Abstract Submitted
for the DFD12 Meeting of
The American Physical Society

Fluid flow and ponding on elastic beams JEROME NEUFELD, BP Institute, Department of Earth Sciences, Department of Applied Mathematics and Theoretical Physics, University of Cambridge, RACHAEL BONNEBAIGT, Department of Applied Mathematics and Theoretical Physics, University of Cambridge — Fluids propagate over floating, elastically deformable surfaces in a variety of industrial, environmental, and geological settings, and can exhibit a wide variety of transient and steady-state behaviours. Here we show that, for a sufficiently localised release, steady states exist where a dense, viscous fluid propagates along a beam floating on a relatively light, inviscid ocean. The steady-state radius, fluid depth, and elastic deformation can be characterised solely as functions of the beam's bending length scale, and the relative densities of ocean and fluid. In contrast, for releasees of relatively light fluid no steady states exist, and a transient solution is instead found.

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Date submitted: 03 Aug 2012 Electronic form version 1.4