4DEMON

4 Decades of Belgian Marine Monitoring

"uplifting historical data to today's needs"

Lagring R[1], Strobbe F[1], Borges A V[2], Desmit X[3], De Witte B[4], Gauquie J[4], Goffin A[5], Nohe A[6], Sabbe K[6], Stojanov Y[1], Tyberghein L[5], Van der Zande D[3], De Cauwer K[1]

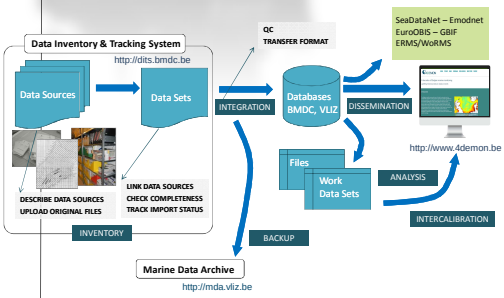
[1]*Royal Belgian Institute of Natural Sciences, Operational Directorate Natural Environment, Belgian Marine Data Centre (BMDC), Belgium (bmdc@mumm.ac.be)*
[2]*Chemical Oceanography Unit, University of Liège, Belgium*
[3]*Royal Belgian Institute of Natural Sciences, Operational Directorate Natural Environment, Remote Sensing and Ecosystem Modelling (REMSEM), Belgium*
[4]*Institute for Agricultural and Fisheries Research (ILVO), Belgium*
[5]*Flanders Marine Institute (VLIZ), Data Centre Division, Belgium*
[6]*Protistology & Aquatic Ecology Laboratory, Biology Department, Ghent University, Belgium*

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. 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. The project focuses **on compilation of longstanding integrated and intercalibrated data sets** on **contamination** levels, **eutrophication** and ocean **acidification** in the BCS.

RV Mechelen

RV Belgica

Data



A **work flow** has been agreed upon to identify and recover relevant data sets per topic.

The **Data Inventory and Tracking System (DITS)** was set up to describe the different data sources and to follow-up the process of data digitization and import in the database.

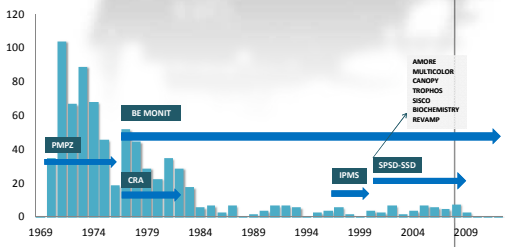


Fig 1. Current number of datasources in DITS assigned to project start date.

Contamination

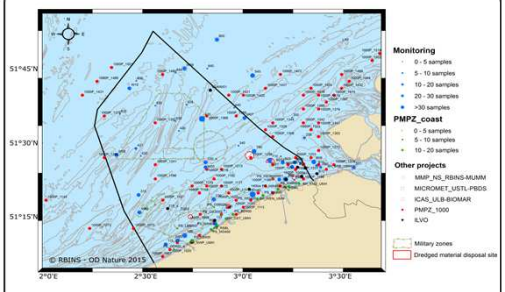


Fig 2. Overview of locations with metal concentrations in sediment since the '70s in the Belgian Continental Shelf.

Organic pollutants (PCBs) – Heavy metals in marine sediments and biota

Eutrophication

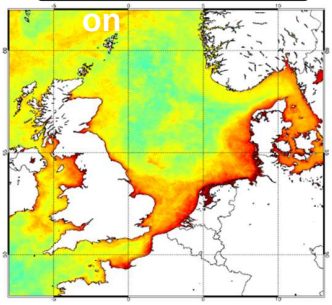


Fig 3. The chlorophyll-a 90 percentile map of the North Sea generated using daily MERIS chlorophyll-a products for the period March-October 2011.

Chlorophyll a – Turbidity – Dissolved nutrient concentrations and ratios in water – Phyto- and zooplankton biomass – Species composition (incl. remote sensing data)

Acidification

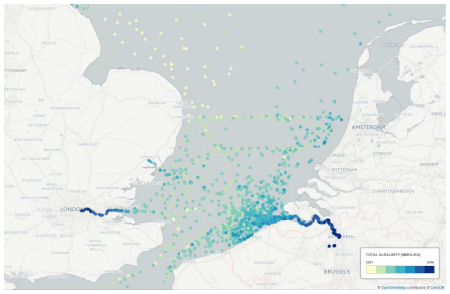
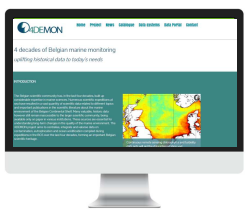


Fig 4. Total alkalinity collected on Belgica cruises (1996-2010) by the Chemical Oceanography Unit of the University of Liege.

pH – Partial pressure of CO_2 – Total alkalinity – Dissolved inorganic carbon (incl. continuous underway data)

Data Analysis

www.4demon.be



- **Long-term change detection** in BCS based on the resulting quality-controlled data sets.
- **Integrated analysis** to assess interaction between the environmental variables.
- Comparison with research results in **adjacent areas**.
- **Data products**: Density and distribution maps, graphs, intercalibrated data sets.

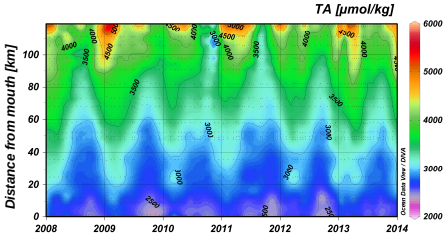


Fig 5. Scheldt monitoring (Luctor/NIOZ) ULg data-sets (Total Alkalinity, pCO2, S, T) – surface (2008-present).

4DEMON project funded by Belgian Science Policy Office