Mesozoic Denudation of the Moroccan Atlas Constrained by Apatite Fission-Track Thermochronology

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The High and Middle Atlas mountains constitute inverted basins with Triassic to Jurassic sedimentary rocks now at high elevations. It is generally admitted that inversion is mostly concentrated to the basins and does not affect the local borders (Moroccan meseta, Haute Moulouya, Anti-Atlas). This study aims to constrain - age of inversion, amount of erosion, differences between domains- this hypothesis. Sampling has been carried out on both side of the High Atlas Mountain, northward on the Moroccan meseta and southward on the Anti-Atlas and the Red beds unit.

Preliminary results show that FT ages are much younger than expected on both side of the High Atlas with ages ranging between 114±5 and 188±9 Ma. FT lengths are about 12 µm with a negatively skewed distribution. Modelling of these data using AFTASolve suggests a phase of temperature decrease between 160 and 120 Ma. Amount of erosion might be estimated to 2-3 km using basic thermal properties.

Samples closer to the South Atlasic front show younger ages (135±18 to 47±9 Ma) ; these ages are interpreted to be linked with the Tertiary uplift associated with the main phase of the High Atlas building.

The main conclusion of this study is that the overall area has undergone a regional uplift during the Late Jurassic – Early Cretaceous which finds its geodynamical evidences by the transition from marine deposition (Middle Jurassic limestones) to continental deposition (Red Beds) and by the high thickness of the remaining Red Beds.