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On the Motion of Isolated Lenses on a Beta-Plane

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ABSTRACT

This paper examines the motion and propagation of an isolated of anomalous water on a beta-plane, considered previously by Nof (1981). His perturbation analysis is extended to show the following:

- 1) Only westward propagation can occur, induced by the beta-effect; the eddy's speed must be ten less than two-thirds of the long Rossby-wave speed (unless the potential vorticity of the eddy is somewhere negative, which would be unlikely).
- 2) The eddy must be at least $2\sqrt{2}$ deformation radii in radius.
- 3) The shape and velocity structure of the eddy has a simple structure, which is calculated for one range of cases.
- 4) The unperturbed eddy (on an f -plane) is stable to small disturbances making it likely that the eddy can propagate great distances before decaying.

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