Japan Geoscience Union Meeting 2013
(May 19-24 2013 at Makuhari, Chiba, Japan)

SSS25-P04 Room:Convention Hall Time:May 21 18:15-19:30

A stress estimation using calcite twin piezometer of fault rock derived from the Ryoke belt along MTL, SW Japan

Nobuaki Tanaka[1*], Koichiro Fujimoto[1], Norio Shigematsu[2]

[1]Tokyo Gakugei University, [2]AIST

Stress is important to understand the strength of the crust and the generation of large earthquakes. Despite considerable research, there is still no consensus on the stress of major tectonic faults. In this study, we measured deformation twin density (mmˆ(-1)) in the calcite grain in the fault rocks along the Median Tectonic Line (MTL) and evaluated differential stress (MPa) of them.

AIST drilled a borehole penetrating the MTL for predicting Tonaikai-Nankai Earthquake at Matsusaka-Iitaka, Mie prefecture (total depth 600m). It crosses MTL at the depth of 473.9m. Hangingwall of the MTL consists of the Ryoke-derived tonalitic rocks and footwall of the MTL consists of the Sanbagawa metamorphic rocks.

The fault rocks in the hangingwall experienced the four kinds of tectonic stresses within the brittle regime (Shigematsu et al., 2010). The fault rocks contain a large number of calcite veins (Tanaka et al., 2012). So far, calcite twin piezometer has applied only to the rocks purely composed of calcite. Sakaguchi et al. (2011) found a strong correlation between differential stress and twin density for the sand stone containing calcite grains; D=6.0729ˆ(-3) x (delta d)ˆ1.7543 (D: twin density, delta d: differential stress).

At the depth of 353.4m, the twin density is 118.7 +/- 87.8 /mm (n=63) and differential stress is 155MPa < delta d < 456MPa.

Keywords: calcite, twin, stress, Ryoke belt, Median Tectonic Line, fault rock