

We would like to thank the anonymous reviewer for the recommendation and the helpful suggestion. Specific responses to each of the comments are provided below (reviewer's comments in **black**, our responses in **bold font**).

RC1: 'Comment on egosphere-2023-379', Anonymous Referee #1,

This paper uses a set of synthetic black carbon-containing aerosol mixtures made from materials with known composition to assess the ability of four different techniques used to isolate the black carbon component for carbon isotope determination (^{13}C and ^{14}C). The advantage of this approach is that the 'true' results are known, and therefore the reliability of the methods used can be assessed. This is an innovative approach to the long-standing issues around method specific analytical biases, and therefore I think represents a significant step forward in achieving more reliable source apportionment for aerosol samples. This is important because of the significant role that black carbon in aerosols plays in anthropogenic warming. The study finds that the hypy technique out-performs the other techniques in its ability to produce reliable results across a range of BC compositions.

I think the paper is well and clearly written and the experimental and analytical components sound. I have no substantive issues with the interpretation or conclusions of the study, but have made a number of grammatical suggestions, with some requests for clarification on the annotated pdf attached.

Response: We thank the reviewer for careful reading and valuable comments so much. The revision was carried out carefully according to the reviewer's suggestions. Following is our detailed response to the comments.

1. Line 55-And the Hydrolysis (Hypy) method,

Response: We have modified it to "The Hydrolysis (Hypy) method," .

2. Line 58- was

Response: We have modified it to "were".

3. Line 73,74- The limited understanding of EC aerosol emissions causes poorly constrained estimates of their contribution to anthropogenic climate warming that globally may be second only to CO_2 and regionally

Response: We have modified it to "The limited understanding of EC aerosol emissions results in poorly constrained estimates of their contribution to anthropogenic climate warming that globally may be second only to CO_2 and regionally".

4. Line 81- separation of OC

Response: We have modified it to "isolation of organic carbon (OC)".

5. Line 83- organic carbon (OC)

Response: We have modified it to "OC".

6. Line 91- Due to the

Response: We have modified it to “Due to the application of the”.

7. Line 102- ^{14}C of EC

Response: We have modified it to “ ^{14}C activity of EC”.

8. Line 120- the EC/TC

Response: We have modified it to “the elemental carbon/total carbon (EC/TC)”.

9. Line 136- carbon isotopes

Response: We have modified it to “a carbon isotope composition”.

10. Line 139- gasoline truck

Response: We have modified it to “gasoline truck exhaust”.

11. Line 166- this is pretty low catalyst load - justification?

Response: All the samples were collected on pre-combusted quartz filters (8×10 inch; Pall). The catalyst load is based on the carbon content in the sample, and exceed 20% of carbon weight. In order to make the readers better understand, we have modified it to “more than 20% of sample carbon weight”.

12. Line 176- analysisfor all samples

Response: We have modified it to “analysis for all samples”.

13. Line 187- (TC)

Response: Line 120 displayed TC defined as total carbon.

14. Line 190- sufficient to use for

Response: We have modified it to “therefore suitable for”.

15. Line 196,197- (Hypy, CTO-375, $\text{EC}_{\text{He/O2-475}}$ and EC_{LARA})

Response: We have modified it to “(CTO-375, $\text{EC}_{\text{He/O2-475}}$, EC_{LARA} and Hypy)”.

16. Line 210- obtains

Response: We have modified it to “isolates”.

17. Line 225- than in

Response: We have modified it to “compared to”.

18. Line 231- worse

Response: We have modified it to “lower”.

19. Line 235- EC separation following water

Response: We have modified it to “EC isolation following the water extraction”.

20. Line 240,242- compact

Response: We have modified it to “condensed”.

21. Line 246- ~125%

Response: We have modified it to “~ +125%”.

22. Line 260- the same as

Response: We have modified it to “very close with”.

23. Line 280- is irregular to follow

Response: We have modified it to “is irregular”.

24. Line 329- data of the literatures

Response: We have modified it to “data from the literature”.

25. Line 344- of carbonaceous aerosols

Response: We have modified it to “in carbonaceous aerosols”.

26. Line 359- This result can provide participation value for other separation methods.

Response: We have modified it to “These two isotope values was able to provide a valuable reference for other EC isolation methods”.