



A reference global lithospheric and upper mantle model for 2 gravity and integrated geophysical studies

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Global models of the physical properties and state of the Earth's interior have improved considerably over the past decade due to the availability of higher-quality and more comprehensive data sets, the rapid growth in computational and data processing power and the arrival of new satellite-derived datasets of global coverage. Such models, especially those focused on the lithosphere and upper mantle, have proven useful in a wide range of geophysical and geodynamic applications. Global models that integrate more than one data type (i.e. seismic, magnetotelluric, gravity, geoid, etc) are still rare. We present a global lithospheric and upper mantle model compatible with first-order seismic, thermal and petrological information, as well as with gravity anomalies, geoid height, satellite-derived gravity gradients and absolute elevation. The model is obtained via an iterative nonlinear inversion scheme in spherical coordinates and presented on a $2^\circ \times 2^\circ$ grid within the depth range 0 - 400 km depth. Relevant (prior) seismic information is included by adopting CRUST1.0 and a LAB model based on six recent seismic tomography models as prior models. We present easy-to-use codes to allow the users to extract information from the model, including the computation of contributions from the entire model (or parts of it) to gravity, geoid and gravity gradients at any point on or above the surface of the Earth.