

Interactive comment on “Anaerobic oxidation of methane: an underappreciated aspect of methane cycling in peatland ecosystems?” by K. A. Smemo and J. B. Yavitt

Anonymous Referee #1

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This review gives a very nice and broad overview about the circumstantial evidence that anaerobic methane oxidation might exist in peatlands and might play an considerable role therein. I have only minor comments.

Minor comments:

Page 7946, line 21: change “. . .in unknown, . . .” into “. . . is unknown, . . .”

Page 7952, line 5: replace “8+” with “8H+”

Page 7953, line1: It is not stated which material (from which environment) was used for these incubations.

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Page 7954, line 3: Knorr et al., 2009 (Geoderma 153: 379–392) and Alewell et al., 2008 (Sci Total Environ 404: 335–342) have made important contributions to peatland biogeochemistry and should be cited as well.

Page 7955, lines 1-5: The authors should state more explicitly what the experimental evidence for detecting and quantifying AOM rates in peatlands was. This is very important since the whole argumentation for the presence of AOM in peatlands is based on two studies conducted by the authors themselves (Smemo and Yavitt, 2006, 2007).

Page 7956, line 25-26. Please give a citation for the experimental evidence that AOM “. . .proceeds at very slow rates even when SO₄²⁻ concentrations are large. . .”

Page 7957, line 29. Replace “anaerobic conditions” with “anoxic conditions”. Microorganisms can have an anaerobic lifestyle but conditions can only be anoxic.

Page 7959, line 11. The authors should cite the extensive work on peatland iron reduction by Kirsten Küsel as well, e.g., Küsel et al., 2008 (Biogeosciences 5: 1537–1549).

Page 7959, line 23. The authors should cite the work of Kappler et al., 2004 (FEMS Microbiol Ecol 47: 85-92), which made an important contribution to electron shuttling via humic acids in microbial iron(III) reduction.

Table 1: write “kJ” instead of “kj”. Please give also the dG values for pH4 since peatlands often have an acidic pH ranging between pH 4 and pH 7.

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