

Interactive comment on “Source apportionment and sensitivity analysis: two methodologies with two different purposes” by Alain Clappier et al.

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My co-workers and I have recently developed a method that provides a direct, mathematical connection between sensitivity analysis and source apportionment. (See references below.) The path-integral method involves integrating sensitivity coefficients over a range of emissions between two simulations. The integrals correspond to the contributions of the different emission sources to the change in concentrations between the two simulations. If the two simulations are a base simulation with anthropogenic emissions included and a background simulation without anthropogenic emissions, then the change in concentrations is the anthropogenic increment to ozone and other pollutants. This path-integral method has a number of advantages, and it would be good if A. Clappier et al. included the method in their review.

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A. M. Dunker, Path-integral method for the source apportionment of photochemical pollutants, *Geosci. Model Dev.* 8, 1763-1773, 2015.

A. M. Dunker, B. Koo, G. Yarwood, Source apportionment of the anthropogenic increment to ozone, formaldehyde, and nitrogen dioxide by the path-integral method in a 3D model, *Environ. Sci. Technol.* 49, 6751-6759, 2015.

A. M. Dunker, B. Koo, G. Yarwood, Contributions of foreign, domestic, and natural emissions to US ozone estimated using the path-integral method in CAMx nested within GEOS-Chem, *Atmos. Chem. Phys. Discuss.*, doi:10.5194/acp-2017-366, 2017.

Interactive comment on *Geosci. Model Dev. Discuss.*, <https://doi.org/10.5194/gmd-2017-161>, 2017.

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