

Atmos. Meas. Tech. Discuss., community comment CC1
<https://doi.org/10.5194/amt-2022-262-CC1>, 2022
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Comment on amt-2022-262

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Community comment on "Use of lidar aerosol extinction and backscatter coefficients to estimate cloud condensation nuclei (CCN) concentrations in the southeast Atlantic" by Emily D. Lenhardt et al., Atmos. Meas. Tech. Discuss.,
<https://doi.org/10.5194/amt-2022-262-CC1>, 2022

The correlation between extinction coefficients and CCN concentrations is intriguing. The findings support additional research into extinction-to-CCN parameterizations for various aerosol types that will be directly applicable to spaceborne lidar measurements. Here, I would like to draw the author's attention to an ongoing effort in the lidar community to obtain aerosol-type-specific CCN concentrations from ground-based and spaceborne lidar. For ground-based lidar, Mamouri and Ansmann (2016) presented a technique to convert the lidar-derived aerosol-type-specific extinction coefficients to number concentrations of aerosols, which were then used in parameterizations to estimate CCN concentrations at different supersaturations. Choudhury and Tesche (2022a) further developed a CCN-retrieval method specifically for application to spaceborne CALIPSO lidar measurements. The technique uses the normalized size distributions of the CALIPSO aerosol model and modifies it to reproduce the CALIPSO-derived extinction coefficients. The final modified size distributions are then used in CCN parameterizations, similar to Mamouri and Ansmann (2016), to compute CCN concentrations at different supersaturations. The resulting CCN concentrations were found to be consistent with airborne (Choudhury et al., 2022) and surface (Choudhury and Tesche, 2022b) in-situ measurements.

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