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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Concentration-weighted trajectory approach to identifying sources of Speciated Atmospheric Mercury at an Urban Coastal Site in Nova Scotia, Canada" *by* I. Cheng et al.

Anonymous Referee #1

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Positives: 1) There are some good aspects of this paper, including a nice literature survey and statistical methods using back trajectories. 2) The discussion and explanation of CWTs and how they differ from PSCF is very good. 3) The paper is well written and easy to follow. It is well referenced. 4) The Hg measurements are first rate. There are not many reports of speciated Hg data in maritime Canada, an important region being that it is downwind of point sources in Canada and the U.S.

Negatives: 1) The fact that the trajectory model showed there were speciated Hg sources in the Atlantic Ocean and elsewhere calls into question the accuracy and ef-

ficacy of using this kind of trajectory approach for speciated Hg. 2) Because of the uncertainty of the output results (the CWT plots) can the authors say whether speciated Hg originates globally, regionally, or locally? I don't think they can. Example of conjecture is lines 292-296. Just because the trajectories gave a result, should we then conclude that these areas are sources of Hg? It seems too simplistic to me. 3) What if a trajectory endpoint segment resided in a grid cell at 5 km altitude? Would it still be counted in the CWT? This seems like a real problem because how could an air mass at such a high altitude pick up pollutants emitted at the surface? Can you filter the CWTs to include only those that are < 1 km altitude for example?

Section 3.4 is kind of interesting and suggests the trajectories could be telling us something. Section 3.5 seems like conjecture and may be superfluous Section 3.6 has a lot of conjecture as well.

Overall impression: 1) Nice to have more speciated Hg data in the literature, but I'm not sure the authors have satisfied their objectives which were: "identify regional source areas contributing to speciated atmospheric Hg measurements at an urban site in Dartmouth, Nova Scotia, Canada" and "address potential local sources of Hg".

Interactive comment on Atmos. Chem. Phys. Discuss., 13, 4183, 2013.