



Generating Digital terrain model for European sea basins

Multiple and diverse sources of bathymetric data



Geo-Seas

- ✓ Different purpose
(hydrographic, research and engineering)
- ✓ Sensors
- ✓ Dataset delivery (content, format)
- ✓ Processing level
- ✓ References system
- ✓ Metadata

✓ often subject to institutional policy which imposes restrictions in terms of cost or resolution



e-infrastructure



Multiple user needs



Geo-Seas

<i>Community of users</i>	<i>Scale / Resolution</i>	<i>Vertical datum</i>	<i>Horizontal datum and coordinates</i>	<i>Interpolation characteristics</i>	<i>Value added products</i>
Geology Sedimentology Morphology	Regional (10s of km) Local (100s of m)	MSL	WGS84 – projected coordinates	Smoothing should be limited	Seamless sea - land
Oceanography Hydrodynamic Climate change	1 ° , 1km, 100s m, 10s m	Geoid or LAT	WGS84 – geographic coordinates	Smoothing and hole filling allowed	
Ecology Habitat mapping Fisheries	1 to 100 m	MSL preferred	WGS84 – projected coordinates	Smoothing must be limited. Residual (grid height – sounding height) must be minimal.	Geomorphology (slope, aspect, roughness, BPI) and dependant physical variables
Dredging disposal Mineral Coastal and marine engineering	Several meters	Not clearly defined	WGS84 – no preference	Holes permitted. Minimal residual	Difference map

Source: J. GeoSeas

To satisfy users needs

Rectangular grids are used because:

- ✓ they are widely used by end-users;
- ✓ they allow each data provider to select a resolution compatible with his data policy;

but require specifications to be interoperable:

- ✓ Data content (multiple layer describing the depth and ancillary data, source of data at each cell)
- ✓ Semantic (common vocabularies, references, common origin and geometry)
- ✓ Interfaces (format)

and must be consistent with the services expected by end-users such as:

- ✓ Viewing services
- ✓ Downloading services

Perspective of the European projects

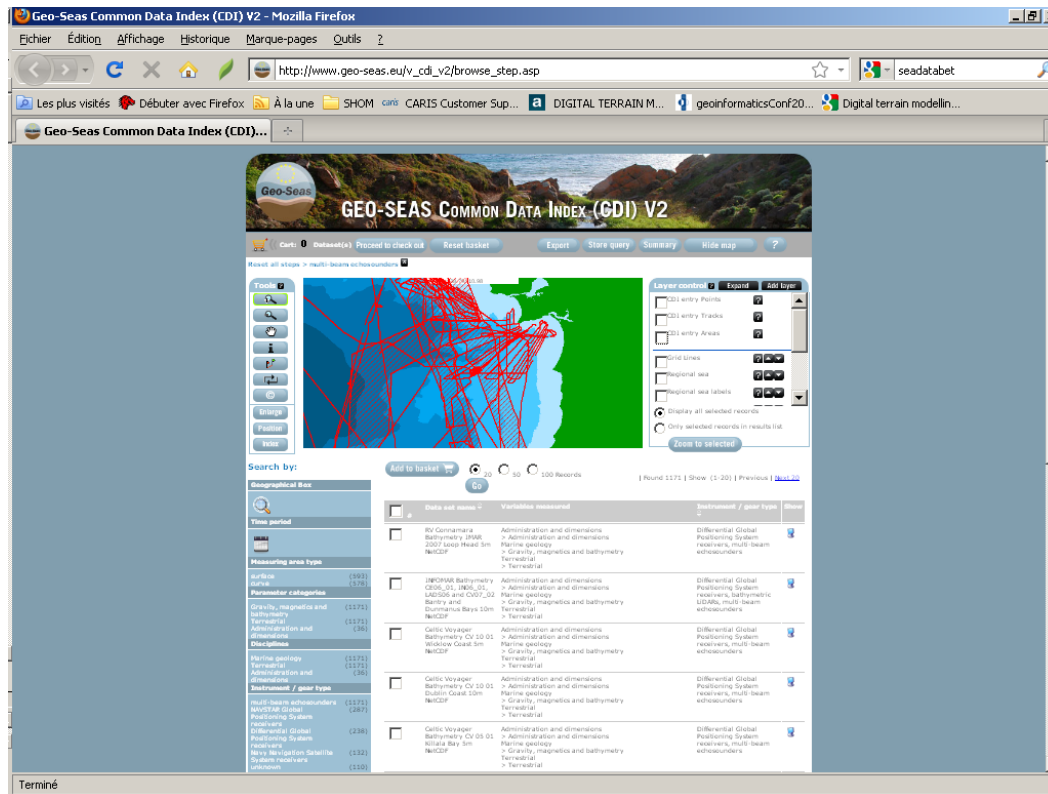
- ✓ Seadatanet -
Harmonisation/Standardisation of the vocabulary with respect to metadata and interoperability (CDI)
- ✓ EMODNET Hydrography – Regional DTM gridding project
- ✓ Geo-Seas – Set the e-infrastructure of observation data. In the specific case of bathymetric data, **develop methodologies** to elaborate adapted and reusable grids



