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A Darwinian mechanism for biogenic ocean mixing KAKANI KATIJA, Bioengineering, California Institute of Technology, JOHN DABIRI, Bioengineering and Aeronautics, California Institute of Technology — Recent observations of biogenic turbulence in the ocean have led to conflicting ideas regarding the contribution of animal swimming to ocean mixing. Previous measurements indicate elevated turbulent dissipation in the vicinity of large populations of planktonic animals swimming in concert. However, elevated turbulent dissipation is by itself insufficient proof of substantial biogenic mixing. We conducted field measurements of mixing efficiency by individual *Mastigias sp.* (a Palauan jellyfish) using a self-contained underwater velocimetry apparatus. These measurements revealed another mechanism that contributes to animal mixing besides wake turbulence. This mechanism was first described by Sir Charles Galton Darwin and is in fact the dominant mechanism of mixing by swimming animals. The efficiency of Darwin's mechanism (or drift) is dependent on animal shape rather than fluid length scale and, unlike turbulent wake mixing, is enhanced by the fluid viscosity. Therefore, it provides a means of biogenic mixing that can be equally effective in small plankton and large mammals.

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