PALM-4U – A building-resolving microscale model to support future adaptation of cities in a changing urban climate

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In a world with increasing extreme weather events, such as dry or extreme rain periods, due to climate change and an ever growing population specifically in urban areas, a forsighted planning and adaption of cities and their urban surroundings is becoming more and more important. Here, particularly health and comfort of the urban population, such as thermal comfort, air quality, ventilation or UV exposure, but also other aspects like safety and environmental sustainability play an important role. In order to create the cities of tomorrow that meet the real requirements to host healthy and friendly living conditions, city planners are relying on scientific models where they can simulate how changes in the urban environment can effect its climate. The PALM-4U (Parallelised Large-Eddy Simulation Model for Urban Applications) model was specifically developed to be able to simulate a large variety of parameters on short timescales and at the high resolution that is required to resolve single buildings or obstacles like trees within the city.

In September 2019, the second phase of the German research project MOSAIK (model-based city planning and application in climate change), a module within the large over-arching project [UC]² (Urban Climate Under Change) that focusses on the further development of the model, has started.

In this overview, we will present the PALM-4U's current capabilities and outline the planned future development in the coming years like windbreak modelling, coupling with traffic flow models, including biogenic volatile organic compounds in urban air quality modelling. Furthermore, our PALM-4U community model strategy will be explained.