

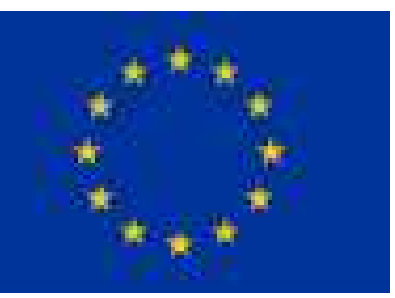


# THE IGME MARINE GEO-INFORMATION SYSTEM: INTEGRATING INTERNATIONAL STANDARDS TOWARDS INSPIRE-COMPLIANCE

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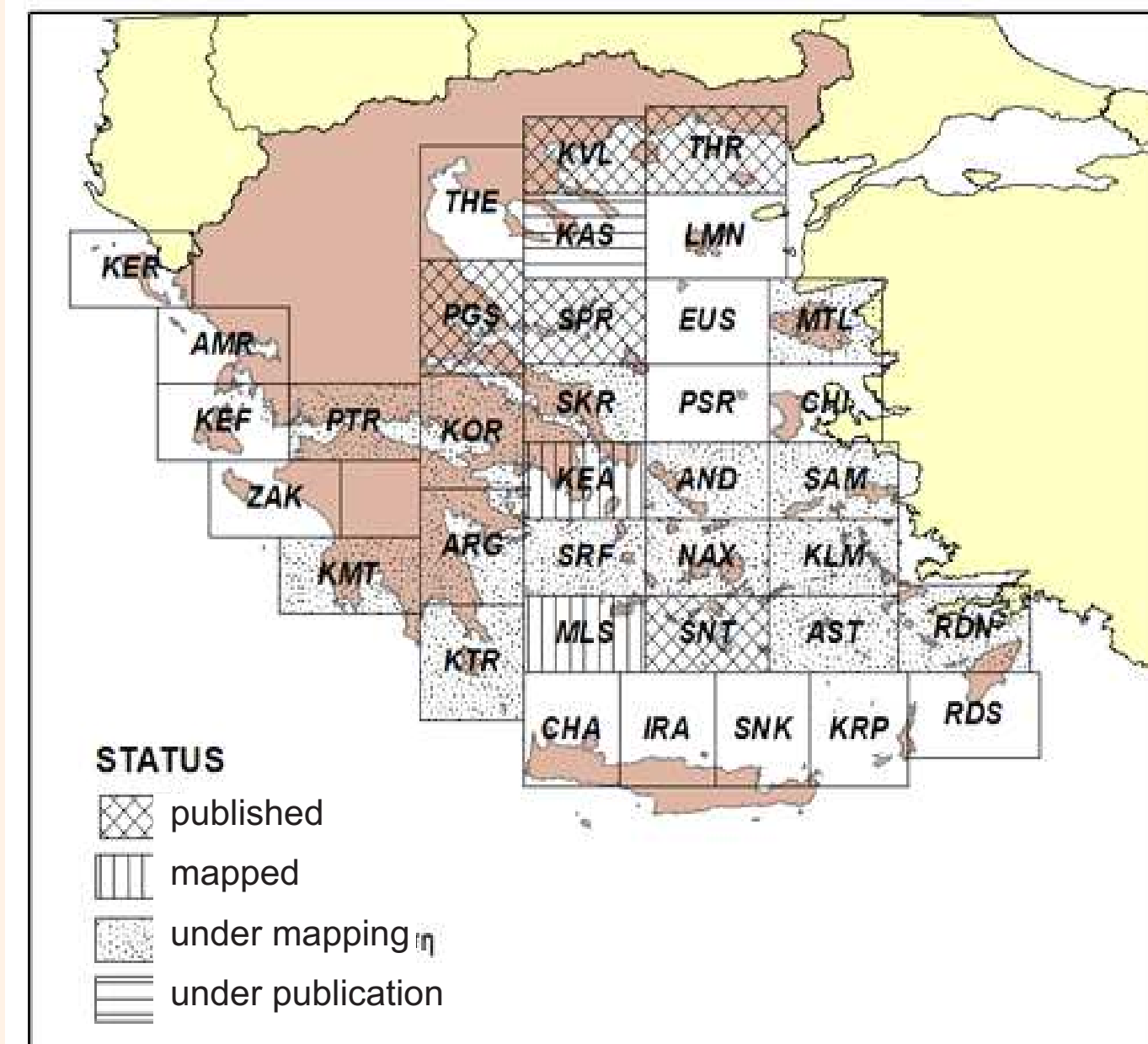
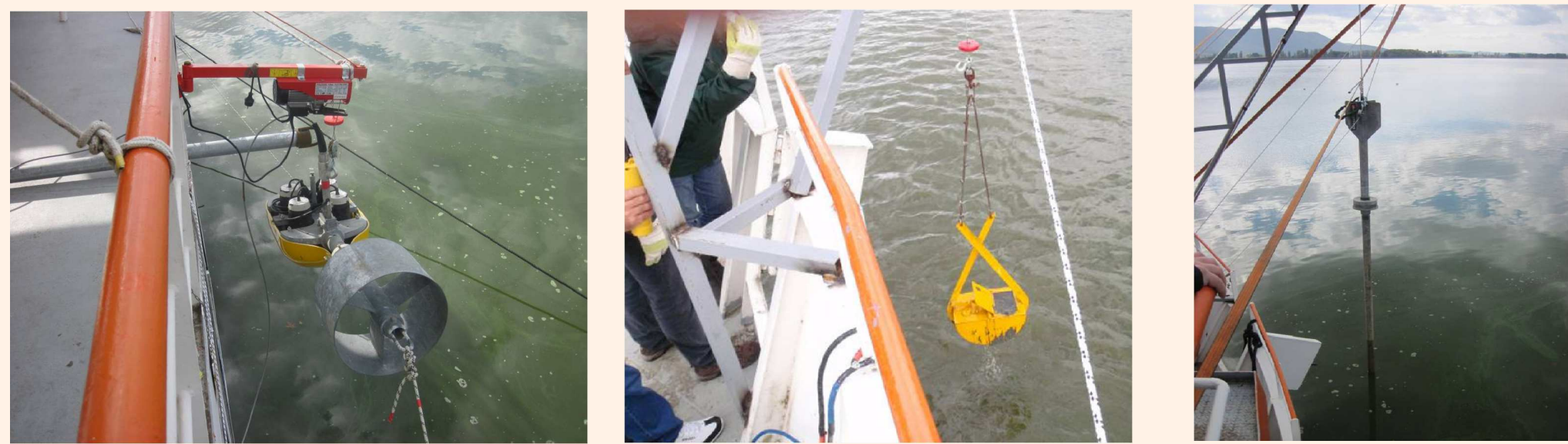
NSRF 2007-2013  
Programme for development

