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Open Access Earth System Science Data Discussions

Interactive comment on "An open-access CMIP5 pattern library for temperature and precipitation: Description and methodology" *by* Cary Lynch et al.

Anonymous Referee #2

Received and published: 12 March 2017

Summary: The paper presents a library of patterns from CMIP5 models, generated using two published methodologies, which are then compared. The value of the work lies in the fact that it takes a lot of time and resources to compute these spatial patterns, so making it available to the community would facilitate advances in this field. Also, a standardized comparison helps users to recognize the strengths and weaknesses of the two methodologies. The results are provided to the public, packaged with documentation, code, etc., and associated with a doi.

This paper appears to be written out as a science report with a data, methods and results section, rather than a dataset description. I expected an explanation of the library content, i.e., structure of files, as well as how to access, and applications. The

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paper is well written and clear, but it is the content and organization that could be improved. I suggest a re-write for greater clarity to potential users of this dataset. In particular, Section 5 seems to be added at the last minute. This is the section that users will read for a description of the data so it could be expanded, and information in other sections could be moved here. As such, it could be inserted earlier. Also, the two access points of the library do not have the same contents, and are not fully described in the article reviewed. In fact, my impression from reading the paper was that results for both methodologies were available, and that it was limited to 12 models. It took several re-reads, and examination of the files to understand that this was not the case.

Specific comments.

1. I had was confused by the description provided in that it discusses the application of methodology to only 12 models that met certain criteria needed for the comparison, and only the first realization. It is not clear what was done for these other models for which there are files are available at the access sites. Does the library contain results for both methods? The netCDF file contained only temperature and precipitation output, seemingly for one method only.

2. The paper shows results for temperature, but the library contains precipitation. Since these two variables behave quite differently on a global and temporal scale, it would be worth showing some precipitation examples, and perhaps go less in depth about temperature.

3. There should be a clearer explanation about the difference between the two access points. At the doi location (mentioned in the abstract), one can download the entire packaged zipped. Once unzipped, the README is hard to open because it contains scripting language so the laptop software refuses to open it. Only annual patterns are found here. In the github location (mentioned in the section 5), one can download only single files, but the README displays easily. Once downloaded, NetCDF files from both locations open easily. Also, one site appears to have only annual files.

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4. Rather than merely listing the variables, it would have been more useful to a potential user to get a brief recap of what the variables represent or refer back to the appropriate section. For example, the grid size depends on the original model grid. Why not refer back to Table 1 for the 12 models? What about the other models? Also it was not clear if the patterns were derived on the coarse grid and then remapped, because the comparison was done on a common grid. Where is the description of the analysis done on native grid?

5. I cannot validate this product. The closest thing to a "validation" for this type of product might be a computation of the scaling patterns for the last 20-50 years, using the decades prior to that as the baseline, i.e., an L20C/M20C. In this way, the user can see how a model captured the changes in the last few decades, and compare with actual observed trends. This might help them users decide which model(s) might be more appropriate for this use. If this work has been done by others, a brief review of that literature would be very helpful and should be included in the paper. In re-reading this paper, it appears that the Data and results might actually represent the Validation of the dataset.

6. I would also suggest a polar projected example (Arctic) for temperature, at least.

7. The dataset is not complete in the sense that it only analyzes the for each model, it only analyzed one run, as stated in the paper. Thus, the library has limited value than if they analyzed all runs. Not all users will want the results for only one run, so they will have to re-compute the patterns anyway.

8. I cannot determine if the dataset is of high quality that but it is reassuring that error fields and statistics are provided.

9. I pasted the link listed under associated files listed for the climatology variable. It did not go anywhere. I am surprised SI units are not used. Perhaps there is a specific reason for this? It should be explained in the manuscript.

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10. I didn't do a detailed list of the typos, which are few. However, the paper will need to be re-organized.

Minor comments: Page. 4 1861 -1990 ...should be 1861-1890?

Introduction: Please clarify if the patterns are purely spatial, not temporal.

Table 1. What are the units? Is it longitude X latitude or vice versa?

Table 2. Need more clarity on what this represents..difference in RMS?

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