



Evaluating the impact of active tectonism in the Moulay Idriss massif, South Rifain Ridges, Northern Morocco

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The south Rifain Ridges (SRR) are classically interpreted as active thrusts and folds-related faults. They have accommodated partially the southwestward expulsion of the Rif chain, Northern Morocco, due to the collision between the African and European plates. This motion, continued to recent times, is favored by the presence of the subsiding Gharb Basin and the distribution of deep Triassic rocks that constitute the main detachment level. The NE-SW major sinistral faults bounding the area could have been reactivated to strike-slip mode, and are responsible for the arcuate shape of (SSR) such as: Ain Lorma, Nzala des Oudayas and Sidi fili fault systems, which also have favoured fluid circulation (Sani and al,2007).

We are interested in the Eastern Arc especially Moulay Idriss massif, which is considered by Amine and al, 2017, to be the most active one. Our aim is to analyze the Neogene-Quaternary landscape evolution and the influence of recent tectonics. However no study has been done to compare the relative growth in this area.

In this respect, we have designed surface indices that allow classification of topographic variations in the area, according to the dynamic behavior, using surface roughness (Sr) and surface index (SI). Hypsometric analysis of its drainage network is carried on by using Hypsometric Integral (HI) and curve. In addition, Normalized steepness index (ksn) is used to infer tectonic perturbations from stream profiles. The relative stability of catchments that strive to attain equilibrium between tectonics and river erosion is demonstrated by drainage Chi (χ) values. These methods are used since the factors that control geomorphology (lithology, elevation and climate) are similar for all anticlines.

Our geomorphic analysis suggests that the quaternary landscape evolution has been governed by tectonics with a relatively high degree of tectonic activity along the Eastern branch, especially in Dehar N'Sour dome, Nesrani and Takerma-Kannoufa anticlines. In contrary the Western part is dominated by gorge formations that could be interpreted as a consequence of active folding. The doming process accounts for the elevation of the area, and this in turn could be explained as being promoted by The Nzala des Oudayas fault systems, which is still active in response to plates' motion. The fault zones exert a strong influence on the morphology of the streams and adjacent area.

Amine, A and El ouardi, H., 2017. Active tectonics revealed by isobase surfaces analysis from South Rifain Ridges, Northern Morocco. *Geogaceta*, 61, 2017

Sani, F., Del Ventisette, C., Montanari, D., Bendkik, A., Chenakeb, M., 2007. Structural evolution of the Rides Prerifaines (Morocco): structural and seismic interpretation and analogue modelling experiments. *Int. J. Earth Sci.* 96, 685–706