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Biogeosciences Discussions

Interactive comment on "Short-term changes in a microplankton community in the Chukchi Sea during autumn: consequences of a strong wind event" *by* N. Yokoi et al.

Anonymous Referee #4

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Review Yokoi et al – Biogeosciences

The paper by Yokoi et al. describes the microplankton taxonomic composition of the upper water column (0-30 m) at one station in the Chukchi Sea. Sampling was done daily during 15 days in the month of September (2013). The authors argue that changes in taxonomic composition occur as a result of a 'strong wind event' (SWE) about 8 days after the sampling started.

The data is well presented in good quality Tables and Figures. For the most part, the language is clear but there are some parts, that due to the language used and poor/lack of connections between sentences, the message is not straightforward.

Despite a nice representation of the data and some useful information on microplankton taxonomy, I think that the paper is weak in terms of contributing substantially to the understanding of the Chukchi Sea's planktonic ecosystem. It is a one-time, 15-day assessment of taxonomy at one location (within a highly variable region). But most importantly, the entire paper is based on comparing microplankton assemblages before and after a SWE, for which I don't see strong evidence in their data. For example, Figure 2 shows very weak changes along the sampling period in temperature, salinity, density and silicate, and no change is observed for dissolved nitrogen concentrations throughout the 15-day sampling period. Differences are however seen for chlorophyll concentrations, but whether those changes are due to a SWE or something else, it is not clear. Temperature decreased slightly from the start to the end of the study period, and salinity and density seemed to weakly increase (seen in Figure 2 and Figure 7). But there is no evidence of a mixing event strong enough to have broken the stratification (as indicated by the authors as the reason for increasing nutrients towards the surface to sustain a small fall bloom). Firstly, the authors should define what they mean by "SWE" and also demonstrate the occurrence of this event during their study (e.g. wind data?). However, even if there were strong winds half way into the sampling period, the authors should also demonstrate that this wind event mixed the water column enough to allow for a change in the assemblage composition (due to upward injection of nutrients and other physical changes of the water column).

Specific comments:

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

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

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.

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?).

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

Page 8794 line 13 – Ammonium is NH4+, not NH3.

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

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

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

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.

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

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

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?

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

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.

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 ($\sim$0.5) and temperature ($\sim$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).

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

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

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.

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 μM but why not add a 1 μM contour at least. Same for silicate, after the SWE.

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.

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.

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

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

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?

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