

Fluvial archives of NW African climate and tectonic evolution, Atlas Mountains, central Morocco

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The Atlas mountains in Morocco are a natural laboratory at the junction between the Atlantic Ocean (passive margin), the Mediterranean (subduction) and the African Craton. Here, interactions between the mantle and lithosphere, crustal compression and uplift have been recorded in river terraces, alluvial fans, drainage patterns, river long profiles, and in wedge-top & foreland sediments.

Limited work on terraces in one of the catchments crossing the Atlas thrust front has shown rates of incision are low and have been sustained since the Pleistocene. Dating of terraces using Optically Stimulated Luminescence, together with field sedimentology, links the formation of terraces in the Dades River to 100 ka climate cycles. Studies of tributary fans and fan sediments in terraces suggest coupling of hillslopes, tributaries and trunk streams vary across glacial-interglacial cycles and is geologically controlled. River long profiles extracted across the Atlas Mountains contain knickzones (areas of increased steepness), resulting from tectonically driven uplift.

We will use newly acquired high resolution DEM data together with field mapping and Optically Stimulated Luminescence dating to constrain river terrace formation in High Atlas catchments draining into the Ouarzazate foreland basin. These data will be used to constrain further, the regional tectonic and climatic controls on river terrace formation. Integrating the terrace records with the other fluvial archives will enable challenging questions on tectonic surface processes, source-to-sink sedimentology and intra-plate tectonics to be tackled.