Local and microclimatic variations around long term meteorological stations in small urban areas.

Jenny Lindén (1) and Sue Grimmond (2)

(1) Department of Geography, Johannes-Gutenberg University, Mainz, Germany, (2) Department of Meteorology, University of Reading, Reading, United Kingdom

Climatic differences over short distances are common in heterogeneous environments; for example single buildings or different vegetation types can cause temperature differences of several degrees. Although meteorological stations are designed to avoid such inhomogeneities due to anthropogenic influences, station metadata often reveal that there have been changes in surroundings or locations that could potentially influence homogeneity. While anthropogenic influences on meteorological stations located in or near large cities are rather well studied, less focus has been directed on stations in smaller urban areas.

In order to assess the potential influence of local and microclimatic variations in data from small urban settlements stations, a network of air temperature sensors were installed in the summer of 2013 to collect continuous measurements around two long term stations in different climate zones; Geisenheim, Gemany (49°59'N, 07°57'E, 110 m.a.s.l., station installed 1884, village population 11 000), and Haparanda, Sweden (65°49' N, 24°08' E, 5 m.a.s.l. station installed 1859, village population 5 000). The sensors were placed in current and previous locations of the meteorological station where possible, but also in the village center, riverside, and in other typical environments in order to examine temperature variability around these stations. Preliminary results from the Geisenheim station show a station network ΔT of on average 0.8 °C, with larger differences during summertime and in minimum temperatures. Differences in seasonal average, maximum and minimum temperature measured at the previous station locations show similarities with data measured at the same location by the meteorological station, indicating that this data could be used to assess the inhomogeneities due to station moves. A complete analysis based on a full year of data around the two stations will be presented at the conference.