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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Analysis of variability in divergence and turn-over induced by three idealized convective systems with a 3D cloud resolving model" *by* Edward Groot and Holger Tost

Anonymous Referee #1

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Review of "Analysis of variability in divergence and turn-over induced by three idealized convective systems with a 3D cloud resolving model" by Edward Groot and Holger Trost.

This work describes a set of simulations with the CM1 model that aim at assessing the sensitivity of storm evolution, with a particular emphasis on divergent outflow at tropopause level, on various aspects of convection that are usually unresolved. These include the amount of latent heat released by condensation, convective momentum transport and water vapor advection. The authors conduct simulations with various hor-

izontal grids, as well as with altered physics settings to change the above-mentioned processes, and report the effects of these changes on the vertical profiles of divergence, condensation rate, vertical advection of horizontal momentum and moist static energy. Overall, the study and the manuscript are of low quality. - The simulations are not well motivated, insufficiently described, and violate basic laws of conservation. They are inappropriate to study the sensitivities of circulation to uncertainties in microphysics schemes. Often, as the authors acknowledge, the simulations are downright unphysical and their differences cannot be interpreted, as the design does not allow one to disentangle individual processes. Thus, overall, the experimental design is poor. - The text is not at all well prepared with major problems in language, grammar, and logic. I had a lot of trouble trying to understand what the authors mean. This cannot be considered scientific writing. - The conclusions reached are weak and not new, sometimes trivial. For instance, it is clear that a simulation at 1 km resolution does not resolve fine features like a 100 m resolution simulation does. The authors motivated their study with error growth in NWP models and state that their approach could help to better understand such errors and their roots. The study, however, does not even touch this topic and the conclusion has no substance. I recommend rejection and encourage the authors to rethink their goals and approach. Maybe some of the work can be published at some point.

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