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Lithospheric modeling in Iran and the Arabian Peninsula from gravity data including seismic tomographic data: first results.

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In this presentation we want show our lithosphere density model of a Middle East area encompassing Iran and the Arabian Peninsula, realized through a Bayesian inversion applied to an optimized density model. The starting model used for the inversion was obtained converting seismic velocities interpolated from local and global tomographies and converted in densities using a simplified version of the Brocher's relation for velocity-to-density conversion, recalculating new coefficients for the relation. This optimization was realized following a Least Squares method, inverting global gravity field data. The model was divided into five parts: water, sediment, crust, mantle, and a separate crustal layer was defined in the Red Sea zone. Specifically, the Moho depth was obtained using the vertical velocity gradient method as presented in Tadiello and Braitenberg (2021), except for the southeastern zone along the Red Sea suture, which had strong velocity anomalies at the surface, and we relied on those to model a faster intrusive body within the crust, while estimation of the density distribution in the mantle was obtained using Perple_X software. We present the final density model, resulting from the inversion, and discuss it in terms of intra-crustal densification and relation to surface magmatic outcrops, finding that correlations can be identified. These demonstrate the presence of deep-seated crustal density variations which relate to geological provinces identified from surface investigations. A further point to discuss is the rheological properties obtainable from the joint velocity and density model and the relation to the inhomogeneous distribution of seismicity.