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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Development and chamber evaluation of the MCM v3.2 degradation scheme for β-caryophyllene" *by* M. E. Jenkin et al.

Anonymous Referee #2

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The authors present in this manuscript a "detailed" degradation mechanism for one of the most important sesquiterpene emitted to ambient atmosphere: beta-caryophyllene. The authors use the MCM mechanism that is build using solid knowledge of kinetic degradation of b-caryophyllene as well as its degradation products. The performance of the MCM mechanism was evaluated using a series of experimental data obtained either from the literature or originated directly from smog chamber experiments conducted by the authors. The experimental data comprises a wide variety of conditions: e.g. ozonolysis, photooxidation in the presence of NOx etc... Although the model is very complex (280 multi-functional compounds) and is based on a variety of assumptions as well as its combination with chamber auxiliary mechanism developed using another smog chamber (wall chemistry), the model seams to produce a reasonably well picture of the SOA as well as products distribution either in the gas or in the particle phases.

As mentioned by the authors, the mechanism is based on a detailed degradation of b-caryophyllene that is expensive and time consuming to be implemented directly in applications requiring great computational efficiency. It will be suitable if the authors provide to the scientific community a condensed mechanism for b-caryophyllene to be implemented in air quality models focusing on the main products that lead to ambient SOA formation from b-caryophyllene (e.g. b-caryophyllinic acid that was detected in ambient aerosol).

It's clear to me that the paper is long however it provides useful and needed informations for b-caryophyllene that its chemistry is still difficult to understand.

The auxiliary chemistry is not discussed appropriately to reflect the importance of wall chemistry! Mainly when using wall chemistry to characterize a chamber that was not used to generate the experimental data set used for the evaluation of the MCM mechanism! This becomes more complicated when using data from a series of smog chambers that their experimental characterization is not available/associated with the set of data used for the mechanism)! Does the wall chemistry is dependent on the history of each chamber? Comment(s)!

The paper need to be edited carefully for errors. Mainly the authors need to check the reference section: there are references missing from the reference section! Years are not accurately reported for some references etc...

The topic of this manuscript is of great interest and appropriate to ACP. The paper should be published after the authors address the comments raised above.

Interactive comment on Atmos. Chem. Phys. Discuss., 12, 2891, 2012.