirrosa	(NEPHCIRR)	51	60	53.9	62.0	0.1104	0.1335
Nephtys hombergii	(NEPHHOMB)	32	37	12.2	21.3	0.3498	0.8674
Nephtys incisa	(NEPHINCI)	2	2	0.7	5.0	0.0129	0.0838
Nephtys longosetosa	(NEPHLONG)	11	12	3.7	11.9	0.0533	0.2208
Nereis longissima	(NERELONG)	5	5	1.5	7.5	0.0635	0.5030
Notomastus latericeus	(NOTOLATE)	14	16	6.1	18.3	0.1412	0.4484
Ophelina acuminata	(OPHEACUM)	3	3	0.7	3.8	0.0003	0.0015
Ophelia limacina	(OPHELIMA)	8	9	2.1	6.8	0.0031	0.0123
Ophidromus flexuosus	(OPHIFLEX)	11	12	3.1	9.6	0.0101	0.0331
Orbinia sertulata	(ORBISERT)	2	2	0.5	3.5	0.0431	0.3818
Owenia fusiformis	(OWENFUSI)	2	2	0.7	5.0	0.0006	0.0041
Paraonis gracilis	(PARAGRAC)	2	2	0.5	3.5	0.0001	0.0009
Pectinaria auricoma	(PECTAURI)	1	1	0.2	1.6	0.0001	0.0002
Pectinaria koreni	(PECTKORE)	2	2	1.5	12.8	0.0053	0.0455
Pholoe minuta	(PHOLMINU)	18	21	9.8	26.9	0.0052	0.0157
Pista cristata	(PISTCRIS)	1	1	0.3	3.2	0.0009	0.0079
Poecilochaetus serpens	(POECSERP)	10	11	7.9	39.3	0.0072	0.0265
Polydora guillei	(POLYGUIL)	8	9	8.6	30.7	0.0067	0.0292
Prionospio cirrfera	(PRIOCIRR)	5	5	7.4	33.4	0.0054	0.0257
Scalibregma inflatum	(SCALINFL)	3	3	0.5	2.6	0.0002	0.0011
Scoloplos armiger	(SCOLARMI)	51	60	44.7	85.7	0.2889	0.4567
Scolelepis bonnieri	(SCOLBONN)	6	7	1.3	5.3	0.0178	0.1196
Scolelepis squamata	(SCOLSQUA)	14	16	4.5	12.9	0.0769	0.3097
Sigalion mathildae	(SIGAMATH)	12	14	2.8	8.6	0.0439	0.1558
Spiophanes bombyx	(SPIOBOMB)	60	70	111.4	265.7	0.1083	0.4088
Spio filicornis	(SPIOFILI)	30	35	20.4	47.1	0.0060	0.0153
Sthenelais limicola	(STHELIMI)	21	24	4.6	9.0	0.0408	0.1275
Streptosyllis websteri	(STREWEBS)	6	7	0.9	3.5	0.0001	0.0005
Synelmis klatti	(SYNEKLAT)	10	11	3.3	10.2	0.0008	0.0028
Travisia forbesi	(TRAVFORB)	1	1	0.2	1.6	0.0001	0.0003

Table 10b. List of macrobenthic species (with shortening) found in the MILZON-BENTHOS II area 1992/93 and the number of lacation (n, %) were the species have been found. The mean values of density (ind./m²) and biomass (g/AFDW/m²) are given with their standard deviation.

II. CRUSTACEA : (57 species) (35.6 % of the total species)

				density		biomass	
		n	%	main	st.dev.	main	st.dev.
Ampelisca tenuicornis	(AMPETENU)	7	8	1.5	5.5	0.0008	0.0028
Amphilochus neapolitanus	(AMPHNEAP)	1	1	0.2	1.6	0.0001	0.0006
Aora typica	(AORATYPI)	1	1	0.3	3.2	0.0003	0.0032
Apherusa ovalipes	(APHEOVAL)	2	2	0.3	2.0	0.0002	0.0010
Argissa hamatipes	(ARGIHAMA)	2	2	1.2	9.6	0.0004	0.0029
Atylus falcatus	(ATYLFALC)	2	2	0.3	2.1	0.0002	0.0010
Atylus swammerdami	(ATYLSWAM)	6	7	2.6	12.8	0.0008	0.0035
Bathyporeia elegans	(BATHELEG)	31	36	45.0	115.5	0.0133	0.0306
Bathyporeia guilliamsoniana	(BATHGUIL)	37	43	43.7	108.4	0.0262	0.0567
Bathyporeia tenuipes	(BATHTENU)	6	7	2.9	12.9	0.0011	0.0048
Bodotria arenosa	(BODOAREN)	1	1	0.2	1.6	0.0001	0.0008
Bodotria scorpioides	(BODOSCOR)	1	1	0.2	1.6	0.0001	0.0003
Callianassa subterranea	(CALLSUBT)	26	30	39.7	77.9	1.0351	2.1963
Caprellidae spec.	(CAPRELLI)	5	5	0.9	4.0	0.0002	0.0010
Cirolana borealis	(CIROBORE)	1	1	0.2	1.6	0.0001	0.0008
Corystes cassivelaunus	(CORYCASS)	5	5	0.8	3.4	0.1408	1.1126
Crangon crangon	(CRANCRAN)	1	1	0.2	1.4	0.0002	0.0021
Diastylis bradyi	(DIASBRAD)	6	7	1.4	5.3	0.0008	0.0034
Diastylis lucifera	(DIASLUCI)	1	1	0.5	4.8	0.0002	0.0016
Diastylis rathkei	(DIASRATH)	3	3	0.5	2.4	0.0005	0.0027
Diastylis rugosa	(DIASRUGO)	1	1	0.2	1.6	0.0003	0.0024
Ebalia chanchii	(EBALCRAN)	3	3	0.5	2.6	0.0005	0.0030
Eudorellopsis deformis	(EUDODEFO)	2	2	0.9	6.5	0.0002	0.0016
Eudorella truncatula	(EUDOTRUN)	9	10	1.7	5.3	0.0005	0.0015
Eurydice spinigera	(EURYSPIN)	1	1	0.3	2.8	0.0006	0.0059
Gastrosaccus spinifer	(GASTSPIN)	18	21	5.6	13.1	0.0091	0.0255
Harpinia antennaria	(HARPANTE)	16	18	12.7	37.1	0.0034	0.0097
Harpinia crenulata	(HARPCREN)	2	2	0.7	4.5	0.0002	0.0013
Hippomedon denticutaus	(HIPPDENT)	17	20	3.8	9.5	0.0015	0.0036
Iphinoe trispinosa	(IPHITRIS)	1	1	0.2	1.6	0.0001	0.0008
Leucothoe incisa	(LEUCINCI)	5	5	1.6	8.8	0.0011	0.0053
Leucothoe lilljeborgii	(LEUCLILL)	11	12	2.6	7.8	0.0012	0.0037
Leucothoe richiardii	(LEUCRICH)	3	3	1.0	5.9	0.0005	0.0029
Liocarcinus pusillus	(LIOCPUSI)	1	1	0.2	1.6	0.0001	0.0008
Megaluropus agilis	(MEGAAGIL)	44	51	18.2	26.3	0.0068	0.0108
Melita obtusata	(MELIOBTU)	1	1	0.2	1.4	0.0002	0.0014
Metopa borealis	(METOBORE)	1	1	0.2	1.6	0.0001	0.0008
Mysidacea spec.	(MYSIDACE)	1	1	0.2	1.6	0.0001	0.0008
Orchomene humilis	(ORCHHUMI)	1	1	0.3	2.8	0.0002	0.0014
Perioculodes longimanus	(PERILONG)	15	17	3.8	10.5	0.0014	0.0041
Phoxichilidium femoratum	(PHOXFEMO)	1	1	0.2	1.4	0.0001	0.0003
Pinnotheres pisum	(PINNPISU)	2	2	0.3	2.0	0.0005	0.0029
Pontocrates altamarinus	(PONTALTA)	20	23	8.0	23.6	0.0026	0.0079
Pontocrates arenarius	(PONTAREN)	7	8	3.6	14.3	0.0012	0.0049
Pontophylus trispinosus	(PONTTRIS)	5	5	0.9	3.5	0.0004	0.0017
Processa nouveli	(PROCNOUV)	1	1	0.2	1.4	0.0006	0.0055
Pseudocuma longicornis	(PSEULONG)	44	51	19.7	31.1	0.0041	0.0058
Pseudocuma similis	(PSEUSIMI)	1	1	0.5	4.8	0.0003	0.0011
Siphonoecetes kroyeranus	(SIPHKROY)	1	1	0.2	1.4	0.0001	0.0004
Siriella clausii	(SIRICLAU)	1	1	0.2	1.4	0.0002	0.0014
Synchelidium maculatum	(SYNCMACU)	1	1	0.2	1.6	0.0001	0.0008
Tanaidacea spec.	(TANAIDAC)	1	1	0.3	2.8	0.0001	0.0001
Thia scutellata	(THIASCUT)	8	9	1.7	5.8	0.0494	0.2284
Upogebia deltaura	(UPOGDELT)	10	11	4.3	13.7	0.9676	3.6008
Urothoe brevicornis	(UROTBREV)	30	35	24.9	47.4	0.0152	0.0308
Urothoe elegans	(UROTELEG)	6	7	1.9	7.8	0.0006	0.0022
Urothoe poseidonis	(UROTPOSE)	21	24	38.7	118.2	0.0120	0.0336

Table 10c. List of macrobenthic species (with shortening) found in the MILZON-BENTHOS II area 1992/93 and the number of lacation (n, %) were the species have been found. The mean values of density (ind./m²) and biomass (g/AFDW/m²) are given with their standard deviation.

III. MOLLUSCA : (26 species) (16.2) % of the total species)

				density		biomass	
		n	%	main	st.dev.	main	st.dev.
Abra alba	(ABRAALBA)	7	8	3.3	16.9	0.0009	0.0042
Abra prismatica	(ABRAPRIS)	1	1	0.3	3.2	0.0015	0.0136
Acanthocardia echinata	(ACANECHI)	1	1	0.2	1.6	0.0001	0.0006
Cochlodesma pratenue	(COCHPRAE)	1	1	1.7	15.9	0.0167	0.1539
Corbula gibba	(CORBGIBB)	2	2	0.3	2.2	0.0009	0.0083
Cultellus pellucidus	(CULTPELL)	13	15	3.6	9.8	0.0012	0.0037
Cylichna cylindracea	(CYLICYLI)	4	4	0.7	3.0	0.0002	0.0010
Donax vittatus	(DONAVITT)	6	7	1.8	8.5	0.1740	1.0884
Dosinia exolata	(DOSIEXOL)	1	1	1.9	17.5	0.0017	0.0157
Dosinia lupinus	(DOSILUPI)	2	2	0.3	2.1	0.0217	0.1996
Ensis ensis	(ENSIENSI)	2	2	0.3	2.1	0.0180	0.1164
Ensis siliqua	(ENSISILI)	3	3	0.6	3.5	1.0332	7.7873
Gari fervensis	(GARIFERV)	1	1	0.2	1.6	0.0038	0.0348
Lepton squamosum	(LEPTSQUA)	1	1	0.2	1.6	0.0001	0.0002
Lutraria lutraria	(LUTRLUTR)	1	1	0.2	1.6	1.2271	11.3134
Mactra corallina	(MACTCORA)	1	1	1.5	14.3	0.0002	0.0014
Montacuta ferruginosa	(MONTFERR)	23	27	11.5	28.0	0.0069	0.0218
Mysella bidentata	(MYSEBIDE)	24	28	129.7	306.4	0.0263	0.0644
Natica alderi	(NATIALDE)	30	35	10.0	18.0	0.0137	0.0489
Nucula turgida	(NUCUTURG)	7	8	2.7	10.7	0.0119	0.0736
Spisula subtruncata	(SPISSUBT)	1	1	0.2	1.4	0.0751	0.6929
Tellina fabula	(TELLFABU)	24	28	16.7	48.2	0.0795	0.3196
Tellina pygmaeus	(TELLPYGM)	1	1	0.2	1.6	0.0001	0.0002
Thrasia convexa	(THRACONV)	1	1	0.2	1.6	0.0123	0.1130
Turbonilla lactea	(TURBLACT)	1	1	0.2	1.6	0.0001	0.0003
Venus striatula	(VENUSTRI)	4	4	0.6	2.9	0.1011	0.6641

IV. ECHINODERMATA : (8 species) (6.3 % of the total species)

				density		biomass	
		n	%	main	st.dev.	main	st.dev.
Amphiura filiformis	(AMPHFILI)	22	25	163.2	374.4	2.3258	5.8756
Acrocnida brachiata	(ACROBRAC)	1	1	0.2	1.6	0.0001	0.0002
Brissopsis lyrifera	(BRISLYRI)	1	1	0.2	1.6	0.1274	1.1743
Echinocardium cordatum	(ECHICORD)	44	51	18.3	29.9	6.8456	13.3072
Echinocyamus pusillus	(ECHIPUSI)	25	29	17.6	63.0	0.0100	0.0228
Leptosynapta inhaerens	(LEPTINHA)	4	4	1.0	4.9	0.0308	0.1732
Ophiura albida	(OPHIALBI)	14	16	10.1	46.0	0.0206	0.0872
Ophiura texturata	(OPHITEXT)	2	2	0.3	2.0	0.0058	0.0530

V. REST : (10 species) (5.0 % of the total species)

				density		biomass	
		n	%	main	st.dev.	main	st.dev.
Anthozoa spec.	(ANTHOZOA)	7	8	7.4	53.1	0.0052	0.0419
Branchiostoma lanceolatum	(BRANLANC)	1	1	1.5	13.9	0.0348	0.3212
Enteropneusta	(ENTEROPN)	1	1	0.2	1.4	0.0001	0.0001
Hydrozoa spec.	(HYDROZOA)	4	4	0.8	4.0	0.0001	0.0006
Nemertinae spec.	(NEMERTIN)	68	80	21.6	20.1	0.1167	0.2614
Oligochaeta spec.	(OLIGOCHA)	6	7	4.1	22.0	0.0003	0.0015
Phoronida spec.	(PHORONID)	26	30	36.3	124.2	0.0158	0.0560
Plathyhelminthes spec.	(PLATHYHE)	5	5	1.5	7.1	0.0016	0.0121
Priapulida spec.	(PRIAPULI)	1	1	0.2	1.6	0.0001	0.0008
Sipunculida spec.	(SIPUNCUL)	6	7	7.7	39.0	0.0819	0.4529

VI. TOTAL NUMBER OF SPECIES : 160

Table 11. Presence (n, %) of the most abundant macrobenthos species, found at more than 25 % of the stations in the MILZON-BENTHOS II area 1992/93. The mean values of density (ind./m²) and biomass (g AFDW/m²) are given with their standard deviation. Abundance patterns are shown in indicated maps.

		Number of presence		density (ind./m^2)		biomass (g AFDW/m^2)	
species	Fig.	n	%	mean	st.dev.	mean	st.dev.
Nemertinae spec.	73.	68	80	21.6	20.2	0.1167	0.2614
Spiophanes bombyx	56.	60	70	111.4	265.7	0.1083	0.4088
Nephtys cirrosa	52.	51	60	53.9	62.0	0.1104	0.1335
Scoloplos armiger	55.	51	60	44.7	85.7	0.2889	0.4567
Echinocardium cordatum	71.	44	51	18.3	29.9	6.8456	13.3072
Megaluropus agilis	67.	44	51	18.2	26.3	0.0068	0.0108
Pseudocuma longicornis	68.	44	51	19.7	31.1	0.0041	0.0058
Magelona papillicornis	51.	43	50	67.2	198.6	0.1762	0.3391
Aricidea minuta	47.	38	44	20.5	42.5	0.0050	0.0088
Bathyporeia guilliamsoniana	64.	37	43	43.7	108.4	0.0262	0.0567
Goniada maculata	49.	36	42	8.6	12.3	0.0358	0.0881
Chaetozone setosa	48.	35	41	21.5	66.0	0.0084	0.0242
Nephtys hombergii	53.	32	37	12.2	21.3	0.3498	0.8674
Bathyporeia elegans	63.	31	36	45.0	115.5	0.0133	0.0306
Spio filicornis	57.	30	35	20.4	47.1	0.0060	0.0153
Natica alderi	61.	30	35	10.0	18.0	0.0137	0.0489
Urothoe brevicornis	69.	30	35	24.9	47.4	0.0152	0.0308
Callianassa subterranea	65.	26	30	39.7	77.9	1.0351	2.1963
Phoronide spec.	74.	26	30	36.3	124.2	0.0158	0.0560
Echinocyamus pusillus	72.	25	29	17.6	63.0	0.0100	0.0228
Mysella bidentata	60.	24	28	129.7	306.4	0.0263	0.0644
Tellina fabula	62.	24	28	16.7	48.2	0.0795	0.3196
Montacuta ferruginosa	59.	23	27	11.5	28.0	0.0069	0.0218
Amphiura filiformis	70.	22	25	163.2	374.4	2.3258	5.8756

Table 12. Presence (number and percentage of stations), minimum, maximum, mean value with standard deviation and percentage of the mean of some taxonomic macrobenthic groups in the MILZON-BENTHOS II area 1992/93.

	presence n	%	min.	max.	mean	st.dev.	% of mean
Density:							
Polychaeta	85	100	87.8	2311.5	528.1	441.5	40.36
Crustacea	85	100	29.3	1385.6	302.7	245.8	23.14
Mollusca	67	79	0.0	1477.6	189.2	313.9	14.46
Echinodermata	69	81	0.0	1741.0	210.9	377.2	16.12
Branchiostoma	1	1	0.0	128.3	1.5	13.9	0.12
Cnidaria	11	13	0.0	487.5	8.3	53.2	0.63
Enteropneusta	1	1	0.0	12.8	0.2	1.4	0.02
Nemertinae	68	80	0.0	117.0	21.6	20.1	1.65
Phoronida	26	31	0.0	1024.1	36.3	124.2	2.77
Plathyhelminthes	5	6	0.0	43.9	1.5	7.1	0.12
Priapulida	1	1	0.0	14.6	0.2	1.6	0.02
Sipunculida	6	7	0.0	278.0	7.7	39.0	0.59
Sum density (ind./m²)			256.6	4125.7	1308.4	835.5	100.00
Biomass :							
Polychaeta	85	100	0.2852	31.5919	3.2657	5.3357	18.12
Crustacea	85	100	0.0103	25.1841	2.3039	4.8537	12.79
Mollusca	67	79	0.0000	104.5139	2.8280	13.6605	15.69
Echinodermata	69	81	0.0000	93.3789	9.3660	13.9716	51.98
Branchiostoma	1	1	0.0000	2.9612	0.0348	0.3212	0.19
Cnidaria	11	13	0.0000	0.3962	0.0053	0.0419	0.03
Enteropneusta	1	1	0.0000	0.0012	0.0001	0.0001	0.00
Nemertinae	68	80	0.0000	1.7644	0.1167	0.2614	0.65
Phoronida	26	31	0.0000	0.4550	0.0158	0.0560	0.09
Plathyhelminthes	5	6	0.0000	0.1112	0.0016	0.0012	0.01
Priapulida	1	1	0.0000	0.0073	0.0001	0.0008	0.00
Sipunculida	6	7	0.0000	3.6165	0.0819	0.4529	0.45
Sum biomass (g AFDW/m²)			0.79	135.58	18.02	21.81	100.00
$Hill_0$ (number of species)			11.0	33.0	18.4	4.7	
$Hill_1$			2.8	23.4	9.8	3.4	
$Hill_2$			1.6	17.5	6.8	3.0	
$Hill_\infty$			1.3	7.9	3.7	1.5	

Table 13. Correlation between the macrobenthos and the abiotic parameters, log (x+1) transformed, found in the MILZON-BENTHOS II area 1992/93. (n=85, α=0.001, r=0.347, 95 % reliability) *=significant

	Density (ind./m²):					Biomass (g AFDW/m²):					Diversity :			
	total	Poly.	Crus.	Moll.	Echi.	total	Poly.	Crus.	Moll.	Echi.	Spec.	$Hill_1$	$Hill_2$	$Hill_\infty$
total density	1.00													
Polychaeta "	0.52*	1.00												
Crustacea "	0.34	-0.05	1.00											
Mollusca "	0.67*	0.15	0.16	1.00										
Echinoderm."	0.63*	-0.06	0.27	0.55*	1.00									
total biomass	0.48*	-0.00	0.24	0.38*	0.62*	1.00								
Polychaeta "	0.36*	0.45*	0.07	0.22	0.14	0.33	1.00							
Crustacea "	0.52*	-0.16	0.20	0.45*	0.57*	0.51*	0.16	1.00						
Mollusca "	0.25	0.04	0.25	0.32	0.11	0.36*	-0.02	0.07	1.00					
Echinoderm."	0.31	-0.15	0.19	0.25	0.62*	0.81*	0.03	0.33	0.03	1.00				
Species number	0.65*	0.33	0.30	0.64*	0.62*	0.48*	0.42*	0.38*	0.33	0.26	1.00			
$Hill_1$	-0.38*	-0.16	0.02	-0.02	-0.03	0.02	0.13	-0.14	0.01	-0.04	0.35*	1.00		
$Hill_2$	-0.53*	-0.24	-0.07	-0.16	-0.18	-0.07	0.06	-0.22	-0.05	-0.11	0.11	0.95*	1.00	
$Hill_\infty$	-0.52*	-0.24	-0.09	-0.18	-0.19	-0.07	0.06	-0.22	-0.03	-0.12	0.01	0.85*	0.95*	1.00
Depth	0.43*	-0.05	0.03	0.37*	0.63*	0.45*	0.17	0.55*	-0.08	0.41*	0.35*	-0.12	-0.20	-0.19
Median gr.size	-0.50*	0.15	-0.12	-0.60*	-0.52*	-0.47*	-0.30	-0.67*	-0.08	-0.33	-0.39*	0.12	0.20	0.18
Mud content	0.45*	-0.08	0.03	0.50*	0.49*	0.51*	0.32	0.70*	0.05	0.34	0.41*	-0.04	-0.11	-0.10
Chl.a content	0.15	0.11	0.01	0.14	-0.01	0.21	0.11	0.07	0.02	0.20	0.14	-0.02	-0.07	-0.13
POC content	0.49*	0.17	-0.08	0.48*	0.28	0.35*	0.35*	0.59*	0.05	0.20	0.28	-0.21	-0.28	-0.30
Oxidized layer	-0.41*	0.02	-0.09	-0.54*	-0.50*	-0.55*	-0.37*	-0.55*	-0.19	-0.39*	-0.54*	-0.14	-0.02	0.02

Table 14. Mean values of abiotic and macrobenthic parameters of each macrobenthic TWINSPAN cluster, as shown in Figs. 75 and 76, with their standard deviation.

	Cluster 1	Cluster 2	Cluster 3	Cluster 4
Symbols	⊠	●	◀	◇
Number of location	18	5	19	43
	mean/st.d.	mean/st.d.	mean/st.d.	mean/st.d.
<u>Abiotic parameters :</u>				
Depth (m)	41.8 / 3.9	33.2 / 2.9	29.8 / 3.8	31.5 / 4.5
Median grain size (μm)	136.5 / 24.5	150.6 / 25.0	229.9 / 55.0	288.7 / 36.6
Mud content (%)	13.10/ 6.5	9.44/ 3.5	5.11/ 3.6	2.34/ 1.1
Chl.a content (μg/g)	1.00/ 0.7	1.21/ 0.5	4.39/ 8.8	0.96/ 1.9
POC content (% C)	0.45/ 0.2	0.28/ 0.1	0.25/ 0.4	0.06/ 0.1
Oxidized layer (cm)	0.7 / 0.2	0.9 / 0.1	0.9/ 0.3	1.3 / 0.1
<u>Macrobenthos :</u>				
Total number of species	83	50	98	87
Density (ind./m²)	2177.4/ 862.9	921.0/ 594.7	1588.5/ 686.7	865.4/ 530.5
Biomass (g AFDW/m²)	36.01/ 28.34	15.33/ 12.5	18.71/ 16.58	10.50/ 17.20
Polychaeta (ind./m²)	372.3/ 162.7	298.5/ 135.9	838.3/ 538.2	483.0/ 437.0
Crustacea (")	290.2/ 138.5	155.1/ 39.5	413.2/ 368.0	276.3/ 214.5
Mollusca (")	588.5/ 416.2	280.9/ 482.8	142.8/ 100.0	31.9/ 69.8
Echinodermata (")	778.6/ 481.3	84.9/ 93.3	103.2/ 161.2	35.4/ 45.8
Polychaeta (g AFDW/m²)	5.64/ 8.44	3.90/ 5.10	4.76/ 6.50	1.49/ 1.02
Crustacea (")	8.20/ 7.34	2.49/ 1.83	1.33/ 3.49	0.24/ 0.32
Mollusca (")	6.33/ 24.54	0.19/ 0.28	5.77/ 16.10	0.42/ 1.54
Echinodermata(")	15.11/ 9.56	8.57/ 12.44	6.76/ 9.00	8.21/ 16.89
$Hill_0$ (species richness)	21.3 / 3.9	19.6 / 3.0	21.8 / 4.7	15.5 / 3.2
$Hill_1$ diversity	8.5 / 3.1	12.6 / 3.9	11.4 / 4.4	9.3 / 2.4
$Hill_2$ "	5.3 / 2.5	9.6 / 4.3	7.6 / 3.8	6.8 / 2.3
$Hill_\infty$ "	2.9 / 1.0	5.3 / 2.5	3.8 / 1.7	3.7 / 1.3

Table 15. List of abundant macrobenthos species in each macrobenthic TWINSPAN cluster of the MILZON-BENTHOS II area 1992/93. The presence (number and percentage of stations) and mean values with the standard deviation of density (ind./m²) and biomass (g AFDW/m²) (cf. Fig. 75). **Bold**-printed species were 'indicator species' of the 4 clusters.

species	presence n	%	density mean	st.dev.	biomass mean	st.dev.
Cluster 1 ⊠ (✳)						
Amphiura filiformis	18	100	752.6	471.8	10.7055	8.6680
Callianassa subterranea	18	100	154.4	94.0	3.5557	2.2278
Mysella bidentata	17	94	552.7	407.9	0.1163	0.0931
Pholoe minuta	14	77	40.6	46.1	0.0216	0.0285
Harpinia antennaria	13	72	54.5	64.4	0.0144	0.0165
Nephtys hombergii	13	72	28.4	29.0	0.4357	0.5950
Echinocardium cordatum	12	66	20.3	22.5	3.6612	5.4112
Cluster 2 (●)						
Callianassa subterranea	5	100	96.6	48.1	2.2422	2.0803
Cultellus pellucidus	4	80	23.4	13.1	0.0111	0.0063
Lumbrineris latreilli	4	80	43.9	38.7	0.1235	0.0983
Magelona papillicornis	4	80	20.5	13.1	0.0108	0.0088
Nephtys hombergii	4	80	20.5	22.2	1.2471	2.2435
Cluster 3 (◀)						
Chaetozone setosa	18	94	75.2	125.9	0.0248	0.0451
Magelona papillicornis	18	94	256.5	365.7	0.4785	0.5040
Spiophanes bombyx	16	84	209.5	317.9	0.1642	0.4414
Tellina fabula	15	78	63.7	85.8	0.3073	0.6200
Natica alderi	14	73	24.7	24.0	0.0409	0.0883
Nephtys hombergii	14	73	21.3	22.1	0.7461	1.1416
Goniada maculata	12	63	16.6	16.4	0.1082	0.1593
Cluster 4 (◇)						
Nephtys cirrosa	40	93	92.4	58.6	0.1899	0.1339
Scoloplos armiger	39	90	76.0	104.8	0.5108	0.5235
Aricidea minuta	35	81	37.6	53.0	0.0091	0.0105
Megaluropus agilis	35	81	20.5	30.2	0.0115	0.0130
Spiophanes bombyx	34	79	116.3	297.4	0.1350	0.4929
Pseudocuma longicornis	31	72	30.4	37.5	0.0062	0.0066
Urothoe brevicornis	29	67	48.6	57.5	0.0298	0.0381
Bathyporeia guilliamsoniana	27	62	46.9	94.3	0.0324	0.0526

Table 16. Spearman rank correlations between the meio- and macrobenthic TWINSPAN scores and abiotic parameters. Prior to the calculations, all data were (x+1)-transformed. Number of observations = 3570 (n*(n-1)/2; n=85).

Abiotic parameters TWINSPAN Scores	Depth	Median	Mud	Chl.a	POC	Oxidized layer
Meiobenthos	0.568	-0.823	0.780	0.451	0.643	-0.739
Macrobenthos	0.535	-0.740	0.708	0.348	0.647	-0.721

Table 17. Spearman rank correlations between benthic (meio- and macrobenthos) and abiotic dissimilarity matrices. k gives the number of combinations of environmental parameters, yielding the 'best matches' of the respective dissimilarity matrices. Number of observations = 3570 (n*(n-1)/2; n=85).

A. Meiobenthos

k	Best environmental parameter combinations					
1	Depth	Median	Mud	Chl-a	POC	Oxygen layer
	.261	.762	.657	.091	.441	.564
2	Depth/Median	Depth/Mud		Median/Mud		
	.743	.665		.724		
3	Depth/Median/Mud					
	.727					

B. Macrobenthos

k	Best environmental parameter combinations					
1	Depth	Median	Mud	Chl-a	POC	Oxygen layer
	.407	.729	.666	.061	.456	.504
2	Depth/Median	Depth/Mud		Median/Mud		
	.767	.694		.723		
3	Depth/Median/Mud					
	.743					

Table 18. Correlations between the meio- and macrobenthos, log(x+1) transformed, found in the MILZON-BENTHOS II area 1992/1993.
(n=85, α=0.001, r=0.347, 95 % reliability) *=significant

	Macrobenthos: Density (ind./m²)					Biomass (g AFDW/m²)					Diversity			
Meiobenthos:	total	Poly.	Crus.	Moll.	Echi.	total	Poly.	Crus.	Moll.	Echi.	Spec.	$Hill_1$	$Hill_2$	$Hill_\infty$
Total density	0.42*	0.01	-0.02	0.49*	0.54*	0.39*	0.12	0.47*	0.08	0.31	0.34	-0.03	-0.06	-0.01
Taxa	-0.26	-0.01	-0.15	-0.45*	-0.21	-0.34	-0.24	-0.22	-0.19	-0.30	-0.28	-0.05	0.02	0.04
$Hill_1$	-0.55*	-0.06	-0.20	-0.71*	-0.50*	-0.57*	-0.32	-0.50*	-0.27	-0.40*	-0.55*	-0.04	0.09	0.10
$Hill_2$	-0.55*	-0.09	-0.22	-0.70*	-0.51*	-0.55*	-0.30	-0.46*	-0.28	-0.38*	-0.57*	-0.06	0.08	0.10
$Hill_\infty$	-0.52*	-0.08	-0.22	-0.68*	-0.50*	-0.53*	-0.27	-0.43*	-0.27	-0.36*	-0.56*	-0.09	0.05	0.08
Nematoda	0.52*	0.03	0.05	0.62*	0.61*	0.49*	0.19	0.53*	0.15	0.37*	0.46*	-0.00	-0.07	-0.03
Copepoda	-0.25	-0.11	-0.22	-0.45*	-0.13	-0.24	-0.28	-0.12	-0.20	-0.16	-0.38*	-0.15	-0.05	-0.00
burrowing	0.49*	-0.09	0.01	0.52*	0.66*	0.52*	0.11	0.61*	0.11	0.40*	0.38*	-0.13	-0.21	-0.19
interstitial	-0.49*	-0.00	-0.10	-0.68*	-0.42*	-0.50*	-0.33	-0.50*	-0.22	-0.36*	-0.47*	0.02	0.12	0.13
Gastrotricha	-0.45*	0.11	-0.08	-0.53*	-0.46*	-0.56*	-0.31	-0.60*	-0.18	-0.40*	-0.45*	-0.01	0.09	0.09
Turbellaria	-0.38*	0.04	-0.09	-0.44*	-0.36*	-0.41*	-0.28	-0.47*	-0.16	-0.25	-0.32	0.01	0.06	0.04
Archiannelida	-0.23	0.09	-0.26	-0.26	-0.25	-0.29	-0.10	-0.28	-0.07	-0.28	-0.19	0.01	0.07	0.09
Oligochaeta	-0.04	0.16	-0.24	-0.12	-0.05	-0.19	-0.04	-0.10	0.09	-0.33	0.10	0.13	0.11	0.08
Polychaeta	-0.13	0.11	-0.32	-0.38*	-0.21	-0.21	-0.06	-0.13	-0.22	-0.22	-0.26	-0.11	-0.05	-0.02
Hydrozoa	-0.43*	-0.02	-0.12	-0.46*	-0.39*	-0.53*	-0.23	-0.37*	-0.20	-0.44*	-0.43*	-0.01	0.08	0.10
Tardigrada	-0.39*	0.06	-0.03	-0.51*	-0.36*	-0.46*	-0.33	-0.49*	-0.09	-0.38*	-0.30	0.10	0.18	0.19
Ostracoda	0.01	-0.08	-0.17	-0.00	0.18	0.04	-0.06	0.12	-0.13	-0.00	0.05	0.04	0.04	0.04
Halacarida	0.00	0.21	-0.03	-0.04	-0.12	-0.27	-0.11	-0.10	-0.04	-0.28	0.03	0.01	-0.00	0.01
Rotifera	0.14	0.10	-0.09	0.11	0.03	0.01	-0.00	0.11	-0.05	-0.07	0.09	0.04	0.02	-0.01
Kinorhyncha	0.51*	0.03	0.04	0.46*	0.53*	0.39*	0.15	0.60*	0.09	0.30	0.27	-0.23	-0.27	-0.21
N/C ratio	0.44*	0.13	0.22	0.64*	0.36*	0.43*	0.33	0.32	0.24	0.30	0.52*	0.13	0.01	-0.01

Figures

Figures :

I Abiotic parameters

II Meiobenthos

III Macrobenthos

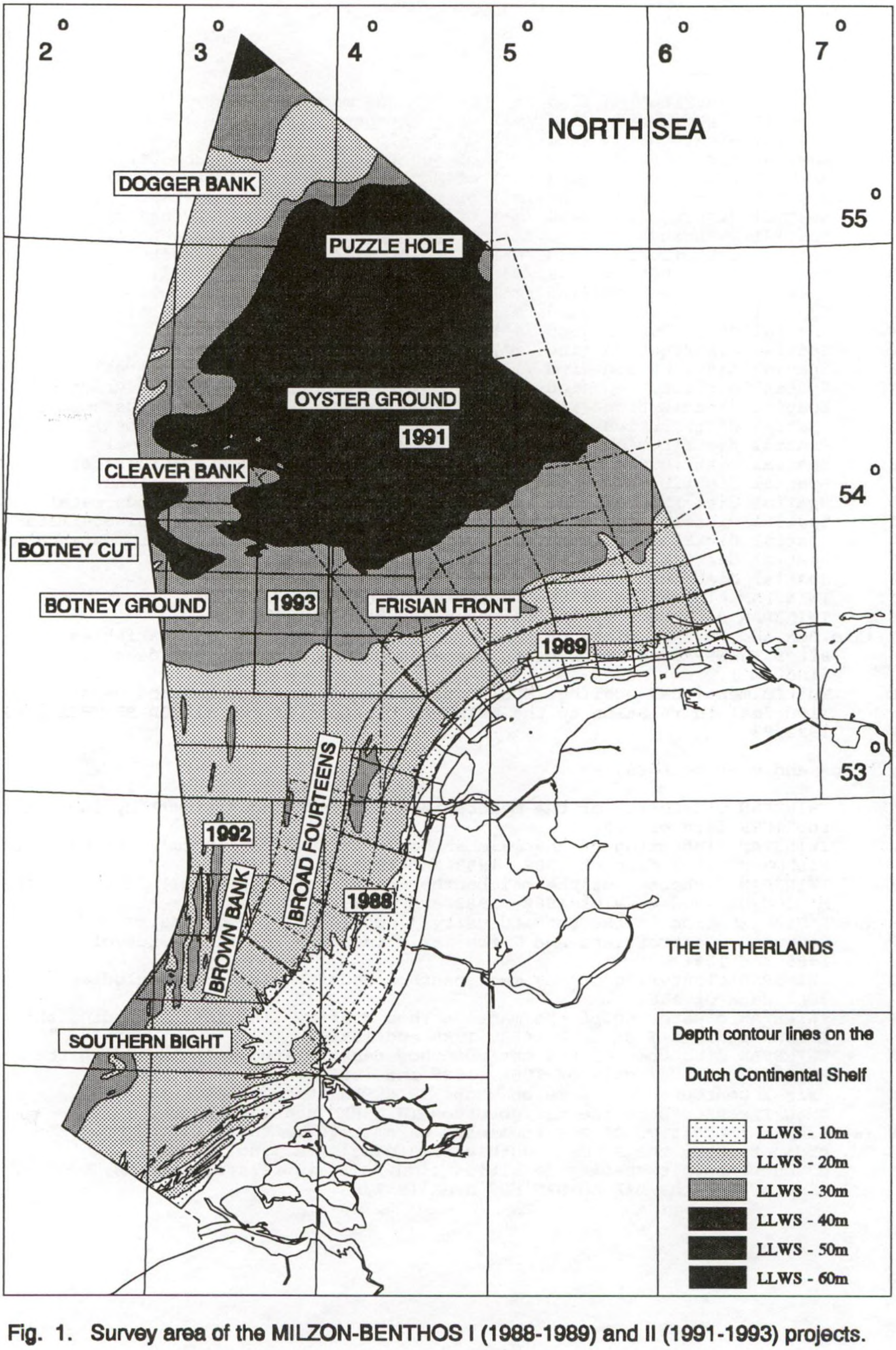


Fig. 1. Survey area of the MILZON-BENTHOS I (1988-1989) and II (1991-1993) projects.

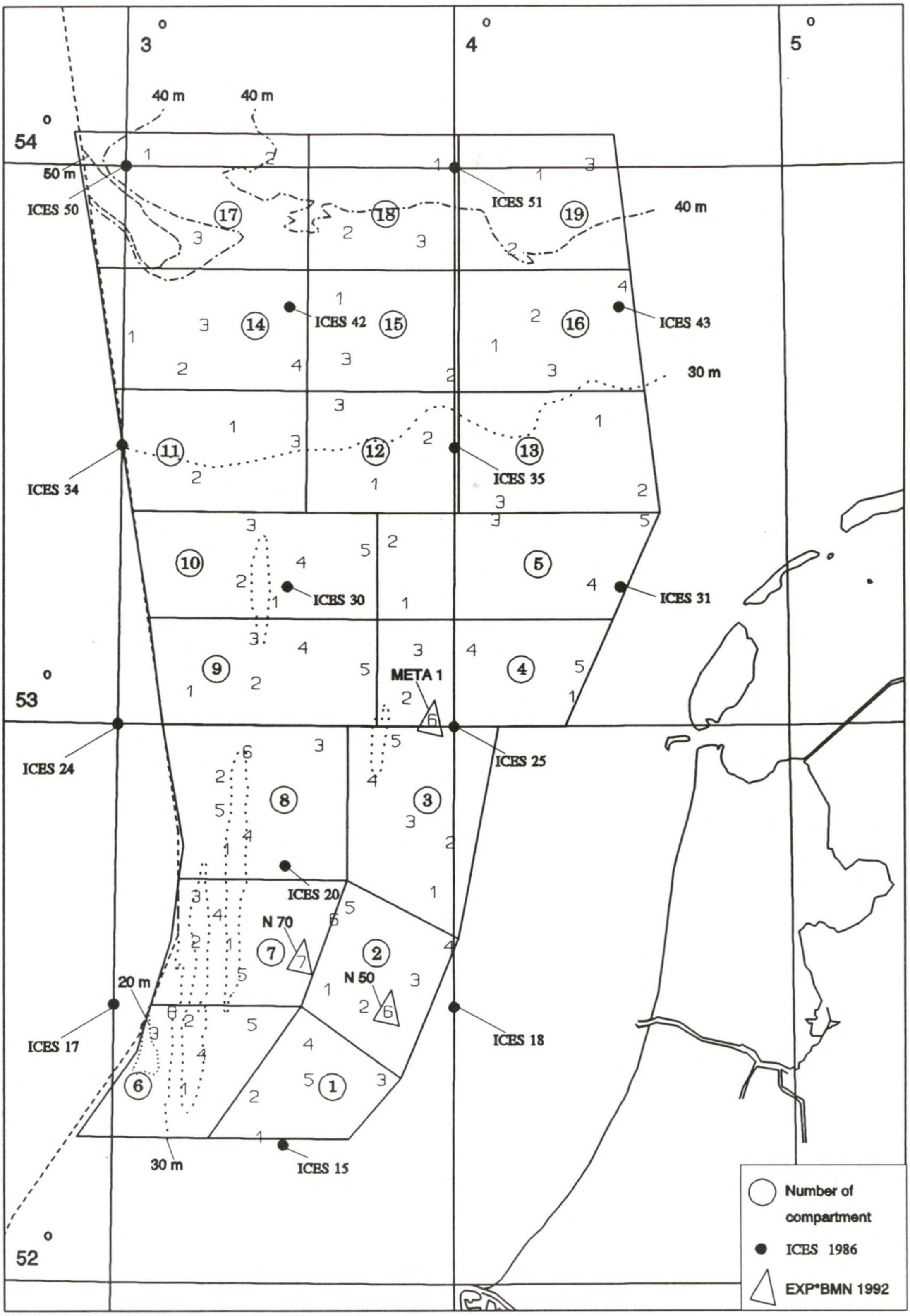


Fig. 2. Location of ICES (1986) and the EXP*BMN project 1992 in the MILZON-BENTHOS area 1992/93.

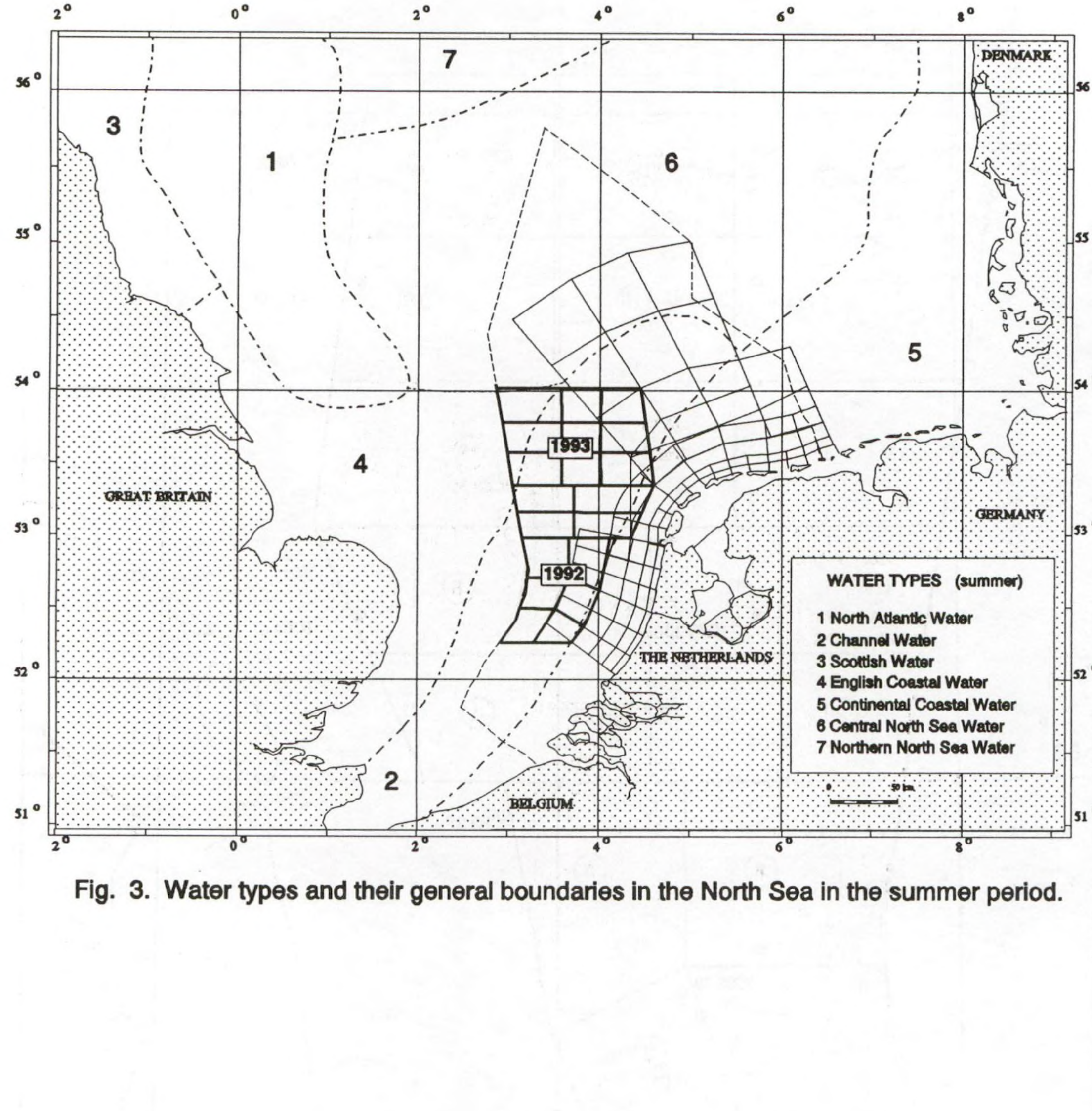


Fig. 3. Water types and their general boundaries in the North Sea in the summer period.

