

# MODELING THE INFLUENCE OF SURFACE COMPLEXATION ON NON-CONSERVATIVE IONIC TRACER TRANSPORT THROUGH WEATHERED SEDIMENTS

**M. Guerin** (1), J.C. Seaman (1)

(1) Savannah River Ecology Laboratory, Advanced Analytical Center for Environmental Sciences, University of Georgia, Drawer E, Aiken, SC 29802, USA

guerin@srel.edu

Reactive transport models and surface complexation models were developed as aids for investigating and explaining the geochemical characteristics of highly weathered sediments found in the Upper Coastal Plain region of the southeastern U.S.A. (Aiken, South Carolina). Low ionic strength (0.001 N) solute breakthrough experiments had previously shown that various anionic tracers are delayed with respect to tritium in this material. The addition of selected surface reactions to equilibrium speciation and mineral precipitation/dissolution reactive transport models of the experiments effectively modeled the non-conservative breakthrough behavior of various anionic tracers in the columns. The study integrates site-specific field data, sediment-specific laboratory data, and data collected from the literature on stability constants for proposed surface complexation reactions on clay minerals in the sediment, especially goethite. Selected sensitivity analyses of equilibrium model parameters (soil solution chemistry) and of reactive transport model parameters quantify several sources of uncertainty in the model results. As sample disruption was minimized during collection of bulk material for the column experiments and the low ionic strengths are analogous to field observations, the results form a bridging step to modeling field-scale reactive transport studies in these sediments.