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Testing conceptual geological reconstructions of salt tectonic provinces with 3D thermomechanical models

Tobias Baumann, Anton Popov, and Boris Kaus
University of Mainz, Institute for Geosciences, Geophysics/Geodynamics, Mainz, Germany (baumann@uni-mainz.de)

The three-dimensional evolution of salt-tectonic provinces has been studied mainly with conceptual models or analogue sandbox models. Frequently, numerical models have also been used, but these are usually limited to two dimensions or use simplifications for the various rheologies involved in the stratigraphy.
Here, we conduct a numerical study with 3D thermomechanical models of various salt tectonic provinces. We consider viscoelastoplastic rheologies, and take into account different aspects of temperature profiles, pore pressure conditions, sedimentation and erosion processes. Our focus is on different boundary conditions to optimally implement initiating and driving mechanisms. We compare our results with conceptional reconstructions from literature at different tectonic regimes.
In comparison with analogue models, our simulations employ non-scaled rock and other physical properties such as realistic geotherms. This is especially useful when aiming for a direct comparison with geophysical observations in nature such as strain magnitudes and stress orientations.