

## ***Interactive comment on “Frozen debris lobe morphology and movement: an overview of eight dynamic features, southern Brooks Range, Alaska” by M. M. Darrow et al.***

### **Anonymous Referee #2**

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The paper addresses distribution and dynamics of several frozen debris lobes in the Brooks Range. The manuscript provides much information about these features, which not only are clear signs for permafrost, but also pose a possible threat to infrastructure in the region when accelerating or decaying. Thus, this manuscript is of high interest for the general cryosphere community and should be published after a revision.

When writing this review, I have also read the review provided by W. Haeberli (Reviewer 1), and most of his comments I agree and will not duplicate here. From my point of view, the following major issues arise:

1. Writing style: The paper is long and wordy, the style reminds me of an oral lecture (much “we have . . .” etc.), including many details which are important in a report to e.g.

C1

a government agency, but not in a comprehensive scientific publication. The paper contains some redundant information, like “rain has exposed ice” is mentioned some times. The paper could be re-structured and shortened.

2. Introduction: Is very long, ranging from an historic overview about the research development of the slope features to a mini review about the term “rock glacier”. I would suggest shortening this and stick to scientific important points.

3. Setting: A “Setting” chapter is missing as far as I can see. You use the “Introduction” partly to describe the setting, however, I think readers not familiar with the region would like to know a bit more about the geophysiographic conditions including key values of earlier investigations as given in p. 4, l. 4 ff.

4. Methods: 2.1. is very wordy and could be shortened. In the result/discussion you introduce new methods, like dating organic layers (p. 13) or the collection of creek samples (p. 9) etc. This should be introduced in the method section, and subsequently described in the Result chapter.

5. Results: The results chapter is much longer than the Discussion chapter, often because you already give interpretations of observations here, which would be good for a discussion. As mentioned above, also new methods are introduced here.

6. Discussion: The discussion is poor. It contains paragraphs which would be good in a “Setting” chapter which includes previous investigations (e.g. p. 12) or results (p. 13, organic layer), but is lacking a scientific discussion such as a comparison and relevance to other studies, rock glaciers etc. This is also pointed out by reviewer 1, and highlighted nicely in that review. Maybe it is better to move your little rock glacier review from the Introduction to a discussion chapter, and really discuss your findings with the literature focusing on debris bodies containing more coarse material.

7. Your timing based on the one radio-carbon date. You must be very careful here, normally I would say that you cannot say anything based on one dating from one site.

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You can mention the date, but one dating does not justify a strong conclusion. But its is good to discuss against other studies, as suggested by reviewer 1.

8. Conclusions: The bullet point conclusions sound ok and are mostly justified by your observations and measurements (beside the dating). The second part is again a Discussion and not a conclusion, so you should remove it or move it to an appropriate place in the discussion.

Some details: p. 3, l. 21: You may use the term "moraine-derived". L 27 ff: this all is a discussion p. 4, 2nd para: This is typical info for a "Setting" chapter p. 5, l1: This whole paragraph can be removed p. 7, l 16-19: remove p. 8, l 21: "The rounder . . .": This is interpretation and should be addressed in an discussion l. 30: agreeing with reviewer 1: also what commonly is termed "rock glaciers" are of course frozen and moving debris lobes, only consisting of coarser material. And maybe "frozen debris lobe" is actually a better term than "rock glacier", which you should discuss in the end. p. 9, 2nd para: Again a lot of interpretations of the observations which sound reasonable, but should come into a discussion. l. 20: This is a figure text, avoid explaining figures in detail in the main text. 3rd para: See above, not mentioned in method chapter p. 10: Here you mix observation and velocity measurements, which you present in subsequent paragraphs, it is a bit hard to follow this structure. p. 11, l. 13: Remove this sentence, if the thing would not move downhill I would question your measurements. . . l. 27: Again parts of the paragraph describe a method you used. p. 13, l 1: You mention now "benches", what is this? Maybe explain this in a setting part. In the following you again introduce a new method (dating, see above)

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