Atmos. Chem. Phys. Discuss., 12, C12310–C12312, 2013
www.atmos-chem-phys-discuss.net/12/C12310/2013/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Measurements of natural deposition ice nuclei in Córdoba, Argentina" *by* M. L. López and E. E. Ávila

Anonymous Referee #2

Received and published: 5 February 2013

A four month time series of ice nuclei concentrations is worth publishing in and of itself. There's a scarcity of ice nuclei measurements (especially in the Southern Hemisphere) and most are very limited in temporal extent. Given the utility of the time series, my primary recommendation to the authors is to include a plot of the time series. Pick a couple of supersaturations and plot the concentration of ice nuclei at those supersaturations as a function of time. I realize that you don't have the data to define a seasonal cycle, but even plotting the data over the time you do have would show some indication of the variability.

Variability or uncertainty leads to my second major recommendation. These values are almost meaningless without some idea of the uncertainty. As an example, the bottom panel of Figure 4 shows a local maximum in IN concentration at S = 14% and $T = -24$

Full Screen / Esc
Printer-friendly Version
Interactive Discussion
Discussion Paper

C. The concentrations then decrease(!) as T falls further at the same supersaturation, rising again as T falls to about -30. This is unphysical. Clearly there's an uncertainty in the reported values that would smooth that unphysical local maximum out.

Aside from the inherent variability in the concentration of the ice nuclei, there must also be some uncertainty associated with the technique. The authors discuss uncertainty in S on page 31707 (lines 9 through 13). There's a mention of the uncertainty associated with the counting of activated ice crytals on line 27 of that same page. Combining the uncertainty associated with the technique and the uncertainty associated with the variability of the concentrations and showing that uncertainty on the plots would help the reader to interpret them. (You don't need to show the uncertainty for every data point. I think an error bar at the low and high end of the concentration range would suffice.) As an example, it looks as if the unphysical local maximum shown in the contour plot in Figure 4 would be within the experimental uncertainty.

Editorial and minor comments

Abstract: ".. can initiate freezing at temperatures below -15 C." Why -15? There are documented instances of freezing at higher temperatures. It isn't very common, but it has happened.

Pg. 31701, line 14: I think the comma after the parentheses should be a semicolon.

Pgs. 31701 and 31702, discussion of ice multiplication processes: I don't think this discussion is warranted here. The paper isn't about ice multiplication. This comment is just my opinion. Feel free to ignore it.

Pg. 31703, line 13: "condition" should be "conditions"

Pg. 31703, line 27: "...no agreement has been reached as to the most appropriate technique..." I'll throw in another personal opinion here. There is no *most* appropriate

ACPD
12, C12310–C12312, 2013

technique. The technique to be used depends on the question being asked. Every technique and instrument has advantages and disadvantages.

Pg. 31705, lines 10 through 21: The description of replenishing the humid air in the box is ambiguous. Are there aerosol particles in the humid air that's injected into the chamber to increase S? If not, the number of aerosol particles in the chamber is decreasing because you remove air to keep the pressure in the chamber constant. Please clarify this.

Discussion of the parameterization of the results, Pgs. 31711 and 31712: Another editorial comment. Feel free to ignore it. In my opinion, this discussion is of limited utility. While I think, as I said above, that publication of the results is warranted, I do not think a parameterization is necessary. The time series of the IN concentration is longer than most, but it is still only 4 months.

Interactive comment on Atmos. Chem. Phys. Discuss., 12, 31699, 2012.

ACPD

12, C12310–C12312, 2013

Interactive Comment