

## ***Interactive comment on “Source-sector contributions to European ozone and fine PM in 2010 using AQMEII modeling data” by Prakash Karamchandani et al.***

**Anonymous Referee #2**

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Dear Editor,

This MS presents a source apportionment analysis of ozone and PM<sub>2.5</sub> using a modelling approach. The paper is very well written and structured, with clear conclusions for the reader. I have two main concerns, though, which should be addressed prior to publication: 1) uncertainty calculations: the MS does not present any uncertainty estimates for the source contributions. These would be highly necessary to support the robustness of the author's approach and results. 2) variability of the traffic source with regard to ozone source contributions: at present, there is no reference in the MS to the composition of the vehicle fleet (% diesel vs gasoline, % of EURO4-6 type vehicles) in the different cities under study, while this has a strong influence on the NO<sub>2</sub>/NO ratios

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and the emissions of primary NO<sub>2</sub> in the cities, which in turn strongly influences ozone formation. For example, the vehicle fleet composition is very different in Amsterdam, Barcelona, Athens or Helsinki, and this will influence the relevance of this source with regard to ozone formation. A discussion should be included regarding this in the MS.

Specific comments:

- Abstract and text: please define "boundary conditions", what do the authors refer to with this term? Are these the meteorological conditions, e.g. the boundary layer height? Or the model boundary conditions? Please clarify. - page 4, lines 17-18: "provides an indication...", how? Please describe in more detail. Why does the model perform better (Table 2) for RB sites only? - page 6, line 19: please clarify that the numbers in brackets in table 4 are the % of source contributions. Otherwise it may seem it is a number of days, in general it is confusing. page 6, line 25: "non-road transport", is this agricultural vehicles? Ships? - page 7, lines 9-18: the contribution from road transport depends on the vehicle fleet (dieselisation, EURO...). It is relevant to add a discussion on this for a comparison between the different cities. - page 7, line 12: 12% of non-road transport seems very high for London, where do these emissions come from? Especially if road transport accounts for 11%. Please review or explain this result. - page 8, line 1: Saharan dust is mostly coarse (>2.5 microns). Please add refs if the impact is also observed in <2.5 particles - page 11, lines 19-20: the non-road transport source should be further explained; if it is mostly shipping emissions it will make much more sense than if it is focussing on agricultural and construction vehicles, for example. Please clarify. - Discussion: the references to "controllable" and "non-controllable" sources are interesting, and this discussion could be extended further maybe with 1 paragraph summarising the applicability of this study, e.g., based on the authors' results, what can be done to reduce ozone and PM<sub>2.5</sub> concentrations in the cities under study? Which sources can be controlled, and what kind of reductions (quantifiable) could be achieved if these sources were targeted?

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