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Interactive comment on "Technical Note: Drifting vs. anchored flux chambers for measuring greenhouse gas emissions from running waters" *by* A. Lorke et al.

Anonymous Referee #2

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Review of Technical Note: Drifting vs anchored flux chambers for measuring greenhouse gas emissions from running waters By Lorke et al.

This technical note describes the use of anchored/tethered chambers to measure gas emissions versus those allowed to drift freely in running waters. They used three types of chambers, defining three datasets, in nine different rivers. They also performed turbulence measurements using the chambers in a laboratory flume. They found a definite bias in using anchored chambers in which the gas exchange velocity is enhanced compared to drifting chambers because of the enhanced turbulence under anchored chambers. The authors concisely and convincingly present their results with a focused discussion and implications of their findings. This technical note is useful for the grow-

ing community of researchers studying fluvial greenhouse gas emissions. I recommend this paper for publication with minor revisions.

There are no general comments to be made. I have just a few specific comments.

Abstract – in the list of four points made from this study, switch numbers 1 and 2 so that you start by stating that anchored chambers produce turbulence. It seems to make more sense to start by saying that you find something in one method and then that you didn't in the other, instead of the other way around.

P14622, L19-22 – I am not sure if this sentence regarding microbubbles fits here, especially since the papers you cited refer to lakes. Perhaps you can be clearer with what you are trying to convey with this point and you could use Beaulieu 2012 as a better reference for elevated kCH4 in rivers.

P14623, L8 – Vachon et al. 2010 also discusses turbulence bias of chambers

P14624, L6-7 – Change 'produced' to 'produce' and add a question mark at the end of the question.

P14624, L8 – More details should be give about the size or stream order of the 9 rivers, especially since Hotchkiss et al 2015 just found that CO2 emissions change with size of streams. This new article should be cited and discussed in your manuscript. (Hotchkiss, E. R., Hall Jr, R. O., Sponseller, R. A., Butman, D., Klaminder, J., Laudon, H., ... & Karlsson, J. (2015). Sources of and processes controlling CO2 emissions change with the size of streams and rivers. Nature Geoscience, 8(9), 696-699.)

P14623, L12-17 – Does using these different methods influence your flux results? I presume not seeing as what is important is the rate of accumulation and not absolute concentrations; however, you should make this clear in the text as it may cause confusion.

P14625, L9 – add '(F)' after 'fluxes' to define the variable in eq.3

P14626, L20-25 – this section is a bit hard to follow. Is it possible to include a supplemental figure that will help the reader understand this process?

P14627, L15 – delete 'measured'

P14628, L6-7 – rewrite '. . .than those under drifting chambers, with individual measurements of k600_CO2_a being up to 20 times higher than k600_CO2_d. The average ratio. . .'

Figures 2a and b can have fit lines that refer to those discussed on P14628, L20 & L23

Interactive comment on Biogeosciences Discuss., 12, 14619, 2015.