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Fluid flow through reconstituted marine quartz sediments - an interacting lattice gas simulation ALLEN REED, EDWARD BRAITHWAITE, JOE GETTRUST, Naval Research Laboratory, RAS PANDEY, Naval Research Laboratory and University of Southern Mississippi — A porous sediment sample (cylinder of 5.9 mm diameter) is reconstituted in the laboratory using marine quartz sands from the Northern Gulf of Mexico. Digitized computed tomography images of sub-sample (cylinder of 6.5 mm diameter), removed from different regions of the laboratory sample, provide the porous matrix for an interacting lattice gas simulation. A cubic lattice of size 100^3 is used to represent the sediment matrix of the order of 64 mm^3. Different regions of the reconstituted sample are represented by corresponding porous matrices, each with a unique pore distribution. Mobile particles, the constituents of an interacting lattice gas, are used to model the fluid, which flows through the porous media from a source at the bottom to a sink at the top. Fluid particles are driven by their concentration gradient and an external pressure bias against gravity. Variations of the root mean square displacement of each particle (tracer) and that of their center of mass with the time steps, mass transfer and flux are examined as a function of the external pressure bias. Transport properties, including the response of the fluid flux to pressure bias, will be presented.

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