

Interactive comment on “The infrastructure MESSy submodels GRID (v1.0) and IMPORT (v1.0)” by A. Kerkweg and P. Jöckel

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General Comments

GRID and IMPORT should be important submodels in the infrastructure MESSY. This manuscript presents the details of GRID and IMPORT. It may be interested to MESSY developers, users, as well as the ones who develop couplers or other model infrastructures. I have already implemented similar common modules in the latest version of our software recently while it is still very difficult for me to follow the details in the manuscript because the presentation is not good or even poor. I recommend that revisions are required before this work can be published in GMD. Authors should reorganize the manuscript so as to significantly improve the presentation.

Specific comments

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This manuscript focuses on the GRID and IMPORT submodels in the infrastructure MESSY. However, as a paper, it should not be limited to MESSY. For revision, authors should well address the following questions:

1. The key idea of GRID and IMPORT is to make part of preprocessing online in model integration. What are the requirements of preprocessing according to the current or even future status of Earth system modelling in the world? Which requirements are considered for the design and implementation of GRID and IMPORT, and why? There should be some discussions about the requirements that are not included in current GRID and IMPORT. Examples are welcome for the discussion of the requirements.

2. How about the related works? It may be difficult to go through all related works because engineers always do not write papers. Many models already have modules for online “preprocessing”. Authors try to achieve common modules for various models. I believe that authors can quickly know whether a model have common modules according to the code or configuration system. Similar models in some well known models and infrastructures (if have) such as CESM, WRF, FMS and ESMF should be discussed and compared.

3. The common modules in this manuscript generally focuses on online interpolation. What are the requirements of online interpolation according to the current or even future status of Earth system modelling in the world? To answer this question, various types of grids (including 3-D grids) and various remapping algorithms (or requirement for interpolation) should be discussed.

4. About the implementation of GRID and IMPORT. Here authors should answer how to make GRID and IMPORT support various types of grids, various remapping algorithms, 3-D interpolation in parallel, and various expressions of time information. There may be some limitations in GRID and IMPORT, while authors should clearly discuss these limitations. For example, are these limitations because of the whole MESSY or other reasons, and how to solve these limitations in the future? Why and how about the

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design of the API and configuration format should be presented, corresponding to what are supported in GRID and IMPORT.

5. How to use GRID and IMPORT? Some comprehensive examples are required.

6. How about the performance of GRID and IMPORT, especially the scalability of parallel interpolation? How about the comparison to the offline solution? I/O should be a bottleneck for both online and offline solution. How about the performance comparison when parallel I/O is used? It is possible that the online solution and offline solution outperforms in some cases and then the hybrid solution (for example, horizontal interpolation is processed offline and vertical and time interpolation is processed in parallel online) should be much better. Authors should discuss about that.

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