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[Volume 16, Issue 4 \(April 1986\)](#)

Journal of Physical Oceanography

Article: pp. 709–716 | [Abstract](#) | [PDF \(507K\)](#)

On the Propagation of Isolated Multilayer and Continuously Stratified Eddies

Peter D. Killworth

Robert Hooke Institute/Institute of Oceanographic Sciences, Dept. of Atmospheric Physics, Clarendon Laboratory, Oxford OXI 3PU, United Kingdom

(Manuscript received June 12, 1985, in final form October 11, 1985)

DOI: 10.1175/1520-0485(1986)016<0709:OTPOIM>2.0.CO;2

ABSTRACT

Integra expressions are derived for the east-west velocity of propagation of isolated eddies on a beta plane. It is assumed that the eddies have no surface or floor expression, i.e., that both surface and floor are isopycnals. The results of Nof and Mory are generalized and demonstrate the crucial necessity for all such results that, on the bounding density surfaces, the linearized Bernoulli function depends only on the depth of that surface. Thus there are examples of isolated eddies satisfying the assumptions but which are not directly amenable to the analyses presented hitherto. Results for multiple layers (including a simple rule for the direction of propagation) and for continuously stratified eddies, subject to some assumptions, are given. A simple model fit to salt lenses observed by Armi and Zenk gives westward motion of order 1 cm s^{-1} , which is not unreasonable.

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