

# ***Interactive comment on “A Steady State Continuous Flow Chamber for the Study of Daytime and Night time Chemistry under Atmospherically Relevant NO levels” by Xuan Zhang et al.***

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Studying atmospheric processes such as isoprene oxidation under realistic concentrations of NO<sub>x</sub>, hydrocarbons and radicals is an important goal in chamber studies. Improvements in VOC measurement techniques allow these compounds to be measured at low concentrations with a resulting decrease in the radical concentrations required to detect measurable differences in concentrations and in general to operate at concentrations much closer to those of ambient conditions, providing a better test of chemical models. However, working at ambient concentrations extends the duration of the exper-

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Discussion paper



iment; this has a practical effect on the number of repetitions, but potentially increases the role of heterogeneous chemistry.

The authors present initial data from a new steady-state, slow continuous flow chamber looking at background chemistry and reporting some initial results on isoprene oxidation. I think it would be helpful for the authors to address the following points to improve what is already a good paper.

1) As Ref #1 has already commented, it would be helpful to provide some comparisons with other chambers which are capable of operating under zero to medium NO<sub>x</sub> conditions.

2) AMT is a technical journal and so I think it would be appropriate to include some more technical aspects (e.g. spectra of the lamps, temperature profiles across the chamber when lamps in operation, rationale for minimum 10% rel humidity - presumably it would be possible to run with cylinder air if necessary). Is the air in the chamber mechanically mixed or just relies on incoming air flow? How was the mixing time determined?

3) An important aspect of any simulation chamber and particularly one with long reaction times is the reproducibility of the results. Have repeat measurements been carried out? When working with higher concentrations of NO<sub>x</sub> is there any evidence of wall reactions or that the walls can be a source of HO<sub>x</sub> (HONO)?

4) Isoprene chemistry is a topical and very important subject, but, as the authors point out, it is a system where there is still some uncertainty in the chemistry. Have the authors carried out any intermediate studies (e.g. ethane or butane oxidation) where the chemistry is better defined. Reproducing results from a simpler VOC system would give greater confidence that the excellent data obtained for isoprene can be directly compared with the literature.

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