

Contrasted terrace systems of the lower Moulouya valley as indicator of crustal deformation in NE Morocco

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The Moulouya river has the largest catchment in Morocco and drains an area which is characterized by active crustal deformation during the Late Cenozoic due to the convergence between the African and Eurasian plates. As yet, its Pleistocene terrace sequence remains poorly documented. Our study focuses on the lowermost reach of the river in NE Morocco, which drains the Triffa sedimentary basin directly upstream of the estuary. New field observations, measurements and sedimentological data reveal contrasted fluvial environments on either side of a newly identified thrust zone, which disrupts the whole sedimentary basin and is associated with N–S compressive shortening in this region (Barcos et al., 2014). Long-lasting fluvial aggradation, materialized by ≥ 37 m-thick stacked fill terraces, and the development of a well-preserved terrace staircase, with (at least) three Pleistocene terrace levels, occur in the footwall and the hanging wall of the thrust, respectively. Same as for the Pleistocene terrace sediments of the middle Moulouya, a recurrent sedimentary pattern, characterized by fining-upward sequences was observed in the studied terrace profiles.

Assessing the rates of crustal deformation along this main thrust zone requires age estimations for these Pleistocene terrace deposits of the lower Moulouya on each side of the thrust. Samples for luminescence (OSL/IRSL), electron spin resonance (ESR, on quartz) and cosmogenic nuclide dating ($^{26}\text{Al}/^{10}\text{Be}$, burial dating) were collected in terrace deposits located both in the foot- and hanging walls. Sample preparation and analysis as well as age determination are in progress.

The preliminary data mentioned above, soon to be completed by chronological data, agree well with morphometric indicators stating that the whole Moulouya catchment is at disequilibrium state (Barcos et al., 2014). This is confirmed by several knickpoints in its longitudinal profile. Late Cenozoic uplift associated with crustal shortening, which occurred in the lowermost reach of the river, may have both hindered profile rectification of the Moulouya and, at the same time, buffered the effects of long-term base-level changes due to eustatic sea-level variations.

Reference:

Barcos, L., Jabaloy, A., Azdimousa, A., Asebriy, L., Gómez-Ortiz, D., Rodríguez-Peces, M.J., Tejero, R., Pérez-Peña, J.V., 2014. Study of relief changes related to active doming in the eastern Moroccan Rif (Morocco) using geomorphological indices. *J. African Earth Sci.* 100, 493–509.