

We are pleased to learn that our revisions were well received. We appreciate the additional suggestions to strengthen the manuscript. Here we describe the minor revisions we have made to the manuscript, as requested by the reviewer, prior to publication. Reviewer comments are provided in italics and our responses are given in plain text. Line number references pertain to the revised manuscript with no tracked changes. Quoted text from the revised manuscript is given in blue in this response document. We have provided revised versions of both the manuscript and the SI along with accompanying documents.

Specific comments

1. **Comment:** *Abstract. You can mention that PM2.5 not just impact public health, but **NEGATIVELY** impact public health. You have better description of this aspect in the first sentences of the introduction. Check, please. Also, you need to find a way to include three ideas in the 2nd sentence of the abstract: measuring aerosols is important, there are many networks and instruments to do it, but there are still gaps and that 's why cheap sensor technology is required. The concluding sentence (or 2 sentences) about “why this research is important for science/industry/society” is missing. Please try formulating these sentences. For instance*

- *the improved sensors can be deployed for citizen science efforts in the cities where aerosol observations are scarce (no reference), but weather conditions are variable (inferior cheap sensors would suffer from excessive instability).*
- *another option, you can check WMO (World Meteorological Organization) requirements for AOD measurements' accuracy. As your sensor is very precise and stable, you can state that you introduce the method+sensor that meet WMO requirements for AOD measurements and therefore can objectively qualify as a nominee as the core for new global-scale network for AOD measurements in future.*

Response: We edited the first sentence of the abstract on lines 21-22 as follows:

“Atmospheric particulate matter smaller than 2.5 micrometers in diameter (PM2.5) has a negative impact on public health, the environment, and Earth’s climate.”

We have edited the second sentence of the abstract on lines 22-25 as follows:

“Consequently, a need exists for accurate, distributed measurements of surface-level PM2.5 concentrations at a global scale. Existing PM2.5 measurement infrastructure provides broad PM2.5 sampling coverage, but does not adequately characterise community-level air pollution at high temporal resolution. This motivates the development of low-cost sensors which can be more practically deployed in spatial and temporal configurations currently lacking proper characterization.”

We have added the following conclusive sentences on lines 48-51 as follows:

“We demonstrate that the AMODv2 is an accurate, stable and low-cost platform for air pollution measurement. We describe how the AMODv2 can be implemented in spatial citizen-science networks where reference-grade sensors are economically impractical and low-cost sensors lack accuracy and stability.”

*2. **Comment:** Conclusions. My previous comment (1st stage of revision) about the discussion was aimed to show that it is uncommon to denote a discussion as a subsection, but you do not necessarily need to delete it completely. You can call your conclusion section “Discussion and conclusions” in the present form also. From my point of view, it would be logical to make just 2 paragraphs of the “Discussion and conclusions”. First paragraph may consist of what is described between lines 500 and 515. The second paragraph may consist of what is the first paragraph of the conclusions now (Lines 488-499). As mentioned above, I suggest adding as tailored as possible implication that logically stems from your work. Likewise in the intro, you can add the concluding sentence (or 2 sentences) about “why this research is important for science/industry/society”. These sentences can be identical for intro and conclusions. This recommendation is important because smartly tailored implications help scientists (a) to conclude whether your work results can lay the basis for a next series of similar research, and also may increase (b) “citability” of your article later.*

Response: We have titled the final section “Discussion and conclusions” and re-ordered the paragraphs according to the reviewers suggestions.

With respect to the ending sentences of the introduction and conclusions sections, we have added the following text at the end of of the introduction on lines 141-144 as follows:

“The results presented here demonstrate that AMODv2 is a practical option to establish spatially-dense PM2.5 and AOD measurement networks. Applied in these networks, the AMODv2 will close gaps in the existing global aerosol measurement infrastructure of ground-based and satellite-based observations.”

And the conclusions on lines 513-516 as follows:

“The portability, performance, and low cost of the AMODv2 make it a practical option to establish spatially-dense PM2.5 and AOD measurement networks. Applied in these networks, the AMODv2 will close gaps in the existing global aerosol measurement infrastructure of ground-based and satellite-based observations.”

Minor comments

3. **Comment:** Line 42. *“We present results from a trial development aimed at assessing...” Too complex sentence, simplify to “we conducted trial development and assessed...”. Something like this.*

Response: The sentence on lines 45-46 now reads as follows:

“We conducted a trial deployment to assess the reliability and mechanical robustness of AMODv2 units.”

4. **Comment:** Lines 513... *“Such networks could provide...” This sentence is undesirable because, how this information can advance satellite remote sensing technologies? It is better to state that this technology will close existing gaps of the global aerosol measurement infrastructure (that is currently based on combination of ground-based and satellite observations).*

Response: We have edited the sentence on lines 142-144 as follows:

“Applied in these networks, the AMODv2 will close gaps in the existing global aerosol measurement infrastructure of ground-based and satellite-based observations.”

5. **Comment:** Line 253. *‘Unique error code’. In aerosol measurements, this kind of procedure is usually denoted as ‘flagging’, i.e. ‘unique error code’ = ‘flag’.*

Response: We have altered the wording to clarify the flags are numerical to add more information with error code and flag being synonymous. The edited text is as follows:

“Measurements identified as cloud-contaminated are flagged with a unique numerical code. Measurements with incomplete triplets are also flagged with a unique numerical code.”

6. **Comment:** *Check if Levy Zamora reference should be cited as “Levy-Zamora et al., 2019” (with ‘-’) or not, please.*

Response: We have verified that the author's name is not hyphenated.

7. **Comment:** *Double-check if you included all required AERONET acknowledgments please.*

Response: We have reviewed the document and verified necessary AERONET acknowledgements are present

8. **Comment:** Table 1. You mention “manufacturing cost”. Please mention the date at which this estimate was applicable because the cost may change in future.

Response: We have added the date of original manufacturing in the table as follows:

“Manufacturing Cost (As of July 2019).”

9. **Comment:** Line 377. “AOD units” I am not sure if it is correct to refer to the unitless quantity like this.

Response: We have removed the phrase “AOD units” on lines 385-386 as follows:

“With respect to stability across AOD magnitude, the mean absolute error deviated by less than 0.011 between clear days and elevated-AOD days across all wavelengths (Table S1).”

10. **Comment:** Line 439. Check if you need subscript index in V_0 or not. Here and elsewhere, please.

Response: We have reviewed the document and ensured all mentions of the variable are italicized with the zero subscripted (i.e. V_0).

11. **Comment:** Supplementary material, to quote the sentence: “with all units reporting consistent values for AOD ($>0.3 \pm 0.06$)”. Please be consistent with precision reporting, check elsewhere.

Response: We have reviewed the supplementary material to ensure AOD values are reported with the proper number of digits after the decimal point.