IMDIS 2018 - International Conference  
on Marine Data and Information Systems  
Barcelona, 5-7 November 2018

## 1. MARINE GEOLOGY IN I.G.M.E.

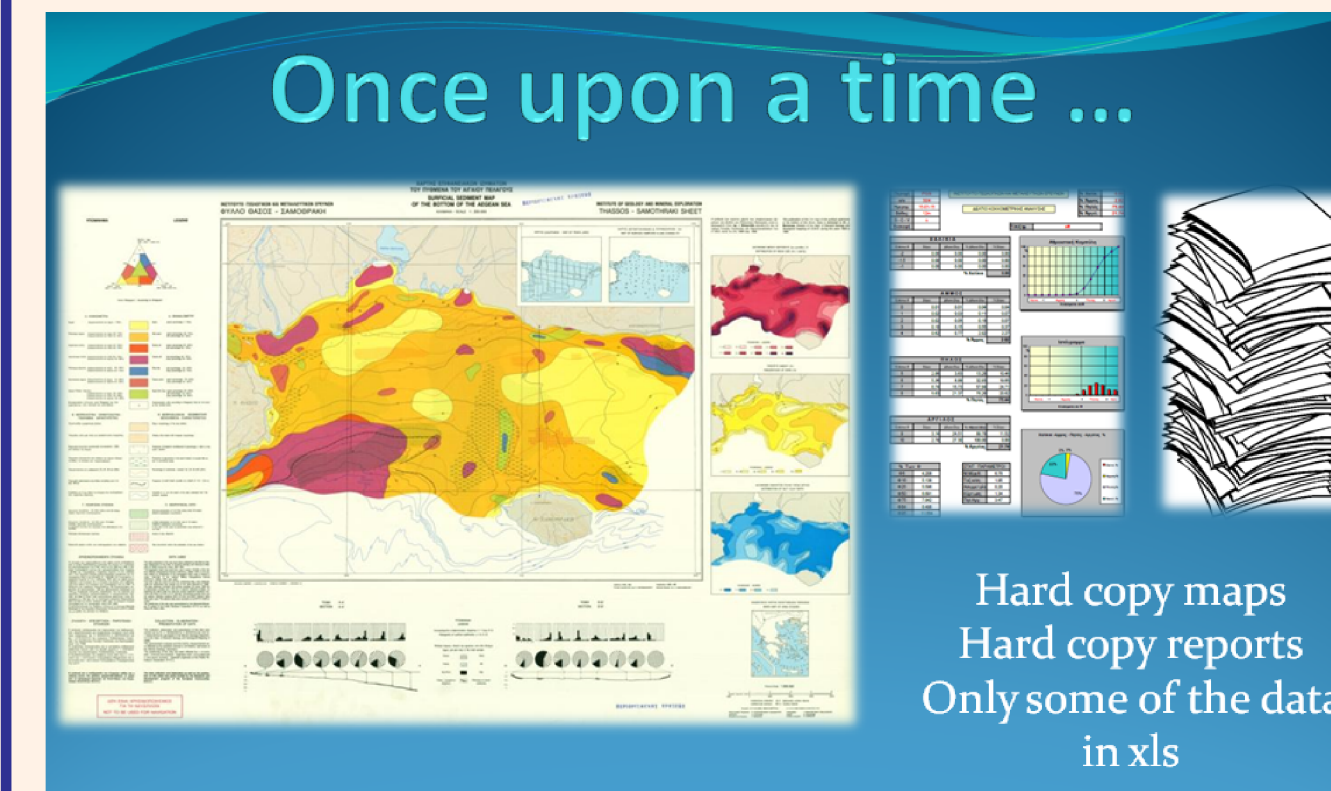
During more than 30 years of activity in numerous research projects, the Institute of Geology & Mineral Exploration of Greece has carried out extensive work in marine geology:

- National research projects (e.g. for the construction of bridges & ports, for the installation of submarine cables, for the study of lakes)
  - European projects (e.g. Anaximander) and bilateral cooperations (e.g. Albania)
  - Projects funded by the 3<sup>rd</sup> C.S.F. (Urban geology) and the N.S.R.F. (Marine geology)
  - Marine Geology mapping in scale 1:200 000
- 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.



Seabed mapping in scale 1:200 000

## 2. FROM ANALOGUE TO DIGITAL



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 and initiatives provided standards for the development of an integrated digital data management scheme in GIS environment.

- Scanning
- Geo-referencing
- Digitizing
- Detailed attributes
- Cartography
- Metadata

