

Abundance and distribution patterns of demersal and epibenthic communities of the Portuguese North Coast

Felício, M.1a, Gonçalves, M. 1a, Machado, I. 1a Siborro, S.1b, Gaspar, M. B. 1c
 1) IPIMAR, Instituto Português da Pesca e do Mar; a. Avenida General Norton de Matos, 4, 4450-208 Matosinhos, Portugal; b. Avenida de Brasília, 1449-006 Lisboa, Portugal; c. Avenida 5 de Outubro 8700-305 Olhão, Portugal
 e.mail: mfelicio@ipimar.pt

OBJECTIVE

Describe the abundance and distribution patterns of the demersal and epibenthic communities of the Portuguese northern coast, and to understand the influence of depth, latitude and sediment characteristics.

METHODOLOGY

- . A bottom trawl survey was carried out on September 2009
- . 7 profiles were defined (each with 6 sampling stations located at different depth strata)
- . Otter bottom trawl with a 6 m horizontal opening and 30 mm mesh size
- . Sampling unit = 15 minutes hauls
- . At each haul the individuals caught were identified and measured
- . At each sampling station environmental parameters were recorded and sediment samples were collected

RESULTS

- Bottom sediments were mainly composed of sand particles, and the organic matter content was low (between 0,39 and 3,48%)
- 81 species were collected, corresponding to a total of 69261 individuals
- Chordata dominated the catch with 67,96%, followed by Arthropoda, Mollusca, Echinodermata and Cnidaria (Figure 1)
- The most abundant species was *Trisopterus luscus* with 4 709 955,22 ind/Km². The least abundant were *Microchirus boscanion*, *Raja montagui* and *Laevicardium crassum* (107,99 ind/Km² each)
- The species *Callionymus lyra* and *Polybius henslowii* were the most common species, present in 38 stations (95%), followed by *Alloteuthis* spp. in 33 stations (82,5%) and *Echiichthys vipera* in 32 stations (80%)
- The relative abundance varied from 6767,46 (3C) to 3310612,0 ind/km² (3E) and the relative biomass ranged from 173,94 kg/ km² (3C) to 96926,45 kg/ km² (3E) (Figure 2)
- Shannon- Wiener diversity index (H') ranged from 5,76E-02 (3E) to 2,30 (3B) (Figure 3)

