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# Reproducing field-measured values of ongoing uplift rates in the central alps using 2D finite element models – How much realism is necessary?

R. Mettier and O.A. Pfiffner

University of Bern, Institute for Geology, Bern, Switzerland (mettier@geo.unibe.ch)

Recent and ongoing advances in satellite based geodesy and fission-track dating, as well as high-precision GPS methods are constantly providing new and improved measurements of current horizontal and vertical movements across the alpine orogen. These new datasets can be used to extract profiles of vertical motion, which in turn can help calibrate numerical models representing commonly accepted concepts of the processes involved in orogenesis. We present a series of 2D finite element models of increasing complexity, attempting to reproduce the motion observed on a regional scale across an orogen scale cross section of the alps, especially the differential uplift between the Aar- and Gotthard massifs, as well as the non-linear uplift gradient in the alpine foreland and the observed peak in vertical motion in the Penninic nappes. The numerical models are based on widely accepted conceptual models, and take into account the main tectonic units and current day topography. Gravitative unloading and subsequent re-loading of the resulting geometry provide us with a realistic static starting representation of the status quo.

Starting with a largely unrestricted parameter space, we explore in how far basic characteristics such as interaction properties between tectonic units, material heterogeneity or isostatic loading and unloading affect the ability of a model to produce 'realistic' behavior at the surface.