



Quaternary offset and evolution of a major active strike-slip fault system: Kuh Banan fault, central Iran

M. Shahpasandzadeh (1), A. Shafeyi Bafti(2)

(1) International Institute of Earthquake Engineering and Seismology, Tehran, Iran, (2) Islamic Azad University, Tehran, Iran (m.shahpasand@iiees.ac.ir / Fax: +98-21-2229-9479 / Phone: +98-21-2283-1116)

Most of seismic activities in central Iran have been concentrated among various tectonic blocks, known as Yazd, Tabas, and Lut blocks. As the western boundary of the Lut block with more than 300 km length, Kuhbanan fault has caused several catastrophic earthquakes. Drainage reconstruction has been used to estimate long-term offset on the Kuh Banan fault as a major oblique right-lateral strike-slip fault system. A 0.75 km horizontal offset is inferred from well preserved geomorphology in the northern segment of the fault since 360 ka. Similarly, a total cumulative offset of ~ 3.66 km is identified in the middle segment of the fault since 1.1 Ma. This cumulative offset produces a constrain reconstruction of geomorphology across the fault, restore rivers to linear courses across the fault trace, aligning structural features and filling in pull-apart basins.

The geomorphic evolution of the fault zone at the surface includes both reverse and strike-slip faulting components. According to the stratigraphic ages of offset Pliocene-Pleistocene conglomerates, a minimum slip rate of $\sim 3.3\text{-}1.4$ mmyr^{-1} is suggested as the long-term slip rate of the fault. In addition, an overall denudation rate of $\sim 2\text{-}4$ mmyr^{-1} is derived from calculation of geomorphic indices and detailed field studies. The well correlation between denudation rates and seismicity of the area is consistent with the seismological data and surface rupture evidences in recent earthquakes.