Interactive comment on “Improved quantification of microbial CH$_4$ oxidation efficiency in Arctic wetland soils using carbon isotope fractionation” by I. Preuss et al.

Anonymous Referee #2

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This manuscript examines the influence of methane oxidation and diffusion on the isotope ratio of CH$_4$ emitted from polygonal tundra. The authors make the scientific argument that fractionation due to diffusion is not often measured and they show that it can have a considerable effect on the 13C-CH$_4$ of emitted CH$_4$, thus improving our understanding of sources and sinks of CH$_4$ in these environments. The paper is thorough and well written, and although I cannot say I am an expert in the field of isotopic fractionation and CH$_4$ oxidation, the arguments and data seem well organized and justifiable. The conclusions seem to flow directly from the data and I do not think they are overstating their case. The only two comments I have are the following. First, on page 17019, the authors do not consider the importance of anaerobic methane oxidation in
either the change in concentration or 13C of CH4 with depth. What affect could anaerobic methane oxidation have on either of these patterns? Second, the discussion is repetative (around pages 17019/20), and could be ‘tightened up’ a bit.

Interactive comment on Biogeosciences Discuss., 9, 16999, 2012.