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# 1 New insights on the High Atlas building steps from Mesozoic to Quaternary times (Morocco).

B. Ghorbal (1,2), G. Bertotti (2), J. Foeken (3), F. Stuart (3) and P.A.M. Andriessen (1)

(1) Isotope Geochemistry Dept., V.U. Amsterdam, NL, (2) Tectonic Dept., V.U. Amsterdam, NL, (3) Isotope Geoscience Unit, SUERC, U.K. (badr.ghorbal@falw.vu.nl)

The purpose of this study is to provide information on the evolution of the Atlas system (High Atlas of Marrakech, Siroua Plateau and the Jebilet) since the rifting period until the recent mountain range by quantifying vertical movements through the 120˚ to 45˚C isotherms using low-Thermal thermochronometers (U-Th/He and Fission Track in apatites) to constraint the timing of the inversion.

Angular unconformities, time gaps, and progressive increase of the thickness in the Mesozoic sedimentary pile of the Western High Atlas, Morocco, point to the Middle-Late Jurassic up to the Early Cretaceous tectonic pulses in this area. Red beds, Middle Jurassic and Late Jurasssic/Early Cretaceous in age, were respectively deposited in the nearshore Agadir-Essaouira basin and in the off-shore (DSDP sites 370 & 416) in the Atlantic margin. These phenomena can be easily explained by uplift and erosion in the mountain belt.

Thus, the Late Permian to Early Jurassic rift of High Atlas was followed by an exhumation stage from the Middle-Late Jurassic to the Early Cretaceous as proven by the 160 to 120 Ma AFT thermochronology ages performed on sedimentary and basement rocks of the SubAtlas Zones.

As reported by the tectonic and sedimentology evidences, Low Thermochronology

ages (ages range from 40 to 9 Ma for the AFT and from 20 to 7 Ma for the (U-Th)/He method) from the axial zone of the system (Toubkal Massif and northern Siroua Plateau) confirm that most important part of the high topography in the High Atlas was created during the Late Miocene and the Pliocene.

Nevertheless, (U-Th)/He and AFT ages ranging from 90 Ma and 40 Ma also indicate two others vertical movements involving the outer part of the system showing a complex evolution of the system.