



Impact of urban planning scenarios on the climate in the summer season

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Believing in projections of the UNFPA the urbanization will continue to increase in the future. Thus, studying the urban climate becomes more and more popular for the scientific community but is also relevant for the urban planners. With regard to the temperature increase projected by global and regional climate models, the urban planners consider different adaptation measures to keep the climate comfortable for the citizens. Also in our days the citizens are faced with the heat stress arising from an urban heat island.

An estimation about the impact of various adaptation measures on urban climate is found in lots of publications. Most of the impact studies make use of building-resolving, microscale models in order to draw a realistic picture of the interaction between urban structures and the urban canopy layer. However, these studies provide only a very limited view on the atmospheric dynamics - urban climate is analyzed under calm wind situations with constant atmospheric forcing. Moreover, most of the adaptation measures are more or less considered in a theoretical framework, i. e. the grade of adaptation is in contrast to what might be done / will be realized by the city building authorities.

Therefore, with our contribution we intend to consider a) scenarios for the urban development of Hamburg, which are based on projections of the Ministry for Urban Development and the Environment and which incorporate an estimation for future urban adaptation measures **and**, for instance, house building. b) We intend to investigate the impact of urban development and adaptation considering full and realistic dynamics. The mesoscale model METRAS is used to simulate the urban climate of Hamburg for 'so-called' characteristic weather regimes in the summer season. Sensitivity studies are performed separately for the urban development measures and for the adaptation measures. We will show that urban planning scenarios has positive and negative effects on the urban climate. Considering exclusively the projected sealing for Hamburg (mainly due to housing shortage) an increase of the UHI is caused, but taking into account also adaptation measures this effect will reverse. Overall, the adaptation measures cannot compensate for the projected climate change signals.