Geophysical Research Abstracts
Vol. 18, EGU2016-18376, 2016
EGU General Assembly 2016

Viscoelasticity of multiphase fluids: future directions

Nicola Tisato (1), Kyle Spikes (1), Farzam Javadpour (1,2)

(1) The University of Texas at Austin, Jackson School of Geosciences, Austin, TX, (2) The University of Texas at Austin, Bureau of Economic Geology, Austin, TX

Recently, it has been demonstrated that rocks saturated with bubbly fluids attenuate seismic waves as the propagating elastic wave causes a thermodynamic disequilibrium between the liquid and the gas phases. The new attenuation mechanism, which is called wave-induced-gas-exsolution-dissolution (WIGED) and previously, was only postulated, opens up new perspectives for exploration geophysics as it could potentially improve the imaging of the subsurface. In particular, accounting for WIGED during seismic inversion could allow to better decipher seismic waves to disclose information about saturating phases. This will improve, for instance, the mapping of subsurface gas-plumes that might form during anthropogenic activities or natural phenomena such as those prior to volcanic eruptions.
In the present contribution we will report the theory and the numerical method utilized to calculate the seismic-wave-attenuation related to WIGED and we will underline the assumptions and the limitations related to the theory. Then, we will present the experimental and the numerical strategy that we will employ to improve WIGED theory in order to incorporate additional effects, such as the role of interfacial tensions, or to extend it to fluid-fluid interaction