

Preliminary results of core descriptions of Taiwan Chelungpu-fault Drilling Project

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We summarize the variations of lithology, bedding dip, structure attitude and fracture density with the depth between 500m and 1800m and the locations of fault zones in this preliminary result for general core description.

Based on the lithology, the boundaries between the Cholan Formation, Chinshui Shale and Kueichulin Formation are roughly at 1027m and 1290m, respectively. Deeper contacts between formations can not be determined easily by our lithology column. Most bedding dip is 30°. Based on the attitude (dip direction/dip) and the sense of shear, five different structural groups can be identified as: thrust (105/20-60), left-lateral fault (015/30-80), right-lateral fault (195/30-80), backthrust (285/30) and normal fault (105/5-10). From the orientation statistics, the number of structures with the thrust orientation is highest.

Nine fault zones between 500 and 1800m are observed. Four shallower fault zones are within the Chinshui Shale. For the thrust of Fault Zone 1111 (FZ1111) and FZ1153, the grain size of hanging wall is finer than that of foot wall. The feature of lithology is opposite in the FZ1222 (sinistral fault with normal shear), i.e. the grain size of hanging wall is coarser. For FZ1241 (backthrust), it looks like creep deformation without distinct gouge. The FZ1111 and FZ1153 are the candidates of the fault zone which slipped during Chi-chi earthquake according to the location and deformation structure. Slickenside with a rake of 70° SW on the fragile black material within the bottom of FZ1111 is observed. The orientation of this slickenside set is consistent with slip direction from seismic data inversion, suggesting the black material could be the product of slip deformation during Chi-chi earthquake. The deeper five fault zones (deeper than 1500m) are located in a spacing of rough 50m. Also, they are usually developed within the lithology with finer grain size and closed to the lithology boundary. These five fault zones include thrust faults and strike slip faults.