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Geoscientific Model Development Discussions

Interactive comment on "Non-orthogonal version of the arbitrary polygonal C-grid and a new diamond grid" *by* H. Weller

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Comment: i) I think (as Andrew [Staniforth] pointed out to me originally) that a further advantage of this grid is that the velocity components are not held at the edges where their components change discontinuously.

Reply: I am not sure that this is a separate advantage. I am thinking in terms of arbitrarily structured grids rather than having different coordinate systems on every panel. I do not know how to measure the problem that you describe in terms of arbitrarily structured grids. I would rather not mention this advantage.

Comment: ii) Your number (1.8) for the ratio of min to max lengths for the equi-angular cubed sphere does not tally with the asymptotic 1.3 given by Staniforth and Thuburn,

citing Rancic et al (1996)? And in that vein, it would be interesting to know what the asymptotic value is for the diamond grid (the resolution you go to is not enough to be able to say it has converged yet).

Reply: I have realised that these stats were for grids that had one iteration of Laplacian smoothing. I am currently re-making the grids without the smoothing and re-running the test cases. I have also worked out that hte asymptotic ratio for the diamond grid is sqrt(3). The grids in this paper have a larger ratio because of the smoothing. This will be fixed

Comment: iii) Figure 10 shows a strange mix of experiments with different numbers of d.o.f.'s (and therefore also timesteps) whereas in other figures you have approximately matched the d.o.f.'s?

Reply: I will match the dofs and the time steps.

Interactive comment on Geosci. Model Dev. Discuss., 6, 6035, 2013.