

Interactive comment on “Ground-based Observations of Cloud and Drizzle Liquid Water Path in Stratocumulus Clouds” by M. P. Cadeddu et al.

Anonymous Referee #2

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The paper by Cadeddu presents a new technique to retrieve column integrated values of drizzle water below and above cloud base as well as cloud water above the cloud base.

The technique is well presented, but is only applied only to a small data set. However, the paper fails to provide necessary information to evaluate if the technique can be applied, for example, only to geometrical thin clouds or only to warm clouds. I would be good to know the range of, e.g. cloud optical and geometrical thickness or cloud top temperature of the clouds that can be considered as potential targets for the technique. The authors should also state if the technique only works for single cloud layers or how

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the observed LWP would be distributed over multi-layered clouds. Can the method could also be applied to Arctic clouds?

I would be very helpful if the authors would provide a brief review on cloud-droplet size distributions and drizzle size distributions. What are typical values in the literature for warm stratocumulus clouds? The calculated cloud droplet diameters shown in Figure 5 seem quite large and the drizzle diameters rather small.

Minor comments:

Line 87: calculations are based ... for non-spherical and oriented particles. How are spherical droplets (cloud/drizzle) handled in the model?

Line 89: what do you understand under ice crystal habit?

Line 212: What drizzle size was observed? Please add a figure of the observed DSD in cloud and below cloud for the different cases and add in Table 2 and 3 the mean cloud and drizzle (in and below cloud) diameter, CTT, and optical and geometrical thickness.

Figure 1: add the observed precipitation at ground

Figure 2/line 109: Drizzle modal diameter is not shown in the Figure 2. Please change. Also, change the colour scale, maybe use a log scale. Now it is only shown to 500 μm . It should be extend to the 800 μm (largest diameter stated in the text).

Figure 5b, black line is missing.

Other comments: Figure 5, yellow is not a good choice of colour. The contrast is very poor.

Figure 7, The colour in the legend and the plotted data seem not to be the same.

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