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Full waveform tomography of the South Atlantic upper mantle

Lorenzo Colli (1), Andreas Fichtner (2), and Hans-Peter Bunge (3)

(1) Ludwig Maximilian University, Department of Earth and Environmental sciences, Munich, Germany (colli@geophysik.uni-muenchen.de), (2) Utrecht University, Department of Earth Sciences, Utrecht, The Netherlands (fichtner@geo.uu.nl), (3) Ludwig Maximilian University, Department of Earth and Environmental sciences, Munich, Germany (bunge@geophysik.uni-muenchen.de)

We develop a full waveform tomography to infer the thermo-chemical state of the upper mantle beneath the South Atlantic, and to address various key questions concerning the geodynamic evolution of the region: (1) How and to which extent does the South Atlantic plume system feed the asthenosphere in the oceanic basin and adjacent regions? (2) What are the current thermal states of the Walvis Ridge and the Etendeka and Paraná continental flood basalts? (3) What, if any, is the pathway of slow seismic material descending from the asthenosphere to the lower mantle? (4) Is the prominent topographic gradient across the South Atlantic region from Africa to South America explicable solely in terms of lower mantle structure, or do we also find a systematic gradient in upper mantle heterogeneity across the ocean basin? (5) What is the relation of upper mantle heterogeneity and anisotropic structure to the Mid-Atlantic ridge system and hotspots?
Full waveform tomography allows us to exploit information from seismograms in a very efficient way. Our approach is thus well suited for regions with comparatively low data coverage such as the South Atlantic.