

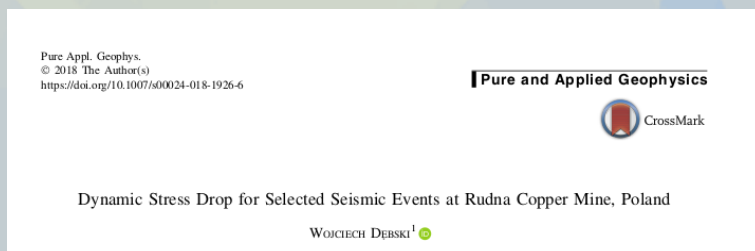
How nature speaks about imminent catastrophic failure?

W. Dębski
Inst. Geophys. PAS

Collabolators

- ◆ Prof. Alex Hansen, Phys. Dep. NTNU (Norway)
- ◆ Dr. Srutarshi Pradhan, Phys. Dep. NTNU (Norway)
- ◆ Dr. Piotr Klejment, IGF PAS

Publications



Dynamic Stress Drop for Selected Seismic Events at Rudna Copper Mine, Poland, W. Debski



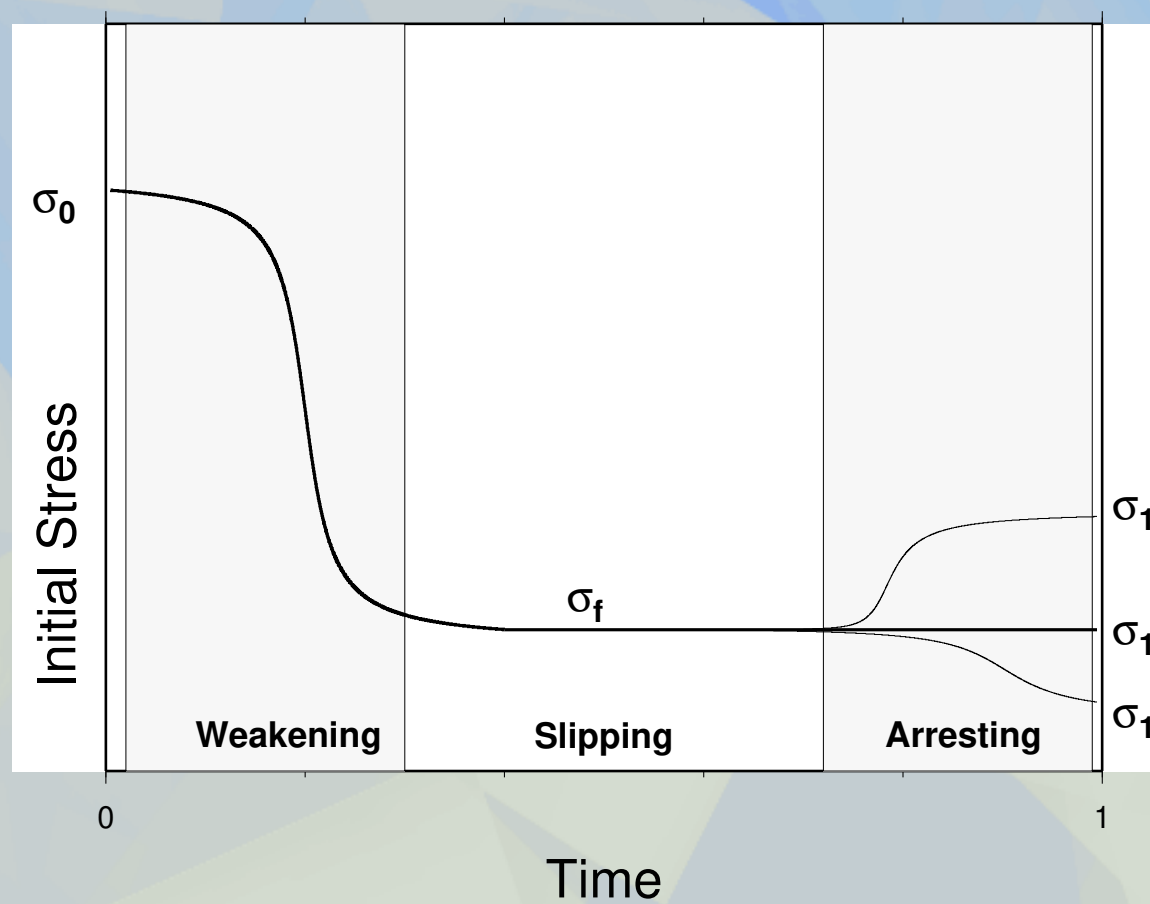
Variation of elastic energy shows reliable signal of upcoming catastrophic failure S. Pradhan, J.T. Kjelstadli, A. Hansen



