

Response Letter to Editor for:

Reactive Organic Carbon Emissions from Volatile Chemical Products

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Thank you to the editor for reviewing our manuscript and suggesting changes that provide additional clarity. Nearly all revisions were adopted, as suggested. Please see below where all notes are addressed, point-by-point.

Editor:

lines 16-19 are confusing as written (and in the introduction). Part of the confusion is that it is unclear what “these processes” refer to and it is easy to read “use” before “use timescale” as a verb. After reading the methods, it is suggested to revise as: “We introduce two timescales to describe the net evaporative behavior of a compound from a VCP mixture: evaporation timescale and use timescale.” A similar rephrasing is recommended in lines 85-87. In addition, it is recommended that 2.1.5 section heading be written as “Evaporation- and Use-Timescales” or “Evaporation Timescale and Use Timescale” (since these timescales are not hyphenated in the text).

We updated lines 16-19 to the following:

“Evaporation of a species from a VCP mixture in the VCPy framework is a function of the compound specific physiochemical properties that govern volatilization and the timescale relevant for product evaporation. We introduce two terms to describe these processes: evaporation timescale and use timescale, respectively.”

Lines 85-87 have been updated, as well, to be consistent. The heading for section 2.1.5 has been updated.

lines 24-25: Suggested revision to: “VCPy predicts higher emissions than the NEI for approximately half of the counties, with 5% of all counties having greater than 55% higher emissions.”

Revised.

line 26: VCPy is introduced as a framework. Thus it is unclear how a framework can report something. Suggest revision to: “Categorially, application of the VCPy yields higher emissions for...”

We updated this line to:

“Categorially, application of the VCPy framework yields higher emissions for...”

line 27: Suggest to replace “in the methods employed here” with “using the VCPy framework”

Replaced.

line 38: Suggest to introduce “O3” here (“tropospheric ozone (O3) and secondary organic aerosol (SOA).”) and use throughout. (Appears for the first time in line 470, section 3.5.)

Introduced.

lines 49-55: Is there a reason NMVOC and VOC abbreviations introduced here are not “NMVOCs” and “VOCs”, whereas VCP abbreviation is introduced as VCPs? The use in all cases is as a plural noun (adjective should be singular), and “VOCs” appears subsequently in the manuscript.

Updated.

line 74: Suggest to revise as “biased low”

Revised.

lines 89-91: Suggest to revise as: “In addition, we test the sensitivity of predicted emission factors to uncertain parameters, such as evaporation; and use timescales, through Monte Carlo analysis, to evaluate the VCPy inventory using published emission ratios, and to estimate the effective SOA and O3 formation potential of both the complete sector and individual product use categories.”

We updated the sentence to the following:

“In addition, we test the sensitivity of predicted emission factors to uncertain parameters, such as evaporation timescale and use timescale, through Monte Carlo analysis, evaluate the VCPy inventory using published emission ratios, and estimate the effective SOA and ozone formation potential of both the complete sector and individual product use categories.”

line 103: Suggest to revised “organics component” as “organic component” (consistent with previous sentence and subsequent use).

Revised.

line 132: Remove “nationally” at the end of the sentence (already established that this is national level). Also, check the use of “national level” throughout. When used as an adjective, sometimes it is hyphenated (e.g., 392, Fig. 7) and sometimes it is not (e.g., line 411, 567). Similarly, recommended changing 3.3 header (line 414) to and Figure S3 caption to: “State- and County-Level ...”.

Updated and checked.

line 153: Suggest to revise as “The organic component is further decomposed into non-evaporative and evaporative organics.”

Updated.

line 244: “KOA” should be italicized (KOA is preferred throughout (italics only on the variable "K" and not abbreviation "OA", but should at least be consistent with other appearances).

Updated.

line 253: The use of “in contrast” is a little confusing since these products are in the same PUC. Suggestion to reword as follows: “As such, these Short Use Personal Care Products are assigned a “Minutes” use timescale. However, it is also assumed that each person bathes once a day and associated Daily Use Personal Care Products are therefore assigned a “Days” use timescale.”

Updated.

line 359: “compound class” should be “compound classes”

Updated.

line 364: “comprise” should be “compose”

Updated.

line 555: Suggest to add “O3” before “MIR”

Added.

Additional notes:

In Table S1 and S2, a column header in each table was updated from “NAICS Codes” to “NAICS Product Codes” for additional clarity.