

ARCHIMEDE - A software for management of marine geological and biological samples and data

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Since 2003, IFREMER manages the marine geology database of Brest (BGMB) which includes information on geological samples (sediment cores and rocks) and geotechnical measurements collected by IFREMER teams and/or resources and related analyses (stratigraphy, lithology, chemistry, grain size). In the same way, the IFREMER Deep Sea Lab database (BIOCEAN) gathers data about biological, sediment and hydrological samples collected by IFREMER biologists and ecologists since 1967. These databases which include several thousands of operations and samples require having a better visibility for the scientific community through the improvement of existing software tools and services.

Indeed, according to the current scientific projects and future applications (*e.g.* management of mining licenses, implementation of the Nagoya Protocol, observatory of mineral raw materials, data dissemination), it becomes crucial to access to:

- the geographic position of sampling operations,
- the samples description (preservation, identifications,...) and related analyses,
- the samples physical location.

In this context, a project was initiated in order to:

- improve archiving and maintenance of marine samples collected during expensive marine cruises all over the world,
- make visible and accessible the available information (data and samples) to the whole scientific community,
- rationalise and optimise the logistic for cruise preparation for the French and international community.

As part of this, a study about management of marine geological and biological samples and related data in a unique system has been undertaken. The main objective is to save all information about the technical and scientific work during the operational phase in the field and in the lab. All metadata and data about handling and curating of sampled materials have to be collated as well. In that aim, new tools and services have been developed:

- A new database was designed by merging and adapting BGMB and BIOCEAN schemas. It allows management of multi-points operations, in-situ measures and observations. Different types and subsampling levels of samples (cores, fluids, organisms...) can be stored in relation with their physical place and transfers. The analyses on samples could also be managed following this new schema.
- The onboard software SEALOG allows recording and reporting events and operations and tracking samples from cruises, dives and moorings operated by biologists and geologists. Back on land, these data are loaded into the central database. However they must be completed after processing of samples and performing analyses.

- The graphical user interface connected to the new database, ARCHIMEDE, can be used in the lab, downstream the early acquisition at sea. This software was developed through four structuring functions: (1) Data input; (2) Visual display of data and query; (3) Data import; (4) Data export.

So far these functionalities enable processing of information about surface operations, diving operations and samples (acquisition date-time, positions, equipment, originator, description...). The marine samples physical location and movements (transfers, loans...) can already be tracked with ARCHIMEDE whereas the features for the management of analyses on samples will be added by 2017. A module dedicated to geographical sites is planned to be integrated in a longer term.

- A website has been developed (soon available) in order to make visible and accessible to the whole scientific community all the information stored in the database. It is based on Sextant infrastructure (<http://sextant.ifremer.fr/en/>) which allows data display using the OGC Web Map Service protocol (WMS). Thanks to this website, scientists and general public will be able to locate geological and biological material from sea floor and archived in different French repositories. They will have access to related data (analyses) and images according to restriction rules.

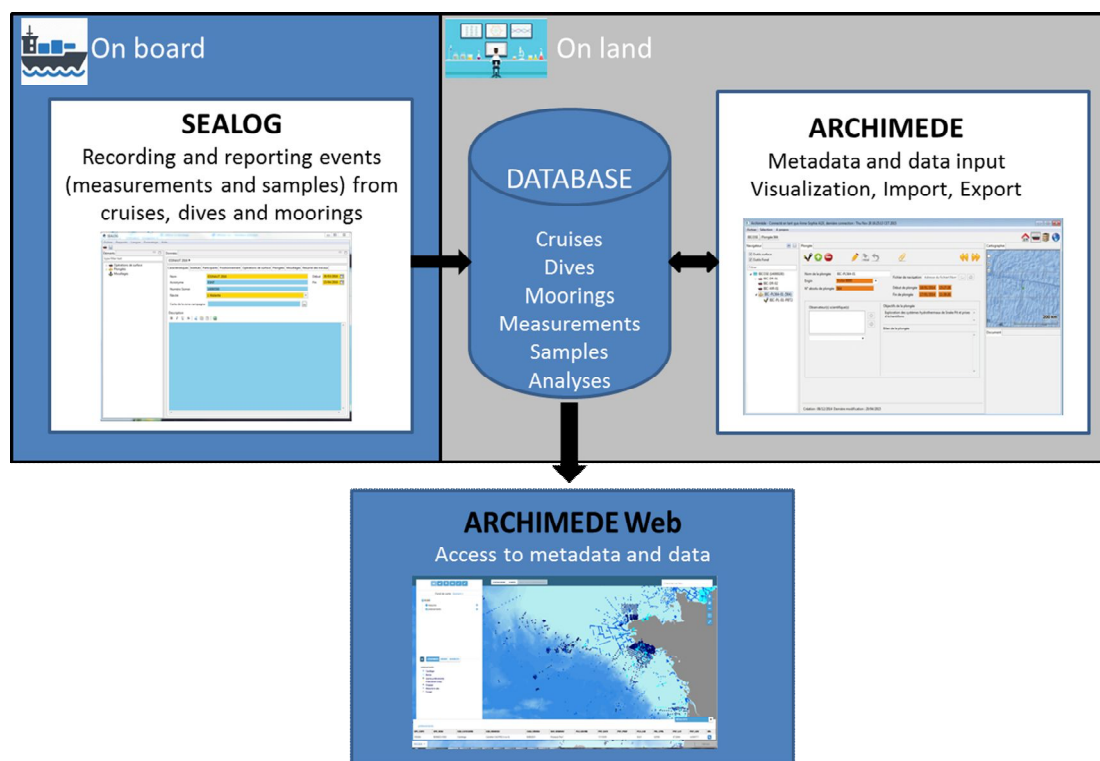


Figure 1: System for management of geological and biological samples and data

This initiative was conducted through a collaborative relationship with field operators as well as laboratory staff in order to answer their needs and to offer user-oriented solutions.

Besides providing a way for scientists and data managers to enhance the currently existing data flows, this project aims to improve our capabilities in data and information security, management, use and delivery.

This is of vital importance for marine researchers, industry and policy-makers in the context of various studies, from the climate change prediction, marine resources assessment, to off shore engineering, and to make evidence-based decisions in France and globally.

The presentation will focus primarily on the software ARCHIMEDE, related developments and perspectives.