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A comparison between laboratory and numerical simulations of gravity-driven coastal currents with a geostrophic theory SANDY GREGORIO[1], PETER THOMAS, The University of Warwick, DALE HAIDVOGEL, Rutgers University, EZGI TASKINOGLU, SRA International, ANDREW SKEEN, Etalon Research Ltd. — Laboratory and numerical simulations of buoyant, gravity-driven coastal currents are summarized and compared to the inviscid geostrophic theory of Thomas & Linden 2007.[2] The lengths, widths and velocities of the buoyant currents are studied. Agreement between the laboratory and numerical experiments and the geostrophic theory is found to depend on two non-dimensional parameters which characterize, respectively, the steepness of the plumes isopycnal interface and the strength of horizontal viscous forces (quantified by the horizontal Ekman number). The best agreement between experiments (both laboratory and numerical) and the geostrophic theory are found for the least viscous flows. At elevated values of the horizontal Ekman number, laboratory and numerical experiments depart more significantly from theory.

[1]MEOM/LEGI from the 1st of October 2011
[2]Thomas, P. J. and Linden, P.F. 2007. Rotating gravity currents: small-scale and large-scale laboratory experiments and a geostrophic model. *J. Fluid Mech.* **578**, 35-65.

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