Atmos. Chem. Phys. Discuss.,
https://doi.org/10.5194/acp-2020-1142-RC2, 2021

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 #2

Received and published: 11 February 2021

The paper presents numerical experiments of idealized convective systems in large-eddy simulations. An ensemble is setup with perturbations of initial conditions and model physics for three idealized profiles of vertical wind shear inducing three degrees of convective organization. It is found that latent heat release is the primary control for the magnitude of the upper-level divergence, while convective organization and stratospheric detrainment also contribute. It is suggested that the variability found between experiments may explain the quick growth of model error in weather forecasts.

The paper appears to build on a large computational effort through a number of very

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Discussion paper

high resolution numerical experiments. Unfortunately, it is written and structured in a way that does not meet standard requirements for scientific papers thus cannot be considered for publication in Atmospheric Chemistry and Physics. The main flaws are listed below.

1) Starting from the title and abstract, the purpose of the study is unclear and the wording is confusing: sensitivity/variability to/of what?

2) The paper fundamentally lacks background: error growth is introduced too quickly and the role of divergence is far from obvious. Furthermore, many papers are cited without details, while several statements are given without reference. Only late in the paper (Section 4.1) some context is given.

3) There is no information about how the model works and which physical parameterizations are used, whereas the description of experiments is approximate, which altogether make the results basically non-reproducible.

4) Throughout the Results Section it is unclear what is referred to in figures and how the discussed processes relate with the displayed variables, which make their description hard to follow and their interpretation practically impossible to understand.

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