



EMODnet Thematic Lot n°0 –*Bathymetry*
–*High Resolution Seabed Mapping*
(*HRSM2*)

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**WP4 : Testing performance of Globe online as
part of the Collaborative Virtual Environment
(CVE)**

Test report

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1. Introduction

As part of the EMODnet Bathymetry project the feasibility and potential benefits of a Collaborative Virtual Environment (CVE) are explored. The objective is to experiment tools, provided to regional coordinators, for producing and/or evaluating merged DTMs.

In this report, we present one solution which is the use of a remote version of the Globe software.

For now, the personal configuration for the regional coordinators is the following:

- All partner pre-gridded and pre-processed data contributions are transferred to the regional coordinator by a file server, e-mail or other tools,
- The regional coordinators have their own workspace and configuration for the DTM processing on the CVE, whereby the processing will be undertaken using the Globe software,
- Afterwards, the produced regional DTMs are uploaded by the regional coordinators to the global integrator by a file server.

The task of the research is set, evaluate and refine a feasible configuration for remote processing of the regional DTMs by the regional coordinators. In this research pilot, 3 regional coordinators are involved, namely: CNR-Ismar (Central Med), HCMR (Eastern Med), and Ifremer (Western Med and taskleader).

2. Implementation of a “Globe online” configuration

The DATARMOR infrastructure, which is managed by Ifremer in Brest, offers the opportunity to implement a collaborative work for the regional coordinators, combining a working space and the access to a shared version of the Globe software.

2.1 Working space

The Ifremer DATARMOR infrastructure can provide facilities for storing and managing the data contribution.

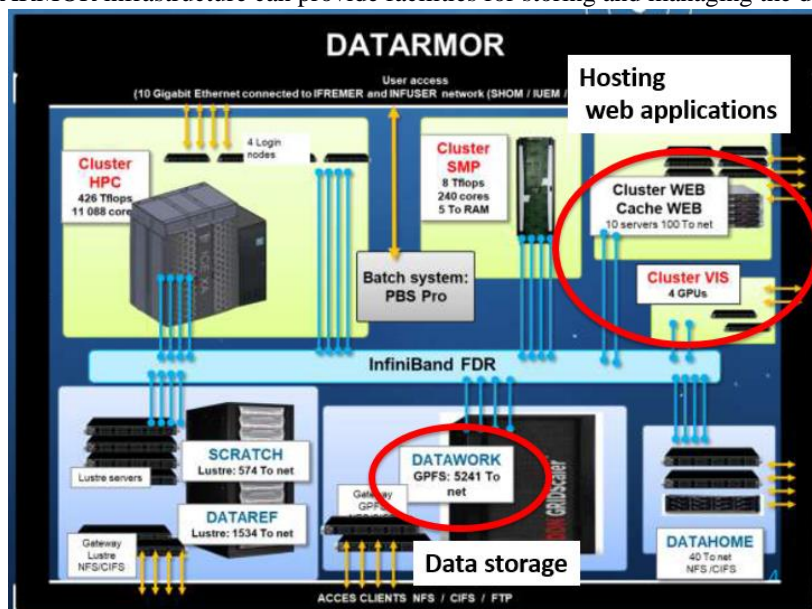


Image: Datarmor infrastructure: data storage capabilities and access to the cluster Web for hosting applications are open to the HRSM project.

A 3To disk is dedicated to the EMODnet Bathymetry HRSM2 project and is defined as a working space for the regional coordinators.

2.2 Virtual Machine

Using the cluster VIS of DATARMOR, the users can connect to a virtual machine which allows the access to the DATAWORK disk space and which hosts a Globe online version. They access the virtual machine through a remote desktop protocol, via a web gateway.

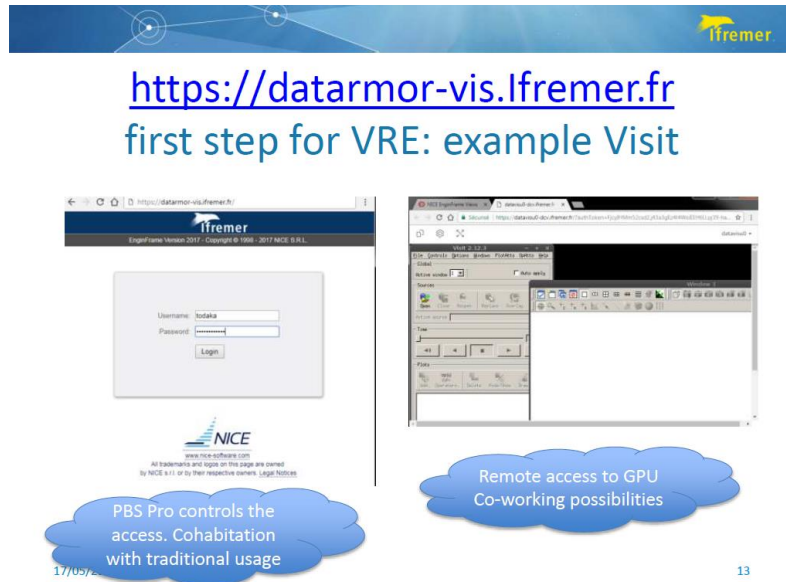


Image: Collaborative environment for a shared access to Globe software : Connection to a virtual machine

