

## Authors' Response to Reviews of

# NMVOC emission optimization in China through assimilating formaldehyde retrievals from multiple satellite products

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EC: Editor' Corrections, ☐ Manuscript Text

## 1. Overview

Response to Editor: Thank you very much for accepting our revised manuscript for publication in *Atmospheric Chemistry and Physics*. We sincerely appreciate your time and careful handling of our manuscript. The listed technical corrections have been fully implemented in the final version.

## 2. Corrections

EC: 1) page 4, line 13: "in turn reduces" => "in turn increases"fer to the suggestions and comments made by the other reviewer.

Text in manuscript

### 1 Introduction

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Because glyoxal is retrieved in a longer wavelength range ( $\sim 435\text{--}460\text{ nm}$ ) than formaldehyde ( $\sim 330\text{--}360\text{ nm}$ ), it exhibits markedly lower sensitivity to molecular scattering, which ~~in turn reduces~~in turn increases the sensitivity of the measurement to the lower troposphere (Palmer et al., 2001; Chan Miller et al., 2014).

EC: 2) page 4, line 14: "Moreover, glyoxal" => "Glyoxal"

Text in manuscript

### 1 Introduction

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~~Moreover, glyoxal~~Glyoxal optical depths are very weak (order of  $10^{-4}\text{--}10^{-3}$ ), rendering the retrieval highly susceptible to fitting residuals from stronger absorbers, uncertainties in absolute radiometric calibration, and spectral features in surface reflectivity (Sinreich et al., 2013; Alvarado et al., 2014).

EC: 3) page 5, line 10: "to apply" => applying"

Text in manuscript

## 1 Introduction

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Top-down approaches, mainly assimilation techniques, with satellite formaldehyde columns have become the primary method for constraining NMVOC emissions. Palmer et al. (2003) pioneered ~~to apply~~ applying a Bayesian inversion framework with GOME formaldehyde observations for constraining isoprene emissions over North America. (Sinreich et al., 2013; Alvarado et al., 2014).

EC: 4) page 5, line 16: "*the underestimated*" => "*an underestimation of*"

Text in manuscript

## 1 Introduction

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Concurrently, Millet et al. (2008) used OMI formaldehyde and identified ~~the underestimated~~ *an underestimation of* isoprene emissions over the north-central United States, while Zhu et al. (2014) reported that anthropogenic emissions of highly reactive VOCs (HRVOCs) in the Houston area were underestimated by a factor of  $4.8 \pm 2.7$  compared to the US Environmental Protection Agency inventory.

EC: 5) page 5, line 35: "*relatively scarce in recent years*" => "*scarce*"

Text in manuscript

## 1 Introduction

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Although substantial progress has been made globally in satellite-based top-down constraints on NMVOC emissions, high-resolution top-down emission optimization studies specifically over China remain ~~relatively scarce in recent years~~ *scarce*. Shim et al. (2005) first used GOME formaldehyde observations in a global Bayesian inversion framework to constrain isoprene emissions.

## References

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