

Workshop “Urban biodiversity versus functional design in cities? - The case of urban trees”,  
University of Salzburg

Abstract for session “Urban trees under climate change”

Modelling growth and cooling effects of urban trees in Munich, Germany

Astrid Moser, Teresa Zölch

Urban green infrastructure and particularly urban trees are increasingly promoted as a key measure to mitigate heat stress in cities caused by the urban heat island effect and climate change impacts, including climate variability and extremes. Trees can provide regulating ecosystem services such as carbon sequestration, reduction of rainwater runoff, pollutant filtering and especially cooling by shading and evapotranspiration and hence, improving outdoor thermal comfort for pedestrians. However, knowledge on the actual provision of ecosystem services by urban trees, also in relation to tree species and urban growth conditions is scarce. This information is crucial for developing sophisticated modelling approaches to project the performance of urban trees under current climate and future climate change scenarios. Against this background, we present results from two ongoing research projects of the Centre for Urban Ecology and Climate Adaptation (ZSK) at Technical University of Munich. First, the benefits of urban trees for outdoor thermal comfort are shown under current and future climate conditions. Therefore, simulations with the microclimatic model ENVI-met have been conducted. Second, the relationship between growth respectively age and Leaf Area Index (LAI) with the shading and cooling effects of two common urban tree species (*Tilia cordata* and *Robinia pseudoacacia*) is presented. For this, regression equations were developed based on extensive empirical data. Finally, we conclude by addressing further research potentials in the fields of urban tree measurements and their representation in microclimatic modelling tools. (233 words)