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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Better constraints on sources of carbonaceous aerosols using a combined ^{14}C – macro tracer analysis in a European rural background site" *by* S. Gilardoni et al.

Anonymous Referee #3

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This manuscript presents a comprehensive and all-year-round assessment of PM2.5 aerosol sources at a rural background site. It combines methodologies that are not new to the field and their use has been successfully demonstrated in recent years for similar purposes. Therefore the reviewer does not feel that the first word of the title 'Better constraints on. . .' can be justified. In this sense, the title of any scientific paper that is published in high-standard journals should start with this word in order to indicate that it indeed adds something new to already existing knowledge. Nevertheless it is a useful manuscript the statements of which corroborate previous European results of

similar nature and lead to very similar conclusions and recommendations.

Page 2506 Line 10 suggest 'particulate matter'

Page 2506 Line 22 In fact, no tracer method is capable of 'accurately' and 'completely' characterize any single source. All source apportionment studies are just estimates of potential source contribution relying on a number of simplifying assumptions.

Page 2507 Line 13 'More recently' – above the authors quote papers from 2009 and 2010. What could be 'more recent' than those? In fact, the quoted simplified approaches are no longer the 'state-of-the-art' methodologies in source apportionment, despite their recent publications. Either this should be put into a more historical perspective or simply omitted.

Page 2507 Line 20 rephrase '. . .is spread throughout the atmosphere. . .'

Page 2507 Line 22 rephrase '..atmospheric values of contemporary 14C. . .'

Page 2508 Line 9 suggest '. . .associated with. . .'

Page 2508 Line 20 In addition to what? The reference 14C/12C values were already used as variables already in the two quoted papers.

Page 2508 Line 25 Why the 'representativeness of results' is guaranteed if the method is applied on a larger dataset?

Page 2510 Line 7 May the selection criteria (high loadings of TC) distort the conclusions of the study strongly in favour of anthropogenic sources? May higher biogenic contributions be expected at days with low TC?

Page 2514 Line 20 'discrimination'

Page 2518 Line 5 Usually with atmospheric dilution the temperature is also changing (decreasing, especially when convection take space). So it is not at all evident that the primary components are 'overestimated': semi-volatile compounds may also condense

on primary particles without being oxidized in the gas-phase.

Page 2519 Line 13 change ‘reduces’

Page 2522 Line 6-8 Why do small concentrations of levoglucosan in fall indicate that wood burning in the dominant source in winter? It should be trivial anyway, but not from the logic of this sentence.

Page 2524 Line 9-10 Why did the authors use the same OM/OC ratios for primary and secondary OC for all categories? I would have expected larger values for SOCs: e.g. 2.1 for SOCbb

Page 2525 Line23 It is reasonable to combine primary and secondary BB and FF sources. From the point of control, it does not make much difference but introduce large uncertainties which make the results less ‘credible’ for decision-makers.

Interactive comment on Atmos. Chem. Phys. Discuss., 11, 2503, 2011.