Abstract Submitted
for the DFD13 Meeting of
The American Physical Society

Stability of High Rayleigh-Number Equilibrium Solutions of the Darcy–Oberbeck–Boussinesq Equations[1] BAOLE WEN, University of New Hampshire, LINDSEY CORSON, University of Strathclyde, GREGORY CHINI, University of New Hampshire — There has been significant renewed interest in dissolution-driven convection in porous layers owing to the potential impact of this process on carbon dioxide storage in terrestrial aquifers. In this talk, we present some numerically-exact equilibrium solutions to the porous medium convection problem in small laterally-periodic domains at high Rayleigh number Ra. The "uni-cellular" equilibrium solutions first found by Corson and Chini (2011) by solving the steady Darcy–Oberbeck–Boussinesq equations are recovered and, in the interior (i.e. away from upper and lower boundary layers), are shown to have the same horizontal-mean structure as the "heat-exchanger" solutions identified by Hewitt et al. (2012). Secondary stability analysis of the steady solutions is performed, and implications for high-Ra porous medium convection are discussed.

[1]Funding from NSF Award 0928098 is gratefully acknowledged.

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Date submitted: 01 Aug 2013 Electronic form version 1.4