

Preliminary report on the analysis of the borehole core penetrating the Median Tectonic Line 2

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We analyzed X-ray diffraction patterns of continuous core samples retrieved from the Iitaka-Ako borehole drilled by Geological Survey of Japan, AIST, to elucidate the hydrothermal activity around the Median Tectonic Line (MTL).

The borehole reached 600.0 m and penetrated the MTL at a drilling depth of 473.9m. 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 450-474.9m and 330-370m. These two intervals suffer rather intense alteration comparing to the neighboring zone. Calcite and zeolite (laumontite and stilbite) abundantly occur as vein minerals at the depth interval of 330-370m, while, zeolite is absent, calcite is less abundant and prehnite occurs at the depth interval of 450-474.9 m. The footwall gouge zone includes smectite and laumontite.

In active geothermal areas, smectite occurs in the temperature range less than 150 C, laumontite occurs in the temperature ranges between 100-150 C, and prehnite occurs in the temperature range higher than 250 C (e.g., Henley and Ellis, 1983). This suggests that the distribution of alteration minerals in Iitaka-Ako core samples is controlled by alteration temperature. The difference between the two depth intervals is possible to be result from the paleo geothermal gradient. The activity of the MTL might affect the difference in alteration minerals between hangingwall and footwall.