

Interactive
Comment

Interactive comment on “Improvement of ozone forecast over Beijing based on ensemble Kalman filter with simultaneous adjustment of initial conditions and emissions” by X. Tang et al.

Anonymous Referee #2

Received and published: 5 May 2011

This manuscript presents a set of experiments on the assimilation with the EnKF of ozone over Beijing. In my opinion few aspects and points of the presentation and analysis need to be clarified/expanded before this work can be published.

MAJOR COMMENTS

Below I have listed few points that the authors need to address to make the manuscript suitable for publication:

- It is not clear to me what is the added value of this contribution when compared to previous works. An effort should be made to stress out new results and what we have learn from this work that we did not already knew;

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- There were 11 urban and 6 suburban stations; as stated at p. 7822 lines 25-28 only 2 urban and 1 suburban sites were not assimilated and used for verification. This choice is questionable and it may seriously limit the statistical significance of the results (given also that the assimilation experiments were less than 2 days long);

- The analysis should be extended at least up to 6 hour forecasts; in data assimilation an important question is how long an observation has an impact on the forecast; as showed by the authors, in few stations it vanishes after 1 hour, in other seems to last longer. How long? Why?

- The section describing model error is not clear; given the importance of it, the authors should expand it and make it a better effort in explaining exactly the approach they have used; - Below I have listed few places with suggestions where the written English could be improved. However, there are many other sentences that are not clear, and if possible the authors should have the manuscript throughout reviewed by a native English speaker.

MINOR COMMENTS

- “on the other hand” and “however” often are not used properly in the text. The authors should revise any occurrence of those.

- P7812, L14: “However, adjustment” → “Adjustment”

- P7812, L21: “by implementing” → “via”

- P7813, L4: “serious problems” → “serious”

- Define “CAREBeijing” and add a reference if it is available

- P7813, L15: “is needed” → “was needed”

- P7815, L4: “It employs a Monte”

- P7815, L4: “variable with a large stochastic ensemble” → “variables with an ensemble”

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ble”

- P7815, L5: “In this way, the” → “The”
- P7815, L6: “ensemble” → “the ensemble”
- P7816, L18: “promised” → “Promising”
- P7816, L22: “3 model grids” . . .how high is that, roughly or on average?
- P7817, L5-6: “It may lead” . . .why? Please explain
- P7819: Is the assimilation performed in every domain?
- P7819, L5: show some of the results of these sensitivity tests (e.g., a figure or a paragraph commenting on it). This is true also for other sensitivity experiments mentioned in the paper
- P7819: say more on how model error is treated and why you chose this approach
- P7821, L25: “real-time way” → “real-time”
- P7823, L10-11: “not as valuable as much longer forecasts such as 24-hour and 48-hour forecast in application” → “not be as valuable as longer forecasts such as 24- or 48-hour forecasts”
- P7824, L16: new line after “areas.”
- P7824, L20L no new line after “Fig. 4.”
- P7824, L24-25-26: this sentence is not clear
- P7824, L27: “a quit” → “a”
- P7827, L5-6-7-8: how do you justify the similar differences in daytime?
- P7827, L24: “furious” → “large”
- P7828, L15: “precious” → “previous”

C2745

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- P7828, L15: “(Hanea” → “(e.g., Hanea”
- P7828, L16: “root mean square error” → “RMSE”. Also, define RMSE the first time you use it in the text
- P7828, L27: “zone” → “ozone”
- P7828, L29: ozone is not emitted
- P7829, L21: “a day in European and a” → “over Europe with a”
- P7832, L21: “as a powerful” → “is a powerful”
- P7832, L22: “emissions can” → “emissions to”
- P7833, L25: take out “while”
- P7833-7834: are other errors coming for the portion of model error that is not accounted for, and for the errors coming from the assumptions built in the EnKF design (e.g., Gaussinity, linearity)?

Interactive comment on Atmos. Chem. Phys. Discuss., 11, 7811, 2011.

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