T223-011 **Room: 301B** **Time: May 19 10:15-10:30**

Frictional properties of serpentinites in low slip velocity regime: review and recent results from laboratory experiments

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The frictional properties of serpentinites are of particular interest in the study of earthquake generation processes along subducting plates and transform faults. Here we review the results of frictional sliding tests on serpentinites. Especially, we focus the frictional behaviors under lower slip velocity conditions, because it is quite important to know how the process of slip acceleration leads to an earthquake.

Reinen et al. [1991-1993] conducted velocity-step change tests on serpentine under dry and room-temperature conditions using a rotary-shear friction apparatus. They found that serpentinites has two-mechanical behaviors at velocity-step test: state-variable dominated behavior at relatively higher velocity (0.1-10 um/sec) and flow-dominated behavior at lower velocity (less than 0.1 um/sec). At the high slip rates, the stepwise decrease in slip velocity results in an instantaneous decrease in the friction followed by a gradual increase in the friction. At the low slip rates, however, the friction decreases gradually just after the stepwise decrease. They suggested that the viscous flow-like frictional behavior at the slow rates is caused by the dislocation glide along the (001) cleavage. Even under the room-temperature condition, those multiple behavior could be observed, which could make our forecast on the slip acceleration process from the plate motion velocity to the earthquake complicated.

We are expecting to observe the multiple behaviors under higher temperature condition, and also we hope to refer the frictional properties development with increasing the depth, meaning subducting along the plate. Although Moore et al. [1997] (reviewed by Hirose et al. in this session) researched the temperature dependence of the frictional strength of the serpentines at a constant sliding velocity, the velocity dependent behavior under high temperature has not been yet revealed. Thus we conduct velocity step tests on antigorite gouge under high pressure (70 MPa in effective confining pressure) and elevated temperatures up to a maximum of 600 deg. C, using a gas-medium, high-pressure, high-temperature deformation triaxial testing machine at GSJ, AIST. The results show that the gouge exhibits velocity-strengthening in the velocity range of 1.15 um/sec to 11.5 um/sec and the amount of the friction change with the velocity step increases with temperature when the temperature is below 300 deg. C. Above the dehydroxylation temperature of the antigorite (500 deg.C), the stick-slip sliding was observed. We could not observe the obvious flow-type behavior, as reported by previous studies by Reinen et al. [1991-93].