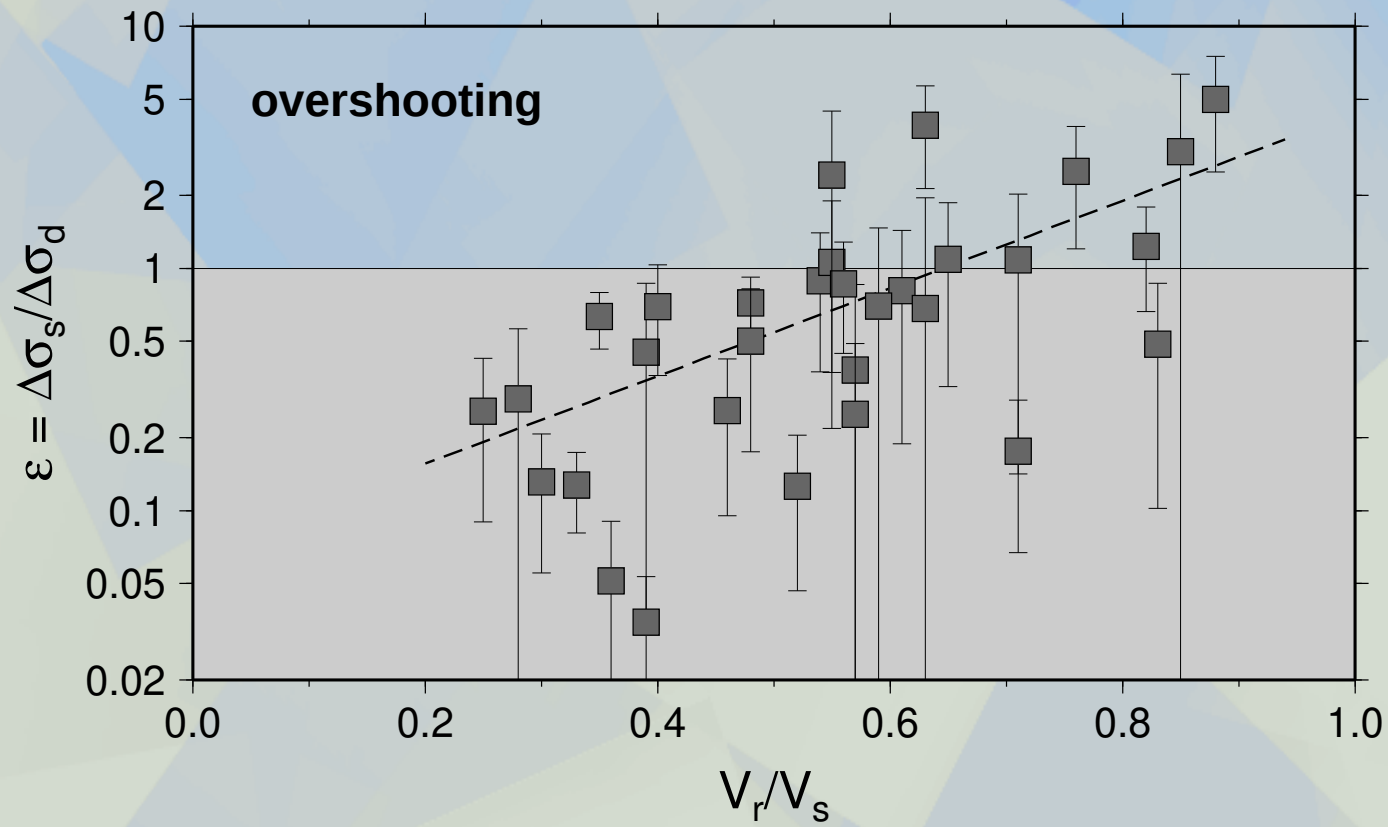
Earthquake physics beyond the linear fracture mechanics - a discrete approach, W. Debski, P. Klejment

Criterion for imminent failure during loading - Discrete Element Method Analysis, W. Debski, S. Pradhan, A. Hansen

