Interactive comment on "Turbulence in the stratified boundary layer under ice: observations from Lake Baikal and a new similarity model" *by* Georgiy Kirillin et al.

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We thank sincerely the Reviewer for the careful review and valuable suggestion on our study, which helped to improve the manuscript. Below we reply to the Reviewer's comments, providing only titles from original review:

Scaling arguments

- Both Q_{cw} and Q_{iw} were used interchangeably in the original version, which can be of course misleading to the reader - thank you for mentioning it. We have consistently changed all Q_{cw}'s with Q_{iw}.

- Mironov et al. (2002) is cited right after Eq. (8)

- We added "kinematic" to viscosity for clarity.

Results

- Interesting questions are raised here about the relationship between the flow strength and the temperature profile in the upper 10 m of the water column. Qualitatively, the profiles at both sites are closer to straight lines than to an exponential "zero-shear" profile from Fig. 13, with the profile at lower current speeds (S1, Fig.3a) is slightly "convex", i.e. closer to the theoretical curve from Fig. 13 and stronger currents correspond to a slightly "concave" shape of the temperature profile (S1, Fig.3a). In our discussion (Page 21, Fig. 13), we propose a nearly steady-state balance between stratification and shear as an explanation of the quasi-linear temperature profile. The deviation from the straight line, and as a result, the variations in the heat content of the upper water column could be caused by horizontal advection of heat by currents, or by restratification during periods of low shear. We do not possess enough well-resolved data on temperature to investigate these effects. We clarified this point in the text and also added time/date to Fig. 3.

Other minor points

Thankfully accepted.

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