Abstract Submitted
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Mesoscale poroelasticity of heterogeneous media SIAVASH MONFARED, HADRIEN LAUBIE , Massachusetts Inst of Tech-MIT, FARHANG RADJAI [1], Universite de Montpellier , ROLAND PELLENQ, FRANZ-JOSEF ULM, Massachusetts Inst of Tech-MIT — Poroelastic behavior of heterogeneous media is revisited. Lattice Element Method (LEM) is used to model interaction between solid constituents due to a pressurized pore space. Exploring beyond mean-field based theories in continuum microporomechanics, local textural variations and its contribution to the global anisotropic poroelastic behavior of real multiphase porous media are captured. To this end, statistical distributions of mesoscale poroelastic coefficients from numerical simulations on X-ray microscopy scans of two different organic-rich shales with different microtextures are presented. The results are compared with predictions using mean-field based tools of continuum micromechanics. The textural dependency of strain localization and stress chain formation captured in this framework promises a powerful tool for modeling poroelastic response of complex porous composites and a path to incorporate local textural and elastic variations into a continuum description.

[1]Visiting Scientist, CNRS-MIT, MIT

Siavash Monfared
Massachusetts Inst of Tech-MIT

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