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Interactive comment on "University of Kentucky measurements of wind, temperature, pressure and humidity in support of LAPSE-RATE using multi-site fixed-wing and rotorcraft UAS" *by* Sean C. C. Bailey et al.

Anonymous Referee #1

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General comments

The manuscript by Bailey et al. introduces the data set available from UAS deployed during the LAPSE-RATE experiment by the University of Kentucky. Four different platforms, either fixed-wing or rotorcraft measured boundary layer parameters as temperature, relative humidity, pressure, and wind. The manuscript provides access to the data set and clearly defines the accuracy of each sensor, the different flights, and the associated technical and regulatory limitations. Quality control and bias correction are also implemented. Description of the UAS are well-documented, yet this reviewer

recommends a table to improve the access to the information. However, a comprehensive overview of the dataset is missing. A section should be added to provide figures showing an overview of the variables. In addition, the time series of the meteorological measurements would allow an assessment of the weather status during which the UAS measurements were taken. Statistic figures (profiles, histograms, etc.) of each variable would help to identify interesting meteorological periods for further scientific analysis. The figures also need to be improved before final publication (for example, maps and flight plan displays).

Specific comments

Page 2 Section 2: It would be complementary to the text to add pictures of each platform with their sensors to visualize the placement of instruments on the UAS.

A table including the UAS and the sensor description, accuracy and resolution should be added. The flux tower instrumentation should also be included in the table.

Page 6 Figure 1: In the legend, add the meaning of the colored dots. It is not clear where each UAS flew on each day when just looking at Figure 1. Incorporating information from table 2 would improve the figure.

Page 7 Table 2: This table should also describe the flight pattern associated to each UAS mission for each day.

Page 8 line 177: For the fixed-wing, what is the diameter of the spirals? For fixed-wing and rotorcraft, what are the ascent/descent rates?

Page 9 Figure 2: Add the legend for blue and red profiles in the figure. Does Zulu represent the 'Zulu time'? Is it a location? Would is rather be location Kilo? A map should be incorporated in Figure 2(a) to show the terrain associated with the location even if the profiles are also similar for other locations on July 16 and 18. Add also the transects from BCT5B in a similar figure as Figure 2(a) with a map. The transects are not easily identified in Figure 1(b).

Page 10 line 213: Do horizontal profiles correspond to transects? What is the length of the transects?

Page 11 Figure 3: The topography in Figure 3(a) is helpful, however the flight patterns are not visible. An appropriate scale should be selected to emphasize the different flights. In Figure 3(b), for the legend with the names of the UAS, same color and same order should be kept between Figures (a) and (b). Different markers or linewidth would clarify which aircraft is a fixed-wing or a rotorcraft UAS.

Page 13 Figure 4: What is the location Zulu? Would it rather be location Kilo? Add the legend for red and blue lines in the figure.

Page 12 Section 5: A case study is provided in this section; however, as the broader meteorological context is not introduced, it is not straight forward how to interpret these UAS measurements and identify relevant periods for further analysis. An overview of the data set is needed, such as time series of the meteorological conditions monitored by the tower over the four days. Statistic figures (temperature, relative humidity, mixing ratio, wind, etc.) should be provided to summarize the flights on each day at each location.

Page 14 line 266: “USA researchers from multiple institutions”, credit also needs to be given to researchers from other countries and foreign institutions.

Technical corrections

Page 2 line 25: Remove one ‘of’

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