



## **The effects of slab breakoff on the present-day (sub)lithospheric architecture beneath the Iranian Plateau**

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Despite considerable efforts in the last decades, the lithospheric structure in the Arabian-Eurasian collision zone remains poorly constrained. The lack of a reliable lithospheric-upper mantle geophysical model limits our knowledge on the tectonic evolution of the Iranian Plateau. To overcome this limitation, in this study, the 3D thermochemical structure of the Iranian lithosphere and asthenosphere is investigated. Our approach is to use an integrated geophysical-petrological modeling scheme constrained by different and complementary data sets (elevation, geoid, gravity field, satellite gravity gradients, mantle xenoliths and seismic data). In addition to the crust and lithospheric mantle, we model, thermochemically, the Neo-Tethys sublithospheric slab based on global and regional seismic tomography data and investigate its effects over existing lithospheric models with homogeneous asthenosphere. Our results suggest that the slab structure is heavily dependent on the assumed thermal structure, and less sensitive to chemical composition variations. In addition, our lithospheric-slab thermochemical model confirms the documented crustal thickening and lithosphere thinning beneath the Zagros collision-subduction zone. The present-day sublithospheric structure imaged beneath the Iranian Plateau is consistent with the recorded magmatism in the Urumieh-Dokhtar area, likely reflecting the small scale mantle convection processes that followed the detachment of the Neo-Tethys slab from the lithosphere in the Iranian Plateau.