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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Presentation of the EURODELTA III inter-comparison exercise – Evaluation of the chemistry transport models performance on criteria pollutants and joint analysis with meteorology" *by* B. Bessagnet et al.

Anonymous Referee #4

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General comments

This manuscript is a thorough description of an international model inter-comparison exercise. It can in my view be published in ACP, provided that the comments and concerns below will be taken into account.

The article contains interesting and useful results. However, in my view the discussion of results should focus much more on the results that have some general interest, and on the more general insights and conclusions, and the amount of small details should be substantially reduced. By small details I mean e.g. discussion on how each

individual model has performed for each pollutant and each campaign. The amount of figures and tables is also very large; I would advise the authors to reduce these. However, the figures that that make it possible to draw general conclusions should be included.

I suggest that the authors would add to conclusions a discussion on the most important improvements of the models, and areas of improvement for the CTM's in general in the future, based on their findings. The terminology also should be more precise, and some of the conclusion more cautious, taking into account the limitations of the data; details are discussed below.

Specific comments

Abstract. Explain which experimental datasets were used, and how many stations were included, please. 'Background stations', specify which background; probably regional background, not urban or global background. The discussion would be in my view more clear, if the evaluation of met parameters would be presented first, then evaluation of concentrations. 'performances were good', specify what is meant with 'performance', do you mean e.g. bias or correlations, or both ? PM, specify which PM fraction.

Introduction. In discussing model inter-comparisons, refer also to the most recent relevant ones, especially Prank et al, 2016, ACP (16, 6041–6070). "... showed better performance but higher uncertainty..." define what is meant with 'performance' and what you mean with 'uncertainty'. The institutes participating... this sentence should be deleted; not scientifically relevant information. 'criteria pollutants': define concept (which criteria ? defined by whom ?); probably the authors refer to the latest EU directives or limit values (?); but that should then be specified.

methods. p 8 'lowest levels of emissions': emissions of which pollutant ?

discussion. p 23: 'model formulation and setup ... more influencing than met conditions'. Define what is meant with 'model formulation and set-up' (is it the setup of

input data, which ones ? set-up of model parameters and submodels, which ones ?; or selection of CTM's themselves ?). This statement is also over-interpretation; it has only been shown to be valid for the range of met parameters that were included in the selected conditions, which was not especially wide. Please re-write this, allowing for the limitations of the data used. p. 23. 'highest errors': which stat. model evaluation parameter is meant by 'error' ?

Technical corrections

I would also suggest that the whole text and the language will be checked, and the fairly numerous misprints and language mistakes will be corrected.

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