

Interactive comment on “Review article: Inferring permafrost and permafrost thaw in the mountains of the Hindu Kush Himalaya region” by S. Gruber et al.

Anonymous Referee #1

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The manuscript by Gruber et al. discusses permafrost and permafrost thaw in the mountain of large parts of central Asia. This is a vast region of high elevation, including the Tibet plateau, being the largest permafrost region outside the Arctic low land permafrost. It is clear, that permafrost plays an important role for slope stability, surface water availability, ecology and human activity in that region, and deserves attention.

It is hear the manuscript starts, aiming to discuss general permafrost distribution, potential permafrost thaw following global warming and various impacts following these discussions. However, there are many studies from Chines colleagues especially related to the transport lines over the QTP plateau, and very few permafrost-related studies for the other areas of this vast mountain region. The authors therefore try to transfer

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scientific results from other mountain regions, which have more permafrost investigations (mainly or almost exclusively the European Alps) to the central Asian mountains, inferring all sorts of processes and impacts. This arises a general comment:

The manuscript is not a review in a strict sense. It contains passages with text book contents (e.g. p. 3 and pgs. 8/9), and general speculations based on knowledge from other areas. This makes the manuscript interesting reading, e.g. valuable for student courses, and a perfect introduction to a book about Central Asian mountains. I am less convinced about the value in a high-impact scientific journal. It is of course true that we can expect all sorts of impacts if permafrost thaws also in the Hindukush, it is only the question if this statement can be described as “review” or original research.

However, the manuscript of course contains lots of significant information. Important are the real review part, summarizing the work done for the area by the authors or other colleagues. And of course the discussion of the map by Gruber (2012), which is the only higher-resolution permafrost map for the area, providing a good image of the permafrost distribution of the area.

This means, after my opinion, the manuscript is an important contribution, but could be much improved by:

1. Stick to the published investigations, and the map
2. Avoid/reduce substantially the text book passages, explaining basic permafrost/thermal processes etc.
3. Keep the “perspective-part”, which was interesting reading. Besides that “promising methodologies” (p. 13, l. 22) maybe also are developed other places then for the Alps. And, if you relate to other mountain areas (which of course is ok within certain limits), maybe other arid mountain ranges as e.g. parts of the Andes etc. could be included more.
4. I would suggest to add some more illustrations, highlighting important work. Now

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only derivatives from Gruber 2012 are shown more or less.

In summary, I agree that the Hindu Kush Himalaya region is full of “white spots” in terms of understanding permafrost processes there, and that this of course justifies the author’s attempt to focus on this region. But I think the manuscript should undergo a thorough revision, focusing more on the “review” part and less on the “inferring” part.

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