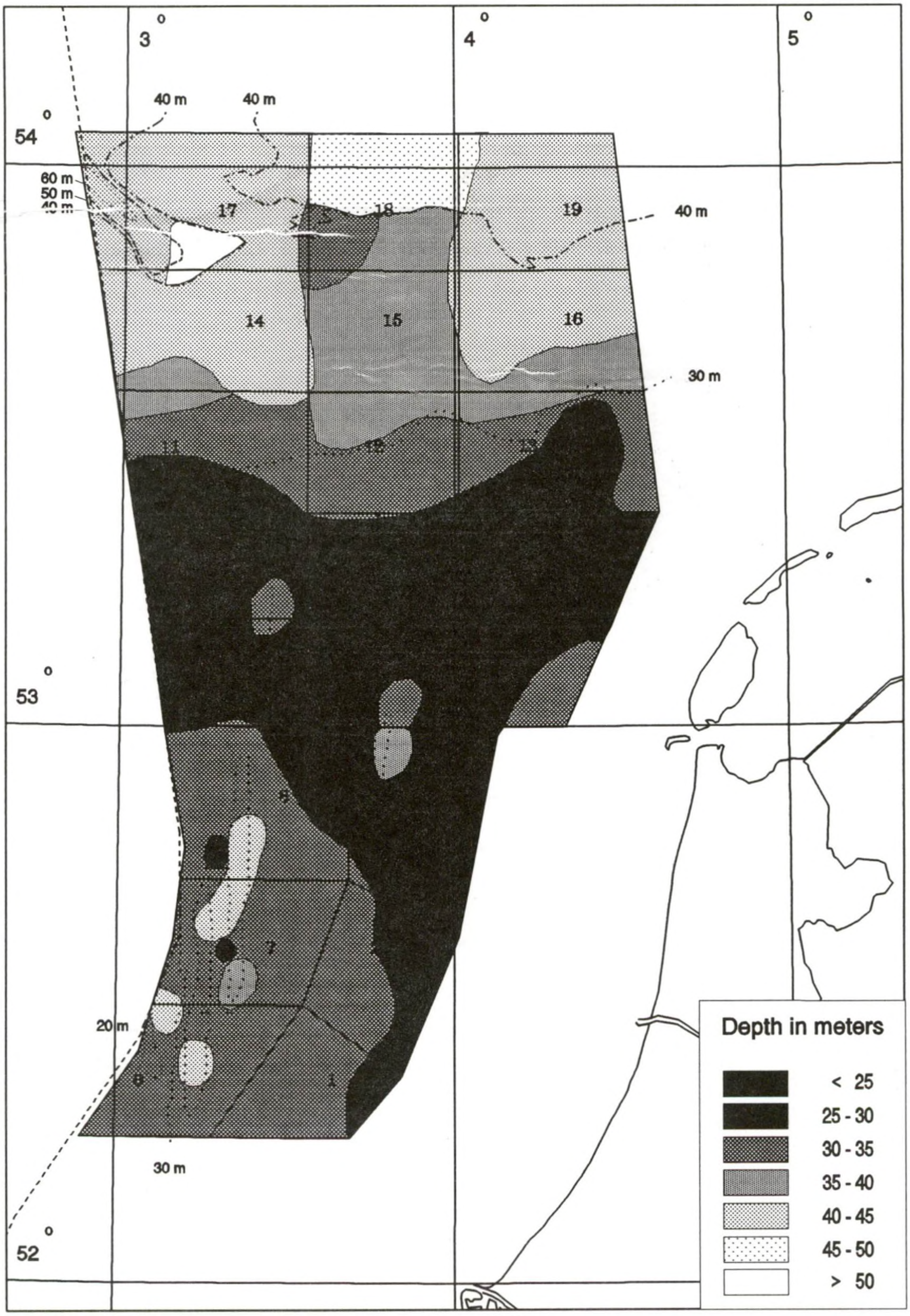


Fig. 4. Depth (m) recordings, uncorrected for differences due to the tidal cycle. Official 30, 40, 50 and 60 m isobaths are indicated.

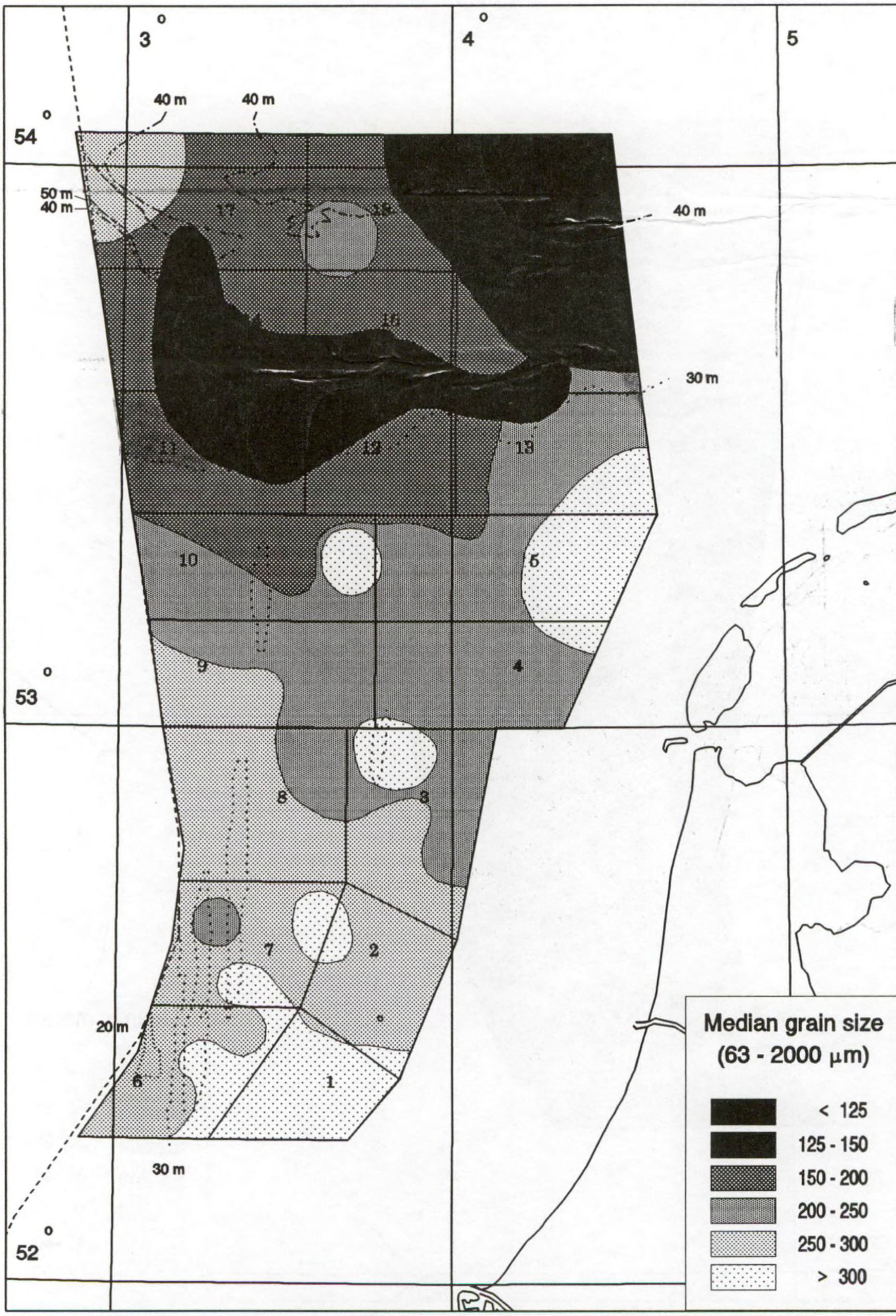


Fig. 5. Median grain size (for the fraction 63 - 2000 µm) of the upper 10 cm of the sediment.

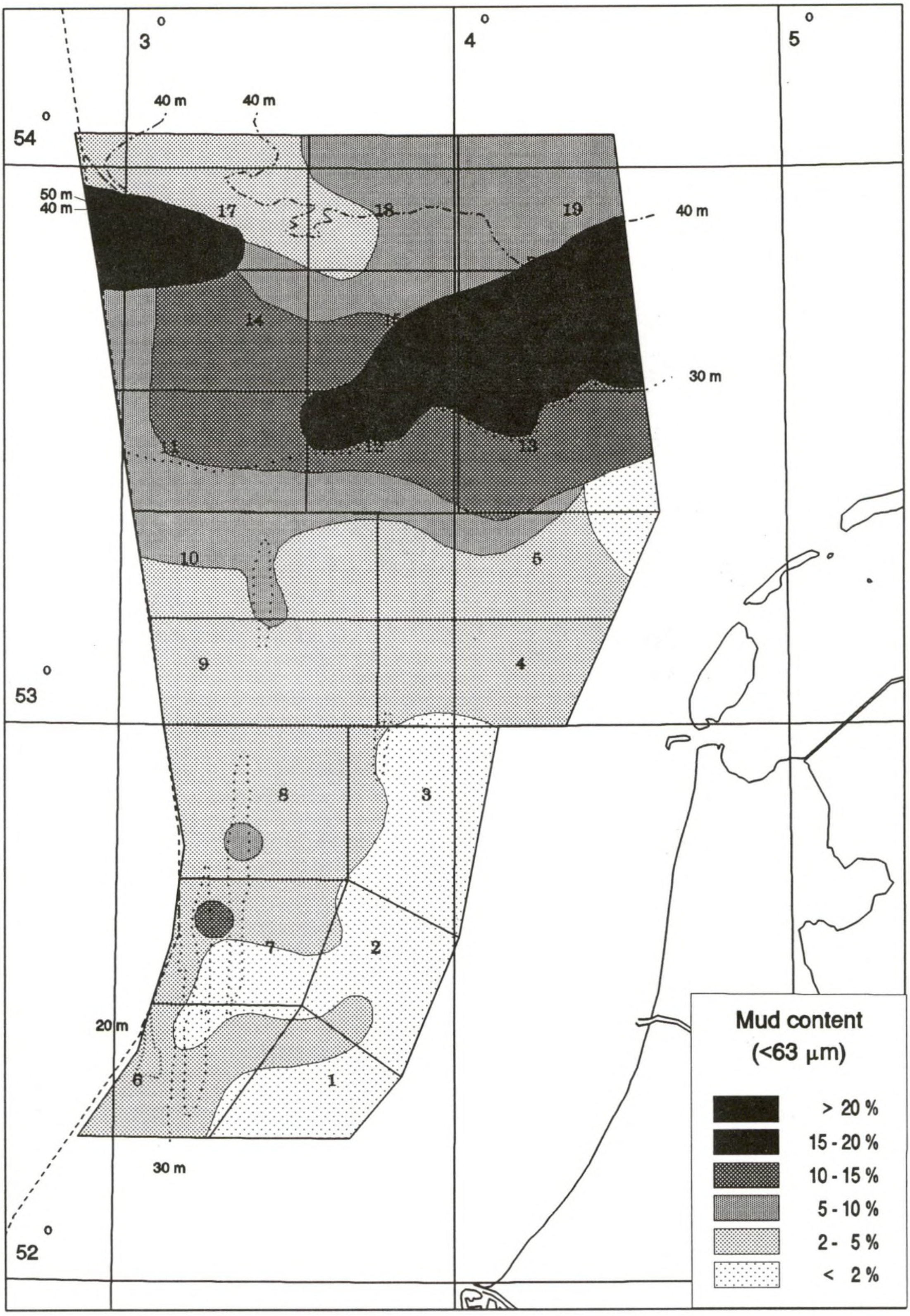


Fig. 6. Mud content (%, particles < 63 µm) of the upper 10 cm of the sediment.

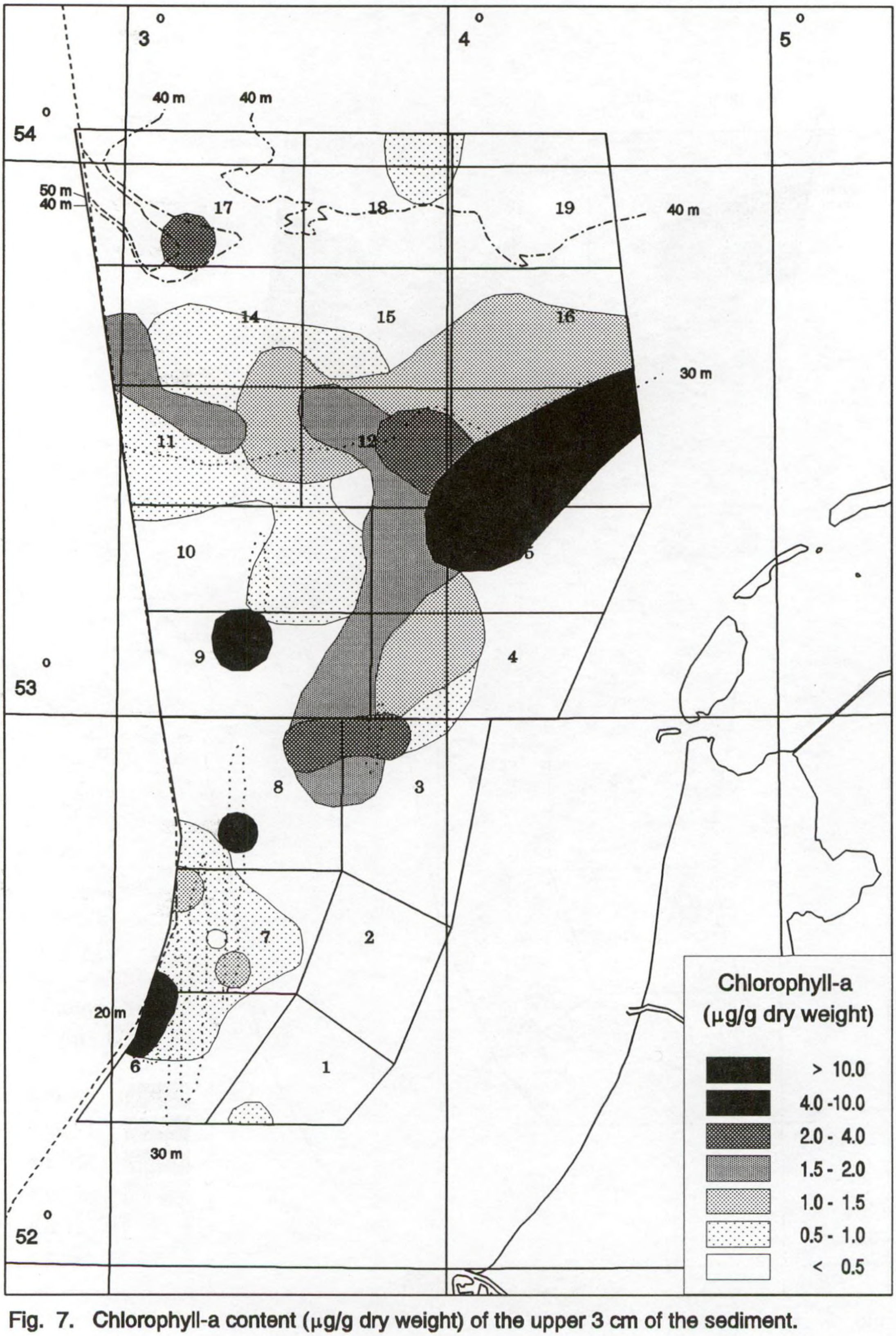


Fig. 7. Chlorophyll-a content (µg/g dry weight) of the upper 3 cm of the sediment.

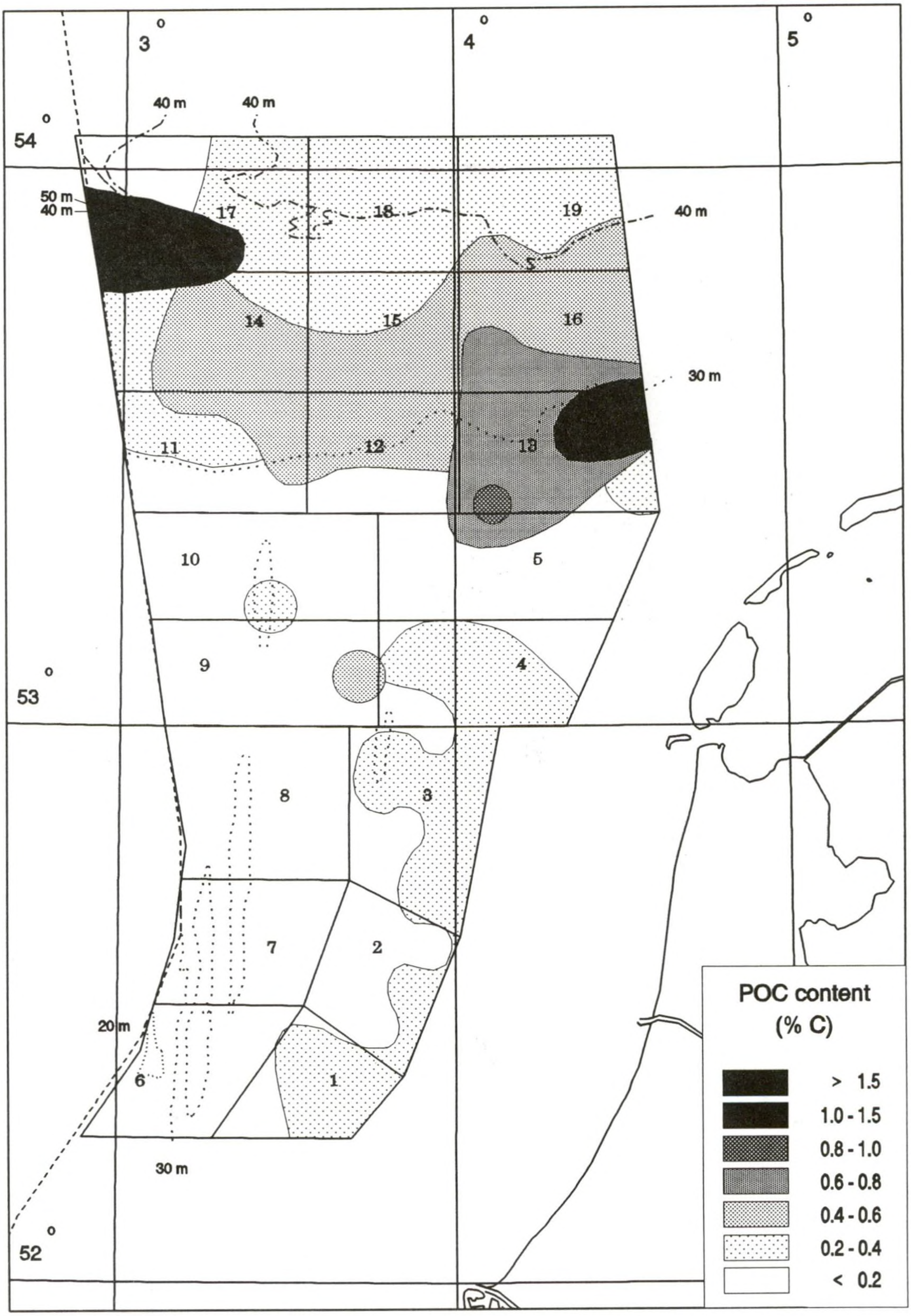


Fig. 8. POC content (% C) of the upper 3 cm of the sediment.

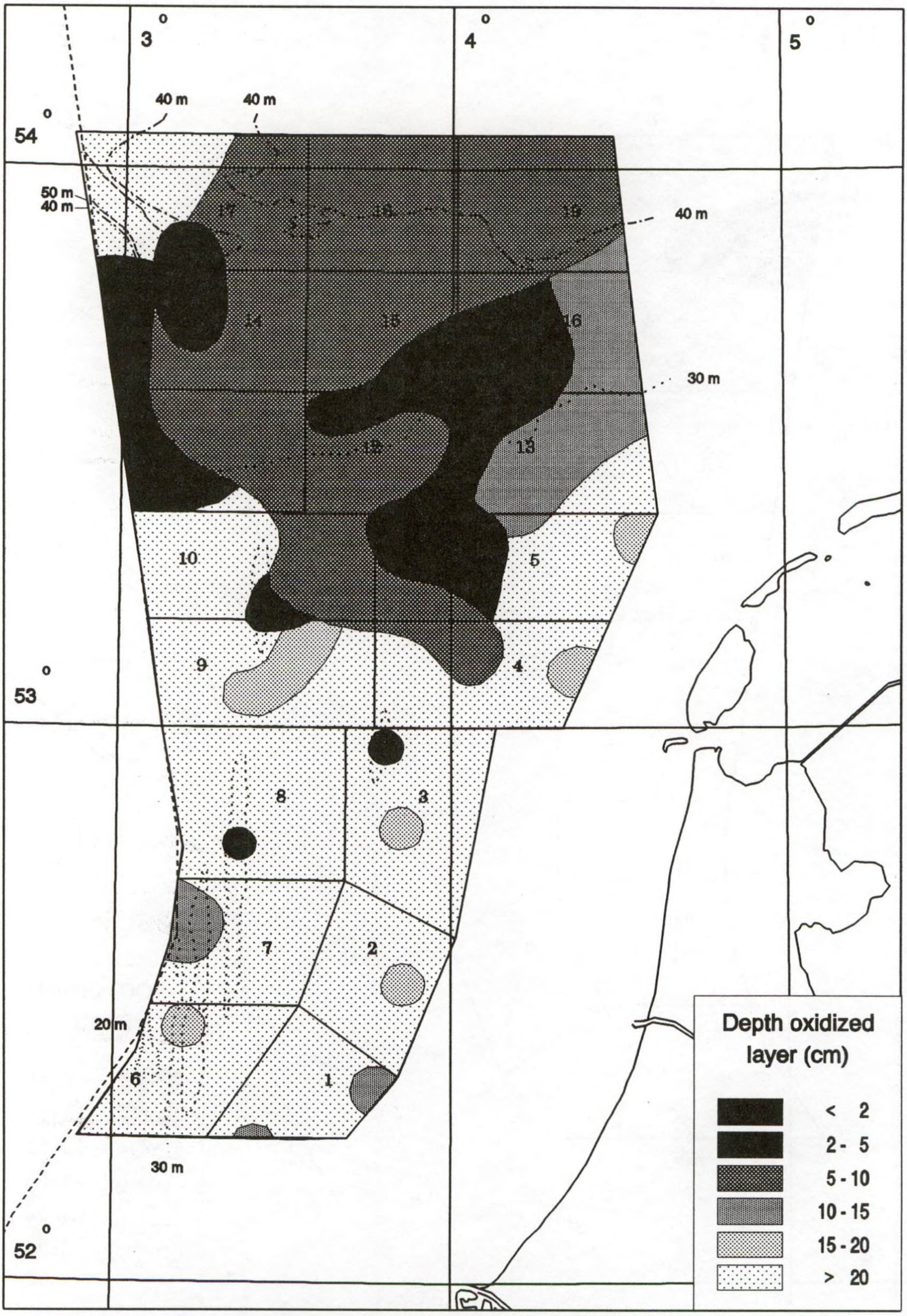


Fig. 9. Depth of the (visible) oxidized layer (cm) of the sediment.

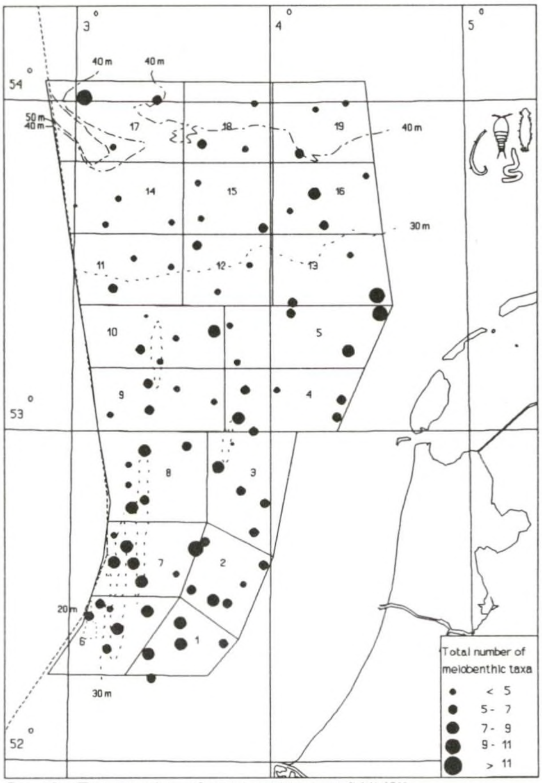


Fig. 10. Total number of meiobenthic taxa (Hill (0)).

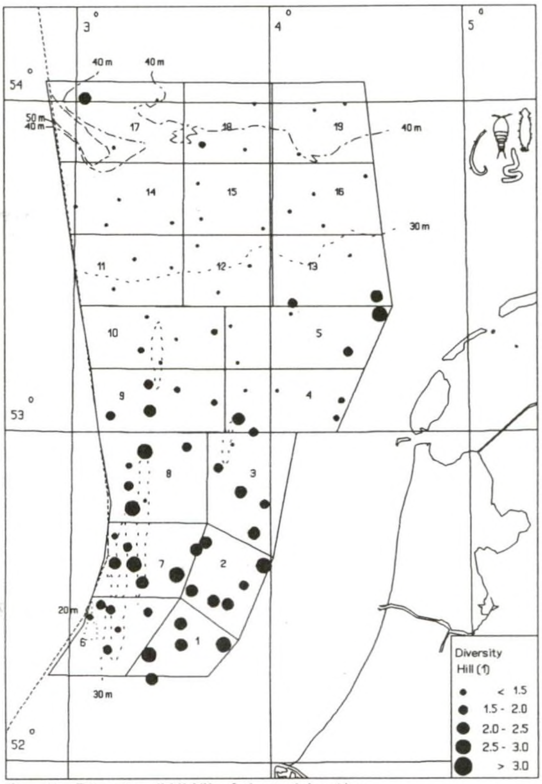


Fig. 11. Diversity (Hill (1)) of the meiobenthos.

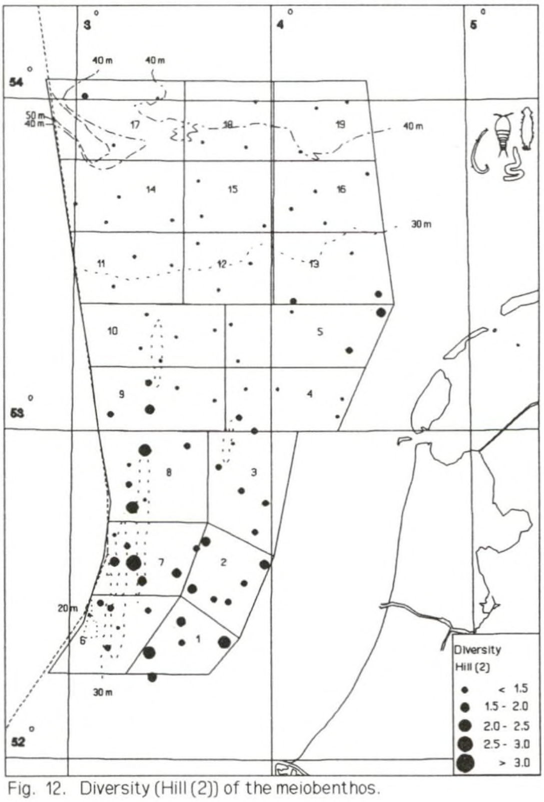


Fig. 12. Diversity (Hill (2)) of the meiobenthos.

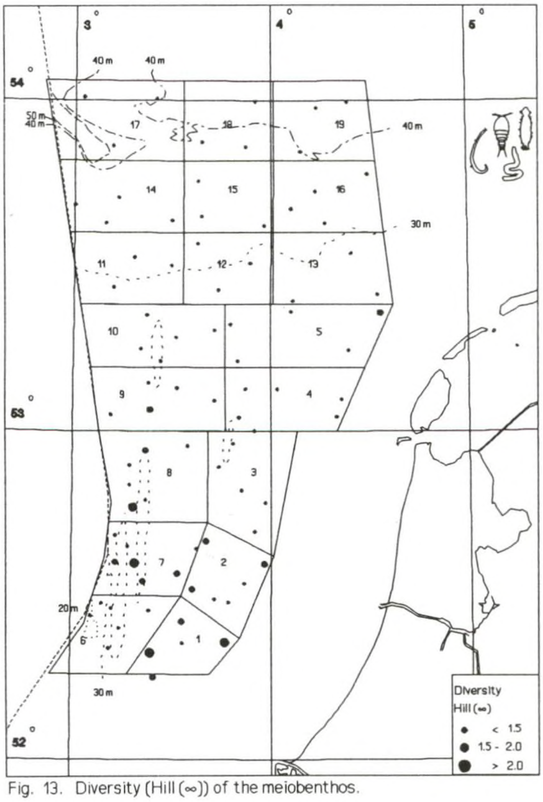


Fig. 13. Diversity (Hill (∞)) of the meiobenthos.

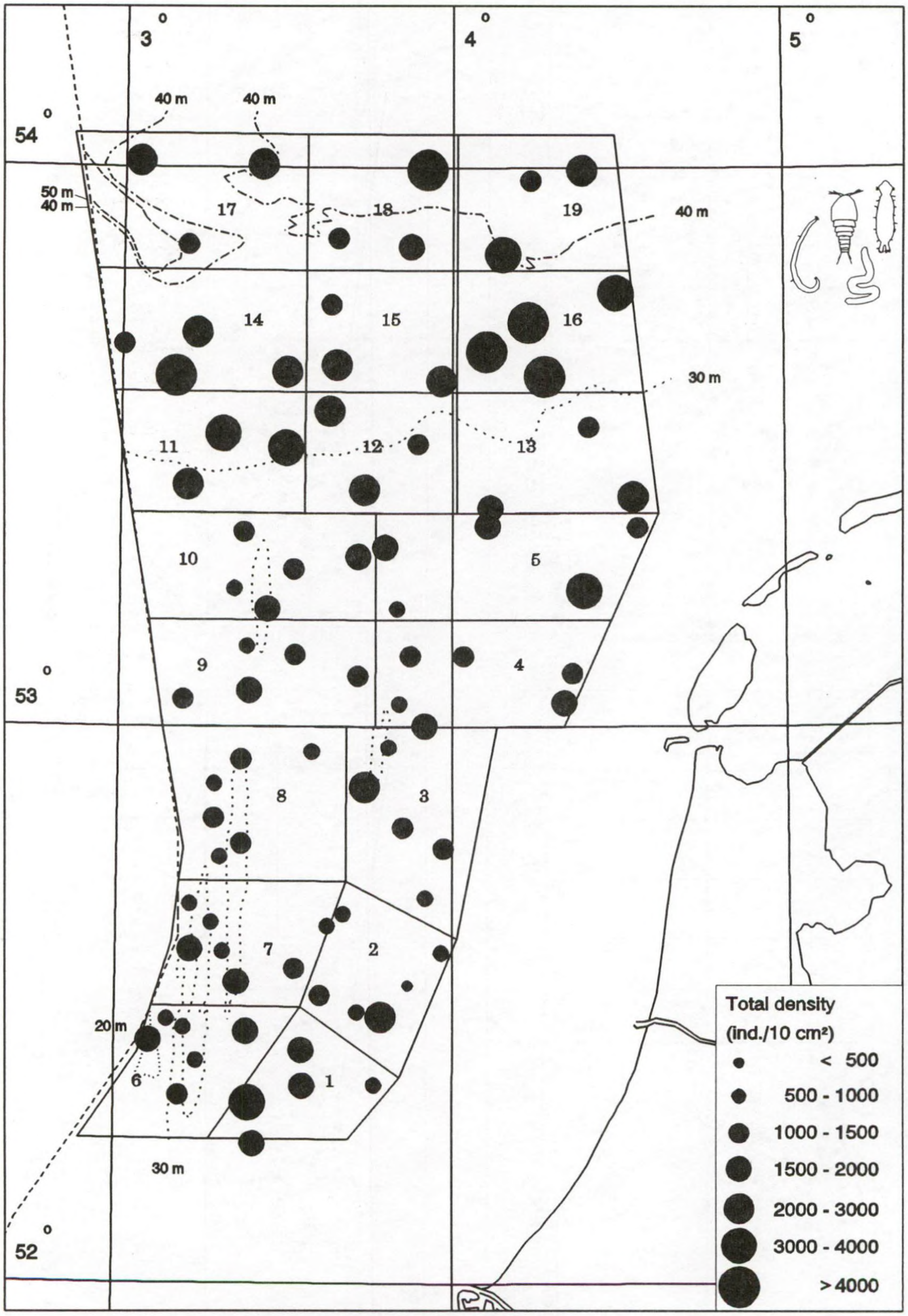


Fig. 14. Total density of the meiobenthos (ind./10 cm²).

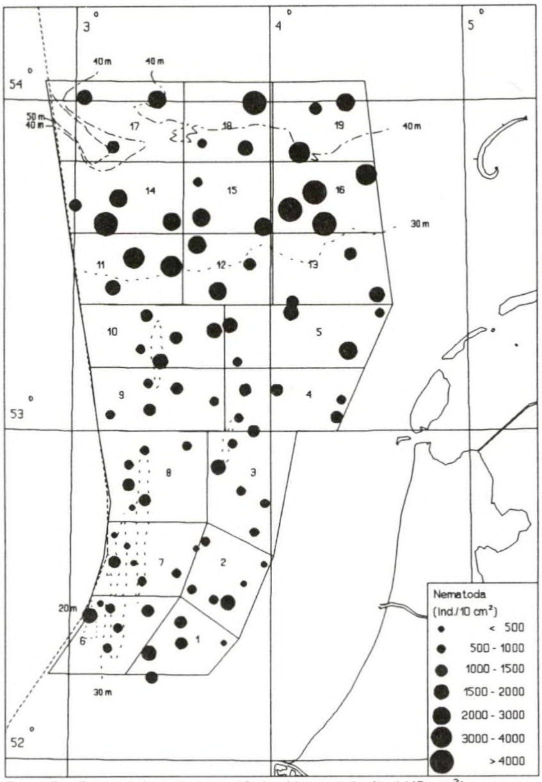


Fig. 15. Spatial distribution of the Nematoda (ind./10 cm²).

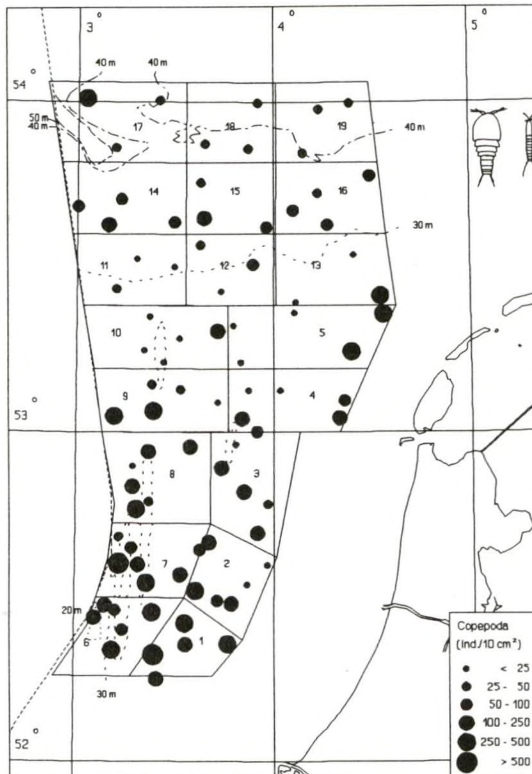


Fig. 16. Spatial distribution of the (total) Copepoda (ind./10 cm²).

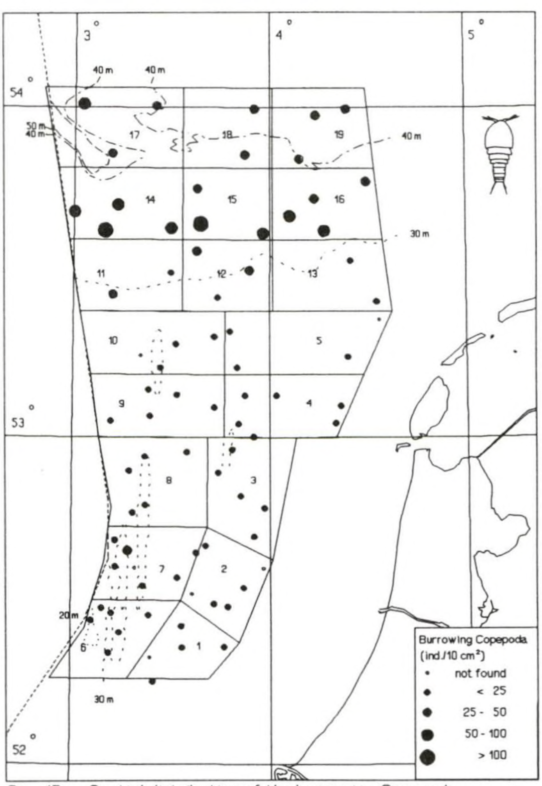


Fig. 17a. Spatial distribution of the burrowing Copepoda (ind./10 cm²).

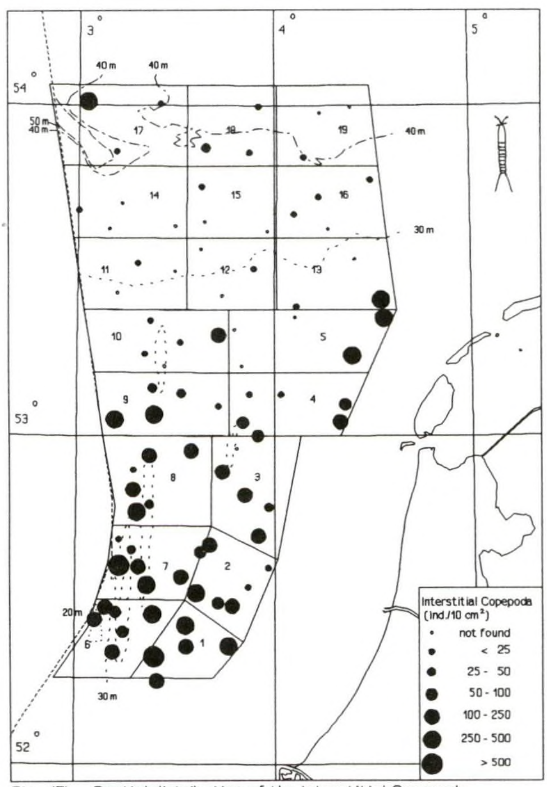


Fig. 17b. Spatial distribution of the interstitial Copepoda (ind./10 cm²).

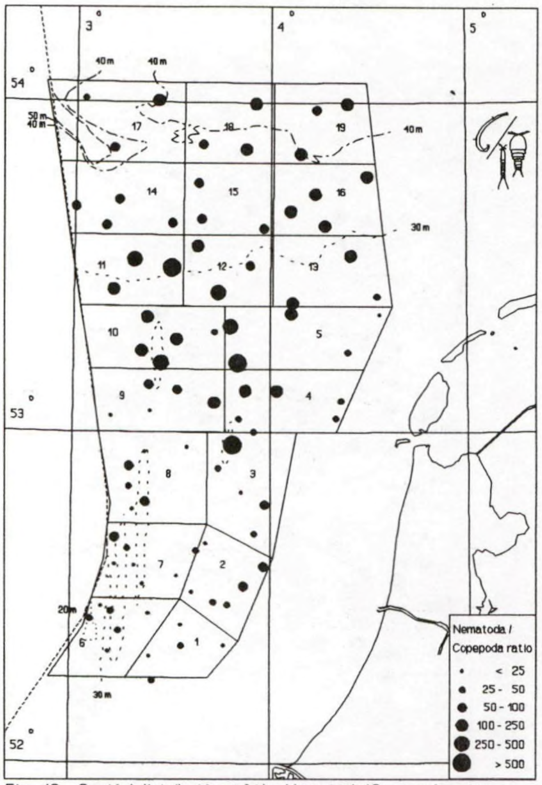


Fig. 18. Spatial distribution of the Nematoda/Copepoda ratio.

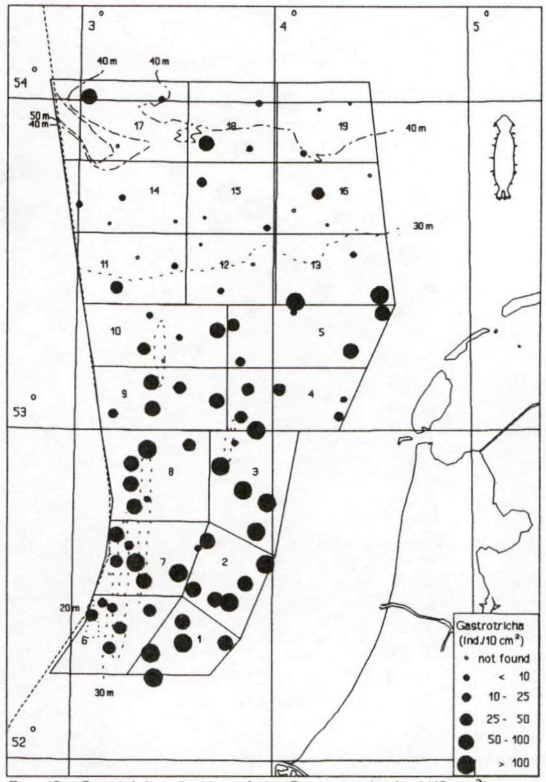


Fig. 19. Spatial distribution of the Gastrotricha (ind./10 cm^2).

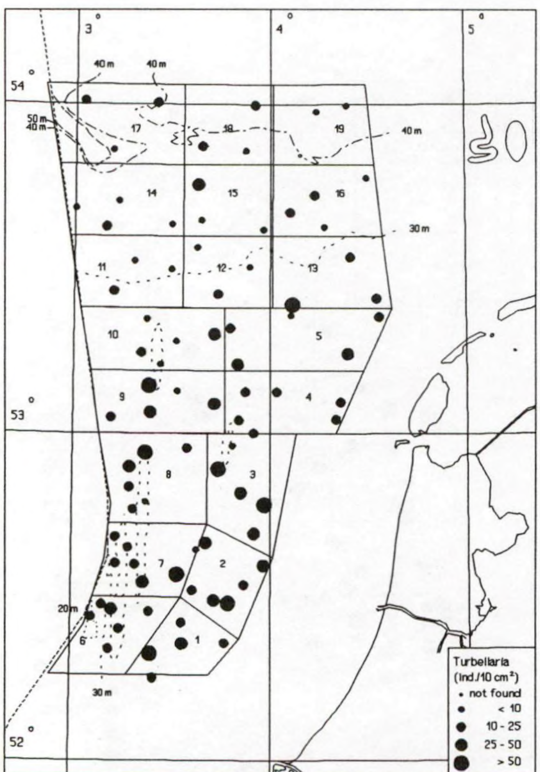


Fig. 20. Spatial distribution of the Turbellaria (ind./10 cm^2).

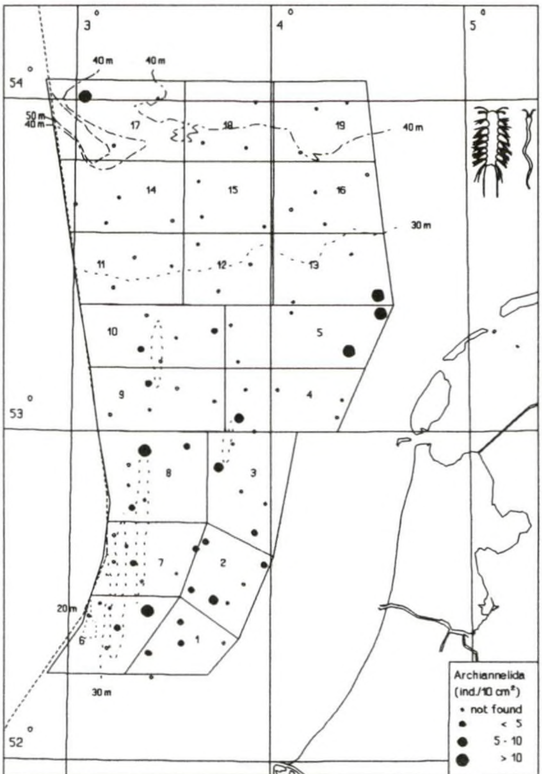


Fig. 21. Spatial distribution of the Archiannelida (ind./10 cm²).

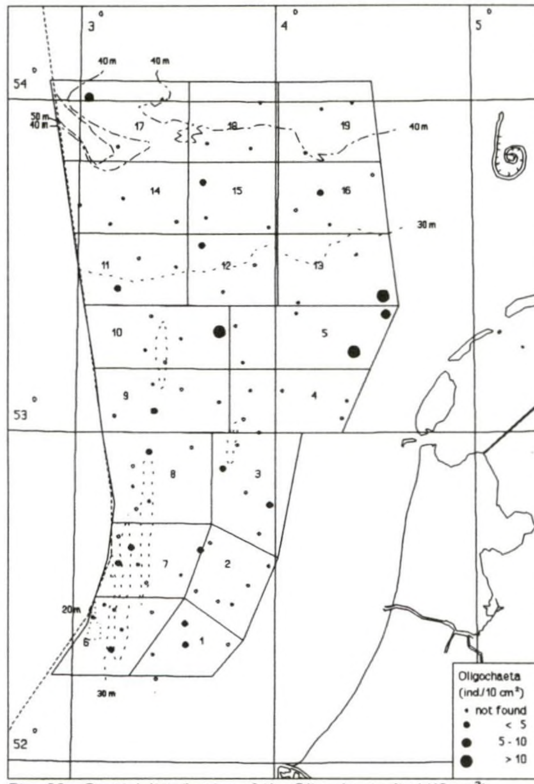


Fig. 22. Spatial distribution of the Oligochaeta (ind./10 cm²).

