

Interactive comment on “The sensitivity of snowfall to weather states over Sweden” by Lars Norin et al.

Lars Norin et al.

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We thank the referee for the time and effort dedicated to review the manuscript as well as for the very constructive comments and suggestions. Below, please find a point-by-point reply to the comments (reproduced in italics).

1. Obtaining reliable quantitative estimates of snow rates and accumulation from radar is challenging. Have the snow rates and accumulation been evaluated?

We agree that obtaining reliable quantitative estimates of snow rates and accumulation from radar is challenging. As a first step toward improving the ground-based radar snowfall measurements a comparison of snow rates from ground-based radar and CloudSat was examined in a paper by Norin et al. (Atmos. Meas. Tech., 8, 5009–5021,

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2015). A paragraph discussing the results of that paper in more detail has been added to the manuscript.

2. It would be valuable to systematically break down snow accumulation into frequency of occurrence and snow rate, and frequency of weather state.

A table listing the number of days containing the different weather states (as well as how many other other weather states occurred for those days) has been added to the manuscript.

3. Partitioning rain and snow based on 2m air temperatures is subject to uncertainties (Harpold et al. 2017), specifically in complex terrain. Other variables such as atmospheric humidity could be used to estimate the phase of precipitation. Can the authors elaborate on this aspect?

We agree that it is difficult to determine the phase of precipitation, especially when 2-m air temperatures are close to 0° C. However, for this paper we have chosen to classify precipitation as snow for temperatures below freezing and as rain otherwise. A short paragraph has been added to the revised manuscript mentioning the difficulties in obtaining accurate snowfall products based on radar data and surface air temperatures.

Interactive comment on Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2017-25, 2017.

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