Response: Thank you for your comment. The latest method developed for black carbon noise reduction referred to the ONA treated data by Hagler et al., 2011. They published results of applying ONA on 1-s data of SootGen, stove, and mobile monitoring. Van den Bossche et al. (2015) also used ONA on 1-s data from AE51 in field measurements. However, the instrumentation for monitoring black carbon used in this study was MA200, which was different with the previous studies (i.e., AE51). In this instrument, the LPR and CMA algorithms were introduced for noise reduction instead of ONA algorithm. Although these two algorithms are the common methods. But their application is still relatively sparse. Therefore, in this study we assessed and evaluated the postprocessing method for black carbon data obtained by MA200.

Response: Thank you for your correction. Nowadays, the portable microAeth® MA200 (MA200) is widely applied for measuring black carbon in human exposure characterization and mobile air quality monitoring. However, the field lacks information about this instrument's performance under various settings. Therefore, it is really important to provide this research (evaluation the real-time performance of the MA200 in an urban area) for MA200 users. Following that, this research also provided the information about postprocessing methods to non-users of MA200, which may also have applicability for other instruments.

Response: Thank you for your suggestion. We have added a deeper discussion in the "Results and discussion" section. Please refer to our revised manuscript for further confirmation.

Presentation Quality:
I have to say that the presentation of the manuscript is very poor. There are many long sentences in the text, which brings great dyslexia to readers. There are also many unreasonable expressions in paragraph structure and grammar. I suggest the author invite a native English speaker to rewrite the manuscript.
Response: Thank you for your suggestion. We have given a check our revised manuscript to a native English speaker to improve the writing quality and readability.

Some technical comments:
1. Consider using the latest references. References in the past three years only account for less than 30% of all your references.

Response: Thank you for your suggestion. We have added some recent references in our revised manuscript. Please refer to "references" section in our revised manuscript for further confirmation.

2. Describe a full name and then its abbreviation throughout the manuscript.

Response: Thank you for your correction. We have again carefully double checked about it and revised through our manuscript regarding your concern. Please refer to our revised manuscript for further confirmation.

3. The form of the pictures in the article is relatively simple. I suggest that you carefully modify the titles of the figures and tables.

Response: Thank you for your correction. We have checked and revised all the texts (titles, labels, legends) in the figures and tables with the same size and their captions, including supplementary file in our revised manuscript. Please refer to our revised manuscript for further confirmation.

4. Throughout the manuscript, the citation format of the figures is inconsistent, e.g., "Figure 4", "Fig. 3". You should keep them in the same format.

Response: Thank you for your correction. We have again carefully double checked about it and keep them in the same format. Please refer to our revised manuscript for further confirmation.

<Specific comments>
1. Line 25-28: "Noise reduction and negative value mitigation were explored via different data processing methods (e.g., local polynomial regression (LPR), optimized noise reduction averaging (ONA), and centered moving average (CMA)) under different interval time (i.e., 5s, 10s, and 30s)".

Response: Thank you for your correction. We have modified it combined with your comment. Please refer to line 26-29 for further confirmation.

2. Line 30: "after noise reduction" repeated.

Response: Thank you for your correction. We have deleted it following your comment. Please

refer to line 29 for further confirmation.

3. Line 31-33: I suggest this sentence "Our results showed that CMA showed a good prospect to analyze the raw BC concentration data in terms of the interval time due to its proportions of negative values and the detail microenvironmental change." should be split into several short sentences.

Response: Thank you for your correction. We have modified it combined with your comment. Please refer to line 32-35 for further confirmation.

4. Line 34-35: I don't know what you want to express, please explain.

Response: Thank you for your correction. After noise reduction, we compare the reduction values and the number of peak samples to further evaluate the noise reduction methods. Briefly, when the reduction of peak value is high, the treated data has a high peak noise reduction without removing the numbers of peak-samples. Therefore, the method with high reduction of peak value and retaining the number of peak-samples after postprocessing was selected as the best method. We have modified and revised through our manuscript regarding your concern to make the reader easier following our manuscript. Please refer to line 32-35 for further confirmation.

5. Line 35: "after background correction" appeared here. It also appeared in line 31, please carefully optimize the structure of the paragraph.

Response: Thank you for your correction. We have modified it following your comment.

6. Line 39: BC instruments? I only saw MA200 in your manuscript.

Response: Thank you for your correction. We have modified it following your comment. Please refer to line 39 for further confirmation.

7. Section 1 Unfortunately, I did not see you have a more detailed summary of the previous research. You only introduced the importance of black carbon measurement and the instruments you used. You should reflect the current research progress and deficiencies in this field in this section. Meanwhile, I suggest you cite some latest references.

