**Atmospheric
Chemistry
and Physics
Discussions**

Interactive comment on "Single ice crystal measurements during nucleation experiments with the depolarization detector IODE" *by* M. Nicolet et al.

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We would like to thank the referee for the helpful comments and suggestions. All uncertainties and unclear points have been corrected and clarified. We checked all equations and corrected the discussion about the OPC efficiency and its size calibration. We reply to the individual suggestions below.

1) Parasite light means light coming from the environment and the exterior of the device that has to remain tight.

2) Rconv is the conversion ratio of the preamplifier unit. It converts the current signal into a voltage signal. We will add the units to the other quantities where necessary.

3) Yes. Scattering from molecules cannot be neglected in that case, as scattering intensities of small particles can be very low.

4) At the level of the detection, yes. This value was obtained from simulations with the Fluent program.

5) Too high aerosol concentrations create saturation of the ice particle detection. The saturation threshold is reached for aerosol particle concentrations of about 1000 cm-3.

6) It is in fact the temperature of the air inside the chamber. Data in Panel F start before those in panel C because the number concentration is still too low to be seen in panel C for the activated fraction (under 0.003)

7) Aerosol particles were generated and stored in the NAUA chamber, using a specific procedure. We will add this in the revised paper.

8) Particle sizes below channel 90 correspond to particle size distribution of the aerosols. Larger particles are expected to be ice crystals that grew inside the chamber. Channel 90 corresponds to particle sizes of about 2.5 μm and 160 to particle sizes of approx. 4 μm, respectively.

9) In this case, intensities are not relevant because it is the ratio between the parallel and the perpendicular channel that is important (depolarization ratio). Closer particles generate larger intensities.

10) It is only for activation as stated in the legend of the Table 1.

11) Concerning the OPC, it counts actually only 50 to 60% of the real concentrations, according to previous OPC calibrations, but for the lowest detectable particle size which is 0.5 μm. The detection efficiency very likely approaches 100% for our ice particle sizes (a few μm). This value is known from previous calibrations made with a known particle concentration. Sometimes two particles or more can be counted as one (coincidence events) or sometimes particles can be missed. This is taken into account in the experiments.

12) This happens when both the OPC and the parallel channel counts increase suddenly and reach saturation as shown in fig 7 and 9. This line is typical of this device and was determined from several experiments. Additional information has been added in the manuscript to better describe the water breakthrough line. Moreover, calculations from Felix Lüönd, whom we added as a co-author, have confirmed the validity of the water breakthrough line.

13) It is a hypothesis. The two significant distributions can be determined in that way, even if there is an uncertainty concerning this distribution type. It can also be a combination of noise and high background signal, so that the noise can cross the threshold limit.

14) Yes, it is.

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