**Atmospheric
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Discussions**

Interactive
Comment

Interactive comment on "The CCCma third generation AGCM and its extension into the middle atmosphere" *by* J. F. Scinocca et al.

J. F. Scinocca et al.

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We thank the reviewer for his or her comments.

Minor Comments:

1. Our initial feeling was that such a table could be useful. In attempting to construct such a table, however, it became clear that this is much more involved than initially anticipated. For example, to be useful it would need to be connected to the discussion of all physical packages in the manuscript. This represents a significant modification to the manuscript. In the end we opted not to undertake such a substantial modification to the paper.

2. We agree that the discussion of the tracer transport should be made more clear in the paper. We have modified the statement on P7890 (L22-23) to now say, "In

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AGCM3 hybridization is applied to specific humidity and standard spectral advection is employed for all remaining prognostic fields. In the hybridization of specific humidity, reference values...". On P7903 (L18-19) we have modified the text to read "The strategy adopted here is to employ standard spectral advection for all chemical tracers and attempt to mitigate the associated artifacts, which are describe below."

3. We agree that such a comparison would be interesting. However, the semi-Lagrangian method is no longer supported in the current version of the model (due to model development related to distributed-memory parallelization). The tests discussed in Appendix A were performed quite some time ago. We will investigate if it is possible to re-run these simulations with the physics filter.

4. It is almost certainly the case that the temperature response to changes in the orographic GWD discussed in Section 3.4 include both a parameterized and resolved wave component, which could be decomposed and analyzed in terms of downward control diagnostics. This is in fact the subject of a follow-on paper that considers the impact of the orographic GWD settings on the climate-change response of AGCM3. This analysis, however, is beyond the scope of the present paper. In terms of the QBO, we agree that the upwelling of the Brewer-Dobson circulation in the tropics will impact its rate of decent. However, the issue considered in Section 3.5 was the basic sensitivity of the QBO to vertical resolution in the lower stratosphere.

5. We have modified our reference to be (e.g. Baldwin, 2001). Simple models here refers not only lab experiments such as those of Plumb and McEwan (1977) but also 1D studies such as Lindzen and Holton (1968).

6. Filtering is used at each time step. The forcing of truncation scale features by threshold processes in the physics has no physical time scale - it occurs at every time step - and so filtering at each time step is required.

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 7883, 2008.

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