Tectonic inversion of hyper-extended continental margin of the Maghrebian Tethys: Insight from the Filali Beni Bousera Shear Zone (Internal Rif, North Morocco)

Michel Corsini*[1], Ahmed Chalouan , Asmae El Bakili , Aboubaker Farah , André Michard , and Omar Saddiqi

[1]Géoazur – Institut National des Sciences de l'Univers : UMR7329, Observatoire de la Cote d'Azur, Université Côte d'Azur, COMUE Université Côte dÁzur (2015 - 2019), Centre National de la Recherche Scientifique : UMR7329, Institut de Recherche pour le Développement : UR082, COMUE Université Côte dÁzur (2015 - 2019), COMUE Université Côte dÁzur (2015 - 2019), COMUE Université Côte d'Azur (2015-2019), COMUE Université Côte dÁzur (2015 - 2019), COMUE Université Côte dÁzur (2015 - 2019), COMUE Université Côte dÁzur (2015 - 2019), COMUE Université Côte dÁzur (2015 - 2019), COMUE Université Côte dÁzur (2015 - 2019), COMUE Université Côte dÁzur (2015 - 2019), COMUE Université Côte dÁzur (2015 - 2019), COMUE Université Côte dÁzur (2015 - 2019), COMUE Université Côte dÁzur (2015 - 2019), COMUE Université Côte dÁzur (2015 - 2019), COMUE Université Côte dÁzur (2015 - 2019), COMUE Université Côte dÁzur (2015 - 2019) – France

Résumé

Located in the Internal domain of the Rif belt, the Beni Bousera massif exhibits a stack of peridotites and crustal metamorphic units in the core of an open NW-SE antiformal structure. Detailed mapping, structural and petrological analyses, and multimethod dating were performed to precise the timing and process of exhumation of the peridotites body.
For the first time, we highlight a metasedimentary unit, the Beni Bousera Marbles (BBMs), located in between the kinzigites of the Beni Bousera Unit and the overlying gneisses of the Filali Unit on both sides of the Beni Bousera antiform. The BBMs are mainly composed of silicate-rich dolomitic marbles, sandy-conglomeratic calcareous marbles, and marbles interbedded with metapelites. They likely contain kinzigite pebbles and peridotite elements which attest that the lower crust and mantle rocks were exhumed close to the Earth's surface during their deposit. Detrital cores of zircon from the BBMs yield a U-Th-Pb age cluster at ∼270 Ma, suggesting that BBMs protoliths may have been deposited onto the kinzigites from Triassic in relation with the Maghrebian Tethys opening.

The Filali–Beni Bousera Shear Zone (FBBSZ), corresponds to a 30 to 300 m thick mylonitic corridor punctuated by the BBMs dismembered in the contact zone. A dominant top-to-the NNW displacement is evidenced by the mylonitic foliation bearing a stretching lineation and many kinematic indicators observed both in the marbles and the host units.

*Intervenant

Phlogopite associated with peak HT-LP metamorphism yields an age at $\sim$ 23 Ma, close to the U-Th-Pb ages at $\sim$ 21 Ma obtained at the rims of zircons. This metamorphism is attributed to the extensional event related to the back-arc opening of the Alboran Basin during the Early Miocene. A later compressional event folded the complete nappes stack to build the Beni Bousera antiform.

We present a model of tectonic inversion controlled by the FBBSZ, which corresponds to a major detachment fault associated with a hyperextended margin during the rifting events that preceded the opening of the Maghrebian Tethys, then acting as a major thrust during the compressive phase of construction of the Rif Belt since at least the Eocene.

Mots-Clés: Rif belt, Alboran basin, tectonic inversion, ductile shear zone, mantle exhumation