

Interactive comment on “Methane emissions from a sediment-deposited island in a Lancang-Mekong reservoir” by Wenqing Shi et al.

Anonymous Referee #2

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The manuscript presents an interesting strategy to estimate the spatial contribution of CH₄ emissions from a sediment-deposited island in the Lancang-Mekong reservoir. While most of the studies in reservoirs are focused in estimate CH₄ emissions in water sites, this study calls the attention to consider the sediment-island CH₄ dynamics during reservoir operations (water level fluctuations). I think the study is relevant as strategy in such ecosystems (sediment-deposited island), but there are major clarifications that should be addressed before going a step forward in the acceptance.

Microbial analysis issues.

Due to the methodology of sampling (no with a core system) and different qPCR programs (I understand but you need explain it); methanotrophy and methanogenesis statements are overstated in the whole manuscript. I would recommend focusing more

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into the water level fluctuation to explain the CH₄ dynamics obtained. Additionally, Figure 5 contains an artifact in the axis to pronounce your statements in the manuscript, please use the same axis level to avoid confusion, even a statistical analysis comparing each site (methanogens vs methanotrophs) and whole samples may help to approve such patterns.

CH₄ measurements.

While, the title of the manuscript is about CH₄ emission. You have only one figure (Figure 4), and a small result description from the same figure (section 3.3) about CH₄ emission patterns. Moreover, Figure 4 is overinterpreted by the extrapolation, which is valid, but you should explain the range of uncertain.

I have seen CH₄ consumption in flux measurements in soils, but in water determinations are very strange. If you are confident of your measurements, I encourage you to include the data obtained, and explore relations with other parameters measured in the study.

Did you sample only once per time in each chamber? If you did it, you have large uncertain in your values, since there are a lot of risk to have leaks and lost sample before determining in the gas chromatograph. Which was the volume of gas pre-evacuated in each vial?

General statements.

There are several statements that you are not able to support with your data, it would help you make a list of different parameters obtained and see how to relate them. Then, avoid such interpretation about redox changes, exudates, among others.

Sections 4.2 and 4.3 contains several discussions unnecessary (they are more introduction than discussion) about the relevance of the CH₄ emission from aquatic ecosystems, how methane is produced biologically, the environment relevance of reservoirs, shelf mitigation, limitations using Darcy fluxes.

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