

Abstract Submitted
for the DFD17 Meeting of
The American Physical Society

On the interaction of vortices and internal waves in the dead-water problem. ERIC HESTER, Univ of Sydney — Dead water refers to a mysterious increase in resistance experienced by boats in density-stratified waters. The problem has been documented since ancient times, and studied scientifically for over a century. These investigations have revealed the role of internal waves in generating drag. However, analytical approaches neglect important vortex dynamics, which experiments fail to visualise. For the first time, we study the phenomenon using state-of-the-art numerical simulations. We reproduce the effect and show it is greatest in strongly nonlinear regimes poorly modelled by current theory. The most exciting development found a new trailing vortex coupled to the boat. This robust structure is consistent with sailors accounts, but has been missed in previous scientific studies. We expect these results to lead to actionable ways to mitigate dead water in the real world.

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Date submitted: 30 Jul 2017

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