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Variations of clay content and anisotropy of physical properties of fine grain material in proximity of an active fault, example of the northern part of Chelungpu fault (Taïwan).

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Core data collected from the Hole-B of the Taiwan Chelungpu-fault Drilling Project (TCDP) are analyzed to establish the physical and chemical influences of this active fault on surrounding rocks, far from and inside the fault zone, except the gouge zone. Our study focuses on two of the three major faults zones; FZB1136, FZB1194. Anisotropy of magnetic susceptibility (AMS), anisotropy of anhysteretic remanent magnetization (AARM) and anisotropy of P-wave velocity (APV) were measured on core samples retrieved from Hole B between 1068 to 1310 meters deep. Two different facies were sampled: siltstones from the damage zone and sandstone and siltstone from the relatively undeformed area. Our data show that the AMS was similar for most of the samples regardless of facies and proximity to faults, with a magnetic fabric characteristic of weakly deformed sedimentary rocks that have undergone layer parallel shortening. Only the samples near FZB1136, assumed to be rupture zone of the 7.6Mw 1999 Chi-Chi earthquake, have a specific signature with respect to the magnetic properties. In the siltstone, both AARM and AMS show similar fabrics meaning that there are no differences between paramagnetic and ferromagnetic mineral distribution. In contrast the P-wave velocity anisotropy in the TCDP samples are correlated with the facies and linked to microcrack distribution and porosity in sandstones. Both AMS and APV results indicate that the microstructural attributes are correlated with

long term type of deformation. XRD was performed on all the samples for the whole-rock and oriented clay fraction. There is great similarity for all samples for each type of curve whatever the distance to the gouge zone, showing no variation in the mineralogical content of the rock samples. The variation in clay contents (smectite, illite, chlorite and kaolinite) along the coring is very low, and seems not to be related to the action of the faults.

We believe these results will contribute to the understanding of the physical and mineralogical changes associated to nearby strain localization, as well as of the interplay between long range and highly localized deformation.