

Interactive comment on “Technical note: CO₂ is not like CH₄ — limits of and corrections to the headspace method to analyse *p*CO₂ in water” by Matthias Koschorreck et al.

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Similar to reviewer one, this review questions whether our technical note is necessary given that it is already acknowledged in the marine sciences. Our view is that there is actually a very strong need for it in the freshwater community considering the large number of studies not considering the potential artifact of simple CO₂ headspace calculation. A good example is a recently published paper about errors in pCO₂ calculation which uses the NEON dataset (which is based on simple headspace calculation) as reference (<https://aslopubs.onlinelibrary.wiley.com/doi/full/10.1002/lom3.10388>). The question becomes really what is the best way to raise awareness of this overlooked

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problem in our segment of the scientific community. For this purpose we opted to write a short technical note in which we not only identify the problem but also 1) perform a quantitative assessment of the potential error (which to our knowledge never have been published in a systematic way before) and point out the general circumstances where this is most problematic, and 2) provide an easy to use tool to correct both old and future data. To date, the positive feedback we received from a number of colleagues confirms our belief that this note is a valuable contribution and therefore should improve the quality of future freshwater carbon cycle studies. To make this clearer we consider exchanging the “water” in the title by “freshwater”. Besides this general point the reviewer raises a couple of minor issues which we would all address in a revised manuscript. We will correct the naming of variables in Eq. 1 by renaming $p\text{CO}_2^{\text{Aftereq}}$ and $p\text{CO}_2^{\text{Beforeeq}}$ to $m\text{rCO}_2^{\text{Aftereq}}$ and $m\text{rCO}_2^{\text{Beforeeq}}$ because these numbers are, as we explain in the text mixing ratios and not partial pressures. We will further add quantitative information about analytical errors and our NDIR method and will fix the other minor edits identified by the reviewer.

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