

Relation of maturity of carbonaceous materials to friction coefficient

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Frictional strength of fault rocks is one of the most important parameters in understanding rupture nucleation and propagation process during an earthquake. At low slip rate, friction coefficients of various types of rocks show almost constant values to be 0.65–0.80. In contrast, friction coefficients of various rocks could decrease to 0.1–0.4 at seismic slip rate (above 0.1 m/s) owing to the occurrence of various dynamic fault-weakening processes. Furthermore, even at low slip rate, frictionally weak minerals in fault rocks could significantly lower bulk strength of fault rocks.

Graphite is one of the representative weak minerals that has extremely low friction coefficient of approximately 0.1–0.2, which could affect on slip behaviors of inland active faults and plate-boundary faults. Carbonaceous material (CM) is known as a precursor of graphite and could transform into graphite by diagenetic and metamorphic reactions during plate subduction. However, changes in frictional strength accompanied by maturation of CM still remain unknown. In this study, we experimentally examine the relation of maturity of CM to frictional properties, and investigate its effects on the slip behaviors of CM-bearing faults. In this presentation, we will report preliminary results of our friction experiments.

Keywords: Friction experiments, Carbonaceous material, Thermal maturation