



From Urban Hydrometeorological Observations to Action Across Three European Cities

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Urban heat is a rapidly intensifying risk for European cities, affecting public health, energy demand and the quality of urban life. This contribution demonstrates how urban hydrometeorological observations can be transformed into actionable climate services and adaptation strategies using three European cities with different local climates and urban forms: Amsterdam (Netherlands), Ghent (Belgium) and Novi Sad (Serbia). Each city operates an urban meteorological network (UMN) that provides high-resolution observations across Local Climate Zones (LCZs), enabling detailed identification of heat-risk patterns within the urban fabric. Multi-year observations show that compact, densely built mid-rise districts (LCZ 2) consistently experience the strongest nocturnal urban heat island (UHI) effects, while areas with dense vegetation and water bodies remain significantly cooler. Average summer UHI intensities reach about 1 °C in Amsterdam and Ghent and 2 °C in Novi Sad, while extreme heat-wave conditions produce hourly UHI values exceeding 6–9 °C.

These spatially explicit data reveal where heat stress is most severe and where cooling potential is greatest, providing a scientific basis for targeted interventions. The observational evidence has directly supported urban climate action. In Amsterdam, UMN data underpin heat-stress maps and “find-your-cool” tools for citizens, as well as the deployment of large-scale blue-green roofs. In Ghent, monitoring and modelling guide the design of green corridors, neighborhood parks and façade gardens to enhance cooling and ventilation. In Novi Sad, fixed and mobile measurements have steered the installation of green roofs and vertical greening on public buildings in the most heat-exposed districts. Together, these case studies show how urban hydrometeorological and climate observations, combined with LCZ analysis and stakeholder engagement, enable cities to move from heat diagnostics to evidence-based, locally tailored climate adaptation.

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