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We conducted triaxial friction experiments on the Northern Shimanto Belt rocks exhumed from the seismogenic zone, at an effective confining pressure of 75 MPa and a temperature of 150°C, and at axial displacement rates (V_{axial}) changed stepwise among 0.1, 1 and 10 μm/s, in order to investigate their frictional properties at a seismogenic condition. Tested samples are sandstone, mudstone and chert from the Yokonami mélange, basalt from the Kure mélange, and sandstone and mudstone from the Nonokawa Formation, all collected in central Shikoku Island. XRD analyses of tested samples revealed that the content of total clay minerals is 15.1 wt%, 11.8 wt% and 0 wt%, respectively in the Yokonami mélange sandstone, mudstone and chert, 1.9 wt% in the Kure mélange basalt, 16.3 wt% and 32.9 wt%, respectively in the Nonokawa sandstone and mudstone.
Friction experiments of tested samples revealed that the steady-state friction coefficient (μ_{ss}) decreases with increasing content of total clay minerals, except for the Nonokawa sandstone with a relatively high μ_{ss} of 0.62 in spite of its moderate content of total clay minerals. μ_{ss} at V_{axial} = 1 μm/s is 0.65 for the Yokonami mélange chert, 0.63 for the Kure mélange basalt, 0.52 for the Yokonami mélange mudstone, 0.50 for the Nonokawa sandstone, and 0.37 for the Nonokawa mudstone. The Yokonami mélange chert without clay minerals and the Nonokawa mudstone with 32.9 wt% clay minerals exhibited an increase in μ_{ss} when V_{axial} was increased and vice versa, i.e., velocity strengthening. Microstructures of these samples after experiments show that deformation is distributed within the gouge layer. In contrast, other samples with 1.9–16.3 wt% clay minerals exhibited a decrease in μ_{ss} when V_{axial} was increased and vice versa, i.e., velocity weakening. Microstructures of these samples after experiments show that deformation is localized along a continuous slip surface. Experimental conditions suggest that dissolution-precipitation processes are possibly responsible for such change in velocity dependence of friction according to the content of clay minerals.
Our results suggest that seismogenic faulting would occur in rocks with 2–20 wt% clay minerals, but not in rocks without or rich in clay minerals, provided that other conditions are the same.

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