

# ***Interactive comment on “Inferring the anthropogenic NO<sub>x</sub> emission trend over the United States during 2003–2017 from satellite observations: Was there a flattening of the emission trend after the Great Recession?” by Jianfeng Li and Yuhang Wang***

**Anonymous Referee #1**

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There are a number of recent papers on the topic of NO<sub>x</sub> emission trends in the United States as observed from space and as compared to predictions from models. The papers raise issues about the emission models, about the resolution of measurements and models needed to derive accurate trends, about interpretation of satellite observations including whether and how the regional background is included in the trend analysis, and whether the lifetime of NO<sub>x</sub> is also changing with time affecting interpretation of temporal trends. The analysis in this paper focuses on nonlinearities in

chemistry which is related to the question of chemical lifetime. The analysis in the paper seems solid and the discussion and conclusions try to put the paper in context of the recent literature.

I recommend the abstract be revisited in light of the discussion and conclusions as now written.

I also recommend the authors consider whether they can make some more general conclusions about the role of nonlinearities that are the focus of their work as a guide to future research. For example does this research help push forward the conversation about the model resolution needed to describe NO<sub>x</sub> to a specified accuracy? Other papers suggest that 36km might not be sufficient for the absolute accuracy the authors are trying to achieve. On the other hand there might be cancellation of errors in computation of trends that allows use of lower resolution for questions about trends?

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Discussion paper

