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Structural response in flow around vertical fault slit in a porous medium: an interacting lattice gas computer simulation JOE GETTRUST, Naval Research Laboratory - Stennis Space Center, RAS PANDEY, University of Southern Mississippi — Response of the density profile of constituents in a driven flow through a porous medium with a vertical fault slit is studied by an interacting lattice gas model on a cubic lattice. The porous medium with a source of fluid (particles) at the bottom and open top is generated by a random distribution of sediment barriers with a longitudinal slit of transverse width L_s. A set of nearest neighbor interactions between mobile particles and effective medium (empty sites and barriers) is considered. The hydrostatic pressure bias (H) is implemented probabilistically. Stochastic movements of particles are governed by the bias and the interaction energy with the Metropolis algorithm. A periodic boundary condition is used along the transverse directions. Fluid particles can leave the system from top or bottom along the longitudinal direction but can be released into the lattice only from the source at the bottom according to their lattice concentration. We examine the transport of constituents, their flow, and density profiles as a function of bias (H) at different porosities. The steady state density exhibits interesting profiles as a function of bias, as the high mobility within the slit region causes hydrostatic correlations among the fluid constituents.

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