Development of efficient and autonomous microstructure measurement system using fast-response thermistors attached to CTD, glider and deep-profiling float, to elucidate vertical distribution

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A new efficient microstructure measurement with fast-response thermistors attached to CTD, underwater glider and deep float has been elaborated. The CTD-attached thermistor measurements were confirmed to be valid in the weak turbulent energy dissipation down to 10^{-11}W/kg by comparing with the one by free-fall instrument with the best accuracy, and revealed cross-Pacific top-bottom turbulence distribution. Vertical distribution of turbulent energy dissipationis found to be proportional withlocal squared buoyancy frequency N^2(representing density vertical gradient) and local internal tide energy generation and dissipation, indicating that energy dissipation of tide-induced turbulence occurs in the main thermocline. Thermistor measurements attached to gliders and deep floats were also confirmed to be useful to measure weak turbulence area as in the deep water as well as the water where double-diffusive convections work. These contribute to revising models of tide-induced three-dimensional distribution used in ocean/climate models, which will contribute to reproducing ocean meridional overturning circulation and oceanic heat/material circulation.

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