

Leveraging FAIR principles to enhance SOCIB corporate Data Management System

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Introduction

Nowadays, Operational Oceanography has reached a sufficient level of maturity to provide extremely helpful scientific information. It can be used to understand global processes such as climate change or mega-scale meteorology and oceanography phenomena. However, there is a clear need to harmonize and standardize methodologies and also make oceanographic data globally available and interoperable to be reused. FAIR principles put specific emphasis on enhancing the ability of machines to automatically find and use the data, in addition to supporting its reuse by individuals (Wilkinson D. et al, 2016). The following of such principles provides an excellent guidance for any organization to deliver standardized and interoperable data on a worldwide scale. This paper presents the efforts that SOCIB is undertaking to become part of a globally integrated ocean observing system through the implementation of FAIR principles in its corporate Data Management System.

The SOCIB-ICTS Marine Research Infrastructure approach

The Balearic Islands Coastal Ocean Observing and Forecasting System (SOCIB, <http://www.socib.eu>), is a Marine Research Infrastructure (ICTS) that provides world-class, quality controlled metocean datasets, in both real time and delayed mode. This is achieved from across its multi-platform, observation and forecasting system, covering coastal to open ocean areas. This multi-platform approach is needed to properly capture oceanographic processes, that take place at different spatial and temporal scales, and that characterise both ocean state and ocean variability. The SOCIB observation system provides physical and biogeochemical variables from different platforms such as the coastal research vessel, a high-frequency (HF) radar system, weather stations, tide gauges, moorings, drifting buoys, ARGO profilers, gliders (autonomous underwater vehicles) and sea turtle tracking, providing trajectories given by the animals. The forecasting system uses high-resolution numerical models for hydrodynamics (Regional Ocean Model System - ROMS) and waves (Autonomous Wave Forecast System - SAPO).

SOCIB Ocean Observing Increased Value Chain

SOCIB data services and applications have been developed in line with EU-funded initiatives such as the Copernicus Marine Environment Monitoring Service, Jerico-Next, ODIP2, and MedSea Checkpoint (among others), to provide a response to scientific and social needs, by targeting different user profiles such as researchers, technicians, policy and decision makers, educators, students, and society in general. SOCIB also provides applications to (1) allow researchers and technicians to access

oceanographic information, (2) provide decision support for oil spill response for open sea and coastal areas, (3) disseminate information about the coastal state for tourists and recreational users, (4) present coastal research in educational programs, and finally, (5) offer easy and fast access to marine information through mobile devices. The following elements represent the fundamentals of the SOCIB Ocean Observing Increased Value Chain - OOIVC (figure 1). The FAIR principles become a relevant framework of reference for a successful implementation and maintenance of the SOCIB OOIVC:

- The utilization of Best Practices to cover the whole SOCIB data life cycle (IODE Ocean Best Practices Repository).
- The development of a Data Management Program and a Data Quality Strategy that contemplates appropriate data formats and interoperable services. This complies with international data and metadata standards, implements world class QA/QC procedures and ensures scientific result traceability through both data and software citation (DOI policy for datasets and software tools).
- The implementation of a Quality Management System (based on the IODE Quality Management Framework) to ensure the successful delivery of oceanographic and meteorological data, products and services.
- The establishment of a structural and diversified Products and Services Strategy, able to reach a broad range of social sectors (including public and private agencies, Defence, tourism, fisheries, etc.).

The SOCIB Data Centre plays the main role for both ensuring the implementation of such fundamentals and the safeguarding of the whole data life cycle, leading to the adoption of FAIR data principles. This ranges from data acquisition using SOCIB observational platforms, numerical models and additional information generated by other SOCIB divisions and facilities. This enables further distribution and visualization through the development of specific tools for both discovering and visualising the datasets. It includes the implementation of dedicated web and mobile applications, relying on open source solutions.

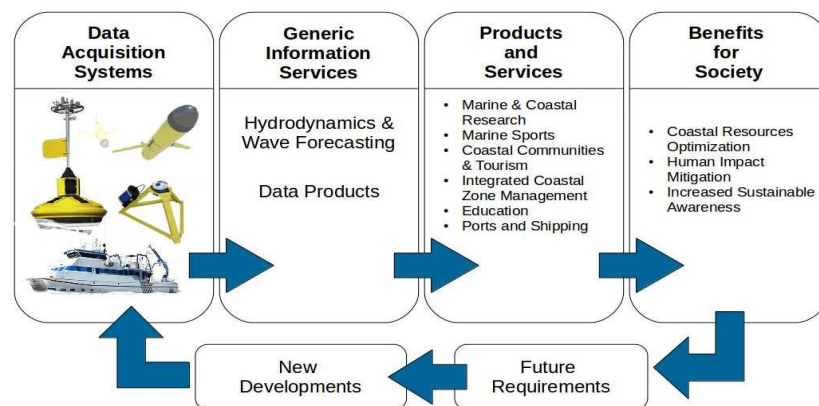


Figure 1: SOCIB Ocean Observing Increased Value Chain (adapted from Pinardi N., 2017)

Conclusions

SOCIB is a multi-platform distributed and integrated system that provides streams of oceanographic data and modelling services to support operational oceanography in a European and international framework, therefore also contributing to the needs of marine and coastal research in a global change context. The following of FAIR principles in our corporate Data Management Strategy is allowing a complete implementation of international standards and best practices within the SOCIB infrastructure.

References

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