I would like to thank the reviewers for their thoughtful comments on the manuscript and the authors for their efforts in addressing those comments resulting in improvements in clarity of the described approach and analysis. I am pleased to preliminarily accept the manuscript for publication, but would ask that the authors address a few additional minor points I include below.

We thank the editor for preliminary accepting the paper and for these final comments.

Regards,

Troy Thornberry, Associate Editor

Editor comments on revised manuscript:

L10: just a note: sUAS/sUAV also applies to small, fixed-wing drones…

L11: “increasingly being used…poised to increase even further”

The point about multirotors being part of the broader sUAS category is an important clarification. We have rephrased this statement in the abstract to read “Multirotor drones (part of the category of small Uncrewed Aerial Systems [sUAS] or small Uncrewed Aerial Vehicles [sUAV]) are used in atmospheric research to make measurements of the lower atmosphere, and their use is poised to increase in the future.” (Lines 10-12)

L12: clause references in the sentence starting “New opportunities…” are a little awkward. Perhaps consider slight rearrangement for clarity.

We have rephrased this to “New drone atmospheric sensing opportunities, such as ride-along applications and drone swarms, are emerging. These opportunities, which may not allow room for specialized shielding or aspiration equipment, together with increased drone usage, necessitate the characterization of the performance of unshielded sensors mounted to drones if the accuracy of such observations is to be understood.” (Lines 12-15)

L15: “mounting position”; or “mounting location”?

We have changed this sentence to: “In this work, we characterize the accuracy of thermodynamic measurements, specifically temperature and water vapor mixing ratio, based on the sensor mounting position onboard multirotor drones.” (Lines 15-16)

L16: drone “operation”?

We have kept the original language here to avoid confusion. We are concerned that if we switch to “drone operation,” multiple flights on the same day could be confusing to readers.

FIg1: check CW and CCW labels

L91: in “b)”, “the positions” or “locations”

Thanks very much for catching these errors. We have resolved this in the figure and caption in the manuscript, and have put the new figure and caption below.

