Geophysical Research Abstracts
Vol. 17, EGU2015-2580, 2015
EGU General Assembly 2015

Another look at the colloid particle size-dependent dispersivity

Constantinos V. Chrysikopoulos (1) and Vasileios E. Katzourakis (2)

(1) Technical University of Crete, School of Environmental Engineering, Chania 73100, Greece (cvc@enveng.tuc.gr), (2) Department of Civil Engineering, Environmental Engineering Laboratory, University of Patras, Patras 26500. Greece (billiskatz@yahoo.gr)

Laboratory and field studies have demonstrated that dispersion coefficients evaluated by fitting advection-dispersion transport models to nonreactive tracer breakthrough curves do not adequately describe colloid transport under the same flow field conditions. Here an extensive laboratory study was undertaken to assess whether the dispersivity, which traditionally has been considered to be a property of the porous medium, is dependent on colloid particle size and interstitial velocity. A total of 48 colloid transport experiments were performed in columns packed with glass beads under chemically unfavorable colloid attachment conditions. Nine different colloid diameters, and various flow velocities were examined. The breakthrough curves were successfully simulated with a mathematical model describing colloid transport in homogeneous, water saturated porous media. The experimental data set collected in this study demonstrated that the dispersivity is positively correlated with colloid particle size, and increases with increasing velocity. The dispersivity values determined in this laboratory study were compared with 380 dispersivity values from earlier laboratory- and field-scale solute, colloid and biocolloid transport studies published in the literature.