

## ***Interactive comment on “CO<sub>2</sub> and CH<sub>4</sub> in sea ice from a subarctic fjord” by O. Crabeck et al.***

### **Anonymous Referee #1**

Received and published: 17 June 2014

Review of the paper “CO<sub>2</sub> and CH<sub>4</sub> in sea ice from a subarctic fjord” by Crabeck and co-workers, submitted to Biogeosciences for publication.

The study “CO<sub>2</sub> and CH<sub>4</sub> in sea ice from a subarctic fjord” by Crabeck et al. investigates the biogeochemistry of CH<sub>4</sub> and CO<sub>2</sub> in sea ice of a Greenland fjord. Characteristics of these two gases are discussed, and analyzed under consideration of ice and freshwater properties.

The paper presents a suite of new and interesting data, however the aim or goals of the paper have not become apparent to me. Individual sections contain relevant discussions, however whether and how those relate to each other has not been made very clear in my view. In my view the paper would strongly benefit, if the authors identify the main points, or the main red line, and then design the paper accordingly. I am confident that this can be achieved.

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A reoccurring pattern, which makes it difficult to read the paper, are long and detailed discussions, of what is not the case. While, I do see the need and the purpose of such sections, eventually the reader spends quite some time and thinking to learn what is NOT the case. Examples: the last section of the abstract is unrelated to the paper, or the long discussions about the sources of CH<sub>4</sub>, which ends with the statement: unfortunately, our data set does not provide any proof....

Again, I think these discussions are thoughtful, and possibly required, it is however unclear, which purpose they serve.

Minor points: Rewrite abstract to summarize the paper, not the key topics in this field of research.

Page 4049, line7: CH<sub>4</sub> is given in mg L<sup>-1</sup>, the rest of the paper is nmol L<sup>-1</sup>. Please use nmol L<sup>-1</sup> consistently. Page4051, line2: saturated mercury chloride SOLUTION. Please also add volume of spike. Page 4054, line17. In my print it reads “atm”, not “mikro atm”? Line23: evacuated instead of vacuumed Page 4061, section 5.3: please spell out STP and IFSW once. Page 4065, line 4: denitrification yields more energy per organic carbon unit than methanogenesis. These processes deliver energy, they do not require energy.

Figs. 2 and 4 are FAR too small.

Fig. 6: please correct y-axis lable. It says Si (silicate), not S(ice).

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Interactive comment on Biogeosciences Discuss., 11, 4047, 2014.

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