



Early Cenozoic tectonic quiescence at the southern Levant continental margin, eastern Mediterranean

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The geological record of the easternmost Mediterranean shows almost continuous tectonic activity across the Levant continental margin since its formation during the early Mesozoic until the Recent. The margin developed as part of the Gondwana super continent breakup. Since mid Cenozoic onwards Gondwana descendants, the African and Arabian plates, progressively collided with Eurasia. This collision along with the initiation activity of the Afar plume led to the Cenozoic reactivation of the Levant margin. We explore the geodynamic development of the Levant region between its formation and reactivation through one of the poorly understood time periods in its history. Geological evidence shows that tectonomagmatic processes associated with the formation of the Levant margin and later geodynamic events lasted until the Maastrichtian. During the following ~ 25 Myr exclusively, thick pelagic and deep sea sediments accumulated on the submerged northwestern Arabian plate. We interpret this early-to-middle Paleogene time window as a unique interval of tectonic and magmatic quiescence. During this mature post continental, breakup stage, thermal equilibrium and isostatic compensation were achieved. A three-dimensional layered lithosphere model was constructed to describe this Middle-Late Eocene geodynamic scene of the Levant area before its reactivation. Layers of the model include the Moho, top of the basement interfaces and the top Avedat Group (Upper Eocene) interfaces. The model was established after a 100 km horizontal restoration along the Dead Sea transform and vertical correction by isostatic compensation to achieve the paleo structure which prevailed in the study area at the end of the Eocene. The reconstructed elevation defines a ramp-shaped structure compatible with independent geological evidence. Results show that most parts of the central Levant margin were submerged ~ 200 m to ~ 1800 m, while the paleo bathymetric slopes ranged from $\sim 2^\circ$ (shelf) to $\sim 6^\circ$ (slope). The early Cenozoic (early-to-middle Paleogene) tectonic quiescence, which resulted in increased subsidence, also induced the maximal transgression of the Mesotethys Ocean over the Sinai and northwestern Arabian plates.