



## **A balanced cross-section across the seismogenic fault system of the 2017 Mw 7.3 Iran-Iraq earthquake**

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The 2017 Mw 7.3 Iran-Iraq earthquake occurred in a region where limited information is available on the seismogenic structures. In this contribution we combine interpretation of seismic reflection profiles, well data, and geological observations, to build a regional balanced cross-section that provides a picture of the geometry and dimensional parameters of the faults in the hypocentral area. Our results indicate: (1) coexistence of thin- and thick-skinned thrusting, (2) reactivation of inherited structures, and (3) occurrence of weak units promoting heterogeneous deformation within the Paleo-Cenozoic sedimentary cover sequence and partial decoupling from the underlying basement. We show that the main shock of the seismic sequence is located within the basement, along the low-angle Mountain Front Fault. Aftershocks unzipped the up-dip portion of the same fault. This merges with a detachment level located at the base of the Paleozoic sequence, to form a crustal-scale fault-bend anticline. Size and geometry of the Mountain Front Fault are consistent with a down-dip rupture width of 30 km, which is required for an Mw 7.3 earthquake.