

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

### **Anonymous Referee #3**

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The paper performs an analysis of snowfall accumulation and rates over Sweden. The influence of atmospheric circulation is analyzed in terms of wind directions, cyclonic situations, and North Atlantic oscillation. Multiple sources of observations are used.

The results presented are interesting and novel as they link atmospheric circulation and snow precipitation patterns and vertical structure. The goals of the paper appear clearly. The analysis conducted in this study is well reasoned. A few minor comments:

1. Obtaining reliable quantitative estimates of snow rates and accumulation from radar is challenging. Have the snow rates and accumulation been evaluated?
2. It would be valuable to systematically break down snow accumulation into frequency of occurrence and snow rate, and frequency of weather state.

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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?

Reference: Harpold et al. 2017: Rain or snow: hydrologic processes, observations, prediction, and research needs. *Hydrol. Earth Syst. Sci.*, 21, 1–22, 2017, [www.hydrol-earth-syst-sci.net/21/1/2017/](http://www.hydrol-earth-syst-sci.net/21/1/2017/). doi:10.5194/hess-21-1-2017

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C2