The Cryosphere Discussions

The Cryosphere Discuss., referee comment RC1
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Comment on tc-2021-342

Anonymous Referee #1

Referee comment on "Incorporating InSAR kinematics into rock glacier inventories: insights from 11 regions worldwide" by Aldo Bertone et al., The Cryosphere Discuss., https://doi.org/10.5194/tc-2021-342-RC1, 2022

This is an interesting intercomparison study that is worth being published in TC after several revisions.

Major comments:

1) The study describes most steps suggested for compiling rock glacier kinematic inventories, but the scientific (or applied) purpose for such inventories is little discussed. As described now, the inventoring appears more for the sake of inventoring rather than with clear scientific or applied purposes. I strongly suggest to add to the paper scenarios of how rock glacier inventories with kinematic attributes as presented in the study can be used, scientific and applied, and to discuss which applications are feasible in terms of characteristics of such inventories, and which not. For instance, it seems that the use of kinematic classes does not really enable monitoring of rockglacier activity from repeat inventories at the scale of decades. Rock glacier activity will in most cases likely not change so much within decades that a rock glacier shifts its kinematic class. On the same topic: how do the differences between the individual study inventories (e.g. slow movements included in some, not in others) impact on application scenarios. It seems these differences complicate use for geomorphological purposes. Problems seem to exits in particular for the smallest and largest movement rates (> 1m/yr). What impact does it have on application scenarios that it is difficult to quantify the largest movement rates? So, in sum, which application scenarios exist for the suggested kinematic inventories, which are feasible with the current characteristics, which require further refinements of the inventories, which application scenarios seem not possible in the foreseeable future? You summarize "The achieved results open up new possibilities for the understanding and numerical modelling of permafrost, mountain landscape dynamics,... ". But which application exactly become feasible now? An own section in the discussion part of the paper on application potentials and limitations could be dedicated to this topic.

2) The interpretation of interferograms by an operator to derive kinematic classes seems to be a critical but (as the authors confirm) a partially subjective decision. It would thus

be important to show several typical interferogram examples for each velocity class in order to demonstrate that and how velocity classes can be derived. Some expamples could be included in a figure in the main text, but a larger representative collection in the appendix or supplement. This would help others that want to produce similar inventories substantially.

Minor comments:

3) Last sentence of abstract: this is much a repetition from a statement further up in the abstract, but here you say you demonstrate, further up you test. So, do you test or demonstrate? Reduce repetition.

4) Line 121. Did you conduct the aerial photography work (they are not included in the paper!), or are they taken from the papers cited? Please clarify.

5) Line 201. Villarroel et al. 2018 give also a nice overview what rock glacier movements can be measured using Sentinel-1 interferometry, which not.

6) Line 551. To me it seems that not the proposed inventorying itself opens new possibilities. It is rather radar interferometry that opens these possibilities. Your kinematic inventoring method is mainly an application of radar interferometry, right?
