

## ***Interactive comment on “Technical note: CO<sub>2</sub> is not like CH<sub>4</sub> — limits of and corrections to the headspace method to analyse $p\text{CO}_2$ in water” by Matthias Koschorreck et al.***

### **Anonymous Referee #2**

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The authors describe a method to correct  $p\text{CO}_2$  measurements using the headspace method with discrete water samples for the effect of the  $\text{CO}_2$  equilibrium in fresh water samples. They compare different approaches of the headspace technique with measurements using a membrane equilibrator directly in the field. I mostly agree with the comments from Reviewer #1 that most of the work is described in Dickson et al (2007) and I will not repeat the arguments here. I understand that the authors want to use this technical note to raise awareness in the community. I can't judge if it is worth to publish an article repeating knowledge that is well documented (as the authors state themselves), or if there are better ways to raise the awareness. But I assume a technical note might be the right way. The authors talk a lot about errors in %. As an outsider

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of the fresh water community, I was missing a short introduction into the field given the aimed accuracies/precisions of pCO<sub>2</sub> measurements. Also the analytical errors of their methods are not stated. This makes it hard to evaluate the benefit of any correction. An error of 100% means to me that the measurement is not very useful, but I might be wrong here. As reviewer #1 said, the manuscript would benefit of comparing the two correction methods, the one described here with the one presented in Dickson et al. (2007). More specific comments: l. 41: a space is missing between UNESCO/IHA, 2010; and Cawley... l. 58: dissolved l. 61: alkalinity (TA); TA is already introduced here, so it can be skipped in line 69 l.74: What is stable? Can you give the range? l. 87: Is the equation correct? The units do not cancel out to a pressure. l. 88: pCO<sub>2</sub> should be given in pressure units not in ppm l. 92: What do you mean with the “two methods”? NDIR vs. headspace method? l. 101: Please give a range and not only “quite”. l. 107: what is acceptable? l. 116ff and Fig. 3: I don’t get the text and the Figure together. Do you mean “using a smaller headspace”? When I look at Fig. 3b at 20°C and HR=1 and move to HR=5 the error increases to 300%.

Dickson, A.G., Sabine, C.L. and Christian, J.R. (Eds.) 2007. Guide to best practices for ocean CO<sub>2</sub> measurements. PICES Special Publication 3, 191 pp.

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