

## ***Interactive comment on “The atmosphere-ocean general circulation model EMAC-MPIOM” by A. Pozzer et al.***

**Anonymous Referee #3**

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General comments ————— This is an interesting paper that describes how the atmospheric chemistry model EMAC is coupled to the ocean model MPIOM using the MESSy interface. This is a new approach and it is interesting because the same model components have already been coupled through the Oasis coupler in COSMOS. The work presented here can therefore be used to compare the single executable approach with the coupling through an external coupler. The paper is clearly and concisely written, and the results are of interest not only for the EMAC and MPIOM communities but also for a wider audience that is interested in the design and performance of coupled models.

Specific comments ————— The first part of the paper that describes the coupling and the performance is a good piece of work. But then I wonder if Section 5, the

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evaluation of the new model system, really is necessary in the context of this work. In my eyes, the intention of this paper is to present a novel coupling design, and not about the climatology of the EMAC-MPIOM model. ECHAM and MIPOM have been coupled before, we know how they behave and can assume that the MESSy coupler doesn't change this as long as the coupling frequency and the number of coupled fields does not change (otherwise one of the couplers would do something more than just couple models...) So, is Section 5 really necessary here? It is too short and incomplete to be an adequate description of the model climate, and in my opinion it doesn't fit well with the issues of coupling design and performance analysis.

What I would like to see more of instead is an extended performance analysis. I am wondering about the resolution T31/GR30 that is used here. Is that really the resolution that will be used for practical applications of this model? Isn't that a little bit low? The scientific community is in the process of doing CMIP5 simulations and the resolutions are substantially higher than T31 (admittedly most of these models do not include chemistry). It would be interesting to see how good the new EMAC-MPIOM scales at higher resolutions that could be of interest in coming simulations.

Atmospheric chemistry was switched off for the performance analysis, that makes certainly sense as long as results are compared against COSMOS. However, an essential component of a chemistry model is chemistry, and it would be nice to see how well the model performs/scales with chemistry activated. These results cannot be compared against COSMOS, but it would be very interesting to see whether or not the scaling is still linear with processor number if chemistry is involved.

Technical comments ————— The other 2 reviewers have already done a thorough job in identifying spelling errors and formulations that could need clarification, please follow their advice.

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