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Since 1914, the IEO performs multidisciplinary studies of the marine environment, systematic studies like specific studies for special requirements (El Hierro submarine volcanic episode, spill Prestige, etc.)

Different methodologies and data acquisition techniques are used depending on the variables concerned.

The acquired data is stored and represented in different formats. Fig. 1.

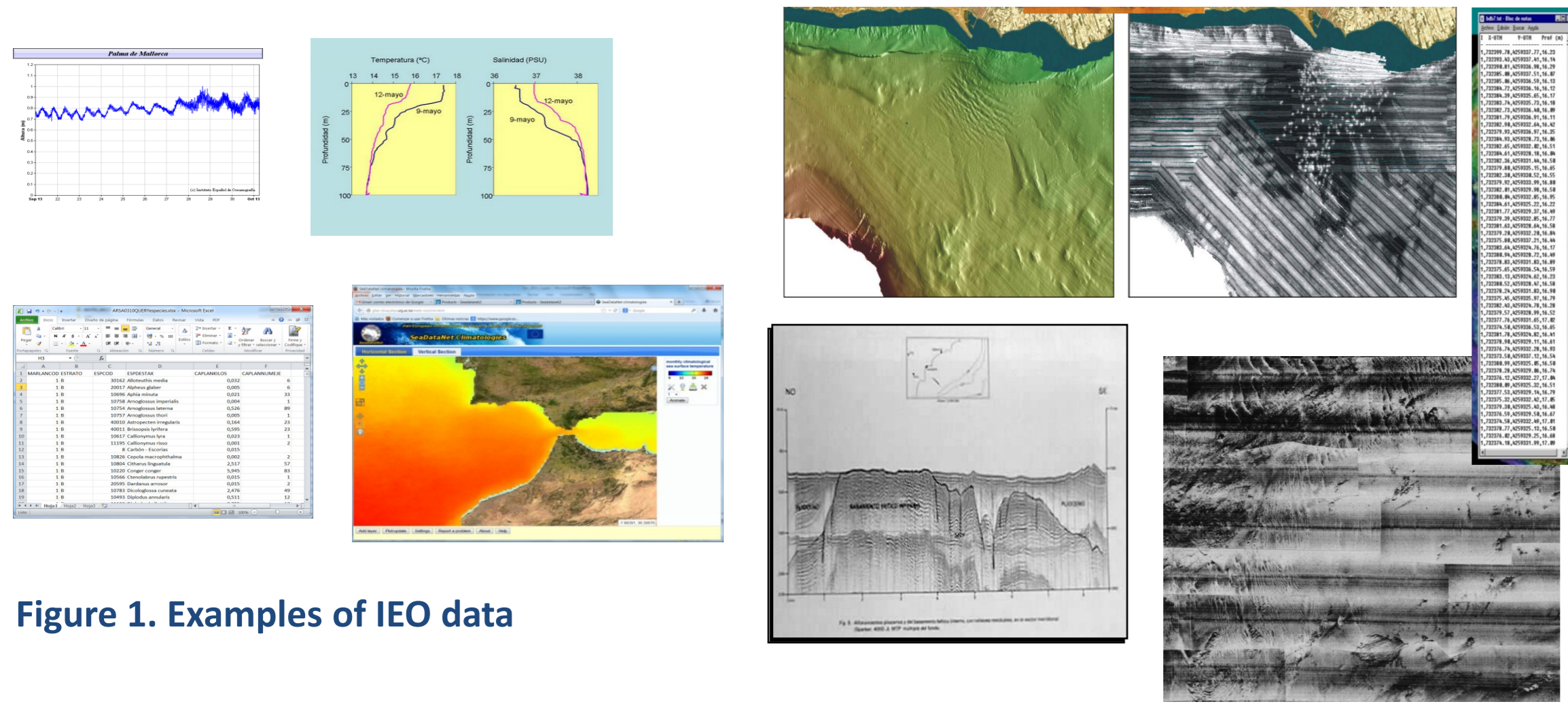


Figure 1. Examples of IEO data

The information is organized into different databases according to the subject and the variables represented (geology, fisheries, aquaculture, pollution, habitats, etc.).

In 1964 the DATA CENTER of IEO (CEDO) (<http://indamar.ieo.es>) was created in order to organize the data about physical and chemical oceanography, to standardize this information and to serve the international data network SeaDataNet. [www.seadatanet.org](http://www.seadatanet.org)

