

Interactive comment on “A quantitative analysis of grid-related systematic errors in oxidising capacity and ozone production rates in chemistry transport models” by J. G. Esler et al.

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This paper by Esler and coworkers is a very good, innovative approach to identifying and quantifying systematic model errors due to the finite grid size in chemistry-transport models (both Eulerian and Lagrangian CTMs have such errors). It is a topic now being addressed with different approaches in two projects I am involved in. This paper makes a valuable contribution to the literature and I think it should reach a wider audience. There are several problems I have with the paper that are addressable with some more cautious statements.

1) the very important, didactic example of flight-path data is OK, but such high variability in this SONEX flight is NOT typical of the upper troposphere unless one flies along the

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tropopause. Also the issue of changing altitude along the flight path is not discussed in terms of biasing the results here. Please note that this is an extreme case. (Do you have evidence that this is typical of the upper troposphere?)

2) true 'transport error' based on grid size is not singled out or accurately evaluated in these experiments. Please be careful making assumptions about it.

3) the plots for OH and P(O₃) are OK, but hard to read. The % difference plots should be masked such that the regions of low OH are not shown, % differences where the values (OH or P-O₃) are irrelevant to the atmosphere are misleading.

4) the series of results with T42, T42D, and T21 are interesting and useful, perhaps some mean 'net' tabulated values would be more useful than all the contour plots.

5) the ECHAM4 T63 vs T30 results do not add much to this paper since we really learn nothing more than that they are different - and of course there are many differences in these two versions. It could easily be dropped.

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