



Quaternary slip rate on the Kuh Banan strike-slip fault system, Southeast Iran, inferred from geomorphic features and geodetic measurements

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The NW-SE to WNW-ESE striking Kuh Banan fault system, extending about 280 km, is one of the largest strike-slip faults in southeast of Iran. As a major active right-lateral strike-slip fault, it plays an important role on the rotation of central Iranian blocks in accommodating $\sim 22 \text{ mmyr}^{-1}$ northward shortening caused by the Arabia-Eurasia convergence. This shortening is dominantly represented as N-S right-lateral shear between central Iranian blocks. The Kuh Banan fault system is composed of a series of right-stepping strike-slip segments with an en-echelon pattern. Between the southeastern segment of the Kuh Banan and the northwestern segment of the left-stepping Gowk strike-slip fault systems, mountain ranges bounded by several active nearly E-W to WNW-ESE cross-thrust/reverse faults and folds.

The Kuh Banan fault system has been associated with five 20-21st centuries medium-magnitude earthquakes (M_s 5-6.2) and at least six catastrophic historical earthquakes. In addition, the cross-thrusts were associated with at least five clusters of medium-magnitude earthquakes. However, the total cumulative displacement and slip rate of the Kuh Banan fault system is still unknown. We document and compare the geologic and geodetic slip rate of the fault, based on tectono-geomorphic interpretation of satellite remote sensing images combined with field studies and GPS experiment. Our results show that the largest cumulative offset of the Kuh Banan fault system is likely $\sim 3.6 \text{ km}$ during Pleistocene-Holocene. A minimum slip rate of $\sim 2\text{-}1.4 \text{ mmyr}^{-1}$ has

been estimated from the lateral stream offsets and incised alluvial fans. This long-term slip rate is nearly consistent with the present-day GPS measurement of $\sim 4 \text{ mmyr}^{-1}$. The average interval between large-magnitude earthquakes on the Kuh Banan fault system will be $\sim 170\text{-}240$ years.