EMODnet



Providing data



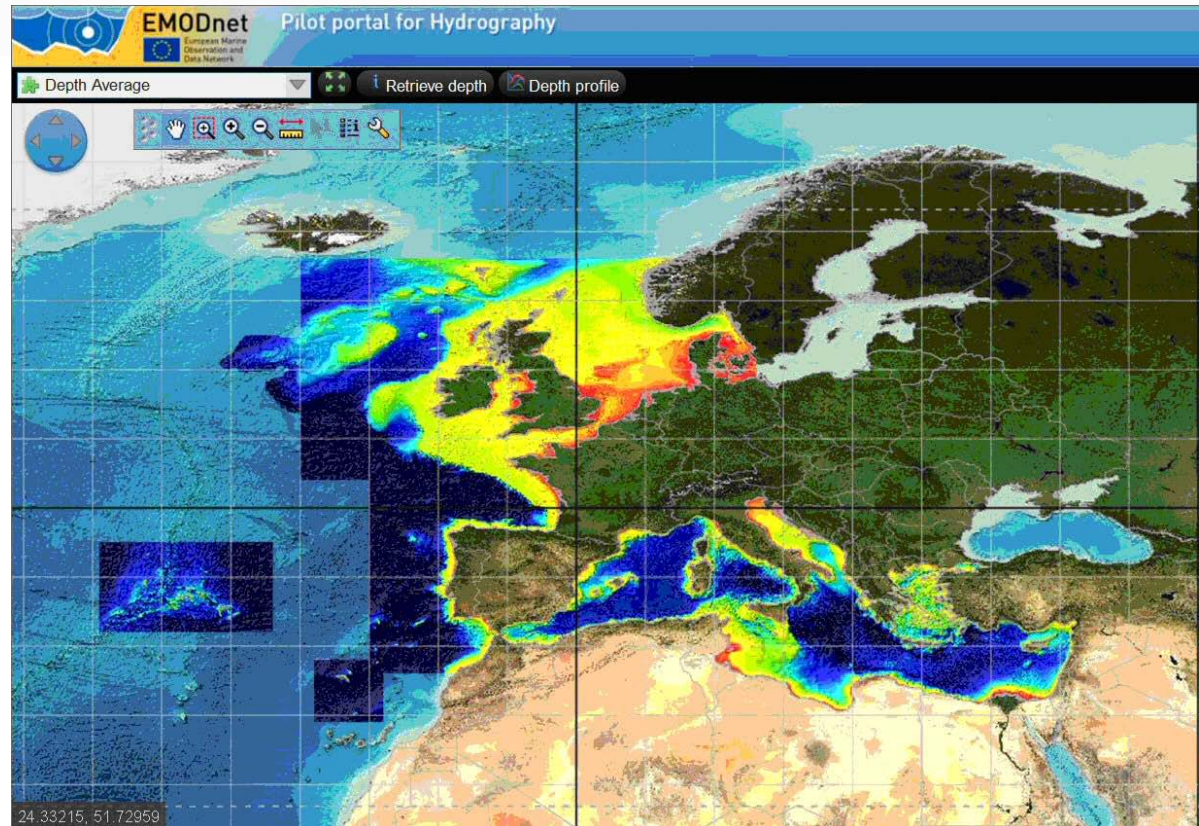
✓ Metadata (coverage, sensor, age, references – vertical and horizontal)

✓ Unified dictionary.

