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Quantitative morphometric analysis for the tectonic characterisation of northern Tunisia.

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Northern Tunisia is characterized by low deformation rates and low to moderate seismicity. Although instrumental seismicity reaches maximum magnitudes of Mw 5.5, some historical earthquakes have occurred with catastrophic consequences in this region. Aiming to improve our knowledge of active tectonics in Tunisia, we carried out both a quantitative morphometric analysis and field study in the north-western region. We applied different morphometric tools, like river profiles, knickpoint analysis, hypsometric curves and integrals and drainage pattern anomalies in order to differentiate between zones with high or low recent tectonic activity. This analysis helps identifying uplift and subsidence zones, which we relate to fault activity. Several active faults in a sparse distribution were identified. A selected sector was studied with a field campaign to test the results obtained with the quantitative analysis. During the fieldwork we identified geological evidence of recent activity and a considerable seismogenic potential along El Alia-Teboursouk (ETF) and Dkhila (DF) faults. The ETF fault could be responsible of one of the most devastating historical earthquakes in northern Tunisia that destroyed Utique in 412 A.D. Geological evidence include fluvial terraces folded by faults, striated and cracked pebbles, clastic dikes, sand volcanoes, coseismic cracks, etc. Although not reflected in the instrumental seismicity, our results support an important seismic hazard, evidenced by the several active tectonic structures identified and the two seismogenic faults described. After obtaining the current active tectonic framework of Tunisia we discuss our results within the western Mediterranean trying to contribute to the understanding of the western Mediterranean tectonic context. With our results, we suggest that the main reason explaining the sparse and scarce seismicity of the area in contrast with the adjacent parts of the Nubia-Eurasia boundary is due to its extended continental platform and its lack of proto-oceanic crust northward.