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Interactive comment on "Implementation of the Community Earth System Model (CESM1, version 1.2.1) as a new basemodel into version 2.50 of the MESSy framework" *by* A. J. G. Baumgaertner et al.

A. J. G. Baumgaertner et al.

work@andreas-baumgaertner.net

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We thank the reviewer for the helpful comments on the original version of the manuscript and respond to each point below.

The comparison in trace species is reduced to only two plots that are compared. Although this is a model description paper, I would expect somewhat more explanation about the scientific meaning of these figures. The figures are thought only to be an example that can show that these two parameters are simulated similarly. However, the example of surface OH with given boundary conditions

is more or less determined by the boundary fluxes and the integration of the chemistry module. I see this not as the best test of the full capability of the model. Therefore similarities are not surprising. It would be a better test to show OH for a higher model level, in which the results is also affected by the calculated transport and dynamics. Therefore I suggest to replace the surface OH figure by one example on a different model level.

Indeed the OH figure confirms the functionality of the emission, boundary condition and chemistry integration scheme. The middle atmosphere ozone (Fig. 5) below does not address emissions, boundary conditions and chemistry to the same extent as surface OH. Therefore, we think that the choice of figure is appropriate to cover these aspects. This will be clarified in the revised manuscript.

The comparison of polar ozone profiles does show that the EMAC model does repro- duce the ozone hole better than the new model (20-25 km, September/October). This should be mentioned.

This is mentioned in the new manuscript: "Again, good agreement is found between the maCMAC-FV (left) and maEMAC (right) simulations. However, the expected polar spring (September/October) ozone loss around 50hPa is only shown by maEMAC."

My impression is also that the maximum ozone mixing ratios are somewhat too high compared with polar observations. As the relevant quantity ozone column is weighted by the molecule number density, it would also be nice to have lower panels of Fig. 5 that show the corresponding time development of the ozone column.

The total column ozone for both simulations will be added to the Figure. They are reproduced here. Indeed, for the region 60S-90S (Fig. 1) it is too high by up to 50 DU, and the ozone "hole" is not represented. This will be indicated in the revised manuscript. Note that for low and mid-latitudes (Fig. 3 and 4, 45S-45N) the ozone column is very similar with no discernible bias.

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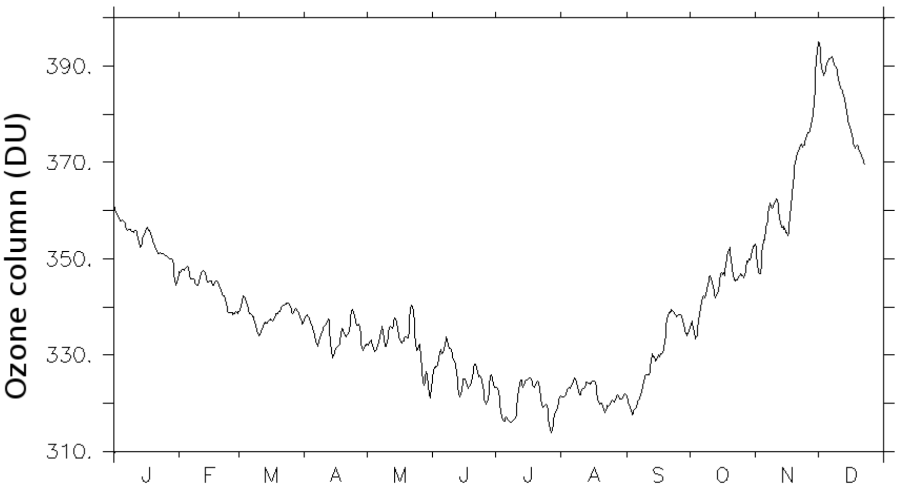

Fig. 1. Columne ozone for simulation maCMAC at 60S-90S

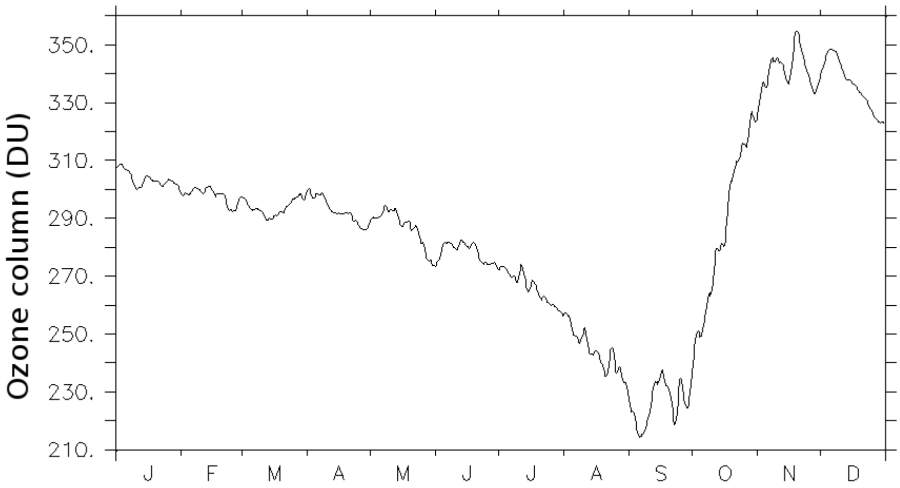

Fig. 2. Columne ozone for simulation maEMAC at 60S-90S

Fig. 3. Columne ozone for simulation maCMAC at 45S-45N

Fig. 4. Columne ozone for simulation maEMAC at 45S-45N