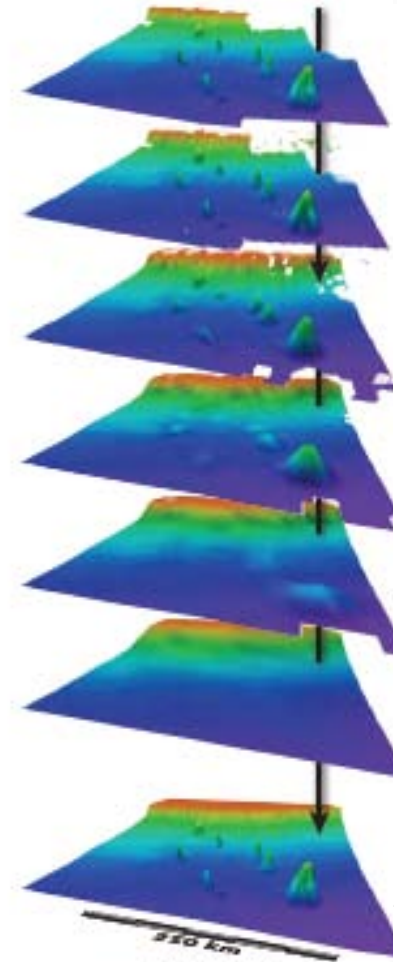
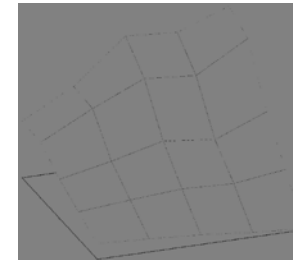
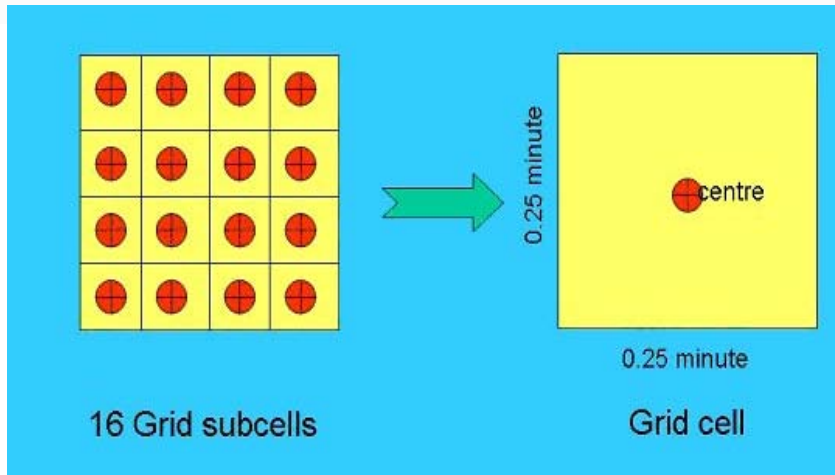
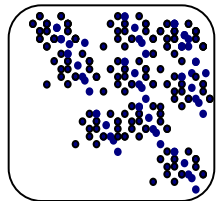
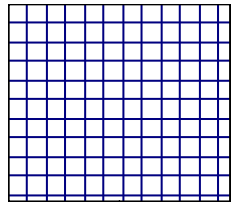
✓ Processing tools have been developed to generate XML metadata files

EMODNET DTM

- ✓ Each data provider grid its dataset at 1/16th of arcminute
=> Standardisation in the sampling method
- ✓ Sea basin integrators grid the provided grid at 1/4 of arcminute
- ✓ All the 1/4 gridded sea bassins are merged
- ✓ Select datasets based on rules

