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Schmidt number and non-Boussinesq effects on the propagation of density currents. THOMAS BONOMETTI, S. BALACHANDAR, University of Florida — The results of a numerical study of density currents are described. Two complementary approaches are used, namely a high-resolution spectral method and a finite-volume interface capturing method. They allow to describe density currents for a wide range of Schmidt number (Sc), density contrast and Reynolds number (Re). First we establish that Sc only weakly affects the dynamics of density currents provided Re is large. The patterns of lobes and clefts are observed to be independent of Sc while the formation of vortex structures at the interface is sensitive to Sc. A criterion is proposed for the stability of the interface, and is found to be in agreement with present computed results and available experimental and numerical data. Effects of wall friction are then considered. They are shown to play a significant role on the propagation of density currents. When slip (resp. no-slip) conditions are imposed at walls, agreement (resp. discrepancy) is observed between computed front velocities and shallow water theories. A simple model is proposed in order to take into account resistive effects at boundaries and good agreement is found for the whole range of density contrast.

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