

Interactive comment on “Ice-nucleating particle versus ice crystal number concentration in altocumulus and cirrus embedded in Saharan dust: A closure study” by A. Ansmann et al.

Anonymous Referee #1

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General comments:

The novel algorithm to derive ice number concentrations from lidar observations on field sites and the comparison with empirical INP parameterization functions is shown in this manuscript. For three case studies covering both mixed-phase and ice clouds, the authors show the observed meteorological situation and vertical profiles. The comparison in the vertical profiles show a good agreement between both approaches. Additionally, the authors show the comparison of INP concentration from INP measurements on the surface level (HINC) and the lidar-derived concentrations. Since this is often a point of discussion, if surface-based techniques can represent INP concentration at cloud levels, the study confirms for this field campaign in Cyprus that

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this is the case.

The reader is guided well through the topic itself und the different case studies. I have only some very minor comments for this nice and well written manuscript.

Specific comments:

- Sec. 5.3: I feel the need of a more detailed discussion of Fig.16 (c), e.g. U17-I(d) overestimates n_{ice} in the upper level, ...

Technical corrections:

- p.2, l.4: "... ice formation (...) is not be possible ..."
- p.3, l.23: Sect.3 is mentioned twice
- p.9, l.32: The superscripts on diameter initially looked to be like footnotes. Maybe it is better here to use a symbol instead.
- p.20, l.14: cloud
- Fig.16 (a): σ subscripts should be mixed-phase here instead of cirrus