Changes in AE similarity track fault kinematics during laboratory earthquakes

Samson Marty[1] (sbm6113@psu.edu)

Raphael A. Affinito[1], Clay Wood[1], Chris Marone[1,2], Parisa Shokouhi[1], Jacques Rivière[1]

[1]Department of Geosciences, Pennsylvania State University

[2]Diparmiento di Scienza della Terra, La Sapienza Università di roma

PennState College of Earth and Mineral Sciences

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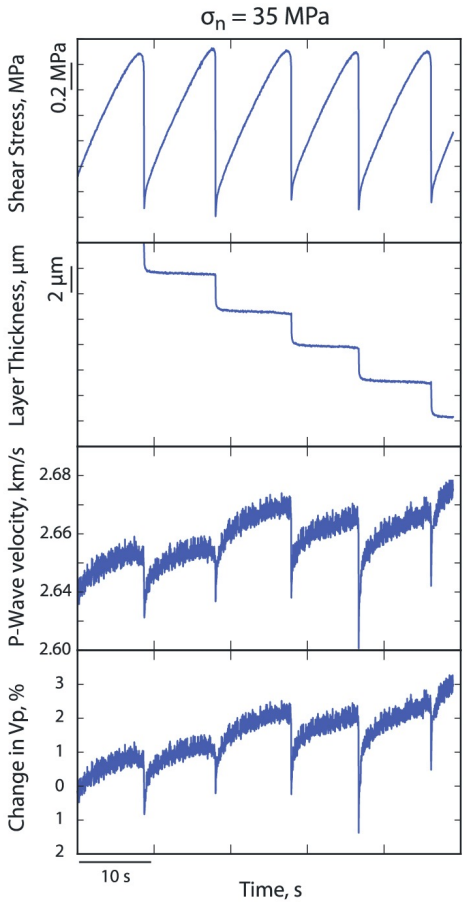
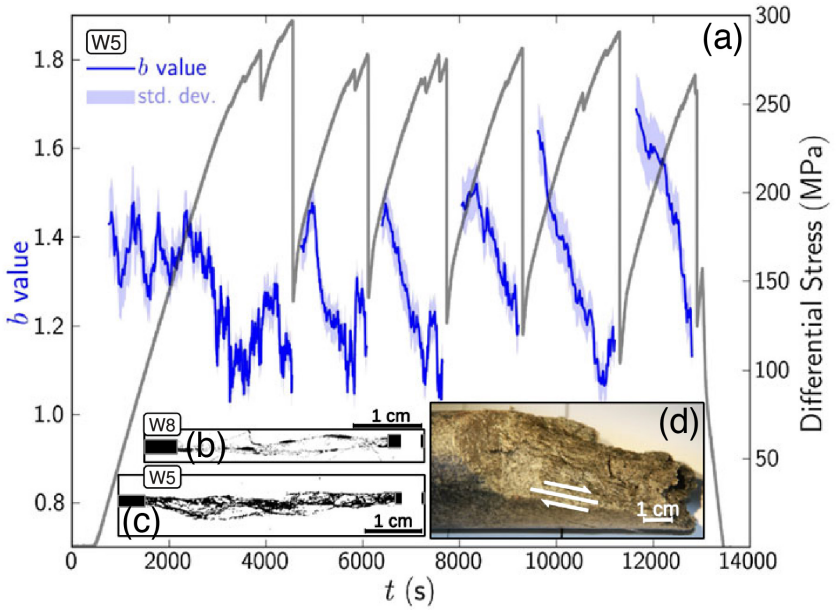
Laboratory earthquake prediction

