

Interactive comment on “Characterization of a catalyst-based total nitrogen and carbon conversion technique to calibrate particle mass measurement instrumentation” by Chelsea E. Stockwell et al.

Anonymous Referee #1

Received and published: 2 February 2018

In this well written manuscript, the authors present the characterization of a catalyst-based total nitrogen and carbon conversion technique to calibrate particle mass measurement instrumentation, as clearly reflected in the title of the manuscript. Set-up, methodology, and conversion efficiencies for particle-bound nitrogen species are thoroughly discussed. The authors convincingly describe, that the instrument is capable of quantitatively converting a range of particle-bound nitrogen species and provides an online signal of total reactive nitrogen from both gas- and particle-phase, which is very useful for the assessment of nitrogen cycling in the atmosphere. The con-

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version of particle-bound carbon via a platinum catalyst is described for a number of organic compounds in laboratory-generated aerosols, while an application to the atmosphere remains challenging due to the small signal compared to background CO₂. Nevertheless, a simultaneous detection of total reactive nitrogen and total carbon in one instrumental set-up is a promising perspective. However, the organization of the manuscripts' content could be improved to increase the value of the paper. For example, clearly dividing the subjects instrument characterization (instrument set-up and experiment design, gas-phase N_r conversion efficiency, particle-phase N_r conversion efficiency, particle-phase C conversion efficiency, proof of concept - N_r measurements of biomass burning), and particle mass measurement calibration (laboratory generated aerosols, comparison with PILS-ESI/MS) in sections 2 and 3. A reader could then very quickly see why this new instrument is worth learning about. After addressing content organization and the specific comments listed below, the paper will be very well suited for publication in AMT.

Specific comments:

1. Could you think of a more representative name or acronym for your instrument? The term N_r instrument does not totally reflect the purpose of the instrument in my opinion
2. Please include more recent references on P. 2 L. 6, e.g., Jimenez, et al. 2009, Science; Hallquist et al. 2010, ACP; etc.
3. You sometimes speak of “these experiments” or “these studies” in the manuscript, please consider revising these statements for clarity and readability
4. The purpose of the MoOx catalyst, i.e., reducing NO₂ to NO, is not clearly stated in section 2.1
5. Please carefully check through the manuscript again and try to revise extensive and anecdotic paragraphs for conciseness. Exemplarily, please have a look at lines 6 – 29 on page 7 and revise this paragraph.

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Exemplary technical comments:

P. 4, L. 3 should read “mass spectrometric detection”

P. 12, L. 20: should read “transfer lines”

P. 13, L. 18: should read “Conventionally, . . .”

and other small mistakes, which should be considered upon revision of the manuscript

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