T223-010 **Room: 301B** **Time: May 19 10:00-10:15**

Frictional properties of serpentinites: Implications for earthquake faulting

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Serpentinite is a significant component of the oceanic lithosphere, and its frictional property plays an important role in the generation of earthquakes along subducting plates and transform faults. In particular, the frictional property of serpentinite is often used to model the low strength of the San Andreas fault, in order to elucidate the lack of pronounced heat flow along the fault. In the presentation, we will review the published data of frictional property of serpentinites and then introduce our experimental studies to investigate the effect of the dehydration reaction of serpentinites on fault stability.

Previous laboratory experiments at room temperature indicated that friction coefficient of serpentine, especially chrysotile, is very low u less than 0.2. Based on the results, it has been argued that the presence of chrysotile-bearing serpentine on faults is responsible for the lack of pronounced heat flow along the San Andreas fault (permanently weak fault model: i.e. Moore et al., 1996). However recent studies revealed that frictional strength of chrysotile increased with temperature to a level comparable with that of antigorite and lizardite (u=˜0.6: slightly lower than common rocks) (i.e., Moore et al., 1997). Therefore the frictional properties of chrysotile at low slip velocities alone cannot explain the apparent weakness of major faults.

In contrast, Hirose & Bystricky (2007) suggested by the results of high velocity experiments at coseismic slip conditions that frictional heating weakens a fault dramatically (u less than 0.2) associated with dehydration of serpentinite at the initiation of earthquake slip. The results indicate that a fault is strong at interseismic period but becomes weak during an earthquake. As phyllosilicates, such as serpentines, are common in mature fault zones, this dynamic fault-weakening mechanism may explain the apparent weakness of crustal faults such as the San Andreas.