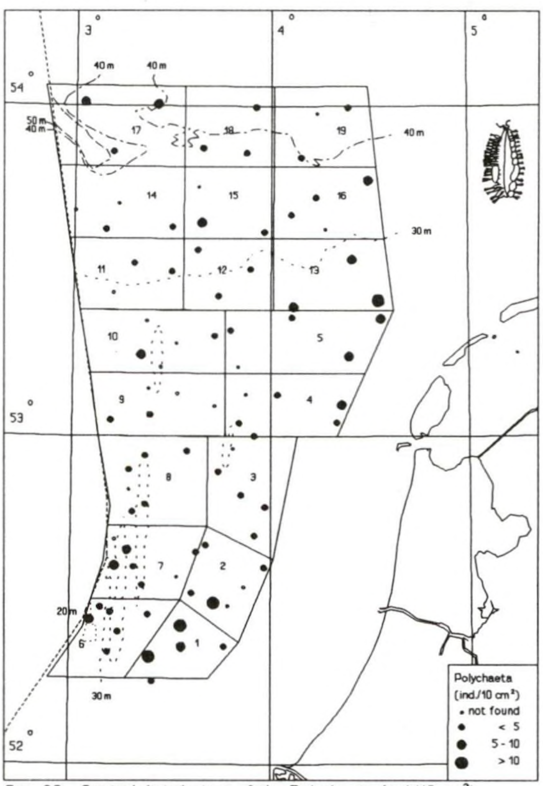


Fig. 23. Spatial distribution of the Polychaeta (ind./10 cm²).

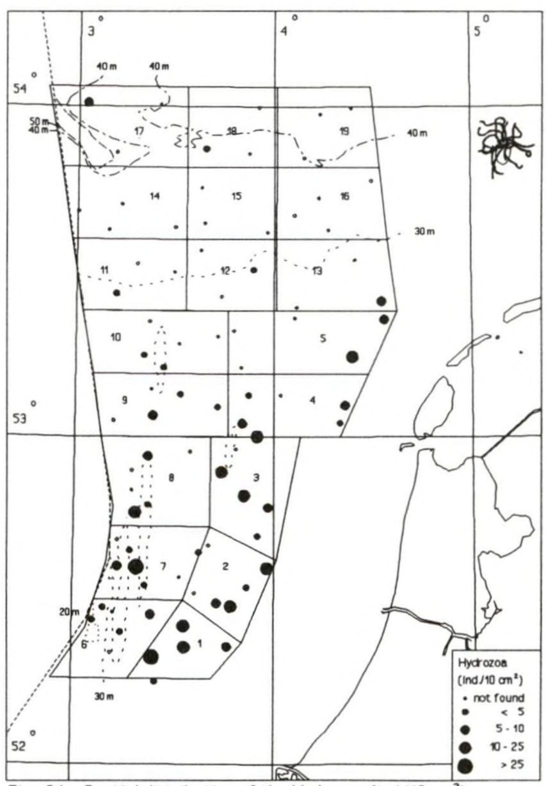


Fig. 24. Spatial distribution of the Hydrozoa (ind./10 cm²).

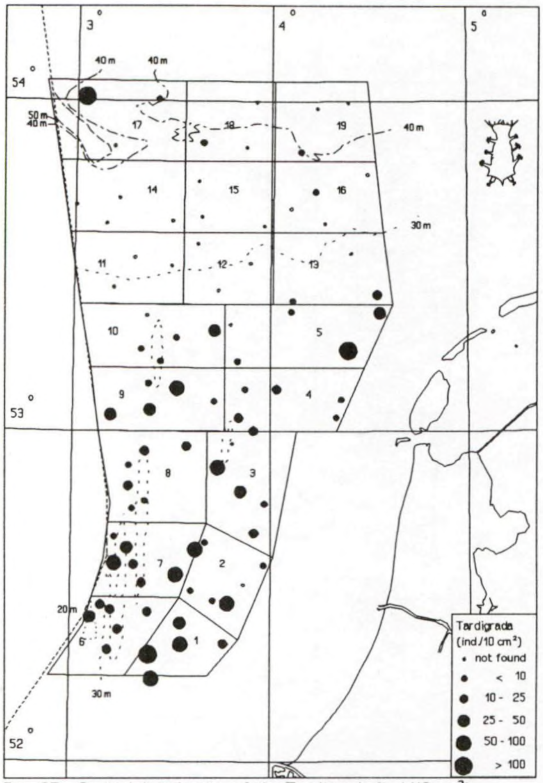


Fig. 25. Spatial distribution of the Tardigrada (ind./10 cm^2).

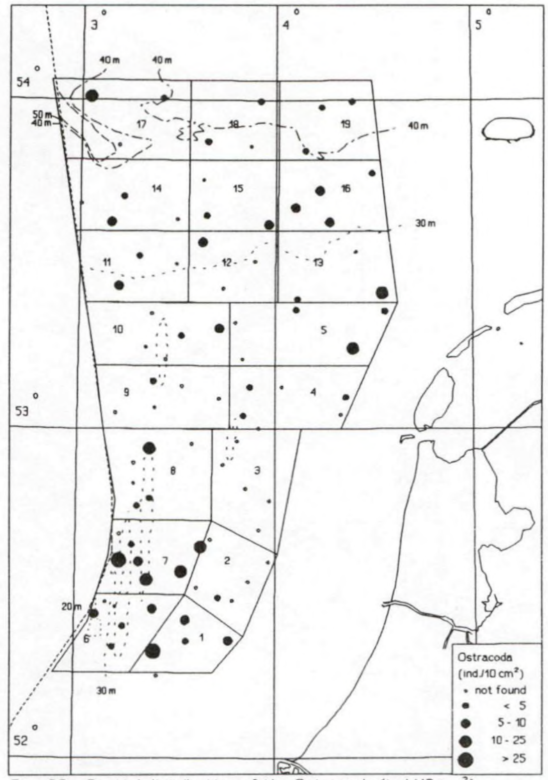


Fig. 26. Spatial distribution of the Ostracoda (ind./10 cm^2).

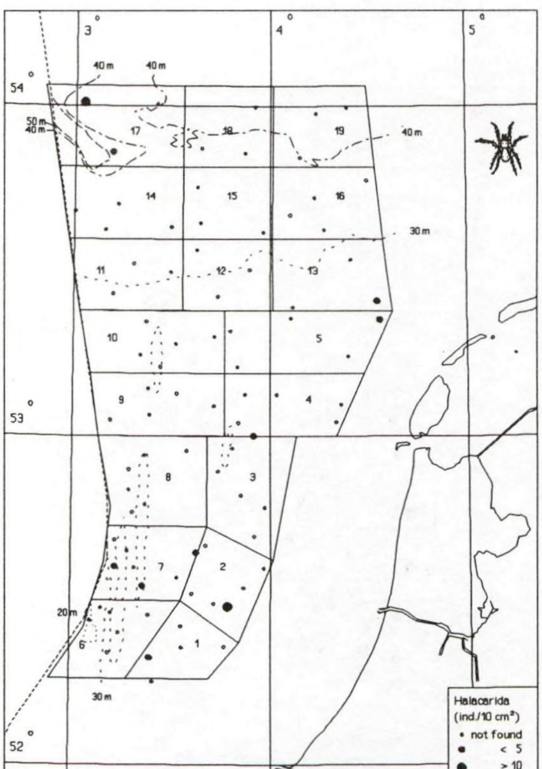


Fig. 27. Spatial distribution of the Halacarida (ind./10 cm^2).

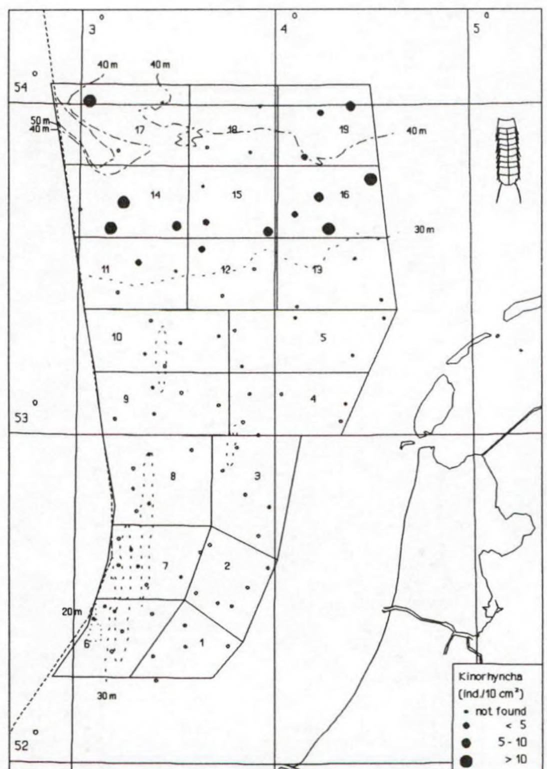


Fig. 28. Spatial distribution of the Kinorhyncha (ind./10 cm^2).

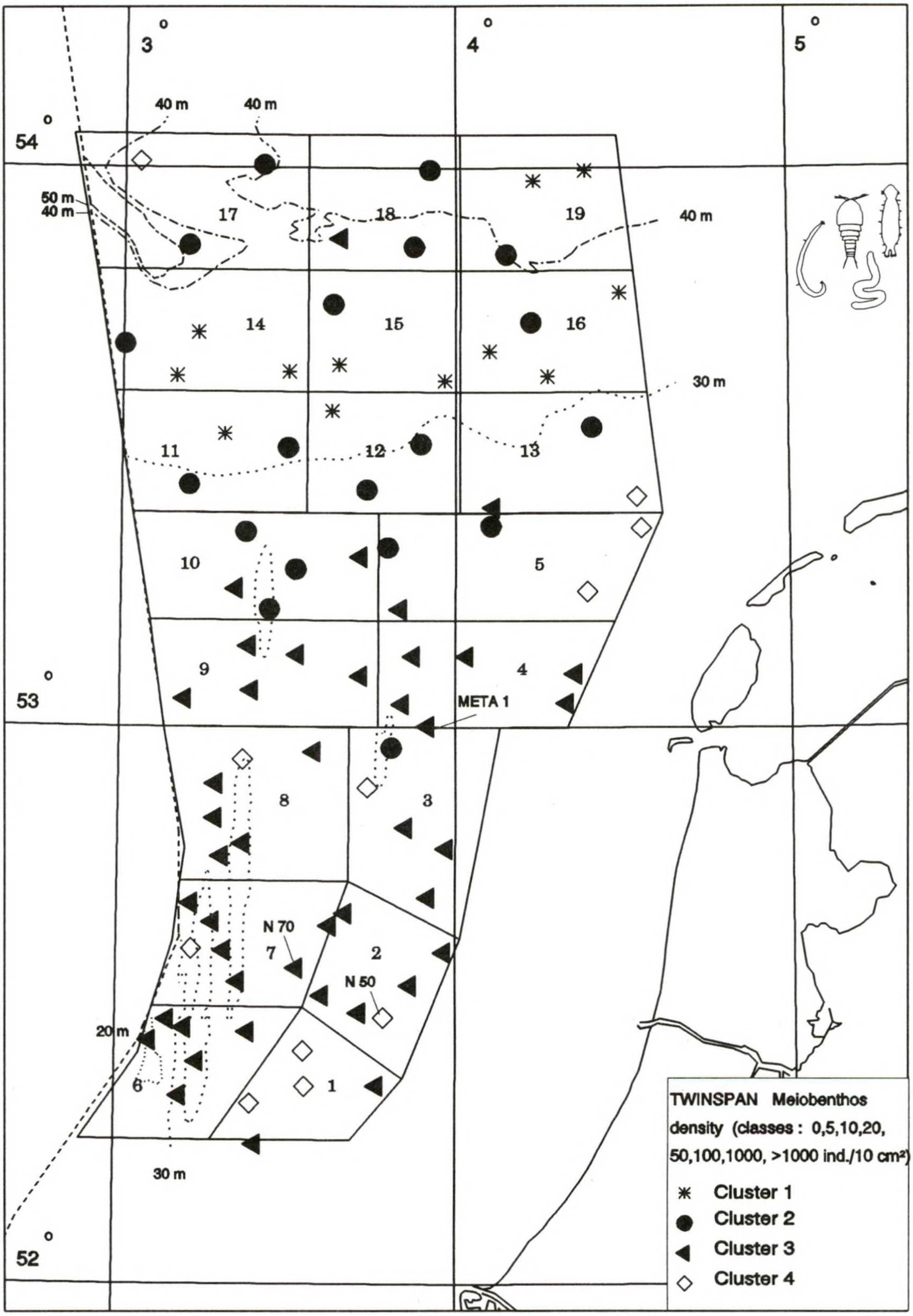


Fig. 29. TWINSPAN clustering of the meiobenthos density (ind./10 cm²).

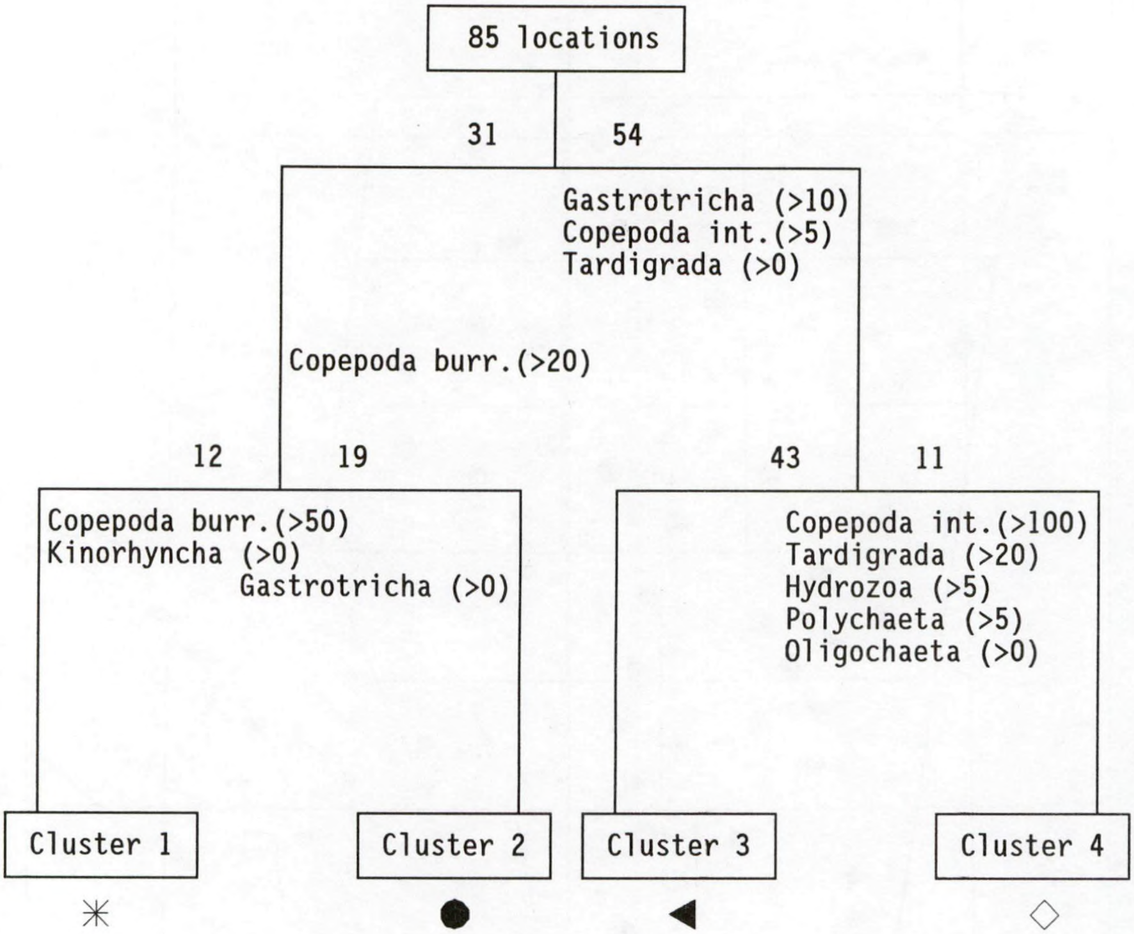


Fig. 30. Dichotomy of the TWINSPAN cluster found in the MILZON-BENTHOS II area 1992/93 by using the meiobenthos density (ind./10 cm²).
Classes : 0, 5, 10, 20, 50, 100, 1000, >1000 ind./10 cm²

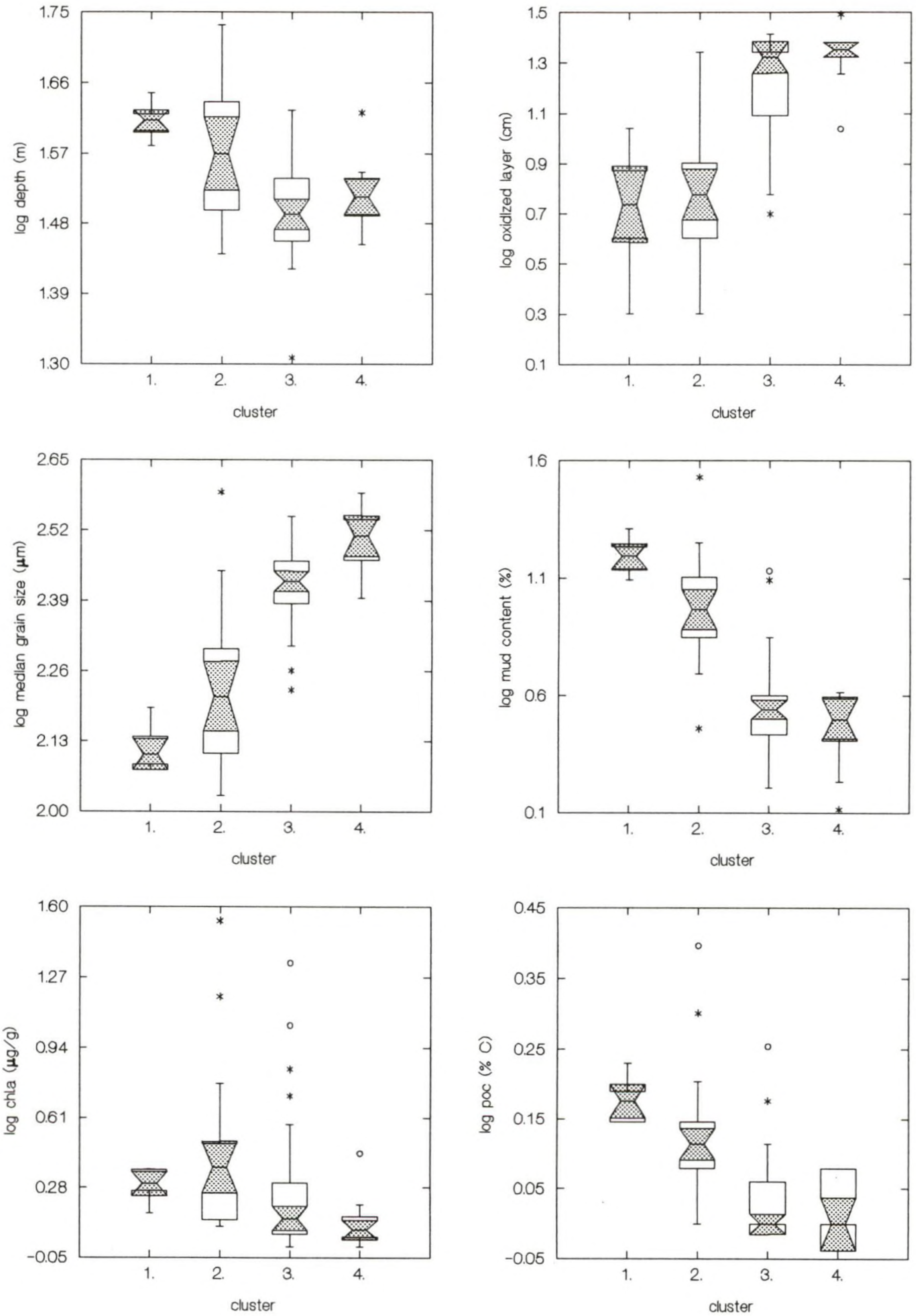


Fig. 31a. **Box and whisker plots of the average abiotic parameters (log(x+1)-transformed) after TWINSPAN analysis using the data of the meiobenthos density (ind./10 cm²) (cf. Figs . 28, 29 and Table 6).**

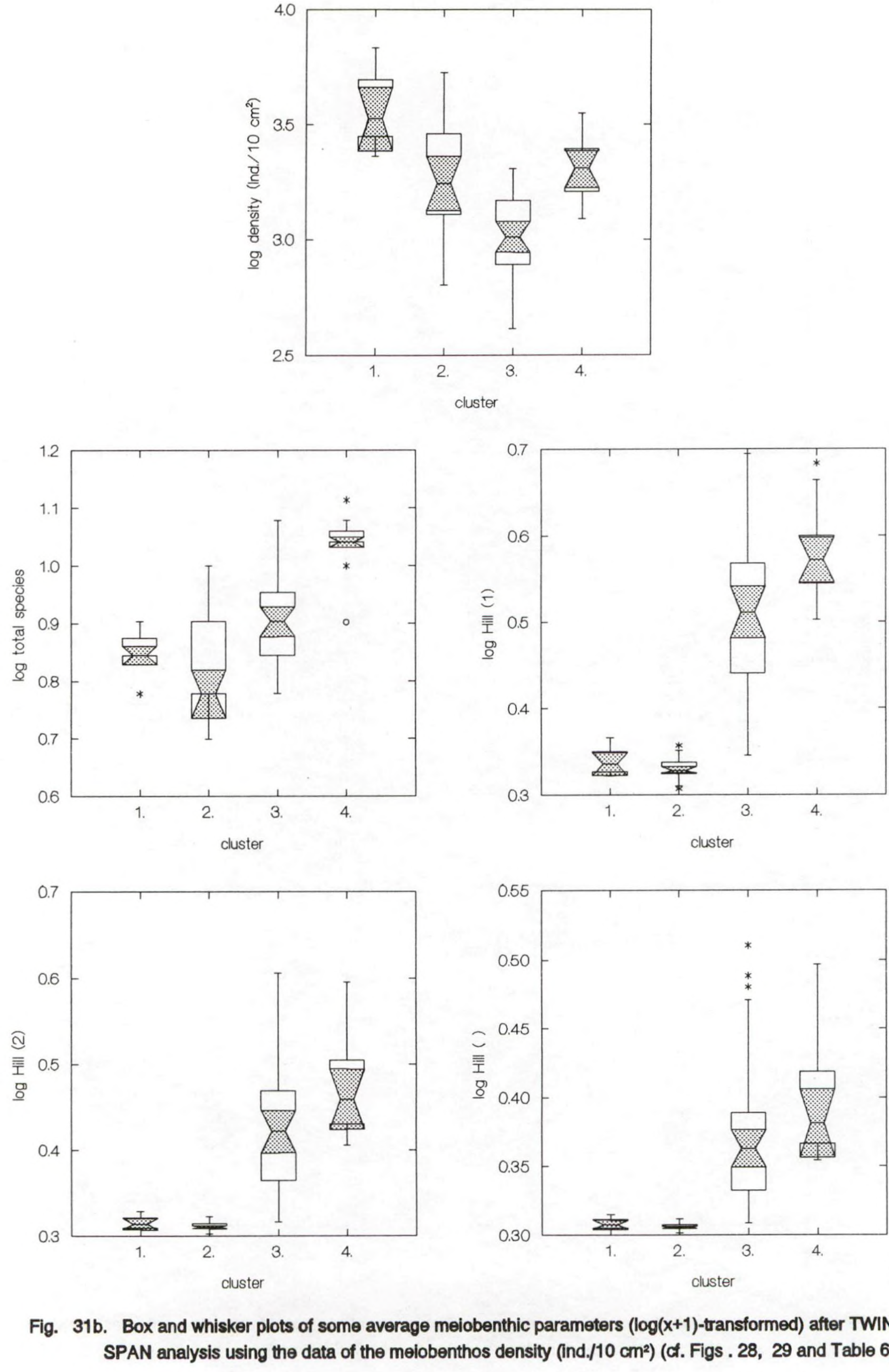


Fig. 31b. Box and whisker plots of some average meiobenthic parameters (log(x+1)-transformed) after TWIN-SPAN analysis using the data of the meiobenthos density (Ind./10 cm²) (cf. Figs . 28, 29 and Table 6).

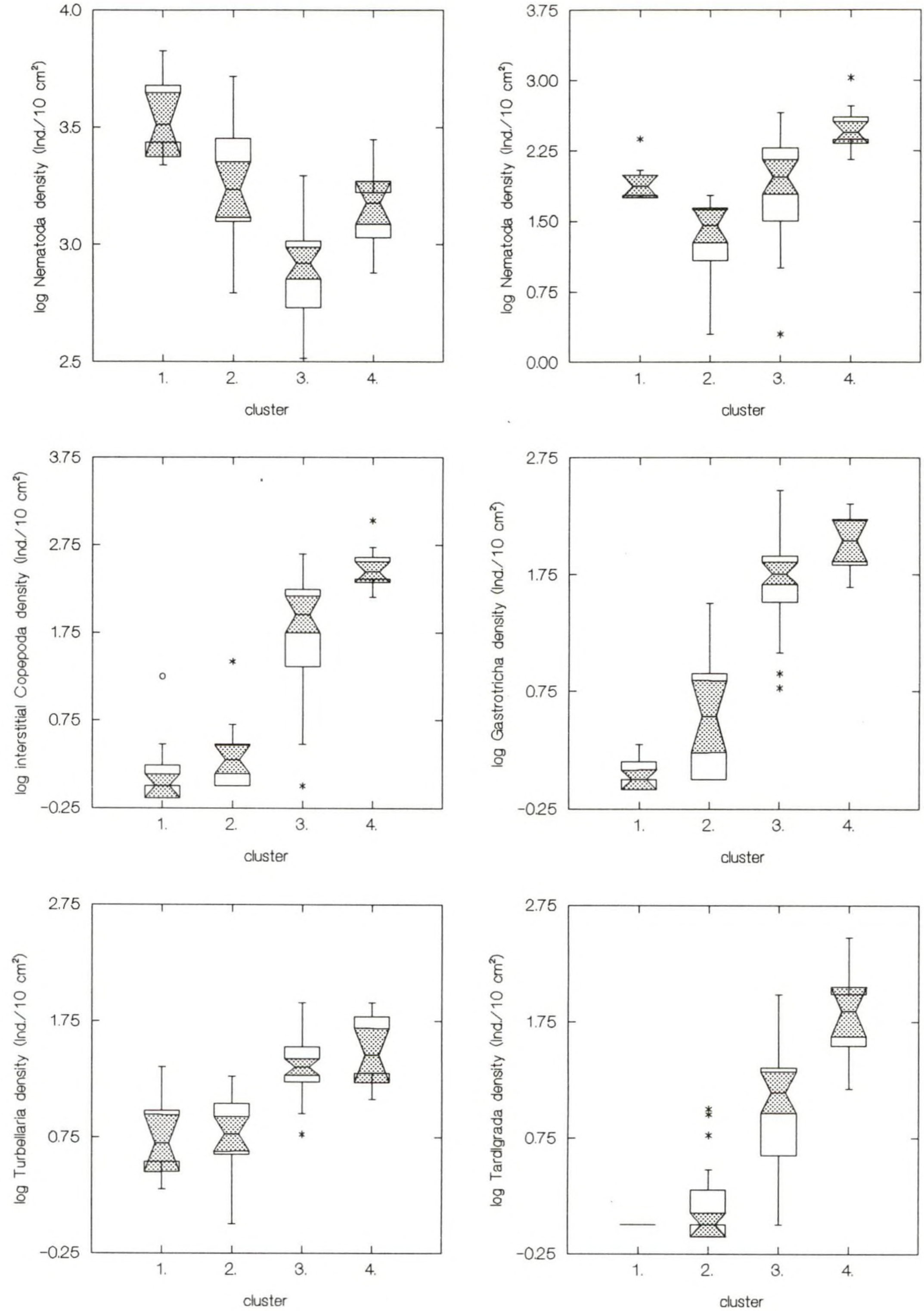


Fig. 31c. Box and whisker plots of the average density (log(x+1)-transformed) after TWINSPAN analysis using the data of the meiobenthos density (ind./10 cm²) (cf. Figs . 28, 29 and Table 6).

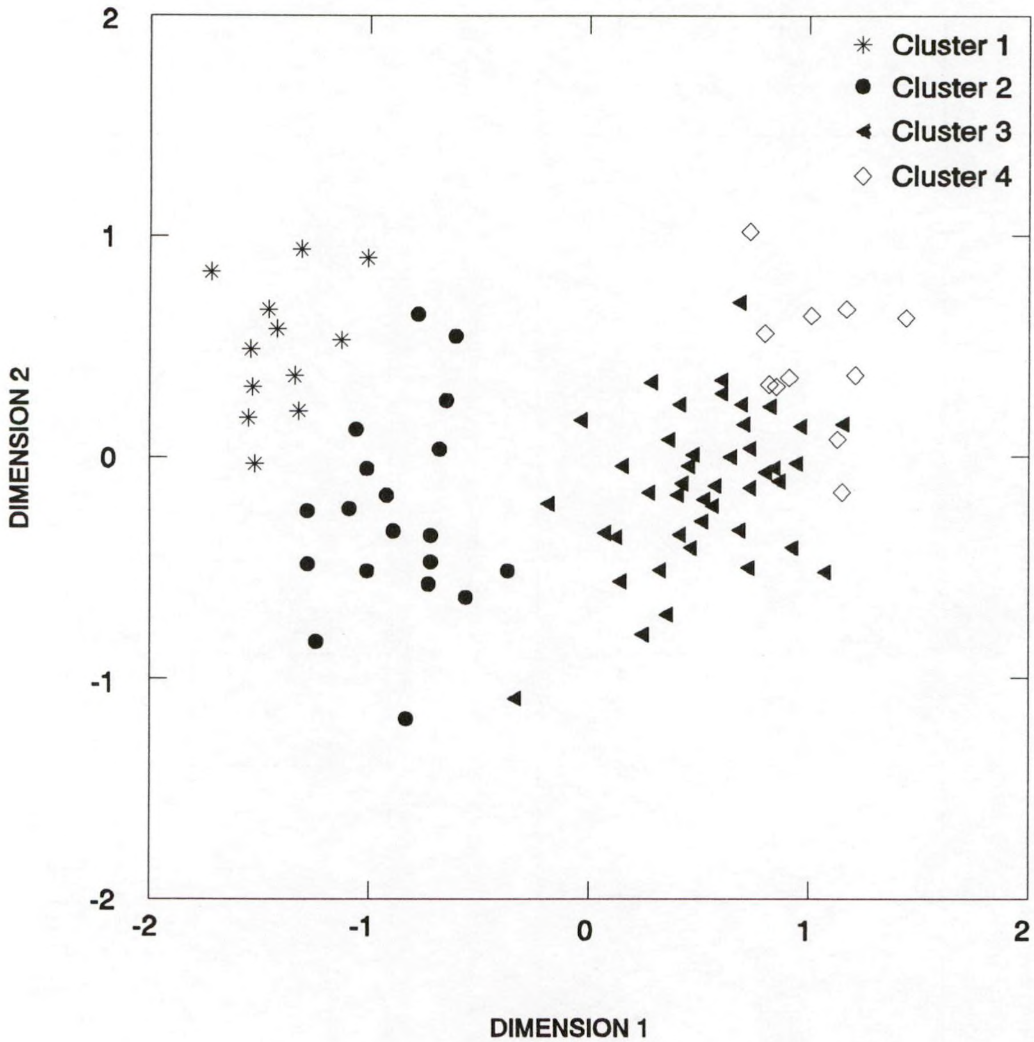


Fig. 32. Multidimensional sacling (MDS) ordination of the meiobenthos density (ind./10 cm²) in relation to the TWINSPAN clusters of the MILZON-BENTHOS area 1992/93. Stress = 0.10

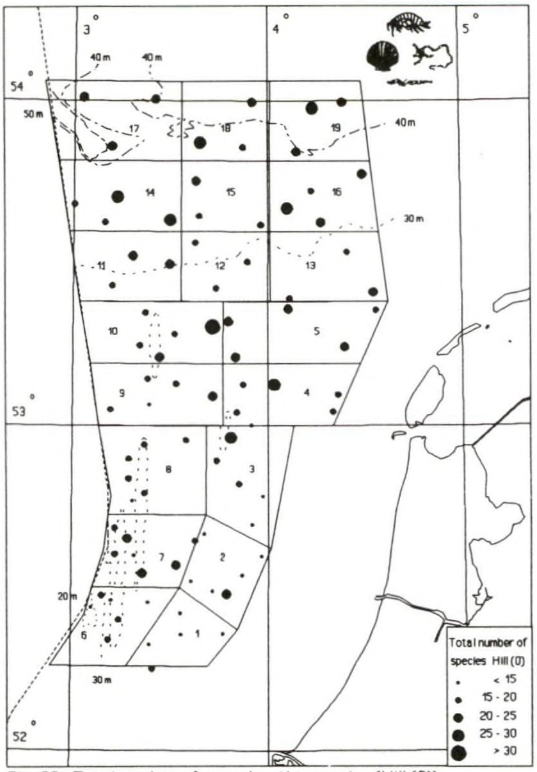


Fig. 33. Total number of macrobenthic species (Hill (0)).

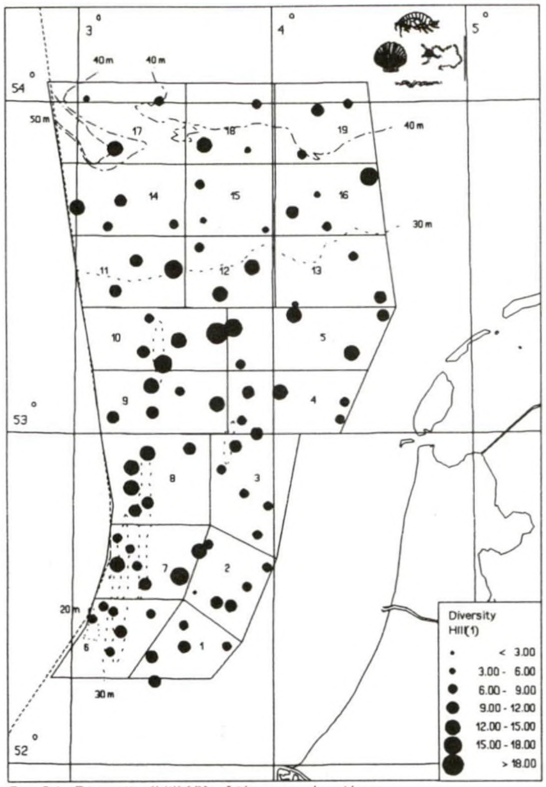


Fig. 34. Diversity (Hill (1)) of the macrobenthos.

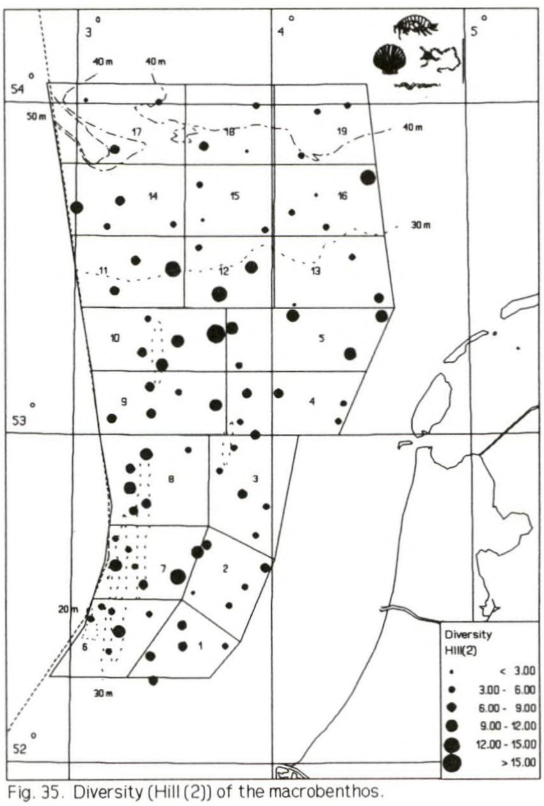


Fig. 35. Diversity (Hill (2)) of the macrobenthos.

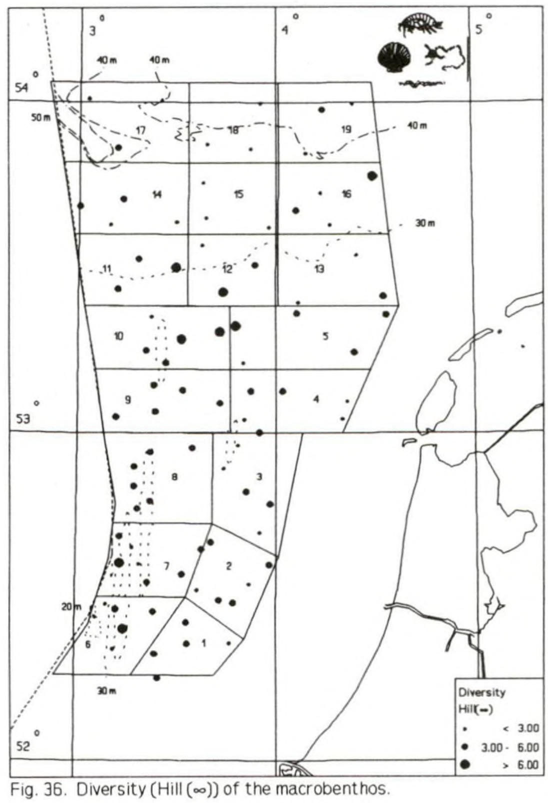


Fig. 36. Diversity (Hill (∞)) of the macrobenthos.

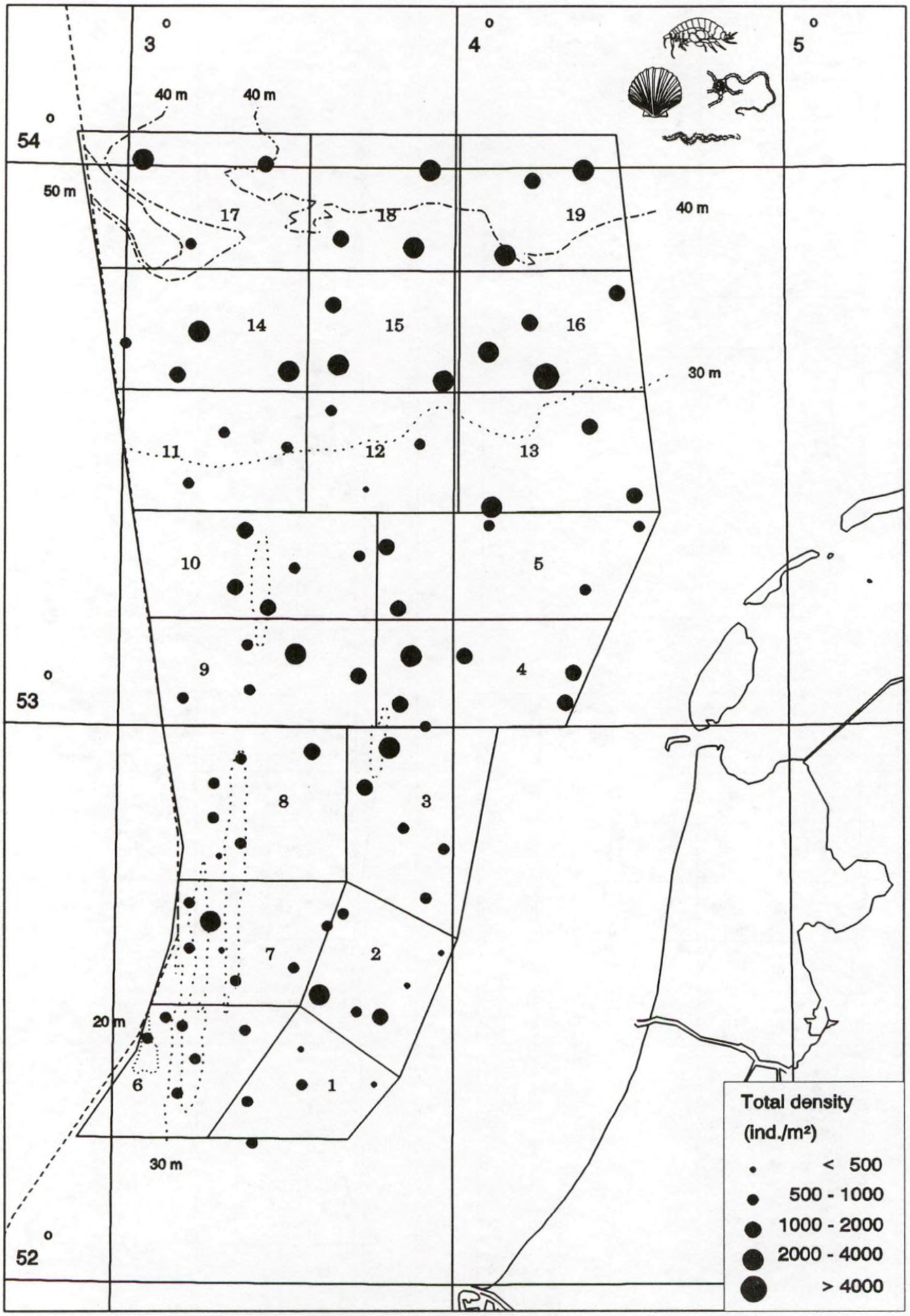


Fig. 37. Total density (ind./m²) of the macrobenthos.

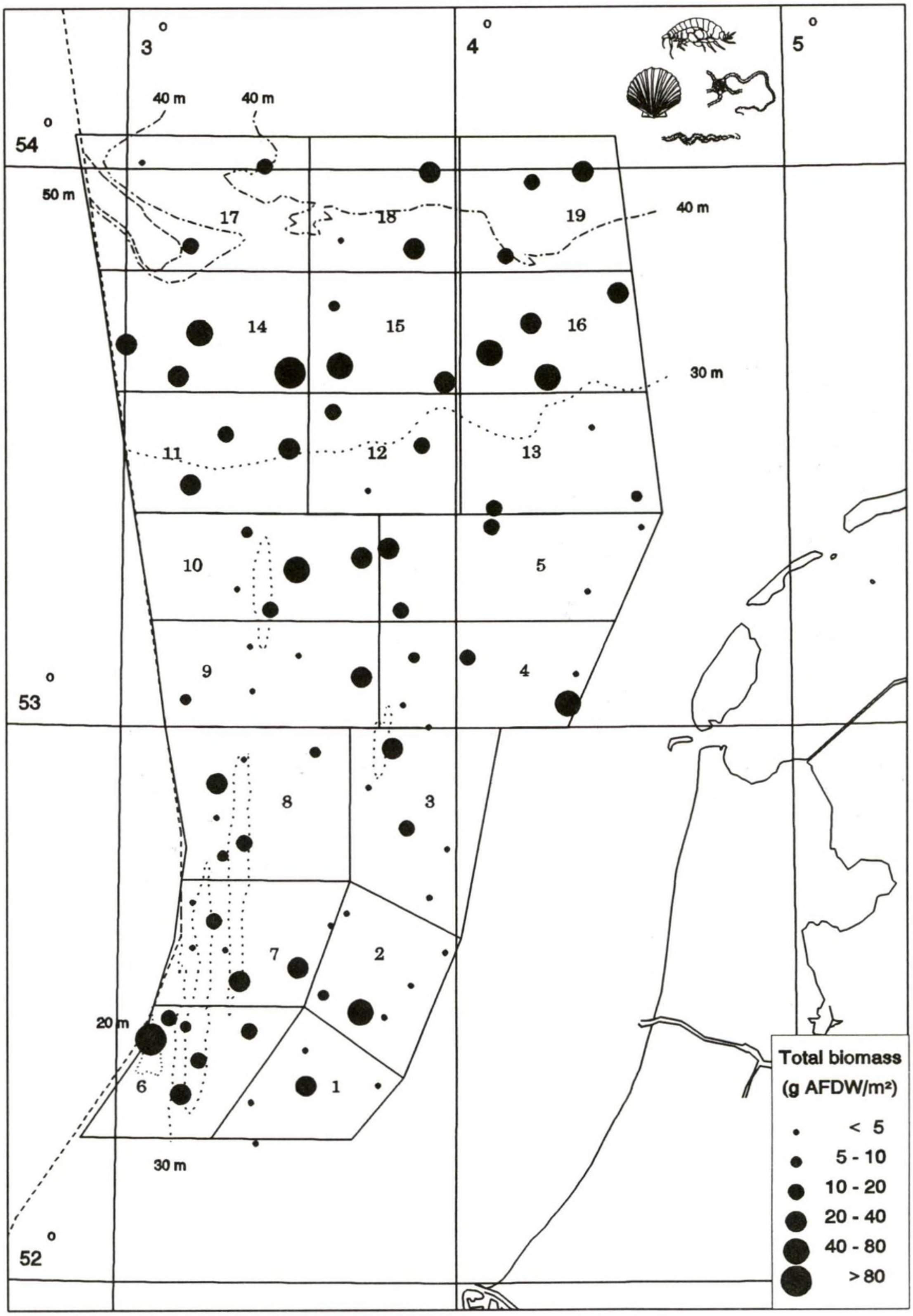


Fig. 38. Total biomass (g AFDW/m²) of the macrobenthos.

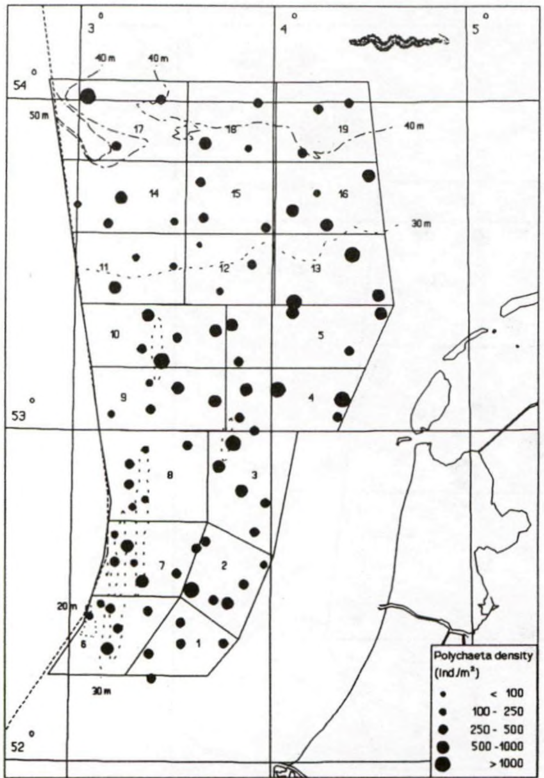


Fig. 39. Spatial distribution of the Polychaeta density (ind./m²).

