1. We have added additional information on the presence of the puzzling difference to the Introduction.

In Section 3 we rely on the results provided by Liu et al. 2005, but also offer new findings. The main purpose of Table 2 is to show that the water temperature trend assessments are different for the Habarova and Kusur, however, mainly due to the air temperature variations within the watershed. Liu et al. 2005 provided very important information about trend assessments day by day, what we did not do, and compared it for the different parts of the watershed. Yet the outlet area in Liu et al. 2005 is represented by Kusur Station alone, and the period of investigation is from 1950 to 1992.

We have longer time series available for the Kusur Station (Table 1), that is why in Table 2 we have one additional column, the other 2 columns show the results for the same periods of time for both stations.

2. Thank you for making this point. We have added information about impact of the mesh resolution on our numerical simulation.

The temperature distribution in the turbulent boundary layer follows the logarithmic law except for a thin wall layer for flows with very high Reynolds numbers (see, e.g., Landau and Lifshitz, 1987). And it is true that resolving dynamics in viscous and buffer layers requires much better resolution. However, the main purpose of the 1st experiment was to estimate the horizontal width of the 'cold zone', formed by the influence of the small tributaries upstream. We increased resolution near the boundary 10 times, but the width of the 'cold zone' did not change, because correct production of the total kinetic energy in the viscous layer is provided by the effective boundary conditions and logarithmic layer has been already resolved with a coarser resolution.

The distance is 5 km to the closest 2 rivers, which play large role in the cold current formation. However, there are 3 more rivers upstream, the farthest among them is situated 25 km upstream from the Kusur Station.

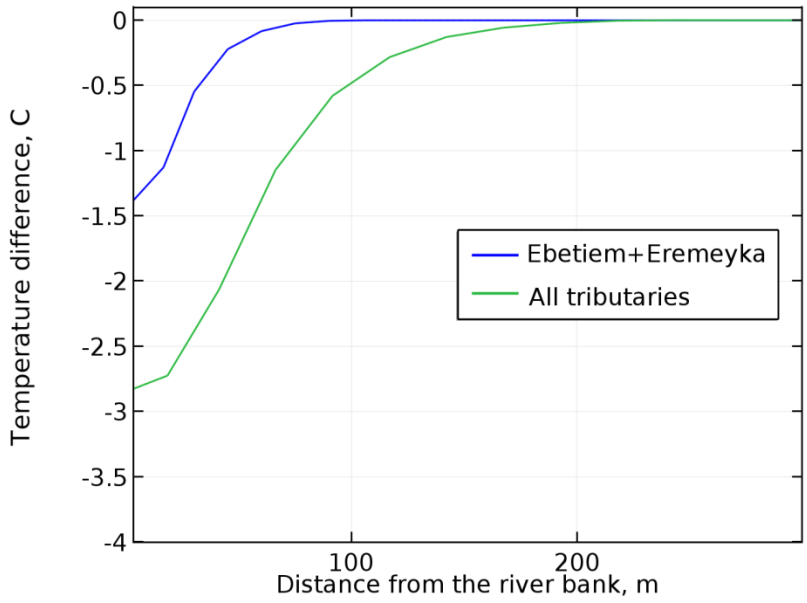

Fig. The difference between water temperatures near right river bank and midstream at Kusur GS (coarse mesh, 1 experiment).

Figure 1 was just showing the positions of the gauging stations. For consistency, we have added to it also small rivers further upstream and refer to Fig. 1 in an appropriate section.

3. The additional details were added to the manuscript. The Tit-Ary Island was taking into account as the variation of the river width and depth at corresponding x-coordinate.

4. Thank you for the comment. The clarification is given below.

a) Page 9, line 1. The 'elevation' is used here in a sense of 'water level' (relatively to the zero of gauging station, but here it does not matter relatively to what position). We can replace it with the full water depth, but the sentence will keep absolutely the same sense. We have replaced 'elevation' by 'water level'.

b) Page 12, line 16. We agree that the notion 'frequency optimization' should be clarified. It is done in the updated version of the manuscript.

c) p.4, II. 14-27, p. 7, 21-34: The clarification of ' lack representativeness' was given (p. 7, 21-34):

'However, several hydrological notes from 1930s, 1950s and 1980s (provided by centres of hydrometeorology and environmental monitoring in Tiksi) mention the possibility that surface water temperature measurements at Kusur GS lack representativeness. **The differences between the weighted average and near coast stream temperatures ranged** from 1 to 3.5 degrees and always remained positive (the measurements have been done in July and August).'