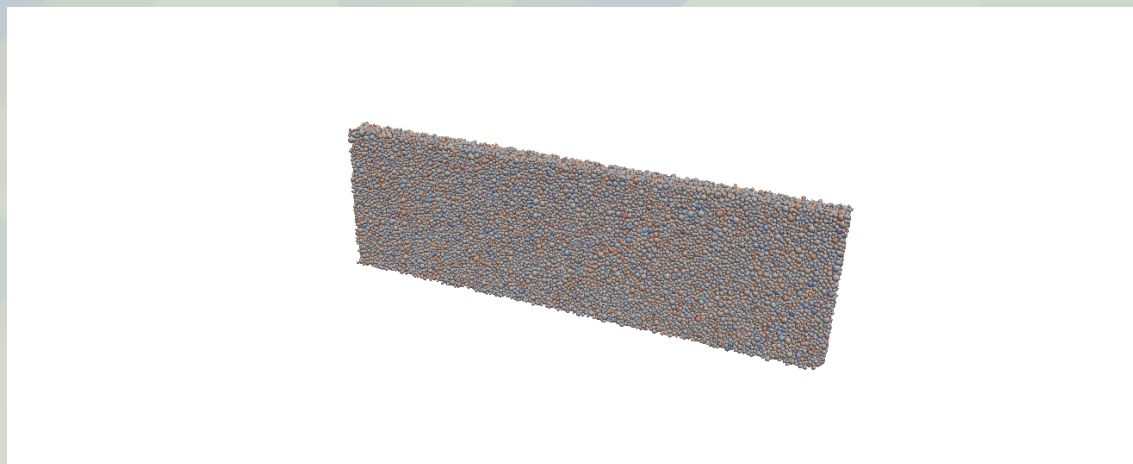
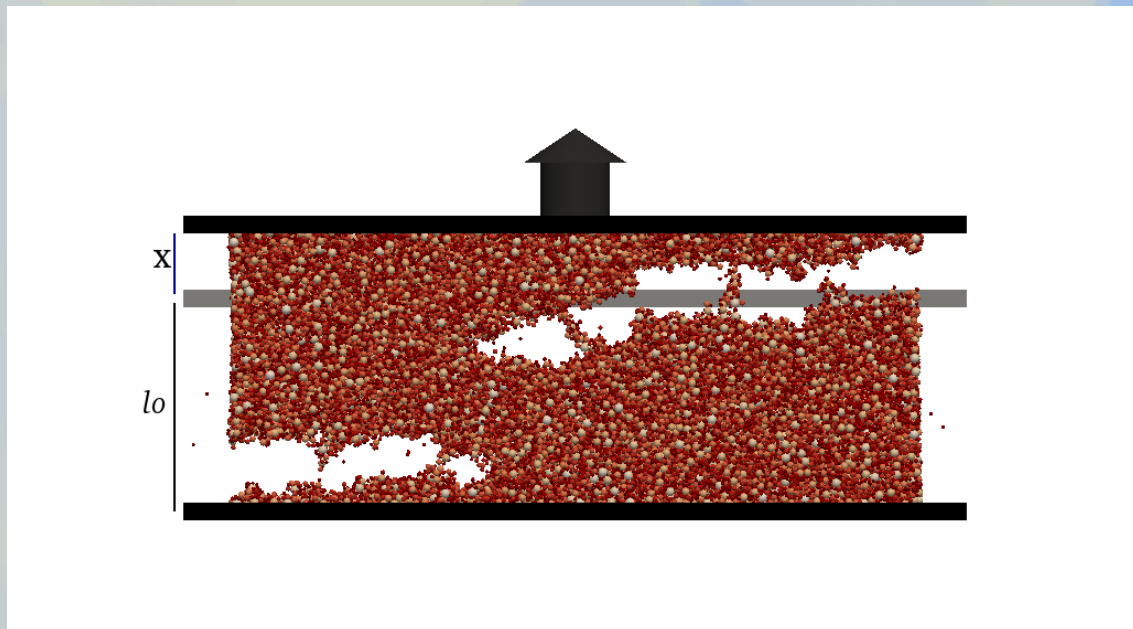
Dynamics of fragmentation (shearing) process



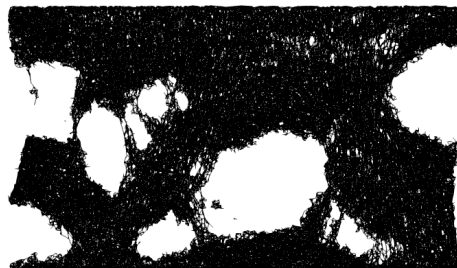
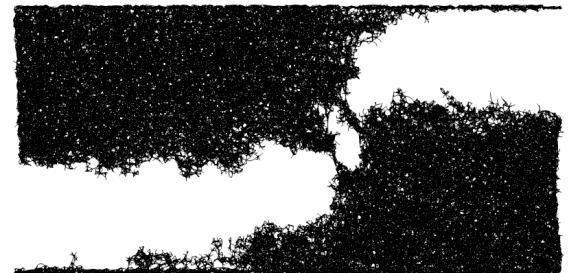
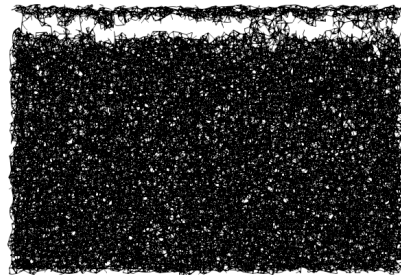
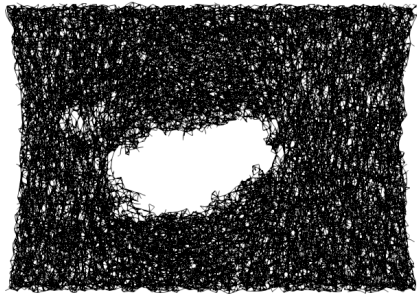
Static and dynamic stress drop



