Geophysical Research Abstracts
Vol. 16, EGU2014-11292, 2014
EGU General Assembly 2014

Observed and modeled diapycnal diffusion in the Indian Ocean

Tonia Astrid Capuano (1), Lynne Talley (2), Julie McClean (2), Alison Macdonald (3), and Caitlin Whalen (2)

(1) Laboratoire de Physique des Océans, UMR 6523, CNRS-Ifremer-IRD- UBO, Brest, France (tonia.capuano@univ-brest.fr), (2) SIO/UCSD, 9500 Gilman Dr., La Jolla, CA 92093-0230, United States , (3) WHOI, Clark 3, MS 21, 360 Woods Hole Rd., Woods Hole, MA 02563, United States

The deep Indian Ocean's role in the global overturning circulation is to upwell abyssal waters to deep and thermocline waters. This requires diapycnal diffusion of buoyancy downwards. The required diapycnal diffusivity ("kappa") is on the order of the Munk value 10-4 m2/sec, but the spatial distribution of kappa is enormous. Extending previous works, we use CTD and LADCP profiles throughout the Indian, compare strain-only calculations with strain-shear calculations, and map diffusivity and diapycnal mixing relative to topography, isoneutral surfaces that span the water column, and monsoon phase (northern Indian). Diapycnal diffusivities and mixing from the high resolution POP general circulation model, which includes some but not all physical processes responsible for diapycnal mixing, are compared with these observations and with our recent estimates of diapycnal diffusivity from Argo profiles, with the comparison providing insight the multiple mechanisms controlling diapycnal mixing.