

FROM THE TYRRHENIAN TO THE IONIAN DOMAIN : DIFFERENT MODE OF BASIN FORMATION

Marco ROMANELLI¹, Carmelo MONACO², Rinaldo NICOLICH¹
and Luigi TORTORICI²

¹ DINMA, Università di Trieste, Italy

² Istituto di Geologia e Geofisica, Università di Catania, Italy

One of the peculiar features of the central Mediterranean is represented by the occurrence of stretched areas developing at the rear of mountain belts. The Tyrrhenian sea, the most recent of these basins, has been developing since the Tortonian time up to the present. The geodynamic significance of the Tyrrhenian domain and its relations with the Calabrian arc and, consequently, with the Ionian domain are still debatable. The Tyrrhenian domain is, in fact, interpreted as a back-arc basin related to the subduction of the Ionian domain underneath the Calabrian arc or as a stretched area as a result of the asthenosphere domal uplift. Finally, it is interpreted as an asymmetric passive rifting developed as a consequence of the N-S collision between the African and European plates.

In order to test these different hypotheses, the structural setting of sedimentary basins which occur along a transect extending from the southern Tyrrhenian sea (Marsili basin) to the Ionian domain (external front of the Calabrian arc) has been analyzed. This study, supported by the analyses of several reflection and refraction seismic profiles and by stratigraphic, sedimentological and structural data carried out on the onshore Neogene-Quaternary basins of the Calabrian arc, points out a complex interplay between extensional and compressional processes that governs the geodynamic evolution of this region.

Along the studied transect three main types of sedimentary basins have been recognized. The first is related to rifting processes and develops above a thinned continental and/or oceanic crust. On the contrary, the second type is related to underplating processes developing above accretionary wedge domains or on the frontal portion of the crustal backstop. Finally, the third type of sedimentary basin is related to accommodation processes occurring at the rear of the accretionary wedge in order to maintain its stable geometry in response to the underplating. These different basins, developed in space and time, are superimposed on each other suggesting an overall southeast migration of the geodynamic processes which govern the whole system.

In addition, a carefully analysis of these data together with geophysical and structural information on the active tectonics characterizing this region allow us to infer that the process responsible for the opening of the southern Tyrrhenian sea and therefore for the development of the sedimentary basins is at present inactive.



G