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Interactive comment on "Low methane (CH_4) emissions downstream of a monomictic subtropical hydroelectric reservoir (Nam Theun 2, Lao PDR)" *by* C. Deshmukh et al.

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Review of BGD 12-11313-2015 "Low methane (CH4) emissions downstream of a monomictic subtropical hydroelectric reservoir (Nam Theun 2, Lao PDR).

This paper presents CH4 concentrations and oxidation rates at various locations within a hydroelectric reservoir and downstream of the reservoir. The topic is of interest, and downstream methane emissions from reservoirs have received little attention to date, and may be an important anthropogenic flux of methane to the atmosphere.

The methods used are appropriate, the analysis and conclusions are robust and I com-

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mend the authors on a nice paper looking at an interesting problem

I have a few comments that I feel could improve the manuscript.

A few equations on how various fluxes were calculated would be welcomed – while I am familiar with the floating dome calculations other readers of BG might not be, also some equations on the "degassing" calculations (I am assuming these are a simple mass balance?) would also be good. Also a little bit more on the analysis precision and accuracy would be appreciated (other than just the 5% reproducibility).

My main issue is with the use of a single "averaged" k600 value for the downstream section of the study area, I feel this simplistic approach is not appropriate as the k600 is likely much higher in the immediate downstream area (and also concentrations are likely to be much higher here) therefore there would be an underestimation of the fluxes. Indeed 10 cm/h seems much too low for an area that would have extremely high turbulence, as noted by the authors in the comment on not being able to do floating chamber measurements due to "safety reasons because of strong water currents". Is there any other way of estimating this? Considering the flow is so highly regulated perhaps a similar method can be employed as used for the "degassing" calculations, essentially a CH4 mass balance between an upstream and downstream point. At least some discussion about the implications of using the single value for gas transfer velocity should be included.

Minor Comments P 11324 L8-10 Comparisons like this belong in discussion P11324 L25 – P11325 L2 Discussion P11325 L9-12 Discussion P11325 L13-16 How was the 10km length defined? Is this based on any modelling or just best guess? Some explanation on how this value was calculated should be included P11326 L24-25 Maybe a narrow range considering the max of $\sim$ 1000 uM but this is still 3 orders of magnitude difference. Perhaps look for different terminology than "narrow range" P11328 L5 – 10 Discussion P11329 L20-23 Give details on how this depth integrated value was calculated in the methods (including equations)

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