



Arabia-Eurasia continental collision: insights from late Tertiary foreland-basin evolution in the Alborz mountains, northern Iran.

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A poorly-understood lag time of 15-20 m.y. exists between a supposed late Eocene to early Oligocene age for the initial Arabia-Eurasia continental collision and the acceleration of tectonic and sedimentary processes across the collision zone in the early-late Miocene. The late Eocene to Mio-Pliocene clastic and shallow-marine sedimentary rocks of the Kond, Eyvanekey, and Semnan basins in the Alborz mountains (northern Iran) offer the possibility to track the evolution of this orogen in the framework of collisional processes.

In the Kond and the Eyvanekey basins, a transition from volcanoclastic submarine deposits to shallow-marine evaporites and terrestrial sediments occurred shortly after 36 Ma in association with reversals in sediment provenance, strata tilting, and erosional unroofing. These events followed the termination of subduction arc magmatism and marked a changeover from an extensional to a contractional regime in response to initiation of continental collision with the subduction of stretched Arabian lithosphere. This early stage of collision produced topographic relief associated with shallow foreland basins, suggesting that shortening and tectonic loading occurred at low rates.

Starting from the early Miocene (ca. 17.5 Ma) flexural subsidence in response to foreland basin initiation occurred. Fast sediment accumulation rates and erosional unroofing trends point to acceleration of shortening by the early Miocene.

We suggest that the lag time between the initiation of continental collision (ca. 36 Ma) and the acceleration in regional deformation (20-17.5 Ma) reflects the effects of a two-stage collision processes involving the “soft” collision of stretched lithosphere at first and “hard” collision following the arrival of unstretched Arabian continental lithosphere in the subduction zone.