Geoscientific
Model Development
Discussions

Interactive comment on "Using the UM dynamical cores to reproduce idealised 3-D flows" *by* N. J. Mayne et al.

N. J. Mayne et al.

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I General Comments

We thank the referee for a useful set of observations which we will incorporate into a revised draft.

II Specifics

1. We have altered the text to address this point earlier and more completely.

2. We have included a statement referencing this work.

3. We have added text describing how the polar wind is defined.

4. We have now reworked this section to make the process much more explicit and

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dropped the internal nomenclature i.e. 'slow' physics.

5. We have expanded the discussion on the dry static adjustment, detailing where it is practically applied and referencing work on exploring how it affects the results of similar tests.

6. We have altered the paragraph to make it more explicit that we mean all of the GCMs we compare our results with are sigma/pressure based, not all GCMs. We have also mentioned the MCore as another example of a height-based dynamical core.

7. Thank you for pointing this omission out. Previous testing has shown that the jet shift is caused almost entirely by the polar filter. When we apply a polar filter to the EG model the jets align much more closely. We have included a discussion of this in the text.

8. We have removed the statement that the results of the Tidally Locked Earth test qualitatively agree with those presented (grid model) from Heng et al (2011), and instead mentioned that our results agree with those found using the spectral code of Heng et al (2011) (not presented). We then include a forward reference to the discussion of the differences and possible cause.

9. We have restructured this sentence.

10. It is true that the 'by eye' method of comparison is a poor one. In this work we have produced difference plots, perhaps the next step in comparison. However, we agree that a more statistically robust method is generally required. That said I think it is beyond the scope of this paper and merits a dedicated work. This is something we are interested in pursuing in the future.

III Technical

1. We have included text making this point.

2. The original purpose of this Figure was just to provide evidence of the consistency

of the results provided by EG, under the dynamical simplifications. However, as it might be useful we have added the results from the ND model and included relevant discussion.

3. Thank you, this was a bug in the interpolation of the meridional velocity performed during the plotting. We have replaced the Figures.