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Passive margin high altitude low relief surfaces: old or new? Testing the glacial/periglacial buzzsaw hypothesis on the landscape of Southern Norway.

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Low relief surfaces at relatively high altitude are a main characteristic of the landscape in Southern Norway. These surfaces have for more than a century been regarded as old surfaces, originally developed as low altitude peneplains and later tectonically uplifted during the Cenozoic (e.g. LidmarBergstrom et al., 2000). Recently, this standard model has been challenged by models suggesting more recent uplift from erosionally driven isostatic adjustments during Pliocene and Pleistocene (Nielsen et al., 2009) or also earlier (Gołędowski et al., 2013). These models differ in opinion as to how and when the surfaces actually have developed from denudational processes in increasingly colder climates, unconstrained by a common base level, but both a glacial and a periglacial 'buzzsaw' have been invoked. If this interpretation is correct, it provides an example of large-scale periglacial bedrock landscape development and further underlines the importance of cryo-conditioning for long-term landscape development (Berthling and Etzelmüller, 2011) and the interconnected role of earth surface processes in cold climates. According to (French, 2007), however, large scale periglacial landscapes are rare or non-existent. Testing the periglacial 'buzzsaw' is therefore important, both for addressing the potential general long-term effects of periglacial processes on landscape development, and specifically to evaluate the mentioned models for Cenozoic landscape development. Here, we assess both the standard model and the glacial/periglacial 'buzzsaw' hypotheses on the Southern Norway landscape development, based on available field relationships. The periglacial 'buzzsaw' involves two aspects: sediment production by frost weathering, and sediment transport by periglacial mass wasting, i.e. solifluction and/or permafrost creep. Several studies evaluate frost weathering at the landscape scale, but periglacial mass wasting – especially regarding solifluction – has mainly been investigated on local scales. We test the periglacial 'buzzsaw' by spatial and temporal upscaling from current periglacial solifluction landforms and process rates.

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