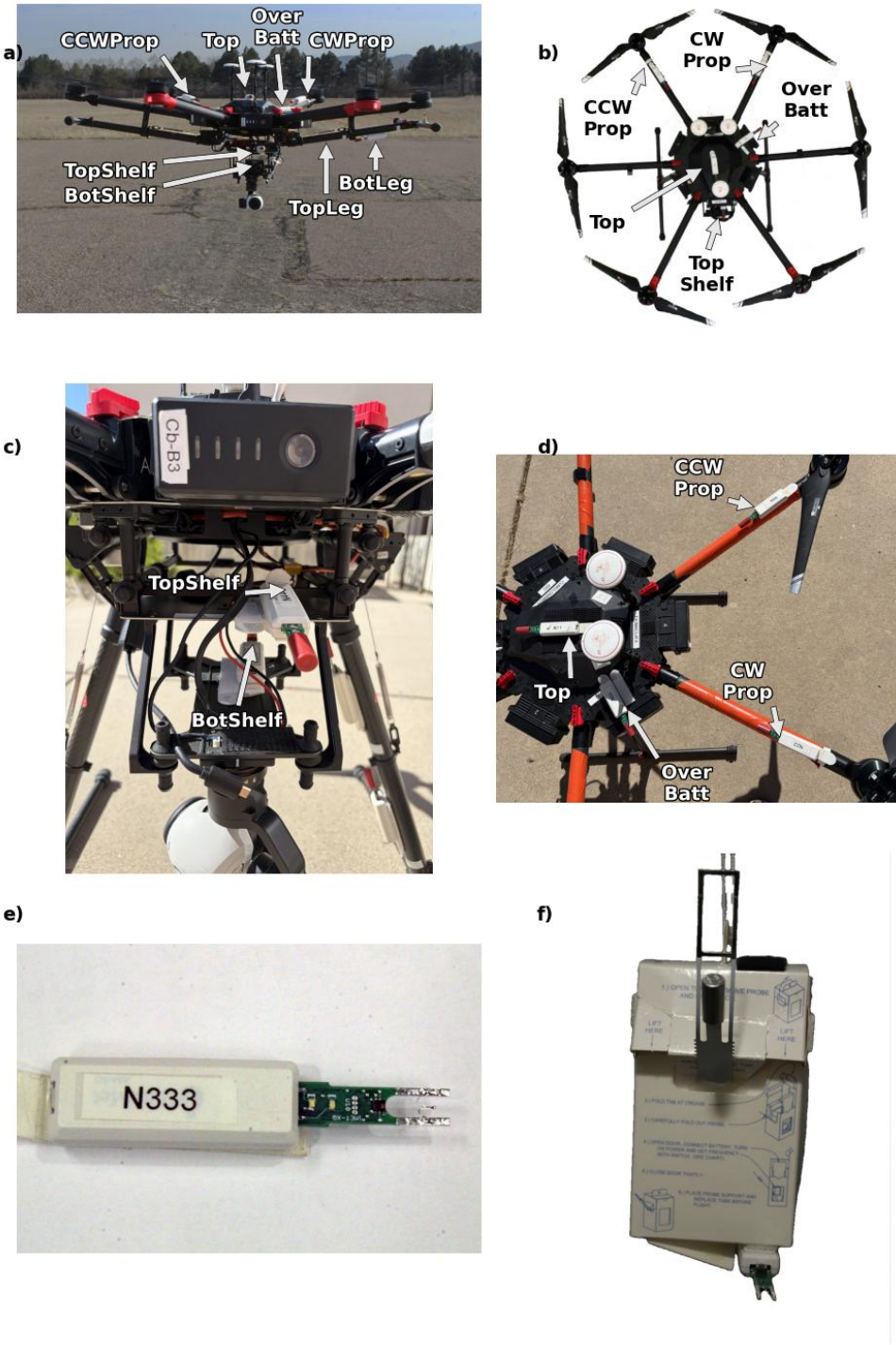

Figure 1: (a) Front-view picture of the DJI Matrice 600 Pro drone in flight with the legs folded up. The 8 sensor positions are labeled. (b) Top-down photo of the drone with the legs down; the positions of all visible sensors are labeled. (c) Side profile of the drone, showing a close-up of the two shelf positions. (d) Close top-down profile of the drone, showing the four positions on the drone's top. (e) Photograph of an iMet XQ sensor. (f) Photograph of the iMet-1 radiosonde with an iMet XQ sensor attached to the bottom.

L102: perhaps saying “impacts of temperature differences” and in L103 “because directly comparing RH relies on the assumption that the temperatures…are the same—an assumption”. The accuracy of the temperature sensor is potentially a larger issue when using it to convert from RH (what the sensor physically responds to, with a temperature dependence that is compensated using the measurement) to mixing ratio using a Clausius-Clapeyron approximation. Which did you use for the conversion?

We used the calculations from MetPy, version 1.7.0 (May et al. 2022), which implements the calculation of water vapor mixing ratio from WMO (2024) and the calculation of saturation mixing ratio from Ambaum (2020). We have revised this section to read: “The RH measurements were converted to water vapor mixing ratio using the temperature reported by the RH sensor, and the pressure measured by the iMet XQ for this study. The conversion from RH to water vapor mixing ratio was performed using MetPy 1.7.0 (May et al. 2022).” (Lines 101-103)

L314: “in Section 3b”—should be “3.2”?

Thank you, we have resolved this.

Fig4: suggest adjusting x-axis labeling for readability (also Fig7)

We have rotated the x-axis labels on both of these figures for readability. We have reproduced these figures below.

