

## **Report and recommendations from the CIESM**

### **Technical meeting:**

#### *"What's new in multibeam swath bathymetry of the Mediterranean Sea"*

During the last 39th CIESM congress, held in Venice from May 10 to 14, a technical meeting or round table on swath mapping in the Mediterranean Sea was convened by Jean Mascle.

This memo includes a short report of the discussion and provides several recommendations to CIESM.

The aims of the meeting were:

- (A) to evaluate new developments and potential follow-ups of regional swath bathymetric compilations of the Mediterranean Sea (further to the last map published in 2007, see CIESM website) and to explore how such documents could continue to be updated by incorporating newly-acquired data, or data soon to become available;
- (B) to share mutual information on the EDMONET EC project (<http://ec.europa.eu/maritimeaffairs/emodnet/preparatory/home.html>), and discuss our involvement and position with respect to this EC action;
- (C) to tentatively define common scientific targets of general interest on which effort can be combined to collect new data, including surveys making use of high-resolution near-bottom instruments.
- (D) any other relevant items

The meeting took place on Thursday May 13 morning from 10 to 12 am.

About 25-30 scientists, chiefly from Italy, Spain, Turkey, Germany, Egypt and France, participated.

#### Introductory Presentation

Jean Mascle started the meeting with a PPT presentation on what has been accomplished up to now in terms of morpho-bathymetric mapping of the Mediterranean Sea as a whole. He noted that this work has taken place in the frame of a collaborative "good will project", in which many scientists and institutions have contributed swath bathymetric data from smaller areas to successive morpho-bathymetric maps, jointly published in 2001, 2005 and finally 2007 by CIESM and IFREMER.

These maps, prepared using a common DTM of 500 m, have drastically modified our understanding of the morphology of the Mediterranean Sea and, in particular, provided remarkable new imagery regarding the various active processes operating on, and shaping, the seabed. Up to now the maps have achieved coverage of wide areas of the deep basins and margins, particularly in

the Eastern Mediterranean; however, large domains remain uncovered (for example most of the central Algerian-Provence deep basin and western Sardinia margin, or the southern Ionian sea and deep Libyan continental margin). Moreover, of the shallower seas (Aegean, Adriatic) or of the continental shelves, only restricted areas have been mapped in detail.

Moreover J. Mascle showed that tools exist to obtain swath bathymetric data at much higher resolutions (DTMs up to 1 m, or even less), in the form of Remotely Operated Vehicles (ROVs) and Autonomous Underwater Vehicles (AUVs) equipped with dedicated multibeam systems. He suggested that key areas should be defined and selected in the near future by the scientific community to become natural observatories from which high-resolution DTMs could be obtained. Such precise DTMs could be provided to microbiologists, biologists, geologists, geophysicists willing to build programs dedicated to long-term in situ studies.

In conclusion J. Mascle strongly recommended the following:

- to complete the systematic swath bathymetric mapping of the deep basins and margins of the Mediterranean Sea, at a standard 100 m DTM if possible.
- to strongly support the continued mapping of shallow areas (less than 200-300 m), which need to be incorporated into any global map of the Mediterranean domain and for which dedicated tools should be made available.
- Select target areas to be mapped in great detail for focused studies.

(A)- After this presentation a discussion was initiated. It was indicated that several new data sets have been obtained during the last two years, particularly by Italian scientists in the framework of MAGIC program (<http://www.magicproject.it/>), or in specific projects managed by Ismar (Bari canyon, South-Western Calabria arc) as well as by scientists from Barcelona. Contacts will be made with the various groups to check if they are willing to provide their data (DTM 500 m) to upgrade the existing synthesis maps. All participants agreed on the necessity of completing a precise bathymetric map both for the deep and shallow areas; several participants strongly support the idea of operating specific tools in selected areas to obtain high detailed DTMs.

From the general discussion, several important recommendations arose that CIESM may wish to endorse:

1. To stress the importance of the meaning of data integration and the key role of swath bathymetry for geological, sedimentological, environmental, biological and oceanographic studies. The round table participants strongly support the continuity of the swath bathymetry synthesis of the Mediterranean Sea, which should be considered as a programme of CIESM.

