

## Rupture structures produced by the 1850 Xichang M 7.5 earthquake and its implications for the Tibetan tectonics

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Studying on the deformation characteristics of co-seismic surface ruptures produced by large historical earthquakes occurred in the eastern margin of the Tibetan Plateau provides important information for further accessing the faulting behavior and seismic hazard as well continental deformation modes associated with the eastward extrusion of the Tibetan Plateau. The eastern margin of the Tibetan Plateau is bounded by a north-south trending fault zone, which is composed of three major active faults, the Anninghe Fault, the Zemuhe Fault and the Xiaojiang Fault and extends for more than 700 km. There are historical and instrumentally-recorded large earthquakes occurred on this fault zone. The 1850 M7.5 Xichang earthquake is one of the most recent large earthquakes occurred on the Zemuhe Fault, which resulted in 20650 deaths and wide spread damage around the Xixiang City. Field investigations and interpretations of aerial photographs reveal that a surface rupture zone produced by the 1850 earthquake for 60 km occurred along the pre-existing Zemuhe Fault for 60 km long. This co-seismic surface rupture zone is mainly composed of en echelon fractures, mole tracks, and fault scarps which are distributed in a zone of less than 100 m. Systematical offset gullies preserved on the lowest terrace risers and the youngest alluvial fans indicate that the co-seismic left-lateral offsets vary from 1.4 m to 6.0 m with vertical components of 0.2-0.6m. Deformation structures and topographic features indicate that the Zemuhe fault is a left-lateral strike-slip fault with minor thrust component. This study demonstrates that the north-south trending active fault zone located in the eastern margin of the Tibetan Plateau play an important strike-slipping role in east-southeastward moving of the Tibetan Plateau.