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Geoscientific Model Development
Discussions
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Interactive comment on "An orthogonal curvilinear terrain-following coordinate for atmospheric models" *by* Y. Li et al.

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I cannot make a formal decision on this manuscript until after the discussion period ends. But in light of the early reviews I can indicate what my decision will be.

I agree entirely with the two excellent and thorough reviews. I cannot envisage that this article will be publishable in anything like its current form. I envisage that my decision will be reject and consider writing a much shorter article introducing the new coordinates and showing preliminary results of advection tests. Although to really make this an interesting piece of work, a more comlete equation set should be solved, including pressure gradients and gravity. But without this, the author should particularly consider the following points (aswell as the other points mentioned by both referees):

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Interactive Discussion
Discussion Paper

1. The authors should not claim that these new coordinates will reduce PGF errors as they have not yet tested this. They can claim that it _might_ reduce these errors

2. Set your work in the context of the papers given by reviewer 2

3. Make the paper much shorter. The reader is initially only interested in the results of the advection tests. Once you have convinced the reader that these coordinates are worthwhile (if and when you write a paper solving the Euler or similar equations) then readers may be more interested in finding out how the coordinates are generated. So make the section on generating the coordinates very short and refer to supplementary material for the details.

4. Make sure that your comparisons between orthogonal and non-orthogonal coords are like for like. So for a useful comparison, two simulations should have coordinate layers at the same height but with different x locations. Then you only really need one or two of these.

5. Remove all information that is not relevant to the advection tests that you present

6. Referee 1 suggests "The impact of steep mountains up to those supported by one point only should be investigated, also the impact of steepness on stability. C One of the coordinates concentrates the curvature to a small area near the mountain, which in current tests has no velocity different from 0. The impact of this area should be investigated by using velocities different from 0 right to the top of the mountain."

I believe that model developers should stick to standard test cases where possible. Therefore I would suggest reproducing the results from the Schar et al, 2002 MWR(2459-2480) (fig 4) test case using similar resolution to other studies and then modifying the test case by moving the non-zero velocity and the tracer right down to the top of the mountain and by decreasing the resolution until the mountain is represented by one point.

7. Remember that not all readers will read every word. Readers will start with the

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abstract and then the figures and their captions. So try to put all the salient points in the figures and their captions. The remainder of the paper should give the necessary detail and a little discussion

As the lead author knows, I am interested in this work. However in its present form there are too many uncertainties. Given the GMD format of allowing the publishing of supplementary material and data, one possibility for testing these new coordinates for more complete equation sets might be for you to publish a list of (x,z) coordinates of the grid points. This would allow other model developers to use your grids to solve more complete equation sets with their models. I for one would be intersted in doing this. (If I used a grid based on your coordinate system I would include you as a co-author on any initial publication)

Interactive comment on Geosci. Model Dev. Discuss., 6, 5801, 2013.