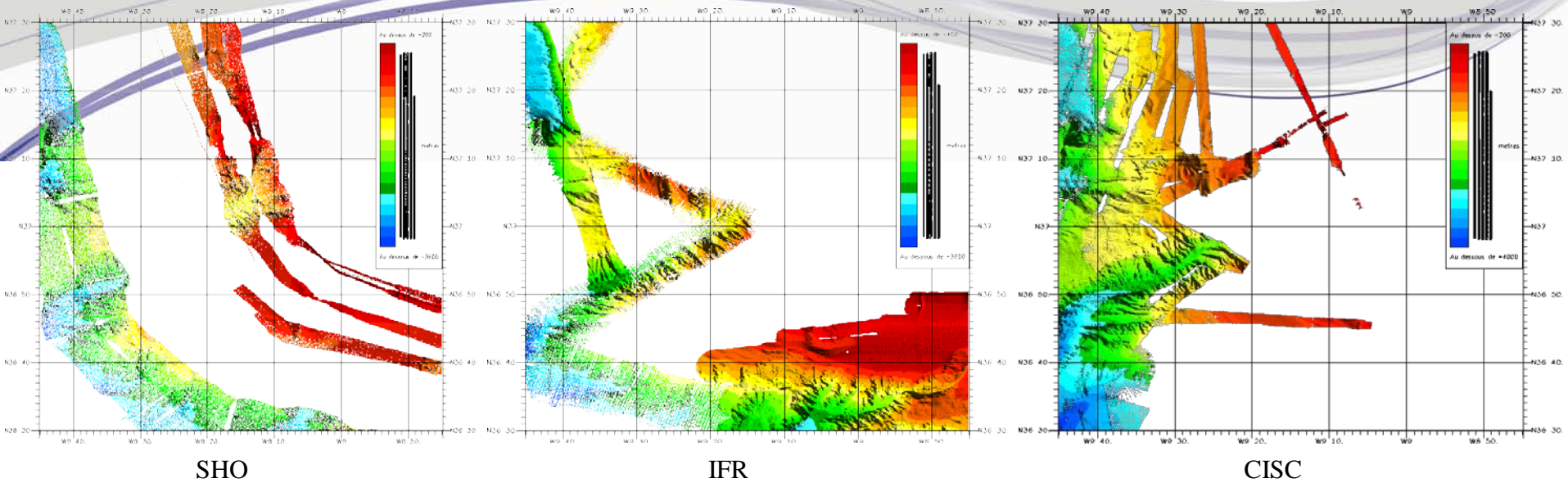


Multiple resolution gridding

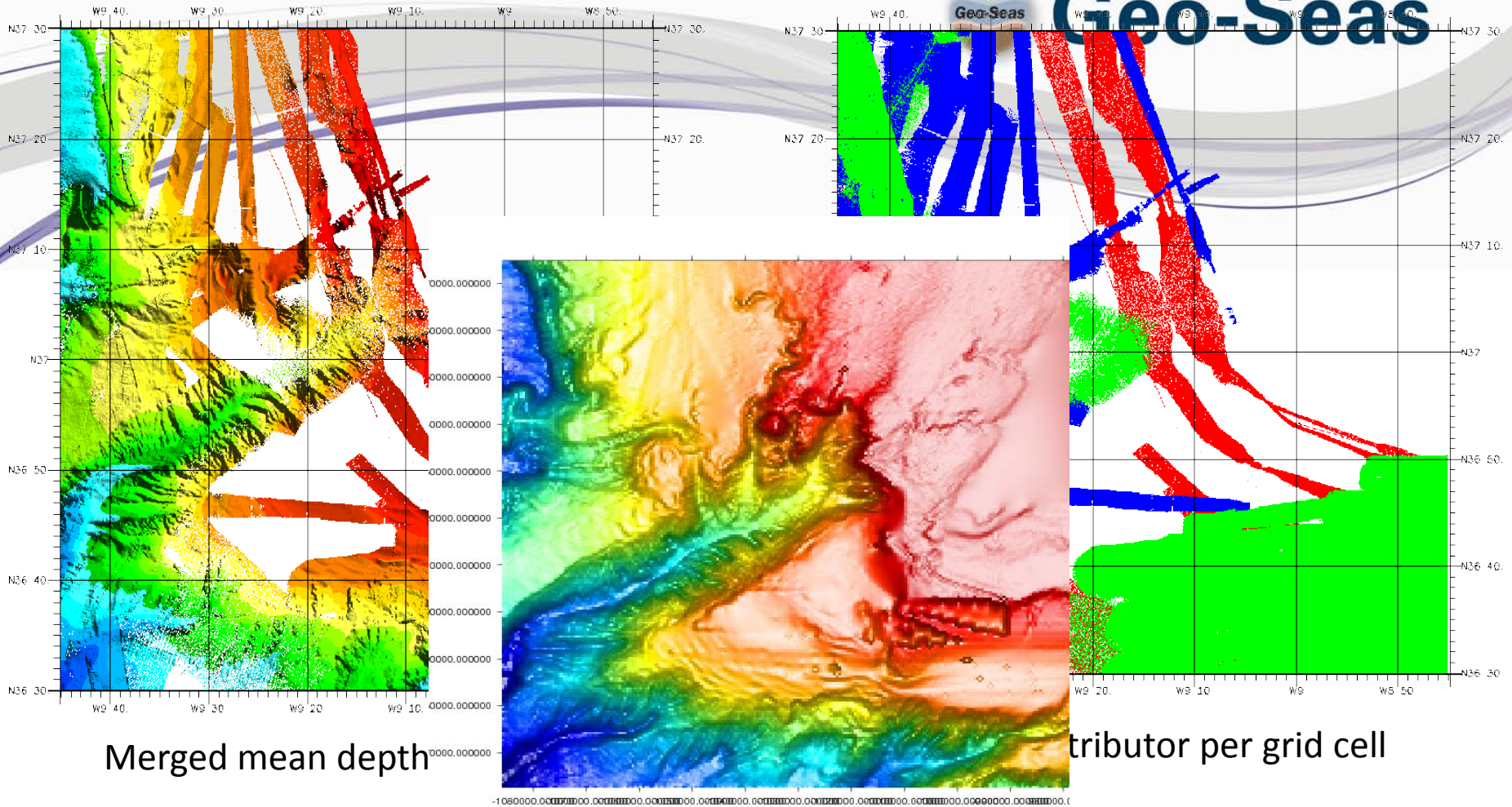


(a) Multiresolution splines
PROGRAMME

- ✓ In line with the gridding processes specified by other projects
- ✓ Generalise at multiple grid resolution
- ✓ Allow the data provider to grid its dataset at the best resolution he can (observation layer)
