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Topography and drainage systems evolution in the volubilis area (South Rifain Ridges, Northern Morocco)

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The volubilis piggy back basin is located between two curved thrusts that form the South Rifian Ridges, Northern Morocco. Since the middle Miocene-early Tortonian, the basin formation has been associated with the activity of these movable arcs, whose southwestward displacement is related to the present-day African and Eurasian convergence.
Neotectonic features analyzed by isobase maps (Amine and El ouardi., 2017) reveal that the ridges active folds are associated with volubilis subsided area. In this case the basin recent surface had to be affected, as a continuation of the deformational orogenic ridges. Given the lack of morphotectonic studies we aimed at the topography evolution of the volubilis basin to get general view about the spatial variations in erosion, tilting units and impacted drainage systems. We applied geomorphometric tools such as hypsometry, normalized stream longitudinal profiles combined with different numerical surfaces and slope parameters as well as swath profile analysis.
Our results proved the influence of active tectonics in the drainage network and topography of volubilis basin. Although the basin area is less dissected comparing to the ridges, the ε-shaped hypsometric curve and integral of the khoumane river catchment indicate a young phase. This latter drains the continuation of the basin and the eastern arc where the tectonic activity is the most concentrated. Based on swath analysis, the general trend of tilting was characterized and was attributed to the recent tectonic movement combined with folds growth of the eastern ridges.