

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" per 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 435–460 nm) than formaldehyde (\sim 330–360 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} – 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 ± 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.

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