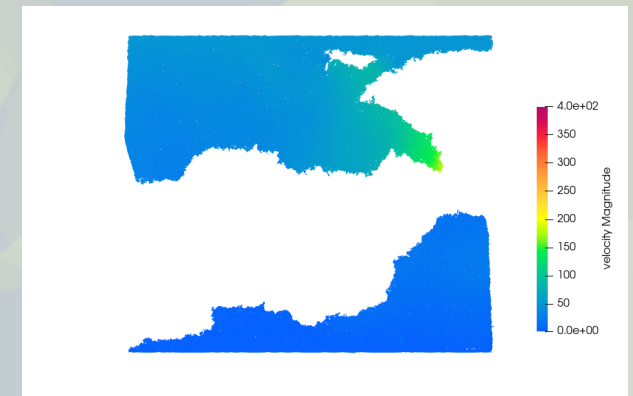
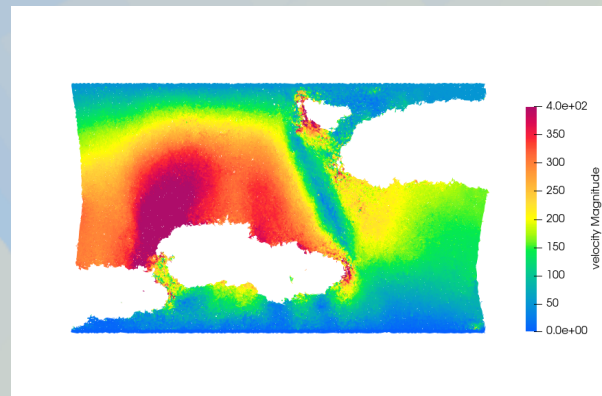
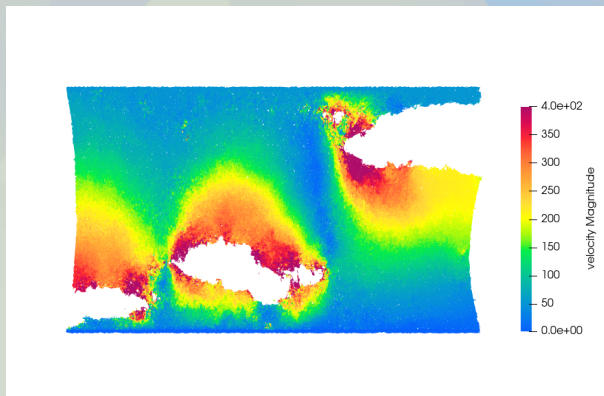
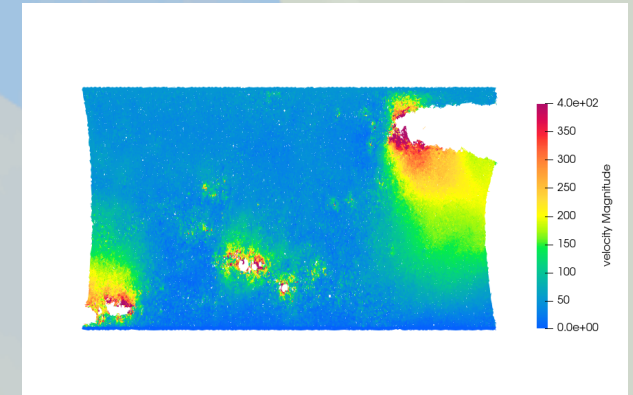
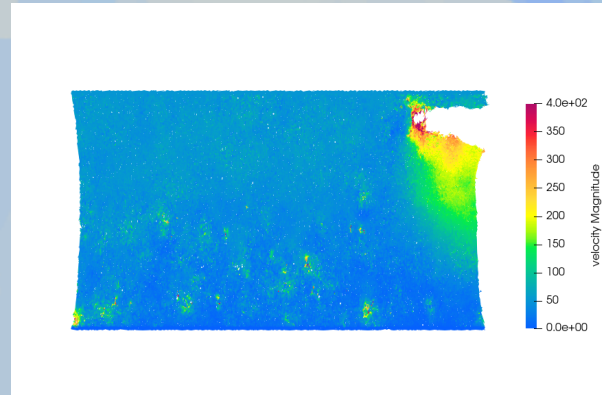
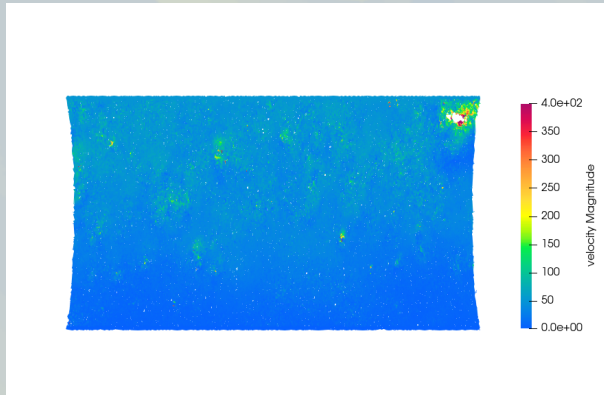
Discrete Element Method



