

SSS019-P11

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Frictional response of faults to earthquake ruptures: Insight from high-velocity experiments on samples from NantroSEIZE

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We have conducted high-velocity friction experiments on clay-rich sediments from IODP Expedition 316, Nankai Trough, in order to evaluate the frictional response of the sediments against rapid sliding associated with rupture propagation along faults in the accretionary prism. High-velocity experiments have been performed over the past decade shows that frictional resistance increases rapidly at the beginning of sliding of simulated faults over slip distance of more than several centimeters, that is followed by prolonged slip-weakening. The sediments from Nankai trough also exhibit similar mechanical behaviors at slip velocity of 1.3 m/s and normal stress of 1.0 MPa. The initial barrier to fault motion on the core sample collected just below the splay fault is ~ 0.42 in friction coefficient, while that on the sample from near the frontal thrust is ~ 0.23 under fluid-saturated conditions. Our pilot experiments suggest that the degree of the initial barrier could depend on the clay content, fragment fraction and degree of fluid saturation. Such frictional response to rapid fault motion could significantly affect the rupture propagation from the depths along faults in the prism. In our poster we will present how the initial barrier changes with depth and mineral composition.

Keywords: fault, earthquake, NantroSEIZE