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Comment

***Interactive comment on* “Direct quantification of total and biological ice nuclei in cloud water” by M. Joly et al.**

Anonymous Referee #3

Received and published: 7 April 2014

The study under review quantified the amount of biological particles or better bacterial cells /INA proteins in cloud water samples. As there is still a controversial discussion about the importance of biological particles for atmospheric processes, this study provides important information about the possible number of bacteria in clouds.

The freezing method used in the study is comparably insensitive, due to the use of large droplets containing a lot of material, but it is still a powerful method to investigate whether a sample freezes or not and how a sample changes if it is treated for example by heat, as it was done here.

The authors focused on the determination of heat sensitive INA proteins in the samples which are the most active biological particles known so far. It would have been

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interesting to see if the samples changed further when they were treated with other procedures, which can also destroy heat insensitive biological IN. So, as already stated in the paper, this study gives only the lowest possible value for concentrations of biological IN, which nevertheless still is important information.

However, the title of the study promises that information about biological particles in general would be given. As this is not done, the authors should change their title as to not give promises that cannot be fulfilled.

In the presentation of the procedure and the data I found some missing and contradictory information.

- p3712, 11: Some samples already froze during the sampling procedure. Is it possible that this makes any differences?

- p3714, 6: Why do you use sometimes 32 and sometimes 160 droplets? The information how many droplets were used for each experiment could be added to table 2. What is the uncertainty for the two types of experiments? Is it possible to get some error bars to figure 3 and 5?

- p3714, 16: It would be interesting to know the value of the dilution factor D_f and how it is determined.

- p3716, 7: I think it is better to say: "none of the samples remained completely supercooled at temperatures below $-11\text{ }^{\circ}\text{C}$ ", because if I understand it correctly, you want to say that at $-11\text{ }^{\circ}\text{C}$ every sample showed at least one frozen droplet. In your statement it sounds that all droplets of all samples were frozen at $-11\text{ }^{\circ}\text{C}$.

- p3716, 7: a reference would be nice at that point (e.g. Pummer et al., 2013)

- p3717, 10: Why at $-9\text{ }^{\circ}\text{C}$?

- Fig1: This is potentially a very interesting sketch, but the font is quite small. If you want that your readers can get anything from this plot, you either have to make sure

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that it will cover one complete page in a possible final publication, or better still increase the size of the font!

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 3707, 2014.

ACPD

14, C1170–C1172, 2014

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