Abstract Submitted
for the DFD14 Meeting of
The American Physical Society

Gravity current flow over topography with a two-layer stratified ambient[1] MITCH NICHOLSON, MORRIS FLYNN, U.Alberta — We report upon a laboratory experimental study of dense lock-released gravity currents propagating through a two-layer ambient and over sinusoidal topography of amplitude A and wavelength λ or 2λ. Particular emphasis is placed on a Boussinesq flow regime and the initial (or "slumping") stage of motion. Because of the presence of the topography, the height of both the lower layer and the channel varies in the downstream direction. In contrast to the flat-bottom case, the gravity current front therefore accelerates and decelerates as it respectively flows up- and downhill. Overall, the topography has a retarding effect on the average front speed, U_{avg}, whose variation with A, the layer densities and the interface height is described. The topography also alters the structure of the gravity current head by inducing large-scale vortices in regions characterized by a substantial shear flow. As in the flat-bottom case, the forward advance of the gravity current can excite a downstream-propagating interfacial wave. We identify the parametric region corresponding to wave generation.

[1]funding by NSERC

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Date submitted: 23 Jul 2014 Electronic form version 1.4