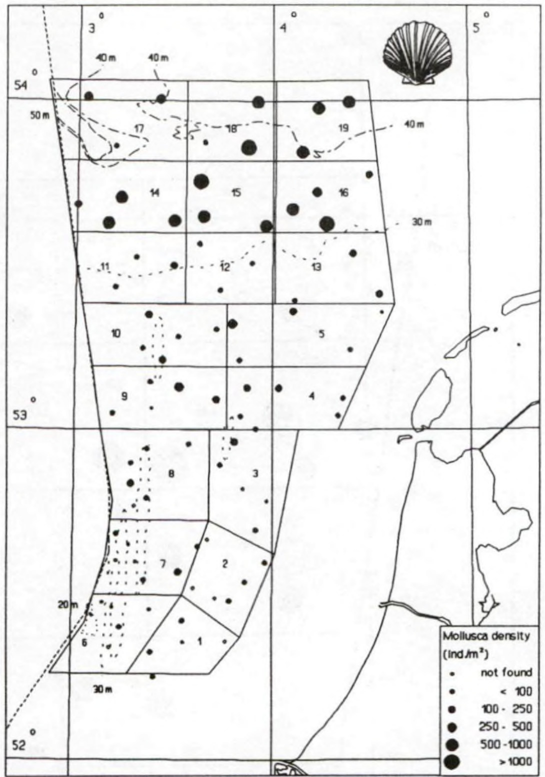


Fig. 40. Spatial distribution of the Mollusca density (ind./m²).

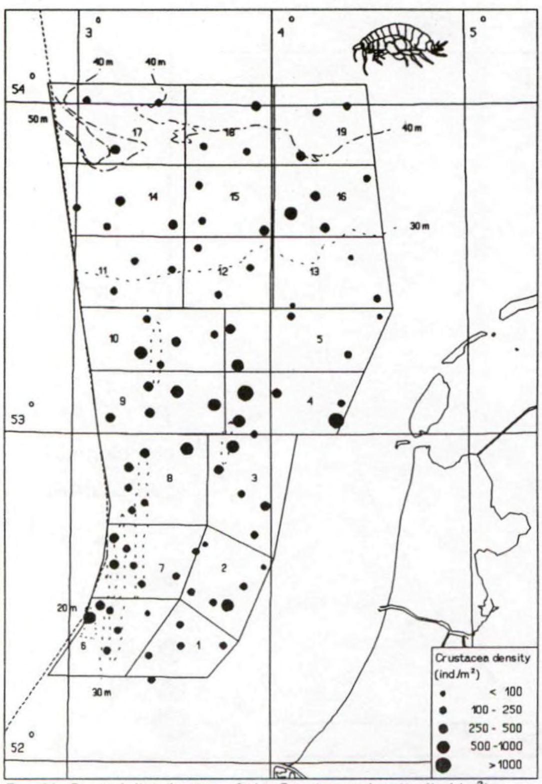


Fig. 41. Spatial distribution of the Crustacea density (ind./m²).

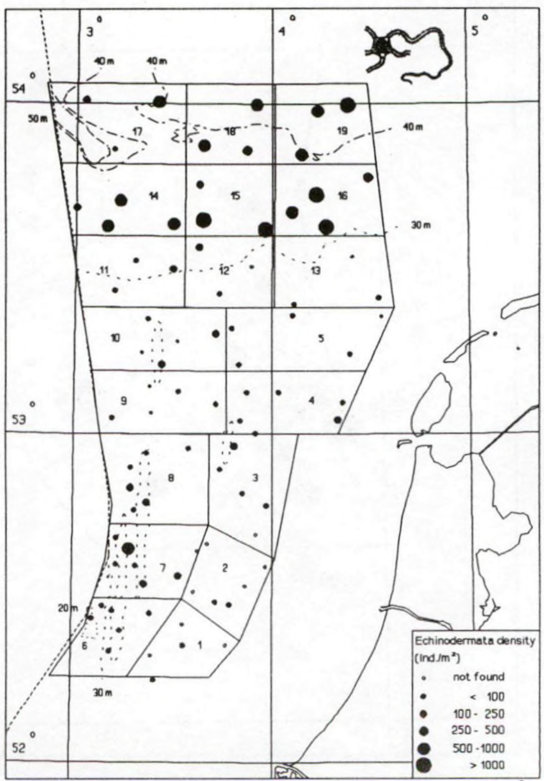


Fig. 42. Spatial distribution of the Echinodermata density (ind./m²).

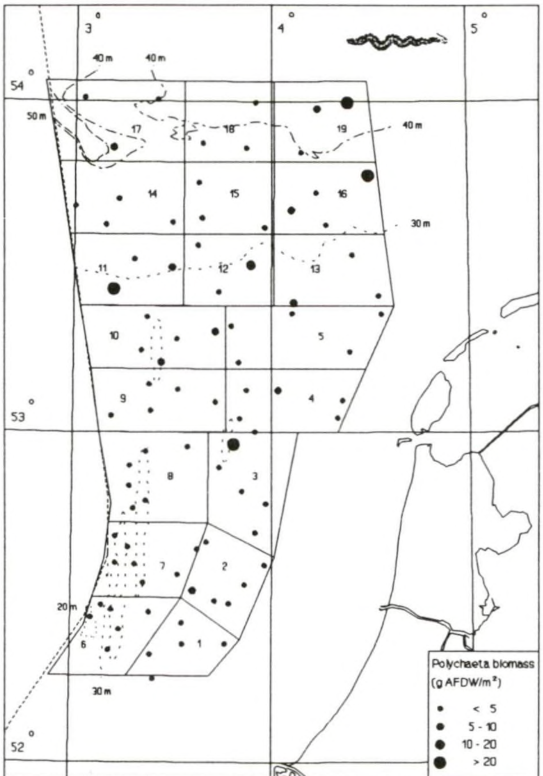


Fig. 43. Spatial distribution of the Polychaeta biomass (g AFDW/m²).

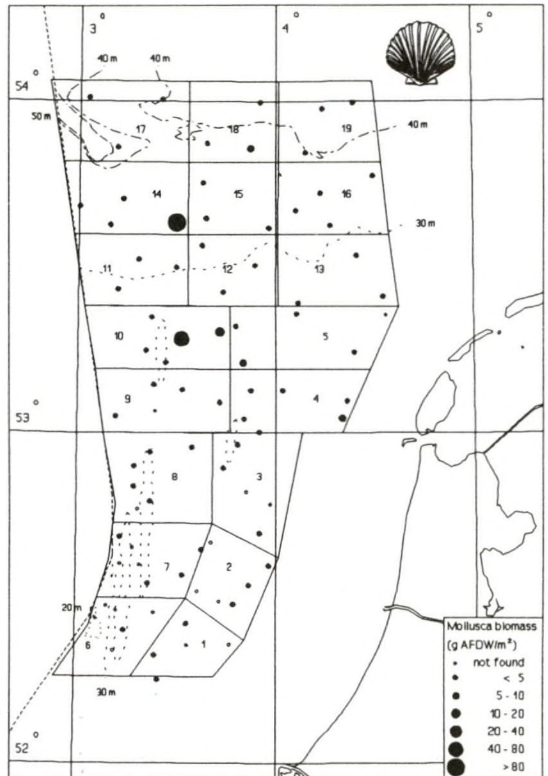


Fig. 44. Spatial distribution of the Mollusca biomass (g AFDW/m²).

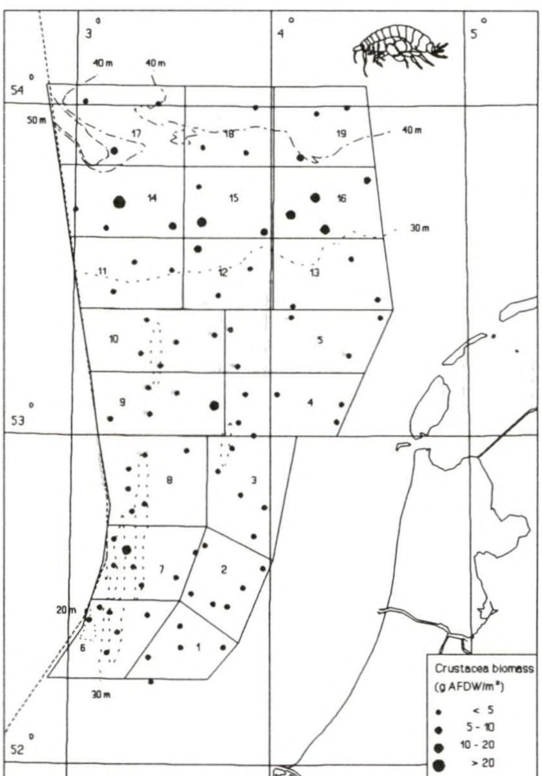


Fig. 45. Spatial distribution of the Crustacea biomass (g AFDW/m²).

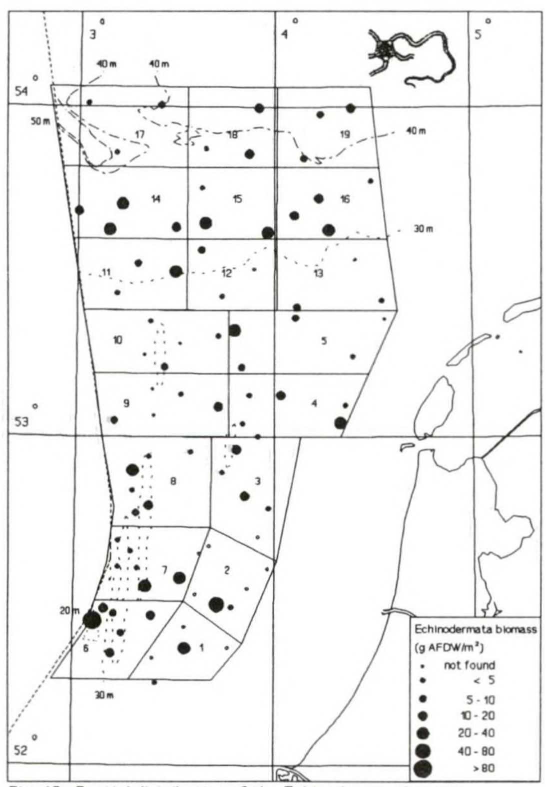


Fig. 46. Spatial distribution of the Echinodermata biomass (g AFDW/m²).

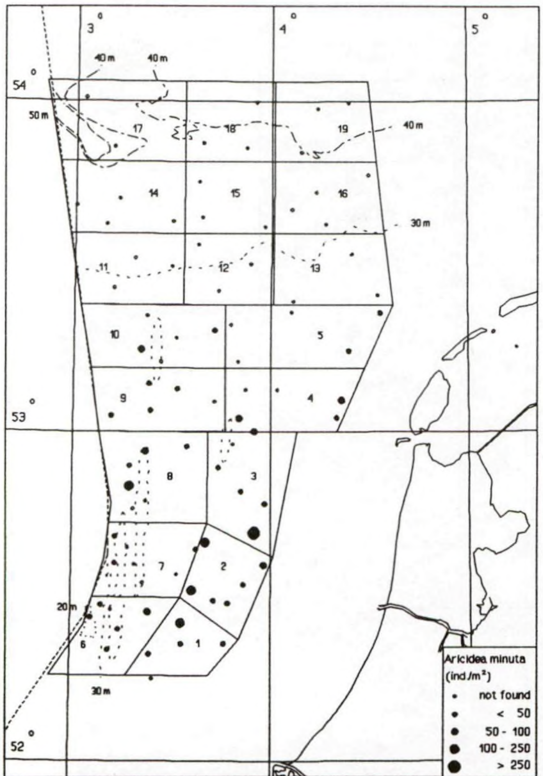


Fig. 47. Spatial distribution (ind./m²) of *Aricidea minuta* (Polychaeta).

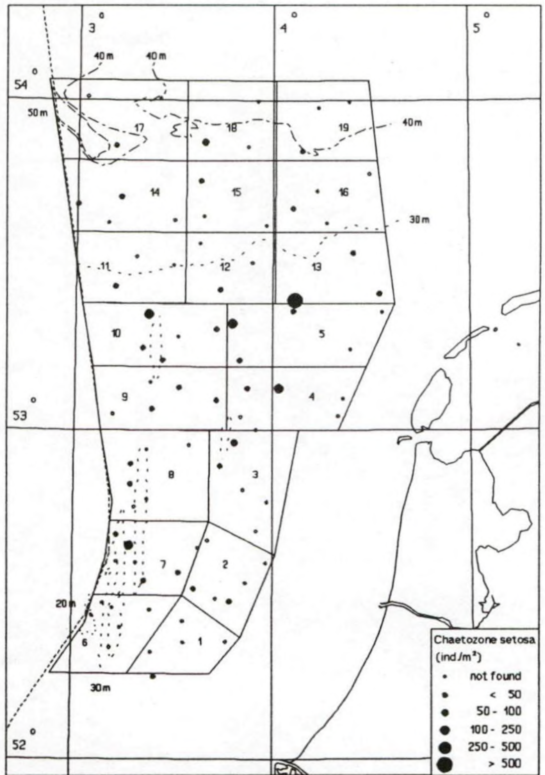


Fig. 48. Spatial distribution (ind./m²) of *Chaetozone setosa* (Polychaeta).

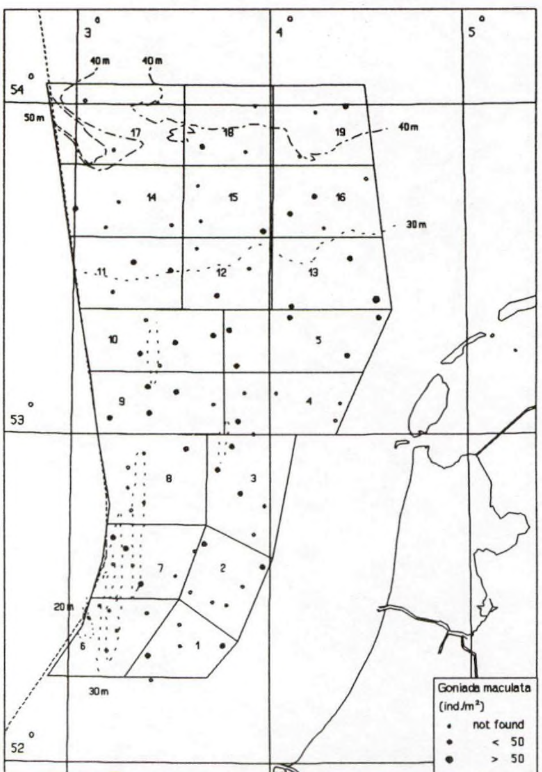


Fig. 49. Spatial distribution (ind./m²) of *Goniada maculata* (Polychaeta).

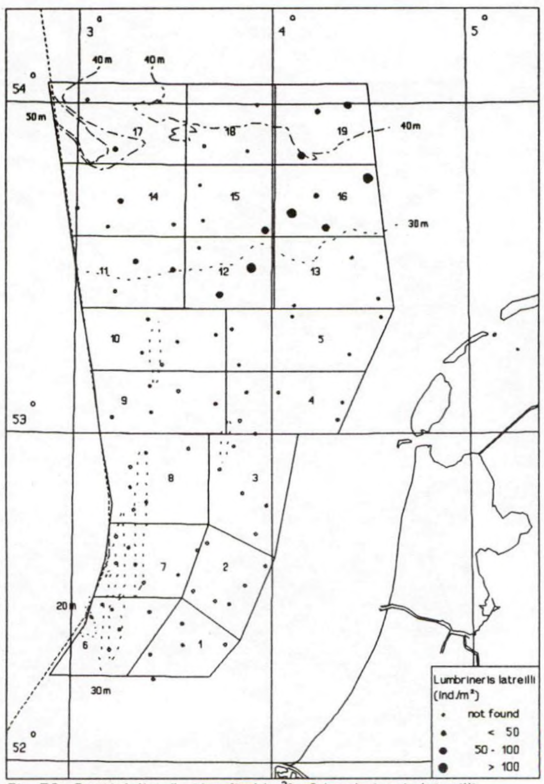


Fig. 50. Spatial distribution (ind./m²) of *Lumbrineris latreilli* (Polychaeta).

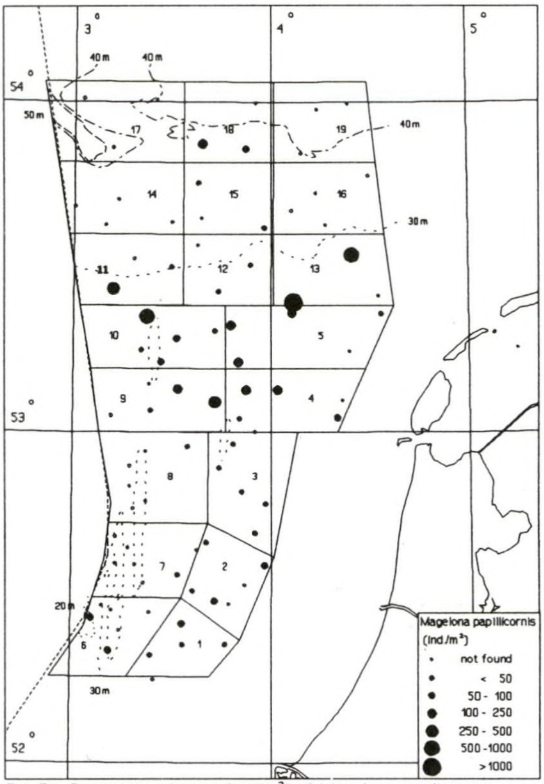


Fig. 51. Spatial distribution (ind./m²) of *Magelona papillicornis* (Polychaeta).

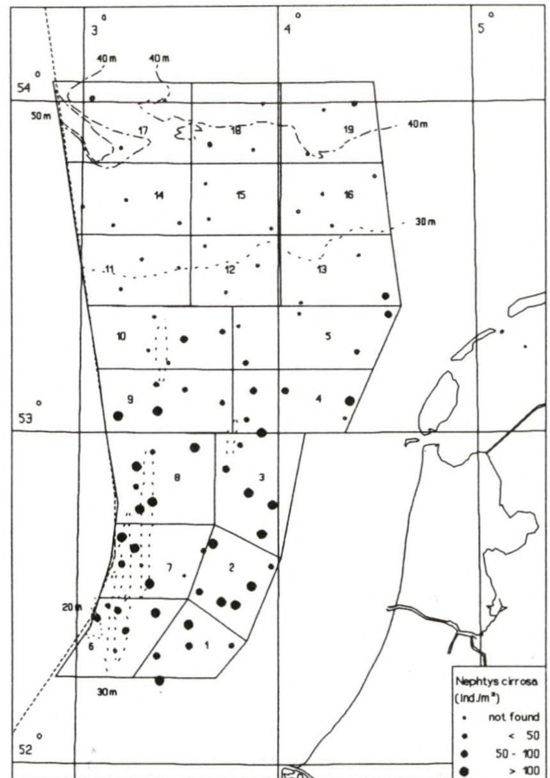


Fig. 52. Spatial distribution (ind./m²) of *Nephtys cirrosa* (Polychaeta).

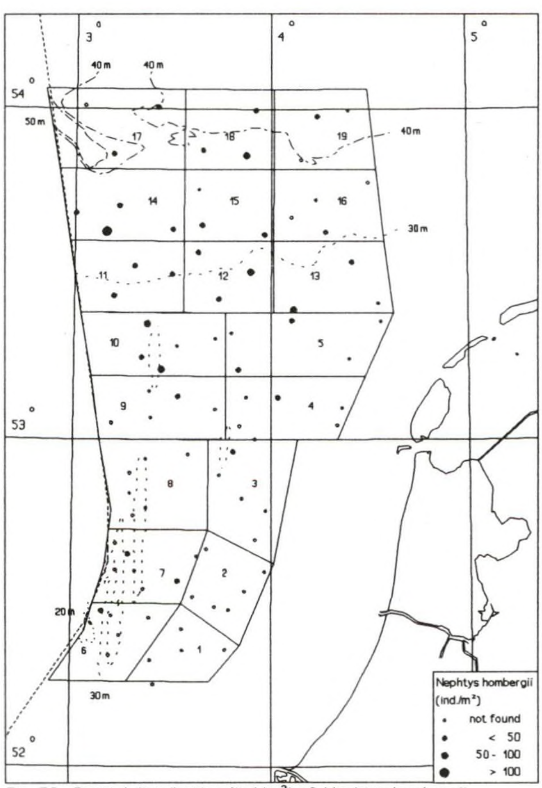


Fig. 53. Spatial distribution (ind./m²) of *Nephtys hombergii* (Polychaeta).

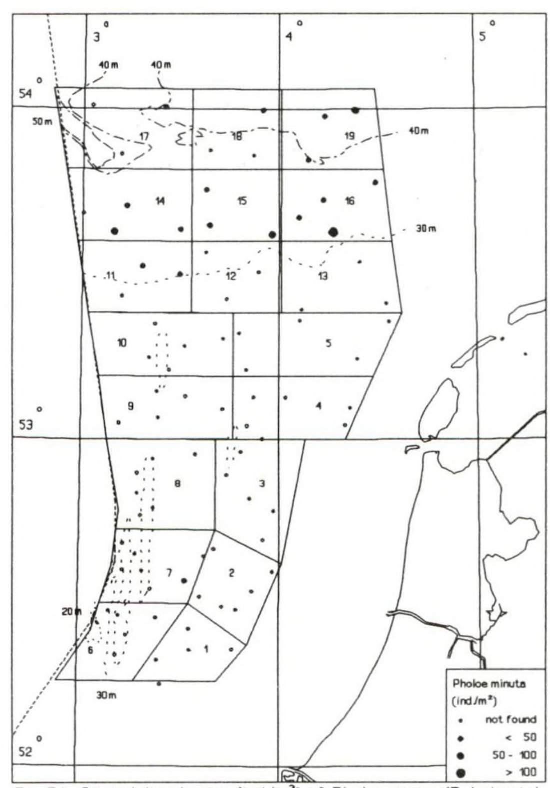


Fig. 54. Spatial distribution (ind./m²) of *Pholoe minuta* (Polychaeta).

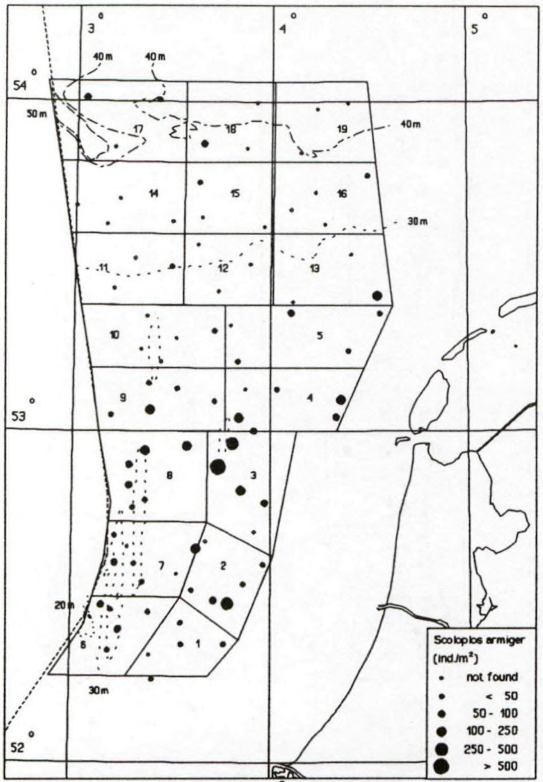


Fig. 55. Spatial distribution (ind./m²) of *Scoloplos armiger* (Polychaeta).

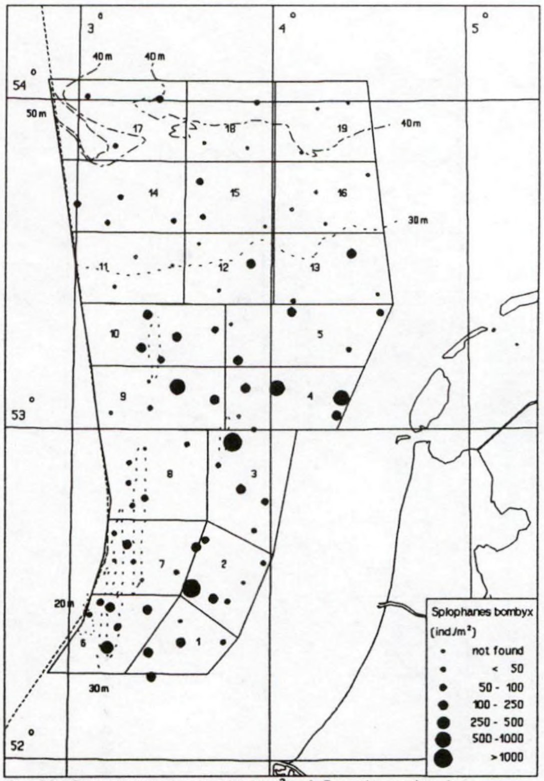


Fig. 56. Spatial distribution (ind./m²) of *Spiophanes bombyx* (Polychaeta).

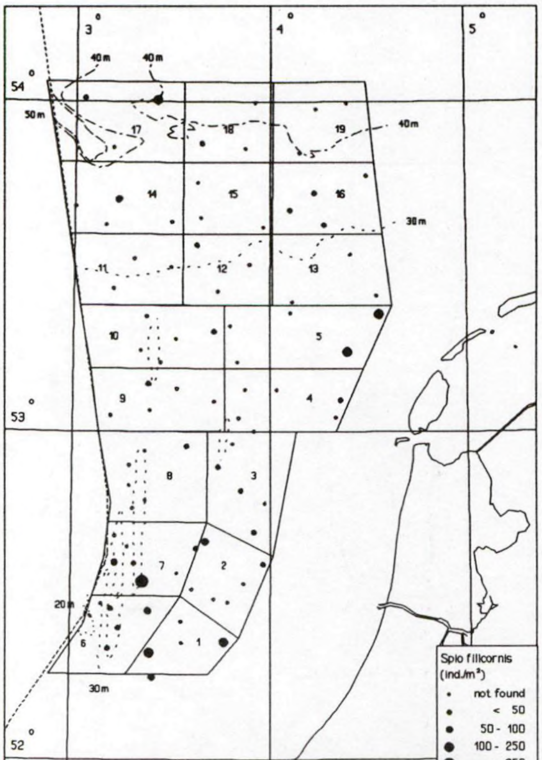


Fig. 57. Spatial distribution (ind./m²) of *Spio filicornis* (Polychaeta).

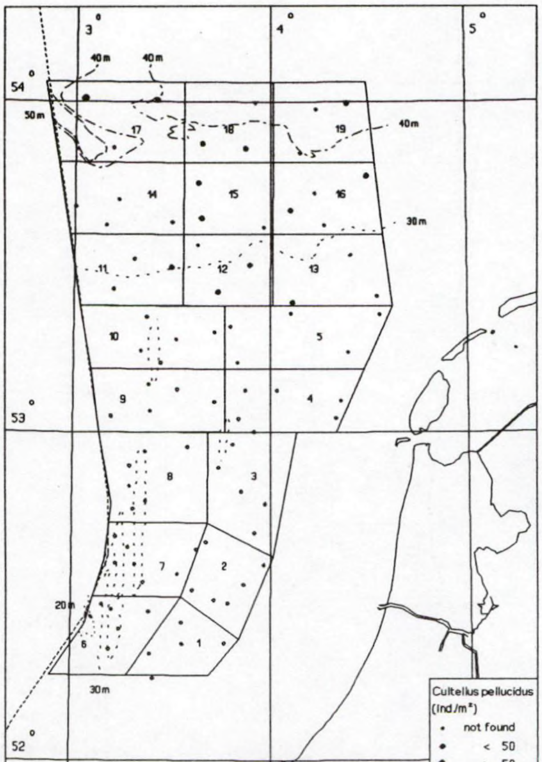


Fig. 58. Spatial distribution (ind./m²) of *Cultellus pellucidus* (Mollusca).

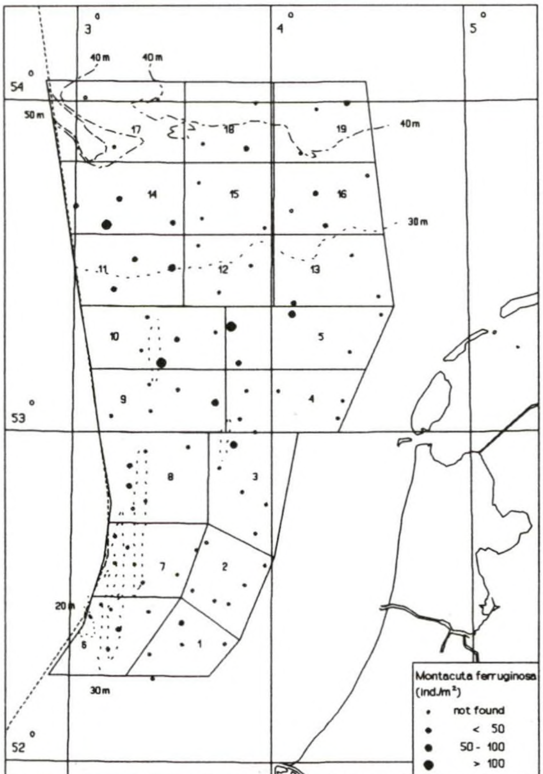


Fig. 59. Spatial distribution (ind./m^2) of *Montacuta ferruginosa* (Mollusca).

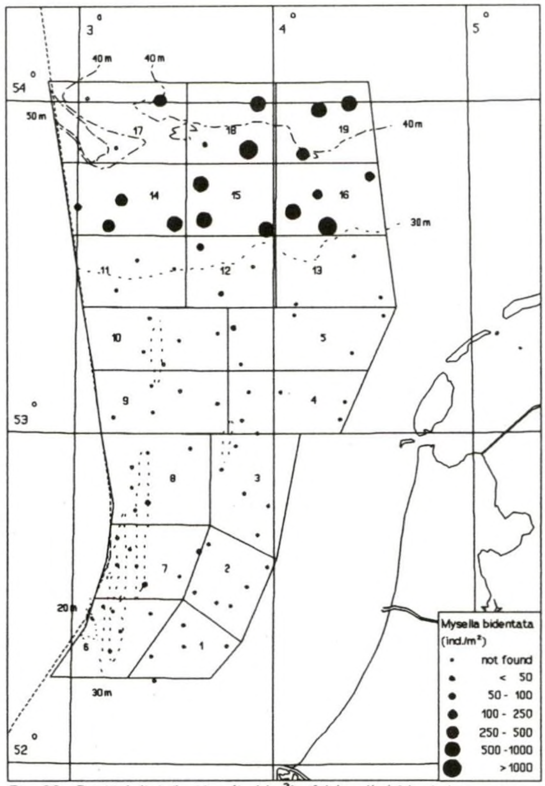


Fig. 60. Spatial distribution (ind./m^2) of *Mysella bidentata* (Mollusca).

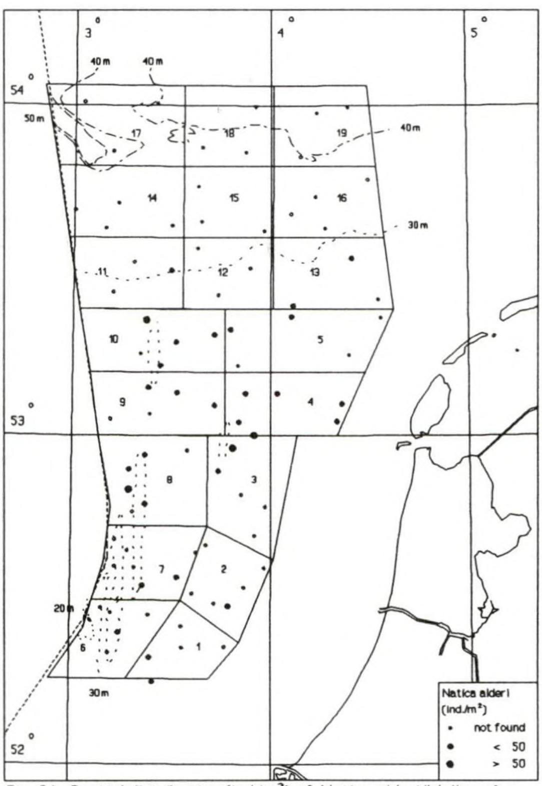


Fig. 61. Spatial distribution (ind./m^2) of *Natica alderi* (Mollusca).

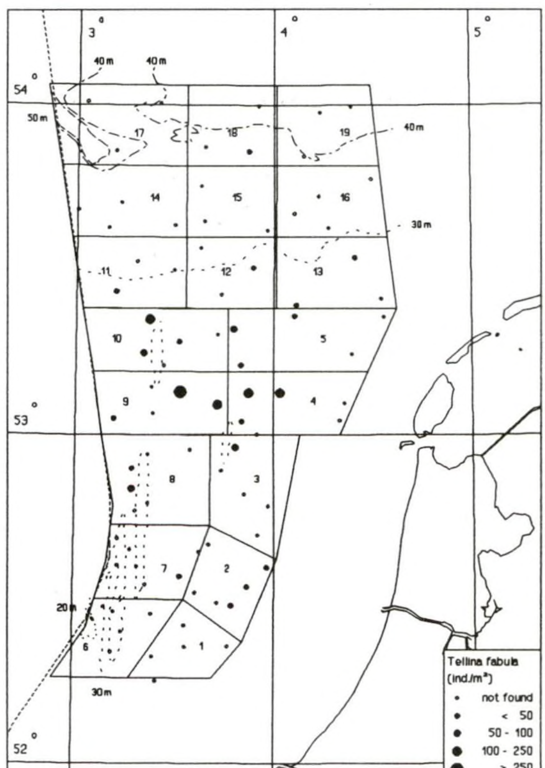


Fig. 62. Spatial distribution (ind./m^2) of *Tellina fabula* (Mollusca).

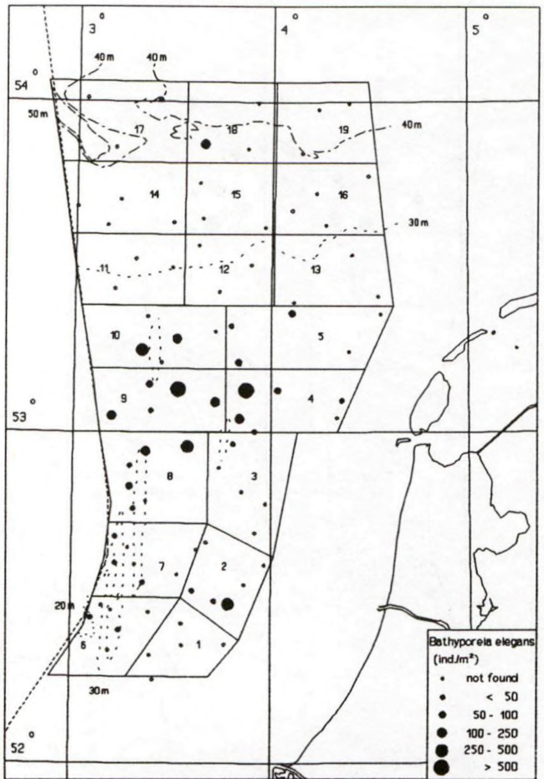


Fig. 63. Spatial distribution (ind./m^2) of *Bathyporeia elegans* (Crustacea).

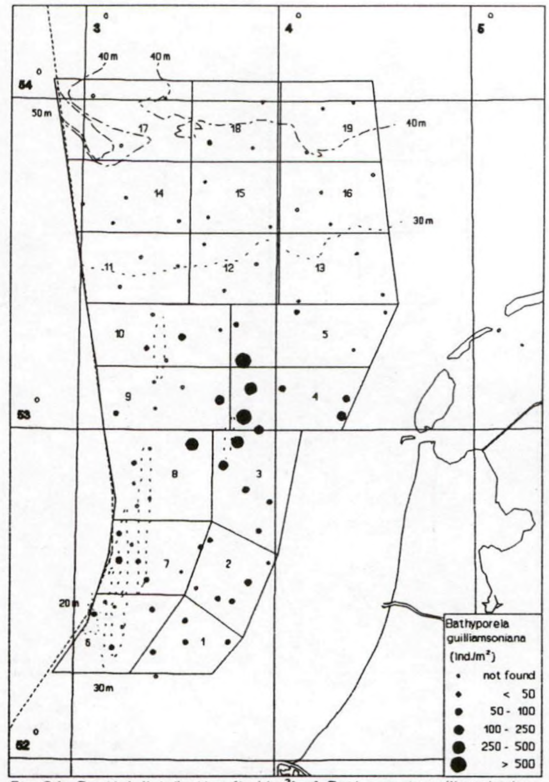


Fig. 64. Spatial distribution (ind./m^2) of *Bathyporeia gulliamsioniana* (Crustacea).

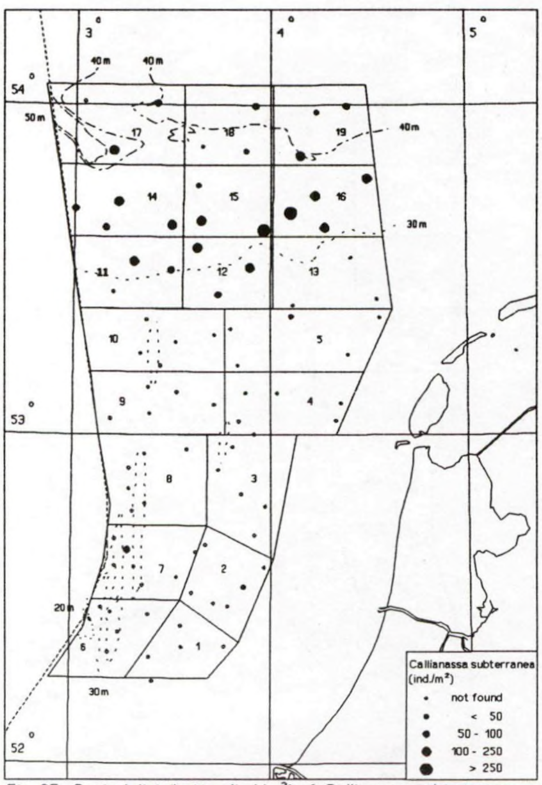


Fig. 65. Spatial distribution (ind./m^2) of *Callianassa subterranea* (Crustacea).

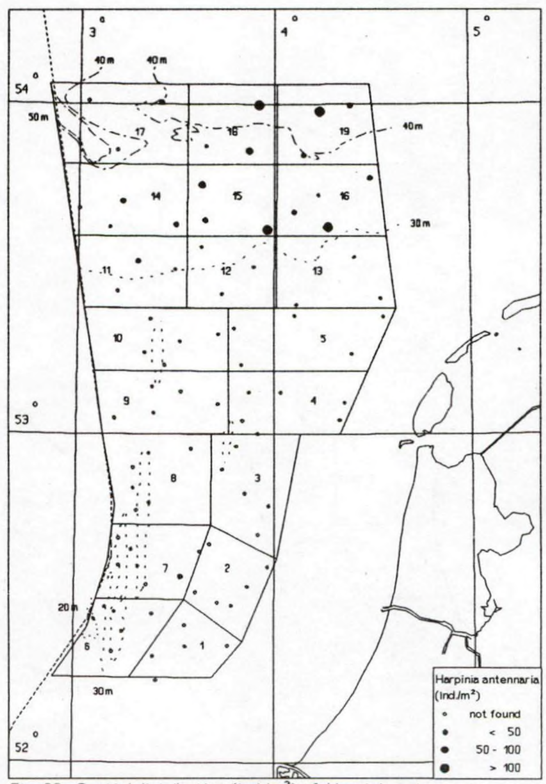


Fig. 66. Spatial distribution (ind./m^2) of *Harpinia antennaria* (Crustacea).

Fig. 67. Spatial distribution (ind./m²) of *Megaluporus agilis* (Crustacea).

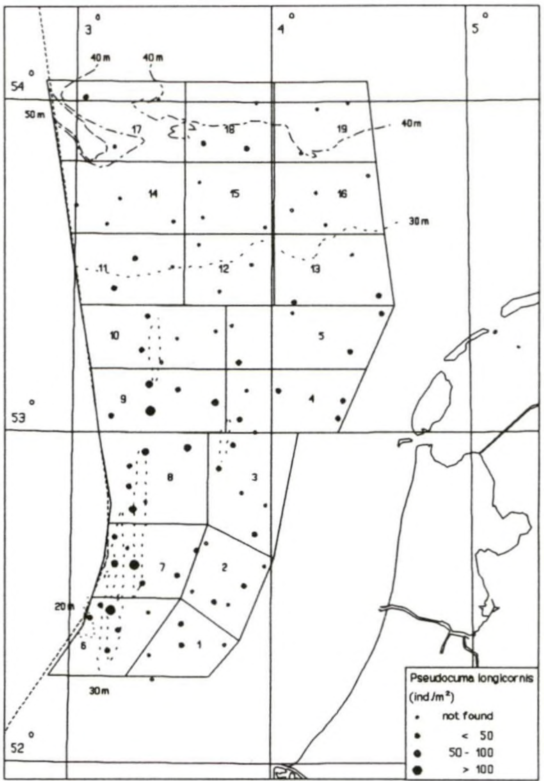


Fig. 68. Spatial distribution (ind./m²) of *Pseudocuma longicornis* (Crustacea).

Fig. 69. Spatial distribution (ind./m²) of *Urothoe brevicornis* (Crustacea).

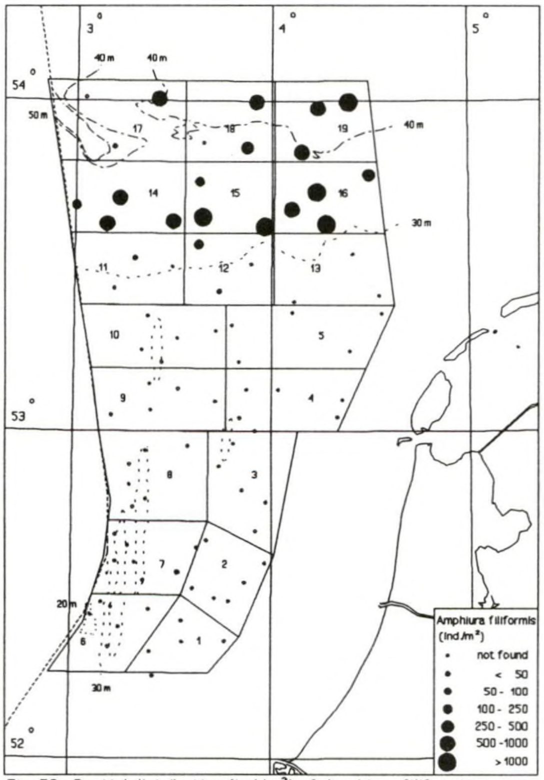


Fig. 70. Spatial distribution (ind./m²) of *Amphiura filiformis* (Echinodermata).

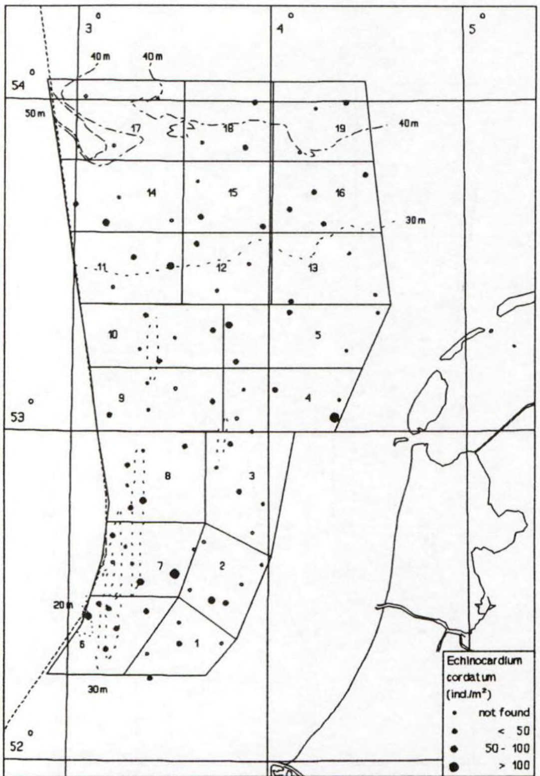


Fig. 71. Spatial distribution (ind./m²) of *Echinocardium cordatum* (Echinodermata).

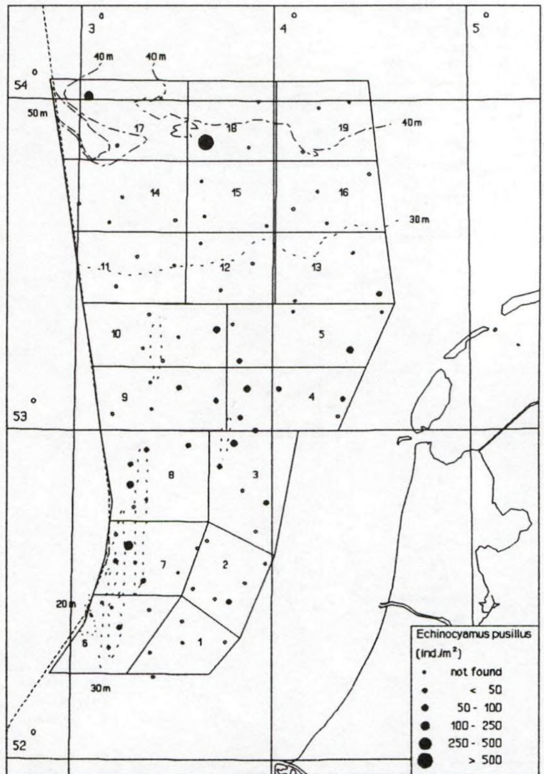


Fig. 72. Spatial distribution (ind./m²) of *Echinocyamus pusillus* (Echinodermata).

