

Sedimentary facies analysis and paleogeographic reconstruction of Pandanassa and Apostoli formations, Rethymnon province, Central-West Crete

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The purpose of this work is to 1) describe the sediments and interpret the depositional environment of the sediments belonging to the Miocene Pandanassa and Apostoli Formations of Apostoli basin in Rethymnon Province of the island of Crete, Greece, 2) to demonstrate the lateral facies relationships and 3) to reconstruct the paleogeography of the study area.

The tectonic-sedimentary regime of Apostoli basin in Rethymnon Province corresponds to a tectonic graben.

The Neogene sedimentary sequence in Apostoli Basin consists mainly of Early to Late Miocene clastics and carbonates. Important lateral and vertical lithofacies changes occur in all the Neogene rock units. The rocks have been divided into four lithostratigraphical units based on their lithofacies. These units were deposited mainly in alluvial-fluvial and marine environments and locally contain intercalations of rocks which were also deposited in a lacustrine environment.

The main depositional environments can be classified into four groups (from marginal to central parts of the basin): 1) alluvial environment, 2) transitional lacustrine and brackish environment, 3) marine environment and 4) carbonate platform.

The detailed lithostratigraphical, biostratigraphical and tectonic analyses which have been carried out in the Apostoli Basin led to very important conclusions concerning the environmental and lithological changes which took place in that area during Late Serravallian to Pliocene times. These changes took place in five stages, each one represented by a paleogeographical sketch.

From Late Serravallian to Late Tortonian times the Rethymnon region underwent a N-S extension. E-W normal faults created a half-graben basin while N-S normal faults created secondary horst and graben structures. The depocenter of the basin has been observed in its central part. Since the end of Miocene and due to the dominant geodynamic regime in the Aegean region, the island of Crete started to rotate towards the north. This rotation caused the emergence and the tilting to the north of the Apostoli Basin, resulting in the erosion and the northward transport of its Neogene infill.

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