

Title: The role of urban green infrastructure measures in improving outdoor thermal comfort

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Research question: Cities are expected to experience heat days in summer more frequently and with higher intensity due to climate change. Urban green infrastructure can help cities to adapt to climate change by providing regulating ecosystem services. Therefore, municipal planning should foster policies and activities for so-called ecosystem-based adaptation. However, municipalities need to be supported by more information and better guidance as to the extent and type of green infrastructure measures they should implement.

Methodology: Against this background, this study aims to increase our understanding of the regulating effects of different green infrastructure settings under a future climate change scenario. Based on a scenario modelling approach, we assess the cooling potential of green roofs, green facades and tree plantings during hot summer days for varying green volume as well as current and future climate conditions. The research applies the urban microclimate model ENVI-met for a case study located in the city centre of Munich, Germany, representing a typical urban fabric of perimeter blocks, which is commonly found in both German and European cities. We analysed the effects of greening interventions on reducing air temperatures and outdoor thermal comfort (PET – physiological equivalent temperature) in a densely built urban area.

Findings: The results show which greening measure has the highest potential to regulate the urban microclimate during day and night time as well as today and in the future. Thereof, we concluded how much greening needs to be implemented to effectively mitigate climate change impacts and increase outdoor thermal comfort conditions.

Significance for practical solutions: Following from this, a guideline for urban planners is developed, supporting them in choosing the most effective combination of green infrastructure measures suitable for their respective situation.