Japan Geoscience Union Meeting 2011
(May 22-27 2011 at Makuhari, Chiba, Japan)

SSS028-07 Room:302 Time:May 26 10:00-10:15

Internal Structure of the Median Tectonic Line, SW Japan revealed by a borehole core

Norio Shigematsu[1*], Koichiro Fujimoto[2], Nobuaki Tanaka[2], Hiroshi Mori[3], Simon Wallis[3]

[1]Geological Survey of Japan, AIST, [2]Tokyou Gakugei University, [3]Nagoya University

Property of fault zones are changed depend on the physical conditions, and influence fluid migration and the mechanical and seismogenic behaviours of the Earth's crust. The fault zone architecture has been evolved by the changing of the physical conditions during the exhumation, thus the analysis of that helps to improve our understandings of the variable fault behaviours at different conditions which are important to construct a pertinent model to predict the mechanical behaviour of the crust.

The Geological Survey of Japan, AIST (GSJ, AIST) recently constructed an integrated groundwater observatory close to the Median Tectonic Line (MTL) in the eastern Kii peninsula in Japan, which is called the Iitaka-Ako observatory. At the observatory, an observation borehole reached 600.0 m and encountered the MTL at a drilling depth of 473.9m. The MTL is the Japan's largest onshore exposed fault, has a long history of displacement under variable conditions.

The objective of this talk is to summarize the internal structure of the MTL based on the analysis of borehole at the Iitaka-Ako observatory. The followings were revealed.

(i) One of the bore holes penetrated the MTL (the boundary between the Ryoke granitoids and Sambagawa metamorphic rocks) at a drilling depth of 473.9 m.

(ii) Regression of locations and altitudes of 8 exposed outcrops and the depth where the borehole penetrated the MTL by least square technique yields fault plane with the attitude of N86^{o}E56^{o}N. The fault plane around the Iitaka-Ako observatory is almost perfect plane without large roughness.

(iii) Beneath the boundary between the Ryoke granitoids and Sambagawa metamorphic rocks, the Sambagawa metamorphic rocks shallower than 555 m are extensively fractured which can be considered the major strand of the MTL. With in the major strand of the MTL, the depth range between 474.5 m and 477.25 m can be considered the fault core, which corresponds to the thickness of 1.1 m. The X-ray diffraction analysis suggests that the deformation in these zones occurs around the temperature of approximately 150^{o}C.

(iv) Several mylonite zones are developed in the hanging wall of the MTL. The temperature conditions of the deformation are varied from 300^{o}C to 450^{o}C.

(v) Quartz grain size in the mylonite deformed under 300^{o}C is very fine, suggesting deformation under high differential stresses.

(vi) The mylonite zones were variably overprinted by later cataclastic deformation, and several stresses which caused the cataclastic deformation can be separated.

The fault rocks formed at different conditions were observed in the Iitaka-Ako core, which help to improve our understandings of variable fault behaviours. Based on the above mentioned results, the internal structure of MTL will be discussed.

Keywords: internal structures of fault zones, Median Tectonic Line, borehole cores, geophysical logging