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IAUC NEWSLETTER

INTERNATIONAL ASSOCIATION FOR URBAN CLIMATE

www.urban-climate.org

Issue No. 14
December, 2005.



President's Column

IAUC Luke Howard Award: I am very pleased to announce that the IAUC Awards Committee have selected **Professor Ernesto Jáuregui** of the National University of Mexico (UNAM), Mexico City as this year's recipient of the IAUC's Luke Howard Award (see further details p21). This award honors an individual who has made outstanding contributions to the field of urban climatology in a combination of research, teaching, and/or service to the international community of urban climatologists. Clearly, Ernesto has made profound contributions in each of these realms. His own work in Mexico City, and with the WMO, have served to enhance understanding and focus attention on urban climates in tropical cities. Please join me in congratulating him on this highly deserved recognition. The award will be presented at the ICUC-6 meeting in Göteborg, Sweden, 2006. I would like to thank the Awards committee for all of their work and particularly those who submitted and wrote in support of nominations.

New IAUC Awards created: I am also very pleased to announce two new IAUC Awards. First, the **Japan Prize** (\$1000 US) to be awarded to up to three researchers from developing countries who are judged to have given the best papers at an ICUC conference. Second, **The William P. Lowry Memorial Awards** also to be awarded in conjunction with ICUC meetings: *The William P. Lowry Graduate Student Prize* (\$200) for the graduate student author/presenter of the best oral presentation (or poster) in urban biometeorology/bioclimateology; *The William P. Lowry Methodology Prize* (\$200) to the author/presenter of a paper (or poster) that incorporates the best conceptual or experimental methodology; and *The William P. Lowry African Student Travel Award* (\$300) to help defray travel expense to the ICUC meetings for a graduate student traveling from the continent of Africa. More details on all of these awards, and procedures and criteria to be followed, can be found on the IAUC Awards Policy Document (follow the links from Committees; Awards Committees). Further details will be sent out via the UrbClim email list. I would like to thank all those who were involved in the creation and approval of these Awards.

ICUC6: An excellent set of submissions have been received for the ICUC6 conference; over 345 abstracts were submitted from 43 countries. Currently, the IAUC Board is putting together the scientific program. I want to thank Prof Sven Lindqvist and Maria Lindqvist, along with all members of the Local Organizing Committee at Göteborg University, for creating and managing such a smooth submission process for the abstracts. We hope to be contacting authors in about a month with notification of the acceptance of papers or posters and with details of the conference program. At that stage information will also be distributed on pre-prints.

Changes: A number of changes are occurring at the moment for the IAUC. First, the location of the urban climate **email list** moved recently. From now on you should email messages that you want distributed to: met-urbclim@lists.reading.ac.uk. I want to thank *Janet Barlow* and her group at University of Reading for all their help in this transition. *John Arnfield* and The Ohio State University deserve special recognition and thanks for hosting the email list for the last few years. **Website:** In the very near future the IAUC website location address will change. If you use www.urban-climate.org then your links will remain the same. Otherwise you will need to update the address you use to www.urban-climate.org. *James Voogt* remains the Webmaster. I would like to thank Indiana University for hosting the site. King's College London will take up this role. Finally, I am moving! Effective January 1, 2006, I will take up a position at King's College London. Should you wish to contact me, my new email is Sue.Grimmond@kcl.ac.uk. Address: Environmental Monitoring and Modelling Group, Department of Geography, King's College London, The Strand, London WC2R 2LS, United Kingdom; phone 44 20 7848 2275, fax 44 20 7848 2287, www.kcl.ac.uk/ip/suegrimmond/.

Sue Grimmond
IAUC President.
Sue.Grimmond@kcl.ac.uk



Urban Project Report

Mapping the London heat island.



Fig. 1. A satellite image of London with the measurement array employed in this study super-imposed.

London has the largest heat island in the UK and there is considerable interest in determining its characteristics so that strategic planning can be properly informed. In the temperate climate of England, an urban heat island (UHI) can be both beneficial and detrimental – reducing the heating energy used in the wintertime, and increasing the cooling load in the summer. Both effects are very strong, and knowing the balance of the UHI effect, both city-wide and for individual buildings, is an important goal of heat island planning. As part of achieving this goal for London, its UHI has been reassessed in greater detail than hitherto.

In the 1960s Chandler surveyed the London UHI in considerable detail using standard weather stations equipped with maximum minimum thermometers. In a recent project completed in 2002 this work has been updated and augmented using miniature data-loggers measuring hourly data. 80 measurement stations were arranged on a radial grid. This consisted of eight transects, at 45° intervals, extending from a focus (the British Museum in central London) out towards the rural edge of the London conurbation (Fig. 1). Stations were placed at 1 mile intervals for the first 4 miles and thereafter at 2 mile intervals until a rural site

was reached. Each station consisted of a double radiation shield bracketed 300mm off a lamppost, at 6m above ground level. A **Tinytalk** data-logger was suspended inside the shield recording hourly air temperature (Fig. 2).

