

Geosci. Model Dev. Discuss., referee comment RC1
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Comment on gmd-2022-205

Anonymous Referee #1

Referee comment on "Evaluation of native Earth system model output with ESMValTool v2.6.0" by Manuel Schlund et al., Geosci. Model Dev. Discuss.,
<https://doi.org/10.5194/gmd-2022-205-RC1>, 2022

The work by Schlund and coauthors describes developments of the ESMValTool software to process non-CMOR-compliant climate model outputs, providing some examples from different models.

This is a practical option since as the authors write it can be used during production before ad-hoc CMORization or to process generic model outputs. Processing a certain model requires developing a set of additional files needed to perform adjustments to input files.

My major concern is related with the definition of 'native' in this context. I have the impression that input files to ESMValTool need to be already e.g. in netCDF format and CF-compliant, which is not standard for many (atmospheric) models using the GRIB format. Other model components may even provide text (i.e., tabular) outputs, which may required preprocessing. For example for EC-Earth, the authors write that the ece2cmor3 tool must be called in advance to prepare 'native' data. Please clarify this aspect. Are preprocessed files by ESMValTool fully CMOR-compliant or not? How is it checked?

Another important point is the availability and possibility to adapt the 'native' processing functionality. It would be important to provide clear guidelines for prospective users, and to explain how more complex calculations are carried out. A set of predefined diagnostics could be suggested for a certain (e.g. AMIP vs coupled) simulation type. Showing more examples of different diagnostics could be useful too. Currently I cannot find the code you mention in the github repository, e.g. this `esmvaltool/recipes/monitor/recipe_monitor.yml` seems related but no links are given in the paper. Are there one or more recipes? Where can one find documentation in

<https://docs.esmvaltool.org/en/latest/recipes/index.html?>

Generally when using publicly available (e.g. via CMIP6), it would be better to include their identifier (e.g. r1i1p1f1) rather than generically refer to 'one realization'

Comments by line:

L34 model independence (Pennell 2011) should be mentioned

L55 I guess Juckes 2020 should be cited

L62 typo 'rawoutput'

L102 I do not understand if a variable, say Tas, would support different fixes, e.g. for different frequencies or aggregations

L108 can you provide more information on these very rare cases?

Fig 1 I am not sure transparency is the best choice to display additions, maybe use a specific color, shape or adding a symbol instead?

L119 what is the relationship between config-developer and config-user?

Is a template for the former provided to all users?

L162 here and elsewhere you mention that this is 'experimental'

(and I think repetition could be avoided).

Can you clarify why this is the case? Since output processing requires python2, does it clash with the ESMValTool environment (which I think is python3)?

L165 I think the statement is inaccurate, see <https://ec-earth.org/consortium/>

L171 Have you switched the sub-models?

L181 So this means that ece2cmor3 can be called by ESMValTool?

Or is the ece2cmor3 step required before running it?

L195 'w.r.t. time' could be rephrased

L202 so are these 'channels' files with multiple variables/frequencies?

L213 Does it mean that the output is CMOR-like netCDF? I can't find this in the text

L224 downloaded from where?

L261 Add general reference on this topic for completeness?

L312 Which method is used for EOFs? Diurnal, seasonal or longer-term variability should probably be subtracted to ensure EOF results are meaningful, while e.g. removal of long-term average may be insufficient

L316 Is this app also included in ESMValTool? Can it be used for other models?

Fig 3 What is 'Cool Ruby'?

L319 This sentence is redundant, as it can be deduced from the table already (e.g. EOFs not shown)

L323 But is ERA5 CMOR-compliant? If not, how can it be used with the tool?

L326 I guess Gates 1992 is a more fitting reference

L373 straw comma after 'note,'. I do not know understand the iterated statements about the impossibility to compare models in this way, can you explain?

L379 It is not clear to me if an end-to-end CMORization from raw to CMOR outputs is possible for some models with ESMValTool

Gates 1992 https://journals.ametsoc.org/view/journals/bams/73/12/1520-0477_1992_073_1962_atamip_2_0_co_2.xml

Juckes 2020 <https://gmd.copernicus.org/articles/13/201/2020/>

Pennell 2011 <https://journals.ametsoc.org/view/journals/clim/24/9/2010jcli3814.1.xml>