Post-glacial topographic vs. tectonic forcings on erosion in the Eastern Austrian Alps

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What is the relative influence of glacial vs. active tectonic processes in driving erosion and uplift across the European Alps? It has largely been argued that repeated erosion through glaciation sustains topography and isostatic uplift in a decaying orogen (Wittmann *et al*., 2007). But, some insist that the Alps are largely a young orogen still in infancy (e.g., Hergarten *et al*., 2010). Some of this debate may be clarified at the eastern end of the Alps, where it is known that tectonic processes are most active and where both glacially sculpted and never-glaciated catchments occur in close spatial proximity.

We explore the relative forcings of post-glacial topography and tectonically-driven uplift on denudation rates in the Eastern Austrian Alps. We target previously glaciated and unglaciated catchments to quantify the erosional and topographic signature of glacial and tectonic forcings. Despite active convergence in this region, previously published levelling data suggest minor surface uplift across our study sites. New catchment-wide denudation rates, determined from ^{10}Be in quartz sand, range from 40-260 mm/ky across the region, and correlate with basin relief. GIS-derived slope distributions across catchments yield clear topographic indicators of glacial preconditioning, which further correlate with denudation rates.

Recorded rates and topographic metrics in western-most portions of the study region reflect the erosional response to the topographic preconditioning by repeated glaciations. The eastern-most rates reflect non-glacially forced erosion and are up to a factor of four lower than rates in previously glaciated catchments. Together, these data suggest that erosion across the Eastern Alps is strongly controlled by post-glacial topography, while active convergence in the region results in lesser forcings on both topography and erosion rates.

[1] Wittmann *et al* (2007) *J. Geophy. Res. Earth Surf.,* **112**, F04010. [2] Hergarten *et al* (2010) *Earth Planet. Sci. Lett,* **297**, 453-460