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Effects of Mineralogical Thermodynamics in Geodynamic Models

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Material parameters of the polycrystalline aggregates in the mantle are important controls for the mechanical and thermal behaviour of the convection system. We use a self-consistent thermodynamic model of mineral phases based on the database by Xu et al. 2008 to determine stable phase assemblages and compute pressure and temperature dependent properties like density that are fed into fluid dynamic simulations. We examine the influence of different bulk compositions and varying material properties on the thermal state and dynamic processes of the earth's mantle. We also compute elastic parameters of the system in a post-processing step to allow the comparison with seismological results.