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Mapping tectonics: a key element in submarine geological events and probabilities assessment

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The Mediterranean region is characterized by a large variability of domains reflecting great differences in timing and styles of deformation. The present-day very complex geological setting is related to several tectonic events ranging from the spreading of the Tethys to the collision of the Africa and Arabia plates with Eurasia and the further opening of the Tyrrhenian back-arc basin [1] in the central Mediterranean area. The high rate of historical and recent seismicity [2] demonstrates that extensional, together with transcurrent and compressive processes, are still active.

A reliable knowledge of active tectonic elements as well as analytic syntheses and the creation of databases at national and international level is fundamental for territorial management and planning, particularly for marine areas (hazards connected to submarine slides, earthquakes, volcanic eruptions and tsunamis).

The European Union is realizing a coordinated and harmonized web GIS service regarding geological knowledge of submerged areas by means of the EMODnet-Geology Project (<http://www.emodnet-geology.eu/emodnet/srv/eng/home>), subdivided into Workpackages (WP). Within the WP dedicated to "Geological events and probabilities" (led by the Geological Survey of Italy-ISPRA) procedures to collect basic geological data concerning earthquakes, volcanoes and submarine slides have been identified in cooperation with all Project Partners. The output products will be fully populated and harmonized GIS layers complemented by attribute tables containing all relevant details. It was agreed to include in this WP active tectonic elements since they are frequently connected to geological events.

The Geological Survey of Italy has constituted a working group, in cooperation with other Italian public research Institutions, in order to convey all of the available structural data and to elaborate a reasoned representation of the relevant tectonic elements. This activity has provided the opportunity to elaborate an updated structural model for submerged areas, in agreement with the model established on land, based on the wealth of data acquired in the last decades and the significant improvement in instrument resolution that has been achieved.

Data represented in the last published version of the structural model [3] have been updated and implemented by data collected in the frame of the ongoing Italian National Geological Mapping Project (CARG), which includes submerged areas from the coast to the shelfbreak at 1:50,000 scale and the entire Italian EEZ at the 1:250,000 scale, as well as by additional data derived from other national projects. The integration of all tectonic lineaments available with other products elaborated for

EMODnet-Geology (such as the map of submarine volcanoes) allows the identification of structural units that constitute the basic elements of the structural model representation.

References:

- [1] Cavazza W et al. (2004) *The TRANSMED Atlas. The Mediterranean Region from Crust to Mantle*. Springer, Berlin Heidelberg
- [2] Serpelloni E et al. (2007) *Kinematics of the Western Africa-Eurasia plate boundary from focal mechanisms and GPS data*. Geophys. J. Int. doi: 10.1111/j.1365-246X.2007.03367.
- [3] CNR (1983) *Structural model of Italy*.

