

## Microstructure and heterogeneity of the Chelungpu fault revealed by Taiwan Chelungpu fault Drilling project (TCDP) Hole C cores

Kuniyo KAWABATA, National Central University, Taiwan

The Chelungpu thrust fault is an active fault having generated earthquake the 1999 Mw7.6 Chi-Chi earthquake. The Taiwan Chelungpu fault Drilling project (TCDP) drilled two vertical holes (Hole A and B) and one side-track hole from Hole B (Hole C). The samples from Hole C preserve whole structures including a possible primary slip zone and other older slip zones. Identification of the slip zone of a recent earthquake is important to understand slip mechanism with combining seismological and geological data. In this presentation we show microstructure and chemical composition of the fault zone and discuss its heterogeneity on the fault surface by comparing the Chi-Chi principle slip zone (PSZ) in Hole C with those in Hole A and B.

The 12 cm-thick Hole C fault zone is divided into thin 16 layers made of gouges composed of quartz, feldspar and clay minerals. Results of microstructural observation suggest that 2 cm – thick lowest layer in the 12 cm fault zone is related to Chi-Chi earthquake and its PSZ is located within a thin 2mm zone with adjoining drag structure.

Comparing our results from Hole C samples with previous studies on the holes A and B, it appears that the PSZ activated by Chi-Chi earthquake is heterogeneous on the fault zone. PSZ in Hole B is also 2 mm-thick and showed a layered structure with very fine grains (Aubourg et al., 2010 presentation in WPGM T33B-03; Chou et al., 2010 poster in WPGM T31A-061). In contrast, PSZ in Hole A is 2 cm-thick and shows random fabric (Boullier et al., 2009). These structures are comparable to those obtained by high velocity rotary shear experiment under not water saturated condition (Ujiie et al., 2010 presentation in JPGU SSS019-15; Boutareaud et al., 2008) where thermal pressurization occurred in the slip zone. From the observations of the PSZ in the three holes, we discuss the slip zone heterogeneity by thermal pressurization model applying to the observed different microstructures to understand the possible dynamic mechanism of faulting for a large slip.