

The Cryosphere Discuss., referee comment RC2
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Comment on tc-2022-149

Matthias Siewert (Referee)

Referee comment on "Allometric scaling of retrogressive thaw slumps" by Jurjen van der Sluijs et al., The Cryosphere Discuss., <https://doi.org/10.5194/tc-2022-149-RC2>, 2022

The manuscript by van der Sluijs, Kokelj and Tunnicliffe provides a large-scale survey of retrogressive thaw slumps (RTS) in the Yukon Territory, Canada. The article has three main components, 1, reconstruction of pre-erosion topography for a database of known RTS in the region using DEM data, 2, assessing the temporal evolution of these features using high-resolution satellite and airborne imagery and LiDAR, 3, determining trends for area/volume relationships for these features and outlier detection. The manuscript is based on a large effort to characterize and map these features.

Overall, the manuscript is well-grounded in the literature and exceptionally well-written. The extent of the detected land surface disturbance features highlights the relevance of this article and there is no doubt a timely interest in this research. The drawback of the manuscript is the amount of research compressed into a single paper leaving little space for details and critical evaluation of the methods and results. This makes the manuscript a lengthy read with still some questions on the methods and the evaluation. Some of these remaining questions are outlined below. Thus, I recommend reconsidering the manuscript's content and dividing it into two papers. For instance, the pre-disturbance terrain reconstruction could be combined with the area-volume relationships to form one paper and the temporal evolution could be treated as another paper. This would give the reader some space to breathe.

Some additional comments:

L 206ff It was unclear to me how these voids were constructed and applied. The whole section could be more developed.

L 218 Could you provide more info on the assumptions behind each method and why they would be suited to address your problem.

L 271 It should also be discussed that RTS can stabilize

L 276 Do you have an uncertainty estimate for your MSI method?

L480 The association with shorelines should be better constraint with some statistical evaluation.