Geoscientific

Model Development

Discussions

[GMDD]

Interactive

comment

Interactive comment on "Spatio-temporal consistent bias pattern detection on MIROC5 andFGOALS-g2" *by* Bo Cao et al.

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The manuscript presents the description of a method to cluster and classify main regions of bias in 3D grids and its application to the outputs of two climate models. The merit of the work is fair, improved by the fact that the code is shared and licensed under GPLv3. However, there are several shortcomings that need to be addressed.

The proposed methodology is, someway, not new. Clustering analysis has been used to check model performance now for a long time and this is not properly put into context in the Introduction. It is surprising that the work by Yokoi et al. (2011) is not cited at all (https://doi.org/10.1175/2011JAMC2643.1) when moreover uses as examples MIROC5 and FGoals1. However, in the Introduction the authors cite other works

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that simply put the focus on regional studies or features, such as the ITCZ. I strongly recommend the authors to perform a better and more complete review of the literature on this topic and improve this section.

Also, the code (see also comment from the executive editor about using ZENODO) includes a README file, but this file does not contain any information about the structure of all the code in the repository. It should explain what each 'program' does and list all the files in the repository. Moreover, the different pieces of code that you share, do not have comments at all. Including commentaries in the code explaining what every set of routines or group of code does, is a basic request in software development and very important when you share it. Therefore, please, include adequate commentaries in the software with explanations. Finally, in the text of the manuscript, when you mention the analysis and the tool to generate Figure 3, include the name of the code/routines that use to do it and make clear to the reader that they can be accessed from the link available in the 'Code and data availability section'.

Other minor issues:

- the current title of the manuscript is misleading. Readers can think that you perform a full detection and study of bias in the two models mentioned. Indeed, your manuscript is about a clustering technique and MIROC and FGOALS are simply used as testbeds without any interpretation. The title should reflect this, maybe something similar to 'An algorithm for spatio-temporal consistent bias pattern detection: a case study using MIROC5 and FGOALS-g2'

- If you want to highlight the relevance of climate models for the study of climate change, probably the papers that you cite in the second line of the Introduction are not the most suitable. Better use Taylor et al. (2012) or IPCC reports.

- When you mention the CMIP5, please, cite the paper by Taylor et al. (2012) (https://doi.org/10.1175/BAMS-D-11-00094.1).

- The last sentence on page 2 is unnecessary, delete it.

- When you state on page 3 (first paragraph) that the computational cost would be too high, please, include extra detail at least on orders of magnitude of how more expensive it would be.

- when you mention the models used, please, provide links and cite the relevant papers with the description of the models.

- the citation and reference to HUANG Xin is capitalized, fix it.

- page 7: you have already explained what CMIP5 stands for in page 1, you do not need to repeat it here.

Interactive comment on Geosci. Model Dev. Discuss., https://doi.org/10.5194/gmd-2019-107, 2019.