

Statistical analysis for stick-slip experiments: Effects of inertial term and granular gouge

*Shinichi Oba¹, Yuta Mitsui²

1. Graduate School of Science and Technology, Shizuoka University, 2. Faculty of Science, Shizuoka University

In natural earthquakes (over km scales), slip displacement D is scaled with fault length L (Scholz, 1982). Laboratory stick-slip experiments have been thought to be analogue of seismic phenomena, but we find that they deviate from the L - D scaling using experimental data from 14 published papers. Namely the experimental data tends to have larger slip displacement than extension of the natural earthquake scaling. We perform correlation analyses to investigate parameters governing the slip displacement D , focusing on gouge thickness and inertia term of frictional system that show high correlation with the slip displacement D . The analyses imply that the slip displacement D for stick-slip experiment is controlled by the characteristic time of inertia (which corresponds to the period of harmonic oscillation) independently of spatial scale.

Keywords: stick-slip, scaling law