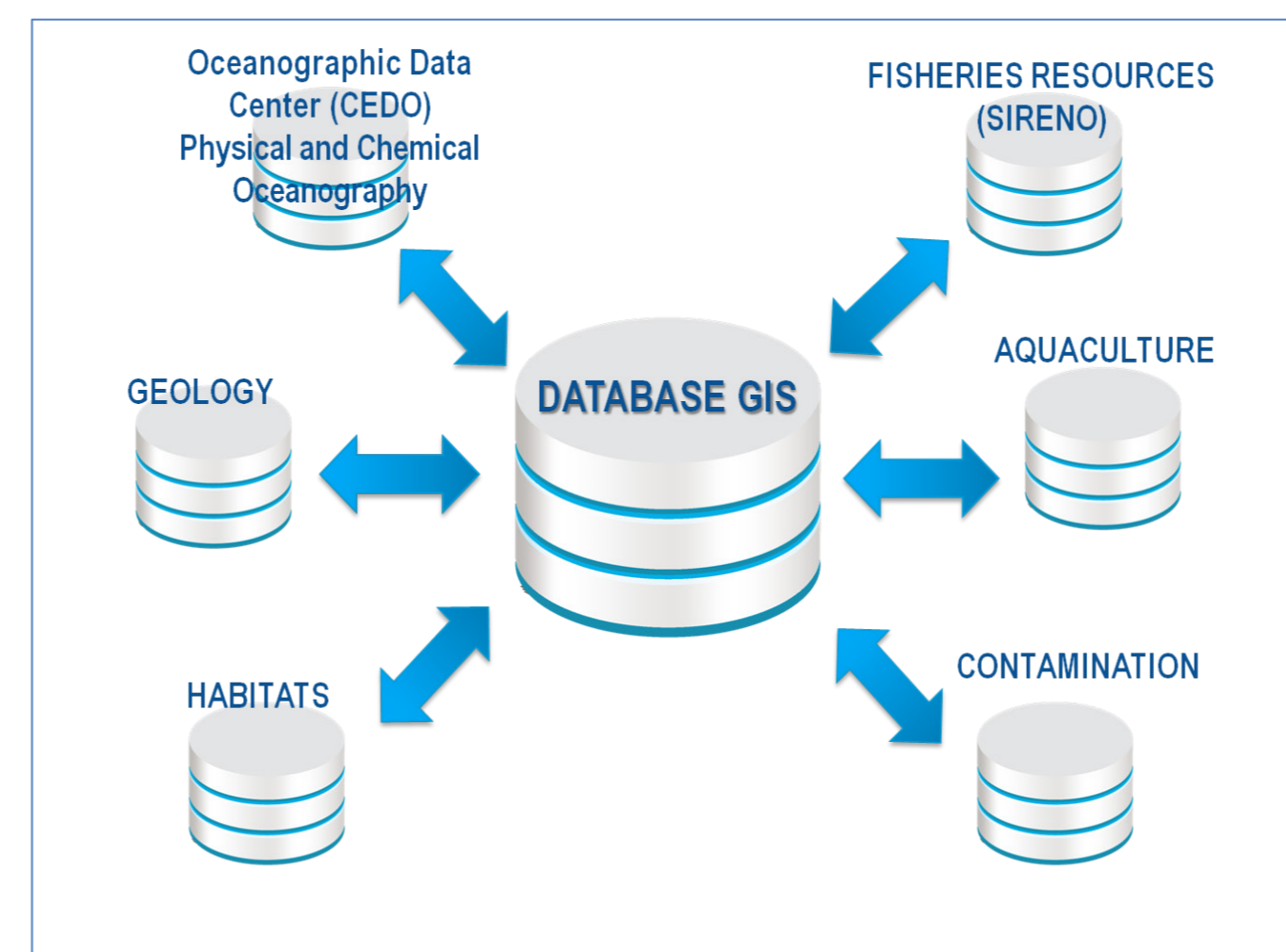


Figure 2. IEO Databases scheme

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

Consequently, in 1997 it emerged the first initiative to organize the IEO spatial information in a Geographical Information System (GIS), and in 2010 this GIS was consolidated as IEO institutional GIS.

The GIS allows the information to be organized, visualized, consulted and analyzed. Besides, it allows to develop high quality thematic cartography. The GIS is an essential tool in the decision making of aspect like protection of marine environment, sustainable management of resources and marine spatial planning.

The information from different IEO databases is integrated into a corporate Geodatabase (Esri format). The Geodatabase is one of the most advanced systems of geo-information storing and managing. Fig. 2.

The IEO Marine GIS has been applied in several project as: SIREMAR (Fig. 6), ESPACE (fig. 3), LIFE-INDEMARES (Fig. 5), Initial assessment of Marine Strategy Framework Directive, (Fig. 4), El Hierro submarine volcanic process (Fig. 8), TPEA: Transboundary Planning in the European Atlantic (Fig. 9), etc. [www.ieo.es](http://www.ieo.es)

