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Atmospheric Chemistry and Physics Discussions

Interactive comment on "A numerical modelling study on regional mercury budget for eastern North America" *by* X. Lin and Y. Tao

Anonymous Referee #1

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The paper represents the type of research needed to get a more complete picture of emitter-receiver relationships of atmospheric mercury species on regional scales. The CMAQ model system used with this study is one of the most advanced numerical modelling frameworks for simulating emissions, transport, transformations and deposition of various air pollutants ranging from urban to regional scales. Clearly, the mercury atmospheric processes scheme integrated in CMAQ in the framework of this study represent the actual state of knowledge in this field. The implementation of interactions of gaseous mercury species between the atmosphere and the earth surface is a substantial contribution to scientific progress in modelling atmospheric dispersion of mercury.

The paper is scientifically sound and very well written. All illustrations and tables are necessary, clear and suitably captioned.

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Given my predisposed favourable view of this paper I would like to suggest a slight extension of section 5.1. Model Validation: Comparing observed and modelled TGM concentrations averaged over the modelling period of about one month is not really a challenge for an advanced model system like CMAQ. Instead or in addition, hourly or at least daily average TGM concentrations should be compared if those data are available from the monitoring network. This comparison would give a more substantial insight into the model performance with respect to emissions and atmospheric transport.

Technical Corrections:

The reference Tokos et al. (1998) in Table 1 is missing in the reference list.

Reference Gardfeldt et al. (2001) co-author Stromberg (capital S).

Reference Burke et al. (1995) to be moved after Bullock (alphabetical order).

Reference Petersen et al. (1995) in section Introduction last paragraph on page 2 is missing in the reference list.

I recommend the paper to be published after attention to matters raised above.

Interactive comment on Atmos. Chem. Phys. Discuss., 3, 983, 2003.