



Plio-Quaternary river incision rates inferred from burial dating (Al-26/Be-10) of in cave-deposited alluvium in the Meuse catchment (E Belgium): new insights into the uplift history of the Ardennes massif

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Although the Late Cenozoic uplift of the intraplate Variscan Ardennes/Rhenish massif (N Europe) has been long studied, its causes, shape and timing are still under debate (Demoulin & Hallot, 2009). This is mainly due to the scarcity of reliable ages for uplift markers, such as Quaternary terrace staircases along the deeply-incised valleys or Late Tertiary planation surfaces. In parallel, multi-level cave systems in limestone rocks, wherein abandoned phreatic passages filled with alluvium represent former phases of fluvial base-level stability, record the history of regional river incision (Anthony & Granger, 2007). Here, we present new burial ages (Al-26/Be-10) from fluvial gravels washed in a multi-level cave system developed in Devonian limestones of the lower Ourthe valley (main Ardennian tributary of the Meuse). Our results highlight a significant increase of incision rates from the Middle Pleistocene on, and allow reconstructing the incision history in the northern part of the Ardennes over the last ~3.4 Ma. These long-term incision rates derived from burial ages are then discussed in relation to the existing studies dealing with river incision and/or tectonic uplift of the Ardennes/Rhenish massif (e.g. Demoulin & Hallot, 2009; Rixhon et al., 2011). Our cosmogenic nuclide ages thus enlarge the data pool required to explore the spatio-temporal characteristics of the drainage system's incision response to combined tectonic and climatic signals.

References

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