

Anonymous Referee #1

We thank reviewer #1 for constructive comments, we really appreciate their time spent reading our manuscript.

*RC1) The manuscript by Brus et al. summarizes atmospheric data collected with UAS and ground-based sensors during the LAPSE-RATE campaign in Colorado in 2018. This is a rich dataset that will likely be mined for many years to come. The introduction would benefit from the inclusion of specific objectives. The summary would benefit from a discussion of what insights these data might provide, what questions might be addressed and answered, and where might future work be headed. Some ideas are presented below for improving and condensing the tables such that the data repository may be better linked to the manuscript.*

AR1) The introduction and summary were revised.

*RC2) L7, this sentence is a bit awkward. Let the data speak for themselves. No need to state in the abstract that things were reliable and scientifically sound. . .*

AR2) The sentence was restated in revised manuscript.

*RC3) L34, the acronyms should be listed after they are defined.*

AR3) Acronyms were listed in revised manuscript.

*RC4) L40-45, this paragraph would benefit from the inclusion of (a) specific objectives and (b) specific hypotheses to be tested.*

AR4) Was restated in revised version of manuscript.

*RC5) L47, are should be were, is should be was. careful of tense throughout the paper. Past tense describing work that has been done.*

AR5) Was corrected in revised manuscript.

*RC6) L55-60, consider adding information on particle size bins and sampling rates for the particle counters.*

AR6) Information was added.

*RC7) L73, neither should be for.*

AR7) Corrected.

*RC8) Section 2 should provide information on the placement of the sensors and how this placement was designed to minimize impacts of prop wash. This reviewer is particularly concerned about this salient point, given that it does not appear that the sensors were mounted above the rotary wing airframes (e.g., Nolan et al., 2018; <https://www.mdpi.com/1424-8220/18/12/4448>).*

AR8) The sensors of both modules (aerosol and gas) were mounted in between landing gears since the module size and weight does not allow mounting above the plain of propellers. However, in aerosol module each of the CPCs used 30 cm inlet made of conductive tubing, led upwards to the center of the

rotorcraft where both lines were merged to additional 10 cm piece of conductive inlet tubing, also facing upwards. OPC-N2 was used with no additional inlet, this OPC is not meant to be used with any kind of inlet due to use of fan for aerosol intake. On the rotorcraft the OPC was mounted from the bottom and middle of the carbon plate of the module, thus shielded from air mass movement and propeller eddies. For the gas module the influence of propellers is not of any concern.

This was clarified in revised version of manuscript.

*RC9) L95-101, provide some citations for this information please.*

AR9) Reference added.

*RC10) L140, I see sensor sampling rates in section 4, but I think these details would be better suited to a prior section. Or maybe even consider a separate section under a heading of 'sensors' where these could be separated from the description of the UAS platforms?*

AR10) The sensors sampling rate was moved to section 2. Section 2 was renamed to "Description of Platforms, Modules and Sensors".

*RC11) L184, . . .likely caused by farm vehicles. . .*

AR11) Not likely but certainly. All passing vehicles were recorded to a notebook with corresponding times.

*RC12) L187, suffered Figure 1, B. The blue flag waypoints are very hard to see in the image. Figure 3 legend, make sure to add information that this was from the car mount, approximately 2m AGL, at least as I understand it.*

AR12) Corrected accordingly.

*RC13) Table 1 is beautiful! This supports the idea of a separate section on just 'sensors', highlighting this table.*

AR13) We would rather like to keep the sensors description together with description of modules and platforms. Since the sensors are clustered to modules based on their purpose. However, the Section 2 was renamed to "Description of Platforms, Modules and Sensors".

*RC14) Tables 2,3, and 4 could be combined into a single UAS measurements table, with a platform designation column and a mission column. It would also be nice to have a flight/mission number listed here that would correspond to a labeled dataset. This will make it much easier for other folks to actually use these data.*

AR14) Tables were combined and column "mission" was added. The labeling of data sets corresponds the columns in table 2 (now merged 2.3 and 4), platform-date-UTtime, please see detail in de Boer et al. (2020), in our opinion there is no need to introduce "a flight number".

*RC15) Tables 5 and 6 could be combined into a single surface measurements table, with just a platform column. It would also be nice to have a sampling period/mission number listed here that would correspond to a labeled dataset. This will make it much easier for other folks to actually use these data.*

AR15) Table 5 and 6 were merged as suggested by reviewer.

## References:

de Boer, G., Houston, A., Jacob, J., Chilson, P. B., Smith, S. W., Argrow, B., Lawrence, D., Elston, J., Brus, D., Kemppinen, O., Klein, P., Lundquist, J. K., Waugh, S., Bailey, S. C. C., Frazier, A., Sama, M. P., Crick, C., Schmale III, D., Pinto, J., Pillar-Little, E. A., Natalie, V., and Jensen, A.: Data generated during the 2018 LAPSE-RATE campaign: an introduction and overview, *Earth Syst. Sci. Data*, 12, 3357–3366, <https://doi.org/10.5194/essd-12-3357-2020>, 2020.