



Plio-Quaternary incision rates in the Meuse catchment vs long-term uplift rates of the Ardennes (E Belgium): new insights from $^{26}\text{Al}/^{10}\text{Be}$ burial dating of in cave-deposited alluvium

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The causes, shape and rates of the Late Cenozoic, intraplate uplift affecting the Variscan Ardennes/Rhenish massif (N Europe) are still under debate, although it has been long studied (e.g. Demoulin & Hallot, 2009). This is mainly due to the scarcity of reliable ages for uplift markers, such as Late Tertiary planation surfaces or Quaternary terrace staircases along the deeply-incised valleys. Alternatively, alluvium-filled multi-level cave systems can unravel the history and pace of regional river incision (e.g. Anthony & Granger, 2007). Here, we present a dataset of $^{26}\text{Al}/^{10}\text{Be}$ burial ages obtained on river gravels washed into a multi-level cave system developed in Devonian limestones of the lower Ourthe valley, i.e. the main Ardennian tributary of the Meuse. Our results allow reconstructing, for the first time, the incision history in the northern part of the Ardennes since the end of the Pliocene and over the Quaternary. While incision rates remained very low over >2.5 Ma, they significantly increased during most of the Middle Pleistocene before decreasing from the late Mid-Pleistocene to present. 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. 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 a long-term tectonic signal coupled with climatic forcing.

References

- Anthony, D., Granger, D.E., 2007. A new chronology for the age of Appalachian erosional surfaces determined by cosmogenic nuclides in cave sediments. *Earth Surf. Process. Landforms* 32, 874–887
- Demoulin, A., Hallot, E., 2009. Shape and amount of the Quaternary uplift of the western Rhenish shield and the Ardennes (western Europe). *Tectonophysics* 474, 696-708.
- Rixhon, G., et al., 2011. Quaternary river incision in NE Ardennes (Belgium): Insights from $\text{Be-10}/\text{Al-26}$ dating of river terraces. *Quaternary Geochronology* 6, 273-284.