Atmospheric Measurement Techniques Discussions

Atmos. Meas. Tech. Discuss., referee comment RC1
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Comment on amt-2022-84

Anonymous Referee #1

Referee comment on "A study on the performance of low-cost sensors for source apportionment at an urban background site" by Dimitrios Bousiotis et al., Atmos. Meas. Tech. Discuss., https://doi.org/10.5194/amt-2022-84-RC1, 2022

General comments:

This manuscript showcases an important method that can be applied to measurements from low-cost sensors for source apportionment. I recommend the following major revisions:

Specific comments

1) Some of the sentences in the Introduction are very long and should be shortened to make the manuscript clear

2) In the methods, it might be useful to have a table detailing the different instruments, their method of operation, pollutants measured as well as if they were low-cost/ reference, and location. This was not clear for some of the instruments mentioned, for example, the Box of Clustered Sensors. This section was a little hard to follow with the number of instruments mentioned but not described in detail. It also wasn't clear why indicators such as LDSA were mentioned in this section and what that had to do with source apportionment. I think including a few more details about the method and the pollutants used in the Introduction would be helpful to readers.

3) The last paragraph in section 2.1 was not about the instruments at all. I suggest moving this paragraph to the next sub-section.

3) When explaining the PMF method I suggest that the authors actually include equations to describe the two-step PMF process used in this analysis. The authors do not explain the limitations of using a combination of PNSD and particle composition, and the need to use the two-step PMF method. I think this is a critical point and needs to be elaborated on. How did this method differ from that used by Hagan et al.- the study the authors cited in the Introduction?

4) More details of the PMF method were included in the Results instead of the Methods section (eg section 3.2). This again makes it hard for the reader to follow with the authors did.

5) It appeared that without data from reference monitors, the four factors identified from the OPC data alone were hard to interpret. If so- why bother conducting a source apportionment analysis with low-cost sensors?

6) Given that the OPCs do not measure particles < 0.3 micrometers, how useful is this technique in areas dominated by vehicle emissions?