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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 #4

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The knowledge of ice nucleating particles and their impacts on clouds was restricted by the development of measurement techniques and instruments. This manuscript presents a new instrument based on expansion chamber for both laboratory studies and field observations to measure ice nucleating particles. The authors successfully demonstrate the applicability of their new instrument to be compared with AIDA and deployed in a field campaign. Different from the commonly used Continuous Flow Diffusion Chamber (CFDC), PINE is truly the first commercial instrument capable of automated long-term continuous observation, and its development provides an excellent

complement to enrich measurement methods. This research aligns well with the scope of AMT. The manuscript is well written and easy to follow, thus should be acceptable for publication after considering following minor comments:

P2 Line28: The abbreviation "(INPs)" should not be linked directly after ". . .atmospheric aerosol particles". Moreover, two sets of parentheses are used instead of one. For example, ". . .atmospheric aerosol particles (INPs) (Vali et al., 2015)".

P2-3: The need for promoting INP monitoring was put forward until P3 Line 63, and the new methods and instruments for INP measurements were discussed from P3 Line 90. Please consider adding more descriptions and comparisons of existing instruments, especially the most commonly used CFDC, and simplifying the context on INP.

P9 Line275: A parenthesis is missed.

P12-14: PINE-c performed the field measurements to demonstrate its capability, however, the comparisons with AIDA and performance tests were conducted by the prototype version PINE-1A. PINE-c is a further developed version with major upgrades in chamber type, cooling system, controlled temperature range, particle detector, and so on. So direct characterizations and tests of the performance of PINE-c would be helpful.

Figure 7: Please notice the superscript of the unit, ". . .5 l min-1".