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Interactive comment on "Conservative interpolation between general spherical meshes" *by* E. Kritsikis et al.

Anonymous Referee #1

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General comments: This was an interesting paper and I thought that overall the ideas were good and seemed potentially useful. However, I felt that much of the paper would benefit from being expanded. In particular, I thought that section 2 could be expanded to give a clearer more in depth description of the calculations, as well as section 3 (especially 3.1) describing the creation of the super-mesh. Both of these sections would also benefit from more diagrams to illustrate what's happening. This would make it a lot easier for someone to be able to reproduce the work (e.g. to use the method in their own code).

Specific comments:

+ Make it explicit how you actually calculate the interpolation weights.

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+ In section 2 it would be good to change the symbols a bit to make it clearer what's related to what. One possibility would be to use s, t, and u for i, j, k. For example, this would make it a bit clearer which A's represent the source area vs. the target area.

+ In section 2 I also found it a bit confusing which f represented what. You could experiment with using meaningful superscripts (e.g. app for approximate) or different symbols for f instead of the range of different lines over f, but it's possible that none of those will be better than what you have.

+ It wasn't clear if the calculations are done in 3D Cartesian space or in spherical coordinates or something else. It would be good to add some text about that.

+ The idea of a super-mesh is very similar to that of the exchange grid used by GFDL. I notice that they support 2nd order conservative on their exchange grids as well (see slide 13 in http://www.gfdl.noaa.gov/∼vb/talks/xgrid.pdf). The authors might want to research how they do the calculations there and if it seems relevant add them to the previous work section.

+ For one representative pair of grids it would be interesting to see a set of pictures showing a source field and then the corresponding piecewise-constant and piecewise-linear fields resulting from the interpolation.

Technical corrections:

+ Sometimes colons are used before formulas (e.g. 3) and sometimes not (e.g. 2). It would be good to make this consistent.

+ The text "(reference)" and "(refs)" in section 3 should be filled in with references (which would be preferable) or removed from the paper.

+ In section 4.2 used "round-of error" instead of "round-off error".

Interactive comment on Geosci. Model Dev. Discuss., 8, 4979, 2015.