

Exploring new experimental possibilities for the investigation of Nonlinear Mesoscopic Elasticity

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Why are we investigating Nonlinear Mesoscopic Elasticity?

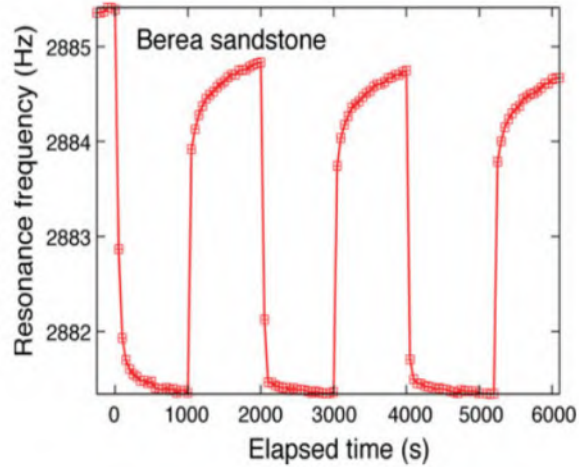
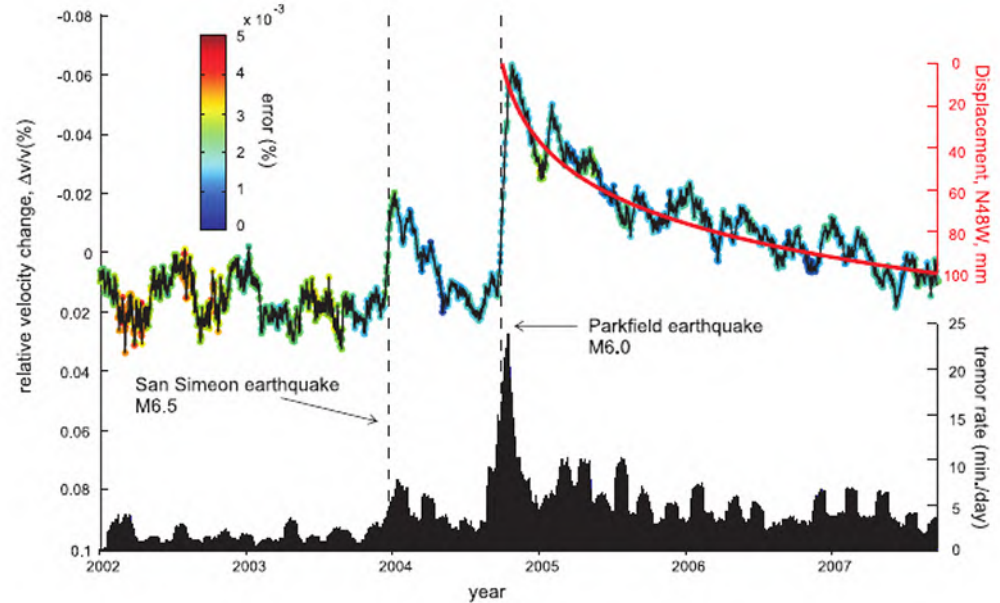


Figure 3

Resonance frequencies plotted as a function of time for a Berea sandstone bar 25.4 mm diameter and 0.35 m long. At time $t = 0$, a (conditioning) strain of 10^{-6} was applied for 1,000 s (~ 15 min) and then turned off for the same period of time (recovery) and repeated twice more. Resonance frequency was tracked throughout the experiment with a very small strain frequency sweep

[TenCate, 2011]



[Breguier, 2008]

