

## ***Interactive comment on “Application of the ECT9 protocol for radiocarbon-based source apportionment of carbonaceous aerosols” by Lin Huang et al.***

### **Anonymous Referee #3**

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1. Does the paper address relevant scientific questions within the scope of AMT? The manuscript fits perfectly within the scope of the journal Atmospheric Measurement Technique. It proposes the use of ECT9 protocol to separate OC and EC for radiocarbon analysis. This protocol is normally used for concentration and stable isotope measurements on OC and EC fractions, but this time the application is extended for  $^{14}\text{C}$  based source apportionment of carbonaceous aerosols. 2. Does the paper present novel concepts, ideas, tools, or data? The manuscript proposes the use of the ECT9 protocol to physically separate OC from EC in carbonaceous aerosols, but introduces new adaptations of the method to determine  $^{14}\text{C}$  of both fractions. The  $^{13}\text{C}$  composition of the fractions obtained with the method was also determined to as-

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sure that the fractions were well separated. 3. Are substantial conclusions reached? Yes. The effectiveness of the ECT9 to physically separate OC and EC from aerosol samples for  $^{13}\text{C}$  and  $^{14}\text{C}$  analysis is demonstrated. 4. Are the scientific methods and assumptions valid and clearly outlined? Yes. 5. Are the results sufficient to support the interpretations and conclusions? Yes. 6. Is the description of experiments and calculations sufficiently complete and precise to allow their reproduction by fellow scientists (traceability of results)? Yes. The authors used a number of materials containing only OC or EC as well as mixtures of them. The experiments are clearly described. The tests to establish accuracy, precision and background are well described. HOWEVER, I would suggest some minor additions: Concerning the sample preparation protocol: In Section 2.3 Isolation of OC, EC or TC. . . Line 150: Please give more details on how the filters are treated after an OC material dissolved in water is loaded onto a pre-cleaned quartz filter. Line 151: Please explain in a more detailed way how the filter punch is loaded and manipulated to avoid losing material during ECT9 protocol. Concerning the comparison of FM $^{14}\text{C}$  obtained values vs FM $^{14}\text{C}$  accepted values: Line 245: it is mentioned that FM $^{14}\text{C}$  values of pure modern and fossil reference materials agreed with their accepted FM $^{14}\text{C}$  values within approx. 5% uncertainty. Please indicate the individual uncertainties that resulted in less than 5% in average. 7. Do the authors give proper credit to related work and clearly indicate their own new/original contribution? Yes. The cited references are adequate. 8. Does the title clearly reflect the contents of the paper? Yes. The title fully reflects the objective and the expected results 9. Does the abstract provide a concise and complete summary? Yes 10. Is the overall presentation well structured and clear? Yes 11. Is the language fluent and precise? The language is very appropriate. 12. Are mathematical formulae, symbols, abbreviations, and units correctly defined and used? Yes 13. Should any parts of the paper (text, formulae, figures, tables) be clarified, reduced, combined, or eliminated? The organization of the manuscript is adequate. The selected materials for testing the protocol are adequate; the description of methodology is in general clearly explained; except that a more detailed description on the filter loading. Validation of the protocol applied

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to 14C analysis is rigorous. 14. Are the number and quality of references appropriate?  
Yes 15. Is the amount and quality of supplementary material appropriate? Yes.

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