

## **Stimulating Clay Rich Reservoirs: From Microtomography to Enhancing Ductile Reservoirs Rocks**

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We present a new approach for stimulating ductile reservoir rocks. The approach is based on a new multiscale workflow. The workflow is particularly suited for unconventional gas plays as clay minerals creep at very low temperatures and can show thermally activated dewatering/gassing-reactions, which generate shear-aligned porosity.

The workflow has so far been tested for high temperature deformation of granite where high speed time-lapse synchrotron deformation experiments were reproduced in a numerical experiment to derive the multiphysics processes leading to formation of microcracks. In a next step the so calibrated computational approach is used to predict the stimulation protocol for the reservoir. The aim of this step is to control the coupled propagation of permeability in a virtual experiment prior to the costly field trial. This final step allows assessing the physics of time and length scales of a reservoir and its surrounding tectonic environment and can be used to optimize the injection strategy. The new method is promising for characterizing and stimulating many other reservoir materials.

**Notes**