

# 4DEMON

## 4 Decades of Belgian Marine Monitoring

"uplifting historical data to today's needs"



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In the seventies data was collected aboard the research vessel "A962 Mechelen" by many Belgian scientists and institutions.

### What is 4DEMON?

Within the last four decades, the Belgian scientific community has built up considerable expertise in marine sciences. Numerous research actions, programs and monitoring campaigns have resulted in a valuable set of scientific data and important publications about the Belgian Continental Shelf (BCS). Although these data are essential for understanding long-term changes in the quality of the marine environment, many valuable, historic data still remain inaccessible to the larger scientific community, being only available on paper across various institutions. In addition, most data need to be thoroughly quality-controlled and intercalibrated to achieve comparability with recent data.

4DEMON will centralise, integrate and valorise data compiled during expeditions in the BCS over the last 4 decades, forming an important part of Belgian scientific heritage. At the core of 4DEMON is a multidisciplinary consortium of five Belgian partners with a long-standing expertise in marine science.

The project focuses on the **compilation of longstanding integrated and intercalibrated data sets on contamination levels, eutrophication and ocean acidification** in the BCS. To facilitate, coordinate and streamline data compilation and data interpretation for the different topics, specific work tasks on **data management and data analysis** were defined.

### Background

In the BCS, modern oceanography, with systematic campaigns for assessing the quality of the marine environment, started with the "Projet Mer/Projekt Zee" (PMPZ) in 1970. Within this first phase of the Belgian Federal North Sea Research Programme, all compartments of the marine ecosystem were studied. This initial program was followed by other research actions, programs and monitoring campaigns, resulting in a large set of valuable historic data on the marine environment of the BCS.

### Project structure



Initial work emphasizes on identifying, recovering, quality-controlling and intercalibrating the relevant data sets per topic. A Data Inventory and Tracking System (DITS) was set up to follow up the process. For each topic, the **key indicators** were identified:

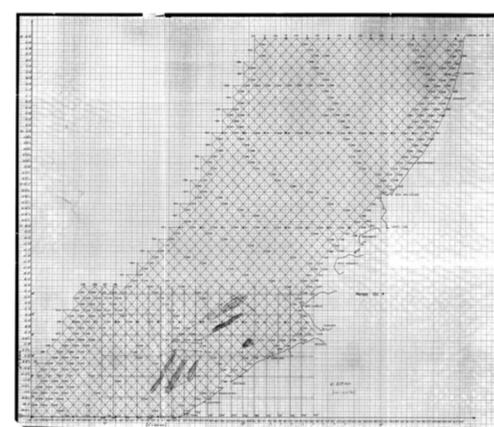
- **Contamination:** organic pollutants and heavy metals analysed in marine sediments and biota, with priority to the longest time series (i.e. heavy metals and polychlorinated biphenyls).
- **Eutrophication:** turbidity, dissolved nutrient concentrations and ratios in water, phyto- and zooplankton biomass and species composition.
- **Acidification:** pH, partial pressure of CO<sub>2</sub>, total alkalinity and dissolved inorganic carbon.

Contemporary data, like **continuous underway data** (e.g. salinity, temperature, pH, nutrients and chlorophyll) and **remote sensing** chlorophyll a and turbidity, will supplement the data sets and will aid the data interpretation and intercalibration as they have a much higher spatial and temporal resolution.

### Data analysis

Pollution, eutrophication and acidification do not impact independently on the marine environment and its ecosystem function. For example, carbonate chemistry is affected by eutrophication in addition to acidification, sediment polychlorinated biphenyl (PCB) concentrations are linked to trophic state, and PCB concentrations in bivalves can possibly be linked with algal growth dynamics in the water column. **Integrated statistical analyses** of the newly combined and intercalibrated multiparameter data sets will offer a unique opportunity to **assess long-term trends** in the selected environmental parameters and could also **expose potential interactions** between them.

Data sheet representing phytoplankton counts from samples taken aboard of RV Mechelen during september 1972.



The research during PMPZ was geographically divided in different locations and stations. This so called "1000-points" map represents the 1970-1976 sampling grid.

### More information

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