

Interactive comment on “C-Coupler1: a Chinese community coupler for Earth System Modelling” by L. Liu et al.

Anonymous Referee #3

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General Comments:

The paper provides a good overview of a new coupler for climate models. The mix of general description, code examples, figure and timing results is appropriate for this type of paper. There needs to be a better distinction made between the library, the build/configure system and the existence of a separate coupler executable (needed for the FGOALS-gc example but not clearly identified). The word "platform" is overused. For example in CESM, "cp17" refers to both the library of routines each component must add to talk to the coupler AND the main driver of the single executable system. But it doesn't refer to the build/configure system.

The most unique feature of C-Coupler1 is the configuration files, their conventions and how they are interpreted/used by the system. More space should be spent on

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describing that. I'd like to see the lines used to define the "kernel_stage" in Figure 6. Also please list the grid and decomposition names recognized by the system. That could be a first in the coupler field.

Specific Comments:

The main distinction between CSM and ESM is not the need for the 3D coupling but the inclusion of bio-geochemistry, dynamic vegetation and other scientific features. A CSM needs 3D coupling, for example, between the atmospheric physics and dynamics.

The authors should better define what they mean by "namcouple" and "codecouple" before using the terms.

MCT is not intended to be a coupler. Its a library from which one can build a coupled model with or without a coupler. Since MCT is not a coupler, it doesn't care about "codecouple" or "namcouple". See OASIS3-MCT for example of using MCT in a nam-couple coupler.

Does CoR support unstructured grids? This should be more clearly stated.

The text implies C-Coupler is handling all of the restart data for all the components of a coupled model. Fields needed for a restart aren't necessarily needed for coupling so why is C-Coupler1 handling that? What happens if a component already has its own restart system? Maybe this was mis-stated.

p 3910, line 20: please clarify what is meant by different data types. float or double?

C-Coupler has borrowed ideas and concepts from many existing coupler systems which is fine but those debts should be referenced alongside the description of the corresponding C-Coupler feature. For example, the steps to run a model in 4.3 are almost exactly the same as the CESM system including the invocation of a "create_newcase" script. That is probably not a coincidence. The parallelization of the remapping algorithm (p 3911) is the same as MCT. A registry of functions in a coupled system was first advanced by ESMF. The references could be made as the features are described

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in section 4. Section 2 can be shortened to compensate.

Can C-Coupler support 3 or more components coupled simultaneously? The FGOALS example suggests that it can but Figure 5 is so stripped down its not clear C-Coupler is doing more than “atmosphere-surface” coupling. This should be clarified.

Section 5.6: what does it mean to add a single model to the C-Coupler platform? I’m not sure what feature is being described here.

The claim that “more and more models are using C-Coupler for development” needs to be backed up. List some institutions and models. Use the “personal communication” reference if necessary.

Technical Comments:

Overall: Some grammar problems that a native English speaker could fix. Too many to list but a big one is the need to use “a” or “the” before “coupler”.

Since Table 3 has just one row it shouldn’t be broken out into a table. Just list the processors and times in the text.

Section 5.2 doesn’t have enough information to be its own subsection.

Interactive comment on Geosci. Model Dev. Discuss., 7, 3889, 2014.

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