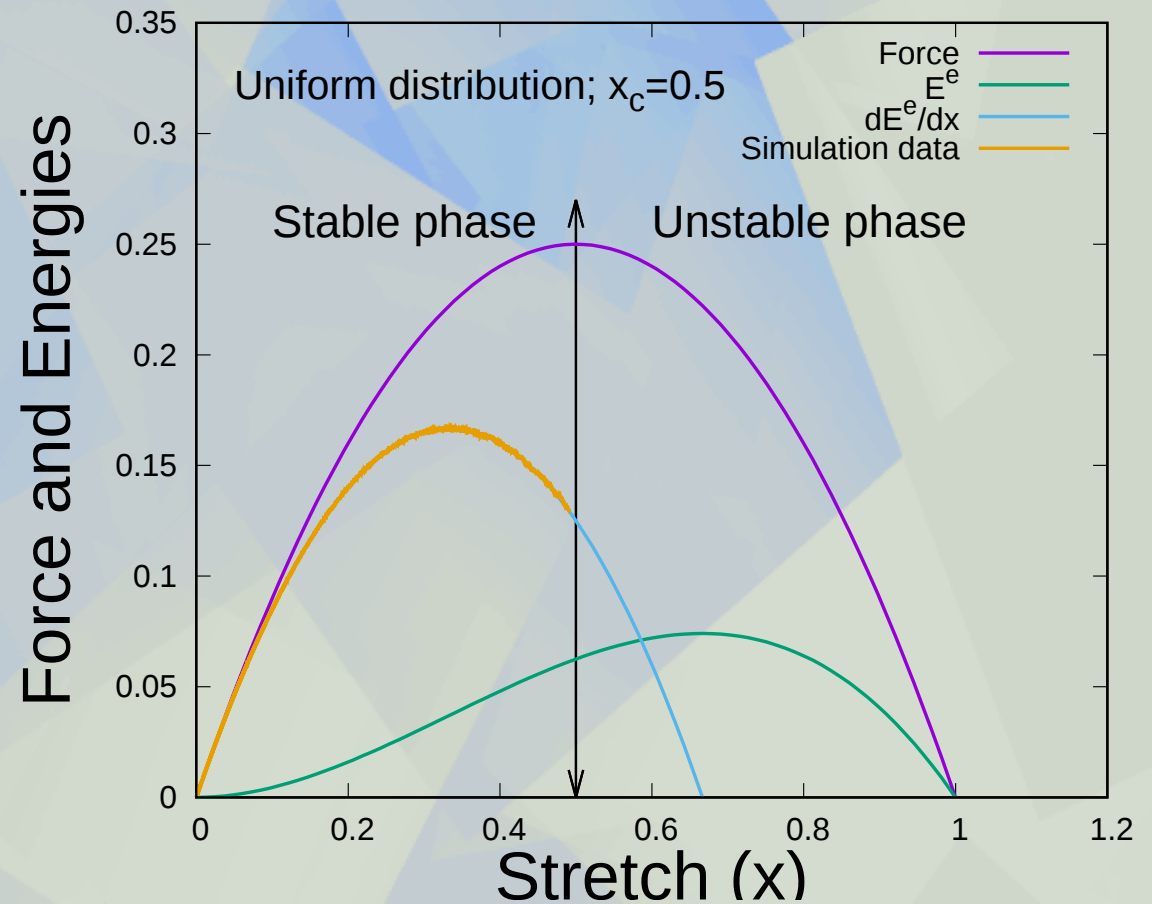
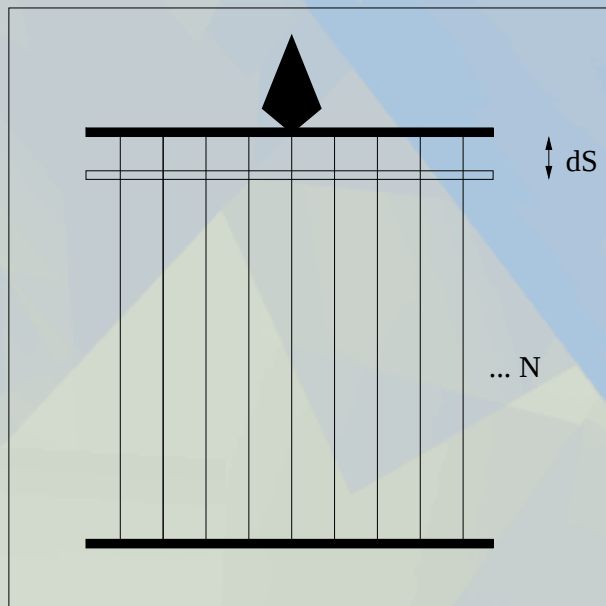
Fragmentation patterns



