

Correction method of fast-response thermistors data to estimate turbulence intensity

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Fast-response thermistors (FP07) can be used to estimate turbulent energy dissipation rate ε and temperature dissipation rate χ . However, correction is necessary because the insufficient response of FP07 causes underestimate for relatively strong turbulence and individual FP07 sensors have different response. In this study, using simultaneously observed shear probe and FP07 data from a free fall microstructure profiler descending at the speed of 0.6-0.7 m/s, ε_T from various FP07 are compared with ε_S from shear probe to estimate how much correction is necessary for FP07 data. For 3 (7) msec time constant of FP07 for double-pole (single-pole) correction, ε_T is consistent with ε_S within a factor of 3 in the range of $\varepsilon_S = 10^{-10} \sim 10^{-7}$ W/kg. In the presentation we also discuss the impact of correction on χ and the validity of ε_T under double diffusion.

Keywords: vertical mixing, turbulence