Response to reviewers

We thank the reviewers for their positive feedback on our revised draft. We have been happy to make the technical corrections requested. We have also included a new DOI for the ε_μ and ε_μ estimates archived at BODC, given the methodological changes made is response to the first round of reviews. This is included in the updated Data Availability section (line 395).

Throughout this document, reviewers' comments are reproduced in black. Our responses are presented in blue and, where appropriate, quotations from the revised paper are included in indented *italic blue* text.

Line 106 Inertial -> inertia

This mistake has been corrected.

Line 291 10^{-5} W/kg seems too large, is this a typo?

The figure quoted ($> 10^{-5}$ W kg^{-1}) is correct, but we erroneously quoted this as being a representative value of ε. In fact, the figure is a representative value of κ_ρ, hence the following reference to Figure 7a. This mistake has been corrected.

Section 3.3 The Osborn and Cox diffusivities can include the contributions of mechanical turbulence to chi. Perhaps it would be good to acknowledge this.

> *Line 275. We refer to these second salt finger diffusivities as Osborn-Cox κ_Θ and κ_S; we note that the Osborn-Cox relation can include a contribution of mechanical mixing on χ and hence on κ_Θ.*

Lines 446–447 Although it is true that epsilon and chi are derived from the same data, they can sometimes have very different vertical patterns (driven to a large extent by stratification). So, I do not fully agree with this sentence.

We have removed this and the following sentence from the paragraph, which now reads:

> *Line 354. The distribution of κ_Θ and κ_S from the Osborn-Cox relation (i.e. from χ), resembles that of κ_ρ – itself derived from ε_μ – far more closely than do either κ_Θ and κ_S from R_ρ (Figs. 7a and 9). Notably, neither κ_Θ nor κ_S from R_ρ seems to be particularly influenced by features of the water column that might be expected to influence vertical diffusivity, such as stratification (Fig. 4c) or temperature and salinity gradients (not shown). Given that the Osborn-Cox relation explicitly relates diffusivity to a mixing variable (i.e. χ), we suspect that it is more accurate than the empirical relation of Radko and Smith (2012, i.e. κ_Θ and κ_S from R_ρ).*