Atmospheric
Measurement
Techniques

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Discussions

Interactive comment on "Continuous online-monitoring of Ice Nucleating Particles: development of the automated Horizontal Ice Nucleation Chamber (HINC-Auto)" *by* Cyril Brunner and Zamin A. Kanji

Anonymous Referee #2

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In this paper authors described the HINC-Auto, which is automated version of HINC. They describe the technical setup and validation experiments. CFD modeling is also performed. The chamber was deployed in the field and ran for 90 days. The paper is well written, and I recommend publication after following minor points are addressed.

Line 104 -105: Is flow rate affects the buoyancy? Can you have larger gradient but smaller flow rate?

Figure 2: For completeness label the vacuum pump. Currently, the output air is recir-

culated – closed loop configuration. What is the need of MFC after OPC?

Line 123: How many layers of filter paper were used.

Section 2.1: A plot showing the time series of temperature, RH, and droplet diameter would help to understand the operation of the chamber. This plot can include droplet growth, rewetting, and INP measurement periods.

Line 189: CDF or CFD?

Section 2.4: Regarding particle losses. Is there any size-dependent transmission curve established? Any particular reason why >3 um cannot be transmitted? Because of the presence of any upstream impactor?

How droplet diffusion growth calculations are performed? Can this equation be added to the appendix? It is not clear why d0 = 2 um used. A typical size-distribution at JFJ can be shown to understand what is d0.

How ice crystals are distinguished from water droplets? The description on line 238-240 is not clear. It is also mentioned that d = 0.2 um grew to 4.57 um. This indicates droplets and ice crystals co-exist. Please clarify.

Equation 1: Define the term [LOD] in the RHS or it is saying the units of LOD are in std Lmin-1 – if so move the units to another line. It is not clear how this equation is formulated. The number '60' in the numerator is confusing. Is this number not used to convert the 'V' into std L per sec from std L per min? If so then units of 'V' should be revised. What are the units of 'BG_counts' parameter?

Line 250: How many OPC intervals were used, and are they have the same length in terms of time? MDC = 1 count is defined. How this is assumed or calculated?

Line 269: clarify '. . .size bin 4995. . .'

Line 313: Is AF is same FF?

Figure 9: Add vertical line Sw = 1.04 to panel b to understand AF value. Please comment on AF. Do you achieve maximum droplet activation?

Figure 10: The tail end of the size distribution is not shown. It looks significant number of large particles exist. How these large particles (> 1 um) are distinguished from ice crystals?

Section 3.3: It is not very clear how AF/FF values are converted to std L min-1 as shown in Figure 11. Please show the equation. Do you use std Temperature and Pressure values?

It is not clear here, but how data is quality controlled? How data is flagged as good or bad. Any outliers are removed? Thoughts on data quality assessment would useful.

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