XRD Analyses of core samples at Taiwan Chelungpu-fault Drilling Project(TCDP) Hole B

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Chelungpu-fault was slipped at the 1999 Taiwan Chichi earthquake (M7.6). Taiwan Chelungpu-fault Drilling Project (TCDP) was conducted to elucidate several subjects including slip mechanism, deformation structures, thermal history and fluid circulation. Two deep drillholes (Hole A and Hole B) penetrates Chelugpu fault. Core samples were recovered from Hole B between 950m and 1300m depth. The samples were provided for non-destructive analysis at Kochi institute for core sample analysis, JAMSTEC.

The lithology in hole B is intercalated sand stone and silt stone (950m - 1043m depth), silt stone characterized by abundant fractures and deformation structures (1043m - 1280m depth) and silty to sandy rocks characterized by bioturbation (1280m - 1350m depth) in descending order. Three fault zones (FZB1136, FZB1194, FZB1243) were recognized and characteristic fault rocks such as black gouge, white gouge and black material disks were observed, (Hirono et al., GRL 2006).

We conducted XRD analysis to clarify the mineralogical characteristics. For the bulk analysis, the samples were collected at every one meter. Quartz, felsdapr are main constituent minerals and mica, chlorite, carbonate minerals (calcite, dolomite and siderite) are accessory minerals. The mineral assemblages are almost the same, however, carbonate contents are characteristically decreases in the fault zone.

116 oriented samples were prepared for the analysis of clay minerals. Clay minerals are transformed more easily due to environmental changes than the other silicate minerals. Montmorillonite, chlorite and mica were detected in almost all samples. Kaolinite are considered to be present since the peak at 25 degrees (two theta angle of Cu-Ka radiation) can be separated to two peaks, which are kaolinite (002) peak and chlorite (004) peak. The assemblages were almost the same except three fault zones, where, the contents of chlorite, montmorillonite and kaolinite were decreased.

Some of the clay minerals are of detrital origin and the others are results of diagenesis and/or alteration. It is possible that the clay minerals were decomposed during faulting activity considering that the such changes are observed only at the fault zone. The occurrence of the clay minerals must be examined more fully.