

The paper reads good, but does still include many little flaws, which need to be corrected before the paper can be accepted for publication.

-Salinity still has no unit.

We are aware that according to the 'old' system, salinity is expressed without unit. This is indeed still the case for *practical salinity*. However, here we report *absolute salinity*, as per the latest recommendations (TEOS10), which is reported in g/kg. Therefore, we follow the latest international standards (TEOS10) and quote values of absolute salinity, in g/kg.

-Planktonic foraminifera may be abbreviated PF in the very beginning of the paper and be used throughout instead of the full term, 'foraminifera' only, or 'planktonic' only.

We will follow the editorial recommendation on the use of abbreviations. We have kept the unabbreviated form for now since it tends to enhance readability for the broader audience.

-New papers have been published, which show the invasion of new species in polar waters from the North Atlantic Current entering the Arctic Ocean

We have read Chaabane et al. (2024), which presents interesting findings that our study complements well. Chaabane et al. showed that some species are moving towards the pole, in our study we show that these have not reached the pole yet. We clearly emphasized that our results relate to the perennially ice-covered part of the Arctic Ocean.

Lines 65-66, What is suggested by the statement that 'In general, the extent to which *T. quinqueloba* occurs in the central Arctic Ocean is a topical question.'? What is the topical question?

We reformulated the sentence

Figure 1, LS is not shown in the map, AB is not explained in the caption. What are the small green dots with the black line, not shown in legend?

Fixed

Line 152, change 'foraminifera' to PF

Fixed

Line 190, better put: '...against samples collected from the Niskin bottles of the rosette water sampler.'

Fixed

Line 201, do you mean the stern of the ship, not bow?

No, the CTD is commonly deployed from the bow on Oden.

Line 219, *Anacystis nidulans* in italic font

Fixed

Lines 234-250, please state which water body is under the AW, because this is included with some of your CTD profiles.

The deep water, fixed.

Line 286, 'very thick' is what? Better give number.

Fixed

Line 294, NO₂ should read NO₃ plus NO₂

Multimeter thick, fixed

Line 296, better 'pronounced chlorophyll-a peak'

Fixed

Line 297, 'much weaker' than where or what? Relative clause!

'Than the central Arctic sites', fixed

Line 298-299, better 'subsurface chlorophyll maximum'

Fixed

Lines 301-306, such a detailed description of the oxygen profiles is not possibly needed, and a word on the general trend plus a reference to the Fig. 5 would be sufficient.

We decided to keep the description.

Lines 307-309, 'The nutrient...', this section should be moved to the Discussion and provided with references.

We believe that, due to its descriptive nature; the sentence belongs in the Results section.

Line 321, 'Spatial variability' should read 'Regional variability', of the section 3.2.2 should be made section 3.2.2.1, because 'Depth variability' is also spatial variability (not temporal)

Fixed

Line 329, 'different' from what?

Clarified

Figure 5: Please make all x-axes the same length to allow for comparability. As requested earlier.

We equalized x-axes formatting.

Lines 381-382, how do you know that empty tests were produced by reproduction? Any sign of GAM calcification? As requested earlier.

Yes, most of these have gametogenic calcite, but we didn't check this systematically so we've removed the statement "following reproduction":

Figure 7, I would suggest to skip the figure, which conveys a very simple message in a complicated kind of way, and caused more confusion than support a better understanding of the distribution of T vs. S vs. water depth.

OK, we've removed the figure

Discussion section, for *N. pachyderma* and *T. quinqueloba*, please also have a look at the paper of Simstich et al. (2003, ecology and isotopes), as suggested earlier, and which may add value to the manuscript.

Because the suggested paper is a bit more focused towards isotopes we unfortunately didn't find an elegant way to fit into our discussion paragraph.

Line 440, change 'currents' to 'water bodies'

Fixed

Line 468, change 'were able to' to 'may'

Fixed

Lines 495-496, please discuss the findings of Chaabane et al. 2024 published in Nature on November 13, 2024.

We have now discussed Chaabane et al. 2024 in the discussion and conclusions.

Lines 505-511, the correct reference is always Bé 1960

Fixed

Figure 10, should possibly be moved to the Results section

Yes, we will evaluate this during proofing.

Figure 11, should possibly be moved to the Results section, and the data should be discussed for the synodic lunar reproduction cycle and size structure of assemblages presented in Schiebel et al. 2017, as suggested earlier, and which may add value to the paper.

We agree with this – we have a follow study in progress where are discussing synodic lunar reproduction cycle, size structure as well as surprising coiling directions observed in the dataset.

In reviewing the manuscript by Vermassen et al., The distribution and abundance of planktonic foraminifera under sea-ice in the Arctic Ocean, I read the original submission, the three original reviews, the authors' response to the reviewers, and the revised manuscript. Like the authors and Reviewers 1-3, I find the presented dataset to be a valuable baseline for Atlantification of the Arctic that should be published. I also find that the authors were careful and thorough in their consideration of the reviewers' comments.

