

Interactive comment on “Applicability and consequences of the integration of alternative models for CO₂ transfer velocity into a process-based lake model” by Petri Kiuru et al.

Anonymous Referee #2

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The manuscript “The Applicability and consequences of the integration of alternative models for CO₂ transfer velocity into a process-based lake model” of Petri Kiuru, Anne Ojala, Ivan Mammarella, Jouni Heiskanen, Kukka-Maaria Erkkilä, Heli Miettinen, Timo Vesala, and Timo Huttula is a interesting scientific report about the performance of different gas exchange models for simulations of CO₂ fluxes between lakes and atmosphere. The article represents the high scientific expertise of the finish research community. No doubt, the authors did a grandiose job. In my understanding, the article can be accepted after two minor improvements.

(1) The authors wrote on page 7, line 4 that the lake has a maximum width of only

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0.3km. This raises the question whether the footprint of the EC measurements is really representative for the lake-atmosphere exchange. How did the authors approximate the width of the parabolic footprint? And how did the authors consider transversal advection, i.e., advection orthogonally to the mean flow (wind) direction?

(2) The authors discuss in section “4.2 Comparison to CO₂ flux measurement” potential reasons for discrepancies between EC flux measurements and simulations results. Especially, they mentioned measurement errors and the spatial variability of governing parameters as major reasons. In my understanding, the authors are completely right with this statement. However, I would like to encourage the authors to provide quantitative support for this statement through a short error analysis.

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