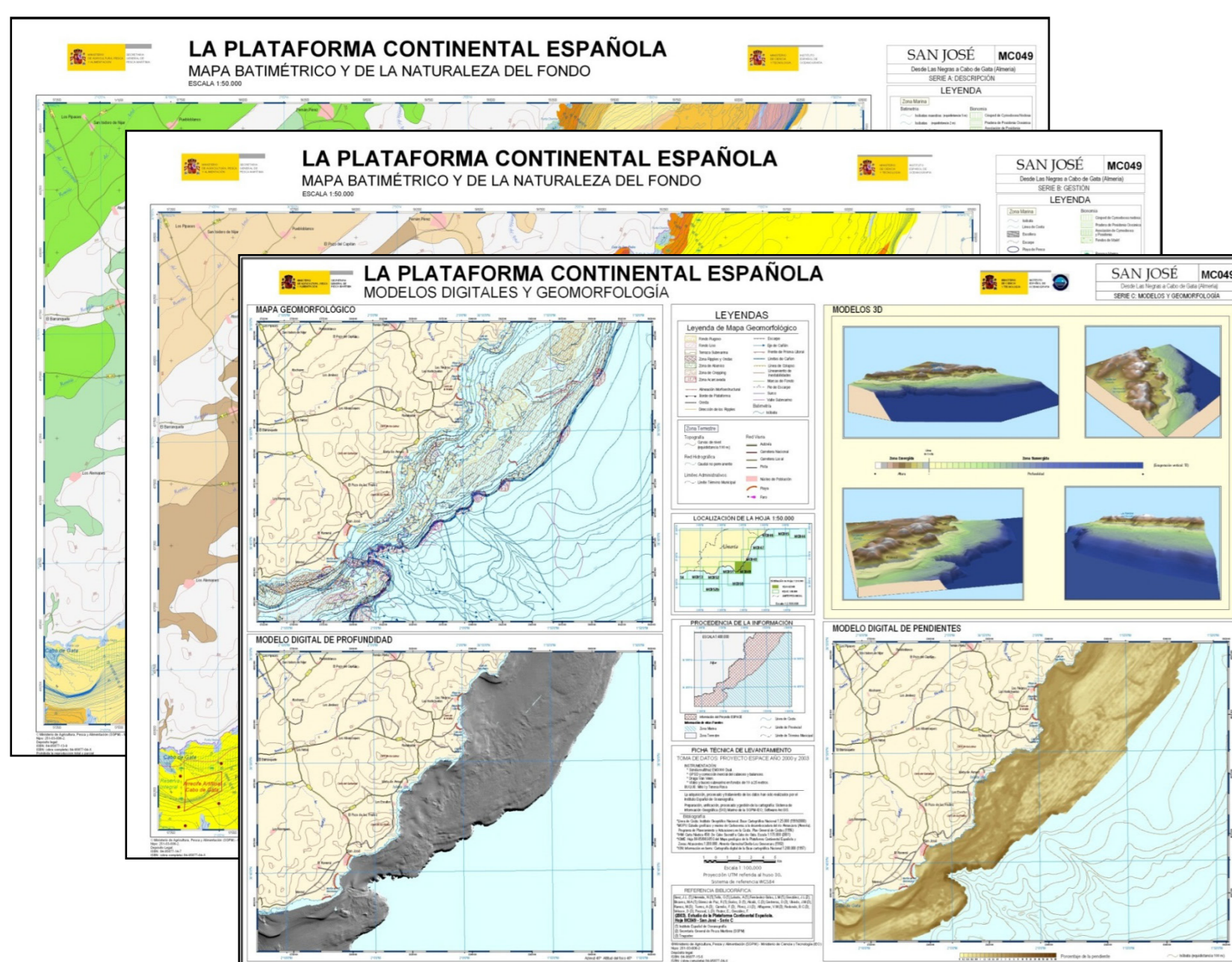


Figure 3. Cartographic series about Spanish continental shelf, developed from data integrated in IEO marine GIS, acquired from oceanographic surveys in ESPACE project. [www.ieo.es/web/ieo/cartografia](http://www.ieo.es/web/ieo/cartografia)

