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Relationship between vertical shear rate and kinetic energy dissipation rate in stably stratified flows DAVID HEBERT, STEPHEN DE BRUYN KOPS, University of Massachusetts Amherst — High resolution direct numerical simulations of strongly stratified turbulence are analyzed in order to investigate the commonly used assumption that vertical shearing of horizontal motions is the dominant cause of kinetic energy dissipation. The relative magnitude of each component of the dissipation rate is examined as a function of the nominal Reynolds number and of the buoyancy Reynolds number. From the simulation results, in conjunction with published laboratory results, it is concluded that (1) the simulation results are consistent with the laboratory data but span a much larger range of buoyancy Reynolds number, (2) the ratio of the square of the vertical shear rate to the dissipation rate is a strong function of buoyancy Reynolds number, and (3) the assumption that vertical shear rate is the dominant cause of energy dissipation rate is only good when the buoyancy Reynolds number is less than order one.

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