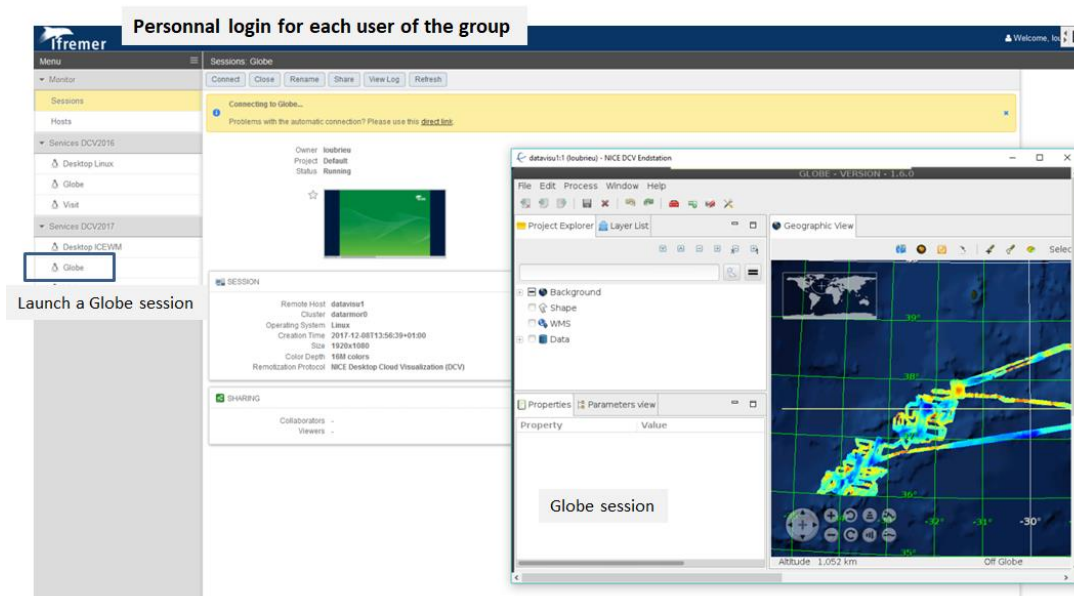


Image: Collaborative environment for a shared access to Globe software : Connection to a virtual machine

This configuration is available for the 3 basins coordinators, CNR-Ismar for the Central Med, Ifremer for the Western Med and HCMR for the Eastern Med region.

The users connect the virtual machine with an Extranet login to DATARMOR.

2.3 Flow chart for the tests

2.3.1 Basic tests

The test users have individually validated the tools and their efficiency in comparison with the current configuration of the regional coordinators at their offices. The main functions tested were:

- Connection to the server and the virtual machine,
- Launching Globe and performing basic routines on the data,
- A data viewer.

2.3.2 Advanced tests

The advanced tests aim to produce merged DTMs, on the basis of single DTMs (= pre-processed and pre-gridded data sets) as provided by data providers.

Selection of subregion

Two subregions have been defined in the Mediterranean with the following criteria.

- Overlapping regions coordinated by CNR, HCMR and Ifremer,
- Significant extent,
- Large number of single DTMs

The first subregion is defined around Sardinia and Corsica islands. It concerns both partners CNR and Ifremer.

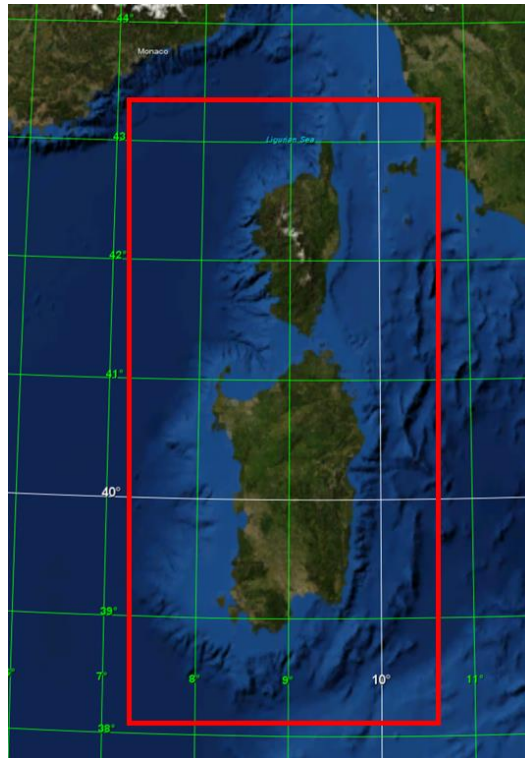


Image: Sardinia-Corsica subregion

Geographical extent: N38°15 to 43°15 / E07°15 to E10°30

Grid size: 4800*3120

The second subregion is located in the Ionian Sea. It concerns both partners CNR and HCMR.

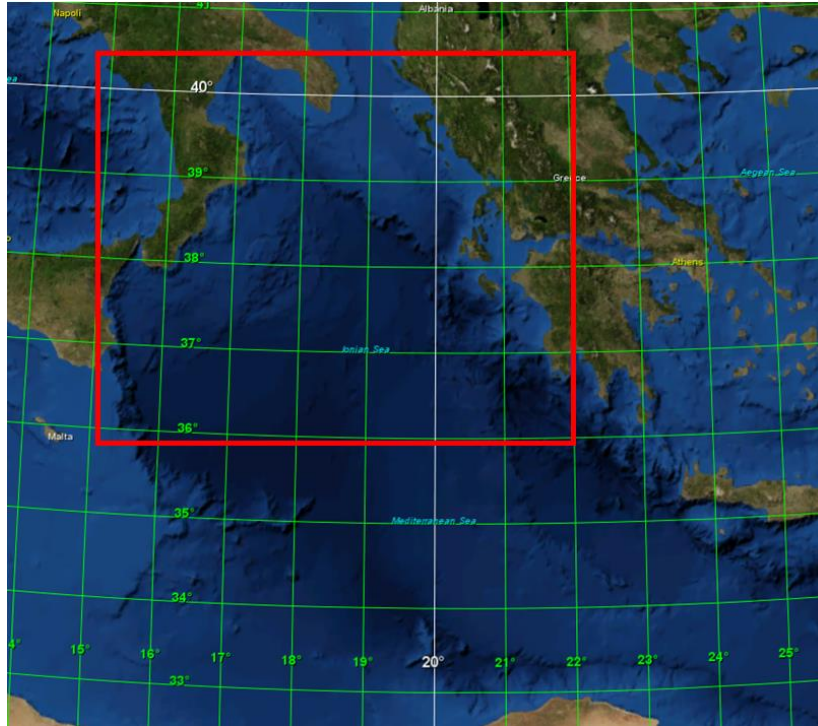


Image: Ionian sea subregion

Geographical extent: N36° to N40°30' / E15° to E22°

Grid size : 4320*6720

Available Single DTMs

For the Sardinia-Corsica region, single DTMs from six partners are compiled: CNR-Ismar, Conisma, IAMC, IIM, Shom and Ifremer.

