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Italian NODC, from the ingestion to the publication of the European marine environmental data

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National Oceanographic Data Centres (NODC) are structural elements of the IODE program of UNESCO International Oceanographic Commission. This network has been dealing since several decades with the challenge of collecting, ingesting, processing, and publishing the available oceanographic information. Within this framework, the Italian NODC is involved in different projects and activities supporting the connection between data and knowledge.

Among the Italian NODC activities, the experience of the EMODnet Chemistry project can be considered a positive example of a work-flow going from the ingestion to the publication of nutrients, contaminants and marine litter data. These data are often fragmented because stored in several repositories and project databases, and heterogeneous due to the use of different measurement protocols and transport formats. Furthermore, depending on the topic, some data can be really complex due to the amount and variety of information that need to be stored. In this landscape, a strong effort is done in formats definition and standardization, allowing to include the collected information into an interoperable infrastructure continuously upgraded following INSPIRE Directive rules. The final aim is to provide access to meta-data, raw and controlled data and processed products through on-line services. The products, generated after a data control and analysis phase, are designed following the requests of relevant stakeholders. Examples are the data distribution and magnitude maps, gridded fields obtained by interpolation with specific software and quality controlled aggregated data-sets. The products are distributed through the web portal for the general public or through specific services.

In the last years, there has been an increasing availability of information deriving from automatic and semi automatic measuring systems. These systems produce big amounts of data that need a tailored workflow and dedicated tools. The Italian NODC is involved in data collection from these type of systems. In this case,the data are automatically received from the autonomous observing systems, formatted and quality controlled using a set of automatized codes and then included into a relational database. Together with the storage facilities, this process provides the chance of performing early analysis and re-aggregation of the information. Meta-data are stored in specific Sensor Markup Languages profiles and integrated with data in a Sensors Observation Service client providing a near real time visualization on the web of the measured parameters.

Another fruitful experience relying on the previous data management activities is the use of metadata in the interactive analysis of information distribution thanks to an On-Line Analytical Processing (OLAP). This tool is able to provide a multidimensional picture of the available information contained in a relational database in a specific moment.

The previous examples show how the data management efforts performed by the center coupled with the use of specific processing and visualization tools support the generation of datasets and products disclosing relevant scientific information. Reliability and accessibility of data provide the basis for the assessment of the environmental state and monitoring plans efficiency, allowing to highlight actions that need to be undertaken and gaps of knowledge still present.