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Daniel M Anderson* (danders1@gmu.edu), Dept. of Mathematical Sciences, 4400 University Drive, MS3F2, George Mason University, Fairfax, VA 22030. *Homogenization for Free Boundary Problems in Layered Porous Media.*

We examine mathematical models and homogenization approaches for gravity currents in heterogeneous porous media. We first outline the dynamics of a gravity current in a layered porous media slumping along an impermeable bottom boundary. We then focus on a simpler geometry in which a free-boundary problem characterizes one-dimensional drainage through layered media. We examine analytical and numerical solutions as well as ones generated by asymptotic approximation schemes. Of particular interest is the identification of corrections to the leading-order approximations based on homogenization theory. (Received September 13, 2013)