Response to Referees' Comments on Submission OS-2021-71 - revision 2

Impact of ADCP motion on structure function estimates of turbulent kinetic energy dissipation rate

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Our responses to the referees' comments on our submission are as follows:

Comments by Referee #1

> 1) In the opening paragraph of the introduction, the reference to Lueck 2016 is a non-peer reviewed report. Since the sentence is referring to microstructure profilers, a better reference may be the following review paper :
>
> - Lueck, R. G., Wolk, F., & Yamazaki, H. (2002). Oceanic velocity microstructure measurements in the 20th century. Journal of Oceanography, 58(1), 153–174. https://doi.org/10.1023/A:1015837020019
>
> I also think the authors would be amiss to neglect to mention the use of gliders for microstructure measurements. They do not require a surface vessel, but are still limited in duration in comparison to ADCP measurements (days to weeks). Some possible references include are:
>
> - Fer, I., Peterson, A. K., & Ullgren, J. E. (2014). Microstructure measurements from an underwater glider in the turbulent Faroe Bank Channel overflow. Journal of Atmospheric and Oceanic Technology, 31(5), 1128–1150. https://doi.org/10.1175/JTECH-D-13-00221.1
> - Scheifele, B., Waterman, S., Merckelbach, L., & Carpenter, J. R. (2018). Measuring the Dissipation Rate of Turbulent Kinetic Energy in Strongly Stratified, Low-Energy Environments: A Case Study From the Arctic Ocean. Journal of Geophysical Research: Oceans, 123(8), 5459–5480. https://doi.org/10.1029/2017JC013731
> - Schultze, L. K. P., Merckelbach, L. M., & Carpenter, J. R. (2017). Turbulence and Mixing in a Shallow Shelf Sea From Underwater Gliders. Journal of Geophysical Research: Oceans, 122(11), 9092–9109. https://doi.org/10.1002/2017JC012872

We have revised the opening paragraphs of section 1 to address both the specific points raised and to recognise other relevant work; see lines 20 – 39.

> 2) Figure 2: I really like the addition of this figure. If I'm interpreting it correctly, it suggests that the bias of order $1 \times 10^{-8}\,\mathrm{W\,kg^{-1}}$ is comparable to the dissipation rate itself. I think this deserves a comment after line 151.

We are glad that the figure is helpful and have included additional text as suggested; see lines 158 – 159.

> 3) Typos:
>
> - Line 53: "beams" should be "beam"

Corrected; see line 60.

> - Line 147: you say "between 5 and 25 bins", but this isn't true in Figure 2 for all δr (e.g. $\delta r > 0.2$). It might be easier to say "$r_{\max}$ varied between $0.5\,\mathrm{m}$ and $5\,\mathrm{m}$"

The different markers in Figure 2 actually relate to varying δz rather than δr (although the two are directly related as $\delta r = \delta z / \cos\theta$), which may explain the reviewer's comments. However, we have amended the text as suggested to clarify the issue; see line 154.

> - Line 382: "fromt he" should be "from the"

A frustratingly recurrent typo that I apologise for not spotting. Corrected; see line 392.

Comments by Referee #2

> Typos
>
> - line 48 : double "the"

Corrected; see line 55.

> - line 54 : "by any shear" $->$ "of any shear"?

Corrected; see line 60.

> - line 361: "section'3" $->$ "section 3"

Corrected; see line 371.

> - line 382 : "fromt he" $->$ "from the"

Corrected; see line 392.