

Dear Editor(s),

Thank you for reviewing the manuscript. We have addressed all the raised points and revised the manuscript accordingly. Please see below for the detailed answer (in blue) for each point.

Best regards,
Shuaiqi Tang

Dear Authors,

Thank you for revising the manuscript. I am providing below a set of remarks based on reading the revised version of the paper and the reviews.

Please address the following points:

* Appendix A requires a substantial refactoring if aimed for publication both in terms of content and presentation. Units and descriptions should be provided for all items, and all rows must have understandable meaning. NB, "namelist" is not a part of Python nomenclature or jargon.

As response to a later comment, we uploaded the model configuration and execution scripts as electronic supplement, which include the content in Appendix A. Therefore, we removed this appendix from the main text.

* In the reply to comments from both reviewers, there is a mention of newly added "In the future, this diagnostics package ..." paragraph with new references (Zuidema et al. 2018, Redemann et al., 2021, Brock et al., 2019), which cannot be found in the uploaded revised manuscript.

Thank you for catching this error. This paragraph is now added in the revised manuscript (line 559-565 in the revised manuscript).

* Reproducibility: please add information to the Code Availability section on the way to and any legal constraints to obtain code and reproduce results of the EAMv1/MAM4 model simulations ("In this study, we run the model from 2012 to 2018", ... "we performed an EAMv1 simulation using the regionally refined mesh ..."). Note that according to GMD guidelines, such specification includes precise version specification of the model code as well as configuration files, model execution automation scripts as

well as output analysis scripts. All these files must be stored in a persistent repository such as Zenodo (or provided as an electronic supplement to the paper).

We added version information and DOI for the model code used in this study:

“The model simulation used in this paper is version 1.0 of E3SM (<https://doi.org/10.11578/E3SM/dc.20180418.36>). The model configuration and execution scripts are uploaded as electronic supplement to this paper.”

The model configuration and execution scripts are uploaded as electronic supplement of this paper.

* page 30 / line 535 - please archive this resource as well (can be either Zenodo or electronic supplement to the paper)

we archived this resource as an electronic supplement of the paper and revised the text regarding this supplement:

“A full set of diagnostics plots and metrics for simulations used in this paper are available at https://portal.neresc.gov/project/m3525/sqtang/ESMAC_Diags_v1/forGMD/webpage/ and archived as an electronic supplement of this paper.”

* Similarly as with reviewer-suggested specification of what "size" means (mobility/optical dry diameter), I suggest to specify if concentrations are given "at standard temperature and pressure" conditions or in ambient conditions or where which option is used. (see, e.g., [https://scholar.google.com/scholar?q=+concentration+"standard+temperature+and+pressure"+ccn](https://scholar.google.com/scholar?q=+concentration+))

We added the sentence “All in-situ measurements are converted to under ambient temperature and pressure.” In line 162-163 of the revised manuscript.

* Please refrain from using subjective statements regarding easiness of further code modifications (unless depicting such developments with examples):

- remove "easily" in the abstract (p1/l27, also suggest removing last sentence of the abstract)

Revised as suggested

- remove "Only minimal modifications to the diagnostics package are needed ..."
(p4/l102-102)

Removed as suggested

- remove "It is relatively straightforward to add ..." (p4/l114-115)

Removed as suggested

- rephrase "can be easily implemented" (p30/l525)

This sentence is revised as "The code structure is designed to be flexible and modular for future extension to other field campaigns or additional datasets."

- remove "It can also be applied to evaluate other ESMs with small modifications"
(p30/l540)

This sentence is revised as "It can also be applied to evaluate other ESMs with necessary modifications to fit different model output formats."

* Whenever referring to 25%-75% percentiles, perhaps worth to use the notion of "inter-quartile range"

We replace some of the "25%-75% percentiles" with "inter-quartile range" (lines 255, 270, 277, 358 in the revised manuscript), but keep those when they appear with 5% and 95% percentiles for consistency.

* unclear statement: "aerosol properties decrease with height" (p17/l325-326)

This sentence is revised as "The observed aerosol concentrations of number and chemical composition decrease with height"

Hope that helps,
Best regards,
Sylwester Arabas