

Responses to Reviewer' Comments for Manuscript

EGUSPHERE-2024-2508

Tuning the ICON-A 2.6.4 Climate Model with Machine-learning based Emulators and History Matching

Addressed Comments for Publication to

GMD

by

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Fernando Iglesias-Suarez, Veronika Eyring

Dear Editor Dr. Caldwell,

We would like to thank you and the reviewer for the additional valuable comments which helped us to further improve the quality of our manuscript. We have carefully addressed these comments. A summary of main modifications and a detailed point-by-point response to the comments are given below.

We hope that our paper can now be accepted for publication, and we are looking forward to your reply.

Sincerely,

On behalf of all authors,

Pauline Bonnet

Note: To enhance the legibility of this response letter, all the reviewer's comments are typeset in boxes.

Authors' Response to the Editor

Comment 1

I think there is a missing word in the second sentence of the abstract.

Response: We thank the reviewer for noticing this.

We changed “This is traditionally a computationally expensive step as it requires a large number of climate model simulations, which becomes more challenging with increasing spatial resolution and complexity of climate models.”

Into these two sentences: “This is traditionally a computationally expensive step as it requires a large number of climate model simulations. This step also becomes more challenging with increasing spatial resolution and complexity of climate models.”

Comment 2

I don't really understand (and not sure to agree with what I understand) the end of the paragraph after "History matching aims at minimizing the number of required model simulations in the search of optimal [I would have said acceptable rather than optimal] parameters ..."

But it can stay as it is.

(line 80 of the pdf with track changes)

Response: We agree with the reviewer.

We changed “optimal” into “acceptable”. (in the new line 61 of the updated manuscript).

Comment 3

Section 3.2.2 I think there is a word missing in "the sample variance the distribution" at line 369 in the pdf whth track chanegs. And at line 375 the sentence starting by "Looking at panels (d) and (e) " is repeated.

Response: We thank the reviewer for these comments.

- We changed “ $\text{Var}_x(\text{Yemul})$ denotes the sample variance of the emulator over the distribution of all parameters x , $\text{Var}_{x_i}(\cdot)$ the sample variance the distribution of parameter x_i ,” into: “ $\text{Var}_x(\text{Yemul})$ denotes the sample variance of the emulator over the distribution of all parameters x , $\text{Var}_{x_i}(\cdot)$ the sample variance of the emulator over the distribution of parameter x_i ,”
- We deleted the repeated sentence starting with "Looking at panels (d) and (e) "