EMODnet Atlantic checkpoint : data adequacy to EU challenges

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Introduction

After a time when observations of the sea have been made for specific purposes, e.g. for specific national purposes or to demonstrate a technological capability, the European Commission has now moved to a new paradigm where data are collected once and used them for as many purposes as possible. This means relying preferably on users rather than on producers to assess existing data sets and data sources and promote recommendations for a better satisfaction of their needs. The **EMODNET** Atlantic **checkpoint** (http://www.emodnet-atlantic.eu/) was designed to evaluate the fitness-for-use of current observations and data assembly programs towards 11 marine applications and prioritizing the needs to optimize monitoring systems at the scale of the North Atlantic Ocean.

Methodology

The methodology adopted from the Medsea checkpoint documents the fitness for use of the existing data by providing indicators of adequacy to the challenge products. The assessment criteria and the development of checkpoint information and indicators are derived from the ISO standards for geographical information (ISO19131 Data product Specification, ISO19157 Data Quality and ISO 19115 Metadata). The fitness for use of input data is evaluated in function of the Data appropriateness, and of the availability conditions.

The infrastructure initially set up by the Medsea Checkpoint is based on standardized catalogues of products and input datasets including the specifications and assessment results of the challenge experts exploited to provide feedback and recommendations to their commissioners in the Data Adequacy Report.

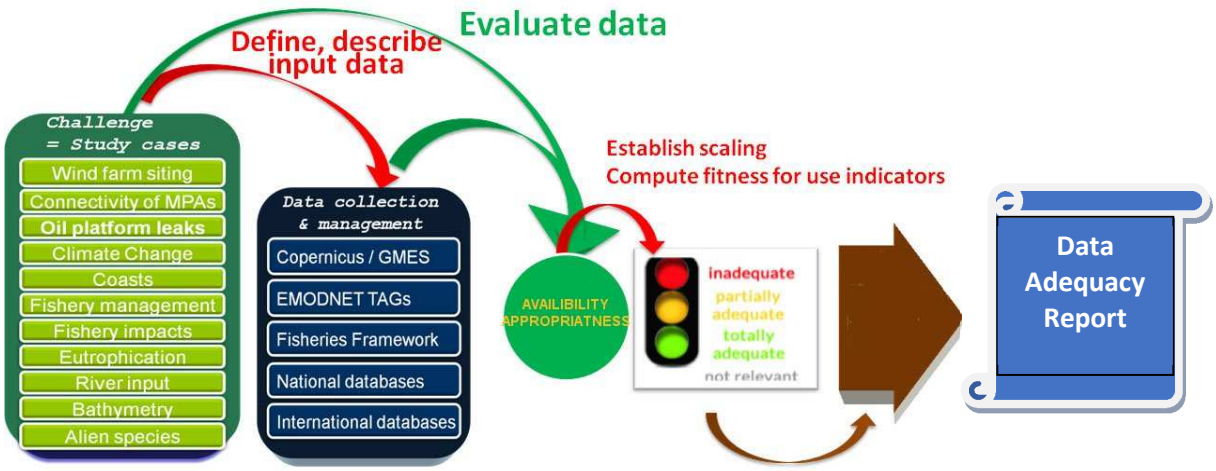

Figure 1 : Checkpoint concept

To provide a consistent overview of what is needed or available and to reveal the potential synergies among users of the same variable, the results have been classified according to the SeaDataNet

vocabulary initially designed for marine data (https://www.seadatanet.org/Standards/Common-Vocabularies) which offers three levels of granularity from finer to the coarser: the Parameter Usage Vocabulary (P01) list for Characteristics, the P02 list for the "Category of characteristics" and the P03 list for the "Groups of categories of characteristics".

The issues encountered were classified into the following types:

- Data gaps due to lack of appropriate spatial or temporal resolution or coverage or attributes
- Assembly needs which should be covered by the creation or update of Thematic Assembly Centres (TACs), which concerns data scattered but taken care of by a number of providers ;
- Availability restrictions due to policy, lack of information on data quality and technical issues.

Decision makers and data providers will refer to the Data Adequacy Report to find the details of the specifications which have not been satisfied.

Data gaps

The main categories of characteristics (P02s) suffering from gaps are:

Air: wind speed and direction

Biology-Biota: fish abundance in water bodies is ill-known, especially for Eel and Salmon, two key species for river environments; phytoplankton generic abundance; invasive species monitoring parameters which suffer both of lack of completeness and of reliability

Fresh water: too few rivers are instrumented for a number of parameters allowing better modeling of the fate of marine water: water flow, temperature, salinity, oxygen, nitrates, phosphates, etc.

Marine water: horizontal velocity of the water column (currents) which generally needs at least 1 km resolution to properly address phenomena at the coast, whether for renewable energies or larvae dispersion computations; sea level change cannot be properly assessed at the coast due to the lack of density of tidal gauges; in situ chlorophyll, dissolved oxygen, salinity and temperature, along with chemicals such as nitrates and phosphates, are all suffering from a low density and lack of co-located measurements, which severely limits the ability to deal with eutrophication.

Seabed-riverbed: the composition of the seabed is ill-known. In terms of sediment and lithology, a scale of 1:1 000 000 would be necessary to address windfarm siting while the EU broad-scale seabed habitats map should be extended to the whole basin, while particular focus on the coastal zone.

Assembly needs

Besides true data gaps, a lot of data suffer from a lack of assembly, i.e. the data exist somewhere but are scattered, not catered for, or not homogeneous. This is mainly the cases in Biology for the threatened or declining species and for Human activities : Marine Traffic (AIS, VMS including vessels of length less than 12m), Marine Protected Areas monitoring parameters , fishing by-catch in numbers and discards in weight.

Availibility restrictions

High resolution VMS and ERS (logbook) data are missing from most countries to policy issues. Costs limit the use of AIS data. Open and more affordable marine traffic data would benefit to a large number of applications. Information on the completeness, the temporal validity, the accuracy of the datasets is a recurrent need. The extreme size of data files has been an obstacle to download and process data and metadata from Copernicus and EMODnet bathymetry highlighting the need of offering cloud computing services to end users.

Conclusions and perspectives

The lessons learned through this experience are discussed. Beyond data adequacy the Checkpoints can provide much needed information for optimizing future European ocean observing systems and data management.