SEISCANEX EMODNET  
GEO-SEAS EGD ONE-GEOLOGY

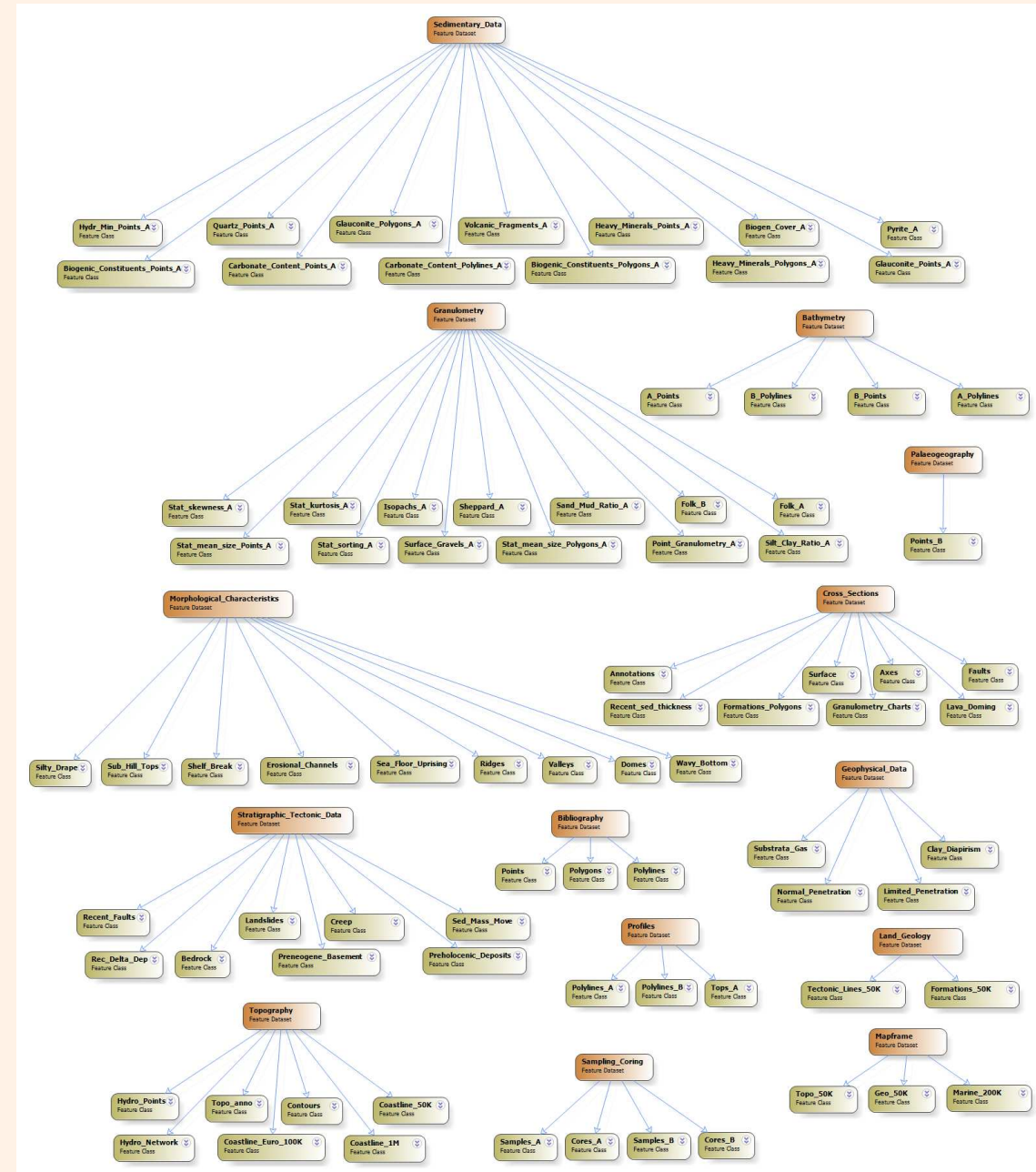
## 3. DATABASE DESIGN

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).

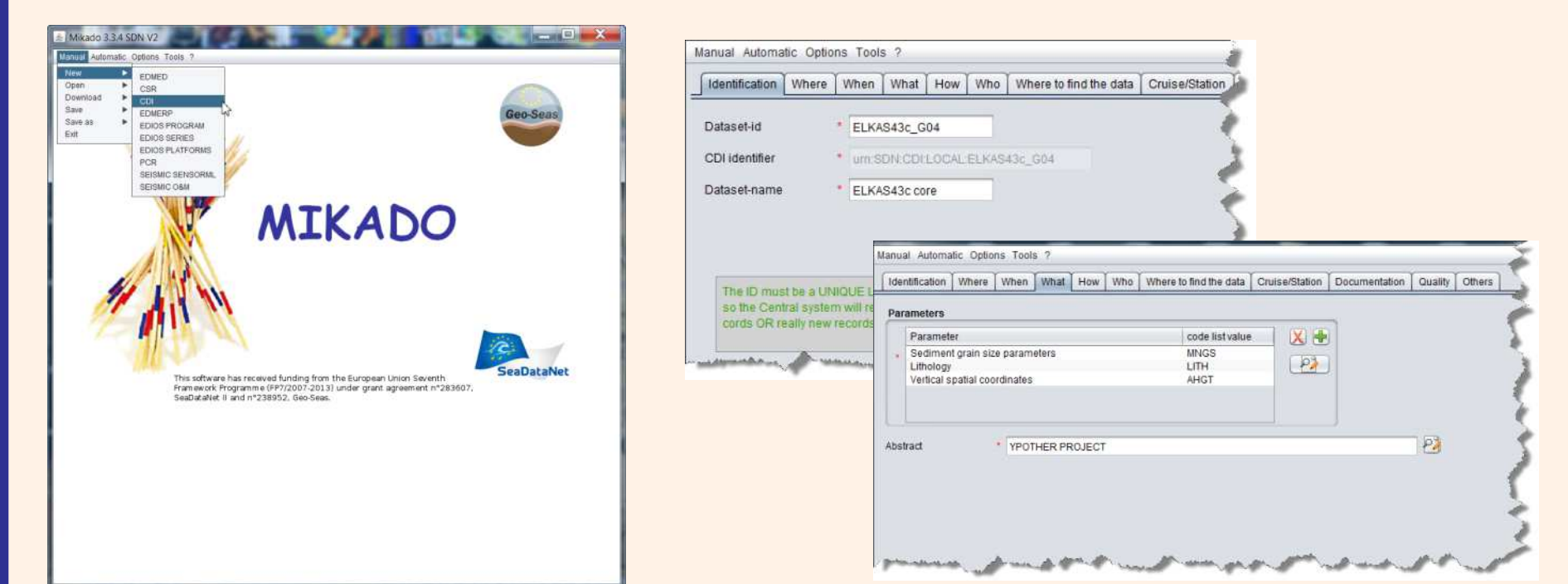
The spatial distribution of available information extends over the **Hellenic EEZ**, also including on-shore water bodies (t.i. lakes).  
The **EPSG:4326 projection** system was chosen, to allow interoperability with international datasets.

