

Modeling reduction of the Urban Heat Island effect to counter-act the effects of climate change in densely built-up areas

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The phenomenon of Urban Heat Islands (UHIs) observed in cities, caused by changes in energy balance due to the structural development of the city as well as by sealed surfaces and a lack of vegetation, is expected to strengthen in the future and will further contribute to heat stress, creating an increased need for energy for cooling and ventilation as well as lowering human comfort. Due to a changing climate, rising heat stress, pronounced by an increased intensity or frequency of heat waves, could have far reaching implications for major Austrian cities in the near future.

Simultaneous to this expected increasing of the already existing UHI-effect, it is observable, that continuous densification of the core parts of cities is being intensified through implemented traditional urban planning measures. This is particular relevant for high densely populated districts of the city. Several possible counteractions how to address this challenge are already known, partly investigated in urban modeling studies on the effects of modifying the reflective properties of buildings and urban areas for the city of Vienna.

On this experience, within the Austrian FFG and KLIEN Smart Cities project JACKY COOL CHECK (Project Nr. 855554), a wide set of measures to reduce heat stress, consisting of e.g. unsealed surfaces, green areas, green roofs, improve reflective properties of different surfaces etc., for the densely built-up residential and business district of Jakomini in the city of Graz/Styria is investigated, to gain decisive data pointing out the peculiarities of UHIs and the potential cooling effects of these target measures for this local specific area. These results serving as a basis for the selection of sustainable measures that will be implemented, in coordination with local stakeholders and considering their interests.