

Interactive comment on “Seasonal methane dynamics in three different Siberian water bodies” by Ingeborg Bussmann et al.

Anonymous Referee #2

Received and published: 7 September 2020

This is a very interesting study and it is also practically difficult to conduct field research in waterbodies of Arctic regions. It is thus a timely contribution of methane cycles.

The manuscript is well organized, and the writing appears to be somehow redundant.

The major concerns are the following.

- (1) Title. Is the term seasonal dynamic appropriate? There are only two sampling period for some rivers. A better title might be formulated such methane dynamics under contrasting ***? (2) Conclusion. The rationale behind the higher methane concentrations in winter than that in summer is not very clear for Tiksi bay and Lake Golzovoye. Please make a brief and focused discussion about the possible mechanisms.
- (3) Methane production potential. If these data are not available, the authors may dis-

C1

cuss methanogenesis a little bit more. Or methane simply stored in waterbodies due to physiochemical mechanisms? (4) Oxygen concentrations. Please provide these data as much as possible if available. Major con

Minor concerns

- (1) L20. How to define “the most rapid climate warming on Earth”?
- (2) L22. Maybe the authors can briefly introduce the proportion of these poorly unexplored water bodies.
- (3) L35. It is somehow abrupt to compare with temperate environments. This is more appropriate in the review paper
- (4) L45. Please give concluding remarks as a summary of the key findings.
- (5) L55. Pls describe the range of variability
- (6) L65-67. This sentence seems irrelevant to the previous one. The ebullition mode and transportation from Arctic rivers to the shelf seems to be different.
- (7) L108. Pls write the conclusions in the abstract in line with the hypothesis.
- (8) L111. Why not measure the potential of methanogenesis, and how to integrate these potential in situ sink with the budget estimate of methane emission?
- (9) L125. The freeze-up and ice-off days can be specified for each waterbody
- (10) L168. How low it is below the ice?
- (11) L174. Is the sampling procedure the same for different rivers?
- (12) L195. Please describe the procedures for methane concentration measurement. For example, is there any vigorous shaking
- (13) L305. Figure 3 and Figure 4 can be merged.
- (14) L340. Figure 5 and Figure 6 can be merged
- (15) (16) (17)

Interactive comment on Biogeosciences Discuss., https://doi.org/10.5194/bg-2020-106, 2020.

C2