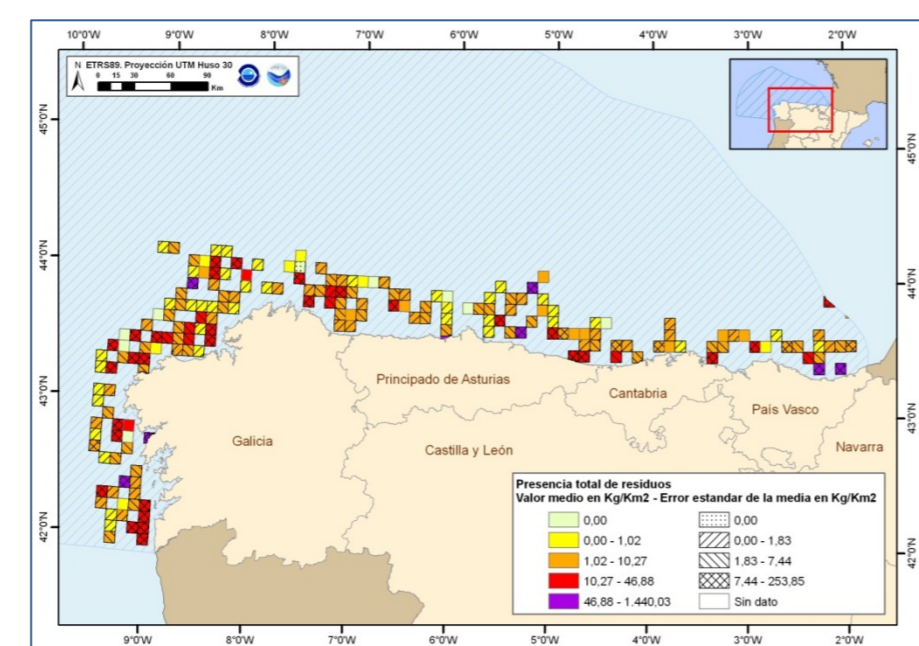


Figure 4. Cartography developed from the information gathered in Initial assessment of Marine Strategy Framework Directive, and recently integrated into IEO Marine GIS.

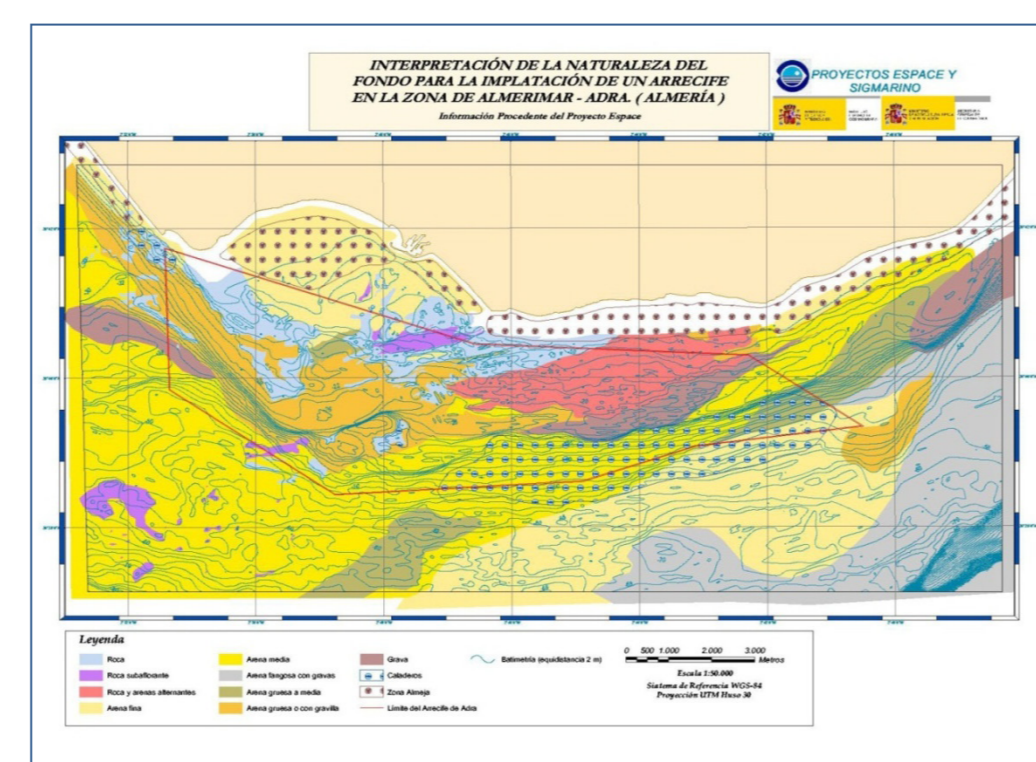


Figure 6. Use of GIS as a spatial analysis tool applied to the study of location of suitable site for the installation of an artificial reef.