Response: Thank you for your suggestion. We have added more detailed summary of the previous research (Hegler et al., 2011; Van den Bossche et al., 2015) that reflected the current research progress and deficiencies in this field. Please refer to line 55-60 for further confirmation.

8. Line 53-54: When is the specific development and market investment time of MA200?

Response: In 2017 AethLabs released the MA Series of Black carbon monitors with 3 different products that build on microAeth® AE51 personal exposure monitor. The MA200 is a compact and highly integrated personal exposure monitor often used for health effects and mobile transportation studies.

9. Line 59-60: such as fossil fuel (e.g., diesel), biomass, and tobacco combustion.

Response: Thank you for your correction. We have modified it following your comment. Please refer to line 74 for further confirmation.

10. Line 60: "The instruments" or "This instrument"? Please check!

Response: Thank you for your correction. We have double checked and modified it. Please refer to line 75 for further confirmation.

11. Line 63-64: There is a huge jump.

Response: Thank you for your correction. We have double checked and slight modified it. Please refer to line 80-81 for further confirmation.

12. Line 65-66: "This is due to the use of an incremental optical attenuation value (ATN) to calculate the BC value." is not a correct sentence.

Response: Thank you for your correction. We have deleted this sentence and modified it. Please refer to line 81-83 for further confirmation.

13. Line 77-86: Two references are not enough to explain the research progress of these contents, please consider adding references.

Response: Thank you for your correction. We have added more references following your comment. Please refer to line 96-105 for further confirmation.

14. Line 110: What is your motivation for mentioning AE51 in this manuscript?

Response: Thank you for your correction. AE51 is a predecessor instrument to the MA200, and this instrument has demonstrated some sensitivity to mechanical shock during mobile measurements. Therefore, We mentioned the instrument AE51 as a reference for MA200.

15. Line 123: "significant" is not a colloquial vocabulary. Its appearance usually requires standardized calculations. How did you get this conclusion?

Response: Thank you for your correction. We have modified the "significant" term in the sentence. Please refer to line 147-149 for further confirmation.

16. Section 2.2: These redundant words make it difficult for me to understand your true intentions. It would be better if you could provide a framework figure.

Response: Thank you for your correction. We have modified the 2.2 section and added the map of sampling to make the reader better understand following our manuscript. Please refer to 2.2 section in our revised manuscript for further confirmation.

17. Line 138: What does "relative patterns in environmental exposures" stand for?

Response: We are sorry to make you difficult to understand this sentence. It means "To control the different land use types of microenvironment". In order to avoid misunderstanding of the reader, we have modified and revised through our manuscript. Please refer to line 164 for further confirmation.

18. Section 2.4: The introduction of the three methods is not sufficient. Who are their developers? What research field is it used for? What are the advantages and disadvantages? Specific formula? Since the comparison of three methods is the highlight of this article? You should give full attention instead of spending text in unimportant places.

Response: Thank you for your correction. We have modified it following your comment. Please refer to section 2.4 for further confirmation.

19. Line 159: "the optical attenuation (ATN)", Line 65: "an incremental optical attenuation value (ATN)". This is a very irregular expression. I hope you can determine a correct expression about "ATN". This will bring greater difficulties to readers.

Response: Thank you for your correction. We have modified it following your comment. Please refer to line 71 for further confirmation.

20. Line 174: "2.4.3. CMA (centered moving average)" should be changed to "2.4.3 CMA (centered moving average)"

Response: Thank you for your correction. We have modified it following your comment. Please refer to line 220 for further confirmation.

21. Line 185: How did you define "more detailed"?

Response: We defined "more detailed" to microenvironmental characters information.

22. Line 191: Do you think the research 7 years ago (Brantley et al., (2014)) is the latest paper? This expression is inaccurate. I hope you can refer to the latest article. And the citation format of the references is also wrong. The correct one should look like this: A recent paper by Brantley et al. (2014) compared several methods for detecting and eliminating peak-value samples in mobile air pollution measurements.

Response: Thank you for your correction. Brantley et al., (2014) is most suitable reference according to identification of peak-samples in mobile air pollution measurements, therefore, we cited this reference in this part. We have modified it following your comment. Please refer to line 238 for further confirmation.

23. Line 200: This passage is an explanation of the above formula. It does not belong to an independent sentence. Therefore, the first letter should be lowercase. "Where" to "where".

Response: Thank you for your correction. We have modified it following your comment. Please refer to line 248 for further confirmation.