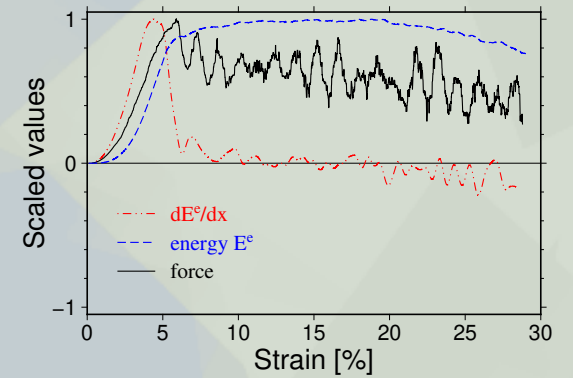
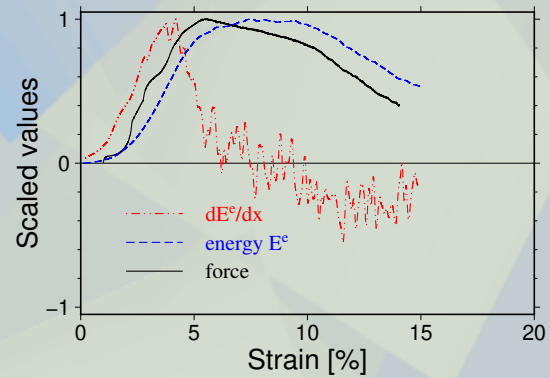
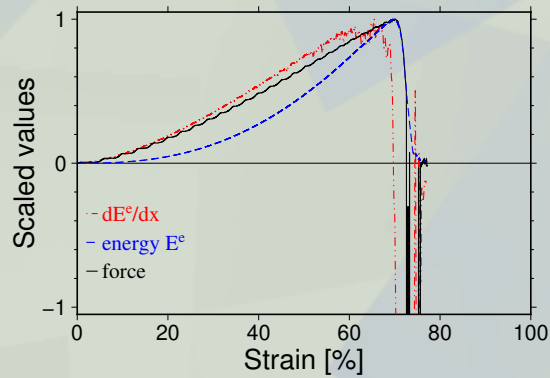
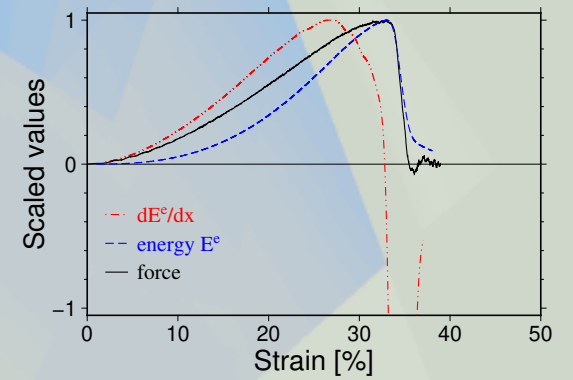
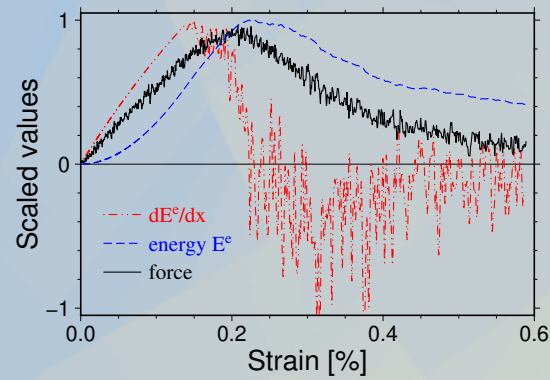
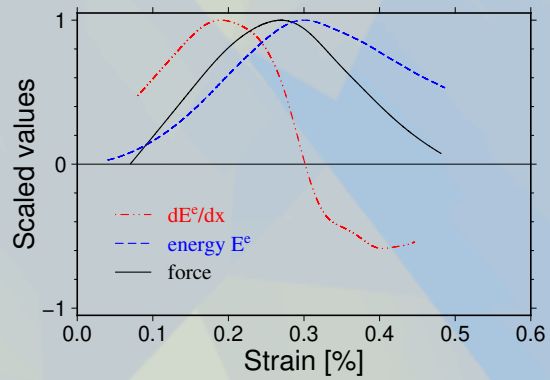
Dynamics of fragmentation



