



## **Seismicity of SE of central Iran, Kuhbanan fault: an intra-continental strike-slip fault system**

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Most of seismic deformation of central Iran has been concentrated among various tectonic blocks, known as Yazd, Tabas, and Lut blocks. Due to overall Arabia-Eurasia convergence, about  $20\text{-}25 \text{ mmyr}^{-1}$  of the present-day shortening in central Iran is dominantly represented as N-S shear. This shortening involves oblique right-lateral and convergent motion, is achieved by a complex configuration of strike-slip and reverse fault systems.

As the western boundary of the Lut block with more than 300 km length, Kuhbanan fault has caused several catastrophic earthquakes. The Kuhbanan fault has been associated with three earthquakes of  $M_w = 5.9\text{-}6.4$  in the 20-21<sup>st</sup> centuries as well as at least five catastrophic historical earthquakes. As the recent seismic activities of this fault, the 22 February 2005 Zarand ( $M_w$  6.4) earthquake ruptured about 10 km of the Kuhbanan fault with an average vertical uplift of  $\sim 80$  cm but with surface displacements up to 110 cm in places. Analysis of long-period seismic body waves shows that the earthquake ruptured a reverse fault dipping north at  $\sim 110^\circ$  to a depth of about 14 km. Two earlier large earthquakes of the 19 December 1977 Bob-Tangol ( $M_w$  5.9,  $I_0 \sim \text{VII}^+$ ) and 28 November 1933 Behabad ( $M_w$  6.5) devastated various segments of the fault. The 1977 Bob-Tangol earthquake occurred not far from the region where the 1896 and 1933 earthquakes occurred; The 1977 Bob-Tangol earthquake was associated with about 19.5 km of surface ruptures north of Zarand, and vertical and right-lateral displacements of up to 7 and 20 cm, respectively. The much larger 1933 Behabad earthquake produced about 10 km of discontinuous right-lateral surface rupture. This devastating earthquake was followed by the earthquake of 24 May 1978 on the west of Behabad. Among documented historical earthquakes, the 27 May 1897

Qobeh-e-Sabz ( $M_w 5.4$ ,  $I_0 \sim VII^+$ ) earthquake, the 27 May 1896 Chatrud ( $M_w 5.3$ ,  $I_0 \sim VII$ ) earthquake, the May 1875 Kuhbanan ( $M_w 6$ ,  $I_0 \sim VII^+$ ) earthquake, the 4 August 1871 Chatrud ( $M_w 5.9$ ,  $I_0 \sim VII^+$ ) earthquake, and the 17 January 1864 Chatrud ( $M_w 5.9$ ,  $I_0 \sim VII^+$ ) earthquake constitute the prominent events of Kuhbanan fault activities.