

Abstract Submitted  
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**An advective volume-balance model for flow in porous media<sup>1</sup>**

CARLOS MALAGA, FRANCISCO MANDUJANO, Physics Department. School of Science. Universidad Nacional Autonoma de Mexico, JULIAN BECERRA, Abacus, CINVESTAV — Volume-balance models are used by petroleum engineers to simulate multiphase and multicomponent flow phenomena in porous media and the extraction process in oil reservoirs. In these models, mass conservation equations and Darcy's law are supplemented by a balance condition for the pore and fluid volumes. This provides a pressure equation suitable for simulating a compressible flow within a compressible solid matrix. Here we present an alternative interpretation of the volume-balance condition that includes the advective transport within a consolidated porous media. We obtain a modified equation for the time evolution of the pressure field. Preliminary numerical tests of phase separation due to gravity suggest the model reproduces qualitatively the physical phenomena.

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