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Segmentation of the Yushu Fault Associated with the 14 April, 2010 Yushu Earthquakes, Qinghai Province, China

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Mapping of surface-rupture features and fracture-sets near suspected segment-breaks, coupled with trenching and OSL/¹⁴C dating, indicates that the Yushu fault has 4 segments from NW-SE with left step-overs between the Dangjiang-Longbao and Guoqiong segments and between the Zuoerla and Changu segments which are consistent with published remotely sensed data and geophysical data from the earthquake swarm. Although the Dangjiang-Longbao segments previously ruptured in 1738 AD and in 2010 AD, previous surface-ruptures along the Guoqiong, Zuoerla, and Changu segments are consistent with less frequent surface-ruptures on the order 1500-3000 years between events. The present status of known offsets and retro-deformation of features based on trenches and ages is consistent with no evidence of pre-Holocene activity on these segments. The change of trend of the Changu segment and the absence of left step-overs to the SE toward the Ganzi fault (which ruptured 1986) may signal a redistribution of strain along the Yushu fault during the Holocene to the last few hundred years.

Key words: fault segmentation, OSL/¹⁴C dating, recurrence interval, Holocene Yushu fault

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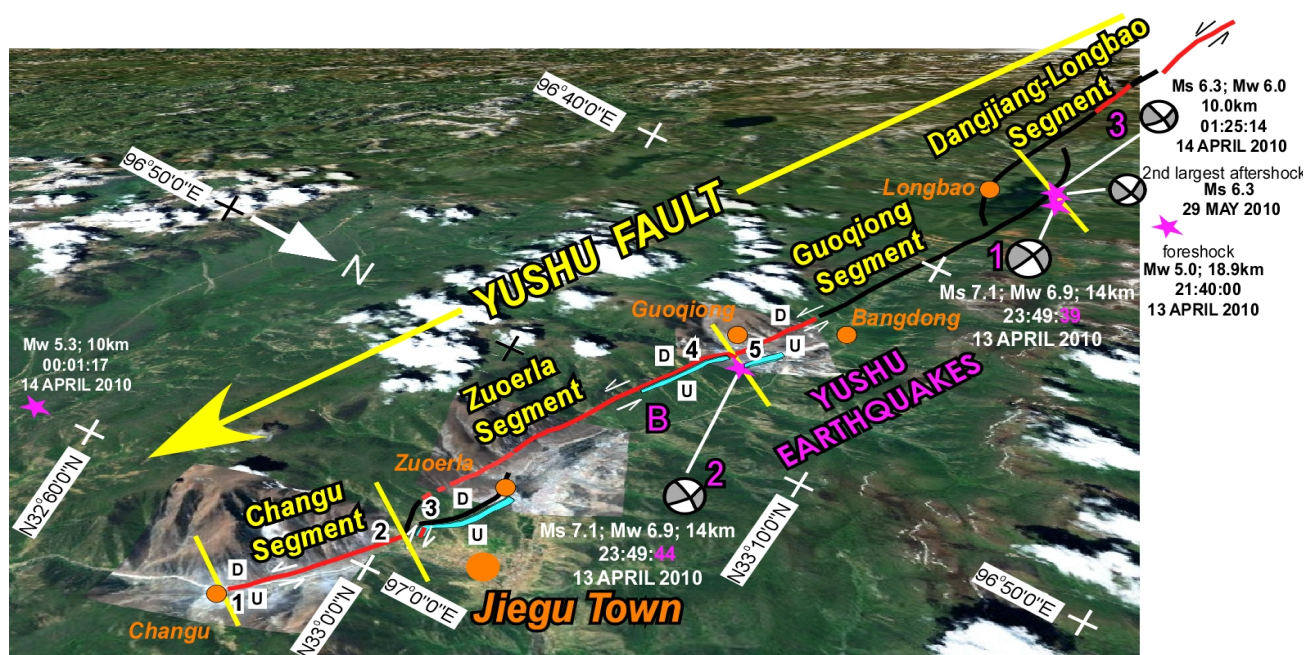


Fig. 1 The four identified segments (this study) of the Yushu fault are related to three of the Yushu earthquakes that produced the 2010 surface ruptures (red lines). Surface ruptures from Bartholomew et al. (2010), Chen et al. (2010), Li et al. (2010), Lin et al. (2011), Armstrong et al. (2012), Feng, et al. (2012), Guo et al. (2012); the 3 major Yushu earthquakes (violet numbers 1, 2, 3) and other epicenters (violet stars) (from Ni et al., 2010; Zhang et al., 2010; Pei and Chen, 2012); and communities (orange) are shown on the DEM of Yushu area with three Quickbird images draped over it. Localities (black) 1, 2, 3, 4, and 5 are those discussed in this presentation.