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The effect of different methods to compute N on estimates of mixing in stratified flows[1] OLIVER FRINGER, Stanford University, ROBERT ARTHUR, Lawrence Livermore National Laboratory, SUBHAS VENAYAGAMOORTHY, Colorado State University, JEFFREY KOSEFF, Stanford University — The background stratification is typically well defined in idealized numerical models of stratified flows, although it is more difficult to define in observations. This may have important ramifications for estimates of mixing which rely on knowledge of the background stratification against which turbulence must work to mix the density field. Using direct numerical simulation data of breaking internal waves on slopes, we demonstrate a discrepancy in ocean mixing estimates depending on the method in which the background stratification is computed. Two common methods are employed to calculate the buoyancy frequency N, namely a three-dimensionally resorted density field (often used in numerical models) and a locally-resorted vertical density profile (often used in the field). We show that how N is calculated has a significant effect on the flux Richardson number Rf, which is often used to parameterize turbulent mixing, and the turbulence activity number Gi, which leads to errors when estimating the mixing efficiency using Gi-based parameterizations.

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