

OPEN SPACE CLIMATE

Towards a Holistic Climate-Impact Classification of Urban Open Spaces

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Keywords: GIS, Classification, Climate Performance, Holistic Accounting, Urban Open Space, Climate Adaptation

Abstract Urban Open Spaces significantly influence the urban climate. Depending on their morphology, they can contribute to cooling or exacerbate heat stress, thereby affecting thermal comfort, public health, and overall urban liveability. While the role of singular specific types of Open Spaces for urban climate is widely studied, there remains a lack of holistic approaches that address the full spectrum of Open Spaces types and their interlinkages to the urban system.

To deepen our understanding of the complex interactions between urban climate and Open Spaces, we are developing a Holistic Accounting Matrix to assess the climate impact of urban Open Space. This matrix evaluates 11 climate impact indicators structured in three steps (Form, Climate, Connectivness) and applies them to all Open Spaces within the case study area of Salzgitter, Germany.

Firstly, the indicators are used to define the Climate Sphere of each Open Space, revealing its role and connectivity within the urban morphology. Based on this analysis, we calculate a Climate Performance Index that allows for clustering Open Space according to their climate function. This results in a new climate impact based classification system for urban Open Space that reflects their specific contributions to the urban climate.

This research is part of the Urban Climate Future Lab (UCFL), a multidisciplinary project investigating the nexus of urban development and climate change in Lower Saxony and beyond. UCFL holistically assesses climate impacts and risks within the urban system of Lower Saxony and works with stakeholders to co-develop holistic implementation paths for the sustainable transformation and increased resilience of the Lower Saxony urban system.

The Holistic Accounting Matrix is designed as a practical tool for landscape architects and urban designers, aiming to strengthen the knowledge for the climate friendly transformation of urban Open Space. By providing systematic and comparable insights into the Climate Performance of different Open Space types, it supports evidence-based decision-making in design and planning processes, and enables a climate impact classification for the whole spectrum of urban Open Space.