

Dear Stephan Bansmer,

thanks for the replies and revision of the manuscript.

I do have some follow up questions and further comments, please see below.

Follow up questions – I repeat my original question and your response (typeset in bold) in order to keep the context before asking my follow up question (typeset in italic):

p1, l8: "... than usually used..." – what is usually used?

We stayed with the original wording, which came from the reviewer (British native speaker). Is that okay with you?

I did not say that the wording needs changing, but it needs explanation! You are talking about facilities „usually used“ but it is not clear what facilities are usually used, name it!

p1, l9: "... measurement techniques for particle sizing have performed..." Either "have been performed" or "are performed".

We stayed with the original wording, which came from the reviewer (Canadian native speaker). The meaning is "The techniques have performed well." Is that okay with you?

The reviewer's suggestion was „... for particle sizing are performed on ice crystals“ (which was one of my alternatives, too). If that does not reflect your meaning of the sentence it might be better to rephrase the sentence!

p5, l11: "Figure 46" – figures should be numbered in the order they appear in the text!

We have put the large image on the facility deliberately as the last picture in the manuscript. I guess it depends how the final paper is typesetted... That's why the figure numbering is a bit odd at this place. We can move the figure of course, if you insist...

As I said, figures should be numbered in the order they appear. If you want the figure to appear at an exposed position, you could, I assume, easily move it to number 1 by referring to it early in your manuscript.

p7, l16: figure13 – again, figures should be numbered in the order they appear in the text!

Here it is more difficult. The Figure 13 is explained properly much later in the manuscript (section 2.9). It was just one reviewer, who wanted to have information on where the heat exchanger is placed inside the tunnel's circuit. That's why we created the link here. What do you suggest?

As I said, figures should be numbered in the order they appear. You could for example add a reference to the section where the figure is described in more detail here!

p12, l9: Is there a reference for TAUICE?

No

Is it an abbreviation for something then? I feel there should be a few words about the code to give the reader an idea what it is used for etc.

p14, l32/Figure 16: In the introduction you introduce Median Volume/Mass Diameters as important parameters, why do you use d_{eq} here?

The area equivalent diameter d_{eq} defined as the diameter of a circle of the same area as the shaded pixelnumber for each particle is one way to deal with size information of particles. The information on particle shape is lost for d_{eq} but hasn't been the focus of this study. In general, comparability to the airborne measurements was aimed at and therefore d_{eq} has been used.

We added this information in the manuscript.

Maybe my question wasn't clear, why don't you use/calculate MVD or MMD from the airborne measurements to compare with your measurements? If you have to stay with Deq, please also add the information to the text that it is used for comparability purposes as well.

p18, l12-32: Is there no reference for the IKP?

I am afraid not.

I am a little surprised because there are references for a probe named IKP2 (for example mentioned in one of your references – Leroy, 2017 - for the HAIC campaign, of which you also show data). Is this not related to the Cranfield IKP?

p23, l7: "...higher concentrations of small particles..." – could this not be due to particle shattering introducing numerous small particles (as the removal treatment was turned off)?

CHRISTIANE & TINA. Please comment.

Yes, particle shattering was taken care of by using anti-shattering tips and inter-particle time analysis ("removal treatment"). See also the above comment.

This is true for the field observations, but not for the wind tunnel!

In an earlier comment you said: „... Additionally the high concentrations in the wind tunnel would have rendered an inter-particle time analysis difficult because the inter-particle time of shattered and non-shattered particles were similar....“ This tells me, you did not use the inter-particle time analysis to identify possible shattering on your wind tunnel data, please clarify! Were anti-shattering tips used in the wind tunnel, if yes, add this information to the text.

My main point/question here is: How can you compare measurement data that use shattering artefact removal with data that are not treated to remove shattering artefacts? Particularly if you discuss differences in the number concentrations of small particles, which could be caused by shattering artefacts. You also make the point (in your reply to my comment whether the p14, l31 – p15, l14 could be shortened) „One valuable aspect of the paper is that it tries to compare wind tunnel and atmospheric conditions using the same instrument and evaluation technique thus making it independent on technical or computational aspects.“ I would argue that when you use shattering removal on the field observation data but not use it for the wind tunnel data, then you are not using the same evaluation technique! I think the implications of this should be discussed.

Figures:

I am still not sure whether Figure 5 and 35 are necessary, what value do they add to the manuscript?

Figure 14: Caption: „... dependence on ambient air temperature.“ → „... in dependence of ambient...“

Figures 20 and 21: They show both spatial distributions for mixed phase cloud conditions, that's why I thought and still think they could be combined.

Figure 23, right: x-axis says „MVD vs. V water in ml min⁻¹“, caption says „MVD vs. LWC“?

Figure 27: Where was the IKP mounted?

Figures 29 and 30: If these figures are only aimed at showing examples of particles taken from different probes at different conditions, then I believe they could be combined. In the text explaining figure 30 (p23, l6/7) you say: „Based on the analyses of ice particle images one can conclude that the particles partially break up during conveyance and are reduced to smaller sizes.“

You mean during the distribution step of the ice particles into the tunnel, or break up during the measurement at the cloud probe tips?