

## **Local climate zones in Cardiff and their connections with urban heat island and outdoor human thermal comfort**

Recent heatwaves have highlighted the need for UK cities to be better prepared for the impacts of increasing urban warming. During heatwaves, the urban heat island (UHI) effect can further increase air temperatures in urban areas, leading to increased heat stress, air pollution, and energy consumption. This can have negative impacts on human health, infrastructure, and the local environment. Despite being the capital of Wales there has been limited research to examine the UHI and outdoor thermal comfort (OTC) conditions in Cardiff, latter being a crucial indicator of the health and well-being of people using urban spaces. In this study, we have examined the UHI and OTC for the local climate zones (LCZs) for Cardiff. UHI map for Cardiff is generated from land surface temperature using Landsat 8 satellite image. To investigate the OTC, we have calculated mean radiant temperatures ( $T_{mrt}$ ) for each available LCZs in Cardiff using the SOLWEIG model in a GIS platform. Then using the  $T_{mrt}$  and weather data for Cardiff, PET (Physiological Equivalent Temperature) thermal comfort index was calculated using the RAYMAN model. The findings of this study will help to identify vulnerable areas in terms of UHI and OTC and take mitigating measures accordingly, thus helping to improve the resilience of the city in a changing climate.