

Abstract Submitted
for the DFD13 Meeting of
The American Physical Society

Long-Lasting Effect of Initial Configuration in Gravitational Spreading of Material Fronts¹ NADIM ZGHEIB, Department of Mechanical and Aerospace Engineering, University of Florida, Gainesville, FL 32611, USA, THOMAS BONOMETTI, Université de Toulouse; INPT, UPS; IMFT; UMR 552, Allée Camille Soula, F-31400 Toulouse, France, S. BALACHANDAR, Department of Mechanical and Aerospace Engineering, University of Florida, Gainesville, FL 32611, USA — We present results from experiments and simulations pertaining to finite release gravity currents with a non-axisymmetric cross-section. First, we demonstrate that, contrary to expectation, the effects of the initial shape strongly influence the current's evolution well into the self-similar phases. Then we identify the physical mechanisms responsible for this dependence and propose a simple model capable of well capturing the dynamics of such releases. Finally, we show that this dependence on initial configuration is robust for various types of gravity currents (homogeneous and inhomogeneous) over a wide range of parameters such as Reynolds number, density ratio, wall friction and aspect ratio. We additionally inspect the deposition patterns pertaining to the abovementioned inhomogeneous currents.

¹Chateaubriand Fellowship; NSF OISE-0968313

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Date submitted: 02 Aug 2013

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