Active acoustic measurement

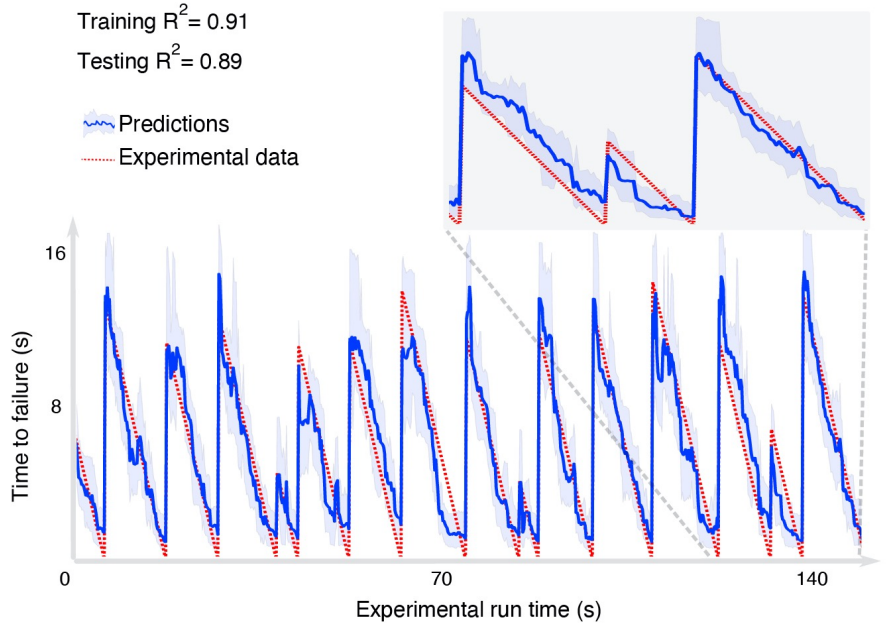


Tinti et al. 2016

Passive acoustic measurement



Goebel et al. 2013

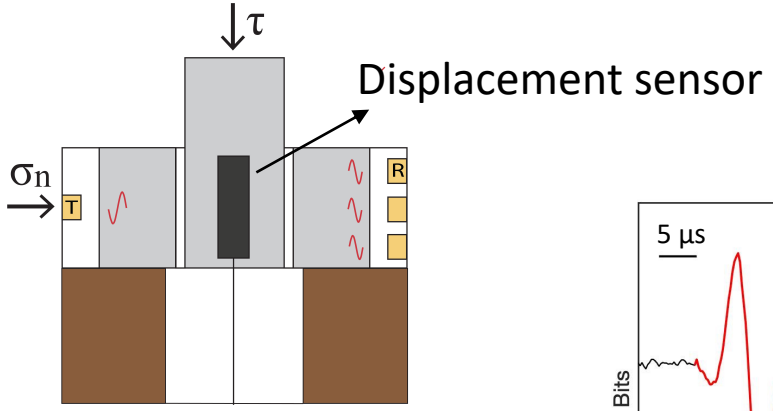


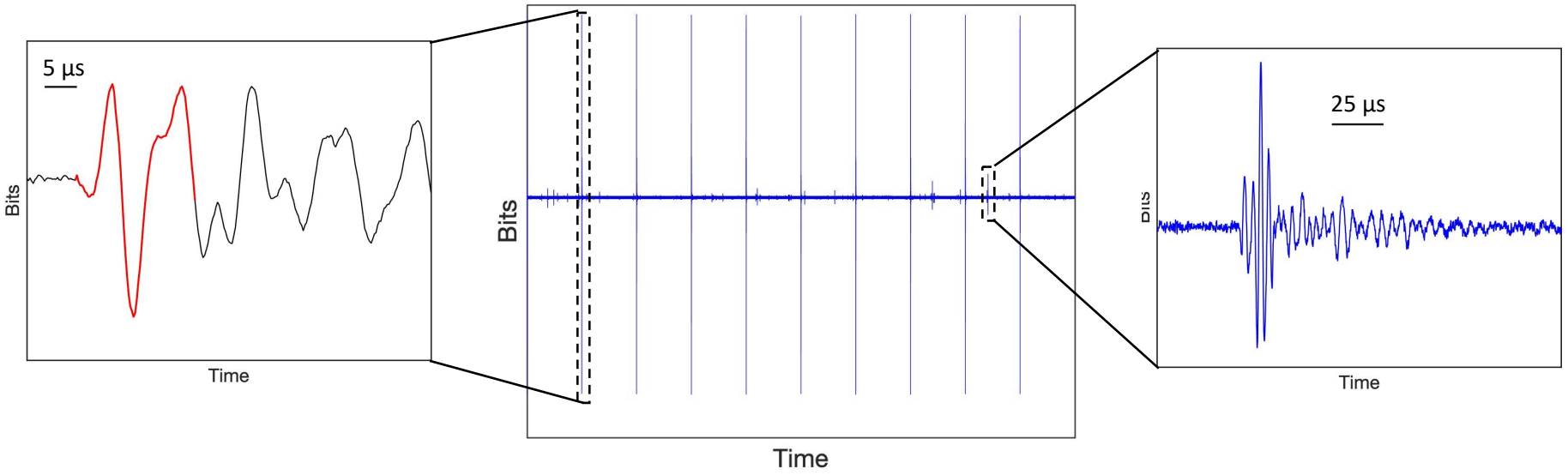
Drouet et al. 2017

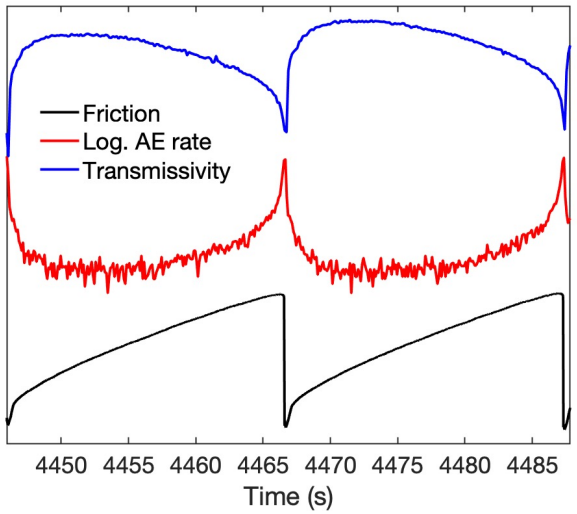
Does AE similarity provide information relevant for (laboratory) earthquake prediction ?

Definition of AE similarity: average value of the correlation matrix of a population of AEs