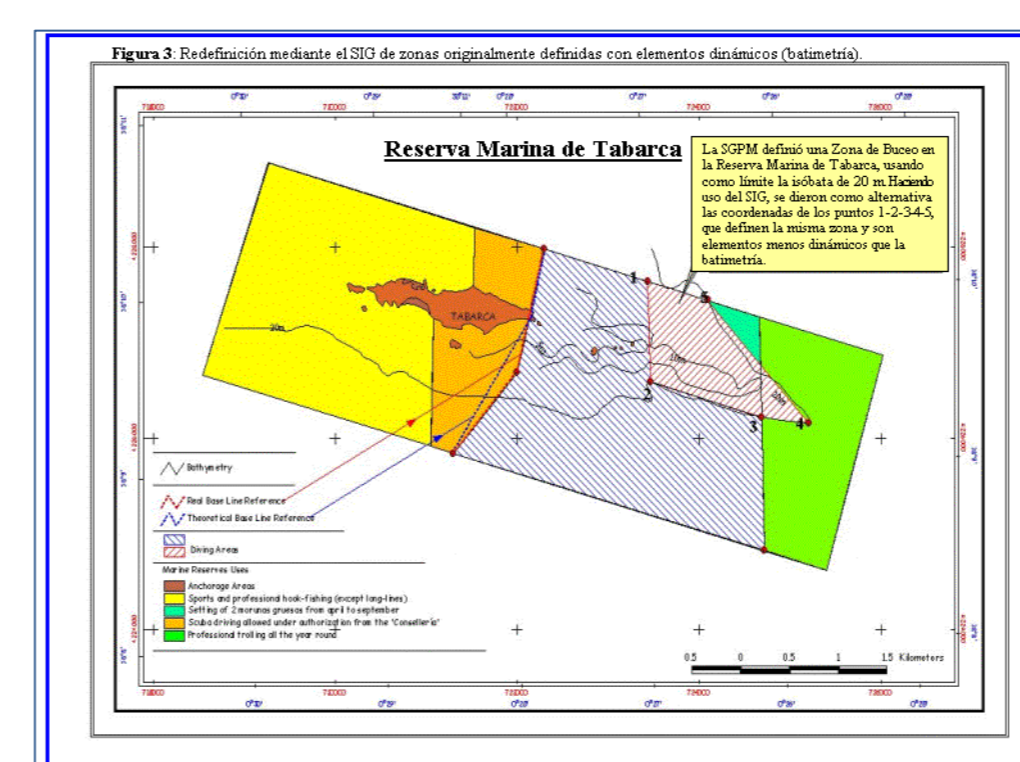


Figure 7. Application of GIS for the monitoring studies about Reserve Marine effects Proyecto SIREMAR.

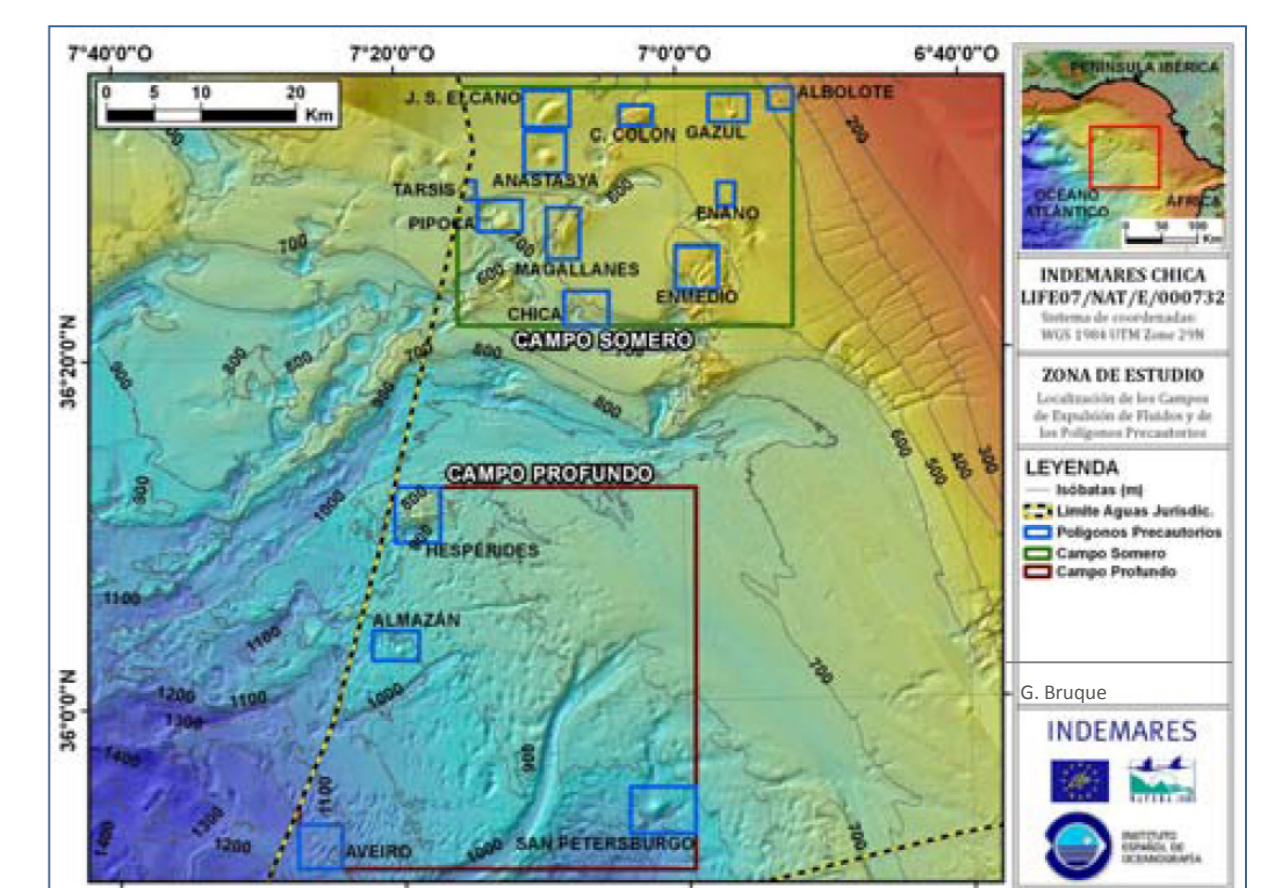


Figure 5. Mud volcanoes explored in LIFE-INDEMARES project. Information integrated in IEO marine GIS.

