Analysis of one-dimensional models for exchange flows under strong stratification[1] HERMAN CLERCX, STEVEN KAPTEIN, Eindhoven University of Technology, VINCENZO ARMENIO, University of Trieste, MATIAS DURAN MATUTE, Eindhoven University of Technology — One-dimensional models of exchange flows driven by horizontal density gradients are well known for performing poorly in situations with weak turbulent mixing. The main issue with these models is that the horizontal density gradient is usually imposed as a constant, leading to non-physically high stratification known as runaway-stratification. Here, we propose two new parametrizations of the horizontal density gradient leading to one-dimensional models able to tackle strongly stratified exchange flows at high and low Schmidt number values. The models are extensively tested against results from laminar two-dimensional simulations and are shown to outperform the models using the classical constant parametrization for the horizontal density gradients.

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