

A Fluid Inclusion in a Poroelastic Solid Susceptible to Void Compaction

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Experimental results by Zhu and Wong (J. Geophys. Res., 102: 3027-3041, 1997) suggests that void compaction can take place in materials such as sandstone leading to alterations in the elasticity the hydraulic conductivity properties. The poroelastic behaviour of these materials can be modelled by appeal to stress-dependent skeletal response. The stress dependent alterations of the elasticity and hydraulic conductivity values are determined through an evaluation of the experimental data for Berea Sandstone The computational results illustrate the influence of the void compaction process on both the amplification of the pressure in the fluid inclusion, which represents the Mandel-Cryer effect, and on the rate at which dissipation of the fluid pressure takes place.

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