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Interactive comment on "The OASIS3 coupler: a European climate modelling community software" *by* S. Valcke

Anonymous Referee #2

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The manuscript presents the OASIS3 coupler, describing its structure and its implementations (and usage) into the models participating to the Fifth Coupled Model Intercomparison Project (CMIP5). The topic is extremely important for the community, and a detailed description (and reference) of the OASIS3 coupler is indeed very welcome.

Nevertheless, as it is now, the manuscript does not present a very detailed description of the coupler, neither shows any real application of it. Rather, it is mostly a descriptive manuscript, mostly listing the models which have implemented such coupler, and only a partial description of all the OSASIS3 features. I hence think that the manuscript can be largely improved.

As part of special issue, I could understand the large space in the manuscript given to models that use the OASIS3 coupler in the CMIP5 (Sect.6). However, this is somewhat

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reducing the amount of space given tot the coupler itself, or better to its technical characteristics, which I was somehow expecting.

Following these concerns I would suggest either to focus much more on the technical details or to drastically reduce them.

If the author believes this manuscript to be a technical description of the coupler, a revision is necessary, adding additional technical informations and quantifying more precisely the performances/overheads (see "main concerns" below).

On the other side, if the manuscript is intended to purely describe the coupling method used in some (but not all!) models participating the CMIP5 project, without focusing on the technical details, then sections 4.1 and 4.2 should be removed, keeping only section 4.3 as important for the understanding of section 6. In this case I also suggest to slightly change the title, underling that the history, actual applications and future of the OASIS couple are described but not the technical features of the coupler.

I personally believe that a manuscript submitted to the "Geophysical Model Development" should, however, contains by far more than only a short description of the code, but rather a well detailed and stand-alone explanation of the code in each part, if this was not published already somewhere else.

I hope that my suggestions will help the author to improve the manuscript and make it a full and complete description of the OASIS3 coupler.

Main concerns:

- **OASIS acronym** The "OASIS" name is mentioned in every single page. Nevertheless the acronym is *never* explained through the manuscript. Although the acronym is well known by the author, one should not forget that the reader may not be aware of that.

- **OASIS3 manual:** The author describes some of the technical characteristics of

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OSASI3. However, a manual in the electronic supplement should be present to describe all the feature of the OASIS3 coupler. Without that the manuscript seems to me incomplete. For example, in Fig.2 it is mentioned that in the OASIS namelist "the one additional line is provided for each transformation with some specifications". Could you perhaps described what are the specification for? In theory, reading this article a new user should be able to prepare the coupling namelist and to use the coupler, and use this manuscript as a reference for his work.

- **Performances:** The author describes the overheads due to OASIS3 coupler with respect to the "stand-alone" models. However, the quantification seems to me vague and mostly based on a single simulation. Could a profile program give precise numbers, based on the cores usage? At least few configurations of the same model could also be tested.

- **Discussion and next developments:** From what I can see, it seems that the fate of OASIS3 is already established. With the increase of resolution and decrease of available memory for each process, the interpolation on full grid is not possible anymore. Additionally, the large increase of processes will reduce the overall speed due to the global gathering. Would you argue that, for future development of new GCMs, it would be more advantageous to plan also an "integrated framework" for the coupling, as mostly done in the USA? Is the "external" coupling somewhat less flexible for future application ?

Minor concern:

- **Introduction**. The description of the manuscript structure should be in the introduction.

- **Sedction 3**. Section 3 and 6 seems redundant to me. The models using OASIS3

are already discussed in detail in section 6. Therefore section 3 could be removed for better readability of the manuscript.

- **Page 2144, line 2**. "Appendixtable A1" should be "table 1" (please rename the table as well).

- **Page 2144, line 2**. Is any coupled model used in Europe that is NOT using the OASIS3 coupler? Maybe it would be worth to see if this is the case and just cite the few cases (if they exist!).

- **Page 2148, line 11**. Missing a space.

- **Page 2166, line 6**. I find remarkable that OASIS4 description was published before the OASIS3. From the manuscript one can guess that the development was almost independent. Was it that the case ?

- **Page 2166, line 20**. Maybe the work of Pozzer et al. (2012) should be cited here. Can it be considered an example of "integrated framework" coupling used in Europe?

- **Page 2166, line 24**. Are you totally sure that the code changes required in a OASIS3 type of coupling is much less that what required by the "integrated framework"? In principle this should be the case, but I expect that this mostly depends on the GCM code itself, rather than the coupling method.

References

Pozzer, A., Jöckel, P., Kern, B., and Haak, H.: The Atmosphere-Ocean General Circulation Model EMAC-MPIOM, Geosci. Model Dev., 4, 771-784, doi:10.5194/gmd-4-771-2011, 2011.

Interactive comment on Geosci. Model Dev. Discuss., 5, 2139, 2012.