Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Flow through a reconstituted marine quartz sediment by an interacting lattice gas simulation ALLEN REED, Naval Reseach Laboratory, EDWARD BRAITHWAITE, JOE GETTRUST, Naval Research Laboratory, RAS PANDEY, Naval Research Laboratory and University of Southern Mississippi — Regions of a reconstituted cylinder of quartz sediment (5.9 cm diameter x 13 cm long) from the Northern Gulf of Mexico were sub-sampled as 6.5 mm diameter cylinders. Images of sub-samples were made from x-ray micro-focus computed tomography data at 11 micron resolution. Using a coarse-grained approximation, each sample image is represented by a cubic lattice (100^3 voxels). Fluid, a pool of particles at the lattice base supplies fluid-particles flows against gravity to the sink at the top of the lattice. In addition to the concentration gradient, an external pressure bias, similar to a hydraulic head drives the mobile particles upward against gravity. Particles are allowed to execute stochastic motion by a Metropolis algorithm. Variations of the root mean square displacement of each fluid-particle and their center of mass with the time steps, mass transfer, and flux are examined as a function of the external pressure bias and compared to constant head permeameter measurements.

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Date submitted: 21 Nov 2007 Electronic form version 1.4