The estimation of the vertical mixing in double diffusive favorable regions of the Indian Ocean by CTD-attached microstructure measurement

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Although it is suggested in several previous studies that double diffusion is a potentially effective contributor to vertical mixing, it is still challenging for estimating how double diffusion vertically transports heat and salt quantitatively. During the cruise of R/V Mirai along the I08N and I07S sections (MR19-04), microstructure measurements were carried out by fast response thermistors FP07, which were mounted on the CTD rosette. We obtained micro-temperature profiles in salt finger (diffusive convection) favorable regions such as tropical and subtropical zones (Antarctic zones) of the Indian Ocean. The high value of thermal variance dissipation (χ) in these double diffusion favorable regions potentially indicates the enhanced thermal vertical diffusivity, although we should also consider the contribution from the horizontal thermal diffusion. In addition, we discuss the difference of thermal variance spectral shape between double diffusion and turbulence.

キーワード：二重拡散、乱流、海洋微細構造観測
Keywords: double diffusion, turbulence, microstructure measurement

