# Hydrothermal alteration process along a clay vein in deep fractured granitic rock

# Shoji Nishimoto[1]; Hidekazu Yoshida[2]

[1] Nagoya City Science Museum; [2] NUM

Hydrothermal alteration halo along a clay vein in a drilled core from 200m under the ground surface of Toki granite, central Japan are investigated to understand the process of hydrothermal alteration in granitic rocks. The clay vein consisits of micro-crystalline minerals such as illite, quartz and pyrite infilling the fracture. The alteration halo is subdivided into phyllic zone adjacent to the fracture and the outside propylitic zone. The result of microscopic and chemical investigation revealed that the phyllic and propylitic zones are characterized by Fe-rich corrensite with chlorite and illite with albitized plagioclase respectively, reflecting different alteration condition such as temperature, pH and fluid/rock ratio. Base on the investigation, the alteration processes can be three successive stages: 1) partial dissolution of plagioclase; 2) precipitation of Fe-rich phyllosilicate due to mixing of infiltrating hydrothermal fluid and pre-existed water in dissolution pores; 3) illite precipitation in microcracks and plagioclase albitization. Therefore, it is considered that hydrothermal alteration of granite proceeds with mainly dissolution-precipitation process due to infiltration of hydrothermal fluid controlled by microcrack development. This work has implications for the behavior of radioactive waste repositories within fractured granite upon interaction with heated groundwaters.