

Structural observations of the major thrust fault zones encountered in Taiwan Chelungpu-fault Drilling Project

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The Taiwan Chelungpu-fault Drilling Project has penetrated through two fault zones at depths 1111m and 1153m (FZ1111 and FZ1153), whose depths and fault plane orientations coincide with the estimated Chelungpu fault plane obtained from seismological analysis and field observations. Here we attempt to depict the internal structure of these major thrust fault zones by summarizing our onsite visual core inspections.

The observed orientations of the two fault planes were roughly parallel to the bedding plane of the adjacent host rocks (North-South strike and 30 degrees dip) suggesting a bedding-parallel slip within the Chinshui Shale. By passing through the fault zones from the hanging wall side, both fault zones are roughly characterized by a wide zone of fractured rocks (15-25 m), thin zone of intensely fractured rocks (1 m), deformation localized zone (1-1.5 m), and a less intensely fractured rocks compared to the hanging wall side (thickness yet undefined).

Some differences were observed within the deformation localized zones by means its fault rock component. Soft light gray clayey fault gouge was dominant within FZ1111, whereas, a thick zone (1m) of rather sandy foliated breccia existed above the clayey fault gouge in FZ1153. However, the two fault zones were both accompanied by some layers of unknown black material, at either the top or the bottom of the deformation localized zones.

Inspecting the internal structure would be critical in judging the slip planes produced by fault motions, and thus, also critical in arguing the relation between experimentally determined properties of the fault rocks and the observed fault motion.