Investigation of a wind-packing event in Queen Maud Land, Antarctica by *Sommer et al.* presents a set of unique and novel data acquired with state of the art instrumentation. This is the first time, to my knowledge, that the combination of such detailed spatial coverage of the snow cover morphology and hardness evolution of the snow surface have been acquired simultaneously. Snow hardness is thought to be an important component of the erodibility of snow, therefore having a control on where snow is being removed at a small scale (decimeter to decameter), and having a control on fluxes of snow moved by wind at a larger scale (hectometer and larger) (Li and Pomeroy 1997). The data themselves should be of high interest to the scientific community.

Over the span of almost a month, the authors collected 9 laser scanner scans, and 454 snowmicropen profiles at 12 different dates. During this event, it is clear that there is one 10cm snowfall followed 9 days later by a drifting event (as captured by the SPC sensor). The lidar as well as the SMP data brackets both events quite well. While there have been laser scanner records of the snow surface transformation during storms in Antarctica on sea ice and on the ice cap (Picard et al. 2016, Trujillo et al. 2016), this study adds a new aspect to the system with the snow hardness measurements.

I recognize the effort of the authors to revise the manuscript following a first round of reviewers requesting major changes, but I find the manuscript still in need of in-depth changes to become clearer to the reader. In the response to the reviewer, the authors mention the original intent of this manuscript to be a letter, which, in my opinion would require even further clarification of its structure. Many parts of the text did not or only slightly changed. Section 2 and 3 are poorly defined when reading the text, and present data not used in the analysis. Many syntax errors add to the confusion of the reader. As a result, the assertions and deductions done in the discussion are poorly convincing. On the opposite, the addition of the lidar error estimate is very useful, as well as the set of new figures is more relevant, compact, and complementary to the text than the previous version.

Section by section general comments:

The introduction could use some re-structuring with 1) a more extensive background for the reader, providing references to previous work on the topic, 2) a throughout paragraph on the impact of this study, and 3) a clearly articulated research question. After reading the introduction, it is still unclear where the manuscript is heading to, and what is the main question/hypothesis being asked/tested. The title of the manuscript eludes to a descriptive paper while in fact the reader finds a test of a statistical model (proven to not be useful at the end). So, are the authors presenting a statistical model to estimate the spatial distribution of snow hardness? Are they presenting an event based description of a phenomenon? Or, are they testing out a hypothesis?

Data and methods for the three types of instrumentation (lidar, SMP, and met-data) are presented all at once rather than independently. For instance, the last paragraph of this section starts by presenting the SMP measurements and finishes by explaining lidar error estimates. Moreover, much of the content here could be part of the results rather than methods.

The result section starts with a whole paragraph pointing to figure 4, with almost no other content. The actual relevant content related to this figure (where it should be referenced) is somehow split between the previous section and section 3.1. Further in this section, collection and processing methods are mixed with results (e.g. paragraph from line 24-35 on page 9). This makes it harder to combine all this information together. Also, many data are presented throughout this section and dropped out of the analysis. Why including and presenting them then? If the authors think that they are of any use for other purposes, then they could be organized and included in a supplementary to the manuscript.

Section 3.4 and 3.5: The authors, opportunistically present data related to a barchan dune starting on page 13 with little mention of this in the introduction, and how it relates to the rest of the analysis. These data are unique though! The barchan dune is loosely defined, and it appears to be a made of at least two barchans. Notice in figure 10 how the lower horn (on the lower left of the image) has itself two smaller horns. Bedforms are known to merge and split. This bedform could be a merge between at least two. Instead of looking at the difference between two scans, could the scan of January 11 itself show the bedform in a clearer manner than the DSM difference? Barchans in Antarctica are known to be more elongated (Kuznetsov, 1960, and Kotlyakov, 1966).

When it comes to the hardness measurement on the barchans:

- The scatter might be reduced by plotting the SMP hardness as a function of the radial distance from the crest.
- Is the trend more influenced by the date of the measurement or the actual position on the barchan? A GLM taking into account the date (i.e. hardness ~ distance to tail + date) could help to detect if the date of the measurement plays a significant role or not into the correlation. If it does, why would this be the case? What processes could have come into play? Moreover, a Pearson's coefficient of 0.4 leads to a R^2 of 0.16 which shows almost no dependence of SMP hardness to the distance to tail.
- Is it possible to see in the SMP data the difference between the snow of the barchan and the underlying layer? If yes, showing the raw data as a section through the barchan would be very insightful to the reader.

The discussion is also mixed. For instance, paragraph 2 compares the data to the wind tunnel experiment, paragraph 3 presents interpretation of the hardness data on the bedform, and paragraph 4 is again talking about the wind tunnel experiment. The discussion also contains contradicting assertions about the potential cause for hardening. The authors justify the trend in hardness of the barchan with the tunnel experiment, when afterwards, the model derived from the tunnel experiment is shown to statistically not hold for this dataset.

Overall, this manuscript contains an interesting and unique dataset, but it would require some in-depth changes to be convincing, and clear to the reader.

Specific comments:

Page 1, line 13: "Wind-packing and **its results**" the use of its results seems vague. What is specifically meant?

Page 2, line 6: "The Antarctic event …" Odd formulation, as if this was a widely recognized event, but also multiple events are mentioned before.

Page 3, line 10: What is the actual wavelength of the laser?

Page 3, Line 14: 'the coreless winters' not sure what is meant by coreless.

Page 6, line 4: "*All (accurately known) SMP positions have a range below about 100 m"* what is meant here?

Page 7, line 11: 'very' not necessary.

Page 9, line 1: 'the logbook notes about 10 cm …' is there a verb missing, or a miss use of the verb *to note*.

Page 9, line 9: "each" and "furthermore" should be removed, or the sentence syntax needs to be reviewed

Page 9, line 11: remove "very"

Page 10, line 1, 4, : remove all unnecessary "very"

Page 10, line 7: reason should read reason**s**; "in the following" could be replaced by "any further"

Page 10, line 8: "At first glance" used with "appears to be" could be simplified. Remove "very"

Page 10, line 9: the sentence has two verbs "was" and "reaches", and two subjects. Syntax problem.

Page 11, line 3: 'the position**s** … **are**'

Page 11: Many use of "therefore" where not actually needed.

Page 13, line 11: could read ‘Fig. 9 shows the dune for each of the four days it was scanned …’. The ‘four scan days’ sounds odd in this case.

Page 14, Fig9 caption. The expression ‘scan day’ is confusing and not quite accurate.

Reference:

Li, L., & Pomeroy, J. W. (1997). Estimates of threshold wind speeds for snow transport using meteorological data. *Journal of Applied Meteorology*, *36*(3), 205-213.

Picard, G., Arnaud, L., Panel, J. M., & Morin, S. (2016). Design of a scanning laser meter for monitoring the spatio-temporal evolution of snow depth and its application in the Alps and in Antarctica. *The Cryosphere*, *10*, 1495-1511.

Trujillo, E., Leonard, K., Maksym, T., & Lehning, M. (2016). Changes in snow distribution and surface topography following a snowstorm on Antarctic sea ice. *Journal of Geophysical Research: Earth Surface*, *121*(11), 2172-2191.