



Fault Activity, Seismicity and GPS Deformation of the Seismic Gap along the Red River Fault Zone (RRFZ) in Yunnan, China

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Along the middle segment of the NW-trending and dextral-slip Red River fault zone (RRFZ), also the Honghe fault zone, Yunnan, China, there has been little of modern seismicity since the 1970's. Some Chinese researchers believed that this fault segment is inactive in the late Quaternary. However, more and more evidence shows that the middle segment of RRFZ is geologically-active in the late Quaternary, even is a Holocene-active one with evidence of paleo-earthquakes occurring. Our study suggests that along the fault segment there has been no any major earthquake occurring for over 500 years at least, and a large-scale seismic gap, the Honghe seismic gap, have formed there. On the modern seismicity, the middle segment of RRFZ has presented as a fault portion without or with very few small earthquakes occurring since the 1980's, but surrounded by several areas with low b-values, suggesting relatively high stress having built-up there. Also, GPS deformation analysis suggests that this fault segment has tightly locked already. Such tight locking would be associated with the fault geometry: A large-scale restraining bend of about 30° over a distance of ~100 km exists along the main fault trace along RRFZ between Yuanjiang and Yuanyang. However, how such a restraining bend makes the middle segment of RRFZ have tightly locked? How much strain has built up there? Moreover, how about the long-term seismic potential of major earthquake on the middle segment of RRFZ, and on some secondary active faults of the two sides of the segment, especially on the parallel faults Chuxiong, Qujiang and Shiping. All these are issues we want to study further.

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