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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Evaluating BC and NO_x emission inventories for the Paris region from MEGAPOLI aircraft measurements" *by* H. Petetin et al.

Anonymous Referee #2

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General Comment:

The study have performed nice analysis method and followed all the precautions for evaluating the model with observations. In principle, they have done extensive work. The content of the paper and novel methodology is worth publication in ACP. The shortcoming of the paper is that manuscript is not easy to read and contain too many details about the model observation comparison, too many subsections which many time confusing and lengthy and should be avoided. I am not sure how to reduce so many sections and subsections but composition of paper need significant overhaul and rearrangement.

Specific Comments:

The paper covers an important and interesting topic. Evaluating BC and NOx emission Inventories from the urban center using aircraft measurements. This study evaluates BC and NOx emissions from the Paris city using aircraft measurements across the city plume as well as using measurements at ground site. Authors have considered the emission inventories EMEP, TNO and TNO-MP. Further they have used CHIMERE chemical transport model to simulate the emission Plume over the Paris region to evaluate the BC and NOx emissions from these emission inventories. Finally authors have shown that BC emissions in EMEP and TNO, and NOx emissions in TNO-MP, is overestimated over the Paris region. This paper is definitely a first step in achieving the objectives the authors have set up to achieve. My overall recommendation is acceptance after careful revision of the text and queries as under.

1. The manuscript is not easy to read and contain too many details. I would suggest to cuts-sot some of these fine details (or move in supplementary material) and focus on the objective of the manuscript.

2. In addition to advantage, author should also discuss the demerit of this approach in the abstract as well in conclusion section to put a transparent balance picture to readers.

3. Authors have shown that compared to MM5, WRF meteorology shows better agreement with the observation shows. Why authors have done 16 tracer experiments with MM5 meteorology? This need clarification in text and justification required.

4. Page 29243, L25: The aim of the paper has not come out properly. Composition of the paper is discussed but the major objective of paper should come out in 1-2 sentences to sum-up the introduction section

5. Are different PBL schemes are used during MM5 and WRF simulations? Which PBL scheme is used? Uncertainty, will also be introduced due to PBL scheme, authors

should discuss the same in text with quantification?

6. Section 3.5: Black Carbon/Elementary Carbon Terminology- This section can be merged with introduction and there is no need to make it a separate section.

7. P. 29254 and Fig. 6: Flight timings are different for different days and taking single day for diurnal profiles of BC, NOx and BC/NOx ratio is inhomogeneous. How it is analyzed? Few days or whole July month?

8. 5. Uncertainty of the inversion methodology: This section should have come before the results. The result and discussion section can be combined.

9. Conclusions cannot run for 2 pages. It must be shortened. I think authors can delete first para except first 2 sentences.

10. Page 29273: Remove first sentence of line 28-29.

11. Section 3.2: Provide details of resolution of inventories in each scenario.

12. Figures and Tables: It is way too many. There are repetitive information between Figures and Tables. Author should try to combine information in various tables in 1. As for example, all error and uncertainty related information can come in one table. In my opinion, Figures 11, 12 and 15 can be avoided as information is well covered in text as well as in tables.

13. Figure 2: Unit of Y-axis missing.

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 29237, 2014.