For the Ionian Sea region, single DTMs from 4 partners are compiled: HCMR, Ifremer, NIOZ, and Conisma.

The data files are stored on the DATAWORK disk. They are sorted by subregions and data providers. The regional coordinators have access to the DATAWORK space and all files created along the processing are written and stored on the disk.

Processing flow

The flow chart for testing the online version version of Globe is designed in accordance with the standard EMODnet Bathymetry processing flow. It aims to test the main tools used by the coordinators for producing the regional DTMs.

- Loading single DTMS from data providers, converting to the updated format NetCDF4 of Globe
- Single DTMS QA/QC: check layers content, DTM visualisation for identifying residual artefacts, pixel size reduction to the standard 1/16 arc minute grid,
- Sorting DTMS by QI
- Merging single DTMS into common files: QI can be used to set up priorities,
- Merged DTM QA/QC: visualisation (shading, isobaths, ...), smoothing if needed,
- Interpolation for small gaps before filling in by the Gebco grid.

The above-mentioned tools are illustrated below in the « Collaborative Virtual Environment ».

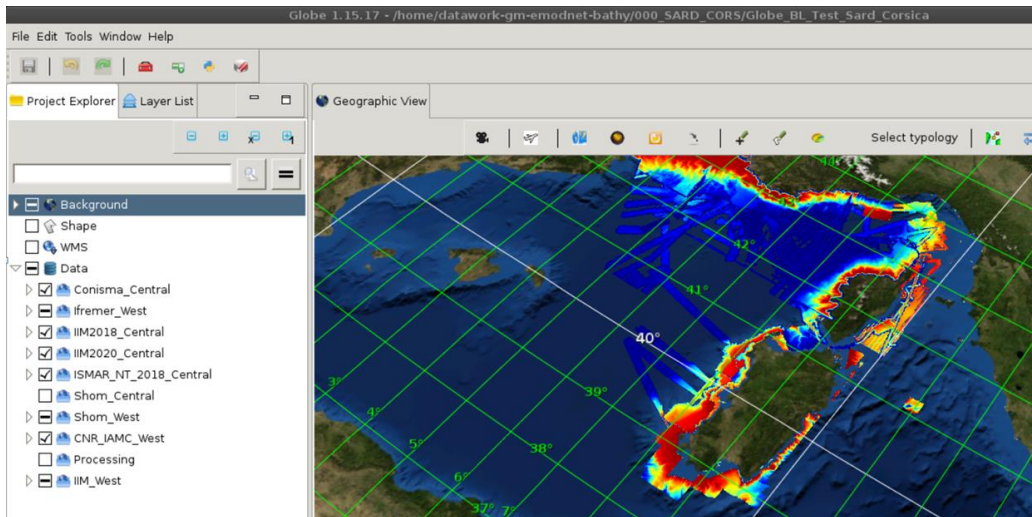


Image: Step: Data import and viewing

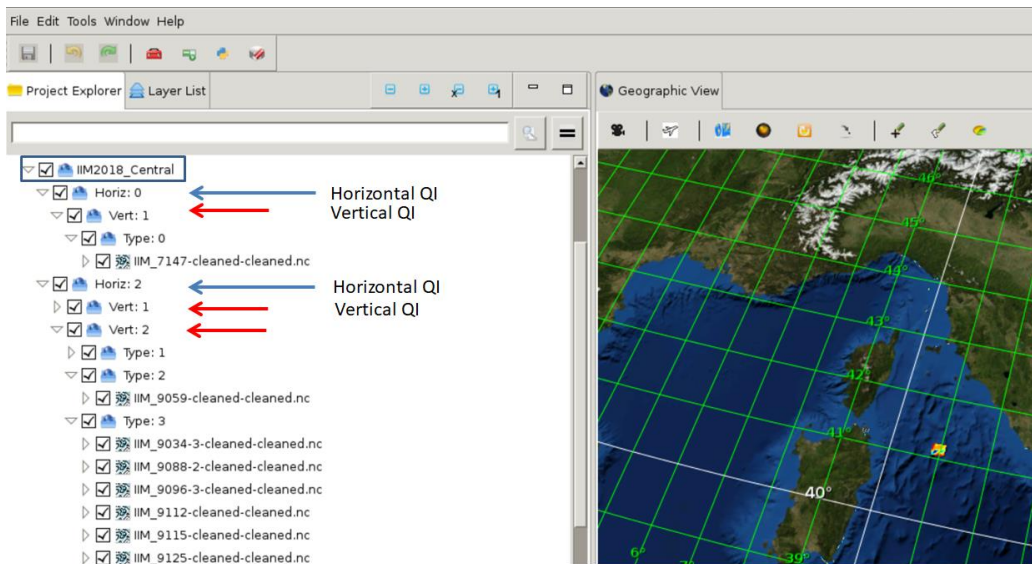


Image: Step: Sorting data by QI

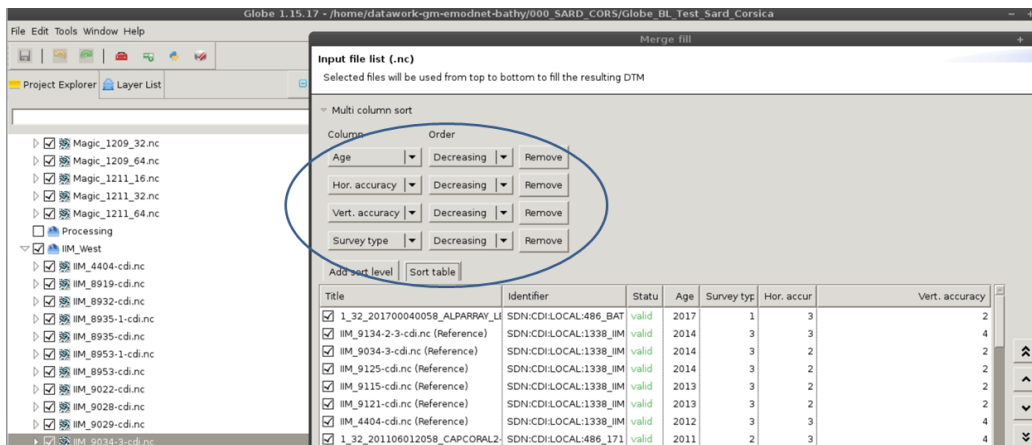


Image: Step: Merging DTMs

3. Results of the tests for both subregions

3.1 Sardinia-Corsica subregion

Work has been performed by both partners CNR and Ifremer. The final outcome is the production of a merged DTM around Sardinia and Corsica islands.

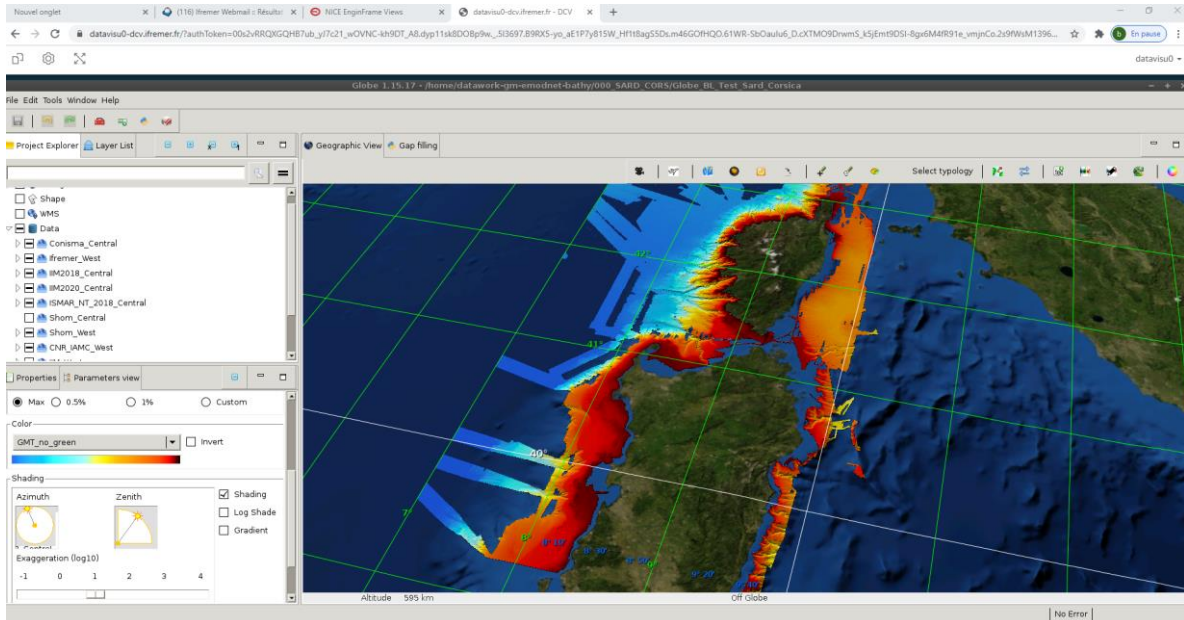


Image: Merged DTM

Around Sardinia Island, both partners have processed a merged DTM. The CVE allows:

- To share the input data for two neighbouring regions (West Med and Central Med are overlapping in the selected subregion).
- To share the successive stages of the processing
- To have a common analysis of the data quality, of residual artefacts, of additional processing when needed...

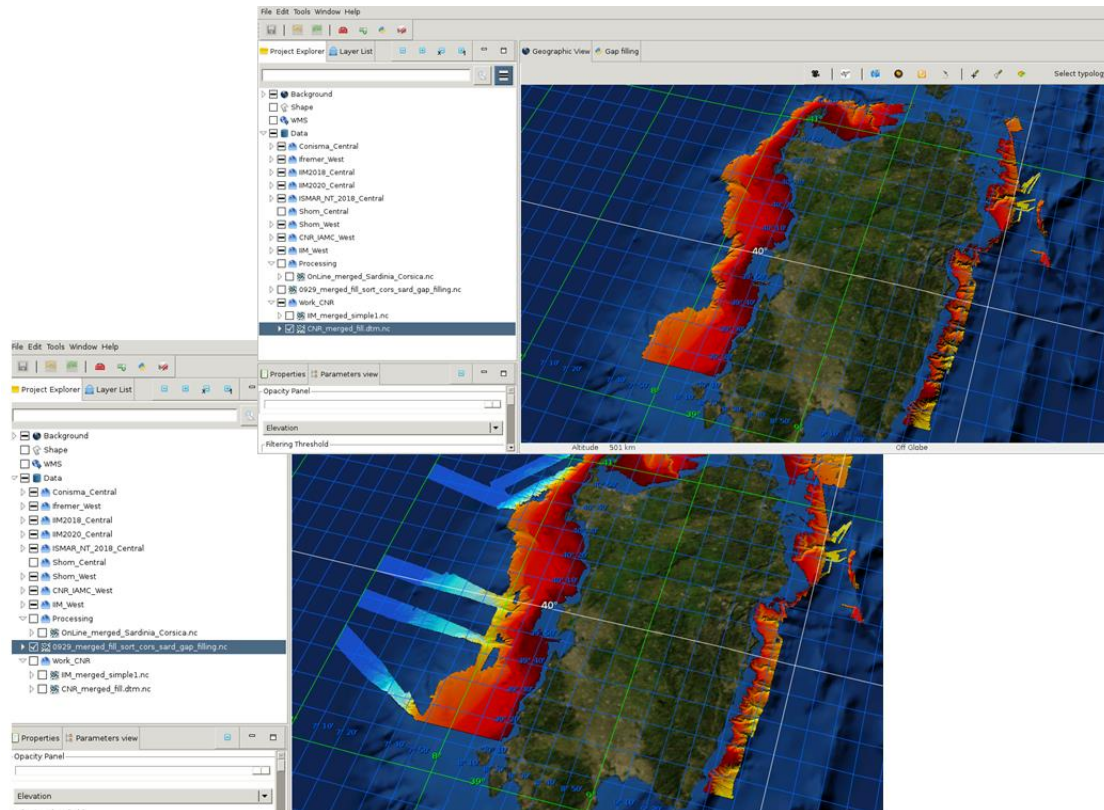


Image: Work shared around Sardinia island by both regional coordinators

3.2 Ionian Sea subregion

Work has been performed by HCMR. The final outcome is the production of a merged DTM between Italy and Greece.

