Multiphase tectonic interaction of Tyrrenian - Tunisia Margin - Ionian systems: Implications for regional seismogenesis

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The region at the transition from the west to the east Mediterranean is a complex puzzle of terrains spanning in age from the Mesozoic Ionian lithosphere to the Pleistocene arc and back arc domains of the Tyrrenian system. Although the region has had a complicated evolutionary history, the current configuration of terrains fundamentally denotes Miocene to recent kinematics.

In this contribution we present new data from Tunisia Margin showing the evolution from its formation in early Miocene to recent, the tectonic interaction with the opening of the Tyrrenian system and its current inversion, and discuss the implications for the regional kinematics evolution.

The Tyrrenian is no longer extending, but all basin borders indicate currently active large-scale thrusting to strike slip tectonics. Tunisia margins formed by a well-know contractional tectonic phase in early Miocene expressed in large-scale tectonics with a clearly imaged thrust and fold belt, cut by Messinian to Pliocene extensional faulting. However, high resolution multibeam bathymetry and images of the shallowest layers indicates ongoing inversion tectonics.

We compare the tectonic evolution of north Tunisia and Tyrrenian with the patterns of deformation of the Ionian tectonic wedge observed in new and reprocessed seismic images. We interpret the current deformation of the Ionian tectonic wedge based on the integration of evolution of the kinematics from the data sets of observations from the three systems.

We conclude that the entire region is currently under collision of the Africa Plate with the Adria Plate and the Neogene terrains of the Tyrrenian Domain. The corollary is the subduction of the Ionian lithosphere is fundamentally stalled so that the megathrust fault is possibly not any longer accumulating significant shortening and most deformation is currently occurring in steeper faults re-activation or cutting the previous structural framework.