Review of “Effect of disdrometer sampling area and time on the precision of precipitation rate measurement” for *Atmospheric Measurement Techniques*

Summary (adding to what is stated in the Abstract): The authors consider the collection area needed for a newly developed hotplate disdrometer (acronym DEID) to meet the World Meteorological Organization’s guidelines on measuring rain rate. The investigation was carried out both by simulation, assuming drop size follows an exponential distribution, and by using recent field measurements. The authors also look at the time needed to detect the first and the one hundredth drop via simulation, this time assuming a gamma distribution for drop size.

<u>Review:</u>

I recommend publication after very minor editing (see below). The presentation is clear (including figures), the technical details appear to be correct, appropriate citation to the meteorological literature is made, and the results are certainly of interest with respect to the design of new disdrometer technology (to meet WMO guidelines). Presumably, there would be less disagreement between the simulation and field results (see lines 194-197) if a more general model, such as the gamma, was used instead of an exponential model (cf. Figure 4(b)).

<u>Comment:</u>

Line 121: “the distribution more closely resembles a gamma distribution”

Using your exponential model (equation (3)) and fall speed model (equation (4)), it is known that the raindrop distribution at the surface will follow (using your notation) the gamma distribution

This is a special case of the result in Johnson et al. 2014: Given the atmospheric model

and fall speed model

the distribution at the surface will be

For clarity, no action is expected from the authors with respect to this comment.

<u>Minor details:</u>

Indentation: An added, inappropriate indent has been added at the beginning of each line following the presentation of a formula.

Corrected indenting before equations.

Line 25: “follows a negative exponential distribution” → “follows an exponential distribution”

Corrected as suggested.

Figure 2: It is desirable to have the same vertical scaling in any one column of figures for comparative purposes. When 1 R = 0.10 mm h^{-1} a common scale of 0 to 0.3 could be used, when R = 1.00 mm h^{-1} a common scale of 0.4 to 1.6 could be used, and when R = 10.00 mm h^{-1} a common scale of 6 to 14 could be used.

Used consistent vertical scaling in Figure 2.

Reference:

Johnson, R., Kliche, D., and Smith, P. (2014), Maximum likelihood estimation of gamma parameters for coarsely binned and truncated raindrop size data, Quarterly Journal of the Royal Meteorological Society, 140(681), 1245-1256.