

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 #2

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Addendum:

I forgot to include a comment about the calculation of ICNC based on the quotient of the vertical ice crystal number flux (most direct observation) and the ice crystal terminal velocity v_t (as stated in Table 2). More information about v_t is needed. For example, v_t should be based on the ice particle size distribution (PSD), and can be either number- or mass-weighted. Since ICNC is based on the number flux, v_t should be the number-weighted ice fall speed:

$$vN = \sum v(D)N(D)\Delta D / \sum N(D)\Delta D = \sum v(D)N(D)\Delta D / N,$$

where D = ice crystal maximum dimension, $v(D)$ is the fall speed, $N(D)$ is the PSD, N is

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the total PSD number concentration and ΔD is the size bin width of the PSD. Doppler lidar estimates of vN should be adequate, but estimating vN from radar reflectivity and the ice cloud extinction coefficient appears more dubious (Sect. 4.2.2). Please address this concern.

Interactive comment on Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2019-447>, 2019.