

Abstract Submitted
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Pre-Darcy flow in tight and shale formations¹ MORTEZA DEJAM, University of Wyoming, HASSAN HASSANZADEH, ZHANGXIN CHEN, University of Calgary — There are evidences that the fluid flow in tight and shale formations does not follow Darcy law, which is identified as pre-Darcy flow. Here, the unsteady linear flow of a slightly compressible fluid under the action of pre-Darcy flow is modeled and a generalized Boltzmann transformation technique is used to solve the corresponding highly nonlinear diffusivity equation analytically. The effect of pre-Darcy flow on the pressure diffusion in a homogenous formation is studied in terms of the nonlinear exponent, m , and the threshold pressure gradient, G_1 . In addition, the pressure gradient, flux, and cumulative production per unit area for different m and G_1 are compared with the classical solution of the diffusivity equation based on Darcy flow.

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