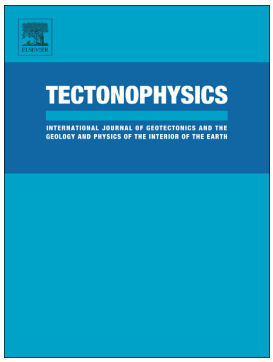

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Hematite (U-Th)/He thermochronometry constrains intraplate strike-slip faulting on the the Kuh-e-Faghan Fault, central Iran

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Abstract

The Kuh-e-Faghan strike-slip fault system (KFF), located to the northern edge of the Lut Block in central Iran, developed through a Neogene-Quaternary pulsed history of eastward fault propagation and fault-related exhumation. This system is a consequence of the residual stresses transmitted from the Arabia-Eurasia convergent plate boundary. Here we integrate structural and textural analysis with new and previously published apatite fission-track (AFT) and apatite (U-Th)/He (apatite He) results, chlorite thermomentry, and hematite (U-Th)/He data from hematite-coated brittle fault surfaces to constrain the timing of tectonic activity and refine patterns of late Miocene-Pliocene burial and exhumation associated with the propagation of the KFF. Twenty-nine hematite (U-Th)/He (hematite He) dates from three striated hematite coated slip surfaces from the KFF fault core and damage zone yield individual dates from ~12-2 Ma. Petrographic analysis and chlorite thermometry of a polyphase, fossil fluid system in the KFF fault core document that fluid circulation and mineralization transitioned from a closed system characterized by pressure solution and calcite growth to an open system characterized by hot hydrothermal (T = 239 ± 10 °C) fluids and hematite formation. Hematite microtextures and