Atmos. Meas. Tech. Discuss.,
doi:10.5194/amt-2018-230-RC1, 2018
© Author(s) 2018. This work is distributed under
the Creative Commons Attribution 4.0 License.

Atmospheric Measurement Techniques Discussions

Interactive comment on "Twin-plate ice nucleation assay (TINA) with infrared detection for high-throughput droplet freezing experiments with biological ice nuclei in laboratory and field samples" *by* Anna T. Kunert et al.

Anonymous Referee #1

Received and published: 30 August 2018

General Comments:

Kunert et al. designed a new instrument for measuring immersion mode using multi-well plates analyzed simultaneously with a high-throughput experiments. Freezing events are detected automatically based on the heat release during crystallization using an infrared detector. TINA was tested with comprehensive characterization of bacterial (Pseudomonas syringae ,Snomax®) and fungal (Mortierella alpine) ice nuclei, as well as atmospheric particles collected on filters. Chemical processing effect of the biological ice nuclei was shown to decrease their activity. The conclusion of

Printer-friendly version

Discussion paper

this manuscript is that TINA is suitable for high-throughput experiments for analyzing field and laboratory samples, and characterizing the ice nucleating particles. This manuscript is suited for publication in AMT, and can have valuable contribution to experimentalist in the field of atmospheric ice nucleation. Overall, the manuscript is well structured and I recommend to publish it in AMT after issues raised in this review will be addressed. The authors should stress what is the scientific innovation in their instrument given the very recent paper of Harrison et al. (2018), which was mentioned shortly in the end of the introduction section. Also, why infrared detector enables improved detection over other methods? The ability of high-throughput experiments was mentioned repeatedly in the manuscript, and it will be valuable contribution if the authors could use their existing data to show if this ability is important. I also wonder why error bars are lacking from all data and figures.

Specific comments:

Line #26: It is stated that there is a good agreement with literature data. Where was this shown or detailed in the manuscript?

Line #76: I think it is confusing: up to 10 K min-1 or more?

Line #83: Is this the correct place to introduce the similar approach by Harrison et al.?

Line #94: Here it is not clear if the plates are commercial product or self-designed? If commercial, manufacture details should be specified.

Line #137: It confused me that it was cooled to 218.2 K and heated from 220.7 K?

Section 2.2: So what is the temperature uncertainty of TINA and how was it propagated?

Line 144: I think it is still not clear at this point what is the temperature gradient you refer to. I would first defined that.

Line #151: please clarify why do you mention here Zaragotas et al. (2016).

CC BY

Line #152: I think it would be nice if you will add the plate temperature at the different images

Line #157: what is the resolution in which images are taken?

Line #182: Are those new plates? or the same plates described earlier in the text?

Line #209: Please add a reference to this claim.

Line #235: Is this correct? Class A only seen for high suspension concentrations.

Line #302: per liter air? Or liter water.

Technical corrections:

Line #97: Fig. 1b should be describes before Fig. 1c.

Line #165: add “is” after Vdrop, and m, and etc..

Line #206: You can remove ‘respectively’.

Line #209: ’showed’ and not ‘show’. Also found in other places in the text.

Interactive comment on Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2018-230, 2018.

Printer-friendly version

Discussion paper

CC BY