

Interactive comment on “Effects of midwinter snowmelt on runoff generation and groundwater recharge in the Canadian prairies” by Igor Pavlovskii et al.

Anonymous Referee #1

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This paper provides important insights into how infiltration occurs during winters in the Canadian Prairies. The results are likely to be of interest in cold regions throughout the world, in particular, semi-arid and arid ones. The paper is well-written and is in good shape in its current form. However, some minor revisions could help to improve its readability and increase its impact. My comments are as follows:

p.1, l.9: Be more specific about “the prairies” in this first line. Specifying Canadian would be helpful.

p.2, l.6: Semi-arid and arid is one component of this but a key factor in the Canadian Prairies is the presence of low permeability tills and clays. I think this might be

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important when considering where else these results can be applied.

p.2, l.12-13: Again, geology is an important consideration when comparing mountainous environments versus the Canadian Prairies. Mountainous areas of Canada are dominated by thin soils and fractured bedrock in some areas and extensive alluvial fans in others. The Canadian Prairies have thick till and clay sequences.

p.7, l.15: Is the lack of hydraulic response due to a lack of infiltration or due to unsaturated conditions, which might lessen hydraulic diffusion?

p.9, l.7: Why is the data not shown? It would be useful to allow the reader to form their own judgements on the data.

p.11, l.1: There is no description of prairie soils in the manuscript and there should be. A paragraph on soils and geology somewhere in the paper would be quite helpful.

p.11, l.4-6: Was pore blockage actually observed or is this inferred?

p.11, l.23-27: The idea that midwinter melt leads to more infiltration and less runoff is a key finding of this study. The paper would be more impactful if this conclusion was placed in the context of other studies that have examined this issue. I am thinking specifically of a Owor et al. (2009, ERL) and earlier ideas on climate change leading to more runoff and drier soils presented by Trenberth et al (2003, BAMS).

p.12, l.7: Was the future climate for the prairies ever discussed? A brief discussion of this issue could help to frame the importance of this work.

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