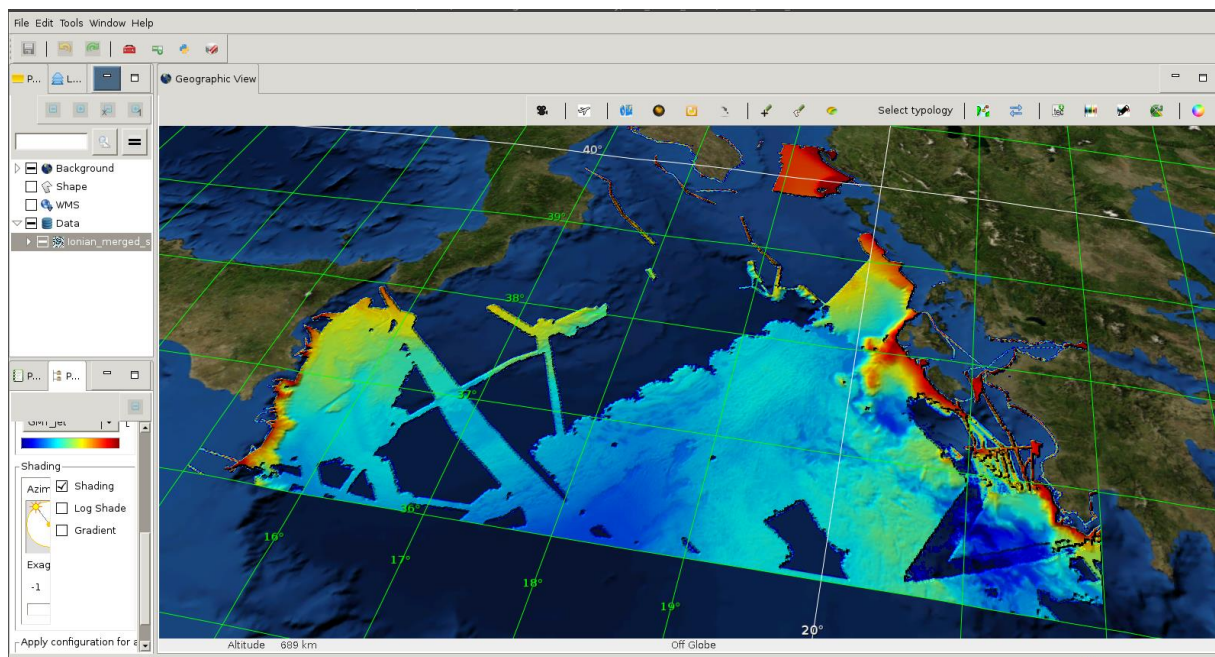


Image: Merged DTM

4. General conclusion

From the tests with Globe online, we can conclude that there are no major issues and it is possible to work using the Globe online version. The strongest limitations are the computing performance when working online. The processing is many times very slow because of performance of the connections from regional coordinators to the CVE. We have to remind that, for the project, a large number of files are managed and the merged DTMs files also have a large size (several hundreds of Mb).

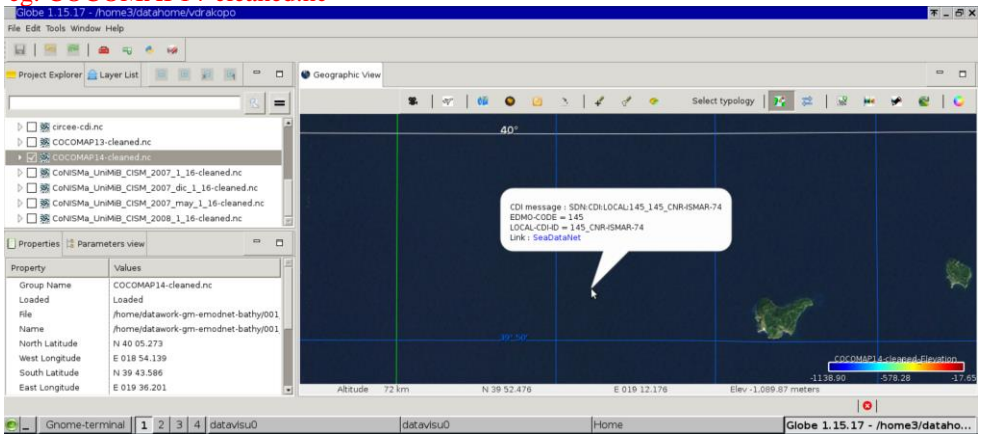
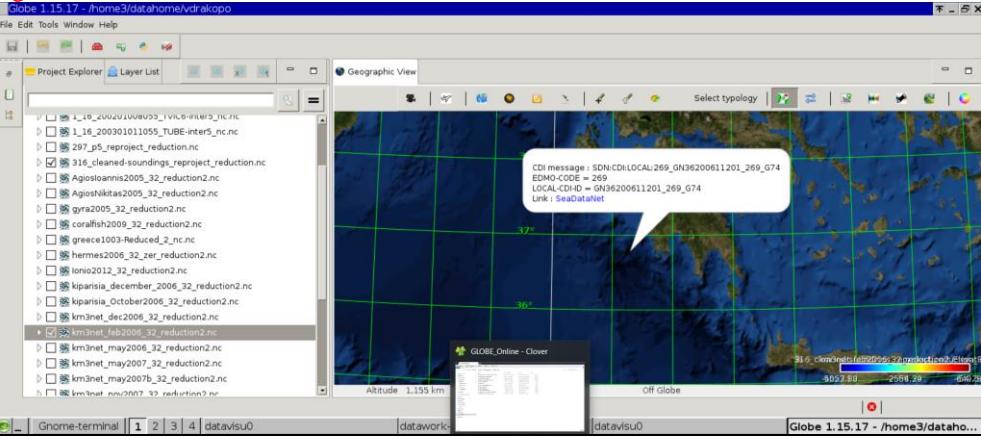
Residual errors of Globe have been identified, which can be explored by the support team. It is quite positive to conclude that working online helps partners to work with a common configuration and then facilitates the technical support.