- 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)



## 5. METADATA

**Raw Data Metadata\*** according to GEO-SEAS/ SEA-DATA NET standards: CDI, O&M, SensorML (xlm files)  
\* Also corresponding data files (ODV ASCII files)



**Auxiliary metadata** (e.g. for the produced datasets) are INSPIRE-compliant and in accordance with requirements of EGD and EMODnet e-infrastructures.

## 7. FUTURE SCOPES & SERVICES

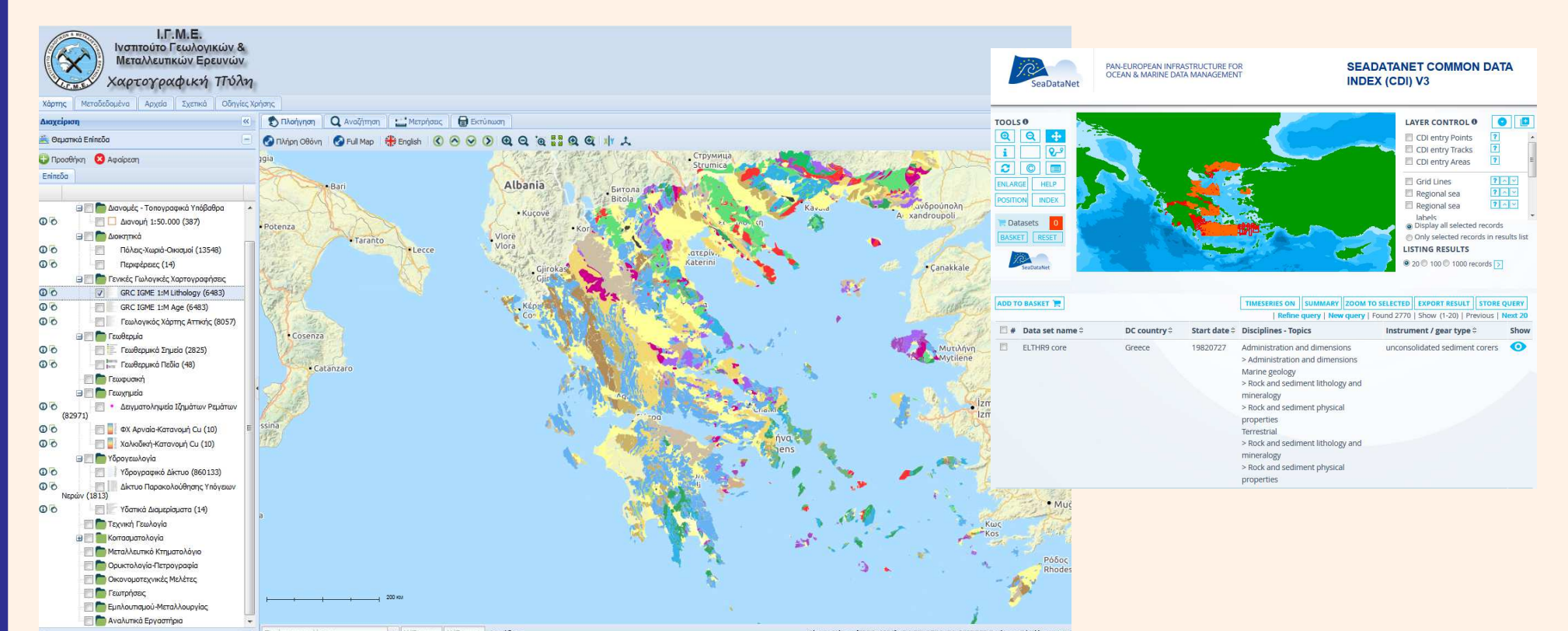
The Marine Geology database of IGME is a fundamental tool that provides guidelines and standards for future projects. The integrated data management supports Greece towards implementation of the Marine Strategy Framework Directive and the INSPIRE directive, promoting the establishment of Maritime Spatial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

