Geophysical Research Abstracts
Vol. 18, EGU2016-16374, 2016
EGU General Assembly 2016

Estimating the buoyancy field for Earth's lower mantle using seismic and mineralogical models

Lorenzo Colli (1), Siavash Ghelichkhan (1), Thomas Chust (1,2), Gerd Steinle-Neumann (2), Nathan Simmons (3), and Bernhard S. A. Schuberth (1)

(1) LMU Munich, Geophysik, Munich, Germany (colli@geophysik.uni-muenchen.de), (2) Bayerisches Geoinstitut, University Bayreuth, Bayreuth, Germany, (3) Lawrence Livemore National Laboratory, California, USA

Many geophysical phenomena, such as mantle convection, dynamic topography, geoid undulations, and plate motions, arise as a balance between driving gravitational forces and resisting viscous stresses within the Earth's mantle. A good characterization of the present-day buoyancy field of the mantle would allow for tighter constraints on its viscosity. It is possible to derive an estimate for the present-day buoyancy field of the lower mantle using seismically-derived global tomographic models together with thermodynamically self-consistent models of mantle mineralogy. However, given the uncertainties affecting both seismic and mineralogical models, different choices can be made, which lead to different estimates. Here we explore some of the possible endmembers, looking at the different buoyancy structure they produce and the different implications they have for the dynamic Earth.