

The Cryosphere Discuss., referee comment RC2
<https://doi.org/10.5194/tc-2021-137-RC2>, 2021
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Comment on tc-2021-137

Anonymous Referee #2

Referee comment on "Assessing volumetric change distributions and scaling relations of retrogressive thaw slumps across the Arctic" by Philipp Bernhard et al., The Cryosphere Discuss., <https://doi.org/10.5194/tc-2021-137-RC2>, 2021

This manuscript presents interesting characterisation of retrogressive thaw slump (RTS) changes in the several Arctic regions. Knowledge gap and research questions are clearly identified as well as methods are mostly sufficiently described. The exact way how the RTSs were delineated is difficult to infer from the text thus manuscript will benefit from visual examples of RTS delineation. The results are novel and well discussed with good examples of important implications. I consider the manuscript well suited for publication in The Cryosphere journal after a minor revision. The specific comments are listed below and are mostly about the text structure and details. The manuscript would also benefit from a thorough grammar any typo check.

Line 18: Only 15% of the Northern Hemisphere is underlain by permafrost. Please correct accordingly. Explanation for why one quarter is not the correct value can be found in this publication: <https://doi.org/10.1029/2021JF006123> . I would also suggest adding it as a reference.

Line 20: Missing comma after "Furthermore".

Line 29: You probably meant nutrient cycles.

Line 54: "Arctic RTSs": Are there any RTSs outside the Arctic? Consider omitting "Arctic"

Line 54: "only remote sensing techniques are feasible": I would argue that other techniques are not impossible to perform. Consider changing to "more feasible" or similar.

Line 55: The sentence is not clear.

Lines 110-112: "It is difficult to assess RTS delineation procedure based only on this text. I suggest adding examples of RTS delineation from each site to the supplement."

Lines 117-118: It is not clear for reader at this point what "shoreline" and "hillslope" relate to.

Line 120: From the text, one could assume that you only delineated RTS according to the active elevation change occurring at headwall. Substantial area of RTSs is a zone where material is transported and no significant elevation change occurs.

Line 132: You probably meant "than" instead of "then".

Line 137: Missing comma after "For this computation"

Lines 168-177: This part would be more suitable for the methods section. Consider moving it.

Line 189 and other sentences describing figures before and after: It would be more appropriate to refer to the figure inside the text, instead of writing separate sentences just for that purpose. I would suggest extending these sentences to describe the main results shown in these figures.

Line 204: Is there an established methodology on how to quantitatively discriminate megaslumps from slumps? Otherwise I would suggest avoiding this term.

Line 215: Very good application example.

Line 254: The correct would be "relict ice". Since not all of the relict ice is necessarily excess or massive ice, using "massive" or "excess" would be more appropriate.

Lines 296-297: This statement might be too general. Differences between the aspects according to solar radiation might be relatively small in the high Arctic, where also north-facing slopes receive quite some solar radiation during the Arctic summer. Given that RTS headwalls are close to vertical, relatively low sun angles might still be efficient in melting ice.