

Late Neogene and Quaternary Reactivation of a Paleozoic Basement: The Western Morocco Platform. Results from a Morphostructural Analysis Based on DEM, Field Data and Datings

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The combined analysis of DEM and satellite images analysis allowed to define a Quaternary style of deformation of the Western Morocco platform from Larache to Safi. This work is combined with field observations and datings from the recent literature. The Rharb depression represents a wrenched forearc basin activated at least since the Upper Miocene. South of this zone, after a major flexure, the platform is deformed by long wavelength deformations controlled by the faulting of the Variscan basement. The zone of Casablanca corresponds to a major riedel pattern which controls local uplift and valley incision. This suggests that the global subsidence of the Morocco Atlantic margin is strongly affected by the basement reactivation under control of the Africa-Iberia collision. Upper Cretaceous coincides with an offshore sequence showing a transition towards a prograding regime that leads to the topography of the present-day margin. It is associated with a major marine abrasion surface cropping south of Rabat and covered by upper Cretaceous onshore of Kenitra. This evolution is guided by a basement flexure which was activated prior to the Messinian as a major valley incision predated the Messinian flooding of most the platform south of Rabat, attesting an early bulging of this region, probably from the early Miocene. Flooding was progressive, probably from the Tortonian. The maximum Messinian flooding surface is limited inland by a marine paleocliff and some rias, well preserved from Safi to the Oued Melah. A major deformation occurred during the late Pliocene, with a fault-ramp fault located on a main detachment fault, related to the Rif arc southward propagation. In the region of Casablanca, a stacked sequence of clustered raised beaches and notches record a pulsed uplift synchronic with the Quaternary global sea level drop. Two major steps are related with about 1 Ma and 400-300 ka events. This tectonical activity is recorded in form of faulted beaches-dunes complexes and probably some moderate co-seismic activities. The main coastal paleocliff is related with a change of longshore erosion driven by a main climate change younger than 1 Ma. The main inland paleocliff is also related with a climate degradation, probably associated with enhanced storminess and SW storms.