

## ***Interactive comment on “Impact of resolution and air temperature on Large Eddy Simulation of mid-latitude summer time convection” by Christopher Moseley et al.***

### **Anonymous Referee #2**

Received and published: 27 September 2019

This paper examines the convection activity simulated by the ICON-LEM at 625 m horizontal resolution for 36 days in summer over Germany and compares it to that observed by the ground radar system. It also examines the impact of horizontal resolution on the simulated convection over 3 days by nesting into 300 and 100 m resolutions. I agree with the other reviewer that the authors showed great expertise in terms of deployment of the model and the analyzing techniques. But the logic of the paper, in other words, why they set up and present the study in such a way to answer the questions they want to answer, is not clear enough to me. I suggest a major revision. Here are my major concerns,

C1

1. In the analysis of the 36-day simulations, the authors separated the cases into warm and cool days to compare the impact of surface air temperature on convection activity as seen in simulations and in observation. One of the motivations for doing this seems to be that the authors are concerned with the ability of the cloud-resolving models to correctly simulate the response of atmospheric convection in a warming climate, which they hinted at in the introduction. But it is not obvious to me that the contrast in the large-scale environment between the warm and cool days chosen in this study is comparable to the contrast in typical large-scale environment of middle-latitude convection activity between the current and future warmer climate. If the authors think they are comparable, they should make the claim more explicitly. If the authors just want to compare the sensitivity of the simulated convection to different environmental conditions as characterized by the surface air temperature the analysis is completely valid in my opinion given the importance of surface condition for summertime convection over mid-latitude land.

2. I wonder what criterion the authors used for selecting cases to perform higher-resolution simulations and why the authors did not choose those cases so that they could also investigate the contrast between warm and cool days at higher resolutions (even just with 2 or 4 cases).

---

Interactive comment on Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2019-638>, 2019.

C2