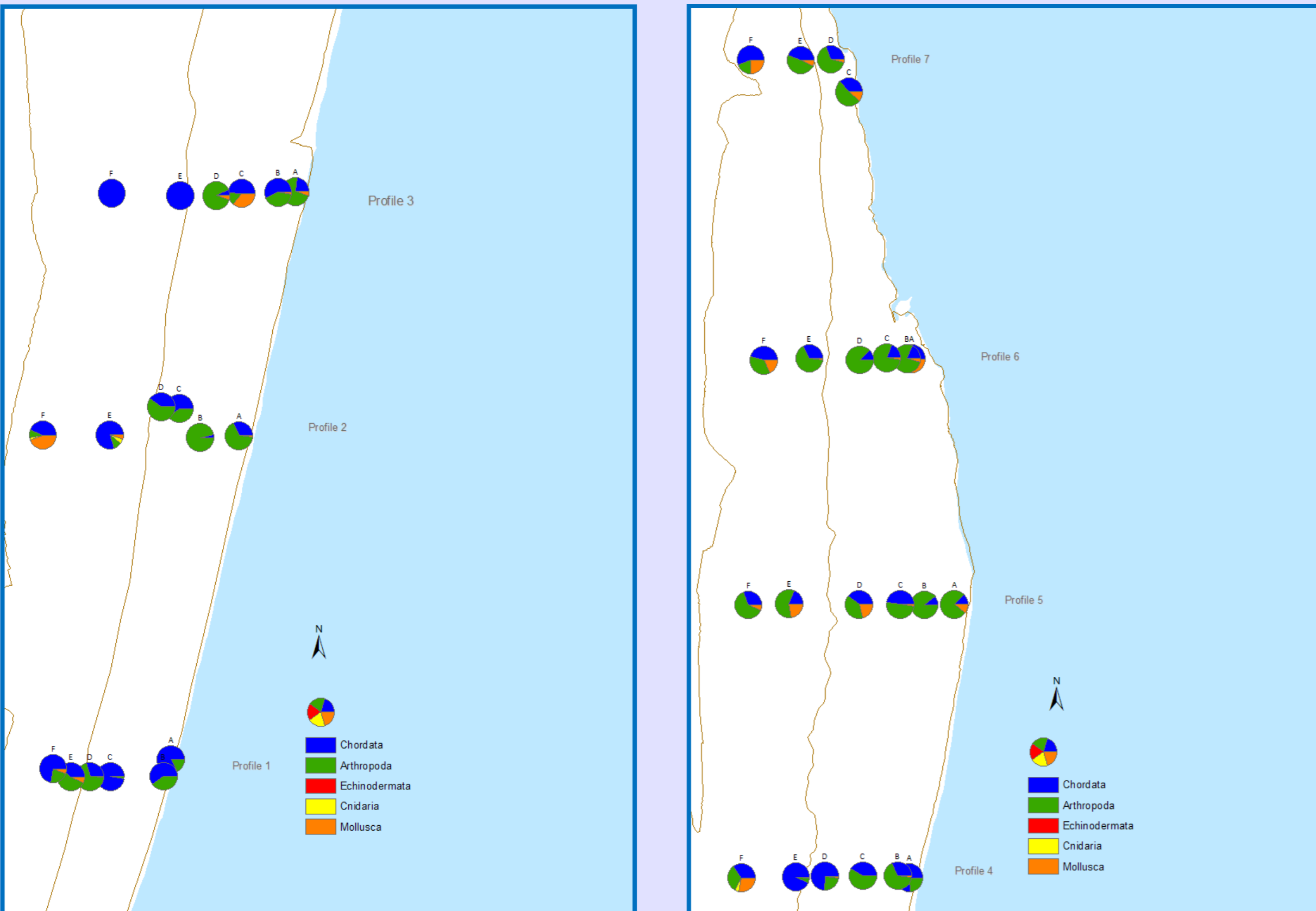


Figure 1 – Spatial distribution of the stations taxa composition.