Simultaneous active and passive acoustic recording during the seismic cycle

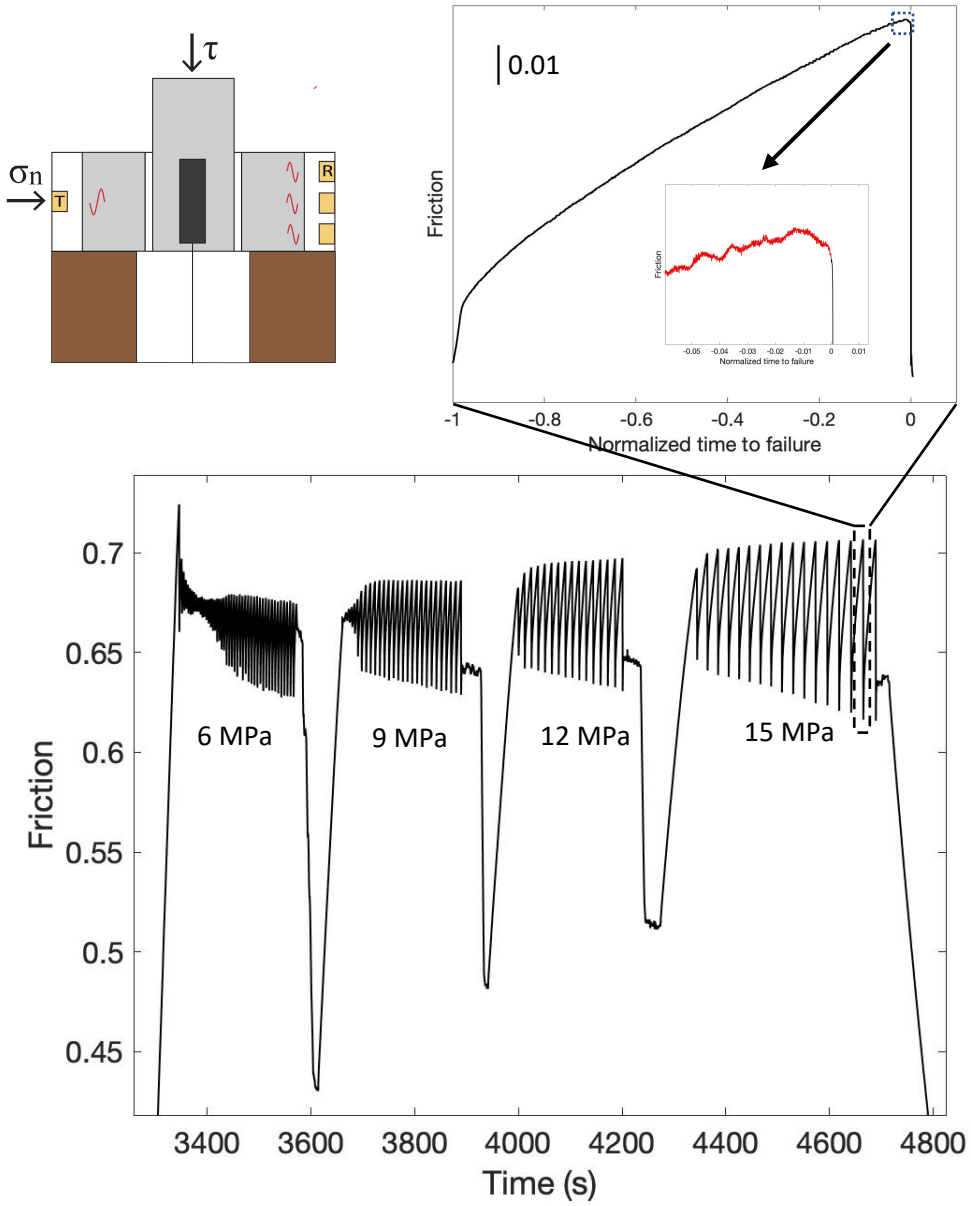


