

A New Class of Multiscale Reduced Computational Models for Coupled Flow and Geomechanics in Porous Media Characterized by Severe Geological Complexity

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In this talk, we present a new class of multiscale computational reduced models to describe flow in deformable porous media with the presence of geological complexity. Among the geological structures, we particularly highlight the presence of fractures (joints) which are capable of sustaining non-linear elastic stresses, geological faults containing adjacent damage zones induced by tectonic shear stresses and karst conduits (caves) which arise from water (meteoric or hydrothermal) dissolution. Numerical simulations of hydrocarbon flow in the giant brazilian pre-salts reservoirs are presented to validate the proposed model