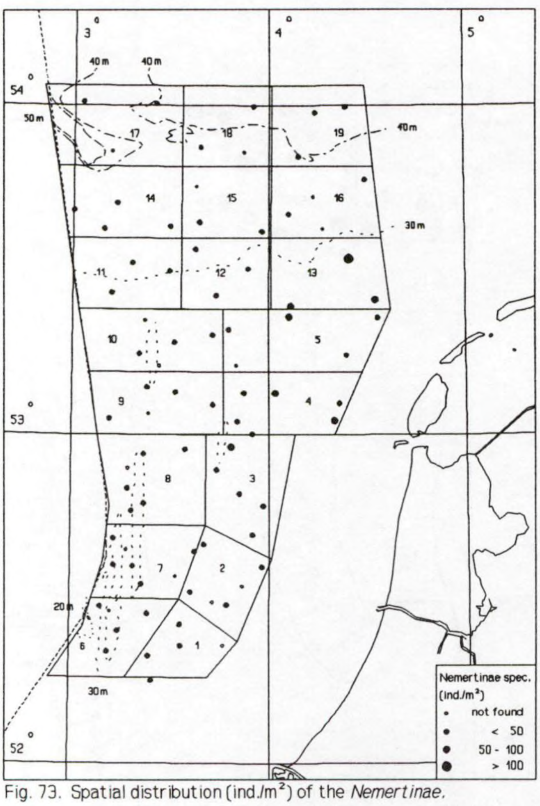


Fig. 73. Spatial distribution (ind./m²) of the *Nemertinae.*

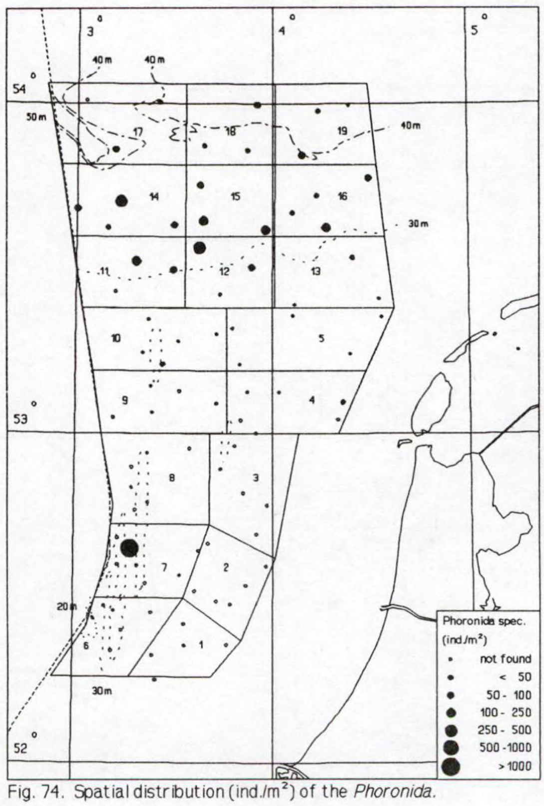


Fig. 74. Spatial distribution (ind./m²) of the *Phoronida.*

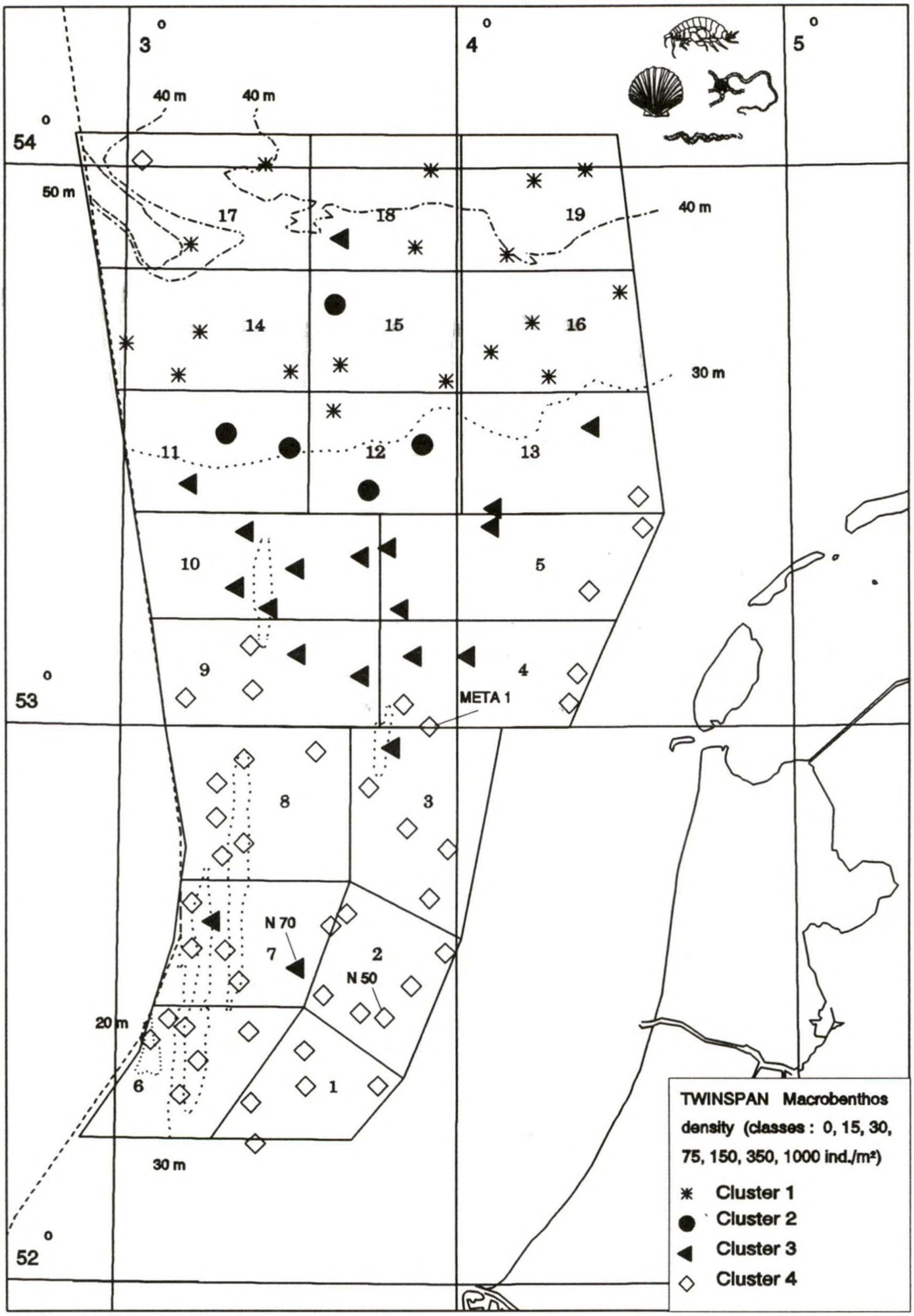


Fig. 75. TWINSPAN clustering of the macrobenthos density (ind./m²).

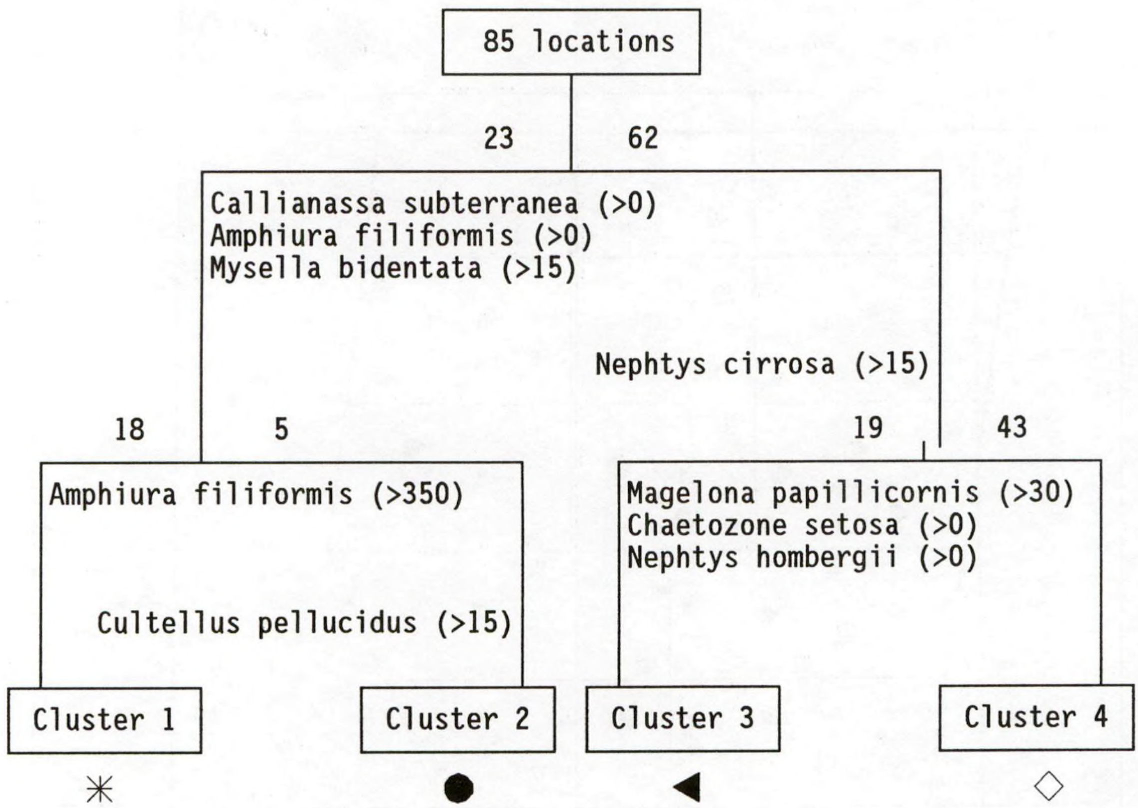


Fig. 76. Dichotomy of the TWINSPAN cluster found in the MILZON-BENTHOS II area 1992/1993 by using the macrobenthos density (ind./m^2).
Classes : 0, 15, 30, 75, 150, 350, 1000 ind./m^2

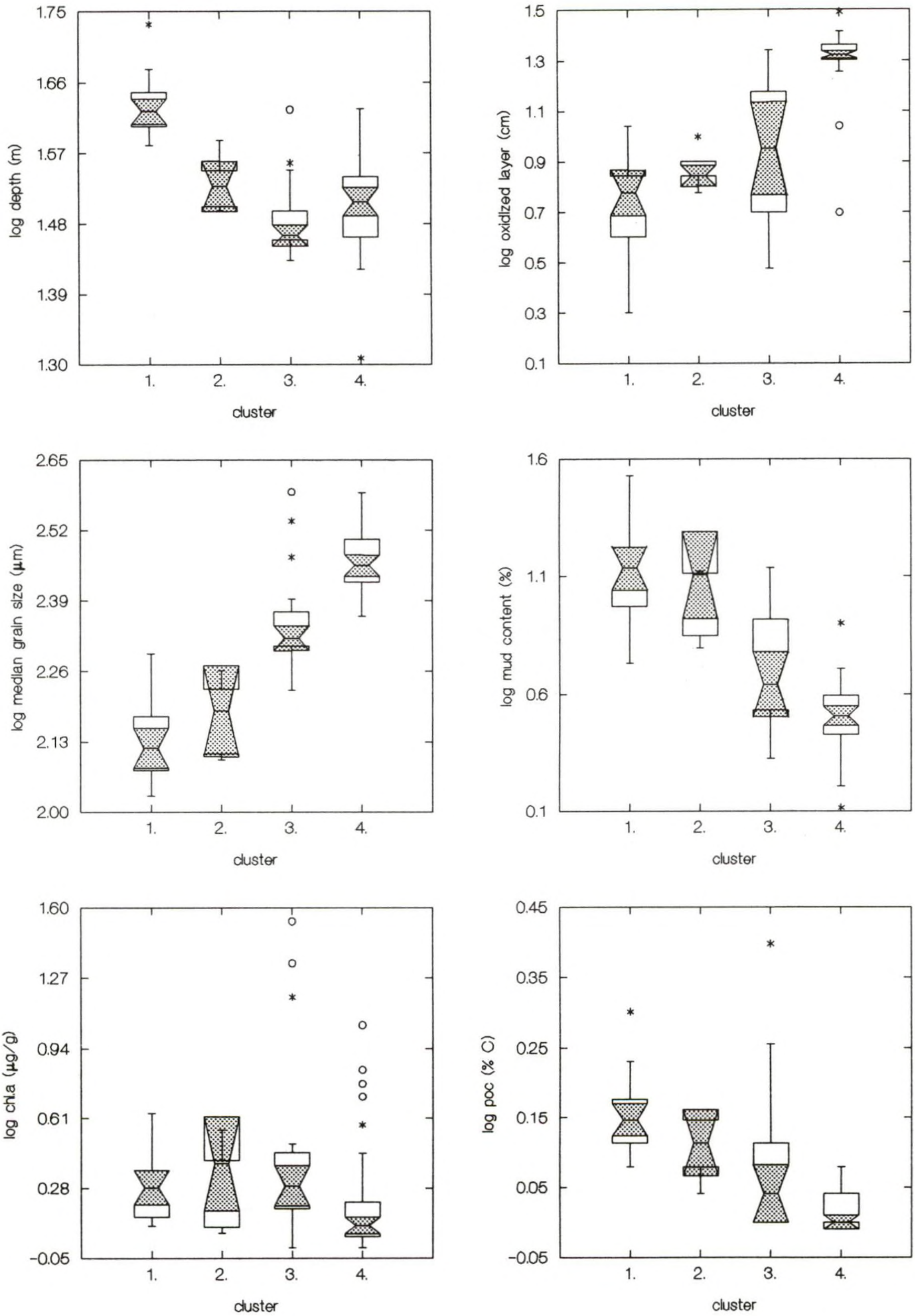


Fig. 77a. Box and whisker plots of the average abiotic parameters (log(x+1)-transformed) after TWINSPAN analysis using the data of the macrobenthos density (ind./m²) (cf. Figs. 45, 46 and Table 11).

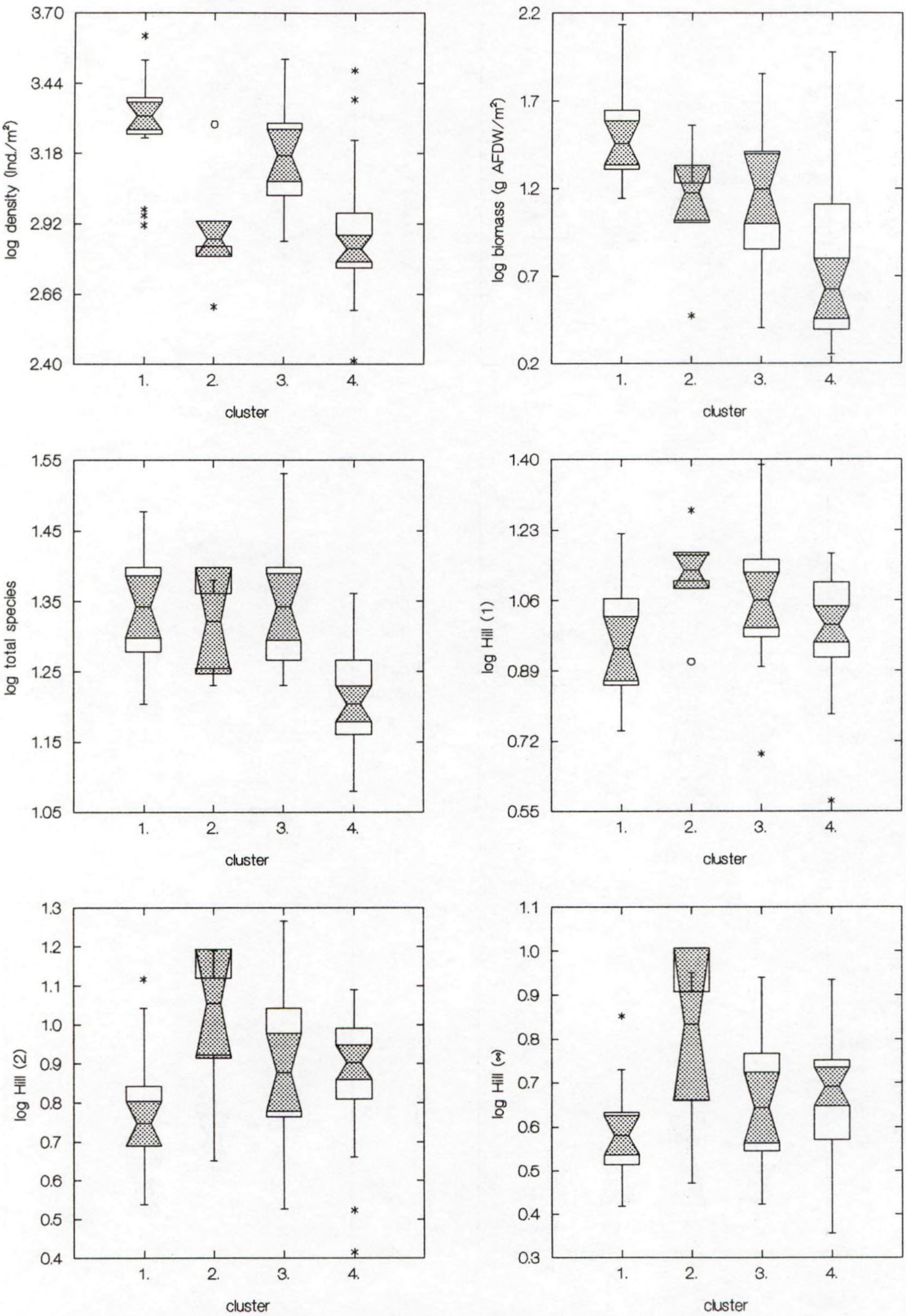


Fig. 77b. Box and whisker plots of some average macrobenthic parameters (log(x+1)-transformed) after TWINSPAN analysis using the data of the macrobenthos density (Ind./m²) (cf. Figs. 45, 46 and Table 11).

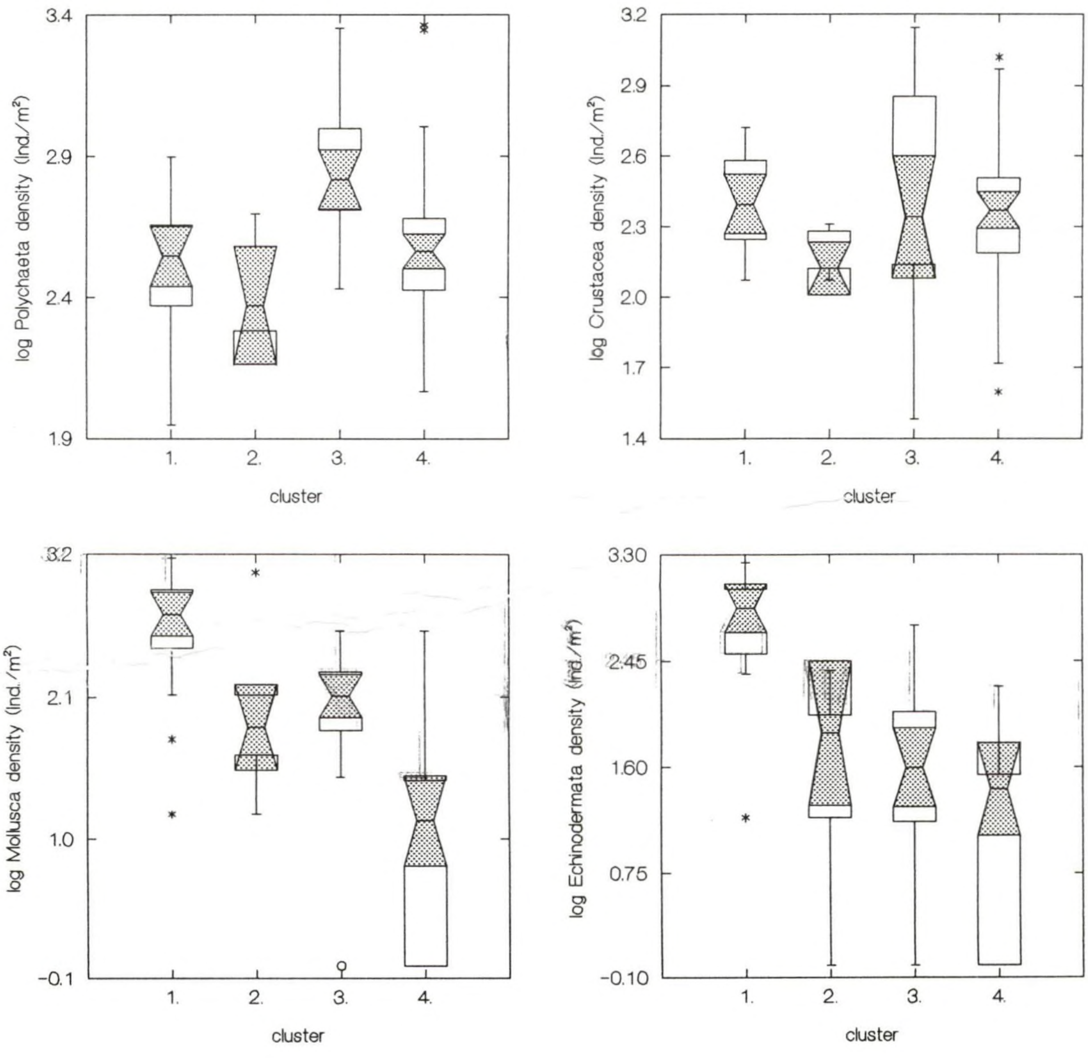


Fig. 77c. Box and whisker plots of the average density (log(x+1)-transformed) after TWINSPAN analysis using the data of the macrobenthos density (Ind./m²) (cf. Figs.45, 46 and Table 11).

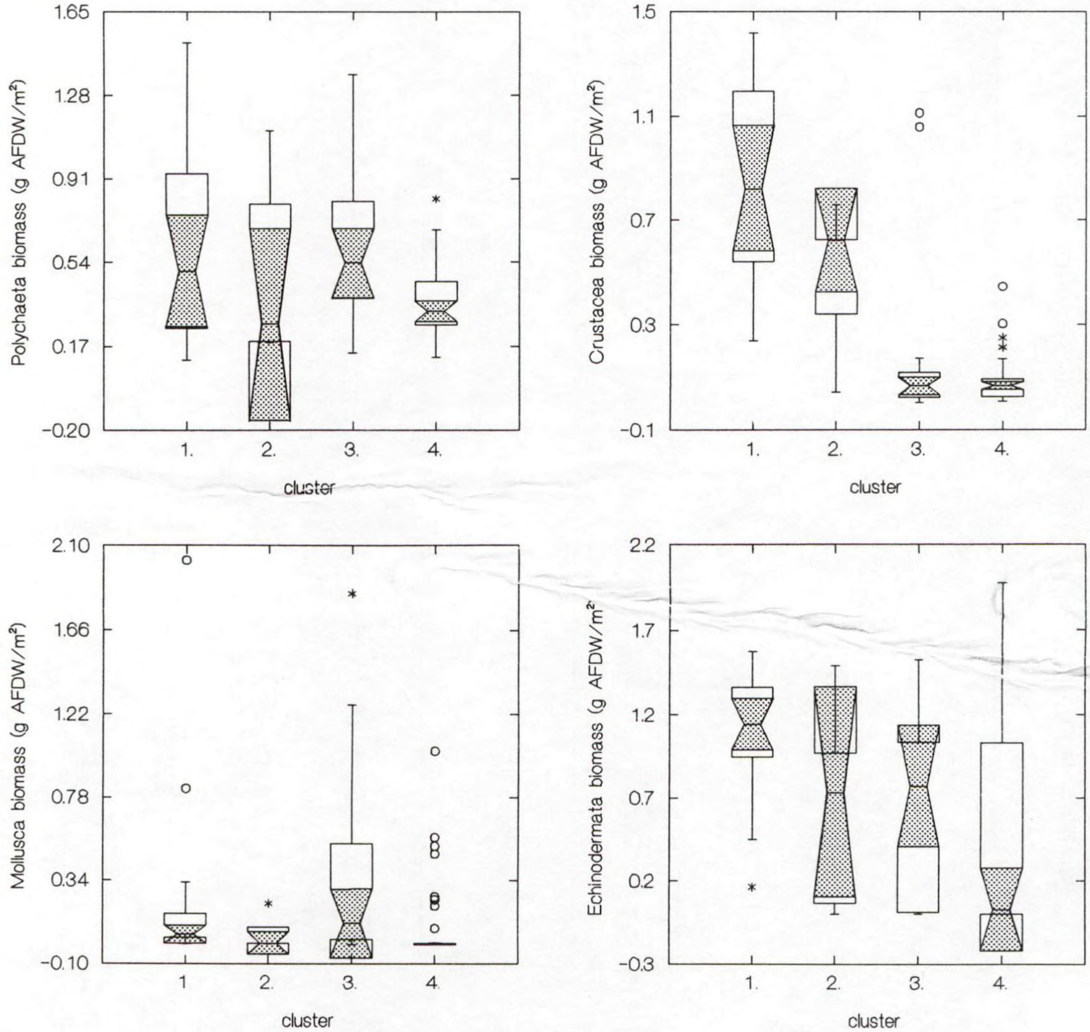


Fig. 77d. Box and whisker plots of the average biomass (log(x+1)-transformed) after TWINSPAN analysis using the data of the macrobenthos density (ind./m²) (cf. Figs. 45, 46 and Table 11).

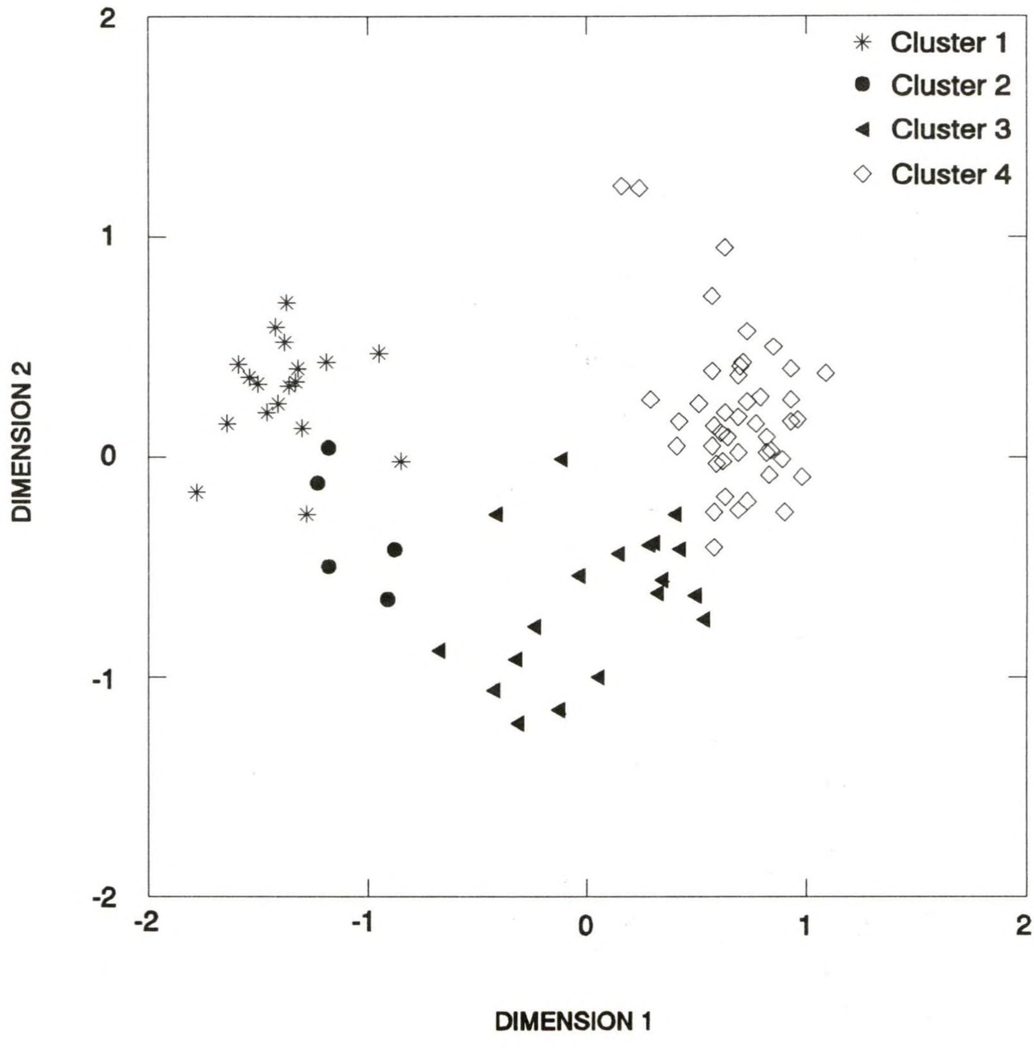


Fig. 78. Multidimensional sacling (MDS) ordination of the macrobenthos density (ind./m²) in relation to the TWINSPAN clusters of the MILZON-BENTHOS area 1992/93. Stress = 0.16

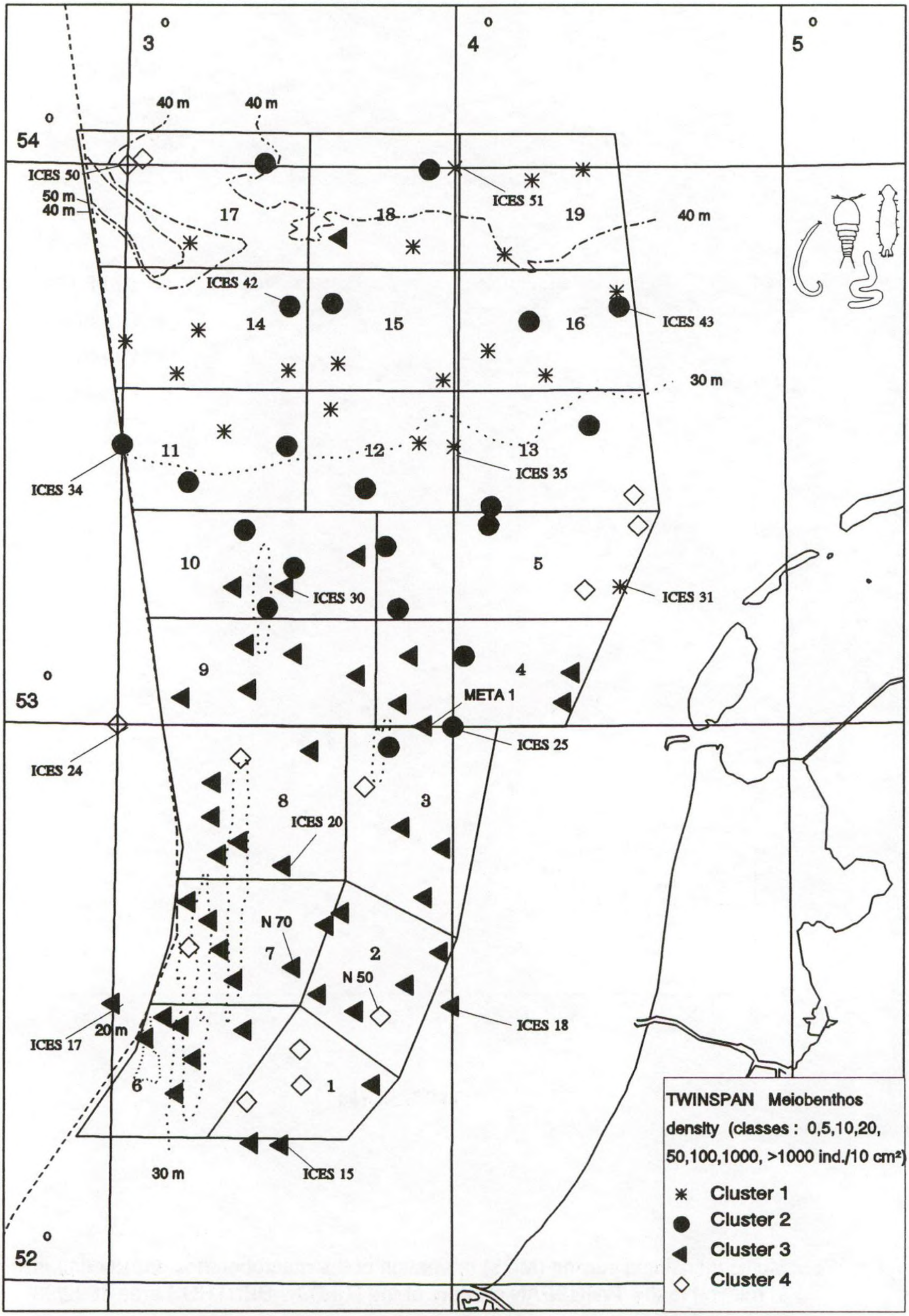


Fig. 79. TWINSPAN clustering of the meiobenthos density (ind./10 cm²) including the ICES data of 1986.

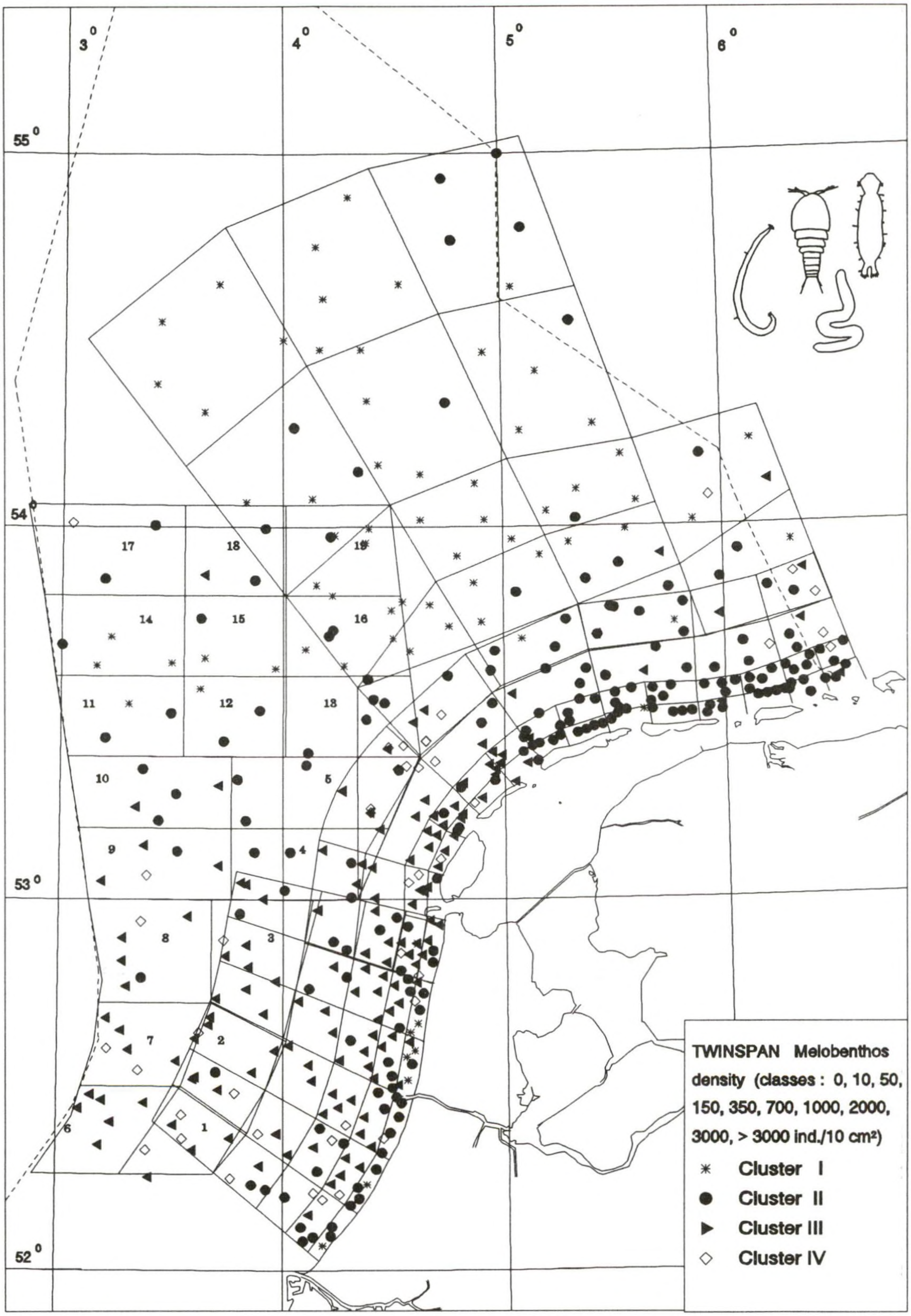


Fig. 80. TWINSPAN clustering of the meiobenthos density (ind./10 cm²) including the MILZON-BENTHOS I + II data of 1988/89 and 1991.

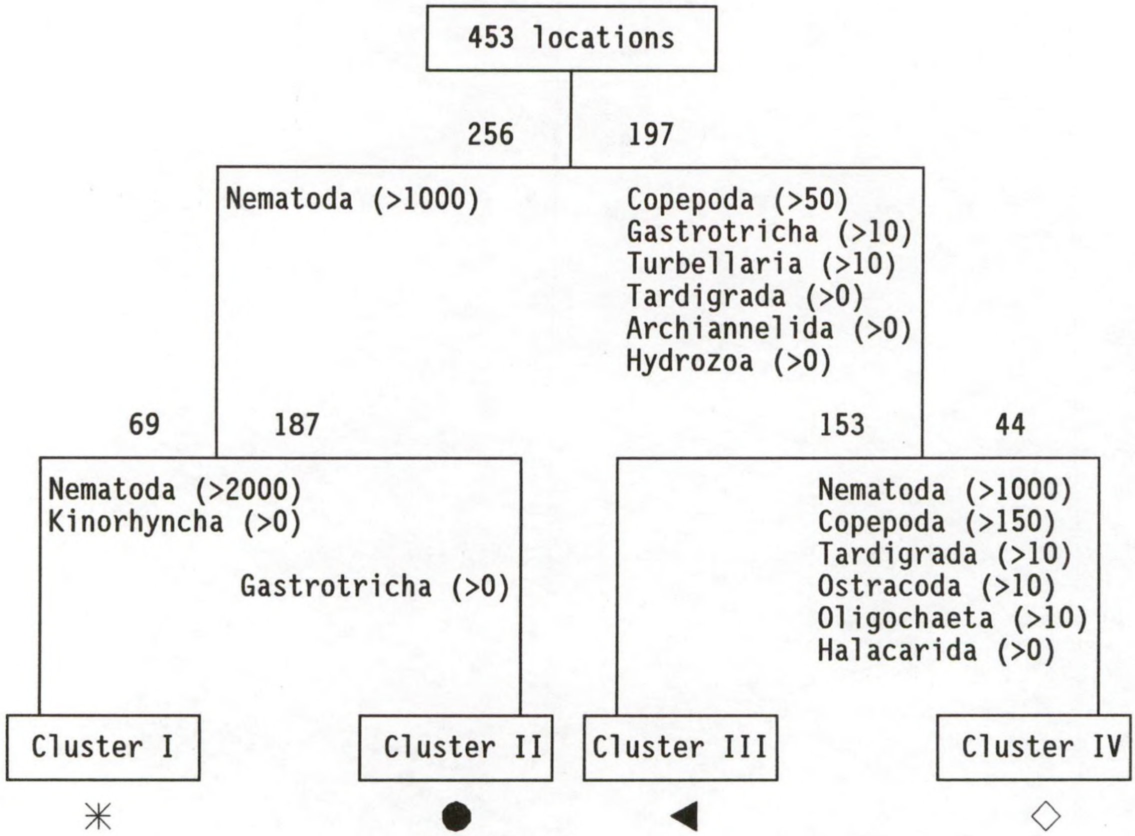


Fig. 81. Dichotomy of the TWINSPAN cluster found in the MILZON-BENTHOS I + II area 1988-1993 by using the meiobenthos density (ind./10 cm²).
Classes : 0, 10, 150, 350, 700, 1000, 2000, 3000, >3000 ind./10 cm²

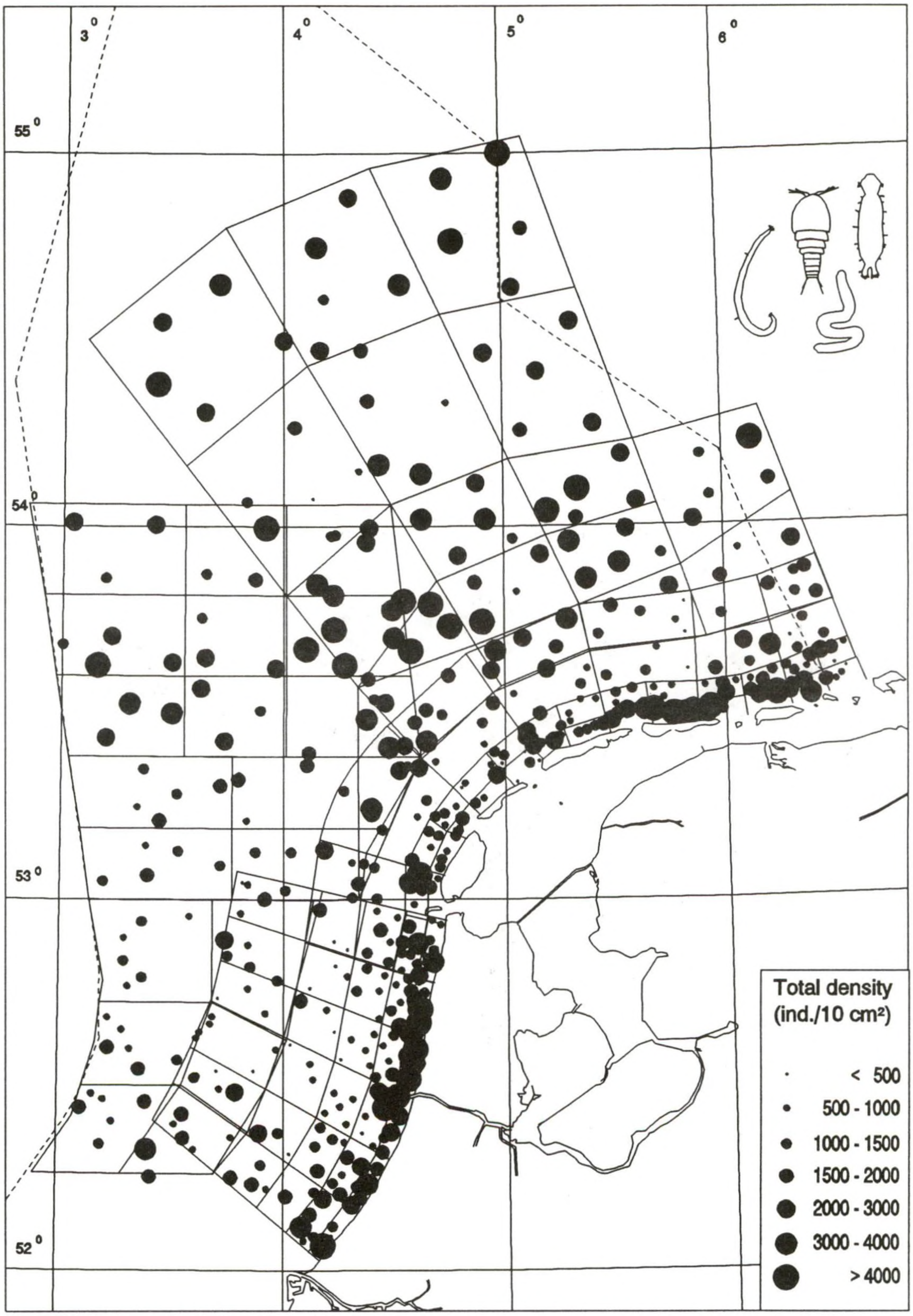


Fig. 82a. Spatial distribution of the total meiobenthic density (ind./10 cm²) including the MILZON-BENTHOS I + II data of 1988/89 and 1991.

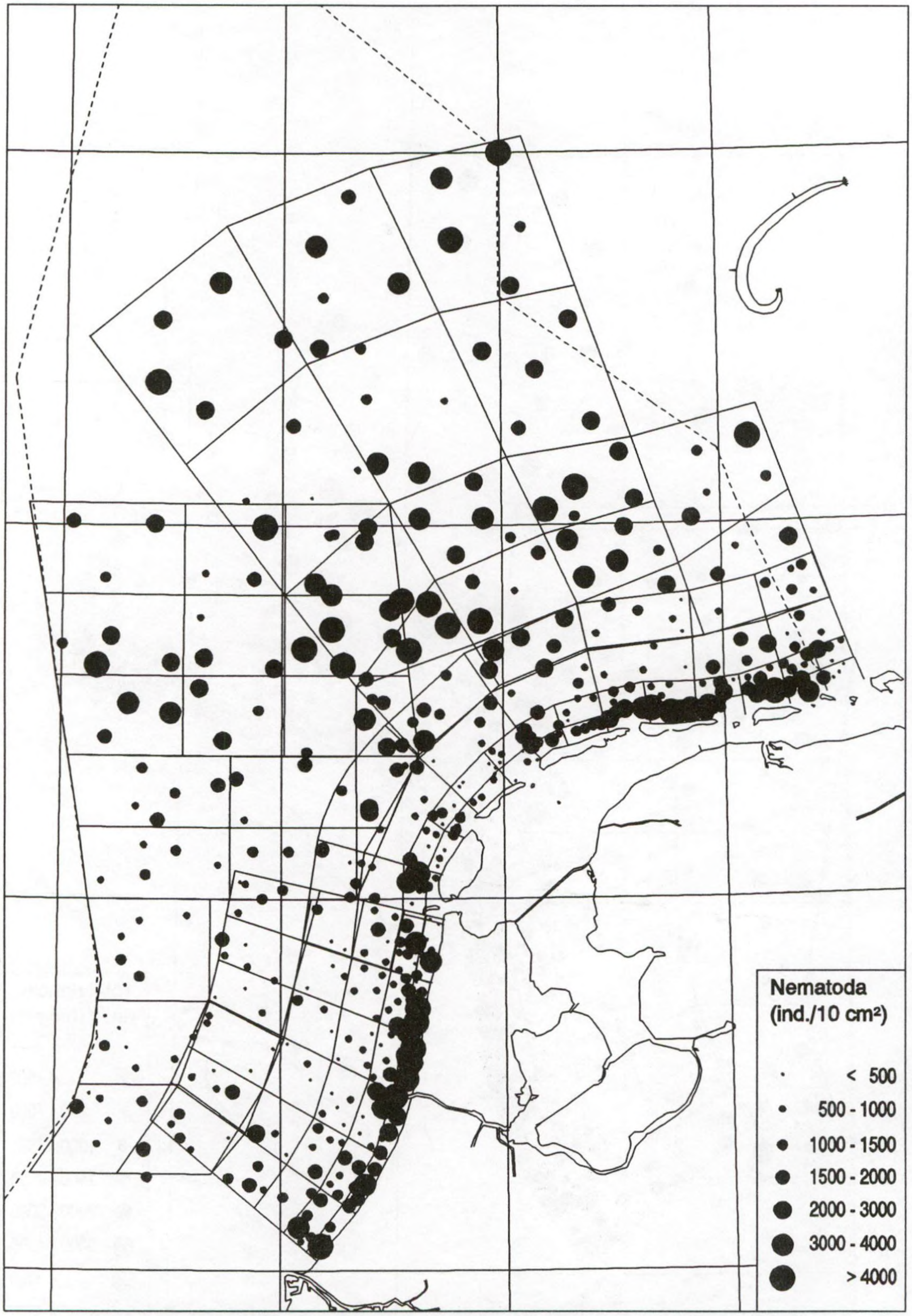


Fig. 82b. Spatial distribution of the Nematoda (ind./10 cm²) including the MILZON-BENTHOS I + II data of 1988/89 and 1991.

