Mudstone Reservoir Compaction – Triaxial Testing and a Brief Look at the Micromechanical Behavior

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Dr. Evan Kias is a geomechanics specialist at W. D. Von Gonten Engineering in Houston, TX. His presentation will be at 9:00 Central Time on Thursday, October 19, 2023. The topic is **"Mudstone Reservoir Compaction – Triaxial Testing and a Brief Look at the Micromechanical Behavior."**

Abstract

The mechanical properties of unconventional reservoir rocks typically follow linear and elastic trends where the Youngs's modulus, Poisson's ratio, elastic anisotropy, and compressive strength are constant with varying confining stress. The measured properties and typical trends are then used for hydraulic fracturing and wellbore stability modeling. However, in some unconventional reservoir rocks, non-linear and non-elastic behavior (i.e., compaction and stress-dependent properties) may be observed. In this presentation I will review the topic of compaction plasticity in rock mechanics with a series of tests conducted on Indiana limestone. Then I will present results of triaxial testing on two mudstones, the Vaca Muerta and a middle eastern carbonate, both exhibiting compaction plasticity. I'll show SEM imagery used to investigate the micromechanics driving the plasticity and then I will finish by presenting some field implications for plasticity and non-linear elastic behavior.

Biography

Evan Kias is a geomechanics specialist at W. D. Von Gonten Engineering in Houston, TX. He received his Ph.D. in Mining and Earth Systems Engineering at the Colorado School of Mines in 2013. He also holds degrees in Civil Engineering (M.S.) and Physics (B.S.). His research interest is currently focused on plasticity and micromechanics in the laboratory. His professional career in Houston has been focused on laboratory characterization of unconventional oil and gas lithologies in consulting and research and development settings. Additional topics of expertise in hydraulic fracturing include rock/proppant interaction and clay stability.