

The Cryosphere Discuss., referee comment RC1  
<https://doi.org/10.5194/tc-2021-364-RC1>, 2022  
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## Comment on tc-2021-364

Anonymous Referee #1

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Referee comment on "Inventory and classification of the post Little Ice Age glacial lakes in Svalbard" by Iwo Wieczorek et al., The Cryosphere Discuss.,  
<https://doi.org/10.5194/tc-2021-364-RC1>, 2022

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As my current knowledge, the detailed and comprehensive inventories and quantification of the changes of glacial lakes in Svalbard is are not reported up to now. A long time (1936-2020) area/number changes process of different types of glacial lakes were described using multi-remote sensing data in this paper. So, this is an original paper on an interesting topic of glacial lakes inventory and classification in Svalbard. However, there are some apparent deficiencies in current version, I think the manuscript should be substantially improved at least in methodology and discussion before publication.

(1) More detailed information about the remote sensing data used are suggested to provide, e.g., the spatial resolution of the remote sensing data, the source data of vectorised data from Norwegian Polar Institute, the coverage of the archival aerial photos taken during the 1936–1938 (I suggest showing the coverage boundaries for the remote sensing data that do not cover the entire area of Svalbard in Figure 1).

(2) As it is also mentioned in the manuscript, identifying the types of glacial lakes (e.g., glacial erosion lakes bedrock-dammed lakes, etc.) is usually difficult by remote sensing data. Can the authors provide further operated rules (or discussions) for identifying the types of glacial lakes?

(3) The paper does not mention the minimum area size of glacial lake. However, the minimum area size of glacial lake is possible to impact the lake number and area recorded in a given time phase (e.g., 1936-1938, 1990s, etc.) since the spatial resolution of the remote sensing data were used.

(4) Lake area errors of each glacial lake and region are suggested supplementing which

usually determined by the spatial resolution of the remote sensing data and the methodology of glacial lake inventory.

(5) To outstand the differences and new insights of glacial lake in the High Arctic, extensive and intensified discussions are encouraged to compare the inventory methods, changes, potentially dangerous of glacial lakes in the High Arctic with those of glacial lakes in high mountain area in Discussion section.