Abstract Submitted
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**Gravity currents in stratified fluids**[1] PAUL LINDEN, University of Cambridge — This paper discusses the application of a model for the speed of a gravity current in an unstratified ambient fluid to the case where the ambient fluid is stratified with a constant vertical density gradient. The model is based on the fact, first noted by Ungarish & Huppert (2002), that away from the front of the current the flow is hydrostatic so that the driving pressure difference can be determined from a vertical integral of the density field. An energy-conserving model derived by Shin et al. (2004) for a gravity current in an unstratified fluid is modified to take account of the changed pressure difference. This modified model is compared with lock-release laboratory experiments of Maxworthy et al. (2002) and numerical simulations by Maxworthy et al. (2002), Birman et al. (2007) and White & Helfrich (2008). Excellent agreement between the predicted and observed current speeds is found for supercritical currents for a wide ratio of dimensionless lock-depths. Subcritical currents, on the other hand, are observed to travel faster than predicted by this model. The reasons for these behaviours are discussed and the roles of the internal waves generated in the ambient stratification are evaluated.

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