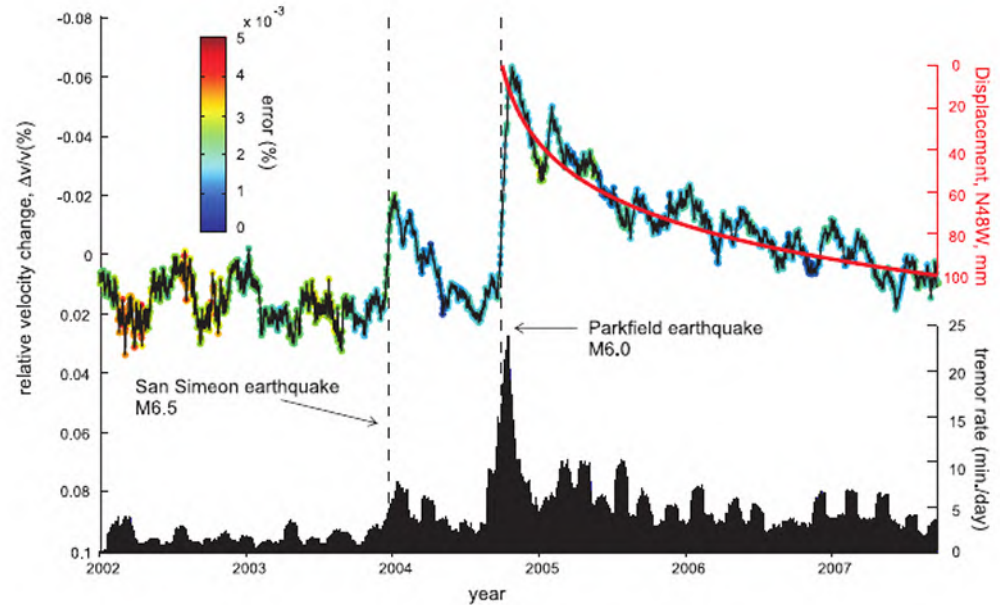
SPIN WP2: „New physical models for the restless Earth“

Why are we investigating Nonlinear Mesoscopic Elasticity?

Scaling laws in time, space and amplitude?

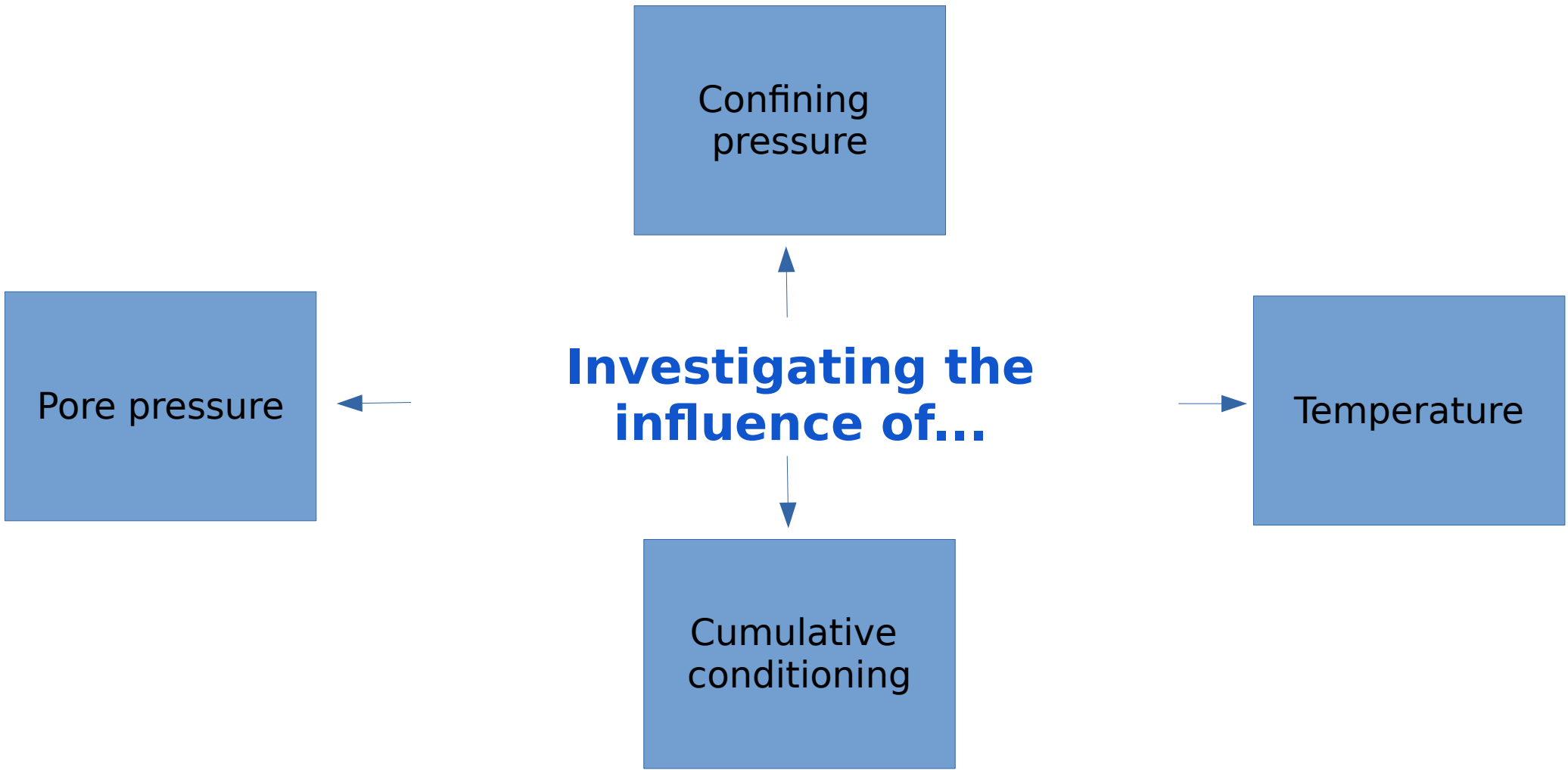
Physics?

