

Characterization of active fault behavior in Eastern Iran for a realistic seismic hazard assessment, combining geodesy (GPS and InSAR), tectonics and modeling

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The current deformation in Iran basically results from the northward motion of Arabia with respect to Eurasia, at a velocity of about 25 mm/yr. This overall northward motion produces a 15 mm/yr northward displacement of Central Iran with respect to Eurasia. This differential motion is accommodated by (1) right-lateral shear on N-striking faults at both the eastern and western borders of the Lut block as well as on other NW-trending faults nearby, and (2) left-lateral motion on E-striking faults, mainly the Doruneh and Dasht-e-Bayaz faults at the northern margin of the Lut block. The residual motion north of the Doruneh fault is about 5 mm/yr directed to the north. It is taken up by strike-slip faulting and shortening in the Binalud and Kopeh Dagh mountains, and leads to the westward extrusion of the South Caspian Basin by right-lateral slip on the Ashkabad (Main Kopeh Dagh) fault to the north and left-lateral slip on the Shahroud fault system to the south. Recent geological studies have greatly improved our understanding of active faulting in the region. Following the establishment of the first order geodetic measurement networks that provided the regional, current deformation pattern in NE Iran, we proposed to study in more detail some of the major active faults in the region, as those faults pose a great seismic hazard to the populations. We have selected two of those major active faults, namely the Doruneh fault and the Baghan-Quchan fault systems. We concentrated a multi-disciplinary approach on those target-faults to get a better, more quantitative knowledge of their seismogenic potential, as to better understand their contribution to the overall kinematics (current and long-term) in eastern Iran.

