

Abstract Submitted  
for the DFD13 Meeting of  
The American Physical Society

**Transient diffusive boundary layers in heterogeneous porous media** DON DANIEL, AMIR RIAZ, University of Maryland, College Park — The onset of convection of gravitationally unstable transient, diffusive boundary layers in saline aquifers has been extensively investigated due to its importance in carbon dioxide sequestration. However, due to theoretical complexities, the onset of convection in heterogeneous porous media with span-wise variation in permeability (varying cross-wise to direction of gravity) has been relatively less explored. Unlike homogeneous porous media, we demonstrate that the onset of convection in such heterogeneous media is simultaneously triggered by a combination of several individual span-wise perturbation modes. Using a combination of linear stability analysis and numerical simulations, we obtain the dominant two dimensional global perturbation structures for different spatially varying permeability fields. We compare our results with previous literature for homogeneous porous media, and conclude whether the onset of convection in heterogeneous media is enhanced or delayed.

Don Daniel  
University of Maryland, College Park

Date submitted: 30 Jul 2013

Electronic form version 1.4