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# What controls the vertical distribution of turbulence in the ocean thermocline?

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Turbulent mixing in the ocean thermocline helps shape its vertical structure, affects the vertical transport of properties, and impacts ocean/atmosphere interactions. The latter is particularly true in the tropical ocean where the vertical distribution of mixing is found to be important in determining the sharpness of the thermocline and interactions with the atmosphere. Here we formulate an expression for the turbulent kinetic energy dissipation rate associated with shear generated turbulence in terms of readily measured properties of the flow or easily derived quantities in models given enough vertical resolution. The expression depends on a turbulent vertical scale, an inverse time scale and a function of the Richardson number. Using measurements in the western equatorial Pacific it is found that the vertical variation of the turbulent length scale is equally, if not more, important than variations in the Richardson number in determining the vertical distribution of the dissipation rate. Our study highlights the need to consider the vertical length scale and its estimation in environmental flows. Implications for the vertical distribution of the turbulent diffusivity and application to other regions of the ocean will be discussed.