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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Top-down constraints on atmospheric mercury emissions and implications for global biogeochemical cycling" *by* S. Song et al.

Anonymous Referee #1

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The paper by Song et al. presents results from an inverse modeling study of global mercury emissions. The data uses a sound modeling approach and a wealth of measurement data. The paper is clearly written and the results significant. The model is used to constrain uncertainties in processes affecting mercury emissions from ocean surfaces as well as emissions from anthropogenic sources. Given the extensive amount of work and the apparent soundness of the results, publication is recommended for ACP.

A weakness of the study is the very modest improvement in model performance due to the inversion as discussed on page 5286. This is not unexpected given the uncertainties in simulating mercury. The last paragraph of the conclusions discusses these

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issues, but I would recommend an extra sentence or two in the conclusions to connect the discussion in uncertainties with the small increase in model performance.

On a minor note, Fig. 2 could benefit from a more complete caption.

Interactive comment on Atmos. Chem. Phys. Discuss., 15, 5269, 2015.