Impact on global wave propagation?



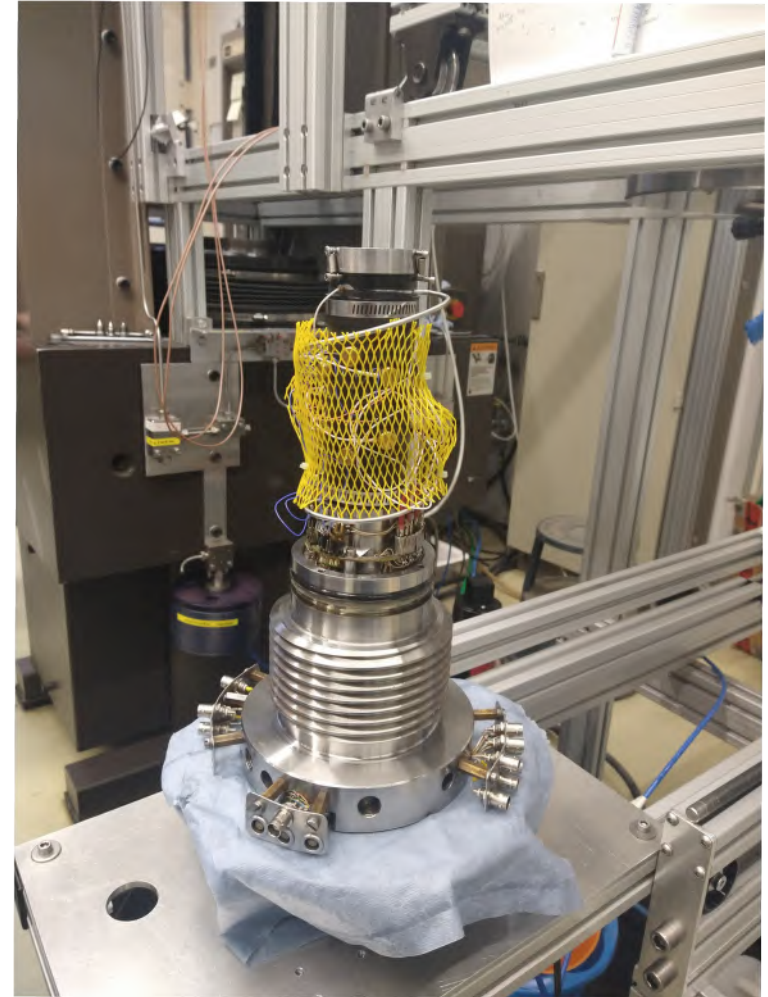
[Brenugier, 2008]

