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# Mapping benthic invertebrate assemblages from bottom trawl hauls observations

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Census of Marine Life: Community and species biodiversity in marine benthic habitats from the coastal zone to the deep sea



## Context

In the southern North Sea, IFREMER organises each year a scientific survey to produce recruitment indices for commercial fish species using bottom trawl (ICES "International Bottom Trawl Survey" program).

Providing an adequate protocol is developed, repeated surveys may provide a useful mean to regularly collect data on the large-scale distribution of epi-benthic macro-invertebrate that were opportunistically collected during trawl haul<sup>1</sup>.



## Approach

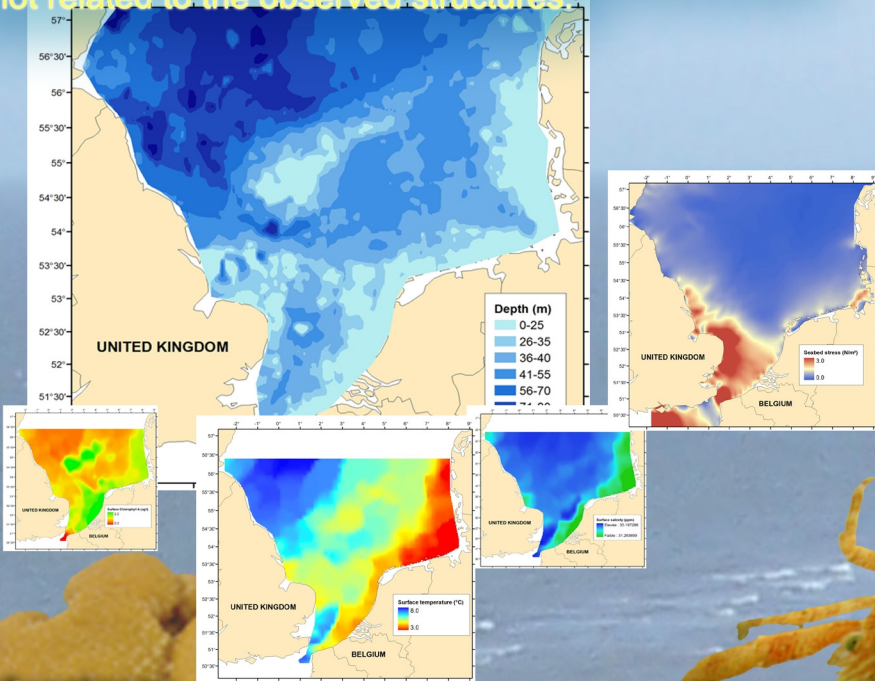
Invertebrates were identified to the lowest taxonomic level possible and recorded as absent (0), present (1) or dominant (2) if it represented over 50% in volume of the collected sample

The data was explored using statistical methods adapted to community analyses<sup>2,3</sup>



## Environmental conditions

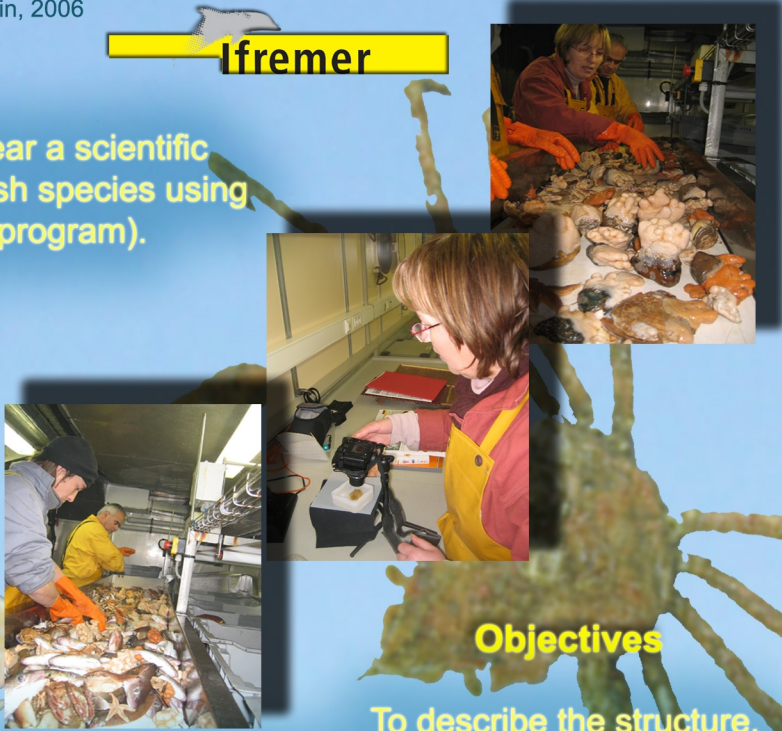
Depth, surface temperature and seabed shear stress were found to be significantly related to the assemblage structure. Depth on its own could explain the better part of the observed species-environment relationships. Surface salinity and Chlorophyll A concentration were not related to the observed structures.



