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# Influence of various parameters on time-dependent dynamic topography with respect to the African plate

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Mantle flow due to density variations in the Earth's interior interacts with the Earth's surface which results in the formation of dynamic topography. In this study time-dependent dynamic topography with respect to the African plate is modelled using the finite-element code CitcomS [1]. Mantle flow is reversed backwards in time in order to reconstruct dynamic topography in the last 70 Myr on the African plate.

Here, uncertainties in the various parameters which control dynamic topography and its rate of change are considered. It is assessed to which extent the uncertainties of velocity anomalies of seismic tomography models affect mantle flow. Therefore, results of the mean and standard deviation of dynamic topography from the model runs using 10 shear-wave tomography models are shown. The model approach of converting all seismic anomalies from seismic tomography models into temperature anomalies is applied and its uncertainties as well as limitations evaluated. Different cut-off depths of velocity anomalies in the upper part of the mantle and their implications on the time evolution of dynamic topography are presented. Furthermore, the influence of the radial and temperature dependent viscosity structures and lithospheric thickness is examined in this study. The obtained results imply that the applied method of modelling dynamic topography on the African plate is connected with large uncertainties which make it difficult to obtain a reliable picture of the spatial and temporal evolution of dynamic topography on the African plate based on modelling.

## References

[1] S. Zhong, M. T. Zuber, L. Moresi, and M. Gurnis, 2000, Role of temperature-dependent viscosity and surface plates in spherical shell models of mantle convection. *J. Geophys. Res.*, 105(B5):11063–11082