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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Tropospheric bromine chemistry: implications for present and pre-industrial ozone and mercury" *by* J. P. Parrella et al.

Anonymous Referee #1

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The authors present a new model of tropospheric bromine chemistry which successfully reproduces the main features of the satellite observed tropospheric BrO climatology. The good agreement with the observations was, to a large extent, achieved by assumptions about the heterogeneous HOBr + HBr -> Br2 + H2O reaction which is an important pathway to recycle bromine radicals. The inclusion of bromine chemistry decreases the difference between the observed and modeled lifetime of methyl chloroform and comes near to explain very low ozone concentrations in surface air observed some hundred years ago. Another implication of the model is its prediction that the tropospheric Hg(0) lifetime in the preindustrial troposphere was about half of its present lifetime.

The results of the model are impressive and they represent a further improvement of the model by Holmes et al. (2010). The paper is well organized and lucidly written and can be published as it is. Only the last paragraph of Section 7 is difficult to understand probably because the authors tried to simplify a complicated story worth of an entire paper in preparation. As this paragraph contributes neither substantially to a description of the model nor to a discussion of its implications, I would recommend to delete it.

Interactive comment on Atmos. Chem. Phys. Discuss., 12, 9665, 2012.