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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Speciated mercury at marine, coastal, and inland sites in New England – Part 1: Temporal variability" *by* H. Mao and R. Talbot

Anonymous Referee #2

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Overview:

The manuscript entitled "Speciated Mercury at Marine, Coastal, and Inland Sites in New England: Part I. Temporal Variability", by H. Mao and R. Talbot reports on the inter-annual, seasonal and diurnal variability in speciated atmospheric Hg at three measurement sites in New England. The analysis draws upon measurements of gaseous elemental mercury (Hg°), reactive gaseous mercury (RGM) and particle-bound mercury (HgP) made at a marine site (Appledore Island), a coastal inland site (Thompson Farm) and an elevated inland site (Pac Monadnoc) from 2004–2010 (data availability was not the same for each site).

A particular strength of this manuscript is that it compares the temporal variability of atmospheric Hg at three sites that, while located within a limited spatial domain (i.e., they are <200 km distant from one another), represent quite different local environments. The measurements from these sites therefore provide valuable information on factors influencing concentrations and speciation of Hg in the lower troposphere. Atmospheric Hg measurements provide key constraints in the development of models to describe the underlying processes governing the environmental cycling of Hg, yet the availability of such measurements is still limited at present.

My main criticisms are: (1) much of the discussion appears to be inconsistent/contradictory in comparison with tabulated data; (2) the results presented, and the associated discussion, are at times insufficient to support conclusions drawn; (3) grammatical errors are pervasive. These issues are discussed further below (see "Specific Comments"). The inconsistencies between the text and tables may be partly a result of the lack of a systematic statistical basis for describing the measurements, but they also suggest that the authors have not been careful in their analysis. These inconsistencies, together with grammatical errors detract from the value of the analysis and significantly weaken the paper.

While I feel this manuscript is relevant to the scope of ACP, my comments below highlight that major revisions are required before publication in ACP. I have provided a few suggestions on grammar under "Technical Corrections"; I have not highlighted every error I encountered.

Please also note the supplement to this comment:
http://www.atmos-chem-phys-discuss.net/11/C15054/2012/acpd-11-C15054-2012-supplement.pdf

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Interactive comment on Atmos. Chem. Phys. Discuss., 11, 32301, 2011.