

Response to referee #2 (our answers in blue):

The paper by Vigderovich et al. investigated the pathways of anaerobic methane oxidation in Lake Kinneret sediments by a combination of incubation techniques, lipid and metagenomic analyses.

The authors performed a series of long-term incubations in bottles and semi-bioreactors with an array of added potential electron acceptors and inhibitors for specific metabolic processes in order to track down the dominant processes responsible for AOM. The results obtained from this study were interpreted in combination with results obtained from previous studies on these sediments. All in one, the experimental design was thorough and the use of combinations of electron acceptors/inhibitors feasible for interpretation of possible AOM pathways in these sediments.

We would like to thank the reviewer for the constructive review and the approval of our experimental design and selection of e-acceptors. Our main goal was to cover all potential electron acceptors and scenarios with many experiments in a comprehensive way.

The paper is mostly focusing on presentation and interpretation of geochemical data. The authors did perform taxonomic read and metagenomic analyses from several incubations and incubation time points, but I miss the presentation of these results in the paper. The results are briefly mentioned, but I would prefer to see a visual representation of DNA-based results in a separate section in the 'Results' section and a more thorough integration with lipid and geochemical analyses.

We agree with the reviewer's comment that the previous version focused almost entirely on the presentation and interpretation of geochemical data and that we should put more emphasis on the molecular-biological results. As suggested by the reviewer, we added a microbial section with visual representation of DNA-based results (in addition to the table) and integrated this with the other analyses.

It was also a little confusing to see a 'black coffee' treatment, as there was no introduction or reasoning why this rather unusual substrate was used for AOM incubations. Also there was no detailed protocol on how this treatment was prepared (what fraction, concentration etc). Every treatment should be reproducible from the information provided by the paper, but here any details are lacking. So I would suggest to either remove this from the paper completely or to describe the treatments and reasoning thoroughly.

The "black coffee" means coffee grinds as an organic source. However, as this treatment seemed confusing to all reviewers, we decided to remove it from the paper.

In general, the results presented in this paper are interesting and will benefit the scientific community investigating AOM in natural sediments. The paper will benefit from a more clear structure and better visual presentation of results.

As mentioned above in the reply to the first reviewer, we improved the structure of the manuscript, clarified and simplified the paper, all co-authors edited the manuscript and we also added final English editing.