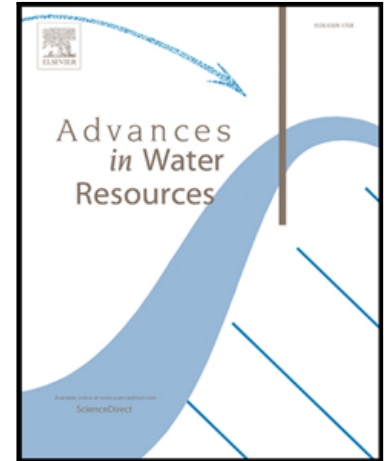


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The Impact of Porous Media Heterogeneity on Non-Darcy Flow Behaviour from Pore-Scale Simulation

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Highlights

1. The effect of pore-scale heterogeneity on non-Darcy flow behaviour is investigated using direct flow simulations on 3-D images of a beadpack, Bentheimer sandstone and Estailades carbonate.
2. The critical Reynolds number indicating the cessation of the creeping Darcy flow regime in Estailades carbonate is two orders of magnitude smaller than in Bentheimer sandstone, and is three orders of magnitude smaller than in the beadpack.
3. The emergence of steady eddies in pore space of Estailades at elevated fluid velocities accounts for the early transition away from the Darcy flow regime.
4. The non-Darcy coefficient β , the onset of non-Darcy flow, and the Darcy permeability for all samples are obtained and compared to available experimental data

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