

Interactive comment on “Correction of raindrop size distributions measured by Parsivel disdrometers, using a two-dimensional-video-disdrometer as a reference” by T. H. Raupach and A. Berne

Anonymous Referee #3

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This paper describes an interesting method to correct the Parsival data based on comparisons with 2D video disdrometer measurements of fall velocity and drop concentration as a function of drop equi-volume diameter. The correction procedures when applied to Parsivel and Parsivel 2 data were found to result in improved estimates of DSD moments. The paper is clearly written and well organized, although I would suggest that adding a paragraph on why the two step approach presented in sections 5.1 and 5.2 were chosen, in order to provide more clarification.

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The paper is highly suitable for publication in AMTD. I have only a few, minor, suggestions/comments:-

- 1) Page 8523, line 26: Add Thurai et al., 2007, J. Atmos. Oc. Tech., to the reference since it is in that reference where the 2DVD-based contoured images of drop shapes are shown.
- 2) Page 8524, lines 26-30: This was found to be the case mostly for $R > 20$ mm/h, so change sentence to 'Thurai et al. (2011) found that Parsivels record higher mass-weighted mean diameter and rain rate than 2DVD, mostly when the rain rate exceeded 20 mm/h.'
- 3) Section 2, second sentence: Authors should note that for drops become oblate spheroids for Deq larger than 1 mm – as they have stated, and the Andsager reference is appropriate here – but for drops larger than ~ 4 mm Deq, base of the drops get 'flattened' more and more, thus deviating from the oblate-spheroidal shapes, and here the appropriate references are Beard-Chuang 1984 (from theoretical considerations), and Thurai et al. (2007) from 2DVD-based contour measurements.
- 4) Page 8527, last sentence: Note, other formulas are also good approximations, given in Atlas et al. 1973, and also Brandes et al. 2002. The Gunn-Kinzer (1949) data can also be quoted, for fall velocities at ground level and Foote and Dutoit (1969) for the altitude corrections.
- 5) Table A1: 30 to 60 seconds are somewhat significant time differences, so just mention that.
- 6) Fig. 2: Is the y-axis $\log_{10} N(D)$..? If so, what are the units of $N(D)$..? It seems to be different from the standard units used, namely, $/\text{mm}/\text{m}^3$, so please specify.
- 7) Page 8533, line 23: What is meant by solid precipitation in this sentence - please specify.
- 8) Section 5, 1st sentence:- Can the authors provide/clarify justification why these two

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particular steps were chosen.

9) Section 5.1: Any specific reason why the velocity is adjusted rather than the drop equi-volume diameter.

10) Page 8439, line 4:- ‘There is clearly a dependency . . .’

11) Page 8540, line 4: ‘that it is applied to larger drops’

12) Section 6.1: Just a comment, it is a very good idea to make comparisons in terms of DSD moments.

13) Page 8545, lines 8-9:- Change “We conclude that the correction works to make the Parsivels match the 2DVD . . .’ to “We conclude that our correction procedures result in Parsivel measurements matching better with the 2DVD measurements . . .’, or something similar.

14) Page 8546, line 14:- ‘We compare the rain rates after the correction of Parsivel 2 s to those recorded by’. Remove ‘s’ ?

15) Conclusions, Last sentence: - ‘Further work is ongoing to test the transferability of the correction method to other climatologies’, The authors should certainly be encouraged to follow up their work as they have suggested.

Recommendation: Publication in AMTD after minor revision.

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