Figure 2 – Spatial distribution of abundance

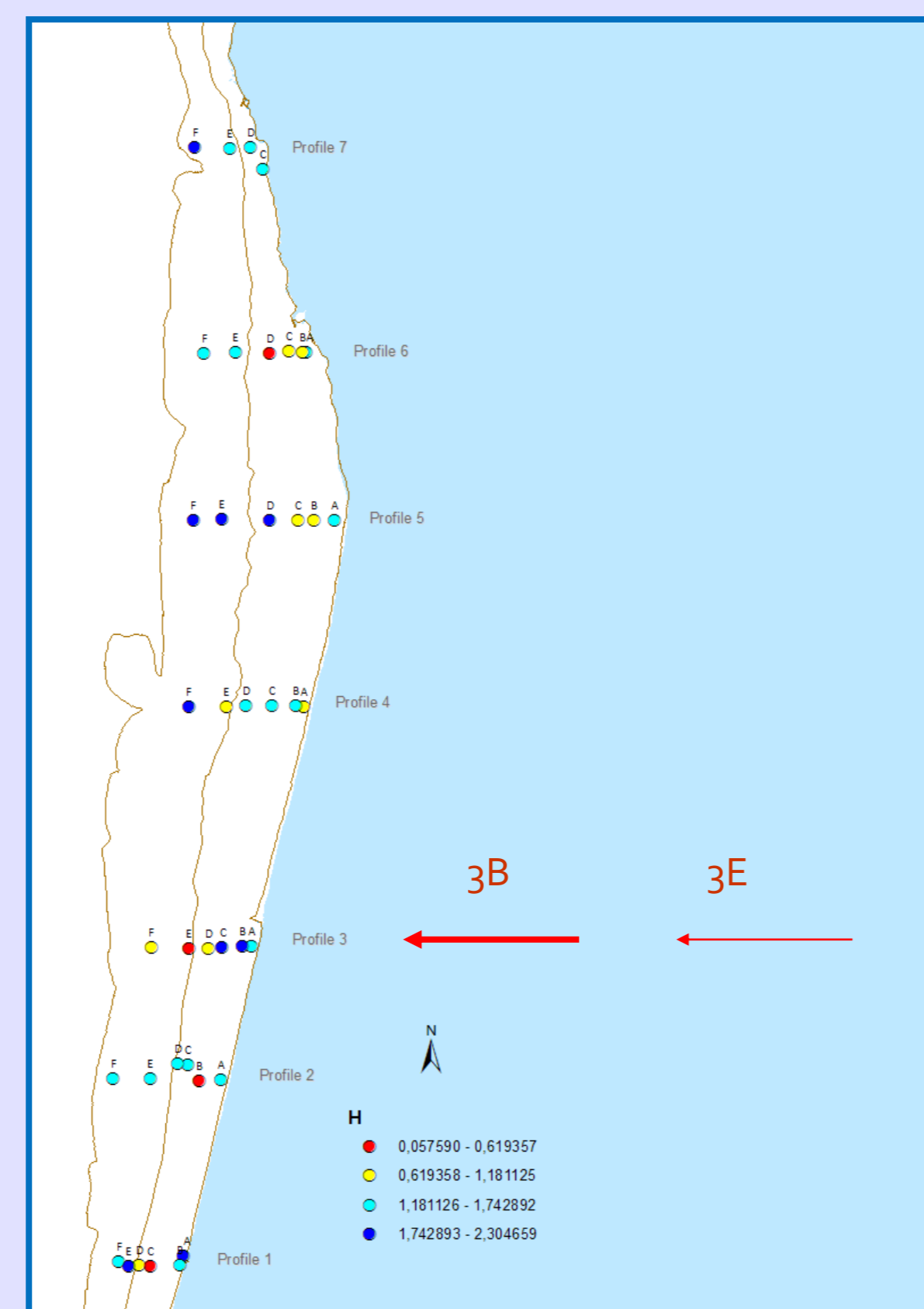


Figure 3 – Spatial distribution of the Shannon-Wiener diversity index (H')

RESULTS

Community structure

The cluster analysis revealed four species assemblages (I, II, III and IV) at the distance level of 45% and two outliers (stations 3F and 6A). The MDS analysis produced the same result, with a 0.20 stress (Figure 4).

