

Interactive comment on “Cloud droplet size and liquid water path retrievals from zenith radiance measurements: examples from the Atmospheric Radiation Measurement Program and the Aerosol Robotic Network” by J. C. Chiu et al.

Anonymous Referee #1

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This paper presents a method for retrieving cloud microphysics (cloud optical depth, effective radius, and liquid water path) from AERONET instruments operating in nadir mode. It enhances the previous cloud optical depth retrievals of Chiu (2010) by adding a water-absorbing wavelength to the non-absorbing wavelengths used in the previous retrievals (this is what enables the retrieval of effective radius and liquid water path). Retrieved results are compared to large eddy simulations of stratocumulus clouds, ground-based cloud radars and microradiometer retrievals at the ARM SGP site, short-wave flux with microwave retrievals, and MODIS satellite retrievals. The paper is well

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organized and well written; I only have a few minor comments.

MINOR POINTS

page 5, line 16: The authors state: “Overall, the comparison of transmittance-based retrievals to cloud radar retrievals is less conclusive and depends strongly on radar retrieval methods.” I don’t understand this sentence – less conclusive than what?

page 7, line 22: Are these absolute or relative uncertainties?

page 8, line 27: Here, and elsewhere, it sounds as though the transect is vertical in the figure. I suggest modifying the text slightly to “located at 3.1km...” .. or, alternatively, just refer to the dashed line in the figure, which is plenty obvious enough.

page 14, line 5: The authors talk about “a significant difference in the overall mean in Fig. 9b, where...,” but Fig 9b is a boxplot. Thus, don’t the authors really mean “median” instead of “mean?”

Fig 1: The first sentence of the caption should be more descriptive. Mention that you are comparing transmittance-based retrievals to cloud radars or MODIS. Maybe use these terms in your axes labels, too, as the word “source” is not immediately descriptive.

Fig 6: x-axis in Fig 6a,b is labeled $\tau_{reff, constv}$ effective radius and $\bar{\tau}_{reff}$ effective radius; shouldn’t these be $r_{eff, constLWC}$ effective radius and \bar{r}_{eff} effective radius? Two similar mislabelings appear in the caption.

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