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eEarth, 3, 1-6, 2008

www.electronic-earth.net/3/1/2008/

doi: 10.5194/ee-3-1-2008

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Characteristics of chlorites in seismogenic fault : the Taiwan Chelungpu Fault Drilling Project (TC core sample

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Abstract. The iron content and the asymmetry of iron and magnesium in chlorites are examined for the Chelungpu Fault in Taiwan, which is a seismogenic fault. The samples are collected from the cores drilled in the Taiwan Chelungpu Fault Drilling Project (TCDP, borehole B). Three fault zones are recognized as candidates for the source of seismogenic materials. The fault zones are composed of fractured-damaged rock breccia, gray gouge, black gouge, and black material. Chlorite from each type of rock was analyzed by using X-ray diffraction (XRD). The iron content and asymmetry of the iron and magnesium ions in the chlorites were estimated from the XRD peak ratios. The hydroxide and silicate layers in chlorite in the black gouge and black material have low iron content. Previous studies have suggested that a temperature rise occurred at the fault



zones. In addition, the temperature rise can result in the production of iron-bearing oxides such as magnetite or maghemite, as reported by other studies. However, the temperature rise cannot explain the low value of iron content in the chlorites. Another reason for the low value of iron content is the variation in the pH of the fluid, which can be controlled by radical reactions. Therefore, on the basis of chlorite characteristics, the reactions at a seismogenic fault are due not only to the thermal decomposition reactions from the temperature rise and but also to rock-fluid interactions.

▣ [Final Revised Paper](#) (PDF, 3114 KB) ▣ [Discussion Paper](#) (eED)

Citation: Hashimoto, Y., Tadai, O., Tanimizu, M., Tanikawa, W., Hirose, W., Lin, W., Mishima, T., Sakaguchi, M., Soh, W., Song, S. R., Aoike, K., Ishikawa, T., Murayama, M., Fujimoto, K., Fukuchi, T., Ikehara, M., Iizumi, K., Kikuta, H., Kinoshita, M., Masuda, K., Matsubara, T., Matsubayashi, M., Mizoguchi, K., Nakamura, N., Otsuki, K., Shimamoto, T., Sone, H., and Takahashi, M.: Characteristics of chlorites in seismogenic fault zones from the Taiwan Chelungpu Fault Drilling Project (TCDP) core sample, *eEarth*