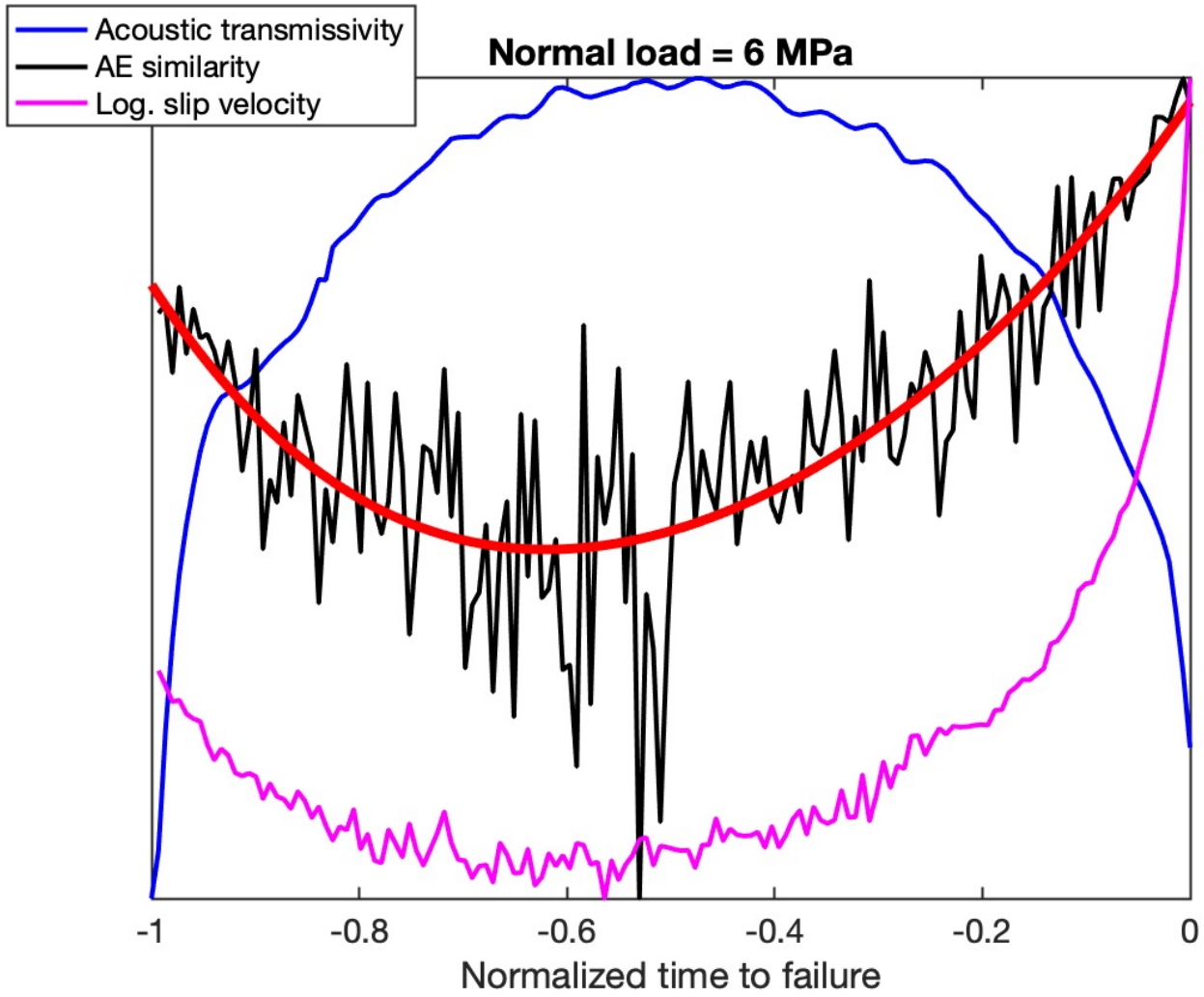




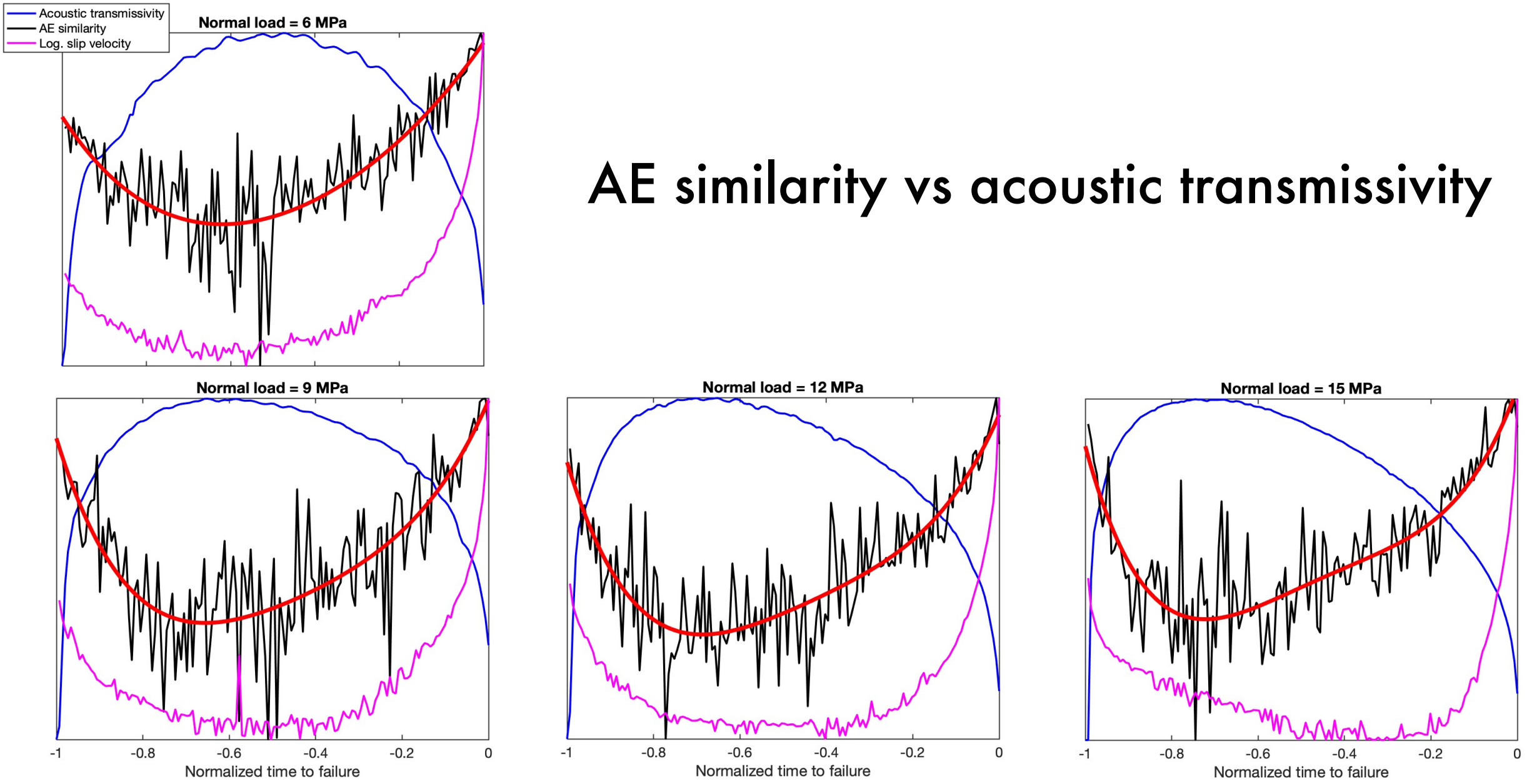
- Normal stress conditions: 6-9-12-15 MPa
- Load point velocity: 10 µm/s
- 1 transmitter and 8 receivers. Sampling frequency: 10 MHz

