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Alteration minerals and alteration condition in the borehole core penetrating the Median Tectonic Line

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Analysis of internal structure of the Median Tectonic Line (MTL), the largest in-land fault in Japan, may improve our understandings on the crustal faulting at various depths. AIST drilled a borehole penetrating the MTL for predicting Nankai-Tonankai Earthquake at Iitaka-Ako, Matsuzaka, Mie prefecture. The drilling length is 600m. It crosses MTL at the depth of 474m. Hangingwall of the MTL consists of Ryoke-derived tonalitic mylonite and footwall of the MTL consists of fractured rocks derived from Sambagawa metamorphic rocks. The hangingwall mylonite includes strongly deformed zones at the depth intervals of <160-286m, 330-370m and 450-474m. Ryoke-derived tonalitic mylonite suffers later cataclastic deformations. Stress history during the exhumation is being revealed by the multiple inverse method (Shigematsu et al., oral presentation in this meeting).

We analysed X-ray diffraction patterns of powdered samples derived from Iitaka-Ako borehole to identify alteration minerals. Chlorite, laumontite and calcite are main alteration minerals in the Ryoke belt above about 400m depth, while alteration is less intense and analcine and stilbite occur as zeolite minerals instead of laumontite between 400m and 474m depth. Fractured rocks and fault gouge just below MTL are composed of various minerals including quartz, plagioclase, mica, calcite, analcime, stilbite, saponite and serpentine. Cataclastic deformation may occur under the temperature conditions around 200 degrees centigrade considering laumontite occurs at the depth of fault planes.

Keywords: Median Tectonic Line, Fault, Borehole core, Hydrothermal Alteration