

Interactive comment on “Carbon geochemistry of plankton-dominated supra-micron samples in the Laptev and East Siberian shelves: contrasts in suspended particle composition” by Tommaso Tesi et al.

Anonymous Referee #2

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General comments

The objective of this study was to investigate the composition of the suspended particulate organic matter in ice-covered and ice-free waters over the Laptev and East Siberian shelves. The main problem of this study is to assume that these samples are plankton-dominated, as indicated by the title. There are no data to support the fact that phytoplankton dominated the suspended particulate matter and such a dominance would actually be quite surprising over the shallow Siberian shelves (a lot of particulate material is resuspended and/or transported with the ice). An effort should be

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made to quantify the phytoplankton contribution and composition before resubmitting this manuscript. If the authors somehow collected ice samples during this expedition, it would be relevant to compare the composition of the particulate matter in the ice with the composition of the suspended matter.

Another important problem is that too much of the current manuscript is based on another paper submitted elsewhere by many of the same authors that seems to be very similar to the current manuscript. This problem must be addressed.

Overall, while the study had the potential to provide interesting results from a very rarely sampled region, the current results do not bring very interesting or new information. It is well-known that ice covered regions are productive and display high concentrations of particulate matter. The interpretation of the results must be reevaluated in this context. Also, please keep in mind and specify throughout the manuscript that these are late summer observations and that conditions may be quite different during the productive spring period. Finally, the manuscript is too long, often repetitive, and the text needs to be revised by a native English speaker.

Specific comments

Title

I have never heard the terms supra-micron or supra-POM and I don't think there is a need for it. Please remove the term supra- throughout the manuscript.

Abstract

Lines 50-51: Comments like these are not informative. Always be specific.

Introduction

Lines 54-55: Provide more recent references.

Material and methods

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Some information on the dates of sampling are required.

Lines 110-113: Several steps are unclear. When it is mentioned that particulate material was kept frozen, it means the filters? In which state were the samples transferred into the centrifuge? Were the samples thawed first?

Lines 115-116: Such information belongs in figure captions.

Lines 150 and 154: IP25 is a highly branched isoprenoid mono-unsaturated alkene. Introduce it properly and only once.

Section 2.3 Microscopic images of plankton* This is probably the biggest shortcoming of the study. It is baffling that the authors use microscopic images as a qualitative tool but did not include a quantification of the different phytoplankton groups. This would definitely improve the quality of the study. *Always precise if it is phytoplankton or zooplankton. Plankton is not a term precise enough.

The material and methods section is too long and often repetitive. Reduce.

Results/discussion

Section 3.1. Surface water conditions Most of this section does not belong in the paper. All the results (salinity, temperature, nutrients...) for which material and methods were not presented in the precedent section must be removed from the manuscript and the figures/tables as well. This is even more crucial considering that the same results are part of another submitted paper from the same authors. It is not appropriate to submit the same results twice and all the results that were submitted in Humborg et al. must be removed. Instead the authors should refer to these results in the discussion, which would be much stronger if or once the other paper is published. It would be more appropriate to start the discussion with section 3.2.

Lines 220-222: You should never write sentences in this form: Figure 1 displays... Table 1 reports... This is the type of mistakes made at the undergraduate level.

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Line 225 and others: All maps (figures 1, 2 and 4) should be switched with North towards the top to help with the description of the results. This is the usual and correct way to place a map and it is less confusing when looking for the westernmost stations.

Lines 230-232: DOC concentrations mirrored. . . 'Mirrored' does not mean the opposite, it means similar. Get an English speaker to review your paper. And please limit your use of the word 'thus'.

Line 252: It is late and unnecessary to introduce the term TerrOC at this point. Either you introduce it earlier or you use other terms for consistency.

Lines 284-287: These phytoplankton species are typically observed late in the season. This should be specified. Chaetoceros and Thalassiosira are pelagic species growing in water only while Fragilariopsis cylindrus and oceanica grow both in ice and water (they are not sea ice species necessarily). More information could be obtained through extensive and quantitative taxonomic analyses of the existing samples.

Lines 304-306: . . .captured the signal of the sea-ice retreat that occurred shortly before. . . Sea ice retreat actually took place weeks and months before so it is not appropriate to say shortly before. The fact that IP25 was still detectable would be more likely the result of advection or resuspension.

Lines 378-380: However, it would then remain elusive why such an aged* land-derived influence was not visible in the river-dominated LS waters while it affected the sea-ice dominated region. Is it that elusive? It is puzzling that the authors did not consider that the presence of this land-derived material is likely the result of the release of material that was trapped in the ice during its formation on the shallow shelf. The trapped material is transported towards the outer shelves and released during ice melt, which was occurring at the time of sampling. This is an important and well-known process on the Siberian shelves. The interpretation must be improved to consider these ice-released particles. *How old? Be more specific.

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Lines 394-396: Hence, results suggest a heterotrophic environment in the outer LS open waters where the river-derived DOC is transferred to relatively higher trophic levels via microbial incorporation (i.e, microbial loop). This sentence reflects a poor comprehension of the food web. Energy is not transferred to higher trophic levels through the microbial loop.

Table 1

What is TN? Mean sea ice percentage is over which area?

Table 2

This table does not belong in this manuscript.

Table 3

This qualitative analysis is nearly useless. The authors should definitely invest in quantitative taxonomic analyses to support their results.

Fig. 1

Switch North up.

Fig. 2

Should be removed, presented in other submitted paper.

Fig. 4

Patterns are often not as clear as described by the authors in the results/discussion. Be careful when interpreting.

Fig. 6

The new results should also be presented as whisker boxes for consistency. In the caption: East Siberian Sea, not Eastern Siberian Sea.

Fig. 7

Why only for East Siberian Sea?

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