Several minor issues remain, however, that require attention before this manuscript should be accepted. Mostly, the manuscript should be revised for clarity and consistency (see my notes below) to include verb tense, use of italics, and spaces before units. As another example, the figures are out of order, and Figure 9 does not exist. Crucially, much of the data is missing from this version. For example, I see under Data Availability that foram species count tables are under revision at the Bolin Centre database, but I don't have access to them. It is not possible to reproduce these results without access to the data, and therefore all the data must be available before publication.

The necessary corrections listed below are relatively minor individually, but as a whole they are critically important to successfully communicate the science presented here.

We thank Marci Robinson for her thorough review of the manuscript. We have revised the manuscript according to her proposed series of minor/technical corrections. Figure referencing has now been fixed, and the datasets were published online at the Bolin Centre database and are accessible.

First line in Section 2.2. "One photo was taken for each square on the microfossil slide" makes it sound like all 15,381 individuals were on one slide. Perhaps change "slide" to "slides" and revise this sentence from the previous section, "Planktonic foraminifera individuals were picked onto microfossil slides using a combination of pipettes and brushes", to indicate that picking resulted in one slide per what... per depth range per site? Presumably, each slide represents one sample with identified species counts.

We clarified that , per depth interval per site, tests were divided over several slides (when needed) and that one image per square was obtained (with the tests being divided over multiple squares).

Section 2.3. All these data must be available through links provided under Data Availability or as tables in this manuscript. It's not clear to me, though I may be missing it, that the chlorophyll-a and nutrient data are included in the datasets accessed by the links provided.

As now stated in Data Availability, Foraminiferal data is available at the Bolin Centre Database, Chlorophyll data is available as a supplementary table.

Section 3.1.1. Improper use of the word "lied". Change this sentence to something like: Below the Atlantic Water, the deep water was characterized by temperatures lower than 0°C but with a salinity that remained high.

Fixed.

Section 3.1.2. Replace 'real' with true (without quotes).

Fixed

Section 3.3.1. Please check the figure citations in this section. I think Fig. 4 should be 5, and Fig. 3 should be 4.

The figure citations and referencing were checked and fixed.

Section 3.2.3. You jump to citing Fig. 11 here after Fig. 6, skipping 7-10. I would delete the sentence about a follow-up study. You don't need quotes around 'empty'.

The figure citations and referencing were checked and fixed. The sentence was deleted, as well as the quotes.

Section 4.2. First line reads "In order determine their". Change to "in order to determine the". Also, be consistent throughout the manuscript italicizing the cruise names.

Fixed

Section 4.3, line 574. Change "fossil test" to "fossil tests".

Fixed

Conclusions, line 640. Plateau should be capitalized in Yermak Plateau.

Fixed

References. I did not check the references, but I would recommend a thorough proofreading of references and citations before resubmission.

References checked

Figures, tables, and plates

Figures are cited out of order, though it's possible I missed something. I believe Figure 2 is cited before Figure 1; Figure 11 is cited before Figures 7-10, and Figure 7 is not cited at all. Figure 9 does

not exist. Are all the Appendix figures cited in the text? Please check the order of all figures and correct if necessary.

The figure citations and referencing of appendices were checked and fixed.

Figure 1. Should the Ryder19 dots be the same size as the SAS Oden dots? Should they be labeled like the SAS Oden dots? The figure caption explains the red arrow on the inset map, but what do the orange arrows represent?

We homogenized the labels and clarified the arrows

Figure 2 caption. Use lowercase b) to match the figure and the a). Also, the site numbers in Figure 2 are different from the site numbers in figure 1. What do they mean? How is SO21-26-10 in Figure 1 different than SO21-26 (19/8) in Figure 2?

Fixed and clarified the site numbers (which are abbreviated here).

Figure 3. Be consistent with capitalization of As and Bs in the panels and the captions. What are the journal formatting rules for this? Spell out CTD in the caption.

Fixed and we kept 'CTD' as it is defined previously.

Figure 5. The data presented here must also be available in data tables, either attached to this article or accessible by links.

All data is now accessible through links or tables.

Figure 6. Instead of using "Left" and "Right", use A and B consistent with the other figures. Instead of SAS21, do you mean SAS ODEN21? Change RYDER 2019 to RYDER19 to be consistent with the rest of the manuscript.

Fixed

Figure 8. These color data need to be included in a data table.

Data now available in data Table A1.

Figure 10. Make sure these data tables are accessible.

Data now available at Bolin Center Database

Figure 11. These size data need to be included in a data table.

Data now available at Bolin Center Database

Figure 12. Do these data include all samples from all sites from both cruises?

We clarified that the data relate to SAS ODEN21.

Check to make sure the tables are cited in order. They should also all be formatted the same way.

Fixed

Table 1. Change the blue text to white.

Fixed

Table 3. Spell out const, avg and std.

Fixed

Plates. The figure name formatting is inconsistent. What are the journal rules for plate figure numbering?

We homogenized the numbering of the plate elements.

Supplementary Table S1 requires a caption.

Fixed