

Abstract Submitted  
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**Effects of convection and diffusion in the viscous Lamb dipole**

LING XU, North Carolina AT State University, ROBERT KRASNY, University of Michigan, Ann Arbor — We present a numerical study of the viscous Lamb dipole in the Reynolds number range  $125 \leq Re \leq 1000$ . The effects of convection and diffusion are examined by comparing solutions of the Navier-Stokes equations (NSE) and diffusion equation (DE) with the inviscid Lamb dipole as the initial condition. The results show that for a given Reynolds number, the vortex core size, shape, and maximum vorticity are diffusion-dominated features. However, the total circulation is affected by convection; at low  $Re$ , convection in the NSE inhibits circulation decay in comparison to the DE, while it enhances circulation decay at high  $Re$ . The lateral separation of the vortex cores plays a key role in this transition.

Ling Xu  
North Carolina A  
T State University

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