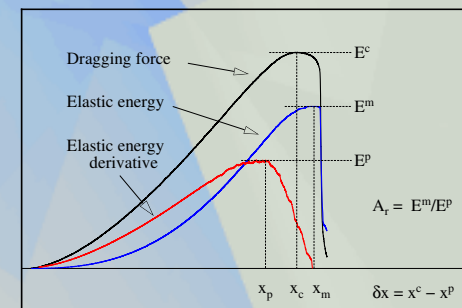
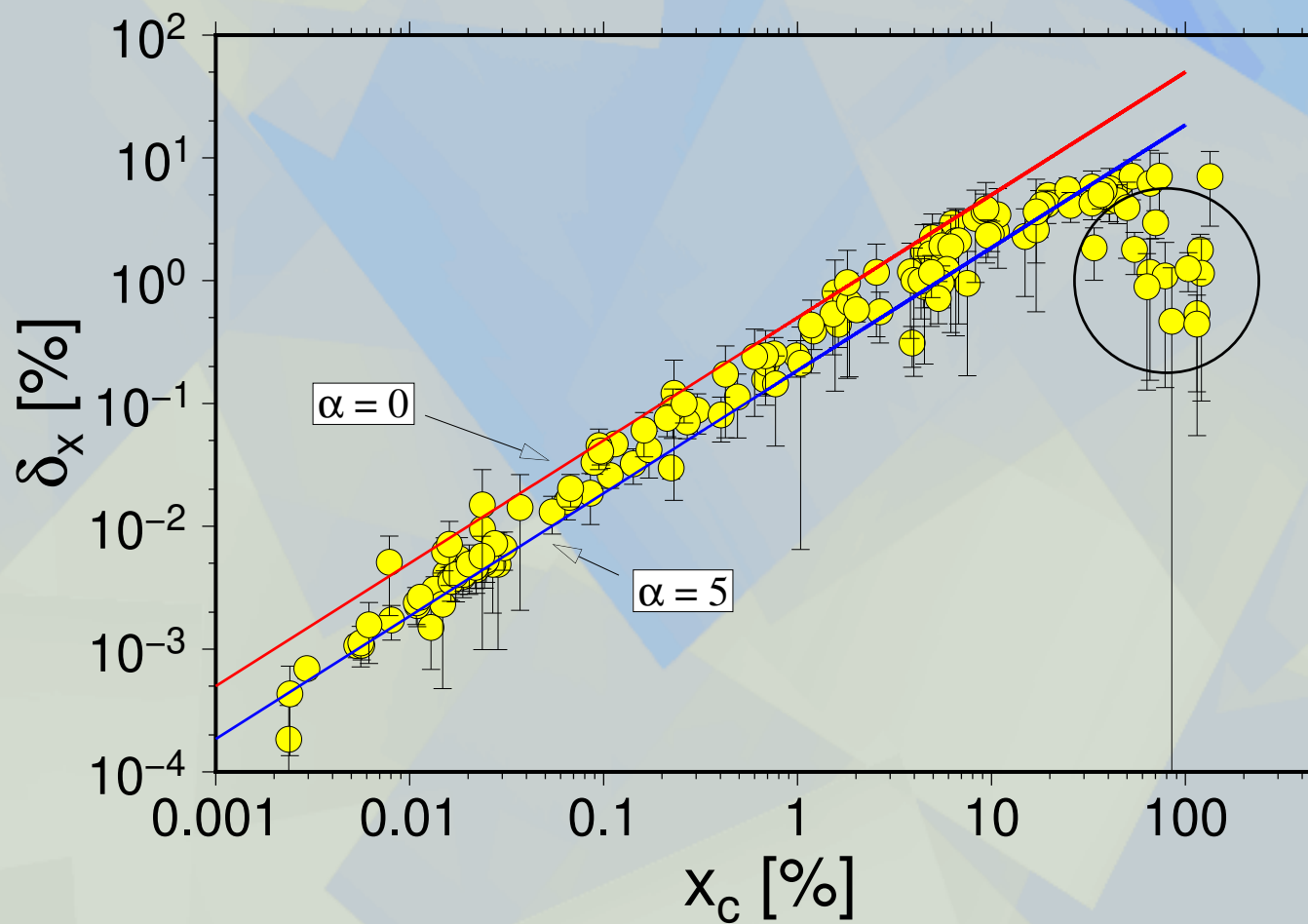
Fiber Bundle Model: *Front. Phys.* (2019) SP, JTK, AH



