We thank the reviewer for very detailed comments on the manuscript. Responding to them has substantially improved the manuscript. The reviewer's comments are italicized and responses are in red.

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.

To address this concern, we added more discussion on this in section 5 at lines 417-428. Rather than specific atmospheric conditions under which the technique can be used, below we report specific criteria under which the technique can be applied,

1) The radar and ceilometer are not attenuated by precipitation and are able to adequately detect the cloud base and cloud top.
2) The radiometer measurements are not affected by precipitation on the lens.
3) The drizzle droplet diameter is large enough to be detected by the 90 GHz channel (in other words the technique will not work in very light drizzle).
4) The cloud can be considered close to be adiabatic so that the cloud and in-cloud drizzle water content can be modeled with sufficient confidence.

Given these criteria the applicability of the technique can be different for ground-based and airborne instrumentation, and for a combination of the two. For example, if we had a radiometer looking down instead of looking up the criterion #2 would be satisfied for a broader range of precipitating clouds than what was presented in this work, as long as the other criteria are met. The attenuation at Ka-band wavelength is significant during heavy precipitation, making it not possible to retrieve below-cloud cloud drizzle properties. The adiabaticity of marine stratocumulus clouds changes on shorter (less than minute) timescales, with sub-adiabatic downdrafts and super-adiabatic updrafts (Stevens et al. 1998, Wood, 2012). However, the clouds are nominally adiabatic on minute or longer timescales, suitable for application of this technique. We have also added in Tables 3-5 the estimated optical depths for the clouds in this work (assuming a cloud drop effective radius of 10 μm) and the geometrical thickness from the radar-estimated cloud top and the ceilometer-estimated cloud base. We think that the value reported are optimal for the application of this technique.

Stevens, B., W.R. Cotton, G. Feingold, and C. Moeng, 1998: Large-Eddy Simulations of Strongly Precipitating, Shallow, Stratocumulus-Topped Boundary Layers. J. Atmos. Sci., 55, 3616–3638, https://doi.org/10.1175/1520-0469(1998)055<3616:LESOSP>2.0.CO;2

The authors should also state if the technique only works for single cloud layers or how the observed LWP would be distributed over multi-layered clouds.

We used the technique for single layer clouds. In the open cell dataset examined for this work there were several occurrences of heavy precipitating stratocumulus clouds with non-precipitating shallow cumulus clouds in the layers below. These cases were usually heavy precipitating and therefore the passive retrieval was not applied. Theoretically, the technique could be applied to multi-layer clouds, however, as the reviewer mentioned here, a realistic representation of the cloud boundaries and LWP may be needed. This was added in section 5 lines 423-425.

Can the method could also be applied to Arctic clouds?

The falling ice/snow below a mixed phase Arctic clouds can potentially scatter the microwave radiation at 90 GHz emitted by the liquid water within the cloud. However, that will depend significantly on the shape and size of the ice crystals. This is outside the scope of this work and hence at this stage we can't recommend this methodology for Arctic clouds.

It 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.

Thank you for raising this issue. A comprehensive survey of cloud drop size distributions have been carried out by Miles et al. (2000) with estimates from multiple field campaigns reported in various articles e.g. DYCOMS-II Stevens et al. (2003 BAMS), VOCALS Zheng et al. (2011 ACP), Bretherton et al. (2010 ACP), EPEACE (Russell et al. 2013) and CSET (Albrecht et al. 2019). A comprehensive review of stratocumulus clouds is also provided in Wood et. al. (2011) and Wood (2012).
Due to the large variability of in-cloud and precipitation microphysical properties (diameter and number) both vertically and horizontally due to turbulence and aerosol-cloud interactions, many of these estimates are for bulk properties such as rain rates, LWC and LWP. Tables 3 and 5 now added to this work provide information of typical properties for these clouds.

Miles, N.L., Verlinde, J. Clothiaux, E. E.: Cloud Droplet Size Distributions in Low-Level Stratiform Clouds, *J. Atmos, Sci.*, 57, 295--311, 2000.

R. Wood, C. S. Bretherton, D. Leon, A. D. Clarke, P. Zuidema, G. Allen, and H. Coe: An aircraft case study of the spatial transition from closed to open mesoscale cellular convection over the Southeast Pacific, *Atmos. Chem. Phys.*, 11, 2341–2370, doi:10.5194/acp-11-2341-2011, 2011

Wood, R.: Stratocumulus clouds, *Mon. Weather Rev.*, 140, 2373--2423, 2012.

Minor comments:

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

The single scattering properties of spherical droplets such as cloud, drizzle, or rain are calculated with the Mie theory. For the radiative transfer solver RT4 it doesn't matter if the particles are spherical or non-spherical. It simply gets the 4 by 4 scattering and extinction matrix and the emission vector as input. These have to be calculated or provided by appropriate methods.

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

By ice crystal habits we mean the shape, density, size, mass-size relation, and so on. All that which differentiates frozen particles in terms of radiative properties.

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.

We added in Fig. 8, left panels (new) the distribution of the retrieved drizzle diameter below cloud base and what was retrieved immediately above cloud base with the radar only. Because the number of columns was too large to keep in one table, we added tables 3 and 5 with the shaft-averaged drizzle diameter found below and above cloud base, cloud top temperature, optical and geometrical thickness. Throughout the paper the cloud droplet diameter is assumed constant with a value of 10 micron. This value is also used in the calculations of the optical depth.

Figure 1: add the observed precipitation at ground

We added panel 1d with the precipitation at the ground observed by the video-disdrometer. Because of the large range of precipitation values the vertical axis is shown in log scale.

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 extend to the 800 µm (largest diameter stated in the text).

Accepted. Thank you for this suggestion.

Figure 5b, black line is missing.

For this case which was at the very onset of the drizzle event the black line was entirely under the blue line. We state this in the caption now.

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

Changed to green. Thanks.

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

Figure 7 was changed, and the colors were changed to be the same. Thanks.