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Interactive comment on “Methanotrophy within the water column of a large meromictic tropical lake (Lake Kivu, East Africa)” by C. Morana et al.

Anonymous Referee #1

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The authors present strong motivation for the study since tropical regions are responsible for half of the methane emissions from freshwater ecosystems, and Lake Kivu is one of the largest freshwater reservoirs but has very low emissions to the atmosphere, raising the question of the mechanisms for methane consumption in the lake water column. The authors present a strong case that type I methanotrophs actively oxidize methane in the water column and could contribute a significant portion of the pelagic food web.

The paper is well written and the study well executed. My only major scientific criticism is that the authors focus solely on sulfate-AOM but do not present concentrations of alternative electron acceptors. It's possible that AOM in lake is coupled to another electron acceptor such as nitrate, nitrite, Fe(III) or Mn(IV). Why do the authors assume

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(e.g. on page 15680 line 6) that sulfate-AOM is occurring and not another form of AOM? Did they measure concentrations of sulfate, nitrate, nitrite, Fe(III), Mn(IV)? The paper also has some minor grammatical errors for which I have suggested corrections for below.

Specific comments: Page 15664/Abstract: Line 4: change "has" to "have" Line 5: change "showing" to "suggesting" Line 8: add "the" before "rainy" and "dry" Line 23: add "based on lipid analyses" after "Lake Kivu"

Page 15666: Line 4: cite Knittel & Boetius 2009 Annual Review Microbiology review or another recent AOM review, this is an old reference in AOM literature Line 12: define "methanotrophic bacterial production (MBP)" – how measured and what exactly this means in this context Line 14: correct spelling of "But" Page 15667: Line 1: change "showing" to "suggesting" Line 3: "Due to its inherent characteristics" – this is very vague, rewrite to be more specific Lines 11-13: remove parentheses Line 23: correct spelling of "wave"

Page 15669: Lines 3: "saturated HgCl₂" instead of "HgCl₂ saturated"

Page 15670: Lines 5: provide the exact depths

Page 15672: Line 14: correct spelling of "decreased" – it has an extra "i" at the beginning Line 15: "being 4 orders of magnitude lower in surface waters" – this wording is awkward, rewrite for clarity Line 16: "upcoming" – this is not the correct word, do the authors mean "methane fluxing upward"? can this word simply be left out?

Page 15672: Line 7: move extra "the" before d¹³C-POC to between "in" and "surface" Line 19: change "to estimate" to "estimation of" Line 28: add "the" before "rainy" Line 29: add "the" before "dry"

Page 15679: Line 13: change "genus" to "genera"

Page 15680: Line 5: change "indicates" to "indicate"

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