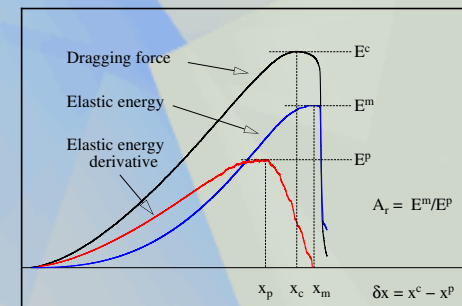
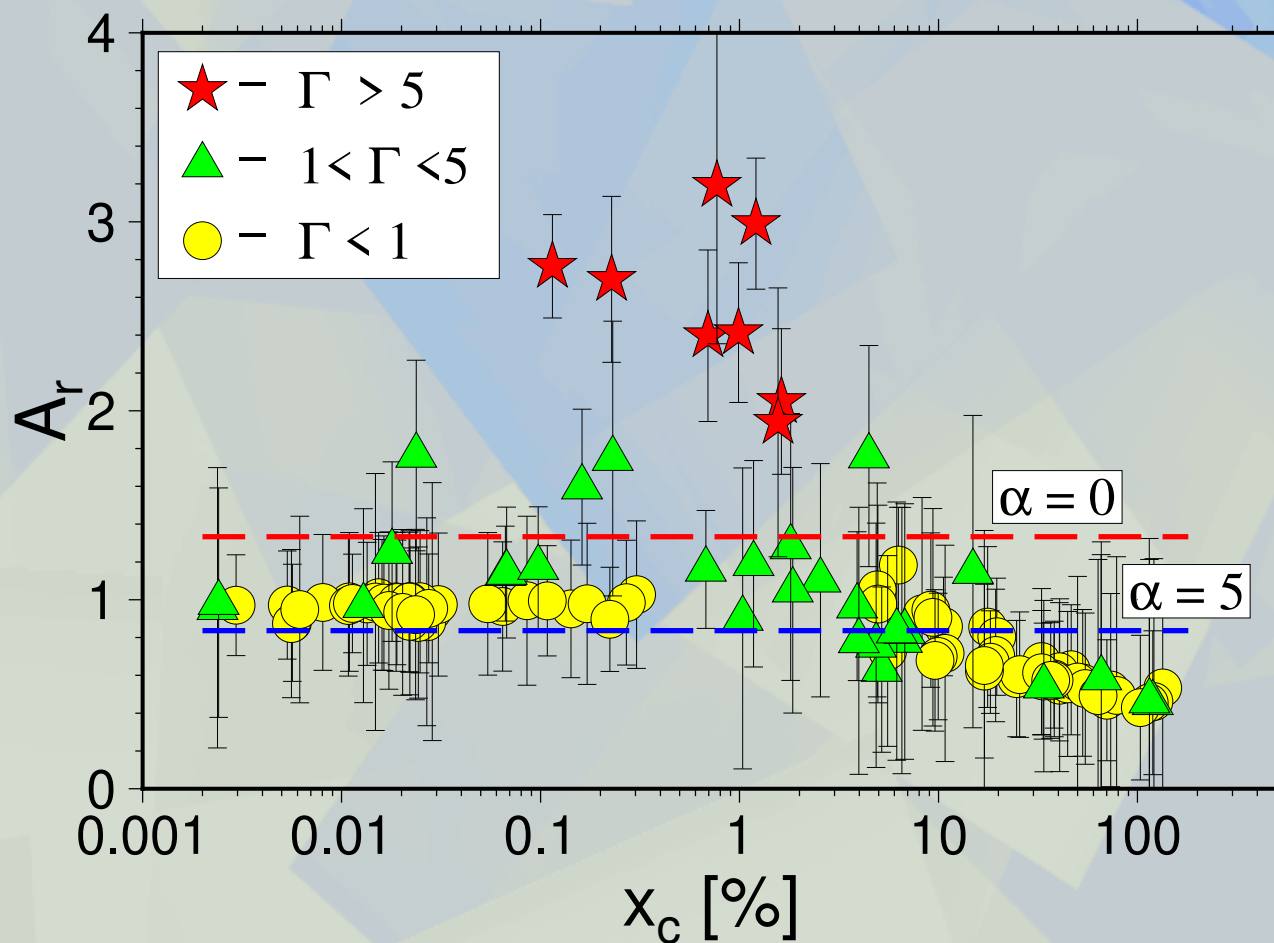
DEM simulations



Results (1)



Results (2)



Going ahead ...

1. comparison with real data

- ✦ induced seismicity
- ✦ breaking ice ...

2. further theoretical analysis