NERC CASE Studentship: Quantifying the influence of wind advection on urban heat island for an improvement of a climate change adaptation planning tool

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Background: In recent years the importance of understanding climate change and Urban heat island (UHI) associated with heatwaves (e.g. August 2003, 2006) has increased due to its impact on future public services such as electricity and water supply as well as on heat-related health risks (e.g. mortality). In 2008, Birmingham established the Climate Change Adaptation Partnership in response to "National Indicator 188, adapting to climate change" in order to understand the risks to people and places, both in the present day and in the future, caused by the combined effect of climate change and UHI in Birmingham. The Partnership between the University of Birmingham (UoB) and Birmingham City Council (BCC, the CASE partner) have successfully completed project BUCCANEER (Birmingham Urban Climate Change Adaptation with Neighbourhood Estimates of Environmental Risk). The BUCCANEER project has developed for the first time a new web-based planning tool for BCC based on the modelled UHI maps (Figure 1) derived from the Joint UK Land Environment Simulator (JULES). The tool enables BCC to map Birmingham's UHI up to 2100, together with transport, health, air quality, housing, population and life expectancy, in order to help identify vulnerability and risks for people and places. It also contains a green infrastructure assessment function and the ability to export layers into Google Earth for 3D mapping as a communications tool. BCC are using it currently as a planning and risk management tool to evaluate how new developments and council services will need to address climate change and extreme weather impacts.

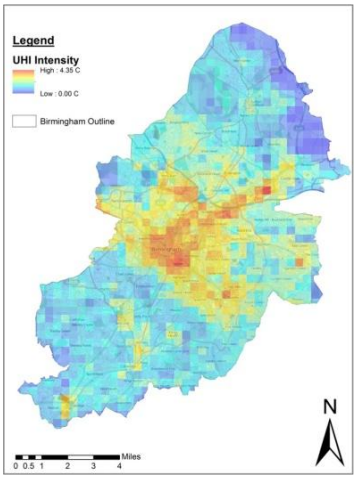

Figure 1. UHI of Birmingham from the BUCCANEER tool.

Project details: A NERC-funded CASE PhD studentship is available starting October 2013 for 3.5 years in the School of Geography, Earth and Environmental Sciences, UoB. This PhD studentship aims to develop a generic methodology of correcting the urban heat island (UHI) patterns from a local-equilibrium UHI model (e.g. the BUCCANEER model) by incorporating wind advection simulated from a 3D meteorological model. To achieve this goal, an advanced approach of modelling 3D meteorological fields using the urban version of 3D dynamical Weather Research and Forecasting model (WRF+BEP) is proposed in this study. Evaluation of the model will use the multi-scale urban climate dataset from the NERC-funded HiTemp project at UoB (~200 sensors within Birmingham; data will be available from 2013). This will be the first time that evaluation of a meteorological model is carried out on such a high spatial resolution.

Student training: The student will work in a vibrant group of researchers in the area of urban climate modelling and observation at UoB and will be trained to gain multi-disciplinary expertise and skills in the areas of urban weather/climate modelling. The student will also enhance their personal skills through 6 months training at BCC on knowledge of risk assessment & adaptation procedure within decision-making body, managerial skills, and leadership skills. The scientific output of the generic methodology is transferrable to other cities and other models of the similar kind. The output of the project will be delivered to BCC for the purpose of risk assessment, climate change adaptation, and strategic planning.

Qualifications: Candidates should (or expect to) hold a good Master's degree in natural sciences (preferably in meteorology, physics, physical geography or applied maths) or engineering. Background in other relevant areas may also be considered. Candidates should be interested in atmospheric modelling, micrometeorology, or urban climate, or keen to learn about these areas. Preferably experience in these aspects is advantageous but not required.

Candidates must meet the requirement of the **UK residence eligibility**. Please check the NERC website or contact us if you are unsure of your eligibility.

Applications must be made online at https://pga.bham.ac.uk/lpages/LES030.htm. You should choose "PhD in Department of Environmental Health and Risk Management Full-time Research 2013/14". The most promising candidates will be invited for interview.

Closing date: 30 May 2013 in the first instance. Applications will be accepted until the position has been filled.

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