

Interactive comment on “The portable ice nucleation experiment PINE: a new online instrument for laboratory studies and automated long-term field observations of ice-nucleating particles” by Ottmar Möhler et al.

Anonymous Referee #1

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Review of Moehler et al. “The portable ice nucleation experiment PINE: a new online instrument for laboratory studies and automated long-term field observations of ice-nucleating particles”

This manuscript details the design and performance of a new ice nucleation chamber. This instrument is based on an expansion principle, much like the AIDA chamber at KIT (location of several of the co-authors). In this regard the chamber is different than the continuous flow principle used on almost all current ice nucleation chambers. PINE therefore represents an important addition to the field.

C1

The design and performance is important and the use of a long term (in this case 45 days) makes this a solid paper and very appropriate for AMT. The paper is well written and only minor revisions are needed. There are a few points I'd like to ask the authors to consider:

Starting in the Abstract but running through paper there are several unquantified terms : “...extensive.” ‘...good...’ ‘...high time resolution...’ These are all subjective and need to be removed.

The Introduction, although highly comprehensive, is also very long for an instrumental paper (3 pages). It seems like it could be considerably shortened.

The ‘milestone’ portion of the 2. Basic Principles section should be removed. It does not seem relevant to outline the timeline / dates (i.e. 20 years, first test 2016, etc.) since they don't impact the instrument performance. Please eliminate this part of the paper.

The dates of the SGP test (Oct 1 -) is found in Section 2 and then repeated 4 times in the paper; please state once.

During HyICE, there are repeated references to CCN activation. Just as PINE is compared to AIDA, wasn't there a CCNC at HyICE? If so can the PINE droplet data be compared to those data? The topic of drop formation could be more fully developed in the paper and this would help.

Figures Please check f ice and others not in subscript ;

Figure 8 : Does “in preparation of the HyICE field campaign” have an impact on the measurement? It seems highly extraneous.

Figure 11 : Is ‘aerosol, right after the PINE-1A runs were finished.’ the relevant point? Is ‘using the same aerosol’ correct?

Figure 12 : Does not seem necessary to attribute funding to DOE here since this is

C2

typically done in the acknowledgements. Site location seems sufficient. Inset legend – seems to mean ‘6 hour averaged data’ (not daily)? And ‘45 day average’

Figure A1 : ‘setup’ can be removed, it is redundant after ‘Schematic’

Figure A5 : Figure text appears to be of low quality and needs to be increased in resolution.

Figure A6 : ‘foto’ should be ‘photograph’. Panel (b) appears redundant and can be removed.

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