

We thank the reviewer and appreciate the thorough and insightful comments which have helped improve the quality of the manuscript. Please find our responses to the reviewers' suggestions below. Our author responses are denoted "AR" with blue text.

Reviewer #2

This paper provides valuable data and methodology for comparative research on CH₄ emission processes and mechanisms in high-latitude lakes, as well as in global lakes. There are some suggestions and comments for the authors' consideration as follows:

1. Line 64-65 It is true that diffusive flux is dynamic and continuous. The diffusive flux can show high temporal resolution variations (e.g., diurnal variation). Consequently, if measurements lack sufficient temporal coverage, such variations may be overlooked.

AR: Agreed and this clarification has been added.

2. In Table 1, Can authors provide the information about freeze thaw period or open water period?

AR: Information about typical months with ice most years (seasonally) or some years (intermittently) have been added to Table 1.

3. Part 2.3, Eq1. only can be used to calculate diffuse flux. F in Eq.q should be F_{diff}.

AR: Correct and now clarified. Thanks.

4. Figure 2 left column show the all measurements in several years. Dose the right column show only one year in different lakes? If they show only one year, please provide the year in figure 2 right column.

AR: The left column panels include data from all measurement-years, which is now clarified in the figure legend.