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Drift due to viscous vortex rings[1] THOMAS MORRELL, SAVERIO SPAGNOLIE, JEAN-LUC THIFFEAULT, Department of Mathematics, University of Wisconsin - Madison — Biomixing is the study of fluid mixing due to swimming organisms. While large organisms typically produce turbulent flows in their wake, small organisms produce less turbulent wakes; the main mechanism of mixing is the induced net particle displacement (drift). Several experiments have examined this drift for small jellyfish, which produce vortex rings that trap and transport a fair amount of fluid. Inviscid theory implies infinite particle displacements for the trapped fluid, so the effect of viscosity must be included to understand the damping of real vortex motion. We use a model viscous vortex ring to compute particle displacements and other relevant quantities, such as the integrated moments of the displacement. Fluid entrainment at the tail end of a growing vortex 'envelope' is found to play an important role in the total fluid transport and drift.

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