Geoscientific
Model Development
Discussions

Interactive comment on "ESM-Tools Version 4.0: A modular infrastructure for stand-alone and coupled Earth System Modelling (ESM)" *by* Dirk Barbi et al.

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Dear Sir/Madam,

First of all we would like to thank you for the detailed comments you provided for our manuscript, they were much appreciated and we hope that we were able to improve the paper by carefully re-writing the mentioned sections. We especially tried to give a clearer overview, partly by adding extra explanations to the description chapter, partly by re-arranging paragraphs from the discussion to earlier parts. Also, we included several more examples of YAML configuration files, to make it clearer what we are talking about.

Concerning the detailed comments, let me shortly answer those point by point:

Specific comments p2l2: Rephrased that to make it clearer.. p2l39: Explained that, and added Paul Gierz's SCOPE paper as reference p2l44: The author is right, and I tried to explain why. p3l68ff: Explained that this is our experience as model supporters, avoided the criticized language p3l83:Rephrased that: Changed the sentence "The ESM-Tools emphasize the needs of researchers for such a software and fills this gap by fulfilling the specified criteria." To "The ESM-Tools emphasize the needs of researchers for such a software and fills this gap by fulfilling the criteria such as user-friendliness, modularity, portability, maintainability, extendablilty (see also Section~\ref{sec:yamlconf})." p4l94: Addressed the comment by adapting the paragraph "To achieve this, the code of the ESM-Tools is organised so that all information about models (e.g., HPC systems, input datasets) are contained in YAML\footnote{\url{https://yaml.org/}} configuration files, while the actual program, i.e. the commands to be performed using this information, is in itself entirely independent of the models or HPC systems used, and has been fully re-coded in Python." Changed to "To achieve this, the software architecture of the ESM-Tools is structured so that all information that are mandatory for an experiment (e.g., HPC systems, input datasets) are contained in separate YAML\footnote{\url{https://yaml.org/}} configuration files, while the actual program, i.e. the commands to be performed using this information, is in itself entirely independent of the models or HPC systems used. For this purpose, the ESM-Tools software has been fully re-coded in Python (see also Section~\ref{sec:python}) compared to previous versions." p4l96: Removed the reference to a previous version due to other referee's comment p5l113: Made that clearer, meant coupled setup. p5l124ff: Changed LaTeX 'itemize' environment to 'description' environment. p6l131ff: Added a figure and explanation p6l43: If external packages are included with ESM-Tools (and the fact mentioned in the article), it should be mentioned which and why. That is just how python works... Yes, we include expernal packages, but a well-written setup.py makes sure that all dependencies are met during the installation process. I don't agree with the statement that a list of packages should be

included as it doesn't add information about our product - I don't think the reader needs to know in this instant which YAML reader we use, for example. And there is always the documentation for these detailed questions.... p7l165: Added the half sentence "...in terms of functionality." Changed the sentence: "This tool consists of optimized implementations of all the functionalities to run an ESM." to "This tool consists of optimized implementations of all the functionalities to set up all required phases to run an ESM simulation."

p8f2: added an explanation on the caption of the figure p8l174: Included reference to a future publication p8l188: This refers to the repositories of the supported models. Added "... of the models" here. p9l191ff: Added some text, also two figures with yaml p11f4: It is supposed to show that we warp different compilation strategies.

p12l231ff: This is a misunderstanding. The code is hosted and developed on Github. Added the sentence on page 11, line 214: "The ESM-Tools software is currently hosted and developed on GitHub (see also Code availability).". Also changed paragraph at page 12, line 135 by adapting the sentence to "This can be done by contributing to the development on GitHub (e.g., by pull requests). Furthermore, users can suggest a "wish-list" of missing functionalities (e.g., via issue tracker)." p12l298: This is a misunderstanding. Both, code and configuration are hosted and developed on Github. See also comment above. Made that clearer in the text. **Technical corrections** p7f1: Changed figure: esm_master get-model1 -> esm_master install-model1 and added other tasks.

I hope we could include all suggestions of the referee, and want to thank him/her again for the kind help. Dirk Barbi, for the ESM-Tools team