

Biogeosciences Discuss., author comment AC2
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Reply on CC1

Shinsuke Kawagucci et al.

Author comment on "Hydrogen and carbon isotope fractionation factors of aerobic methane oxidation in deep-sea water" by Shinsuke Kawagucci et al., Biogeosciences Discuss., <https://doi.org/10.5194/bg-2021-167-AC2>, 2021

To Jeff Chanton:

I was asked to review this paper by the editor Jack Middelburg. I agree with the authors treatment of the data, and their interpretation of it.

- I do think it is important that they clearly state the temperature of the seawater where they made their measurement. They state that the vent fluid temp was 229C in line 91 and the other site was 323C, line 88. In the graphs, figure 2, they report the temperature differential. Is that relative to these reported fluid temps? or to what?? The fraction factor for methane oxidation is sensitive to temperature as found in the reference below, so the authors should be crystal clear about the temperature at which they made their measurements.
 Chanton, J. P., D. K. Powelson, T. Abichou, D. Fields, & R. B. Green. 2008. Effect of Temperature and Oxidation Rate on Carbon-isotope Fractionation during Methane Oxidation by Landfill Cover Materials, Environmental Science and Technology No 42, pp 7818-7823. DOI 10.1021/es80122y.

---We appreciate the comments. Water temperatures were described as 'temperature were drawn as difference from the bottom temperature (Figure 2a), which was 3.79 at Hatoma Knoll and 4.45 at ANA site' at L104-105 of original manuscript. We believe that the difference of these temperatures is negligible in terms of microbial physiology. By the way, for more clear presentation, we revised the temperature profiles in Figure 2 based on temperature, not the temperature difference from the bottom. In addition, we added a sentence 'temperatures of seawater collected ranged between 3.5°C and 7.0°C (Figure 2a)' in Results chapter.

- Rather than call the height of the water column above the seafloor as altitude, it should be referred to as height above the sea floor.

---We know both altitude and height are used in community studying the hydrothermal systems. Here we decide to use altitude, not height. Thanks.