

## Internal structures and high-velocity frictional properties of Longmenshan fault zone: the current status of researches

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Disastrous Wenchuan earthquake (12 May 2009, Mw 7.9) was accompanied by surface ruptures of about 280 km in EW extension mostly along existing Longmenshan fault system (e.g., Lin et al., 2009, Tectonophysics). Wenchuan Earthquake Fault Scientific Drilling (WFSD) has started about two years ago under the leadership of Z. Xu and this was the third rapid drilling into seismogenic fault immediately after a large earthquake, following the drilling into the Nojima and Chelungpu faults. Compared with the latter two, a big advantage of studying the Longmenshan fault system is that deep exhumed fault zones such as low-temperature mylonites are exposed on surface (e.g., Xu et al., 2008, Episodes). One has a chance to construct a fault model for shallow to deep portions of the fault by combining studies of coseismic surface ruptures, shallow drill cores and exhumed fault rocks that formed at depths. WFSD drilling is still underway although initial results from series researches were reported at AGU fall meeting in 2010. Unfortunately, however, WFSD drill cores are not released for physical property measurements as yet. Thus Institute of Geology, CEA drilled five shallow holes into the Beichuan-Yingxiu fault and studied fault zones at several surface outcrops. We report here internal structures of fault zones as studied at Hongkou, Pingxi and Xiaoqiaqiao outcrops and from Shenxigou shallow drill core. All gouge from those fault zones exhibit dramatic slip weakening at high velocities and we compare experimental results for fault gouges from those locations to delineate heterogeneity in frictional properties of faults. Fault gouge exhibits considerable variation even from the same fault outcrop. WFSD data will be included if cores are available in the near future.

Keywords: Longmenshan fault, Wenchuan earthquake, Fault rheology, High-velocity friction, Fault rock, Earthquake mechanism