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Gravity Currents Propagating Up a Slope in a Uniform Ambient and a Two-Layer Stratified Ambient Depth LARISSA MARLEAU, MORRIS FLYNN, BRUCE SUTHERLAND, Univ of Alberta — Bottom propagating gravity currents resulting from full- and partial-depth lock-release experiments are investigated as they propagate up a slope within a uniform and a two-layer stratified ambient. For the former case we adapt the theory of Shin et al. (J. Fluid Mech., 521, 2004) and derive a relationship for the deceleration of the front as a function of the slope angle and gravity current density. Experimental results show that the shape of the gravity current is self-similar as it decelerates over relatively steep slopes. The evolution of a gravity current in a two-layer ambient is complicated by the excitation of and interaction with a solitary wave. If the initial gravity current speed is subcritical to the wave speed, the current eventually stops abruptly while the wave continues at constant speed. If supercritical, turbulence at the current head is suppressed as it approaches the interface at the leading edge of the wave and the is re-established as the head becomes in direct contact with the upper layer.

Larissa Marleau
Univ of Alberta

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