Biogeosciences Discuss., 7, C4364–C4366, 2010
www.biogeosciences-discuss.net/7/C4364/2010/

Biogeosciences Discussions

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 #2

Received and published: 15 December 2010

The authors provide a comprehensive literature review on the biogeochemistry and microbial ecophysiology of anaerobic methane oxidation (AOM) in different marine, freshwater, and semiterrestrial ecosystems. The goal of this review is clearly stated, and the authors point out the potential relevance of AOM in peatland ecosystems and present evidence of the occurrence of this process in peat soils, in combination with an in-depth discussion of the potential mechanisms. The study represents a large effort to summarize our current knowledge of AOM, the key microbial players, and how the process may be linked to other biogeochemical processes and cycles, including the most recent publications and discoveries in this field. Nevertheless, there are some issues concerning the structure of the manuscript and how the relevance of AOM in

Full Screen / Esc
Printer-friendly Version
Interactive Discussion
Discussion Paper

peatland systems is argued for, that the authors should pay attention to:

Structure of the manuscript: In the way that the manuscript is organized in its current form with first the overview of AOM in different ecosystems, followed by the introduction to the biogeochemistry of the process with a focus on peatlands, information, e. g., about the use of different electron acceptors, needs to be repeated in the different sections. Here, redundant information should be avoided. Why not use "biogeochemistry" as the first section heading with a general introduction to AOM and then discuss marine, freshwater, and peatland ecosystems in subsections? By re-organizing this part of the manuscript, some sections could be shortened, and links between different processes or similarities/dissimilarities between different ecosystems could be pointed out more clearly. This would help the reader to get a better overview of the integration of AOM into several biogeochemical cycles as outlined in the manuscript.

Potential relevance of AOM in peatlands: The authors are primarily referring to their own publications (Smemo and Yavitt 2006, 2007) to propose the presence and relevance of AOM in peatland ecosystems. Here, some more background information about the experimental evidence previously obtained by the authors would be desirable. This way, the reader could follow the argumentation for AOM more easily without reading the cited literature.

Additional comments:

In some places the line of thought is not clear (e. g., p. 7960, l. 1-9; p. 7961, l. 9-13). Please rephrase these sections.

In several places the authors should be careful not to become too speculative about their assumptions. One example is the last sentences of the manuscript (p. 7967, l. 25 – p. 7968, l. 2), where they conclude from the potential relevance of AOM in peatland ecosystems – for which so far only little experimental evidence exists – to the relevance of the process in tropical swamps and marshes, which seems to be a big step here in this context.

BGD

7, C4364–C4366, 2010

p. 7954, l. 9-10: Please correct: "...surface peat that is oxygenated seasonally and around plant roots (Roden and Wetzel, 1996; Watson et al., 1997).

Interactive comment on Biogeosciences Discuss., 7, 7945, 2010.