

***Interactive comment on* “The Influence of Humidity on the Performance of Low-Cost Air Particle Mass Sensors and the Effect of Atmospheric Fog” by Rohan Jayaratne et al.**

Anonymous Referee #1

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This manuscript presents an interesting assessment of the influence of relative humidity on the performance of one low cost sensor. The results are robust, even if the amount of data presented could be considered scarce. They are useful in general for the scientific community. I would favor publication, but a number of relevant issues should be addressed first:

Title: please modify to “the performance of a low cost sensor”, as the authors mainly analyze one type of sensor and the title is therefore misleading. The few data presented for another 4 sensors do not justify generalizing in the title.

Page 1: Line 19: “sensors can accurately report particle mass and number concentra-

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tions”, please remove as this is not a conclusion from this work. The authors have not studied the overall performance of sensors. Line 30, reference needed.

Page 2: References needed in lines 3, 4 and 5. In general, please review references in the introduction, as they are scarce Line 7: “the performance of low cost” should be “the performance of one low cost”

Page 3: Line 23: “out of each”, sentence unfinished Line 29: what were the results from the intercomparison of the Dusttrak? They could be useful, even if in Supporting Information

Page 4: Line 29: how do the authors know? The Dusttrak concentrations also increased with $RH > 78\%$. Is 1.8 the ration between the sensor and the Dusttrak readings? If so, what was the ratio for RH between 60-75%? Please clarify these issues: with the data in figure 1 it is not possible for the reader to extract the conclusions in lines 28-30 on page 4

Page 5: Line 1: could the PNC time series be added to figure 1? It would be interesting to see Lines 9-14: these are not original results from the authors and should be moved to the introduction. Especially, figure 2 should be removed as it is published material and in addition it doesn't add relevant information for the paper. Line 31: “illustrating” should be “suggesting”. This comparison is useful, but it can only suggest. Without a collocated CPC it is not possible to conclude firmly that the increase in PNC is an artifact and not that an additional source could be present which by chance correlates with foggy scenarios. However unlikely this is, it can't be ruled out with the data presented by the authors

Figure 7: same as for figure 2, it should be removed as it is not primary research by the authors (it is already published by other authors). Therefore it should be removed and, if anything, referenced in the introduction

Page 7, lines 15-16: why is this an “interesting observation”, if it is “not unexpected” by

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the authors? It all seems quite expectable (until line 22) page 7, line 33: “sensors are not always fit for purpose”, I believe there is a misconception here: precisely because they are fit for purpose they shouldn't be used to verify compliance with standards, as this is not the purpose that sensors are designed for. This should be the message to be conveyed, to that they are not fit for purpose.

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