

Abstract Submitted
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The Effect of Confining Boundaries on Viscous Gravity Currents.

DAISUKE TAKAGI, University of Cambridge, HERBERT HUPPERT, DAMTP, University of Cambridge — We examine the influence of different bottom boundaries on viscous gravity currents by considering two cases: horizontal flow along pipes with (i) semi-circular and (ii) V-shaped cross-sections. The main motivations of the study are to understand the underlying structure of the solutions and also to indicate how to analyze lava flows down confined channels. Similarity solutions are obtained for both cases treating the problem as a thin layer of unidirectional viscous flow. Laboratory experiments are set up so that a viscous liquid (glycerine) is initially suspended by a lock gate and released at one end of the pipe into open air. The rate of spread and shape of the resulting currents will be discussed quantitatively. We will conclude by comparing the analytic solutions with the experimental data and showing that they are in accurate agreement.

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