2. To emphasize the necessity of multibeam data in key, shallow and deep water, areas in the Mediterranean Sea. Several regions may represent crucial points for various societal and scientific reasons (such as coastal management, geo-hazards marine protected areas, etc.) and are potentially of considerable interest for many stakeholders across the European community

3. To explore how to better integrate shallow water data (50-600m) from various national projects (for example MAGIC in Italy, see above) or/and from private companies (for example first arrivals of seismic 3D data from Oil/gas companies). For the shelf area a suggestion was made concerning the use of data from Olex ([www.olex.no](http://www.olex.no)), mainly acquired by commercial vessels (e.g. fishing boats, merchant vessels). Olex users share sea floor data (mostly single beam) acquired over time by many vessels and the resolution they are able to achieve can be close to that of multibeam, certainly enough for DTM at 500 m.

4. It is recommended that CIESM act as a crossroads to discuss and define key areas in the Mediterranean Sea, where it may be particularly interesting to increase the resolution of swath bathymetry using tools like AUVs or ROVs. This is particularly important to tentatively answer specific questions such as sedimentological and geological studies, specific biological mapping, protected areas, integration with other data, etc.

5. The participants recommend that for any future updated publications of the swath bathymetric map the resolution of the DTM should remain limited to 500 m. They also recommend that CIESM should continue to show (as done up to now), on printed bathymetric maps of the Mediterranean, the logo of each contributing institution and provide several copies of the maps free of charge to contributing institutions.

They also strongly recommend that these terms and conditions along with general information about the mapping project and its history should be presented on dedicated pages on the CIESM website. The website should also show the regions that still need good mapping.

Essential information could be compiled in a flyer to be sent to all CIESM delegates, asking them to encourage national institutions in their home countries to contribute continued completion and compilation of the swath mapping compilation.

(B)-EMODNET.

( <http://ec.europa.eu/maritimeaffairs/emodnet/preparatory/home.html>),

J. Mascle provided some information on this EC-supported action extracted from a PPT presentation provided by B. Loubrieu, who was unable to participate in the meeting. Within its road map EDMONET has four data pilots: Geology, Chemistry, Biology and Hydrography. Only the hydrographic lot is of concern

for our discussion since this lot is aiming to provide, through a web? portal, a DTM at a quarter-degree (c. 500 m) of several peri-European seas, including the Western and Central Mediterranean. The round table participants questioned this proposal for several reasons: (1) it is clear that such a DTM is already available through the consortium of Institutions participating to the CIESM/IFREMER program; (2) the available DTM covers the entire Mediterranean Sea and not only the Western and Central regions and is thus scientifically more coherent; (3) the CIESM/IFREMER DTM is already more complete than any other DTM since the number of participating institutions seems to be more important than the one indicated in the EDMONET information.

There were questions as to what data has to be provided – it was not obvious from our information if EDMONET simply need a quarter-degree DTM, or actually request the raw multibeam data, from which they will generate a DTM. Given the above questions, it is strongly recommended to CIESM to establish a contact with EDMONET to at least share information and possibly initiate cooperation between the two organizations. Important points are a) to avoid any duplication in the construction of a DTM for the Mediterranean Sea, and b) to promote the construction of a DTM for the whole Mediterranean Sea and not only for some regions of it.

It was further proposed that CIESM (or a collaboration in the context of CIESM) could serve to lobby the EC for a large-scale project to co-fund the construction of a Mediterranean swath bathymetric dataset, through the acquisition of additional multibeam data; such a project could serve to bring together European and North-African geoscientists around common interests in seabed processes and geo-hazards (with considerable potential for training of our North African colleagues), lead to the discovery and inventory of new seabed features and establish a foundation for future research into geosphere-biosphere coupling.

(C)- Due to time constraints no specific exploratory discussion was devoted to scientific targets on which high-resolution swath data could be recorded in the future. The great benefits of this type of data have already been demonstrated in the framework of national or EC-supported projects (deep biological habitats, fluid seepages, sedimentary destabilization, etc.) and several participants have indicated their great interest. It is proposed that CIESM organizes, in a near future, a dedicated workshop to better define the scientific objectives and interests of near bottom detailed bathymetric acquisition.