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Comment on bg-2021-350

Anonymous Referee #2

Referee comment on "Compositions of dissolved organic matter in the ice-covered waters above the Aurora hydrothermal vent system, Gakkel Ridge, Arctic Ocean" by Muhammed Fatih Sert et al., Biogeosciences Discuss., https://doi.org/10.5194/bg-2021-350-RC2, 2022

The manuscript by Sert et al. make a comparison of DOM composition between background water and hydrothermal plume water in the deep Arctic Ocean. The data provided give some insights into the potential influence of hydrothermal plume on the abyssal DOM. I think these results will be of interest to the DOM research community and worth publishing on BG. Yet, I have some comments on the present manuscript and hope the authors will take into account in subsequent revisions.

Line 117: Is the GF/F filter pre-combusted?

Line 118: Are the HDPE bottles acid-washed before use?

Line 124: 'the cartridges were then eluted into pre-combusted, amber glass vials with 2 ml methanol', previous studies have generally used >6ml of methanol to elute DOM from the PPL-cartridges (e.g., Dittmar et al., 2008). So, I wonder if the DOM on the PPL could be completely eluted by 2 ml of methanol?

Line 367: 'the $\delta^{13}CH_4$ value of the hydrothermal fluid source to be about -36 ‰', the estimate of fluid endmember should include the error derived from the curve fitting. And, the error needs to be considered in the discussion.

Line 398 and Figure 6b: What does 'average abundance' mean? The signal intensity of each formula? Please define it where it first appears in the text.

Line 421 (Fig. 6a-d, Fig.S2) and Line 424 (Fig. 6a-d, Fig.S2): Refer to wrong figures?

Line 420-421: Changes in DOM composition seem inconsistent with the changes in nutrient and DOC. For example, the average MW, diversity index, and UHC percentage of UL-1000 are similar to that of surface water (UL-5), while DOC/nutrients (except ammonium) of UL-1000 are much lower/higher than surface water.

Line 460: 'H:C≤1.0' should be 'O:C≤1.0'.

Line 469-471: Low molecular diversity and relative abundances (average abundances?) are also observed in BG-samples at similar depths (Figure 6b,d). So, it is not sufficiency to demonstrate the influence of hydrothermal intrusion or the plume based on these data (i.e., molecular diversity, average abundance) alone.

Line 529-532: This explanation seems more plausible to me, as the difference in DOM compositions between NP2-samples and BG-samples is greater than that between PL-samples and BG-samples (Figure 8).

Table 1: According to the text, DOM compositions of PL-3400 and PL-3500 have been measured but they are not labeled with superscript '3' in the table.

Figure 7: The letter numbers of panels are inconsistent with the caption. In addition, the contributions of the PCoA1 and PCoA2 to the total variance need to be presented.

Figure 8: According to the Krevelen diagram, there are differences in DOM composition among different BG-samples, yet, the authors did not discuss the possible reasons for these differences in the current manuscript. Do the differences in DOM composition of different BG-samples indicate effects of non-hydrothermal plume processes? This information may help to distinguish the effects of hydrothermal and other processes.

Supplementary: Figure3, 4 and 5 have wrong numbers.