

Abstract Submitted
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Gravity currents in an ambient flow ANJA SLIM, HERBERT HUPPERT, University of Cambridge — Gravity currents occur whenever fluid of one density flows, predominantly horizontally, into fluid of a different density. In natural and man-made situations they are frequently generated in the presence of a flowing ambient. For example, both volcanic ash clouds and toxic gas releases are affected by atmospheric winds, while river plumes and pollutant releases in the sea are affected by marine currents. We theoretically study the canonical problem of a homogeneous, high Reynolds number gravity current generated by a constant source in a uniform ambient flow. In order to model it we employ a shallow-water formulation and present both numerical and asymptotic solutions. Of interest is how the current evolves and its dimensions, particularly its maximum upstream extent. We also briefly describe unusual features of gravity currents generated by a slowly sedimenting particle load.

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