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Mineralogical tomography in the upper mantle

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Large-scale seismic anisotropy in the upper mantle may help to put constraints on its mineralogical (and chemical) composition. A simple forward modelling is used to calculate elastic properties of model rocks (lherzolite, MORB, harzburgite) at pressures and temperatures relevant to the upper mantle. These synthetic data are then inverted to test the ability of seismic surface waves to discriminate between different mantle compositions. It is shown, using a global optimization method, that parameters which describe fundamental and overtones Love waves phase velocity in slightly anisotropic media may, ideally, be relevant to that aim. Applying a tomographic filter to the synthetic data ponderates this optimistic conclusion, although inferences on mineralogical composition can be done in some cases.