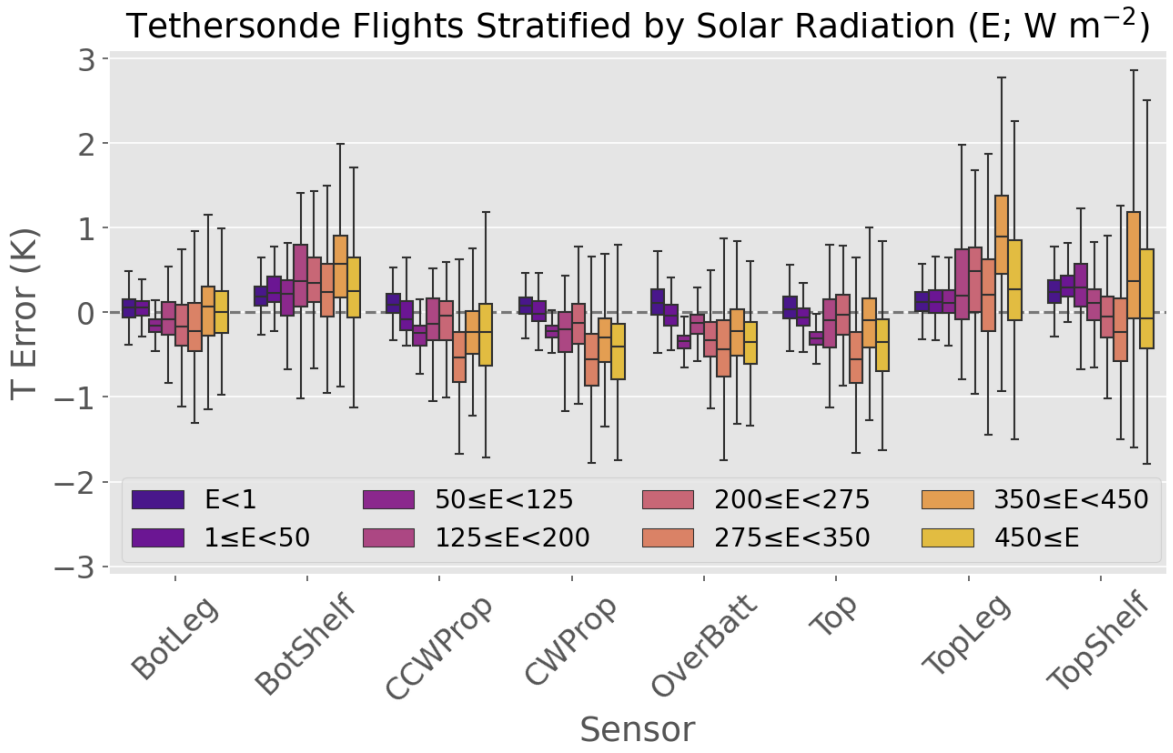

Figure 4: As in Figure 3a, except that for each sensor position, the tethersonde data is stratified by solar radiation, E (W m^{-2}), observed by the surface weather station.

