

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

### **Anonymous Referee #2**

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PeRL: A Circum-Arctic Permafrost Region Pond and Lake Database, Muster et al.

The manuscript presents a new Permafrost Region pond and Lake (PeRL) database, a circum-Arctic effort to map ponds and lakes from high-resolution aerial and satellite imagery. The database includes 69 water body maps that are linked to regional permafrost maps, and describes water body classification and accuracy, and presents statistics of water body distribution for each site. The water body maps are also used together with permafrost maps to extrapolate water body statistics. The database is a very valuable contribution as it complement previous approaches, but there are some minor concerns that needs to be addressed. For example, there is much technical detail, but I am missing a discussion on some of the methods and materials described. The concerns are brought up in the order they appear in the manuscript.

C1

[Page 1, Lines 37-39] There are also study areas in the sporadic permafrost zone.

[Page 3, Lines 33-35] The selection process for the water body maps used in the database is not clear. I would like to see more information on this, e.g., how was the study areas chosen – what was the criteria (both old and new ones)? What area is the individual study area covering? (Again, there are also study areas in the sporadic permafrost zone.)

[Page 5, Table 1] Remove isolated permafrost from the table caption since there are no study areas in the isolated permafrost zone. I would suggest adding numbers to the study areas (and perhaps add number to the maps), or keep the list of study areas in the same order for comparison between the different tables in the manuscript.

[Page 7, Lines 8-9] What were these purposes and who were the experts?

[Page 7, Line 10] Do you mean supplement “material” or Appendix?

[Page 7, Lines 11-12] What was the motivation and criteria for the additional 28 maps that was produced for PeRL?

[Page 8, Line 9] Do you mean supplement “material” or Appendix?

[Page 8, Lines 17-18] What minimum water body size are four pixels equivalent to (considering that pixel resolution ranged from 1 to 4 m)?

[Page 8, Lines 16-23] I would consider rephrasing this part – removing partial lakes for some study areas but not for other (to retain maximum information) may appear as ambiguous. Also, what are these “RapidEye classifications”? - authors may want to specify this

[Page 8, Line 28] How big was the original study area? Which areas are new and which are from previous published studies?

[Page 9, Lines 1-9] This is a repetition from [Page 8, Lines 19-26]. A new discussion on accuracy assessment is needed. Also, what are the potential limitations and errors

C2

of the database?

[Page 9, Lines 10-31] Although I appreciate all the statistical analysis, it is not specified why all these were carried out (or needed).

[Page 9, Lines 33-34] What is the reasoning behind this step? Is there a uniform pond/lake pattern in different permafrost landscapes? Have you considered the approach used in Olefeldt et al. 2016 (Nature Comments) or how your approach compares to theirs? (this also applies to [Page 11, Lines 13-29])

[Page 10, Line 7] Is it correct that you used GLOBE30 for some analysis and GTOPO30 for other?

[Page 19, Line 12] Downing et al. 2006 and Seekell et al. 2010 is missing from the reference list.

[Page 19, Line 16-17] Lehner and Döll 2005 and Wania et al. 2013 is missing from the reference list.

[Appendix] Many references in the appendix are not listed in the reference list.

Following references in the reference list are not found in the main text:

[Page 41, Line 24] Arp et al. 2012

[Page 42, Line 1] Boike et al. 2015

[Page 42, Line 21] CAVM, 2003

[Page 43, Line 10] Jershov et al. 1988

[Page 44, Line 14] Natural Resources: Canada

[Page 44, Line 25] Nowacki et al. 2001

[Page 45, Line 32] Smith et al. 2010

[Page 46, Line 3] van Huissteden et al. 2005

C3

[Page 46, Line 9] Walker et al. 1986b (there is no Walker 1986a)

[Page 46, Line 12] Walter et al. 2007

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