



EGUsphere, referee comment RC2  
<https://doi.org/10.5194/egusphere-2022-585-RC2>, 2022  
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## **Comment on egusphere-2022-585**

Anonymous Referee #1

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Referee comment on "Winter brown carbon over six of China's megacities: light absorption, molecular characterization, and improved source apportionment revealed by multilayer perceptron neural network" by Diwei Wang et al., EGU sphere, <https://doi.org/10.5194/egusphere-2022-585-RC2>, 2022

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### General Comments

This study reports the absorption properties, chemical functional bonds, and sources of BrC in six Chinese cities. They were conducted to acquire comprehensive BrC datasets with higher resolution and more species and provide insight into more specified source identification. Overall, the combination and intercomparison of BrC in six Chinese cities is a valuable study of the BrC measurement. I recommend publication after the following issues are addressed.

#### P7 Line 188

As far as I know, "Elser et al., 2016" reported the AMS data in China, the result is about BBOA is the major source for OA in Xi'an, it was not included any results for the brown carbon. Please revise it.

#### P11 Line 265-280

In Figure 4, there are the big differences between cities at the peak of 1385 cm<sup>-1</sup>, why? What are the insights on the difference?

#### P12 Line 292-308

My concern is related to the results of PMF. PMF is a commonly used receptor model for source apportionment. From the shown factor profiles in Figure S4. The results of PMF are highly associated/influenced by the sample number (not many here), chemical components (could be enlarged here), and the suggested factors (4, 5, 6, or even more). There are only 30 (or 31?) samples in each city and different profiles in each city. It could be more careful. And here needs more evidence.

Also, there are some studies about the source apportionment of BrC, which directly input the MAE365 of BrC to the data matrix. Did the author try this solution? How about the

results?

Please also note the supplement to this comment:

<https://egusphere.copernicus.org/preprints/2022/egusphere-2022-585/egusphere-2022-585-RC2-supplement.pdf>