Geoscientific Model Development Discussions

Geosci. Model Dev. Discuss., author comment AC1
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Reply on RC2

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Author 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-AC1, 2021

The issue of synchronization with the "official" release is an important one. For the time being I foresee the parallel gridded version remaining downstream. Because the modifications documented here reside in a repository "forked" from the official DSSAT repository, the process of pulling in most new features that do not affect input/output routines should be fairly seemless.

The incorporation of new crop modules would not require any change for soil or weather input data. It would be necessary to add code to "register" state variables for output to NetCDF format, but those changes would be very straightforward. If the developer wanted to use NetCDF format for the genotypic parameter files, then there would be further changes needed. However, if the command line flag for the NetCDF genotypic parameter file is not used, then the input routine defaults to the standard DSSAT genotypic parameter input routines. Thus, bringing a new crop module into the parallel framework would not be too burdensome.

Merging the parallel gridded version into the "official" DSSAT-CSM code base would be possible. The parallel and gridded input data features are activated by the use of command line flags. Thus, one can actually run the "parallel gridded" DSSAT-CSM version using only the standard DSSAT-formatted files by excluding these command line flags when running the model. Compiling the parallel gridded version depends on MPI and NetCDF, which adds a layer of complexity for developers when initially setting up the development environment. However, as long as DSSAT-CSM is statically compiled, then these dependencies would not affect the experience for the average user of the DSSAT shell. The final executable would be larger, although this is not likely to have noticeable impact on most users.

I would like to clarify that there is no "unnecessary burden" imposed by storing genotypic parameters as NetCDF. As I alluded to above, the use of NetCDF inputs for any of the inputs is controlled by command line flags. This means that the model user has full control over which format is used for which input data. If the command line flag for the NetCDF genotypic parameter file is excluded, then the input routines will default to the standard DSSAT-CSM file formats for reading these parameters. I will look for ways to clarify this point within the manuscript.