

# The Zagros Collisional Zone: An example of the interplay between shallow and deep structures

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## Abstract

IUGG23-1866: The Zagros Collisional Zone: An example of the interplay between shallow and deep structures

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Subduction of the Neotethys Ocean resulted in collisions of continental plates, with formation of Cenozoic orogens. The different shapes and structures of various segments of these young orogens, such the Zagros Collisional Zone, suppose a complex interplay of shallow and deep structures, producing different degrees and styles of deformation. As part of the PRIN 2017 project, we analyze several types of recently acquired data (e.g., seismic tomography models of the crust and upper mantle, Moho depth, seismicity distribution, and surface topography). We find that the NW and central Zagros is characterized by a zone of thickened crust of variable width and overlain by topography that exhibits large height variations over small distances, in the central part of the collisional zone. These variations are accompanied by sharp lateral changes in the number of seismic events and velocities/temperatures at depths of ~100 km.

We attribute these observations to relamination processes (i.e., the detachment of Arabian crust from the subducting lithospheric mantle and its underthrusting beneath the crust of the overriding plate), which are controlled by the variable geometry and stiffness of the overriding and subducting plates. This hypothesis is tested by performing a series of numerical experiments, using the numerical code I2VIS [1], that simulates relamination processes, occurring during continental collision. The consistency of the results is also verified through forward models of the static gravity field of the modelled structures, which are compared with the present-day observed gravity.

## References

[1] Gerya, T.V., 2019. Cambridge University Press. ISBN 978-0-521-88754-0.