AE similarity vs acoustic transmissivity

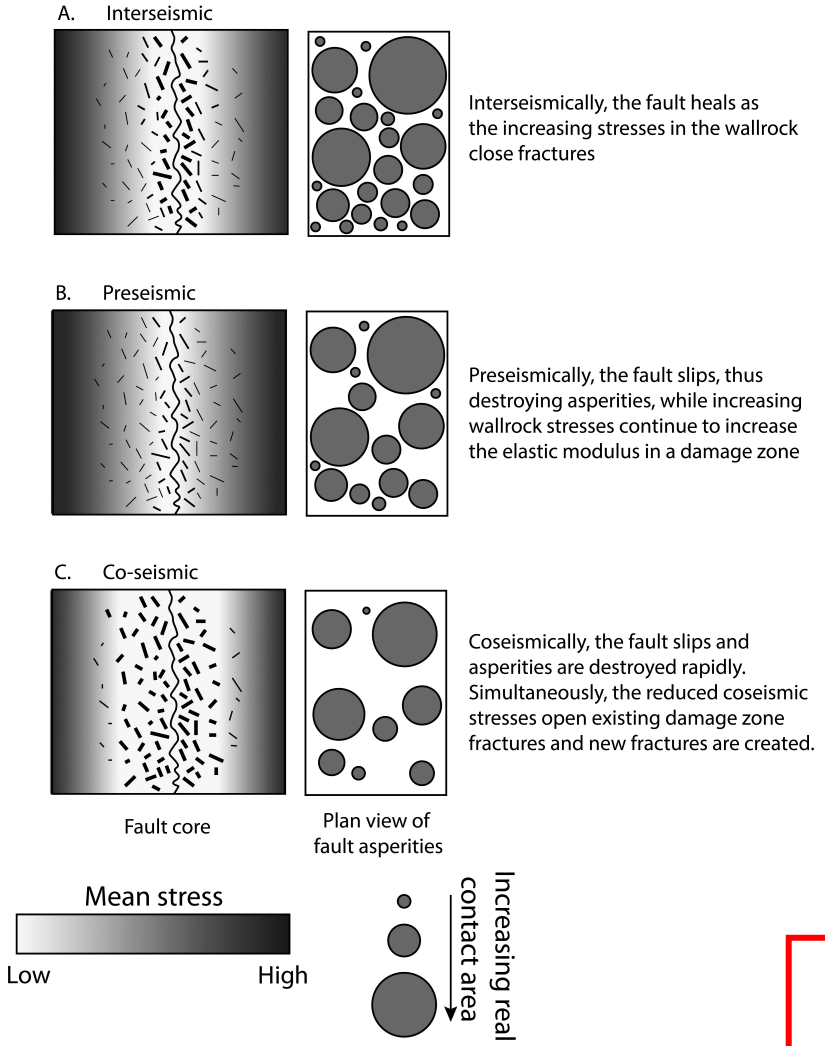




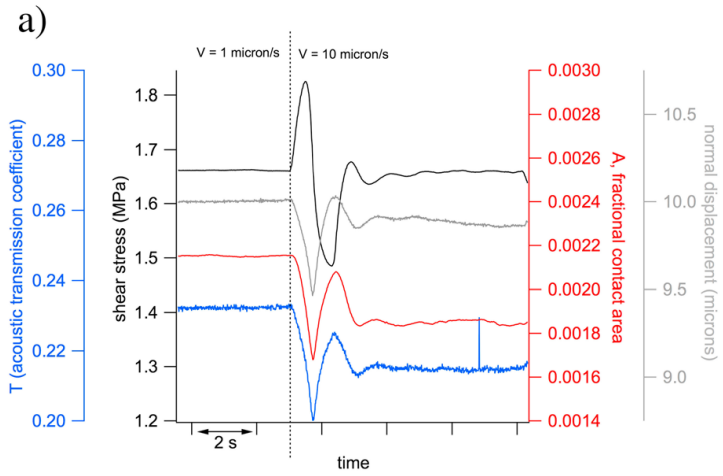
AE similarity vs acoustic transmissivity



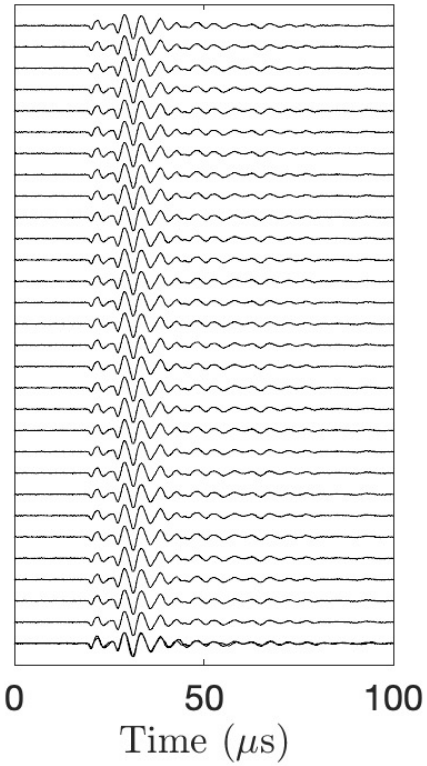
Interpretation and perspectives



Shreedharan et al. 2021



Nagata et al. 2016



AE similarity is a proxy to fault contact area

acoustic transmissivity
vs
spectral coherence