The role of Triassic evaporitic-carbonate sequences in fold-thrust belt evolution: Insights from structural restoration and U-Pb dating (the Cannet des Maures structure, Eastern Provence, France)

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Résumé

The eastern Provence fold-thrust belt in southeastern France involves highly deformed Triassic evaporitic-carbonate sequences, but the age of deformation is difficult to establish because no syntectonic sedimentary strata are preserved. To constrain both the style and timing of deformation affecting these Triassic sequences, we combined balanced and restored cross-section with U-Pb dating of syn-kinematic calcite slickenfibers from the Cannet des Maures structure. Structural restoration reveals that the present-day geometry results from the inversion of a Jurassic rollover structure initially shaped by listric normal fault rooted in Triassic evaporitic-carbonate layers. These mechanically weak layers acted as a major décollement zone, enabling vertical and disharmonic shortening between the basement and the overlying Mesozoic cover. Rather than being expressed through significant forward translation, deformation was absorbed by flexural slip, back-thrusting and the development of a

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retro-wedge, indicating limited frontal propagation and internal strain localization. U-Pb ages of syn-kinematic calcite range from 94 to 4 Ma, providing a robust temporal framework linking Cretaceous extension to Provençal and Alpine compression. These absolute ages validate the structural interpretation of inverted extensional geometries and demonstrate a long-lived deformation continuum. These findings highlight the critical role of Triassic evaporitic-carbonate sequences in accommodating shortening through vertical decoupling. By integrating geochronology with structural analysis, we refine the temporal and mechanical understanding of tectonic inversion processes and demonstrate how inherited structures can remain active throughout prolonged orogenic cycles. In addition, this work contributes to a broader understanding of natural hazards in evaporite-bearing terrains, particularly with regard to ground collapse risks associated with gypsum dissolution in the region.

Mots-Clés: Eastern Provence, Structural restoration, U, Pb geochronology, Triassic evaporitic, carbonate, Polyphase deformation