

Response to Reviewer 1

We wish to thank for the editor and the reviewers for their effort in handling of and commenting on our manuscript. We highly appreciate the insightful and helpful comments that helped to improve the hopefully final version of our manuscript.

Comment 1

L47: Is Atlantification not the same as sea ice losses?

Answer to Comment 1

Atlantification cause the sea ice loss. Warmer and saltier Atlantic water is extending its reach covering areas located more northward into the Arctic Ocean and as a result sea-ice is disappearing.

The sentence has been changed to:

“In addition, Henley et al. (2020) indicated that, with ongoing sea ice losses due to Atlantification, the expected shift from more Arctic-like ice-impacted conditions to more Atlantic-like ice-free conditions is expected to increase nutrient availability and the duration of the vegetation period in the Arctic shelf region.”

Comment 2

L87: I think the authors mean a north-east to south west orientation.

Answer to Comment 2

The sentence is changed to:

“Krossfjorden exhibits a north-east to south-west orientation, stretching approximately 30km in length and reaching widths from 3km to 6km.”

Comment 3

L111: "Seawater pH was measured 10ml of seawater was filtered." check text.

Answer to Comment 3

The sentence has been corrected and changed to:

“10ml of seawater was filtered (cellulose acetate filters with a pore size of 0.45µm), frozen in a pre-cleaned high-density polyethylene bottle and stored at -20°C for further nutrient analysis.”

Comment 4

Section 2.2.2 I see that for the porewater data there are quite some numbers missing, which might need some explanation in the methods section.

Answer to Comment 4

The explanation has been added to the description:

“GEMAX and Nemisto gravity corers were used to collect up to approximately 40 cm long sediment cores, with inner diameter equal to 12 and 10cm, respectively. However, the retrieval of the cores in some locations was not possible due to the consolidated seafloor. Additionally, the pore water extracted from some sediment cores was insufficient to perform all analyses.”

Comment 5

L135: check size of letters.

Answer to Comment 5

The size of letters has been corrected.

Comment 6

Section 3.1. I find this section a bit hard to read because of all the abbreviations that for me are not very common. It might become better when figure 2 is plotted close to the text, however currently there is no reference to Fig. 2 in this section. Additionally, it might help to also plot the water masses as a "section plot" with potential T on the Y axis and distance on the x axis. I leave this up to the authors.

Answer to Comment 6

The reference to Fig.2 is added. The characterization of the water masses is provided in section 2.1 together with abbreviations, and we think that there is no need to repeat this information. We think that T-S diagram sufficiently represent the characterization of similarities and differences among the distribution of the water masses.

Comment 7

L154: Krossfjorden is marked yellow not grey.

Answer to Comment 7

Text has been improved:

"...Krossfjorden (marked yellow)..."

Comment 8

L163: (at 25°C) is mentioned after pH.

Answer to Comment 8

The methodology section has been improved and this particular sentence corrected.

Comment 9

L209. I find point two here a bit detailed compared to the other two. I would remove it. Also because there are more (micro)nutrients that can limit primary productivity such as iron and manganese.

Answer to Comment 9

Point number 2 has been changed to:

" 2) the determination of C:N:P:Si ratios in different water masses and their comparison between fjords, as an assessment of the environmental controls and limiting factors for the primary production"

Comment 10

Fig. 4 This figure is a bit unreadable. maybe it would help if the authors plot three figures next to each other instead of 4.

Answer to Comment 10

The figure has been improved in accordance with the comment.

Comment 11

Fig 5. This figure is a bit unreadable. maybe it would help if the authors plot three figures next to each other instead of 4.

Answer to Comment 11

The figure has been improved in accordance with the comment.

Comment 12

Fig. 6. There is an l missing after mmo and umo in the unit of the figures.

Answer to Comment 12

The figure has been improved in accordance with the comment.

Comment 13

Krossfjorden 265 (marked grey). (actually marked yellow).

Answer to Comment 13

Changed.