

# Review of “Volumetric evolution of supraglacial lakes in Southwestern Greenland using ICESat-2 and Sentinel-2” by Feng et al.

This study develops a novel method to estimate the volume of supraglacial lakes during the 2022 melting season in Southwestern Greenland by integrating Sentinel-2 imagery and ICESat-2 data.

## Major comments

This study employs Sentinel-2 Level-1C images which provide top-of-atmosphere (TOA) reflectance and do not include corrections for atmospheric effects which can lead to biases in the reflectance values and can impact the accuracy of the depth estimation. Was there any atmospheric correction made during the pre-processing of the sentinel-2 imagery?

The paper does not provide enough details about the annotation process for supraglacial lakes. It is unclear how the 50-pixel samples were defined and whether they included a mix of lake and non-lake pixels or if separate negative samples were used. Furthermore, does a sample size of 50 pixels capture the variability in lake sizes? For the evaluation of the random forest model, the method for randomly selecting five lakes is not well explained, and if the five supraglacial lakes chosen per image were excluded from the training dataset. A suggestion would be to split the annotated dataset into training, validation and testing sets instead of randomly selecting supraglacial lakes for the evaluation.

## Minor Comments

Why is the 2022 melt season selected for this study? Was this melt season used due to significant meltwater?

L 305-306: Area, depth and volume were mentioned, however only area and volume have values, with depth being mentioned with no specific value. Additionally, please clarify “the individual supraglacial lake” further as this is also used in the caption of Figure 10 and figure 11 as well.

## Figures

Figure 1: Please include the study period in the caption.

Figure 4: Please include the date range in the figure as well.

Figure 12: The color scheme is difficult to follow. Use more distinguishable color and match the maximum value (star) to the corresponding line color.