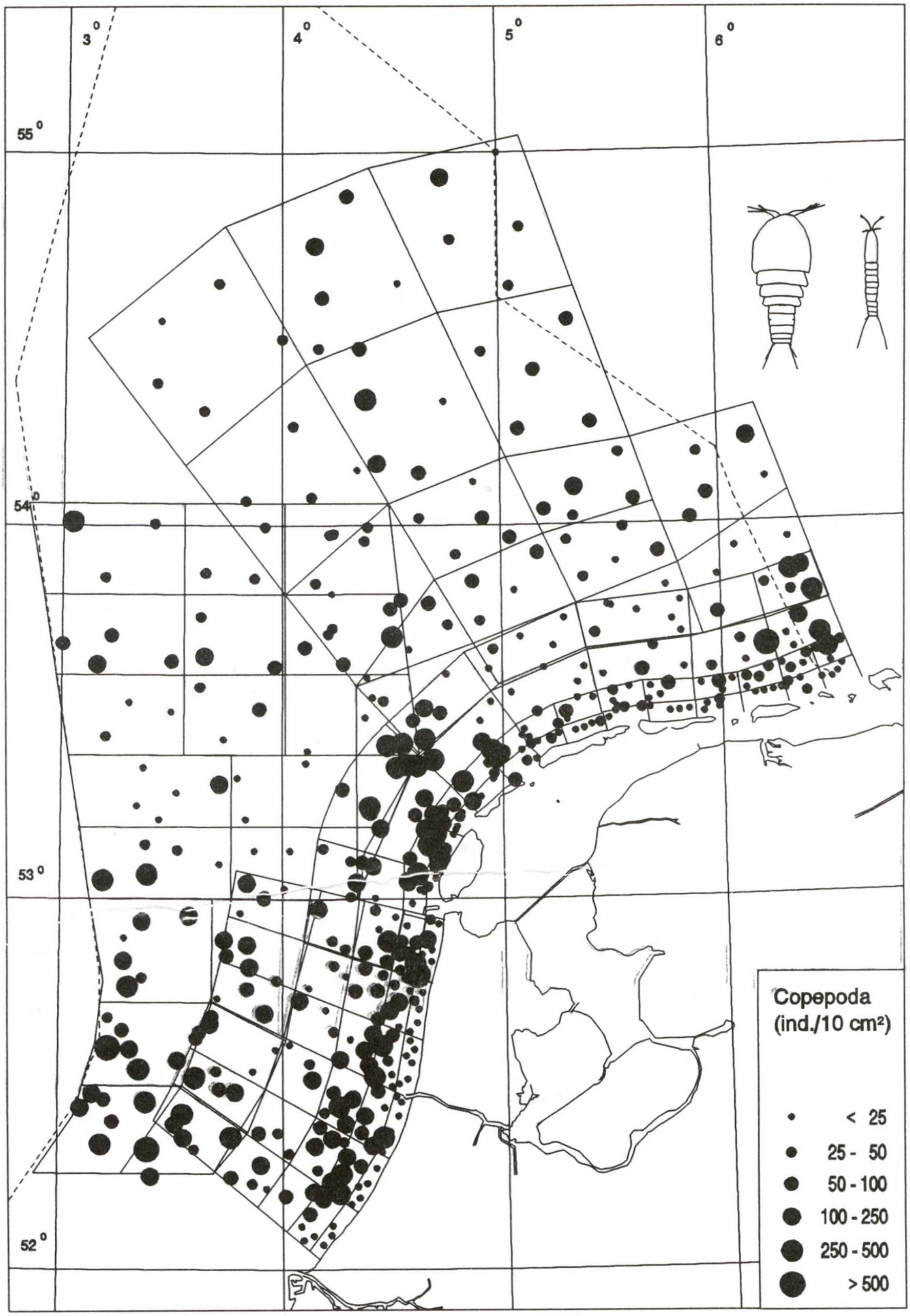


Fig. 82c. Spatial distribution of the Copepoda (ind./10 cm²) including the MILZON-BENTHOS I + II data of 1988/89 and 1991.

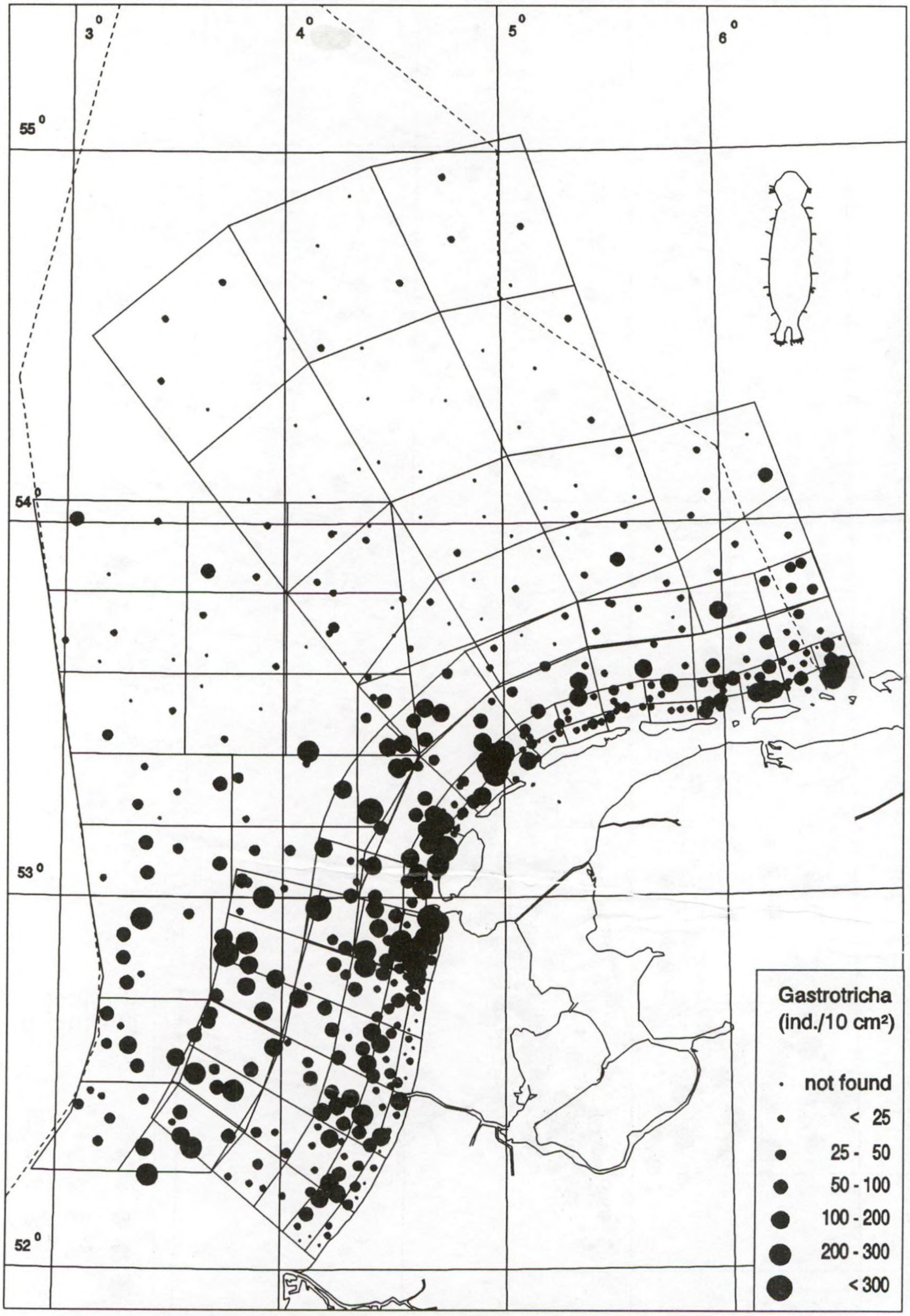


Fig. 82d. Spatial distribution of the Gastrotricha (ind./10 cm²) including the MILZON-BENTHOS I + II data of 1988/89 and 1991.

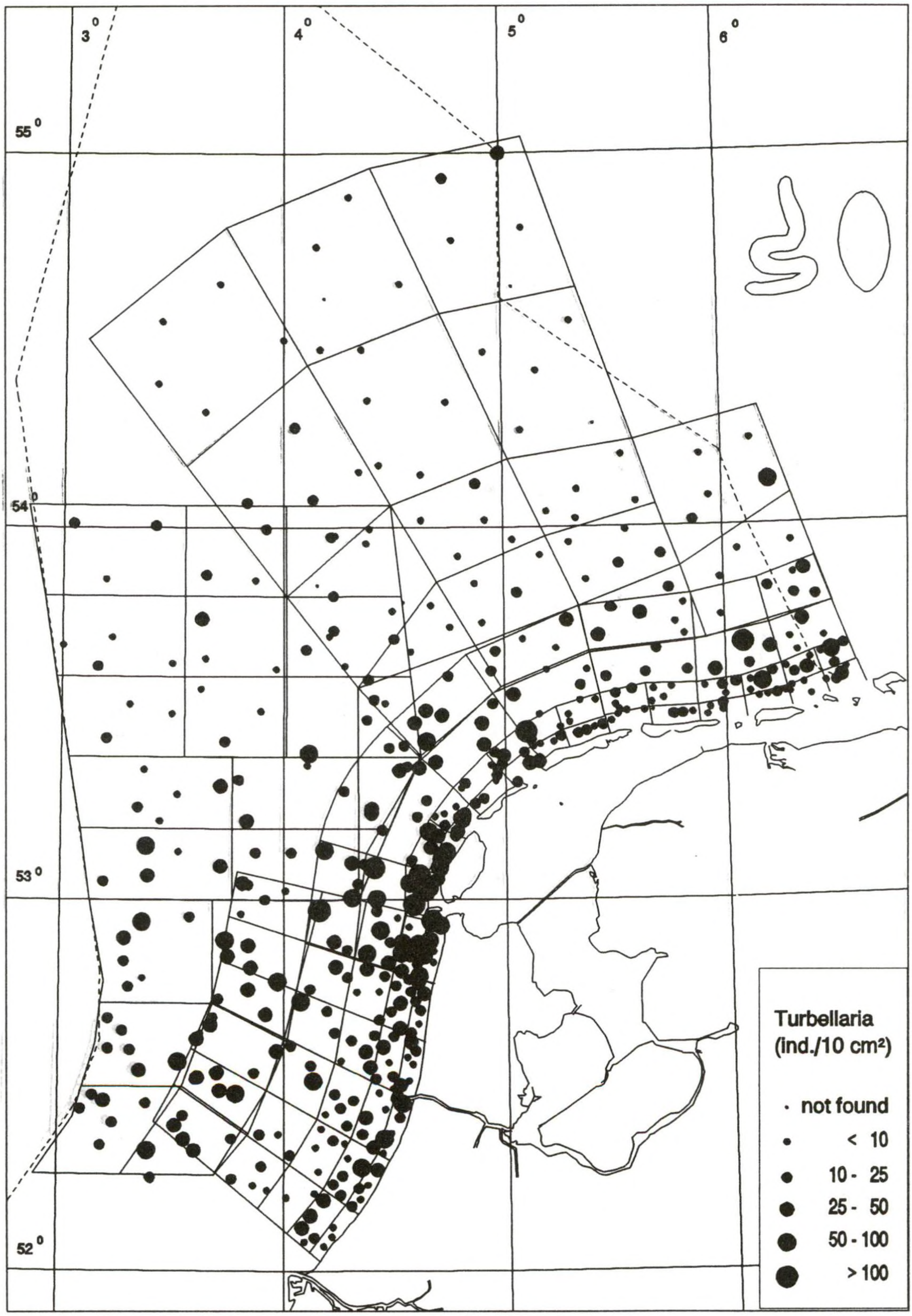


Fig. 82e. Spatial distribution of the Turbellaria (ind./10 cm²) including the MILZON-BENTHOS I + II data of 1988/89 and 1991.

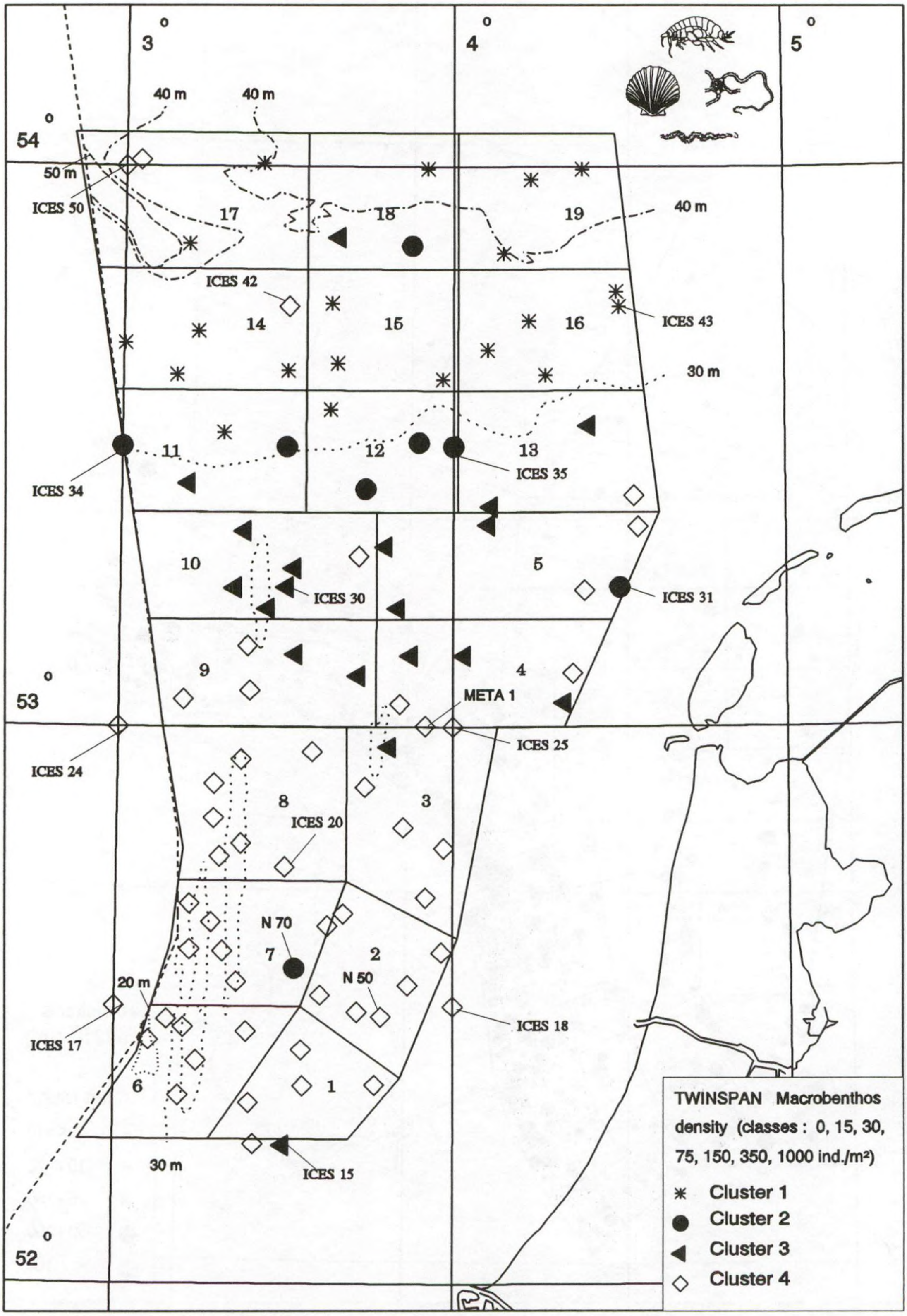


Fig. 83. TWINSPAN clustering of the macrobenthos density (ind./m²) including the ICES data 1986.

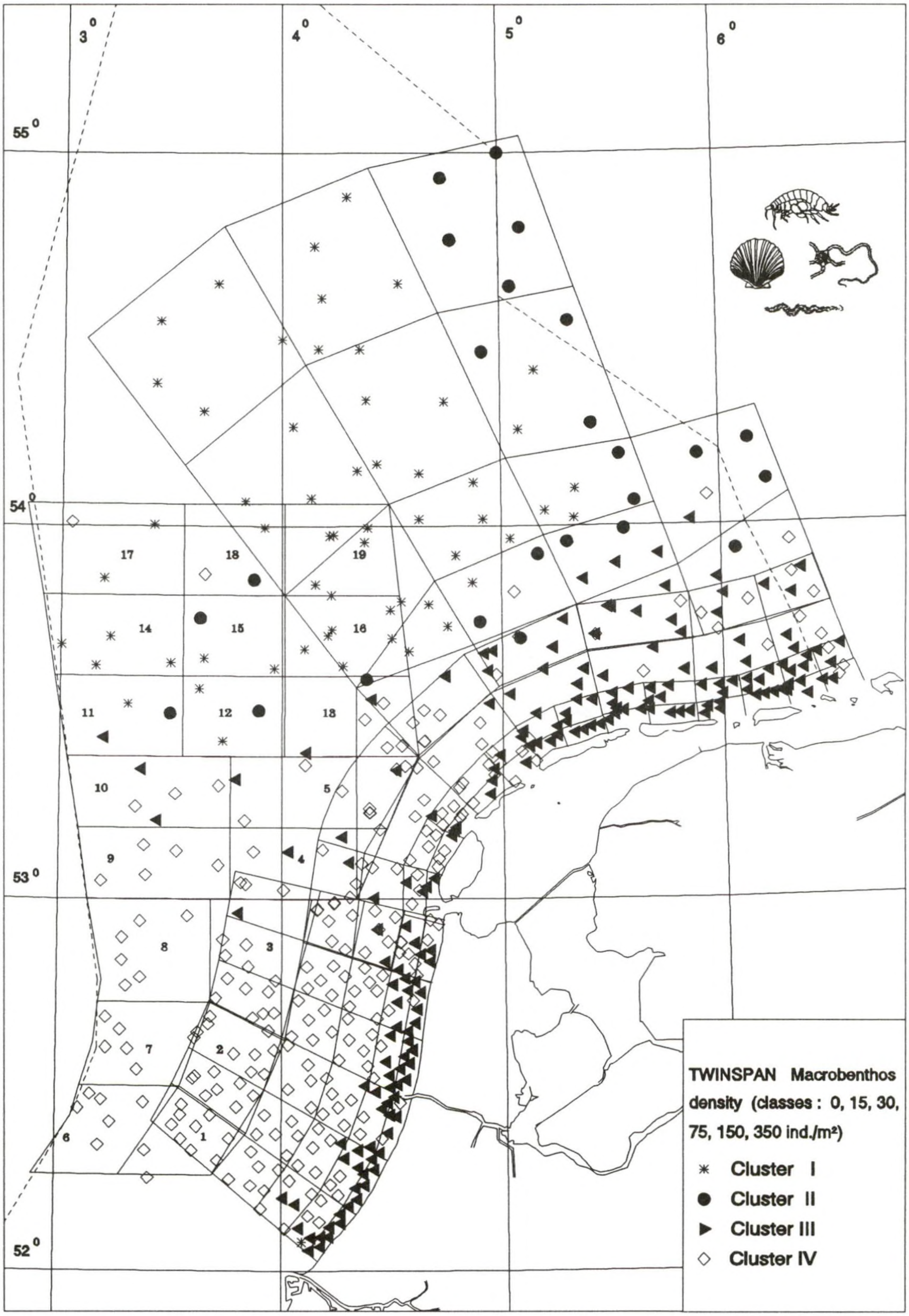


Fig. 84. TWINSPAN clustering of the macrobenthos density (ind./m²) including theMILZON-BENTHOS I + II data of 1988-1990.

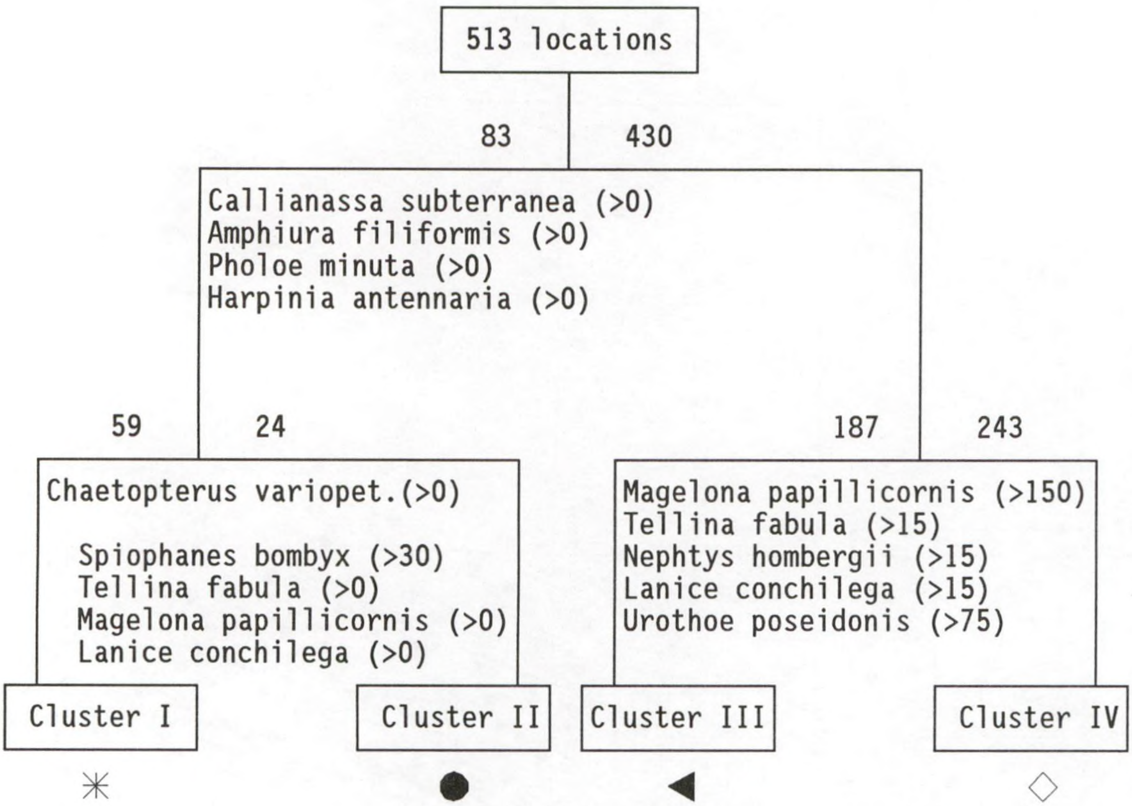


Fig. 85. Dichotomy of the TWINSPAN cluster found in the MILZON-BENTHOS I + II area 1988-1993 by using the macrobenthos density (ind./m^2).
Classes : 0, 15, 30, 75, 150, 350 ind./m^2

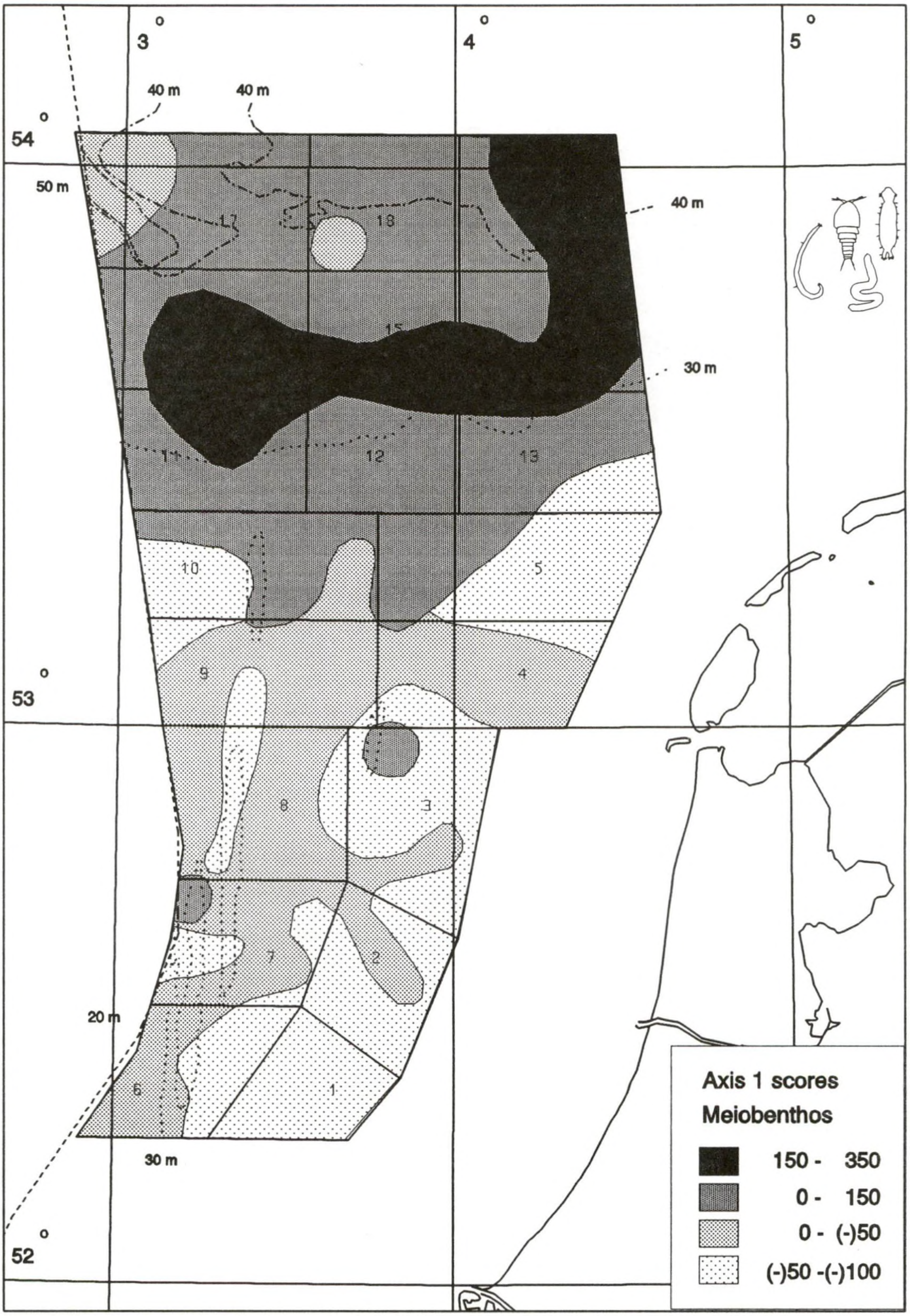


Fig. 86. Axis 1 contours of the meiobenthos.

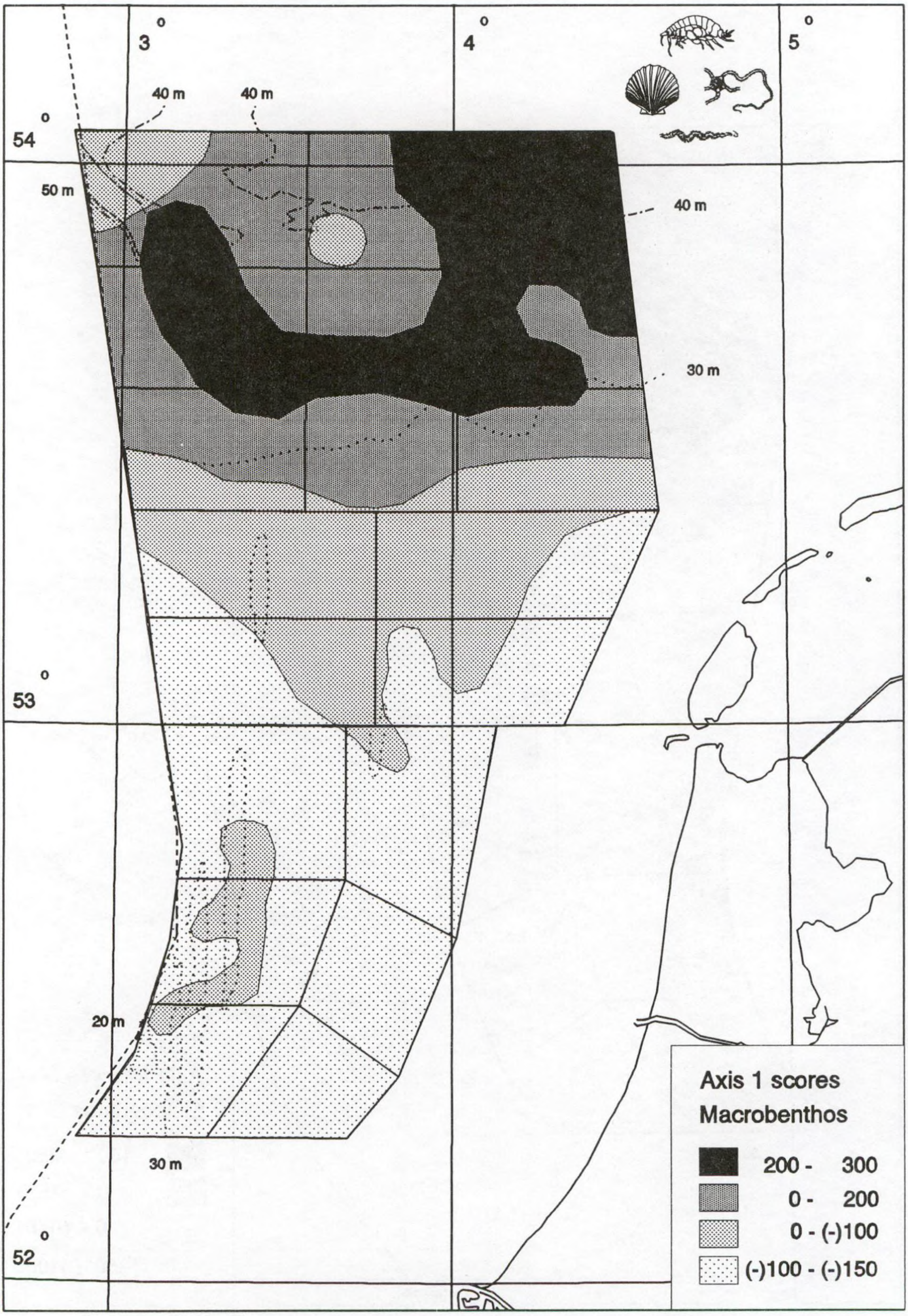


Fig. 87. Axis 1 contours of the macrobenthos.

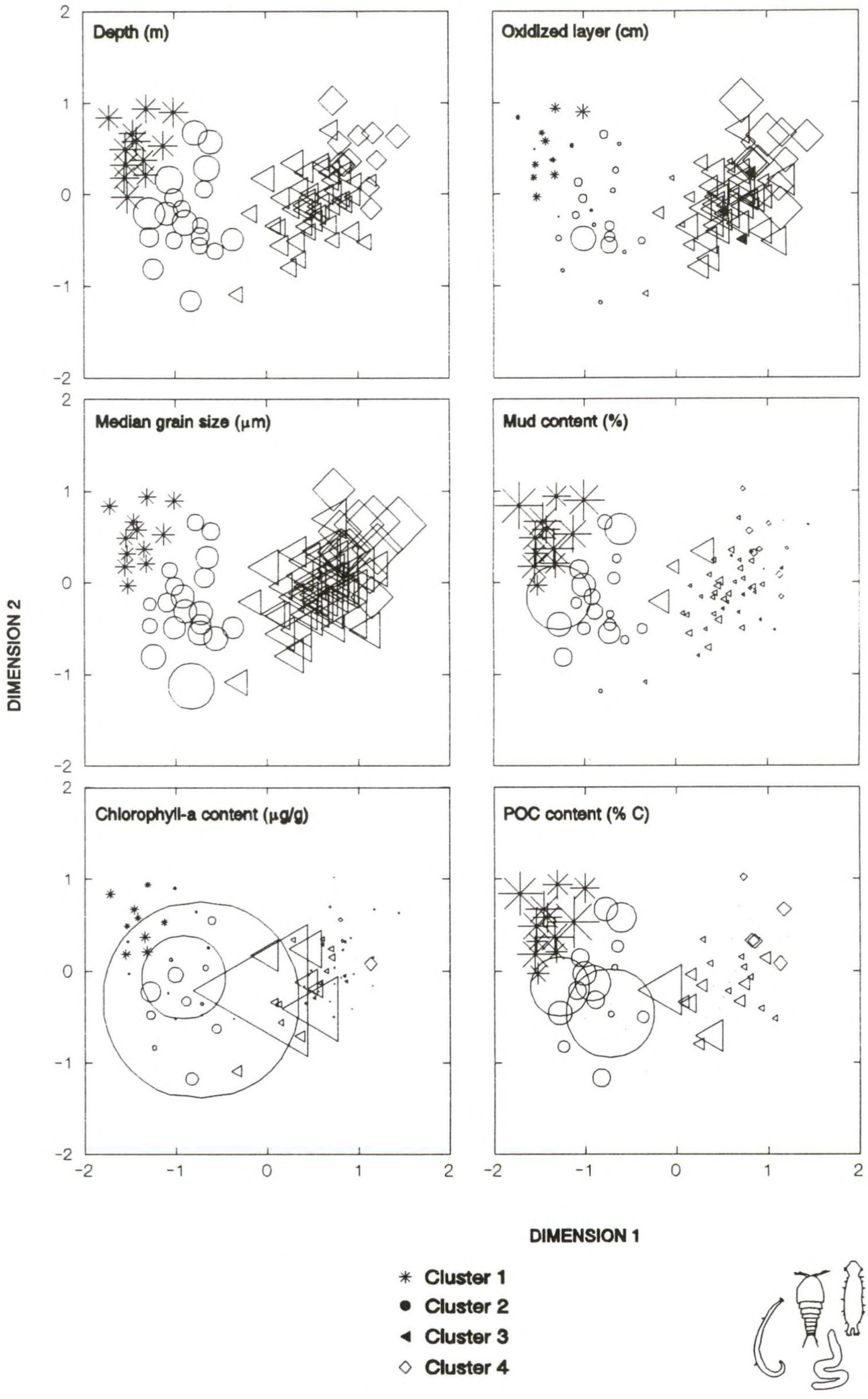


Fig. 88a. Super-imposition of scaled sedimental parameters on the 2-dimensional MDS ordination of the meiobenthic taxa (ind./10 cm²).

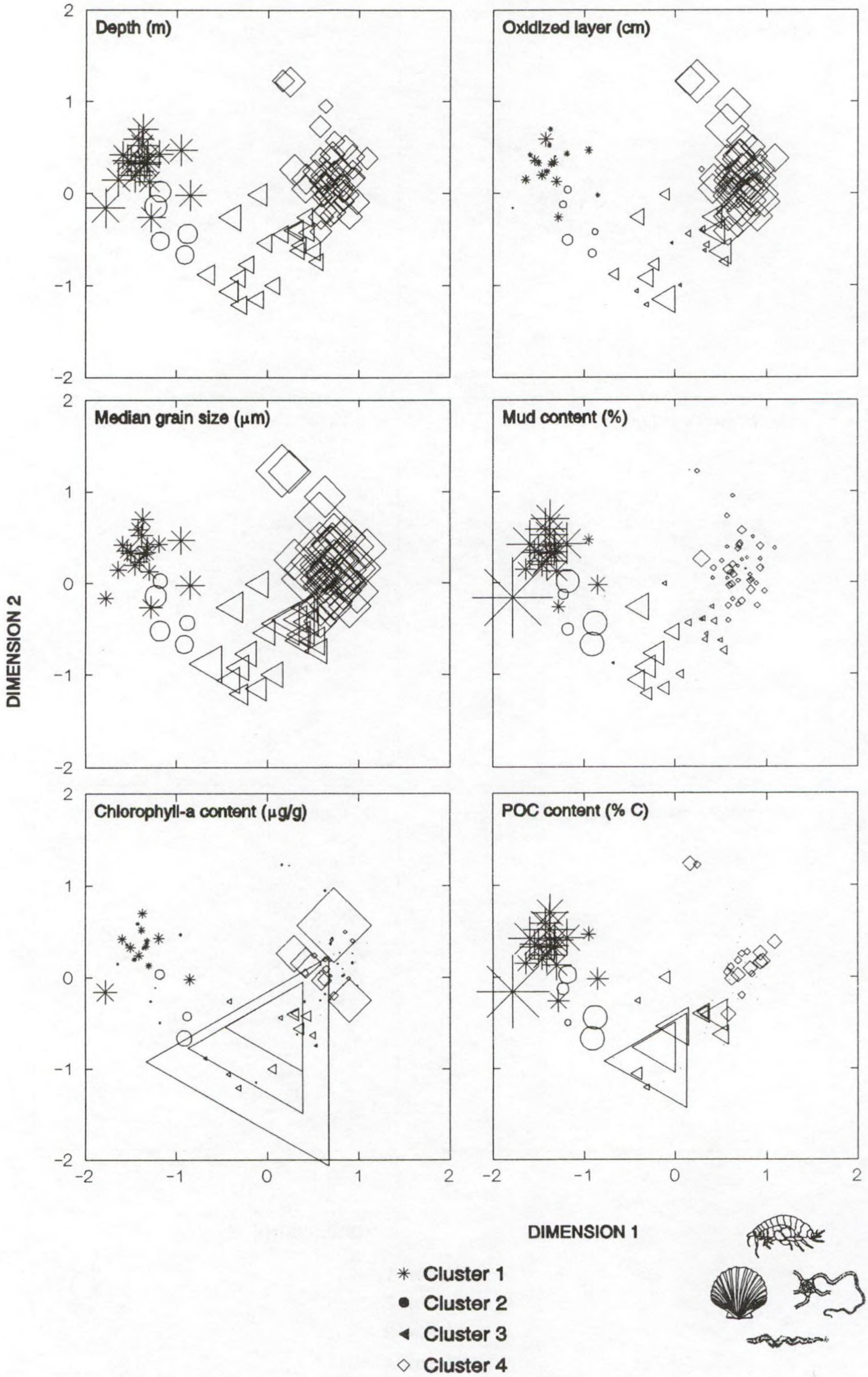


Fig. 88b. Super-imposition of scaled sedimental parameters on the 2-dimension MDS ordination of the macrobenthic species (ind./m²).

Appendices

Appendix 1-1. Densities (ind./10 cm²) of meiobenthic taxa (permanent and temporary) on all MILZON-BENTHOS II 1992 locations.

Station	1-1	1-2	1-3	1-4	1-5	2-1	2-2	2-3	2-4	2-5	3-1	3-2	3-3	3-4	3-5
<u>Permanent</u>															
Nematoda	1047	1505	358	1124	1105	531	660	327	378	513	599	787	937	1730	623
Copepoda total	155	1067	322	378	213	412	92	17	23	160	106	38	194	226	1
burrowing	14	.	1	5	11	.	7	4	.	10	4	5	5	2	1
interstitial	141	1067	321	373	202	412	85	13	23	150	102	33	189	224	.
Gastrotricha	288	157	70	99	109	68	81	50	145	74	112	150	125	167	7
Turbellaria	22	51	11	17	28	19	29	16	37	37	27	63	30	72	5
Archiannelida	.	2	.	2	4	1	8	.	2	1	1	.	.	5	.
Oligochaeta	.	.	.	1	1	.	.	.	.	.	.	2	.	3	.
Polychaeta	2	18	3	10	9	3	12	.	1	4	4	4	1	2	.
Hydrozoa	2	58	9	12	12	.	6	2	18	.	3	6	10	18	.
Tardigrada	95	296	24	39	68	4	2	.	5	4	13	3	48	60	.
Ostracoda	.	63	5	7	4	.	1	.	.	.	.	.	.	.	.
Halacarida	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.
<u>Temporary</u>															
Nauplii	222	1511	96	160	106	24	10	8	9	35	37	10	55	54	15
Bivalvia	1	2	.	.	1	.	2	.	.	.	.	.	.	1	.
Foraminifera	27	91	1	10	21	5	1	.	1	10	5	.	3	9	.
Isopoda	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Cumacea	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Nemertina	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Tanaidacea	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Amphipoda	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Echinoidea	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Ophiuroidea	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Cnidaria other	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.
Bryozoa	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Taxa permanent	7	10	8	10	10	7	9	5	8	7	8	8	7	9	4
Taxa temporary	3	3	3	2	3	2	3	1	2	2	2	1	2	3	1
Taxa total	10	13	11	12	13	9	12	6	10	9	10	9	9	12	5

Appendix 1-2. Densities (ind./10 cm²) of meiobenthic taxa (permanent and temporary) on all MILZON-BENTHOS II 1992 locations.

Station	4-1	4-2	4-3	4-4	4-5	5-1	5-2	5-3	5-4	5-5	6-1	6-2	6-3	6-4	6-5	6-6
<u>Permanent</u>																
Nematoda	1443	576	1400	1359	978	832	1702	1820	2807	794	888	547	1619	812	1047	424
Copepoda	161	100	10	10	72	1	5	23	443	276	253	65	193	56	373	117
burrowing	6	7	3	6	5	1	5	23	5	.	6	4	14	2	3	13
interstitial	155	93	7	4	67	.	.	.	438	276	247	61	179	54	370	104
Gastrotricha	18	43	38	39	7	11	26	4	51	66	35	24	31	34	43	21
Turbellaria	16	11	18	24	18	36	10	6	31	22	20	48	20	11	16	20
Archiannelida	.	5	.	.	.	.	.	.	10	10	.	.	.	2	10	.
Oligochaeta	.	.	.	.	.	.	.	.	12	9	1	.	.	.	.	.
Polychaeta	2	3	.	1	7	.	1	1	8	9	2	3	7	2	3	3
Hydrozoa	4	9	2	.	8	.	.	.	24	8	.	.	1	2	6	1
Tardigrada	1	18	4	14	7	1	.	1	136	30	14	15	34	12	20	13
Ostracoda	.	3	2	.	1	.	.	1	15	3	1	.	6	1	5	.
Halacarida	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.
<u>Temporary</u>																
Nauplii	29	26	47	38	26	2	16	95	130	141	82	8	142	16	40	80
Bivalvia	.	9	.	.	.	3	6	1	2	1	3	1	1	.	3	.
Foraminifera	4	39	2	5	14	.	4	.	18	18	10	31	14	14	60	9
Isopoda	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Cumacea	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.
Nemertina	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Tanaidacea	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Amphipoda	.	.	.	1	.	.	1	.	.	.	.	.	.	.	.	.
Echinoidea	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Ophiuroidea	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	1
Cnidaria other	.	1	.	1	.	.	.	.	.	.	.	.	.	.	.	.
Bryozoa	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Taxa permanent	7	9	7	6	8	5	5	7	10	11	8	6	8	9	9	7
Taxa temporary	3	4	2	5	2	2	4	2	3	3	4	3	3	2	3	3
Taxa total	10	13	9	11	10	7	9	9	13	14	12	9	11	11	12	10

Appendix 1-3. Densities (ind./10 cm^2) of meiobenthic taxa (permanent and temporary) on all MILZON-BENTHOS II 1992 locations.

