

EFFECT OF HETEROGENEITY ON THE MISCIBLE DISPLACEMENT OF FLUIDS

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The miscible displacement of a fluid by another with different density and viscosity in a porous medium is controlled by the gravitational and viscous forces. The advancing front can display a stable (gravity current) or fingering shape depending on the relation of the governing forces. The properties of the porous medium, which is usually considered homogeneous, are also important for the dynamics of the problem. Here we study the influence of hydraulic conductivity heterogeneity on the miscible displacement of fluids in porous media under a stochastic approach. We perform a series of numerical simulations using randomly generated conductivity fields realizations with varying statistical properties. Numerical results are used to analyze the impact of variance and spatial correlation of conductivity fields on the fingering or stable behavior of the plume, its shape and migration velocity. We also explore how heterogeneity affects the mixing between the two fluids.