



Birmingham Urban Climate Laboratory (BUCL): Experiences, Challenges and Applications of an Urban Temperature Network

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The Birmingham Urban Climate Laboratory (BUCL) has recently been established by the University of Birmingham. BUCL is an in-situ, real-time urban network that will incorporate 3 nested networks - a wide-array of 25 weather stations, a dense array of 131 low-cost air temperature sensors and a fine-array of temperature sensor across the city-centre ($50/\text{km}^2$) - with the primary aim of monitoring air temperatures across a morphologically-heterogeneous urban conurbation for a variety of applications. During its installation there have been a number of challenges to overcome, including siting equipment in suitable urban locations, ensuring that the measurements were 'representative' of the local-scale climate, managing a large, near real-time data set and implementing QA/QC procedures. From these experiences, the establishment of a standardised urban meteorological network metadata protocol has been proposed in order to improve data quality, to ensure the end-user has access to all the supplementary information they would require for conducting valid analyses and to encourage the adequate recording and documentation of any changes to in-situ urban networks over time. This paper will provide an introduction to the BUCL in-situ network, give an overview of the challenges and experiences gained from its implementation, and finally discuss the proposed applications of the network, including its use in remote sensing observations of urban temperatures, as well as health and infrastructure applications.