

Interactive comment on “Satellite ice extent, sea surface temperature, and atmospheric methane trends in the Barents and Kara Seas” by Ira Leifer et al.

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Received and published: 19 February 2019

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Anonymous Referee #1 Received and published: 17 December 2018 Re-review of “Satellite ice extent, sea surface temperature, and atmospheric methane trends in the Barents and Kara Seas” by Ira Leifer et al.

The resubmitted paper was reworked in many ways that improved it. Now, in my opinion, the paper is worth publishing.

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Interactive comment

The authors responded to all the points raised in the previous review, and made necessary corrections and alterations in their paper. The Introduction and Methods chapters were shortened and rearranged significantly. The figures were provided in higher quality that made them easier readable. Typos and inaccuracies found earlier were fixed. The authors also rewrote some parts of the paper to make it more understandable and to fill some gaps mentioned in the previous review.

>Thank you, we worked very hard on the revision and thank the many comments that we addressed to make a significantly improved manuscript.

Line 316: There are no units in "from 0.2 to 0.12".

>They were meant to be fraction, changed to percent.

Line 318: A missed space in "MCand".

>Done

Line 342: A couple of typos happened in "to the west of the Grand Bank". The phrase is likely "to the south of the Great Bank" (according to Fig. 2b and 4a). True, there was a problem here. Actually, southwest would be more accurate.

>Changed.

The Persey Current position in Fig. 4a differs significantly from that in Fig. S2.

>The currents in these two figures are from different sources; however, the Percy Current in Fig. S2 was not consistent with other flows around east FJL. It has been corrected to be consistent with Fig. 4a in Fig. S2.

Line 535: As SST and CH4' are mentioned here, a reference to Fig. 8 should be added as well.

>Done.

Line 547: In July, the Kara Sea is partly ice free, not wholly.

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>Corrected. Also note that in August it is ice free.

Line 555–556: The statement that "the MC then flows along the east shores of Franz Josef Land" is inaccurate. The western side of the St. Anna Trough (right east of Franz Josef Land) is a site where modified Atlantic waters (100–300 m) enter the northeastern Barents Sea from the north. The transformed Atlantic waters leave the Barents Sea between Novaya Zemlya and Franz Josef Land flowing mainly along the southern and eastern sides of the St. Anna Trough.

>True. We were imprecise as to where the MC flow goes, which is not important for this study, which is on the Barents and Kara Sea and the impact of currents – not what happens further north. Sentence rewritten and shortened to be correct and more focused.

Line 557: The Ob and Yenisei Rivers influence significantly the eastern and southeastern Kara Sea. Their impact on the northern Kara Sea, especially the northwestern part, is much weaker.

>Agreed, rewritten to distinguish the northern Kara Sea from the northeast margin.

Line 561: July or June?

>July – see Supp Fig. S8b

Line 564: Fig. 10c seems to be the right reference here.

>Yes. Fixed

Line 574: A typo in "In", the word needs lowercasing.

>Done

Line 583: A full stop was missed at the end of the sentence.

>Done

Line 686: A typo in "the Kara Straits", in the singular. It looks like a comma was missed

after "coast".

>Thanks, Done

Line 693: "north of the White Sea" is a bit inaccurate. Kolguyev Island is relatively far away from the White Sea northeastward. It is also northeast of the Kanin Peninsula.

>Changed. Agree that it is more appropriate to reference to the Kanin Peninsula given its importance to natural gas production and extensive reservoirs.

Line 697–698: There is no flow of the Murman Current around Franz Josef Land, just Arctic waters and underlying modified Atlantic waters which are continuation of Atlantic waters flowing along the continental shelf break through the Fram Strait west of Spitsbergen, then rounding the northern tip of the archipelago and flowing east along the continental slope.

>True. We were imprecise as to where the MC flow goes, which is not important for this study, which is on the Barents and Kara Sea and the impact of currents – not what happens further north. Sentence rewritten and shortened to be correct and more focused.

Line 714: The phrase "moving northwards from June–September" appears to be a bit ununderstandable.

>Rewritten: More rapid SST warming occurs offshore Novaya Zemlya shifting from south to north from June to September

Line 717–718: The northern Kara Sea is influenced by the Barents Sea and modified Atlantic waters (see the remark for lines 697–698) much stronger than by river outflow.

>Actually riverine outflow is very important to dominant for the Northern Kara Sea as revealed by its brackishness. The reader is now referenced to Section S3, which describes and provides citations)

Line 722: What season is described here, when the mixed layer becomes shallower

and, at the same time, cooling to the atmosphere takes place?

>This is for the season June to September as noted in the prior paragraph. Added June to September to this paragraph for clarity.

Line 774: There is a reference to Fig. 11 in the text, but there is no Fig. 11. It looks like Fig. 10. Yes.

>Done.

Line 847–849: This sentence needs rewriting. What "trends" (the trends, mentioned trends, discovered trends)?

>Warming trend – fixed.

"Sea" or"-s" need removing in "the Barents Sea and Kara Seas". The second "free" looks redundant.

>Done.

Line 1199: Some captions in the list differ slightly from those under the figures in pages 34–43.

>Fixed.

Line 1281: In Fig. 7 caption, "Box names on panel a" left from the previous version of the paper. Now, it should be "Box names on panels".

>Done.

Line 1284: Perhaps, it would be better to write "methane anomalies" in the caption of Fig. 8, as the anomalies are exactly what are shown on the vertical axes of the figure.

>Done.

Interactive comment on The Cryosphere Discuss., <https://doi.org/10.5194/tc-2018-237>, 2018.

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