



Understanding long-term strain accommodation in the Longmen Shan region: Insights from 3D thermo-kinematic modelling of thermochronometry data

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The Longmen Shan marks the steep eastern margin of the Tibetan Plateau and three parallel NW-dipping fault zones define its structural geometry. From foreland (southeast) to hinterland (northwest), the main faults are the Guanxian-Anxian fault, Yingxiu-Beichuan fault and Wenchuan-Maowen fault. The exhumation pattern constrained by 1-dimensional modelling made from a compilation of published and unpublished thermochronometry data shows a strong structural control, with highest amounts of exhumation in the hinterland region, a pattern that is characteristic of out-of-sequence thrusting (Tian et al., 2013, *Tectonics*, doi:10.1002/tect.20043). 3-dimensional thermo-kinematic modelling of these data suggests that the listric Longmen Shan faults merge into a detachment at a depth of ~ 20 -30 km. The models require a marked decrease in slip-rate along the frontal Yingxiu-Beichuan in the late Miocene, whereas the slip-rate along the hinterland Wenchuan-Maowen fault remained relatively constant. These results reveal the long-term pattern of strain accommodation and have important implications for hazard risk assessment in the region. Further, the out-of-sequence thrusting architecture highlights the importance of upper crustal shortening and extrusion in forming this plateau margin.