Station	7-1	7-2	7-3	7-4	7-5	7-6	8-1	8-2	8-3	8-4	8-5	8-6
<u>Permanent</u>												
Nematoda	372	1032	493	487	913	487	393	705	551	1258	1020	758
Copepoda	169	538	30	66	452	90	297	16	144	33	187	242
burrowing	.	7	9	30	8	3	6	2	7	8	18	10
interstitial	169	531	21	36	444	87	291	14	137	25	169	232
Gastrotricha	135	43	59	15	73	5	76	72	32	4	87	226
Turbellaria	23	11	18	12	47	5	23	26	13	5	18	72
Archiannelida	1	.	.	.	.	1	1	.	1	.	.	12
Oligochaeta	.	1	.	1	.	1	.	.	.	.	.	1
Polychaeta	4	9	.	9	1	4	1	2	1	1	.	4
Hydrozoa	26	5	.	2	3	4	18	.	.	2	.	6
Tardigrada	15	77	1	41	17	85	7	3	20	9	14	24
Ostracoda	7	43	.	2	16	10	1	.	.	4	.	11
Halacarida	.	2	.	.	1	1	.	.	.	.	.	.
<u>Temporary</u>												
Nauplii	153	188	18	58	115	65	50	3	29	44	56	44
Bivalvia	.	.	.	1	.	1	1	.	.	7	1	1
Foraminifera	14	5	17	3	31	8	5	1	2	4	10	16
Isopoda	.	.	.	.	.	1	.	.	.	.	.	.
Cumacea	1	2	.	.	.	.	.	.	1	.	.	.
Nemertina	.	.	.	.	.	.	.	.	.	.	.	.
Tanaidacea	.	.	.	.	.	.	.	.	.	.	.	.
Amphipoda	.	.	.	.	.	.	.	.	.	.	.	.
Echinoidea	.	.	.	.	.	.	.	.	.	.	.	.
Ophiuroidea	2	.	.	.	1	.	.	.	.	1	.	.
Cnidaria other	1	.	.	1	.	.	.	.	.	.	1	.
Bryozoa	.	.	.	.	.	.	.	.	.	.	.	1
Taxa permanent	9	10	5	9	9	11	9	6	7	8	5	10
Taxa temporary	5	3	2	4	3	4	3	2	3	4	4	4
Taxa total	14	13	7	13	12	15	12	8	10	12	9	14

Appendix 1-4. Densities (ind./10 cm^2) of meiobenthic taxa (permanent and temporary) on all MILZON-BENTHOS II 1992 locations.

Station	9-1	9-2	9-3	9-4	9-5	10-1	10-2	10-3	10-4	10-5
Permanent										
Nematoda	833	1026	567	1311	956	1548	823	1257	1062	1587
Copepoda	271	381	37	32	9	4	16	19	14	107
burrowing	11	1	6	6	1	4	.	18	13	6
interstitial	260	380	31	26	8	.	16	1	1	101
Gastrotricha	23	77	55	44	58	.	33	5	3	79
Turbellaria	23	32	50	8	34	3	14	3	3	30
Archiannelida	.	.	1	.	.	.	1	.	.	1
Oligochaeta	.	1	.	.	.	.	.	.	.	10
Polychaeta	2	3	.	.	.	.	6	.	.	4
Hydrozoa	.	7	.	2	2	1	4	.	.	.
Tardigrada	34	38	8	75	2	1	9	.	8	39
Ostracoda	.	.	1	.	.	.	.	.	1	5
Halacarida	.	.	.	.	.	.	.	.	.	.
Temporary										
Nauplii	40	82	35	46	9	17	82	33	45	42
Bivalvia	.	.	1	.	.	1	2	6	5	4
Foraminifera	2	34	8	5	1	9	22	15	2	7
Isopoda	.	1	.	.	.	.	.	.	.	.
Cumacea	.	2	.	1	.	.	.	.	.	.
Nemertina	.	3	.	2	1	.	.	.	.	.
Tanaidacea	1	.	.	1	.	1	.	.	.	.
Amphipoda	.	.	.	.	.	.	.	.	.	.
Echinoidea	.	.	.	1	.	.	.	.	.	.
Ophiuroidea	.	.	.	.	.	.	.	.	.	.
Cnidaria other	.	.	.	.	.	.	.	.	1	5
Bryozoa	.	.	.	.	.	.	.	.	.	.
Taxa permanent	6	8	7	6	6	5	8	4	6	9
Taxa temporary	3	5	3	6	3	4	3	3	4	4
Taxa total	9	13	10	12	9	9	11	7	10	13

Appendix 1-5. Densities (ind./10 cm^2) of meiobenthic taxa (permanent and temporary) on all MILZON-BENTHOS II 1993 locations.

Station	11-1	11-2	11-3	12-1	12-2	12-3	13-1	13-2	13-3	14-1	14-2	14-3	14-4	15-1	15-2	15-3
Permanent																
Nematoda	3921	1967	3039	2111	1284	2833	1058	1599	1297	1415	4644	2827	2740	929	2738	2179
Copepoda	18	25	5	11	51	41	8	278	21	59	238	85	58	32	80	109
burrowing	17	25	5	11	48	41	8	2	19	56	238	85	58	27	80	109
interstitial	1	.	.	.	3	.	.	276	2	3	.	.	.	5	.	.
Gastrotricha	.	26	1	9	.	.	5	115	293	7	.	1	.	17	1	.
Turbellaria	5	11	4	18	9	8	13	23	77	5	22	4	6	35	1	4
Archiannelida	.	.	.	.	.	.	.	10	.	.	.	.	.	.	.	.
Oligochaeta	.	1	.	.	.	1	.	12	.	.	.	.	.	1	.	.
Polychaeta	2	.	1	1	2	1	7	27	7	.	3	.	1	.	3	7
Hydrozoa	.	1	.	.	1	.	.	8	.	.	.	.	.	.	.	.
Tardigrada	.	.	.	.	.	.	.	14	1	.	.	.	.	.	.	.
Ostracoda	1	6	.	.	.	5	.	12	1	.	7	4	.	.	5	4
Halacarida	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.
Rotifera	.	.	.	.	.	.	.	14	.	.	.	.	.	.	.	.
Kinorhyncha	3	.	.	.	.	1	.	.	.	.	36	13	6	.	7	3
Priapulida	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Temporary																
Nauplii	40	76	15	16	26	50	20	126	59	34	779	30	167	40	119	343
Bivalvia	5	9	.	3	4	.	1	8	1	5	1	4	.	8	1	9
Foraminifera	13	40	7	18	15	28	.	27	17	.	104	64	56	43	131	69
Isopoda	.	.	2	.	.	.	.	.	1	.	.	.	.	.	.	.
Cumacea	.	1	.	.	1	.	.	.	.	.	.	.	.	.	.	.
Tanaidacea	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.
Amphipoda	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.
Echinoidea	.	.	.	.	.	.	1	2	.	.	.	.	.	.	.	.
Ophiuroidea	.	.	.	.	.	.	.	1	1	.	.	1	.	.	.	.
Gastropoda	.	.	.	.	.	.	.	.	.	.	20	.	.	.	.	.
Cnidaria other	6	.	6	.	.	1	.	.	.	.	2	.	18	.	3	.
Bryozoa	1	10	.	.	2	4	.	.	.	.	.	.	.	.	2	.
Taxa permanent	6	7	5	5	5	7	5	12	7	4	6	6	5	5	7	6
Taxa temporary	5	5	4	3	5	4	3	5	6	2	5	5	3	3	5	3
Taxa total	11	12	9	8	10	11	8	17	13	6	11	11	8	8	12	9

Appendix 1-6. Densities (ind./10 cm^2) of meiobenthic taxa (permanent and temporary) on all MILZON-BENTHOS II 1993 locations.

Station	16-1	16-2	16-3	16-4	17-1	17-2	17-3	18-1	18-2	18-3	19-1	19-2	19-3
<u>Permanent</u>													
Nematoda	4950	5225	6711	3738	1953	2318	1007	4411	867	1729	1005	3673	2320
Copepoda	56	48	68	60	361	36	27	41	44	33	28	29	43
burrowing	54	46	68	43	58	32	25	40	19	31	28	26	43
interstitial	2	2	.	17	303	4	2	1	25	2	.	3	.
Gastrotricha	.	31	.	.	68	1	.	1	58	2	.	7	.
Turbellaria	12	12	3	2	15	15	3	13	22	3	4	.	3
Archiannelida	.	.	.	.	15	.	.	.	.	.	.	.	.
Oligochaeta	.	1	.	.	7	.	.	.	.	.	.	.	.
Polychaeta	2	1	.	6	7	5	2	1	3	1	.	1	1
Hydrozoa	.	.	.	.	8	.	.	.	3	.	.	.	.
Tardigrada	.	1	.	.	120	2	.	.	1	.	.	5	.
Ostracoda	9	8	6	3	19	2	.	2	2	.	2	3	2
Halacarida	.	.	.	.	6	.	1	.	.	.	.	.	.
Rotifera	.	.	1	.	.	.	.	.	.	.	.	.	.
Kinorhyncha	2	9	25	18	19	.	.	.	.	.	1	3	5
Priapulida	.	.	1	.	.	1	.	.	.	.	.	.	.
<u>Temporary</u>													
Nauplii	33	238	160	53	524	51	15	57	18	22	59	56	53
Bivalvia	1	6	5	4	8	6	4	4	2	7	9	8	8
Foraminifera	69	162	32	36	88	149	.	76	5	18	60	228	178
Isopoda	.	.	.	.	.	.	.	.	.	.	.	.	.
Cumacea	.	.	.	.	.	.	.	.	.	.	1	.	.
Tanaidacea	.	.	.	.	.	.	.	.	.	.	.	.	.
Amphipoda	.	.	.	.	.	.	.	.	.	.	.	.	.
Echinoidea	.	.	.	.	1	.	.	.	3	2	.	.	.
Ophiuroidea	1	1	2	1	.	1	.	1	.	.	1	.	1
Gastropoda	.	.	.	.	.	.	.	.	.	.	.	.	.
Cnidaria other	3	15	.	9	.	.	.	7	.	.	.	.	2
Bryozoa	.	3	.	6	.	.	3	2	.	.	.	.	.
Taxa permanent	6	9	7	6	12	8	5	6	8	5	5	7	6
Taxa temporary	5	6	4	6	4	4	3	6	4	4	5	3	5
Taxa total	11	15	11	12	16	12	8	12	12	9	10	10	11

Appendix 2-1. Macrobenthos density and biomass of MILZON-BENTHOS II 1992 (compartment 1).

	Density (ind./m²) :					Biomass (g AFDW/m²) :				
Station	11	12	13	14	15	11	12	13	14	15
Compartment	1	1	1	1	1	1	1	1	1	1
Number	1	2	3	4	5	1	2	3	4	5
Date	280492	280492	280492	280492	280492	280492	280492	280492	280492	280492
Species	15	13	11	11	14	15	13	11	11	14
Density	746.13	570.57	497.42	468.16	570.57	746.13	570.57	497.42	468.16	570.57
Biomass	1.79	1.64	1.40	2.48	26.82	1.79	1.64	1.40	2.48	26.82
Depth	32.8	33.5	26.7	31.7	33.6	32.8	33.5	26.7	31.7	33.6
Polychaeta (12 species) :										
ANAIROSE	14.63	.	.	.	.	.0219	.	.	.	.
AONIPAUC	.	14.63	.	.	.	.	.0015	.	.	.
ARICMINU	.	29.26	29.26	102.41	14.63	.	.0029	.0029	.0205	.0029
CHAESETO	29.26	.	.	.	.	.0117	.	.	.	.
GONIMACU	.	14.63	14.63	.	.	.	.0044	.0293	.	.
MAGEPAPI	.	29.26	29.26	58.52	14.63	.	.7359	.3555	.7783	.0293
NEPHCIRR	146.30	73.15	29.26	102.41	87.78	.4184	.4843	.2619	.1053	.1565
NEPHLONG	29.26	.	.	29.26	.	.1024	.	.	.2824	.
SCOLARMI	29.26	.	29.26	43.89	29.26	.0614	.	.6306	1.2330	.1009
SCOLSQUA	14.63	14.63	.	.	43.89	.4155	.1434	.	.	1.5800
SPIOBOMB	117.04	131.67	14.63	.	160.93	.3628	.1258	.0146	.	.2502
SPIOFILI	73.15	131.67	204.82	.	.	.0146	.0688	.0410	.	.
Mollusca (2 species) :										
MONTFERR	.	.	.	14.63	.	.	.	.	.0073	.
NATIALDE	14.63	14.63	.	.	.	.0073	.0059	.	.	.
Crustacea (8 species) :										
BATHGUIL	.	43.89	14.63	14.63	43.89	.	.0263	.0044	.0073	.0132
GASTSPIN	.	43.89	14.63	29.26	.	.	.0263	.0088	.0176	.
MEGAAGIL	58.52	14.63	43.89	14.63	29.26	.0176	.0044	.0132	.0044	.0088
PONTALTA	14.63	.	.	.	.	.0044	.	.	.	.
PSEULONG	.	.	.	43.89	14.63	.	.	.	.0088	.0029
THIASCUT	.	.	.	.	29.26	.	.	.	.	.2824
UROTBREV	160.93	.	.	.	43.89	.0805	.	.	.	.0219
UROTPOSE	.	.	73.15	.	14.63	.	.	.0366	.	.0044
Echinodermata (2 species) :										
ECHICORD	14.63	.	.	.	29.26	.2165	.	.	.	24.1219
OPHIALBI	14.63	.	.	.	.	.0483	.	.	.	.
Rest (1 species) :										
NEMERTIN	14.63	14.63	.	14.63	29.26	.0073	.0073	.	.0117	.2472

Appendix 2-2. Macrobenthos density and biomass of MILZON-BENTHOS II 1992 (compartment 2).

	Density (ind./m^2) :					Biomass (g AFDW/m^2) :				
Station	21	22	23	24	25	21	22	23	24	25
Compartment	2	2	2	2	2	2	2	2	2	2
Number	6	7	8	9	10	6	7	8	9	10
Date	280492	280492	060592	060592	080592	280492	280492	060592	060592	080592
Species	14	14	11	11	11	14	14	11	11	11
Density	2399.32	819.28	461.88	256.60	577.35	2399.32	819.28	461.88	256.60	577.35
Biomass	5.71	47.71	1.48	1.09	1.30	5.71	47.71	1.48	1.09	1.30
Depth	32.5	30.9	29.7	26.1	31.2	32.5	30.9	29.7	26.1	31.2
Polychaeta (13 species) :										
ANAIROSE	29.26	.	.	.	.	.0585	.	.	.	.
ARICMINU	117.04	14.63	12.83	51.32	115.47	.0293	.0029	.0026	.0103	.0231
CHAESETO	14.63	.	.	.	.	.0029	.	.	.	.
EXOGHEBE	.	.	12.83	.	.	.	.	.0077	.	.
GONIMACU	.	.	.	12.83	12.83	.	.	.	.0398	.0898
MAGEPAPI	14.63	73.15	.	64.15	25.66	.0102	.2414	.	.7647	.3028
NEPHCIRR	87.78	117.04	205.28	12.83	128.30	.1448	.1419	.2925	.0128	.1514
NEPHLONG	29.26	.	.	.	12.83	1.6137	.	.	.	.4478
SCOLARMI	29.26	73.15	38.49	12.83	.	.0146	.9027	.5389	.1347	.
SCOLSQUA	.	87.78	.	.	25.66	.	2.2091	.	.	.0629
SPIOBOMB	1887.27	117.04	.	12.83	89.81	3.2230	.3321	.	.0731	.0180
SPIOFILI	.	.	.	12.83	64.15	.	.	.	.0026	.0128
STHELIMI	14.63	.	.	.	.	.5208	.	.	.	.
Mollusca (1 species) :										
TELLFABU	.	.	12.83	12.83	.	.	.	.0077	.0026	.
Crustacea (8 species) :										
BATHELEG	14.63	14.63	.	.	.	.0044	.0029	.	.	.
BATHGUIL	.	14.63	89.81	.	25.66	.	.0059	.1103	.	.0128
CALLSUBT	.	.	12.83	.	.	.	.	.4980	.	.
GASTSPIN	29.26	14.63	12.83	25.66	.	.0176	.0088	.0077	.0192	.
LEUCLILL	.	.	12.83	.	.	.	.	.0044	.	.
MEGAAGIL	58.52	29.26	25.66	25.66	.	.0176	.0088	.0077	.0077	.
PSEULONG	.	14.63	25.66	.	.	.	.0029	.0051	.	.
UROTBREV	29.26	146.30	.	.	51.32	.0146	.0995	.	.	.0205
Echinodermata (1 species) :										
ECHICORD	.	73.15	.	.	.	.	43.7481	.	.	.
Rest (2 species) :										
HYDROZOA	.	29.26	.	.	.	.	.0044	.	.	.
NEMERTIN	43.89	.	.	12.83	25.66	.0366	.	.	.0231	.1552

Appendix 2-3. Macrobenthos density and biomass of MILZON-BENTHOS II 1992 (compartment 3).

Density (ind./m^2) :						Biomass (g AFDW/m^2) :				
Station	31	32	33	34	35	31	32	33	34	35
Compartment	3	3	3	3	3	3	3	3	3	3
Number	12	13	14	15	16	12	13	14	15	16
Date	060592	060592	060592	060592	060592	060592	060592	060592	060592	060592
Species	14	12	15	17	28	14	12	15	17	28
Density	667.16	731.31	910.93	1154.70	3399.95	667.16	731.31	910.93	1154.70	3399.95
Biomass	3.98	1.34	12.46	3.79	39.43	3.98	1.34	12.46	3.79	39.43
Depth	25.5	29.7	27.4	28.0	35.1	25.5	29.7	27.4	28.0	35.1
<u>Polychaeta (16 species) :</u>										
ANAIGROE	.	.	.	.	25.66	.	.	.	.	.9635
ARICMINU	269.43	25.66	38.49	25.66	.	.0539	.0051	.0077	.0051	.
CHAESETO	.	.	.	25.66	89.81	.	.	.	.0154	.0269
EXOGHEBE	.	12.83	12.83	.	.	.	.0026	.0026	.	.
GONIMACU	.	.	12.83	12.83	38.49	.	.	.0308	.0462	.4144
HARMLUNU	.	.	.	.	76.98	.	.	.	.	.1450
LANICONC	.	.	.	.	166.79	.	.	.	.	14.6467
MAGEPAPI	12.83	12.83	25.66	12.83	12.83	.0885	.0321	.1514	.1180	.0128
NEPHCIRR	141.13	205.28	230.94	89.81	38.49	.1950	.2925	.2476	.1925	.0385
NEPHHOMB	.	.	.	.	12.83	.	.	.	.	2.8842
NEPHLONG	12.83	.	.	12.83	.	1.0957	.	.	.0244	.
POECSERP	.	.	.	.	38.49	.	.	.	.	.0924
SCOLARMI	.	64.15	115.47	551.69	256.60	.	.5530	1.0161	2.4480	.6146
SCOLSQUA	12.83	.	.	38.49	12.83	.0192	.	.	.7480	.0321
SPIOBOMB	12.83	89.81	218.11	12.83	1308.66	.1296	.0860	.4349	.0359	1.9656
SPIOFILI	12.83	.	12.83	38.49	.	.0192	.	.0026	.0077	.
<u>Mollusca (4 species) :</u>										
DONAVITT	38.49	.	.	.	.	2.3286	.	.	.	.
MONTFERR	.	.	.	.	51.32	.	.	.	.	.0192
NATIALDE	.	.	.	25.66	76.98	.	.	.	.0128	.3759
TELLFABU	.	.	.	.	51.32	.	.	.	.	2.2940
<u>Crustacea (11 species) :</u>										
ATYLSWAM	.	.	.	.	12.83	.	.	.	.	.0051
BATHELEG	.	.	.	.	38.49	.	.	.	.	.0115
BATHGUIL	25.66	38.49	51.32	230.94	295.09	.0154	.0192	.0205	.1091	.0885
LEUCLILL	.	.	12.83	.	51.32	.	.	.0051	.	.0205
MEGAAGIL	25.66	12.83	.	12.83	38.49	.0077	.0038	.	.0038	.0115
ORCHHUMI	25.66	.	.	.	.	.0128	.	.	.	.
PERILONG	.	.	.	.	12.83	.	.	.	.	.0038
PONTALTA	.	12.83	.	.	.	.	.0038	.	.	.
PSEULONG	38.49	.	.	25.66	25.66	.0115	.	.	.0026	.0051
UROTBREV	12.83	192.45	76.98	.	.	.0038	.1552	.0308	.	.
UROTPOSE	.	.	25.66	.	449.05	.	.	.0077	.	.1347
<u>Echinodermata (3 species) :</u>										
ECHICORD	.	.	25.66	.	25.66	.	.	10.4937	.	13.9975
ECHIPUSI	.	25.66	.	12.83	76.98	.	.0398	.	.0128	.0411
OPHIALBI	.	.	.	12.83	38.49	.	.	.	.0013	.4940
<u>Rest (2 species) :</u>										
HYDROZOA	.	.	12.83	.	12.83	.	.	.0013	.	.0026
NEMERTIN	25.66	38.49	38.49	12.83	64.15	.0026	.1488	.0026	.0038	.0834

Appendix 2-4. Macrobenthos density and biomass of MILZON-BENTHOS II 1992 (compartment 4).

	Density (ind./m^2) :					Biomass (g AFDW/m^2) :				
Station	41	42	43	44	45	41	42	43	44	45
Compartment	4	4	4	4	4	4	4	4	4	4
Number	18	19	20	21	22	18	19	20	21	22
Date	070592	060592	070592	070592	070592	070592	060592	070592	070592	070592
Species	17	19	19	26	19	17	19	19	26	19
Density	1667.90	1154.70	2129.78	1809.03	1295.83	1667.90	1154.70	2129.78	1809.03	1295.83
Biomass	45.49	3.01	5.16	18.10	1.47	45.49	3.01	5.16	18.10	1.47
Depth	30.4	31.4	28.4	28.2	31.2	30.4	31.4	28.4	28.2	31.2
Polychaeta (19 species) :										
ANAIROSE	.	.	.	12.83	12.83	.	.	.	.0192	.0103
ARICMINU	12.83	51.32	.	.	51.32	.0013	.0154	.	.	.0321
CHAESETO	.	.	25.66	128.30	.	.	.	.0321	.0205	.
ETEOLONG	12.83	.	.	.	.	.0128	.	.	.	.
EUMISANG	.	.	12.83	.	.	.	.	.0128	.	.
GONIMACU	.	12.83	.	.	.	.	.0885	.	.	.
HARMLUNU	.	12.83	25.66	38.49	.	.	.0192	.0257	.0500	.
LANICONC	51.32	12.83	51.32	89.81	.	.5145	.7826	1.0572	3.0587	.
MAGEPAPI	51.32	12.83	141.13	102.64	.	.2014	.0962	.6915	.5312	.
NEPHCIRR	.	25.66	64.15	89.81	102.64	.	.0218	.1694	.1168	.3092
NEPHHOMB	.	.	.	12.83	.	.	.	.	1.7936	.
NOTOLATE	.	.	.	12.83	.	.	.	.	.2053	.
POECSERP	.	.	.	38.49	.	.	.	.	.0321	.
SCOLARMI	51.32	205.28	.	12.83	192.45	.0334	1.5858	.	.7287	.5466
SCOLSQUA	.	12.83	.	.	.	.	.0718	.	.	.
SIGAMATH	.	.	12.83	.	.	.	.	.2925	.	.
SPIOBOMB	166.79	.	192.45	603.01	615.84	.0654	.	.1617	.0282	.1848
SPIOFILI	.	.	.	.	38.49	.	.	.	.	.0128
STREWEBS	.	.	.	12.83	.	.	.	.	.0013	.
Mollusca (3 species) :										
DONAVITT	64.15	12.83	12.83	.	.	9.5891	.0064	1.9925	.	.
NATIALDE	12.83	12.83	25.66	12.83	12.83	.0064	.0064	.0128	.0064	.0064
TELLFABU	.	25.66	115.47	141.13	.	.	.0064	.1694	1.0867	.
Crustacea (14 species) :										
APHEOVAL	.	.	.	12.83	.	.	.	.	.0051	.
ATYLFALC	.	.	.	.	12.83	.	.	.	.	.0051
BATHELEG	.	115.47	538.86	51.32	25.66	.	.0462	.1078	.0257	.0128
BATHGUIL	166.79	513.20	487.54	76.98	76.98	.1001	.2053	.2951	.0552	.0770
DIASRATH	.	.	.	12.83	.	.	.	.	.0128	.
HIPPDENT	.	.	12.83	12.83	12.83	.	.	.0051	.0051	.0051
MEGAAGIL	12.83	38.49	12.83	25.66	38.49	.0038	.0115	.0038	.0077	.0115
PERILONG	12.83	.	.	25.66	.	.0051	.	.	.0077	.
PONTALTA	12.83	.	102.64	.	12.83	.0038	.	.0308	.	.0038
PROCNOUV	.	.	.	.	12.38	.	.	.	.	.0505
PSEULONG	12.83	12.83	.	25.66	12.83	.0013	.0026	.	.0103	.0026
THIASCUT	25.66	.	.	.	.	.4952	.	.	.	.
UROTBREV	.	25.66	.	.	.	.	.0154	.	.	.
UROTPOSE	795.46	.	230.94	166.79	.	.0282	.	.0398	.1334	.
Echinodermata (3 species) :										
ECHICORD	141.13	.	.	12.83	.	34.3523	.	.	10.0651	.
ECHIPUSI	.	12.83	51.32	25.66	12.83	.	.0026	.0449	.0321	.0026
OPHIALBI	.	12.83	.	.	.	.	.0026	.	.	.
Rest (3 species) :										
ENTEROPN	.	.	.	.	12.83	.	.	.	.	.0013
NEMERTIN	64.15	25.66	12.83	51.32	25.66	.0757	.0231	.0128	.0654	.1732
PHORONID	.	.	.	.	12.83	.	.	.	.	.0192

Appendix 2-5. Macrobenthos density and biomass of MILZON-BENTHOS II 1992 (compartment 5).

	Density (ind.m²) :					Biomass (g AFDW/m²) :				
Station	51	52	53	54	55	51	52	53	54	55
Compartment	5	5	5	5	5	5	5	5	5	5
Number	23	24	25	26	27	23	24	25	26	27
Date	070592	070592	070592	070592	070592	070592	070592	070592	070592	070592
Species	23	24	23	21	16	23	24	23	21	16
Density	1398.47	1141.87	962.25	718.48	603.01	1398.47	1141.87	962.25	718.48	603.01
Biomass	14.82	26.96	14.50	3.23	1.94	14.82	26.96	14.50	3.23	1.94
Depth	26.1	27.6	28.3	29.8	27.4	26.1	27.6	28.3	29.8	27.4
Polychaeta (25 species) :										
ANAIROSE	.	12.83	.	12.83	.	.	.0064	.	.0051	.
AONIPAUC	.	.	.	12.83	.	.	.	.	.0038	.
ARICMINU	.	.	.	12.83	25.66	.	.	.	.0064	.0128
CHAESETO	12.83	102.64	12.83	.	.	.0064	.0026	.0038	.	.
ETEOLONG	.	.	.	12.83	.	.	.	.	.0128	.
EUMISANG	.	25.66	.	.	.	.	.0192	.	.	.
EXOGNAID	.	.	.	76.98	76.98	.	.	.	.0077	.0077
GONIMACU	12.83	25.66	12.83	25.66	12.83	.0744	.1706	.0192	.0269	.0128
HARMLONG	.	.	.	12.83	12.83	.	.	.	.0128	.0257
HARMLUNU	.	25.66	.	.	.	.	.0488	.	.	.
HESIAUGE	.	.	.	25.66	.	.	.	.	.0026	.
LANICONC	.	51.32	.	.	.	.	1.2650	.	.	.
MAGEPAPI	218.11	166.79	128.30	.	38.49	.8352	.2758	.3233	.	.5145
NEPHCIRR	38.49	.	.	38.49	64.15	.0488	.	.	.1565	.0872
NEPHHOMB	12.83	.	12.83	.	.	.1963	.	.1232	.	.
NOTOLATE	.	25.66	25.66	.	.	.	.8237	.6274	.	.
OPHELIMA	.	.	.	25.66	25.66	.	.	.	.0385	.0192
POECSERP	.	.	230.94	.	.	.	.	.0872	.	.
SCOLARMI	12.83	.	51.32	12.83	12.83	.0231	.	.0488	.0115	.0180
SCOLBONN	.	.	.	.	38.49	.	.	.	.	1.0880
SCOLSQUA	.	25.66	.	.	.	.	.0192	.	.	.
SIGAMATH	12.83	38.49	12.83	.	.	.2361	.5453	.0462	.	.
SPIOBOMB	166.79	.	102.64	25.66	76.98	.0629	.	.0642	.0064	.0064
SPIOFILI	.	.	.	102.64	128.30	.	.	.	.0180	.0128
STREWEBS	.	.	.	.	12.83	.	.	.	.	.0013
Mollusca (8 species) :										
DONAVITT	.	.	.	12.83	.	.	.	.	.8622	.
DOSILUPI	.	.	.	12.83	.	.	.	.	1.8398	.
MONTFERR	38.49	179.62	51.32	.	.	.0629	.0847	.0103	.	.
MYSEBIDE	.	12.83	.	.	.	.	.0026	.	.	.
NATIALDE	.	12.83	38.49	.	.	.	.0026	.0192	.	.
SPISSUBT	12.83	.	.	.	.	6.3881	.	.	.	.
TELLFABU	38.49	64.15	25.66	.	.	.1129	.0282	.0334	.	.
VENUSTRI	.	.	12.83	.	.	.	.	2.9188	.	.
Crustacea (16 species) :										
APHEOVAL	.	12.83	.	.	.	.	.0077	.	.	.
BATHELEG	51.32	38.49	51.32	.	.	.0205	.0154	.0205	.	.
BATHGUIL	577.35	25.66	12.83	.	.	.2502	.0128	.0064	.	.
CALLSUBT	.	.	12.83	.	.	.	.	.3759	.	.
CAPRELLI	.	25.66	.	.	.	.	.0077	.	.	.
DIASRATH	12.83	.	.	12.83	.	.0077	.	.	.0205	.
EBALCRAN	.	.	12.83	.	.	.	.	.0154	.	.
HIPPDENT	12.83	.	.	.	.	.0051	.	.	.	.
LEUCLILL	.	12.83	25.66	.	.	.	.0051	.0205	.	.
MEGAAGIL	.	.	.	153.96	25.66	.	.	.	.0616	.0103
PERILONG	12.83	.	.	.	.	.0038	.	.	.	.
PINNPISU	12.83	.	12.83	.	.	.0192	.	.0192	.	.
PONTALTA	64.15	38.49	12.83	.	12.83	.0192	.0115	.0038	.	.0038
PSEULONG	12.83	.	.	12.83	12.83	.0013	.	.	.0051	.0038
SIPHKROY	.	.	12.83	.	.	.	.	.0038	.	.
UROTPOSE	25.66	141.13	.	.	.	.0128	.0847	.	.	.
Echinodermata (3 species) :										
ECHICORD	12.83	51.32	12.83	.	.	5.9416	23.5046	9.6187	.	.
ECHIPUSI	12.83	.	.	76.98	.	.0026	.	.	.0372	.
OPHITEXT	12.83	12.83	.	.	.	.4888	.0064	.	.	.
Rest (2 species) :										
NEMERTIN	.	12.83	76.98	12.83	25.66	.	.0051	.0949	.0834	.1193
OLIGOCHA	.	.	.	38.49	.	.	.	.	.0090	.

Appendix 2-6. Macrobenthos density and biomass of MILZON-BENTHOS II 1992 (compartment 6).

Density (ind./m²) :							Biomass (g AFDW/m²) :					
Station	61	62	63	64	65	66	61	62	63	64	65	66
Compartment	6	6	6	6	6	6	6	6	6	6	6	6
Number	28	29	30	31	32	33	28	29	30	31	32	33
Date	290492	180592	290492	180592	210592	290492	290492	180592	290492	180592	210592	290492
Species	16	11	14	16	11	15	16	11	14	16	11	15
Density	804.65	603.01	907.06	538.86	500.37	760.76	804.65	603.01	907.06	538.86	500.37	760.76
Biomass	20.75	9.68	94.14	11.35	13.36	14.16	20.75	9.68	94.14	11.35	13.36	14.16
Depth	32.4	34.0	34.5	41.2	34.7	40.5	32.4	34.0	34.5	41.2	34.7	40.5
Polychaeta (13 species) :												
ARICMINU	14.63	.	14.63	12.83	51.32	14.63	.0044	.	.0059	.0064	.0205	.0073
ETEOFLAV	.	12.83	.	.	.	.	.	.0718	.	.	.	.
HARMLONG	.	.	29.26	.	12.83	14.63	.	.	.0219	.	.0077	.0146
MAGEPAPI	58.52	.	58.52	.	.	.	.9627	.	.2546	.	.	.
NEPHCIRR	.	76.98	73.15	89.81	128.30	43.89	.	.1771	.2063	.3785	.1103	.0644
NEPHHOMB	.	.	.	.	.	14.63	.	.	.	.	.	1.4806
NEPHLONG	73.15	.	.	12.83	.	.	.1873	.	.	.1373	.	.
SCOLARMI	29.26	38.49	.	64.15	25.66	58.52	.4155	.6004	.	1.5358	.7108	.5413
SCOLSQUA	14.63	25.66	.	.	.	.	.4155	.2155	.	.	.	.
SPIOBOMB	307.23	179.62	29.26	76.98	115.47	87.78	.0146	.0359	.0146	.0154	.0423	.0059
SPIOFILI	14.63	12.83	.	12.83	89.81	.	.0029	.0051	.	.0026	.0180	.
Mollusca (2 species) :												
MONTFERR	.	.	.	12.83	.	.	.	.	.	.0051	.	.
NATIALDE	.	.	.	12.83	.	.	.	.	.	.0038	.	.
Crustacea (12 species) :												
ATYLSWAM	.	12.83	.	.	.	.	.	.0051	.	.	.	.
BATHELEG	.	.	14.63	12.83	.	.	.	.	.0059	.0064	.	.
BATHGUIL	14.63	.	14.63	.	12.83	.	.0278	.	.0366	.	.0205	.
GASTSPIN	.	.	.	38.49	12.83	.	.	.	.	.1578	.0038	.
HIPPDENT	14.63	.	.	.	.	14.63	.0044	.	.	.	.	.0044
LEUCLILL	.	.	14.63	.	.	.	.	.	.0088	.	.	.
MEGAAGIL	58.52	25.66	14.63	64.15	.	14.63	.0219	.0103	.0059	.0257	.	.0044
PERILONG	.	.	.	.	.	58.52	.	.	.	.	.	.0176
PONTALTA	14.63	.	.	.	.	.	.0044	.	.	.	.	.
PSEULONG	29.26	141.13	43.89	12.83	.	14.63	.0088	.0192	.0132	.0038	.	.0029
UROTBREV	102.41	64.15	29.26	64.15	12.83	102.41	.0863	.0667	.0146	.0385	.0077	.0688
UROTPOSE	.	.	453.53	.	.	263.34	.	.	.1653	.	.	.1551
Echinodermata (2 species) :												
ECHICORD	14.63	12.83	87.78	12.83	12.83	29.26	18.1895	8.4768	93.3789	9.0092	12.1654	11.7918
ECHIPUSI	.	.	.	25.66	.	.	.	.	.	.0128	.	.
Rest (3 species) :												
ANTHOZOA	.	.	29.26	.	.	14.63	.	.	.0088	.	.	.0029
NEMERTIN	14.63	.	.	12.83	25.66	14.63	.3892	.	.	.0064	.2540	.0029
OLIGOCHA	29.26	.	.	.	.	.	.0117	.	.	.	.	.

Appendix 2-7. Macrobenthos density and biomass of MILZON-BENTHOS II 1992 (compartment 7).

	Density (ind./m^2) :						Biomass (g AFDW/m^2) :					
Station	71	72	73	74	75	76	71	72	73	74	75	76
Compartment	7	7	7	7	7	7	7	7	7	7	7	7
Number	34	35	36	37	38	39	34	35	36	37	38	39
Date	210592	290492	290492	290492	210592	080592	210592	290492	290492	290492	210592	080592
Species	13	15	15	24	22	18	13	15	15	24	22	18
Density	397.73	555.94	570.57	2413.95	910.93	667.16	397.73	555.94	570.57	2413.95	910.93	667.16
Biomass	0.93	1.40	3.89	14.16	28.69	1.30	0.93	1.40	3.89	14.16	28.69	1.30
Depth	19.3	32.6	33.7	41.2	37.4	33.3	19.3	32.6	33.7	41.2	37.4	33.3
<u>Polychaeta (22 species) :</u>												
ANAIGROE	.	.	.	14.63	.	.	.	.	.	.0146	.	.
ARICMINU	.	14.63	14.63	.	.	12.83	.	.0073	.0073	.	.	.0038
CHAESETO	.	.	14.63	102.41	38.49	.	.	.	.0073	.0205	.0642	.
ETEOLONG	.	.	.	14.63	.	.	.	.	.	.0219	.	.
EXOGHEBE	.	.	.	29.26	.	.	.	.	.	.0029	.	.
GONIMACU	.	.	14.63	14.63	12.83	.	.	.	.0527	.0980	.0218	.
GYPTCAPE	.	.	.	43.89	.	.	.	.	.	.0263	.	.
HARMLUNU	.	.	.	43.89	12.83	.	.	.	.	.0512	.0128	.
HESIAUGE	.	43.89	.	.	.	12.83	.	.0044	.	.	.	.0013
NEPHCIRR	.	58.52	131.67	190.19	141.13	38.49	.	.0571	.2414	.2911	.2104	.2104
NEPHHOMB	.	.	.	29.26	.	.	.	.	.	.2546	.	.
NEPHLONG	.	14.63	.	.	.	.	.	.3892	.	.	.	.
PECTKORE	.	.	.	14.63	.	.	.	.	.	.4184	.	.
POECSERP	.	.	.	14.63	.	12.83	.	.	.	.0746	.	.0654
OPHELIMA	12.83	.	.	14.63	.	25.66	.0192	.	.	.0219	.	.0257
SCOLARMI	38.49	58.52	14.63	.	12.83	102.64	.2322	.6203	.0980	.	.4824	.2874
SCOLBONN	12.83	.	.	.	.	.	.1257	.	.	.	.	.
SCOLSQUA	.	.	.	.	.	25.66	.	.	.	.	.	.3990
SPIOBOMB	12.83	.	14.63	131.67	.	153.96	.0038	.	.0073	.0644	.	.0513
SPIOFILI	25.66	58.52	.	.	282.26	25.66	.0077	.0439	.	.	.0449	.0077
STHELIMI	12.83	.	.	.	.	.	.3580	.	.	.	.	.
STREWEBS	.	14.63	.	.	.	12.83	.	.0015	.	.	.	.0013
<u>Mollusca (3 species) :</u>												
ENSIENSI	.	.	14.63	.	.	.	.	.	.7330	.	.	.
MYSEBIDE	.	.	.	.	12.83	12.83	.	.	.	.	.0038	.0038
NATIALDE	.	.	.	.	12.83	.	.	.	.	.	.0064	.
<u>Crustacea (18 species) :</u>												
AMPHNEAP	.	.	.	14.63	.	.	.	.	.	.0059	.	.
ATYLSWAM	.	.	.	14.63	.	.	.	.	.	.0059	.	.
BATHELEG	.	14.63	43.89	.	12.83	.	.	.0059	.0176	.	.0064	.
BATHGUIL	12.83	58.52	14.63	.	25.66	38.49	.0282	.0629	.0322	.	.0192	.0449
CALLSUBT	.	.	.	87.78	.	.	.	.	.	11.8942	.	.
CRANCRAN	12.83	.	.	.	.	.	.0192	.	.	.	.	.
EURYSPIN	25.66	.	.	.	.	.	.0539	.	.	.	.	.
GASTSPIN	51.32	73.15	14.63	.	25.66	12.83	.0436	.0819	.0658	.	.0372	.1052
HIPPDENT	.	.	.	14.63	.	.	.	.	.	.0059	.	.
LEUCLILL	.	.	.	14.63	.	.	.	.	.	.0059	.	.
MEGAAGIL	.	43.89	14.63	14.63	12.83	64.15	.	.0176	.0059	.0059	.0051	.0257
METOBORE	.	.	.	.	.	12.83	.	.	.	.	.	.0073
PERILONG	.	.	.	.	12.83	.	.	.	.	.	.0051	.
PHOXFEMO	.	.	.	.	12.83	.	.	.	.	.	.0026	.
PSEULONG	141.13	58.52	29.26	.	38.49	25.66	.0282	.0176	.0059	.	.0077	.0051
THIASCUT	.	.	.	.	12.83	.	.	.	.	.	.6274	.
UROTBREV	.	14.63	190.19	29.26	64.15	51.32	.	.0088	.0775	.0117	.0539	.0308
UROTPOSE	.	.	.	.	25.66	.	.	.	.	.	.0128	.
<u>Echinodermata (3 species) :</u>												
ECHICORD	.	.	14.63	.	89.81	.	.	.	2.5295	.	26.8968	.
ECHIPUSI	.	14.63	.	131.67	12.83	.	.	.0585	.	.1302	.0051	.
OPHIALBI	25.66	.	.	395.01	25.66	.	.0064	.	.	.2677	.0077	.
<u>Rest (2 species) :</u>												
NEMERTIN	12.83	14.63	29.26	.	12.83	25.66	.0026	.0234	.0044	.	.1565	.0282
PHORONID	.	.	.	1024.10	.	.	.	.	.	.4550	.	.

Appendix 2-8. Macrobenthos density and biomass of MILZON-BENTHOS II 1992 (compartment 8).

	Density (ind./m²) :						Biomass (g AFDW/m²) :					
Station	81	82	83	84	85	86	81	82	83	84	85	86
Compartment	8	8	8	8	8	8	8	8	8	8	8	8
Number	41	42	43	44	45	46	41	42	43	44	45	46
Date	290492	300492	070592	290492	290492	300492	290492	300492	070592	290492	290492	300492
Species	14	19	19	15	17	18	14	19	19	15	17	18
Density	482.79	877.80	1372.81	585.20	950.95	672.98	482.79	877.80	1372.81	585.20	950.95	672.98
Biomass	8.64	21.63	8.28	19.29	1.16	1.99	8.64	21.63	8.28	19.29	1.16	1.99
Depth	25.4	33.4	28.1	41.3	34.6	34.2	25.4	33.4	28.1	41.3	34.6	34.2
<u>Polychaeta (15 species) :</u>												
ARICMINU	.	14.63	12.83	.	190.19	58.52	.	.0073	.0051	.	.0161	.0117
CHAESETO	.	14.63	.	.	14.63	.	.	.0044	.	.	.0219	.
ETEOFOLI	.	14.63	.	.	14.63	.	.	.0293	.	.	.0366	.
GONIMACU	.	.	12.83	.	.	.	.	.	.0411	.	.	.
HARMLONG	.	.	.	14.63	.	.	.	.	.	.0059	.	.
HESIAUGE	14.63	.	.	.	.	.	.0015	.	.	.	.	.
LANICONC	.	.	12.83	.	.	14.63	.	.	.8378	.	.	.4857
MAGEPAPI	.	.	25.66	.	.	.	.	.	.1065	.	.	.
NEPHCIRR	102.41	190.19	153.96	146.30	43.89	29.26	.2911	.1595	.3015	.2414	.1214	.0454
SCOLARMI	43.89	87.78	102.64	29.26	87.78	117.04	.0775	.5194	.6056	.1346	.4940	1.0665
SCOLBONN	14.63	.	.	.	.	.	.0117	.	.	.	.	.
SPIOBOMB	29.26	29.26	25.66	58.52	43.89	.	.0468	.0146	.0154	.0146	.0088	.
SPIOFILI	.	.	12.83	.	.	.	.	.	.0026	.	.	.
STHELIMI	.	14.63	.	.	.	.	.	.6042	.	.	.	.
STREWEBS	.	.	.	.	.	14.63	.	.	.	.	.	.0015
<u>Mollusca (5 species) :</u>												
ENSIENSI	.	.	12.83	.	.	.	.	.	.7929	.	.	.
MONTFERR	.	14.63	.	.	14.63	.	.	.0044	.	.	.0029	.
MYSEBIDE	.	.	.	14.63	.	.	.	.	.	.0029	.	.
NATIALDE	.	14.63	.	29.26	73.15	29.26	.	.0117	.	.0117	.0629	.0146
TELLFABU	.	14.63	.	.	87.78	.	.	.0073	.	.	.1551	.
<u>Crustacea (15 species) :</u>												
BATHELEG	43.89	29.26	436.22	.	58.52	131.67	.0219	.0088	.0975	.	.0234	.0336
BATHGUIL	.	43.89	282.26	.	.	.	.	.0219	.2207	.	.	.
DIASRUGO	.	.	.	.	.	14.63	.	.	.	.	.	.0219
EBALCRAN	.	.	.	.	.	14.63	.	.	.	.	.	.0073
GASTSPIN	14.63	.	.	.	.	14.63	.0658	.	.	.	.	.0658
HIPPDENT	.	.	.	14.63	14.63	.	.	.	.	.0044	.0044	.
LEUCINCI	.	.	.	14.63	.	.	.	.	.	.0146	.	.
LEUCLILL	14.63	.	.	.	.	.	.0073	.	.	.	.	.
MEGAAGIL	43.89	29.26	12.83	29.26	.	29.26	.0176	.0117	.0051	.0117	.	.0117
PERILONG	.	.	.	14.63	.	.	.	.	.	.0059	.	.
PONTALTA	.	29.26	76.98	14.63	14.63	14.63	.	.0088	.0205	.0059	.0059	.0059
PSEULONG	87.78	43.89	51.32	.	14.63	58.52	.0176	.0088	.0103	.	.0044	.0176
THIASCUT	14.63	.	25.66	.	.	.	.8690	.	.0975	.	.	.
UROTBREV	29.26	190.19	38.49	14.63	73.15	58.52	.0146	.0995	.0257	.0088	.0336	.0293
UROTPOSE	.	58.52	.	.	.	14.63	.	.0307	.	.	.	.0059
<u>Echinodermata (3 species) :</u>												
ECHICORD	14.63	29.26	25.66	73.15	.	.	7.1936	20.0592	4.9575	18.5596	.	.
ECHIPUSI	.	14.63	25.66	.	73.15	14.63	.	.0146	.0192	.	.0658	.0439
OPHIALBI	.	.	.	87.78	102.41	14.63	.	.	.	.2575	.0293	.0234
<u>Rest (1 species) :</u>												
NEMERTIN	14.63	.	25.66	29.26	29.26	29.26	.0073	.	.1168	.0059	.0688	.0966

Appendix 2-9. Macrobenthos density and biomass of MILZON-BENTHOS II 1992 (compartment 9).