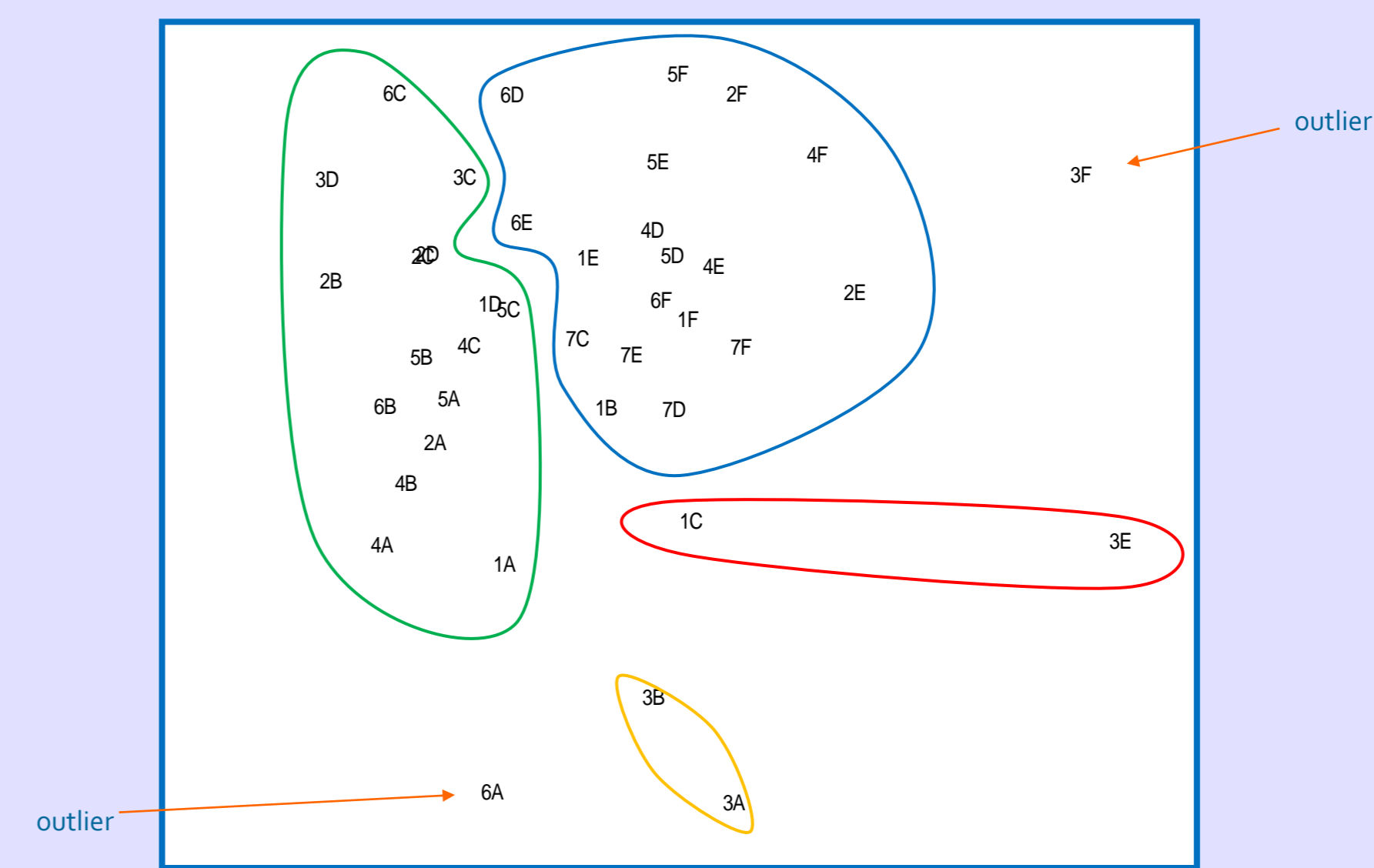


Figure 4 – MDS ordination plot showing the fish assemblages clustering based on stations density (individuals/km²).

When these assemblages are superimposed on the stations map a pattern can be observed, where cluster I stations are nearer to the shore and the cluster II stations are further away, in deeper waters.

Assemblage I (16 stations), located in shallower waters (5 to 30 m). This community comprised 49 taxa and was dominated by *Polybius henslowii*, *Trachurus trachurus* and *Crangon crangon*

Assemblage II (18 stations), located in deeper waters (15 to 50 m). This community comprised 53 taxa and was dominated by *Polybius henslowii*, *Trisopterus luscus* and *Echiichthys vipera*

Assemblage III (2 stations on profile 3), with 31 taxa, in very shallow waters, from 7 to 12 m. It was mainly composed by *Palaemon serratus*, *Syngnathus acus* and *Polybius henslowii*

Assemblage IV (2 stations), with only 19 taxa, showed the highest mean abundance and biomass. It was clearly dominated by *T. luscus* followed by *Polybius henslowii* and *Alloteuthis* sp.