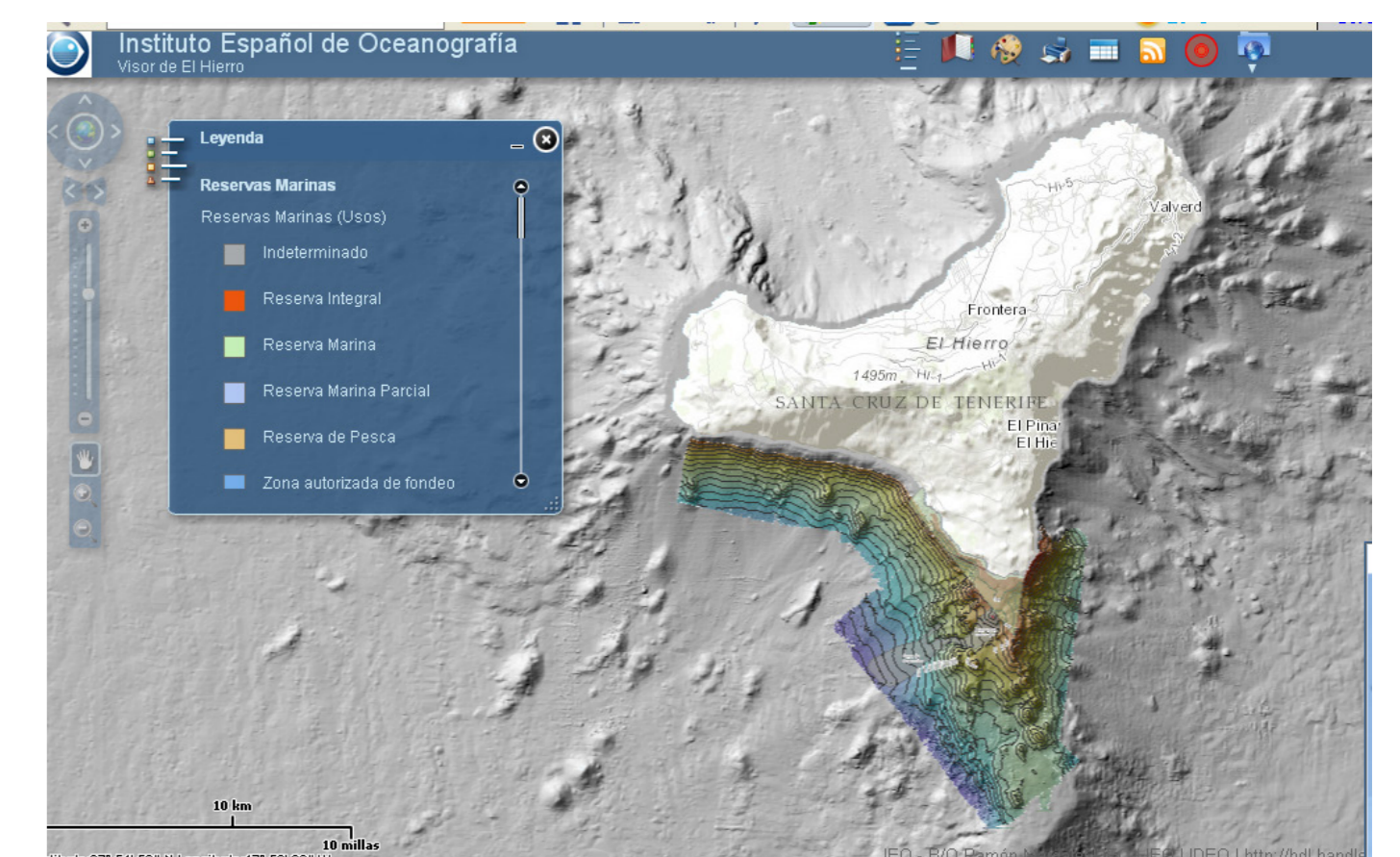


Figure 8. Data Viewer El Hierro submarine volcanic process

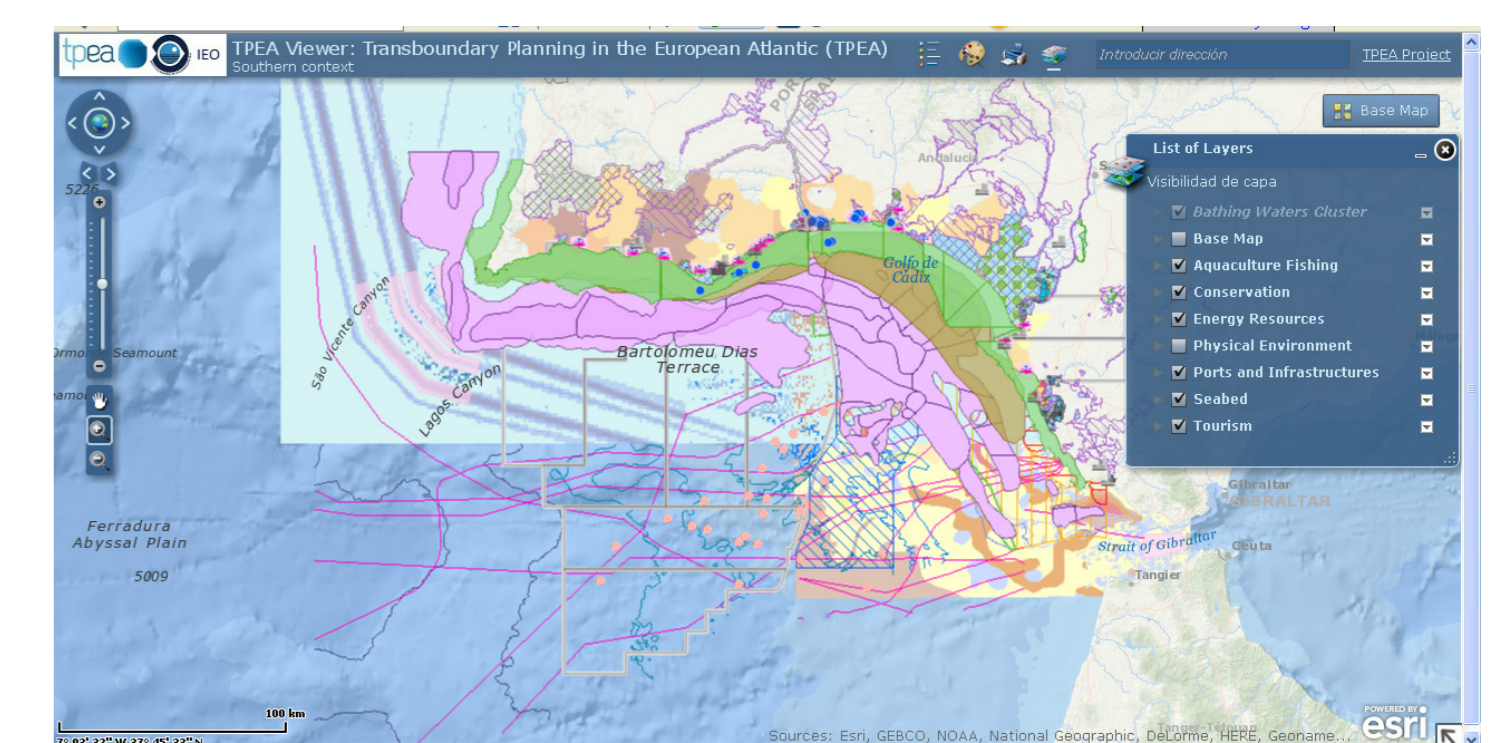


Figure 9. Data Viewer Transboundary Planning in the European Atlantic

Presently, the knowledge of marine environment, its protection and its spatial planning are extremely relevant issues. Therefore, several European initiatives (EMONDENT, Growth Blue, Horizon 2020, etc.) are being developed. To carry out these initiatives is imperative that the marine information is standard, interoperable and accessible. Following this trend, the UE elaborated the INSPIRE DIRECTIVE 2007/2/CE, which provides guidelines and standards to share the information through Spatial Data Infrastructure.

In this regard, the IEO in 2010, initiated the development of Spatial Infrastructure Data of IEO: IDEO (Fig. 10)

