

## ***Interactive comment on* “Characterizing the nature and variability of avalanche hazard in western Canada” by Bret Shandro and Pascal Haegeli**

### **Anonymous Referee #3**

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This is a very interesting paper with a unique database of avalanche hazards for different geographic location of western Canada. I really appreciate the innovative methodology (self-organizing maps) and the robustness of the results and related figures and tables. In that regards, most of them present useful information although some might be considered as supplemental material.

Considering the high quality of the submitted paper, I only have a few general comments. As mentioned, the inter-annual variability is not surprising and clearly shows the importance to have a deeper look at the synoptic situations leading to an increased avalanche hazard. It also demonstrates the limitations of the snow avalanche climate classification and related avalanche hazard for risk management. In this regard, and considering the importance of storms for avalanche problems, it could be interesting in

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the next future to look at the ratio from different storm tracks and 500-mbar composite anomaly maps such as reported by Martin and Germain (2017).

I also completely agree with the authors concerning the need of good quality and specific data to improve our knowledge. However, I suggest adding one or two sentences in the discussion section about the availability of the weather data and the extrapolation based on a few weather stations. Do you think a more robust network of weather stations could significantly improve the delimitation of avalanche climate? Also, in the Conclusion section, the authors stated the need for looking at smaller scale variabilities but also to include the U.S. hazard assessments. However, because snow avalanches are mainly driven by climate at various spatiotemporal scales, it should also be stated the need for better climate variability analysis such as teleconnexion (PDO, El Nino and so on) but also in order to detect trends, if any, in climate variability and what might explain this intra- and inter-annual variability.

Please also note the supplement to this comment:

<https://www.nat-hazards-earth-syst-sci-discuss.net/nhess-2018-2/nhess-2018-2-RC3-supplement.pdf>

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