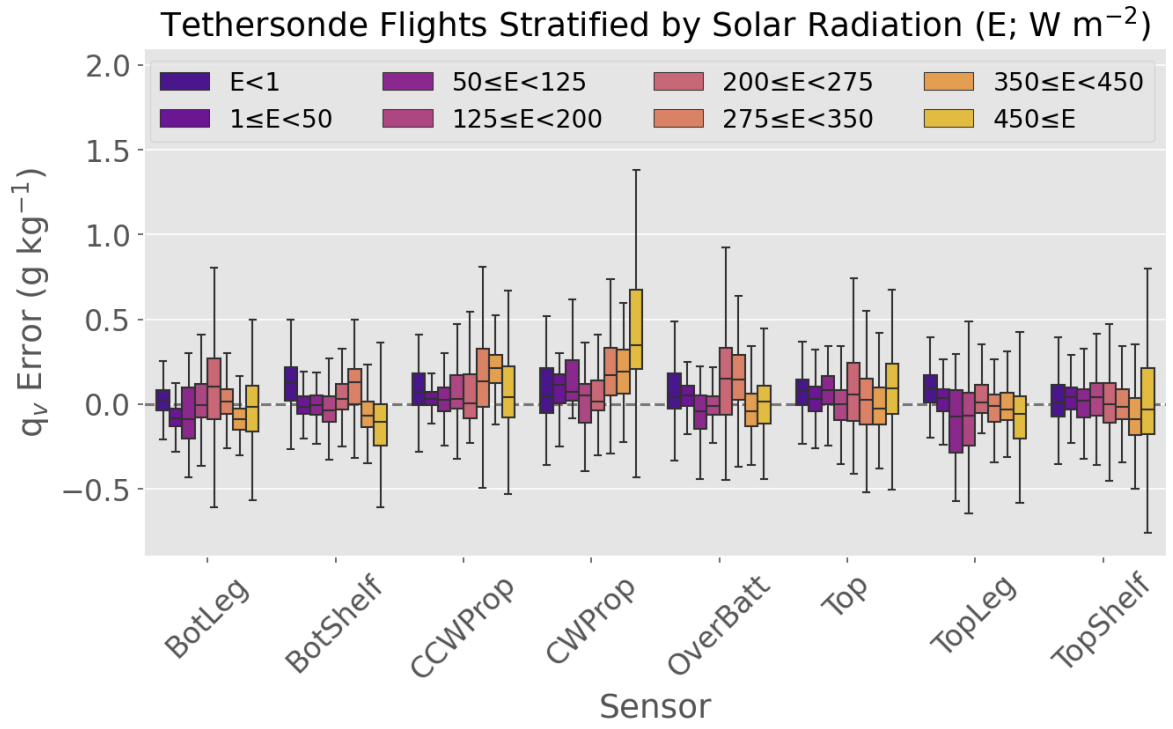

Figure 7: As in Figure 4, but for water vapor mixing ratio errors.

L375: the statement about the trends in mean and std dev of q with insolation in Fig 7 seem to be a stretch. Did you do any analysis (e.g. regression) that would show significance? Did you contact the sensor manufacturer about the relative time response speculation on line 380? Did you try to look at the error as a function of delta T magnitude and direction?

We have revised this language to be much less conclusive, as the signal is not very strong.

We have removed the speculation about response time. While the manufacturer does note a different RH response time from temperature response time on the sensor used, the difference is not substantial.

The new text is below:

"The 82 tethersonde flights are stratified by solar radiation (Figure 7), as in Section 3a for temperature, to determine the contribution of solar radiation to the water vapor mixing ratio error. This figure shows that, for some positions (e.g., CWProp, CCWProp), the errors (spread and mean bias) in water vapor mixing ratio increase with increasing solar radiation. However, this signal is unclear for other positions (e.g., BotShelf, BotLeg), and there are even trends that stay approximately constant for some positions (e.g., TopShelf). The mean biases for all positions are less variable than the standard deviations, however. The changes in standard deviation with varying solar radiation suggest that there is a contribution of radiative error to the total water vapor mixing ratio error. This is despite the fact that the RH sensor measures the temperature that the RH is based on and this temperature is used in the calculation of the water vapor mixing ratio. However, it is impossible to conclusively determine the exact cause of the radiative error with the data collected. Future work should explore this issue further." (lines 376-384)

L468: "at a 90% confidence level"?

We have reworded this sentence to:

"Our study indicates that the magnitudes of the variance in temperature measured by the drones in the LAFE campaign are likely to be real atmospheric features at the 90% confidence level, as half of the sensor siting locations (*BotLeg, CWProp, OverBatt, Top)* had a 90% confidence interval for $\Delta_{60s}\bar{T}$ <±0.5 K." (lines 465-468)

L533: "lower than 1e)" should be "lower than 1/e)"

Thank you, we have resolved this.

References

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May, R. M., Goebbert, K. H., Thielen, J. E., Leeman, J. R., Camron, M. D., Bruick, Z., Bruning, E. C., Manser, R. P., Arms, S. C., & Marsh, P. T. (2022). MetPy: A Meteorological Python Library for Data Analysis and Visualization. Bulletin of the American Meteorological Society, 103(10), E2273-E2284. https://doi.org/10.1175/BAMS-D-21-0125.1

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