Project: 1263Project title: ICON-LEM simulations for Paris RDPPrincipal investigator: Vera SchemannReport period: 2021-11-01 to 2022-12-31

The transition from Mistral to Levante caused more issues for our ICON-LEM setup, than we expected, especially with respect to having a reasonable performance. Additionally, the new icon release 2.6.5 also needed some adjusted to be usable for ICON-LEM again. Due to these delays, we could not perform the planned simulations yet. The measurement campaign took place this year and the observational data gets processed and starts to be usable. Instead of simulating the whole campaign, we performed several sensitivity studies for a first evaluation of ICON-LEM capability to simulate specific sommer events - as urban heat islands and thunderstorms over Paris.

Figure 1 shows one of these sensitivity studies for a thunderstorm case in 2017. We could already show, that the strong decrease in temperature due to precipitation is certainly better captured in the ICON-LEM simulations (621 m and 310 m) than in the ICON-NWP (2 km) setup. This highlights the potential of O(100 m) simulations for thunderstorm forecasts. Nevertheless, e.g. precipitation itself is still underrepresented. Based on these sensitivity studies, we defined further experiments including an advanced land surface parameterization for urban regions. These experiments will also benefit from the more advanced and detailed observations that were taken during the campaign in June and July 2022 in Paris.



ICON 2017/07/09+10, SIRTA (48.7N, 2.2E)

Figure 1: Comparison of different ICON simulations with observations for a thunderstorm case in 2017. Ongoing work.