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Discussions

Interactive comment on "A standard test case suite for two-dimensional linear transport on the sphere" *by* P. H. Lauritzen et al.

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The article proposes a number of new test cases for validating tracer transport schemes for global models (i.e. in spherical geometries). The test cases are composed out of two given wind fields, one of them divergent, and four different initial conditions, one of them combining two tracers with a pre-defined functional relation. All five resulting test cases are thoroughly described, well designed and well reproducible. All in all, this is a very relevant and important contribution and the publication is highly appreciated by this reviewer.

I have two comments, which I would like the authors to address:

1. In order to be called a test suite, a number of simpler and at least one or two more

realistic test cases should be included in the suite. The paper would be even more useful, if the authors did not just refer to other test cases but would include those test cases with similarly comprehensive descriptions and template implementations.

2. The assessment of computational cost is a weak part of the paper. In fact, since this issue would require a lot more in depth assessment in order to come up with some sort of objective measure of computational efficiency, I would recommend to skip this part altogether. The somewhat heuristic remarks on what influences computational efficiency are not really a good guidance to assessing ones code's efficiency.

There are a few more minor comments:

a. page 193, line 16. The CFL number is usually called Courant Number. The condition that the Courant number should be smaller that 1 is called CFL condition. (same applies in eq. (24) and around).

b. page 195, line 13 and line 16: there is one "for" too much and one "to".

c. page 196, line 9: why don't you define the Gaussian hill entirely in (\lambda,\theta)?

d. page 202, line 1: "to operator" should be erased.

e. page 205, line 18: l_t is in the wrong type.

f. page 210, line 8: incomplete sentence.

g. page 210, line 10: why do you want to restrict the minimum resolution to \Delta\lambda = 0.3 \deg? It can be anticipated that resolutions will get higher and higher with the emerging exa-scale computing devices. I can see that one wants to have at least a resolution of 0.3 \deg but it could be higher, or not?

h. page 210, line 13: I could not see (also not in the previous derivation) why \Delta \lambda_m is defined by the two-norm error being 0.033. What is the rationale behind this specific choice?

Interactive comment on Geosci. Model Dev. Discuss., 5, 189, 2012.