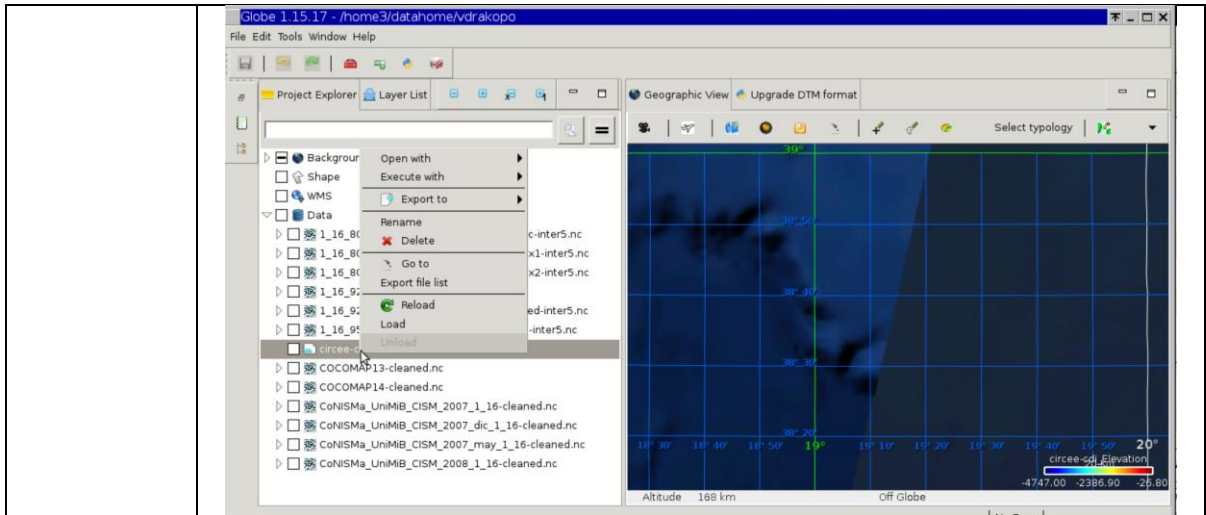
The solution makes it possible to work between different regions and exchanging datasets and has many merits.

Note: For testing Globe online, data of the subregions have been copied on the disk. Extending this way of work would require a main effort of data management, which is not planned in the project.

5. Annex 1 : Technical evaluation report

5.1 Test report by HCMR

Data import	<p>Data providers from 2 regions, Central Med and EastMed OK ✓ Loading dtms gave not any problem</p>
Data visualization	<p>Some DTMs are not visible or become visible after a long time regardless of dtm size eg CoNISMa_UniMiB_CISM_2008_1_16-cleaned.nc became visible after more than 1 hour</p> <p>eg. COCOMAP14-cleaned.nc</p>  <p>eg. Km3net_feb2006_32_reduction2.nc</p> 
Right click on a DTM	<p>When right click on a DTM you have to keep the button (which is not functionable) otherwise (if you leave the button) the dtm is unloaded and you have to reload.</p>

