

Deep upwelling and diffusivity in the Central Indian Basin.

McCarthy, M.C., L.D. Talley, J. Hummon, 1996.

Eos Trans. AGU, 77, Fall Meet. Suppl., Abstract OS21C-6, 1996

Estimating abyssal upwelling rates for the Indian Ocean is central to understanding global overturning since it appears the rates there are 3-4 times those of the Atlantic and Pacific. The complex bottom topography may contribute to enhanced deep diffusivity and upwelling. The Central Indian Basin has 3-4 sources of bottom water of Antarctic origin. A survey of the southernmost source, a gap in the Ninetyeast Ridge at 28S, is used to estimate abyssal upwelling and diffusivity. Westward flow through the narrow gap fills a confined region in the southern Central Indian Basin. Using geostrophic velocities from CTD data and reference level choices based mostly on water mass boundaries and also on highly smoothed LADPC velocity sections, we estimate that .67 Sv of water denser than $\sigma_{\theta} = 45.92$ is flowing westward into the basin through the channel. This yields an upwelling rate of 7×10^{-4} cm/s and a vertical diffusivity of $10-20$ cm²/s, a figure slightly higher than other estimates of bottom diffusivity.