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# Comparative visual analysis of 3D urban wind simulations

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Climate simulations are conducted in large quantity for a variety of different applications. Many of these simulations focus on global developments and study the Earth's climate system using a coupled atmosphere ocean model. Other simulations are performed on much smaller regional scales, to study very small fine grained climatic effects. These microscale climate simulations pose similar, yet also different, challenges for the visualization and the analysis of the simulation data.

Modern interactive visualization and data analysis techniques are very powerful tools to assist the researcher in answering and communicating complex research questions. This presentation discusses comparative visualization for several different wind simulations, which were created using the microscale climate model MITRAS. The simulations differ in wind direction and speed, but are all centered on the same simulation domain: An area of Hamburg-Wilhelmsburg that hosted the IGA/IBA exhibition in 2013. The experiments contain a scenario case to analyze the effects of single buildings, as well as examine the impact of the Coriolis force within the simulation. The scenario case is additionally compared with real measurements from a wind tunnel experiment to ascertain the accuracy of the simulation and the model itself. We also compare different approaches for tree modeling and evaluate the stability of the model.

In this presentation, we describe not only our workflow to efficiently and effectively visualize microscale climate simulation data using common 3D visualization and data analysis techniques, but also discuss how to compare variations of a simulation and how to highlight the subtle differences in between them. For the visualizations we use a range of different 3D tools that feature techniques for statistical data analysis, data selection, as well as linking and brushing.