**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. Data and metadata are at this moment served through the GEO-SEAS & SEA-DATA NET infrastructures, while products (maps) and data are incorporated in EMODnet-Geology datasets.

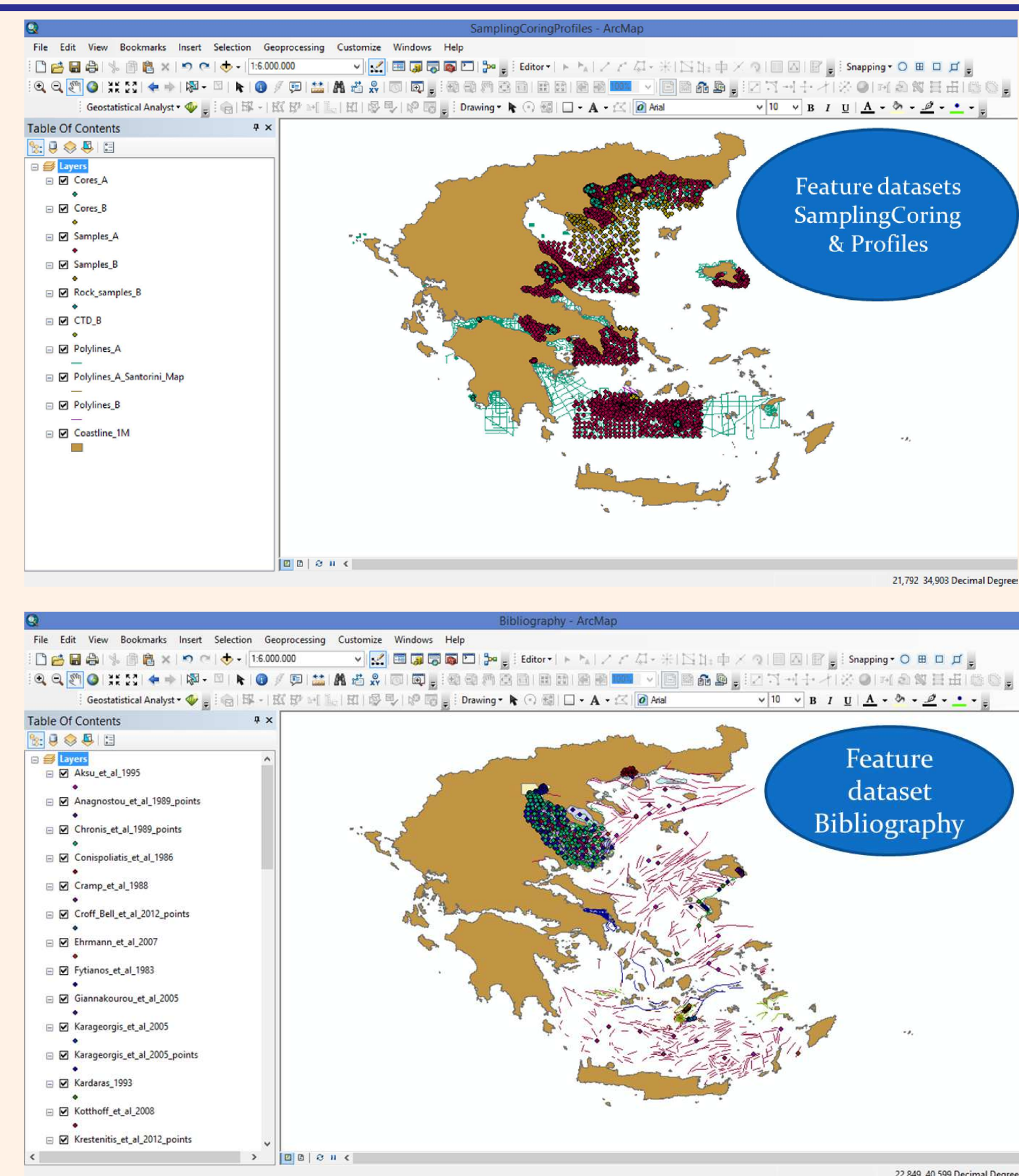
**Work in progress:** the generation of datasets in various formats suitable for dissemination (e.g. georeferenced PDF, GPX, KML, SHP, WMS, WFS, REST) to the scientific community.