Data were collected from each station every two months; sites were visited by bicycle for the first six months and later by car as the total distances were significant (150-200 miles). The project produced 15 months of hourly data for 1999-2000, including both summers. The intensity of the heat island was calculated using a rural reference site approximately 18 miles West of London in a large park surrounded by farmland.

Fig. 2. A typical measurement station located near Oxford Street, central London.



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The data provide evidence of the current strength of the heat island (a maximum of about 7°C) and how it varies spatially and with weather. The spatial heat island pattern changes too quickly over an hour to allow visual investigation, and therefore the hourly station data were interpolated to 10 minute data. These were then graphed using *Surfer* contour mapping software controlled by *Excel*. This allowed a user to step through the data at will and view the temperature distribution across London together with solar and wind data. Some examples of the maps are shown (Figs. 3 & 4).

Once the data were collected, they were used as input to a building simulation model to establish the effect of the heat island on building cooling load (for a "standard" air-conditioned office). This was done for 25 of the stations (i.e. the building was "placed" in 25 different locations) to cover different depths into the heat island. The modelling took account of the increasing overshadowing in more urban contexts by surrounding the test building with neighbouring ones. The study showed that the cooling load increased by 25% when going from a rural location to an urban context, and that the heating load decreased by 22%. For an office in the London climate, the

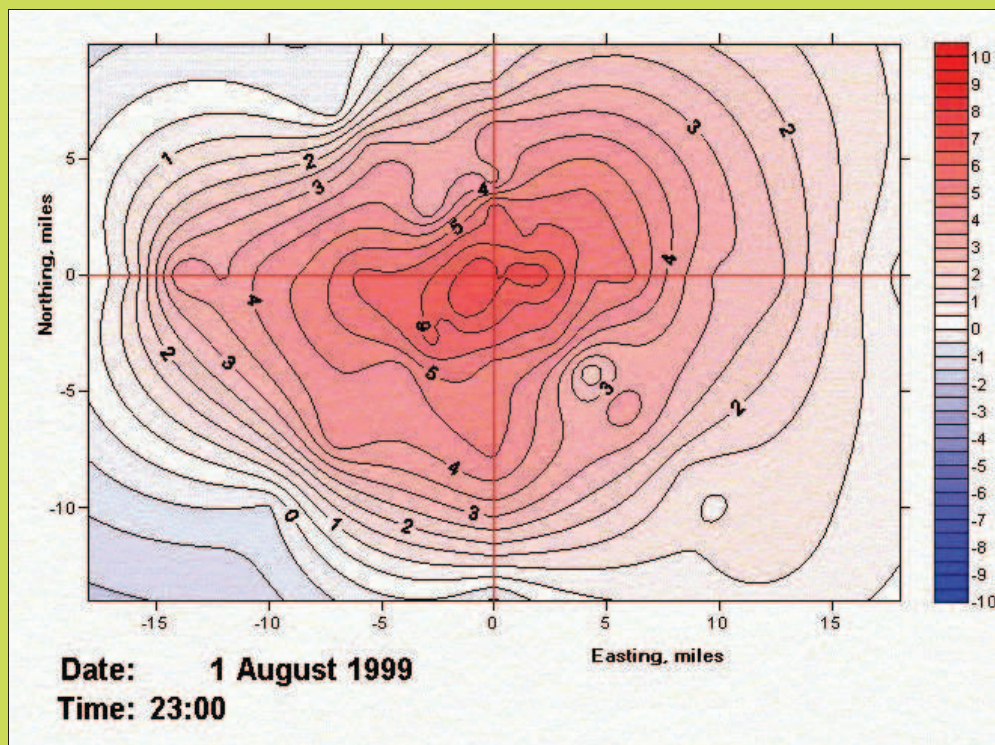
cooling load dominates and there is a net increase in total load of about 8% (rural to central location). However, this balance depends heavily on the internal and solar gain of the building.

The analysis of the air temperature distribution across London showed that there was a broad trend from the urban centre to the rural cooler area. Overlaid on this trend were the effects of micro-climate and it was found that at any given radial distance from the centre the temperature reached a peak for a particular kind of urban context before decreasing again. This context was defined as a medium density urban area with hard surfaces, i.e. no vegetation.

This reassessment of the London UHI has generated data that can help to identify the warmer areas in London and enable further work, such as cross-correlating with satellite surface data, and work towards producing a city wide aggregate model of the effects of the UHI on different building types.

Dr. Richard Watkins
(Richard.Watkins@brunel.ac.uk)
Dept. of Mechanical Engineering
Brunel University

Fig. 3. An intense heat island at 1100 hr on 1 August 1999 after a sunny day.



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Fig. 4. The location of the thermal centre when the wind is from the NE, and the following night when the wind is from the SW. The location shifts several miles in line with wind direction

