

Clustering Geometry of Aftershocks in Earthquakes

A Simple Model for Controlling Stick-Slip Friction and Implications for Effects of Tides on Earthquakes” Irregular stick-slip friction of slowly sheared rocks, or granular materials is affected by small applied oscillatory stresses. Neural Networks (NNs) Modeling such systems is important (1) to predict and control the timing of large slips during friction, and (2) to resolve whether or not lab experiments can predict analogous effects of tides on large earthquakes. Recent experiments, contradict traditional friction models and the connection of lab-experiments to earthquakes is controversial. Here we present a simple model that predicts (I) observed experimental results, (II) new ways to control stick-slip motion, (III) the need for higher oscillation-frequencies than previously used in experiments to mimic the effect of tides on large earthquakes, and (IV) the need for ten-thousands of large earthquakes by NNs simulation to observe significant correlations with tidal or seasonal stress variations(while lab experiments require only a few large slips). Our results thus resolve the long-standing controversy about the applicability of experiments to earthquake observations.

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