We thank the referee for taking the time to read through the manuscript and for the constructive suggestions and criticisms. Below we reproduce the referee's comments (printed in italic) and address them individually:

1. *The calibration of the MIRA-35 radar*
The observed radar reflectivity reported in Figure 6 is significantly less than I would expect for drizzling stratocumulus. As the authors outline on P2 L25, the consensus in the literature of typical radar reflectivity for the onset of drizzle is between 20 to 15 dBZ. Yet, on P17 L17, the authors report observed radar reflectivity is typically no higher than 28 dBZ. Given that drizzle is clearly present in Figure 6, and almost reaches the ground at around 4 UTC, I anticipate there is a calibration error of at least 10 dB. Extrapolating the 3 dB error investigated on P16 L4, the retrieved LWC and effective radius are likely to be significantly underestimated. It is therefore difficult to trust the conclusions of the evaluations against other retrieval methods in Section 5. Are there any independent observations of radar reflectivity at Cabauw that could be used to validate the MIRA-35 calibration?

We compare the reflectivity values from MIRA-35 radar with those from a colocated 3.3 GHz radar (TARA). TARA was operational during the ACCEPT campaign and was independently calibrated. Due to the difference in radar frequencies, the comparisons are focused on periods with precipitation events which are detected by both radars. Figure 1 below shows the reflectivities at a 1000 m altitude on October 25, 2014 between 13:30 and 15:00 (UTC), just before the period analysed in the manuscript. The left panel of Fig. 1 displays the time series and the right panel shows the scatter plot. TARA measurements were collected with a 45 deg elevation angle, while MIRA was pointing to zenith. At 1000 m, both radars observed different resolution volumes, which explains the large scatter. However, there is no obvious sign of strong miscalibration of MIRA.

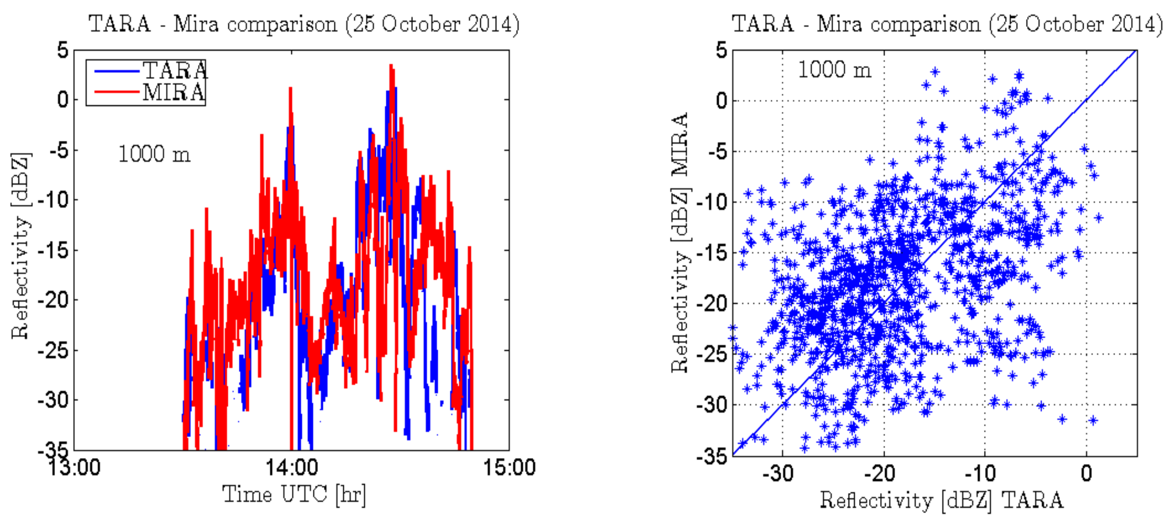

Figure 1: Time series and scatter plot of radar reflectivity values measured using MIRA and TARA at 1000 m. TARA was operated with a 45-degree elevation angle, while MIRA was pointing to zenith.

To confirm this, we consider another case from the ACCEPT campaign when both radars pointed to zenith. A two-hour period with light to moderate rain events on October 4 between 19:30 and 21:30 (UTC) is selected. We show the time series and the scatter plot in Figure 2 below. For reflectivities higher than 20 dBZ, the small offset in the scatter plot is due to the different attenuations observed at different radar frequencies. From the two comparison cases, we find no evidence of a significant calibration error for the MIRA-35 radar.

It is perhaps relevant to note that in this work we use an effective radius threshold of 13 microns and the retrieved droplet radius of the drizzle that we detect is mostly between 13 and 25 microns. It is common in observational studies or in-situ measurements to define drizzle as droplets with a higher

