

The observational evidence of double diffusive instability in the Arabian Sea during winter and spring

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The presence of prominent thermohaline interleaving layers has been documented in the Arabian Sea. As reported by earlier studies in the Arabian Sea these interleaving layers are conducive for the formation of double diffusive convection. However, the presence of double diffusion instability, its intensity, and its spatial coherence during different seasons is not yet documented in the Arabian Sea. In this study, the measurements of the microstructure of temperature, and shear using Vertical Microstructure Profiler (VMP 250), collected from three different cruises during winter and Spring is utilized to document the double diffusive instability. Our measurements indicate that non turbulent double diffusion states, dominated by moderately strong to strong salt fingering regime. The two order difference between ε and χ further confirm the presence of double diffusion instability. Besides, we have also performed the validation of the existing empirical form of effective heat diffusivity for salt fingers using observation data.

Keywords: Arabian sea, Double diffusive instability, Salt fingering