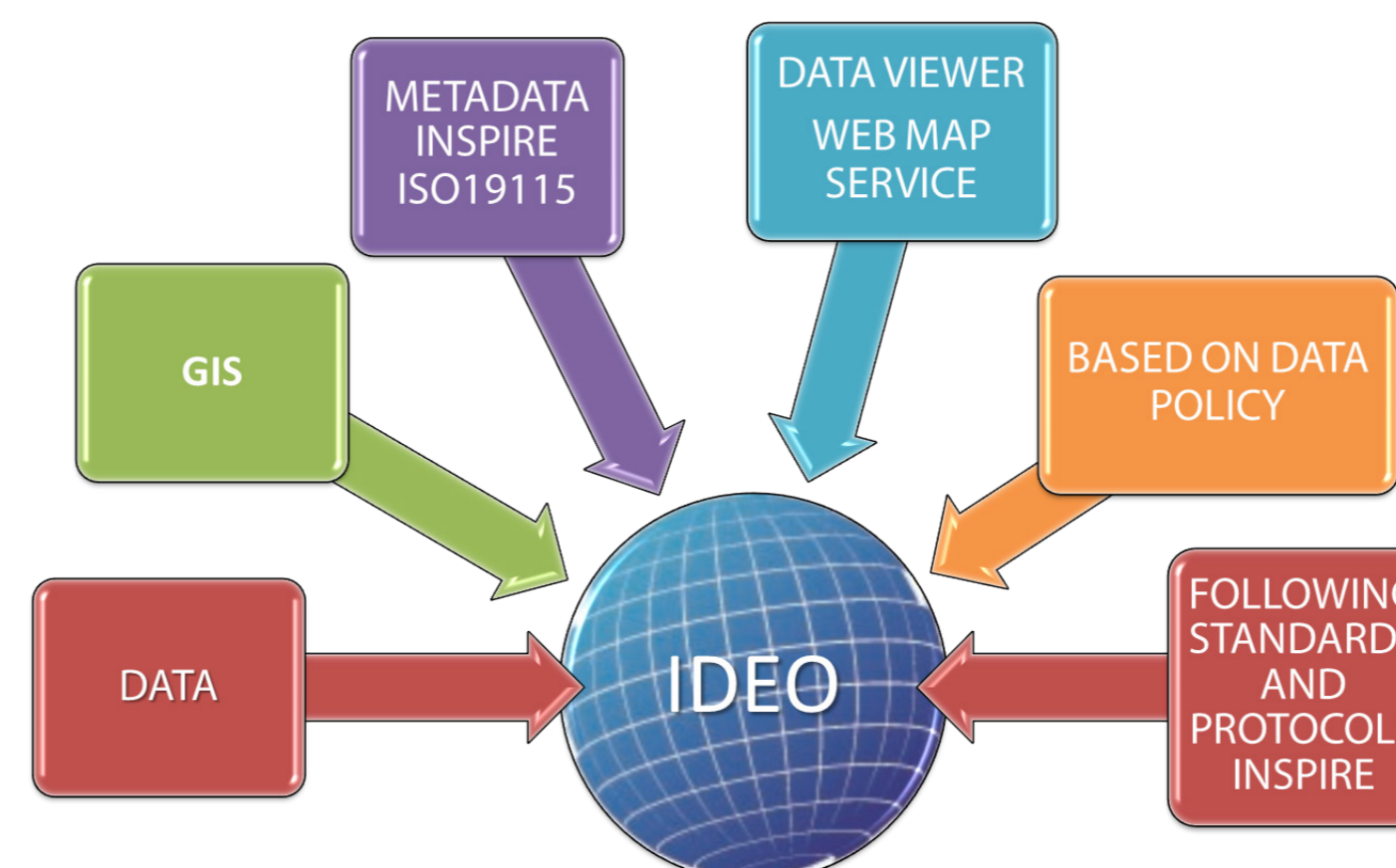
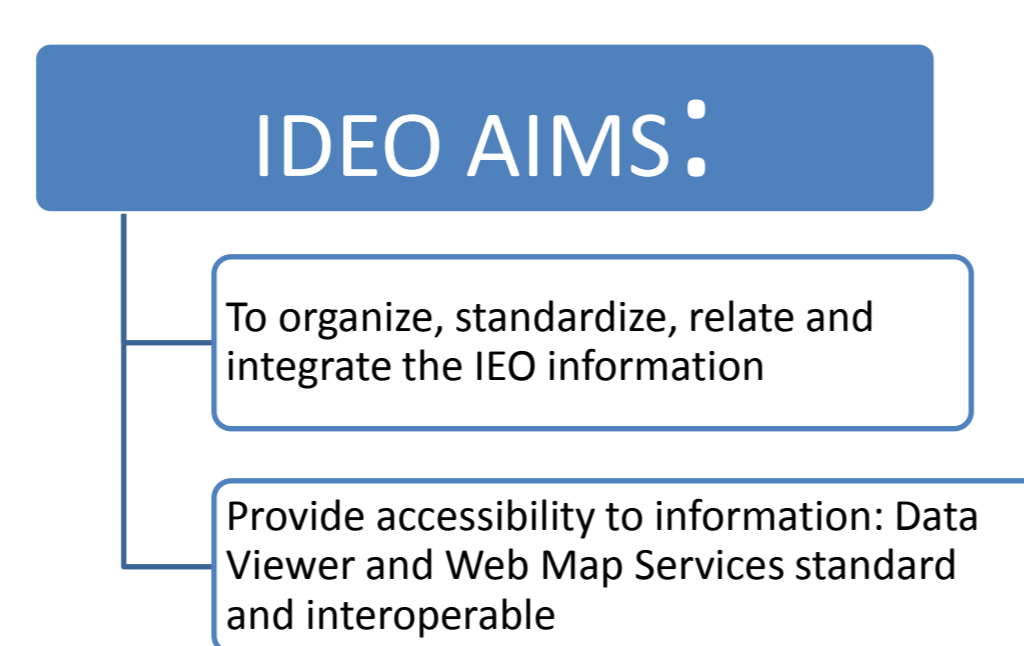


Figure 10. IDEO components.

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 and the access to the data viewers and Web Services of IDEO. (Fig. 11)



Figure 11. [www.geo-ideo.ieo.es/geoportalideo/](http://www.geo-ideo.ieo.es/geoportalideo/)