24. Line 200-201: The line spacing does not match the full manuscript.

Response: Thank you for your correction. We have modified it following your comment. Please refer to line 246 for further confirmation.

25. Section 3: The discussion part is not sufficient.

Response: Thank you for your suggestion. We have added a deeper discussion in the "Results and discussion" section. Please refer to our revised manuscript for further confirmation.

26. Section 3.1: The author did not perform a significance test after data processing. This is a huge flaw. In addition, there are problems with the structure of many sentences.

Response: We are sorry to make you misunderstanding. We have changed the related sentence in our revised manuscript to avoid misunderstanding of the readers and we have restructured the

section 3.1 to improve the readability of the manuscript.

27. Line 223: I suggest changing "three" to "3". In an article, the number format should be consistent. Please check the numbers that appear in the full manuscript.

Response: Thank you for your correction. We have modified it following your comment. Please refer to our revised manuscript for further confirmation.

28. Line 226: "Figs. 1b, 1c and 1d" is only part of Figure 1. "Fig. 1b, 1c, and 1d" is a more accurate way of expression.

Response: Thank you for your correction. We have modified it following your comment. Please refer to line 288 for further confirmation.

29. Line 249-251: "The analysis based on data from measurements 5, 6, and 7, that were one run with three MA200 measuring parallel." is not a complete sentence.

Response: Thank you for your correction. We have modified it following your comment. Please refer to line 336-338 for further confirmation.

30. Section 3.2: The results of this section is very interesting.

Response: Thank you for your positive comment.

31. Section 3.3: "Comparison of background estimation and correction after noise reduction methods" should be replaced by "Comparison of background estimation and correction after noise reduction".

Response: Thank you for your correction. We have modified it combined with your comment. Please refer to line 397 for further confirmation.

32. Line 294-296: This sentence should be simplified.

Response: Thank you for your correction. We have modified it combined with your comment. Please refer to line 398-400 for further confirmation.

33. Line 299-301: "However, after different noise reduction approaches, the background correction concentration is different, therefore, further evaluation on their background correction concentration was necessary for this study." should be replaced by "However, the background correction concentration is different via different noise reduction approaches. Therefore, further evaluation on their background correction concentration was necessary for this study."

Response: Thank you for your correction. We have modified it combined with your comment. Please refer to line 401-406 for further confirmation.

34. Line 302: Delete the first "methods".

Response: Thank you for your correction. We have deleted it following your comment.

35. Line 302-303: The structure of this sentence is so improper.

Response: Thank you for your correction. We have modified it following your comment. Please

refer to line 407-408 for further confirmation.

35. Line 317-320: Change this sentence to several short sentences.

Response: Thank you for your correction. We have modified it following your comment. Please refer to line 424-426 for further confirmation.

36. Line 363: Delete "the centered moving average".

Response: Thank you for your correction. We have deleted it following your comment.

37. It seems to me that the whole manuscript does not have a decent map of the study area. In addition, lots of number expressions, made me lost in the jungle of numbers. Discover the hidden meaning of the numbers as much as you can.

Response: We are sorry inconvenient. Following your concern, we have added one map to show the study area **(Figure S1)**. In addition, we have added some figures to reduce a lot of number expressions and make the reader easier to follow our manuscript. For example, we added **Figure S4** to represent the negative values proportion and average noise reduction of this study. More than that we have restructured the whole manuscript to improve its readability. Please refer to support information for further confirmation.

38. Supporting information: You need to ensure the relative consistency of the font size in these figures.

Response: Thank you for your correction. We have checked and revised all the texts (titles, labels, legends) in the figures with the same size. Please refer to our revised manuscript for further confirmation.

39. Table S1: You need to give more detailed information, e.g., maximum, minimum, median, observation period, etc.

Response: Table S1 are mean of the 5040 data points, the measurements were performed for 14 h. In our perspective, the maximum, minimum, and median have very limited meaningfulness, because these data are ambient air measurements with a diurnal pattern.

40. Table S2: Why does the "Measurement number" jump?

Response: Thank you for your correction. After reanalysis all of the raw data and all postprocessing data (measurements 1-10), the number of peak samples did not change before and after postprocessing. Therefore, this table is no longer used in our revised manuscript. The detail information about it, please refer to line 356-357 for further confirmation.

41. Figure S3: In order to improve the visibility of the curve, you can consider reducing the thickness of the curve.

Response: Thank you for your suggestion. We have revised Fig. S3 (Fig. S6 after revised) to improve the visibility of the curve. Please refer to supporting information for further confirmation.