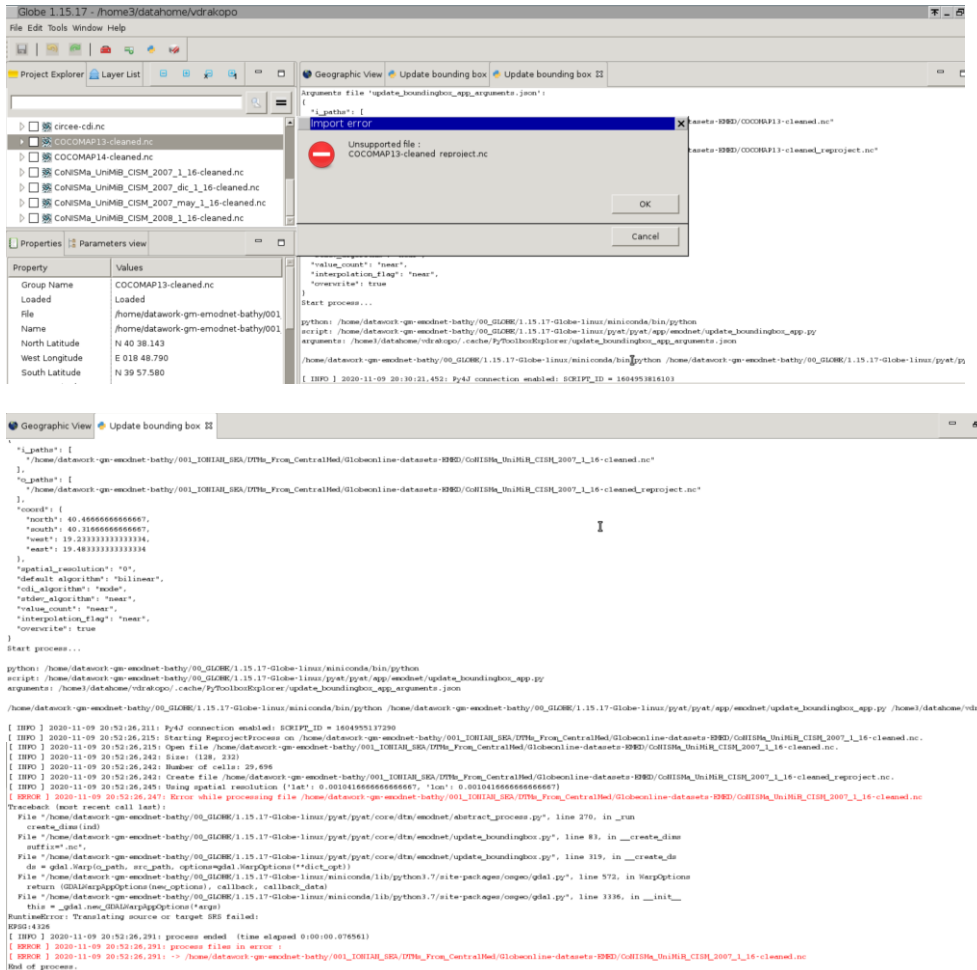


Upgrade DTM format

OK ✓

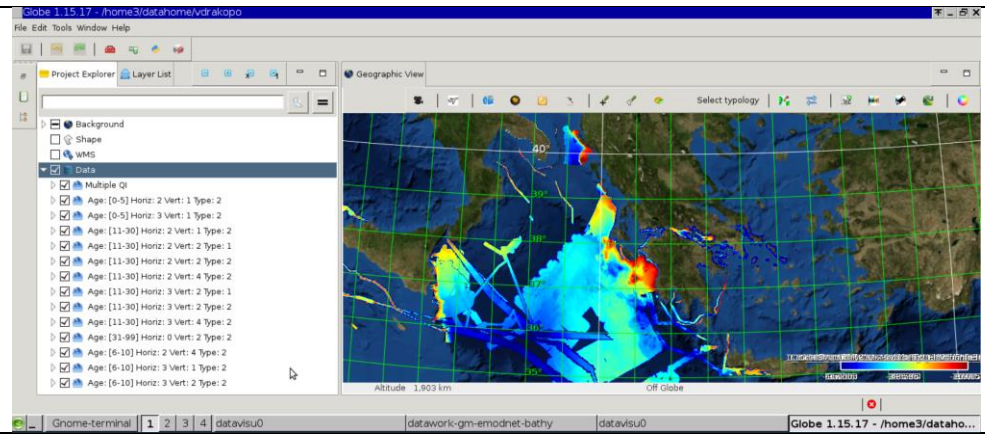
Update bounding box

Can't update bounding box for the DTMs with no integer number of angle minute – **X**
Action : Globe software support team for checking the error.



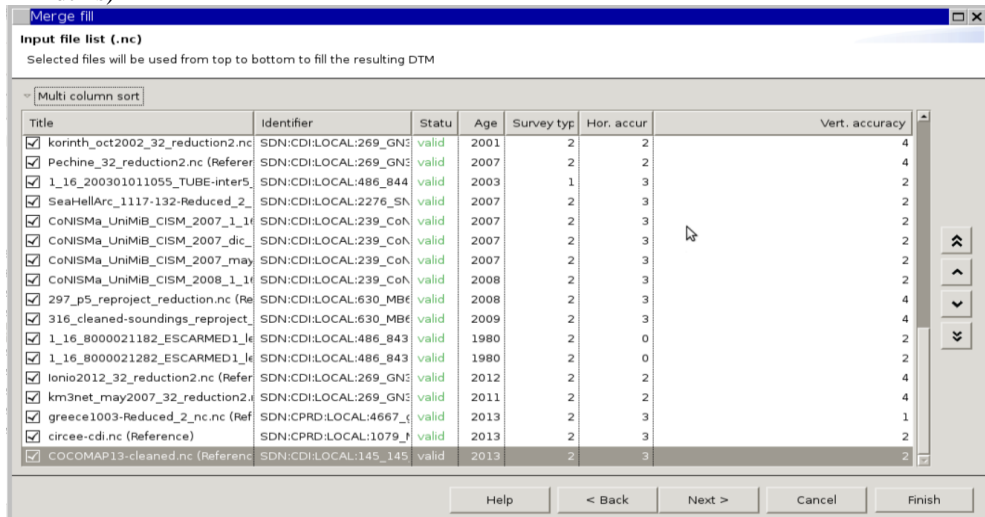
Sorting DTMs by QI

Project Explorer / Sorting DTMs by QI – OK ✓

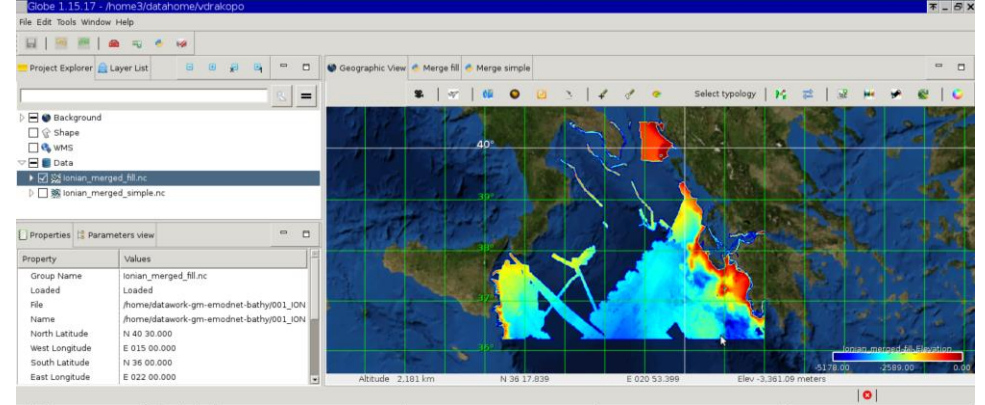


Merge fill

- Add an *.txt which contain a list of absolute paths – OK ✓
 - Multi column sort doesn't expand – X
- Action: Globe software support team for checking the error.
-
- DTMs sorting only by using the arrows on the right (difficult to apply when many dtms)