- ✓ Allow the end-user to use the data at the best resolution available and elaborate products (product layer)

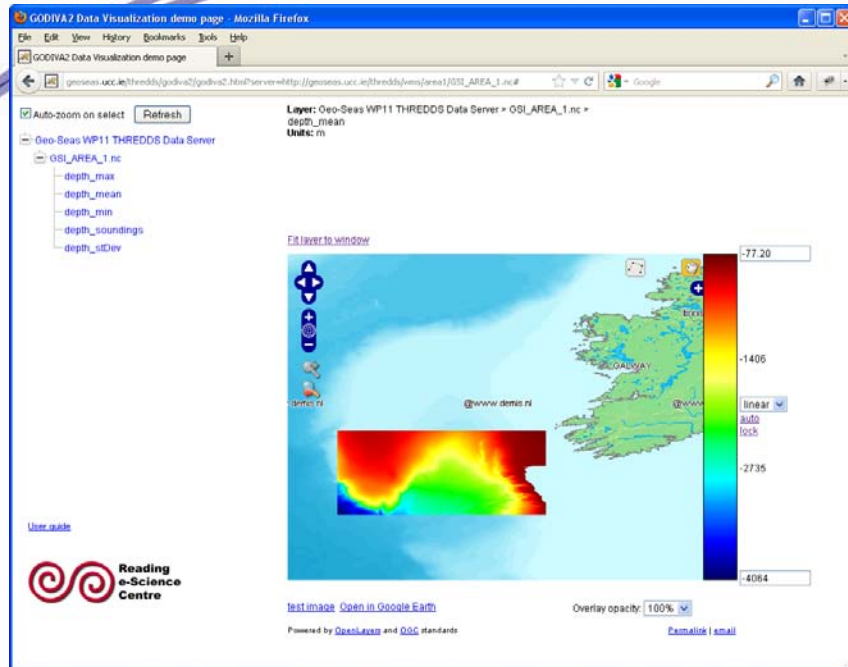


WP11 package has developped a methodology for data provider to grid there data at the best resolution they can (cookbook and scripts available on demand)



