



## **An application of GOCE satellite gravity to resolve mantle heterogeneity in Europe**

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The aim of this study is to obtain new information on the density structure of the European upper mantle by incorporating the state-of-the-art global gravity data derived from the GOCE satellite gravity mission and recently released seismic model for the crustal structure, EUNaseis.

The residual mantle gravity anomalies are derived from the GOCE data, from which gravitational effects of the deep mantle and the crust are removed. Our model of mantle density structure has lateral resolution of ca. 100 km, which allows to distinguish small-scale mantle anomalies and to link them to regional geodynamic processes.

Given a relatively small range of expected density variations in the lithospheric mantle, knowledge on the uncertainties associated with incomplete knowledge of density structure of the crust is of utmost importance for further progress in density heterogeneity studies. Therefore, we examine the propagation of crustal model uncertainties into determinations of lithospheric mantle density.

To understand better geodynamic causes of mantle density heterogeneity, we compare mantle residual gravity anomalies for the European upper mantle with upper mantle velocity structure constrained by seismic tomography. Furthermore, we compare our regional upper mantle density model with petrological studies of mantle-derived xenoliths from the Baltic shield and the Arkhangelsk region.