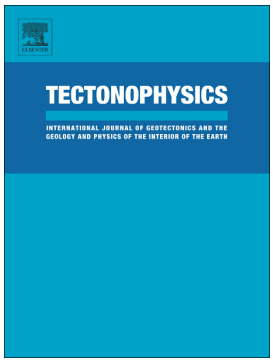

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Re-evaluating seismic hazard along the southern Longmen Shan, China: insights from the 1970 Dayi and 2013 Lushan earthquakes

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Abstract

Competing hypotheses have been proposed to explain the seismic hazard (i.e. whether earthquakes with $M \geq 7$ occur) of the southern Longmen Shan (LMS). This region did not rupture during the 2008 M_w 7.9 Wenchuan earthquake, but later generated the 2013 M_w 6.6 Lushan earthquake. Currently, the maximum possible earthquake magnitude, its average recurrence interval, and the seismogenic structure of the southern LMS, remain poorly documented. This study aims to re-evaluate seismogenic structures and seismic hazard along the southern LMS. We first describe the sub-surface structural geometry, as well as the total slip and Quaternary activity of the Range Front blind thrust (RFBT), using high-resolution seismic reflection profiles, borehole data, and intensity-derived macroscopic epicenters. This thrust, which generated the 1970 M_s 6.2 Dayi and 2013 M_w 6.6 Lushan earthquakes, extends for more than 250 km along the LMS range front. Integrating new evidence of active faulting and folding and previous quantitative horizontal shortening rate results, we estimate that the Quaternary slip rate of the RFBT is nearly 1 mm/yr,