WP11 is finalising the integration script that will be used by data integrator

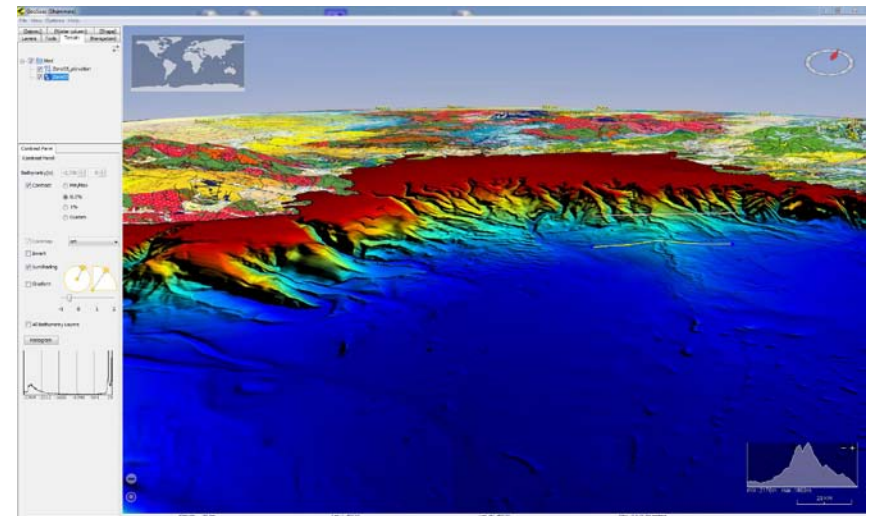
Viewing



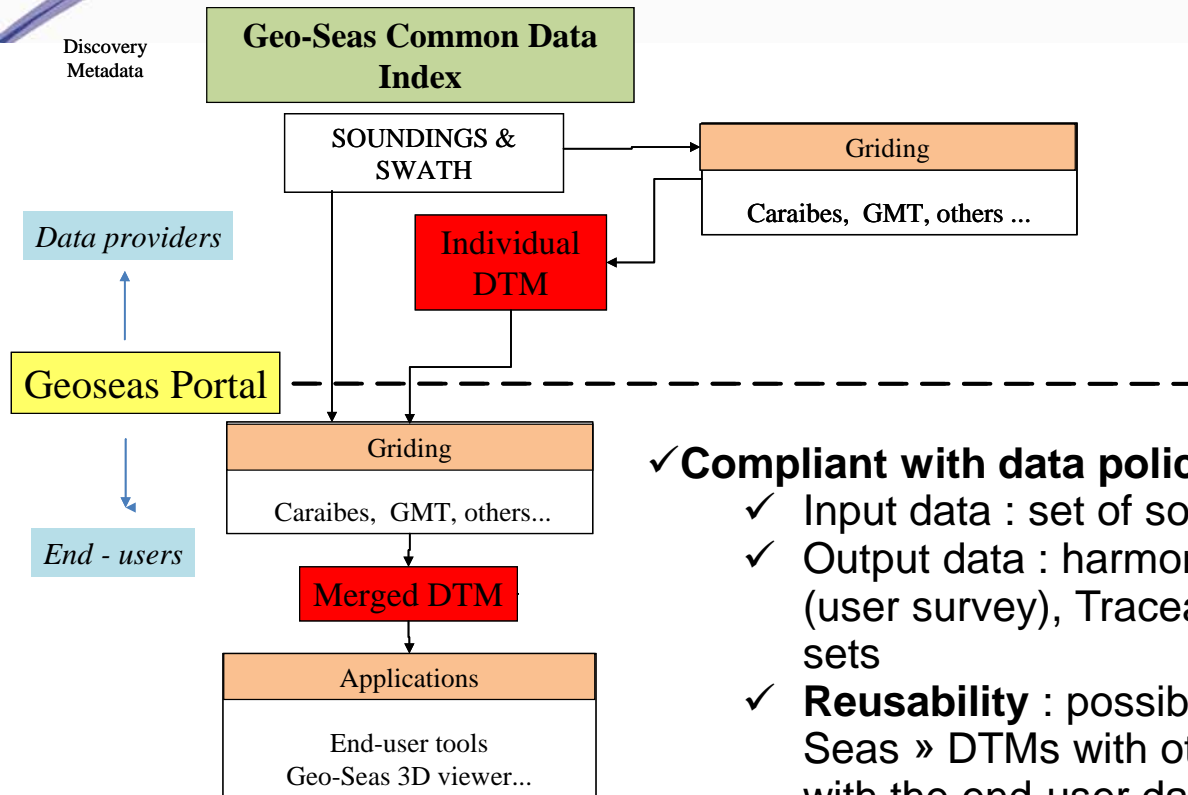
Adapted 2D and 3D viewers allow the end-users:

to visually assess the integration of bathymetric data

Understand physical processes



Summaries of Geo-Seas results



✓ **Compliant with data policy** of providers

- ✓ Input data : set of soundings, swath data or DTM,
- ✓ Output data : harmonised grids fit for purpose (user survey), Traceability back to sources data sets
- ✓ **Reusability** : possibility to combine the « Geo-Seas » DTMs with other « Geoseas » DTMs or with the end-user data

✓ **Easy to implement** by providers and users

✓ **Easy to understand**

Conclusion

- ✓ Standardisation of bathymetric data is a long march:
 - ✓ Seadatanet – Harmonisation/Standardisation metadata and format
 - ✓ EMODNET Hydrography – Global DTM gridding project
 - ✓ Geo-Seas – Adapted DTM through a distributed infrastructure
- ✓ Standardisation at various level is the way forward to control the quality of the datasets and the products
- ✓ Promote the diffusion of bathymetric data, using the Geo-Seas infrastructure by focusing:
 - Discovery metadata
 - DTM products and corresponding serviceswhile preserving the roles and limitations of the data providers and fulfilling the needs of the end-users
- ✓ There is a real synergy amongst all the European projects to promote the use and diffusion of bathymetric data