

## Turbulence observations in urban areas

**Helen Ward**

Department of Meteorology, Reading University, UK

Understanding of urban climates is important for the health of the urban population, to improve current forecasting ability and to make accurate predictions concerning the impacts of future land-use development and climate change. However, obtaining representative observations of urban areas is hugely challenging on account of their diversity and extreme spatio-temporal variability. These aspects present issues for both collection and interpretation of data, but using a range of observational techniques and adopting a process-based approach to analysis can allow insights into these complex environments.

I will present results from a multi-scale field campaign in the town of Swindon, UK. The aim of the study was to improve understanding of energy and mass exchange in suburban areas, particularly with respect to seasonal variability. Two years of results are considered, and comparisons are made with other nearby sites subject to similar meteorological forcing but with very different land use and land cover: a dense urban site in central London and a deciduous forest.

Over regions of mixed land cover spatially-integrated turbulence observations are especially valuable. Scintillometry, a ground-based remote-sensing technique, can provide turbulent heat fluxes at the kilometre-scale. These results comprise the first scintillometer observations of large-scale latent heat fluxes over urban areas. The controls on energy partitioning at different scales are investigated, with particular attention given to the availability of surface moisture and energy, as well as the performance of the observational techniques. Conclusions are relevant to the planning of future urban measurement campaigns and offer deeper insight into land-surface processes across a range of conditions, also helping to inform model development.