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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Estimating the size of a methane emission point-source at different scales: from local to landscape" *by* Stuart N. Riddick et al.

E. Harris (Editor)

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Please find below an additional referee comment:

A plot included in the response to reviewer #2 appears problematic. This is the plot under "Supplementary Material Section 2: Scatterplot of posterior enhancements vs. observed enhancements".

There are three problems with this plot. The first two are matters of presentation, and the third is scientifically substantive.

First: these are not enhancements, they are concentrations. In the inverse modeling literature an enhancement is the concentration of the constituent at the observation site minus the background. A plot of modeled vs observed enhancements allows one

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to separate the variability in the background from the variability in the influence of local emissions. When one plots modeled vs. observed concentrations, a well modeled background will hide problems with the model of the emissions.

Second: the points in this plot are so dense that they are indistinguishable. There are plotting strategies that can ameliorate this, like coloring by point density or contouring.

Third, and most importantly, I think this plot indicates a problem in the model. There appears to be heteroscedasticity in the model residuals. This is likely due to the fact that the background was not subtracted. The variation in the model and observed background is likely falling along the 1-1 line, and the enhancements are likely falling off of it. There appears to be a number of highly influential outliers.

A plot of modeled vs observed enhancements is generally considered among the most basic diagnostic plots for an inverse analysis. It would be good to see this type of plot for every site and every model. It isn't clear for which model this plot is showing.

Interactive comment on Atmos. Chem. Phys. Discuss., doi:10.5194/acp-2016-963, 2016.

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