SPIN WP2: „New physical models for the restless Earth“



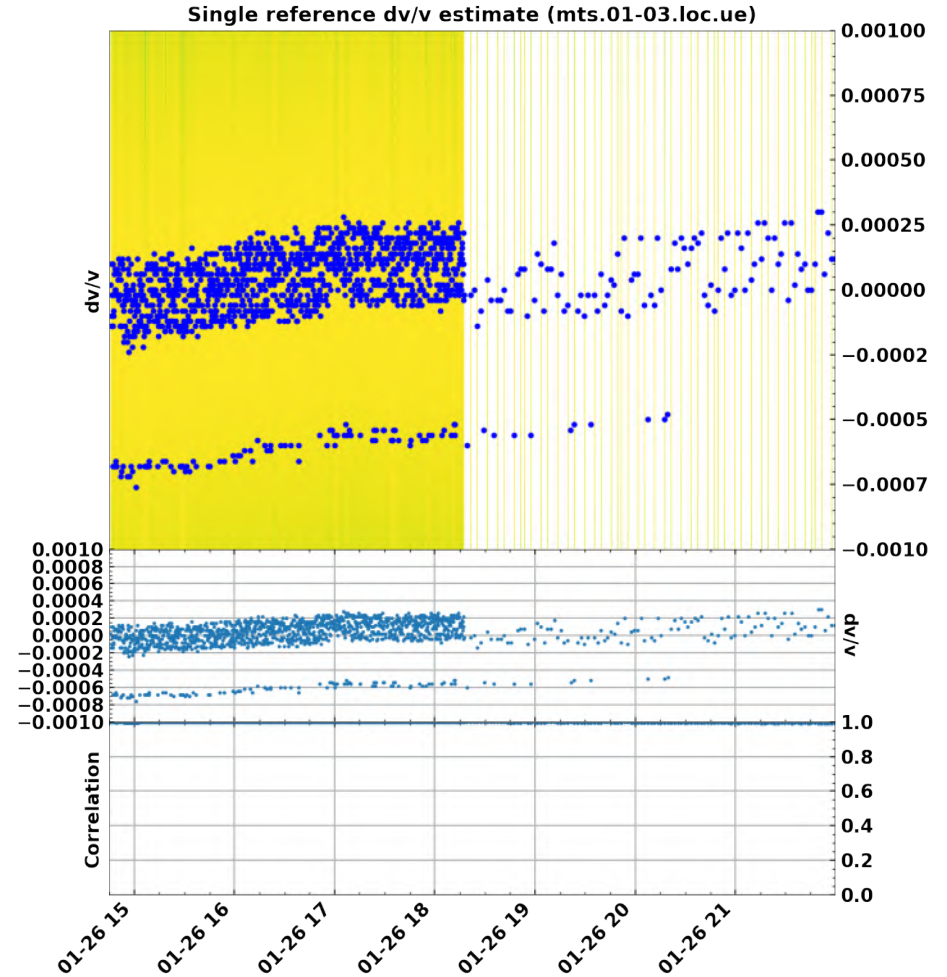
Experimental setup

- Rock sample properties
 - Dry Bentheim sandstone (isotropic)
 - 10x5cm cylinder
- Triaxial compression machine
- Confined in a pressure cell
 - Control over temperature, pressure, and fluid injection (not used yet)
- 16 acoustic sender/receivers



Processing and results

- Coda Wave Interferometry w/ stretching method (SeisMIC by Peter Makus)
- Preliminary results
 - Single upwards trend → not the loading pattern!
 - Unimodal, bimodal and trimodal distributions



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Happy to chat with you at my poster about how and why it went wrong

