

Institut für Geophysik
Geophysikalisches Kolloquium
Sommersemester 2017

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Thomas Bodin, PhD
Laboratoire de Geologie de Lyon, Terre Planetes Environnement
L'Université de Lyon, Frankreich

Reconciling scales in global seismology

For more than 30 years, seismologists have used seismic waves to produce 3D images of the structure of the Earth. Despite many successes, a number of key questions still remain, which are of the uttermost importance to understand plate tectonics. The problem is that different seismic observables sample the Earth at different scales; they have different sensitivity to structure, and are usually interpreted separately. Images obtained from short period converted and reflected body waves see sharp discontinuities, and are interpreted in terms of thermo-chemical stratification, whereas seismic models constructed from long period seismograms depict a smooth and anisotropic upper mantle, and are usually interpreted in terms of mantle flow.

In this presentation, we will first show that a non negligible part of the observed anisotropy in smooth tomographic models may be artificial and the result of unmapped fine layering in the mantle, i.e. small-scale heterogeneities that cannot be resolved by long-period seismic waves. In this way, we will show that tomographic images do not represent the true Earth, but rather a smooth effective, apparent, or equivalent model that provides a similar long-wavelength data fit, but which cannot be interpret in terms of deformation. We will propose a fully probabilistic approach to explore the ensemble of small scale models equivalent to a given smooth tomographic profile. Finally, we will show how a joint interpretation of different frequency bands can allow to fully localizing the patterns of deformation in the mantle.

Das Kolloquium findet um **16 Uhr c. t.** im Seminarraum GEO 315, Corrensstr. 24, 48149 Münster statt.

Alle an dem Thema Interessierten sind hierzu herzlich eingeladen.

Die Dozenten des Instituts für Geophysik