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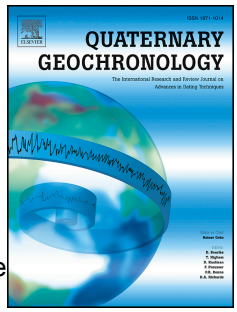

Deciphering landscape evolution with karstic networks: A Pyrenean case study

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Deciphering landscape evolution with karstic networks: A Pyrenean case study

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Abstract

The rates and chronologies of valley incision are closely modulated by the tectonic uplift of active mountain ranges and were controlled by repeated climate changes during the Quaternary. The continental collision between the Iberian and Eurasian plates induced a double-vergence orogen, the Pyrenees, which has been considered a mature mountain range despite significant seismicity and evidence of neotectonics. Nevertheless, recent studies indicated that the range may have never reached a steady state. One option for resolving this controversy is to quantify the incision rates since the Miocene by reconstructing the vertical movement of geometric markers such as fluvial terraces. However, the few available ages for the Pyrenean terrace systems do not exceed the Middle Pleistocene. Thus, we study alluvium-filled horizontal epiphreatic passages in limestone karstic networks to increase the span of this dataset. Such landforms are used as substitutes of fluvial terraces because they represent former valley floors. These features record the transient position of former local base levels during the process of valley deepening. The Têt river valley (southern Pyrenees) is studied near the Villefranche-de-Conflent limestone gorge, where 8 cave levels have been recognized over a vertical height of 600 m. In this setting, already published $^{26}Al/^{10}Be$ cosmogenic burial data were limited to the last ~5 Ma. This work extends this initial dataset through the acquisition of cosmogenic $^{10}Be/^{21}Ne$ data, which should enable us to reconstruct a more