

Active Faulting and Tectonics of Eastern Iran

By

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Eastern Iran is a region of rapid active tectonics, with abundant strike-slip and thrust faulting that poses a serious seismic hazard to local populations. However, little is known about Late Tertiary and present-day slip-rates of the many active faults.

The first aim, therefore, is to determine cumulative offsets across the major strike-slip faults, by restoration of drainage networks, geomorphic features, and bed-rock lithologies cut by the faults. This provides an estimate of the Late Tertiary to Recent strain distribution, which is important, both for an understanding of Iranian tectonics and for potential seismic hazard.

A second aim is to use the interactions between fault movement and surface geomorphology, exceptionally preserved in the arid desert climate, to investigate the development of strike-slip and thrust fault systems through the Quaternary. This gives insight into the ways in which the faults grow and evolve. Understanding how faults develop in Iran has relevance to other regions of active continental shortening and strike-slip deformation, where surface indications of faulting might be less well preserved.

Satellite imagery, aerial photography, and digital elevation models (DEMs) are used to identify indications of active faulting. Where we have studied the surface geomorphology of a fault, earthquake seismology provides insight into the nature of the faulting at depth. By showing how subsurface faulting can drive surface deformation, we can look for evidence of active faulting in regions not known to be at risk from earthquakes. This again has importance for potential seismic hazard.