

Interactive
Comment

Interactive comment on “Fossil versus contemporary sources of fine elemental and organic carbonaceous particulate matter during the DAURE campaign in Northeast Spain” by M. C. Minguillón et al.

Anonymous Referee #1

Received and published: 19 September 2011

General comments:

This paper shows the analysis of atmospheric carbonaceous aerosols during the DAURE project using ^{14}C analysis. This is a relatively new technique that has allowed some important insights into the apportionment of both elemental and organic carbon to fossil and modern sources, which has in turn helped to verify budgets in larger modelling works. This is a very relevant work for ACP and should be of use to both the DAURE project directly and atmospheric science in general. The most significant findings come when the data are compared with the AMS factor analysis

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data. The authors are also able to assess the consistency of various biomass burning markers and underscore how difficult using these markers quantitatively can be.

Perhaps the biggest shortcoming of this paper is that it relies very heavily on work that is yet to be submitted, specifically in the works by Zhang, Mohr and Pandolfi that are extensively cited as 'in preparation'. The authors do report the details of the EC collection method in the supplementary material, however it is a little disconcerting that the technique is described as 'still under development'. I think it would have been preferable to have covered this as a technical section within the main manuscript. However, I won't go as far as to say its inclusion in this paper is vital for publication because I do not see that the conclusions of this paper rely too heavily on this part of the analysis. Assuming that it is left with the current level of detail in the supplementary material, I should stress that this paper should not, in the future, be used as a technical reference for the technique, as the technical details cannot be said to have passed proper peer-review. By that token, the authors should endeavour to get the Zhang et al. paper published soon.

In contrast, the lack of detail regarding the factor analyses does present a more significant issue because unlike the 14C analysis, these results could be subject to change between now and the publication of the Mohr et al. and Pandolfi et al. papers. For this reason, I would consider it important that the key technical details of the factorisations are documented here, specifically the software used, what error estimation and data pretreatment methods were employed and whether any special variables (e.g. FPEAK) were used. It would also be useful (perhaps in the supplementary material) if the authors could report on what basis the solution sets used was selected (in terms of the number of factors and FPEAK, etc.) and whether they were subjected to any tests such as seed variation or bootstrapping. I should note that I am not requesting that this paper becomes the primary reference for these analyses, nor should it preclude the factorisation being modified before the submission of another paper if it is deemed necessary for whatever reason; this is more so that the consistency (or otherwise) with

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future publications can be verified by the reader.

Specific comments:

Page 23581, line 20: More details should be provided on the discrepancy between the AMS and OC measurements, as the lack of agreement could undermine the comparisons presented later in the paper. Looking at the graph in the supplementary material, the difference appears to be systematic, so this is not simply a signal-to-noise issue. The magnitude of the discrepancy and the modifications to the AMS should be stated explicitly. Could a collection efficiency issue be responsible?

Page 23581: How did the assumed OM/OC values for BCN compare with the measured values for MSY?

Technical comments:

Page 23576, line 16: EC and BC aren't technically the same thing, as they are both operationally-defined metrics

Page 23577, first paragraph: The statement on the most important sources of carbonaceous aerosols should be backed up by a reference.

Page 23578, line 10: Recommend rephrasing as, "the difference between summer and winter".

Page 23579: How far apart were the two sites?

Section S1: "Theoretical T" seems an odd choice of words. Referring to it as the "setpoint" would be more conventional.

Interactive comment on Atmos. Chem. Phys. Discuss., 11, 23573, 2011.

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