

Author's response to referee #4

We are grateful to your comments and useful suggestions that improved our manuscript greatly. As described below, we have revised our manuscript. Please note that the expression in black colored letters are the ones provided by you whereas those in red are our replies.

Specific comments:

Page 8790 lines 25-26 – That conclusion does not seem to be supported by the data presented.

→OK, we deleted this part (p8790, Line25-25).

Page 8792 line 11 – delete 'and' (there are two 'and's).

→We deleted (p8792, Line 11).

Page 8792 line 23 – I assume they are measuring silicic acid. I realize that many researchers refer to dissolved silicon as silicate, but the proper chemical form is silicic acid.

→We corrected as silicic acid (p8792, Line 23).

Page 8793 line 15: Why was the diatom data (only) log transformed? I don't find their explanation satisfying ("to reduce any bias in abundance" what does that mean?). If the diatom data was log transformed, does it mean that all diatom data shown in figures is log transformed? The authors should indicate data manipulation in the Figure legends also (or axis title?).

→To make appropriate clustering, reduction of bias with log-transformation is common for such analysis (cf. Field et al. 1982). In the revised manuscript, we referred adequate reference at this statement (p8793, Line 16).

Page 8794: Data should be presented in the Results section demonstrating/quantifying the occurrence of the SWE.

→Since SWE during this study period was documented by the several other studies (Nishino et al. 2015; Kawaguchi et al. 2015). We refer their points (p8793, Line 23-26), and concentrated more on phytoplankton issue in this study.

Page 8794 line 13 – Ammonium is NH_4^+ , not NH_3 .

→We corrected, thank you (p8794, Line13).

Page 8794 lines 13-15 – Change 'nutrientcline' for nutricline.

→We changed (p8794, Line 13).

Page 8796 line 4 – What do the authors mean by “As a character of microplankton assemblages in this study?”

→We changed from “character” to “feature” (p8796, Line 4).

Page 8796 line 9 – All diatoms are autotrophic (primary producers), so there is no need to say “primary autotrophic diatoms”.

→We deleted “primary autotrophic” (p8796, Line 9).

Page 8796 line 11 – “A cluster analysis based on diatom abundance classified the microplankton community into” Do the authors mean “microplankton” or diatoms? They refer to Figure 6, which presents an analysis of diatom data only.

→It was our mistake. We deleted “microplankton” from the sentence (p8796, Line 11).

Page 8796 line 27 – Is it 0 to 20 m or 0 to 30 m?

→It was 0-20 m (p8796, Line 27).

Page 8797 line 6 – What do the authors mean by horizontal changes? Latitudinal? Longitudinal?

→Since these studies include both latitudinal and longitudinal changes, we changed the term as “geographical” (p8797, Line 6).

Page 8798 line 20 - Authors compare their data to a study from western Greenland. That region is very far away and different from the Chukchi Sea; how significant is the comparison? Is there any data from around their study site?

→Owing to comment, we deleted this part (p8798, Line 27).

Page 8799 line 2 – Clarify where low salinity occurs: in surface waters?

→We added “at surface layer” (p8799, Line 2).

Page 8799 line 6 – Figure 7 does not (clearly?) show that “sea surface temperatures decreased while salinity gradually increased” from the beginning to the end of the sampling period.

→We deleted Fig. 7 and refer Fig. 2 in this sentence (p8799, Line 6).

Page 8799 lines 6-9 – Authors do not provide strong evidence of weakening of the pycnocline or mixing of deep water towards the surface. There is a small difference in salinity (~ 0.5) and temperature (~ 1 degree) (Fig 8) between before and after the SWE, but is that strong enough evidence for a mixing event? In addition, nitrogen concentrations don't change from before and after

the SWE (Fig 2).

→Effects of this SWE were documented by physical oceanography (Kawaguchi et al. 2015) and chemical oceanography (Nishino et al. 2015). In the revised manuscript, we refer these studies and added short note on their conclusions (p8793, Line 23).

Page 8800 line 12 – I don't believe that they can say that there was a 'dramatic' increase in salinity.

→OK, we deleted term "drastic" (p8800, Line 12).

Page 8801 line 14 – Is it 0-20 m or 0-30 m?

→It is 0-20 m (p8801, Line 14).

Figure 1 legend. What does it mean: "Depth contours at 50, 100 and 1000 m are superimposed"?

These need to be marked on the map (add labels on contour lines). Map has no labels of any sort.

Other labels would be useful, e.g. Bering Strait, Russia, Alaska.

→We added labels for Fig. 1 map.

Figure 2d and 2e: Add contours on the top part of those panels. I assume that for 2b the grey area is for values $< 2 \mu\text{M}$ but why not add a $1 \mu\text{M}$ contour at least. Same for silicate, after the SWE.

→OK, we added lines of $1 \mu\text{M}$ for Fig. 2d and 2e.

Figure 3: Are these log-transformed data? They don't seem to be. However in the methods, the authors said that diatom data was log-transformed.

→These data are in linear raw data. We used log-transform data only for clustering (Fig. 6). We mentioned it clearly in the revised manuscript (p8793, Line 50).

Figures 3, 4 and 5 legends: The previous to last sentence should read: "In (a), values represent the mean of diatom abundance between 0 and 30 m"... assuming this is what the authors meant.

→We corrected along your suggestion (Fig. 3, 4, 5). Thank you.

Figure 6: Do circles in panel (b) refer to mean abundance? It should be noted somewhere in the figure.

→OK, we added (Fig. 6).

Figure 7. Is the plotted temperature and salinity data for surface water, or for all depths?

→We deleted this figure from revised manuscript.

Figure 8. What are the temperature, salinity and Chl. a values shown in the top panel? Are those means for the water column or integrated values?

→It is integrated mean value. In the revised manuscript, we made these notes in the legend.