

## ***Interactive comment on “Observations of tropical rain with a polarimetric X-band radar: first results from the CHUVA campaign” by M. Schneebeli et al.***

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General comments: As already answered in the reply to reviewer 1, the title of the manuscript will be changed. The data considered for the evaluation does not stem from one day only but from one month of data (i.e. the duration of the measurement campaign in Fortaleza). As suggested, we will give more details on the considered data set (how many events, what kind of events, selection of events).

-) Radome attenuation: We agree that the event that is causing 15 to 20 dB of radome attenuation should be better characterized. We will do so using the ground-based instruments that are at our disposal and show time series that will give an impression of the characteristics of the considered events.

C938

-) We agree that the temperature could play a role in the determination of the radome attenuation. Using T-matrix calculations that take dielectric constants evaluated at different temperatures as input, the effect of the temperature on the EKF parameters can be determined (similar to what has been done concerning the effect of the zenith angle on these parameters). Like this, we will be able to correct the standard EKF parameters for different temperature conditions.

-) The calibration bias in dry conditions will be determined.

-) As already replied to reviewer 1, the effect of the wet radome on Zdr will be assessed with the method described on page 14.

We will also indicate the sample size for the statistical results.

Specific comments: 1. We agree that the binning procedure is not well explained. This will be improved in the upcoming version. The binning procedure itself is however appropriate: equally-spaced bins lead to very large variabilities in the relations at high rain rates, which in return lead to erroneous fits. We will explain this fitting procedure in more detail in the upcoming version.

2. Yes, the same dataset for the determination of the parameters and the validation are used. Like this, the error induced by the possible non-representativity of the parameters can be mitigated. We agree that this must be clearly stated.

3. We agree and this will be changed.

4. We agree and the manuscript will be changed accordingly.

5. We agree that this plot is misleading: In Figure 6b, the mean offset (0.34 dB), determined in Figure 7, is already removed. We will change Figure 6b such that this offset won't be removed.

6. Yes, and this will be more elegant than the method we have applied. We will select the data in the revised version with a threshold on the SNR.

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7. Will be done.

8. This assumption has been tested and was found to be valid (although not perfect). We will provide the figures that indicate the variability of the reflectivity at the first range gate in the indicated elevation range.

9. We are aware that with our method a correlation between the variables is introduced. However, there is no other possibility for comparing the two radome attenuation estimates independently, since no rain gauge was deployed at the radar site. With the assumption that the EKF determined offset is correct, also the Bechini offset can be calculated via the Z-R relationship, but it is right that in that case the determined Bechini offset has a dependency with the EKF offset. This behavior will be explained in more detail. Concerning the high EKF offset values that were found during light rain: This is due to the characteristics of tropical rain, which exhibits high spatial variability, as well as the behavior of the drying radome. The radome can still be very wet when the reflectivity above the radome is low. We also agree that the estimate of the dry radome is somewhat crude: dry radome attenuation will therefore be re-estimated based on events that where the disdrometer detected rain but the radar was outside of the rain cell.

10. Done

11. Since the radome offset is corrected with the EKF method, erroneously determined offsets will lead to inconsistencies in the relations given in Eqs. (9) - to (16), since these relations are only valid in bias-free conditions. Therefore, such errors not only affect  $Z_h$  but also all the other polarimetric observables. This issue will be clarified in the revised version.

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