

The IGME Marine geo-information system: integrating international standards towards INSPIRE-compliance

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During more than 30 years of activity and participation in numerous research projects, the Institute of Geology and Mineral Exploration of Greece has carried out extensive work in marine geology. As a result a vast amount of data has been collected, including marine sediment samples and cores, shallow and medium penetration seismic profiling, bathymetry and side scan sonar data.

Up to a few years ago, management of available information was carried out by means of hard copy maps and reports, archive of seismic paper rolls and data stored in spreadsheets. In order for those data to be readily available and used by local authorities and the international scientific community, a need for standardization and harmonization was imminent. Towards this scope, our involvement in EU projects (e.g. SEISCANEX, Geo-Seas, EMODnet Geology) provided standards for the development of an integrated digital data management scheme in GIS environment.

The IGME Marine Geology database (IMGdb), used for storage, management, analysis and cartographic representation of the Institute's marine data, was designed as a normalized schema and implemented in an ESRI ArcGIS file geodatabase, using layers and related tables, annotations, raster datasets and relations (topology). It consists of a "back end" that contains all the raw analytical data and supporting metadata, and a "front end" comprising data interpretations and syntheses (t.i. maps).

Data are organized in several feature datasets, listed below, as well as raster datasets (e.g. DEM):

- Bathymetry (point data and polylines)
- Bibliography (literature data were scanned, georeferenced and digitized)
- CrossSections (2D interpretations, e.g. Holocene thickness)
- GeophysicalData (data from interpreted seismic profiles)
- Geochemistry (point data from laboratory analyses and interpolation polygon data)
- Geomorphology (point, line, polygon features)
- Sedimentology (point data from laboratory analyses and interpolation polygon data)
- LandGeology (onshore lithology, age and tectonic lines)
- Mapframe (the IGME Marine Geology 1:200K and frames of other datasets)
- Minerals (point data from laboratory analyses and polygon data from interpretations)
- Palaeogeography (derived palaeogeography information)
- Profiles (metadata information)
- ResidentData (administrative information, shoreline)
- SamplingCoring (metadata information)
- TectonicData (derived tectonic interpretations)
- Topography (on-shore features)

The spatial distribution of available information extends over the Hellenic EEZ, also including on-shore water bodies (t.i. lakes). The EPSG:4326 projection system was chosen, to allow interoperability with international datasets. The database design, vocabulary terms and portrayal rules were determined by use of existing common European protocols and standards (e.g. ISO 19115, INSPIRE); common

standards were applied for on-shore datasets to allow integrated studies. Auxiliary metadata are INSPIRE-compliant and in accordance with requirements from Geo-Seas and EMODnet e-infrastructures.

The IMGdb is also equipped with several Toolboxes, designed to serve the specific needs of data analysis and processing: e.g. Folk.tbx (grain size data manipulation using Folk classification scheme), Roundness.tbx (GIS-based evaluation of grain roundness), IndiKrig.tbx (geostatistical mapping using indicator krigging).

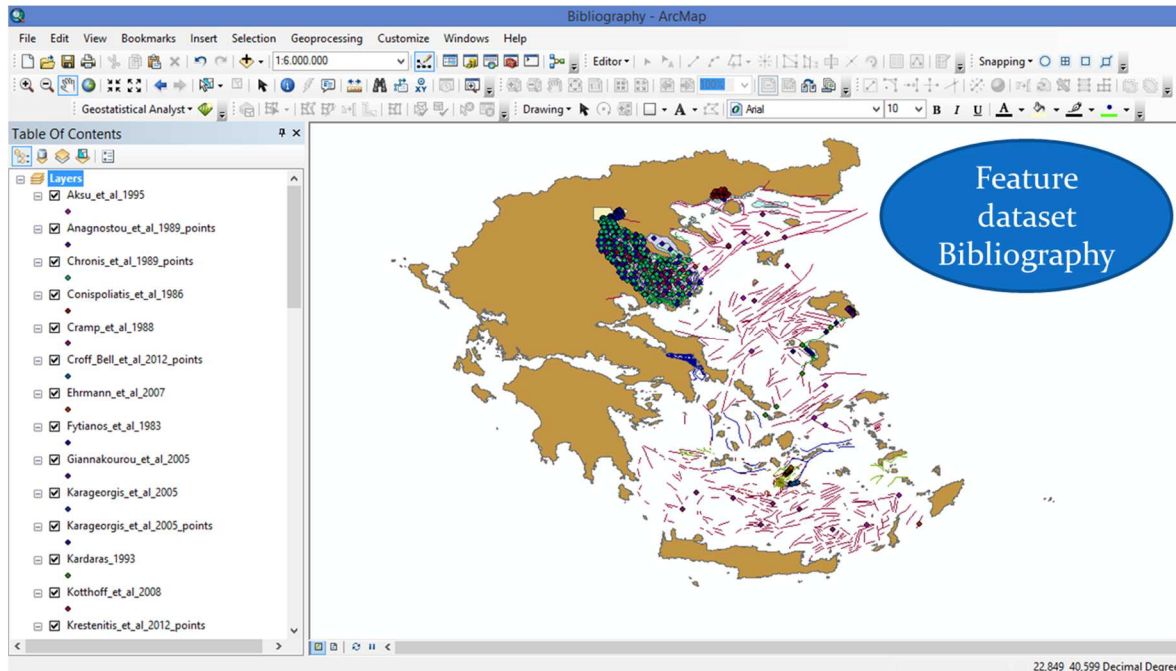


Figure 1: An example of the bibliography feature dataset.

Benefits of this geo-information system: all data are stored in a common format, readily available to be used in various studies (selection by area), allowing for combined interpretations and accurate digital mapping. Users can easily discover, access and reuse collected data; auxiliary metadata provide the required information to evaluate data quality and appropriateness.

The Marine Geology database of IGME is a fundamental tool that provides guidelines and standards for future projects. The integrated data management supports Greece towards implementation of the Marine Strategy Framework Directive and the INSPIRE directive, promoting the establishment of Maritime Spatial Planning.

Future steps in the IGME Marine geo-information system comprise full INSPIRE-compliance and provision of WMS, WFS services. Moreover multiscale GIS layers from various maps and case studies will be visualized and queried interactively through WebGIS.