

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

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We are grateful for the referee’s constructive comments as well as the kind words. Referees comments are in red.

Referee #3 General comments The ms is interesting, although very descriptive: some biogeochemical transformations which take place in the shallow continental shelf seas of Siberia are investigated. The ms provides useful information in order to improve the knowledge on the dynamics of shelf water, from the East Siberian Sea and assess their sources. I suggest the publication of the ms after a minor revision. In the introduction (P.2 L.8) the authors state: “here we assess data collected in 2014” Unclear sentence is this an objective? In this case this should be reformulated. The relevance of the objectives and of the results obtained could be better stated and evidenced in the

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introduction and conclusion. The effect of the variations in sea-ice coverage, one of the main objectives, is not considered in the conclusion. P.2 L.8: The notation of the data collection is not an objective, but information. The objective is specified on lines 12-14. We delete some of the text here and expand in the method section. Also the variations of sea-ice coverage will be included in the conclusions.

The methods used are appropriate. When describing the sediment core subsampling the authors should specify the thickness of the subsamples where the biogenic Si were analyzed. In the text  $\mu\text{mol kg}^{-1}$  is used for  $\text{O}_2$  concentration but in figure 5  $\mu\text{mol L}^{-1}$  is used for AOU. Please uniform the units used throughout the ms. The transient tracers Sulphur Hexafluoride is used in this work to investigate the ventilation states of the different water masses but Overall it is unclear which benefit are derived by SF6 analysis with respect to  $\text{O}_2$ , as no water mass age is derived. Method section. The thickness of the sediment sub-samples will be included in Table 1. The unit of AOU in Fig 5 is wrong, should be  $\mu\text{mol kg}^{-1}$  and will be changed. SF6 is used to indicate ventilation age, i.e. relative ages, which give important information with regards to the source of the  $S \sim 34.5$  water with high silicate concentration. Giving ages are associated with substantial errors as we note in the method section, P. 4, L 9-10, and we thus avoid this concept.

For SF6 “ppt” is used as a measure units but is unclear, the authors should use International System of Units and anyway clearly indicate if the concentration is expressed on a volume basis. Is there any significant negative correlation between SF6 and AOU? Specific comments As for the unit of SF6 we use ppt as it avoid the issue of the temperature effect, i.e. if a water leave the surface in equilibrium with the atmosphere at different temperature it will result in different concentrations, but the same ppt. We will add a motivation on this in the method section also spelling out that it is on a volume basis. There is no correlation between AOU and SF6 if one does not restrict the data to a very close geographical and depth range. In the salinity range 34.3 to 34.7 there is an association and we suggest to include a new figure of this in a revised version.

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P.4 L.9 The precision for onboard measurements was  $\pm 0.02$  fmol/kg for SF6 and  $\pm 0.02$  pmol/kg for CFC-12: If CFC were analyzed together with SF6 why this data are not presented and discussed? P.4 L.9: CFC-12 is not used as it does not add anything and will thus be deleted from the method section.

P. 7. L. 16. Please clarify “indicating that this water has had its signature coloured by hypoxic conditions.” P.7 L 16: We will clarify what we mean by the statement that the water is colored by hypoxic conditions.

Fig. 2 Most of the capital letter are in white, a few are in black please uniform. Fig. 2: We have chosen to use a color that clearly shows the letters in relation to the background color.

Fig. 3. The pH index is not readable Fig 3: We will increase the font size.

Fig. 4. Biogenic Silica is expressed as % dwt? This could be specified, Fig 4: We will specify % dwt.

Fig. 11. The percentage is representing annual data and not monthly data as stated in the caption. Fig 11: There must be some miss understanding. The color of each pixel shows the ice coverage of that month. We will clarify to avoid miss-understandings.

Fig. 12. the strongest gradients in silicates and SF6 are closest to the shul. Is unclear how the reader can verify this statement, as the sampling stations are not identifiable in the profiles- Fig 12: This is information that cannot be seen form the figure, and that's why we give this information in the legend. We can see if it is possible to modify the fig to illustrate this info.

Fig. 13. green arrows are not sufficiently evident Fig 13: We will make it a darker green.

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