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Urban sites in climate change

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For the 21st century a significant rise of near surface air temperature is expected from IPCC global climate model simulations. The additional heat load associated with this warming will especially affect cities since it adds to the well-known urban heat island effect. With already more than half of the world's population living in cities and continuing urbanization highly expected, managing urban heat load will become even more important in future.
To support urban planners in their effort to maintain or improve the quality of living in their city, detailed information on future urban climate on the residential scale is required. To pursue this question the 'Umweltamt der Stadt Frankfurt am Main' and the 'Deutscher Wetterdienst' (DWD, German Meteorological Service) built a cooperation. This contribution presents estimates of the impact of climate change on the heat load in Frankfurt am Main, Germany, using the urban scale climate model MUKLIMO_3 and climate projections from different regional climate models for the region of Frankfurt.
Ten different building structures were considered to realistically represent the spatial variability of the urban environment. The evaluation procedure combines the urban climate model simulations and the regional climate projections to calculate several heat load indices based on the exceedance of a temperature threshold.
An evaluation of MUKLIMO_3 results is carried out for the time period 1971 - 2000. The range of potential future heat load in Frankfurt is statistically analyzed using an ensemble of four different regional climate projections. Future work will examine the options of urban planning to mitigate the enhanced heat load expected from climate change.