

Abstract Submitted
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Vertical propagation of submerged wakes in stratified fluids.¹

STEPHANE GALLET, GEOFFREY SPEDDING, University of Southern California — The vertical propagation of energy and momentum from vortex wakes immersed in a stratified ambient can be considered important either as a determinant of the vertical flux parameters required for effective mesoscale modeling in planetary-scale geophysical computations, or as an information transmission problem, where patterns from otherwise inaccessible objects can potentially be observed far from their origin, such as at a free surface. While internal waves can propagate this energy or information over relatively small timescales, questions have been raised as to how and whether the residual vortex motions themselves can propagate vertically through the atmosphere or ocean. A series of laboratory experiments was conducted in carefully-controlled conditions so that the long-time wake disturbances behind a towed sphere, and their vertical propagation through a uniform density gradient were measured. The propagation rates are compared with various models for the horizontal and vertical growth rates, and are parameterized with respect to the internal Froude number. The relative significance of the vertical diffusion can then be evaluated for field conditions.

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Geoffrey Spedding
University of Southern California

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