

Interactive comment on “Shelf–Basin interaction along the Laptev — East Siberian Seas” by Leif G. Anderson et al.

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Received and published: 17 January 2017

General comments: This paper presents analyses of hydrographic and biogeochemical data obtained from the East Siberian Arctic Seas, where only the limited data are available. Therefore, the dataset is significantly valuable. From the data, the authors proposed a new image of the Siberian shelf water spreading into the Arctic basins. Furthermore, they suggested the origin of deep silicate maximum water, which was not clear in the previous studies. This is an interesting paper that is in general clearly written and well-laid out. I recommend the paper for publication in Ocean Science after some revisions.

Specific comments: P. 1, L. 1 (Title): Did you discuss about Laptev Sea - Makarov Basin interaction with the present data? If not, it might be better to delete "Laptev"

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from the title or use such as "East Siberian Arctic Seas".

P. 1, L. 25: Can you say that the water of $S \sim 34.5$ is lower halocline water? If so, it might be better to add sentences to distinguish from the explanation about upper halocline water. For example, '... $S \sim 34.5$, where the water is classically named lower halocline water. Here, we found new characteristics of the water ...'.

P. 2, L. 4: Probably, some references would be given.

P. 2, L. 7: Also, please see the paper below for the Makarov Basin (e.g., Figure 3 in this paper). Nishino, S., M. Itoh, W. J. Williams, and I. Semiletov (2013), Shoaling of the nutricline with an increase in near-freezing temperature water in the Makarov Basin, J. Geophys. Res. Oceans, 118, 635–649, doi:10.1029/2012JC008234.

P. 2, L. 14–15: This kind of sentences might be better to move to the Method section.

P. 3, L. 15: In addition to the introduction on the upper halocline water, it might be better to introduce some previous studies on the lower halocline water and deep silicate maximum, because this topic is another important part of the present study. You should describe more clearly what is still unknown about the deep silicate maximum. I think that the origin of the deep silicate maximum water was not clear in the previous study, but the present study sheds light on the origin from the wide-area hydrographic and biogeochemical surveys including the first SF6 measurements.

P. 4, L. 9: Is CFC-12 data used in the present study?

P. 5, L. 11–12: Is the surface low salinity with strong stratification an influence of Lena River? If possible, please explain in the discussion section.

P. 5, L. 17–18: Is the surface high silicate an influence of Lena River? If possible, please explain in the discussion section.

P. 6, L. 26 (Figure 6): It would be helpful to depict positions or a line of $S=34.5$ connecting each section from A to F. Or it might be better to depict SF6 distribution on the

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isohaline surface of $S=34.5$ to identify the less ventilated area.

P. 6, L. 32: Where did you assume the reference level in the geostrophic shear calculation? Only the density field, we don't know whether the bottom currents are eastward or westward. Probably, we need discussion from current data or chemical tracer data to infer the flow direction.

P. 7, L. 4-6: I can't understand what you want to mention here. Do you want to describe implications of the bottom-intensified eastward flow?

P. 7, L. 5 (Figure 7): In Figure 7, it is not easy to understand the increase in salinity ALONG THE SHELF SLOPE with the temperature increase. Does "ALONG THE SHELF SLOPE" mean "ALONG AN ISOBATH"? If so, why didn't you show vertical sections ALONG AN ISOBATH or ALONG THE SHELF SLOPE to explain these distributions?

P. 7, L. 24: and?

P. 8, L. 1: It might be proper to describe such as "ice formation periods with cooling and convection".

P. 9, L. 5: Based on the SF6 distribution, the deep silicate maximum water (SF6 minimum and AOU maximum water) might not be related to the brine production (i.e., ventilation).

P. 9, L. 7: Figure 4 of Nishino et al. (2013; JGR) indicated the variation of nutrient maximum water along the Siberian continental margin. The variation is also associated with the recent sea ice reduction over the East Siberian Sea during the ice formation period.

P. 9, L. 15 (Figure 11): Please describe why you selected the calculation area (76-80N, 140-150E).

P. 9, L. 22: Please explain what a purpose of the analysis in Figure 12 is. Why do you

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need to discuss the shelf plumes penetrating down into the central deep basin? Why does this discussion limited to the eastern part of the study area?

Same comments were inserted in the PDF file of Ocean Science Discussion.

Please also note the supplement to this comment:

<http://www.ocean-sci-discuss.net/os-2016-95/os-2016-95-RC2-supplement.pdf>

Interactive comment on Ocean Sci. Discuss., doi:10.5194/os-2016-95, 2016.

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