



Modeling Petroleum Migration: Conventional vs Unconventional Techniques

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Summary

The choice of the optimal petroleum migration modeling technique depends on the type of petroleum system being modeled. In conventional petroleum systems, petroleum is typically generated in a relatively impermeable source rock and migrates to a high-permeability reservoir. Migration modeling in these systems focuses on transport through relatively permeable rocks between source and trap. In contrast, in unconventional shale plays the source rock typically also serves as the reservoir, and modeling should focus primarily on transport within the low permeability shale. We discuss the application of two modeling methods to both conventional and unconventional systems: Darcy flow modeling and a combined Darcy flow and invasion percolation method, with some recent improvements focusing on capillary effects, complex accumulation structures, migration losses and breakthrough. To illustrate these methods, we conclude with a discussion of modeling in some specific resource areas, such as the Green Canyon area of the Gulf of Mexico and the Shublik Play on the Alaska North Slope