



A new gravity model of the upper mantle of Europe based on a joint analysis of the gravity and seismic data.

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We use new data on the lithosphere structure to estimate gravity effect of mantle density anomalies and to characterize principal factors controlling mantle heterogeneity. The gravity effect of the crust is estimated using the new model for Western and Central Europe (EuCRUST-07) (Tesauro et al., 2008). The improved residual mantle gravity anomalies and residual topography are estimated based on these data. These anomalies reflect the effect of mantle density variations, which are induced by temperature and compositional anomalies. Temperature variations in the upper mantle are then determined based on seismic tomography data. The new seismic tomography model has also been constructed taking into account the crustal structure, which helps to exclude a trade-off with mantle heterogeneities (Koulakov et al., 2008). We estimate the effects of mantle temperature anomalies on the gravity field and topography and remove it from the total fields. It provides a possibility to discover compositional density anomalies in the upper mantle. Some features of the composition density distribution, which are invisible in the seismic tomography data, are for the first time detected. One important example is a strong positive density anomaly under significant part of the Alpine fold belt, which is likely related to remnants of the lithosphere plate.