Geoscientific
Model Development
Discussions

Interactive comment on "ESMValTool (v1.0) – a community diagnostic and performance metrics tool for routine evaluation of Earth System Models in CMIP" *by* V. Eyring et al.

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Reply to Anonymous Referee #1

We thank the reviewer for the helpful comments. We have now revised our manuscript in light of these and the other review comments we have received. A pointwise reply is given below.

In this very long paper the authors present a new diagnostic tool for comparing climate models against either observations or other models. The paper

is written very clearly and is easy to follow. As the ESMValTool is still under construction and is expected to add more functionalities in future I regard this paper as a snap-shot of the project. For me it's fine to publish it as is. I just have a few general comments/questions and one minor typo that I found.

General comments:

i) The ESMValTool is still in development. The single functions or namelists are explained in great detail. However, since this undertaking is evolving it would be nice to have some tool or platform to look for changes/additions to the existing namelists and descriptions of new functionalities. Is something like this planned?

Yes. The current version already includes a first implementation of Sphinx (http://www.sphinx-doc.org/en/stable/), which allows for an easier and automatic documentation method as the tool grows. In future releases, the ESMValTool code will be formatted to allow for automatic documentation using Sphinx. We added more details on code documentation using Sphinx as well as a reference to the "ESMValTool User's Guide" (i.e., the supplementary information) to section 2 of the revised manuscript.

ii) If new functions are build, is there a central place where the code is checked/reviewed or how is the quality of the tool being maintained?

Checking the tool quality is a responsibility of the core development team. For that, we implemented an automatic testing framework, which allows checking that every new development does not affect existing code. In term of code formatting, we followed the pep8 standard for Python, which we also adapted to check also NCL scripts. This is described in detail in the "ESMValTool User's Guide" (i.e., the

supplementary information).

iii) The tool checks and corrects certain errors such as units and so on. But from experience there are 'issues' that are harder to detect, for example mistakes in sign conventions, soil moisture in Antarctica, zeros instead of missing values over land in the ocean files, . . . Mostly these problems are found after a while. So what I would like to say is that the know issues can be changed easily but what about the ones which are not expected/known? Are there any efforts to automatically search for inconsistencies?

The reformat routines are able to automatically spot errors in variable dimensionality, coordinates (names, ordering and units), variable units, missing values definition. Other less common errors in the data are hard to detect automatically, hence an automatic search method has not been implemented yet. However, errors in the data are usually evident once a diagnostic is applied. In such a case, users can take advantage of the fixing framework in the reformat routines and define project- and model-specific procedures to correct any kind of error in the input data.

v) I find it really helpful, that it can be used to compare a model with observations but also with other models or previous versions of a model. Hopefully, the latter results in more homogeneous data on the archives (see point iii).

Thanks for highlighting this feature. Indeed, the tool can be also applied to compare different versions/releases of a dataset. Modelling groups could apply the tool to check the quality of their data before submitting them.

Typo: pg 7584, line 6: 'e.g. CMIP, models' (i guess at least) should be 'e.g., CMIP models'

For clarity, we have rephrased this sentence as follows: "against other models, e.g. CMIP5 models".