

## ***Interactive comment on “A low-cost monitor for measurement of fine particulate matter and aerosol optical depth – Part 2: Citizen science pilot campaign in northern Colorado” by B. Ford et al.***

### **Anonymous Referee #1**

Received and published: 14 July 2019

#### General comments:

This manuscript presents the results of a citizen science pilot campaign to measure PM<sub>2.5</sub> and AOD using low-cost sensors. A companion paper (Part 1) focuses on instrument designs, calibration and validation of the low-cost sensor and Part 2, presented here, is based on the deployment of the sensors across Colorado and comparison of the data with AERONET and MODIS AOD values. The authors also discuss the feasibility of using citizen-science to create a network of monitors for measuring PM. The manuscript overall is well written and suitable for AMT. I recommend the manuscript for

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publication after addressing the comments below.

#### Specific comments:

1. Further information should be provided on the continuous PM<sub>2.5</sub> sensor. Biases are given, but what is the uncertainty/precision of this measurement?
2. I only see 4 AERONET sites on the map in Figure 1, but 7 are listed in the supplement. Was the comparison between the CEAMS AOD and Aeronet AOD performed for all 7 sites? How representative are these sites for the AOD measured in the network, as the CEAMS network measurements appear to be located around Ft Collins where there are limited AERONET sites?
3. In section 2.3 the authors state that the AMOD PM<sub>2.5</sub> measurements were compared to measurements taken by a US EPA AQS however there is no mention of the method used by the AQS. Are the AQS PM<sub>2.5</sub> filter or online measurements? On page 6, L18 a comparison between the 48 hr avg CEAMS and 24 hr avg AQS is performed, but would it be possible to determine a 48 hr avg AQS to allow for a more direct comparison?
4. The discussion on the PM<sub>2.5</sub> to AOD ratio in section 3.4 is a little hard to follow and could benefit from some restructuring of the text and clarification of important points. It may be clearer to start this section with the discussion on the calculation of the ratios using the 48 hour samples and the Plantower PM<sub>2.5</sub> data hourly averages, then follow up with the comparison with the EPA-AQS/MODIS ratios.
5. Further discussion on the distributions of the PM<sub>2.5</sub>:AOD ratio from CEAMS and EPA-AQS/MODIS (shown in Figure S6) should be included in the main text. What is the explanation for CEAMS observing ratios above the 500, which are not seen in the EPA-AQS/MODIS ratio?
6. Pg 8, L39: It is mentioned again on Pg 9, L2 that 109 filters were taken, so suggest combining these two sentences to avoid repetition.

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7. Pg 9, L19: Should this be Fig S7 rather than Fig S6 here?

8. Figure 9: Is the background colour in the figure on the right here representing anything (i.e. the MODIS PM2.5:AOD ratio)? If not then suggest re-plotting without a background colour.

9. Figure S6: Change the caption to state the correct colours as shown in the legend.

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