

DEDICATION

To My Dear Father-----the symbol of
wisdom

To My Mother----- the essence of my life
My Brothers and Sisters

My Friends and All My Family

To All those who gave me
Enough support during my work.

Supervisor

Dr. Bakri Mirghani Ahmed

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Abstract

We present a mainly theoretical study of high-Reynolds-number planar gravity currents in a uniformly flowing deep ambient. The gravity currents are generated by a constant line source of fluid, and may also be supplied with a source of horizontal momentum and a source of particles. We model the motion using a shallow-water approximation and represent the effects of the ambient flow by imposing a Froude-number condition in a moving frame. We present analytic and numerical expressions for the threshold ambient flow speed above which no upstream propagation can occur at longtime. For homogeneous gravity currents in an ambient flow below threshold, we find similarity solutions in which the up- and downstream fronts spread at a constant rate and the current propagates indefinitely in both directions. For gravity currents consisting of both interstitial fluid of a different density to the ambient and sediment in particle load, we find long-time asymptotic solutions for ambient flow strengths below threshold

الخلاصة

في هذا البحث نقدم بصفة نظرية انسياب تيار تنثا قلبي مستوي له عدد رينولدز عالي خلال تيار محيط مستقر وعميق . التيارات التنثا قلبية تتولد بواسطة مصدر ثابت من المائع . ويمكن تطبيق ذلك بمصدر لمدة بمنبع له دفع أفقي من الجسيمات . نضع نموذج للحركة في شكل طبقة ضحلة من المائع وتمثل لاثر التيار المحيط بافتراض شرط علي عدد فروود في هيكل متحرك . تعطي قيم تحليلية وعددية لحالة العتبة للانسياب المحيط التي فوقها لا يمكن ان يصعد علي المدي الطويل تيار تنثا قلبي متجانس اسفل العتبة يوجد حل متماثل في حالتي التيار الصاعد والهابط في سرعات منتظمة .

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