The representativeness is used in a sense that the mean cross-sectional water temperature deviates from near bank water temperature. Vertical temperature distribution is uniform. There are no opposing statements.

To avoid confusion we have removed word 'surface' in the sentence mentioned.

d) p.13, II. 5-28. Yes, now we see that it looks puzzling as it is, thank you a lot for pointing it out. We changed the text to eliminate the issue.

e) Page 14 presents discussion about possible heat release from sediments in the autumn (September-October).

' Given that the air temperatures are nearly equal at Kusur GS and Habarova for the first decade of **October** and cooling influence of the atmosphere within the area studied, we conclude that the shift in the beginning of ice conditions is mostly explained by the impact of heat stored in the sediments. '

'Even if we suppose that the sediment strata actively **starts losing** its heat in the beginning of September, we cannot explain such warming without introducing additional large positive heat flux from the hyporheic zone in the delta head area.'

However, we have added additional clarification to the manuscript.

Specific comments

1. We have corrected this sentence.

2, 3. We made some relevant corrections in the Introduction.

4. Thank you a lot for the point! We forgot to add 'at this position'.

5. We have added a reference to Table 1.

6. It is better to keep as it is, the distance from right river bank to the island can vary depending on discharge. But we have replaced word 'fairway' on 'main ship channel'.

7. Done

8. The additional citation and comment have been added. There is no mismatch with the future statement about non-representativeness, please, see 4c.

9. Please, see the answer above (1).

10. The clarification has been added.

11. We reformulated it.

12. This is true, but we decided to avoid putting too much 'inconsistencies' (they are scattered throughout article), also c) is part of b). a) highly depends on heat accumulated upstream as you mentioned. Also it is still a warming process, because the balance is positive, but warming slows down.

13. Thank you, we added the statement about ice to the manuscript.

14, 15. The sentence and paragraphs have been reformulated to include additional comments.

16. We have tried to strengthen mentioned line in the new version of the manuscript.

17. Done

18. Thank you a lot for the point! It is our mistake, we lost μ ($\times 10^{-6}$) typesetting text. Yes, there is still a question what value should be taken. However, for this particular study it is not so important. Sensitivity tests were done, we see some, but not substantial differences.

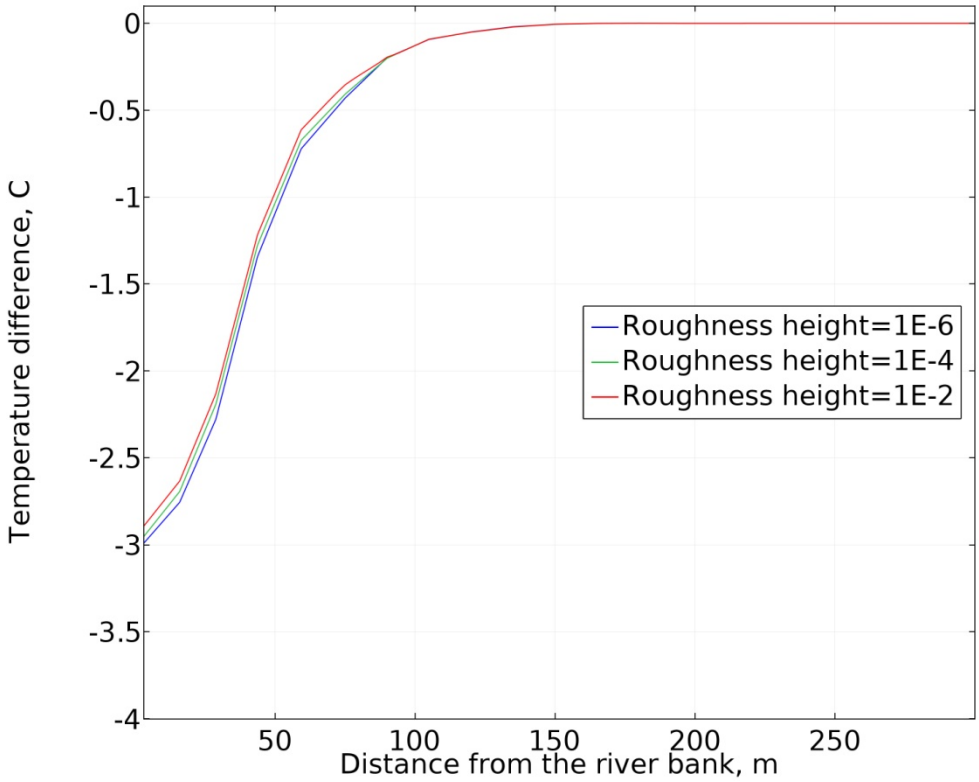

Fig. The difference between water temperatures near right river bank and midstream at Kusur GS (coarse mesh, 1 experiment).