**Future steps** in the IGME Marine geo-information system comprise full INSPIRE-compliance and provision of WMS, WFS services from the IGME portal ([www.igme.gr](http://www.igme.gr)). Moreover multiscale GIS layers from various maps and case studies will be visualized and queried interactively through WebGIS.

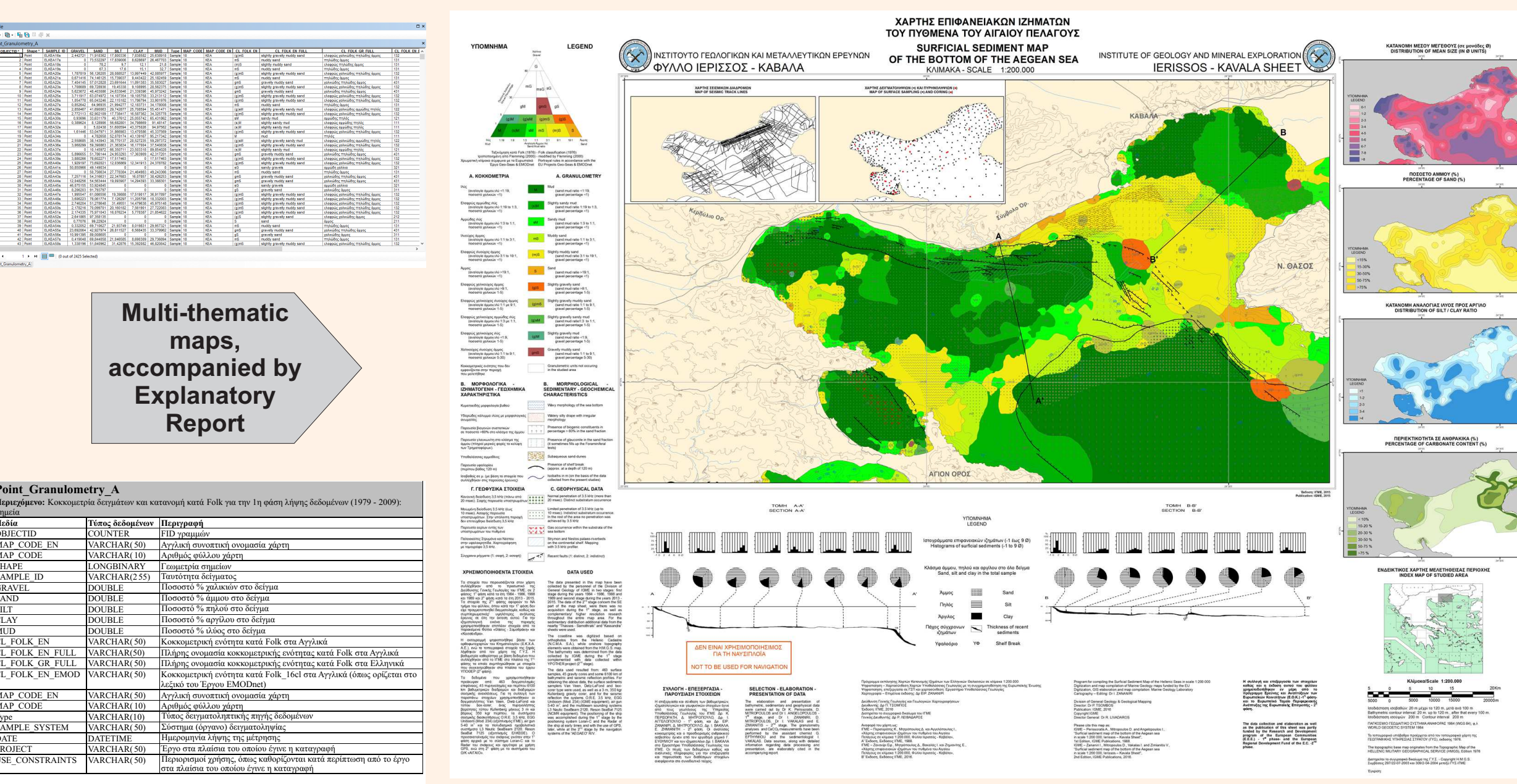
Users will be able to easily discover, access and reuse collected data; auxiliary metadata will provide the required information to evaluate data quality and appropriateness.