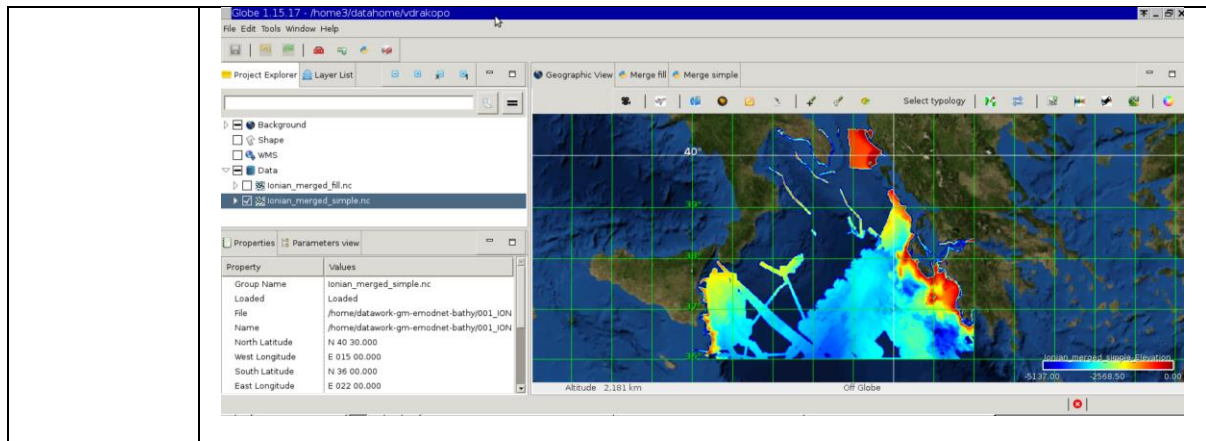


Merge fill processing completed – OK ✓



Merge simple

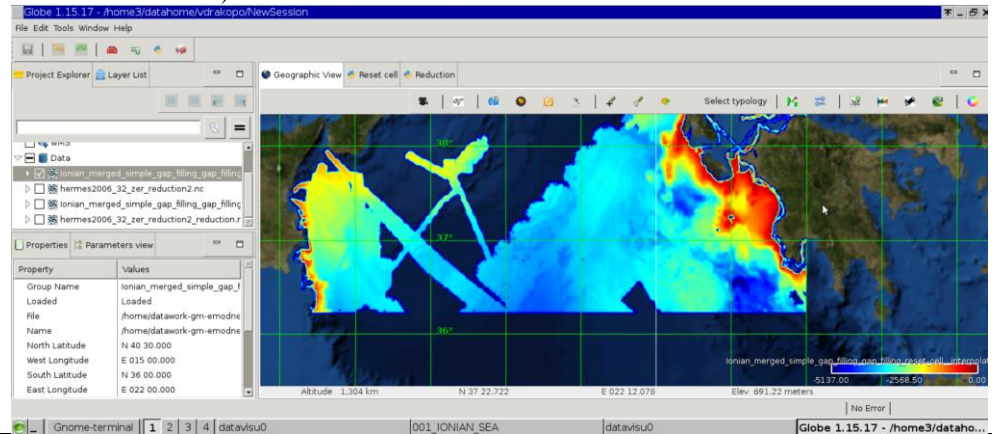
Merge simple processing completed – OK ✓



Add zone Save markers (shapes) to define areas to reset or fill – OK ✓

Gap filling Applied to whole extent and in specific area – OK ✓

Problem with the visible extent (The boundaries are correct but the DTM seems not to extend to 360 south)



Reset cell OK ✓
By applied filter (CDI)
Problem with the visible extent (The boundaries are correct but the DTM seems not to extend to 360 south)

Heighmap interpolation OK ✓
Problem with the visible extent (The boundaries are correct but the DTM seems not to extend to 360 south)

DTM Reduction Reduction 1/16 to 1/8 just for testing reduction, as the dtms of the Ionian test area don't need reduction - OK ✓

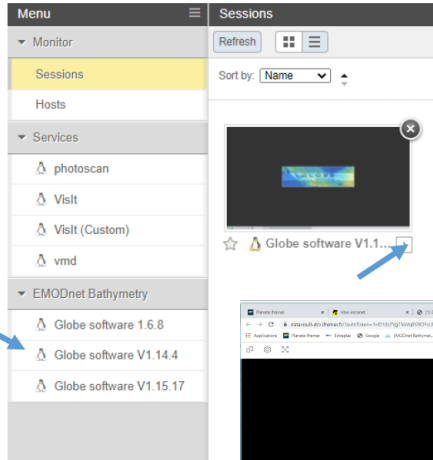
5.2 Test report by CNR-Ismar

Test summary report. Globe Linux online version

1. Uploading datasets → OK, however if datasets too many, the session collapses 😊
2. Upgrading to .nc → OK 😊
3. Modify existing cdi → OK 😊
4. Reduction of resolution and other processing tools → OK 😊
5. Right click mouse option → When you right click the mouse on the selection, automatically unloads the file/s selected, very annoying, could not use right click mouse option and had to use edit menu bar which is less functional especially for merge fill 😡
6. Dataset size → 1.3 Gb datasets obtained from a simple merge not supported as .nc in uploading, I had to merge fewer datasets 😡
7. Writing permission → No permission to write in folders created by other user – not ideal for collaborative environments 😐

Connect the computer to CALCUL with Pulse Secure, Ifremer extranet credentials: mr30ed9 bt5vhgpyTD

<https://datarmor-vis.ifremer.fr/> Different DATARMOR credentials: marover complexe crier soja



Connect to Globe session. Then (double click) and CANCEL to quit the Windows session

Open a Xterm terminal (right click, system, Terminal, Xterm)
`cd /home/datawork-gm-emodnet-bathy/00_GLOBE/1.15.17-Globe-linux`
`./Globe (case sensitive for G)`

To open a File manager run the command nautilus
 Computer is the correct location to Reach datawork-gm-emodnet-bathy
 00_SARD_CORS

