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The Cryosphere Discussions

Interactive comment on "Multi-scale spatialization of snow water equivalent (SWE) according to their spatial structures in eastern Canada" *by* Noumonvi Yawu Sena et al.

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The contribution of this work is to spatialize the average maximum SWE in eastern Canada at both (10km and 300m) scales according to spatial variability structure, which Sena et al. delineated in their previous study (Sena et al. 2015). This work is maybe useful, but the data description/validation is unclear and may be problematic. Also, the line numbering is not fully available in the manuscript, so it was difficult to leave comments. My comments focus on clarifying the methodology. - Snow data: Where is the location of the measurement sites (map)? How many samples for each site? What's the possible uncertainties and error of these measurements? Also, there is no

description of the measurement site. It's better to provide the maps of elevation, vegetation,.. of the study area for a better understanding of these sites. - Another thing that I am concerned with is the only use of the snow survey station data for both estimation and validation. Since the main trust of this paper is on SWE estimation and its validation, one would expect to see a more comprehensive probabilistic assessment of SWE estimation using a suite of measures to have a convincing analysis and conclusion. In addition, including regions of A and C is problematic because there are almost no observations there. - Analysis of regional/local physiographic factors is not fully or well explained. Is it possible to explain which factor is the dominant cause for each zone? Maybe an additional table including this information is helpful. - Section 3.2: It would be difficult to read this section for those who are not familiar with this region. The authors used a bunch of different names for stations, landscape, mountains ... without any locational information in the text. Quantified comparison results between estimated SWE maps and CRCM, GEMCLIM, Strum et al. (1995), and Langlois et al.(2014) are needed rather than just say "resemble" or "consistent". - Fig 8: three sub-figures are identical.

Specific comments:

1. What are the criteria for choosing both scales (10km vs 300m)?

2. Page 2, Line 11: remove "The spatial variability of the snow cover is explained by physiographic factors, which generate spatial structures at different scales."

3. Page 4, line 4: (MDDELCC, 2001) -> What means of 'MDDELCC'? I also had a hard time finding this citation in the reference.

4. Section 2.3: Which resampling method is used for SWE estimates at a local scale?

I stop here because the line numbering is not available after page 4.

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