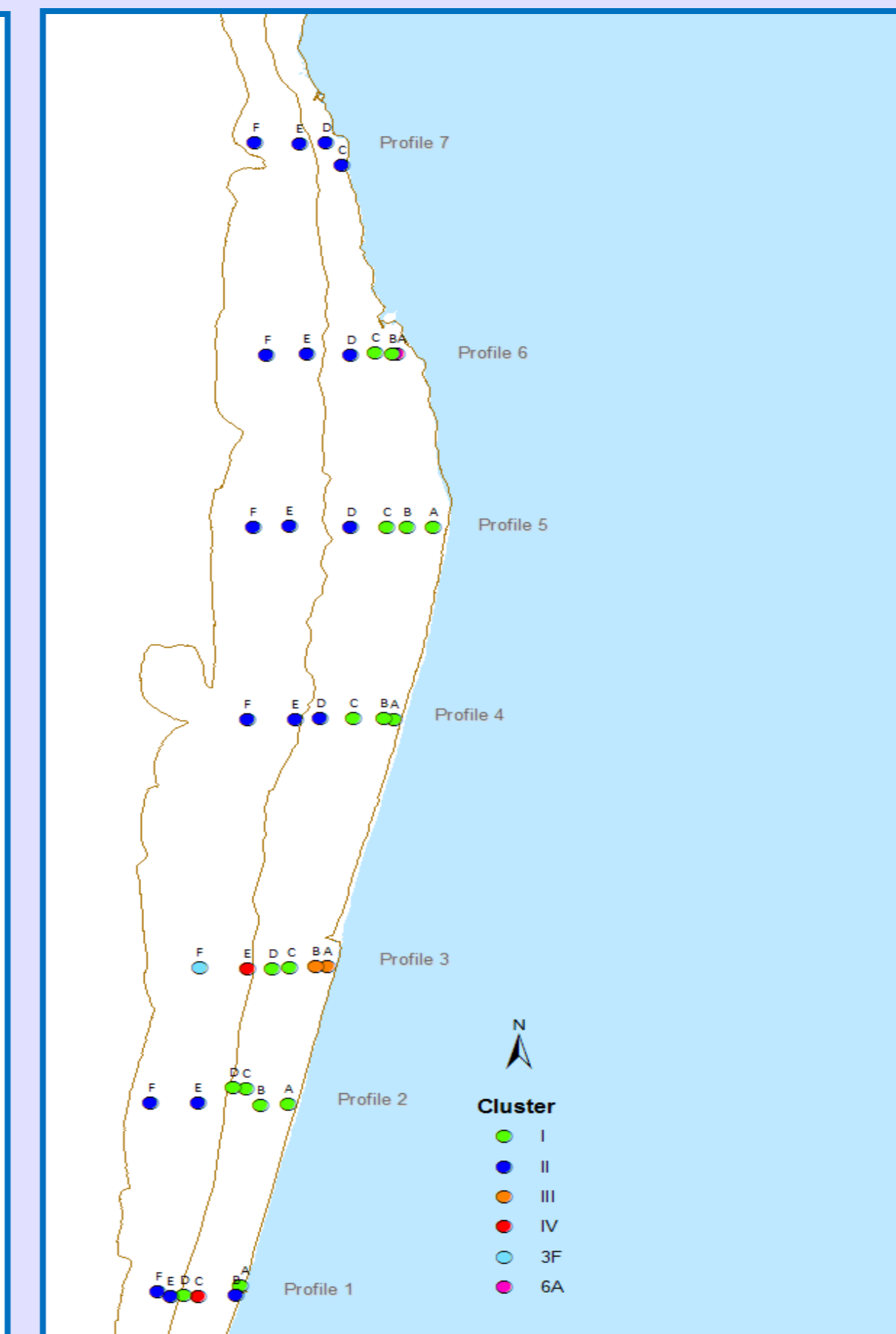


Figure 5 – Cluster assemblages' spatial distribution

- The results of the BIOENV revealed that the three environmental variables that best explained the composition of the community assemblages in the present study were depth, organic matter content and silts and clays composition (0,425).
- There were significant differences between stations as a function of depth, despite the low R statistics (ANOSIM R=0,214 p=0,1%), but there were no significant differences as a function of latitude and sediment.

CONCLUSIONS

- The bottom sediments were mainly composed of sand particles and a significant correlation was found between sediment and depth.
- A total of 81 species corresponding to 5 phyla (Chordata, Mollusca, Arthropoda, Echinodermata and Cnidaria) were present in the study area; the most abundant species was *Trisopterus luscus* and the species *Callionymus lyra* and *Polybius henslowii* were the most frequent.
- The community structure revealed four species assemblages and a pattern can be observed in relation to the depth.
- The depth, organic matter content and silt and clay composition were the three environmental variables that best explained the composition of the community assemblages found in the present study