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Control of mixing hotspots over the vertical turbulent flux in the Southern Ocean ALI MASHAYEK, RAFFAELE FERRARI, MIT, JIM LEDWELL, Woods Hole Oceanographic Institution, SOPHIA MERRIFIELD, MIT, LOUIS ST. LAURENT, Woods Hole Oceanographic Institution — Vertical turbulent mixing in the Southern Ocean is believed to play a role in setting the rate of the ocean Meridional Overturning Circulation (MOC), one of the key regulators of the climate system. The extent to which mixing influences the MOC, however, depends on its strength and is still under debate. To address this, a passive tracer was released upstream of the Drake Passage in 2009 as a part of the Diapycnal and Isopycnal Mixing Experiment in the Southern Ocean (DIMES). Vertical dispersion of the tracer was measured in subsequent years to estimate vertical mixing. The inferred effective turbulent diffusivity values have proven larger than those obtained from localized measurements of shear made at various locations along the path of the tracer. While the values inferred from tracer imply a key role played by mixing in setting the MOC, those based on localized measurements suggest otherwise. In this work we employ the tracer data and localized turbulence measurements from DIMES in combination with a high resolution numerical ocean model to investigate whether these discrepancies are the result of different sampling strategies: the microstructure profiles sampled mixing only in a few regions, while the tracer sampled mixing over a much wider area as it spread spatially.

Ali Mashayek
MIT

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