Reply to referee's #1 comments on manuscript:

We thank the reviewer for carefully reading the manuscript and for additional constructive comments.

OK, but the text ("The reason is that the collection of cloud droplets by ice becomes more efficient in experiments with less LWP (i.e., when the droplets are larger; not shown). ") is a little confusing as it doesn't explain that when the LWP is lower we have fewer droplets, which are therefore larger (despite the lower LWP). I suggest "The reason is that in the experiments with less LWP there are also fewer droplets, so that the droplets are larger (the reduction in number dominates over the reduction in LWP) and therefore the collection of cloud droplets by ice becomes more efficient (not shown)."

We agree with the reviewer that the previous statement could have been clearer. We have now changed it to: "The reason is that in the experiments with less LWP there are fewer droplets, so that the droplets are larger (the reduction in number dominates over the reduction in LWP) and therefore the collection of cloud droplets by ice becomes more efficient (not shown)."

Also, total IWP and LWP is not particularly clear - it would be good to specify that you mean ice+snow+graupel and liquid+rain (assuming that this is what you mean by total LWP).

We have now added the clarification to the Fig. 7 caption.

Ok, but perhaps the phrase "integrated particle concentration dN" in the caption would be better as "particle concentration in each size bin, dN".

We have now changed it to "particle concentration in each size bin, dN".

"Note that the dN values shown in Table A1 represent the modal integrals under the fitted curve in Fig. 5 (yaxis; dN/dlogDp multiplied with dlogDp)" seems to contradict what you just said. It would be better to call the values in Table A1 "N" rather than "dN" and to say that they "represent the total number of aerosols in each mode from the fitted curves in Fig. 5 (sum of dN values)..."

The A1 caption is now written as: "**Table A1.** Distribution parameters ("total particle concentration in each mode, N; modal diameter, Dp and standard deviation σ) of the particle size distribution, calculated for the simulated case study (12:00 to 24:00 UTC on 18 August) and the whole ice drift period (14 August - 14 September). Note that N values shown in Table A1 represent the total number of aerosols in each mode from the fitted curves in Fig. 5 (sum of dN values) and are the numbers used as the model input parameters."

Reply to referee's #2 comments on manuscript:

The revisions improved the article substantially. I only have one minor comment and recommend publication after resolving it.

We thank the reviewer for carefully reading the manuscript and for additional constructive comment.

Fig. 5: In their response, the authors express that indeed the integral form, "dN", is shown, because the model input is structured that way. However, in line 310 the model is given "log-normal modes". This contradiction should be resolved. Also, if "dN" (instead of "dN/dlogD") is used, wouldn't it be necessary to provide bin information for others to compare?

We have now removed "log-normal" and instead written: "The aerosol number size distribution was represented by two modes (accumulation and Aitken) that were fitted to the observed values (see Fig. 5 and Table A1)." We refer to the A1 table so that readers can check the model input parameters. The A1 caption has also been slightly modified for clarification sake.