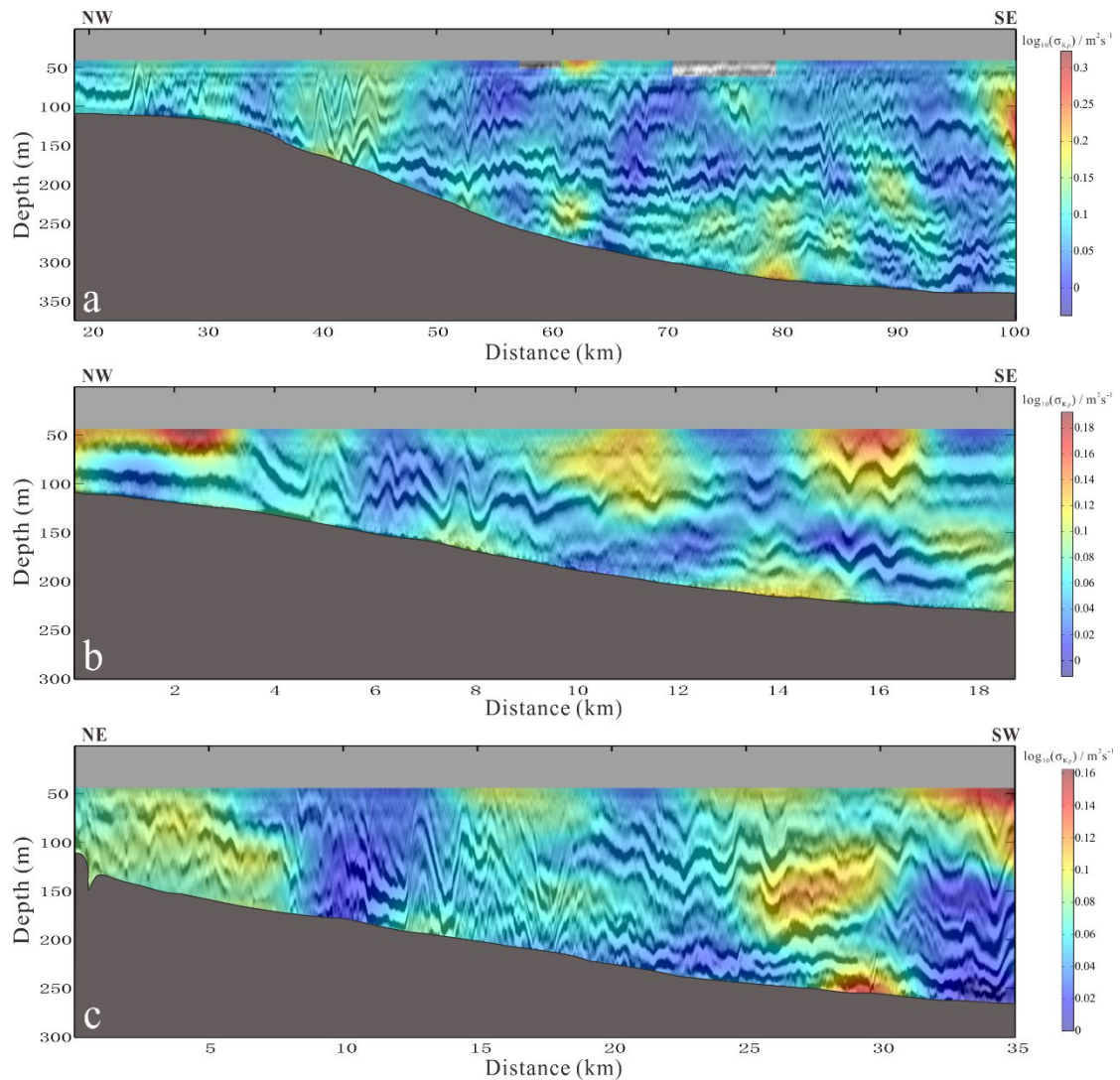


Referee #2

The applied method is also of interest. The general comment is related to using chain assumptions, filtering windows, data from different sources (e.g. stratification parameters from Copernicus), etc. The question is: Would authors provide estimates of the sensitivity of calculated dissipation and diffusivity to the used in calculations parameters/assumptions because of the lack of comparison with dissipation/diffusivity data obtained using other methods?

Response: *Thank you for your time and constructive comments. According to formulas 2-1 and 2-2, the parameters used in calculating the diffusivity are N , Γ , and C_T . It can be seen from the formula that the diffusivity is proportional to N . The mean deviation of the buoyancy frequency we use is about 2% (Figure 1), so the uncertainty of the corresponding diffusion rate is about 0.008 logarithmic units. In addition, the diffusivity is proportional to $\Gamma^{-1/2}$, and the uncertainty of Γ is 0.1-0.4, so the corresponding uncertainty of the diffusivity is 0.15 logarithmic units. Similarly, the diffusivity is proportional to $C_T^{-3/2}$. The uncertainty of C_T is 0.3-0.5, and the corresponding diffusivity uncertainty is 0.15.*

In addition, the key reason for the uncertainty of the diffusivity in our calculation is the fitting of the Batchelor model and the slope spectrum (Figure 3b and Figure 6). We evaluated the uncertainty of the diffusivity based on the fitting error. The fitting error is the least squares standard deviation between the Batchelor model and the slope spectrum. The following figure is the uncertainty of the diffusivity. We have added an Appendix in the manuscript to illustrate the uncertainty of the diffusivity.



The uncertainty of diffusivity in Figure 8 of the manuscript.

Minor comment1: l. 26 “ the difference between our and previous diffusivity profiles is about 2-3 orders of magnitude,...”. May be better to write “mixing scheme based on Richardson number dependent turbulence parameterizations instead of “previous diffusivity profiles”?”

Response: *Thanks for your suggestion, we have changed the statement in the manuscript.*

Minor comment2: 1.64 $O(-3) \text{ m}^2 \text{ s}^{-1}$ Please, use standard order designation $O(10^{-3})$ through the paper and correct misprint.

Response: *Thanks for your suggestion, we have corrected the misprint.*

Minor comment3: l.274 and l. 284 “Huntter” read as Hutter

Response: *We have corrected this spelling error.*