

Interactive
Comment

Interactive comment on “Concentration maxima of volatile organic iodine compounds in the bottom layer water and the cold, dense water over the Chukchi Sea in the western Arctic Ocean: a possibility of production related to degradation of organic matter” by A. Ooki et al.

A. Ooki et al.

ooki@fish.hokudai.ac.jp

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Referee’s comments were very helpful and we have revised the manuscript according to the comments.

Response to the general comments: The manuscript will be corrected by English editor (Editorial support of Copernicus publication affiliated with BG) after the all corrections in relation to scientific comments pointed out thought the open discussion.

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Response to specific comment 1: The sentence “VOIs are believed ...” has been omitted from the paragraph.

Response to specific comment 2: The only VOI measurement in the western Arctic Ocean was conducted in the Canada basin (Karlsson et al., 2013). We have added the reference in the sentence, and deleted a sentence “As can be seen, each of these studies considered VOIs in the Atlantic sector of the Arctic Ocean.”.

Response to specific comment 3: Headspace was introduced to avoid the damage of the glass bottle. We have added an explanation in the sentence.

Response to specific comment 4: We have added the reference.

Response to specific comment 5: We have added some explanations, as follows. Concentration ratio of major nutrients, such as nitrate and phosphate, in seawater is usually fixed with N/P ratio of 16. In anoxic region, such as bottom sediment, in which nitrate is used in the destruction of organic matter, phosphate can increase with decrease in nitrate.

Response to specific comment 6: We have deleted “subsurface” in the abstract section.

Response to specific comment 7: We set average concentrations of Chl a, ammonium, and VOIs in all Pacific-origin Water (ACW + BSAW + PMLW + CDW) to threshold values of each compound. We use the terms of “high” and “low” concentrations as “higher than the threshold” and “lower than the threshold”, respectively.

We have added some explanations and revised the manuscript in the “Results” section.

“We set average concentrations of Chl a, ammonium, and VOIs in all Pacific-origin Water (ACW + BSAW + PMLW + CDW) to threshold values of each compound. We use the terms of “high” and “low” concentrations as “higher than the threshold” and “lower than the threshold”, respectively.” “We set threshold value of *** pmol L⁻¹ to describe “high” or “low” concentrations in this study.”

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Response to specific comment 8: We concluded that VOIs productions over the shallow continental shelf of the Chukchi Sea are associated with the degradation of organic matter which has been produced by marine primary production. Thus, distribution pattern of VOIs abundance in regional scale is not consistent with the pattern of living phytoplankton abundance. On the other side, in global scale (or basin scale), overall distribution pattern of VOIs abundance would be dependent on the marine biological productivity.

We added an explanation in the manuscript, as follows. “ It seems that Chl a is not a main factor in the vertical-horizontal distributions of VOIs on regional scale, such as the Chukchi Sea and adjacent sea area, implying that large fraction of VOIs abundances in coastal sea area were not directly emitted from living phytoplankton as discussed in later sections 4.1.1 and 4.1.2. “

Response to specific comment 9: We have added “P” and “n” values to the all “R” in discussion section.

Response to the technical correction 1: We have revised as follow. “Method” -> “Methods”

Response to the technical correction 2: We revised the order of the station number in section 3.1.

We used the station number labeled by the MR12-E03 cruise. We rearrange the order of the stations according to our definition in 3.1. “The sampling stations are listed in order of latitude from the southernmost St1 to the northernmost St45 under the influence of ACW and in order of bottom depth from the shallowest St72 to the deepest St64 under the influence of PMLW.” We used the rearranged order in latter section and figures.

Response to the technical correction 3: We have revised “~” as “-”

Response to the technical correction 4: We have revised the captions of figure 2 and

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figure 3.

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