

Vertical Movements of the Moroccan Atlas Domain During Cenozoic

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The topography of continental lithosphere results of a wide variety of processes occurring at different spatial and time scales. Their study still remains a strong matter of debate, often as a consequence of complicated interactions between them. The Atlas domain constitutes a tremendous natural laboratory to study these processes. The geological evolution of this area is now well constrained and many available field data allow us to reconstruct the history of vertical movements since Triassic. At that time two rifting phases are distinguished, different in age and direction. The first one is Triassic in the Western High Atlas; the second one is middle Liassic in the Central High Atlas and Middle Atlas. From Cenomano-Turonian to Lower Eocene, the whole area topography is regular at low altitude, as testified by the deposition of low bathymetry facies. Two main tectonic phases occurred during Upper Eocene and Plio-Quaternary. They are separated by a Miocene wide subsidence event. A Neogene large scale uplift also affects the whole area.

In this study, we focus on the South Atlas Front, on which all of the previously cited events have been recorded, to highlight the nature and effect of the processes controlling the topography during Cenozoic. We combine geological data, geophysical constrains and new apatite fission-track results. This allows us to distinguish the effects of five main processes on the topography: crustal shortening, lithospheric thinning, lithospheric flexure and buckling and finally local volcanic doming. Their ages and the strong interactions with the structural heritage are also discussed. These results are generalized to the whole Atlas domain and considered in the general geodynamic context.