

Home

Online Library ACP

- Recent Final Revised Papers
- [Volumes and Issues](#)
- Special Issues
- Library Search
- Title and Author Search

Online Library ACPD

Alerts & RSS Feeds

General Information

Submission

Review

Production

Subscription

Comment on a Paper

Impact  
Factor  
4.865

ISI  
indexed



[Volumes and Issues](#) [Contents of Issue 3](#)

Atmos. Chem. Phys., 3, 535-548, 2003  
www.atmos-chem-phys.net/3/535/2003/  
© Author(s) 2003. This work is licensed  
under a Creative Commons License.

## A numerical modelling study on regional mercury budget for eastern North America

X. Lin and Y. Tao

Kinectrics, 800 Kipling Avenue, Toronto, M8Z 6C4, Canada

**Abstract.** In this study, we have integrated an up-to-date physio-chemical transformation mechanism of Hg into the framework of US EPA's CMAQ model system. In addition, the model adapted detailed calculations of the air-surface exchange for Hg to properly describe Hg re-emissions and dry deposition from and to natural surfaces. The mechanism covers Hg in three categories, elemental Hg ( $\text{Hg}^0$ ), reactive gaseous Hg (RGM) and particulate Hg ( $\text{HgP}$ ). With interfacing to MM5 (meteorology processor) and SMOKE (emission processor), we applied the model to a 4-week period in June/July 1995 on a domain covering most of eastern North America. Results indicate that the model simulates reasonably well the levels of total gaseous Hg (TGM) and the specific Hg wet deposition measurements made by the Hg deposition network (MDN). Moreover, results from various scenario runs reveal that the Hg system behaves in a closely linear way in terms of contributions from different source categories, i.e. anthropogenic emissions, natural re-emissions and background. Analyses of the scenario results suggest that 37% of anthropogenically emitted Hg was deposited back in the model domain with 5155 kg of anthropogenic Hg moving out of the domain during the simulation period. Overall, the domain served as a net source, which supplied ~a half ton of Hg to the global background pool over the period. Our model validation and a sensitivity test further rationalized the rate constant for gaseous oxidation of  $\text{Hg}^0$  by hydroxyl radical OH used in the global scale modelling study by Bergan and Rodhe (2001). A further laboratory determination of the reaction rate constant, including its temperature dependence, stands as one of the important issues critical to improving our knowledge on the budget and cycling of Hg.

[Final Revised Paper](#) (PDF, 1269 KB) [Discussion Paper](#) (ACPD)

Citation: Lin, X. and Tao, Y.: A numerical modelling study on regional mercury budget for eastern North America, Atmos. Chem. Phys., 3, 535-548, 2003. [Bibtex](#) [EndNote](#) [Reference Manager](#)

Search ACP

Library Search

Author Search

News

- Sister Journals AMT & GMD
- Financial Support for Authors
- Journal Impact Factor
- Public Relations & Background Information

Recent Papers

01 | ACP, 11 Mar 2009: Measurements of Pollution In The Troposphere (MOPITT) validation through 2006

02 | ACPD, 10 Mar 2009: Regional differences in organic composition of submicron and single particles during INTEX-B 2006

03 | ACPD, 10 Mar 2009: First steps towards the assimilation of IASI ozone data into the MOCAGE-PALM system

04 | ACPD, 10 Mar 2009: