

# The Urban Heat Island on a Meso- and Microscale

## Can vegetation and water bodies effectively mitigate thermal stress in Münster?

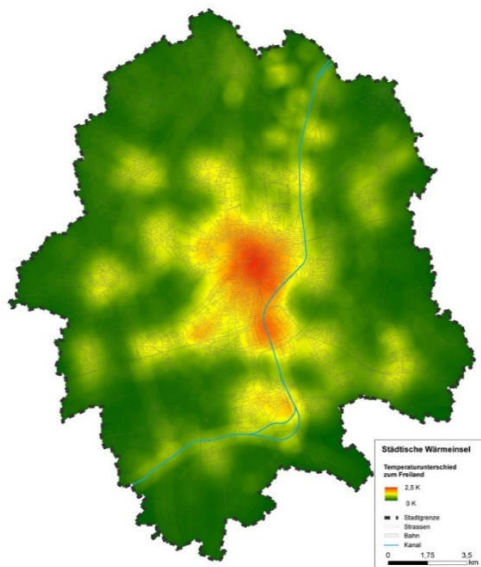


Figure 1: Recent urban heat island in Münster  
(Source: Klimaanpassungskonzept Stadt Münster 2015).

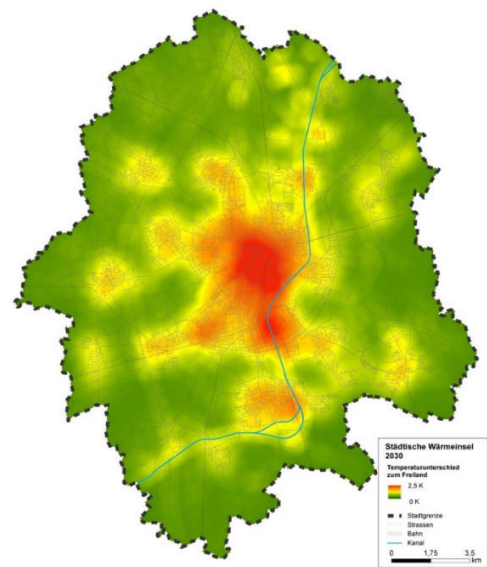
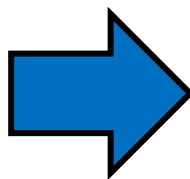


Figure 2: Predicted UHI for Münster in 2030  
(Source: Klimaanpassungskonzept Stadt Münster 2015).

**Background:** Cities modify the regional climate due to soil sealing, city architecture and anthropogenic heating. This causes the development of an urban heat island (UHI) with higher urban air temperatures compared to rural areas (Fig. 1). The UHI effect is likely to intensify in the future due to climate change (Fig. 2). Water bodies and vegetated areas are known to mitigate the intensity of the UHI. This master thesis should investigate the potential of vegetation and water surfaces for the adaptation of cities to present and future climate change.

**Research questions:**

1. Mesoscale UHI effect: Is cold air transported towards the city center along vegetated and water surfaces (e.g. the Aasee)?
2. Microscale UHI effect: Can green and blue infrastructures mitigate the urban heat island effect on a small scale of a few meters?

**Methods:** Low-cost temperature loggers (Thermochron iButtons) will be used to conduct continuous air and water temperature measurements across the city of Münster with a high spatial resolution. Additional mobile measurements with high-precision thermometers will be conducted to verify the iButtons.



Source: <https://www.fuchs-shop.com/de/shop/4/1/13372780/>

**Requirements:**

- Interest in field work (setup and maintenance of sensors, data collection)
- Statistical analysis of large data sets (e.g. with R, MatLab, etc.)