Geophysical Research Abstracts
Vol. 17, EGU2015-6835, 2015
EGU General Assembly 2015

Nature and evolution of the Ionian basin: integration into the East Mediterranean Realm

Julie Tugend (1), Stavros Arsenikos (1), Nicolas Chamot-Rooke (1), Dominique Frizon de Lamotte (2,3), Geoffroy Mohn (2), and Christian Blanpied (3)

(1) Laboratoire de Géologie, ENS, CNRS/UMR 8538, Paris, France (tugend@geologie.ens.fr), (2) Département Géosciences et Environnement, Université Cergy-Pontoise, Cergy-Pontoise, France, (3) Total EP, Paris La Défense, France.

The East Mediterranean preserves a complex spatial and temporal succession of rift events from the Late Palaeozoic to Mesozoic times, eventually leading to extreme lithosphere thinning during the Triassic to Middle Jurassic and potentially associated with oceanic crust formation. The onset of convergence between Africa and Europe by the Late Cretaceous is accommodated by discontinuous reactivation and inversion episodes. In this tectonic context, many fundamental questions remain, related to (1) the nature (oceanic or not) of the East Mediterranean basement (including the Levant, Herodotus and Ionian basins) and (2) the age of formation of these deep basins.
In this contribution, we focus on the Ionian basin that is remarkably well-preserved, considering that it is delimited to the north and north-west by the Hellenic and Calabrian subduction complexes. To the south, it is separated from the Sirt basin by a relative topographic high, the Cyrenaica ridge. However, the relation between these two basins remains poorly constrained. We use a set of academic seismic reflection data (mainly the IMERSE and ARCHIMEDE surveys) combined with the existing Expending Spread Profiles (from the PASIPHAE cruse) to propose a homogeneous seismic stratigraphy across the Ionian basin and characterize its velocity structure.
The mapping of sedimentary sequences across the basin further confirmed the major role of NE-SW oriented structures that have been interpreted to be Late Miocene as they are almost directly sealed by Messinian evaporites. These NE-SW inverted structures control the deposition of Messinian evaporites, which, in turn, control the morphology of the Mediterranean deformation front. Sedimentary sequences have been identified deeper than previously assumed, confirming the occurrence of an extremely thinned basement (about 5 km thick). Furthermore, the interpretations of reflection seismic sections unravel the occurrence of deeply buried rift basins that are characterized by poly-phased rift events, questioning the nature of the Ionian basin.
As major result of this work, we propose a new regional transect going from stable North Africa to Greece and crossing the whole Ionian basin, the Mediterranean accretionary wedge and the Hellenic backstop. Further unravelling the evolution of the Ionian basin and of the Eastern Mediterranean domain in general remains a major challenge that may bring new insights for the understanding of formation and deformation of rift and oceanic domains.