

# ***Interactive comment on “GEOS-Chem High Performance (GCHP): A next-generation implementation of the GEOS-Chem chemical transport model for massively parallel applications” by Sebastian D. Eastham et al.***

## **Anonymous Referee #2**

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The manuscript presents the development of a high-performance computing capability (GCHP) for the GEOS-Chem CTM. The paper address relevant scientific modelling questions within the scope of GMD and presents a model with valid and clearly outlined methods.

It should in theory be possible for an independent scientist to construct a model that, while not necessarily numerically identical, will produce scientifically equivalent results. For the benchmarking, it should be possible for the results to be precisely reproduced.

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## General Comments:

The large number of similar acronyms is confusing to the reader. Consider summarising in a table and perhaps showing the relation between the different modelling/data components by means of a diagram to aid the reader.

Beyond the scaling comparison between GCHP and GCC and changes in resolution, a direct comparison between the two should be added (in the same resolution/configuration) to show the correctness but also the difference in accuracy and efficiency because of the new grid.

p.8 l.26: Any indication/reference on the error introduced by the correction?

p.12: Is the statement "The scalability of advection suffers from the additional communication overhead associated with reducing the domain size, as each domain must communicate a larger proportion of its concentration data to its neighbors" referring to the communication vs computation time for each MPI process?

Code Availability is outdated and has to be updated. Also, license information should be added.

## Minor Comments:

p.8 l.13: Remove "information from"

p.8 l.18: "/" instead of "."

p.15 l.8: Remove "an unchanged copy of"

p.15 l.12 Please consider rephrasing to "GCHP was tested and shown to scale from six cores up to at least 540 [...]"

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Interactive comment on Geosci. Model Dev. Discuss., <https://doi.org/10.5194/gmd-2018-55>, 2018.

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