

**Finite element upscaling to characterize
the seismic response of hydrocarbon reservoirs**

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ABSTRACT

An hydrocarbon reservoir is a fluid-saturated poroelastic medium (a Biot medium). In a Biot medium two compressional waves, one fast and one slow and one shear wave can propagate. Fast waves traveling in a Biot medium induce fluid-pressure gradients at mesoscopic-scale heterogeneities, generating wave induced fluid flow (WIFF). I present a FE upscaling procedure to characterize the seismic response at the macroscale of a highly heterogeneous Biot medium.