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Flow through a laboratory sediment sample: hydraulic conductivity by computer simulation modeling EDWARD BRAITHWAITE, Naval Research Laboratory, ALLEN REED, Naval Research Laboratory, RAY SEYFARTH, University of Southern Mississippi, RAS PANDEY, Naval Research Laboratory and University of Southern Mississippi , JOE GETTRUST, Naval Research Laboratory — Digitized catscan image of a three dimensional laboratory sediment sample provides a host matrix of size 100^3. The porosity of the sample is 0.282, i.e., below the site percolation threshold of a cubic lattice. Despite a high fraction of sediment barriers, visualizations reveal that the ramified channels of connected pores span across the sample. A coarse grained description is used to model fluid by interacting particles in spirit of classical lattice gas. As in experiments, the source of the fluid is connected at one end of the sample in our computer simulations. The fluid constituents execute their stochastic motion via Metropolis algorithm and flow through the sample with periodic boundary condition across transverse boundaries. From the net flow of fluid, we estimate the flux density and the hydraulic conductivity in steady-state. We also consider pressure bias (H) to investigate the response. Results of transport, flux rate, and distribution of fluid will be presented.

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