Interactive comment on "Snow cover variability across glaciers in Nordenskiöldland (Svalbard) from point measurements in 2014–2016" *by* Marco Möller and Rebecca Möller

Anonymous Referee #1

Snow data is important in climate studies of the cryosphere components. Time series are needed as input and validation of remote sensing and modelling data. The authors present data from a region in Svalbard were few (but some) snow data is available before. In that context this paper provides some useful data. The paper is in general well written and easy to follow. They have an extensive reference list. However, I have some problems with the applications of the data they present. They say that snow data is needed as validation in Svalbard-wide glacier mass balance modelling studies, but that requires that the data is representative for the snow cover and thus can be used in validation. I am doubtful that this is the case with the data they present. The survey was done early in the spring season, late March and early April. A consider-

able amount of snow can be accumulated after this period, in April/May, often up to 30 % of the total winter snow fall. Only three of the glaciers have been measured all three years 2014, 2015 and 2016, glaciers C, D and E. Two glaciers, A and B, were only measured in 2014, F only in 2015 and I only in 2016. Over the three years they measure altogether 109 points. In the results they give the average of all these 109 as a result with a mean of 0,63 m w.e. But that is in my opinion not useful and is just a number saying that there is fairly low snow accumulation in this region of Svalbard. Especially since the number of 109 samplings is taken from different glaciers and different years. They state that there is a substantial spread in the snow depth and water equivalent. That is fairly obvious and when they select ten points on a glacier for snow probing they may easily hit a place that is not at all representative for that elevation band since it could be a place with wind-drift and almost now snow accumulation. This is well known from all who run mass balance programs. Therefore snows probing on glaciers for mass balance usually have a large number of points spread out to cover the spatial variability. Their main finding is probably that there is large spatial and inter-annual variability in snow precipitation, but then a one year sampling from one glacier has very limited value for general information about the snow cover and as validation data. They could also have discussed their finding in relation to precipitation data from the Norwegian Meteorological Institute synoptic weather station in Longyearbyen. Is there any correlation? Or they could have compared their data with the mass balance data, winter accumulation data, from the monitoring program by the Norwegian Polar Institute from the Kongsfjorden area. Ground Penetrating Data could have been done simultaneously and would have extended the spatial distribution and indicated representativeness of the point data. Fig. 2. I do not understand why they put in marks (open circles) for years without any measurements. It only gives an impression that there are more measurements than it actually is. On four glaciers, Glaciers A, B I and F only one year of measurements are done. I think they should simply delete all the open circles. Then it would be easier to see where and which year they did sampling.

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