Abstract Submitted
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Mixing efficiency of turbulent stratified flows: Not all flows are created equal[1] ALBERTO SCOTTI, BRIAN WHITE, UNC — Small scale mixing in the stratified interior of the ocean is a fundamental, yet poorly characterized, controlling factor of the global Meridional Overturning Circulation (MOC). In the oceanographic community, the mixing efficiency is usually assumed to be 20%. In this talk, we use DNS datasets to calculate the mixing efficiency in different class of flows. The mixing efficiency is calculated using the actual irreversible diapycnal flux of buoyancy (Winters and D'Asaro, 1996; Scotti et al., 2006) instead of the more customary turbulent diapycnal fluxes. This avoids potential issues of contamination of the latter from reversible processes (e.g., internal waves). For flows in which mixing is solely mechanically driven our profiles of mixing efficiency vs. turbulent intensity parameter agree well with the profiles previously established in the literature. However, for flows in which mixing is driven in part or fully by a thermodynamically induced excess of available potential energy, we obtain profiles characterized by much higher values of mixing efficiencies. Applications of these results to the MOC are discussed. Note: The DNS datasets of turbulent stratified channel flow was provided courtesy of M. Garcia-Villalba and J. C. del Alamo.

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