## Advantages

Yearly observation may easily be made on-board scientific bottom trawl surveys, quickly accumulating data and increasing the spatial resolution of the information. Such observations may indicate benthic habitat on a larger scale than those usually studied using grabs which may be more relevant to ecological study of benthic habitat<sup>4</sup>

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## Objectives

To describe the structure, composition, distribution and diversity of macro-epibenthic invertebrate assemblages

To determine which environmental variables best explained the observed patterns in these assemblages

## Species assemblage classification

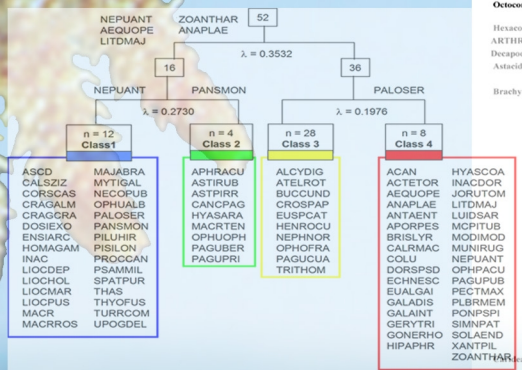
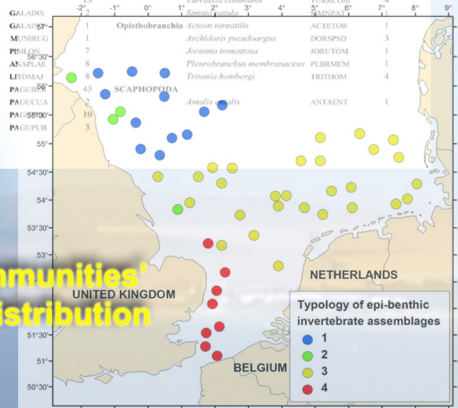


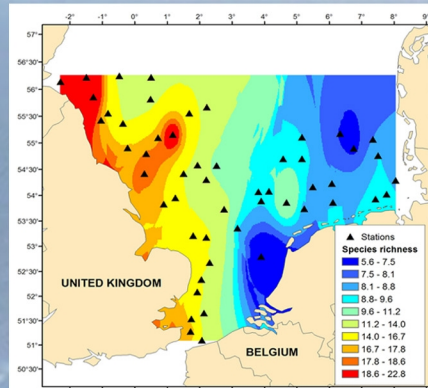
Table listing species names, codes, and counts for various phyla including ANNELIDA, CHORDATA, Cnidaria, and others.

In total, 52 stations were sampled and 84 epi-benthic invertebrate species were identified. TWINSpan classification resulted into 4 classes of species assemblages giving indicator species for each division level and preferential species of each group.

## Sub-communities' spatial distribution



## Species richness spatial distribution



Sub-communities 1 and 2 had high species richness and were localised in the northern part of the English coast and in the deepest waters.

Class 4, to the south, was exposed to relatively high seabed stress and had intermediate species richness. Class 3 had the lowest species richness. It covered a large area to the centre and the east, in shallow waters exposed to continental influence.

## Perspectives

Observations of epi-benthic macro-invertebrates made during bottom trawl survey may be used as an approximation of offshore benthic biotic habitat types at meso-scale to monitor their quality, biodiversity and evolution in space and time may be used as predictors for fish distribution and preferential habitat modelling studied using grabs which may be more relevant to ecological study of fish habitat

## Reference

- [1] Ellis and Rogers, 2004. ICESCM 2004/P-03 CD-ROM.
[2] Hill, 1979. TWINSpan: A FORTRAN program.
[3] ter Braak and Smilauer, 2002. CANOCO reference manual.
[4] Hinz et al., 2003. Journal of Fish Biology 63: 1219-1234.