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Atmospheric Chemistry and Physics Discussions

Interactive comment on "The two-way nested global chemistry-transport zoom model TM5: algorithm and applications" *by* M. Krol et al.

Anonymous Referee #2

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General comments

The paper first provides a description of the two way nested global chemistry-transport zoom model TM5. It then analyses two case studies showing the added value of the zooming capability. The first study illustrates, using 222Rn, the benefits of the zoom when used over regions where sources are then better captured at higher resolution. The second study analyses the influence of having a two way zoom versus a one way zoom using a pseudo tracer with simplified non-linear chemistry. The paper finishes by quantifying budgets of different processes across different resolutions.

Illustration of the two-way nested zooming capabilities of this model is new and appears to be promising for future studies. The full chemistry zoomed model however still needs to be properly validated in the future. A few elements need to be changed in the paper

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(especially the title) to precise that it is not a full validation of the model but an illustration of its zoom capability. The first case study would benefit from adding the comparison obs/model at a few other sites where continuous 222Rn measurements are also made [Chevillard et al., 2002]

Detailed comments

Title The title needs to be changed to reflect the fact that the applications presented in this paper are illustration focusing on the zooming capability of the model. Maybe : The two-way nested global chemistry-transport zoom model TM5: algorithm and first zoom applications.

Abstract L17 p3976: “therefore ” is not needed

Introduction L11-12 p3979 : This paper does not do a full evaluation of the transport of the model but rather illustrates with some application the effect of the zooming. Hence, this sentence should be suppressed.

2.2 Two-way nested zoom algorithm L2-3 p 3981 : Could the authors comment/expend on whether this smooth transition (second grid) is necessary. How do things change if it is not present ?

L6 p3981 : “is” should be changed to “it”

L8-9 p3982 : What is the implication of this partial symmetry in terms of accuracy. How much is lost ?

2.5 Implementation L12 p 3987 Indicate in parenthesis which platforms

3.1 222Rn measurements on Crete Other continuous 222Rn (+ meteo) measurements exist in Europe. To give more weight to the paper, the authors should include in the paper model/obs comparison at a few other sites. [Chevillard et al., 2002]

3.2 Effects of zooming on the transport of chemical trace species L25 p 3991 : For clarity I would add in parenthesis after “artificial mixing” : (due to coarse resolution)

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L26-28 p 3992 : Shouldn't this conclusion be tempered by a mention of sampling errors as was done in case study 3.1 ?

Tables

Table 2: Adding in the caption the signification of the "Ĕ" would be better it seems to me. Step 6 : Is setting the flux to zero the way to preserve mass ? If yes, it would be nice to say so.

References:

Chevillard A., Ciais P., Karstens U., Heimann M. , Schmidt, M., Levin, I., Jacob, D. and Podzun, R., Transport of 222Rn using the regional model REMO: A detailed comparison with measurements over Europe. Tellus, 54B, 872-894, 2002.

Interactive comment on Atmos. Chem. Phys. Discuss., 4, 3975, 2004.