

PLOCAN multi-platform observatory data infrastructure

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Introduction

The Oceanic Platform of Canary Islands (PLOCAN) is a multipurpose technical-scientific service infrastructure that provides support for research, technological development and innovation in the marine and maritime sectors, available to public and private users. As part of its activities PLOCAN runs an observatory consisting of four components that contribute to a broad range of coastal and regional sampling missions and services; (a) Coastal observing system: coastal component, expandable, permanent observing system, that will also serve as instrumentation test-bed, (b) Open-ocean deep water observatory: regional component, located 60 miles north of the archipelago in 3670m water depth (a.k.a. ESTOC site), (c) Offshore platform observing system: coastal, located on the platform physical structure, observes seabed, water column, ocean surface and atmosphere and (d) Mobile observing system: coastal, regional and global observation missions including the characterization of the Atlantic Ocean.

Multi-platform Observatory

A wide range of Observation Platforms are managed by PLOCAN's Observatory in order to provide a continuous and real-time in-situ monitoring of the ocean. These platforms can be both fixed (oceanographic moorings, weather stations, and HF radar) or mobile (autonomous underwater vehicles, unmanned surface vehicles, remotely operated vehicles and drifters), providing information about the ocean surface and/or the water column. Different sensors are placed in PLOCAN Observation Platforms allowing access to physical (temperature, salinity, currents, etc.), biochemical (ph, nutrients, carbon dioxide, chlorophyll-a, etc.) and meteorological data (air temperature, wind speed and direction, barometric pressure, etc.). Those platforms provide both engineering and scientific data in near-real-time with its own particular format and communication flow which leads to an unmanageable scenario when developing information systems. This is a common challenge shared by all ocean observatories which work with different observing systems and its solution becomes even more complex for small institutions like PLOCAN.

International initiatives and standards

As in an increasing number of regional, national, European and international infrastructures, PLOCAN is engaged in the implementation of FAIR principles. Data and metadata standards have been in place for a subset of existing and emerging observing networks, e.g. [netCDF OceanSITES](#) profile for fixed open-ocean observatories or [EGO netCDF](#) profile for gliders. However, a stronger effort in adopting common strategies and agreed protocols is still needed, working in that direction there are initiatives such as [EMSO-ERIC](#) for fixed observatories, [OceanGliders](#) and the GROOM II project for gliders or [EuroGOOS HFR Task Team](#) for HF radars. In addition, data harvesters such as The European Marine Observation and Data Network ([EMODnet](#)) and umbrella initiatives like [ENVRI](#) (via ENVRIFAIR) can be instrumental in bridging interoperability requirements across networks and set best practices. The current landscape implies that the observatory infrastructure should be flexible and prepared for adaptations, and the data need to be formatted and served to be delivered for different uses.

PLOCAN data infrastructure

Taking into account the standards already adopted by the different communities and networks (gliders, fixed observatories, HF Radar, etc), their best practices and recommendations, PLOCAN has designed a common infrastructure, Figure 1, to manage and distribute the data produced in its observatory. A specific platform-driven data management has been developed in order to unify data flow and harmonize the different sources for posterior common treatment, which allows common visualization, statistical processing or automation on operational decision making process among others.

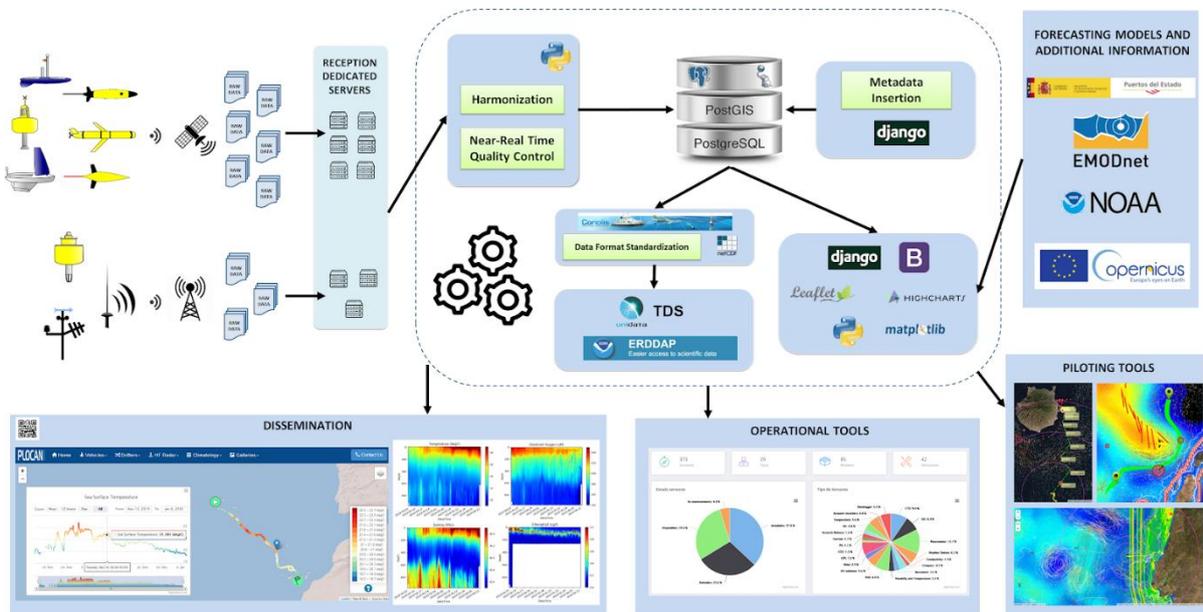


Figure 1: PLOCAN's observatory data infrastructure, dissemination and operational web tools.

Visualization tools have been built, on top of this harmonized data, with two main objectives: disseminating the observation activities (for both scientific and non-specialized audience) and providing visual tools in order to take better operational decisions. Regarding dissemination, dynamic maps and interactive data plots have been integrated in a unique web data portal that leads to a better understanding of the scientific collected data, which are also linked to its corresponding metadata. Furthermore, for operational purposes and with the aim of facilitating PLOCAN's autonomous marine vehicles fleet piloting, engineering information has been integrated in a web based operational map tool with other information sources such as forecasting models or near-real-time observations from HF radars, buoys, moorings or remote sensing platforms.

Among forecasting products it is worth highlighting the physical ones that include currents and waves as parameters which are of great importance for operational purposes. Depending on the scale, there exist different products. For instance, physical parameters at a global or regional (North-Atlantic and Maracaronesian area) scale are obtained from Copernicus Marine Environment Monitoring Service ([CMEMS](#)) and NOAA Operational Model Archive and Distribution System ([NOMADS](#)), whereas Spanish and Canary Islands local scale products are obtained from [Puertos del Estado](#). From CMEMS it is also possible to obtain near-real-time remote sensing observation data and has a vast marine data catalog for European regions from where it is possible to obtain bathymetric products or vessel density maps. Building a common data infrastructure for PLOCAN observatory allows a more efficient use of the observation platforms and equipment available. In addition, using open data already available thanks to other institutions and initiatives in conjunction with PLOCAN observatory data, leads to a deeper understanding of the ocean.