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Surface uplift of the Eastern Alps - much faster than we thought?

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Surface uplift of the Eastern Alps is generally considered to have occurred more or less continuously over the last 30 Ma. Since this time the fine interplay of many kilometres of rock uplift and erosion has resulted in net surface uplift of some 2-3 kilometres. However, reference frames that allow to discern between rock uplift and surface uplift are often hard to identify. One way of measuring surface uplift rates is through the study of areas where erosion did not occur. That is, identification and dating of relicts of ancient base levels. In the eastern Alps elevated low relief landscapes (ELRLs) are a common feature at a series of discrete levels up to 3000 m surface elevation and have been identified as relicts of base levels.

In this contribution we present a map of these ELRL landforms for much of the Eastern Alps and present ¹⁰Be, ²¹Ne, ²⁶Al cosmogenic nucleide data of fluvial sediments sampled in some 50 caves across the Eastern Alps that are interpreted to have formed at the same time as the ELRL paleosurfaces. We collected samples that were interpreted to have been deposited during cave formation at the vadose-phreatic transition. As such, they form markers for base level and the age of their burial into the cave may be interpreted as the time the cave was at base level. Interpretation of our data indicates that the uplift rate of the Eastern Alps may be in the order of 200 m – 500 m per Million years for much of the Pliocene. As such, much of the observed surface uplift of the Eastern Alps may have occurred since the late Miocene and surface uplift is thus much faster than previously thought.

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