

Atmos. Meas. Tech. Discuss., referee comment RC2  
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## Comment on amt-2020-471

Anonymous Referee #2

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Referee comment on "Distributed wind measurements with multiple quadrotor unmanned aerial vehicles in the atmospheric boundary layer" by Tamino Wetz et al., Atmos. Meas. Tech. Discuss., <https://doi.org/10.5194/amt-2020-471-RC2>, 2021

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The paper describes the procedure to use multiple drones for free field measurements. It is well written and includes many details on the drones itself as well as on the methodology for calibrating the drones. Measurements for different flight patterns for the drones are compared to measurements from a met mast with cup and ultrasonic anemometers as well as lidar systems. Even though the analysis is not at its limit, the results are already very promising. Nevertheless I do have a few questions and comments.

- The term „swarm“ suggests that the drones are somehow communicating and that one drone-path depends on the path and reaction of the other drone, which is not the case. I would suggest to use another term (unfortunately I do not have a better idea).
- Would it be possible to use perform the calibration in the a wind tunnel und laminar wind flow? Even though the presented calibration function seem to be linear I can imagine that the ambient turbulence and gusts in the wind field might result in an overshoot in the control system which can bias the parameters. In the paper the authors used the 10 minutes averaged data right away — what happens if they use lets say 2 minutes averaged data or 5 minute averaged data for their calibration? Will that increase the error? By looking at shorter time windows the amount of calibration data will automatically increase and maybe will give additional insight in the dynamic response of the drones.

- The authors mention that they are interested in capturing small-scale structures with an array of drones, which is a very nice idea. Doing that, they should say something about the smallest scale they can resolve with the drones, which is about 0.25m for a single drone, but what about the arrangement of multiple drones? What is the minimum spacing between the drones in horizontal and vertical direction so that the drones do not „feel“ the effect of the neighbouring drone? I can imagine that this could be an issue in the vertical direction due to the downwash of the drones. Can the authors comment on that?
  
- figure 7, b) and c): the vertical positions of the cup and the quadrotors should be marked and maybe separated. It is hard to identify e.g. seven time series in figure 7 c) and it is hard to see which measurement represents which range in vertical direction.