	Density (ind./m²) :					Biomass (g AFDW/m²) :				
Station	91	92	93	94	95	91	92	93	94	95
Compartment	9	9	9	9	9	9	9	9	9	9
Number	47	48	49	50	51	47	48	49	50	51
Date	300492	300492	300492	300492	070592	300492	300492	300492	300492	070592
Species	17	13	17	19	21	17	13	17	19	21
Density	672.98	643.72	629.09	2165.24	1526.77	672.98	643.72	629.09	2165.24	1526.77
Biomass	6.72	1.15	0.79	4.27	23.90	6.72	1.15	0.79	4.27	23.90
Depth	29.5	27.9	26.9	29.5	28.1	29.5	27.9	26.9	29.5	28.1
Polychaeta (17 species) :										
ARICMINU	14.63	29.26	29.26	14.63	.	.0073	.0146	.0117	.0044	.
CHAESETO	.	14.63	.	14.63	25.66	.	.0102	.	.0015	.0192
ETEOFOLI	.	.	.	14.63	.	.	.	.	.0073	.
GONIMACU	29.26	29.26	14.63	43.89	.	.1097	.1697	.1112	.2341	.
HARMLUNU	.	.	.	.	12.83	.	.	.	.	.0103
LANICONC	.	.	.	.	12.83	.	.	.	.	.0783
MAGEPAPI	.	14.63	.	131.67	320.75	.	.0585	.	.4330	1.4857
NEPHCIRR	102.41	102.41	43.89	29.26	38.49	.2165	.1024	.1478	.1565	.0398
NEPHHOMB	.	.	.	14.63	.	.	.	.	.5238	.
NEPHLONG	29.26	.	58.52	.	.	.1756	.	.0702	.	.
OPHELIMA	29.26	.	.	.	.	.0293	.	.	.	.
SCOLARMI	14.63	102.41	14.63	29.26	12.83	.1200	.6832	.0088	.0293	.0128
SCOLBONN	14.63	.	14.63	.	.	.0702	.	.1156	.	.
SIGAMATH	.	.	.	.	12.83	.	.	.	.	.5902
SPIOBOMB	.	14.63	.	614.46	153.96	.	.0146	.	.2750	.0475
SPIOFILI	.	.	14.63	.	.	.	.	.0044	.	.
STHELIMI	.	.	29.26	14.63	.	.	.	.1287	.7871	.
Mollusca (4 species) :										
DONAVITT	.	.	.	14.63	.	.	.	.	.0073	.
MONTFERR	.	.	.	.	64.15	.	.	.	.	.1398
NATIALDE	.	.	14.63	29.26	38.49	.	.	.0102	.0293	.0385
TELLFABU	14.63	.	.	365.75	115.47	.0073	.	.	1.4601	.1232
Crustacea (12 species) :										
ATYLFALC	.	.	14.63	.	.	.	.	.0073	.	.
BATHELEG	117.04	43.89	73.15	629.09	205.28	.0468	.0176	.0336	.1624	.0500
BATHGUIL	14.63	.	.	.	102.64	.0059	.	.	.	.0718
CORYCASS	.	.	.	.	12.83	.	.	.	.	10.1986
DIASBRAD	.	.	29.26	.	.	.	.	.0219	.	.
GASTSPIN	.	14.63	29.26	.	.	.	.0146	.0205	.	.
MEGAAGIL	14.63	43.89	.	43.89	51.32	.0059	.0176	.	.0176	.0205
PONTALTA	14.63	29.26	160.93	.	.	.0059	.0088	.0585	.	.
PONTAREN	.	.	.	58.52	38.49	.	.	.	.0234	.0154
PSEULONG	43.89	146.30	58.52	29.26	89.81	.0132	.0117	.0117	.0059	.0180
UROTBREV	131.67	58.52	14.63	.	.	.1185	.0293	.0073	.	.
UROTPOSE	58.52	.	.	.	166.79	.0176	.	.	.	.0667
Echinodermata (2 species) :										
ECHICORD	14.63	.	.	.	12.83	5.7598	.	.	.	10.8593
ECHIPUSI	.	.	.	43.89	25.66	.	.	.	.0219	.0154
Rest (1 species) :										
NEMERTIN	14.63	.	14.63	29.26	12.83	.0059	.	.0176	.0863	.0013

Appendix 2-10. Macrobenthos density and biomass of MILZON-BENTHOS II 1992 (compartment 10).

	Density (ind./m²) :					Biomass (g AFDW/m²) :				
Station	101	102	103	104	105	101	102	103	104	105
Compartment	10	10	10	10	10	10	10	10	10	10
Number	52	53	54	55	56	52	53	54	55	56
Date	300492	200592	200592	200592	070592	300492	200592	200592	200592	070592
Species	24	16	18	17	33	24	16	18	17	33
Density	1492.26	1257.34	1372.81	808.29	987.91	1492.26	1257.34	1372.81	808.29	987.91
Biomass	11.29	1.53	7.27	70.71	25.52	11.29	1.53	7.27	70.71	25.52
Depth	34.4	26.7	28.2	26.6	27.4	34.4	26.7	28.2	26.6	27.4
Polychaeta (23 species) :										
ANAIROSE	.	.	.	.	12.83	.	.	.	.	.0103
ARICMINU	.	89.81	.	.	25.66	.	.0180	.	.	.0103
CHAESETO	29.26	38.49	102.64	.	12.83	.0146	.0115	.0128	.	.0192
ETEOLONG	.	.	12.83	.	.	.	.	.0192	.	.
EUMISANG	117.04	.	.	12.83	76.98	.0878	.	.	.0128	.0077
GLYCNORD	.	.	12.83	.	.	.	.	.0436	.	.
GONIMACU	.	38.49	.	12.83	12.83	.	.1771	.	.0462	.0744
GYPTCAPE	14.63	.	.	.	.	.0219	.	.	.	.
HARMLUNU	117.04	.	.	.	76.98	.8573	.	.	.	.1591
HESIAUGE	.	.	.	.	38.49	.	.	.	.	.0038
LANICONC	219.45	12.83	25.66	.	128.30	.7856	.8237	.0192	.	6.6716
MAGEPAPI	73.15	38.49	603.01	89.81	38.49	.0512	.0565	.9379	.1681	.1142
NEPHCIRR	.	.	.	51.32	38.49	.	.	.	.0821	.2540
NEPHHOMB	73.15	25.66	64.15	.	.	3.6692	.1039	.6223	.	.
NERELONG	.	.	.	.	12.83	.	.	.	.	.0975
NOTOLATE	.	.	.	.	12.83	.	.	.	.	.0475
OPHELIMA	.	.	.	.	12.83	.	.	.	.	.0128
POECSERP	277.97	.	12.83	.	.	.1858	.	.0115	.	.
SCOLARMI	.	.	.	.	25.66	.	.	.	.	.0192
SPIOBOMB	58.52	153.96	141.13	102.64	89.81	.0322	.1001	.1142	.0718	.0860
SPIOFILI	.	.	.	.	12.83	.	.	.	.	.0090
STHELIMI	29.26	12.83	12.83	.	.	.0263	.0603	.0269	.	.
STREWEBS	.	.	.	.	12.83	.	.	.	.	.0013
Mollusca (8 species) :										
ABRAALBA	14.63	.	.	.	.	.0059	.	.	.	.
CYLICYLI	14.63	.	12.83	.	.	.0073	.	.0051	.	.
ENSISILI	.	.	.	12.83	25.66	.	.	.	69.8812	17.3487
MONTFERR	102.41	.	.	12.83	.	.0293	.	.	.0038	.
NATIALDE	29.26	.	76.98	12.83	12.83	.1258	.	.0269	.0038	.0064
NUCUTURG	.	.	38.49	.	.	.	.	.4516	.	.
TELLFABU	.	64.15	115.47	25.66	.	.	.0103	.0385	.1681	.
VENUSTRI	.	.	.	.	12.83	.	.	.	.	.2540
Crustacea (20 species) :										
AORATYPI	29.26	.	.	.	.	.0293	.	.	.	.
ARGIHAMA	14.63	.	.	.	.	.0059	.	.	.	.
ATYLSWAM	102.41	.	.	.	25.66	.0249	.	.	.	.0128
BATHELEG	.	410.56	.	128.30	.	.	.0565	.	.0513	.
BATHGUIL	.	38.49	.	64.15	.	.	.0282	.	.0257	.
BATHTENU	.	.	89.81	.	12.83	.	.	.0359	.	.0051
CAPRELLI	.	.	12.83	12.83	.	.	.	.0038	.0026	.
EBALCRAN	14.63	.	.	.	.	.0219	.	.	.	.
HIPPDENT	.	.	.	12.83	12.83	.	.	.	.0038	.0038
MEGAAGIL	14.63	.	.	.	.	.0059	.	.	.	.
MELIOBTU	.	.	.	.	12.83	.	.	.	.	.0128
LEUCINCI	.	12.83	.	76.98	.	.	.0257	.	.0385	.
PERILONG	14.63	.	.	.	12.83	.0059	.	.	.	.0038
PONTALTA	.	.	12.83	.	.	.	.	.0051	.	.
PONTAREN	.	64.15	.	89.81	.	.	.0231	.	.0269	.
PSEULONG	.	25.66	12.83	.	.	.	.0064	.0026	.	.
SIRICLAU	.	.	.	.	12.83	.	.	.	.	.0128
TANAIDAC	.	.	.	.	25.66	.	.	.	.	.0013
THIASCUT	.	.	.	.	12.83	.	.	.	.	.0090
UROTPOSE	14.63	205.28	.	76.98	.	.0029	.0282	.	.0385	.
Echinodermata (3 species) :										
ECHICORD	14.63	.	12.83	.	12.83	5.2478	.	4.8959	.	.0680
ECHIPUSI	.	.	.	.	89.81	.	.	.	.	.0847
OPHIALBI	87.78	.	.	.	12.83	.0146	.	.	.	.0103
Rest (3 species) :										
NEMERTIN	.	25.66	.	12.83	12.83	.	.0013	.	.0872	.0872
OLIGOCHA	.	.	.	.	38.49	.	.	.	.	.0013
PHORONID	14.63	.	.	.	.	.0293	.	.	.	.

Appendix 2-11. Macrobenthos density and biomass of MILZON-BENTHOS II 1992 (compartment 11).

	Density (ind./m²) :			Biomass (g AFDW/m²) :		
Station	111	112	113	111	112	113
Compartment	11	11	11	11	11	11
Number	57	58	59	57	58	59
Date	030693	030693	030693	030693	030693	030693
Species	20	17	23	20	17	23
Density	713.50	892.43	687.61	713.50	892.43	687.61
Biomass	13.97	23.12	35.59	13.97	23.12	35.59
Depth	34.3	29.2	32.7	34.3	29.2	32.7
Polychaeta (16 species) :						
ANAIGROE	14.63	.	.	.0073	.	.
CHAESETO	.	29.26	.	.	.0102	.
DIPLGLAU	29.26	.	.	.0146	.	.
GONIMACU	14.63	.	14.63	.0146	.	.0102
GYPTCAPE	14.63	29.26	14.63	.0088	.0117	.0117
HARMLUNU	.	102.41	14.63	.	.1551	.0293
LANICONC	.	175.56	43.89	.	20.9882	4.0291
LUMBLATR	29.26	.	29.26	.0878	.	.0863
MAGEPAPI	.	263.34	29.26	.	.5179	.0088
NEPHHOMB	14.63	14.63	14.63	.3219	.5940	.4389
NERELONG	.	.	14.63	.	.	.6188
OPHIFLEX	43.89	.	.	.0717	.	.
PHOLMINU	14.63	.	29.26	.0073	.	.0146
SCALINFL	14.63	.	.	.0044	.	.
SCOLARMI	.	.	14.63	.	.	.0073
SIGAMATH	.	58.52	14.63	.	.2326	.0307
Mollusca (5 species) :						
ABRAALBA	.	.	14.63	.	.	.0029
CULTPELL	.	.	29.26	.	.	.0146
MONTFERR	14.63	14.63	58.52	.0073	.0029	.0176
TELLFABU	.	14.63	.	.	.0073	.
NATIALDE	.	.	29.26	.	.	.1990
Crustacea (11 species) :						
BODOSCOR	.	.	14.63	.	.	.0029
CALLSUBT	146.30	.	87.78	4.7182	.	.0907
CAPRELLI	.	14.63	.	.	.0015	.
CORYCASS	.	14.63	.	.	.0146	.
EUDOTRUN	14.63	.	14.63	.0029	.	.0029
HARPANTE	14.63	.	.	.0044	.	.
HIPPDENT	.	43.89	.	.	.0176	.
LEUCLILL	.	29.26	.	.	.0117	.
PONTALTA	14.63	.	.	.0044	.	.
PONTTRIS	.	.	14.63	.	.	.0073
PSEULONG	14.63	43.89	.	.0044	.0073	.
Echinodermata (3 species) :						
AMPHFILI	29.26	.	.	.3540	.	.
ECHICORD	43.89	.	87.78	7.9748	.	29.9052
OPHIALBI	.	14.63	14.63	.	.5340	.0556
Rest (4 species) :						
ANTHOZOA	.	14.63	.	.	.0073	.
HYDROZOA	14.63	.	.	.0029	.	.
NEMERTIN	29.26	14.63	14.63	.3233	.0015	.0059
PHORONID	204.82	.	73.15	.0351	.	.0044

Appendix 2-12. Macrobenthos density and biomass of MILZON-BENTHOS II 1992 (compartment 12).

	Density (ind./m²) :			Biomass (g AFDW/m²) :		
Station	121	122	123	121	122	123
Compartment	12	12	12	12	12	12
Number	60	61	62	60	61	62
Date	010693	010693	020693	010693	010693	020693
Species	16	17	15	16	17	15
Density	409.64	848.54	936.32	409.64	848.54	936.32
Biomass	1.97	16.00	16.97	1.97	16.00	16.97
Depth	30.4	30.8	37.2	30.4	30.8	37.2
Polychaeta (14 species) :						
APHRACUL	14.63	.	.	.0029	.	.
CHAESETO	43.89	.	.	.0102	.	.
GATTCIRR	.	14.63	.	.	.0073	.
GONIMACU	14.63	.	.	.0044	.	.
HARMLUNU	.	73.15	.	.	.2326	.
LANICONC	.	87.78	14.63	.	6.3875	2.3847
LUMBLATR	58.52	102.41	.	.2487	.1946	.
MAGEPAPI	29.26	29.26	.	.0234	.0146	.
NEPHHOMB	14.63	58.52	14.63	.2209	5.2536	.1946
OPHIFLEX	14.63	.	14.63	.0410	.	.0219
SCALINFL	.	14.63	.	.	.0073	.
SPIOBOMB	.	117.04	.	.	.1814	.
SPIOFILI	.	.	14.63	.	.	.0059
STHELIMI	.	.	14.63	.	.	.1039
Mollusca (4 species) :						
ABRAALBA	.	29.26	.	.	.0029	.
CULTPELL	29.26	29.26	.	.0146	.0146	.
MYSEBIDE	14.63	.	58.52	.0029	.	.0176
TELLFABU	.	14.63	.	.	.0044	.
Crustacea (9 species) :						
BATHTENU	14.63	.	.	.0073	.	.
CALLSUBT	58.52	146.30	102.41	.0497	3.1659	6.1241
CORYCASS	14.63	.	14.63	1.1294	.	.0146
DIASBRAD	.	.	14.63	.	.	.0102
EUDOTRUN	.	14.63	.	.	.0044	.
HIPPDENT	.	14.63	.	.	.0132	.
LEUCINCI	.	14.63	.	.	.0088	.
PONTAREN	29.26	.	.	.0088	.	.
PONTTRIS	.	.	14.63	.	.	.0073
Echinodermata (2 species) :						
AMPHFILI	14.63	.	190.19	.1682	.	3.3356
ECHICORD	.	.	29.26	.	.	4.5060
Rest (4 species) :						
ANTHOZOA	14.63	.	.	.0044	.	.
NEMERTIN	29.26	29.26	43.89	.0336	.4784	.0366
OLIGOCHA	.	.	14.63	.	.	.0029
PHORONID	.	58.52	380.38	.	.0263	.2019

Appendix 2-13. Macrobenthos density and biomass of MILZON-BENTHOS II 1992 (compartment 13).

Density (ind./m²) :				Biomass (g AFDW/m²) :		
Station	131	132	133	131	132	133
Compartment	13	13	13	13	13	13
Number	63	64	65	63	64	65
Date	250593	240593	250593	250593	240593	250593
Species	16	21	17	16	21	17
Density	1653.19	1700.53	2501.73	1653.19	1700.53	2501.73
Biomass	2.74	7.04	14.72	2.74	7.04	14.72
Depth	28.0	30.0	28.0	28.0	30.0	28.0
Polychaeta (15 species) :						
ANAIROSE	175.56	38.49	.	.0307	.0064	.
CHAESETO	29.26	12.83	570.57	.0117	.0051	.2063
ETEOLONG	.	25.66	.	.	.0038	.
EXOGNAID	.	102.64	.	.	.0103	.
GONIMACU	43.89	51.32	29.26	.5925	.0141	.0219
HESIAUGE	.	38.49	.	.	.0051	.
MAGEPAPI	775.39	.	1521.52	.6671	.	1.7922
NEPHCIRR	.	51.32	.	.	.6210	.
NEPHHOMB	29.26	.	58.52	.5486	.	.0922
NOTOLATE	.	.	29.26	.	.	1.9399
SCALINFL	.	12.83	.	.	.0064	.
SCOLARMI	.	192.45	.	.	1.0495	.
SCOLBONN	.	.	14.63	.	.	.1024
SIGAMATH	14.63	.	14.63	.0351	.	.9817
SPIOBOMB	131.67	.	14.63	.0263	.	.0146
Mollusca (9 species) :						
ABRAALBA	146.30	14.63	.	.0293	.0015	.
CORBGIBB	14.63	.	.	.0029	.	.
CULTPELL	.	.	14.63	.	.	.0015
MACTCORA	.	131.67	.	.	.0131	.
MONTFERR	.	.	29.26	.	.	.0059
NATIALDE	43.89	.	14.63	.0146	.	.1039
TELLFABU	29.26	.	29.26	.1902	.	.1156
TELLPYGM	.	14.63	.	.	.0015	.
THIASCUT	.	12.83	.	.	1.7616	.
Crustacea (7 species) :						
ATYLSWAM	.	51.32	.	.	.0154	.
BATHTENU	.	.	43.89	.	.	.0132
DIASBRAD	.	12.83	.	.	.0064	.
EUDOTRUN	14.63	.	.	.0059	.	.
PONTAREN	.	.	14.63	.	.	.0044
PSEULONG	.	25.66	29.26	.	.0038	.0029
UROTPOSE	14.63	.	.	.0044	.	.
Echinodermata (2 species) :						
ECHICORD	.	.	14.63	.	.	9.2813
ECHIPUSI	.	25.66	.	.	.0064	.
Rest (6 species) :						
ANTHOZOA	.	487.54	.	.	.3862	.
BRANLANC	.	128.30	.	.	2.9612	.
NEMERTIN	117.04	76.98	58.52	.5647	.1617	.0366
OLIGOCHA	.	192.45	.	.	.0015	.
PHORONID	29.26	.	.	.0117	.	.
PLATHYHE	43.89	.	.	.0015	.	.

Appendix 2-14. Macrobenthos density and biomass of MILZON-BENTHOS II 1992 (compartment 14).

	Density (ind./m²) :				Biomass (g AFDW/m²) :			
Station	141	142	143	144	141	142	143	144
Compartment	14	14	14	14	14	14	14	14
Number	66	67	68	69	66	67	68	69
Date	030693	030693	030693	030693	030693	030693	030693	030693
Species	19	17	26	25	19	17	26	25
Density	892.43	1726.34	2443.21	2443.21	892.43	1726.34	2443.21	2443.21
Biomass	21.72	29.00	52.68	135.58	21.72	29.00	52.68	135.58
Depth	42.3	39.2	43.4	40.0	42.3	39.2	43.4	40.0
Polychaeta (19 species) :								
CHAESETO	43.89	.	14.63	.	.0146	.	.0073	.
DIPLGLAU	.	43.89	.	14.63	.	.0132	.	.0410
EXOGNAID	.	14.63	.	.	.	.0029	.	.
GONIMACU	14.63	.	.	.	.0205	.	.	.
GYPTCAPE	29.26	.	.	.	.0146	.	.	.
HARMLUNU	.	.	.	14.63	.	.	.	.0790
LUMBLATR	.	.	14.63	.	.	.	.0117	.
MEDIFRAG	.	.	14.63	14.63	.	.	.0044	.0073
NEPHHOMB	43.89	117.04	43.89	14.63	.1068	.4610	.5516	.0380
NOTOLATE	.	.	87.78	29.26	.	.	2.3057	1.7673
OPHEACUM	.	.	14.63	.	.	.	.0073	.
OPHIFLEX	.	14.63	29.26	.	.	.0541	.1068	.
PHOLMINU	.	73.15	29.26	29.26	.	.0366	.0146	.0146
POLYGUIL	.	.	146.30	29.26	.	.	.2209	.0600
PRIOCIRR	.	.	.	43.89	.	.	.	.0146
SPIOBOMB	58.52	14.63	43.89	29.26	.0146	.0059	.0088	.0073
SPIOFILI	.	.	87.78	.	.	.	.0146	.
STHELIMI	14.63	.	.	.	.1024	.	.	.
SYNEKLAT	29.26	.	.	.	.0117	.	.	.
Mollusca (6 species) :								
CYLICYLI	.	14.63	.	.	.	.0015	.	.
LUTRLUTR	.	.	.	14.63	.	.	.	104.3046
MONTFERR	43.89	102.41	14.63	14.63	.0980	.0380	.0044	.0059
MYSEBIDE	87.78	438.90	482.79	950.95	.0176	.0878	.0966	.1975
NUCUTURG	.	.	.	14.63	.	.	.	.0059
THRACONV	.	.	14.63	.	.	.	1.0417	.
Crustacea (14 species) :								
AMPETENU	.	.	.	29.26	.	.	.	.0146
CALLSUBT	87.78	87.78	146.30	248.71	2.4491	1.1192	3.1484	2.5515
DIASBRAD	14.63	.	.	.	.0059	.	.	.
EUDOTRUN	14.63	14.63	29.26	.	.0059	.0029	.0088	.
HARPANTE	.	.	29.26	43.89	.	.	.0088	.0130
HIPPDENT	29.26	.	.	.	.0117	.	.	.
LEUCLILL	14.63	.	.	.	.0059	.	.	.
LEUCRICH	.	.	43.89	14.63	.	.	.0219	.0073
LIOCPUSI	.	.	.	14.63	.	.	.	.0073
MEGAAGIL	14.63	.	.	.	.0044	.	.	.
MYSIDACE	.	.	.	14.63	.	.	.	.0073
PERILONG	.	.	14.63	.	.	.	.0044	.
PONTTRIS	.	14.63	.	.	.	.0073	.	.
UPOGDELT	.	.	58.52	14.63	.	.	21.9918	6.7532
Echinodermata (4 species) :								
AMPHFILI	204.82	585.20	702.24	746.13	1.9882	7.3369	10.7355	15.9760
BRISLYRI	.	.	14.63	.	.	.	10.8262	.
ECHICORD	43.89	87.78	.	.	16.8172	18.0593	.	.
LEPTINHA	.	.	14.63	.	.	.	.6525	.
Rest (5 species) :								
NEMERTIN	14.63	29.26	14.63	14.63	.0029	1.7644	.2253	.0527
OLIGOCHA	.	43.89	.	.	.	.0015	.	.
PHORONID	87.78	29.26	292.60	58.52	.0234	.0117	.1302	.0290
PRIAPULI	.	.	.	14.63	.	.	.	.0073
SIPUNCUL	.	.	43.89	14.63	.	.	.5325	3.6165

Appendix 2-15. Macrobenthos density and biomass of MILZON-BENTHOS II 1992 (compartment 15).

Density (ind./m²) :				Biomass (g AFDW/m²) :		
Station	151	152	153	151	152	153
Compartment	15	15	15	15	15	15
Number	70	71	72	70	71	72
Date	020693	020693	020693	020693	020693	020693
Species	22	18	18	22	18	18
Density	1945.79	3364.90	3203.97	1945.79	3364.90	3203.97
Biomass	9.14	38.71	43.46	9.14	38.71	43.46
Depth	37.6	37.9	39.9	37.6	37.9	39.9
Polychaeta (20 species) :						
CHAESETO	29.26	.	.	.0219	.	.
ETEOLONG	14.63	.	.	.0293	.	.
GONIMACU	.	14.63	.	.	.0146	.
GYPTCAPE	14.63	.	.	.0146	.	.
LUMBLATR	.	58.52	.	.	.1770	.
MAGEPAPI	14.63	14.63	.	.0073	.0117	.
NEPHHOMB	.	29.26	29.26	.	1.9473	.1156
NERELONG	.	14.63	.	.	.0424	.
NOTOLATE	.	.	43.89	.	.	.9232
OPHEACUM	14.63	.	29.26	.0102	.	.0059
OPHIFLEX	14.63	.	.	.0102	.	.
OWENFUSI	.	14.63	.	.	.0146	.
PECTKORE	117.04	.	.	.0351	.	.
PHOLMINU	14.63	87.78	29.26	.0117	.0395	.0146
POLYGUIL	.	58.52	160.93	.	.0293	.1229
SCOLARMI	14.63	.	.	.0512	.	.
SIGAMATH	14.63	.	.	.6203	.	.
SPIOBOMB	73.15	.	29.26	.0146	.	.0059
STHELIMI	14.63	.	.	.0146	.	.
SYNEKLAT	29.26	43.89	14.63	.0117	.0176	.0029
Mollusca (4 species) :						
ABRAALBA	43.89	.	.	.0058	.	.
CULTPELL	29.26	.	14.63	.0117	.	.0044
MYSEBIDE	994.84	833.91	760.76	.1258	.2414	.1902
NUCUTURG	73.15	.	.	.5121	.	.
Crustacea (5 species) :						
CALLSUBT	43.89	336.49	117.04	3.1864	5.7686	2.7475
HARPANTE	73.15	117.04	29.26	.0219	.0351	.0073
HIPPDENT	14.63	.	.	.0044	.	.
LEUCINCI	.	.	14.63	.	.	.0073
UPOGDELT	.	29.26	43.89	.	.0673	14.1106
Echinodermata (3 species) :						
AMPHFILI	234.08	1536.15	1682.45	4.3875	26.3384	18.4879
ECHICORD	.	14.63	29.26	.	1.8258	4.8659
LEPTINHA	.	29.26	29.26	.	1.3708	.5398
Rest (2 species) :						
NEMERTIN	.	14.63	29.26	.	.7330	1.2509
PHORONID	58.52	117.04	117.04	.0366	.0351	.0541

Appendix 2-16. Macrobenthos density and biomass of MILZON-BENTHOS II 1992 (compartment 16).

	Density (ind./m²) :				Biomass (g AFDW/m²) :			
Station	161	162	163	164	161	162	163	164
Compartment	16	16	16	16	16	16	16	16
Number	73	74	75	76	73	74	75	76
Date	250593	250593	250593	250593	250593	250593	250593	250593
Species	29	16	21	24	29	16	21	24
Density	2443.21	1872.64	4125.66	1784.86	2443.21	1872.64	4125.66	1784.86
Biomass	44.24	26.69	57.31	39.75	44.24	26.69	57.31	39.75
Depth	40.5	41.0	37.0	41.0	40.5	41.0	37.0	41.0
Polychaeta (21 species) :								
CHAESETO	14.63	.	.	.	.0073	.	.	.
CHAEVARI	14.63	.	14.63	175.56	2.8924	.	2.1272	27.0787
DIPLGLAU	29.26	.	14.63	.	.0146	.	.0146	.
EXOGNAID	.	14.63	.	.	.	.0015	.	.
GATTCIRR	14.63	.	.	73.15	1.0065	.	.	1.0548
GONIMACU	14.63	14.63	.	.	.0073	.0117	.	.
GYPTCAPE	14.63	.	.	14.63	.0073	.	.	.0146
LUMBLATR	117.04	43.89	87.78	146.30	.2633	.3775	.3072	.1843
MEDIFRAG	29.26	.	.	73.15	.0059	.	.	.0117
NEPHHOMB	.	.	43.89	.	.	.	.6291	.
NEPHINCI	.	.	.	14.63	.	.	.	.5837
NERELONG	58.52	.	.	29.26	4.6041	.	.	.0351
NOTOLATE	14.63	.	14.63	117.04	.1507	.	.0073	1.5230
OPHIFLEX	.	.	14.63	.	.	.	.0410	.
PARAGRAC	.	.	.	29.26	.	.	.	.0073
PHOLMINU	29.26	14.63	190.19	29.26	.0146	.0073	.1229	.0146
POLYGUIL	73.15	73.15	146.30	43.89	.0132	.0366	.0746	.0146
SCOLARMI	.	.	.	14.63	.	.	.	.9802
SPIOFILI	14.63	29.26	14.63	.	.0029	.0029	.0073	.
STHELIMI	14.63	.	14.63	14.63	.0336	.	.0775	.0849
SYNEKLAT	58.52	.	.	14.63	.0029	.	.	.0044
Mollusca (5 species) :								
CORBGIBB	.	.	14.63	.	.	.	.0761	.
CULTPELL	14.63	.	.	14.63	.0015	.	.	.0015
MONTFERR	.	43.89	14.63	.	.	.0161	.0015	.
MYSEBIDE	512.05	234.08	1448.37	117.04	.1024	.0702	.3804	.0293
VENUSTRI	.	14.63	.	.	.	.0044	.	.
Crustacea (8 species) :								
AMPETENU	14.63	14.63	14.63	.	.0117	.0117	.0059	.
CALLSUBT	307.23	234.08	234.08	160.93	3.9603	5.2756	6.6991	3.7102
CIROBORE	14.63	.	.	.	.0073	.	.	.
HARPANTE	43.89	.	190.19	29.26	.0146	.	.0190	.0088
LEUCRICH	.	.	29.26	.	.	.	.0146	.
PERILONG	29.26	14.63	.	.	.0088	.0044	.	.
UPOGDELT	73.15	58.52	29.26	29.26	15.5034	9.4466	10.0654	1.6927
UROTELEG	43.89	.	.	.	.0117	.	.	.
Echinodermata (2 species) :								
AMPHFILI	775.39	1024.10	1448.37	292.60	13.4494	7.4277	34.0411	1.7541
ECHICORD	14.63	29.26	43.89	14.63	.0746	3.9911	2.5661	.0468
Rest (3 species) :								
NEMERTIN	14.63	.	.	43.89	.0073	.	.	.4813
PHORONID	14.63	14.63	102.41	73.15	.0059	.0059	.0322	.0310
SIPUNCUL	58.52	.	.	219.45	2.0497	.	.	.4050

Appendix 2-17. Macrobenthos density and biomass of MILZON-BENTHOS II 1992 (compartment 17).

	Density (ind./m²) :			Biomass (g AFDW/m²) :		
Station	171	172	173	171	172	173
Compartment	17	17	17	17	17	17
Number	77	78	79	77	78	79
Date	020693	020693	030693	020693	020693	030693
Species	22	23	21	22	23	21
Density	3072.30	1916.53	819.28	3072.30	1916.53	819.28
Biomass	2.94	12.87	19.41	2.94	12.87	19.41
Depth	40.9	43.2	53.2	40.9	43.2	53.2
Polychaeta (24 species) :						
ANAIROSE	29.26	.	.	.0015	.	.
ARICJEFF	29.26	.	.	.0219	.	.
CHAESETO	.	.	14.63	.	.	.0102
CHAEVARI	.	.	14.63	.	.	4.1169
EXOGNAID	1989.68	.	.	.0424	.	.
GLYCROUX	.	.	14.63	.	.	.0073
GYPTCAPE	.	14.63	.	.	.0073	.
HESIAUGE	29.26	.	.	.0015	.	.
LUMBLATR	.	.	14.63	.	.	.0629
MAGEALLE	.	73.15	.	.	.1551	.
NEPHCIRR	43.89	.	.	.1609	.	.
NEPHHOMB	.	14.63	29.26	.	.1361	.1024
NEPHINCI	.	.	43.89	.	.	.5135
NOTOLATE	.	.	43.89	.	.	1.4162
OPHIFLEX	.	.	58.52	.	.	.1522
ORBISERT	29.26	.	14.63	.1405	.	3.5185
PARAGRAC	.	.	14.63	.	.	.0044
PHOLMINU	.	43.89	.	.	.0219	.
PISTCRIS	29.26	.	.	.0731	.	.
PRIOCIRR	.	.	87.78	.	.	.0366
SCOLARMI	58.52	14.63	.	.1726	.0146	.
SPIOBOMB	14.63	87.78	14.63	.0658	.0322	.0073
SPIOFILI	43.89	131.67	.	.0146	.0995	.
STHELIMI	14.63	29.26	.	.0585	.1814	.
Mollusca (9 species) :						
ABRAPRIS	29.26	.	.	.1258	.	.
ACANECHI	.	.	14.63	.	.	.0058
CULTPELL	58.52	14.63	.	.0146	.0029	.
COCHPRAE	146.30	.	.	1.4191	.	.
DOSIEXOL	160.93	.	.	.1448	.	.
ENSISILI	.	14.63	.	.	.5954	.
GARIFERV	14.63	.	.	.3204	.	.
MYSEBIDE	.	336.49	.	.	.0673	.
NUCUTURG	.	14.63	.	.	.0146	.
Crustacea (13 species) :						
AMPETENU	.	14.63	14.63	.	.0059	.0088
ARGIHAMA	87.78	.	.	.0263	.	.
BATHELEG	.	43.89	.	.	.0176	.
CALLSUBT	.	58.52	248.71	.	1.9092	8.8848
DIASLUCI	.	.	43.89	.	.	.0146
EUDODEFO	.	14.63	.	.	.0029	.
HARPANTE	.	29.26	.	.	.0117	.
HARPCREN	.	.	29.26	.	.	.0088
HIPPDENT	58.52	.	.	.0176	.	.
PERILONG	.	14.63	.	.	.0044	.
PONTTRIS	.	.	14.63	.	.	.0073
PSEULONG	14.63	.	.	.0059	.	.
UROTELEG	.	29.26	.	.	.0088	.
Echinodermata (2 species) :						
AMPHFILI	.	848.54	14.63	.	9.4700	.4594
ECHIPUSI	117.04	.	.	.0805	.	.
Rest (4 species) :						
ANTHOZOA	43.89	29.26	.	.0161	.0117	.
NEMERTIN	29.26	14.63	.	.0205	.0761	.
PHORONID	.	29.26	58.52	.	.0190	.0688
PLATHYHE	.	.	14.63	.	.	.0073

Appendix 2-18. Macrobenthos density and biomass of MILZON-BENTHOS II 1992 (compartment 18).

Density (ind./m²) :				Biomass (g AFDW/m²) :		
Station	181	182	183	181	182	183
Compartment	18	18	18	18	18	18
Number	80	81	82	80	81	82
Date	250593	020693	020693	250593	020693	020693
Species	23	28	18	23	28	18
Density	2370.06	1550.78	2106.72	2370.06	1550.78	2106.72
Biomass	20.08	3.53	21.47	20.08	3.53	21.47
Depth	46.5	34.1	39.1	46.5	34.1	39.1
Polychaeta (22 species) :						
ANAIGROE	.	.	14.63	.	.	.0073
ANAIROSE	.	43.89	.	.	.0015	.
CHAESETO	.	58.52	.	.	.0380	.
DIPLGLAU	.	14.63	.	.	.0073	.
EXOGNAID	14.63	58.52	.	.0015	.0029	.
GONIMACU	.	29.26	.	.	.1331	.
GYPTCAPE	14.63	.	14.63	.0073	.	.0102
MAGEALLE	.	14.63	.	.	.0073	.
MAGEPAPI	.	219.45	87.78	.	.1902	.0205
NEPHCIRR	.	14.63	.	.	.0059	.
NEPHHOMB	43.89	14.63	58.52	1.6166	2.7534	1.2333
OPHIFLEX	29.26	.	.	.2063	.	.
OWENFUSI	.	43.89	.	.	.0351	.
PHOLMINU	29.26	.	.	.0146	.	.
POECSERP	14.63	14.63	.	.0176	.0336	.
PRIOCIRR	160.93	.	.	.1463	.	.
SCOLARMI	.	73.15	.	.	.0585	.
SIGAMATH	.	14.63	.	.	.0307	.
SPIOBOMB	14.63	.	.	.0073	.	.
SPIOFILI	.	14.63	.	.	.0029	.
STHELIMI	.	14.63	43.89	.	.1214	.0980
SYNEKLAT	29.26	.	.	.0073	.	.
Mollusca (7 species) :						
CULTPELL	.	29.26	14.63	.	.0146	.0029
DOSILUPI	.	14.63	.	.	.0029	.
MONTFERR	.	.	43.89	.	.	.0102
MYSEBIDE	570.57	14.63	1302.07	.1024	.0029	.1536
TELLFABU	.	.	14.63	.	.	.1302
TURBLACT	.	14.63	.	.	.0029	.
VENUSTRI	.	.	14.63	.	.	5.4160
Crustacea (14 species) :						
AMPETENU	29.26	.	.	.0088	.	.
BATHELEG	.	102.41	.	.	.0307	.
BATHGUIL	.	14.63	.	.	.0044	.
BATHTENU	58.52	.	29.26	.0176	.	.0117
CALLSUBT	87.78	.	14.63	.5720	.	3.3883
CAPRELLI	.	14.63	.	.	.0015	.
EUDODEFO	58.52	.	.	.0146	.	.
EUDOTRUN	14.63	.	.	.0029	.	.
HARPANTE	204.82	.	73.15	.0614	.	.0219
HARPCREN	29.26	.	.	.0088	.	.
MEGAAGIL	.	14.63	.	.	.0044	.
PSEULONG	.	29.26	14.63	.	.0059	.0059
UPOGDELT	14.63	.	.	.0483	.	.
UROTELEG	.	43.89	14.63	.	.0132	.0044
Echinodermata (3 species) :						
AMPHFILI	833.91	.	307.23	12.3155	.	5.4614
ECHICORD	14.63	.	14.63	4.4709	.	5.4833
ECHIPUSI	.	541.31	.	.	.0117	.
Rest (3 species) :						
NEMERTIN	29.26	29.26	.	.3789	.0088	.
PHORONID	58.52	43.89	29.26	.0410	.0088	.0059
PLATHYHE	14.63	.	.	.0073	.	.

Appendix 2-19. Macrobenthos density and biomass of MILZON-BENTHOS II 1992 (compartment 19).

	Density (ind./m²) :			Biomass (g AFDW/m²) :		
Station	191	192	193	191	192	193
Compartment	19	19	19	19	19	19
Number	83	84	85	83	84	85
Date	250593	250593	250593	250593	250593	250593
Species	25	21	24	25	21	24
Density	1828.75	2062.83	2852.85	1828.75	2062.83	2852.85
Biomass	17.02	13.20	38.03	17.02	13.20	38.03
Depth	44.5	42.0	44.5	44.5	42.0	44.5
Polychaeta (18 species) :						
CHAESETO	.	43.89	.	.	.0292	.
CHAEVARI	29.26	.	29.26	4.6070	.	20.6371
DIPLGLAU	14.63	.	.	.0044	.	.
EXOGNAID	.	29.26	.	.	.0015	.
GLYCROUX	.	.	73.15	.	.	.2253
GONIMACU	.	.	14.63	.	.	.0146
GYPTCAPE	14.63	.	29.26	.0146	.	.0219
HARMLUNU	29.26	.	43.89	1.9780	.	1.0343
LUMBLATR	14.63	87.78	73.15	.0234	.4565	.1141
NEPHCIRR	.	.	14.63	.	.	.0161
NEPHHOMB	29.26	.	.	.7096	.	.
NOTOLATE	.	14.63	43.89	.	.0146	.2458
OPHIFLEX	14.63	14.63	.	.0761	.0775	.
POECSERP	.	.	14.63	.	.	.0132
PHOLMINU	29.26	29.26	87.78	.0146	.0146	.0439
PRIOCIRR	146.30	190.19	.	.1170	.1463	.
STHELIMI	14.63	14.63	.	.0044	.0702	.
SYNEKLAT	14.63	14.63	29.26	.0029	.0029	.0059
Mollusca (7 species) :						
ABRAALBA	14.63	.	.	.0249	.	.
CULTPELL	.	.	14.63	.	.	.0029
CYLICYLI	.	14.63	.	.	.0015	.
LEPTSQUA	.	.	14.63	.	.	.0015
MONTFERR	.	.	29.26	.	.	.0102
MYSEBIDE	526.68	497.42	790.02	.1053	.0878	.1463
NUCUTURG	29.26	.	14.63	.0190	.	.0029
Crustacea (10 species) :						
CALLSUBT	43.89	175.56	87.78	.5881	2.5062	2.5998
CORYCASS	14.63	.	.	.6145	.	.
DIASBRAD	.	14.63	.	.	.0117	.
EUDOTRUN	14.63	.	.	.0029	.	.
HARPANTE	131.67	14.63	43.89	.0395	.0044	.0132
LEUCLILL	.	14.63	.	.	.0044	.
PERILONG	.	14.63	.	.	.0044	.
PONTTRIS	14.63	.	.	.0073	.	.
UPOGDELT	.	14.63	.	.	2.5705	.
UROTELEG	14.63	14.63	.	.0044	.0044	.
Echinodermata (3 species) :						
AMPHFILI	555.94	746.13	1053.36	7.8314	7.1511	9.1394
ECHICORD	.	.	29.26	.	.	3.1937
LEPTINHA	.	.	14.63	.	.	.0585
Rest (4 species) :						
NEMERTIN	14.63	14.63	14.63	.0029	.0278	.2291
PHORONID	14.63	87.78	.	.0073	.0132	.
PLATHYHE	43.89	.	14.63	.1112	.	.0073
SIPUNCUL	43.89	.	277.97	.1053	.	.2546

Appendix 3-1. Densities (ind./10 cm^2) of meiobenthic taxa (permanent and temporary) on the EXP*BMN 1992 locations.

Station	N 50	META 1	N 70
Permanent			
Nematoda	1510	1347	840
Copepoda	143	93	194
burrowing	3	3	11
interstitial	140	90	183
Gastrotricha	220	237	100
Turbellaria	80	21	80
Archiannelida	.	.	.
Oligochaeta	.	.	.
Polychaeta	.	3	.
Hydrozoa	10	20	.
Tardigrada	70	19	60
Ostracoda	.	.	10
Halacarida	10	1	.
Temporary			
Nauplii	.	.	.
Bivalvia	.	.	.
Foraminifera	.	.	.
Isopoda	.	.	.
Cumacea	.	.	.
Nemertina	.	.	.
Tanaidacea	.	.	.
Amphipoda	.	.	.
Echinoidea	.	.	.
Ophiuroidea	.	.	.
Cnidaria other	.	.	.
Bryozoa	.	.	.
Taxa true	7	8	6
Taxa temporary	.	.	.
Taxa total	7	8	6

Appendix 3-2. Macrobenthos density and biomass of EXP*BMN 1992 (compartment 2, 3 and 7).

Density (ind./m²) :				Biomass (g AFDW/m²) :		
Station	N 50	META 1	N 70	N 50	META 1	N 70
Compartment	2	3	7	2	3	7
Number	11	17	40	11	17	40
Date	310392	310392	200592	310392	310392	200592
Species	20	14	21	20	14	21
Density	1316.70	746.13	716.87	1316.70	746.13	716.87
Biomass	2.12	1.90	33.73	2.12	1.90	33.73
Depth	30	27	32	30	27	32
<u>Polychaeta :</u>						
ANAISUBU	14.63	.	.	.0059	.	.
ARICMINU	29.26	87.78	.	.0044	.0132	.
CHAESETO	14.63	.	43.89	.	.	.0132
HARMLUNU	.	.	14.63	.	.	.0702
LANICONC	.	.	58.52	.	.	.6935
MAGEPAPI	.	.	29.26	.	.	.0073
NEPHCIRR	131.67	160.93	.	.0600	.3701	.
NEPHHOMB	.	.	29.26	.	.	.0161
OPHELIMA	29.26	.	.	.0951	.	.
PECTAURI	.	.	14.63	.	.	.0015
PHOLMINU	.	.	43.89	.	.	.0219
SCOLARMI	409.64	73.15	.	.9056	.7739	.
SCOLSQUA	.	29.26	.	.	.2063	.
SIGAMATH	.	.	14.63	.	.	.0922
SPIOBOMB	43.89	29.26	14.63	.0102	.0775	.0044
STHELIMI	.	.	29.26	.	.	.0073
TRAVFORB	.	14.63	.	.	.0029	.
<u>Mollusca :</u>						
NATIALDE	14.63	58.52	43.89	.0015	.0234	.0102
NUCUTURG	.	.	43.89	.	.	.0073
TELLFABU	14.63	.	14.63	.6013	.	.
<u>Crustacea :</u>						
BATHELEG	321.86	14.63	.	.1609	.0073	.
BATHGUIL	29.26	102.41	.	.0146	.1302	.
BODOAREN	.	.	14.63	.	.	.0073
DIASBRAD	29.26	.	.	.0146	.	.
HARPANTE	.	.	14.63	.	.	.0073
HIPPDENT	14.63	.	.	.0073	.	.
IPHITRIS	.	.	14.63	.	.	.0073
MEGAAGIL	102.41	73.15	.	.0512	.0366	.
PERILONG	.	.	58.52	.	.	.0293
PSEULONG	.	.	14.63	.	.	.0073
PSEUSIMI	43.89	.	.	.0219	.	.
SYNCMACU	14.63	.	.	.0073	.	.
THIASCUT	14.63	.	.	.0600	.	.
UROTPOSE	.	14.63	.	.	.0073	.
UROTBREV	.	43.89	.	.	.0205	.
<u>Echinodermata :</u>						
ACROBRAC	.	.	14.63	.	.	.0015
AMPHFILI	.	.	43.89	.	.	.0805
ECHICORD	14.63	.	146.30	.0761	.	32.6395
ECHIPUSI	14.63	14.63	.	.0146	.0468	.
<u>Rest :</u>						
NEMERTIN	14.63	29.26	.	.0029	.1829	.

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