19-20, 22-27. The appropriate changes have been added to the new version of the manuscript.

21. This analytical computation is directly connected with the first numerical experiment.

28. Yes, but when we merge 10a and 10b the figure becomes worse readable.

29, 31, 32, 33. Please, find below the clarification and logic chain from the beginning. We have added some clarifications also to the manuscript.

We assume, based on observations and river characteristics, that vertical water temperature distribution is uniform. We need to know, however, what is the horizontal temperature distribution.

The first experiment was carried out to obtain the horizontal temperature distribution, in particular, the width of the 'cold zone' and water temperature distribution in it. Actually it also shows that the vertical distribution is very close to the uniform one as expected. Then, the results of the 1st experiment were written in analytical form. Knowing the water temperature in the tributaries, their discharge, discharge of the Lena River and water temperature near the right river bank we can analytically obtain the mid stream Lena water temperature, which is close to mean water temperature. Yes, there is a weak point that we do not take into account the presence of factors which add additional stress to the system, for example, wind stress. The reason is that we need highly detailed information about wind direction and its magnitude to make a correct amendment. Also during the summer season the winds are not so strong (on average less than 4 m/sec). Nevertheless we can state that results agree well with the information presented in hydrological notes and provide a good benchmark for the further discussion and analysis.

In the second experiment, we restore the mean Lena water temperature on every time step and try to obtain the Habarova water temperature simulating heat exchange with the atmosphere. The short wave radiation is a body force, unlike other components of the balance, because it can penetrate deeply to the water body depending on it transparency. That is why we need information from the Secchi disc measurements.

In the second experiment we face the problem that the discharge behavior from all tributaries is unknown on a scale of 4h, which is the time scale of our second experiment. We have monthly information about the Eremeyka discharge and daily information for the temperature only. We can calculate approximately the total discharge from other inflows on a monthly scale using the available information about the watershed square, width and depth of these inflows, but the total discharge variation on a smaller scale remains unknown to us. That is why we turned to the optimization procedure trying to find an 'optimal' discharge from all tributaries to obtain the water temperature measured at Habarova:

$\frac{1}{t_m}\int_{June}^{September}|T_{obs}-T_m|^2dt \rightarrow min$, T_{obs} and T_m are measured and modeled water temperatures respectively at Habarova station and t_m is total model time. T_m depends on mean cross-sectional water temperature at Kusur GS (heat accumulated upstream), which is in turn obtained using Eqs. 4, 5 and 2, and thus depends on the total discharge.

These estimates embrace all uncertainties caused by the wind presence, this is a week point. However we obtained reasonable agreement between the calculated monthly discharge and monthly discharge obtained by solving the optimization task. However, during 2007 there was a situation when we could not find proper discharge to explain the difference by solving the optimization task. The reason is that the temperature in the tributaries is higher or the same as in the Lena river during 10 days. It means that tributaries could 'warm up' the measurements or do nothing and it doesn't depend on wind. But within this period of time the difference between Habarova and Kusur was very large and as usual positive. This happened in the middle of September, when the atmosphere tends to cool the water. We can only guess that either water temperature measurements were inaccurate (during 10 days!), or atmospheric data are incorrect and heat balance is still positive (very unlikely), or there is an additional heat source. The model can do nothing with this situation.

30. We have added additional info and removed the expression.

34. We have removed it.

35. Yes, it is also a question. But the diffusive processes are slow and cannot provide such pronounced heating if we take into account Lena's discharge rate.

36. Figure 1 has a schematic character. The area from Kusur till delta head area is nearly a tube oriented from south to north. We have added the North arrow and made lines thicker.

37. Unfortunately, we were not able to find information for the period from 1990 to 1999.

38. The Fig. 2 shows that the depth sharply increases at the Kusur Station. It means that there cannot be a situation as at Tit-Ari and we explained this in the manuscript. Another reason to have this Figure is to show that the profile is close to rectangular.

41-46. Many thanks for these recommendations and remarks. We made changes in the manuscript.

Technical corrections:

Many thanks once again! We did the corrections.