

Interactive comment on “Four-dimensional evaluation of regional air quality models” by E. Solazzo et al.

Anonymous Referee #2

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General comments

The manuscript of Solazzo et al. is an evaluation study including AQ model results from a well coordinated modeling exercise (AQME-II) and observations from the MOZAIC dataset.

As stated by the authors the primary aim of this study is to illustrate the potential for using MOZAIC data for regional scale evaluation and the capabilities of models to simulate concentration and meteorological fields in the vertical.

The scientific approach and applied methods are valid. The capabilities of models are tested and evaluated by using some standard metrics and their performance is discussed, without performing any in-depth analysis, which is out of the scope of this

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work, as stated by the authors.

In my opinion, the extent of this material could be used in a more sophisticated way, in order to highlight the common problems of AQ models and suggest pathways for further analysis and model improvements.

The paper is relevant for publication in GMD since the dataset used is quite extended, however major revisions concerning the analysis and presentation of the material would be necessary prior to publication. The language should definitely be improved in order to be more clear and precise.

Specific comments

The title of the paper is too generic; the authors could consider revisiting the proposed title including more specific keywords in order to make it more informative.

The abstract is not very informative. It would be preferable to include more specific comments on model performance based on the calculated metrics. Preferably avoid expressions like “some success” which are not objective. Highlight the major findings and conclusions, including model performance, impact of boundaries, analysis altitudinal correlations/errors and suggestions for future work.

The authors state the “..set the stage for future process oriented studies and in depth diagnostic analysis”. Highlight which suggestions for future process oriented studies rise as a result of the current analysis.

The paragraph “Wind direction” 4.2.2. is a mere description of bias on every airport. What do we learn from this description? The main conclusions one can draw? A more sophisticated synthesis of results would be preferable.

In paragraph 4.2.4 a reference to a figure is missing.

“Ozone skills are clustered by height and by modelling group, rather than simply by AQ model” (4.2.5). It would be better to rephrase the statement to convey the right

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message. In general, 4.2.5 needs to be edited by a native speaker.

Page 555, line 10 “Results obtained by correlating the bias... for example establishing some indicators that could be compared to observed quantities” The suggestion is rather vague, could it become more specific?

May be references to previous evaluations work using MOZAIIC data would be necessary in order to give proper credit to previous related work and clearly indicate which is your own original contribution. (E.g. Elguindi et al, 2010 Geosci. Model Dev., 3, 501-518, 2010).

Technical corrections

Some parts of the paper are not fluent in expression, editing by a native speaker is strongly suggested.

Figures composites and legends are too difficult to follow (Fig 2-6)

Several typos scattered through the text.

Restructure the main body of paragraphs to make it more easily readable.

Interactive comment on Geosci. Model Dev. Discuss., 6, 521, 2013.

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