The authors fulfill important research for Arctic limnology. By assessing the performance of the LAKE model in simulating lake water temperatures across lakes, seasons, depths and soil and water column resolutions, they make a strong case that LAKE is suitable for future studies of lake-permafrost interactions. In view of the manuscript overview, it is also clear that the authors made strong additions to the paper in response to earlier referee comments. With this in mind, I find this paper to be acceptable for publication at GMD, subject to what are mostly minor revisions and small details that I recommend addressing below.

1) This paper is framed as a necessary step toward understanding lake-permafrost interactions, a very important topic to many geoscience fields. Yet, I find the conclusion misses what future developments will be necessary to apply the model to this end. E.g., in each lake's description in the methods, it is repeated that underlying permafrost presence and/or depths are not yet known. Would bridging such an observational shortcoming be necessary for future applications of LAKE to more directly model lake-permafrost interactions? What other limitations must be overcome for this type of research to move forward? I feel the research progression for which this study's validation is necessary could be better wrapped up.
2) If this is within the bounds of figure/page limits, I think it would be valuable for readers if you present the study sites by adding a map of Alaska, or some explicit spatial domain, that shows the locations of these three lakes.
3) Is there an explanation for why only one lake's (Atqasuk) sensitivity to soil column resolution was tested and the others were not? I note that a lake of median depth among the study sites was chosen, but I don't know if we might expect more or less sensitivity in the other lakes. Perhaps less sensitivity for the deepest lake and more for the shallowest lake? I don't need to see further simulations added to this end, but perhaps some explanation could be provided to justify the single lake approach for this part of the analysis.

Minor details:

L70-72: More correct to explicitly state "in Arctic lakes" at some point here.

L82: "similar types of models" instead of "similar type models".

L93: acronym "MAAT" unnecessary since it only appears once.

L106: "k-eps" should be k-**ε?**

L103: units should be [Wm^{-2}] instead of [Wm^{-1}].

L214: "Scenario data" was a bit confusing upon first read. Suggest adding "Scenario data used in the model sensitivity analysis (section ref) was compared …"

L255: Table 2 should explicitly state that performance metrics are for water temperatures, i.e. "LAKE model performance for Atqasuk, Fox Den, and Toolijk Lake water temperatures…"

L310: Referencing Figure E1 and Table E1, which also have captions that should better directly state what the figure displays water temperature simulations as a function of. Currently, the section header of Appendix E describes that this is a soil column resolution sensitivity analysis. However, figures should be readable in a stand-alone manner by their captions (and therefore also include

some mention of simulations differing by soil column resolution). I recommend scanning the other figures/tables for this property.

L346: Add a space between “Toolik Lake” and (Fig. 6)

L376: Section header using an unofficial “met” acronym for meteorological. I would replace for the full word or introduce an acronym and use more widely.

L386: “…as high winds can and do remove…” should be “…as high winds can remove…”

L402: “…and in a fully coupled lake-atmosphere system model the similar sensitivity experiments should provide different estimates.” Should be, “…and in a fully coupled lake-atmosphere system, similar sensitivity experiments should provide different estimates”

General: Note that figure references sometimes switch styles from “Figure X” to “Fig. X”, I guess this should be consistent.