# Oceanography Information System of Spanish Institute of Oceanography (IEO)

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Since 1914, the Spanish Institute of Oceanography (IEO) performs multidisciplinary studies of the marine environment. In same case are systematic studies and in others are specific studies for special requirements (El Hierro submarine volcanic episode, spill Prestige, others.).

Different methodologies and data acquisition techniques are used depending on studies aims. The acquired data are stored and presented in different formats. The information is organized into different databases according to the subject and the variables represented (geology, fisheries, aquaculture, pollution, habitats, etc.).

Related to physical and chemical oceanography data, in 1964 was created the DATA CENTER of IEO (CEDO), in order to organize the data about physical and chemical variables, to standardize this information and to serve the international data network SeaDataNet. www.seadatanet.org. This database integrates data about temperature, salinity, nutrients, and tidal data. CEDO allows consult and download the data. http://indamar.ieo.es

On the other hand, related to data about marine species in 1999 was developed SIRENO DATABASE. All data about species collected in oceanographic surveys carried out by researches of IEO, and data from observers on fishing vessels are incorporated in SIRENO database. In this database is stored catch data, biomass, abundance, etc. This system is based on architecture ORACLE.

Due to the large amount of information collected over the 100 years of IEO history, there is a clear need to organize, standardize, integrate and relate the different databases and information, and to provide interoperability and access to the information.

Consequently, in 2000 it emerged the first initiative to organize the IEO spatial information in an Oceanography Information System, based on a Geographical Information System (GIS). The GIS was consolidated as IEO institutional GIS and was created the Spatial Data Infrastructure of IEO (IDEO) following trend of INSPIRE. All data included in the GIS have their corresponding metadata about ISO19115 and INSPIRE.

IDEO is based on Web services, Quality of Services, Open standards, ISO (OGC) and INSPIRE standards, and both provide access to the geographical marine information of IEO. The GIS allows the information to be organized, visualized, consulted and analyzed. The data from different IEO databases are integrated into a GIS corporate Geodatabase (Esri format). This tool is essential in the decision making of aspects like:
- Protection of marine environment
- Sustainable management of resources
- Natural Hazards.
- Marine spatial planning.

Examples of the use of GIS as a spatial analysis tool are:
- Mud volcanoes explored in LIFE-INDEMARES project.
- Cartographic series about Spanish continental shelf, developed from data integrated in IEO marine GIS, acquired from oceanographic surveys in ESPACE project.
- Cartography developed from the information gathered in Initial Assessment of Marine Strategy Framework Directive.
- Studies of natural hazards related to submarine canyons in southeast region marine Spanish.

Currently the IEO is participating in many European initiatives, especially in several lots of EMODNET. The IEO besides is working in consonance with INSPIRE, Growth Blue, Horizon 2020, etc., to contribute to, the knowledge of marine environment, its protection and its spatial planning are extremely relevant issues.

In order to facilitate the access to the Spatial Data Infrastructure of IEO, the IEO Geoportal was developed in 2012. It mainly involves a metadata catalog, access to the data viewers and Web Services of IDEO. http://www.geo-ideo.ieo.es/geoportalideo/catalog/main/home.page