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# Pyrenean Miocene deformation episode recorded by U-Pb geochronology on syn-kinematic calcites.

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## Résumé

Brittle deformation and fold growth is usually dated using structural cross-cutting relationships as well as pre- and syn-tectonic sedimentological record. Recent advances in U-Pb dating by LA-ICP-MS on syn-kinematic calcites provides a precise characterization of age, duration and rate of deformation. Applied on microstructures as well as on major faults this method raises new questions about the post-orogenic evolution. In the Pyrenean domain, Parizot et al., (2021) and Hoareau et al., (2021) have highlighted that unexpected brittle deformation is recorded in the Corbières area and on the southwestern belt front during Miocene. This event thus occurred late after the end of Pyrenean main shortening event estimated at the end of the Eocene. To constrain this late episode of deformation at the scale of the Pyrenean chain, we sampled syn-kinematic calcites in the eastern North Pyrenean Zone (NPZ) and Sub Pyrenean Zone (SPZ) (between Lavelanet and Lannemezan) on microstructures, where brittle deformation in the "Petites Pyrénées" fold-and-thrust belt is well documented by Choukroune and Delair, (1976). U-Pb dating on syn-kinematic calcites coupled with microstructural analysis confirms the N-S, NW-SE main shortening direction. Most U/Pb ages on syn-kinematic calcites ranges between Eocene and Oligocene allowing to discuss the detailed sequence of brittle deformation during the main orogenic phase. On the other hand, our work in the NPZ and SPZ fold-and-thrust belt also highlight a Miocene brittle episode of deformation never before documented in this part of the orogen.

**Mots-Clés:** Pyrenean retro, foreland, U, Pb dating, Syn, kinematic calcite, tectonic.

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