

GEOPHYSICS call for papers

## Hydromechanical phenomena at the pore scale and their upscaling

This special section of Geophysics is dedicated to studies of hydromechanical phenomena at the pore scale which complement or extend the classical understanding of rock poroelasticity. In the process of upscaling coupled hydromechanical phenomena of fluid-saturated porous media, classical theories of poroelasticity neglect certain pore-scale effects, which may strongly affect geophysical acoustic measurements in the seismic-to-sonic frequency range. Hence, we propose to revisit the pore scale to explore poroelasticity in its full range of possibilities as well as to consider new upscaling approaches. We are aiming at a representative sampling of the latest advances in this area inspired and motivated by recent developments in a number of techniques. For example, advances in laboratory-based characterization techniques now enable well constrained investigations of frequency-dependent effects in fluid-saturated rocks. Advances in numerical techniques, combined with the continuous increase of computation power, allow for higher resolution and more accurate estimates of hydraulic and mechanical properties based on 3D image data sets of the rock microstructure or on stochastic distributions of microstructural features.

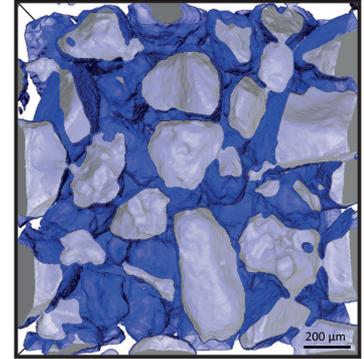


Image credit: Kathleen Sell (Johannes Gutenberg University Mainz, Germany)

Ultimately, this special section aims at presenting current state-of-the-art developments in the research field and to stimulate interest not only among rock physicists but also among reservoir geophysicists. We invite researchers to submit original research articles, as well as review articles, covering theoretical, numerical, and experimental aspects.

### Topics of interest include:

- Laboratory measurements of hydromechanical properties of rocks
- Theories of poroelasticity
- Effective medium theories
- Pore-scale numerical simulations
- Computations of effective mechanical or hydraulic properties
- Numerical upscaling approaches
- Attenuation and velocity dispersion caused by pore-scale phenomena
- Studies based on images (e.g., SEM, X-Ray micro-CT) of the rock microstructure
- Interpretation of borehole pressure transients considering the hydromechanical coupling

Manuscripts must be uploaded using the GEOPHYSICS online submission system (<https://mc.manuscriptcentral.com/geophysics>) and will undergo the standard SEG GEOPHYSICS review process, which includes a double-blind peer review by three reviewers. When uploading manuscripts, please select **Hydromechanical phenomena at the pore scale and their upscaling** as the manuscript type.

### We will work according to the following timeline:

Submission deadline: ..... 1 July 2018  
Peer review complete: ..... 1 February 2019  
Publication in the issue: ..... May-June 2019

### Special-section editors:

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