## 4. "BACK END" DATA & CARTOGRAPHY PRODUCTS

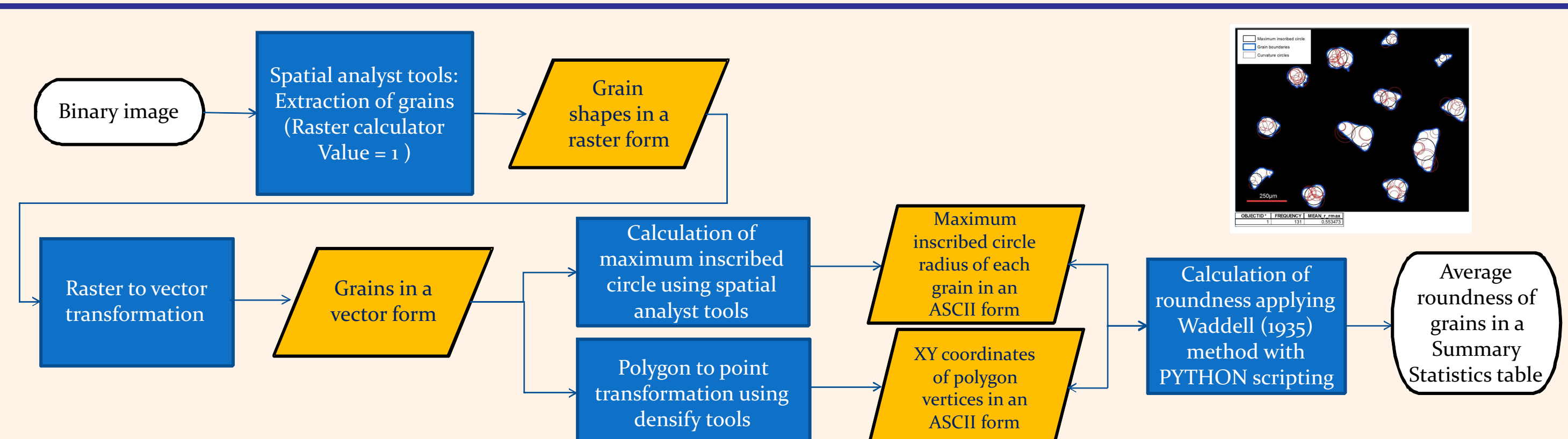


The database design, vocabulary terms and portrayal rules were determined by use of existing **common European protocols and standards** (e.g. ISO 19115, INSPIRE), taking into account the experience and developments arising from international geological projects, such as, OneGeology and GeoSciML; common standards were applied for on-shore datasets to allow integrated studies.



## 6. TOOLS FOR PROCESSING

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).



## Acknowledgements

Part of this work was carried out in the frame of:  
**GEO-SEAS** (2009-2012, GA N°238952),  
**EMODnet-Geology 2** (2013-2016, GA MARE/2012/10/SI2.658129),  
**YPOTHER** (2012-2015, GA NSRF/2007-2013/351008)  
**EMODnet-Geology 3** (2017-2019, GA EASME/EMFF/2016/SI2.750862) projects.

**Thank you for your attention!**