

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

### **Anonymous Referee #2**

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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 followings.

- (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-

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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)

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