

Geosci. Model Dev. Discuss., referee comment RC1
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Comment on gmd-2021-105

Anonymous Referee #1

Referee comment on "Object-based analysis of simulated thunderstorms in Switzerland: application and validation of automated thunderstorm tracking with simulation data" by Timothy H. Raupach et al., Geosci. Model Dev. Discuss., <https://doi.org/10.5194/gmd-2021-105-RC1>, 2021

This study uses a newly developed tracking method to evaluate the WRF model simulation of storm over Swiss region. This is a quite important topic as when the model resolution goes higher and higher, finally, storms can be directly resolved in the models but how to evaluate it will be a big problem in the coming years. This paper is well written but overlooks some important progress on this topic. Another missing part is the lack of discussion on what causes the model-observation difference. Whether the large-scale environments play an important role is unclear, but should be paid attention in the revision. Except these two, the manuscript is very scientific solid.

Detailed comments:

1. Page-2 L24-28: Feng et al. (2021) has evaluated mcs simulation in a high-resolution climate models based on a newly developed tracking method by Feng et al. (2019) and Song et al. (2019). Please considering citing these studies here.

Feng, Z., F. Song, K. Sakaguchi, and L. R. Leung, 2021: Evaluation of Mesoscale Convective Systems in Climate Simulations: Methodological Development and Results from MPAS-CAM over the U. S. *J. Climate*, 34(7), 2611-2633.

Song, F., Z. Feng, L.R. Leung, R.A. Houze, J. Wang, J. Hardin, C. Homeyer, 2019: Contrasting spring and summer large-scale environments associated with mesoscale convective systems over the U.S. Great Plains, *J. Climate*, 32, 6749-6767.

Feng, Z., R.A. Houze, L.R. Leung, F. Song, J. Hardin, J. Wang, William I. Gustafson, C.

Homeyer, 2019: Spatiotemporal Characteristics and Large-scale Environments of Mesoscale Convective Systems East of the Rocky Mountains, *J. Climate*, 32, 7303-7328.

2. How about the role of large-scale environments in the storm initiation in this region? Are the underestimated frequency of storms in the model is caused by the underestimated frequency of large-scale favorable environments in the model? In Feng et al. (2021), it was found that this is the case in the United States Great Plains as large-scale environments are very important for the storm initiation there (Song et al. (2019)). It is good to check whether this is also the case here.