

# Episodic Tremor and Slip on a Frictional Interface with Critical Zero Weakening in Elastic Solid

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Non Volcanic Tremor (NVT) and related relatively weak and slow slip events, termed jointly Episodic Tremor and Slip (ETS), are observed below the seismogenic sections of numerous subduction zones and major strike-slip faults. These events have several distinguishing characteristics including moment-duration scaling relation with exponent less than 2, intermittency and flickering behavior, relatively small slip, high susceptibility for triggering, and temporal occurrence with numerous periodicities. Here we show that a frictional fault in elastic solid with a strip below the seismogenic zone having critical zero weakening during slip provides a simple unified explanation for the diverse observed phenomena associated with ETS. The results imply that ETS have little to no predictive power on the occurrence of large events in the overriding seismogenic zone. Additional model predictions that should be tested with future high-resolution observations are fractal slip distributions and failure areas, potency/moment proportional to area and duration proportional to effective source radius (producing together the observed moment-duration scaling), discrete power law frequency-moment statistics with exponent  $3/2$  and exponential tapering, overall scale-invariant potency/moment time histories, and parabolic (or exponential) source time functions for event sizes measured by duration (or moment).