Geoscientific Model Development Discussions

Geosci. Model Dev. Discuss., referee comment RC2
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Comment on gmd-2021-183

Anonymous Referee #2

Referee comment on "Parallel gridded simulation framework for DSSAT-CSM (version 4.7.5.21) using MPI and NetCDF" by Phillip D. Alderman, Geosci. Model Dev. Discuss., https://doi.org/10.5194/gmd-2021-183-RC2, 2021

General comments:

The manuscript "Parallel gridded simulation framework for DSSAT-CSM (version 4.7.5.21) using MPI and NetCDF" describes modifications to the DSSAT Cropping System Model to allow parallel processing of gridded simulations using NetCDF inputs. Modification of the model was required to bypass the normal operation of transferring data by reading and writing ASCII-format files to reduce I/O time and improve computational efficiency. The manuscript is organized, well-written, and seems to provide sufficient detail and links to open source code and data to allow an interested person to duplicate the process.

The topic is suitable for publication in Geoscientific Model Development. The method presented improves the performance of large-scale gridded simulations using DSSAT, which is a significant contribution as DSSAT is one of the most widely-used crop models and is increasingly used for large-scale gridded modeling campaigns.

The author satisfactorily addressed validation of model results after modifications of the model, describing the reasons for differences in simulated outputs. The author presented results of benchmark simulations to evaluate improvement in simulation time over the unmodified model with various numbers of compute cores.

Specific comments:

I do not have specific comments on the manuscript itself. I believe that it is suitable for publication as-is. But I do have a couple of question for the author's consideration.

The modifications to the DSSAT-CSM code requires that a user deviate from the "official" released DSSAT-CSM source code. Can the author propose a method to maintain this code to include the latest features of DSSAT as they become available? How difficult would it be to apply these changes to new crop modules, for example?

Could these modifications be incorporated into the official DSSAT-CSM code base, or would that be disruptive to normal (i.e., single season, single location) operation of the model?

What is the advantage of storing the genotypic parameters as NetCDF even though these do not vary spatially, at least in the author's simulations? It seems to add an unnecessary burden on the user.