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Upper- Mantle Driven Dynamic Uplift in Central Anatolia

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Based on geological and geophysical observations and interpretations of the present-day geodynamics, we propose that mantle structures beneath the crust drive a non-isostatic component of topography in Central Anatolia. Topography residuals for the region were calculated from the isostatic component of topography according to the principle of Airy isostasy while assuming crustal block is in hydrostatic equilibrium in the mantle. For the geodynamic interpretations we ran numerous 2D thermo-mechanical models based on different temperature inputs and viscous creep strength coefficients and using available P-wave tomography data along a N-S directional profile (33oE) through Central Anatolia as an estimate on the regional mantle structure. Our models are uniformly affected by widespread NE-SW oriented mantle flow obtained in the shear-wave azimuthal anisotropy studies and predict dynamic topography based on vertical components of density–driven flow in the upper mantle mainly induced by 2D temperature variations. The dynamic topography results indicate $\sim$1 km instantaneous uplift in concordance with the under-compensated topography in the region. The data and modelling results define the region as a plateau-like uplift, slightly inflated in southern part based on dynamic topography patterns. The dynamic topography induced by upper-mantle flow provides robust new information about the main geodynamic components by showing broad consistency with independent data sets and observables for the area; such as, asthenospheric source of volcanism, gravity data, and high surface heat flow distributions.