

The physicochemical reaction during the coseismic-interseismic period of the fault gouge of the MTL, Japan

MATSUTA, Noriko^{1*}, ISHIKAWA, Tsuyoshi², HIRONO, Tetsuro¹, KAWAMOTO, Kazurou³, FUJIMOTO, Koichiro⁴, KAMEDA, Jun⁵, NISHIO, Yoshiro²

¹Earth and Space Science, Osaka Univ., ²JAMSTEC Kochi, ³Oshika Geological Museum of Japan MTL, ⁴Tokyo Gakugei Univ.,

⁵Department of Earth and Planetary Science Graduate School of Science, The University of Tokyo

Frictional heating during coseismic slip induces transient fluid-rock interaction and fluid transfer. It is crucial to understand these physicochemical process and mechanism because these fluids strongly influence the dynamic behavior and rupture propagation of earthquakes. In order to understand these reactions, we investigated the Median Tectonic Line (MTL), which runs through Nagano prefecture and is newly exposed around the Anko outcrop. We performed geochemical analyses of major- and minor-element concentrations, Sr isotope ratio and semi-quantitative clay mineral composition. Using the fluid-mobile trace element spectrum, which is sensitive to fluid-rock interaction at high temperatures, we estimated that the black gouge experienced frictional heating of approximately 150-200 degree Celsius. The clay collected from this black gouge show a distinctly low XRD pattern compared to the surrounding gouge, which may suggest amorphusization of clay minerals related to the shear slip. So the temperature signal probably indicates that frictional heating have occurred in the gouge together with high amount of coseismic fluid transfer.