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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Can 3-D models explain the observed fractions of fossil and non-fossil carbon in and near Mexico City?" *by* A. Hodzic et al.

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This is a nice piece of work, containing an careful analysis of a set of measurements and model results of C14 and other carbon relevant tracers over Mexico city, during Milagro 2006.

While I have few comments to the scientific part of the manuscript, I found it relatively difficult to work way through the manuscript, due to the very compact writing with many abbreviations. Also I suggest to more clearly present the conclusions from this work, specifically addressing what exactly has been learned from combining model and measurements (compared to a stand-alone measurement analysis).

I also would like the authors to comment better in the revised on the uncertainties of the measurements: on p. 14531 l. 16 there is something mentioned between the lines, but this needs a more prominent place, also in the light of the overall very few measurements available. Having only 4 measurements available on the PM10 filters: what is the risk that agreement is just by coincidence?

I therefore recommend publication of this manuscript in ACP, with minor revisions. I mention here that my collegue Stefania Gilardoni also provided comments to the manuscript (... for free ... :)

Specific comments

- the readibility of the manuscript suffers from a surplus of abbreviations that are not intuitive (although it is good to have a list of abbreviations). At my first reading of the manuscript, I lost track of all things. My suggestion is that were abbreviations are not used more than ca. 5 times, substitute with the full wording. AIK dataset=>PM10; MAR dataset=>PM2.5 dataset. ROB and GRI simulations=> find something more appropriate. T0; T1=>urban- sub-urban.

- I would like the questions on page. 14518 (l. 22 to l. 24) explicitly answered in the abstract and conclusions.

- Also address more explicitly what was the added value of the model? I think one added value was that the PM1 and PM10 discrepancy could not be explained using model simulations

- p.14514 l. 10 source information on what?

- p.14514 l. 13 which known differences?

- p.14514 l. 28 the S/IVOC param has newer insights; better skills, but correlation is as poor?

- p. 14515 l. 1 closing the gap: more quantitive. What was the problem? -p. 14516 l.

15 is anything know about the age of the burned material?

- p. 14517 l. 2 residence time is days to ca. 1 week.

- p. 14517 in discussing all these measurements: are they fully comparable, e.g. have there been intercomparisons?

- p. 14518 the outcome of these two main goals should be more clearly mentioned in abstract and conclusions.

- p. 14520 it would be useful to know why the large time intervals have choosen like this (sensitivity issue). In your recs you say that this would have to improve. Is this possible?

- p. 14520 l. 8 explain why fNF for EC at T0 is assumed equal to 0.05 and which is the uncertainty derived from this assumption.

- p. 14520 l. 14 At T0 the EC/BC ratio varies between 1.8 and 9.3. The ratios indicate that Ec and BC do not "agree reasonably well" at this site. It is not clear if the estimate of EC at T0 is based on this agreement; in such a case, please explain comment the uncertainty.

- p. 14520 l. 15 low TIME resolution

- p. 14520 l.20 not only fcm(OC) exceeds also the f (Cnf,oc)>1. You only discuss this later, but it should be here.

- p. 14520 is there a reason for using a constant factor 1.1? Are the results sensitive?

- p. 14521 why so few measurement. And can the correspondance just be coincidence?

- p. 14530 few high BB events not captured by model. Can be corrected for this?

- p. 14531 0.57-1.07 =>measurement noise: should be discussed earlier

- p. 14533 what is the general conclusion of 4.4.1: levels better; correlation not?

- p. 14536 l 10: larger than expected uncertainties. I didn't know what to expect.

- p.14547 Table 3 EC/BC is dimensionless; 0.05(3) should be 0.05(d); for consistency in the footnotes "...EC is assumed to be 5%".

Interactive comment on Atmos. Chem. Phys. Discuss., 10, 14513, 2010.