Reviewer's report

Title: Understanding Intra-Neighborhood Patterns in Fine Particulate Air Pollution Using Mobile Monitoring in Braddock, PA

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Reviewer: Kevin Lane

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No Major Compulsory Revisions were identified for this manuscript.

Minor Essential Revisions (See numbering below).
2.1, 2.2, 2.3,
Discretionary Revisions (See Numbering Below)
2.4, 4.1, 5.1, 5.2

1. Is the question posed by the authors new and well defined?
The question and hypothesis posed by the authors in general is not new (page 6 last sentence of section 1. Background), but the mobile monitoring methods and regression modeling results for a non-attainment area are unique and important to the field. The results support the authors’ notion for including a mobile-monitoring approach for identification of an areas optimal location for stationary monitors and to supplement ongoing monitoring in areas with annual PM concentrations exceeding NAAQS.

2. Are the methods appropriate and well described, and are sufficient details provided to replicate the work?
The authors use of the Hazdust EPAM-5000 (Hazdust) monitor to conduct a spatial and temporal analysis through a mobile monitoring approach are appropriate and provide sufficient detail to replicate analysis within the context of this study.

2.1 Authors address primary issues with light scattering nephelometers related to correlation and calibration, but may want to consider including a caveat about comparing Hazdust concentration to absolute values collected through a FRM such as gravimetric or beta-attenuation monitors. Validation studies of Dusttraks, a similar technology have shown significant overestimation of PM concentrations when compared to FRM that require factor or regression adjustment. I am unaware of similar validation studies using the Hazdust monitors, but expect a similar bias given “inherent error of light-scattering instruments” (page 10, section 2.4, line 3). Authors may want to consider including language about making direct comparisons to FRM in this area or as part of the discussion section when explaining the issue with Hazdust calibration to Arizona Road Dust (page 20, last sentence of paragraph 2).
2.2 Further explanation is needed to explain why outliers +/-1 standard deviation were removed from analysis (Page 10 section 2.4 line 3). “1 to 2% of the data was removed, and concentration differences pre- and post-data cleaning were minimal”. It is unclear why the inherent error of light-scattering technology would justify removal of values that are only +/- 1 standard deviation from the mean.

2.3 Last two sentences of page 7 dealing with collocation of Hazdust monitors needs a little more clarification. “PM measures were found to correlate within 5%”. Does the correlation pertain to concentrations within each size distribution, or correlation between PM2.5 and PM10 concentrations? Also, the collocation check of monitors every 5 sampling runs was a good methodological step, but authors did not report on this data. Recommend authors let the readers know if there was any significant change from the initial 5% reported for the full day monitor collocation test.

2.4 GIS methodologies employed by the study are appropriate in reducing the potential for positional error through GPS location ascertainment for vehicle monitoring sites. Authors may want to clarify how the ETSW location was determined from the TRI Emission Points within ArcGIS (assume either through geocoding, GPS or downloaded coordinates). The authors provide superb detail on spatial data sources as well as processing via spatial “joins” and utilization of the “nearest tool” within ArcGIS.

2.5 Regression model building followed a logical sequential process that was clearly explained and results properly presented β-effects and partial R^2 contributions.

3. Are the discussion and conclusions well balanced and adequately supported by the data? The conclusions are supported by the results.

4. Do the title and abstract accurately convey what has been found? 4.1 The background section of the abstract and title should include a mention of coarse particulate matter PM10 since the rest of the abstract and manuscript covers both particles and not just fine particulate matter PM2.5. Would recommend to authors that they include PM10 at least in the title that way Title queries will identify this manuscript and the significant findings in this article related to PM10.

5. Is the writing acceptable? Quality of writing is excellent. Just a couple recommendations to make maps more interpretable.

5.1 Figures 2 &3. Fantastic maps. Only piece that was a little unclear was the PM10 and PM2.5 concentration scale in the legend on the left side of each figure. The ordering of days in the bar charts is easily understood given the legend, but the concentration levels are less clear? Do the .10 and .11 values on each legend represent an increase of some sort or PM2.5 and PM10
respectively?

5.2 Figures 4 & 5. It is not especially clear where the ETSW parcel boundary is located and which dots correspond to which stop location since the map scale and format has changed. Authors may want to consider keeping a similar format as used in figure 1 to maintain visual consistency, or incorporating the stop numbers into figures 4&5.

**Level of interest:** An article of importance in its field

**Quality of written English:** Acceptable

**Statistical review:** No, the manuscript does not need to be seen by a statistician.

**Declaration of competing interests:**

I declare that I have no competing interests.