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Geoscientific
Model Development
Discussions

Interactive comment on "ECHMERIT V1.0 – a new global fully coupled mercury-chemistry and transport model" *by* G. Jung et al.

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Response to the Editor comments:

Thank you for the supplementary comments on the publication and for the acceptance of the submission of a revised manuscript . We'd be pleased to submit a revised version of the manuscript. In the following the specific comments will be answered.

to General Comments:

1) A clarification: there is not the entire MECCA model implemented in the ECHMERIT model. The basic gas-phase mechanism is the CBM-Z mechanism, which was chosen due to its computational efficiency and the applicability on larger temporal and spatial scales (as mentioned also in the manuscript). What was included from the MECCA

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mechanism was the wet chemistry equations, as wet chemistry needs to be included for a sophisticated Hg-chemistry mechanism. Additionally no stratospheric chemistry was considered so far (as included in MECCA). Anyhow it for sure would have been also possible to include the mercury chemistry into the MECCA mechanism and the ECHAM5/MESSy modelling system.

2) The Henry's law constant of HgO was chosen to be the same as for HNO3 (2.1e5 M/atm), following the strategy as in the CAMx model (www.camx.com), due to the similar solubility of oxidized mercury compounds and HNO3. This will be also mentioned in the text.

to Technical Comments:

1) Thank you very much for the reminder on mixing ratios and concentrations. This will be carefully reviewed and corrected where necessary. Anyhow the use of mixing ratios will be in most cases favored against that of concentrations as in the analysis of large-scale features there is a larger interest in conservative variables, for the sake of comparability of different world regions and atmospheric layers.

2) As recommended and to support a common notation the mixing ratios will be expressed in nmol/mol etc.

3) We will include the chemical mechanism as an electronic supplement, that's for sure a good way.

4) This will be corrected.

5) A typing error, it was meant to be SO3–.

6) Will be done.

7) Will be done.

8) Will be done.

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9) The CPU time analysis will be plotted as suggested to give a more clear picture of decrease of the improvement of model performance with the number of CPUs.

Interactive comment on Geosci. Model Dev. Discuss., 2, 385, 2009.