

## ***Interactive comment on “PeRL: A Circum-Arctic Permafrost Region Pond and Lake Database” by Sina Muster et al.***

### **Anonymous Referee #1**

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This manuscript describes a database (PeRL) that maps ponds and lakes for the Circum-Arctic Permafrost region. The authors provide detailed information on the generation of the database, how images were processed and classified. Additionally, they discuss classification accuracy and uncertainty as well as the potential use of the database.

This database is a very valuable contribution to the scientific community as well as potential stakeholders from outside science. As the authors describe, classifying the area of waterbodies in the Arctic is crucial, as it impacts permafrost degradation and carbon fluxes of permafrost lowlands. The introduction is very well written and delivers the right message on why this database is useful. The second chapter defines ponds and lakes, which I thought was really useful, since I usually don't think about lakes and ponds, and chapter three explained the study areas. Up to this point I could easily

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follow the manuscript and I don't have any major comments. Chapter four deals with the generation of the PeRL database and because image processing or classification are not my expertise I cannot comment much on the correctness of the methods. However, I would like to comment on the understandability of this section of the manuscript. I got completely lost in all the technical details and had a hard time staying focused. I understand that technical details have to be provided but I would suggest to refine the language to the extent that a non-expert can understand it. Ultimately, you want this database to be useful to a large audience and the user of this database may not be the expert for all the technical details.

Besides having a hard time with the technical part of this manuscript, I could not follow what the benefits of the statistical analyses for all waterbodies are or even why they were performed. Was that explained somewhere and I missed it?

Then, section 4.6.1-4.6.3 explains permafrost landscape maps for Alaska, Canada, and Russia (Table 2) but I couldn't find details for Europe. Are there none available? There are a few study areas in Scandinavia (Figure. 1) and so I would have assumed to read something about Europe as well. This is probably an easy fix but it should be addressed.

One questions that I had that I couldn't quite figure out from the manuscript is whether wetlands can falsely be classified as ponds or lakes, depending on precipitation and other factors, some areas might be really wet in some years and could get misinterpreted as ponds although they aren't real ponds. There is some text about that on page 18, line 13ff but it would be good to address this in the manuscript in more detail.

Some small comments: Table 1: why do you abbreviate Permafrost depth as PT? That doesn't make any sense and is certainly not intuitive.

Duplicate paragraph: 4.5 Accuracy assessment of classification. This paragraph is a duplication of what is written a page earlier, p. 8, lines 19-26.

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