

## ***Interactive comment on “Metagenomic insights into the metabolism of microbial communities that mediate iron and methane cycling in Lake Kinneret sediments” by Michal Elul et al.***

### **Anonymous Referee #3**

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This manuscript on “Metagenomic insights into the metabolism of microbial communities that mediate iron and methane cycling in Lake Kinneret sediments” is very well written and organized. The title accurately describes the subject of the manuscript, though it is a bit dry and lacks any insight into what was concluded in the study. The abstract is clean and concise and effectively summarizes the key findings of the manuscript, which are largely descriptive. The introduction is also well constructed and (mostly) properly referenced, though the statement at line 40 of “largely unknown isn’t exactly true. The figures are well put together, informative and high quality with figure 5 a very nice summary of the results/discussion. However, my main concern with this paper is that there is no geochemical data from the incubations to confirm/support the metage-

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conomic interpretations. The authors state at line 374 : “our geochemical experiments suggest. . . .” however, no geochemical data is provided. As such, while the authors engage in thorough, well referenced discussion of inferred function based on homology searches, implying that there is experimental geochemical evidence to support their conclusions is misleading unless that data is presented. If it is available it needs to be presented, even if only in the supplement and not the focus of the main text. I find similarity between the in situ sediment samples and all of the incubations for which metagenomes are available to also be curious, especially in the presence of inhibitors. Perhaps some geochemical data could shed some light on this? At line 71-72 the authors state that “ slurry incubations. . . . produced substantial amounts of  $^{13}\text{C}$ -labelled DIC”. How much is “substantial amounts”? Was there iron reduction?  $\text{H}_2$  production? Or did the slurry just sit there static and are just a reflection of the initial sediment slurry sitting there for over a year, as it sort of looks like from the non-departure from the t0 microbial community (Figure S2). There seems to be some presentation of in situ geochemical data (lines 208-209) though it’s unclear if this was measured or a previously reported value. In the absence of any geochemical data, this study is not entirely novel, but rather confirmatory of other studies on the metabolic potential (potential being the key word) of ferruginous sediments (Vuillemin et al. 2018)

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