

We thank the referee for his/her work and constructive comments! The referee's comments are copied below, and our responses are written in red below each comment.

Interactive comment on “Towards the Marine Arctic Component of the Pan-Eurasian Experiment” by Timo Vihma et al.

Anonymous Referee #1

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The paper introduces the need to study in depth the marine part of the Eurasian arctic, supplementing the ongoing effort of PEEX, that addresses the terrestrial part. The document is a compilation of recent work (the past two decades) on the area, a list of relevant scientific subjects, including the corresponding observational component, and a final part of different proposition to push the research in the area forward, including novel ways of data production and societal impacts. In general the paper is interesting, but it is too long, the different chapters have a lot of superposition and the list of references is incomplete (cites in the text not in the list) or with errors in the references. The impression is that this is a report of the interested group that has been submitted as a paper to ACP. The authors should reduce the text indicating the main points, including clearly the rationale and the actions to perform. This is why I propose a return of the paper to the authors encouraging resubmission of a much shorter document. I think it is easier for the authors than to request Major Revisions providing a very long list of Major Comments. Below I summarize some points according to the ACP review guidelines.

1. Does the paper address relevant scientific questions within the scope of ACP? The subject is correct in introducing the need to perform the study in the marine Eurasian area, but it fails to focus on what is really needed. It does not provide a clear rationale on how to proceed neither what actions are essentially needed.

We have made a major modification to the manuscript to focus on what actions are really needed and how to proceed. Among others, Section 5 (Discussion: The way forward), has been entirely rewritten.

2. Does the paper present novel concepts, ideas, tools, or data? The paper tries to identify all novel methods of measuring to see if they would be of use for their effort. Nevertheless they do not proceed to analyze how these methods should be implemented in such harsh environment.

In Section 5 we now provide more concrete plans for the implementation of MA-PEEX. In Appendix 1, we have now made in clearer that the new observation technology discussed has been tested in harsh Arctic conditions.

3. Are substantial conclusions reached? No, other than the experiment is necessary (and I agree with that).

As the paper does not include concrete new results, it is hard to present clear conclusions. We have, however, now more clearly presented our evaluation on what should concretely be done to establish the Marine Arctic component of PEEX (Section 5).

4. Are the scientific methods and assumptions valid and clearly outlined? The methods are well described, the assumptions are very reasonable. However, the second half of the paper dealing with the societal impact is not clear. Sections 5 (Socio-economy) and 6 (The way

forward) are long, too wordy and should be drastically reduced or be written in a more clear manner.

We have reduced the length of the socio-economy section (now Section 4) by 30% (from 1501 to 1048 words). Previous Sections 6 (The way forward) and 7. (Discussion) included a total of 3755 words. We have merged them together into a new Section 5 (Discussion: The way forward), which only includes 1704 words. We think that the new Sections 4 and 5 are more clear and concrete than the old text.

5. Are the results sufficient to support the interpretations and conclusions? There are not results in the paper, but there is a very good compilation of the work done, so the authors are in very good position to go for the experiment, but this is more for a research proposal than for a scientific paper.

We agree with the reviewer. The approach is different from a typical scientific paper, because the objective of the manuscript is to describe a new component of PEEEX in the PEEEX Special Issue of ACP.

6. Is the description of experiments and calculations sufficiently complete and precise to allow their reproduction by fellow scientists (traceability of results)? Not applicable, since it is a review/prospective paper.

We agree.

7. Do the authors give proper credit to related work and clearly indicate their own new/original contribution? Yes, the compilation of previous work is excellent, although the reference list misses a lot of the references in the text and some references are inconsistent between the text and the list.

We have corrected the errors and added the missing references.

- 8, Does the title clearly reflect the contents of the paper? Yes.

We decided to modify the title, because the previous title would not generate interest among readers who have not heard about PEEEX.

9. Does the abstract provide a concise and complete summary? The abstract is good.

Thank you!

10. Is the overall presentation well structured and clear? The structure of the paper is good, but every section is too long and there are too many differences between sections, some are relatively concise and very clear others are more speculative and less precise. It is true that the paper addresses many different subjects and it is a big challenge to make a readable document with such a varied contents. However I am positive that a second try will manage to produce a good paper on MA-PEEX.

We have reduced the length of the paper from Introduction until the end of Section 5 (previously 7) by 36% (from 15512 to 9968 words). Structural changes include removal of previous Section 2, as the core issues of the Arctic climate system are now presented in Section 1 (Introduction) and in the present Section 2 (Existing observations and processes to be studied). Further, a lot of detailed information on new observation methods and community-based observations have been moved to appendices, and the previous Sections 6 (Way forward) and 7 (Discussion) have been merged together to remove repetition and make the message more clear and compact.

11. Is the language fluent and precise? In general English is good although there are some language mistakes, easy to correct. There are some changes of writing style between sections, probably due to different contributors, but the main problem is that not every section is written with the same approach, some are good others are weak.

To make the approach and writing style more homogeneous throughout the manuscript, the lead author has alone prepared the revised manuscript, and then collected final input and comments from co-authors.

12. Are mathematical formulae, symbols, abbreviations, and units correctly defined and used? Not applicable, since no mathematical expressions or formulae are used in the text or in the figures.

13. Should any parts of the paper (text, formulae, figures, tables) be clarified, reduced, combined, or eliminated? As indicated, the paper should be substantially reduced in size and also be written in a more internally coherent manner.

See our responses above: 36% reduction in length and internally more coherent rewriting.

14. Are the number and quality of references appropriate? See point 7 on the errors in the references. The list is extensive but appropriate, it reflects well the scientific work made in the area in the recent times.

See above: we have corrected the errors and added missing references.

15. Is the amount and quality of supplementary material appropriate? No supplementary material that I can see. However if the authors produced a shorter version, perhaps they could derive some of the removed parts to supplementary material.

Thank you for the good suggestion! We have moved parts of the original manuscript to appendices.

Timo Vihma on behalf of all co-authors.