

RC2: ['Comment on egusphere-2023-2720'](#), Anonymous Referee #2, 18 Dec 2023

COMMENTS TO THE AUTHOR(S)

A comprehensive and objective evaluation of Earth System Models (ESMs) is essential to understand the strengths and weaknesses of individual ESMs and to provide a basis for model improvement. This paper provides an overview of the PCMDI Metric Package (PMP) Version 3, which provides a "quick-look" objective comparison of ESMs to each other and to observations. The purpose, flow, and explanation of the present paper were well written in a concise and easy to understand manner. I expect that the PMP package will be more useful in the context of the CMIP7 project and subsequent phases. I have only a few suggestions before the publication of this paper in the GMD journal.

We appreciate the reviewer's time and their constructive comments. Please find our point-by-point response below, text colored in blue.

General suggestion:

I am so curious about how to install the PMP package on my local computer as a user, and what are the requirements for a successful installation. This is the most basic and critical question that readers may have. While the author provides a GitHub link for the related information, I believe it is essential to have a dedicated section in this paper with a brief explanation. This will serve as a catalyst for more readers to become actual PMP users.

We agree that information for installation is important and it is worth including in the paper. To respond, we included the following additional descriptions.

In Section 2:

"The PMP leverages other Python-based open-source tools and libraries. Its installation process is streamlined and user-friendly, leveraging the Anaconda distribution and the conda-forge channel. By employing conda and conda-forge, users benefit from a simplified and efficient installation experience, ensuring seamless integration of PMP's functionality with minimal dependencies. This approach not only facilitates a straightforward deployment of the package but also enhances reproducibility and compatibility across different computing environments, thereby contributing to the accessibility and widespread adoption of PMP within the scientific community. The pointer to the installation instructions can be found in the Code and Data Availability section."

In the Code and Data Availability section:

"PMP's installation process is streamlined using the Anaconda distribution and the conda-forge channel (https://anaconda.org/conda-forge/pcmdi_metrics, last access: 21 February 2024), and the installation instructions are available at http://pcmdi.github.io/pcmdi_metrics/install.html (last access: 21 February 2024)."

We however decided to not include further detailed technical steps in the manuscript because they will likely evolve with technological advances, and we would rather this description not become obsolete. Details are however provided online where they can be updated as needed.

Minor comments:

Lines 101-102: I am just wondering if the PMP can be used to evaluate the regional climate models that participated in the RCM project, such as CORDEX. The authors could briefly discuss this or any related future plans (if the authors have any) in the discussion section.

Thank you for this important point. Although the PMP has been traditionally focused on the global scale evaluations, the PMP team has been interested in broadening the PMP's scope to enable regional climate applications. This could be considered in connection with the evaluation of high-resolution models. In the original submission we have discussed this as "*This application of the PMP aligns with a broader plan for regional expansion, with a deliberate emphasis on processes intrinsic to specific regions*" in the "Summary and Future Directions" section of the original manuscript.

In the revised manuscript, we expanded the original text as follows and moved the text to the "Discussion" section to make it more noticeable.

"These example enhancements of the PMP are indicative of an increasing priority to target regional simulation characteristics. With a deliberate emphasis on processes intrinsic to specific regions, this may lead to enabling potential applications of the PMP within the regional climate modeling activities such as Coordinated Regional Downscaling Experiment (CORDEX; Gutowski Jr. et al., 2016)."

Figure 1. Are all model grids (or just land?) used in the evaluation? It would be helpful to indicate this in the figure caption.

Following the comment, we have added the following description to the caption: "The RMSE is calculated over the globe including both land and ocean, and model and reference data were interpolated to a common 2.5x2.5 degree grid."

For Abbreviation:

Thank you for pointing out the below missing full names. In addition to responding to each of the comments, we also have added a table of acronyms as Appendix A.

Line 37 (Abstract): Provide the PCMDI's full name.

Revised accordingly.

Line 247. Provide the ITCZ's full name.

The full description, “intertropical convergence zone” is added.

Line 288. Provide the DOE's full name.

“U.S. Department of Energy (DOE)” is added.

Line 344. Provide the GoG's full name.

“GoG” is replaced by “Gulf of Guinea”.

Line 466. Provide the ESGF's full name.

Earth System Grid Federation (ESGF) was introduced in Section 2 so we didn't re-introduced it here, but we have added Appendix A for list of acronyms to help improve readability.