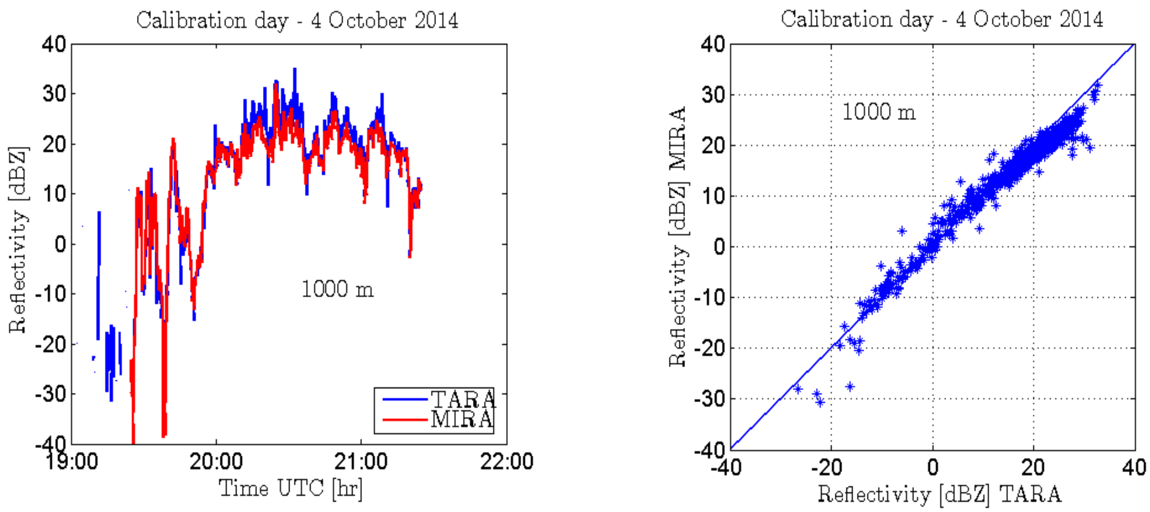

Figure 2: Time series and scatter plot of radar reflectivity values measured using MIRA and TARA on Oct 4, 2014 at 1000 m. Both radars pointed to zenith.

radius threshold: larger than 20 (e.g. Baedi et al. 2002), 25 (e.g. Wang & Geerts 2003) or larger than 50 (e.g. Frisch et al. 1995, Sauvageot & Omar 1987) microns, which could explain the high drizzle reflectivy thresholds reported in the literature.

The calibration of MIRA should not be an issue for the evaluations against other retrieval methods since the same radar was used (Section 5.2 and 5.3). In section 5.1, the comparison with the lidar depolarisation technique also does not show any large or obvious systematic difference in the cloud products that could indicate a large radar calibration offset.

2. *Test using synthetic data*
It is a shame that the LES used to verify the retrieval does not contain drizzle (P14 L22). As the novel aspect of the algorithm is to separate cloud and drizzle signals, the test does nothing but serve as a sanity check to the forward models (in the authors words on P14 L25) and therefore adds little to the paper. Perhaps testing with idealized profiles of cloud and drizzle would be more informative, or the addition of a synthetic drizzle profile to the LES data? The description of the retrieval technique (Section 2) is somewhat hard to follow, so illustrated examples of the different retrieval scenarios using idealized profiles might be helpful.

   We added one section (3.2) in the manuscript to present examples of the full (cloud and drizzle) retrieval using idealized drizzle profiles. There we discuss two drizzle scenarios/cases and show the retrieval results as compared to the truth in the newly added Figure 6 in the manuscript.

   Section 2 has been revised. The description of the retrieval technique is hopefully easier to follow now.

3. Minor and style comments

   - *P1 L18 aerial –> areal*
     Done.

   - *P2 L3 settle –> form*
     Done.

- *P2 L21 It is not clear whether This retrieval refers to Fielding et al., or the method presented*
  'This retrieval' refers to Fielding et al. We replaced it with 'Their retrieval'.

- *P3 L12 respectively is not needed*
  Omitted.

- *P3 L21 define Heavy precipitation events.*
  We replaced the whole sentence to avoid ambiguity [P3 L21].

- *P8 L28 minute –> small*
  Done [P7 L22].

- *P9 L12 If the vertical structure of drizzle within cloud is constrained by Eq. 13, why does the retrieved cloud extinction need to be fixed at 150m?*
  Eq. 13 specifies the vertical structure of drizzle within the cloud once $r_{\mathrm{e,cb}}$ and k_1 are known. One could include these two parameters in the state vector to solve eq. 13, but they would be less directly constrained by the lidar data. The cloud and drizzle separation within the cloud is largely reliant on the lidar attenuated backcatter, which is mostly sensitive to the extinction coefficient, not the effective radius. For this reason, we choose to retrieve drizzle extinction coefficient at two height levels (at the cloud base and at 150 m), instead of $r_{\mathrm{e,cb}}$ & k_1. The 150-m height level is a somewhat arbitrary choice. Considering that the lidar attenuated backscatter provides constraints only up to about 200 m into the cloud, we expect that 150 m can be a good compromise between going deep into the cloud while at the same time still getting useful constraints.

  Would it be clearer to include k1 in the state vector (in place of the cloud extinction) and say that any lidar backscatter further than 150m above cloud base is not forward modeled?
  Apart from the reason stated above, including k_1 in the state vector (instead of the drizzle extinction) would make the choice of lower and upper boundaries of the state vector values (as required by the differential evolution routine) less intuitive or less obvious for the user.
  The 150-m height level should not be confused with the stopping point up to which the lidar backscatter is forward modelled. The stopping point can be set at a higher altitude (e.g. 200 m for the ACCEPT data), depending on the data quality. We clarify these points in section 2.2.2 of the revised manuscript.

- *P21 L8 (and in other places) when comparing differences in radar reflectivity the unit is dB (relative) rather than dBZ (absolute).*
  Done.

The manuscript has been revised based on the input from two anonymous reviewers. The notable changes are:

1. The flowchart in Figure 1 has been simplified. In the flowchart, we include references to the sections where more details can be found.
2. Section 2 has been reconstructed and reorganized to provide a clearer and a more coherent description of the retrieval method. No changes were made in the conceptual design or the implementation of the method.
3. Section 3 has been expanded to include the retrieval of drizzling clouds using synthetic data. Along with this, an additional figure was produced (shown as Fig. 6 in the revised manuscript).

Changes in the text are marked in red in the revised manuscript.